

PRODUCT CATALOG

AquaSensors



LIQUID
ANALYTICAL
MEASUREMENT
SYSTEMS

UNIVERSAL
PLUG-N-PLAY
SENSORS

DIRECT
NETWORK
CONNECTIONS

REMOTE
CONFIGURATION
AND DIAGNOSTICS

Free Chlorine

Toroidal

pH

DO

Ozone

Resistivity

ORP

Conductivity

Turbidity

Suspended Solids

Flexible Functions Cost Savings Easy Implementation

About AquaSensors™

THINKING OUTSIDE THE BOX



AquaSensors began with a revolutionary idea: Simplify analytical measurements by designing digital sensors that connect directly to PLCs, HMIs and PC-based SCADA systems. The result of this unique development effort is the patented DataStick™ Measurement System.



COMPANY OVERVIEW

AquaSensors™ designs and manufactures innovative liquid analytical measurement systems for water quality and process control applications. Unique product designs reduce equipment and installation costs while improving reliability in a wide variety of applications. The patented DataStick™ Measurement System features pre-calibrated plug-in sensor heads that provide 24-bit data and can be calibrated, configured or diagnosed directly from a PLC or computer system. No intermediate analyzer boxes are necessary.

This evolution in analytical measurement is available in a complete line of true plug-and-play modular sensor configurations for the measurement of pH, ORP (Redox), contacting and toroidal conductivity, resistivity, dissolved oxygen (ppm), trace dissolved oxygen (ppb), drinking water turbidity, high range turbidity, suspended solids, dissolved ozone and free chlorine.

DataStick™ Means Integral Communications

The modular DataStick™ provides unparalleled flexibility. Configure a communication protocol and measurement parameter by simply connecting the appropriate sensor head and communication module. A wide variety of integrated network protocols are supported directly from the DataStick™ Measurement System including Ethernet/IP, Modbus TCP, TCP/IP, Modbus RTU,

DeviceNet, CANopen, Profibus DPV0/DPV1, USB and RS-232.

The DataStick™ consumes very little power and can be used in portable applications with USB connections to laptop computers. Multiple DataSticks can be accessed directly using a standard Web browser, terminal program, AquaComm™ for Windows, or PLC programs.

Local Display & Control...and Conventional Solutions

For local display and calibration of any DataStick™ system, the low cost AV38 display interface can be used. It supports multiple DataSticks™ and provides current outputs for traditional data reporting and PID control. Relays are provided for control and alarm, and a variety of communications protocols are available for remote display, calibration and configuration of DataStick™ measurement systems. DataStick™ systems have hazardous location approval from UL.

The AnalogPlus™ line of analytical measurement systems features traditional cabled sensors with improved reliability and accuracy. All AnalogPlus™ sensors can be used with the AV88 Universal Analyzer and many can also be used with other industry standard analyzers.

All AquaSensors products are manufactured in the USA.

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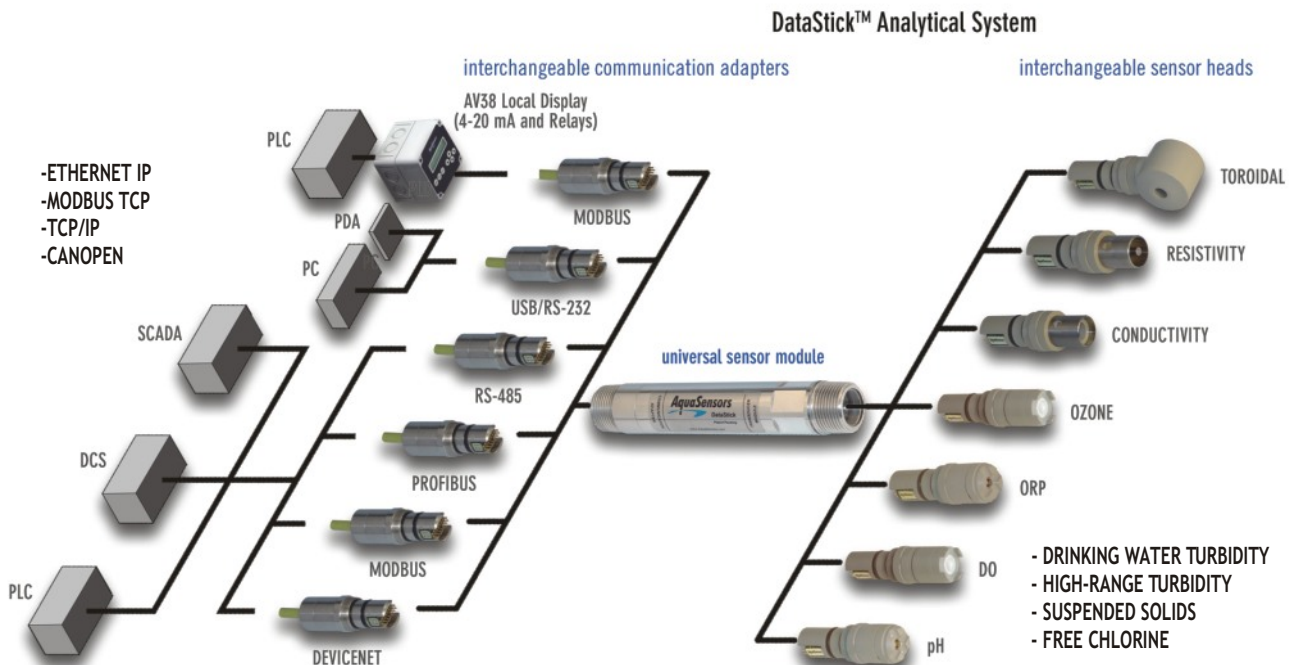
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DataStick™ Measuring Systems

The DataStick™ is a versatile, configurable analytical measurement system. By mixing and matching interchangeable plug and play components, the DataStick™ can be tailored for many water quality and process control applications. It can be remotely configured, calibrated and diagnosed. The DataStick™ can be configured for a large and growing list of protocols and water quality and process control measurements.



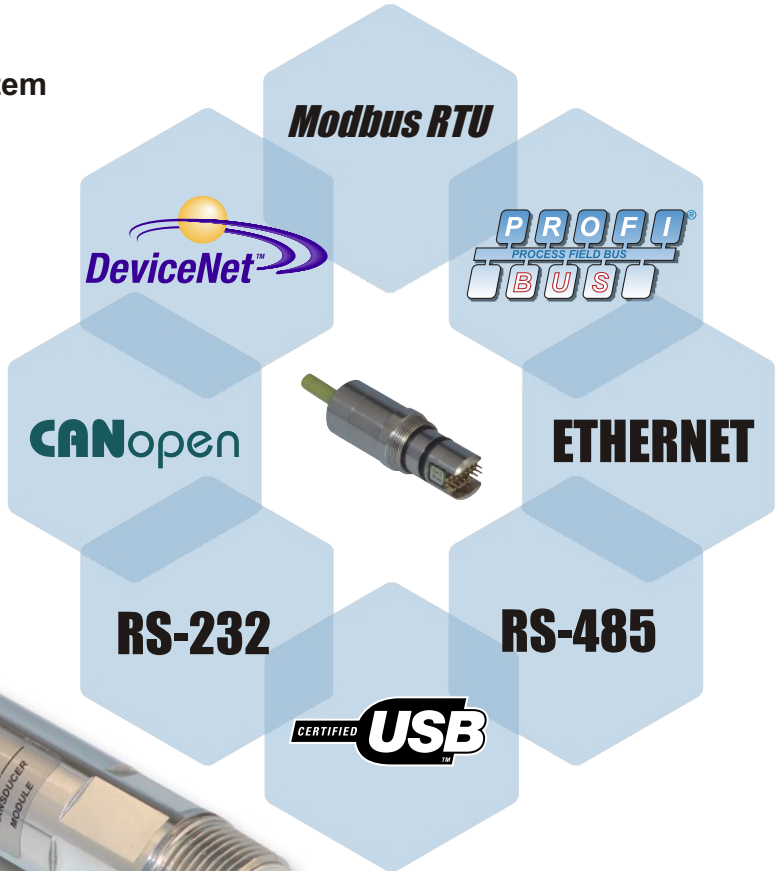
Communication Protocols

AquaSensors™ is committed to supporting a wide variety of industrial communication protocols for remote measurement, calibration, configuration and diagnostics. If we don't have your protocol listed here, call us. We continue to expand our offering.

Configure Your Measurement System

Three steps to specifying your DataStick™

1. Select a Communication Protocol
2. Choose materials and mounting requirements for your DataStick™
3. Customize your sensor head



Communications Adapter Selection Matrix			
Body Material	Communications	Cable Length	Cable Termination
316 Stainless Steel	RS-232 ASCII	10 feet	Stripped Wires
CPVC	RS-485 ASCII	20 feet	Connector
PEEK®	Modbus RTU	30 feet	Custom
	Modbus RS-232	Custom	
	Ethernet		
	DeviceNet		
	Profibus DP		
	USB		
	CANopen		

DataStick™ Selection Matrix	
Body Material	Mounting
316 Stainless Steel	1 inch NPT front/back
CPVC	1 inch NPT front only
PEEK®	1 inch Tri-clamp
	2 inch Tri-clamp
	3 inch Tri-clamp
	4 inch Tri-clamp
	Custom Mounting

Direct-Connect Interfaces

Local Display with Current Outputs and Relays for DataSticks

AV38 Display



The AV38 provides a high contrast display of measurement parameters. The low cost AV38 provides automatic recognition of DataStick™ sensor type, calibration, configuration and diagnostics. Will operate with any DataStick™ regardless of configuration.

- Built-in PID Controller for pH & Conductivity
- Backlit high contrast display
- ¼ DIN NEMA 4X enclosure
- 2 Line x 16 character display
- 7 button menu navigation
- 2 current outputs (4-20 mA)
- 2 relays
- Digital network options
- Multiple DataStick™ input options
- Panel mount & wall mount options

Note: Multiple sensor inputs available with Host Communications option.

Integrated System Monitoring and Control from a Single Location

HMI / PLC



Use an HMI (Human Machine Interface)/PLC (Programmable Logic Controller) for indication, calibration, configuration and diagnostics of the entire measurement system from one convenient location.

Modbus: Register map provides measurement and calibration data in floating point and integer formats. Configuration and diagnostic is also accessible.

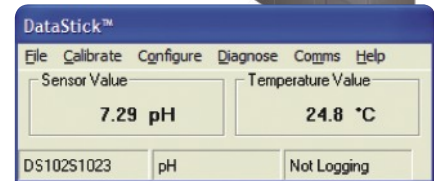
DeviceNet: Electronic Data Sheet (EDS) supports all measurements. Easy configuration works with all PLCs that support DeviceNet.

Ethernet: Plugs into any Power over Ethernet (PoE) enabled switch or power injector. Accessible with a static IP address with any web browser and automatically detects and uses Ethernet/IP or Modbus TCP protocols when used with industrial PLCs.

Inquire about other communications adapters including Profibus and CANopen.

Menu-guided Network Data Reporting

PC / SCADA



Choose any PC or SCADA to report data from a network of DataSticks.

Use AquaComm™ Software from AquaSensors, standard OPC server software, or any "terminal" software program such as Microsoft HyperTerminal to measure, calibrate, configure and diagnose the entire measurement system from one convenient location.

AquaComm™ is a Windows program that automatically configures itself for each DataStick™ and directly supports USB, RS-232 and Modbus.

DataSticks can communicate directly with PCs via:

- USB (No external hardware)
- RS-232 (Requires DC power)
- CANopen (Requires Hardware/Software)
- Modbus (Requires RS-485 hardware)
- DeviceNet (Requires hardware / software)
- Profibus (Requires hardware / software)

DataStick™ Sensor Heads

Sensor heads are pre-calibrated and can be replaced or exchanged in any DataStick™ without reinitializing the system. Connect directly to a PLC for seamless integration with industrial control systems for centralized 24-bit measurement, calibration, configuration and diagnostics.

Differential pH/ORP



pH Range: 0 to 14 pH
Resolution: 0.01 pH

ORP Range: -2000 to +2000 mV
Resolution: 0.1 mV

This rugged, temperature compensated pH sensor is unaffected by hand capacitance and maintains 24-bit resolution throughout the system. The ORP sensor is immune to most interference and measures accurately in the toughest processes for extended periods of time. Either can be refurbished in the field or replaced quickly at low cost.

- Differential pH/ORP measurement
- Pre-calibrated
- Plug & play sensor head
- Replaceable salt bridges
- Reconditionable reference
- Electrode protection options
- Temperature compensation or provided
- Direct 24-bit data reporting
- Plug & play communications adapters

Conductivity & Resistivity



Range: 0 to 5000 $\mu\text{S}/\text{cm}$
(Contacting Conductivity)
Range: 0 to 18.2 $\text{M}\Omega \cdot \text{cm}$
(Resistivity)
Resolution: 5 significant digits

Rugged concentric electrode construction reduces noise and improves durability. Sensor heads are pre-calibrated and available with 0.01, 0.1 or 1.0 cell constants for high accuracy conductivity and resistivity measurements. Other cell types are available on request. For very high conductivity measurements, AquaSensors™ toroidal conductivity sensors should be used.

- High performance construction
- Pre-calibrated 0.01, 0.1 or 1.0 cells
- Plug & Play sensor head
- High accuracy temperature compensation
- Direct 24-bit data reporting
- Plug & play industrial communications adapters

Toroidal Conductivity



Range: 0 to 2 S/cm (2,000,000 $\mu\text{S}/\text{cm}$)
Resolution: 5 significant digits

Unique construction makes this sensor very robust in applications with heating and cooling cycles. The sensor head gives the measurement system unparalleled accuracy and range - even in the 0 to 200 $\mu\text{S}/\text{cm}$ range with resolution to 1 $\mu\text{S}/\text{cm}$. Pre-calibrated for conductivity and temperature.

- 0 to 2 S/cm range
- High Resolution Measurement
- Fouling Resistant
- Pre-calibrated
- 1.5 Inch Diameter Sensor
- Plug & play sensor head
- Offered in a variety of materials
- Direct data reporting
- Plug & play industrial communications adapters

DataStick™ Sensor Heads

Sensor heads are pre-calibrated and can be replaced or exchanged in any DataStick™ without reinitializing the system. Connect directly to a PLC for seamless integration with industrial control systems for centralized 24-bit measurement, calibration, configuration and diagnostics.

Dissolved Oxygen



PPM
or
PPB

Range: 0 to 40 ppm (ppm sensor)
Resolution: 0.01 ppm
Range: 0 to 20,000 ppb (trace sensor)
Resolution: 1.0 ppb

Unique membrane construction makes this sensor very robust, and air calibration options enable simple field calibration. Pre-calibrated for dissolved oxygen and temperature. Replacement, pre-stretched membrane caps are simple to install. Mounting configurations range from immersion styles for wastewater basins for ppm DO sensors to low-flow assemblies for typical trace DO applications in power utilities.

- Clark Cell technology
- Pre-calibrated
- Plug & play sensor heads
- Rugged, foul resistant membrane
- Electrode protection options
- Simple membrane caps replacement
- Turn-key AquaTrace DO System available
- Direct data reporting
- Plug & play industrial communications adapters

Dissolved Ozone



Range: 0 to 10 ppm
Resolution: 0.01 ppm

Robust and chemically resistant PEEK® construction. Pre-calibrated for ozone and temperature. Ideal design for application in ozonation chambers in municipal water treatment as well as disinfection processes in bottling and food processing plants. Use any computer to display, calibrate and customize the measurement without an intermediate analyzer. Sensor heads are pre-calibrated and can be replaced or exchanged with other sensor heads without reinitializing the system. Pre-stretched membrane caps are simple to install.

- Amperometric cell technology
- Pre-calibrated
- Plug & play sensor heads
- Rugged, foul resistant membrane
- Electrode protection options
- Simple membrane replacement
- Turn-key AquaZone System available
- Direct data reporting
- Plug & play industrial communications adapters

Free Chlorine



Ranges: 0 to 5.0 ppm or 0-20.0 ppm
Resolution: 0.01 ppm

Reliable amperometric sensor design for on-line monitoring and control of chlorination systems in both municipal and industrial process water treatment. Available AquaChlor™ turn-key system perfect for reagent-free and unattended operation monitoring free chlorine in drinking water distribution. Replacement, pre-stretched membrane caps are simple to install. No buffers and moving parts to worry about.

- Amperometric cell technology
- Temperature compensated
- Optional pH correction
- Pre-calibrated Plug & play sensor heads
- Rugged, foul resistant Teflon Membrane
- Simple membrane cap replacement
- Optional constant head flow cell
- Direct data reporting
- Plug & play industrial communications adapters

DataStick™ Turbidity & Suspended Solids Systems

AquaClear™ Low-Range Turbidimeter



Range: 0 to 200 NTU
Resolution: 0.001 NTU

This compact online turbidimeter meets or exceeds requirements for USEPA Method 180.1 for drinking water monitoring. Designed to perform best in low turbidity ranges typical in stringent membrane filtration applications. The unique sample chamber makes this system easy to calibrate, clean and maintain. The low volume significantly reduces the amount of Formazin needed for calibration. The specially designed, low cost tungsten lamp will run for at least three years without replacement and improves measurement response time. The close-coupled detector reduces noise and makes the reading very stable without the need for large amounts of digital filtering.

- USEPA Method 180.1 compliant
- 135mL sample chamber
- 3 year light source
- Compact mounting foot print
- Digital network Interface
- Local Interface
- Current outputs and relays
- Low flow rate
- Temperature measurement included

High-Range Turbidity



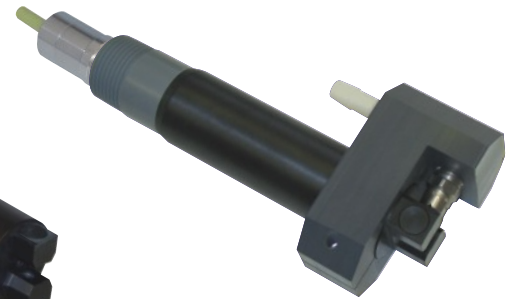
Range: 0 to 4000 NTU
Resolution: 0.1 NTU

Unique sensor construction provides options for measurement of turbidity as defined by ISO 7027, with enhanced compensation provided by a transmitted light path correction. For applications ranging from raw source water turbidity to back wash process monitoring, the RT1 Sensor is an invaluable optical tool for drinking water plant operators. Wastewater plant effluents can also be measured accurately and reliably.

Connects with any DataStick™ communications adapter for integration into industrial networks. It also connects with AquaSensors™ universal AV38 interface for local display, current outputs and relays.

- 0 to 4000 NTU range
- Conforms to ISO 7027 Method
- 90 and 180 degree light paths
- Rugged, foul resistant construction
- Optional self-cleaning wash head
- Local and remote configuration and diagnostics
- Temperature measurement included
- Plug & Play industrial communications adapters

Suspended Solids



Range: 0 to 20,000 mg/L for TSS
Resolution: 0.1 mg/L

The RT2 Sensor has been designed for monitoring Mixed Liquor Suspended Solids or Activated Sludge where solids are typically in the range of 1,500 to 3,500 mg/L. It can also measure Returned Activated Sludge (RAS), Waste Activated Sludge (WAS) and Suspended Solids. Also suitable for monitoring solids in Sequencing Batch Reactors (SBRs) and processes where solids levels can be as high as 20,000 mg/L. This sensor can make spectral measurements of suspended solids that are compensated for particle color, size and shape to indicate true sediment load.

- 0 to 20,000 mg/L TSS range
- Conforms to ISO 7027 Method
- 90 and 180 degree light paths
- Rugged, foul resistant construction
- Optional self-cleaning wash head
- Local and remote configuration and diagnostics
- Temperature measurement included
- Plug & Play industrial communications adapters

AnalogPlus™ Sensors and Analyzer Systems

AnalogPlus™ Universal Analyzer



The AV88 Universal Analyzer can be configured in the field for any AnalogPlus™ sensor parameter. The analyzer is in a ¼ DIN enclosure and has a backlit alphanumeric display with easy to use keypad navigation. It has two standard current outputs, two relays optional and digital communications options that allow for remote monitoring, calibration, configuration and diagnostics. Standard Power: 24 VDC. Optional Power: 90-240 VAC.

- Backlit high contrast display
- ¼ DIN NEMA 4X wall mount enclosure
- 2 Line x 16 character display
- 7 button menu navigation
- Two current outputs standard
- Personality modules reconfigure AV88 in field for any measurement parameter
- Built-in PID controller for pH & conductivity
- Two alarm/wash/control relays optional
- Digital network options
- Panel mount & pipe mount options

Differential pH/ORP



pH Range: 0 to 14 pH
Resolution: 0.01 pH

ORP Range: -2000mV to +2000mV
Resolution: 0.1 mV

This family of differential pH and ORP sensors is designed for continuous use in the most demanding applications. Our 1.0 and 1.5-inch NPT sensors have a buffered reference chamber that resists contamination. The pH glass or Platinum ORP electrode is well protected from breakage and the reference junction salt bridge can be easily replaced when fouled. Sensor bodies are offered in CPVC and PEEK® versions. Ground rod and encapsulated preamplifier construction reduces effects of ground loops and allows pH signals to be transmitted up to 3,000 feet.

- Differential pH or ORP measurement
- Protected glass or platinum electrode
- Temperature compensation or measurement
- Easy reference junction replacement
- 1 inch and 1.5 inch NPT bodies
- Hex body for easy installation and removal
- Industry leading 30 month pro-rated replacement warranty.
- Available in convertible, insertion, immersion, and sanitary mounting styles

Conductivity & Resistivity



Range: 0 to 5000 µS/cm
(Contacting Conductivity)
Range: 0 to 18.2 MΩ·cm
(Resistivity)
Resolution: 5 significant digits

This family of conductivity and resistivity sensors is designed for continuous use in the most demanding applications. Precision-machined concentric electrodes provide high accuracy, low noise readings. Temperature compensation is accurate and responds quickly. Compact sensor bodies are designed for a wide range of process connections – ranging from ½” compression to 1” NPT and Tri-Clamp sanitary fittings.

- High performance construction
- Two electrode measurement
- Accurate temperature
- Pre-calibrated
- Offered in PEEK® for high temperature applications
- Offered in CPVC where high cost materials are not required
- Offered in Titanium and 316SS body styles
- Conductivity with 0.1 and 1.0 Cells
- Resistivity with 0.01 and 0.05 Cells

AnalogPlus™ Sensors and Analyzer Systems

Toroidal Conductivity



Range: 0 to 2.0 S/cm at 25°C
Resolution: 5 significant digits

Unique construction makes this sensor very robust in applications with heating and cooling cycles – common in CIP (Clean-In-Place) and chemical blending applications. This cabled sensor provides excellent accuracy and range - even in the 0 to 200 μ S/cm range. Temperature compensation is accurate with exceptional response time. Interfaces to most industrial toroidal conductivity analyzers and transmitters.

- 0 to 2 S/cm (0 – 2,000,000 μ S/cm) range
- Fouling resistant 'electrodeless' design
- High resolution measurement
- 1-½ inch diameter sensor head
- ¾ inch NPT and Tri-Clamp sanitary styles
- Accurate temperature compensation
- Offered in a variety of materials

Dissolved Oxygen



Range: 0 to 40 ppm
Resolution: 0.01 ppm

Robust membrane and sensor construction ideal for use in aeration basins and related wastewater applications. Air calibration options make this sensor simple to calibrate in the field. Replacement, pre-stretched membrane caps are simple to replace. Interfaces to most industrial DO analyzers and transmitters.

- Clark Cell technology
- Rugged, foul resistant membrane
- Electrode protection options
- Simple membrane cap replacement
- Accurate temperature compensation
- Wash hardware options

Dissolved Ozone



Range: 0 to 10 ppm
Resolution: 0.01 ppm

Robust and chemically resistant PEEK® construction. Pre-calibrated for ozone and temperature. Ideal design for application in ozonation chambers in municipal water treatment as well as disinfection processes in bottling and food processing plants. Economical ozone monitoring option when packaged with the AV88 Universal Analyzer. Pre-stretched membrane caps are simple to install.

- Amperometric cell technology
- Pre-calibrated
- Rugged, foul resistant membrane
- Electrode protection options
- Simple membrane replacement
- Direct data reporting
- AV88 host digital communications

Mounting Hardware & Accessories

AquaSensors™ provides a full line of standard mounting hardware.

Mounting Hardware

Immersion Mounting
Hand Rail with Swivel Mount,
Hand Rail with Ball Float



Immersion Mounting
Fixed Mount



Union Mount
Size: 1.5 inch and 2 inch
Materials: CPVC and 316SS



Standard Tee Mount
Size: 1 inch and 1.5 inch
Material: CPVC and 316SS



Insertion Hardware
Sizes: 1.5 inch and 2 inch
Materials: CPVC and 316SS



Other Mounting Assemblies

- Sanitary Mount
- Wash Head Assemblies
- Float Platforms
- Custom Requirements

Calibration Solutions & Accessories



Calibration Solutions and Refurbishment Kits

pH and ORP

- Standard pH and ORP cell solution
- Buffer solutions for pH calibration
- Calibration solution for ORP sensors
- pH/ORP salt bridges
- pH sensor storage solution
- ORP sensor storage solution

Conductivity

- 1000 $\mu\text{S}/\text{cm}$ calibration solution
- 2000 $\mu\text{S}/\text{cm}$ calibration solution
- 5000 $\mu\text{S}/\text{cm}$ calibration solution

Dissolved Oxygen, Ozone and Free Chlorine

- Replacement membrane caps and electrolyte kits

Turbidity

- 4000 NTU Formazin stock solution
- 40 NTU Formazin calibration kit
- CalStick™ calibration verification