Immersion pH & ORP Sensors

Inline, Immersion & Submersible Series pH Sensors & ORP Sensors for Continuous Measurement in Any Process Application & Installation Scheme

PNHF 6431 RADEL-KYNAR High HF & Fluoride Resistant series pH sensor without preamplifier; Complete with shielded black cable with tinned lead wire terminations

6X31 RADEL-KYNAR series pH sensor with integral preamplifier and Q7M quick disconnect snap connector interfaced with mating Q7F to tinned leads extesion cable. The Q7M/Q7F connector system is rated NEMA 6P when interfaced and suitable for rugged field use.

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ASTI offers unique solutions for process measurement problems. Features and options are itemized below:

- Leading novel and proprietary solid-state industrial pH sensor & ORP sensor design and technology combined with built-to-order extensively configurable manufacturing offer the best possible service lifetime at the most cost effective price point. Review the **Competitive Advantages of Design & Technology for IOTRON™ & ZEUS™ Industrial pH & ORP Sensors** for details.
- Best reference service lifetime in process industry through proprietary, novel, non-porous, cross-linked, conductive polymer technology; Available in double junction (standard) or triple junction (optional “TJ”) configurations
- Rugged industrial grade sensors can operate in a temperature range from -35 to 150 degrees Celsius at pressures up to 150 psig for 3/4″ MNPT screw-in type inline style installations
- The solid state reference is highly resistant to dehydration and our thick wall glass is nearly impervious to cracking, even under high pressure conditions.

- Base models for general purpose, high temperature resistant, ultra-high temperature resistant, slurry & viscous material resistant, acid/fluoride & HF resistant, pulp & paper resistant, aggressive dissolved gas & volatile organic solvent resistant, Oxidation Reduction Potential (ORP) and saturated sodium (brine) resistant.

- Selected optional features include Ammonia gas resistant (“A”), Chlorine gas resistant (“C”), Wide Range -0.5 to +14.5 pH Media Resistant (“V”), Organic Media Resistant (“L”), Solvent Resistant (“TS”), 3-Wire TC (“M”), ACCU-TEMP Fast Response Temperature Compensation (TC) Element (“X”), 2 each Protective Tines Only Configuration (“GRO”), No Protective Tines Configuration (“NG”), Shielded Preamplifier Cable (“BL”).

- Available with most any integral temperature compensation element (Pt100 or Pt1000 Standard), Solution Ground Liquid Earth (316SS or Platinum), Dual pH/ORP All-In-One Configuration and Conventional or Differential Analog preamplifier to allow for interfacing with most any existing OEM transmitter.

- Available end of cable terminations include tinned leads, BNC connector for pH sensors and ORP sensors without integral preamplifier.

- **Quick disconnect IP67 & NEMA 6P** rated waterproof and corrosion resistant **Q7M/Q7F snap connector** option is available for pH sensors and ORP sensors with integral preamplifiers.

- **HiQDT SMART DIGITAL MODBUS RTU pH & ORP SENSORS FOR DIRECT CONNECTION TO ANY PLC, HMI, SCADA** or any other data acquisition or control device that can serve as the MODBUS RTU master.
    - The PLC or HMI employed can either be customer supplied or else ASTI supplied as a part of a turn-key ready system ready for plug and play field commissioning right out of the box.

    - ASTI supplied HMI & PLC include options for advanced smart touchscreen controllers with full remote access suitable use in for Class I, Division II hazardous locations as well as Explosion-Proof controller suitable for use in hazardous Class I, Division I EX rated locations. Lower cost instrumentation options also exist for use in safe non-hazardous locations as well as blind installations if no local display is required.

- **Available in smart digital configurations for use with intelligent pH/ORP digital transmitters. Detailed information about this smart digital type configuration option can be found in the separate 3TX-HiQ digital pH/ORP measurement product webpage.**

- Back of sensor 3/4″ MNPT and 1″ MNPT threads can be sealed with waterproofing option for use in immersion or submersible type applications as well as for inline use. All inline, immersion & submersible sensor series except the 2X12 & 6X11 are suitable for immersion and submersible type installations since they come standard 4 each protective tines as the default configuration. It is recommended to also consider selecting a **Waterproofing Option for Fully Submersible Assemblies**. Inline, immersion & submersible sensor series are available in 2 each only protective tines configuration (“GRO”) for ease of cleaning for process measurements where extensive buildup is common as well as the no protective tines configuration (“NG”) for cases where this is desirable to minimize fouling build-up on the measuring tip (typically only used in conjunction with the low-profile thick-wall break-resistant parabolic style pH glass configurations).

- Wrench flats feature is standard for 3/4″-1″ MNPT series pH sensors and ORP sensors (6X52, 6X51, 6X31, 6X41) and knurls feature is standard for 3/4″-3/4″ MNPT series pH sensors and ORP sensors (6X53, 6X54, 6X32, 6X42 and 2X12, 6X11, 6X13, 6X12) to allow for securing sensor into threaded 3/4″ FNPT inline process connection or 3/4″ FNPT and 1″ FNPT immersion tube without damaging sensor body.
    - Care must be taken not to over-tighten any sensor to avoid damage during commissioning or insertion and removal from process for cleaning, recalibrating or replacement during maintenance. Consult ASTI factory for assistance to ensure best practice care and use.

- Each standard sensor selection and/or special customized sensor design are based upon a thorough review of the customer supplied application information by senior in-house chemists to ensure that the best possible choice of available pH sensor or ORP sensor model and options is made at the lowest possible price configuration which is suitable for the intended process measurement & installation scheme.

- pH sensors & ORP sensors are manufactured with sensor body housing materials of construction ranging from cost-effective Chlorinated-Polyvinyl-Chloride (CPVC) for simpler measurement requirements to rugged RADEL® (Poly-Phenyl-Sulfone, PPSU), KETASPIRE® (Poly-Ether-Ether-Ketone, PEEK) or RYTON® (Poly-Phenylene-Sulfone, PPS) to handle even the most difficult field process measurement applications.

- **Thick-wall break resistant low-profile parabolic pH glass element for slurry and viscous type process media extends service life for tough installations.**
    - This type of rugged parabolic thick-wall, low-profile, break-resistant pH glass is now standard for all X3XX series pH sensors.

- **Novel extreme dehydration resistant reference technology option allows sensor to endure prolonged exposure to dryness as well as intermittent wet and dry operation conditions for batch applications and uncertain fluid levels**
    - Invoked with Alpha Prefix “E” on supported sensor mode

- **Special “Self-Powered” pH sensor configuration allows for extended cable lengths up to 1,000 feet, bridging leads across terminal strip, support for quick disconnect snap connectors and use in noisy electrical areas with pH transmitters that do not support preamplifiers:**

**** 6841 PEEK-KYNAR ORP sensor***
**** Organic Solvent & Gas Resistant***
**** Low-Profile Platinum Ball ORP Element is ideal for slurries and high velocity inline process installations***

**** 6741 PEEK-KYNAR pH sensor***
**** Organic Solvent & Gas Resistant***
**** Wide range -0.5 to +14.5 MUGG pH glass element for measurements in organic synthesis & solvent recovery***

* *6X31 RADEL-KYNAR series ORP sensor*
* *Excellent chemical, thermal & mechanical properties for multiple uses from one sensor*
* *Solid-state double or triple junction reference systems for low-maintenance*

* *6X11 CPVC-HDPE Series pH sensor*
* *Cost effective for cost sensitive use*
* *For Inline, Immersion or Submersion*
* *Available without protective tines (inline use only) or with 2 each tines “GRO” as shown above or 4 each “GR” tines*

* ***2X12 CPVC-HDPE Inline pH sensor***
* ***No protective tines to minimize fouling***
* ***Rugged 8MM MUGG pH glass***
* ***Precise measurement in clean solutions***
* ***Holds calibration for long periods***

APPLICATIONS FOR IOTRON™ IMMERSION SERIES BUILT-TO-ORDER pH SENSORS & ORP SENSORS WITH EXTENSIVE CUSTOMIZATION OPTIONS

- Measurement in strong acids or bases
- Acid fluoride etching solutions
- HF waste treatment systems
- High Temperatures & Pressures
    - Examples include ammonium nitrate manufacturing, sugar extraction
    - Treatment of discharge from processes employing autoclaves
- Pulp digesters for Kraft type mills
- Bleaching lines for white paper mills

- Abrasives and Viscous Processes
- Extraction of precious metal ore with floatation tanks and concentrators
- Gold extraction circuits with cyanide (batch or continuous)
- Cyanide destruction with peroxide and/or sulfur dioxide
- Dissolved Sulfides such as hydrogen sulfide gas (H_2S), hydrogen sulfide (HS^-) or sulfide ion (S^{2-})
- Solvent extraction (SX) with kerosene and other long chain hydrocarbons
- Measurement in most Volatile Organic Compounds (VOC) and most Organic Solvents
- Biodiesel and ethanol fuels
- Processes employing dissolved chlorine (Cl_2), chlorine dioxide (ClO_2), ammonia (NH^3), sulfur dioxide (SO_2) and nitric oxide (NO) and nitrous oxide (NO_2) sometimes together referred to as (NO_x) type gases
- Municipal or industrial wastewater treatment
- General Purpose pH monitoring or control for discharge compliance

View Selected Case Studies as Examples of Selected Applications

TECHNICAL CAPABILITIES OF IOTRON™IMMERSION SERIES
BUILT-TO-ORDER pH SENSORS & ORP SENSORS
WITH EXTENSIVE CUSTOMIZATION OPTIONS

- Low pH range down to -0.5 (with ASTI calibration procedures and buffers)
- High pH range up to 14.5 (with ASTI calibration procedures and buffers)
- Low Temperatures down to -15 degrees Celsius (°C)
- High Temperatures up to 150 degrees Celsius (°C)
- High Pressures up to 150 psig (with RADEL or PEEK bodied type sensors)
- Insertion depths up to 6 feet into tank or line with **compression fitting assembly installation scheme**
- Mining Slurries up to 50% solid & particulate content
- Solids Content up to 12% consistency pulp
- Fluorides up to 50,000 ppm and -0.5 pH
- Support for measurement in most dissolved gases up to saturation
    - Examples include chlorine, chlorine dioxide, ammonia, sulfide gases
- Cyanides up to 10,000 ppm

- Almost All Organic Chemical Mixtures
    - Minimum ~1% aqueous content required to ensure stable readings

- Clean in Place (CIP) processes with hot acid and hot base for food and beverage and pharmaceutical use
- Sterilization with Peroxide (H_2O_2) and Ozone (O_3)
- Up to 600% Saturation Dissolved Oxygen (O_2)
- Fully submersible assembly that can be installed by thick reinforced vinyl tubing seal on cable
    - For best results the use of a suitable immersion tube, standpipe or guiderod is recommended to fix the installation location and to minimize mechanical related damage is recommended

PLEASE INQUIRE FOR ANY CAPABILITIES NOT LISTED HERE

Materials of Construction for Sensor Body of Inline, Immersion & Submersion Series pH Sensors & ORP Sensors

Body Housing ProTherm® Chlorinated-Polyvinyl-Chloride, CPVC2X12, 6X11, 6X13, 6X12 Series Sensors	Body Housing RADEL® Poly-Phenyl-Sulfone, PPSU6X32, 6X31 Series Sensors	Body Housing KETASPIRE® Poly-Ether-Ether-Ketone, PEEK6X42, 6X41 Series Sensors	Body Housing RYTON® Poly-Phenylene-Sulfone, PPS2X12, 6X11, 6X53, 6X54, 6X52, 6X51 Series Sensors
CPVC Chemical Resistance Chart CPVC ProTherm® 4529 Thermal & Mechanical Performance Data	RADEL® R-5000 NT Chemical Resistance Chart RADEL® R-5000 NT Thermal & Mechanical Performance Data	KETASPIRE (PEEK) Chemical Resistance KETASPIRE® KT-880 NT Specifications	RYTON (PPS) Chemical Resistance RYTON® R-4-230BL Specifications

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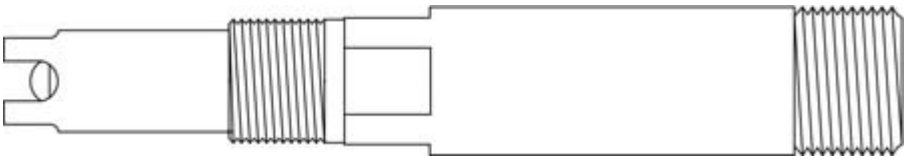
Dimensional Drawings for 3/4″-1″ MNPT & 3/4″-3/4″ MNPT Inline, Immersion & Submersion pH Sensor & ORP Sensor Bodies

3/4″-1″ MNPT INLINE, IMMERSION & SUBMERSIBLE SERIES SENSORS DIMENSIONAL DRAWINGS



3/4″-1″ MNPT pH Sensor Dimensional Drawing 6-1
Hemispherical pH Glass Element

6052/6051/6031/6041 Series General Purpose & Wide Range Resistant

6151/6131/6141 & 6231/6241 Series High Temp & Ultra-High Temp Resistant

6452/6451/6431/6441 Series Acid, Fluoride & HF Resistant

6651/6631/6641 Series hydrogen sulfide gas (H_2S), hydrogen sulfide (HS^-) or sulfide ion (S^{2-}) Resistant

6731/6741 Series Aggressive Dissolved Gas & Volatile Organic Solvent Resistant

6952/6951/6931/6941 Series Saturated Sodium (Brine) Resistant

3/4″-1″ MNPT pH Sensor Dimensional Drawing 6-2
Low-Profile Parabolic Thick-Wall Break-Resistant pH Glass

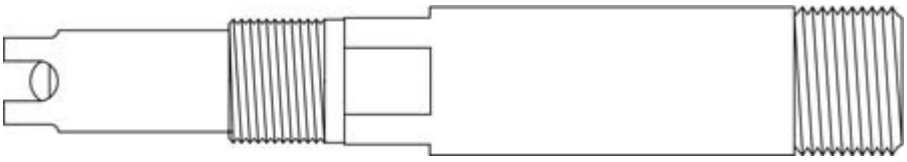
6352/6351/6331/6341 Series Slurry & Viscous Media Resistant

6551/6531/6541 Series Pulp & Paper Resistant

3/4″-1″ MNPT ORP Sensor Dimensional Drawing 6-1-Pt
Low-Profile Platinum Ball Style ORP Sensing Element

6852/6851/6831/6841 Oxidation Reduction Potential (ORP) Series

3/4″-3/4″ MNPT INLINE, IMMERSION & SUBMERSIBLE SERIES SENSORS DIMENSIONAL DRAWINGS



3/4″-3/4″ MNPT pH Sensor Dimensional Drawing 6-5
Hemispherical pH Glass Element

6012/6013/6032/6042/6053/6054 Series General Purpose & Wide Range Resistant

6132/6142/6154 & 6232/6242 Series High Temp & Ultra-High Temp Resistant

6412/6413/6432/6442/6453/6454 Series Acid, Fluoride & HF Resistant

6632/6642/6654 Series hydrogen sulfide gas (H_2S), hydrogen sulfide (HS^-) or sulfide ion (S^{2-}) Resistant

6732/6742 Series Aggressive Dissolved Gas & Volatile Organic Solvent Resistant

6912/6913/6932/6942/6953/6954 Series Saturated Sodium (Brine) Resistant

3/4″-3/4″ MNPT pH Sensor Dimensional Drawing 6-6
Low-Profile Parabolic Thick-Wall Break-Resistant pH Glass

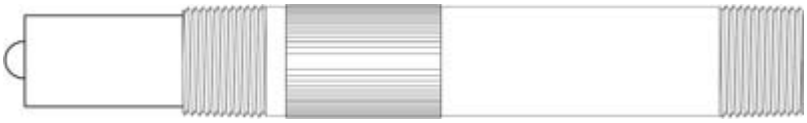
6312/6313/6332/6342/6353/6354 Series Slurry & Viscous Media Resistant

6532/6542/6554 Series Pulp & Paper Resistant

3/4″-3/4″ MNPT ORP Sensor Dimensional Drawing 6-5-Pt
Low-Profile Platinum Ball Style ORP Sensing Element

6812/6813/6832/6842/6853/6854 Oxidation Reduction Potential (ORP) Series

3/4″-3/4″ MNPT INLINE, IMMERSION & SUBMERSIBLE SERIES SENSORS
DIMENSIONAL DRAWINGS – COMPACT HDPE JUNCTION



3/4″-3/4″ MNPT pH Sensor Dimensional Drawing 6-3
Hemispherical pH Glass Element

6011 Series General Purpose & Wide Range Resistant

6411 Series Acid, Fluoride & HF Resistant

6911 Series Saturated Sodium (Brine) Resistant

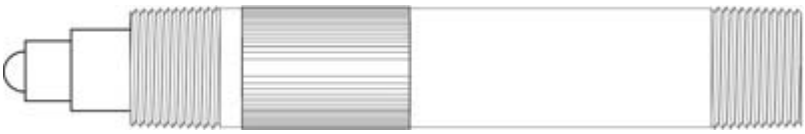
3/4″-3/4″ MNPT pH Sensor Dimensional Drawing 6-4
Low-Profile Parabolic Thick-Wall Break-Resistant pH Glass

6311 Series Slurry & Viscous Media Resistant

3/4″-3/4″ MNPT ORP Sensor Dimensional Drawing 6-3-Pt
Low-Profile Platinum Ball Style ORP Sensing Element

6811 Oxidation Reduction Potential (ORP) Sensor

3/4″ MNPT INLINE INSTALLATION ONLY
SERIES SENSORS DIMENSIONAL DRAWINGS



3/4″-3/4″ MNPT pH Sensor Dimensional Drawing 6-9
Hemispherical pH Glass Element

2012 Series General Purpose & Wide Range Resistant

2412 Series Acid, Fluoride & HF Resistant

2912 Series Saturated Sodium (Brine) Resistant

3/4″-3/4″ MNPT pH Sensor Dimensional Drawing 6-10
Low-Profile Parabolic Thick-Wall Break-Resistant pH Glass

2312 Series Slurry & Viscous Media Resistant

3/4″-3/4″ MNPT ORP Sensor Dimensional Drawing 6-9-Pt
Low-Profile Platinum Ball Style ORP Sensing Element

2812 Oxidation Reduction Potential (ORP) Sensor

Inline, Immersion & Submersion Sensor Selection Guide for 3/4″-1″ MNPT and 3/4″-3/4″ MNPT Series Product Lines

Iotron ™ Sensor Selection Guide	3/4″-1″ MNPT Sensor Body Housing Configuration Sensor Series

Description of pH/ORP Sensor Series	Sensor Body Housing RYTON® Poly-Phenylene-Sulfone, PPS *Large HDPE Junction*	Sensor Body Housing RYTON® Poly-Phenylene-Sulfone, PPS *Large KYNAR® Junction*	Sensor Body Housing RADEL® Poly-Phenyl-Sulfone, PPSU *Large KYNAR® Junction*	Sensor Body Housing KETASPIRE® Poly-Ether-Ether-Ketone, PEEK *Large KYNAR® Junction*
General Purpose	6052	6051	6031	6041
High Temperature Resistant	N/A	6151	6131	6141
Ultra High Temperature Resistant	N/A	N/A	6231	6241

Slurry & Viscous Material Resistant	**6352**	**6351**	**6331**	**6341**
Acid, Fluoride & HF Resistant	**6452**	**6451**	**6431**	**6441**
Paper & Pulp Resistant	**N/A**	**6551**	**6531**	**6541**
Sulfide Resistant	**N/A**	**6651**	**6631**	**6641**
Aggressive Dissolved Gas & Volatile Organic Solvent Resistant	**N/A**	**N/A**	**6731**	**6741**
Oxidation Reduction Potential a.k.a. ORP	**6852**	**6851**	**6831**	**6841**
Saturated Sodium (Brine) Resistant	**6952**	**6951**	**6931**	**6941**

Iotron ™ Sensor Selection Guide	**3/4″-3/4″ MNPT Sensor Body Housing Configuration Sensor Series**

Description of pH/ORP Sensor Series	**Sensor Body Housing RYTON® Poly-Phenylene-Sulfone, PPS** *Large HDPE Junction*	**Sensor Body Housing RYTON® Poly-Phenylene-Sulfone, PPS** *Large KYNAR® Junction*	**Sensor Body Housing RADEL® Poly-Phenyl-Sulfone, PPSU** *Large KYNAR® Junction*	**Sensor Body Housing KETASPIRE® Poly-Ether-Ether-Ketone, PEEK** *Large KYNAR® Junction*
General Purpose	**6053**	**6054**	**6032**	**6042**
High Temperature Resistant	**N/A**	**6154**	**6132**	**6142**
Ultra High Temperature Resistant	**N/A**	**N/A**	**6232**	**6242**
Slurry & Viscous Material Resistant	**6353**	**6354**	**6332**	**6342**
Acid, Fluoride & HF Resistant	**6453**	**6454**	**6432**	**6442**

Paper & Pulp Resistant	N/A	6554	6532	6542
Sulfide Resistant	N/A	6654	6632	6642
Aggressive Dissolved Gas & Volatile Organic Solvent Resistant	N/A	N/A	6732	6742
Oxidation Reduction Potential a.k.a. ORP	6853	6854	6832	6842
Saturated Sodium (Brine) Resistant	6953	6954	6932	6942

Iotron ™ Sensor Selection Guide	**3/4″-3/4″ MNPT Chlorinated-Polyvinyl-Chloride (CPVC) Sensor Body Housing Configuration Sensor Series**

Description of pH/ORP Sensor Series	Compact HDPE Junction Inline Use Only *	Compact HDPE Junction Inline, Immersion & Submersion *	Large HPDE Junction Inline, Immersion & Submersion	Large KYNAR® Junction Inline, Immersion & Submersion
General Purpose	2012	6011	6013	6012
Slurry & Viscous Material Resistant	2312	6311	6313	6312
Acid, Fluoride & HF Resistant	2412	6411	6413	6412
Paper & Pulp Resistant	N/A	N/A	N/A	6512
Sulfide Resistant	N/A	N/A	N/A	6612
Oxidation Reduction Potential a.k.a. ORP	2812	6811	6813	6812
Saturated Sodium (Brine) Resistant	2912	6911	6913	6912

* 2X12 and 6X11 series pH sensors ORP sensors are available with RYTON (Poly-Phenyl-Sulfone, PPS) sensor body material of construction by invoking Alpha Prefix Option “PPS” without incurring any surcharge.

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Inline, Immersion & Submersion pH Sensor & ORP Sensor Options

- All 6X52/6X51/6X31/6X41 and 6X12/6X13/6X32/6X42/6X53/6X54 series pH sensors and ORP sensors are supplied standard (default) in the four (4) each protective tines (“GR”) configuration. The number of protective tines can be reduced to the 2 each (“GRO”) configuration or the guard feature removed altogether (“NG”). The reduction to 2 protective tines type guard (or else no guard at all) is sometimes desirable for ease of cleaning, particularly in heavy slurry and high viscous media process media applications.
    - No guard configuration is most typically used for sensors with break resistant parabolic pH glass element (X3XX series) or for ORP sensors (X8XX series)

- All 6X11 series pH sensors and ORP sensors are supplied standard (default) in the without any protective tines (no guard) configuration. The number of protective tines can be increase to the two (2) each protective tines (“GRO”) or four (4) each protective tines (“GR”) configuration if desired. These options are typically invoked on the 6X11 sensor for immersion and submersible type installation use.

- The 2X12 series pH sensors and ORP sensors are intended ONLY for 3/4″ NPT inline installation only. Do not use these sensors for immersion or submersion style installations.

- Fast temperature compensation response may be desired for some installations with variable temperature conditions (Iotron™ ACCU-TEMP™).
    - The ACCU-TEMP™ (“X”) option is recommended for most inline installations for best temperature compensation as well as for immersion and submersible installations where the sensor will be frequently removed from service for cleaning and recalibration.

- All inline and immersion sensors can have the waterproofing option added for submersible sensor installations.
    - **Link to Submersible Assemblies with WaterProofing Option Webpage**

- All series pH sensors or ORP sensors may be mounted from rear using the 3/4″ or 1″ MNPT threads for immersion installations using a suitable mating insertion tube, standpipe or guide rod

- Sensors employed for immersion of submersible style installations have some form of a protective tines (with guard) configuration to minimize possibility of accidental breakage during handling and field use.

- The inline & immersion series pH sensors or ORP sensors can also be installed with a variable insertion depth into a process line or tank using a compression fitting only scheme (see link below)
    - **COMPRESSION FITTING ONLY NPT VARIABLE INSERTION DEPTH SAMPLE INSTALLATION DRAWING**

- Sensors with integral preamplifiers can be supplied with the rugged field ready Q7M/Q7F NEMA 6P rated quick disconnect snap connector system. See pictures shown

below for visualization of this option.

Q7M sensor end of cable snap connector detail close-up view

Q7M/Q7F snap connectors are NEMA 6P rated when interfaced.

Installation Guide for Q7M/Q7F Quick Disconnect Snap Connector for pH/ORP sensors with conventional integral preamplifiers; For all modern Rosemount & ASTI Transmitters

Installation Guide for Q7M/Q7F Quick Disconnect Snap Connector for pH/ORP sensors with 5-wire differential preamplifiers; For all modern HACH & GLI Transmitters

APPENDIX "A"

Custom Applications	**Add-On Alpha Prefix**
Dissolved Gas Resistant	"A" or "C"
Organic Media Applications*	"L"
Teflon Silicone Required*	"TS"
Triple Junction*	"TJ"
High-Level HF Resistant*	"HF"

Impact & break resistant low-profile parabolic pH glass for slurries*	“X3XX” & “X5XX” series
Aggressive Dissolved Gas & Organic Solvent Resistant Configuration*	“X7XX” series
Extreme Dehydration Resistant*	“E”
Custom Configurations	**Add-On Alpha Prefix**
ACCU-TEMP™ Option for Fast Temperature Response*	“X”
Low Impedance Glass*	“Z”
316SS Solution Ground Addition*	“Y”
Platinum Solution Ground Addition*	“Pt”
Platinum Solution Ground with 2 each reference half-cells allows for simultaneous use on two completely separate input channels or transmitters Addition*	“PtD”
3-wire TC*	“M”
No guard configuration (without protective tines)	“NG”
Add 4 each Protective Tines (for 6X11 series only)*	“GR”
Add/Reduce to 2 each Protective Tines (adder for 6X11 series only)*	“GRO”
Shielded & Reinforced Preamplifier Blue Cable*	“BL”

*** Additional charges may apply for these options. Not all options available on all models (inquire to factory).**

PNHF 6431 high HF resistant submersible pH sensor with integral preamplifier WPH sealing and braid reinforced blue cable for use in high noise areas

Replacement pH & ORP Sensors
For Transmitters that support and/or require Integrated Preamplifiers

The instruments listed below require and/or support integral preamplifiers. Sensors to mate with these OEM pH & ORP transmitters are supplied with the appropriate integrated temperature compensation element, solution ground & OEM compatible high-impedance CMOS operational amplifier (a.k.a. preamplifier) as may be required to ensure full compatibility and optimal performance. Some manufacturers and analyzer models can support both sensors with or without preamplifiers on the same instrument. A sensor hook-up schematics for interfacing to the given OEM pH/ORP transmitter is supplied with each sensor, and some of the most common wiring schematic are posted on our website (please inquire for any not listed).

Fully Supported Hardware – FULL COMPATIBILITY

Manufacturer	pH & ORP Transmitters	OEM pH & ORP Sensors *
Rosemount Analytical Liquid Division A Part of Emerson Process Management	**LEGACY:** 1000, 1001, 1002, 1003, 1050, 1181, 1055, 2081, 3081, 81, 54pH, 54epH, XMT **MODERN:** 1056, 1057, 56, 1066, 5081, 6081	385/385+, 389, 3900 pH & ORP sensors 3300HT, 3400HT & 3500P PERpH-X™ pH & ORP sensors 397, 398/398R, TF396 TUpH™ pH & ORP sensors
Foxboro Analytical EChem by Schneider Electric (a Division of Invensys)	**LEGACY:** 870IT **MODERN:** 875PH, 876PH, 873PH, 873DPX	PH10 DolpHin™ pH sensors, ORP10 DolpHin™ ORP sensors, 871A & 871PH pH & ORP sensors, EP460 & EP466 pH & ORP sensors
Honeywell (formerly Leeds and Northrup, a.k.a. L&N)	**LEGACY:** 7030, 7075, 7076, 7079, 7081, 7082 , 7083, 7084, 7096, 9782 **MODERN:** UDA2182, APT2000PH, APT4000PH	7773, 7774/7774D, 7777/7777D/7777DVP, 7794DVP Sanitary DURAFET™, HB/HB546, HB/HBD547, HB/HB551
Electro-Chemical Devices (a.k.a. ECD)	**LEGACY:** T20, T21, T27, T29, T30, C22 **MODERN:** T23, T28	S10 (PHS10) and S17 (PHS17)

* ASTI offers pH & ORP sensors compatible with the transmitters listed above as an alternative to mating OEM pH & ORP sensors detailed.
Trademarks (indicated with ™) are registered to the respective corporations as listed above.

Replacement pH & ORP Sensors
For Transmitters DO NOT SUPPORT Integrated Preamplifiers

The instruments listed below do no support preamplifiers. Sensors to mate with these OEM pH & ORP transmitters are supplied with the appropriate internal temperature compensation and/or solution ground signals to ensure compatibility. A sensor hook-up schematics for interfacing to the given OEM pH/ORP transmitter is supplied with each sensor, and the some of the most common wiring schematic are posted on our website (please inquire for any not listed). If longer cable runs may be required for your planned installation, it is recommended to select a transmitter that supports preamplifiers (see list to the left).

Fully Supported Hardware – FULL COMPATIBILITY

Manufacturer	pH & ORP Transmitters	OEM pH & ORP Sensors *
Endress+Hauser (a.k.a. E+H)	**LEGACY:** CPM152, CPM280, CPM431 **MODERN:** CPM153, CPM223, CPM253	Inquire to ASTI Factory for alternatives to E+H pH & ORP sensors

Mettler-Toledo International (formerly Ingold)	**LEGACY:** 1120, 1140, 2050, 2100, 2220, 2400, 2500, 2800X, 2050e, pH 2100-PA, pH 2100e **MODERN:** M200, M300, M400, M700, M800	Inquire to ASTI Factory for alternatives to Mettler-Toledo pH & ORP sensors
ABB (formerly TBI-Bailey)	**LEGACY:** TB515, TBN580, TB701/702, 4630, 4631, 4635, 4636, AX416, AX436, AX468, AX460, AX466 **MODERN:** AX460, AX416, AX436, APA592, TB82pH, TB84pH,	AP100, AP200, AP300, TB(X)551, TB(X)556, TB(X)557, TB(X)561, TB(X)567, TB(X)587
Knick	**LEGACY:** Stratos Eco 2402 **MODERN:** Stratos Evo, Stratos Pro A2 pH, Stratos Pro A4 pH, Stratos Eco 2405 pH, Stratos 2221 pH, Stratos Stratos 2231 pH, Protos 3400(X)-035, PHU 3400(X)-110	Inquire to ASTI Factory for alternatives to Knick pH & ORP sensors

* ASTI offers pH & ORP sensors compatible with the transmitters listed above as an alternative to mating OEM pH & ORP sensors detailed.
Trademarks (indicated with ™) are registered to the respective corporations as listed above.

Supported Hardware with Known Issues – LIMITED COMPATIBILITY

Manufacturer	**pH & ORP Transmitters**	**OEM pH & ORP Sensors ***
Rosemount Analytical Liquid Division A Part of Emerson Process Management	**LEGACY:** 1054, 1054A, 1054B, 1055	385/385+, 389, 3900 pH & ORP sensors 3300HT, 3400HT & 3500P PERpH-X™ pH & ORP sensors 397, 398/398R, TF396 TUpH™ pH & ORP sensors

HACH (formerly Great Lakes Instruments, a.k.a. GLI)	**LEGACY:** 33, 53, 60, 62, 63, 70, 83, 90, 95, 570, 670, 671, 690, 691, 692, P33, P53, P63 **MODERN:** si792, si794, PRO-P3 GLI PRO series, sc200	**Encap Diff pH Sensors:** 6028P0, 6028P020, 6028P050, 6028P033, 6058P0, 6022P0, 6022P020, 6028P015, 6028P025000010N, 6028P420, 6052P0, 6058P01000A000N, 6028P510, 6028P4, 6028P210000010N, 6058P025, 6028P090, 6058P4, 6028P6, 6028P01000A000N, 6028P012, 6028P010F00000N, 6028P010000010N, 6022P610, 6022P010000200N, 6022P050, 6058P610F00010N, 6058P6, 6058P050, 6028P010000200N, 6022P2, 6058P010000000N, 6058P033, 6058P620 **3/4 in Combination pH/ORP Sensors:** PC1R1A, RC1R5N, PC1R2A, PC1R1N, PC1R3A, PC1R1A-V12, PC2K1A, PC2K2A, PC3K2A, PC1R2N, RC2K5N, PC1R1A-STC, RC1R5N-HF **Analog Differential pH/ORP Sensors:** PD1P1, PD1R1, PD2P1, PD1R3, PD1P3, PD3P1, PD2P1A30, PD2P1A50, PD1P1A25, PD2P3, PD1P1-PRO1
GF (Georg Fischer) Signet a.k.a +GF+	**LEGACY:** 710, 2720, 9030, 9040, 8710, 5700 **MODERN:** 9900, 8900, 8750	2724-2726 pH/ORP Electrodes, 2734-2736 pH/ORP Electrodes, 2774-2777 Threaded DryLoc pH/ORP Electrodes, 2764-2767 Differential DryLoc pH-ORP Electrodes, 3719 pH/ORP Wet-Tap, 2714-2717 pH/ORP Electrodes

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Supported Hardware with Known Issues – LIMITED COMPATIBILITY

Manufacturer	pH & ORP Transmitters	OEM pH & ORP Sensors *
Yokogawa Electric Corporation (Formerly Johnson Yokogawa Controls, a.k.a. JYC)	**LEGACY:** pH/ORP 200, pH/ORP 400, pH/ORP 202, pH/ORP 402, pH150, pH100, OR100 **MODERN:** PH450G, PH202G	FU20 pH/ORP Combined Sensor, PH8EFP, PH8ERP, OR8EFG, OR8ERG pH/ORP Sensors

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Most of the pH/ORP transmitter models listed also have a both contacting conductivity and toroidal (inductive contactless) conductivity transmitter counterpart to which ASTI can also supply alternative sensors to the OEM model sensors. Please inquire for any such conductivity retrofit and replacement sensor needs as well as for the pH & ORP measurements.

The manufacturers and models detailed on this webpage are not a complete listing of the supported OEM pH & ORP transmitters, analyzers and controllers to which ASTI can retrofit our replacement pH, ORP and conductivity sensors.

PLEASE INQUIRE FOR COMPATIBILITY INFORMATION ABOUT ANY INSTRUMENTATION NOT LISTED HERE

Naturally, all of the ASTI pH, ORP and Ion selective (ISE) sensors are compatible with our own 2TX, 3TX and 4TX transmitters.