

7758 Pipeline Electrode Mountings for Industrial pH and ORP Measurements

Specification

Overview

The 7758 Pipeline Electrode Mounting uses a stainless steel or polypropylene bushing with 3/4" NPT for mounting in pipelines. It can also be mounted in larger pipe through the use of adaptor bushings or by tapping directly into the pipe. It can be "side-mounted" in tanks. The mounting assembly is ideal for use in pipes which contain heavy slurries; it provides self-cleaning where oil and sludge tend to coat electrodes. It resists most chemical attacks and can be used at high temperature and pressure.

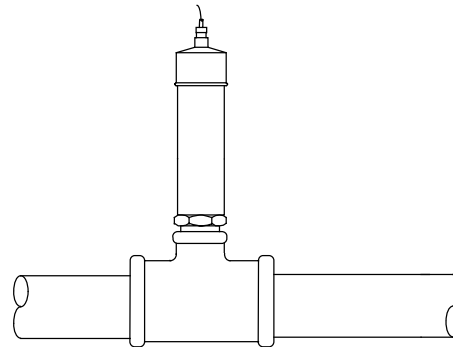
Description

Capabilities now include state-of-the-art ISFET technology with Honeywell Durafet® II electrode options. These truly solid state sensors feature exceptionally fast response and a low impedance signal right from the sensing element that is virtually unbreakable. Preamplifier options allow interface with any Honeywell or other pH instrumentation.

A single housing can hold a Meredian® or Durafet II combination measuring and reference electrode with integral temperature compensator. These electrodes can be mounted in *any* position—even upside-down. Two or three housings can be used for multiple electrode systems.

Features

- New Durafet® II Ion Sensitive Field Effect Transistor (ISFET) pH electrode options



- Available for single or multiple probe measurements of pH or ORP
- Low volume flow chamber option for high purity water
- NEMA 4X weatherproof, corrosion-resistant preamplifier module
- FM -approved options for Class I, Division 1, Group A, B, C, and D
- All models suitable for Division 2 locations
- Sterilizable pH glass electrode available
- Operates at high pressure (up to 150 psig) or high temperatures (up to 130°C)
- Easy to install and service
- 316 SS or polypropylene wetted materials

Durafet II electrode incorporates a reference electrode with replaceable KCl gel fill for long life.

All Durafet II electrodes include an integral automatic temperature compensator for conventional Nernst electrode compensation. Because compensation is performed in the preamplifier, no separate compensator is used and no temperature display can be provided at the measuring instrument; however, for high-purity water measurements requiring *Solution Temperature Compensation* and operating over a narrow pH range, a separate temperature compensator must be specified in Table IV.

Durafet II Combination and Measuring Electrodes

These electrodes use the new ISFET (Ion Sensitive Field Effect Transistor) sensing element with especially fast response. Durafet II sensors produce a low impedance pH signal for outstanding reliability even at low temperatures and they experience no sodium error or ORP interference. The combination

Conventional pH Electrodes and Temperature Compensators

The *measuring electrodes* for 7758 Mountings are usable over a wide pH range. These sensitive, rugged electrodes are electrically guarded against the effects of humidity and shielded against electrical noise pickup.

The fouling-resistant *reference electrodes* are filled with a long-lasting KCl slurry or a viscous KCl gel that eliminates maintenance for the life of the electrode. (The latter are recommended for general-purpose use, especially for applications involving severe contamination, temperature or pressure cycling, continuous high temperatures, or dry periods.) The Ryton-body electrode is virtually unbreakable and has an easily replaced porous-plug junction, the glass electrode has the porous plug sealed into the tube, and the cap and internal element is removable for maintenance.

Automatic temperature compensators correct for the measuring electrode temperature coefficient. With microprocessor-based instruments they can also correct for the change in ionization of pure water samples, providing solution temperature compensation to 25°C. Temperature compensation is not used in ORP systems.

A *Meridian combination measuring/reference electrode*, with or without temperature compensator reduces the number of housings installed in the process. The integral temperature compensator is housed in the upper part of 31050381 and 31055546 Meridian electrodes and is not in close contact with process conditions. If temperature extremes occur and compensation is critical, a separately mounted compensator is preferred.

Preamplifier

The preamplifier conditions the Meridian electrode signal locally to a low impedance signal that can then be sent over ordinary unshielded wire to the Honeywell analyzer, recorder, or transmitter. The preamplifier system has high immunity to RF noise. The unique geometry of the electrode design provides the means to obtain accurate, continuous

measurements in the presence of streaming potentials or high solution currents in electrolytic processes.

The 7758 Assembly can include a preamplifier module in a NEMA 4X enclosure for mounting within 10' of Meridian electrodes.

Another preamplifier option is an environmentally sealed (encapsulated) high-impedance amplifier to which the Durafet II or Meridian combination electrode is directly connected. These preamplifiers feature Honeywell's quick-disconnect plug, allowing easy installation of the electrode using no tools. A second quick-disconnect plug permits removal of the preamplifier for troubleshooting or routine maintenance.

Durafet II Adaptor Module

To use a Durafet II electrode with other than Honeywell instruments, an adaptor module is available. It provides a temperature compensated pH signal to the

conventional electrode input of measuring instruments other than Honeywell. Temperature compensation must be fixed at 25°C on the instrument. Also available is the new battery-powered interface module. P/N 075773.

Special Applications

For high purity water

The 7758-5-8-40-8 low volume flow chamber option produces a high-flow velocity with a low 100-200 m/L/min sample flowrate. In power plant samples that may contain iron oxide and other solids, the high velocity carries them through and prevents them from accumulating and slowing electrode response. This option also provides a solution ground circuit that stabilizes the measurement.

For sterilizable processes

The mountings can be used for processes with a maximum temperature of 130°C (266°F). Typical applications for these sterilizable processes are fermenters, and the food and drug industries. For single-probe sterilizable applications, the 117494 Meridian Electrode is used; specify "50" in Table III.

Specifications

Pressure and Temperature Limits	316 Stainless steel wetted parts: 1034 kPa at 100°C (150 psig at 212°F); 345 kPa at 130°C (50 psig at 226°F) Polypropylene wetted parts: 689 kPa at 35°C (100 psig at 95°F); 345 kPa at 75°C (50 psig at 167°F). Also see electrode specs.
Flow Rate	Recommended velocity of clear solutions, 0.3 - 3 m/s (1 - 10 ft/s). For more viscous or abrasive solutions, recommended velocity is 0.3 - 1.5 m/s (1 - 5 ft/s).
Electrical Connections	Glass Electrodes: 12-ft tinned leads from sensors to preamplifiers. Durafet II Electrodes: Up to 50 ft. quick disconnect cable from sensor to preamplifier.
Mounting Configuration	When more than one housing is used, they should be as close as possible. Suggested sequence to direction of flow, reference electrode, measuring electrode and temperature compensator.

Materials of Construction	Protective cover is always 316 stainless steel; wetted bushings are either 316 stainless steel or polypropylene (as selected by Table II); O-rings are Viton A*. <i>For electrodes and temperature compensators, see specifications for individual probes.</i>				
Dimensions	Pipeline mounting: 3/4" NPT, 32 mm dia. x 127 mm above pipe for conventional electrodes or 165 mm above pipe for Durafet II electrodes (1 1/4" x 5" or 6 1/2"). A 6" clearance from top is required for removal of cover and electrodes. Low Volume Flow Chamber option (7758- -8): 229 mm x 32 mm dia. (9" x 1 1/4")				
Electrical Classification	FM approved for Class I, Division 1, Group A, B, C, and D when used with a 7079 pH Transmitter and Honeywell Intrinsic Safety Barriers. All models are suitable for Division 2 locations.				
Weight	7758-3-1, 7758-3-4: 0.91 kg (2 lb.) 7758-3-2, 7758-3-5: 1.36 kg (3 lb.) 7758-3-3, 7758-3-6: 0.45 kg (1 lb.) Each Sensor: 0.03 kg (1 oz.)				
* For applications where Viton A is not suitable, order one EPM (ethylene propylene) O-ring (31082152) or two Kalrez O-rings (31026692) for each electrode housing.					
pH Measuring Electrodes					
Part Number	31117389	31117390	31117391	51204976-002	
Sensor	Glass	Glass	Glass	ISFET	
Operating Temperature	-5 to 40°C (23 to 104°F)	10 to 80°C (50 to 176°F)	40 to 110°C (104 to 230°F)	-10 to 110°C (14 to 230°F)	
Operating Range	0-11 pH	0-14 pH	0-14 pH	0-14 pH	
Process Pressure, Max.	1034 kPa (150 psig)				
Electrode Body - Materials of construction	31117384, 31117390, 31117391: Glass 51204976-002: Ryton**				
Electrode Length	12.7 cm (5") 079250: 165 mm (6 1/2")				
Electrode Diameter	12 mm (15/32")				
Connector	Glass: Screw Cap Durafet II: Edge connector				
Automatic Temperature Compensators					
Measuring Instrument	Honeywell Analog Instruments		Honeywell 9782P Microprocessor-based Instruments		
Part Number	31152170	31152179	31022290	31022292	31079199
Body	Ryton	Glass	Ryton	Glass	304SS
Resistance	720 ohms at 25°C (77°F)		8550 ohms at 25°C (77°F)		
Operating Temperature	Ryton**: -5 to 110°C (23 to 230°F) Glass and 304 stainless steel: -5 to 130°C (23 to 266°F)				
Process Pressure	1034 kPa (150 psig), maximum				
Dimensions	12 mm OD x 14 cm (15/31" x 5 1/2") 079199: 1/8" NPT to fit flow volume flow chamber				
Cable Length	366 cm (12')				
**Trademark of Phillips Petroleum Co. for polyphenylene sulfide resin.					

The 31050381 and 31055546 have a thermistor temperature sensor located in the upper section of the electrode. They have a low noise coaxial cable for the signal from the electrodes and two leads for the temperature compensator combined in a single jacket.

The 31050383 is applicable for processes with temperatures between 40 to 110°C. It can be operated over the pH range of 0 to 14 pH, but because glass is attacked by hot alkaline solutions, electrode life is seriously affected when high temperature and high pH exist simultaneously.

Applications for this electrode are in hot baths where high current densities, such as chlorine production cells and some plating baths, may exist. This electrode *cannot* be used in a fermentation process; the electrical resistance of the glass will not allow it to operate below 40°C.

Meridian and Durafet II Combination Electrodes									
Part No.	31055546*	31050381*	31117486	31050383	31117494	51205554-001*	31020749*	31020751*	
Sensor/ Measurement	Glass pH					ISFET pH	Gold ORP	Platinum ORP	
Temp. Range	10 - 80°C (50 - 176°F)		10 - 100°C (50 - 212°F)	40 - 110°C (104-230°F)	20 - 130°C (68 - 266°F) intermittent sterilization	-10 - 110°C (14 - 230°F)	-5 - 100°C (23 - 212°F)	-5 - 130°C (23 - 266°F)	
Termination/ Lead Length	Tinned, 12 ft.		Screw Cap. 6"	Tinned, 12 ft	Screw Cap 6"	Up to 50 ft quick disconnect	Tinned, 12 ft.		
Temp. Compensator	For Honeywell- based instrument	For Honeywell micro- processor- based instruments	None			Self-contained	None		
Pressure Limits	57 kPa @ 50°C (75 psi @ 125°F) 345 kPa @ 80°C (50 psi @ 176°F)		207 kPa @ 100°C (30 psi @ 212°F) 689 kPa @ 60°C (100 psi @ 140°F)	207 kPa @ 110°C (30 psi @ 230°F) 517 kPa @ 50°C (75 psi @ 122°F)	345 kPa @ 130°C (50 psi @ 266°F) 689 kPa @ 60°C (100 psi @ 140°F)	1034 kPa @ 80°C (150 psi @ 176°F)	207 kPa @ 100°C (30 psi @ 212°F) 689 kPa @ 60°C (100 psi @ 140°F)	345 kPa @ 130°C (50 psi @ 266°F) 689 kPa @ 60°C (100 psi @ 140°F)	
*Can be mounted upside-down. All other electrodes must have sensing end 15° below horizontal.									

Internal Elements	Ag-AgCl			
Electrode Body	Ryton			
Electrode Dimensions	127 mm x 12 mm dia. (5" x 15/32" dia. 079220: 165 mm (6 1/2") long			
Reference Electrodes				
Electrolyte	KCl Gel*		KCl/NH₄NO₃ Gel**	KCl/AgCl Slurry
Part Number	117482	117483	035833	117425
Electrode Body	Ryton	Glass	Ryton	Ryton
Electrode Tip	Replaceable Ceramic Plug	Nonreplaceable Ceramic Junction	Replaceable Ceramic Plug	Replaceable Ceramic Plug
Maximum Pressure and Temperatures	1034 kPa at 60°C (150 psig at 140°F) 345 kPa at 110°C (50 psig at 230°F)	689 kPa at 100°C (100 psig at 212°F) 345 kPa at 110°C (50 psig at 230°F)	1034 kPa at 60°C (150 psig at 140°F) 345 kPa at 110°C (50 psig at 230°F)	1034 kPa at 60°C (150 psig at 140°F) 345 kPa at 110°C (50 psig at 230°F)
Operating Temperature	-5 to 110°C (23 to 230°F)	-5 to 130°C (23 to 266°F)	-5 to 110°C (23 to 230°F)	-5 to 110°C (23 to 230°F)
*Preferred for general use.				
**Double-junction reference electrode, for use when sulfides are present.				
Internal Elements	Ag-AgCl			
Dimensions	12 mm OD x 14 cm (15/32" x 5 1/2")			
Cable Length	366 cm (12'); spade lug connections			

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