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ПРОМЫШЛЕННЫЕ РН-ЭЛЕКТРОДЫ

Руководство по эксплуатации Durafet II

About This Document

Abstract

The purpose of this manual is to support the installation, operation, and maintenance of the Durafet® II Industrial pH Electrode Series. The electrodes are designated by the following Part Numbers:

Part Number	Description
51204976-001	12 mm body, combination electrode cable connector, 8550 ohm temperature sensor
51204976-002	12 mm body, measuring only, cable connector, 8550 ohm temperature sensor
51204976-003	12 mm body, combination electrode, 12' integral cable, 8550 ohm temperature sensor
51204976-004	12 mm body, combination electrode, 12' integral cable, 8550 ohm temperature sensor
51204976-005	12 mm body, combination electrode, 12' integral cable, 8550 ohm temperature sensor
51204976-006	12 mm body, combination electrode, cable connector, 100 ohm RTD temperature sensor
51204976-007	12 mm body, combination electrode, cable connector, 1000 ohm RTD temperature sensor
51204976-008	12 mm body, measuring only electrode, cable connector, 100 ohm RTD temperature sensor
51204976-009	12 mm body, measuring only electrode, cable connector, 1000 ohm RTD temperature sensor
51205554-001	3/4" NPT body, in-line, cable connector, 8550 ohm temperature sensor
51205554-002	3/4" NPT body, immersion, cable connector, 8550 ohm temperature sensor
51205554-003	3/4" NPT body, immersion, 12' integral cable, 8550 ohm temperature sensor
51205554-004	3/4" NPT body, immersion, 20' integral cable, 8550 ohm temperature sensor
51205554-005	3/4" NPT body, immersion, 50' integral cable, 8550 ohm temperature sensor
51205554-006	3/4" NPT body, immersion, 4' integral cable, 8550 ohm temperature sensor
51205554-007	3/4" NPT body, immersion, 8' integral cable, 8550 ohm temperature sensor
51205554-008	3/4" NPT body, in-line, cable connector, 100 ohm RTD temperature sensor
51205554-009	3/4" NPT body, in-line, cable connector, 1000 ohm RTD temperature sensor
51205554-010	3/4" NPT body, immersion, cable connector, 100 ohm RTD temperature sensor
51205554-011	3/4" NPT body, immersion, cable connector, 1000 ohm RTD temperature sensor

1. Introducti

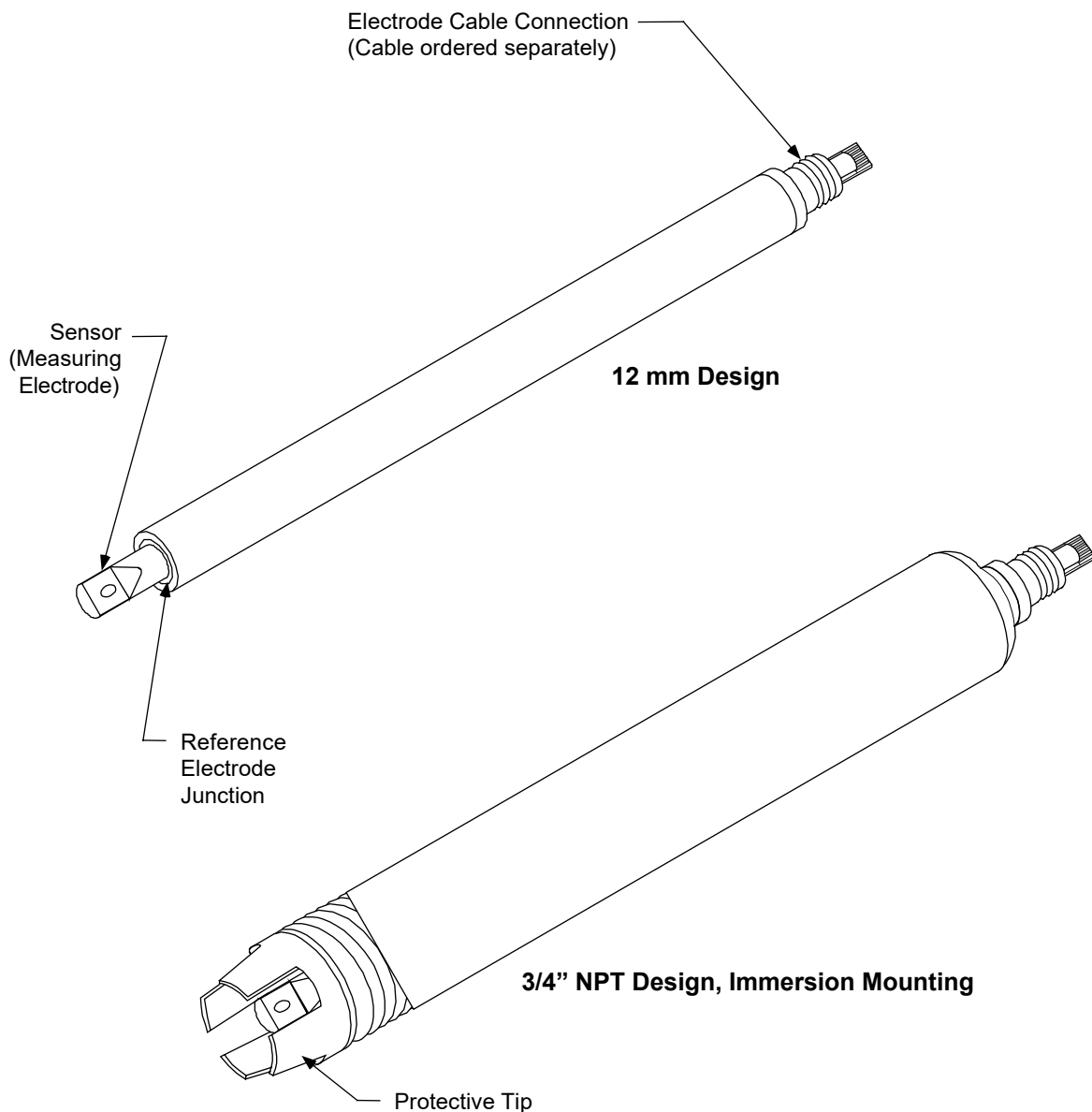
1.1 Overview

The Honeywell Durafet® II Series of industrial electrodes has been designed to provide accurate and stable pH measurements for a wide variety of industrial applications. The Durafet II pH electrode is a non-glass pH electrode. The pH measurement is based on ISFET (Ion Selective Field Effect Transistor) technology, which results in a solid state pH-sensing electrode. The Durafet pH electrode is more rugged than the traditional glass pH electrode. The practically unbreakable pH electrode reduces replacement and inventory costs. The solid state sensing element is packaged in a durable Ryton® body that results in a pH electrode that has extended life in a wide variety of process conditions. The ISFET technology also produces an electrode that is up to 10 times faster than glass electrodes. This fast response improves product quality and provides better process control to optimize chemical usage.

1.2 Description

Durafet II pH electrodes are available in a number of designs to meet customer application and installation needs. There are two basic sizes: 12 mm and 1" diameter. The 1" diameter electrode has a 3/4" NPT thread at both ends. The electrode is also available as a combination electrode or as a measuring only electrode (which requires a separate reference electrode). A temperature sensor is mounted internal to the electrode to measure process temperature and provide a temperature signal for automatic (Nernstian) temperature compensation. Three temperature sensors are available: 8550 ohm thermistor, 100 ohm RTD, and 1000 ohm RTD. The electrodes come with either a connector for separate cable connection or with an integral cable. The cable options are selected based on installation requirements and signal conditioning equipment (preamplifier or Cap Adapter). The Durafet II pH electrode is compatible with various pH instrumentation:

- Honeywell 7082 and 9782 Series pH Analyzers with either an external or internal preamplifier.
- Honeywell 7082 and 9782 Series pH Analyzers with Cap Adapter.
- Honeywell 7084 Controller with an external preamplifier.
- APT2000 Transmitter with Cap Adapter.
- Non-Honeywell instruments, when connected to a Honeywell interface adapter module. This adapter module can be either AC powered or battery powered.
- Non-Honeywell instruments with Cap Adapter. Contact your Honeywell sales consultant for a list of instruments with this compatibility.



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Figure 1-1 Durafet® II Electrode

Part Number 51204976-001, -003, -004, -005, -006, -007 – 12 mm body Durafet II Electrode

This Durafet II electrode has a reference electrode, a measuring electrode, and a temperature compensator. The reference electrode compartment is filled with a gelled formulation of potassium chloride and silver chloride to maximize reference electrode life. It can be supplied with a cable connector or an integral cable in 12', 20', or 50' lengths. *See Section 2 in this manual for Specifications.*

Part Number 51205554-001, -008, -009 – In-Line Durafet II Electrode

This electrode has a measuring electrode, a reference electrode, and a temperature compensator. This unit has been designed for in-line pipe mounting. The recommended mounting for this electrode is in a metal 3/4" NPT schedule 40 pipe tee utilizing the 3/4" pipe threads molded into the bottom of the electrode body. A plastic tee can also be used; but in this case the electrode must be mounted in an extended 3/4" plastic tee, as manufactured by Nibco (Honeywell P/N 31120167). *See Section 2 in this manual for Specifications.*

Part Number 51205554-002, -003, -004, -005, -006, -007, -010, -011 – Immersion Durafet II Electrode

This electrode is identical to the in-line Durafet II electrode except that the sensor end of this electrode has a protective slotted tip. This unit has been designed for immersion in process solutions. The electrode can be supplied with a cable connector or with an integral cable (4', 8', 12', 20', or 50'). For installations where moisture is a problem an integral cable is recommended. The cable end is mounted, using the 3/4" NPT thread, onto a coupling and pipe extension. *See Section 2 in this manual for Specifications.*

Part Number 51204976-002, -008, -009 – Measuring Only Durafet II Electrode

This electrode has a measuring electrode with an integral temperature compensator, but does not have an integral reference electrode. This unit must be used with a separate reference electrode. One of the reference electrodes listed below is recommended. *See Section 2 for Specifications.*

Recommended Reference Electrodes

- Honeywell P/N 31035832 (plastic; diffusion type slurry, double junction)
- Honeywell P/N 31117300 (glass; diffusion type slurry)
- Honeywell P/N 31117392 (plastic; diffusion type slurry)
- Honeywell P/N 31117481 (plastic; diffusion type gel)
- Honeywell P/N 31117484 (glass; diffusion type gel)
- Honeywell P/N 31008712 (glass; flowing junction)

1.3 Compatibility

Preamplifiers and Adapter Modules

The Durafet II Series Electrode can be used with various Honeywell preamplifiers and adapter modules for use with Honeywell instrumentation or other manufacturer's analyzers. The preamplifier output from the electrode system provides a conventional temperature compensated Nernstian output. Refer to Table 1-1 for a list of compatible electrode, preamplifier, and analyzer combinations.

Cap Adapter

The Durafet II Series Electrode is also compatible with the Cap Adapter conditioning module. This module is mounted integral with the electrode cable. The Cap Adapter eliminates mounting of a separate preamplifier. It also eliminates maintenance on a separate component. Separate cables with the integral Cap Adapter are:

- ⁿ 51205965-001, 12-foot cable with Cap
- ⁿ adapter 51205965-002, 20-foot cable with
- ⁿ Cap Adapter 51205965-005, 50-foot cable
- ⁿ with Cap Adapter 51205965-006, 4-foot
- ⁿ cable with Cap Adapter 51205965-007, 8-
- ⁿ foot cable with Cap Adapter

All these cables have a connector at one end to mate with the Durafet II electrode connector. The other end has tinned leads to connect to the pH instrument.

Table 1-1 Compatible Electrodes/Preamplifiers/Analyzers

Durafet II pH Electrode	Remote Preamplifier Mounting/Module	pH Analyzer
51204976-001, -002, -003, -004, -005, -006, -007	None – directly to analyzer	7082-1X and -2X series with 31080239 Preamplifier Kit; 7082-4X and 9782P-03, which includes internal preamplifier.
	None – Cap Adapter in electrode cable	9782-01, APT2000, 7082-1X and -2X, 7084. Also selected instruments other than Honeywell (contact your local Sales representative for information).
	31079236 Preamplifier in 7773 or in 31079288 Preamplifier Module for 7774 stainless steel and 7758 Mountings	7082-1X/-2X, 7084, 9782-01
	31079290 and 31084755 Industrial Adapter Module (120/240V) or 31075773 Battery Powered Adapter Module	Other than Honeywell
003, 004, 005, 006, 51205554-001, -002, -007, -008, -009, -010, -011	None – directly to analyzer	7082-1X and -2X Series with 31080239 Preamplifier Kit; 7082-4X and 9782P-03 which includes internal preamplifier.
	None – Cap Adapter in electrode cable	9782-01, APT2000, 7082-1X and -2X, 7084. Also selected instruments other than Honeywell (contact your local Sales representative for information).
	31079236 Preamplifier in 31079288 Preamplifier Module for 7777 and 7774 (CPVC) Mountings	7082-1X/-2X, 7084, 9782-01
	31079290 and 31084755 Industrial Adapter Modules (120/240V) or 31075773 Battery Powered Adapter Module	Other than Honeywell

1.4 Automatic Temperature Compensation Considerations

The temperature sensor is located approximately 1/2" above the sensor tip. The electrode body should be immersed at least 1" into the process to achieve the best temperature measurement. If process temperature changes abruptly, a small transient error in pH value may result from temperature lag.

1.5 Connections

Electrical connections to preamp or Cap Adapter and instrument are dependent upon the electrode and measuring system used. Connections are described in the appropriate electrode mounting or instrument manuals.

ATTENTION

Durafet II cables have a yellow shield wire that needs to be connected to ground. This connection can be made at the mounting screw on an external preamp or to the ground screw in the 9782, when using an external preamplifier or Cap Adapter.

1.6 Calibration

For calibration procedures, refer to the instrument manual for the instrument you are using with the electrode. For best results, Durafet II electrodes should be calibrated periodically.

2. Specificatio

	51204976-002, -008, -009 *	51204976-001, -003, -004, -005, -006, -007	51205554- 001	51205554-002, -003, -004, -005, -006, -007, -008, -009, -010, -011
Operating Range	0-14 pH**			
Operating Temperature Range	-10 °C to 110 °C	-10 °C to 110 °C sterilizable intermittently to 130 °C	-10 °C to 110 °C	
Maximum Process Pressure	150 psig at 80 °C		50 psig @ 100 ° C 100 psig @ 50 °C	
Body	Glass-filled polyphenylene sulfide (PPS)			
Internal Reference	None	Silver-silver chloride gel-filled diffusion type		
Electrode Diameter	31/64" (12 mm)		1" (25.4 mm), with 3/4" NPT thread at ends	
Electrode Length	6-1/2" (165 mm)		6-3/4" (171 mm)	
Temperature Compensation	Automatic			
Cable Connection	Cable Connector	Cable Connector or Integral Cable		
Compatible Electrode Mountings	Honeywell Catalog 7758, 7773, 7774	Honeywell Catalog 7758, 7773, 7774 (stainless steel)	Honeywell Catalog 7774 (CPVC), 7777	
Materials in Contact with Process Solution	PPS, high alumina ceramic, silicon, EPDM			

* Temperature and pressure specifications for the 51204976-002 Durafet II electrode may be limited by the specifications of the separate reference electrode used.

** For the best accuracy when measuring the pH of solutions less than 1 or greater than 13, use the 51204976-002 Durafet II electrode with the 31008712 flowing reference electrode.

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