

# HORIBA



CE marking compliant

## Water Quality Monitoring System U-20 Series



**N E W**

**NOW AVAILABLE WITH  
DETACHABLE CABLE !!**

1 month  
continuous  
monitoring

Depth up to  
100 meters

GPS  
function

13  
simultaneous  
parameters

# U-20 Series NOW AVAILABLE WITH CABLE DETACHABLE

Water is as precious as life itself. That's why current threats to water supplies make water quality analysis vital to our very existence. HORIBA has created the Multi-function Water Quality Monitoring System. Years of HORIBA sensor technology development have reached their culmination in the form of a 46-mm diameter sensor probe: a compact monitoring solution offering high pressure tolerance, long-term continuous measurement capability and highly accurate, simultaneous analysis of 13 parameters. In addition to the Water Quality Monitoring System's own capabilities, it was designed by HORIBA to be compatible with GPS and other data processing techniques. And now, the U-20 series is available with detachable cable, and the flow through cell to meet your demand.

## One-touch calibration makes work easy

Just submerge the probe into the calibration beaker filled with standard solution and press the button for simultaneous one-point calibration. The system also enables two-point calibration where high-precision measurement data is required.

### ● Press a button

One point calibration for all 5 parameters (pH, Conductivity, Turbidity, DO, Depth) at once with pH4 solution.

### ● Press another button

One point calibration for all 3 lon parameters ( $\text{Cl}^-$ ,  $\text{NO}_3^-$ ,  $\text{Ca}^{2+}$  only) at once with lon one-point calibration solution.



▲ Control Unit

Multi-Probe ▶

## Six sensors, including Turbidity in Two-inches probe



Turbidity sensor

Fits in a 2-inch well

## Dry Cell Battery Operated Meter

You don't have to worry about charging the battery. Just buy a common dry cell battery at a store.



Up to  
one month

## Data logging

The sensor's built-in memory function enables continuous measurement for as long as one month\* — just by leaving the probe submerged in the sample. Personnel need not be present during the measurement process — the data can even be captured by personal computers in remote locations.

\*With measurements every 15 minutes.

## Simultaneous measurement of 13 parameters

With the W-23P unit (only), simultaneous measurements of up to 13 parameters (from pH, dissolved oxygen, and conductivity to seawater specific gravity and a variety of ions) can be obtained — much more quickly and easily than with conventional instruments. With its powerful measurement capabilities, the compact U-20 series is recommended for all water quality researchers and professionals.

## Measurement at depths as low as 100 meters

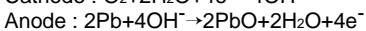
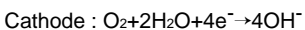
With its superior durability and high pressure resistance, the newly developed sensor facilitates measurements as far as 100 meters below the water surface. Thus, in addition to rivers, lakes and other shallow bodies, high-precision measurement can now be readily obtained — and water quality can be monitored — at dams, and even in the open sea.

## World's First! HORIBA's high-precision dissolved oxygen sensor (Patented)

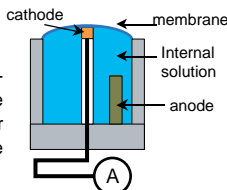
With its membrane galvanic cell, the HORIBA dissolved oxygen sensor is virtually impervious to eddies and flows in the solution. Highly precise measurements can now be obtained with ease.

### HORIBA DO Sensor needs no stirring, quick response

#### ● Diaphragm Galvanic battery method



Larger the cathode surface is, more it is influenced by the eddies and flows of samples. The cathode of the new DO sensor is 1/45 smaller than the old type., obtained 95% influence free from the water flow!!



#### ● Response efficiency

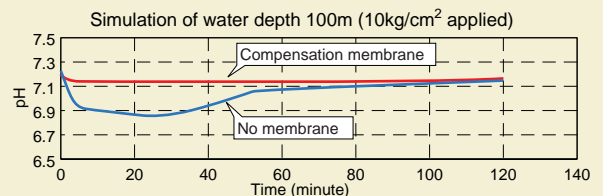
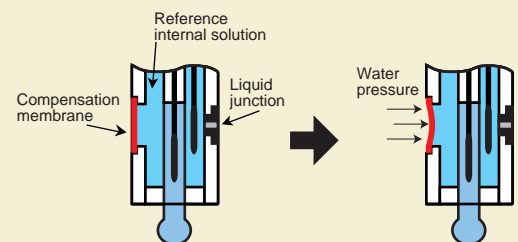
Response from Air to Zero-gas	U-20
T90	30 sec
T95	55 sec

Polarographic method may have slower response.

#### ● Membrane replacement

Membrane of DO sensor can replace by membrane replacement kit .

### Pressure compensation membrane



## U-20 series

## Model Name

## Description

### Multi-Probe



W-22P

Multi-probe for upto simultaneous 10 parameters measurement. At least one set of a cable and a control unit is necessary to view or download the measurement. Guaranteed measurement depth is 100m.



W-23P

Multi-probe for upto simultaneous 13 parameters measurement, including 3 ions. At least one set of a cable and a control unit is necessary to view or download the measurement. Guaranteed measurement depth is 100m.

### Cables



2m

W-002C

10m

W-010C

30m

W-030C

100m

W-100C

### Control Unit



W-2000

Necessary for inputting calibration, measurement mode to the multi-probe, connecting with U-2001(extension unit). The measurement data can be viewed on an LCD.

### Sensors



pH

6230

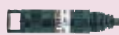
Part No.9037-0056-00



pH/ORP

6280

Part No.9037-0057-00



Dissolved Oxygen

5460

Part No.9037-0058-00 DO membrane replacement kit available



Nitrate Ion

6531

Part No.9037-0059-00 Nitrate ion cartridge available



Chloride Ion

6522

Part No.9037-0060-00 Chloride ion cartridge available



Calcium Ion

6533

Part No.9037-0061-00 Calcium ion cartridge available



Fluoride Ion

6530

Part No.9037-0063-00 Fluoride ion cartridge available



Potassium Ion

6532

Part No.9037-0064-00 Potassium ion cartridge available



Ammonia

5012

Part No.9037-0062-00 Ammonia membrane replacement kit available

### System Unit



U-2002

Simultaneous measurement with GPS, Printer, RS-232C output possible. Battery compartment allows upto 300 hours continuous measurement.

### Extension Unit



U-2001

For connection with AC-10 and GPS, Printer or PC. GPS unit should comply NMEA-0183 Version 2.1. Suggested model is Magellan® MAP-410, GPS315.

### Carrying Case



Cable less than 10m

W-2010

Multi-probe Guard and Flow Through Cell cannot be stored



Cable more than 30m

W-2030

Multi-probe Guard and Flow Through Cell can be stored.

### Flow Through Cell



W-2100

Applicable only for U-22 set and W-22P. Water pressure ; 0 kPa Water flow ; 0.1~0.5L/min

### Multi-probe Guard



W-2200

### Communication Cable

RS-232C

For 9-pin

### AC adapter



AC-10

100 V or 220 V

### Standards and internal solutions



pH4 Standard solution

100-4

Part No.9003-0016-00

pH7 Standard solution

100-7

Part No.9003-0017-00

pH9 Standard solution

100-9

Part No.9003-0018-00

ORP Standard powder

160-51

Part No.9003-0031-00 250 ml X 10packs, 89 mV at 25°C

ORP Standard powder

160-22

Part No.9003-0030-00 250 ml X 10packs, 258 mV at 25°C

pH Reference electrode internal solution

330

Part No.9037-0052-00 500 ml

Ion one-point calibration solution

130

Part No.9037-0065-00 250 ml, for Nitrate ion, Chloride ion, Calcium ion only

Nitrate Reference electrode internal solution

302

Part No.9037-0066-00 50 mL

Chloride Reference electrode internal solution

301

Part No.9037-0067-00 50 mL

Calcium/Fluoride Reference electrode internal solution

300

Part No.9003-0032-00 250 mL

Potassium Reference electrode internal solution

303

Part No.9037-0069-00 50 mL

Ammonia Reference electrode internal solution

370

Part No.9012-0009-00 250 mL

\*Horiba do not supply standard solutions for Conductivity, Turbidity, Dissolved Oxygen and Ions.

Please contact your local distributor or ask Horiba offices around the world for suggested standards supplier(see back cover for addresses).

## Standard Accessories

Sensor probe with built-in sensors (depth, conductivity, temperature, turbidity), pH4 standard solution, Reference solution, calibration beaker, batteries, instruction manual

Sensor probe with built-in sensors (depth, conductivity, temperature, turbidity), pH4 standard solution, Reference solution, ion auto-cal solution, calibration beaker, batteries, instruction manual

Control Unit, Grip holder, batteries

Reference internal solution (50 mL)

Reference internal solution (50 mL)

Reference internal solution (50 mL)

Reference internal solution (50 mL)

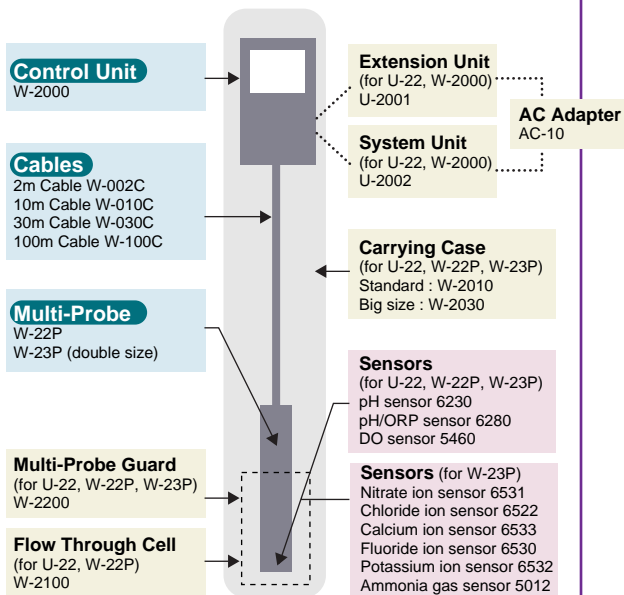
Reference internal solution (50 mL)

Reference internal solution (50 mL)

Sample software (Windows 95, 98)

Sample software (Windows 95, 98)

## Suggested combination



## U-20 series specifications

			U-22SET	W-22P	W-23P	
<b>Control Unit</b>	Water proof construction	IP-67	●			
<b>Multi-Probe *1</b>	Measurement temperature	0-55°C				
	Storage temperature	-5-60°C				
	Measurement depth *2	to 100 m				
	Maximum probe size	95 mm	●	●	●	
	Probe length	430 mm	(to 30 m)			
	Continuous use available *3	30days				
	Data logging	○				
Manual data memory (2880 items)	○					
Automatic calibration	○					
<b>pH</b> ●Two-point calibration ●Automatic temperature compensation	Measuring principle	Glass electrode method				
	range	pH 0-14				
	Resolution	0.01 pH	●	●	●	
	Repeatability	±0.05 pH				
	Accuracy	±0.1 pH				
<b>Dissolved oxygen</b> ●Salt correction (0 to 40 ppt/automatic) ●Automatic temperature compensation	Measuring principle	Diaphragm gavanic battery method				
	range	0-19.99 mg/L				
	Resolution	0.01 mg/L	●	●	●	
	Repeatability	±0.1 mg/L				
	Accuracy	±0.2 mg/L				
<b>Conductivity</b> ●Auto range ●Automatic temperature conversion (25°C) ●SI units	Measuring principle	4 AC electrode method				
	range	0-9.99 S/m				
	Resolution	0.1%F.S	●	●	●	
	Repeatability	±1%				
	Accuracy	±3%				
<b>Salinity</b>	Measuring principle	Conductivity conversion				
	range	0-4%				
	Resolution	0.01%	●	●	●	
	Repeatability	±0.1%				
	Accuracy	±0.3%				
<b>Total Dissolved Solids (TDS)</b> ●Conversion factor setting	Measuring principle	Conductivity conversion				
	range	0-100 g/L				
	Resolution	0.1%F.S	●	●	●	
	Repeatability	±2 g/L				
	Accuracy	±5 g/L				
<b>Seawater specific gravity</b> ●Display $\sigma_t$ , $\sigma_0$ , $\sigma_{15}$	Measuring principle	Conductivity conversion				
	range	0-50 $\sigma_t$				
	Resolution	0.1 $\sigma_t$	●	●	●	
	Repeatability	±2 $\sigma_t$				
	Accuracy	±5 $\sigma_t$				
<b>Temperature</b>	Measuring principle	Thermistor method				
	range	0-55°C				
	Resolution	0.01°C	●	●	●	
	Repeatability	±0.3°C				
	Accuracy	±1.0°C				
<b>Turbidity</b> ●Unit selection	Measuring principle	Penetration and scattering method				
	range	0-800 NTU				
	Resolution	0.1 NTU	●	●	●	
	Repeatability	±3%				
	Accuracy	±5%				
<b>Water depth</b>	Measuring principle	Pressure method				
	range(NTU or mg/L)	0-100m				
	Resolution	1 m	●	●	●	
	Repeatability	±3%				
	Accuracy	±5%				
<b>Oxidation reduction potential(ORP)</b>	Measuring principle	Platinum electrode method				
	range	±1999 mV				
	Resolution	1 mV	●	●	●	
	Repeatability	±5 mV				
	Accuracy	±15 mV				
<b>Ion</b> ●Auto range	Measuring principle	Ion electrode method				
	Resolution	0.1%F.S				
	Repeatability	±5%				
	Accuracy	±10%				
	range	Nitric acid ion	NO <sub>3</sub> <sup>-</sup> : 0.62-62,000 mg/L(pH 3-7)			
		Chloride ion	Cl <sup>-</sup> : 0.4-35,000 mg/L(pH 3-11)			
		Calcium ion	Ca <sup>2+</sup> : 0.4-40,080 mg/L(pH 5-11)			
		Fluoride ion	F <sup>-</sup> : 0.02-19,000 mg/L(pH4-10.20 mg/L)			
		Potassium ion	K <sup>+</sup> : 0.04-39,000 mg/L(pH5-11:3.9 mg/L)			
		Ammonia	NH <sub>3</sub> : 0.1-1,000 mg/L(pH 12 or more)			
Simultaneously measurable parameters			10	10	13	

Note: The accuracy rating value is obtained from measurements at an intermediate point of the standard solution after two-point calibration (at room temperature and pressure).

The repeatability and accuracy rating percentages are based on the full scale (except for salinity).

\*1: Organic solvents, strong acids, and strong alkaline solvents cannot be measured.

\*2: The maximum depth for ion measurements are 100 m for nitric acid ion, chloride ion, fluoride ion, 15 m for calcium ion, ammonia, and 3 m for potassium ion.

\*3: Based on the data measured automatically at 15 minutes intervals. The battery life taken into account.

Periodical maintenance and calibration is necessary when a lot of shellfishes and seaweeds exist at the measurement point.

● Influence of Hindering Ions, The values show permissible coexistence limits

Nitrate Ion	ClO <sub>4</sub> =0.03 I <sup>-</sup> =0.1 Br <sup>-</sup> =2 NO <sub>2</sub> =3 Cl <sup>-</sup> =40 F <sup>-</sup> =200 CH <sub>3</sub> COO <sup>-</sup> =300 SO <sub>4</sub> <sup>2-</sup> = more than 1000
Chloride Ion	S <sub>2</sub> O <sub>3</sub> <sup>2-</sup> , S <sup>2-</sup> , I <sup>-</sup> , Ag <sup>+</sup> , Hg <sup>2+</sup> =Not possible SCN <sup>-</sup> =0.3 MnO <sub>4</sub> <sup>-</sup> =0.1 Br <sup>-</sup> =0.03
Calcium Ion	Fe <sup>3+</sup> =0.1 Fe <sup>2+</sup> , Zn <sup>2+</sup> =1 Sr <sup>2+</sup> =50 Ni <sup>2+</sup> , Cu <sup>2+</sup> =70 Co <sup>2+</sup> =350 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> =more than 1000
Fluoride Ion	OH <sup>-</sup> =10, All negative ions except for OH <sup>-</sup> is permissible
Potassium Ion	Rb <sup>+</sup> =0.4 Cs <sup>+</sup> =3 NH <sub>4</sub> <sup>+</sup> =70 Li <sup>+</sup> , Na <sup>+</sup> , Mg <sup>2+</sup> , Ca <sup>2+</sup> , Sr <sup>2+</sup> , Ba <sup>2+</sup> =more than 1000
Ammonia	—

## Option

### ■System unit Model U-2002 (with GPS, printer, and sample software)



Please specify the printer voltage: 100, 110, 220V

### ■Carrying Case

W-2010(for cable length less than 10m),  
W-2030(for cable length more than 30m)



W-2030

Please select appropriate carrying case depending on your cable length.

\*Multi-probe guard or Flow Through Cell can only be stored in W-2030



W-2010

### ■Flow Through Cell

Model W-2100



Applicable only for U-22 set and W-22P.

### ■Multi-probe Guard

Model W-2200



\*Multi-Probe not included

### ■Extension Unit

Model U-2001



Attaching the extension adapter to the main unit enables connection of an AC adapter, analog output, and RS-232C interface.

### ■Communication Cable

Model RS-232C

For RS-232C communication. U-2001 or U-2002 is necessary.

### ■AC adapter

Model AC-10



Connection to the extension adapter or system unit is required.

Please specify the voltage: 100, 110, 220V

## Spare parts

### ■Cartridges for ion sensor replacement



Tip name	Model No.	Part No.
Nitrate ion cartridge	7681	9003-0152-00
Chloride ion cartridge	7660	9003-0150-00
Calcium ion cartridge	7683	9003-0154-00
Potassium ion cartridge	7682	9003-0153-00
Fluoride ion cartridge	7661	9003-0151-00

### ■Membranes

Ammonia membrane replacement kit (approx. 6 uses)	Membrane (NH <sub>3</sub> )	9037-0070-00
Dissolved oxygen membrane replacement kit (approx. 50 uses)	Membrane (DO)	9037-0074-00

# Application not requiring detachable cable, U-22 SET will be our suggested selection.

## U-22 SET (Cable not detachable)

U-22 -2m

U-22 -10m

U-22 -30m

Enhanced model with Turbidity, ORP and depth function in 2-inch probe. Available in economical price



Data logging

Depth up to 100 meters

10 simultaneous parameters

### Parameters

pH, Dissolved oxygen, Conductivity, Salinity, Total dissolved solids (TDS), Seawater specific gravity, Temperature, Turbidity, Depth, Oxidation reduction potential (ORP)

### Packing list

- Main unit
- Sensor probe with the cable (2m, 10m, 30m).  
Type of cable length is selected depending on applications
- Sensor
- pH4 standard solution (250 ml)
- pH internal solution (250 ml)
- Syringe (with needle)
- Sensor spanner
- Calibration beaker
- Grip holder
- Carrying case
- Dry cell 6F22 (S006P) (1 piece)
- Dry cells (R03) (3 pieces)
- Operation manual

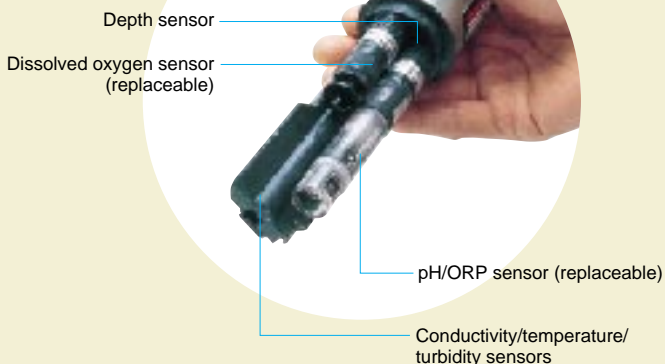


### R&D TOP 100 AWARD FOR 2000

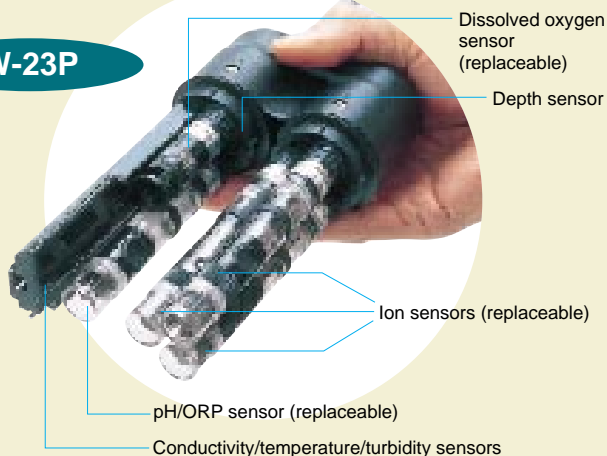
"The Horiba U-20 series has been selected by R&D Magazines to be one out of 100 international products and manufacturers to be awarded the Top 100 Award of the year 2000"

## Multi-Probe

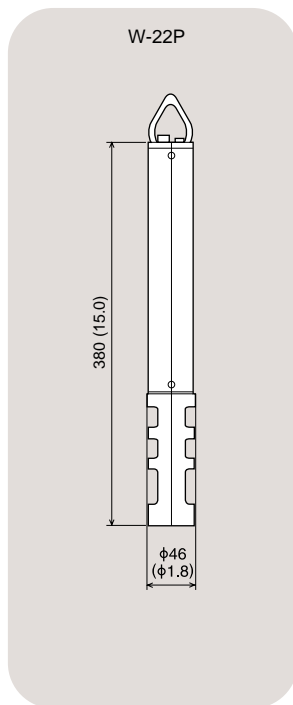
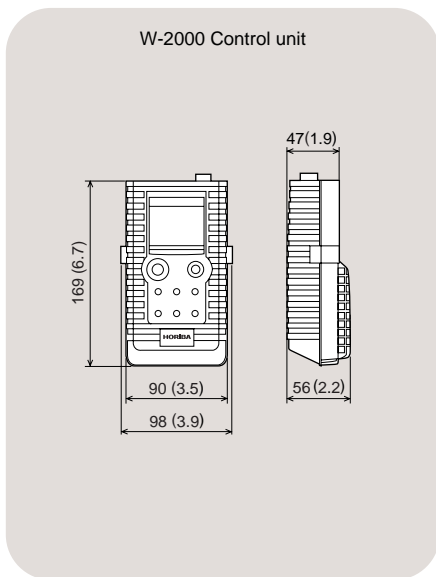
### W-22P



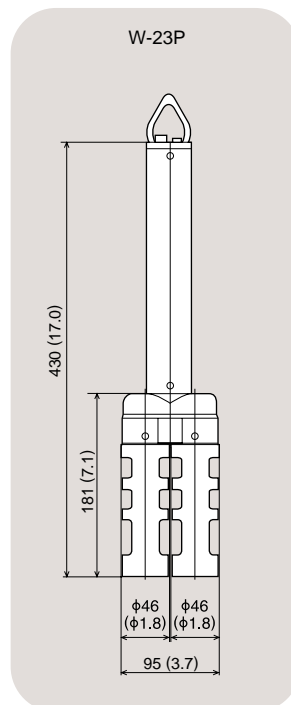
### W-23P



**External dimensions** unit: mm (in)  
 The weight of the U-22 SET is approximately 1985g with 10m cable



Weight: approx 900 g



Weight: approx 1100 g

## Customer Registration System

Register as a Horiba meter user to receive periodical information such as FAQ, Software upgrade, Technical documents and lot others.



**Horiba continues contributing to the preservation of the global environment through analysis and measuring technology.**



**Please read the operation manual before using this product to assure safe and proper handling of the product.**

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