



CODE	HI73127	HI73120	HI73311	HI1270
Description	pH electrode	ORP electrode	EC/TDS electrode	pH electrode
Reference	single, Ag/AgCl	single, Ag/AgCl	-	single, Ag/AgCl
Junction / Flow Rate	cloth	cloth	-	open
Electrolyte	gel	gel	-	viscolene
Max Pressure	0.1 bar	0.1 bar	-	0.1 bar
Range	pH: 0 to 14	ORP: ± 2000 mV	-	pH: 0 to 13
Recommended Operating Temp.	-5 to 50°C (23 to 122°F)	-5 to 50°C (23 to 122°F)	-5 to 50°C (23 to 122°F)	0 to 50°C (32 to 122°F)
Glass Type	LT (low temperature)	-	-	GP (general purpose)
Tip /Shape	spheric (dia: 5.0 mm)	platinum pin	-	spheric (dia: 3.0 mm)
Temperature Sensor	no	no	no	no
Amplifier	no	no	no	no
Body Material	polypropylene	polypropylene	polypropylene	polypropylene
Cable	no	no	no	no
Recommended Use	general purpose, field applications	general purpose, field applications	general purpose, field applications	general purpose, field applications
Connection	pin	pin	pin	screw cap

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CODE	HI1271	HI1280	HI1290	HI1295
Description	pH electrode	pH electrode	pH electrode	pH electrode
Reference	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl
Junction / Flow Rate	open	ceramic, single / 15-20 µL/H	ceramic, single / 15-20 µL/H	ceramic, single / 15-20 µL/H
Electrolyte	viscolene	gel	gel	gel
Max Pressure	0.1 bar	0.1 bar	0.1 bar	2 bar
Range	pH: 0 to 13	pH: 0 to 13	pH: 0 to 13	pH: 0 to 13
Recommended Operating Temp.	0 to 50°C (32 to 122°F)	0 to 70°C (32 to 158°F)	0 to 70°C (32 to 158°F)	0 to 70°C (32 to 158°F)
Glass Type	GP (general purpose)	GP (general purpose)	GP (general purpose)	GP (general purpose)
Tip /Shape	spheric (dia: 3.0 mm)	spheric (dia: 5.0 mm)	spheric (dia: 5.0 mm)	spheric (dia: 5.0 mm)
Temperature Sensor	no	yes	yes	yes
Amplifier	no	yes	yes	yes
Body Material	polypropylene	polypropylene	polypropylene	polypropylene
Cable	no	no	no	no
Recommended Use	general purpose, field applications	general purpose, field applications	general purpose, field applications	general purpose, field applications
Connection	screw cap	multi-pin	multi-pin	multi-pin

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CODE	HI1285-8	HI1285-9	HI1286	HI1293D
Description	pre-amplified pH and EC probe	pre-amplified pH and EC inline probe	pH electrode	pH electrode
Reference	single, Ag/AgCl	triple, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl
Junction / Flow Rate	cloth	PTFE	PTFE	PTFE
Electrolyte	gel	polymer	polymer	polymer
Max Pressure	.2 bar	8 bar	3 bar	3 bar
Range	pH: 0 to 13 / EC	pH: 0 to 12 / EC	pH: 0 to 13	pH: 0 to 13
Recommended Operating Temp.	0 to 50°C (32 to 122°F)	0 to 60°C (32 to 140°F)	0 to 80°C (32 to 176°F)	0 to 60°C (32 to 140°F)
-	LT (low temperature)	LT (low temperature)	GP (general purpose)	GP (general purpose)
Tip / Shape	spheric (dia: 8.5 mm)	dome	spheric (dia: 7.5 mm)	spheric (dia: 7.5 mm)
Temperature Sensor	yes	yes	no	no
Amplifier	yes	yes	no	yes
Body Material	polypropylene	PVC (thread 3/4" NPT)	PEI	PEI
Cable	7-pole; 1 m cable (3.3')	7-pole; 3 m cable (9.9')	coaxial; 2 m (6.6')	5-pole; 2 m (6.6')
Recommended Use	hydroponics, aquaponics, greenhouses	hydroponics, aquaponics, greenhouses	general purpose, water treatment, agriculture	hydroponics, greenhouses
Connection	DIN*	DIN*	BNC	DIN

* To be used with HI981420 GroLine monitor

* To be used with HI981421 GroLine monitor

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Combination Electrodes



Code	HI1043[]	HI1053[]	HI10533	HI1083[]
Description	refillable, combination pH electrode w/ double junction	refillable, combination pH electrode w/ conical tip	refillable, combination pH electrode w/ conical tip	combination pH electrode w/micro bulb for small samples
Reference	double, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl
Junction / Flow Rate	ceramic, double / 30-40 µL/h	ceramic, triple / 40-50 µL/h	ceramic, triple / 40-50 µL/h	open
Electrolyte	KCl 3.5M	KCl 3.5M	KCl 3.5M	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 12	pH: 0 to 13
Recommended Operating Temp.	0 to 100°C (32 to 212°F)	-5 to 70°C (23 to 158°F)	-5 to 70°C (23 to 158°F)	0 to 50°C (32 to 122°F)
Glass Type	HT (high temperature)	LT (low temperature)	LT (low temperature)	GP (general purpose)
Tip / Shape	spheric (dia: 9.5 mm)	conic (12 x 12 mm)	conic (12 x 12 mm)	spheric (dia: 3 mm)
Temperature Sensor	no	no	yes	no
Amplifier	no	no	yes	no
Body Material	glass - HT	glass - LT	glass - LT	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, high purity water, soil samples, potable water, semi-solid products, low conductivity solutions, emulsions	fats and creams, high purity water, soil samples, potable water, semi-solid products, low conductivity solutions, emulsions	biotechnology, samples < 100 µL
Connection	HI1043B BNC HI1043P BNC + pin*	HI1053B BNC HI1053P BNC + pin*	HI10533 Quick Connect DIN	HI1083B BNC HI1083P BNC + pin*

* For pH meters with CAL Check™ system

* For pH meters with CAL Check system

* For pH meters with CAL Check system



Code	HI1093B	HI1131[]	HI1151B	HI1135B
Description	combination pH electrode w/ extended length and micro bulb	refillable, combination pH electrode	refillable, combination pH electrode	refillable, combination pH electrode w/ side arm construction and fast flow rate
Reference	single, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl
Junction / Flow Rate	open	ceramic, single / 15-20 µL/h	ceramic, single / 15-20 µL/h	ceramic, double / 30-40 µL/h
Electrolyte	viscolene	KCl 3.5M	-	KCl 3.5M
Max Pressure	0.1 bar	0.1 bar	0.1 bar	3 bar with back pressure
Range	pH: 0 to 14	pH: 0 to 14	pH: 0 to 13	pH: 0 to 14
Recommended Operating Temp.	0 to 50°C (32 to 122°F)	0 to 100°C (32 to 212°F)	0 to 100°C (32 to 212°F)	0 to 100°C (32 to 212°F)
Glass Type	GP (general purpose)	HT (high temperature)	HT (high temperature)	HT (high temperature)
Tip /Shape	spheric (dia: 3 mm)	spheric (dia: 9.5 mm)	spheric (dia: 9.5 mm)	spheric (dia: 9.5 mm)
Temperature Sensor	no	DIN model only	no	no
Amplifier	no	DIN model only	no	no
Body Material	glass - GP	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	NMR tubes	laboratory general purpose, beer	non-aqueous titration	continuous monitoring with remote filling
Connection	HI1093B BNC HI1093P BNC + pin*	HI1131B BNC HI1131P BNC + pin* HI11313 Quick Connect DIN	HI1151B BNC	HI1135B BNC

* For pH meters with CAL Check™ system

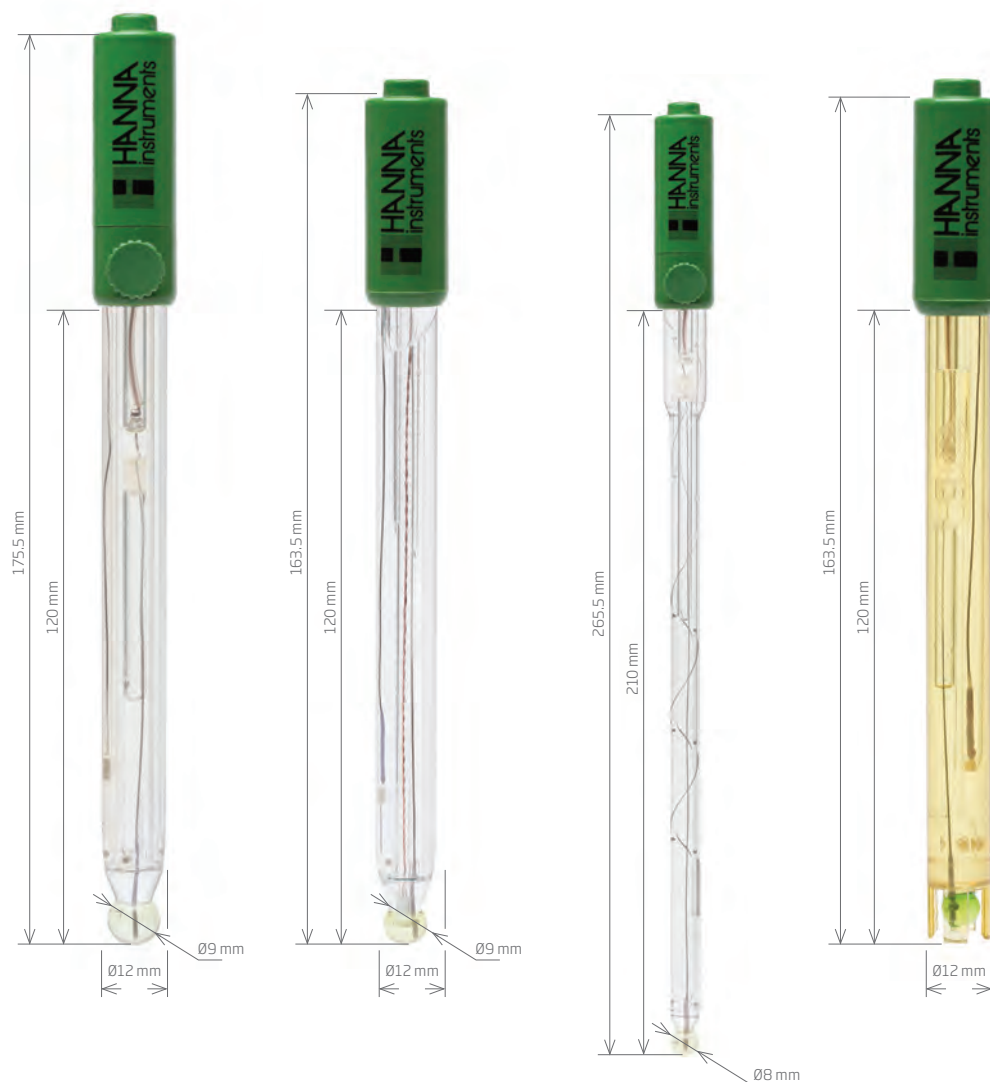
* For pH meters with CAL Check™ system

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Combination Electrodes

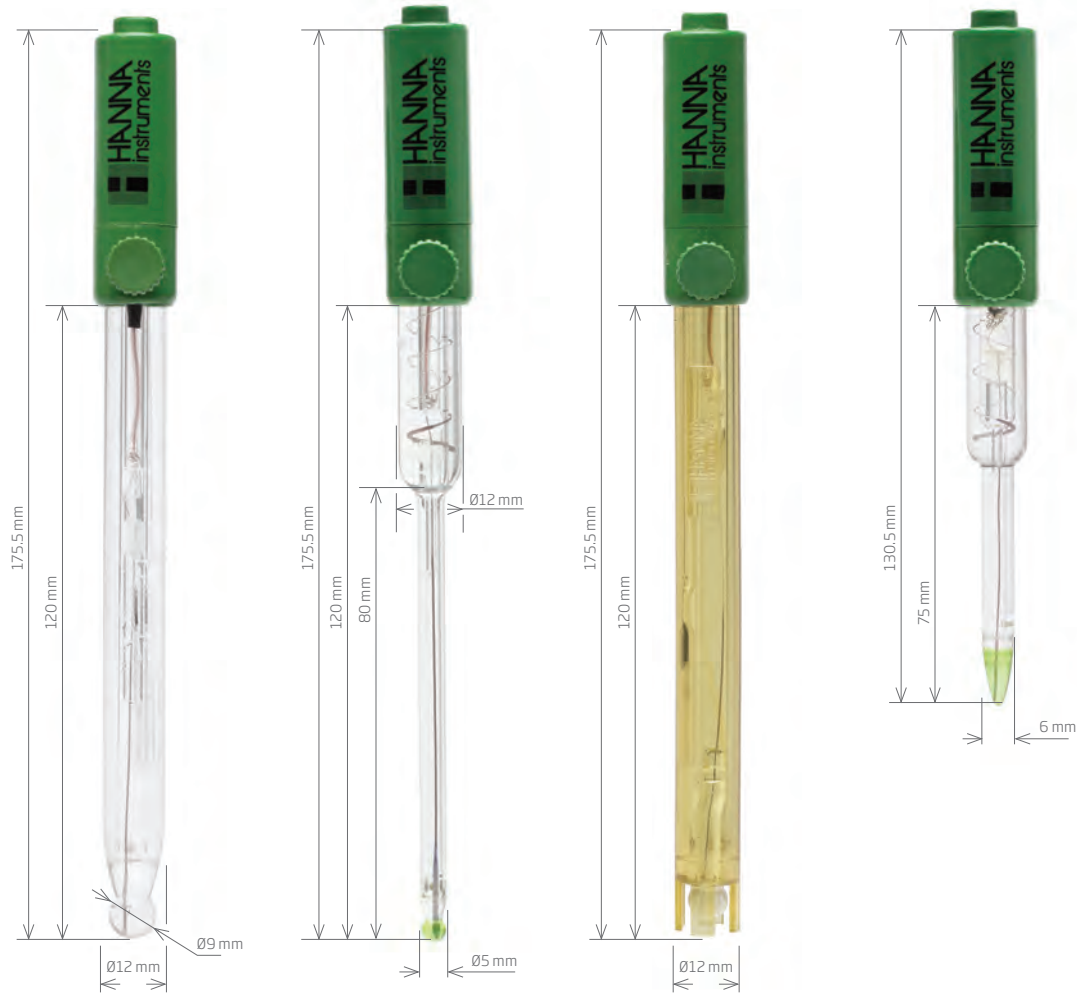


Code	HI1143B	HI1110 []	HI1331B	HI1230 []
Description	refillable, combination pH electrode for fluoride applications	combination pH electrode	combination pH electrode	combination pH electrode
Reference	double, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl	double, Ag/AgCl
Junction / Flow Rate	ceramic, single / 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	gel	KCl 3.5M + AgCl	gel
Max Pressure	0.1 bar	0.1 bar	0.1 bar	2 bar
Range	pH: 0 to 10	pH: 0 to 13	pH: 0 to 13	pH: 0 to 12
Recommended Operating Temp.	-5 to 60°C (23 to 140°F) – HF	0 to 80°C (32 to 176°F) – GP	0 to 70°C (32 to 158°F) – GP	-5 to 70°C (23 to 158°F) – LT
Glass Type	HF (hydrofluoric acid resistant)	GP (general purpose)	GP (general purpose)	LT (low temperature)
Tip/Shape	spheric (dia: 9.5 mm)	spheric (dia: 9.5 mm)	spheric (dia: 7.5 mm)	spheric (dia: 7.5 mm)
Temperature Sensor	no	DIN model only	no	DIN model only
Amplifier	no	DIN model only	no	DIN model only
Body Material	glass	glass	glass	PEI
Cable	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')
Recommended Use	samples with fluoride (max 2 g/L @ pH 2 and temperature < 60°C)	general purpose	specific for flasks	field applications, soil solution, photographic chemicals, laboratory (general use)
Connection	HI1143B BNC	HI1110B BNC HI11103 Quick Connect DIN	HI1331B BNC	HI1230B BNC HI12303 Quick Connect DIN

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Code	HI1144B	HI1330[]	HI1343B	HI2031B
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 µL/h	ceramic, single / 15-20 µL/h	ceramic, single / 15-20 µL/h	ceramic, single / 15-20 µL/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
Glass Type	HT (high temperature)	LT (low temperature)	HT (high temperature)	LT (low temperature)
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	HI1330B BNC HI1330P BNC + pin*	HI1343B BNC	HI2031B BNC

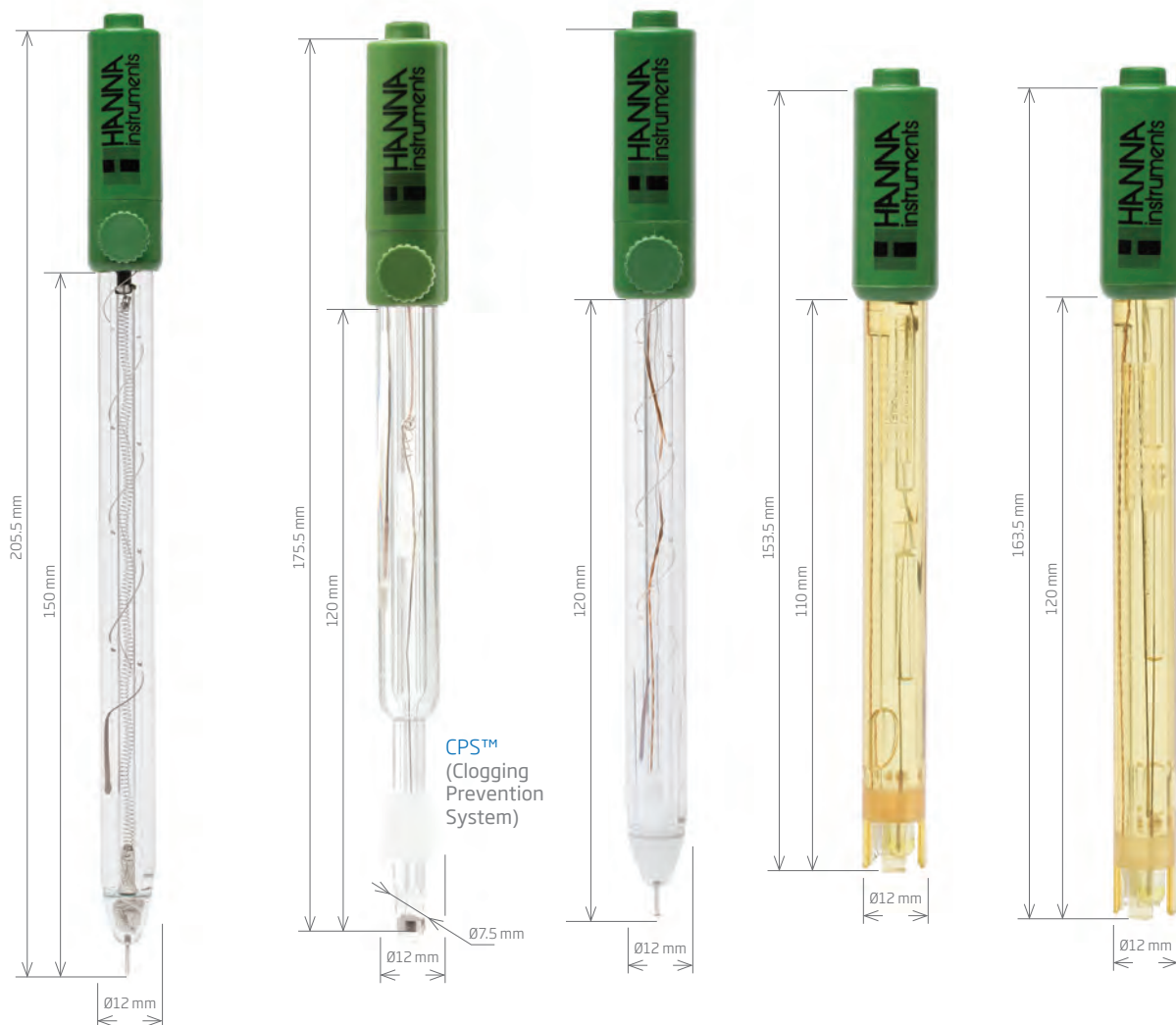
* For pH meters with CAL Check™ system

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Special pH and ORP Electrodes



Code	HI3131B	HI3149B	HI3618D/HI36183	HI1217D	HI1291D
Description	refillable combination ORP electrode	ORP electrode	ORP combination electrode	pH electrode	pH electrode
Reference	single, Ag/AgCl	double, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl
Junction / Flow Rate	ceramic, single / 15-20 µL/h	CPS™	ceramic, single / 15-20 µL/h	ceramic, single	ceramic, single
Electrolyte	KCl 3.5M + AgCl	KCl 3.5M	KCl 3.5M + AgCl	gel	gel
Max Pressure	0.1 bar	0.1 bar	0.1 bar	2 bar	2 bar
Range	ORP: ±2000 mV	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 60°C (23 to 140°F)	-5 to 70°C (23 to 158°F)	0 to 70°C (32 to 158°F)	0 to 70°C (32 to 158°F)
Glass Type	-	-	-	GP (general purpose)	GP (general purpose)
Tip /Shape	platinum pin	platinum ring	platinum pin	spheric (dia: 5.0 mm)	spheric (dia: 5.0 mm)
Temperature Sensor	no	no	yes	yes	yes
Amplifier	no	no	yes	yes	yes
Body Material	glass	glass	glass	PEI	PEI
Cable	coaxial; 1 m (3.3')	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	non-aqueous titrations	laboratory	general purpose	general purpose, education, laboratory
Connection	HI3131B BNC	HI3149B BNC	HI36183 Quick Connect DIN HI3618D DIN**	HI1217D DIN**	HI1291D DIN**

** Recommended for use with HI6314 pH meter

** Recommended for use with HI6314 pH meter

** Recommended for use with HI207 and HI209 pH meters

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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)	0 to 70°C (32 to 158°F)	-5 to 70°C (23 to 158°F)
Glass Type	GP (general purpose)	HT (high temperature)	LT (low temperature)
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

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).
- Single-use 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.

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2 Rugged pH and ORP Electrodes

pH

electrodes



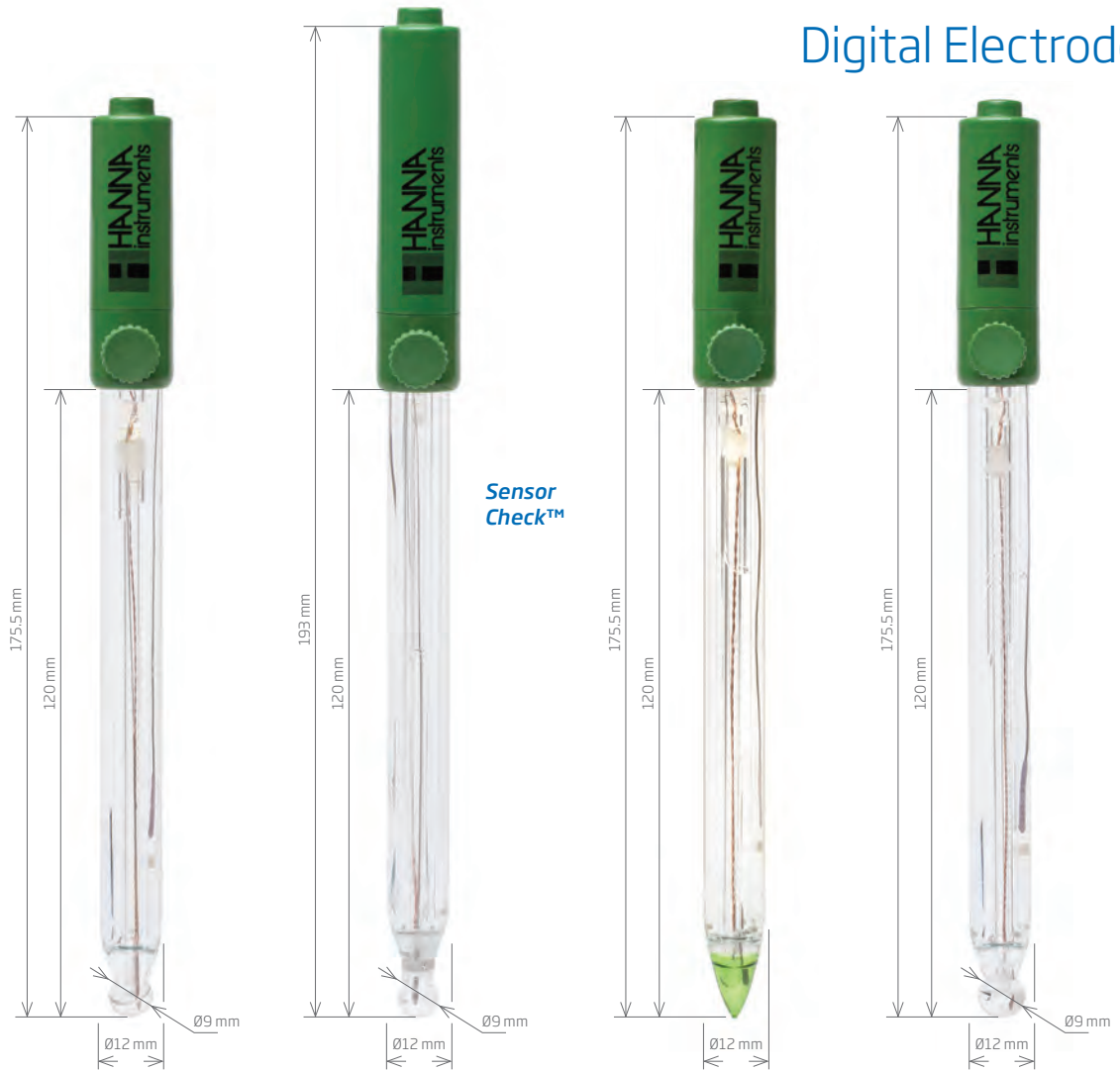
Code	HI1332[]	HI3230B	HI36203	HI4430B
Description	pH electrode	gel-filled, combination ORP electrode w/ platinum contact	ORP probe	gel-filled, combination ORP electrode w/ gold contact
Reference	double, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl
Junction / Flow Rate	ceramic, single / 15-20 µL/h	ceramic, single	ceramic, single	ceramic, single
Electrolyte	KCl 3.5M	gel	gel	gel
Max Pressure	0.1 bar	2 bar	2 bar	2 bar
Range	pH: 0 to 13	ORP: ±2000 mV	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)	-5 to 70°C (23 to 158°F)
Glass type	GP (general purpose)	-	-	-
Tip /Shape	spheric (dia: 7.5 mm)	platinum pin	platinum pin	gold pin
Temperature Sensor	no	no	yes	no
Amplifier	no	no	yes	no
Body Material	PEI	PEI	PEI	PEI
Cable	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')
Recommended Use	chemicals, field applications, quality control, aquariums	municipal water, quality control	field applications	oxidants, ozone
Connection	HI1332B BNC HI1332P BNC + pin* HI1332D DIN	HI3230B BNC	HI36203 Quick Connect DIN	HI4430B BNC

* For pH meters with CAL Check™ system

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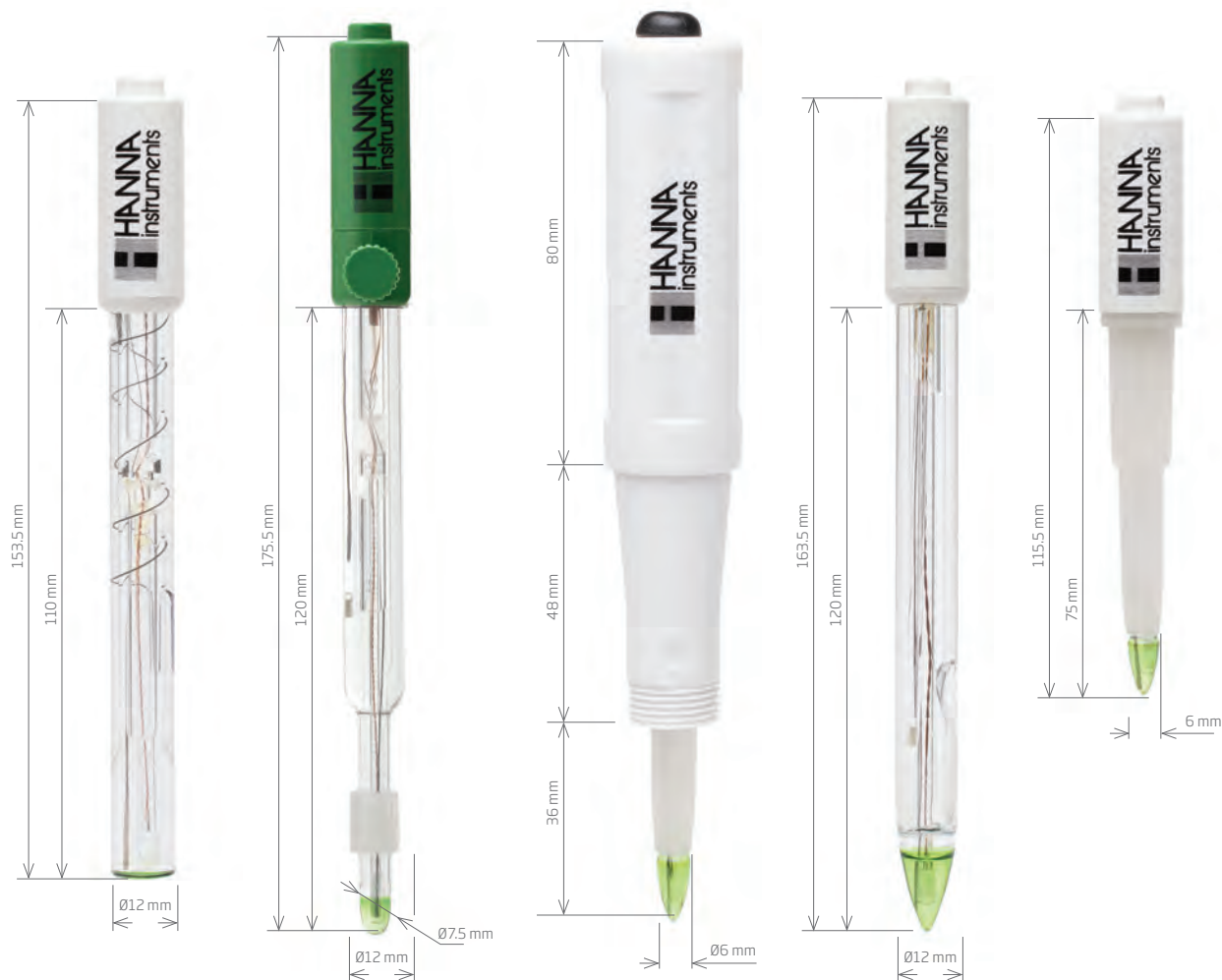


Code	HI11310	HI11311	HI10530	HI10430
Description	refillable, combination, digital pH electrode	refillable, combination, digital pH electrode w/ Sensor Check™	refillable, combination, digital pH electrode with conical tip	refillable, combination, digital pH electrode with double junction
Reference	double, 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 14	pH: 0 to 14	pH: 0 to 12	pH: 0 to 13
Recommended Operating Temp.	0 to 100°C (32 to 212°F)	0 to 100°C (32 to 212°F)	-5 to 70°C (23 to 158°F)	0 to 100°C (32 to 212°F)
Glass Type	HT (high temperature)	HT (high temperature)	LT (low temperature)	HT (high temperature)
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, high purity water, soil samples, potable water, semi-solid products, low conductivity solutions, emulsions	hydrocarbons, paints, solvents, sea water, strong acids and bases, high conductivity samples, tris buffer
Connection	HI11310 3.5 mm connector	HI11311 3.5 mm connector	HI10530 3.5 mm connector	HI10430 3.5 mm connector

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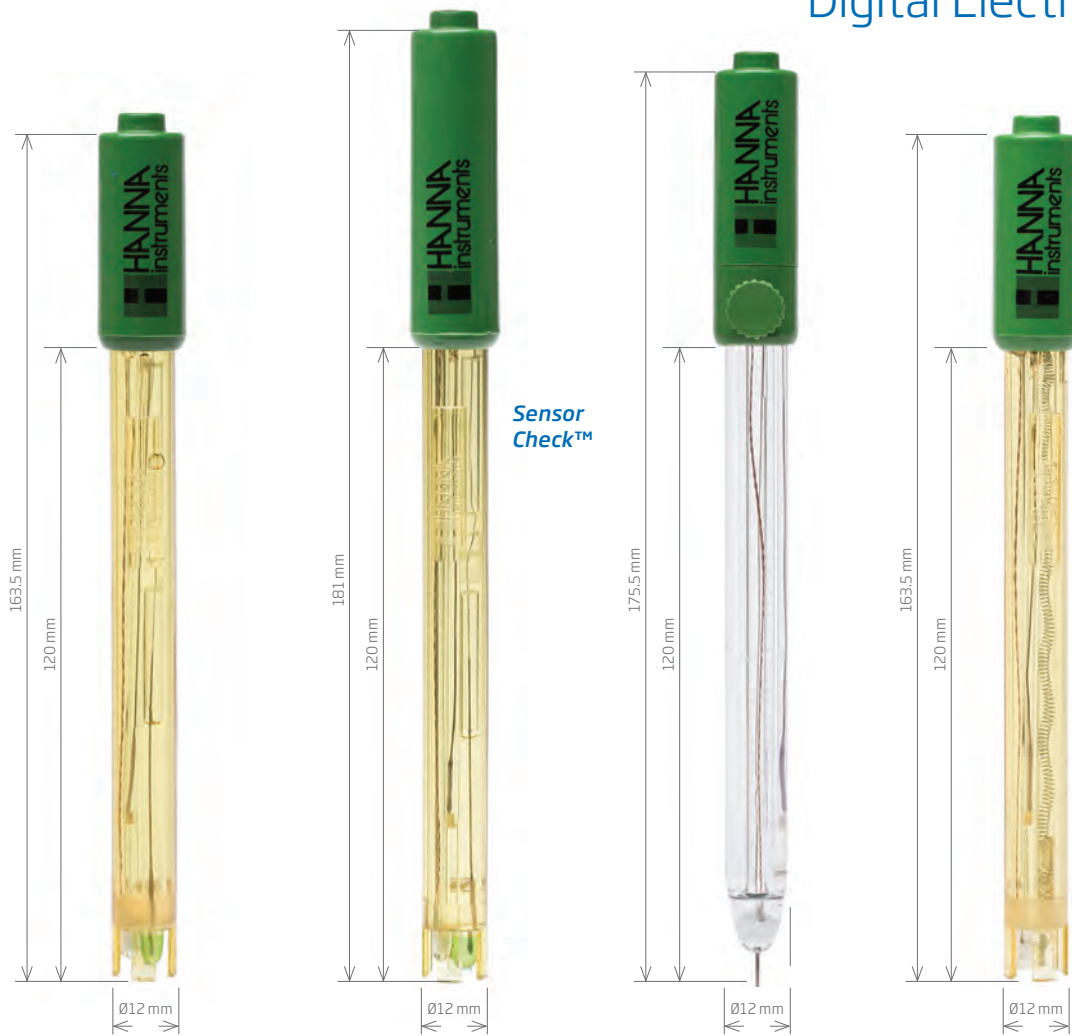


Code	HI14140	HI10480	FC2320	FC2100	FC2020
Description	digital pH electrode	refillable, digital pH electrode w/ CPS™ (clogging prevention system)	digital pH electrode	digital pH electrode	digital pH Electrode
Reference	single, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl
Junction	open	CPS™	open	open	open
Electrolyte	viscolene	KCl 3.5M	viscolene	viscolene	viscolene
Max Pressure	0.1 bar	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	pH: 0 to 12
Recommended Operating Temp.	0 to 50°C (32 to 122°F)	-5 to 60°C (23 to 140°F)	0 to 60°C (32 to 140°F)	0 to 60°C (32 to 140°F)	0 to 60°C (32 to 140°F)
Glass Type	LT (low temperature)	LT (low temperature)	LT (low temperature)	LT (low temperature)	LT (low temperature)
Tip/Shape	flat	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	yes
Matching Pin	no	no	no	no	no
Amplifier	yes	yes	yes	yes	yes
Body Material	glass	glass	PVDF	glass	PVDF
Cable	1 m (3.3')	1 m (3.3')	1 m (3.3')	1 m (3.3')	1 m (3.3')
Recommended Use	surfaces	application specific purpose, must in winemaking	application specific purpose, meat	application specific purpose, yogurt	application specific purpose, yogurt, cheese
Connection	HI14140 3.5 mm connector	HI10480 3.5 mm connector	FC2320 3.5 mm connector	FC2100 3.5 mm connector	FC2020 3.5 mm connector

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pH

electrodes

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 12	pH: 0 to 12	ORP: ±2000 mV	ORP: ±2000 mV
Recommended Operating Temp.	-5 to 70°C (23 to 158°F)	-5 to 70°C (23 to 158°F)	-5 to 100°C (23 to 212°F)	-5 to 70°C (23 to 158°F)
Glass Type	LT (low temperature)	LT (low temperature)	-	-
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 connector	HI12301 3.5 mm connector	HI36180 3.5 mm connector	HI36200 3.5 mm connector

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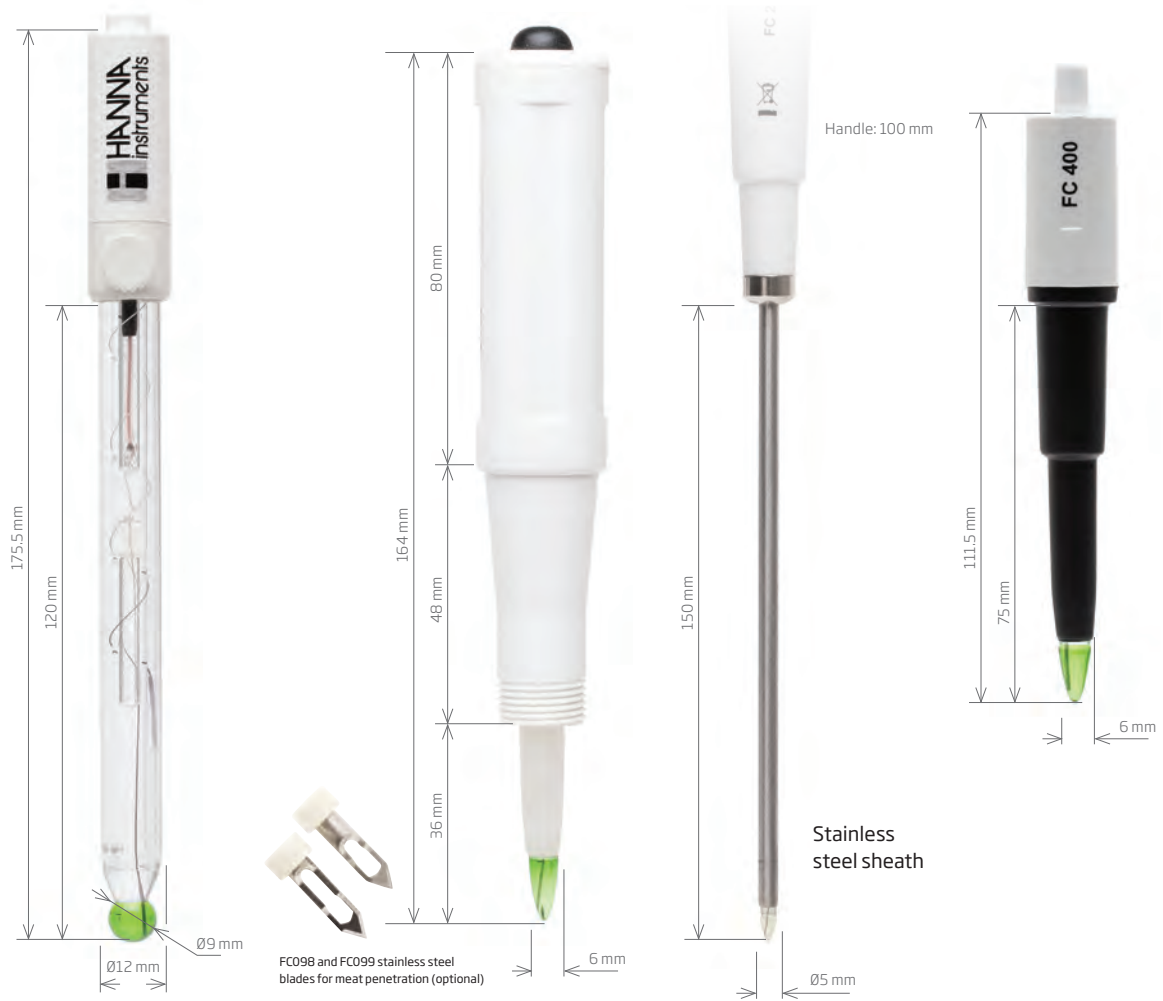
Code	FC100B	FC1013	FC200[]	FC210B
Description	pH electrode	preamplified pH/ temperature probe	pH electrode	pH electrode
Reference	double, Ag/AgCl	double, Ag/AgCl	single, Ag/AgCl	double, Ag/AgCl
Junction / Flow Rate	ceramic, single / 15-20 µL/h	ceramic, single / 15-20 µL/h	open	open
Electrolyte	KCl 3.5M	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 70°C (32 to 158°F)	0 to 70°C (32 to 158°F)	0 to 50°C (32 to 122°F)	0 to 60°C (32 to 140°F)
Glass Type	GP (general purpose)	GP (general purpose)	LT (low temperature)	LT (low temperature)
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	food industry (general use), milk	food industry (general use), milk	penetration, yogurt, cheese, semi- solid foods, fruits, ham and sausages	yogurt, creams
Connection	FC100B BNC	FC1013 Quick Connect DIN*	FC200B BNC FC200D DIN	FC210B BNC

* Recommended for use with HI98162
and HI99162 pH meters

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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	gel	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)	0 to 50°C (32 to 122°F)	0 to 50°C (32 to 122°F)	0 to 60°C (32 to 140°F)
Glass Type	LT (low temperature)	LT (low temperature)	GP (general purpose)	LT (low temperature)
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	titanium	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	penetration, cheese, quality control	penetration, meat
Connection	FC220B BNC	FC230B BNC	FC240B BNC	FC400B BNC

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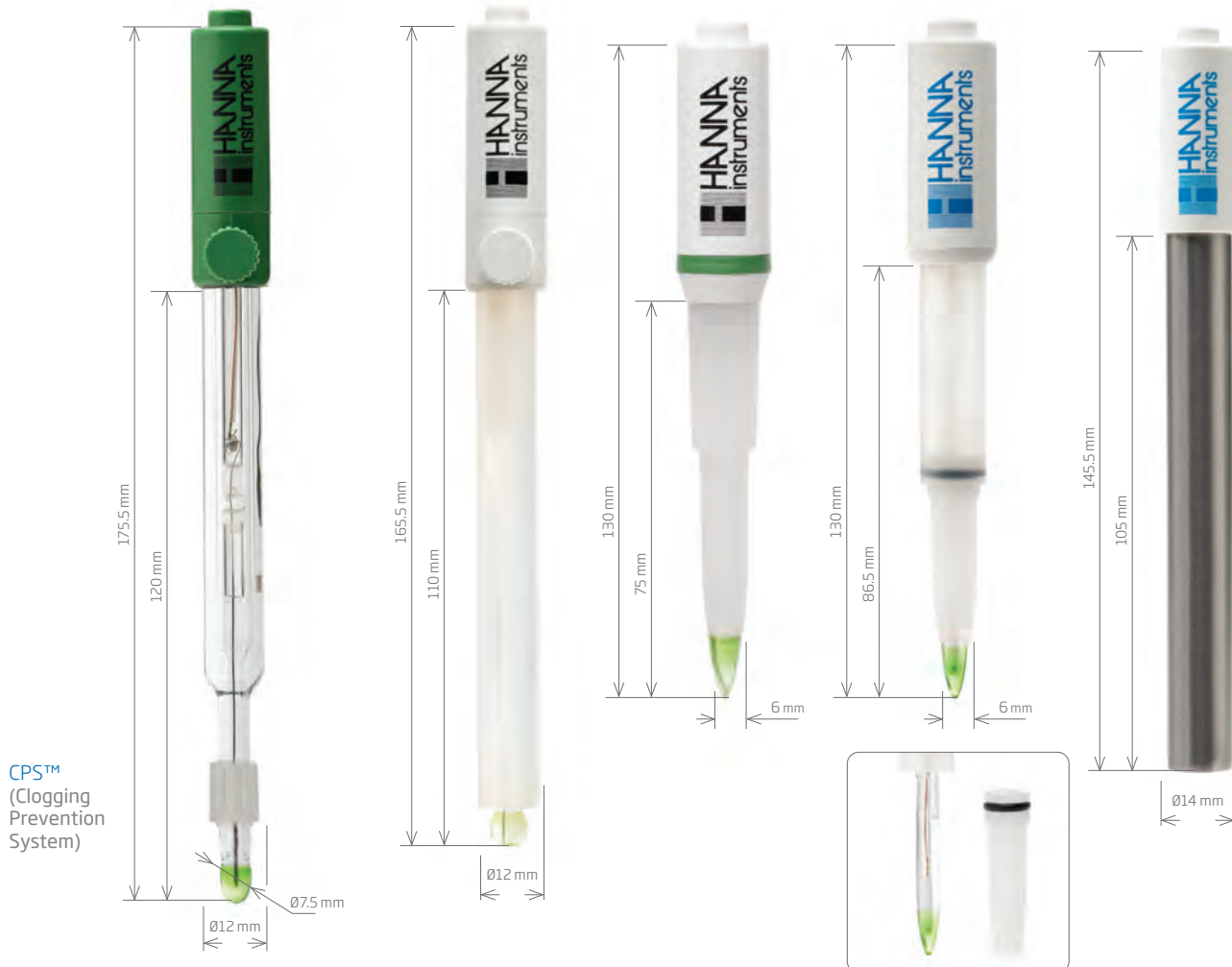
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2 Electrodes for the Food Industry

pH

electrodes



CPS™
(Clogging
Prevention
System)

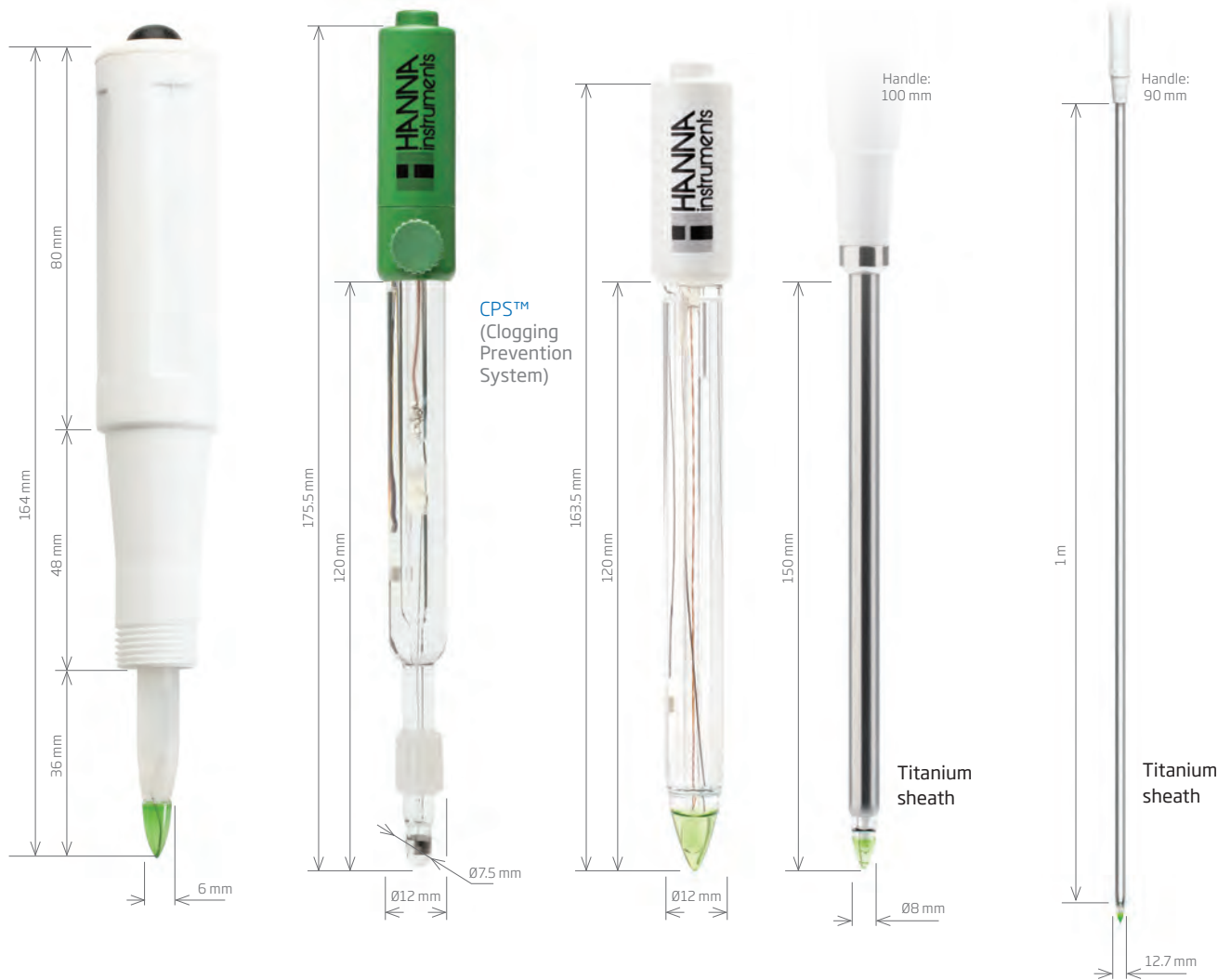
Code	HI1048 [] • FC10483	FC911	FC2023	FC2053	FC2143
Description	pH electrode with CPS™ (Clogging Prevention System)	pH electrode	pH electrode	pH electrode	pH electrode
Reference	double, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl	double, Ag/AgCl	single, Ag/AgCl
Junction / Flow Rate	CPS™	ceramic, single / 15-20 µL/H	open	open	cloth
Electrolyte	KCl 3.5M	KCl 3.5M	viscolene	gel	gel
Max Pressure	0.1 bar	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 12	pH: 0 to 12
Recommended Operating Temp.	-5 to 60°C (23 to 140°F)	0 to 70°C (32 to 158°F)	0 to 60°C (32 to 140°F)	0 to 60°C (32 to 140°F)	0 to 80°C (32 to 176°F)
Glass Type	LT (low temperature)	GP (general purpose)	LT (low temperature)	LT (low temperature)	LT (low temperature)
Tip / Shape	dome (dia: 8 mm)	spheric (dia: 7.5 mm)	conic (6 x 10 mm)	conic (6 x 10 mm)	flat
Temperature Sensor	DIN model only	no	yes	yes	yes
Amplifier	DIN model only	yes	yes	yes	yes
Body Material	glass	PVDF	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')	7-pole; 1 m (3.3')
Recommended Use	must in winemaking	creams, fruit juices, sauces, high humidity	yogurt, cheese, meat, semi-solid foods, fruits, ham and sausages	yogurt, cheese, meat, semi-solid foods, fruits, ham and sausages	beer
Connection	HI1048B BNC HI1048B/50 BNC (.4 m (1.3') cable) HI1048P BNC + pin* FC10483 Quick Connect DIN**	FC911B BNC	FC2023 Quick Connect DIN *	FC2053 Quick Connect DIN *	FC2143 Quick Connect DIN *

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

* Recommended for use with HI98161 and HI99161 pH meters

* Recommended for use with HI98161 pH meter

* Recommended for use with HI98151 pH meter



pH

electrodes

Code	FC2323	HI3148B	FC2133	FC2423	FC2423-1
Description	pH electrode	ORP electrode	pre-amplified pH / temperature probe	pre-amplified pH / temperature probe	pre-amplified pH / temperature probe
Reference	single, Ag/AgCl	double, Ag/AgCl	double	single	single
Junction	open	CPS™	open	open	open
Electrolyte	viscolene	KCl 3.5M	viscolene	viscolene	viscolene
Max Pressure	0.1 bar	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	pH: 0 to 12
Recommended Operating Temp.	0 to 50°C (32 to 122°F) - LT	-5 to 60°C (23 to 140°F)	0 to 60°C (32 to 140°F)	0 to 50°C (32 to 122°F)	0 to 50°C (32 to 122°F)
Glass type	LT (low temperature)	-	LT (low temperature)	LT (low temperature)	LT (low temperature)
Tip /Shape	conic (6 x 10 mm)	platinum ring	conic	conic (6 x 8 mm)	conic
Temperature Sensor	yes	no	yes	yes	yes
Amplifier	yes	no	yes	yes	yes
Body Material	PVDF	glass	glass	titanium	titanium
Cable	7-pole; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')	coaxial; 1 m (3.3')
Recommended Use	meat	must in winemaking	yogurt	penetration, cheese	penetration, cheese
Connection	FC2323 Quick Connect DIN*	HI3148B BNC HI3148B/50 BNC (.4 m (1.3') cable)	FC2133 Quick Connect DIN*	FC2423 Quick Connect DIN*	FC2423 Quick Connect DIN*

* Recommended for use with HI98163 and HI99163 pH meters

* Recommended for use with HI98164 and HI99164 pH meter

* Recommended for use with HI98165 and HI99165 pH meter

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Electrodes for Specific Analysis



Code	HI1049B	HI1413B	HI14143	HI14143/50	HI12923
Description	pH electrode with CPS™ (Clogging Prevention System)	pH electrode	pH electrode	pH electrode	pH electrode
Reference	double, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl
Junction	CPS™	open	open	open	ceramic, triple / 40-50 µL/h
Electrolyte	KCl 3.5M	viscolene	viscolene	viscolene	KCl 3.5M + AgCl
Max Pressure	0.1 bar	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	pH: 0 to 12
Recommended Operating Temp.	0 to 60°C (32 to 140°F)	0 to 50°C (32 to 122°F)	0 to 50°C (32 to 122°F)	0 to 50°C (32 to 122°F)	-5 to 70°C (23 to 158°F)
Glass Type	LT (low temperature)	LT (low temperature)	LT (low temperature)	LT (low temperature)	LT (low temperature)
Tip /Shape	dome (dia: 8 mm)	flat	flat	flat	conic (12 x 12 mm)
Temperature Sensor	no	no	yes	yes	yes
Amplifier	no	no	yes	yes	yes
Body Material	glass	glass	glass	glass	glass
Cable	coaxial; 1 m (3.3')	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	non-aqueous titrations	surface, skin, leather, paper, emulsions	surface, leather, paper, emulsions	skin, scalp	direct soil pH measurement, soil solution
Connection	HI1049B BNC	HI1413B BNC	HI14143 Quick Connect DIN*	HI14143/50 Quick Connect DIN*	HI12923 Quick Connect DIN*

* Recommended for use with HI99171 pH meter

* Recommended for use with HI99161 pH meter

* Recommended for use with HI99121 pH meter

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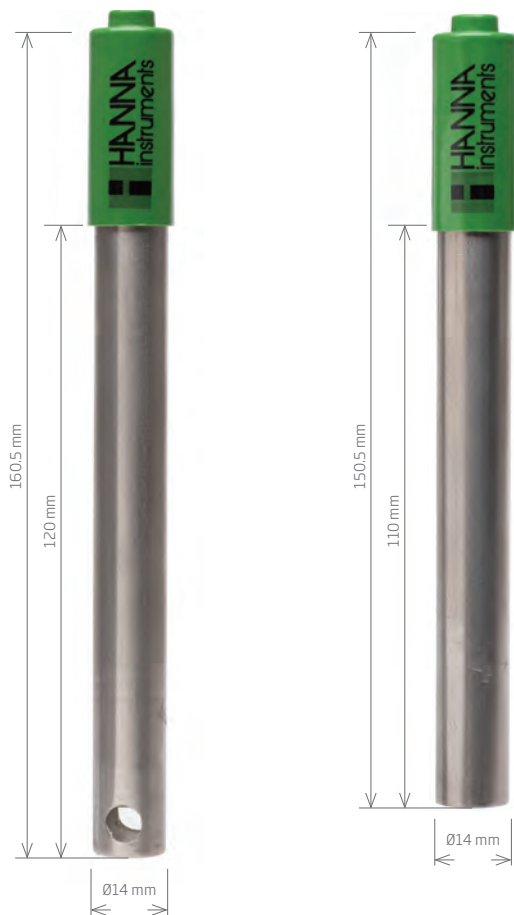
Code	HI12943	FC2153	HI12963	HI12973
Description	pH electrode	pH electrode	pH electrode	pH/ORP electrode
Reference	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl
Junction	ceramic, triple / 40-50 µL/h	ceramic, triple	cloth	cloth
Electrolyte	KCl 3.5M + AgCl	KCl 3.5M + AgCl	gel	gel
Max Pressure	0.1 bar	0.1 bar	3 bar	3 bar
Range	pH: 0 to 12	pH: 0 to 12	pH: 0 to 13	pH: 0 to 13; ORP
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)	0 to 70°C (32 to 158°F)
Glass Type	LT (low temperature)	LT (low temperature)	GP (general purpose)	GP (general purpose)
Tip /Shape	conic (12 x 12 mm)	spheric (dia: 9.5 mm)	spheric (dia: 5 mm)	pH: conic (3 mm); ORP: platinum sensor
Temperature Sensor	yes	yes	yes	yes
Amplifier	yes	yes	yes	yes
Body Material	glass	glass	titanium	titanium
Cable	7-pole; 1 m (3.3')	coaxial; 1 m (3.3')	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')
Recommended Use	direct soil, soilless media, soil solution	drinking water	wastewater	wastewater, municipal water, water treatment, swimming pools
Connection	HI12943 Quick Connect DIN*	FC2153 DIN*	HI12963 Quick Connect DIN*	HI12973 Quick Connect DIN*

* Only for use with HI9814
GroLine® multiparameter meter

* Recommended for use with HI99192
pH meter

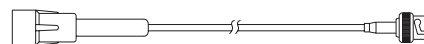
* Recommended for use with
HI98190 and HI991001 pH meter

* Recommended for use with HI991003 pH
meter



Electrode Extension Cables

Screw Type to BNC Cables / Connectors

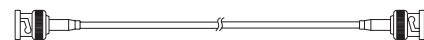


Description

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

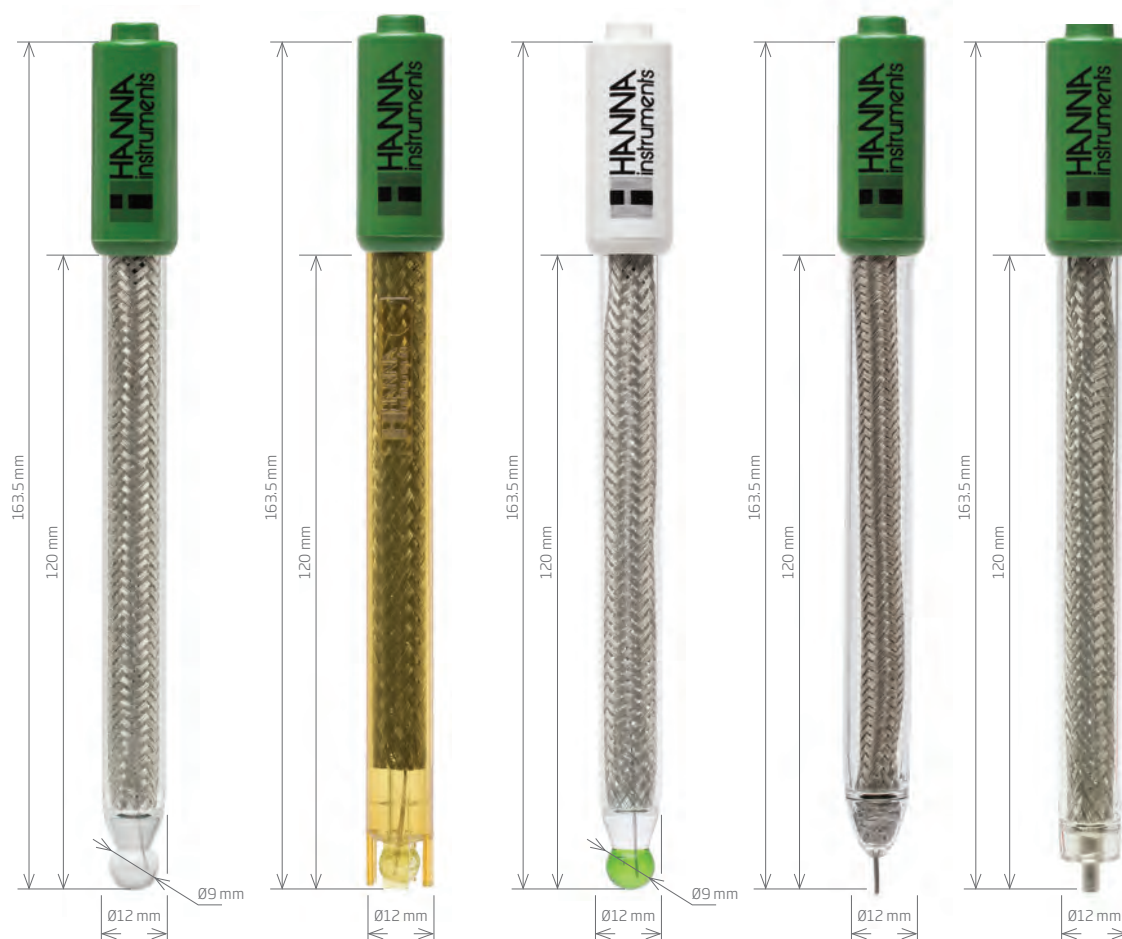
3.0 mm (0.12") cable with BNC connectors

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

Code	HI629113	HI729113 []
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)	0 to 80°C (32 to 176°F)
Glass Type	GP (general purpose)	GP (general purpose)
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	HI629113 Quick Connect DIN*	HI729113 Quick Connect 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	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)	-5 to 80°C (23 to 176°F)	-5 to 100°C (23 to 212°F)	0 to 70°C (32 to 158°F)
Glass Type	HT (high temperature)	GP (general purpose)	LT (low temperature)		
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



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, 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.



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	PE sleeve	PE 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)	0 to 60°C (32 to 140°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	titrations, samples with suspended solids	titrations, samples with suspended solids
Connection	HI5413 4 mm banana	HI5312 4 mm banana	HI5313 4 mm banana