

**HORIBA**  
Scientific

Benchtop/Portable/Compact  
**WATER QUALITY ANALYZERS**

pH mV(ORP) ION DO  
Conductivity Resistivity Salinity TDS

NEW



# LAQUA

## SERIES



CE

Explore the future

Automotive Test Systems | Process & Environmental | Medical | Microprocessor | Scientific

**HORIBA**

# LAQUA

Responding flexibly to your water quality analysis needs,  
our commitment to provide everything you expect from  
a water quality analyzer is distilled in our new brand, LAQUA.

## Whatever your needs

LAQUA is your indispensable partner for maintaining water quality and contributing to a safe and healthy society.

From 1950, when HORIBA pioneered glass electrode pH meters in Japan, we have been continuously evolving to meet customers' requirements with the latest technology.

If you are looking for a versatile product with high technology and accuracy, LAQUA is the best choice for you.



1950

HORIBA introduce s Japan's first electro de pH meter.



1964

M-5 (benchtop)  
From a vacuum tube to a semiconductor, allowing miniaturization and fast response.



1977

Model F-7AD (benchtop)  
Incorporating an industry-first LCD display, the combination of a glass electrode, a reference electrode and a temperature compensating electrode, makes testing easier.



Model F-80 (benchtop)  
Industry-first handheld pH meter capable of measuring pH at 1/100 resolution, includes an integral computer, with automatic calibration and a self-diagnostic function.

1980

L-7 (integrated)

Introduction of a small, hand-held pH meter with the measurement electrode integrated with in the main device.



C-1 (card)  
Development of the variable test sensor.

1987

B-111 (Pen type)  
Pen type sensor allows small samples to be tested.



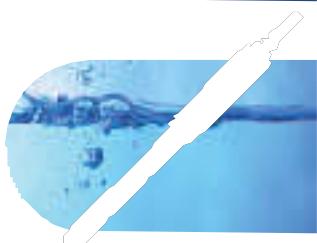
1990



F-20 (benchtop)  
Industry-first handheld pH meter. Large graphical display gives user instructions on screen.

1993

## LAQUA Electrode Technology



### Born from the fusion of our expertise and state-of-the-art technology.

True pH/water quality meters require artisan skills, long-term research and experiments, and breakthrough technology. LAQUA electrodes provide multiple approaches such as;

- Expertise in Manufacturing
- Contains Advanced Materials
- Next-Generation Electrode Technology

P3

## Electrode Lineup

### Various electrodes to match any application

A wide range of products for both benchtop and portable systems are available, including easy and reliable standard models, application-focused models for small samples or large containers, and special electrodes for specific sample characteristics.

LAQUA  
Electrode

P5

## Benchtop

### Stress-free measurement, high-end model

Water quality analysis is repeatedly performed in laboratories on a daily basis. Our high-end benchtop model was developed to provide simplicity with excellent on-site usability - from operation and maintenance through to troubleshooting.

LAQUA  
F-70/DS-70 series

P7

## Portable

### In the lab, in the field or anywhere you need it

Designed for use with one hand and with an IP67 waterproof rating and shock-resistant casing, this meter can be used for long periods, even in dark places making it ideal for field measurements in rivers and lakes.

LAQUAact  
D-70/ES-70 /OM-70 series

P9

## Compact

### Your lab-in-a-pocket

HORIBA's unique compact meter integrates the electrode, display and sample container to enable simple, effective on-site testing by direct measurement from a single drop.

LAQUAtwin  
B-70 0 series

H11

Electrodes/Accessories

P13

Specifications

P15

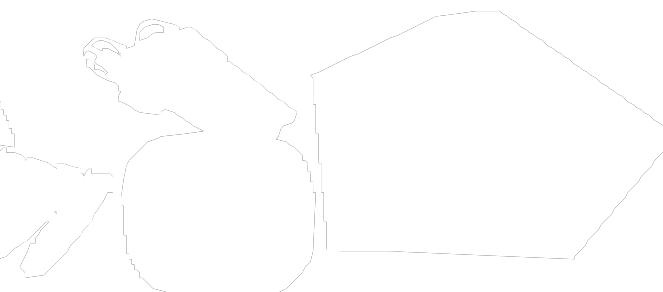
pH Electrode Selection Guide

P17

→ 2003

**F-50 (desktop)**  
• Full color LCD display  
• Navigation panel guides operators in how to use the meter as well as resolving errors.

**D-50 (portable)**  
• Waterproof IP67-rate housing and multi parameter



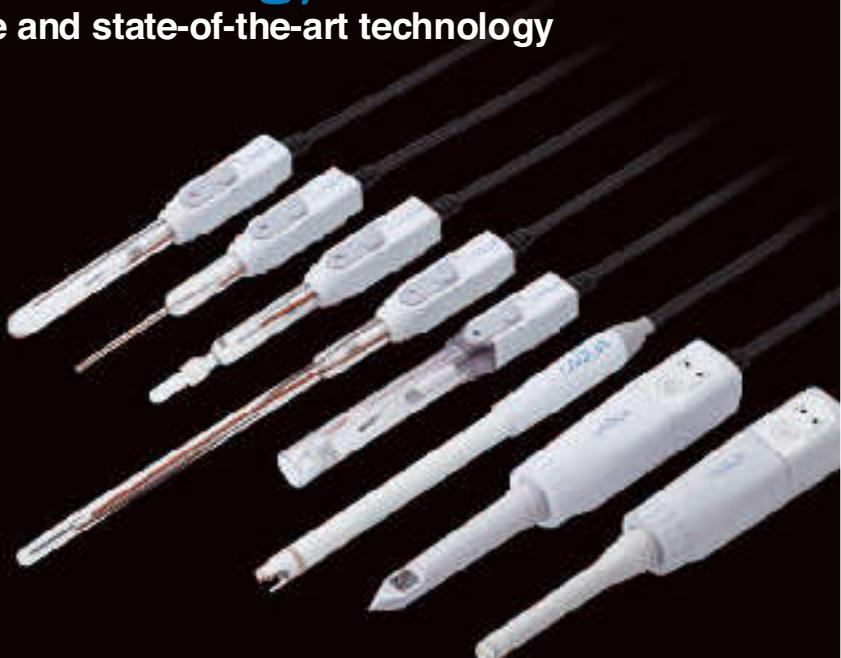
# LAQUA Electrode Technology

Born from the fusion of our expertise and state-of-the-art technology

**As a leading pH electrode manufacturer, HORIBA uses the latest technology for all your measurement needs**

Since developing Japan's first glass electrode pH meter, HORIBA has focused on continually improving our electrode technology, especially in materials and manufacturing.

HORIBA is committed to continually providing groundbreaking and next-generation electrodes so that we always provide you with the newest and best solutions.



## Thick membrane technology

HORIBA's glass membrane molding technology achieves strengths of more than 10 times the Japanese Industrial Standards (strength tests).

## Tough glass

Applicable electrodes:  
9615S-10D/9618S-10D/9680S-10D/9681S-10D

Combination electrodes  
achieve a strength  
in all directions!



The surface-enlarging structure and unique processing technology means the response membrane can be thick and strong, with minimized resistance and high sensitivity. Samples can now be mixed in a beaker using the electrode, without breakage in normal use. The electrodes can be easily cleaned by wiping, helping to ensure reliable measurements.

## Expertise in Manufacturing

Sophisticated processing technology

Various shapes of glass electrodes are available to fit different containers and samples, as well as for use in particular applications.

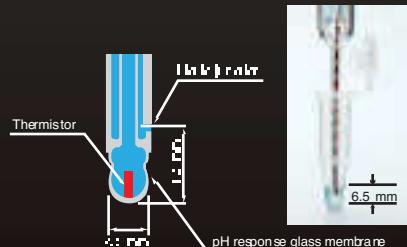
The unique structure of our glass electrodes is achieved through HORIBA's second-to-none manufacturing technology, which we are continually improving.

## Miniaturization



The 3 mm diameter double glass tube contains a temperature sensor inside (US Patent No. 7314841 /  
China Patent No. ZL0318798)

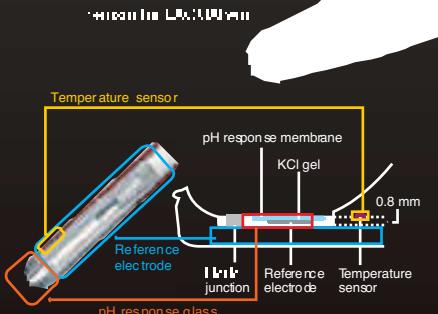
Applicable electrode: 9618S-10D  
(winner of the "Invention Award",  
2011 Excellent Invention Award in Japan)



Combination electrodes have a double thin structure that generally makes manufacturing more difficult due to the tendency to cause variations in the inner tubes during the miniaturization process. However, our proprietary technique to coil the filament around the inner tube has enabled a double glass tube with a diameter of only 3 mm. This pH electrode with temperature sensor enables measurements from ~~sample volumes up to 1 L~~ ~~sample volumes up to 10 mL~~ ~~sample volumes up to 100 mL~~ ~~sample volumes up to 1000 mL~~ for trace measurements of precious limited samples, it can also be used for temperature-sensitive samples owing to quick temperature response.

## Flat electrode

All components are integrated in a flat glass electrode which is less than 1 mm thick



Glass electrode components contained in a flat body of less than 1 mm thickness allows measurement by directly applying a drop of the sample onto the flat electrode instead of dipping the electrode into a liquid. This LAQUA mini combination electrode allows for sample volumes up to 10 mL and various sample types including solid materials containing moisture, powders, and sheet materials.



## Material Technology

Embodying accumulated experiments, research and know-how

The pH-responsive glass membrane is the most important factor in determining responsiveness and durability.

That's why its composition has been improved through our know-how accumulated over many years.

### Long life and high durability

#### Special glass enables longer life in harsh samples

Applicable electro de: 9631-10D (Hydrofluoric acid resistant) / 9632-10D (Alkali resistant)

##### ■ Hydrofluoric acid resistant (US Patent No. 8282877)

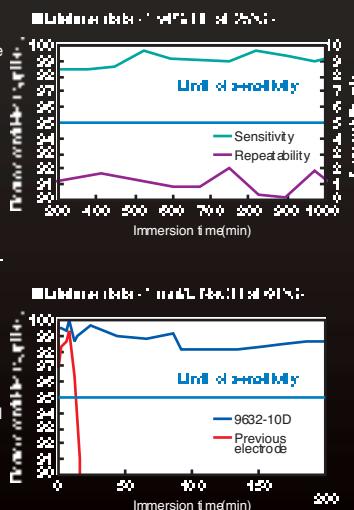
Our special glass membranes meet the Measurement Act (Japan) certification by keeping the membrane resistance to hydrofluoric acid at its highest resistance to hydrofluoric acid. Their long life capable of measuring about 1000 times\* and easily maintainable glass tube structure provides stable measurements for a long time.

\*When the measurement is conducted for 10 minutes with hydrofluoric acid solution (42% v/v).

##### ■ Alkali resistant (US Patent No. 8282877)

The new glass membrane with a strong alkali resistance has achieved about five times\* longer stability than our conventional products. It is suitable for plating solutions or other strong alkaline samples.

\*With 1M sodium hydroxide solution (about pH 13.4-14.0%)



\*Electrode sensitivity: the ratio of the practical slope (potential change per unit pH) to the ideal slope.

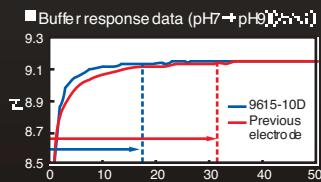
### Fast and highly accurate

#### A unique glass composition including rare earth has improved responsiveness and durability (US Patent No. 8282877)

Applicable electro de: 9615S-10D/9618S-10D/9680S-10D/9681S-10D

##### ■ Fast-response glass membrane

The membrane contains HORIBA's unique rare earth elements to halve the response time and increase durability against chemical substances. It can also enhance stability whilst minimizing the drift of measurement values.

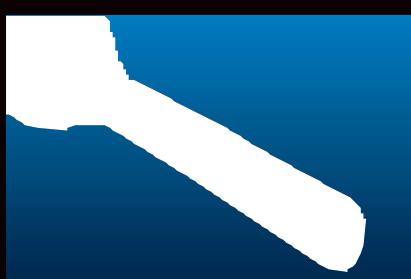
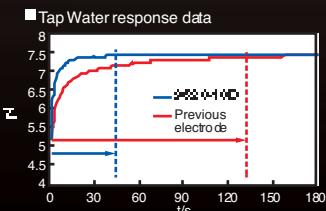


#### Our proprietary glass purification technology ensures high speed and stable measurements with low-conductivity samples

Applicable electro de: 9630-10D

##### ■ High-purity glass

The ideal response membrane, made of high-purity lithium multicomponent glass, enables an excellent response even when measuring samples with low conductivity or low buffering ability, such as tap water or other difficult-to-measure materials.



## ISFET

Applicable electro de: 0030-10D/0040-10D

## Next-Generation Electrode Technology

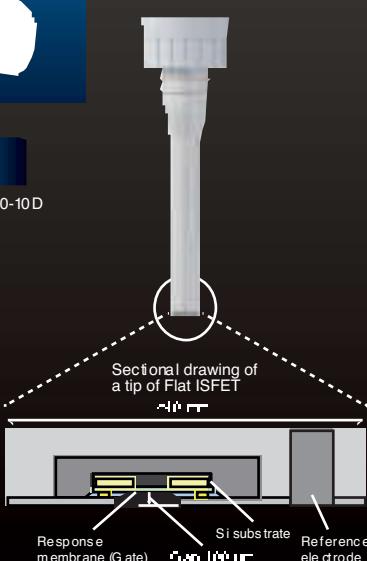
### Semiconductor technology without glass

HORIBA started researching ISFET (Ion Sensitive Field Effect Transistor) using semiconductor technology many years ago and continued to improve its quality. This has provided a new solution for environments where glass material cannot be used.

#### What is an ISFET (semiconductor sensor)?

ISFET is the abbreviation of Ion Sensitive Field Effect Transistor. The response part uses a semiconductor based sensor.

- 1. Will not crack or break like conventional glass electrodes
- 2. The sensor is flat and very small enabling the measurement of extremely small samples
- 3. Easy handling and maintenance - simply clean with a toothbrush
- 4. Can be stored dry



#### The flat electrode has a distance of less than 100 µm between the housing and sensor

The unique structure allows measurements to be taken from the smallest amount of moisture on solid objects and prevents bubbles being trapped on the sensor when measuring samples in a beaker.

#### Reduction of static electricity effect

The combination of HORIBA's unique semiconductor device structure together with the improved electrostatic protection circuit results in a significant reduction of the static electricity effect that had previously been the weak point of a semiconductor sensor.

# LAQUA Electrode Line Up

A wide range of electrodes for pH, ORP, temperature compensation, conductivity and dissolved oxygen.

## ToupH glass



### STANDARD ToupH



**General laboratory applications**  
**Standard ToupH electrode**  
(961SS-10D)

#### Features

Stabilization is quick with minimal drift, helping you read the value at the right moment. The dome-shaped body ensures easy maintenance. Ideal for buffer preparation and suitable for use with a wide range of aqueous samples.

### MICRO ToupH



**Precious, trace amount samples**  
**Micro ToupH electrode**  
(9618S-10D)

#### Features

Ideal for small containers (e.g., micro tubes) and aqueous samples that cannot be obtained in large volumes. The electrode has a temperature compensation sensor. The dome-shaped body is ideal for precious samples. The quick temperature response eliminates the need to warm chilled samples to room temperature prior to measurement.

### LONG



**For large containers and long test tubes**  
**Long ToupH electrode**  
(9680S-10D)

#### Features

251 mm long and 8 mm in diameter, the long, slim body is suitable for use in large containers and measurements in microbial broth test tubes. We recommend using this electrode with our long-type electrode stand (FA-70L).

### SLEEVE ToupH



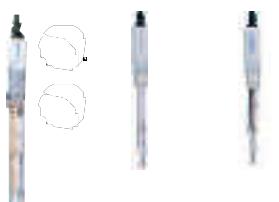
**High viscosity applications**  
**Sleeve ToupH electrode**  
(9681S-10D)

#### Features

The liquid junction on the adjustable sleeve can be washed to prevent clogging by high-viscosity samples and to maintain stable performance. Suitable for use with high-viscosity samples, solvents and samples containing a non-aqueous solvent (e.g. cosmetics and paints).

### pH (3-in-1 electrode)

Plain type  
9625-10D      Sleeve  
6367-10D      Laboratory electrode  
6377-10D      Test tube electrode  
6252-10D



### pH (Conductance electrode)

For thin-walled  
test tubes  
6069-10C      Flat type  
6261-10C



### pH (Glass electrode)

Standard type  
1066A-10C      Laboratory electrode  
1076A-10C



### Reference

Standard type  
2060A-10T      Double-junction  
type  
2565A-10T



### ORP

Metallic electrode  
platinum  
3-in-1 type  
9300-10D



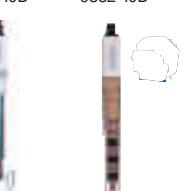
### Temperature

Temperature electrode  
4163-10T



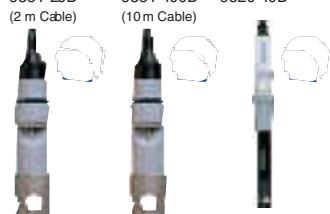
### Conductivity

Conductance type  
3551-10D      3552-10D      3553-10D      3554-10D      Flow type  
9382-10D      3561-10D      3562-10D      3573-10C      3574-10C



### Dissolved Oxygen

Field use  
9551-20D  
(2 m Cable)      Field use  
9551-100D  
(10m Cable)      Laboratory use  
9520-10D



conductivity, dissolved oxygen and ions are available. Our pH electrodes have a broad line-up according to sample, container and application type.

Special glass				ISFET						
										
HF-PROOF	ALKALI-PROOF	For TAP WATER	FLAT ISFET	NEEDLE ISFET						
										
<b>For liquid and combined sample</b> Hydrochloric acid resistant pH electrode (9631-10D)	<b>For strong alkali sample</b> Alkali resistant pH electrode (9632-10D)	<b>For quick tap water measurement</b> Tap water pH electrode (9630-10D)	<b>Surface of solid sample</b> Flat ISFET pH electrode (0040-10D)	<b>Inside solid sample</b> Needle ISFET pH electrode (0030-10D)						
<b>Features</b> With a long measurement time constant, the electrode is capable of aqueous or solid sample measurements. Suitable for measurement of weak acids and salts in the presence of organic materials resulting from sterilizing processes. *When a measurement is conducted for 1 minute with 1% hydrochloric acid solution (at 25 °C).	<b>Features</b> A strong alkali resistance achieves approximately five times* longer stability than that of our conventional products. Suitable for use with strong alkali samples such as plating solutions. *With 0.1 mol/L sodium hydroxide solution (about pH 13) (at 60°C).	<b>Features</b> Quick and stable measurement is possible for low conductivity samples or those with low buffering ability, such as tap water. Suitable for water quality testing at water treatment plants.	<b>Features</b> A semiconductor sensor that eliminates the risk of breakage which may occur in glass electrodes. Measurement is possible even with a slight amount of moisture on solid surfaces, gelatinous material (e.g., agar medium), meat, and sheet surfaces such as cloth and paper.	<b>Features</b> A semiconductor sensor that eliminates the risk of breakage which may occur in glass electrodes. Suitable for measuring of solid materials and for inner measurements of food samples such as fruits, vegetables, and bread dough.						
<b>ION</b>										
Cyanide Ion 8001-10C	Chloride Ion (Combination type) 6560-10C	Chloride Ion 8002-10C	Sulfide Ion 8003-10C	Iodide Ion 8004-10C	Bromide Ion 8005-10C	Copper Ion 8006-10C	Cadmium Ion 8007-10C	Lead Ion 8008-10C	Thiocyanate Ion 8009-10C	Fluoride Ion (Combination type) 6561-10C
 CN <sup>-</sup>	 Cl <sup>-</sup>	 Cl <sup>-</sup>	 S <sup>2-</sup>	 I <sup>-</sup>	 Br <sup>-</sup>	 Cu <sup>2+</sup>	 Cd <sup>2+</sup>	 Pb <sup>2+</sup>	 SCN <sup>-</sup>	F
Fluoride Ion 8010-10C	Silver Ion 8011-10C	Ammonia (Combination type) 5002A-10C	Sodium Ion 1512A-10C	Nitrate Ion (Combination type) 6581-10C	Nitrate Ion 8201-10C	Potassium Ion 6582-10C	Potassium Ion 8202-10C	Calcium Ion (Combination type) 6583-10C	Calcium Ion 8203-10C	
 F <sup>-</sup>	 Ag <sup>+</sup>	 NH <sup>+</sup>	 Na <sup>+</sup>	 NO <sub>3</sub> <sup>-</sup>	 NO <sub>3</sub> <sup>-</sup>	 K <sup>+</sup>	 K <sup>+</sup>	 Ca <sup>2+</sup>	 Ca <sup>2+</sup>	

\* For the specification of each electrode, see pages 13 \* Non-combination types require a reference electrode



Benchtop pH/Water Quality Analyzer

**LAQUA**

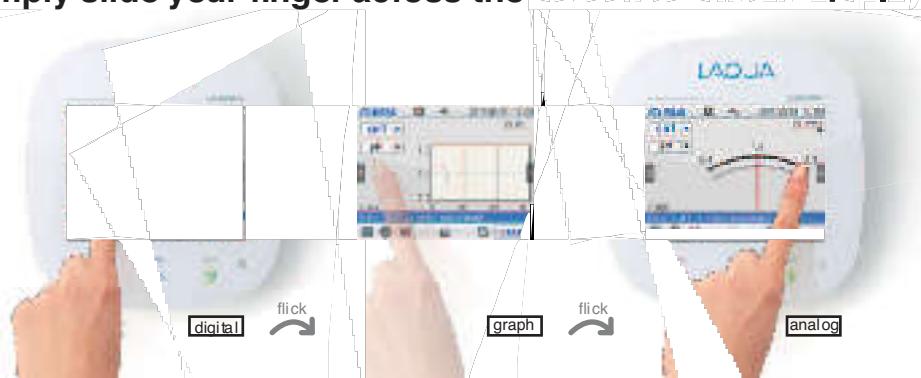
F-70/DS-70 Series

**Intuitive and very easy-to-use  
touch panel operation**

- pH**
- mV(ORP)**
- ION**
- Conductivity**
- Resistivity**
- Salinity**
- TDS**

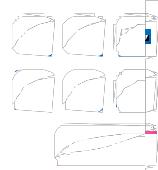


**Simply slide your finger across the screen to switch displays**



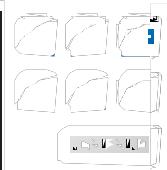
Two channels can be displayed simultaneously

### Color LCD touch panel display



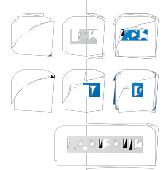
**F-74**

CH.1 pH ION  
CH.2 COND TDS SAL TDS



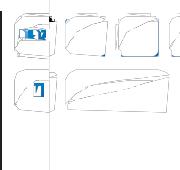
**F-73**

CH.1 pH ION  
CH.2 pH ION



**F-72**

CH.1 pH



**DS-72**

CH.1 pH ION TDS  
CH.2 COND TDS SAL TDS

Set includes conductivity electrode model A-7000.

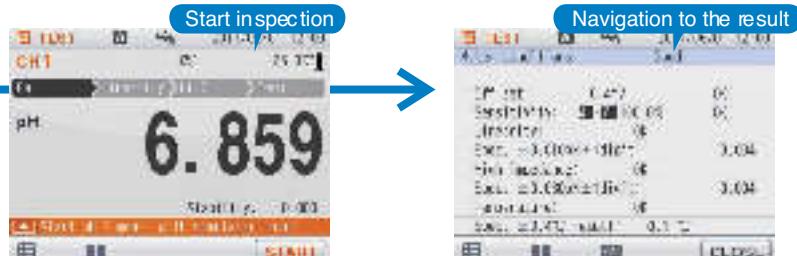


Electrode included. Electrode not included in model F-70. Order separately. Model F-70 does not include electrode.

## Full support for on-screen setting confirmation, maintenance information and troubleshooting tips guide you through trouble-free operation

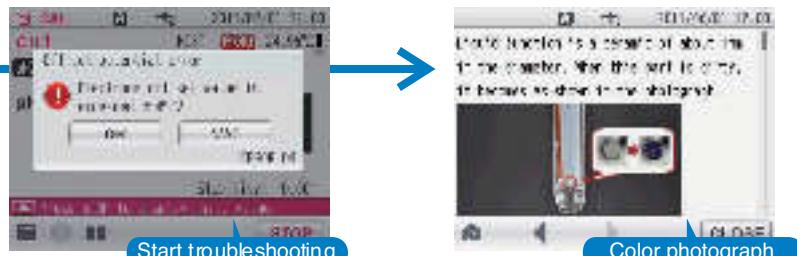
### Inspection Navigation

Easy navigation for main unit and electrode inspections.  
Various industrial standards (JIS, USP, EP, JP, CP) are also supported.



### Troubleshooting Navigation

Reliable on-screen support if a problem occurs during calibration or measurement.  
The software has a user guide to resolve any operation difficulties.



### Application Functions

Various industry standard methods are supported from measurement to result output.  
Conductivity measurements for pharmaceutical pure water guidelines of various countries are also supported.

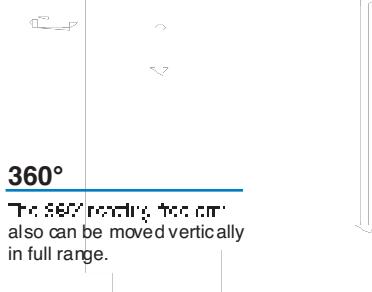


### Free Arm Electrode Stand

The free arm of the stand-alone electrode stand can be positioned in any direction, vertically or horizontally.

The long-type electrode stand\* with telescopic stand is also provided for measurements with large beakers.

\*Optional



**450~650mm**

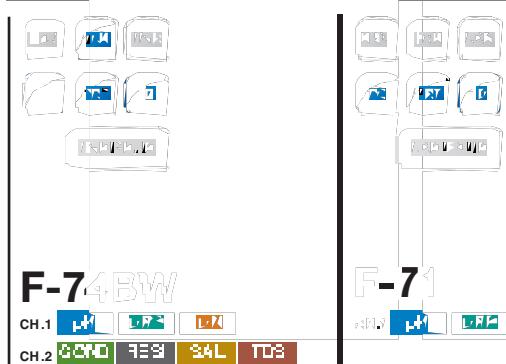
The long electrode stand\* has a maximum length of 650 mm. It can be stored neatly thanks to the telescopic shaft.

\*Optional

### Full-Range Functions for Validation and Usability

- Conductivity measurement JIS/Pharmacopeia/Digital Simulator (F-72/F-73/F-74)
- Full support for pharmaceutical pure water guidelines of various countries. (USP/EP/JP/CP) (F-74/DS-72)
- Convenient auto hold function for calibration and measurement (F-72/F-73/F-74/DS-72)
- Simultaneous connection to a printer and PC
- Digital memory: up to 600 sets of measurement data can be recorded (F-72/F-74BW/DS-71/DS-72)
- RS-232C communication (with modems and USB memory) (F-72/F-73/F-74/DS-72)
- Multi-language support (Japanese, English, Chinese, Korean) (F-72/F-73/F-74/DS-72)
- F-74/74BW (please ask for a quotation)

### Custom LCD display





Portable pH Water Quality Meter

# LAQUAact

D-70/ES-70/OM-70 Series

Industry  
First

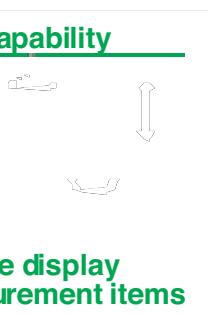
The casing is made from shock resistant and extremely durable polycarbonate resin. With high chemical resistance it is ideal for harsh environments.

According to our research as of June 2013.

In the lab, in the field or anywhere you need it

## Laboratory use capability

The optional electrode stand offers excellent manoeuvrability, allowing the electrode to be moved up and down, and from left to right, easily with one hand.



## Easy-to-view large display shows two measurement items simultaneously

The measurement values are easily visible on a display that is about 40% larger than those of our conventional products. Two measurement values can be displayed on a single screen.

\*Models compatible with two item measurement: D-73, 74, 75



## Chemical resistant

The polycarbonate resin casing is extremely chemical-resistant\*, so can be cleaned using alcohol.



## Various data processing

The built-in data memory can store 1000 items, and connecting to a computer allows measurement data to be collected. Output to a GLP/GMP-compatible printer is also possible.

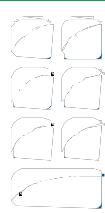
\*An optional cable is necessary to connect to a computer.

The software can be downloaded after user registration.

\*The D-71 does not have computer and printer connectivity.

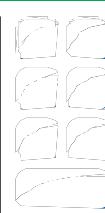


## Backlit LCD model



**D-75**

CH.1 pH ORP  
CH.2 DO



**D-74**

CH.1 pH ORP  
CH.2 ODO TDS TAC



**D-73**

CH.1 pH ORP ION  
CH.2 ODO TDS TAC

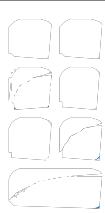


**D-72**

CH.1 pH ORP



## Basic model



**D-71**

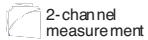
CH.1 pH



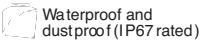
■ Accessories included : Instruction Manual/Quick Manual/2 pcs Batteries



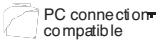
Backlit LCD



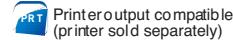
2-channel measurement



Waterproof and dustproof (IP67 rated)



PC connection compatible



Printer output compatible (printer sold separately)



Security function



Shock and chemical resistant body case

Data storage software available as a free download for registered users.

## One hand operation

Slim body fits in your hand.  
Only three basic operation  
buttons for one-hand  
operability.



## Shock-resistant

Polycarbonate resin\* used  
in automobiles and mobile  
phones has been adopted to  
enhance shock resistance.  
\*Polycarbonate resin has about  
twice the shock resistance of  
conventional ABS resin.



## Visible LCD in dark places

Backlight (except D-71) allows  
reading of measurement  
values even in the dark.



## Waterproof and dustproof

IP67 rated waterproof and  
dustproof casing.  
\*IP67: Fully waterproof for  
approximately 30 min in 1 metre  
of water.



## Extended operation

Uses about 10% of the power compared to  
conventional meters. With up to 1000 hrs of use\*,  
long periods of field work are possible.  
\*D-71/D-72



## Easy to carry

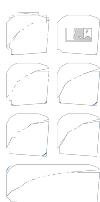
The compact and ergonomic  
design is easy to carry and  
includes a cable winding  
function for the optional  
electrode hook attachment.



## Various functions

LAQUAact boasts a variety of safety and other useful functions to assist with  
measurements and data processing. For details, see page 16 of the specifications.

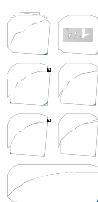
### Conductivity



### ES-71

CH.1 **COND** TDS SALT TDS  
Set includes conductivity electrode  
(model 9382-10D)

### Dissolved Oxygen



### OM-71

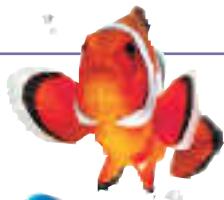
CH.1 **DO**  
Set includes dissolved oxygen electrode  
(BOD measurement)

Common	Interval measurement function (except D-71)
	Sample ID number setting function
	Clock function and auto power-off function
pH [D-70 series]	Automatic calibration and calibration interval alarm function
Conductivity [D-74/ES-71]	Automatic range switching, automatic temperature conversion, and unit switching functions
Dissolved Oxygen [D-75/OM-71]	Temperature compensation, atmospheric pressure calibration and salt concentration calibration functions
	Oxygen concentration and saturated oxygen concentration measurement functions

\*Laboratory set (OM-71-L1) : 1 set electrode stand, 1 pc air pump, 2 pcs battery, 1 bottle of Sulphur Chloride, 2 pcs styrene container, 1 pc flask, 1 pc AC adapter



Compact Water Quality Meter

**LAQUAtwin**

HORIBA's 60 years of sensor engineering enable accurate direct measurement from only a single drop on the unique flat sensor.

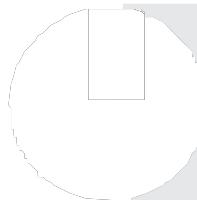
There's a LAQUAtwin meter for seven electrochemistry parameters such as pH, conductivity, various ions ( $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{NO}_3^-$ ,  $\text{Ca}^{2+}$ ) and salt concentration.

Take the compact LAQUAtwin with you wherever and whenever you want - it's your "lab-in-a-pocket".

- Accurate reading from only a single drop in just a few seconds
- pH, conductivity, ion and salt concentration / parameters: 11 models
- Calibrate and measure at the touch of a button - the smiley face appears when the result can be read
- LAQUAtwin is fully waterproof and dustproof (IP67)
- A carry-case with standard solution is provided for handy lab portability



### ► Unique measurement variation by LAQUAtwin Select the measurement method according to your sample and application needs.



#### Drops

Place a drop of the sample onto the sensor with a pipette. LAQUAtwin meters can measure sample volumes as low as 0.1 mL\*.

\*With the exception of salt concentrations, sample volumes down to 0.05 mL can be tested (except for conductivity).



#### Immersion

When you're in the lab, you can test the sample in a beaker. Ensure the sensor guard sliding cap is open.



#### Scoop

Use as a scoop to test water e.g. from a river. A vertical scoop for an aquarium is also available with a unique sensor guard.



#### Solid samples

Foods containing some moisture can be tested by placing a small piece directly onto the sensor.



#### Powders

LAQUAtwin meters can also test dry powders. Simply place the powder sample onto the sensor and drop in your defined volume of pure water.



#### pH Meter

**B-711**
**B-712**
**B-713**  
(US only)

**pH**



#### Conductivity(EC) Meter

**B-771**

**CONDUCT.**

**TDS**

**SALT**



#### Sodium Ion Meter

**B-722**

**ION**



#### Potassium Ion Meter

**B-731**

**ION**



#### Nitrate Ion Meter

**B-743**

**ION**



Model	B-711	B-712/B-713	B-771	B-722	B-731	B-743
Measurement principle	Glass electrode method		2 AC bipolar			Ion electrode method
Measurement volume	0.1 mL or more *1		0.12 mL or more			0.3 mL or more *1
Measurement range	2 to 12 pH		Conductivity: 0 to 19.9 mS/cm (0 to 1.99 S/m) Salt0 to 1.1% TDS0 to 9900 ppm	23 to 2300 ppm (mg/L) ( $10^{-3}$ to $10^{-1}$ mol/L)	39 to 3900 ppm (mg/L) ( $10^{-3}$ to $10^{-1}$ mol/L) 20 to 2000 kg/10a <sup>-2</sup>	$\text{NO}_3^-$ : 62 to 6200 ppm (mg/L) ( $10^{-3}$ to $10^{-1}$ mol/L) $\text{NO}_3^-$ -N: 14 to 1400 ppm (mg/L)
Display range	0 to 14 pH		0 to 199 mS/cm			0 to 9900 ppm (mg/L)
Calibration	One-point *4	Two-point *4				Two-point *4
Accuracy *5	$\pm 0.1$ pH		$\pm 2\%$ F.S. $\pm 1$ digit (for each range) *6			$\pm 10\%$ of reading value
Functions	Temperature compensation Waterproof *7 Auto-hold		Salt/TDS Measurement Temperature compensation Waterproof *7 Auto-hold			Temperature compensation Waterproof *7 Auto-hold
Accessories included	Storage case/Quick manual/Standard solution/5 pieces of Sampling sheet B (Except B-771)					
Power	CR2032 batteries (x2)					
Dimensions/ Mass	164 mm x 29 mm x 20 mm (excluding projections)					
Accessories included	2 CR2032 batteries/1 Pipette/Instruction manual/Quick manual/Storage case/Standard solution/5 pieces of Sampling sheet B (Except B-771)					



## Wipe

The sampling sheet allows the total volume to be analyzed. For example, wipe the surface of the skin with a sampling sheet soaked with pure water and measure.

## Paper, textiles and films

To test sheets of paper and textiles, cut the samples into small pieces and place directly onto the sensor. Drop on your defined volume of pure water.



## Calcium Ion Meter B-751

ION



B-751

## Salt Meter B-721

SALT



B-721

40 to 4000 ppm (mg/L)  
( $10^{-3}$  to  $10^{-1}$  mol/L)

0.1 to 10% by weight

0.00 to 25% by weight

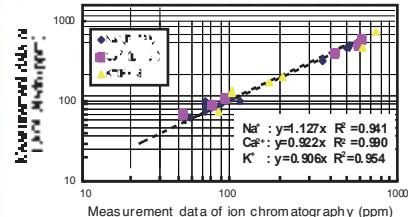
±20% of reading value

±10% of reading value

## Examples for Ion Measurement

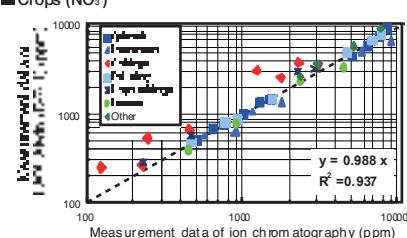
The graphs below depict the correlation between LAQUAtwin and ion chromatography.

■ Isotonic drink, mineral water drinks and mineral water (Na<sup>+</sup>, K<sup>+</sup>, Ca<sup>2+</sup>)



\* When measuring Ca<sup>2+</sup>, the measurement value is approximately 10% higher than the true value.

■ Crops (NO<sub>3</sub><sup>-</sup>)



## Interfering ion influence

	Sodium Ion (Na <sup>+</sup> )	Potassium Ion (K <sup>+</sup> )	Nitrate Ion (NO <sub>3</sub> <sup>-</sup> )	Calcium Ion (Ca <sup>2+</sup> )
Selectivity coefficient	K <sup>+</sup> :Na <sup>+</sup> = $1 \times 10^{-3}$ Li <sup>+</sup> , Sr <sup>2+</sup> , Ba <sup>2+</sup> , K <sup>+</sup> / <sup>+</sup> > $10^{-3}$ Li <sup>+</sup> = $1 \times 10^{-3}$ Cs <sup>+</sup> = $3 \times 10^{-3}$ NH <sub>4</sub> <sup>+</sup> = $6 \times 10^{-3}$	Rb <sup>+</sup> = $1 \times 10^{-1}$ Mg <sup>2+</sup> = $1 \times 10^{-5}$ NH <sub>4</sub> <sup>+</sup> = $7 \times 10^{-5}$ Ca <sup>2+</sup> = $7 \times 10^{-7}$ Cs <sup>+</sup> = $4 \times 10^{-3}$ Na <sup>+</sup> = $3 \times 10^{-4}$	I <sup>-</sup> =10 Cl <sup>-</sup> = $4 \times 10^{-2}$ Br <sup>-</sup> = $9 \times 10^{-1}$ ClO <sub>4</sub> <sup>-</sup> =30 NO <sub>2</sub> <sup>-</sup> = $7 \times 10^{-1}$	Na <sup>+</sup> , K <sup>+</sup> , Mg <sup>2+</sup> = $1 \times 10^{-3}$ Fe <sup>2+</sup> , Zn <sup>2+</sup> =1 Fe <sup>3+</sup> =10 Cu <sup>2+</sup> = $1 \times 10^{-2}$
pH range	pH 3.9 (at $10^{-3}$ mol/L Na <sup>+</sup> )	pH 2.9 (at $10^{-3}$ mol/L K <sup>+</sup> )	pH 2.9 (at $10^{-3}$ mol/L NO <sub>3</sub> <sup>-</sup> )	pH 4.12 (at $10^{-3}$ mol/L Ca <sup>2+</sup> )

\* Selectivity coefficient is a concentration ratio of the interfering ion against the target ion, which affects the target ion measurement value. For example, there will be a 10-fold increase of potassium ion compared to sodium ion ( $10^{-3}$ ), which means for the same concentration of potassium ion and sodium ion (e.g. 10 ppm), the sodium measurement is approximately 10 times (1%) higher.

## Replacement Sensor

Part Number	Model	Name	Applicable model
3200 420204	S010	pH Sensor	B-711, B-712, B-713
3200 420205	S021	Salt Sensor	B-721
3200 420206	S022	Sodium Ion Sensor	B-722
3200 420207	S030	Potassium Ion Sensor	B-731
3200 420208	S040	Nitrate Ion Sensor	B-741, B-742, B-743
3200 420209	S050	Calcium Ion Sensor	B-751
3200 459 672	S070	Conductivity Sensor	B-771

## Accessories

Part Number	Model	Name	Description	Applicable model
3200 459 735	Y046	Sampling sheet B	100 pieces	Except B-771
3200 459 736	3200 459 736	Sampling sheet holder (for LAQUAtwin)		Except B-771

## Nitrate Ion Meter for Crop B-741



■ Measurement range: 100 to 5,000 ppm (NO<sub>3</sub><sup>-</sup>)  
25 to 2,200 ppm (NO<sub>3</sub>-N)

[Accessories included]  
Standard solution for crops (300 ppm, 3000 ppm) (14 mL) /  
2 CR2032 batteries / 5 Pipettes / Instruction manual /  
Quick manual / Cleaning solution bottle (250 mL) /  
Crop sample press / 3 Medical cups / Quick manual /  
Carrying case

## Nitrate Ion Meter for Soil B-742



■ Measurement range: 30 to 600 ppm (NO<sub>3</sub><sup>-</sup>)  
6.8 to 40 ppm (NO<sub>3</sub>-N)  
3.4 to 6 kg/10 a (NO<sub>3</sub>-N)

[Accessories included]  
Standard solution for soil (30 ppm, 300 ppm) (14 mL) /  
2 CR2032 batteries / 5 Pipettes / Instruction manual /  
Quick manual / Cleaning solution bottle (250 mL) /  
3 Extraction bottles (100 mL) / 2 sets of spoons for soil sampling /  
Tweezers / Sampling sheet B / 2 Sampling sheet holders /  
Quick manual / Carrying case

! Carefully read the instruction manual before use with the sampling sheet B. Please note that the measurement value is dependent on the probe length, please use "Sampling sheet holder" (sold separately). \*With wireless sampling probe B-741. After the measurement value is displayed in the new measurement range, the displayed value blinks. It should be used only as a guide. \*4 Selectable between one-point and two-point calibrations. High conductivity standard solution (12.9 mS/cm) is sold separately. \*\*Measuring range B-741: 100 to 5,000 ppm (NO<sub>3</sub><sup>-</sup>) / B-742: 30 to 600 ppm (NO<sub>3</sub><sup>-</sup>) / B-743: 30 to 3,000 ppm (NO<sub>3</sub><sup>-</sup>) / B-751: 40 to 4,000 ppm (Ca<sup>2+</sup>) / B-771: 0.00 to 25% by weight. \*\*\*IP67: In measurement mode, the meter can be immersed in water at a depth of 1 meter for 30 minutes. But the product can not be used under water.



# Electrodes/Accessories

For LAQUA/LAQUAact

## pH Electrode

All pH electrodes are compatible with our pH meters.

	Description	Model	Temp. range [°C]	pH range	Part No.
Combination (3-in-1) pH electrode	Plastic body	9625-10D	0 ~ 100	0 ~ 14	3200360505
	Standard ToupH	9615S-10D	0 ~ 100	0 ~ 14	3200585428
	Sleeve ToupH	9681S-10D	0 ~ 60	0 ~ 14	3200585463
	Long ToupH	9680S-10D	0 ~ 100	0 ~ 14	3200585455
	Micro ToupH	9618S-10D	0 ~ 60	0 ~ 14	3200585447
	Sleeve	6367-10D	0 ~ 60	0 ~ 14	3014079136
	For measurement of low-conductivity water and non-aqueous solvents	6377-10D	0 ~ 60	0 ~ 14	3014093085
	Needle type	6252-10D	0 ~ 60	0 ~ 12	3014080850
	For Tap water	9630-10D	0 ~ 100	0 ~ 14	3200528726
	For Hydrofluoric acid sample	9631-10D	0 ~ 60	2 ~ 12	3200524119
	For Strong alkali sample	9632-10D	0 ~ 100	0 ~ 14	3200524120
ISFET pH electrode	Needle type ISFET	0030-10D	0 ~ 60	0 ~ 14	3014028323
	Flat type ISFET	0040-10D	0 ~ 60	0 ~ 14	3200367925
	Needle type ISFET (0030-10D) sensor	0131	—	—	3014028400
	Flat type ISFET (0040-10D) sensor	0141	—	—	3200367926
Combination pH electrode	For very slender test tubes	6069-10C	0 ~ 60	0 ~ 14	3014081107
Glass pH electrode	Flat type	6261-10C	0 ~ 50	0 ~ 12	3014081807
Glass pH electrode	Standard type	1066A-10C	0 ~ 100	0 ~ 14	3014080432
Reference electrode	Standard type	1076A-10C	0 ~ 100	0 ~ 14	3014093084
Temperature electrode	Double-junction type	2060A-10T	0 ~ 100	—	3014080434
Temperature electrode	For temperature compensation and measurement	4163-10T	0 ~ 100	—	3014080375
ORP electrode	Water proof Platinum 3-in-1 type	9300-10D	0 ~ 60	—	3014046710

Refer to the application guide for details.

## Conductivity Electrode

Electrode	Cell constant m⁻¹(cm⁻¹)	Model	Range m⁻¹(cm⁻¹)	Min. Water req'd	Temp. range [°C]	Part No.	
Conductivity electrode	Immersion type	10 (0.1)	3551-10D	0.1 ~ 1 S (0.1 ~ 100 mS)	50	0 ~ 60	3014081712
		100 (1)	9382-10D	0.1 mS ~ 10 S (0.1 ~ 1000 mS)	20 ~ 30	0 ~ 80	3014046709
		100 (1)	3552-10D	0.1 mS ~ 10 S (0.1 ~ 100 mS)	15	0 ~ 100	3014081545
		1000 (10)	3553-10D	1 mS ~ 100 S (0.1 ~ 1 S)	50	0 ~ 60	3014081714
	Flow type	10 (0.1)	3561-10D	0.1 ~ 1 S (0.1 ~ 10 mS)	10	0 ~ 60	3014082350
		100 (1)	3562-10D	0.1 mS ~ 10 S (0.1 ~ 100 mS)	18	0 ~ 60	3014082513
		1000 (10)	3573-10C	1 mS ~ 100 S (0.1 ~ 1 S)	4	0 ~ 60	3014082590
		1000 (10)	3574-10C	1mS ~ 10 S (0.1 ~ 100 mS)	0.25	0 ~ 60	3014082592

## Ion Electrode

All ion electrodes are combination electrodes; requiring a separate holder for all settings. The electrode stand, reference electrode, and the holding bar and plug connection are not included. Refer to the combination type ion electrode catalog.

Electrode name	Model	Measuring range	Interference	Interfering ion influence*	Part No.
Sodium ion electrode	1512A-10C	2.3 ~ 230,000 mg/L Na <sup>+</sup>	2565A	K <sup>+</sup> , Li <sup>+</sup> =10 NH <sub>3</sub> =20 Ca <sup>2+</sup> =500	3014068526
Cyanide ion electrode	8001-10C	0.03 ~ 2,600 mg/L CN <sup>-</sup>	2060A ~ 2565A	S <sup>2-</sup> , MnO <sub>4</sub> <sup>-</sup> =N/A I=0.1 S <sub>2</sub> O <sub>8</sub> <sup>2-</sup> =1	3014094393
Chloride ion electrode	8002-10C	0.4 ~ 35,000 mg/L Cl <sup>-</sup>	2565A	S <sub>2</sub> O <sub>8</sub> <sup>2-</sup> , S <sup>2-</sup> , I <sup>-</sup> , Ag <sup>+</sup> , Hg <sup>2+</sup> =N/A SCN <sup>-</sup> =0.3 MnO <sub>4</sub> <sup>-</sup> =0.1	3014094394
Chloride ion electrode (Kynise type)	6560-10C	0.4 ~ 35,000 mg/L Cl <sup>-</sup>	—	Br <sup>-</sup> =0.03 NO <sub>3</sub> <sup>-</sup> , F <sup>-</sup> , HCO <sub>3</sub> <sup>-</sup> , SO <sub>4</sub> <sup>2-</sup> , PO <sub>4</sub> <sup>3-</sup> , ClO <sub>4</sub> <sup>-</sup> =1,000	3014094340
Sulfide ion electrode	8003-10C	0.3 ~ 32,000 mg/L S <sup>2-</sup>	2060A ~ 2565A	CN <sup>-</sup> /N/A S <sub>2</sub> O <sub>8</sub> <sup>2-</sup> =10 I <sup>-</sup> , F <sup>-</sup> , Cl <sup>-</sup> , PO <sub>4</sub> <sup>3-</sup> , SO <sub>4</sub> <sup>2-</sup> =1,000	3014094395
Iodide ion electrode	8004-10C	0.01 ~ 13,000 mg/L I <sup>-</sup>	2060A ~ 2565A	MnO <sub>4</sub> <sup>-</sup> , S <sup>2-</sup> , CN <sup>-</sup> /N/A S <sub>2</sub> O <sub>8</sub> <sup>2-</sup> =10 NO <sub>3</sub> <sup>-</sup> =100 Br <sup>-</sup> =1,000	3014094396
Bromide ion electrode	8005-10C	0.8 ~ 80,000 mg/L Br <sup>-</sup>	2565A	Br <sup>-</sup> , I <sup>-</sup> , S <sup>2-</sup> , CN <sup>-</sup> , S <sub>2</sub> O <sub>8</sub> <sup>2-</sup> , N/A Fe <sup>3+</sup> , Cr <sup>3+</sup> , Cu <sup>2+</sup> , Cd <sup>2+</sup>	3014094397
Copper ion electrode	8006-10C	0.06 ~ 6,400 mg/L Cu <sup>2+</sup>	2565A	Fe <sup>2+</sup> =0.1 N <sup>3-</sup> , Na <sup>+</sup> =1,000	3014094398
Cadmium ion electrode	8007-10C	0.1 ~ 11,000 mg/L Cd <sup>2+</sup>	2060A ~ 2565A	Ni <sup>2+</sup> , Pb <sup>2+</sup> , Cu <sup>2+</sup> , Zn <sup>2+</sup> , Cd <sup>2+</sup> , Hg <sup>2+</sup> , Cr <sup>3+</sup> , Fe <sup>3+</sup> , Cr <sup>6+</sup> , Ti <sup>4+</sup> , Sn <sup>2+</sup> , Sn <sup>4+</sup> , Hg <sup>2+</sup> , Cu <sup>2+</sup> , Cd <sup>2+</sup>	3014094399
Lead ion electrode	8008-10C	2 ~ 20,000 mg/L Pb <sup>2+</sup>	2565A	Cu <sup>2+</sup> , Hg <sup>2+</sup> , S <sup>2-</sup> , Ag <sup>+</sup> /N/A Fe <sup>3+</sup> =0.01 Cr <sup>3+</sup> =1 Cd <sup>2+</sup> =10 Ni <sup>2+</sup> , Mg <sup>2+</sup> , Zn <sup>2+</sup> =100 NH <sub>3</sub> , K <sup>+</sup> =1,000	3014094400
Thiomolybdate electrode	8009-10C	0.6 ~ 5,800 mg/L SCN <sup>-</sup>	2565A	CN <sup>-</sup> , I <sup>-</sup> , S <sup>2-</sup> , S <sub>2</sub> O <sub>8</sub> <sup>2-</sup> =N/A Br <sup>-</sup> =1 Cl <sup>-</sup> =100	3014094401
Fluoride ion electrode	8010-10C	0.02 ~ 19,000 mg/L F <sup>-</sup>	2060A ~ 2565A	These electrodes when used in conjunction with the deionizer (ex. Al <sup>3+</sup> , Fe <sup>3+</sup> ) increased and shortened the response time.	3014093439
Ammonium ion electrode	6561-10C	0.02 ~ 19,000 mg/L F <sup>-</sup>	—	I <sup>-</sup> , Cl <sup>-</sup> , N/A Cu <sup>2+</sup> , Cd <sup>2+</sup> , Zn <sup>2+</sup> , Pb <sup>2+</sup> , Hg <sup>2+</sup> , Cr <sup>3+</sup> , Cd <sup>2+</sup>	3014093431
Silver ion electrode	8011-10C	0.01 ~ 110,000 mg/L Ag <sup>+</sup>	2565A	I <sup>-</sup> , Cl <sup>-</sup> , N/A Cu <sup>2+</sup> , Cd <sup>2+</sup> , Zn <sup>2+</sup> , Pb <sup>2+</sup> , Hg <sup>2+</sup> , Cr <sup>3+</sup> , Cd <sup>2+</sup>	3014094402
Nitrate ion electrode	8201-10C	0.62 ~ 62,000 mg/L NO <sub>3</sub> <sup>-</sup>	2565A	ClO <sub>4</sub> <sup>-</sup> =0.03 I <sup>-</sup> =0.1 Br <sup>-</sup> =2 NO <sub>2</sub> <sup>-</sup> =3 Cl <sup>-</sup> =40 F <sup>-</sup> =200	3014094403
Nitrite ion electrode	6581-10C	0.62 ~ 62,000 mg/L NO <sub>2</sub> <sup>-</sup>	—	CH <sub>3</sub> COO <sup>-</sup> =300 SO <sub>4</sub> <sup>2-</sup> =Over 1000	3014093432
Potassium ion electrode	8202-10C	0.04 ~ 39,000 mg/L K <sup>+</sup>	2565A	Rb <sup>+</sup> =0.4 Cs <sup>+</sup> =NH <sub>4</sub> <sup>+</sup> =70	3014094404
Calcium ion electrode	6582-10C	0.04 ~ 39,000 mg/L K <sup>+</sup>	—	Li <sup>+</sup> , Na <sup>+</sup> , Mg <sup>2+</sup> , Ca <sup>2+</sup> , Sr <sup>2+</sup> , Ba <sup>2+</sup> =Over 1000	3014093433
Calcium ion electrode (Kynise type)	8203-10C	0.4 ~ 40,080 mg/L Ca <sup>2+</sup>	2060A ~ 2565A	I <sup>-</sup> , Cl <sup>-</sup> , Br <sup>-</sup> , Zn <sup>2+</sup> , Cd <sup>2+</sup> , Cu <sup>2+</sup> , Pb <sup>2+</sup> , Hg <sup>2+</sup> , Cr <sup>3+</sup> , Cd <sup>2+</sup>	3014068839
Calcium ion electrode (Kynise type)	6583-10C	0.4 ~ 40,080 mg/L Ca <sup>2+</sup>	—	Mn <sup>2+</sup> =500 Mg <sup>2+</sup> =1,000 Na <sup>+</sup> , K <sup>+</sup> , Ba <sup>2+</sup> , NH <sub>4</sub> <sup>+</sup> =Over 1,000	3014093434
Ammmonium ion electrode	5002A-10C	0.1 ~ 1,000 mg/L NH <sub>4</sub> <sup>+</sup>	—	—	3014093560

\* The reference cell voltage is equal to the first concentration of measuring ion (total ion concentration to be measured total). A value of 100% means that the reading line can be permitted up to 100% line. The ion measured and 10% more than other ion change occur in the reading point are here.

## Ion Electrode Tip

Electrode name	Model	Part No.
Chloride tip	7660	3014093436
Fluoride ion tip	7661	3014093438
Nitrate ion tip	7681	3014068364
Potassium ion tip	7682	3014069795
Calcium ion tip	7683	3014068795
Ammonium ion membrane tip (NH <sub>3</sub> )	membrane (NH <sub>3</sub> )	3014067083

## DO Electrode /DO Tip

Electrode	Code length	Model	Specification	Temp. range [°C]	Part No.
DO electrode	2m	9551-20D	Field immersible type	0 ~ 40	3014047090
DO electrode	10m	9551-100D	Field immersible type	0 ~ 40	3014047091
DO electrode	1m	9520-10D	Laboratory use	0 ~ 45	3014046711
DO tip	—	5401	For immersion type electrode	—	3014072770
DO tip	—	7541	For probe type electrode	—	3014074145

## Accessories

Name	Remarks	Part No.	F-70	DS-70	D-70	ES-70	OM-70
Printer (for GLP/GMP compliance)	Cable sold separately, Plain paper	—					
Printer cable	1.5 m	3014030148	○	○	×	○	○
Printer paper	20 rolls	3014030149					
Ink ribbon	5 pcs/set	3014030150					
AC adapter cable set	AC adaptor 1.8 m, cable 1 m	—	○	○	○	○	○
Digital simulator X-5.1	For periodic inspection of the electrode	3014028368	○	—	○	○	○
Digital simulator X-5.2	Conductivity simulator for periodic inspection of the electrode	3014028370	○	○	○	—	—
USB cable	Cable to connect a meter and PC. 1 m	3200373941	○	○	—	—	—
PC software	2 pcs/pack	3200382462	○	○	—	—	—
Protection cover	For F-70, DS-70, D-70 series	3200382441	○	○	—	—	—
Analog cable	Analog (alarm) output cable	3014030152	○	○	—	—	—
Serial cable	Cable to connect a meter and PC (Serial, 9 pins)	3014030151	○	○	○	○	○
Digital cable	For connecting the meter and PC	3200528475			○	○	○
DP-70S Electrode stand (adjustable type)	Height adjustable 100-300 mm	3200528474	—	—	○	○	○
FA-70S Electrode stand (adjustable type)	Height adjustable 100-300 mm	3200382557	○	○	○	○	○
FA-70L Electrode stand (long type)	Height adjustable 100-650 mm	3200382560	○	○	○	○	○



## Standard Solutions

Name	Type	Specification	Remarks	Part No.
pH Standard Solution SET	101-S	pH4.9 Standard Solution	250 mL	3200043642
		pH7 Standard Solution	500 mL	
		Buffer solution in glass bottle	250 mL	
Oxalate standard solution	100-2	pH 4.25 ± 0.05	500 mL	3200043639
Phosphate standard solution	100-4	pH 4.35 ± 0.05	500 mL	3200043638
Phosphate standard solution	100-7	pH 6.85 ± 0.05	500 mL	3200043637
Borate standard solution	100-9	pH 9.15 ± 0.05	500 mL	3200043636
Carbonate standard solution	100-10	pH 10.05 ± 0.05	500 mL	3200043635
Fluoride CFF standard solution	160-51	For 250 mL (10 packets per set)	25.0 ± 89 mV	3200043618
Fluoride CFF standard solution	160-22	For 250 mL (10 packets per set)	25.0 ± 258 mV	3200043617
Kinetic salt in glass Electrode	300	3.33 mol/L KCl	250 mL	3200043640
Standard solution for titration	370	—	250 mL	3014067184

## Electrode Cleaning Solution

For removing inorganic sample residues from glass electrodes, and for cleaning liquid junctions

Name	Type	Volume (mL)	Part No.
Electrode cleaning solution	220	50 x 2 pcs	3014028653

For removing organic residues from glass electrodes, and for cleaning liquid junctions

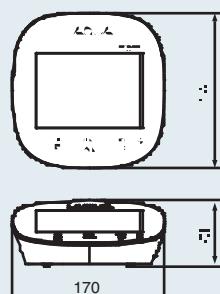
Name	Type	Volume (mL)	Part No.
Electrode cleaning solution	250	400	3200366771

For removing organic residues from glass electrodes, and for cleaning liquid junctions

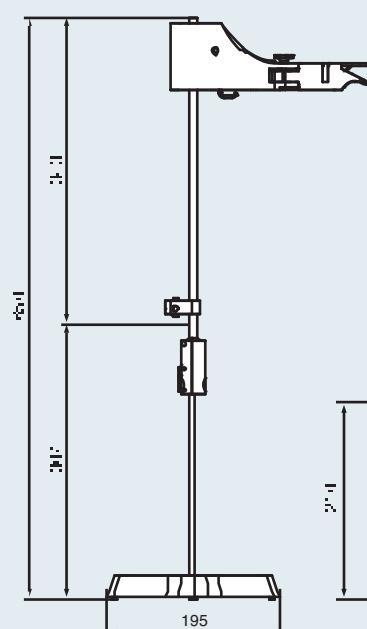
Name	Type	Volume (mL)	Part No.
Electrode cleaning solution	230	500 x 2 mL 500 x 10 mL	3200530494

## Dimension

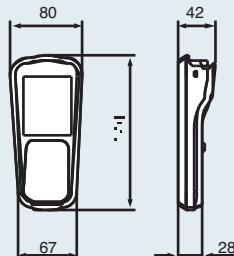
### F-70 Series / DS-70 Series



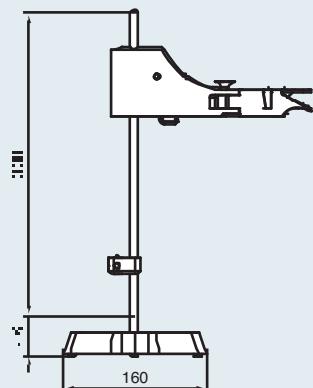
### Long type electrode stand FA-70L



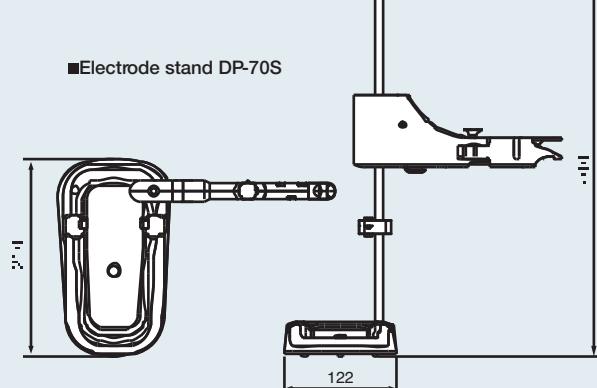
### D-70 Series / ES-70 Series / OM-70 Series



### Electrode stand FA-70S



### Electrode stand DP-70S



# LAQUA F-70/DS-70 series specifications

	F-71	F-72	F-73	F-74	F-74BW	DS-71	DS-72
pH	Measurement method	Glass electrode method				-	-
	Measurement range	pH 0.000~14.000				-	-
	Display range	pH -2.000~20.000				-	-
	Resolution	0.001 pH	0.01/0.001 pH		0.001 pH	-	-
	Auto range select	-	■	■	■	-	-
	Repeatability	±0.001 pH±1 digit	±0.001 pH±1 digit		±0.001 pH±1 digit	-	-
	pH calibration point	5	5		5	-	-
	Repeatability check	■	■	■	■	-	-
	Alarm limit of calibration	■	■	■	■	-	-
	Periodical check	-	■	■	■	-	-
mV (ORP)	Measurement range	±1999.9 mV				-	-
	Resolution	0.1 mV				-	-
	Repeatability	±0.1 mV±1 digit				-	-
Temperature	Measurement range	0.0~100°C/32~212°F				-	-
	Resolution	0.1°C/0.1°F				-	-
	Repeatability	±0.1°C/±0.1°F				-	-
ION	Measurement method	-	Ion electrode method			-	-
	Measurement range	0.001~999 g/L(mol/L)				-	-
	Resolution	-	Valid numbers 3 digits			-	-
	Repeatability	-	±0.5%F.S.±1 digit			-	-
	Periodical check	-	■	■	■	-	-
	Calibration curve point	-	5	5	5	-	-
Conductivity	Addition method measurement	-	■	■	■	-	-
	Measurement method	-	-	-	2 AC bipolar method		
	Measurement range (Display range)	-	-	-	Cell constant 100 m <sup>-1</sup> :0.000 mS/m~19.99 S/m Cell constant 10 m <sup>-1</sup> :0.000 mS/m~1.999 S/m Cell constant 1000 m <sup>-1</sup> 0.00 mS/m~199.9 S/m		
	Resolution	-	-	-	0.05% of full scale		
	Repeatability	-	-	-	±0.5%F.S.±1 digit		
	Change unit	-	-	-	■	■	■
Salinity	Distilled water temperature conversion	-	-	-	■	■	■
	Periodical check	-	-	-	■	-	■
	Calibration curve point	-	-	-	■	-	■
	Measurement method	-	-	-	Conversion from conductivity value		
Density	Measurement range (Display range)	-	-	-	0.00~80.00 PPT (0.000%~8.000%)		
	Resolution	-	-	-	0.01 PPT (0.001%)		
	Salt concentration calibration	-	-	-	■	■	■
	Measurement method	-	-	-	Conversion from conductivity value		
TDS	Measurement range (Display range)	-	-	-	Cell constant 100 m <sup>-1</sup> :0.000 mg/L~8888 mg/L Cell constant 10 m <sup>-1</sup> :0.000 mg/L~888.8 mg/L Cell constant 1000 m <sup>-1</sup> 0.00 mg/L~88882.8 mg/L		
	Resolution	-	-	-	0.05% F.S.		
	Repeatability	-	-	-	±0.5%F.S.±1 digit		
	Measurement method	-	-	-	Conversion from conductivity value		
Input/output	Measurement range (Display range)	-	-	-	0.01 mg/L·100 g/L	0.01 mg/L	0.01 mg/L
	Resolution	-	-	-	0.01 mg/L		
	Input (number of channels)	1	1	2	2	1	1
	USB peripherals (Communication with PC)*1	■	■	■	■	■	■
Data	USB host (USB memory)	-	■	■	-	-	■
	RS-232C (Printer/PC)	■	■	■	■	■	■
	Analog output	-	■	■	-	-	■
	Memory number	999	2000	2000	2000	999	999
Display	Interval memory	■	■	■	■	■	■
	ID input	■	■	■	■	■	■
	Data search	-	■	■	-	-	■
	Display	Custom LCD	Color graphic LCD with capacitive Touch Panel		Custom LCD	Color graphic LCD with capacitive Touch Panel	
Function	Dual component display	-	-	■	■	-	-
	Multilanguage display	-	Japanese/English/Chinese/Korean		-	-	Multilanguage display Japanese/English/Chinese/Korean
	Navigation function	-	■	■	■	-	■
	User guide	-	■	■	■	-	■
	Graph display	-	■	■	■	-	■
	Printer connectivity (GLP/GMP)	■	■	■	■	■	■
	Custom printing function	-	■	■	■	-	■
	Temperature compensation (Auto/manual)	■	■	■	■	■	■
	Auto Hold function	■	■	■	■	■	■
	Auto Hold setting	-	■	■	■	-	■
	Stability function (pH/ION)	-	■	■	■	-	■
	Register operator	-	■	■	■	-	■
	Security (password)	■	■	■	■	■	■
	Version up function	■	■	■	■	■	■
Ambient temperature		0~40°C					
Power		AC adaptor 100~240 V 50/60 Hz					
Dimensions		170 (W)×174 (D)×73 (H)mm (Excluding electrode stand and AC adaptor)					
Power consumption		Approx. 0.7 VA	Approx. 9.8 VA		Approx. 0.7 VA	Approx. 9.8 VA	
Mass of main unit		Approx. 500 g	Approx. 700 g		Approx. 500 g	Approx. 700 g	

\*1 USB cable sold separately. Software can be download by web registration.

# LAQUAact D-70/ ES-70/ OM-70 series specifications

	D-71	D-72	D-73	D-74	D-75	ES-71	OM-71
pH			Glass electrode method			-	-
Measuring principle						-	-
Measuring range			pH 0.00~14.00			-	-
Display range			-2.00~20.00			-	-
Resolution			0.01 pH			-	-
Repeatability			±0.01 pH±1 digit			-	-
Auto calibration (5 points)/Calibration record			■			-	-
Standard solution Auto-detect			■			-	-
USA/NIST selectable			■			-	-
Calibration interval alarm			■			-	-
mV (ORP)			Measuring range (Display range)	-2000~2000 mV			-
Resolution				1 mV		-	-
Repeatability				±1 mV±1 digit		-	-
Absolute/relative selectable			■			-	-
Temperature			Measuring range (Display range)	0°C~50°C/32°F~122°F			-
Resolution				0.1°C/0.1°F		-	-
Repeatability				±0.1°C/±0.1°F		-	-
Calibration function			■			-	-
ION			Measuring principle	-	Ion selective electrode	-	-
Measuring range (Display range)	-	-	0.00 µg/L~3000 µg/L		-	-	-
Resolution	-	-	0.01 µg/L		-	-	-
Repeatability	-	-	±1%~5% F.S.		-	-	-
5 points calibration/Calibration record	-	-	■		-	-	-
Conductivity			Measuring principle	-	2×Clipper rectified	-	2×Clipper rectified
Measuring range (Display range)	-	-	-	0.01µS/cm~1000µS/cm	-	0.01µS/cm~1000µS/cm	-
Resolution	-	-	-	0.05%F.S.	-	0.05%F.S.	-
Repeatability	-	-	-	±0.05%~±0.1%	-	±0.05%~±0.1%	-
Change unit (S/m, S/cm)	-	-	-	■	-	■	-
Auto temperature compensation	-	-	-	■	-	■	-
Salinity			Measuring principle	-	Conversion from conductivity value	-	Conversion from conductivity value
Measuring range (Display range)	-	-	-	0.00‰~4.00‰	-	0.00‰~4.00‰	-
Resolution	-	-	-	0.01‰/0.1 PPT	-	0.01‰/0.1 PPT	-
Calibration function	-	-	-	■	-	■	-
TDS			Measuring principle	-	Conversion from conductivity value	-	Conversion from conductivity value
Measuring range (Display range)	-	-	-	100 mg/L~1000 mg/L	-	100 mg/L~1000 mg/L	-
Resolution	-	-	-	0.01 mg/L	-	0.01 mg/L	-
Dissolved Oxygen			Measuring principle	-	Hydrogen peroxide	-	Hydrogen peroxide
Measuring range (Display range)	-	-	-	0.0~20.0 mg/L	-	0.0~20.0 mg/L	-
Temperature compensation	-	-	-	-	0.0~40°C	-	0.0~40°C
Resolution	-	-	-	-	0.01 mg/L	-	0.01 mg/L
Repeatability	-	-	-	-	±0.01 mg/L~±0.1%	-	±0.01 mg/L~±0.1%
Saturated Oxygen			Measuring principle	-	Conversion from conductivity value	-	Conversion from conductivity value
Measuring range (Display range)	-	-	-	0.0~200.0%	-	0.0~200.0%	-
Resolution	-	-	-	0.1%	-	0.1%	-
Oxygen consumption			Measuring principle	-	Hydrogen peroxide	-	Hydrogen peroxide
Measuring range (Display range)	-	-	-	0.0~50.0%	-	0.0~50.0%	-
Resolution	-	-	-	0.1%	-	0.1%	-
Display		Custom LCD			Custom LCD with backlight		
Function	PC connectivity	-			■		
	Printer connectivity (GLP/GMP)	-			■		
	Temperature compensation (Auto/manual)				■		
	Auto Hold function				■		
	Data memory number			1000			
	Interval memory	-			■		
	ID input				■		
	Clock function				■		
	Auto power off/Battery Level Indicator				■		
	Dustproof and waterproof standard				IP67		
Operating ambient temperature/humidity							
Power	LR03/AAA alkaline batteries or AAA Ni-H rechargeable batteries x 2, AC adapter 100 V to 240 V 50/60 Hz (option)						
Current consumption	Less than 1 mA	Less than 1 mA	Less than 2 mA	Less than 5 mA	Less than 2 mA	Less than 5 mA	Less than 2 mA
Battery life <sup>a</sup>	Approx. 100 hours	Approx. 100 hours	Approx. 600 hours	Approx. 200 hours	Approx. 600 hours	Approx. 200 hours	Approx. 600 hours
Dimensions	Approx. 6.7 (80) x 28 (42) x 170 mm (The figures in parentheses are maximum thicknesses.)						
Weight (without batteries and electrode)	Approx. 270 g	Approx. 270 g	Approx. 285 g	Approx. 285 g	Approx. 285 g	Approx. 270 g	Approx. 270 g

<sup>a</sup> Cell constant 10 m<sup>-1</sup>, 0.000 mS/m~20.00 S/m, Cell constant 10 m<sup>-1</sup>, 0.00 mS/m~200.0 S/m

<sup>b</sup> Cell constant 10 m<sup>-1</sup>, 0.000 mS/m~20.00 S/m, Cell constant 10 m<sup>-1</sup>, 0.00 mS/m~200.0 S/m, Cell constant 1000 m<sup>-1</sup>, 0.000 mS/m~200.0 S/m

<sup>c</sup> It is recommended to use the optional cable when connecting to the LAQUAact system. LAQUAact specification does not guarantee the single operation. Please contact your local distributor for more information.

<sup>d</sup> Battery life will be shorter when connected to a computer and with back light activated.

## pH Electrode Selection Guide

		3-in-1 ELECTRODES (ToupH)						
		PLASTIC	STANDARD ToupH	LONG ToupH	MICRO ToupH	SLEEVE ToupH	For TAP WATER	HF-PROOF
		9625-10D	9615S-10D	9680S-10D	9618S-10D	9681S-10D	9630-10D	9631-10D
Specification	Applicable temperature range (°C)	0-100	0-100	0-100	0-60	0-60	0-100	0-60
	Diameter (mm)	16	12	8	3	12	16	16
	Position of liquid junction (approx. mm)	15	13	21	6	26	15	20
	Length (mm)	150	151	251	151	151	150	155

### pH- Sample Conditions

Aqueous Solution	Conductivity	Normal (over 100 mS/m)	◎	◎	◎	◎	◎	◎
		Low (approx. 10~100 mS/m)				○	◎	
		Very low (approx. 5~10 mS/m)				○	○	
		High (approx. 5 S/m)	○	○	○	◎	○	○
	Strong alkaline (pH 10-12)		○	○		○		
	Strong acidity (pH 0-2) (Except - For pH)		◎					◎
	Quick heat change (within 50°C)	◎					◎	◎
	High viscosity (approx. 5 Pa·s)					◎		
	Containing non-aqueous solvent		○	○	○	○		
	Suspension		○	○	○	◎		
Solid/Semisolid	Inside							
	Surface							

### pH- Sample Conditions

Sample Containers	Microtube/plate (> 50 µL)	×	×	×	◎	×	×	×
	NMR tube	×	×	×	×	×	×	×
	Ampule	~44°C			◎			
	Micro container (> 2 mL)			○	○			
	Tube ID:13 mm, L:100~150 mm			◎				
	Beaker 10 mL~1 L	◎	◎	○	○	○	◎	◎
	Large container (> 1 L)	○	○	○		○	○	
	Petri dish							
	Droplet	×	×	×	×	×	×	×

### pH- Typical Samples

Water	Pure/ion-exchange water (approx. 0.1 mS/m)							
	Distilled water (approx. 0.5 mS/m)		○					
	Tap/drinking water (approx. 10 mS/m)	○	○			○	○	
	Surface water		○			○	○	
	Pharmaceutical water		○			○		
	Environmental water/acid rain	○	○			○	○	
Chemical reagent/ solvent	Caustic/strong acid (Except HF sample)	◎				○		◎
	Hydrofluoric acid							◎
	Organic solvent	×					×	×
	KCl-reactive solution	×	×	×	×	×	×	×
	Surfactant		○			◎		
	Water-based paint		○			◎		
Pharmaceutical/biology sample	Dye/coloring agent					◎		
	Protein-containing sample		○		○	◎		
	Medicinal preparation				○	○		
	Enzyme solution			○	◎			
	Tris buffer	◎			○	○		
	Suspension		○			◎		
Food	Agar medium							
	Jam		○			◎		
	Meat/fish							
	Fruit/vegetable							
	Dough							
	Honey							
Beverage/seasoning	Cheese/butter							
	Yogurt	○	○			○	○	
	Beer	○	○			◎	○	
	Milk		○			◎		
Cosmetic/lotion	Carbonated drink/juice/sauce/soy sauce		○			◎		
	Mayonnaise/ketchup		○			◎		
	Beauty cream/mascara		○			◎		
	Gel/soap/shampoo		○			◎		
Cosmetic/lotion	Hairdye lotion		○			◎		
	Emulsified liquid		○			○		

Recommended    Can be measured    Prohibited or risk of damage  
Representative sample names are shown in the table, therefore they may not apply to all cases. A reference electrode is necessary for a glass electrode.

	ISFET ELECTRODES		3-in-1 ELECTRODES			COMBINATION ELECTRODES		GLASS ELECTRODES		REFERENCE ELECTRODES	
ALKALI-PROOF	NEEDLE ISFET	FLAT ISFET	SLEEVE	NON-AQUEOUS	NEEDLE	SLENDER TEST TUBE	FLAT	STANDARD	NON-AQUEOUS	STANDARD	DOUBLE
9632-10D	0030-10D	0040-10D	6367-10D	6377-10D	6252-10D	6069-10C	6261-10C	1066A-10C	1076A-10C	2060A-10T	2565A-10T
0-100	0-60	0-60	0-60	0-60	0-60	0-60	0-50	0-100	0-100	0-100	0-100
16	15	10	12	12	12	3	12	12	12	12	15
15	11	0.1	10	23	13	8	—	—	—	—	—
150	190	190	150	150	150	291	150	150	150	150	150

x	x	x	x	x	x	x	x	x	x	x	x	x
x	x	x	x	x	x	⊗	x	x	x	x	x	x
						○		x	x	x	x	x
								x	x	x	x	x
								x	x	x	x	x
⊗	○	○	○	○	○	○	○	○	○	○	○	○
○								○	○	○	○	○
		⊗					⊗	x	x	○	x	x
x	x	⊗	x	x	x	x	○	x	x	x	x	x

## Visit HORIBA websites!

### Water Quality Analyzers [www.horiba-water.com](http://www.horiba-water.com)

With over 60 years of engineering excellence, HORIBA's diverse range of water quality analyzers and electrodes are ideal for everyday laboratory needs through to the most demanding of applications. Visit our website for a wealth of useful information and water quality measurement tips to help you obtain the best results in your work.



### Benchtop Meter (LAQUA) [www.horiba.com/laqua](http://www.horiba.com/laqua)

Developed using extensive feedback from users, our new LAQUA meters deliver the best solution for your pH/water quality analysis. Our LAQUA website features an online 'Selection Guide' to enable you to find the perfect LAQUA meter and/or innovative electrode for your needs.



### Compact Meter (LAQUAtwin) [www.horiba.com/laquatwin](http://www.horiba.com/laquatwin)

Analyzing water quality is simplified when using our LAQUAtwin range of meters. Designed to produce accurate and reliable results, anyone, anywhere, at any time can measure samples easily with a LAQUAtwin meter. See just how good they are at our LAQUAtwin website.



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- IQ/OQ/PQ support\*
- SOP guidance
- FAQ

\*Optional services



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