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# ПРОМЫШЛЕННЫЕ РН-ЭЛЕКТРОДЫ

## Руководство по эксплуатации Durafet III

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# About This Document

## Abstract

The purpose of this manual is to support the installation, operation, and maintenance of the Durafet® III pH Electrode with Vario Pin Connector. The electrodes are designated by the following Part Numbers:

Part Number	Description
51453503-001	3/4" NPT body, in-line, mounting (no sensor guard), 8550 ohm temperature sensor, KCl reference fill, Viton media seal
51453503-005	3/4" NPT body, immersion, mounting (with sensor guard), 8550 ohm temperature sensor, KCl reference fill, Viton media seal
51453503-002	3/4" NPT body, in-line, mounting (no sensor guard), 1000 ohm RTD temperature sensor, KCl reference fill, Viton media seal
51453503-006	3/4" NPT body, immersion, (with sensor guard), 1000 ohm RTD temperature sensor, KCl reference fill, Viton media seal

## Revision Notes

The following list provides notes concerning all revisions of this document.

Rev. ID	Date	Notes
1	1/04	This is the initial release of this manual. The basis for this manual was from the Honeywell manual 70-82-25-87 Rev 1.

## Contacts

### World Wide Web

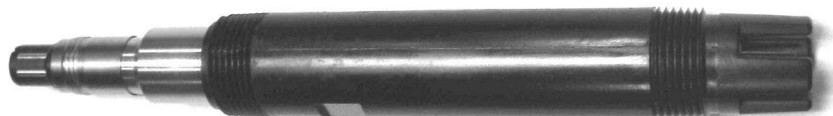
The following lists Honeywell's World Wide Web sites that will be of interest to our customers.

Honeywell Organization	WWW Address (URL)
Corporate	<a href="http://www.honeywell.com">http://www.honeywell.com</a>
Industrial Measurement and Control	<a href="http://www.honeywell.com/imc">http://www.honeywell.com/imc</a>

# 1. Introducti

## 1.1 Overview

The Honeywell Durafet® III Series of industrial electrodes has been designed to provide accurate and stable pH measurements for a wide variety of industrial applications. The Durafet III 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 III pH electrodes are available in a number of designs to meet customer application and installation needs. There are two basic designs in a 1" diameter body. The 1" diameter electrode has a 3/4" NPT thread at both ends. The electrode is available as a combination electrode. A temperature sensor is mounted internal to the electrode to measure process temperature and provide a temperature signal for automatic (Nernstian) temperature compensation. Two temperature sensors are available: 8550 ohm thermistor, and 1000 ohm RTD. The electrodes come with a Vario Pin for separate cable connection. The Durafet III pH electrode is compatible with various pH instrumentation:

- DirectLine® Model DL421 with Durafet remote cable
- Honeywell 7082 and 9782 Series pH Analyzers with Cap Adapter.
- APT2000/4000 Series with Cap Adapter.
- Non-Honeywell instruments with Cap Adapter. Contact your Honeywell sales consultant for a list of instruments with this compatibility.

## 1.3 Compatibility

### Cap Adapter

The Durafet III Series Electrode is 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:

- 51453388-001, 20-foot cable with Cap Adapter
- 51453388-002, 50-foot cable with Cap Adapter

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

### DirectLine pH Modules

The Durafet III Series Electrode is compatible with DirectLine pH modules, Model DL421, only as a remote electrode. There is no integral Durafet III electrode. To use a Durafet III electrode with a DirectLine Module you must use one of the following Durafet cables:

- 51453225-001 20-foot remote sensor cable
- 51453225-002 50-foot remote sensor cable

## 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 electrode to instrument are dependent upon the electrode and measuring system used. Connections are described in the appropriate electrode mounting or instrument manuals.

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### ATTENTION



ESD sensitive devices inside cap adapter and Durafet III electrodes.

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## 1.6 Calibration

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

## 1.7 Restrictions

Avoid using the Durafet III series pH electrode with these chemicals and applications:

- Hydrofluoric acid
- High purity water (<10  $\mu\text{S}/\text{cm}$ )
- Hot caustic (see Figure 1-1 below)

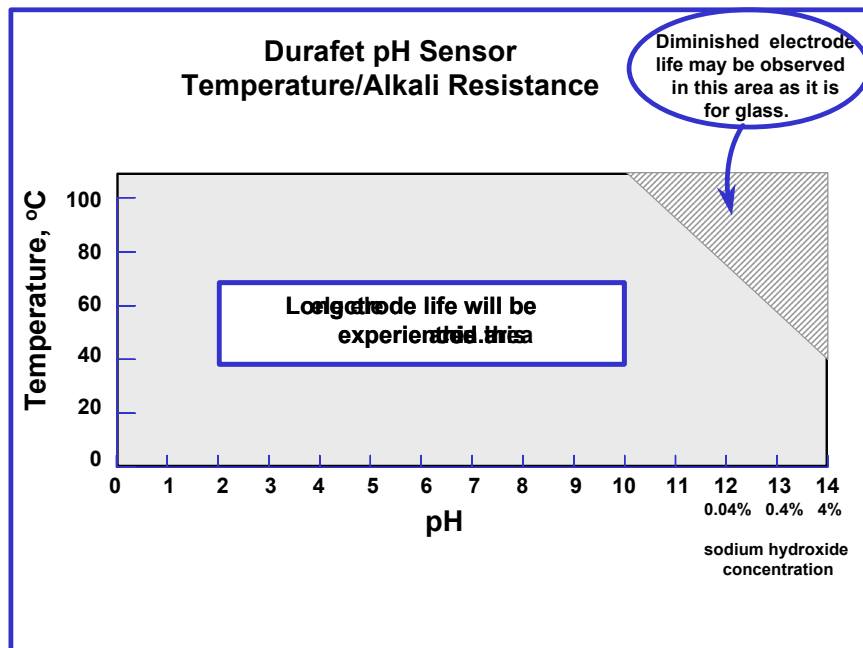


Figure 1-1 Temperature vs. Alkali Resistance

## 2. Specifications

<b>Operating Range</b>	0-14
<b>Operating Temperature Range</b>	-10 °C to 110 °C
<b>Maximum Process Pressure</b>	50 psig @ 100 °C 100 psig @ 50 °C
<b>Body</b>	Glass-filled polyphenylene sulfide, PPS (Ryton®)
<b>Weight</b>	0.23 kg (0.5 lb.)
<b>Internal Reference</b>	Silver-silver chloride gel-filled diffusion type
<b>Temperature Compensation</b>	Automatic
<b>Cable Connection</b>	11-pin Vario Pin Connec
<b>Materials in Contact with Process Solution</b>	PPS, high alumina ceramic, silicon, viton, EPDM

3. Electrode Dimensions

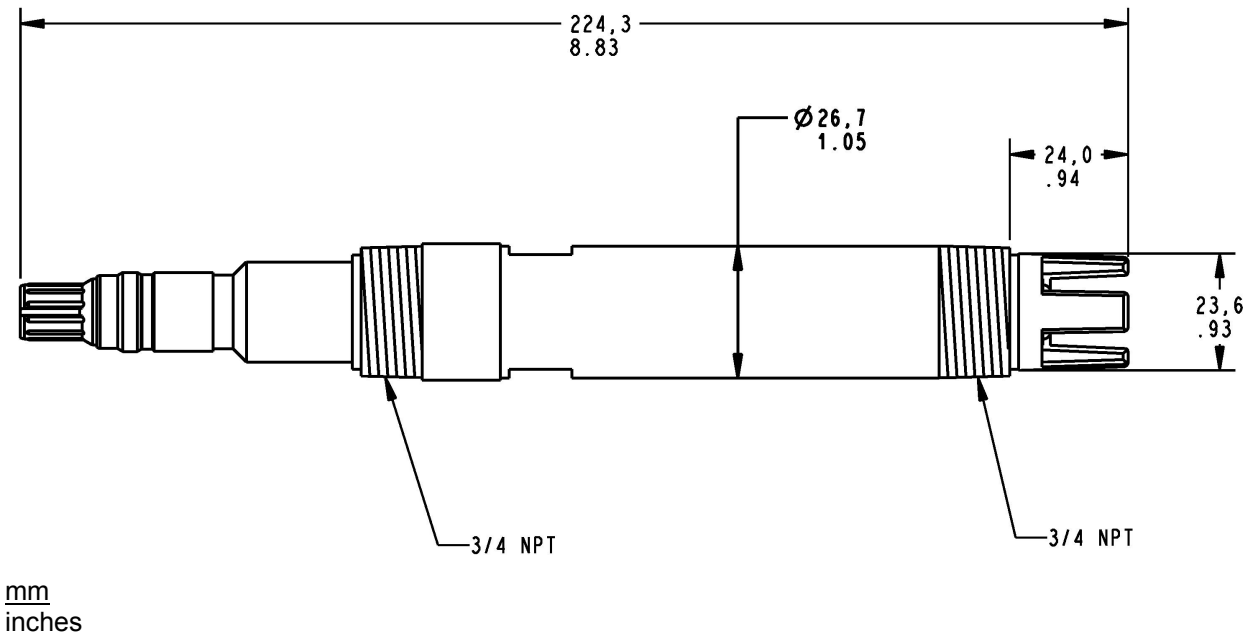


Figure 3-1 Guarded Tip Dimensions

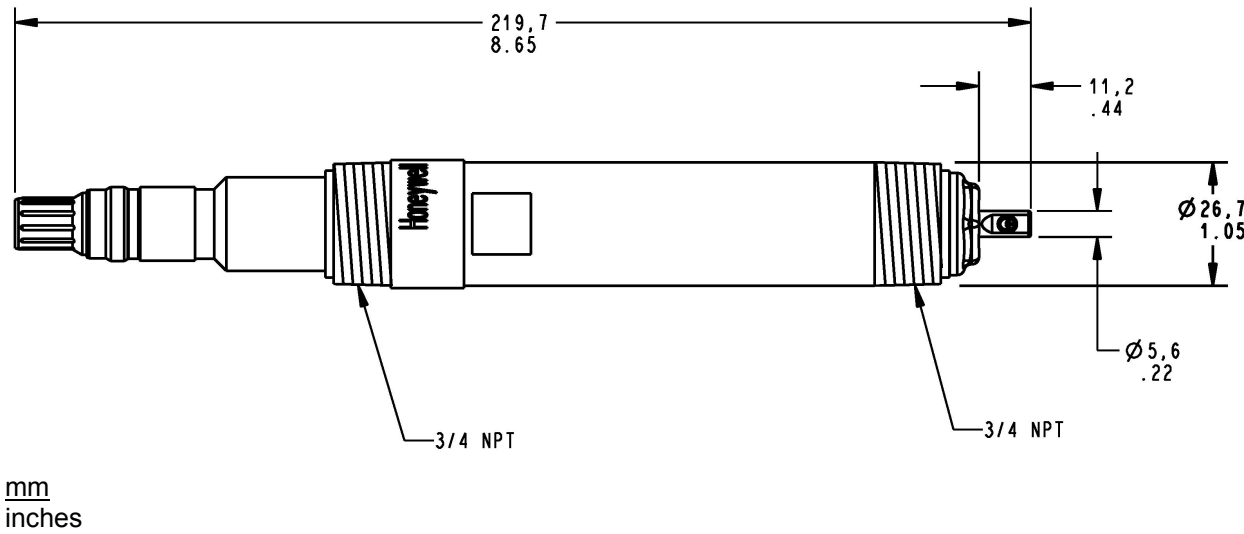


Figure 3-2 Smooth Tip Dimensions

## 4. Electrode Preparation

### 4.1 Unpacking

To safely unpack your Durafet III Electrode, use the following procedure:

1. Carefully remove the electrode from the shipping carton.
2. Remove the plastic storage cap from the sensing end.
3. The fluid inside the cap is water. The water protects the porous reference junction from drying during shipment and storage.
4. Keep the black anti-static cap over the electrical connection end until you are ready to connect the electrode cable.
5. Save the black connector cap for ESD protection whenever the electrode cable is disconnected.
6. Any excess salt crystals on the sensor can be removed by placing the electrode under warm tap water until dissolved. If electrical connector end is wet, wipe dry before connecting to cable.



## 4.2 Precautions

- Do not allow liquids or other foreign matter to contact the cable connectors. Leave the protective cap in place on the electrode connector whenever the cable is not installed on an electrode.
- Avoid touching sensor area. Pressure applied to this area could damage the sensor.
- Avoid contaminating electrical connector contacts. Contamination can result in electrical leakage paths that affect the accuracy of pH measurements.
- Always replace the plastic storage cap over the sensor when the electrode is not in use. *Be sure to reinstall the anti-static connector cap whenever the electrode is removed from service.* Ensure that the plastic storage cap is filled with water.
- Remove the reference junction assembly only if gel replacement is necessary.
- Do not expose the electrode to hydrofluoric acid.
- The sensor will have a reduced service life in processes that use high temperatures in combination with alkaline conditions. Do not install electrodes where temperatures go below – 10 °C (+14 °C) or freeze damage may result. Observe upper temperature limit specifications.
- In abrasive process streams, the electrode should be oriented so that the sensor surface faces downstream. In oily process streams, orient the sensor so that it faces 90° to the process flow. For Durafet III electrodes the “H” of the Honeywell logo on the label is aligned with the sensor.
- Promptly remove any water that might inadvertently come in contact with the electrode connector or cable connector. Blow drying with clean, low-pressure (15 psi) instrument air is a simple and effective means for drying the connector(s).

## 4.3 Cable Connection

Make sure electrode connector and cable connector are clean and dry. Align key way on VarioPin connector of electrode with tab inside mating connector on cable. Press cable connector onto electrode firmly. Tighten knurled bushing of cable connector by hand to ensure waterproof seal.

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