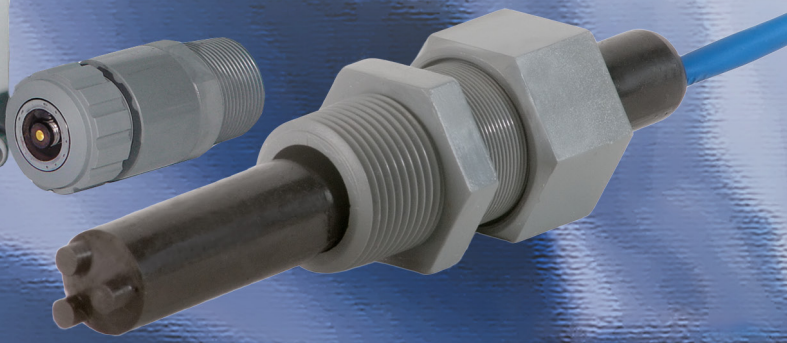
AquaMetrix

by Water Analytics

Rugged and Reliable Instrumentation for Over Fifty Years



AquaMetrix products have been manufactured for more than 5 decades. The original manufacturer, Lisle-Metrix, was licensed to build GLI (Great Lakes Instruments) products for the Canadian market. GLI probes and controllers earned their place as some of the most rugged and reliable water analysis equipment. Following the signing of NAFTA in 1992, Lisle-Metrix expanded to provide products for the global market under its own name. In 1998, Lisle-Metrix became Aquametrix, and in 2010, the company became the foundation for Water Analytics, Inc.

Throughout the changes in both ownership and name, the original GLI probes and controllers, that have been known for their quality, have continued to be made to be interchangeable with their GLI precursors. A steady stream of improvements have made them even better, while a suite of new products have grown to supply even more options to the water treatment industry.

Water Analytics continues to build Aquametrix probes and controllers to even more exacting standards and to incorporate changes that make them all the more rugged and more reliable. We will continue to strive to ensure that Aquametrix products are both the most dependable in the marketplace and priced to represent the best value as well.

Controllers

Shark — *Four parameters, One controller*

The Shark is designed to be the most flexible, easy to use, and easy to see multi-parameter analyzer/controller on the market.

Many analyzers are called "mulit-parameter," but few make changing sensors as easy as the Shark. The Shark switches amongst parameters scrolling through a menu .

Four Measuring Parameters

Select the parameter you wish to measure from the easy-to-use LCD menu on the inside front cover. Choose conductivity, pH, ORP, or flow.

No Extra Cards/Options Required

Each Shark comes complete. There are no extra costs associated with buying boards for different applications or buying components to achieve NEMA 4x protection.

Universal Mounting

Universal mounting kit is included for surface, panel, and pipe-mount applications. The 1/4 DIN enclosure makes panel-mount cutouts and engineering simple.

Snap-On Terminal Connectors

Wiring is easy with removable/snap-on terminal connectors.

Displays & Menus

There are two displays on the Shark. A bright LED numeric display on the outside front panel, and a 2-line, 16-character LCD display on the inside. The LED readout on the outside panel can be seen several yards away. A distinctive, color-coded bar graph will immediately indicate if you are within the process parameters that you set (green), if the control relays are on (yellow), or if you are in alarm condition (red). All configuration and control functions are performed on the LCD menu on the inside front panel.

Calibration

Calibration is performed easily from the front panel. The temperature can also be checked from the front. Since configuration settings are changed from the inside menu, they cannot be adjusted by mistake. Process and temperature calibration can also be performed from the inside men where the latter can be done using manual or automatic modes. Calibration data can be re-called, indicating mode, accepted buffer values, actual sensor input signals, calibration temperature, and more.

Analog Outputs

The Shark provides two isolated, independent and scalable 4-20 mA outputs.

Relays with Cycle Timers

The instrument also provides control of external devices using its two independent control relays. A third relay is pre-set to act as an alarm relay, but can be used as a process control relay. It has both high and low adjustable off and on set-points.

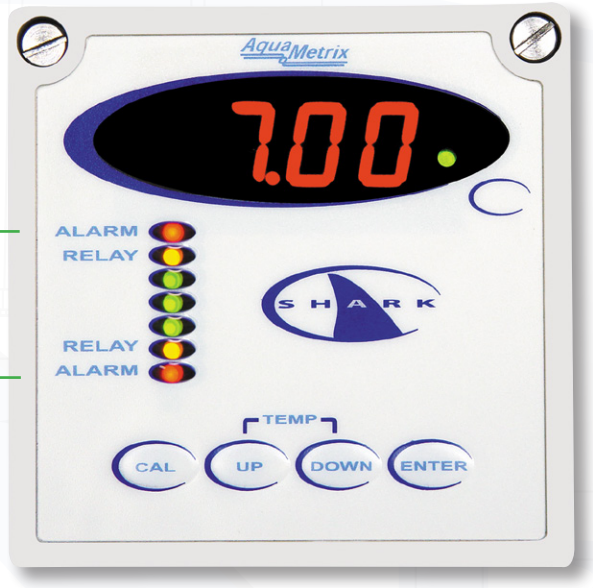
Factory set for bidirectional control, both control relays can be set for either a rising or falling process, with easily programmed on/off set-points. Each control relay has a built-in independent cycle timer, with field-set on and off times. This feature reduces chemical overshoot.

Enclosure

The Shark is housed in a rugged NEMA 4x polycarbonate enclosure, making it ideally suited for heavy-duty applications.

Shark pH, ORP Conductivity & Flow Controller

For routine operation the front display and menu makes operation simple. The bright LED display shows the process reading and allows calibration to be carried out with ease. "Set it and forget it" is the rule until routine calibration, sensor change, or diagnostics are needed.



7 segment bar graph:

3 green LED's indicate within process

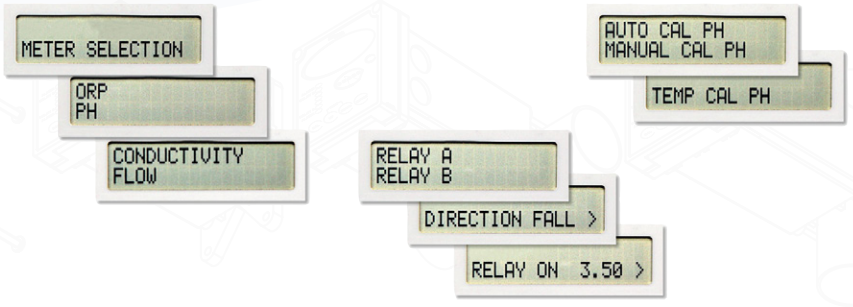
2 yellow LED's indicate relays activated

2 red LED's indicate alarm condition

Loosen the two spring loaded screws on the front plate and a second LCD menu flips down. In addition to showing the process reading, temperature and calibration results, other menus allow the user to change input sensors (as shown below). Other menus offer diagnostics and enable the user to set relay values and fine tune parameters such as noise reduction.

Your television is more challenging to set up than the Shark:

Select parameter... *...Set Relays...* *...Calibrate...* *...DONE*



Transmitters

Shark TX /P — *Four parameters, One transmitter*

Complete and versatile, SHARK-TX is the only 1/4 DIN and DIN rail mountable two wire transmitter on the market that allows the user to select one of four measuring parameters.

Four Measuring Parameters

Select the parameter you wish to measure from the easy-to-use LCD menu on the front cover. Choose Conductivity, pH, ORP or Flow.

Complete - No extra cards required.

Each Shark-TX/P comes complete. There are no extra costs associated with buying boards for different applications.

Two mounting options.

The Shark TX comes complete with a universal mounting kit for surface, panel and pipe-mount applications. The NEMA 4X, 1/4 DIN enclosure is perfect for stand-alone or panel-mount operation.

The Shark-TXP is NEMA 4X for front panel mounting and comes complete with DIN rail mounting hardware for mounting in a control panel.

Display

2-line, 16-character LCD on the front panel.

Analog Outputs

The Shark-TX provides an isolated and fully scalable 4-20 mA output.

Enclosure

The Shark TX enclosure making it ideally suited for heavy-duty applications such as industrial wastewater neutralization, municipal water and wastewater, pulp and paper, and process control. The Shark TXP enclosure is also polycarbonate with a NEMA 4X front panel, and DIN rail mounting hardware on the back.

Features

- pH, ORP, Conductivity & Flow parameters available
- 24 VDC / 24 VDC Loop
- Easy to read 2 X 16 character LCD display
- Quick and easy to calibrate
- Single 4-20 mA output with range expandability
- 1/4 DIN size, NEMA 4X polycarbonate housing
- Shark-TX: Universal mounting hardware provided for surface, panel and pipe mounting
- Shark-TXP: Panel or DIN rail mounting hardware provided

The clean, simple front display shows the process value and temperature. An intuitive 3-button interface allows the user to change the sensor identity, calibrate the sensor, and run diagnostics.

The 1" depth of the Shark TXP enables it to be mounted unobtrusively on a pipe.

The Shark TX/P is typically powered by the 4-20 mA loop, but can also be independently powered by a 24 VDC supply. All the connections needed for power and signal are on the back of the unit.

Use the Shark TX/P for a more flexible 4-20 mA loop circuit.

The appeal of being able to send a 4-20 mA output straight from the probe to the control system makes this an excellent piece of equipment. However, there is another approach which, while necessitating additional electronics, does offer advantages.

Replacing a P/R 65 probe with the combination of a P/R60 probe with a Shark TX transmitter offers the following advantages:

- The 4-20 mA output can be set to encompass a pH (ORP) range selected by the user. This offers greater accuracy by narrowing the measurement range.
- The probe can be calibrated and tested by the transmitter away from the PLC.
- The Shark TX display gives a direct reading of the pH (ORP) while making it easy to distinguish between faults at the PLC or at the probe.

pH / ORP

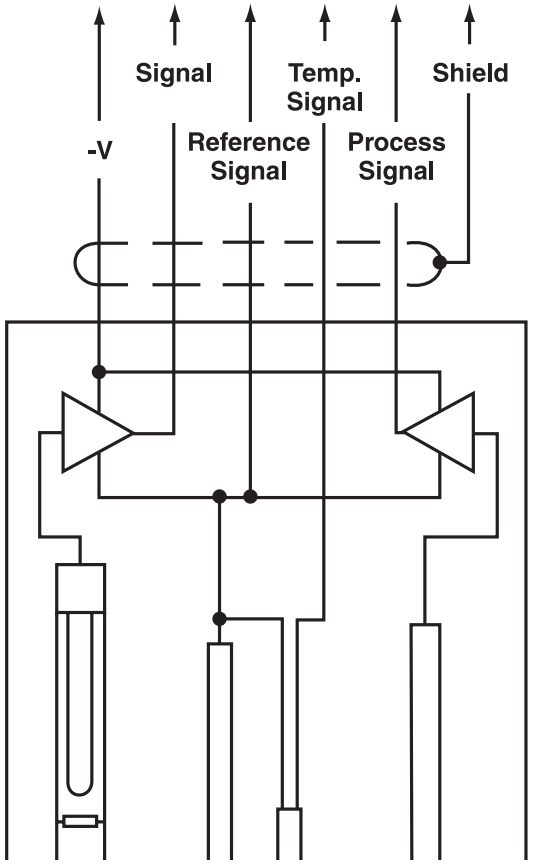
The Differential Advantage

Differential probes may appear to be expensive; however, when your requirements call for a probe that must last years and provide precise pH values, their value is unmatched.

Most sensors are “combination” probes. This means that the reference and process electrodes are “combined” inside one glass envelope. This makes for a simple, compact, and inexpensive probe. But this approach comes at a cost: the process that permeates the reference electrode invariably contaminates it. Since the reference electrode is completely sealed inside the glass envelope, there is no way to replace its contaminated solution. For this reason combination probes can maintain their accuracy for—on average—1 to 2 years. Furthermore, any ground loops that make their way into either the reference or process electrode affect the accuracy of the reading.

Differential probes solve both the problems of reference electrode contamination and ground loop errors. By splitting up the two electrodes and referencing them both to a common ground rod (made of titanium), the following benefits occur:

1. The reference electrode can now be coupled into the process via a replaceable salt bridge. When the salt solution becomes contaminated, simply discard it and replace it with a new one. The pH 7 buffer solution that bathes the reference electrode can also be replaced with fresh buffer.
2. The addition of the ground rod splits the measurement circuit containing the process and the reference electrodes into two high impedance circuits containing the common titanium return electrode. The process electrode generates a potential E1 proportional to the process pH. The reference electrode, immersed in the stable buffer solution, generates a standard reference potential, E2. Both circuits have a common potential E3 at the ground rod, which serves as a return electrode. The two circuits are fed into amplifiers which provide an output representing the differential between them: (E1 - E 3) - (E2 - E3). The common potential E3 is cancelled out electronically, greatly reducing inaccuracies caused by ground loops which may exist between process and instrument grounds. Ground loop current will flow through the low impedance path of the return electrode, affecting the potential E3, but not the differential measurement.



The advantage of differential pH measurement is shown here. The signals from both process and reference electrodes subtract out the signal of the ground (or return) electrode) which measures any non-zero or varying ground voltage. In addition, the separation of the two electrodes allows both the salt bridge connecting the two and the pH 7 buffer solution in which the reference electrode sits to be replaced.

Applications

- Process Control
- Industrial and Municipal Water Treatment
- Industrial and Municipal Waste Treatment and Neutralization
- Fume Scrubbers
- Plating
- Circuit Board Manufacturing
- Food and Beverage
- Chemical Processing
- Pulp and Paper
- Mining
- Power Generation
- Pharmaceutical Industry

pH / ORP

60 Series — Fixed Insertion Differential pH/ORP Sensor

The P60C-8 pH and the R60C-8 ORP probe are dependable industrial grade sensors designed to provide accurate measurement and longer service life under the most demanding conditions.

Some features of these probes include: differential measurement technology, replaceable salt bridge and encapsulated preamp.

The P/R60C-8 has been field proven in thousands of installations for 5 decades. The domed glass process electrode is specially designed for tough applications. This second electrode is protected from the process by a double junction replaceable salt bridge.

The resulting true differential measurement has several advantages over conventional probes: ground loop problems are virtually eliminated, and the salt bridge is easily replaced. If the internal solution becomes contaminated, the probe can be rejuvenated at modest cost by replacing the salt bridge and reference solution. Automatic temperature compensation is accomplished through the use of a thermistor at the tip of the probe. The encapsulated preamplifier provides an output signal which can be transmitted 3000 feet over inexpensive cable. Another version encapsulates a blind 4-20 mA two wire transmitter which can transmit a virtually unlimited distance over a twisted pair cable.

The 60 Series probes have the same form factor and electrical connections as the GLI/Hach probes. Since their durability is unsurpassed in the industry they are frequently used as replacements for GLI probes.

Features

- Differential Measurement Elimination of grounding problems.
- Replaceable salt bridge and reference buffer solution yields low maintenance cost leading to lower lifetime cost.
- Potted construction makes probe durable.
- Field-proven for 5 decades
- Encapsulated preamplifier transmits up to 3000 ft.

Great Lakes Replacement

Exploded view showing the salt bridge and the well containing the reference electrode. Both the salt bridge and buffer solution can be replaced at little cost.

These two items — pH 7 buffer solution and a replaceable salt bridge are all that is needed to keep a differential probe working like new for years. One set is included in every probe purchase

pH / ORP

60 Series — Variable Insertion Differential pH/ORP Sensor

The P/R60C-6 incorporates all the benefits of differential measurement found in other models of the 60 series — in a variable insertion form factor.

This unique pH probe mounts in a standard 1 1/4" NPT tee, or in a tank, through a specially designed CPVC compression fitting. This technology provides several important advantages:

- The probe enters straight into the fitting eliminating twisting of the cable.
- The insertion length is variable between 7/8" and 5".
- One model is used for both flow-through and submersion tank-mount.

Installation does not require a pipe wrench, strap wrench or thread sealant on the probe. This helps to reduce down time for calibration. Another advantage of the P/R60C-6 is the semi-flush face which is more easily cleaned and avoids solution materials gathering on protrusions. The domed glass electrode, the protective metal electrode and the temperature sensor protrude only about 1/8 inch while the salt bridge is flush. A flat-face version of the pH probe is also available.

The encapsulated preamplifier provides an output signal which can be transmitted 3000 feet over inexpensive cable. Another version encapsulates a blind 4-20 mA two-wire transmitter which can transmit a virtually unlimited distance over a twisted pair cable.

All differential probes, including the P60/65C-6 shown here feature replaceable salt bridges. The pH 7 solution in the well behind the salt bridge can also be easily replenished. Kits consisting of 3 salt bridges and pH 7 solution are readily from your Aquametrix distributor.

Features

- Differential Measurement
- Replaceable Salt Bridge
- Easy in: no twisted cable
- Easy out: no special tools
- 1 1/4" Compression Fitting
- Adjustable insertion depth
- Semi-flush face: reduced buildup and easy clean-up.
- Encapsulated Preamp transmits up to 3000 ft.
- Hot-Tap version (P60C-7) available
- Flat-faced, hardened glass, antimony electrodes (for pH) and gold (for ORP) electrodes available

pH / ORP

65 Series — Differential pH/ORP Sensor with direct 4-20 mA Output

AquaMetrix pH and ORP differential probes stay in service and provide accurate measurements under conditions that often render conventional pH probes inoperable. Now for added versatility, these probes, field-proven in hundreds of installations, are available with an integral encapsulated 4-20 mA two-wire transmitter to feed directly to a PLC or a DCS.

The P65 pH and R65 ORP probes employ the same differential measurement technique found in the P60 and R60 5 wire probes. Like other differential probes they maintain their accuracy and stability in aggressive process applications long after a combination-style probe's performance begins to deteriorate.

Encapsulated in the body of the probe is a circuit board which outputs a 4-20 mA output. The 2 wire transmitter is rugged enough to last many years with zero maintenance of the electronics. Calibration is done in tandem with the PLC or DSC.

The 65 series can be provided in most of the physical configurations in the P/R60 series differential probes:

- P/R65C-8 with 1-1/2" threaded body style
- P/R65C-6 "Easy-In, Easy-Out" variable insertion depth version with 1- 1/4" NPT compression fitting
- P/R65C-7 hot tap version of the P/R65C-6

For those circumstances in which a readout is desirable and/or the need to tune the 4-20 mA output to cover a narrower pH range than 0 to 14 we suggest a P60 or R60 5-wire probe in conjunction with a Shark TX (or TXP) transmitter. In this configuration the Shark TX sends the 4-20 mA signal to the PLC or DCS and serves an extra layer of functionality that can be especially useful for diagnosing problems with the probe.

The P/R 65 probes have the same body and electrodes as the P/R 60 series but has an encapsulated pre-amp that also outputs a 4-20 mA signal. From top to bottom: P65C-8, P65C-7 and P65C-6.

Features

- Integral two-wire 4-20 mA transmitter can be fed directly to PLC, DCS
- Differential Measurement
- Replaceable Salt Bridge
- Semi-flush face: reduced buildup
- Automatic temperature compensation on pH versions
- Flow-through and submersion hardware available
- Hot-Tap version available
- Flat-faced, hardened glass, antimony electrodes (for pH) and gold (for ORP) electrodes available

pH / ORP

Specialty Differential pH or ORP Sensors

These pH or ORP probes are dependable industrial grade sensors that incorporate all the benefits of differential measurement found in other models of the P/R 60-6 series, field proven in thousands of installations. This assortment of form factors means that there is a probe for every application.

Great Lakes Replacement

AM Series

These probes are designed to fit into existing GLI MH700 and MH100 series ball valve assemblies. The AM 6010 hosts a 1.5" NPT flow-through mount while the AM 6070 is a variable insertion probe with an O-ring seal.

Model P60C-4

For new installations that don't require a GLI replacement but a 1.5" NPT flow-through mount the P60C-4 is the answer. It can be mounted via an Aquametrix hot tap.

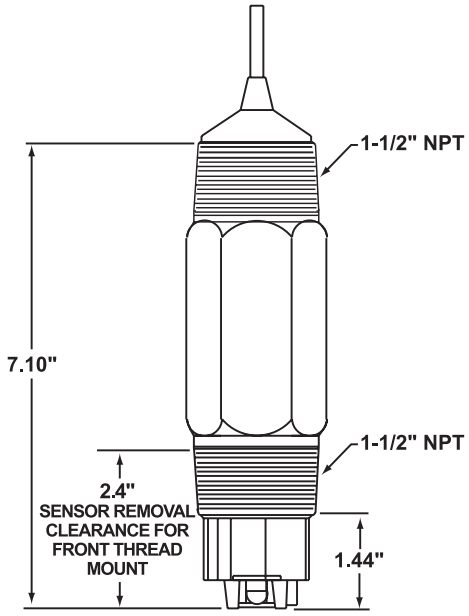
Model P60C-7

For hot tap insertion the P60C-7 offers the same functionality of the P60C-6 in an 18" length. For hot tap functionality we recommend the P60HTC assembly. For fixed insertion a 1 1/4" compression fitting is all that is needed.

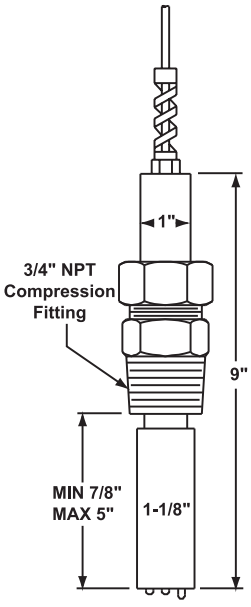
Model P60C-S

For sanitary applications the P60C-S consists of the front end of a P60C-6 mated to a stainless steel tri-clover fitting. The back end of the probe is fully encapsulated inside the stainless steel housing to allow full sanitary compatibility.

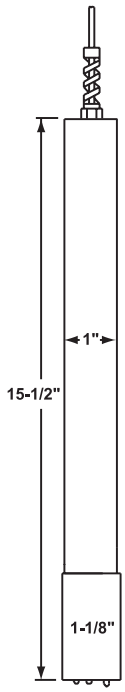
Differential Probe Dimensions



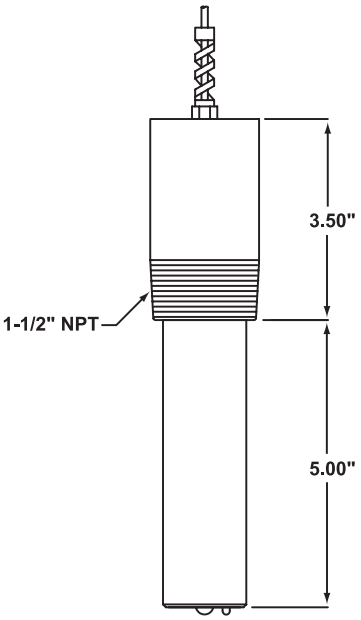
-8 Series Fixed Insertion Depth Probe



-6 Series Variable Insertion Depth Probe and Fitting



-7 Series Hot Tap Probe



-4 Series Flow-through Probe

The Aquametrix family of differential probes includes the fixed insertion -8, the variable insertion -6, an extended length version of the -6 for hot tap connections—the -7 and the flow-through version -4.

For all pH, ORP, 60 series and 65 series probes use this table for ordering information

Order Information

Application	
pH	P
ORP	R
Electronics	
Standard 5 wire sensor	60C
Two wire transmitter, 4-20mA output built-in	65C
Body Type	
Standard, 7/8” to 5” variable insertion	6
Hot Tap, Extended Length, 7/8” to 14” variable insertion	7
1.5” NPT threaded ends, GLI LCP replacement probe	8
GLI605IP replacement (sensor only)	4
Fixed insertion with sanitary 2.5” tri-clover fitting	S
Enhanced Performance Options (only if required)	
Hardened glass electrode (pH sensors only)	H
Flat faced glass electrode (S body type only)	F
Gold electrodes, for ORP sensors only (Platinum is standard)	G
Extended Cable Length	
Add $1.50 per foot for the full cable length to the price	XXX

pH / ORP

Differential Probe Options

CABLES & ACCESORIES

	-8 Series	-6 Series	
JB-1			NEMA 4X junction box
STC60-6			Mounting kit for submersion applications includes 1-1/4" NPT x 1" reducer, 4 feet of 1" CPVC pipe with watertight strain relief fitting and securing assembly
STC60-L			Mounting kit for submersion applications includes 1-1/2" NPT x 1" reducer, 4 feet of 1" CPVC pipe with watertight strain relief fitting and securing assembly
P60HTC			Hot Tap Ball Valve assembly (Probe not included)
C42-5PXXX			Interconnect cable, dressed both ends specify length
C35-17			Salt bridge Kit for all -6 series probes, package of 3
C35-79			Compression fitting for all -6 series probes
C34-51			Adapter for GLI Installations
Protector-6			Protection shroud for submersion applications
Protector-3			Salt bridge kit w/ ceramic outer junction (Package of 3)
AM60-9765K			Salt bridge kit w/ kynar outer junction (Package of 3)
AM60-9765			Salt bridge kit w/ ceramic outer junction (Package of 3)

CALIBRATION SOLUTIONS

A35-13	pH 4 Buffer, 500 mL.
A35-14	pH 7 Buffer, 500 mL
A35-24	pH 10 Buffer, 500 mL
A35-40	ORP Buffer, 200 mV, 500 mL
A35-41	ORP Buffer, 600 mV, 500 mL

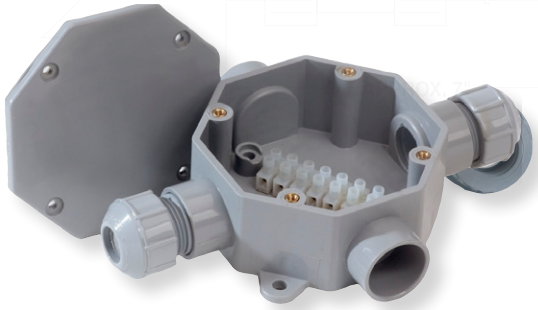
Submersion Mount

Union Tee Flow Through

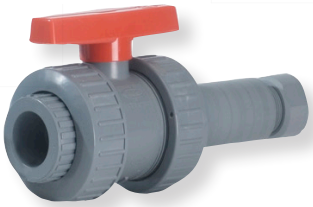
Salt Bridge Kits

pH Calibration Solutions

ORP Calibration Solutions



Junction Box



Hot Tap Assembly

Protectors

pH / ORP

500 Series — Combination pH or ORP Sensor

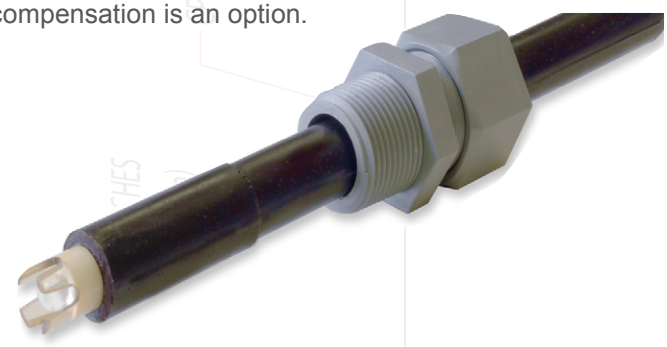
These industrial combination pH or ORP probes are ideal economic alternatives to higher cost differential probes. They use a conventional process pH glass electrode (platinum for ORP) in the same glass envelope as the reference electrode.

The durable materials wetted by the process provide excellent chemical resistance. Their convertible design allows them to be used in flow-through and submersion applications. The probes are offered with or without temperature compensation.

The 585 comes with a 3/4" MNPT compression fitting which allows the probe to be inserted through the supplied compression fitting. The variable insertion depth (3/4" to 4 1/4") makes probe cleaning and system calibration simple.

The 575 is encased in a 1" CPVC body with NPT threads on both ends. Mounting hardware is available for submersion and flow-through mounting.

All 500 series probes can be directly connected to the Shark, Shark TX/P and 2200P/R analyzers, provided the instrument is within the reach of the 3 meter (10 feet) sensor cable. For longer transmission distance, preamplifiers are available. Automatic temperature compensation is an option.



The P585 Combination probe is a combination glass electrode encapsulated in 3/4" epoxy body and comes with a 3/4" NPT compression fitting.

Features

- Industrial-grade quality at low cost
- Convertible design for flow through and submersion
- All materials offer excellent chemical resistance
- Universal style: Flow-through and submersion.
- Easy in: no special tools
- Easy out: no twisted cable
- Automatic temperature compensation available

Applications

All of the same applications listed for differential probes and for those cases where probe lifetimes longer than 3 years are not needed or when the process pH is very close to 7.

Order Information

Application

pH	P
ORP	R

Body Type

CPVC body, 1" MNPT threaded ends	575
Epoxy body, variable insertion - includes 3/4" CPVC compression fitting	585

Enhanced Performance Options (only if required)

Automatic temperature compensation (pH only)	K
MBNC connector	BNC

Temperature Compensation (only if temp compensation is added)

GLI temperature compensation device, PT1000 RTD	1
AquaMetrix temperature compensation device, 300 Ω thermistor	2

The P575 Combination probe features a combination glass electrode encapsulated in epoxy and housed in a CPVC body with 1" NPT threads on both ends.

Rugged and Reliable Instrum

Probes / Sensors

- pH / ORP
  - Combination
    - 1” MNPT P/R 575
    - 3/4” Compression P/R 585
  - Differential
    - Variable Insertion
      - 5 Wire 1.5”NPT P/R 60C4
      - 5 Wire w Sanitary Flange P/R P60CS
      - 5 Wire w Hot Tap P/R P60C7
      - 5 Wire 1” Fitting P/R 60C6
      - 2 Wire 1” Fitting P/R 65C6
    - Fixed Insertion
      - 5 Wire 1.5 “ NPT P/R 60C8
      - 2 Wire 1.5” NPT P/R 65C8
- Conductivity
  - Epoxy-Polypro MSBG-7
  - Epoxy Body MS Series
  - Stainless Steel
    - General Purpose AM3422
    - Boiler Condensate AM3444
- Dissolved O P91
  - Paddle W
    - <6 “ IP 80
    - >6 IP1

Metrix
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Controllers / Transmitters

xygen

Flow

Shark Series

2200 Series

Wheel

Magmeter

Ultrasonic

Controller
Shark 120/240

Transmitter

Transmitter
Panel Mount
Shark TX

Transmitter
Pipe Mount
Shark TXP

pH
2200P

ORP
2200R

Conductivity
2200C

D.O.
2200D

" Low flow <6 " >6"
00 SPX EX 80 EX100

Level or flow
3200U

Level & Fow
AVFM

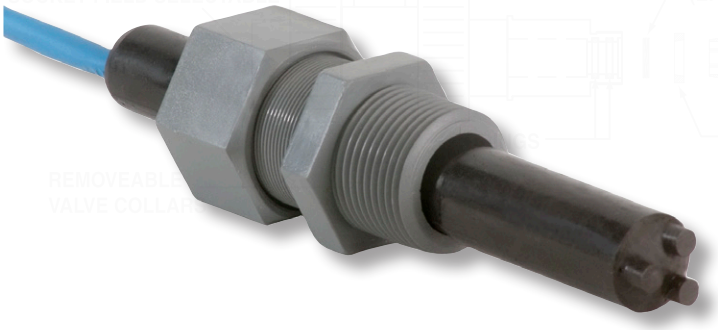
Torroidal
EX

Sanitary
Flange
AM3445

Conductivity

MS Series - Epoxy Body with Graphite Electrodes

AquaMetrix has decades of experience manufacturing a wide variety of conductivity sensors to satisfy any industrial, power plan, water treatment system or laboratory application.



Features

- Constants from 0.01 to 50
- Impregnated graphite electrodes
- Economically priced
- Automatic temperature compensation
- Adjustable insertion length
- Ball valve “Hot Tap” version available
- High Temperature (< 150°C) available
- Applications include cooling towers, high purity water applications, reverse osmosis systems, food and beverage.

The MS series features electrodes made from specially impregnated graphite. This technology gives years of drift-free performance. Several cell constants from 0.01 to 50 are available. All types are designed with a safety stop shoulder on the cell.

An embedded thermistor provides automatic temperature compensation when used with an analyzer such as the Shark. Flow-through mounting using the compression fitting allows adjustable insertion length in 3/4 inch NPT piping or in the side of a tank. This avoids the nuisance of disconnecting the cell cable when installing or removing the cell for cleaning.

Submersion mounting is achieved by reversing the direction of the compression fitting, allowing the cell to be threaded into the MHMSC mounting hardware. Mounting hardware is also available for submersion mounting from the rim of the tank.

A hot tap version permits removal of the cell from process piping or from tanks without shutting down the system.

Cell Constant

Cell constant 0.01 (used for resistivity)	001
Cell constant 0.05*	005
Cell constant 0.1	01
Cell constant 0.5*	05
Cell constant 1.0	1
Cell constant 10	10
Cell constant 20*	20
Cell constant 50	50

Cell Mounting Options

Low temperature, 3/4” MNPT CPVC compression fitting	P
High temperature, 3/4” MNPT SS compression fitting	S
Extended length cell for use with hot tap ball valve MS-HTC	HT

Temperature Compensation

GLI (Hach) Temperature compensation device, PT1000 RTD	1
AquaMetrix Temperature compensation device, 3 kΩ thermistor	2

Extended Cable Length

add $1.50 per foot for the full cable length to the price	XXX

Conductivity

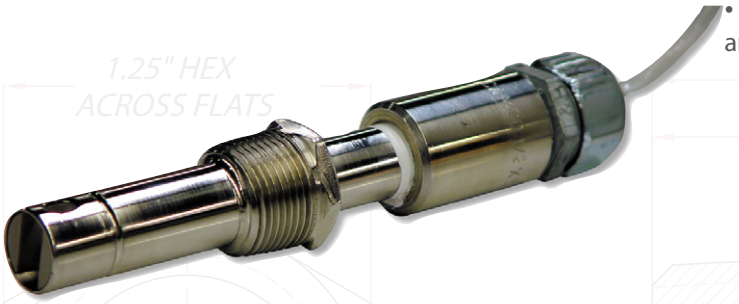
AM3422 Series - Stainless Steel Probes

Great Lakes Replacement

The AM3422 sensors offer a compact design in stainless steel that allows installation into standard pipe fittings in small line sizes such as 3/4" and 1", avoiding the need for special flow cells.

Wetted materials of construction are 316 stainless steel and Teflon, with double O-ring seals at all points. The outer EPDM O-ring bears the brunt of process interface, allowing the back O-ring to maintain reliable sealing free from chemical attack. An integral temperature element tailored to the analyzer of choice provides automatic compensation for maximum accuracy. .

Process connections are made via a customized swage fitting with 1/2" or 3/4" NPT threads. This fitting can be screwed into a line, or tank, and it can also be turned around and connected to a standpipe for use in a submersion configuration. The AM3422 is a general purpose conductivity probe that covers a broad range of conductivities and that is ideal for harsh environments.



Cell Constant	Range
0.01	0-5 µS/cm
0.1	0-500 µS/cm
1	0-5000 µS/cm
10	0-50 mS/cm
50	0-500 mS/cm

Although different probes have varying conductivity ranges for a given cell constant this table can be of help for choosing the right probe for the job.

Features

- Small size for easy installation and service.
- O-ring seals for high on-stream reliability
- Low Maintenance - Reduced cleaning requirements
- Wide Measuring range
- Automatic Temperature Compensation
- Specially suited for plating, pharmaceutical, boilers, food and beverage industries.

Order Information

Cell Constant

Cell constant 0.05	**005**
Cell constant 0.1	**01**
Cell constant 0.5	**05**
Cell constant 1.0	**1**
Cell constant 5	**5**
Cell constant 10	**10**
Cell constant 50	**50**

Conductivity

High Temperature Boiler-Guard Probes

Aquametrix offers two probes designed for high pressure, high temperature conductivity measurements. They are ideal for boiler control applications, blowdown control, condensate monitoring, leak detection on heat exchangers, and steam purity measurements.

Features

- MSBG-7 — Measure conductivity up to 150°C.
  AM3444 — Measures conductivity up to 205°C
- O-ring seals for high on-stream reliability
- Low Maintenance - Easy to clean
- AM3444 — Wide Measuring range
- Automatic Temperature Compensation
- Ideal for boiler condensate, blow-down control and cooling towers.

MSBG-7 Epoxy / Polypropylene

For temperatures below 150 C and pressures below 15 psi the MSBG-7 with a cell constant of 1 is field proven. It features stainless steel electrodes encapsulated in a high temperature epoxy housed in a polypropylene body. An embedded 3K thermistor provides automatic temperature compensation.

Great Lakes Replacement

M3444 Series- Stainless Steel

For high pressure and very high temperature applications the AM33444 series offers a choice of cell constants.

Wetted materials of construction are 316 stainless steel, PEEK, and EPDM O-rings. All possible leak paths through the sensor are double sealed with O-rings for maximum on-stream reliability. The front seals bear the brunt of chemical attack, allowing the back seals to remain relatively unaffected. The result is that sensor life is more than double what can be expected of single sealed, or epoxy sealed units.

NOTE: These probes are made to be compatible with GLI and other controllers. They do have limited compatibility with Shark controllers:

1. The Shark performs automatic temperature control for temperatures up to 100 C.

2. Cell Constants for the AM3444 not compatible with the Shark are marked by an asterisk in the table to the right.

Order Information

MSBG-7-3K

Cell constant 1

AM3444 Series

Cell constant 0.05*	A
Cell constant 0.1	H
Cell constant 0.5*	B
Cell constant 1	C
Cell constant 5*	D
Cell constant 10	E

Conductivity

AM3455 Series - Stainless Steel Sanitary Flange Fitting

The AM3455 sensors are welded to blind flanges that can be inserted into standard tee fittings in sanitary systems using Ladish or Tri-Clover fittings.

Wetted materials are 316 stainless steel and Teflon, with double EPDM O-rings. The process side O-ring is the only one in contact with the stream, allowing the back O-ring to maintain reliable sealing, free from chemical attack. Temperature compensation elements are potted in the body itself.

The insertion depth can be modified to obtain proper positioning in a specific installation. The sensor is built for clean in-place service. All wetted materials are FDA compliant and USP Class VI is available.

Features

- Low Maintenance - Reduced cleaning requirements
- Small size enables convenient installation and service.
- O-ring seals used for high on-stream reliability
- Automatic Temperature Compensation
- Specially suited for dairy, food, beverage and all other sanitary applications.

Great Lakes Replacement

Order Information

Cell Constant Selection

Constant	Code	Constant	Code
0.01	01	1.0	1
0.05	005	10	10
0.1	01		

ES Series - Stainless Steel Electrodeless Conductivity Probe

The ES series electrodeless (or "toroidal") conductivity sensors are used in processes where conventional contacting sensors may become fouled or corroded.

Toroidal conductivity sensors are made up of two wire wound toroids in which one acts as a transmitter and the other as a receiver. An electric current is induced between the toroids through the process solution. This current is proportional to the conductivity of the process.

The ES sensors can be mounted in a flow through configuration or submersion mounted in tanks or open vessels. Each sensor comes standard with a PT1000 RTD temperature device, which provides automatic temperature compensation.

Note: These sensors are made to interface with GLI controllers or analyzers. They will not work the Shark or Shark TX/P.

Features

- Low Maintenance - Reduced cleaning requirements
- No electrode corrosion - Toroid is fully encapsulated
- One Wetted Material - Easier chemical compatibility
- Wide Measuring range
- Automatic Temperature Compensation
- Specially suited for fume scrubbers, plating and textile manufacturing.

Great Lakes Replacement

Order Information

ES-1-A Polypropylene body with convertible style, 3/4" NPT thread fitting

Dissolved Oxygen

2200D Controller and P91 Oxygen Sensor

The model 2200D Dissolved Oxygen analyzer/controller is a rugged and dependable industrial grade instrument that is extremely easy to use.

Its large, bright LED digital display is clearly visible even in direct sunlight. Its speedy calibration and simple operator interface makes this analyzer/controller a favorite with instrumentation departments in a wide variety of demanding industrial and municipal application.

Frequently used functions are accessed through an intuitive step-through menu which is printed directly on the front panel for ease of navigation. Seldom used or set-once adjustments, such as password activation, are located on DIP switches on the back of the swing-out front panel.

Accessories include (top) replaceable P91D DO cartridge, (bottom left) FTA2 inline mounting hardware and (bottom right) ball float (right) for submersion mounting.

Features

- Dissolved Oxygen level displayed in PPM or Percent Saturation
- Intuitive step-through menu design for quick and easy setup
- Bidirectional control through two control relays with independent set-points for Relay On and Relay Off
- High/low alarm relay
- Alarm LED on front panel
- Membrane perforation alarm
- Output signal is field-scalable for maximum resolution
- Altitude compensation for maximum accuracy
- Status errors illuminate LED on front panel
- Test feature allows simulation of DO readings to test relay set-points and analog settings
- Password protection and watchdog timer
- Applications include wastewater treatment, aeration basin monitoring, aquaria and fish hatcheries.

Order Information

Application

D	Dissolved oxygen

Power Supply

1	110 Volt, 50/60 Hz (standard)
2	220 V, 50/60 Hz

Mounting Style

A	Surface Mount
B	Panel Mount Kit
C	Pipe Mount Kit

Dissolved Oxygen Sensor

P91	Dissolved oxygen sensor (sensor cartridge not included)
P91D	Dissolved oxygen sensor cartridge

The 2200 Series
pH, ORP & Conductivity Analyzers

The 2200 Series of controllers are a previous generation of controllers made prior to the Shark series. Because of their ruggedness, precision and easy maintenance they are still sought after for the toughest environments and to replace legacy controllers.

The 22200 controllers feature a large bright LED display and intuitive user interface packaged in a NEMA 4X fiberglass enclosure. Frequently used functions are accessed through an intuitive step-through menu printed directly on the front panel. Seldom used adjustments such as the temperature unit are set using DIP switches on the back of the swing-out front panel.

The 2200P pH analyzer/controller is designed for controlling rising and falling pH in the most demanding environments. The 2200P accepts both the P60 series differential pH probes and 500 series combination pH probes.

The 2200R ORP controller similarly accepts both differential and combination ORP probes.

The 2200C accepts both MS (epoxy body) or AM (stainless steel body) conductivity sensors. To optimize resolution the 2200C can be pre-configured for any of 17 standard conductivity ranges, plus two special ranges.

The 2200D is a member of the 2200 family but, because it is still made to control the P91 dissolved oxygen sensor it is treated as a separate item (on previous page).

Features

- Simple step-through menu design for quick & easy setup
- Bidirectional control through two control relays with independent set-points for Relay On and Relay Off
- Cycle-Time option minimizes chemical overshoot
- High/low alarm relay
- Output signal is field-scalable or maximum resolution
- Status errors illuminate LED on front panel
- Test feature allows simulation of readings to test relay set-points and analog settings
- Password protection and watchdog timer
- Tailored toward legacy installations and harsh environments.

Order Information

Application

P	pH
R	ORP
C	Conductivity
D	D.O. - See page 22

Power Supply

1	110 Volt, 50/60 Hz (standard)
2	220 V, 50/60 Hz

Mounting Style

A	Surface Mount
B	Panel Mount Kit
C	Pipe Mount Kit

These controllers are custom order items and typically have longer lead times than the Shark series of controllers.

Flow

Paddle-Wheel

The IP 80/100 paddle-wheel series are impeller type insertion meters designed for use with a variety of liquids in pipe sizes 1/2" to 8".

IP80 Series

Bodies are machined from a solid rod for maximum precision. High-quality jewel bearings and nickel-bound tungsten carbide shafts provide extreme low friction and long life.

The non-drag Hall-effect sensor outputs a square pulse which can be sent as long as 2,000 feet without a transmitter. This signal can be connected directly to a Shark Shark TX, PLC, counter or computer card.

Features

- Low-friction, long-life jewel bearings
- Single moving part
- Choice of materials for compatibility with variety of chemicals
- Integrated Tee and sensor
- IP80: Fixed depth insures proper placement. Fits 1/2" to 8" pipe sizes

  IP100: Fits 3" to 8" pipe size. Variable insertion in fitting for proper placement
- High level signal can be sent up to 2000 feet
- Each fitting individually calibrated and marked with K-factor (pulses per gallon)
- Ideal for wastewater flow, irrigation, chemical mixing, neutralization systems and filtration systems.

Order Information - IP80

Sensor Style

Impeller sensor (1/2" - 3")	81
Impeller sensor (4" - 6")	82

Sensor Material

PVC	P
Stainless Steel	S
Polypropylene	Y
Brass	B

Mounting Style

1/2" Tee fitting	050
3/4" Tee fitting	075
1" Tee fitting	100
1.5" Tee fitting	150
2" Tee fitting	200
3" Saddle/Weldolet fitting	300
4" Saddle/Weldolet fitting	400
6" Saddle/Weldolet fitting	600

Mounting Tee Material

PVC	P
304 Stainless Steel (available for 0.5" - 2")	S
Bronze (Not available for 6" pipes)	B

IP100 Series

The IP100/200 series employ all of the features of the IP80 Series but with adjustable depth insertion paddle-wheels to fit 3" to 48" pipe. Installation fittings are standard 1-1/2" (101/201) NPT. Fittings such as saddles and weldolets may be purchased either locally or from Water Analytics.

Order Information - IP100/200

Sensor Mounting

Insertion style with MNPT connection (3 - 10")	101
Insertion style with MNPT connection (10 - 48")	201

Sensor Material

Stainless Steel	S
Brass	B

Flow

Magmeter

EX80 series insertion electromagnetic flow meters are designed for use with liquids in 1 to 12" pipe. Conductivity values of 20 µS/cm are sufficient for the magmeter which enables it to work in all but the ultrapure environment.

EX80 Series

The EX80 is ideal for difficult applications with changing viscosities and pulsating flows, such as air-driven diaphragm pumps. With no moving parts, these meters can be used in "dirty" applications where debris would foul a mechanical meter.

The EX80 series have current-sinking pulse output that can be combined with the Shark controller or Shark TX transmitter. These insertion meters require special fittings to ensure correct depth placement in the pipe.

Order Information - EX80

Sensor Style

Impeller sensor (1/2" - 3")	81
Impeller sensor (4" - 6")	82
Impeller sensor (12")	83

Sensor Material

PVC	P
Stainless Steel	S
Polypropylene	Y
Brass	B

Mounting Style

1/2" Tee fitting	050
3/4" Tee fitting	075
1" Tee fitting	100
1.5" Tee fitting	150
2" Tee fitting	200
3" Saddle/Weldolet fitting	300
4" Saddle/Weldolet fitting	400
6" Saddle/Weldolet fitting	600

Mounting Tee Material

PVC	P
304 Stainless Steel (available only for 0.5" - 2")	S
Bronze (Not for 6" pipes)	B

Features

- Low-flow performance and accuracy superior to any mechanical flow sensor
  - No moving parts to wear out
  - Dedicated fittings for simplicity
  - Retainer clip automatically sets correct depth
  - Meter extends only about 1/8 of pipe diameter, minimizing potential for clogging with debris
  - Easy to install and easy to maintain
  - Ideal for any application in which viscosity or fouling may hinder the performance of a paddle wheel sensor. Especially suited for wastewater flow and chemical mixing.

EX100 Series

The EX100 Series offers all of the same features as the EX80 but for larger pipe diameters. An adapter male NPT fitting allows the user to adjust the insertion depth of the sensor to the optimum position for any pipe diameter from 3" to 48".

Order Information - EX100/200

Sensor Style

Impeller sensor (3" - 10")	100
Impeller sensor (10" - 48")	200

Sensor Material

Stainless Steel	S
Brass	B

Flow/Level Open Channel

3200U Ultrasonic

The 3200U is a versatile instrument that continuously measures, displays, transmits and controls liquid levels in storage tanks or pumping stations, or to monitor and totalize open channel flow through any flume or weir. Mount the non-contacting ultrasonic sensor above the liquid being measured and install the watertight electronics enclosure nearby. The 3200U features a keypad calibration system, two digital displays, an isolated 4-20mA output and 3 programmable control relays.

Calibration is easy with the built-in 3 button keypad. The 3200 offers simple menu selection of measurement units, and calculates volume in horizontal round tanks, or flow rate (and total) through any flume or weir. The standard sensor can measure ranges up to 32 ft. Options include a sensor rated for 50 ft, 3 additional control relays (6 total) and a built-in 50,000 point data logger.

Features

- For measuring level or flow through open channels -- flumes or weirs
- Easy to set up - with built in algorithms for standard flume, weir, and tank styles
- Integral temperature compensation
- Three programmable relays
- Sensor range of 16 inches to 40 feet
- User-friendly calibration system
- Isolated 4-20 mA (1000 ohm)
- False echo rejection
- 2 Digital displays
- 4-20 mA isolated output
- Watertight and dust tight NEMA4X (IP 66) polycarbonate with clear, shatterproof cover
- Power input: 200-260 VAC 50/60 Hz, 12VDC (battery power) or 24 VDC

AVFM-II

For those situations when it is feasible to mount a sensor inside the pipe or open channel the AVFM-II is the champion. This is ideal for storm water, combined effluent, raw sewage, irrigation water and streams.

The AVFM-II uses a submerged ultrasonic sensor to continuously measure both velocity and level in the channel. The sensor is a sealed ultrasonic unit with no orifices or ports. It mounts inside a pipe or at the bottom of a rectangular, trapezoid or egg-shaped channel. Calibration is simple: enter the pipe diameter or channel width and the AVFM-II computes the flow volume and displays the flow rate.

Features

- QZ02L sensor measures flow velocity and level
- Sensor cable 25 ft / 7.6 m submersible, shielded 3-coaxial
- Enclosure is watertight polycarbonate, NEMA 4X (IP66)
- Large 4-digit LCD displays flow rate. 16-digit alphanumeric LCD displays menu, totalizer, status and calibration
- Built-in 3-key programmer
- Output: 3 isolated 4-20 mA for flow, level and velocity
- Two programmable control relays
- Proportional pulse output, flow and/or level alarm
- Electrical surge protection and RFI filters.

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