

# Water Quality Meter Model WQC-24

- 35 Days Data Storage
- Up to 11 Simultaneous Parameters
- Up to 100m Depth
- GPS Interface
- PC Interface & Data Acquisition



**DKK-TOA CORPORATION**



# The Perfect Solution for Multiple Parameter Measurements

The Model WQC-24 is the latest development in DKK-TOA's range of multi-parameter water quality meters. The very latest technologies combined with more than 50 years experience have resulted in a compact, high performance and robust water quality monitoring system. The compact sensor probe can provide measurement of up to 11 parameters simultaneously out of a total of 17 available parameters. The instrument also features an interface port for connection to a Global Positioning System (GPS), Local Area Network (LAN), printer or other communication peripherals.



Meter Section  
Compatible with all three  
types of sensor module

## Typical Applications

The Model WQC-24 can be used in a wide range of applications including:

- Lakes
- Agriculture
- Industrial Effluent
- Rivers
- Wells, Underground Water
- Fish Farming
- Dams

## Standard Sensor Module

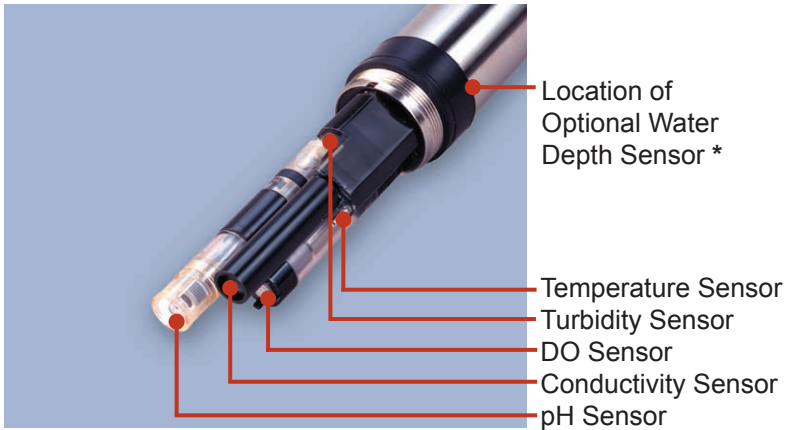


## Standard & Ion Sensor Module



## Standard & Chlorophyll Sensor Module

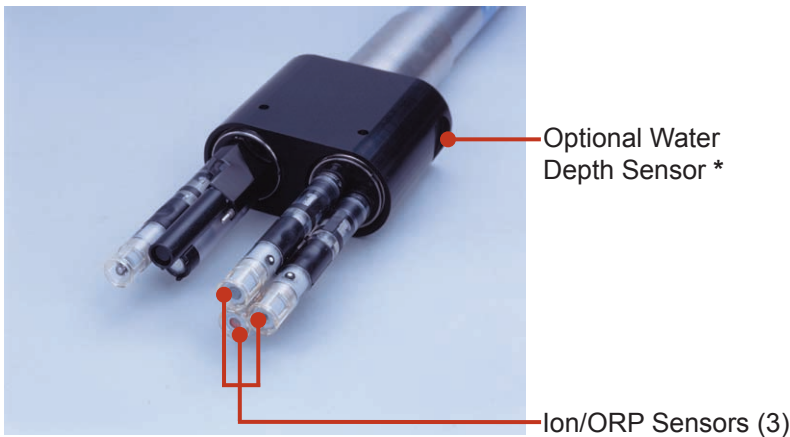




Available parameters:

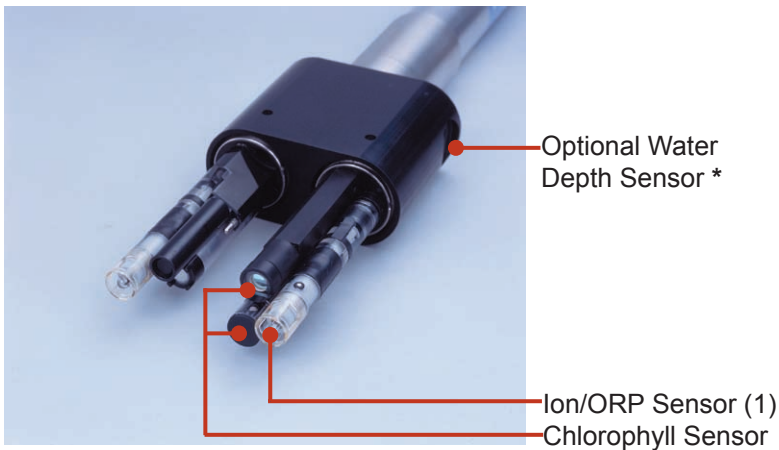
- PH
  - DO
  - Conductivity
  - Salt
  - TDS
  - Seawater SG
  - Temperature
  - Turbidity
- (Total 8)

ORP available as an option  
(replaces pH sensor)



Available parameters:  
as per standard module, plus  
choice of any **three** of the  
following.....

- Fluoride Ion
  - Chloride Ion
  - Nitrate Ion
  - Calcium Ion
  - Potassium Ion
  - Ammonium Ion
  - ORP
- (Total 11)



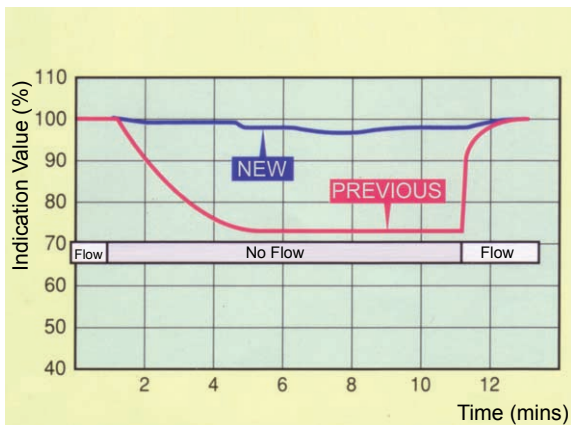
Available parameters:  
as per standard module, plus

- Chlorophyll sensor

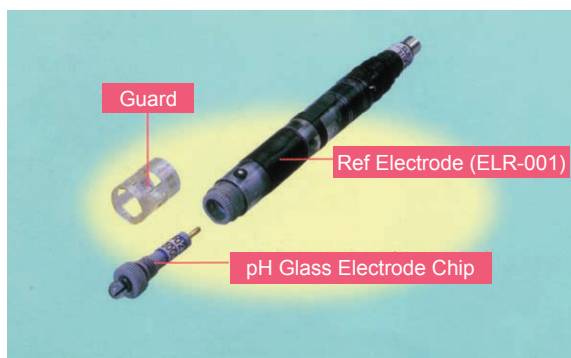
Choice of any **one** of the  
following.....

- Fluoride Ion
  - Chloride Ion
  - Nitrate Ion
  - Calcium Ion
  - Potassium Ion
  - Ammonium Ion
  - ORP
- (Total 10)

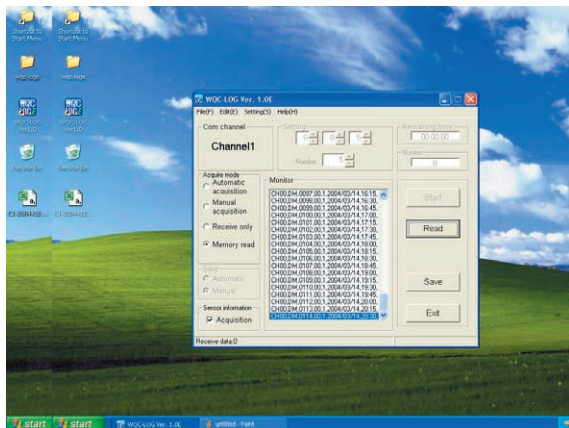
\* Water depth sensor available as an option in all configurations.  
Addition of water depth sensor will extend dimensions of standard probe  
slightly (see page 6 for exact dimensions).



Effect of Sample Flow Across DO Electrode



pH Electrode with Easily Replaceable Chip Module



WQC-LOG Data Acquisition Software



Meter with Standard Sensor Module

## Features

### Multiple Parameter Combinations

The sensor probe can measure up to 11 parameters out of 17 available (pH, ORP, DO, EC, Turbidity, Temperature, Salinity, Total dissolved solids, Specific gravity and Water depth plus Chlorophyll and Ions of  $\text{NO}_3^-$ ,  $\text{Cl}^-$ ,  $\text{F}^-$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$ ,  $\text{NH}_4^+$ ).

### Newly Developed High Performance Sensors

pH sensor is equipped with our "Strong" electrode and pressure compensator.

New DO sensor is functional even under non-flowing conditions.

Electrodes can be easily replaced using "chip" style components.

### Compact Sensor Probe

45 mm outer diameter sensor probe fits into a 2-inch well (standard sensor module).

### Robust Sensor Probe

Sensor probe facilitates measurements as far as 100 meters below the water surface and up to a maximum pressure of 1 MPa (excluding ion sensors).

Optional depth sensor enables measurement and collection of sensor depth information.

### Data Logging Storage Capacity Exceeds One Month

Built-in memory stores measured data for 35 days of continuous measurements (based on measurement every 15 minutes or every hour for Chlorophyll measurement).

The sensor module has its own internal memory and can be left disconnected from the meter section while continuing to measure and record data.

### Interface Port Compatible with Global Positioning Systems (GPS)

An interface port is provided as a standard feature for connection to GPS, Printer, LAN or other data communication peripherals (RS-232C).

### PC Based Data Acquisition Software

Optional WQC-LOG software runs on any Windows® based personal computer. Measurement data can be saved to disk and/or exported to other applications (c,s,v, data format). Personal computer requires serial port or USB-serial port adapter.

## Interface Examples

Standard Sensor Module



Standard & Ion Sensor Module



Standard & Chlorophyll Sensor Module



Sensor Connecting Cable  
2m, 10m, 30m, 100m



GPS Receiver Unit



Windows® Based Personal Computer



RS232 Printer

## Easily Replaceable Electrodes

Description	Model	Measurement Range
pH glass Electrode Chip	ELP-023	pH 0 ~ 14
ORP Electrode Chip	ELM-004	-2000 ~ 2000 mV
DO Electrode	ELD-001	0 ~ 20 mg/L
Chloride Ion Electrode Chip	CL-200B	1 ~ 35000 mg/L
Nitrate Ion Electrode Chip	N-300	0.62 ~ 62000 mg/L
Fluoride Ion Electrode Chip	F-200	0.019 ~ 19000 mg/L
Calcium Ion Electrode Chip	CA-300	0.4 ~ 40000 mg/L
Potassium Ion Electrode Chip	K-300B	0.39 ~ 3900 mg/L
Ammonium Electrode	ELX-002	0.09 ~ 1800 mg/L



Examples of Electrodes  
(Each combined with reference electrode)

**NOTE:** The above electrodes are in "chip" style format and each require combination with ref. electrode, ELR-001 (except for Ammonium and DO sensors).

## Measured Parameters

⊙ Standard Parameter

○ Available as an Option

Measurement Item	Standard Module	Standard Module + Water Depth	Standard + Ion Module *1	Standard + Ion Module *1 + Water Depth	Standard + Chlorophyll Module *2	Standard + Chlorophyll Module *2 + Water Depth
pH *3	⊙	⊙	⊙	⊙	⊙	⊙
Dissolved Oxygen (DO)	⊙	⊙	⊙	⊙	⊙	⊙
Conductivity (COND)	⊙	⊙	⊙	⊙	⊙	⊙
Salt (SALT)	⊙	⊙	⊙	⊙	⊙	⊙
Total Dissolved Solids (TDS)	⊙	⊙	⊙	⊙	⊙	⊙
Seawater Specific Gravity ( $\sigma_t$ )	⊙	⊙	⊙	⊙	⊙	⊙
Temperature (TEMP)	⊙	⊙	⊙	⊙	⊙	⊙
Turbidity (TURB)	⊙	⊙	⊙	⊙	⊙	⊙
ORP	○	○	○	○	○	○
Chlorophyll					⊙	⊙
Nitrate Ion			○	○	○	○
Chloride Ion			○	○	○	○
Calcium Ion			○	○	○	○
Fluoride Ion			○	○	○	○
Potassium Ion			○	○	○	○
Ammonium Ion			○	○	○	○
Water Depth		⊙		⊙		⊙

NOTES: \*1 Maximum 3 optional items can be fitted. \*2 Only one optional item can be fitted. \*3 The pH sensor can be replaced by optional ORP sensor or an optional ORP sensor can be fitted to the second sensor head if simultaneous measurement of pH and ORP is required.

## Meter Section (Includes 2m Sensor Connecting Cable)

Code	WQC24-1-0
Display	LCD Digital
Waterproof Construction	IP67 (JIS C 0920) Immersion proof (assuming cable is connected)
RS-232C	Standard feature (non isolated when using with printer or GPS unit)
Analog Output (common)	DC 0~1V, 3 points non-isolated: channels 1 & 2: outputs two selected parameters, channel 3: outputs the conductivity range
Open Collector Output (common)	Alarm output: 1 point, DC 36V, 100mA or less Measurement timing output: 1 point, DC 36V, 100mA or less
Power Source	2 x AA size dry batteries or exclusive AC adapter (option)
Outline Dimensions (excluding projections)	Approx. 187.5 (L) x 37.5 (H) x 75 (W) mm
Weight (excluding batteries)	Approx. 320g
Operating Temperature Range	0~50 deg C

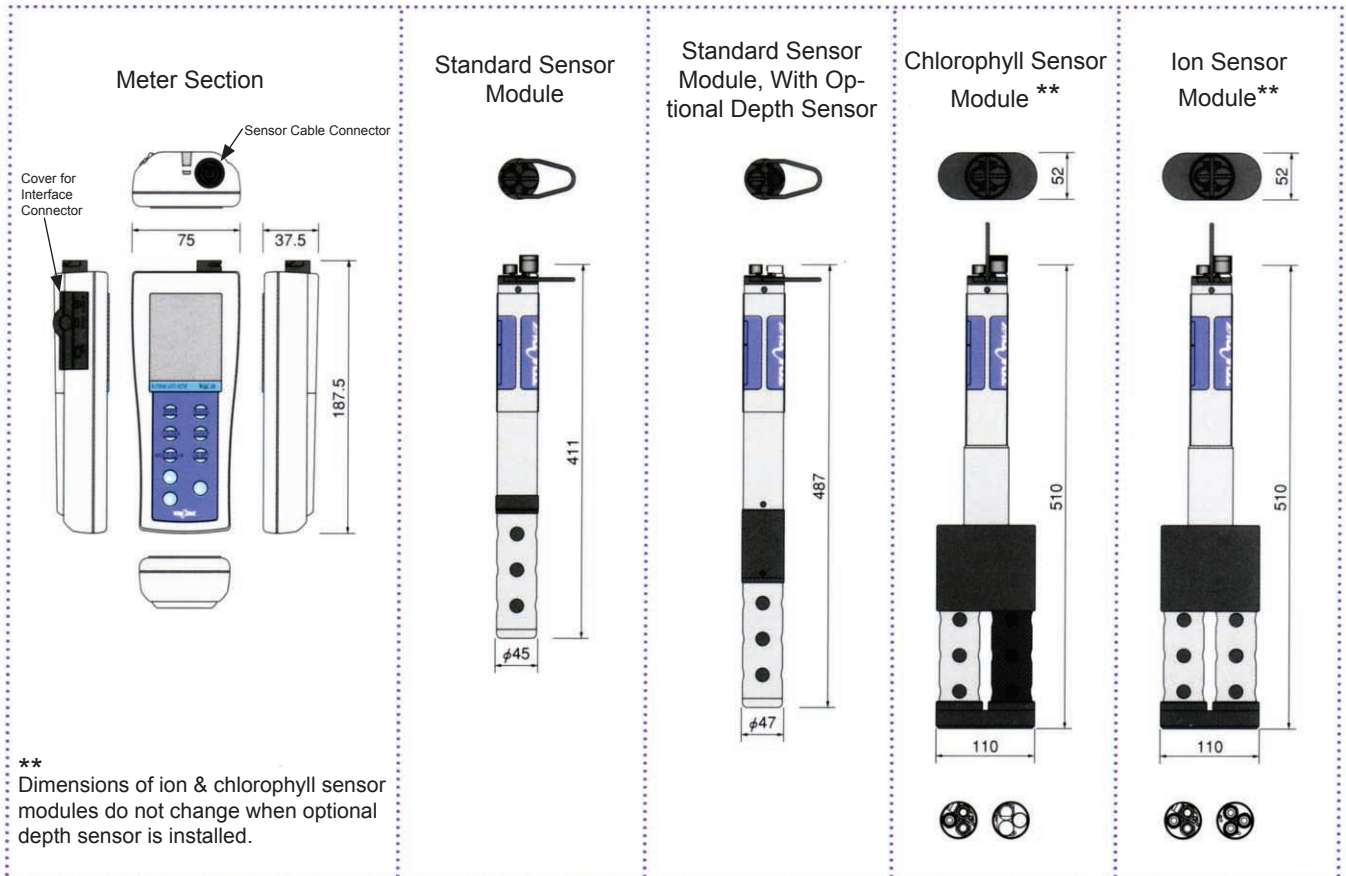
## Sensor Modules

Code	WMS24-1-00	WMS24-1-01	WMS24-1-10	WMS24-1-11	WMS24-1-20	WMS24-1-21
Product Name	Standard sensor module	Standard sensor module (with water depth sensor)	Ion sensor module	Ion sensor module (with water depth sensor)	Chlorophyll module	Chlorophyll module (with water depth sensor)
Waterproof Construction	Pressure resistant 1.0 MPa, waterproof *					
Memory	Max. 3360 data (by sensor module)					
Power Supply	3 x AA size batteries (approx 35 days life for 15 min measurement interval, or 1 hr interval for chlorophyll)					
Outline Dimensions (excluding projections)	Approx. 45 dia x 411 (L) mm	Approx. 47 dia x 487 (L) mm	Approx. 52 (D) x 110 (W) x 510 (L) mm			
Weight (excluding batteries)	Approx. 1350g	Approx. 1450g	Approx. 2400g	Approx. 2420g	Approx. 2400g	Approx. 2420g
Operating Temperature Range	0~50 deg C					

\* Dummy caps are fitted to the empty electrode sockets.

Please refer to the table on page 7 for information on individual ion electrode water depth limitations.

## Dimensions



## Standard Sensor Module

Item	Display Range	Repeatability (main body)	Measurement Method	Calibration
pH (or) ORP (option)	0.00 ~ 14.00	+/- 0.05 pH	Glass electrode method	2 points of 4, 7, 9 or 3 points calibration
	-2000 ~ 2000 mV	+/- 5 mV	Platinum electrode method	---
DO	0.00 ~ 20.00 mg/L / 0 ~ 200 %	+/- 0.1 mg/L / +/- 1 %	Galvanic membrane electrode method	Zero & span calibration
COND	0.00 ~ 10.00 S/m (meter) 0.0 ~ 100.0 mS/m (display), 0.000 ~ 1.000 S/m (display), 0.00 ~ 10.00 S/m (display), Auto & manual range selection	+/- 1 % FS	AC 4-electrodes method	Calibration is possible
SALT	0.00 ~ 4.00 % or 0.0 ~ 40.0 (seawater salinity)	+/- 0.1 % +/- 1	Converted from conductivity value	Calibration is possible
TDS	0.0 ~ 100.0 g/L	+/- 2g/L	Converted from conductivity value	Calibration is possible
Seawater Specific Gravity	0.0 ~ 50.0 σt	+/- 0.1 σt	Converted from conductivity value	Calibration is possible
TEMP	-5.00 ~ 55.00 deg C	+/- 0.25 deg C	Thin film platinum resistance	Calibration is possible
TURB	0.0 ~ 800.0 NTU / 0.0 ~ 800.0 mg/L	+/- 3 % FS	90 degree scattered light method (infrared)	Zero & span calibration
Water Depth (DEPTH) (option)	0.0 ~ 100.0 m	+/- 0.1 m	Diaphragm pressure sensor method (built-in temp. compensation function)	Calibration is possible

## Optional Ion Sensor Module (Available as Factory Configured Option Only)

Item	Measurement Range	Repeatability (main body)	Measurement Method	Calibration
Nitrate ion (NO <sub>3</sub> <sup>-</sup> )	0.62 ~ 62000 mg/L	+/- 5 % FS	Ion electrodes method	Dual point calibration
Chloride ion (Cl <sup>-</sup> )	1 ~ 35000 mg/L			
Calcium ion (Ca <sup>2+</sup> )	0.4 ~ 40000 mg/L			
Fluoride ion (F <sup>-</sup> )	0.019 ~ 19000 mg/L			
Potassium ion (K <sup>+</sup> )	0.39 ~ 3900 mg/L			
Ammonium ion (NH <sub>4</sub> <sup>+</sup> )	0.09 ~ 1800 mg/L			
ORP	-2000 ~ 2000 mV	+/- 5 mV	Platinum electrode method	---
Water depth (DEPTH) (option)	0.0 ~ 100.0 m	+/- 0.1 m	Diaphragm pressure sensor method (built-in temperature compensation function)	Calibration is possible

## Ion Sensors Depth Limitation

Item	Ion Sensor Immersion Limit Depth
NO <sub>3</sub> <sup>-</sup> , NH <sub>4</sub> <sup>+</sup>	5m
K <sup>+</sup> , Ca <sup>2+</sup>	10m
F <sup>-</sup> , Cl <sup>-</sup>	15m

## Optional Chlorophyll Sensor Module (Available as Factory Configured Option Only)

Item	Display Range	Repeatability (main body)	Measurement Method	Calibration
Chlorophyll	0.0 ~ 400.0 micro g/L	---	Fluorescence method	Calibration is possible

## Standard Accessories

- Alkali dry batteries, AA size (LR6), 5 pcs
- Buffer solutions for pH6.86 & pH4.01, 2 x 500 mL bottles
- Reference electrolyte inner solution, 50mL bottle
- Replacement junction for pH electrode, 1 pcs
- Special tools (spanner, driver), 1 set
- Membrane sets for DO electrode, 2 sets
- DO internal electrolyte solution, 50mL bottle
- Calibration receptacles, 2 pcs
- Connector cap, 1 pcs
- Soft case (with shoulder belt), 1 pcs
- Connection cable (2m), 1 pcs
- Instruction manual, 1 copy

## Options & Accessories

### pH/ORP

● pH Standard solution, pH 4.01 (500mL)	143F191
● pH Standard solution, pH 6.86 (500mL)	143F192
● pH Standard solution, pH 9.18 (500mL)	143F193
● Reference electrode inner solution (50mL)	143F235
● Reference liquid junction	6784580K
● Glass electrode chip (pH)	ELP-023
● Reference electrode (for pH, ORP, Ion)	ELR-001
● ORP electrode chip	ELM-004
● ORP standard solution, 500mL + powder	143F196

### DO

● DO electrode electrolyte kit (50mL x 3)	0BG00007
● DO membrane kit ( x 2 pcs)	6789790K
● DO electrode unit	ELD-001
● Sodium sulfite (50g)	NA2SO3-5

### ION

● Reference electrode (pH, ORP, Ion)	ELR-001
● Reference electrode inner solution (50mL)	143F235
● Reference liquid junction	6784580K
● Ammonium electrode (with reference electrode)	ELX-002
● Ammonium electrode inner solution (50mL x 3)	0BG00005
● Ammonium electrode diaphragm cartridge (x 3)	6821890K
● Fluoride ion electrode chip	F-200
● Chloride ion electrode chip	CL-200B
● Nitrate electrode chip	N-300
● Potassium electrode chip	K-300B
● Calcium electrode chip	CA-300
● Ammonium ion standard solution 1000mg/L (500mL)	NH4-1000
● Ammonium-nitrogen std. solution 1000mg/L (500mL)	NH4-N
● Fluoride ion standard solution 1000mg/L (500mL)	F-1000
● Chlorine ion standard solution 1000mg/L (500mL)	CL-1000
● Nitrate ion standard solution 1000mg/L (500mL)	NO3-1000
● Nitrate-nitrogen standard solution 1000mg/L (500mL)	NO3-N
● Potassium ion standard solution 1000mg/L (500mL)	K-1000
● Calcium ion standard solution 1000mg/L (500mL)	CA-1000
● Strength adjuster for ammonia ion solution (500mL)	ISA-NH
● Strength adjuster for fluoride ion solution (500mL)	TISAB-01
● Strength adjuster for fluoride ion solution (500mL)	TISAB-11
● Strength adjuster for chlorine solution (500mL)	ISA-CL
● Strength adjuster for nitrate solution (500mL)	ISA-NO
● Strength adjuster for potassium solution (500mL)	ISA-K
● Strength adjuster for calcium ion solution (500mL)	ISA-CA

#### NOTE FOR ION MEASUREMENT:

For ion measurements, we recommend that the sample is first collected in a container and then measurement carried out in the sample container.

Due to continuous product improvement, specifications contained herein are subject to change without notice.



Always read the instruction manual before operation.

### General

● Connection cable, 2m	6801640K
● Connection cable, 10m	6821850K
● Connection cable, 30m	6821860K
● Connection cable, 100m	6821870K
● RS-232C cable (1m)	0GC00005
● RS-232C cable (2m)	0GC00006
● RS-232C cable (4m)	0GC00007
● RS-232C cable (10m)	0GC00008
● Data Control Software	WQC-LOG
● Analogue output cable, 1.5m	6548270K
● Printer with cable	EPS-G
● Printer paper (20 Rolls)	P000119
● Printer ink ribbon	ORD00001
● AC adapter (specify your supply voltage)	134G022
● GPS unit with connecting cable	6812970K

## Main Equipment Order Codes

### Meter and Sensor Module Combinations

Code	Description
WQC24-1-0	Main meter section only (with 2m cable)
WQC24-1-1	Standard sensor module + meter (with 2m cable)
WQC24-1-2	Standard + ion sensor module + meter (with 2m cable)
WQC24-1-3	Standard + chlorophyll sensor module + meter (with 2m cable)
WQC24-1-4	Standard sensor module (with water depth sensor) + meter (with 2m cable)
WQC24-1-5	Standard + ion sensor module (with water depth sensor) + meter (with 2m cable)
WQC24-1-6	Standard + chlorophyll sensor module (with water depth sensor) + meter (with 2m cable)

### Sensor Modules Only

Code	Description
WMS24-1-00	Standard sensor module
WMS24-1-10	Standard + ion sensor module
WMS24-1-20	Standard + chlorophyll sensor module
WMS24-1-01	Standard + chlorophyll sensor module (with water depth sensor)
WMS24-1-11	Standard + ion sensor module (with water depth sensor)
WMS24-1-21	Standard + chlorophyll sensor module (with water depth sensor)

**NOTES:** (1) Connection cables and ion/ORP electrodes must be purchased separately, please refer to the items described below. (2) One reference electrode chip is required for each ion/ORP sensor used. (3) Ammonia sensor is a complete unit and does not require separate purchase of reference electrode.

### Connection Cables, Electrodes

● Connection cable, 10m	6821850K
● Connection cable, 30m	6821860K
● Connection cable, 100m	6821870K
● Reference electrode	ELR-001
● ORP electrode chip	ELM-004
● Fluoride ion electrode	F-200
● Chloride ion electrode	CL-200B
● Nitrate electrode	N-300
● Potassium electrode	K-300B
● Calcium electrode	CA-300
● Ammonium electrode (with reference electrode)	ELX-002