

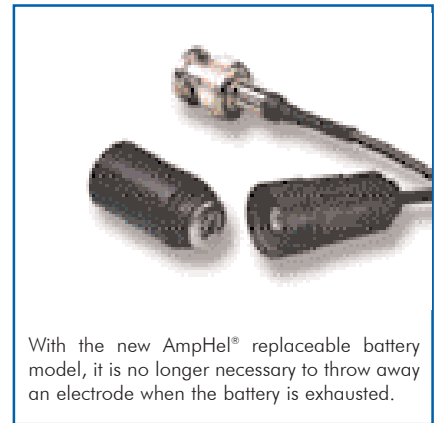
Amplified pH and ORP AmpHel® Electrodes: a Breakthrough in Technology

- Strong signal up to 75 meters (246 feet)
- Low noise coaxial cables are no longer required
- Measurements in unclean samples and high humidity conditions
- Models with external replaceable battery, for longer electrode life
- Glass sensor for specific applications

Due to the high resistance of the glass membrane, conventional electrodes require a high impedance measurement system. Inadequate insulation of the connectors and cables result in erroneous readings due to leakage or noise. For conventional electrodes, the lead is therefore limited to typically less than 15-20 meters. **HANNA** instruments' AmpHel® electrodes incorporate a miniaturized amplifier. This resolves most of the problems associated with high impedance signals. The amplifier circuitry is located right on top of the electrode and is completely sealed. As a result, a strong, low impedance signal is emitted and ordinary connectors with long unshielded cables can be used. This breakthrough technology provides a stable signal for industrial monitoring as well as a major saving in low noise coaxial cable costs. In some cases, the need for a transmitter is also eliminated, resulting in further cost reductions.

For those applications that have proven particularly hostile to electrodes, **HANNA** instruments has developed four types of specialized glass. First is an extremely durable sensor glass for general purpose, industrial use. This glass can withstand sudden impacts and extreme mechanical stress. The remaining types of electrode glass allow continuous monitoring in highly acidic solutions containing fluoride ions, as well as high or low temperature process streams, without significantly reducing the useful life of the electrode.

Electrode body material is glass or Ultem®, while the junction is cloth or Teflon®.



With the new AmpHel® replaceable battery model, it is no longer necessary to throw away an electrode when the battery is exhausted.

HANNA instruments® Glass Sensors for Process Electrodes

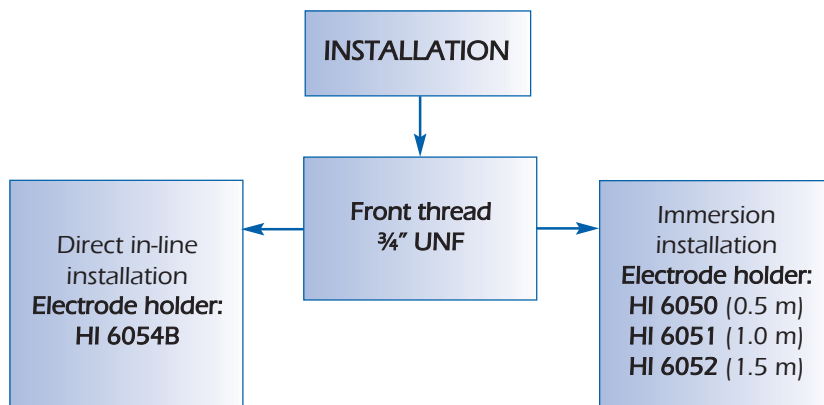
Glass Type	Application	pH Range	Temperature Range
LT	Low Temperature	0 to 12	-10 to 80°C
HT	High Temperature	0 to 14	0 to 100°C
HF	Acid Samples with F ⁻ (+)	0 to 10	-5 to 60°C

Installation

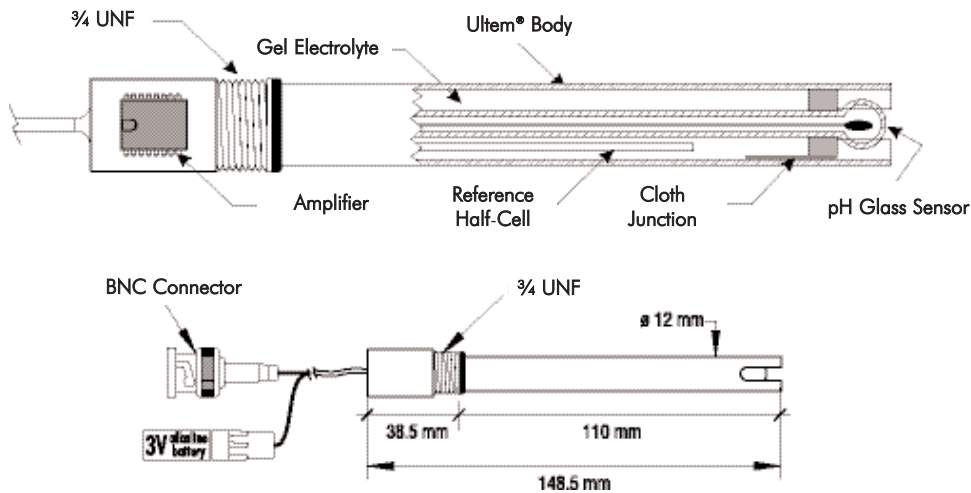
Easy installation of these electrodes is possible thanks to the 3/4" UNF external thread.

Models with glass body and Teflon® junctions are recommended for in-line installations.

Models with an Ultem® body and cloth junction are suitable for tank monitoring or for use with portable meters, where the electrode can be easily accessed for maintenance.



AmpHel® pH and ORP AmpHel® Electrodes: a Breakthrough in Technology



AmpHel® pH Electrodes with Replaceable Battery

General Purpose pH Electrodes

Code	Body	Junction	Electrolyte	Glass Type	Temperature	Max Pressure	Connector	Cable
HI 6291005	Ultem®	cloth	gel	GP	-5 to 80 °C	3 bar	BNC	5 m

Low Temperature pH Electrodes

Code	Body	Junction	Electrolyte	Glass Type	Temperature	Max Pressure	Connector	Cable
HI 5291005	Ultem®	cloth	gel	LT	-10 to 80 °C	3 bar	BNC	5 m

High Temperature pH Electrodes

Code	Body	Junction	Electrolyte	Glass Type	Temperature	Max Pressure	Connector	Cable
HI 8299505	glass	Teflon®	polymer	HT	0 to 100 °C	3 bar	BNC	5 m

pH Electrodes for Acid Samples with Fluoride Ions (F⁻ max 2 g/L, temperature max 60 °C, pH >2)

Code	Body	Junction	Electrolyte	Glass Type	Temperature	Max Pressure	Connector	Cable
HI 7291005	Ultem®	cloth	gel	HF	-5 to 60 °C	3 bar	BNC	5 m
HI 7299505	glass	Teflon®	polymer	HF	-5 to 60 °C	3 bar	BNC	5 m

AmpHel® pH with Internal Battery

Code	Body	Junction	Electrolyte	Glass Type	Temperature	Max Pressure	Connector	Cable
HI 2910B/5	Ultem®	cloth	gel	GP	-5 to 80 °C	3 bar	BNC	5 m
HI 2911B/5	Ultem®	Teflon®	polymer	GP	-5 to 80 °C	3 bar	BNC	5 m

AmpHel® ORP Electrodes with Replaceable Battery

Code	Body	Junction	Electrolyte	Glass Type	Temperature	Max Pressure	Connector	Cable
HI 6293005	Ultem®	cloth	gel	platinum	-5 to 80 °C	3 bar	BNC	5 m
HI 6493005	Ultem®	cloth	gel	gold	-5 to 80 °C	3 bar	BNC	5 m

AmpHel® ORP Electrodes with Internal Battery

Code	Body	Junction	Electrolyte	Glass Type	Temperature	Max Pressure	Connector	Cable
HI 2930B/5	Ultem®	cloth	gel	platinum	-5 to 80 °C	3 bar	BNC	5 m
HI 2931B/5	Ultem®	Teflon®	gel	platinum	-5 to 80 °C	3 bar	BNC	5 m

Accessories

HI 740031 Spare replaceable battery for AmpHel® electrodes