ABQINDUSTRIAL
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Distributed by: ABQ Industrial LP USA
Tel: +1 (281) 516-9292 / (888) 275-5772 **eFax:** +1 (866) 234-0451
Web: https://www.abqindustrial.net **E-mail:** info@abqindustrial.net

HORIBA
Scientific

LAQUA
SERIES

CE RoHS COMPLIANT

HORIBA celebrates its 60th anniversary in 2013
One past, One future, One 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.

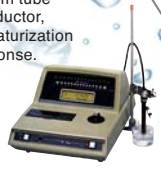
If you are looking for a versatile product with high technology and accuracy, LAQUA is the best choice for you.

1950

HORIBA introduces Japan's first glass electrode 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.

1980

Model F-80 (benchtop)
The world's first instrument capable of measuring pH at 1/1000 resolution, includes an integral computer, with automatic calibration and a self-diagnostic function.

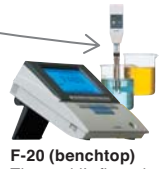
L-7 (integrated)
Introduction of a small, hand-held pH meter with the measurement electrode integrated within the main device.

1987

C-1 (card)
Development of the world's first flat sensor.

1990

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



1993

F-20 (benchtop)
The world's first wireless pH meter. Large graphical display gives user instructions on screen.

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

LAQUA Electrode

P5

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.

Benchtop

LAQUA
F-70/DS-70 series

P7

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.

Portable

LAQUA*act*
D-70/ES-70/OM-70 series

P9

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.

Compact

LAQUA*twin*
B-700 series

P11

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.

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.

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.

Thick membrane technology

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

ToupH glass

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

Dome-shaped construction boosts 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.

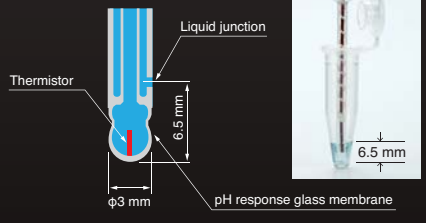
Miniaturization

Invention Award (Japan)

The 3 mm diameter double glass tube contains a temperature sensor inside (US Patent No. 7314541/ China Patent No. ZL0315796)

Applicable electrode: 9618-10D

(winner of the "Invention Award", 2011 National Invention Awards in Japan)

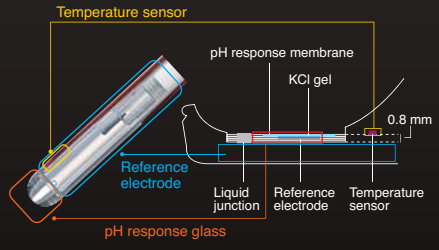


Combination electrodes have a double thin structure that generally makes manufacturing more difficult due to the tendency to cause variations in the inner tubes during the miniaturization process. However, our proprietary technique to coil the filament around the inner tube has enabled a double glass tube with a diameter of only 3 mm. This pH electrode with temperature sensor enables measurements from samples as small as 50 µL. Not only can it be used for trace measurements of precious limited samples, it can also be used for temperature-sensitive samples owing to quick temperature response.

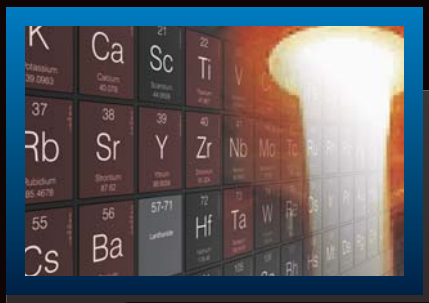
Flat electrode

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

Sensor for LAQUAtwin



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 beaker. Thus, the LAQUAtwin can measure minute volumes down to just 0.1 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

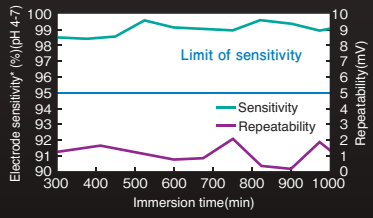
Applicable electrode: 9631-10D (Hydrofluoric acid resistant) / 9632-10D (Alkali resistant)

■Hydrofluoric acid resistant (US Patent No. 8262877)

Our special glass membranes meet the Measurement Act (Japan) certification by keeping the membrane resistance to 300 MΩ or less while improving 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 1 minute with 1 wt% hydrofluoric acid solution (at 25°C).

■Lifetime data (1 wt% HF at 25°C)

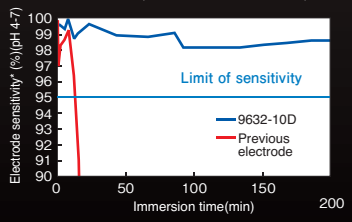


■Alkali resistant (US Patent No. 8262877)

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 0.1 mol/L sodium hydroxide solution (about pH 13 at 60℃).

■Lifetime data (1 mol/L NaOH at 60°C)



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

Fast and highly accurate

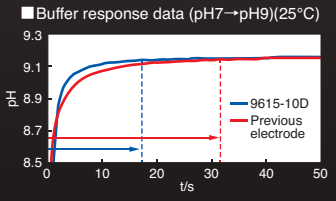
A unique glass composition including rare earth has improved responsiveness and durability (US Patent No. 8262877)

Applicable electrode: 9615-10D/9618-10D/9680-10D/9681-10D

■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.

■Buffer response data (pH7→pH9)(25°C)



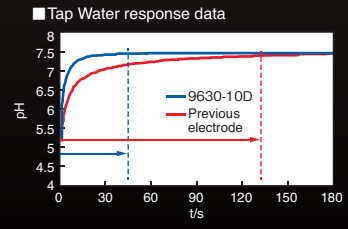
Our proprietary glass purification technology ensures high speed and stable measurements with low-conductivity samples

Applicable electrode: 9630-10D

■High-purity glass

The ideal response membrane, made of high-purity lithium multicomponent glass, it 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.

■Tap Water response data



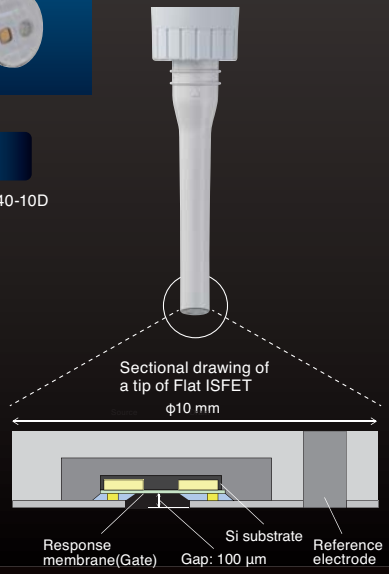
Next-Generation Electrode Technology

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.

ISFET

Applicable electrode: 0030-10D/0040-10D



What is an ISFET (semiconductor sensor) ?

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

Special features of the ISFET
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,

ToupH glass

STANDARD ToupH

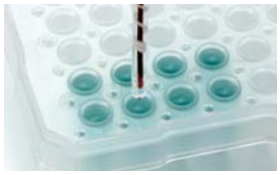
General laboratory applications

Standard ToupH electrode
(9615-10D)

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
(9618-10D)

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 that can measure samples from 50 µL. The quick temperature response eliminates the need to warm chilled samples to room temperature prior to measurement.

LONG ToupH

For large containers and long test tubes

Long ToupH electrode
(9680-10D)

Features

283 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
(9681-10D)

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)

Plastic type
9625-10D

Sleeve
6367-10D

For low-conductivity water and non-aqueous solvents
6377-10D

For food analysis
6252-10D

pH (Combination electrode)

For thin-walled test tubes
6069-10C

Flat type
6261-10C

pH (Glass electrode)

Standard type
1066A-10C

For low-conductivity water and non-aqueous solvents
1076A-10C

Reference

Standard type
2060A-10T

Double-junction type
2565A-10T

ORP

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

Temperature

Temperature electrode
4163-10T

Conductivity

Immersion type
3551-10D

Immersion type
3552-10D

Immersion type
3553-10D

Immersion type
9382-10D

Flow type
3561-10D

Flow type
3562-10D

Flow type
3573-10C

Flow type
3574-10C

Dissolved Oxygen

Field use
9551-20D
(2 m Cable)

Field use
9551-100D
(10 m 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

For hydrofluoric acid contained sample

Hydrofluoric acid resistant pH electrode
(9631-10D)

Features

With a long life and easy maintenance, this electrode is capable of approximately 1000 reliable measurements*.
Suitable for the management of water contaminated with hydrofluoric acid resulting from an etching process.
*When a measurement is conducted for 1 minute with 1 % hydrofluoric acid solution (at 25 °C).

ALKALI-PROOF

For strong alkali sample

Alkali resistant pH electrode
(9632-10D)

Features

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).

For TAP WATER

For quick tap water measurement

Tap water pH electrode
(9630-10D)

Features

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.

FLAT ISFET

Surface of solid sample

Flat ISFET pH electrode
(0040-10D)

Features

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.

NEEDLE ISFET

Inside solid sample

Needle ISFET pH electrode
(0030-10D)

Features

A semiconductor sensor that eliminates the risk of breakage which may occur in glass electrodes.
Suitable for piercing measurements of solid materials and for inner measurements of food samples such as fruits, vegetables, and bread dough.

ION

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

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
(Combination type)
6582-10C

Potassium Ion
8202-10C

Calcium Ion
(Combination type)
6583-10C

Calcium Ion
8203-10C

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

Benchtop pH/Water Quality Analyzer

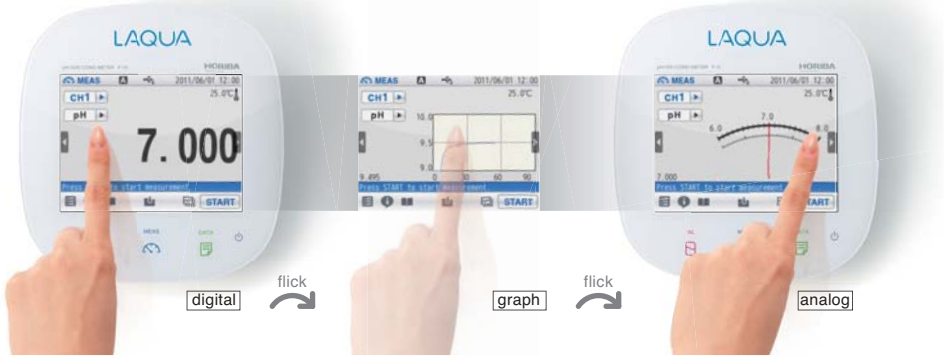
LAQUA

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

NAVI 2CH USB PC PRT ID USP/EP/JP

CH.1 pH ORP ION

CH.2 COND RESI SAL TDS

F-73

NAVI 2CH USB PC PRT ID USP/EP/JP

CH.1 pH ORP ION

CH.2 pH ORP ION

F-72

NAVI 2CH USB PC PRT ID USP/EP/JP

CH.1 pH ORP ION

DS-72

NAVI USB PC PRT ID USP/EP/JP

COND RESI SAL TDS

※Accessories included : Electrode stand/Instruction manual/Quick manual/AC adapter/Cover (F-72/F-73/F-74/DS-72 only)

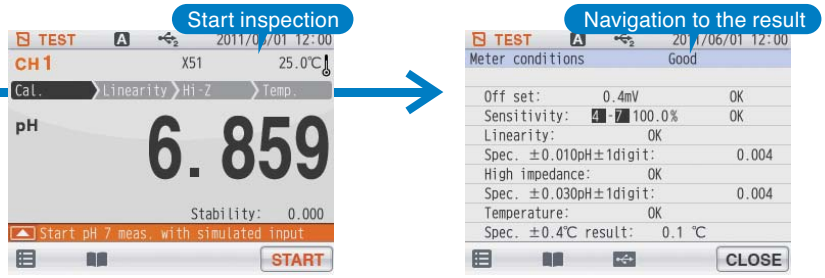
NAVI Navigation function | 2CH 2-channel measurement | USB USB flash drive compatible | PC PC connection* compatible (USB) | PRT Printer output compatible (printer sold separately) | ID Security function | USP/EP/JP Conductivity measurements stipulated under various countries

*Data storage software availiable as a free download for registered users.

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

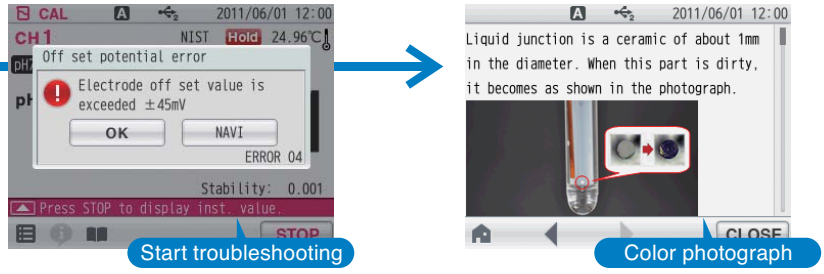
Inspection Navigation

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



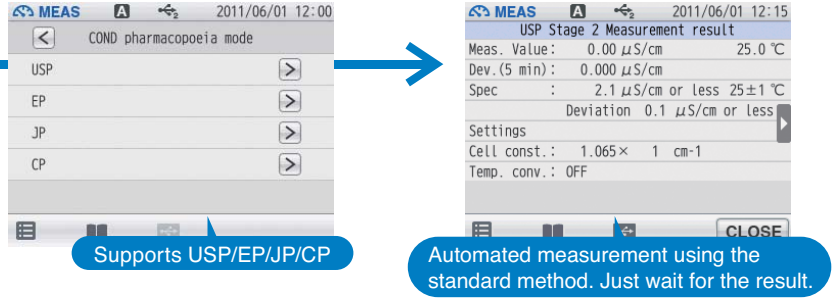
Troubleshooting Navigation

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

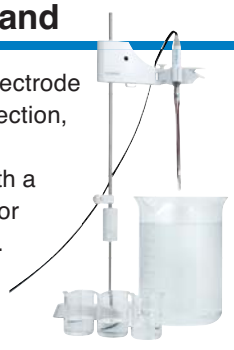
Various industry standard methods are supported from measurement to result output.
Conductivity measurements for pharmaceutical pure water guidelines of various countries are also supported.



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 a telescopic stand is also provided for measurements with large beakers.

*Optional



360°

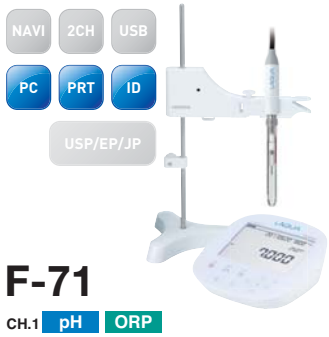
The 360° rotating free arm also can be moved vertically in full range.

450～650mm

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

*Optional

Custom LCD display



Full-Range Functions for Validation and Usability

- Periodic inspection mode: JIS/Pharmacopeias/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)
- Customizable auto-hold function for calibration and measurement (F-72/F-73/F-74/DS-72)
- Simultaneous connection to a GLP/GMP compatible printer and PC
- Digital memory: Up to 2,000 sets of measurement data can be recorded (F-71/F-74BW/DS-71:999)
- USB-PC communication *(all models) 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)
- FDA21CFR Part 11 (please ask for a quotation)

Portable pH · Water Quality Meter

LAQUAact

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

Industry First

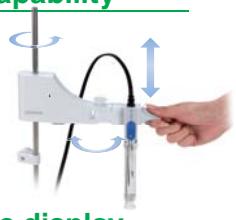
The casing is made from shock resistant and extremely durable polycarbonate resin. With high chemical resistance it is ideal for harsh environments.

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.

*Resistant to alcohol, weak acid, bases and oil.

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

Basic model

BACK LIGHT · 2CH · WATER PROOF · PC · PRT · ID · SHOCK PROOF

D-75

CH.1 pH ORP

CH.2 DO

D-74

CH.1 pH ORP

CH.2 COND RESI SAL TDS

D-73

CH.1 pH ORP ION

CH.2 pH ORP ION

D-72

CH.1 pH ORP

D-71

CH.1 pH

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

BACK LIGHT Backlit LCD | 2CH 2-channel measurement | WATER PROOF Waterproof and dustproof (IP67 rated) | PC PC connection* compatible | PRT Printer output compatible (printer sold separately) | ID Security function | SHOCK PROOF Shock and chemical resistant body case

*Data storage software availiable 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.

CAL MEAS DATA

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.

※image

Waterproof and dustproof

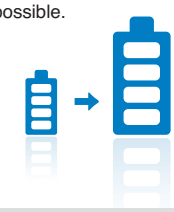
IP67 rated waterproof and dustproof casing.

*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.

Conductivity

BACK LIGHT | 2CH | WATER PROOF | PC | PRT | ID | SHOCK PROOF

ES-71

CH.1 COND RESI SAL TDS

Dissolved Oxygen

BACK LIGHT | 2CH | WATER PROOF | PC | PRT | ID | SHOCK PROOF

OM-71

CH.1 DO

* Select from the following:
- 2 m cable (OM-71-2)
- 10 m cable (OM-71-10)
- Laboratory (OM-71-L1) (BOD measurement)

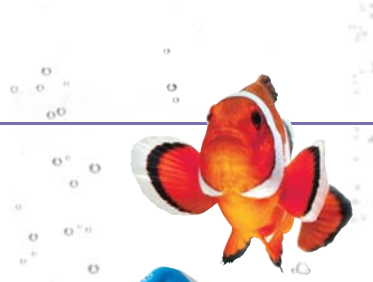
[Various functions]

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.

Common	Interval measurement function (except D-71)
	Sample ID number setting function
	Clock function and auto power-off function
	Usable with AAA alkaline batteries, Ni-MH batteries, or AC adapter
pH [D-70 series]	Automatic calibration and calibration interval alarm function
	Usable with both 5-point calibration and USA/NIST standard solutions
Conductivity [D-74/ES-71]	Electrical resistivity/total dissolved solids/salt content conversion functions
	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

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 (Na^+, K^+, NO_3^-, 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, ions and salt concentration. 7 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*.

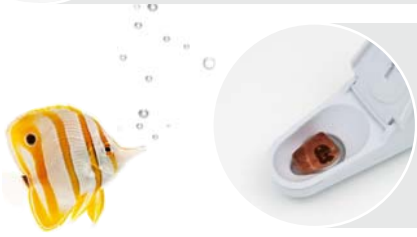
* Using the HORIBA sampling sheet, volumes down to 0.05 mL can be tested (except for conductivity).

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 eg 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 on your defined volume of pure water.

	pH Meter		Conductivity(EC) Meter	Sodium Ion Meter	Potassium Ion Meter	Nitrate Ion Meter
	B-711 **B-712** pH		**B-771** Conductivity TDS SALT	**B-722** ION	**B-731** ION	**B-743** ION
Model	B-711 / B-712		B-771	B-722	B-731	B-743
Measurement principle	Glass electrode method		2 AC bipolar	Ion electrode method		
Minimum sample 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) Salt:0 to 1.1% TDS:0 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 *2	NO_3^-:62 to 6200 ppm (mg/L) (10^{-3} to 10^{-1} mol/L) 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	Two-point *4	Two-point *4	Two-point *4		
Accuracy *5	±0.1 pH		±2%F.S.±1 digit (for each range)*6	±10% of reading value		
Functions	Temperature compensation Waterproof *7 Auto-hold		Salt/TDS Measurement Temperature conversion(2%/°C fixed) Waterproof *7 Auto-hold	Temperature compensation Waterproof *7 Auto-hold		
Operating temperature/ humidity	5 to 40°C, 85% or less in relative humidity (no condensation)					
Power	CR2032 batteries (x2)					
Dimensions/ Mass	164 mm x 29 mm x 20 mm (excluding projections) / Approx. 50 g (meter only, without batteries, B-771 approx. 45 g)					
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 tiny, trace volumes to be analysed. 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 up the sample into small pieces and place directly onto the sensor. Drop on your defined volume of pure water.

Calcium Ion Meter
B-751
ION

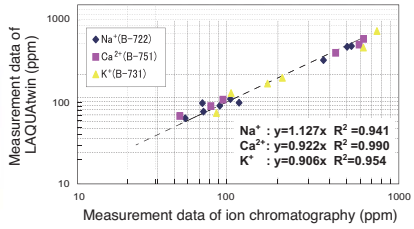
Salt Meter
B-721
SALT

	B-751	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

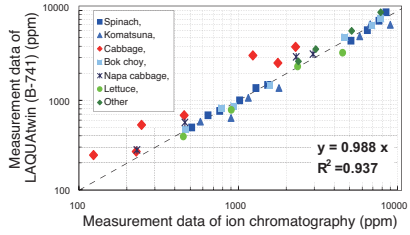
The graphs below depict the correlation between LAQUAtwin and ion chromatography.

■Isotonic drink, mineral water drinks and mineral water (Na^+, K^+, Ca^{2+})



* When measuring Ca^{2+}, we are pretreated in order to match the conditions of the ion chromatography.

■Crops (NO_3^-)



Interfering ion influence

	Sodium Ion (Na^+)	Potassium Ion (K^+)	Nitrate Ion (NO_3^-)	Calcium Ion (Ca^{2+})
Selectivity coefficient	K^+, Rb^+= 1 x 10^{-2} Ba^{2+}, Sr^{2+}, Ca^{2+}, Mg^{2+}= 1 x 10^{-4} Li^+= 1 x 10^{-3} Cs^+= 3 x 10^{-3} NH_4^+= 6 x 10^{-3} pH 3-9 (at 10^{-3} mol/L Na^+)	Rb^+= 1 x 10^{-1} Mg^{2+}= 1 x 10^{-5} NH_4^+= 7 x 10^{-3} Ca^{2+}= 7 x 10^{-7} Cs^+= 4 x 10^{-3} Na^+= 3 x 10^{-4} pH 2-9 (at 10^{-3} mol/L K^+)	I^-= 10 Cl^-= 4 x 10^{-2} Br^-= 9 x 10^{-1} ClO_4^-= 3 x 10^{-3} NO_2^-= 7 x 10^{-1} pH 2-9 (at 10^{-3} mol/L NO_3^-)	Na^+, K^+, Mg^{2+}= 1 x 10^{-3} Fe^{2+}, Zn^{2+}= 1 Fe^{3+}= 10 Cu^{2+}= 1 x 10^{-2} pH 4-12 (at 10^{-3} mol/L Ca^{2+})
pH range	pH 3-9 (at 10^{-3} mol/L Na^+)	pH 2-9 (at 10^{-3} mol/L K^+)	pH 2-9 (at 10^{-3} mol/L NO_3^-)	pH 4-12 (at 10^{-3} mol/L Ca^{2+})

* Selectivity coefficient is a concentration ratio of the interfering ion against the target ion, which affects the target ion measurement value. For example, the selectivity coefficient of potassium ion against sodium ion is 1×10^{-2}, which means for the same concentration of potassium ion and sodium ion coexisting in a sample, the sodium measurement is approximately 1×10^{-2}(1%) higher.

Replacement Sensor

Part Number	Model	Name	Applicable model
3200459834	S010	pH Sensor	B-711, B-712
3200459866	S021	Salt Sensor	B-721
3200459867	S022	Sodium Ion Sensor	B-722
3200459868	S030	Potassium Ion Sensor	B-731
3200459870	S040	Nitrate Ion Sensor	B-741, B-742, B-743
3200459869	S050	Calcium Ion Sensor	B-751
3200459672	S070	Conductivity Sensor	B-771

Accessories

Part Number	Model	Name	Description	Applicable model
3200053858	Y046	Sampling sheet B	100 pieces	Except B-771
3200459736	Y048	Sampling sheet holder (for LAQUAtwin)		Except B-771

Nitrate Ion Meter for Crop B-741

■ Measurement range: 100 to 9,900 ppm (NO_3^-)
23 to 2,200 ppm (NO_3^--N)

[Accessories included]
Standard solution for crops (300 ppm, 5000 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_3^-)
6.8 to 140 ppm (NO_3^--N)
3.4 to 6 kg/10 a (NO_3^--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

*1 Smaller amount (0.05 mL or more) can be measured with the sampling sheet B. (Please close the light shield cover. If a sample that contain particulate, please use "Sampling sheet holder" (sold separately)) *2 With soil/water sampling ratio of 1:5. *3 When the measured value is out of the 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. Calibration point B-712: pH 6.86/B-713: pH 7.00 *5 Repeatability in measurement of a standard solution after calibration using it. *6 ①±5 µS/cm (0 to 199 µS/cm) ②±0.05 mS/cm (0.20 to 1.99 mS/cm) ③±0.5 mS/cm (2.0 to 19.9 mS/cm) *7 IP67: no failure when immersed in water at a depth of 1 meter for 30 minutes. But the product can not be used underwater.

Electrodes/Accessories

For LAQUA/LAQUA*act*

pH Electrode

※1 0-50°C when completely immersed.

	Description	Model	Temp. range (°C)	pH range	Part No.
Combination (3-in-1) pH electrode	Plastic body	9625-10D	0～100※1	0～14	3200360505
	Standard ToupH	9615-10D	0～100	0～14	3200366539
	Sleeve ToupH	9681-10D	0～ 60	0～14	3200366572
	Long ToupH	9680-10D	0～100※1	0～14	3200366560
	Micro ToupH	9618-10D	0～ 60	0～14	3200366552
	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
	Flat type	6261-10C	0～ 50	0～12	3014081807
Glass pH electrode	Standard type	1066A-10C	0～100	0～14	3014080432
	For measurement of low-conductivity water and non-aqueous solvents.	1076A-10C	0～100	0～14	3014093084
Reference electrode	Standard type	2060A-10T	0～100	—	3014080434
	Double-junciton type	2565A-10T	0～100	—	3014080436
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

* See pages 18 and 19 for the application guide for each electrode.

Conductivity Electrode

Electrode	Cell constant $m^{-1}(cm^{-1})$		Model	Range $m^{-1}(cm^{-1})$	Minimum Volume (mL)	Temp. range (°C)	Part No.
Conductivity electrode	Immersion type	10 (0.1)	3551-10D	10 µS～1 S (0.1 µS～10 mS)	50	0～ 60	3014081712
		100 (1)	9382-10D	0.1 mS～10 S (1 µS～100 mS)	20～30	0～ 80	3014046709
		100 (1)	3552-10D	0.1 mS～10 S (1 µS～100 mS)	15	0～100	3014081545
		1000 (10)	3553-10D	1 mS～100 S (10 µS～1 S)	50	0～ 60	3014081714
	Flow type	10 (0.1)	3561-10D	10 µS～1 S (0.1 µS～10 mS)	10	0～ 60	3014082350
		100 (1)	3562-10D	0.1 mS～10 S (1 µS～100 mS)	16	0～ 60	3014082513
		1000 (10)	3573-10C	1 mS～100 S (10 µS～1 S)	4	0～ 60	3014082590
		1000 (10)	3574-10C	1m S～10 S (10 µS～100 mS)	0.25	0～ 60	3014082592

Ion Electrode

※All ion electrodes (except combination electrodes) require a sensor holder for attaching to the electrode stand.
※Please be aware of the hindering ion and pH range interference of ion electrodes. *D-73 connects combination type ion electrodes only.

Electrode name	Model	Measuring range	Applicable reference electrode	Interfering ion influence※1	Part No.
Sodium ion electrode	1512A-10C	2.3～230,000 mg/L Na^+	2565A	K^+, Li^+=10 NH_4^+=20 Ca^{2+}=500	3014068526
Cyanide ion electrode	8001-10C	0.03～2,600 mg/L CN^-	2060A･2565A	S^{2-}, MnO_4^-=N/A I^-=0.1 $S_2O_3^{2-}$=1	3014094393
Chloride ion electrode	8002-10C	0.4～35,000 mg/L Cl^-	2565A	$S_2O_3^{2-}$, S^{2-}, I^-, Ag^+, Hg^{2+}=N/A SCN^-=0.3 MnO_4^-=0.1	3014094394
Chloride ion electrode (Combination type)*	6560-10C	0.4～35,000 mg/L Cl^-	—	Br^-=0.03 NO_3^-, F^-, HCO_3^-, SO_4^{2-}, PO_4^{2-}=1,000	3014093430
Sulfide ion electrode	8003-10C	0.3～32,000 mg/L S^{2-}	2060A･2565A	CN^-=N/A $S_2O_3^{2-}$=10 I^-, F^-, Cl^-, PO_4^{2-}, SO_4^{2-}=1,000	3014094395
Iodide ion electrode	8004-10C	0.01～13,000 mg/L I^-	2060A･2565A	MnO_4^-, S^{2-}, CN^-=N/A $S_2O_3^{2-}$=10 NO_2^-=100 Br^-=1,000	3014094396
Bromide ion electrode	8005-10C	0.8～80,000 mg/L Br^-	2565A	$S_2O_3^{2-}$, I^-, S^{2-}, CN^-=N/A MnO_4^-=1 Cl^-, PO_4^{2-}=100 F^-, NO_3^-, SO_4^{2-}=1,000	3014094397
Copper ion electrode	8006-10C	0.06～6,400 mg/L Cu^{2+}	2565A	Fe^{2+}=0.1 Ni^{2+}, Na^+=1,000	3014094398
Cadmium ion electrode	8007-10C	0.1～11,000 mg/L Cd^{2+}	2060A･2565A	Cu^{2+}, Hg^{2+}, Ag^+=N/A Pb^{2+}=0.1 Fe^{3+}=1 Cr^{3+}, Fe^{2+}=100 Ni^{2+}=1,000	3014094399
Lead ion electrode	8008-10C	2～20,000 mg/L Pb^{2+}	2565A	Cu^{2+}, Hg^{2+}, S^{2-}, Ag^+=N/A Fe^{3+}=0.01 Cr^{3+}=1 Cd^{2+}=10 Ni^{2+}, Mg^{2+}, Zn^{2+}=100 NH_4^+, K^+=1,000	3014094400
Thiocyanate ion electrode	8009-10C	0.6～5,800 mg/L SCN^-	2565A	CN^-, I^-, S^{2-}, $S_2O_3^{2-}$=N/A Br^-=1 Cl^-=100	3014094401
Fluoride ion electrode	8010-10C	0.02～19,000 mg/L F^-	2060A･2565A	Possible interference when multiply-charged ion (ex. Al^{3+}, Fe^{3+})coexisted and foamed the complex.	3014093439
Fluoride ion electrode (Combination type)*	6561-10C	0.02～19,000 mg/L F^-	—		3014093431
Silver ion electrode	8011-10C	0.01～110,000 mg/L Ag^+	2565A	Hg^{2+}=N/A Cu^{2+}, Cd^{2+}, Pb^{2+}, Zn^{2+}, Mg^{2+}, Ca^{2+}, Na^+, K^+=Over 1000	3014094402
Nitrate ion electrode	8201-10C	0.62～62,000 mg/L NO_3^-	2565A	ClO_4^-=0.03 I^-=0.1 Br^-=2 NO_2^-=3 Cl^-=40 F^-=200	3014094403
Nitrate ion electrode (Combination type)*	6581-10C	0.62～62,000 mg/L NO_3^-	—	CH_3COO^-=300 SO_4^{2-}=Over 1000	3014093432
Potassium ion electrode	8202-10C	0.04～39,000 mg/L K^+	2565A	Rb^+=0.4 Cs^+=3 NH_4^+=70	3014094404
Potassium ion electrode (Combination type)*	6582-10C	0.04～39,000 mg/L K^+	—	Li^+, Na^+, Mg^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}=Over 1000	3014093433
Calcium ion electrode	8203-10C	0.4～40,080 mg/L Ca^{2+}	2060A･2565A	Fe^{3+}=0.1 Fe^{2+}, Zn^{2+}=1 Sr^{2+}=50 Ni^{2+}, Cu^{2+}=70 Co^{2+}=350	3014068839
Calcium ion electrode (Combination type)*	6583-10C	0.4～40,080 mg/L Ca^{2+}	—	Mn^{2+}=500 Mg^{2+}=1,000 Na^+, K^+, Ba^{2+}, NH_4^+=Over 1,000	3014093434
Ammonia electrode (Combination type)*	5002A-10C	0.1～1,000 mg/L NH_3	—	—	3014093560

※1 The selection coefficient is a ratio of the limit concentration of coexisting ions (mol/L) to the ion concentration to be measured (mol/L); A value of 1000 means that the coexisting ions can be permitted up to 1000 times the ion measured and "N/A" means that chemical change occurs in the solid response membrane.

Ion Electrode Tip

Electrode name	Model	Part No.
Chloride ion tip	7660	3014093436
Fluoride ion tip	7661	3014093438
Nitrate ion tip	7681	3014068364
Potassium ion tip	7682	3014069795
Calcium ion tip	7683	3014068795
Ammonia electrode membrane (6pcs)	membrane (NH_3)	3014067083

DO Electrode /DO Tip

Electrode	Cable length	Model	Specification	Temp. range (°C)	Part No.
Waterproof DO electrode	2m	9551-20D	Field immersible type	0～40	3014047090
Waterproof DO electrode	10m	9551-100D	Field immersible type	0～40	3014047091
DO electrode	1m	9520-10D	Laboratory use	0～45	3014046711
DO tip	—	5401	Replacement electrode tip for 9551	—	3014072770
DO tip	—	7541	Replacement electrode tip for 9520	—	3014074145

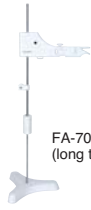
Accessories

Name	Remarks	Part No.	F-70	DS-70	D-70	ES-70	OM-70
Printer (for GLP/GMP compliance)	Cable sold separately,Plain paper	—	○	○	※1	○	○
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-51	pH, mV, ION, DO simulator (for periodic inspection of the electrode)	3014028368	○	—	○	—	○
Digital simulator X-52	Conductivity simulator (for periodic inspection of the electrode)	3014028370	※2	○	※2	○	—
USB cable	Cable to connect a meter and PC.	3200373941	○	○	—	—	—
LCD protection sheet	2 pcs/pack	3200382462	○	○	—	—	—
Protection cover	Protects the meter for F-70, DS-70 series	3200382441	○	○	—	—	—
Analog cable	Analog (alarm) output cable	3014030152	※3	※3	—	—	—
Serial cable	Cable to connect a meter and PC (Serial, 9 pins)	3014030151	○	○	※1	○	○
Electrode hook	With function for winding the cable	3200528475	—	—	○	○	○
DP-70S Electrode stand (adjustable type)	With holder for D/ES/OM-70	3200528474	—	—	○	○	○
FA-70S Electrode stand (adjustable type)	Free-standing type. Hight 384 mm	3200382557	○	○	○	○	○
FA-70L Electrode stand (long type)	Free-standing type. Hight 450～650 mm	3200382560	○	○	○	○	○

※1 Except D-71 ※2 Conductivity measuement model: F-74/F-74BW/D-74 ※3 Except F-71/F-74BW/DS-71


Printer (for GLP/GMP compliance)


Digital simulator


FA-70L Electrode stand (long type)

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	
		Internal Solution for Reference Electrode	250 mL	
Oxalate standard solution	100-2	500 mL	pH 1.68 (25°C)	3200043639
Phthalate standard solution	100-4	500 mL	pH 4.01 (25°C)	3200043638
Phosphate standard equimolal solution	100-7	500 mL	pH 6.86 (25°C)	3200043637
Borate standard solution	100-9	500 mL	pH 9.18 (25°C)	3200043636
Carbonate standard solution	100-10	500 mL	pH 10.02 (25°C)	3200043635
Powder for ORP standard solution	160-51	For 250 mL (10 packets per set)	25°C: 89 mV	3200043618
Powder for ORP standard solution	160-22	For 250 mL (10 packets per set)	25 °C:258 mV	3200043617
Internal Solution for Reference Electrode	300	3.33 mol/L KCl	250 mL	3200043640
Internal solution for NH_3 electrodes	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 protein containing sample residues from glass electrodes, and for cleaning liquid junctions.

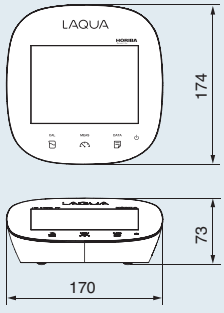
Name	Type	Volume (mL)	Part No.
Electrode cleaning solution	250	400	3200366771

●For 9630-10D (pH electrode for tap water or low conductivity sample)

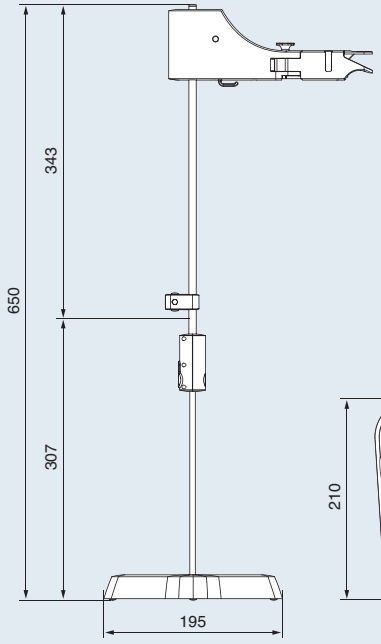
Name	Type	Volume (mL)	Part No.
Electrode cleaning solution	230	Solution A 30 mL Solution B 100 mL	3200530494

■**Dimension** Unit: mm

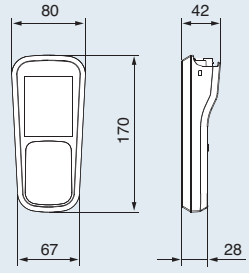
■F-70 Series / DS-70 Series



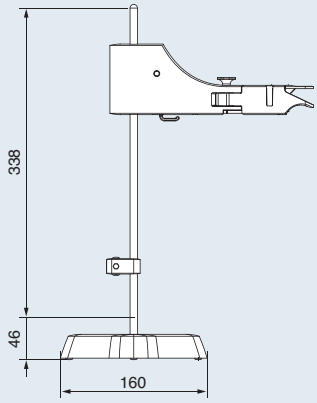
■Long type electrode stand FA-70L



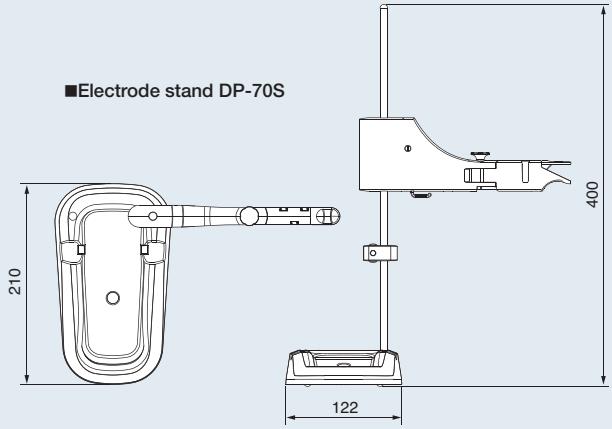
■D-70 Series / ES-70 Series / OM-70 Series



■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	Galass electorode method					–	–
	Measurement range	pH 0.000～14.000					–	–
	Display range	pH -2.000～19.999	pH -2.000～20.000			pH -2.000～19.999	–	–
	Resolution	0.001 pH	0.01/0.001 pH			0.001 pH	–	–
	Auto range select	–	●	●	●	–	–	–
	Repeatability	±0.005 pH±1 digit	±0.001 pH±1 digit			±0.005 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	0.0～100.0°C (-30.0～130.0°C)						
	Resolution	0.1°C						
	Repeatability	±0.1°C±1 digit						
ION	Measurement method	–	Ion electrode method				–	–
	Measurement range	–	0.00 µg/L～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	5	–	–
	Addition method measurement	–	●	●	●	–	–	–
Conductivity	Measurement method	–	–	–	2 AC bipolar method			
	Measurement range (Display range)	–	–	–	Cell constant 100 m^{-1}: 0.000 mS/m～19.99 S/m Cell constant 10 m^{-1}: 0.0 µS/m～1.999 S/m Cell constant 1000 m^{-1}: 0.00 mS/m～199.9 S/m			
	Resolution	–	–	–	0.05% of full scale			
	Repeatability	–	–	–	±0.5%F.S.±1 digit			
	Change unit	–	–	–	●	●	●	●
	Distilled water temperature conversion	–	–	–	●	●	●	●
	Periodical check	–	–	–	●	–	–	●
	JP/EP/USP/CP Pharmaceutical water aplication	–	–	–	●	–	–	●
Salinity	Measurement method	–	–	–	Conversion from conductivity value			
	Measurement range (Display range)	–	–	–	0.00～80.00 PPT (0.000%～8.000%)			
	Resolution	–	–	–	0.01 PPT (0.001%)			
	Salt concentration calibration	–	–	–	●	●	●	●
Resistivity	Measurement method	–	–	–	Conversion from conductivity value			
	Measurement range (Display range)	–	–	–	Cell constant 100 m^{-1} : 0.00 Ω・m～199.9 kΩ・m Cell constant 10 m^{-1} : 0.0 Ω・m～1.999 MΩ・m Cell constant 1000 m^{-1} : 0.000 Ω・m～19.99 kΩ・m			
	Resolution	–	–	–	0.05% F.S.			
	Repeatability	–	–	–	±0.5%F.S.±1 digit			
TDS	Measurement method	–	–	–	Conversion from conductivity value			
	Measurement range (Display range)	–	–	–	0.01 mg/L～1000 g/L	0.01 mg/L～100 g/L	0.01 mg/L～1000 g/L	
	Resolution	–	–	–	0.01 mg/L			
Input/ output	Input (number of channels)	1	1	2	2	2	1	1
	USB peripherals (Communication with PC)*1	●	●	●	●	●	●	●
	USB host (USB memory)	–	●	●	●	–	–	●
	RS-232C (Printer/PC)	●	●	●	●	●	●	●
	Analog out put	–	●	●	●	–	–	●
Data	Memory number	999	2000	2000	2000	999	999	2000
	Interval memory	●	●	●	●	●	●	●
	ID input	●	●	●	●	●	●	●
	Data search	–	●	●	●	–	–	●
Display	Display	Custom LCD	Color graphic LCD with capacitive Touch Panel			Custom LCD		Color graphic LCD with capacitive Touch Panel
	Dual component display	–	–	●	●	●	–	–
	Multilanguage display	–	Japanese/English/Chinese/Korean			–	–	Japanese/English/ Chinese/Korean
Function	Navigation function	–	●	●	●	–	–	●
	User guide	–	●	●	●	–	–	●
	Graph display	–	●	●	●	–	–	●
	Printer connectivity (GLP/GMP)	●	●	●	●	●	●	●
	Custom printing function	–	●	●	●	–	–	●
	Temperature compensation (Auto/manual)	●	●	●	●	●	●	●
	AutoHold function	●	●	●	●	●	●	●
	AutoHold setting	–	●	●	●	–	–	●
	Stability function (pH/ION)	–	●	●	●	–	–	●
	Register operator	–	●	●	●	–	–	●
	Security (password)	●	●	●	●	●	●	●
	Version up function	●	●	●	●	●	●	●
Ambient temperature		0～45°C						
Power		AC adaptor 100 ～ 240 V 50/60 Hz						
Demensions		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	Measuring principle	Glass electrode method					—	—
	Measuring range	pH 0.00～14.00					—	—
	Display range	-2.00～16.00 ※Flashes when outside the measurement range					—	—
	Resolution	0.01 pH					—	—
	Repeatability	±0.01 pH±1digit					—	—
	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 ※Flashes when outside the measurement range				—	—
	Resolution	—	1 mV				—	—
	Repeatability	—	±1 mV±1 digit				—	—
	Absolute/relative selectable	—	●				—	—
Temperature	Measuring range (Display range)	0.0°C～100.0°C (-30°C～130°C) ※Flashes when outside the measurement range						
	Resolution	0.1°C						
	Repeatability	±0.1°C±1digit						
	Calibration function	●						
ION	Measuring principle	—	—	Ion electrode method	—		—	—
	Measuring range (Display range)	—	—	0.00 µg/L～999 g/L	—		—	—
	Resolution	—	—	3-digit valid numbers	—		—	—
	Repeatability	—	—	±0.5% F.S.±1 digit	—		—	—
	5 points calibration/Calibration record	—	—	●	—		—	—
Conductivity	Measuring principle	—	—	—	2 AC bipolar method	—	2 AC bipolar method	—
	Measuring range (Display range)	—	—	—	0.0 µS/m～200.0 S/m※1	—	0.0 µS/m～200.0 S/m※1	—
	Resolution	—	—	—	0.05%F.S.	—	0.05%F.S.	—
	Repeatability	—	—	—	±0.5% F.S.±1 digit	—	±0.5% F.S.±1 digit	—
	Change unit (S/m,S/cm)	—	—	—	●	—	●	—
	Auto temperature conversion (25 °C)	—	—	—	●	—	●	—
Salinity	Measuring principle	—	—	—	Conversion from conductivity value	—	Conversion from conductivity value	—
	Measuring range (Display range)	—	—	—	0.00%～4.00% (0.0PPT～40.0PPT)	—	0.00%～4.00% (0.0PPT～40.0PPT)	—
	Resolution	—	—	—	0.01%/0.1 PPT	—	0.01%/0.1 PPT	—
	Calibration function	—	—	—	●	—	●	—
Resistivity	Measuring principle	—	—	—	Conversion from conductivity value	—	Conversion from conductivity value	—
	Measuring range (Display range)	—	—	—	0.000 Ω·m～2.000 MΩ·m※2	—	0.000 Ω·m～2.000 MΩ·m※2	—
	Resolution	—	—	—	0.05%F.S.	—	0.05%F.S.	—
	Repeatability	—	—	—	±0.5%F.S.±1 digit	—	±0.5%F.S.±1 digit	—
TDS	Measuring principle	—	—	—	Conversion from conductivity value	—	Conversion from conductivity value	—
	Measuring range (Display range)	—	—	—	0.01 mg/L～100 g/L	—	0.01 mg/L～100 g/L	—
	Resolution	—	—	—	0.01 mg/L	—	0.01 mg/L	—
Dissolved Oxygen	Measuring principle	—	—	—	—	Membrane galvanic cell	—	Membrane galvanic cell
	Measuring range (Display range)	—	—	—	—	0.00～20.00 mg/L	—	0.00～20.00 mg/L
	Temperature compensation	—	—	—	—	0～40°C	—	0～40°C
	Resolution	—	—	—	—	0.01 mg/L	—	0.01 mg/L
	Repeatability	—	—	—	—	±0.1 mg/L±1 digit	—	±0.1 mg/L±1 digit
	Salinity concentration correction (0～40PPT)	—	—	—	—	●	—	●
	Air pressure correction	—	—	—	—	●	—	●
Saturated Oxygen	Measuring principle	—	—	—	—	Membrane galvanic cell	—	Membrane galvanic cell
	Measuring range (Display range)	—	—	—	—	0.0～200.0%	—	0.0～200.0%
	Resolution	—	—	—	—	0.1%	—	0.1%
Oxygen concentration	Measuring principle	—	—	—	—	Membrane galvanic cell	—	Membrane galvanic cell
	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※3	—	●					
	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		0°C to 45°C, 80% or less in relative humidity (no condensation)						
Power		LR03/AAA alkaline batteries or AAA Ni-H rechargeable batteries × 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※4		Approx. 1000 hours	Approx. 1000 hours	Approx. 500 hours	Approx. 200 hours	Approx. 500 hours	Approx. 200 hours	Approx. 500 hours
Dimensions		Approx. 67 (80) × 28 (42) × 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

※1 Cell constant 100 m^{-1}: 0.000 mS/m～20.00 S/m, Cell constant 10 m^{-1}: 0.0 µS/m～2.000 S/m, Cell constant 1000 m^{-1}: 0.00 mS/m～200.0 S/m

※2 Cell constant 100 m^{-1}: 0.00 Ω・m～200.0 kΩ・m, Cell constant 10 m^{-1}: 0.0 Ω・m～2.000 MΩ・m, Cell constant 1000 m^{-1}: 0.000 Ω・m～20.00 kΩ・m

※3 RS-232C cable (3014030151) and software is required. Software can be download by web registration. If you need to connect to the USB, the commercially available (RS232C to USB) adapter is required. Please purchase according to the specifications of the PC (Operating system · USB Specification, etc.). ※ HORIBA will not guarantee the adapter operation

※4 Battery life will be shorter when using optional accessories and LCD backlight is 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	9615-10D	9680-10D	9618-10D	9681-10D	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	198	283	185	203	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 HF sample			◉					◉
	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	ϕ5 mm ID > ϕ4 mm	×	×	×	×	×	×	×
	Ampule	> ϕ4 mm				◉			
	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			○			○		
	Enviromental water/acid rain		○	○			○	○	
Chemical reagent/solvent	Caustic/strong acid (Except HF sample)			◉			○		◉
	Hydrofluoric acid								◉
	Organic solvent		×					×	×
	KCl-reactive solution		×	×	×	×	×	×	×
	Surfactant			○			◉		
	Water-based paint			○			◉		
	Dye/coloring agent						◉		
Pharmaceutical/ biology sample	Protein-containing sample			○		○	◉		
	Medicinal preparation					○	○		
	Enzyme solution				○	◉			
	Tris buffer			◉		○	○		
	Suspension			○			◉		
	Agar medium								
Food	Jam			○			◉		
	Meat/fish								
	Fruit/vegetable								
	Dough								
	Honey								
	Cheese/butter								
	Yogurt		○	○			○	○	
Beverage/ seasoning	Beer		○	○			◉	○	
	Milk			○			◉		
	Carbonated drink/juice/sauce/soy sauce			○			◉		
	Mayonnaise/ketchup			○			◉		
Cosmetic/ lotion	Beauty cream/mascara			○			◉		
	Gel/soap/shampoo			○			◉		
	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
	◉	◉	◉	◉	◉	◉	◉	◉	◉	◉	◉	◉
					◉					◉		◉
					◉					○		○
	○								○	○	○	○
	◉			○					○		○	○
	◉								○			
				○	◉				○	○		○
		○	○	○	◉					◉		◉
		○	○		◉				○	○		○
		◉				○						
			◉					○				
	×	×	×	×	×	×	×	×	×	×	×	×
	×	×	×	×	×	×	◉	×	×	×	×	×
							○		×	×	×	×
									×	×	×	×
									×	×	×	×
	◉	○	○	○	○	○	○	○	○	○	○	○
	○								○	○	○	○
			◉					◉	×	×	○	×
	×	×	◉	×	×	×	×	○	×	×	×	×
					◉							
					◉							
					◉				○	○	○	○
					◉				○	○	○	○
					○					○		○
					○					○		○
									○		○	○
	×	×	×		○					◉		◉
	×	×	×	×	×	×	×	×	○	○	×	◉
					○				○	○		○
					○				○	○		○
					○				○	○		○
				○						○		○
					○					○		○
						○				○		○
									○	○		○
			◉		◉				○	○		○
			◉					◉				
		◉ (inside)	◉ (surface)		○	○		○	○	○		○
		◉ (inside)	◉ (surface)			◉		○				
		◉ (inside)	◉ (surface)			○		○				
		◉ (inside)	◉ (surface)			○		○				
		○ (inside)	○ (surface)		◉					○		○
		◉ (inside)	○ (surface)			○		○				
		◉ (inside)	◉ (surface)	○		○		○	○	○		○
				○	◉					◉		◉
				○	○				○	○		○
				○	○				○	○		○
					○				○	○		○
		○			○	○				○		○
					○					○		○
					○					○		○
					◉					○		○

Water Quality Analyzers 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.

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Compact Meter (LAQUAtwin) www.horiba.com/laquatwin

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Our support website is available for registered customers and features:
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- Instruction manual downloads
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- IQ/OQ/PQ support*
- SOP guidance
- FAQ

*Optional services

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Tel: +1 (281) 516-9292 / (888) 275-5772 **eFax:** +1 (866) 234-0451
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RoHS COMPLIANT

Applying to the EU RoHS Directive : These products are compliant with the restriction of the designated 6 hazardous substances(*).
(*) lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)

Using lead-free soldering : Lead-free soldering is used for mounting components of printed circuit boards.
- Many countries consider the reinforcement of regulations concerning the risk caused by lead to human body and the environment

⚠ **Please read the operation manual before using these products to assure safe and proper handling.**

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