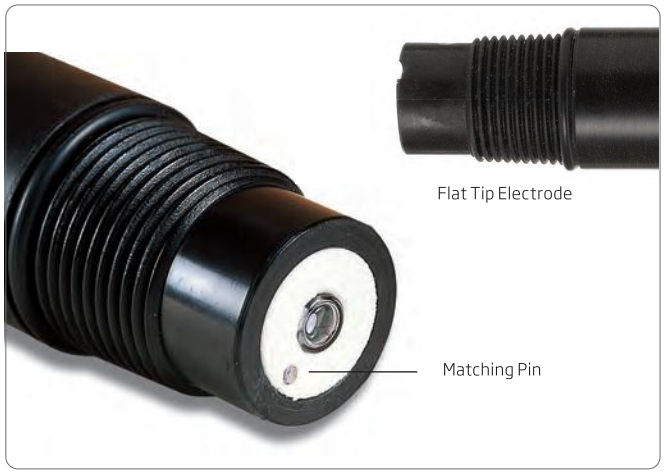
Electrodes Designed and Manufactured by Hanna

Process Electrodes



Potential Matching Pin

In many industrial applications, especially in plating baths, grounding loop current is a very common problem.

When a traditional electrode/controller system is used with the electrode reference connected both to the electrode and to the instrument, a current flow occurs through the reference half cell, causing fluctuations in reading and serious damage to the Ag/AgCl element. The potential matching pin shields the reference from external electrical fields. Shown above, the matching pin allows the measurement to stabilize and ensures effective process regulation. In order to function properly, the matching pin has to be continuously immersed in the measured solution and for this reason is placed near the electrode junction.

Temperature Effect

Sample temperature is an important parameter for solutions with a pH different from 7.0. In fact at pH 7.0, temperature compensation is not required.

Due to a built-in temperature sensor, there is only one electrode to install. Also due to its proximity to the pH sensor, the built-in temperature sensor ensures fast, accurately compensated readings even during sudden temperature fluctuations.

A Specific Electrode for Each Application

The table to the right lists the most common industrial applications with the corresponding, recommended Hanna electrodes.

For each application, several models are available, with different options for the following characteristics:

- Electrode dimensions
- Connection type
- Installation requirement
- Optional configurations (matching pin, Pt100 or Pt1000 sensor)

Hanna produces a wide range of industrial electrodes, for any specific application need.

Common Industrial Applications

Application	pH Electrode Series	Code
Domestic Wastewater Sewage, Septic Tank Treatment	easy	**HI1090B/5**
Industrial Wastewater	flat tip	**HI1006-2005**
	HI1000	**HI1003/5**
	easy	**HI1210B/5**
Food Industry (Beer, Jam, Diary Products)	flat tip	**HI1006-2005**
	easy	**HI1090B/5**
Chemical Neutralization	flat tip	**HI1006-2005**
	easy	**HI1210B/5**
Potable Water (>400µS/cm)	flat tip	**HI1006-2005**
	HI1000	**HI1001**
	easy	**HI1210B/5**
Cooling Towers	AmpHel	**HI6291005**
	HI1000	**HI1002/5**
	easy	**HI1210B/5**
Water Softening	flat tip	**HI1006-2005**
	AmpHel	**HI6291005**
	HI1000	**HI1001/5, HI1002/5**
	easy	**HI1210B/5**
Demineralization	flat tip	**HI1006-2005**
	easy	**HI1090B/5**
Low Conductivity Solutions	flat tip	**HI1006-2005**
Swimming Pools	flast tip	**HI1006-2005**
Sea Water	easy	**HI1090B/5**
Galvanic Baths	flat tip	**HI1006-3005**
	AmpHel	**HI8299505**
	HI1000	**HI1003/5**
	easy	**HI1210B/5**
Sugar Industry, Paper Industry	flat tip	**HI1006-2005**
	easy	**HI1090B/5**
Textile Industry, Tanneries	flat tip	**HI1006-3005**
	AmpHel	**HI8299505**
Acid Samples with Fluoride Ions	flat tip	**HI1006-4005**

Application	ORP Electrode Series	CODE
Oxidation of Cyanide and Nitrite	flat tip	**HI2004-2005**
Ozonization & Oxidant Products	AmpHel	**HI6493005**
Reductant Products (Chromate Reduction)	AmpHel	**HI6293005**
	HI2000	**HI2003/5**
	easy	**HI3210B/5**
Swimming Pools	HI2000	**HI2001, HI2003/5**
	easy	**HI3210B/5**

Flat Tip Industrial Electrodes

Select the flat tip electrode that best fits your process requirements by choosing from the following technical characteristics:

1. Junction

Three junction types are available:

- Annular non-clogging PTFE junction, for testing solutions with high content of suspended solids or for high pressure installation
- Open junction, ideal for wastewater analysis
- Ceramic junction

2a. pH Electrodes

Hanna has developed four types of specialized glass. First is a durable sensor glass for general purpose, industrial use. This glass can withstand the stress of daily use. The remaining types of electrode glass allow continuous monitoring in highly acidic solutions containing fluoride ions, as well as high or low temperature process and streams significantly increase the electrode life.

2b. ORP Electrodes

ORP electrodes are provided with a platinum sensor for most applications, while a gold sensor is required for measurement of cyanide or highly oxidative environments.

3. Temperature Sensor

The pH electrodes with built-in 3-wire Pt100 or Pt1000 temperature sensor allow for the temperature compensation of pH readings as well as temperature measurements.

4. Connection Type

Electrodes are wired for direct connection to a transmitter or process controller, or with the standard BNC connector.

5. Built-in Amplifier

Models with a built-in amplifier are necessary for long distance measurements, where it is not possible to install a transmitter.

The internal amplifier can be powered directly from select Hanna process controllers or a power source that supplies the appropriate voltage.

6. Cable Length

Non-amplified electrodes are provided with a 5, 10 or 15 m cable (16', 33' or 49'), while the amplified models are provided with a 15, 25, 50 or 75 m cable (49, 82, 164 or 246').

- Self-cleaning flat tip sensor
- Significantly reduced maintenance requirement
- Models especially designed for plating baths
- PVDF body
- Three junction types: ceramic, PTFE and open
- Built-in potential matching pin
- Three different glass type pH sensors
- ORP electrodes with platinum or gold sensor
- Models with built-in Pt100 or Pt1000 temp. sensor
- Internal amplifier models powered by the process controller
- 3/4" NPT external thread on both ends for easy installation

Hanna presents a series of combination pH and ORP electrodes, including more than 300 models, incorporating over 20 years of electrode manufacturing experience.

The most advanced feature of this series is the electrode shape with a flat tip, virtually eliminating deposits that can foul the electrode, significantly reducing necessary maintenance. This characteristic makes flat tip electrodes ideal for continuous in-line monitoring and for solutions containing aggressive chemicals.

The PVDF body offers a higher level of mechanical and temperature resistance. Moreover, the PVDF material is non-toxic and compatible with food applications.

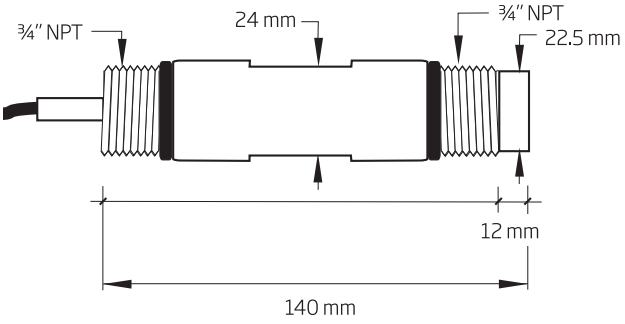
Each pH and ORP electrode is provided with an internal matching pin that can avoid typical problems caused by grounding loop current, such as:

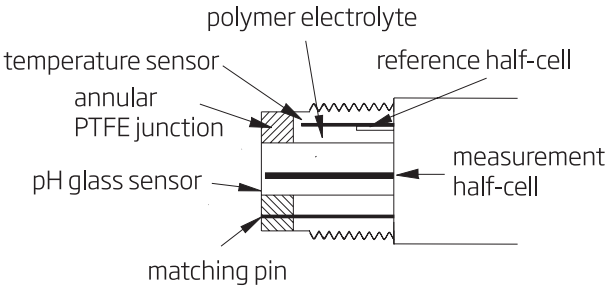
- progressive damage of the electrode
- fluctuating measurements
- poor process regulation

Glass Type	Application	pH Range	Temperature Range
LT	low temperature	0 to 12	-10 to 80°C
HT	high temperature	0 to 14	0 to 100°C
HF	acid samples with F- (*)	0 to 10	-5 to 60°C

(*) F- max 2 g/L, temperature max 60°C, pH >2

Flat Tip Industrial pH Electrodes





Flat Tip pH Electrodes: Ordering Information

Choose your configuration:		
w =	**06**	PTFE junction
	16	ceramic junction
	26	open junction*
x =	**1**	LT (Low Temperature) glass sensor
	2	GP (General Purpose) glass sensor
	3	HT (High Temperature) glass sensor; titanium matching pin
	4	HF (Fluoride resistant) glass sensor
y =	**0**	BNC connector
	1	direct wire connection
	2	BNC connector + Pt100
	3	direct wire connection + Pt100
	4	BNC connector + Pt1000
	5	direct wire connection + Pt1000
	6	amplified electrode with BNC connector
	7	amplified electrode with BNC connector + Pt100
z =	**05, 10, 15** Cable length (meters); for non-amplified electrodes	
	15, 25, 50, 75 Cable length (meters); for amplified electrodes	

HI10 [w] – [x] [y] [z]

* Open junction is available only with GP glass sensor.

Note: The internal amplifier can be powered directly from select Hanna process controllers or a power source that supplies the appropriate voltage.