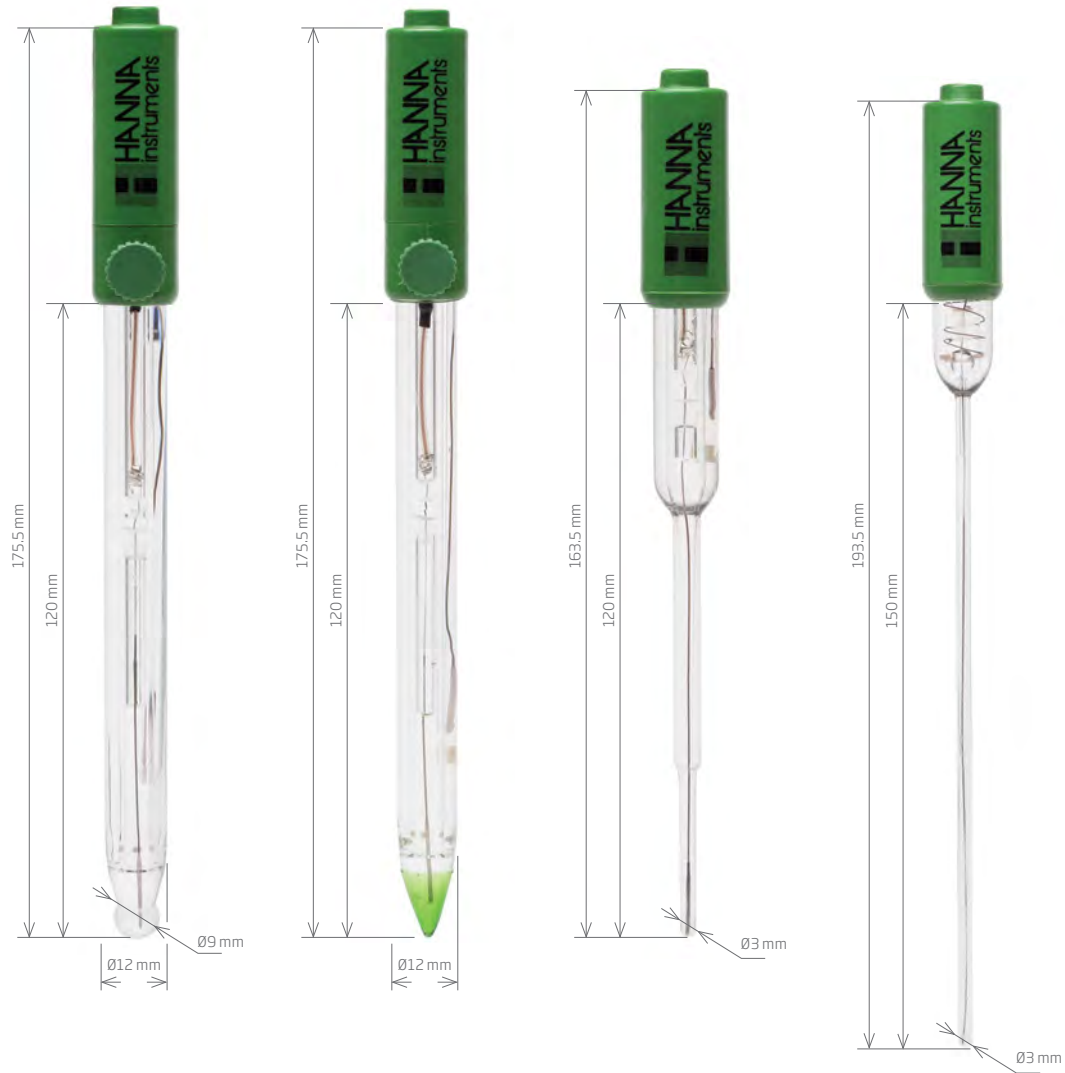


Combination Electrodes



Code	HI1043 []	HI1053 []	HI1083 []	HI1093B
Description	refillable, combination pH electrode w/ double junction	refillable, combination pH electrode w/ conical tip	combination pH electrode w/micro bulb for small samples	combination pH electrode w/ extended length and micro bulb
Reference	double, Ag/AgCl	double, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl
Junction / Flow Rate	ceramic, single / 15-20 µL/h	ceramic, triple / 40-50 µL/h	open	open
Electrolyte	KCl 3.5M	KCl 3.5M	viscolene	viscolene
Max Pressure	0.1 bar	0.1 bar	0.1 bar	0.1 bar
Range	pH: 0 to 14	pH: 0 to 12	pH: 0 to 13	pH: 0 to 13
Recommended Operating Temp.	0 to 100°C (32 to 212°F) - HT	-5 to 100°C (23 to 212°F) - LT	0 to 50°C (32 to 122°F) - GP	0 to 50°C (32 to 122°F) - GP
Tip /Shape	spheric (dia: 9.5 mm)	conic (12 x 12 mm)	spheric (dia: 3 mm)	spheric (dia: 3 mm)
Temperature Sensor	no	no	no	no
Amplifier	no	no	no	no
Body Material	glass – HT	glass – LT	glass – GP	glass – GP
Cable	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')
Recommended Use	hydrocarbons, paints, solvents, sea water, strong acids and bases, high conductivity samples, tris buffer	fats and creams, soil samples, potable water, semi-solid products, low conductivity solutions, emulsions	biotechnology, samples < 100 µL	NMR tubes
Connection	HI1043B BNC HI1043P BNC + pin*	HI1053B BNC HI1053P BNC + pin*	HI1083B BNC HI1083P BNC + pin*	HI1093B BNC

* For pH meters with CAL Check™ system

* For pH meters with CAL Check™ system

* For pH meters with CAL Check™ system

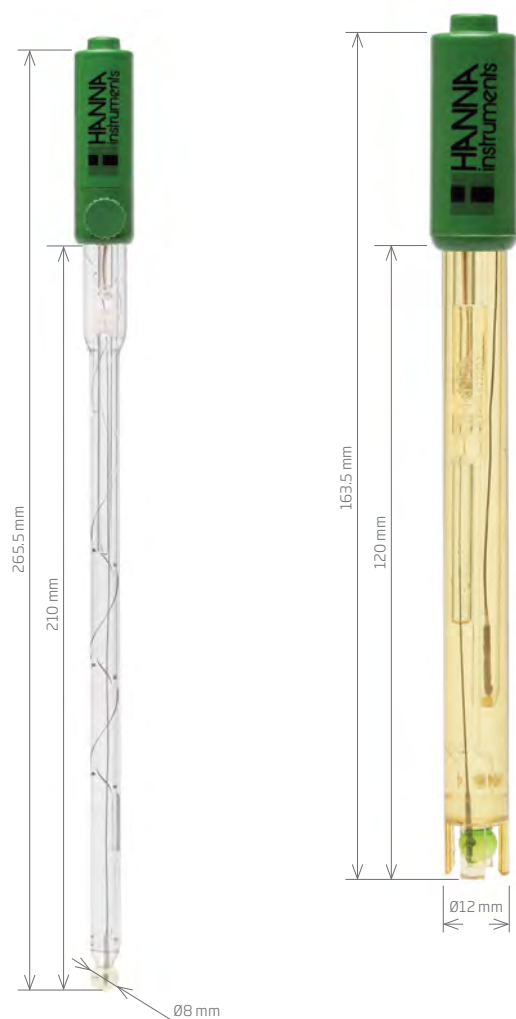
Combination Electrodes



Code	HI1131[]	HI1151[]	HI1135B	HI1143[]
Description	refillable, combination pH electrode	refillable, combination pH electrode	refillable, combination pH electrode w/ side arm construction and fast flow rate	refillable, combination pH electrode for fluoride applications
Reference	double, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl
Junction / Flow Rate	ceramic, single / 15-20 µL/h	ceramic, single / 15-20 µL/h	ceramic, double / 30-40 µL/h	ceramic, single / 15-20 µL/h
Electrolyte	KCl 3.5M	-	KCl 3.5M	KCl 3.5M
Max Pressure	0.1 bar	0.1 bar	3 bar with back pressure	0.1 bar
Range	pH: 0 to 13	pH: 0 to 13	pH: 0 to 14	pH: 0 to 10
Recommended Operating Temp.	0 to 100°C (32 to 212°F) – HT	0 to 100°C (32 to 212°F) – HT	0 to 100°C (32 to 212°F) – HT	-5 to 60°C (23 to 140°F) – HF
Tip /Shape	spheric (dia: 9.5 mm)	spheric (dia: 9.5 mm)	spheric (dia: 9.5 mm)	spheric (dia: 9.5 mm)
Temperature Sensor	no	no	no	no
Amplifier	no	no	no	no
Body Material	glass	glass	glass	glass
Cable	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')
Recommended Use	laboratory general purpose, beer	non-aqueous titration	continuous monitoring with remote filling	samples with fluoride (max 2 g/L @ pH 2 and temperature < 60°C)
Connection	HI1131B BNC HI1131P BNC + pin* HI1131D DIN	HI1151B BNC	HI1135B BNC	HI1143B BNC HI1143D DIN

* For pH meters with CAL Check™ system

Combination Electrodes



Tips for the Most Accurate Measurements

Keep Electrode Hydrated

Ideally, pH electrodes should be kept in a storage solution when not in use. Placing the electrode in a small glass filled with storage solution is suitable. An option for pocket meters is to place a small piece of sponge into the meter's cap and pour storage solution into the cap to wet the sponge. Pouring off any excess solution beforehand, the cap can then be placed on the meter.

If a storage solution is not available the next best option is to use pH 4.01 buffer (pH 7.01 is also suitable to a lesser extent).

Clean Electrodes Before Use

Clean the junction of your electrodes once a day or at least once a week to prevent junction clogging and to maintain accuracy. Immerse the electrode in the proper cleaning solution for at least 15 to 20 minutes. Hanna offers a wide range of cleaning solutions for general purpose and specific applications.

Replace Electrodes Once a Year

If your electrode takes too long to stabilize a reading, or readings fluctuate wildly, it is most likely time to replace the electrode. The typical life span of any pH electrode is from 6 months to 1.5 years.

Additional Tips

- Calibration and storage solutions should be changed regularly (i.e. monthly)
- Calibrate the meter often if a high degree of accuracy is required.
- Remember that the calibration is as only as good the buffer being used (i.e. old or contaminated buffer may not have the same value on the label).
- Calibration sachets, as opposed to bottles, ensure that your buffer solution is always fresh.
- If the meter takes an unusually long time to get a stable reading, the junction may be clogged.
- Rinse the probe with purified water after each use.

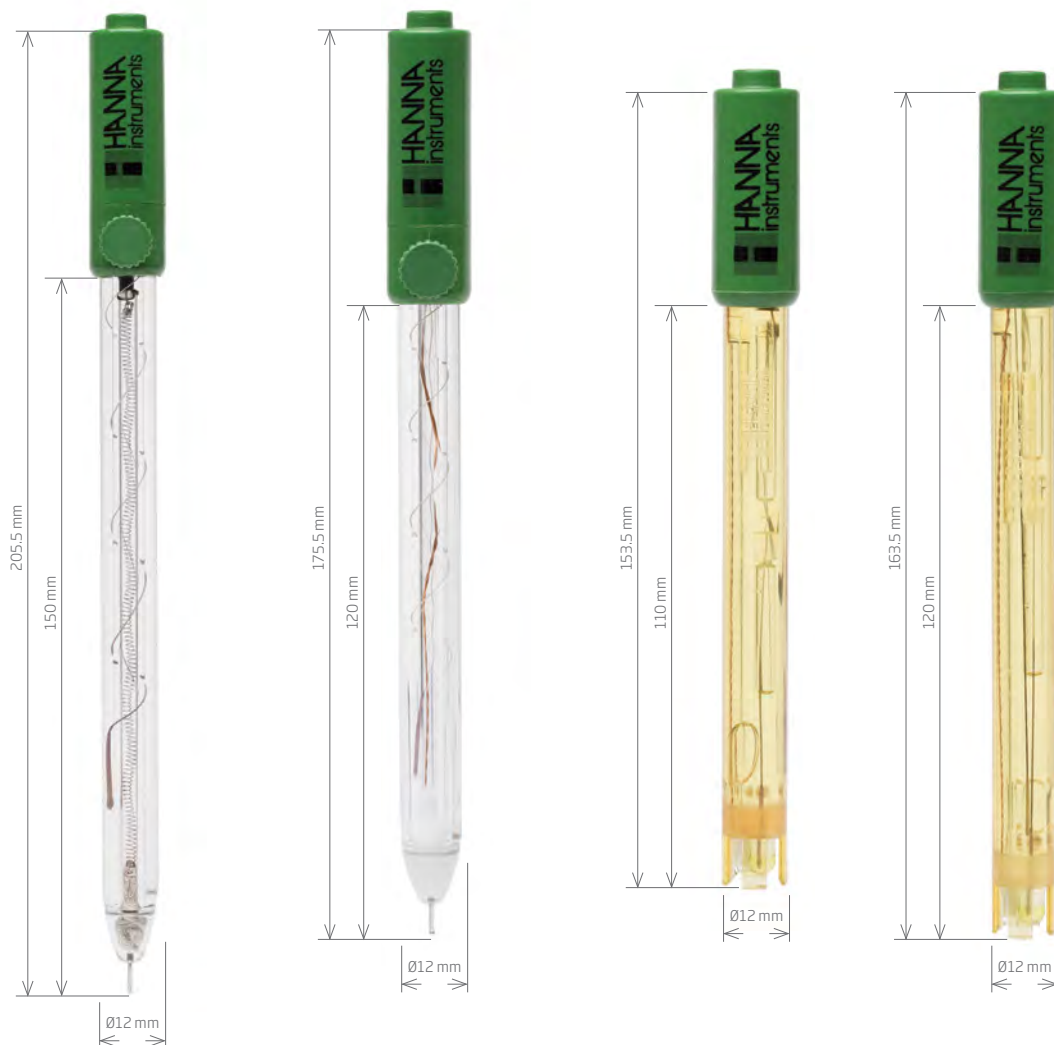
Code	HI1331B	HI1230[]
Description	combination pH electrode	combination pH electrode
Reference	single, Ag/AgCl	double, Ag/AgCl
Junction / Flow Rate	ceramic, single / 15-20 µL/h	ceramic, single / 15-20 µL/h
Electrolyte	KCl 3.5M + AgCl	gel
Max Pressure	0.1 bar	2 bar
Range	pH: 0 to 13	pH: 0 to 13
Recommended Operating Temp.	0 to 70°C (32 to 158°F) – GP	0 to 70°C (32 to 158°F) – GP
Tip /Shape	spheric (dia: 7.5 mm)	spheric (dia: 7.5 mm)
Temperature Sensor	no	no
Amplifier	no	no
Body Material	glass	PEI
Cable	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')
Recommended Use	specific for flasks	field applications
Connection	HI1331B BNC	HI1230B BNC HI1230D DIN

Combination Electrodes



Code	HI1144 []	HI1330 []	HI1343 []	HI2031 []
Description	refillable, combination pH electrode with calomel references	refillable, combination pH electrode	combination pH electrode	refillable, conical tip combination pH electrode
Reference	single, Hg/Hg ₂ Cl ₂	single, Ag/AgCl	single, Hg/Hg ₂ Cl ₂	single, Ag/AgCl
Junction / Flow Rate	ceramic / 15-20 μ L/h	ceramic, single / 15-20 μ L/h	ceramic, single / 15-20 μ L/h	ceramic, single / 15-20 μ L/h
Electrolyte	KCl 3.5M	KCl 3.5M + AgCl	KCl 3.5M	KCl 3.5M + AgCl
Max Pressure	0.1 bar	0.1 bar	0.1 bar	0.1 bar
Range	pH: 0 to 14	pH: 0 to 12	pH: 0 to 14	pH: 0 to 12
Recommended Operating Temp.	0 to 60°C (32 to 140°F) - HT	-5 to 70°C (23 to 158°F) - LT	0 to 60°C (32 to 140°F) - HT	-5 to 70°C (23 to 158°F) - LT
Tip / Shape	spheric (dia: 9.5 mm)	spheric (dia: 5 mm)	spheric (dia: 7.5 mm)	conic (6 x 10 mm)
Temperature Sensor	no	no	no	no
Amplifier	no	no	no	no
Body Material	glass	glass	PEI	glass
Cable	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')
Recommended Use	tris buffer	specific for vials and test tubes	specific for Tris buffer	dairy and semi-solid products
Connection	HI1144B BNC HI1144D DIN	HI1330B BNC HI1330D DIN	HI1343B BNC HI1343D DIN	HI2031B BNC HI2031D DIN

Special pH and ORP Electrodes



Code	HI3131[]	HI3618D	HI1217D	HI1291D
Description	refillable combination ORP electrode	ORP combination electrode	pH electrode	pH electrode
Reference	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl
Junction / Flow Rate	ceramic, single / 15-20 µL/h	ceramic, single / 15-20 µL/h	ceramic, single	ceramic, single
Electrolyte	KCl 3.5M + AgCl	KCl 3.5M + AgCl	gel	gel
Max Pressure	0.1 bar	0.1 bar	2 bar	2 bar
Range	ORP: ±2000 mV	ORP: ±2000 mV	pH: 0 to 13	pH: 0 to 12
Recommended Operating Temp.	-5 to 70°C (23 to 158°F)	-5 to 70°C (23 to 158°F)	0 to 70°C (32 to 158°F) - GP	0 to 70°C (32 to 158°F) - GP
Tip / Shape	platinum pin	platinum pin	spheric (dia: 5.0 mm)	spheric (dia: 5.0 mm)
Temperature Sensor	no	yes	yes	yes
Amplifier	no	yes	yes	yes
Body Material	glass	glass	PEI	PEI
Cable	coaxial; 1 m (3.3')	5-pole; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')
Recommended Use	laboratory general use, ORP titrations	laboratory	general purpose	general purpose, education, laboratory
Connection	HI3131B BNC HI3131P BNC + pin*	HI3618D DIN**	HI1217D DIN**	HI1291D DIN †

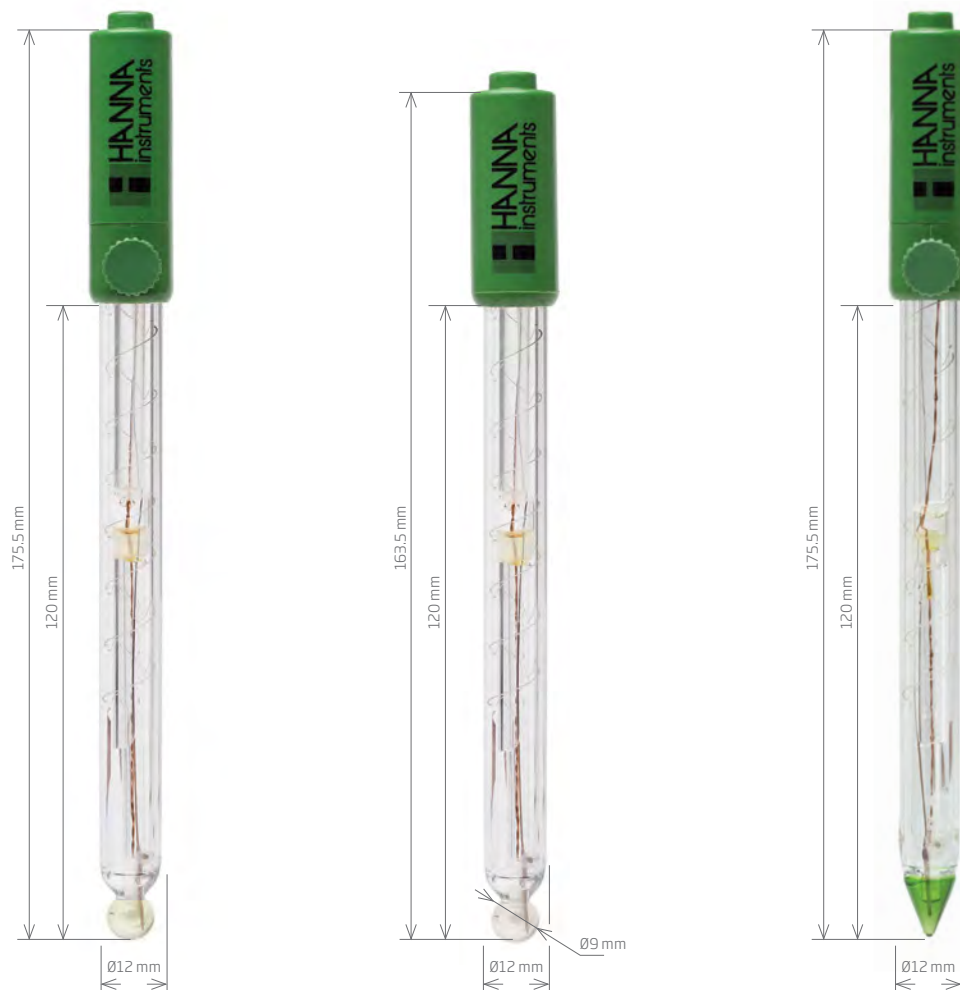
* For pH meters with CAL Check™ system

** Recommended for use with HI8314 pH meter

** Recommended for use with HI8314 pH meter

† Recommended for use with HI207 and HI208 pH meters

pH Electrodes with Temperature Sensor



Code	HI1610D	HI1611D	HI1612D
Description	pH electrode	pH electrode	pH electrode
Reference	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl
Junction / Flow Rate	ceramic, single / 15-20 µL/h	ceramic, single	ceramic, triple / 40-50 µL/h
Electrolyte	KCl 3.5M + AgCl	gel	KCl 3.5M + AgCl
Max Pressure	0.1 bar	2 bar	0.1 bar
Range	pH: 0 to 13	pH: 0 to 14	pH: 0 to 12
Recommended Operating Temp.	0 to 70°C (32 to 158°F) - GP	0 to 80°C (32 to 176°F) - HT	-5 to 70°C (23 to 158°F) - LT
Tip / Shape	spheric (dia: 9.5 mm)	spheric (dia: 9.5 mm)	conic (12 x 12 mm)
Temperature Sensor	yes	yes	yes
Amplifier	yes	yes	yes
Body Material	glass	glass	glass
Cable	5-pole; 1 m (3.3')	5-pole; 1 m (3.3')	5-pole; 1 m (3.3')
Recommended Use	laboratory general use	continuous monitoring	emulsions, semi-solid samples
Connection	HI1610D DIN*	HI1611D DIN*	HI1612D DIN*

* Recommended for use with HI8314 pH meter

* Recommended for use with HI8314 pH meter

* Recommended for use with HI8314 pH meter

Rugged pH and ORP Electrodes



Code	HI1332[]	HI3230[]	HI4430[]
Description	pH electrode	gel-filled, combination ORP electrode w/ platinum contact	gel-filled, combination ORP electrode w/ gold contact
Reference	double, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl
Junction / Flow Rate	ceramic, single / 15-20 µL/h	ceramic, single	ceramic, single
Electrolyte	KCl 3.5M	gel	gel
Max Pressure	0.1 bar	2 bar	2 bar
Range	pH: 0 to 13	ORP: ±2000 mV	ORP: ±2000 mV
Recommended Operating Temp.	0 to 70°C (32 to 158°F) - GP	-5 to 70°C (23 to 158°F)	-5 to 70°C (23 to 158°F)
Tip /Shape	spheric (dia: 7.5 mm)	platinum pin	gold pin
Temperature Sensor	no	no	no
Amplifier	no	no	no
Body Material	PEI	PEI	PEI
Cable	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')
Recommended Use	chemicals, field applications, quality control	municipal water, quality control	oxidants, ozone
Connection	HI1332B BNC HI1332P BNC + pin* HI1332D DIN	HI3230B BNC HI3230D DIN	HI4430B BNC HI4430D DIN

* For pH meters with CAL Check™ system

Electrodes for the Food Industry



Code	FC100B	FC101D	FC200[]	FC210B
Description	pH electrode	preamplified pH/ temperature probe	pH electrode	pH electrode
Reference	double, Ag/AgCl	double, Ag/AgCl	single, Ag/AgCl	double, Ag/AgCl
Junction / Flow Rate	ceramic, single / 15-20 µL/h	ceramic, single / 15-20 µL/h	open	open
Electrolyte	KCl 3.5M	KCl 3.5M	viscolene	viscolene
Max Pressure	0.1 bar	0.1 bar	0.1 bar	0.1 bar
Range	pH: 0 to 13	pH: 0 to 13	pH: 0 to 12	pH: 0 to 12
Recommended Operating Temp.	0 to 80°C (32 to 176°F) - GP	0 to 80°C (32 to 176°F) - GP	0 to 50°C (32 to 122°F) - LT	0 to 50°C (32 to 122°F) - LT
Tip /Shape	spheric (dia: 7.5 mm)	spheric (dia: 7.5 mm)	conic (6 x 10 mm)	conic (12 x 12 mm)
Temperature Sensor	no	yes	no	no
Amplifier	no	yes	no	no
Body Material	PVDF	PVDF	PVDF	glass
Cable	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')
Recommended Use	milk	milk	milk, yogurt, dairy products, semi-solid foods	yogurt, creams
Connection	FC100B BNC	FC101D DIN*	FC200B BNC FC200D DIN	FC210B BNC

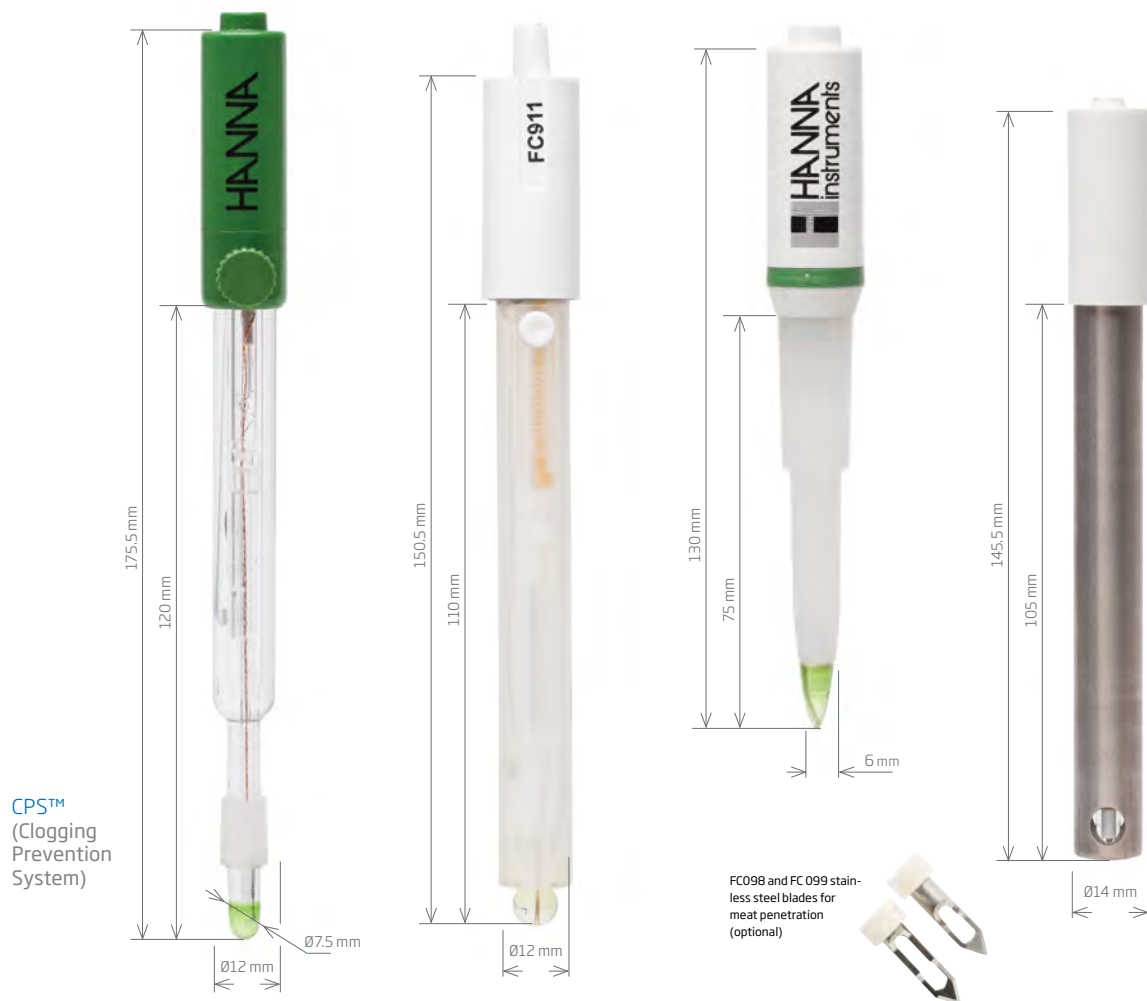
* Recommended for use with HI99162 pH meter

Electrodes for the Food Industry



Code	FC220B	FC230B	FC240B	FC400B
Description	pH electrode	combination pH electrode with PVDF outer body	combination pH electrode with stainless steel sheath	pH electrode
Reference	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl	double, Ag/AgCl
Junction / Flow Rate	ceramic, triple / 40-50 µL/h	open	open	open
Electrolyte	KCl 3.5M + AgCl	viscolene	viscolene	viscolene
Max Pressure	0.1 bar	0.1 bar	0.1 bar	0.1 bar
Range	pH: 0 to 12	pH: 0 to 12	pH: 0 to 13	pH: 0 to 12
Recommended Operating Temp.	-5 to 70°C (23 to 158°F) - LT	0 to 50°C (32 to 122°F) - LT	0 to 50°C (32 to 122°F) - GP	0 to 50°C (32 to 122°F) - LT
Tip /Shape	spheric (dia: 9.5 mm)	conic (6 x 10 mm)	conic (3 x 5 mm)	conic (6 x 10 mm)
Temperature Sensor	no	no	no	no
Amplifier	no	no	no	no
Body Material	glass	PVDF	AISI 316	PVDF
Cable	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')
Recommended Use	creams, fruit juices, sauces	meat, semi frozen products	dairy products, cheese quality control	meat
Connection	FC220B BNC	FC230B BNC	FC240B BNC	FC400B BNC

Electrodes for the Food Industry



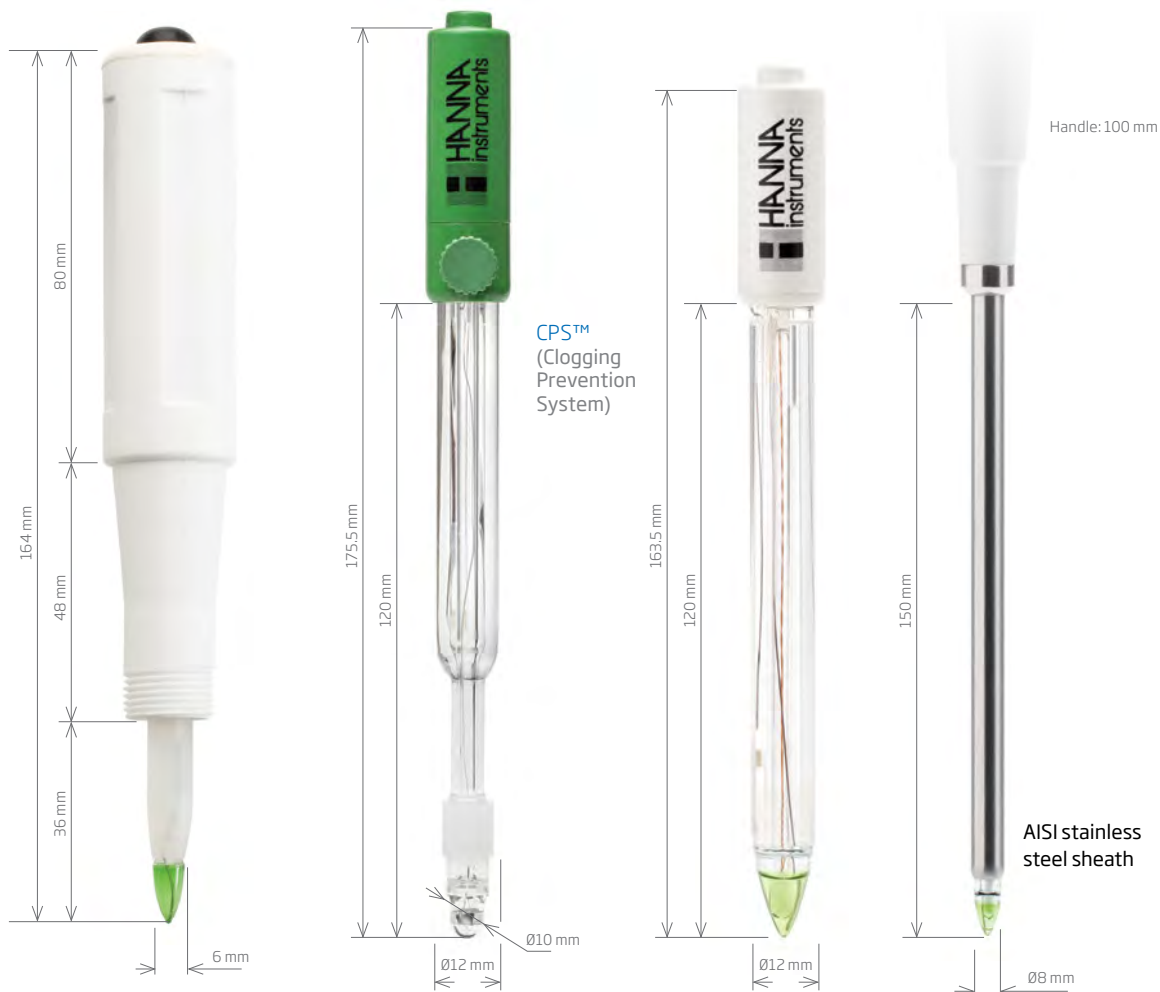
Code	HI1048 []	FC911	FC202D	FC214D
Description	pH electrode with CPS™ (Clogging Prevention System)	pH electrode	pH electrode	pH electrode
Reference	double, Ag/AgCl	double, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl
Junction / Flow Rate	open, CPS™	ceramic, single / 15-20 µL/H	open	cloth
Electrolyte	KCl 3.5M	KCl 3.5M	viscolene	gel
Max Pressure	0.1 bar	0.1 bar	0.1 bar	3 bar
Range	pH: 0 to 12	pH: 0 to 13	pH: 0 to 12	pH: 0 to 13
Recommended Operating Temp.	0 to 80°C (32 to 176°F) - GP	-5 to 80°C (23 to 176°F) - GP	0 to 50°C (32 to 122°F) - LT	0 to 80°C (32 to 176°F) - HT
Tip / Shape	dome (dia: 8 mm)	spheric (dia: 7.5 mm)	conic (6 x 10 mm)	spheric (dia: 5 mm)
Temperature Sensor	yes	no	yes	yes
Amplifier	yes, DIN model only	yes	yes	yes
Body Material	glass	PVDF	PVDF	titanium with HT glass sensor
Cable	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')
Recommended Use	wine, must	creams, fruit juices, sauces	milk, yogurt, dairy products, meat, semi-solid foods	beer
Connection	HI1048B BNC HI1048B/50 BNC HI1048P BNC + pin* HI1048D DIN**	FC911B BNC	FC202D DIN *	FC214D DIN†

* For pH meters with CAL Check™ system
 ** Recommended for use with HI99111 pH meter

* Recommended for use with HI99161 pH meter

† Recommended for use with HI99151 pH meter

Electrodes for the Food Industry



Code	FC232D	HI3148B	FC213D	FC242D
Description	pH electrode	ORP electrode	pre-amplified pH / temperature probe	pre-amplified pH / temperature probe
Reference	single, Ag/AgCl	double, Ag/AgCl	double	single
Junction	open	open / CPS™	open	ceramic
Electrolyte	viscolene	KCl 3.5M	viscolene	viscolene
Max Pressure	0.1 bar	0.1 bar	0.1 bar	0.1 bar
Range	pH: 0 to 12	ORP: ±2000 mV	pH: 0 to 12	pH: 0 to 12
Recommended Operating Temp.	0 to 50°C (32 to 122°F) - LT	-5 to 80°C (23 to 176°F)	0 to 50°C (32 to 122°F)	0 to 50°C (32 to 122°F)
Tip /Shape	conic (6 x 10 mm)	platinum ring	conic	conic (6 x 8 mm)
Temperature Sensor	yes	no	yes	yes
Amplifier	yes	no	yes	yes
Body Material	PVDF	glass	glass	AISI 316 stainless steel
Cable	7-pole; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')
Recommended Use	meat	wine	yogurt	cheese
Connection	FC232D DIN*	HI3148B BNC HI3148B/50 BNC	FC213D DIN*	FC242D DIN*

* Recommended for use with HI99163 pH meter

* Recommended for use with HI99164 pH meter

* Recommended for use with HI99165 pH meter

Electrodes for Specific Analysis



Code	HI1413B	HI1414D	HI1414D/50	HI1292D
Description	pH electrode	pH electrode	pH electrode	pH electrode
Reference	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl
Junction	open	open	open	ceramic, triple / 40-50 µL/h
Electrolyte	viscolene	viscolene	viscolene	KCl 3.5M + AgCl
Max Pressure	0.1 bar	0.1 bar	0.1 bar	0.1 bar
Range	pH: 0 to 12	pH: 0 to 12	pH: 0 to 12	pH: 0 to 12
Recommended Operating Temp.	0 to 50°C (32 to 122°F) - LT	0 to 50°C (32 to 122°F)	0 to 50°C (32 to 122°F)	-5 to 70°C (23 to 158°F) - LT
Tip/Shape	flat	flat	flat	conic (12 x 12 mm)
Temperature Sensor	no	yes	yes	yes
Amplifier	no	yes	yes	yes
Body Material	glass	glass	glass	glass
Cable	coaxial; 1 m (3.3')	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')
Recommended Use	surface, skin, leather, paper, emulsions	surface, leather, paper, emulsions	skin, scalp	direct soil pH measurement, soil solution
Connection	HI1413B BNC	HI1414D 7-pin DIN*	HI1414D/50 DIN†	HI1292D 7-pin DIN**

* Recommended for use with HI99171 pH meter

† Recommended for use with HI99181 pH meter

** Recommended for use with HI99121 pH meter

Electrodes for Specific Analysis



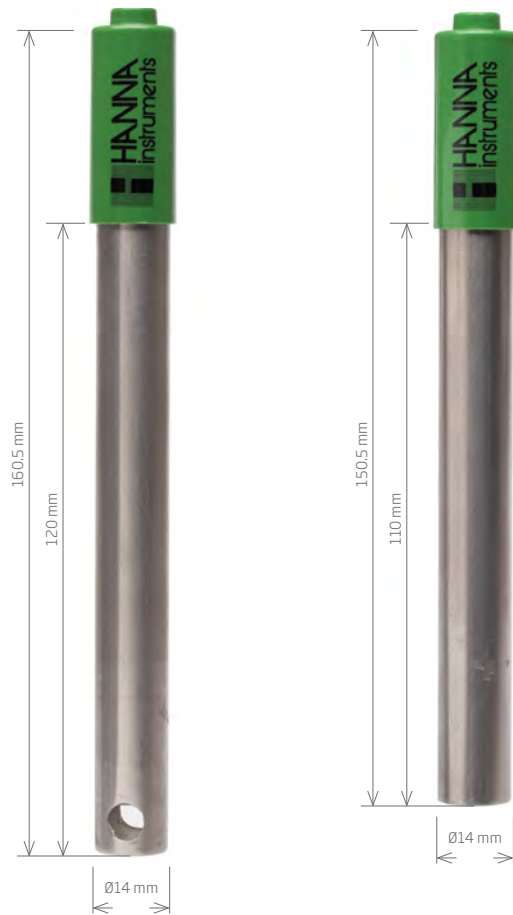
Code	FC215D	HI1296 []	HI1297D
Description	pH electrode	pH electrode	pH/ORP electrode
Reference	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl
Junction	ceramic, triple	cloth	cloth
Electrolyte	KCl 3.5M + AgCl	gel	gel
Max Pressure	0.1 bar	3 bar	3 bar
Range	pH: 0 to 12	pH: 0 to 13	pH: 0 to 13; ORP
Recommended Operating Temp.	0 to 70°C (32 to 158°F) - LT	0 to 80°C (32 to 176°F) - GP	0 to 80°C (32 to 176°F) - GP
Tip /Shape	spheric (dia: 9.5 mm)	spheric (dia: 5 mm)	pH: conic (3 mm); ORP: platinum sensor
Temperature Sensor	yes	yes	yes
Amplifier	yes	yes	yes
Body Material	glass	titanium	titanium
Cable	coaxial; 1 m (3.3')	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')
Recommended Use	drinking water	wastewater	wastewater, municipal water, water treatment, swimming pools
Connection	FC215D DIN*	HI1296D DIN** HI12963 DIN†	HI1297D DIN‡

* Recommended for use with HI99192 pH meter

** Recommended for use with HI991001 pH meter
† Quick connect DIN. For use with HI98190 pH meter only

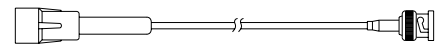
‡ Recommended for use with HI991002 and HI991003 pH meters

Electrodes for Specific Analysis



Electrode Extension Cables

Screw Type to BNC Cables / Connectors

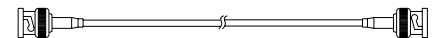


Description

3.0 mm (0.12") cable with screw type and BNC connectors

Part #	Cable Length
HI7855/1	1 m (3.3')
HI7855/3	3 m (9.9')
HI7855/5	5 m (16.5')
HI7855/10	10 m (33')
HI7855/15	15 m (49.5')

BNC to BNC Cables / Connectors



Description

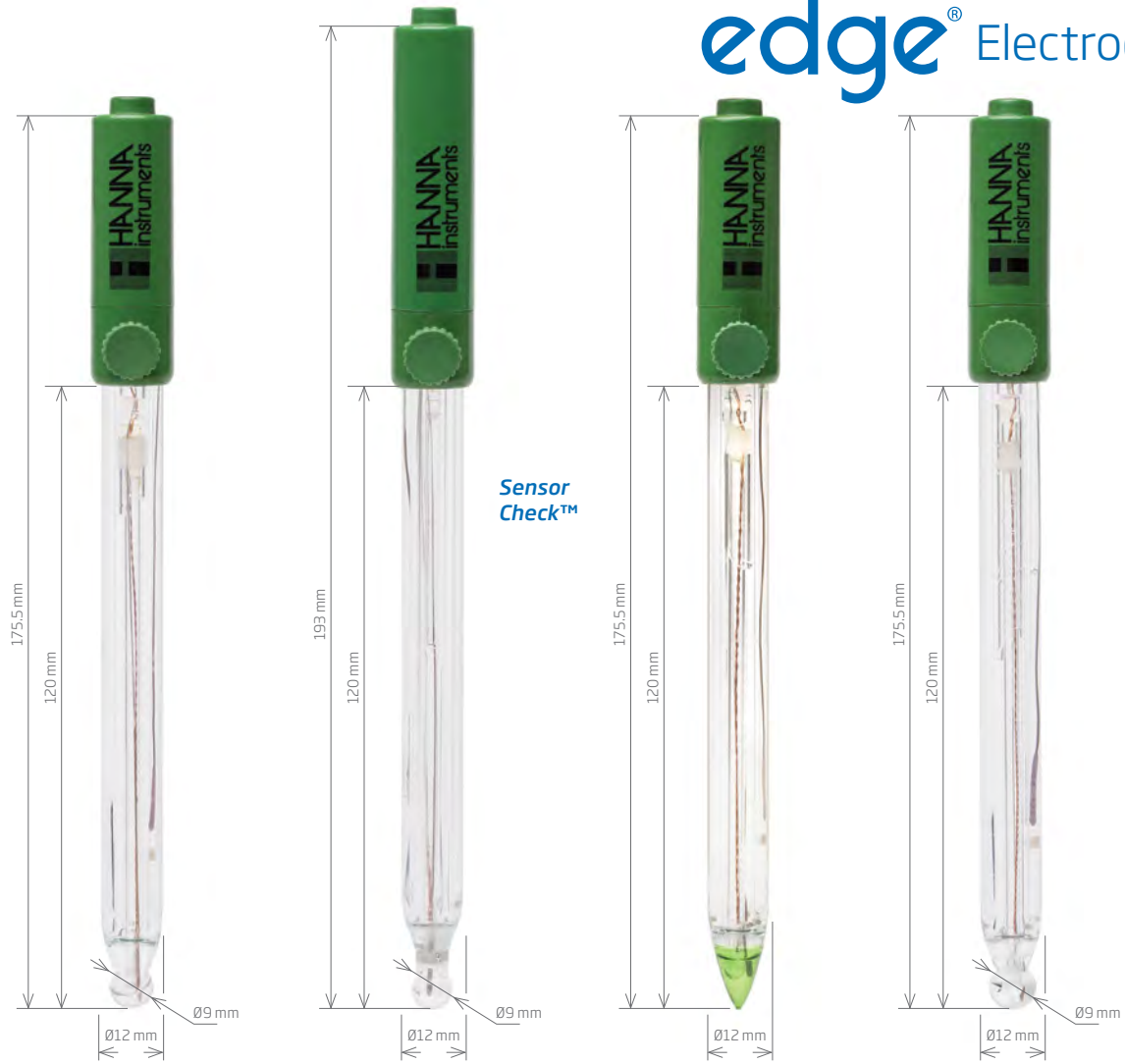
3.0 mm (0.12") cable with BNC connectors

Part #	Cable Length
HI7858/1	1 m (3.3')
HI7858/5	5 m (16.5')
HI7858/10	10 m (33')

Code	HI62911D	HI72911 []
Description	pH electrode	pH electrode
Reference	double, Ag/AgCl	double, Ag/AgCl
Junction	PTFE	PTFE
Electrolyte	polymer	polymer
Max Pressure	3 bar	3 bar
Range	pH: 0 to 13	pH: 0 to 13
Recommended Operating Temp.	0 to 80°C (32 to 176°F) - GP	0 to 80°C (32 to 176°F) - GP
Tip /Shape	flat	flat
Temperature Sensor	yes	yes
Amplifier	yes	yes
Body Material	titanium body working as matching pin	
Cable	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')
Recommended Use	plating baths	cooling towers, boilers
Connection	HI62911D DIN*	HI72911D DIN** HI72911B BNC + phono†

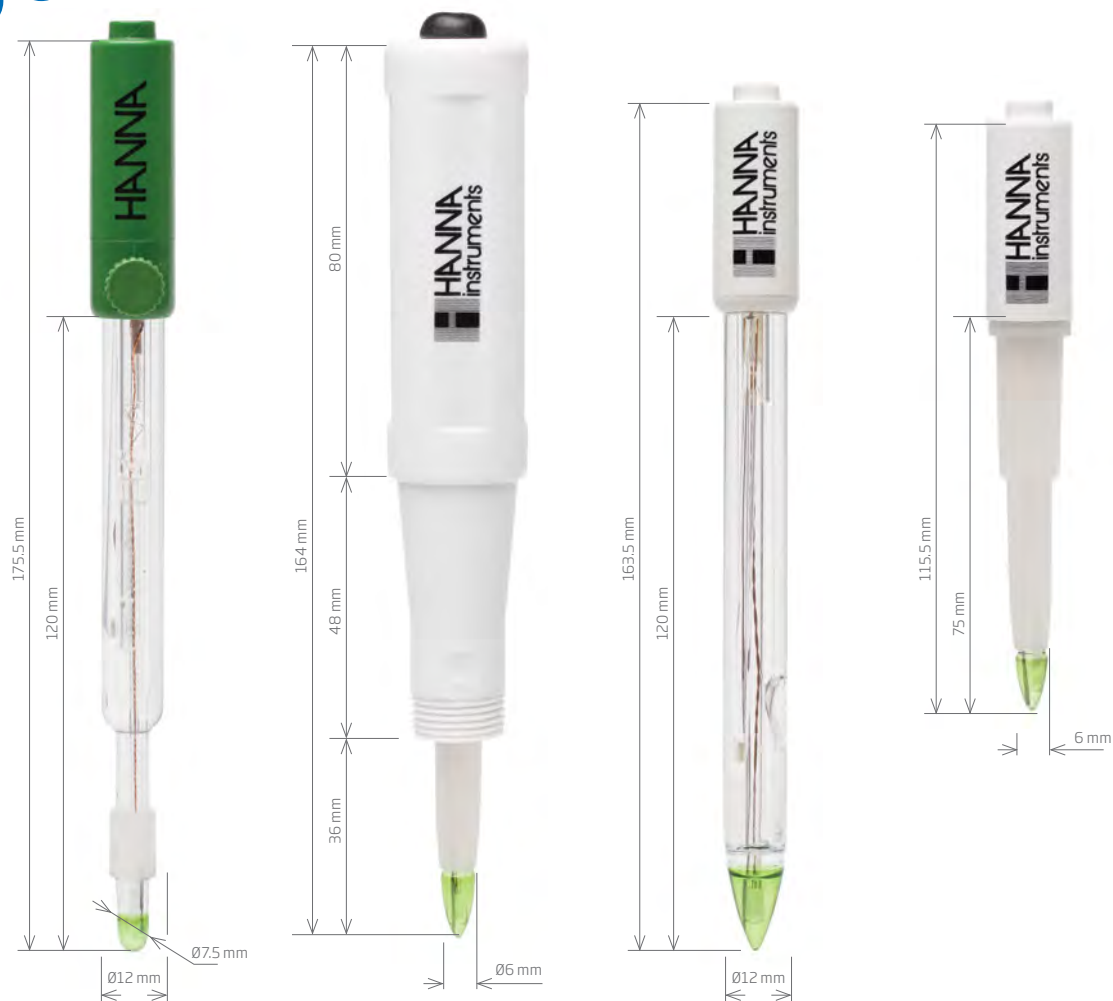
* Recommended for use with HI99131 pH meter

** Recommended for use with HI99141 pH meter
† Recommended for use with HI98191 pH meter



Code	HI11310	HI11311	HI10530	HI10430
Description	refillable, combination, digital pH electrode	refillable, combination, digital pH electrode w/ Sensor Check™	refillable, combination, digital pH electrode with conical tip	refillable, combination, digital pH electrode with double junction
Reference	double, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl
Junction	ceramic, single / 15-20 µL/h	ceramic, single / 15-20 µL/h	ceramic, triple / 40-50 µL/h	ceramic, triple / 40-50 µL/h
Electrolyte	KCl 3.5M	KCl 3.5M	KCl 3.5M	KCl 3.5M
Max Pressure	0.1 bar	0.1 bar	0.1 bar	0.1 bar
Range	pH: 0 to 13	pH: 0 to 13	pH: 0 to 13	pH: 0 to 13
Recommended Operating Temp.	-5 to 100°C (23 to 212°F) - HT	-5 to 100°C (23 to 212°F) - HT	-5 to 100°C (23 to 212°F) - LT	-5 to 100°C (23 to 212°F) - HT
Tip/Shape	spheric (dia: 9.5 mm)	spheric (dia: 9.5 mm)	conic (12 x 12 mm)	spheric (dia: 9.5 mm)
Temperature Sensor	yes	yes	yes	yes
Matching Pin	no	yes	no	no
Amplifier	yes	yes	yes	yes
Body Material	glass	glass	glass	glass
Cable	1 m (3.3')	1 m (3.3')	1 m (3.3')	1 m (3.3')
Recommended Use	laboratory general purpose, beer	laboratory general purpose, beer	fats and creams, soil samples, potable water, semi-solid products, low conductivity solutions, emulsions	hydrocarbons, paints, solvents, sea water, strong acids and bases, low conductivity solutions, tris buffer
Connection	HI11310 3.5 mm jack	HI11311 3.5 mm jack	HI10530 3.5 mm jack	HI10430 3.5 mm jack

edge[®] Electrodes



Code	HI10480	FC2320	FC2100	FC2020
Description	refillable, digital pH electrode w/ CPS™ (clogging prevention system)	digital pH electrode	digital pH electrode	digital pH Electrode
Reference	double, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl
Junction	open/CPS™	open	open	open
Electrolyte	KCl 3.5M	viscolene	viscolene	viscolene
Max Pressure	0.1 bar	0.1 bar	0.1 bar	0.1 bar
Range	pH: 0 to 12	pH: 0 to 12	pH: 0 to 12	pH: 0 to 12
Recommended Operating Temp.	0 to 80°C (32 to 176°F) - LT	0 to 60°C (32 to 140°F) - LT	0 to 60°C (32 to 140°F) - LT	0 to 60°C (32 to 140°F) - LT
Tip /Shape	dome (dia: 8 mm)	conic (6 x 10 mm)	conic (12 x 12 mm)	conic (6 x 10 mm)
Temperature Sensor	yes	yes	yes	yes
Matching Pin	no	no	no	yes
Amplifier	yes	yes	yes	yes
Body Material	glass	PVDF	glass	PVDF
Cable	1 m (3.3')	1 m (3.3')	1 m (3.3')	1 m (3.3')
Recommended Use	application specific purpose, wine	application specific purpose, meat	application specific purpose, dairy	application specific purpose, dairy
Connection	HI10480 3.5 mm jack	FC2320 3.5 mm jack	FC2100 3.5 mm jack	FC2020 3.5 mm jack



Code	HI12300	HI12301	HI36180	HI36200
Description	combination, digital pH electrode	combination, digital pH electrode	refillable, ORP digital probe	ORP digital probe
Reference	double, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl	single, Ag/AgCl
Junction / Flow Rate	ceramic, single / 15-20 µL/h	ceramic, single / 15-20 µL/h	ceramic, single / 15-20 µL/h	ceramic, single
Electrolyte	gel	gel	KCl 3.5M + AgCl	gel
Max Pressure	2 bar	2 bar	0.1 bar	2 bar
Range	pH: 0 to 13	pH: 0 to 13	ORP: ±2000 mV	ORP: ±2000 mV
Recommended Operating Temp.	-5 to 70°C (23 to 158°F) - GP	-5 to 70°C (23 to 158°F) - GP	-5 to 100°C (23 to 212°F)	-5 to 70°C (23 to 158°F)
Tip / Shape	spheric (dia: 7.5 mm)	spheric (dia: 7.5 mm)	platinum pin	platinum pin
Temperature Sensor	yes	yes	yes	yes
Matching Pin	no	yes	no	no
Amplifier	yes	yes	yes	yes
Body Material	PEI	PEI	glass	PEI
Cable**	1 m (3.3')	1 m (3.3')	1 m (3.3')	1 m (3.3')
Recommended Use	field applications	field applications	laboratory general purpose	field applications
Connection	HI12300 3.5 mm jack	HI12301 3.5 mm jack	HI36180 3.5 mm jack	HI36200 3.5 mm jack

Half-Cells



Code	HI2111B	HI2112B	FC260B	HI3133B	HI5110B
Description	pH half-cell	pH half-cell	pH half-cell	ORP half-cell	ORP half-cell
Half Cell	-	-	-	platinum	Ag
Range	pH: 0 to 14	pH: 0 to 13	pH: 0 to 12	mV	mV
Recommended Operating Temp.	0 to 100°C (32 to 212°F)	0 to 70°C (32 to 158°F) - GP	-5 to 100°C (23 to 212°F) - LT	-5 to 100°C (23 to 212°F)	0 to 70°C (32 to 158°F)
Tip /Shape	spheric (dia: 9.5 mm)	spheric (dia: 7.5 mm)	spheric (dia: 9.5 mm)	platinum pin	cylindric (dia: 3 mm)
Body Material	glass	PEI	glass	glass	glass
Cable	coaxial	coaxial	coaxial	coaxial	coaxial
Recommended Use	general purpose, strong alkaline solutions	general purpose	milk	general purpose, potentiometric titration	argentometric titration
Connection	HI2111B BNC	HI2112B BNC	FC260B BNC	HI3133B BNC	HI5110B BNC

Reference Electrodes



Code	HI5412	HI5311	HI5314	HI5414
Description	reference electrode	reference electrode	reference electrode	reference electrode
Reference	single, Hg/Hg ₂ Cl ₂	double, Ag/AgCl	double, Ag/AgCl	single, Hg/Hg ₂ Cl ₂
Junction / Flow Rate	ceramic, single / 15-20 µL/h	ceramic, single / 15-20 µL/h	ceramic, double	ceramic, double
Electrolyte	KCl 3.5M	KCl 3.5M	KCl 3.5M	KCl 3.5M
Max Pressure	0.1 bar	0.1 bar	3 bar with back pressure	3 bar with back pressure
Recommended Operating Temp.	-5 to 60°C (23 to 140°F)	-5 to 100°C (23 to 212°F)	-5 to 100°C (23 to 212°F)	-5 to 60°C (23 to 140°F)
Body Material	glass	glass	glass	glass
Cable	1 m (3.3')	1 m (3.3')	1 m (3.3')	1 m (3.3')
Recommended Use	general purpose, ISE, titrations	general purpose, titrations	measurements with remote filling	measurements with remote filling
Connection	HI5412 4 mm banana	HI5311 4 mm banana	HI5314 4 mm banana	HI5414 4 mm banana



High pressure or high concentration of contaminants

Because of the special electrode recharge system of the HI5314 and HI5414, it is possible to connect an outside container. This will increase the amount of electrolyte of the reference half cell and thus, the pressure inside the electrode. By so doing, the junction has the ability to work in high pressure environments without the danger of implosion.

Reference Electrodes



Code	HI5413	HI5312	HI5313
Description	reference electrode	reference electrode	reference electrode
Reference	single, Hg/Hg ₂ Cl ₂	double, Ag/AgCl	single, Ag/AgCl
Junction / Flow Rate	PTFE sleeve	PTFE sleeve	ceramic
Electrolyte	KCl 3.5M	KCl 3.5M	gel (KCl 1M + AgCl)
Max Pressure	0.1 bar	0.1 bar	0.1 bar
Recommended Operating Temp.	-5 to 60°C (23 to 140°F)	-5 to 80°C (23 to 176°F)	-5 to 60°C (23 to 140°F)
Body Material	glass	glass	PEI
Cable	1 m (3.3')	1 m (3.3')	1 m (3.3')
Recommended Use	samples with suspended solids, ISE	titrations, samples with suspended solids	titrations, samples with suspended solids
Connection	HI5413 4 mm banana	HI5312 4 mm banana	HI5313 4 mm banana