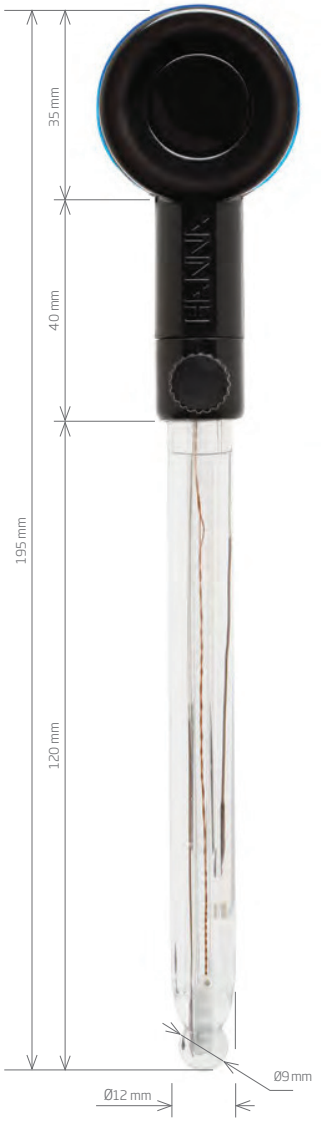



| HALO™ Specifications | HI11312 |
|---|---|
| Reference | double, Ag/AgCl |
| Junction | ceramic |
| Electrolyte | 3.5M KCl |
| Range | 0.00 to 13.00 pH<br>±420 mV<br>-5.0 to 80.0°C (23.0 to 176.0°F) |
| Bulb Shape | spherical |
| Outer Diameter (glass) | 12 mm (glass) |
| Overall Length | 195 mm |
| Solution Temperature | -5.0 to 80.0°C (23.0 to 176.0°F) |
| Environment | 0.0 to 50.0°C (32.0 to 122.0°F), electronic module is not waterproof |
| Temperature Sensor | integrated |
| Body Material | glass |
| Connection | Bluetooth® Smart (Bluetooth® 4.0), 10 m (33') range |
| Battery Type / Life | CR2032 3V lithium ion / approximately 500 hours |
| Ordering Information | **HI11312 (HALO)** is supplied with storage solution, cleaning solution, pH 7.01 buffer solution, pH 4.01 buffer solution, fill solution, battery, quality certificate and instruction sheet. |

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pH solutions begin on page 2.110

HI11312

# HALO™

The HI11312 HALO is a Bluetooth® Smart (Bluetooth 4.0) pH and temperature electrode. This electrode is composed of a glass body and spheric, general purpose glass sensing bulb. The double junction design ensures that the gel electrolyte is free of silver chloride (AgCl) between the sample to be measured and the internal reference cell, resisting clogging and any potential precipitation at the junction. All readings are transmitted directly to an iPhone® or iPad® (not included) running the Hanna Lab App.

## General Purpose Glass Formulation

General purpose glass, as the name implies, is a standard glass formulation that is used for general use. A pH electrode with general purpose (GP) glass will have a resistance of 100 megaohms at 25°C and is suited for measuring pH of samples that are at ambient temperatures. The HI11312 is suitable to use with samples that measure from -5 to 80°C (23 to 176°F).

## Spheric Glass Tip

The spheric bulb is for general purpose use within laboratory environments and applications that measure aqueous solutions due to its large surface area.

## Built-in Temperature Sensor

HI11312 features a built-in thermistor temperature sensor that is in the tip of the indicating pH electrode. A thermistor temperature sensor provides for a high accuracy temperature reading and should be as close as possible to the indicating pH electrode in order to compensate for the effect that temperature has on the change in resistance of the glass. By having an accurate reading it is possible to provide a temperature compensated reading.

## Glass Body

The glass body of the HI11312 is ideal for laboratory use and measurement of grab samples. The glass is resistant to many harsh chemicals and is easy to clean. The glass body also allows for a fast transfer of heat to the internal reference electrolyte. The mV generated by the reference cell is temperature dependent, so the faster thermal equilibrium is reached, the steadier the reference potential.

## Single Ceramic Double Junction Reference

The HI11312 is a double junction design. pH electrodes are available as single junction or double junction. See below for a complete description of the differences. The junction also known as a salt bridge is necessary component of the electrical circuit. The movement of ions must flow through the junction for a steady reading. The outer reference has a single ceramic frit. The ceramic is a porous material that is easily fused with the glass body and has a similar expansion coefficient. A single ceramic junction allows the gel electrolyte to flow at a rate of 15 to 20 µL/hour.