TOA DKK

# P30 Series

## Handheld Water Quality Meter

**P30 Series**

8 Models including
5 Basics and
3 Dual-Channels

pH ION ORP DO EC

Low-Power
Consumption Design
Maximum to 1/30
(compared to previous models)


Waterproof Construction

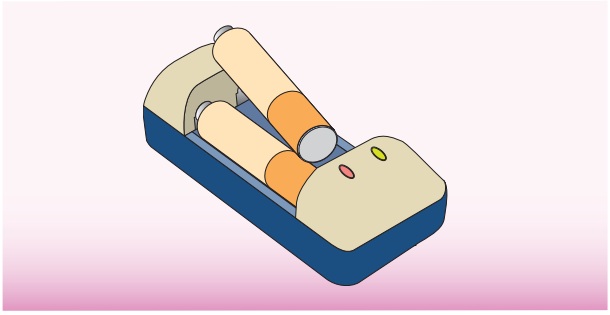
Up to 1000 Data Points Memory

DKK-TOA CORPORATION

# Low Power Consumption & Waterproof Construction Perfectly for Field Measurements

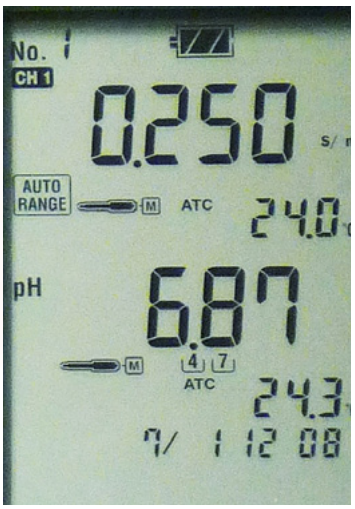

## Rechargeable Nickel-Hydrogen Batteries Adaptability To reduce battery waste dramatically

Enables you to dramatically reduce battery waste.
(Rechargeable nickel-hydrogen AA batteries are sold separately.)



## Improved Easy-to-Read LCD & Dual Channel Mode

The custom LCD indicators are 1.2 times larger than previous models, making them easier to read. Additionally, dual channel meters can display two items simultaneously. This makes it easier to read data for two separate items in real time.




## 1000 Data Points Memory Capacity

**Auto memory at fixed time intervals function***

Ideal for short-term (half day) simple monitoring, etc.

*Short interval memory function: 1 sec. – 99 min. 59 sec., or Long interval memory function: 2 min. – 99 hr. 59 min. (For the long interval memory function, the power goes OFF [into sleep mode] after the first minute measurement and remains off until the next measurement is made.)

## Superb Expandability (HM-30P and RM-30P excepted)

**Connection with PCs, External printers, Recorders, and other devices available**

PC Expandability allows you to manage data easily. Data Acquisition Software available as well.

## Two Year Warranty for the Main Unit

(Sensors and other parts are not covered by the warranty)

## Supporting Functions for Enhanced Validation

Built-in memory sensor, Calibration history, Calibration interval warning function, etc. available.

# Lineup

Please refer to the Specifications & Function table for detailed information about each model.
(If you want an electrode that is not fitted as standard, please place separate orders for the "main unit only" and the electrode you need.)

pH Temperature

## Handheld pH Meter HM-30P

Common type for pH measurements

Comes with the pH combination electrode GST-2739C.

pH ORP Temperature

## Handheld pH Meter HM-31P

High performance model for pH or ORP measurements

Comes with the pH combination electrode "Cal-memo (Calibration Memo)" GST-2729C.

ORP electrode is sold separately.

ORP Temperature

## Handheld ORP Meter RM-30P

Common type for ORP measurement

Comes with the ORP combination electrode PST-2739C.

Electrical Conductivity | Electrical Resistivity | Salinity | Temperature

## Handheld Electrical Conductivity Meter CM-31P

Can be used in general environmental measurements as well as pure water measurements

**CM-31P**
**(for general environmental measurements)**
Comes with the electrical conductivity cell "Cal-Memo (Calibration Memo)" CT-27112B.

**CM-31P-W**
**(for pure water measurements)**
Comes with the electrical conductivity cell "Cal-Memo (Calibration Memo)" CT-27111D for pure water, and special flow cell CEF-22A (made of PP).

Make sure to select the one that best fits your needs.

Electrical conductivity cell for pure water

DO Temperature

## Handheld DO Meter DO-31P

Can be used in field measurements of DO/BOD

Comes with the immersion type DO electrode "Cal-Memo (Calibration Memo)" OE-270AA.

Note : For conducting BOD measurements, please place orders for the "main unit only" and the "DO electrode for the incubator bottle[1)] OE-470AA" .
1) JIS middle type TS19/22(MAX dia. 18.8mm, MIN dia. 16.6mm, 22mm length)

DO electrode for the incubator bottle

ch1 Electrical Conductivity | Electrical Resistivity | Salinity | Temperature
ch2 pH | ORP | Temperature

## Handheld Electrical Conductivity/pH Meter WM-32EP

High performance dual channel type that can simultaneous display electrical conductivity and pH

Comes with the pH combination electrode "Cal-Memo (Calibration Memo)" GST-2729C, and the electrical conductivity cell "Cal-Memo (Calibration Memo)" CT-27112B.

The ORP electrode is sold separately.

Dual channel type

ch1 pH | ORP | Ion | Temperature
ch2 pH | ORP | Ion | Temperature

## Handheld Ion/pH Meter IM-32P

High performance dual channel type that can be used for ion measurements

Comes with the pH combination electrode "Cal-Memo (Calibration Memo)" GST-2729C.

The ORP electrode, ion electrode, and ion standard solutions are sold separately.

Dual channel type

ch1 DO Temperature
ch2 pH | ORP | Temperature

## Handheld DO/pH Meter DM-32P

High performance dual channel type that can simultaneous display DO and pH

Comes with the pH combination electrode "Cal-Memo (Calibration Memo)" GST-2729C, and the immersion type DO electrode "Cal-Memo (Calibration Memo)" OE-270AA.

Note : For conducting BOD measurements, please place orders for the "main unit only" and the "DO electrode for the incubator bottle[1)] OE-470AA" .
1) JIS middle type TS19/22(MAX dia. 18.8mm, MIN dia. 16.6mm, 22mm length)

Dual channel type

# Full Lineup of Highly-Reliable Sensors for Various Applications

■Waterproof sensors perfect for field measurements.
■The "Cal-Memo" sensor is designed for validation support and its built-in memory stores calibration data and cell constants automatically. It is suitable for advanced measurement control.
Can store calibration data and cell constants
Realizes advanced measurement control
Free of setting errors of cell constants and ion types
■Our original built-in floating for monitoring the internal solution concentration allows the user to instantly recognize when the solution needs to be replaced (pH/ORP).

Cal-Memo

## 【pH/ORP】

| Electrode | Use | Meas.Range | Lead Length | Remarks |
|---|---|---|---|---|
| pH combination electrode "Cal-Memo" GST-2729C Waterproof type | General environment/ immersion | pH0～14 0～100℃ | 1m(Standard) / 3m / 5m / 11m | Electrode with HM-31P/WM-32EP/ IM-32P/DO-32P fitted as standard (Lead length: 1 m) Approval of type by Measurement Law |
| pH combination electrode GST-2739C Waterproof type | General environment/ immersion | pH0～14 0～100℃ | 1m(Standard) / 3m / 5m / 11m | Electrode with HM-30P fitted as standard (Lead length: 1 m) Approval of type by Measurement Law |
| pH combination electrode "Cal-Memo" ELP-031 | Organic solvent-containing solution | pH0～14 0～100℃ | 1m | Approval of type by Measurement Law |
| pH combination electrode "Cal-Memo" ELP-040 | Fluorinated acid solution-resistance*1 | pH2～12 0～50℃ | 1m | Replaceable type glass electrode tip glass electrode tip (5082L) |
| ORP combination electrode "Cal-Memo" PST-2729C Waterproof type | General environment/ immersion | 0～± 2000mV 0～100℃ | 1m(Standard) / 5m / 11m | |
| ORP combination electrode PST-2739C Waterproof type | General environment/ immersion | 0～± 2000mV 0～100℃ | 1m(Standard) / 5m / 11m | Electrode with RM-30P fitted as standard (Lead length: 1 m) |

*1 The glass electrode is affected by fluorinated acid solution. However, because this product is a replaceable type glass electrode tip, a reduction in operating costs can be expected. In regards to measuring the 1% fluorinated acid solution (at 25℃ , for 1 min.), approximately 1000 measurements can be performed.

| Product Name | Code Number |
|---|---|
| pH4.01 standard solution, 500 mL | 143F191 |
| pH6.86 standard solution, 500 mL | 143F192 |
| pH9.18 standard solution, 500 mL | 143F193 |
| Reference electrode internal solution RE-4, 50 mL (3 bottles) | OBG00011 |
| ORP check solution (pH4.01 standard solution, 500 mL + quinhydron powder) | 143F196 |
| Abrasive for ORP electrode, 10mL | AO-001 |


## 【Electrical Conductivity】

| Cell | Use | Meas.Range (Cell Constant) | Lead Length | Remarks |
|---|---|---|---|---|
| Electrical conductivity cell "Cal-Memo" CT-27112B Waterproof type | General environment/ immersion | 0.1mS/m～ 10S/m(250m$^{-1}$) 0～80℃ | 1m(Standard) / 5m / 11m | Cell with CM-31P/WM-32EP fitted as standard (Lead length: 1 m) |
| Electrical conductivity cell "Cal-Memo" CT-27111D | pure water measurement/ flow-through type | 5μS/m～ 20mS/m(1m$^{-1}$) 0～80℃ | 1m | Cell with CM-31P-W fitted as standard <Flow cell sold separately.>*2 Note: Cannot be connected to WM-32EP. |
| Electrical conductivity cell "Cal-Memo" CT-57101B | General environment/ tabletop use | 100μS/m～ 10S/m(100m$^{-1}$) 0～100℃ | 1m | |
| Electrical conductivity cell "Cal-Memo" CT-57101A | High electrical conductivity/tabletop use | 1mS/m～ 100S/m(1000m$^{-1}$) 0～100℃ | 1m | |
| Electrical conductivity cell "Cal-Memo" CT-57101C | Low electrical conductivity/tabletop use | 5μS/m～ 1S/m(10m$^{-1}$) 0～100℃ | 1m | Note: When you perform measurements in pure water, you must use CT-27111D. |

*2 If you order the full CM-31P-W set, a flow cell is also fitted as standard.

| Product Name | Code Number |
|---|---|
| Conductivity cell check solution C (140.9mS/m at.25.0℃) , 100 mL (4 bottles) | OBI00001 |
| Conductivity cell check solution B (1286mS/m at.25.0℃) ,250 mL (2 bottles) | OBI00002 |
| Flow cell (made of PP) | CEF-22A |
| Flow cell (made of SUS) | CEF-23A |

## 【DO】

| Electrode | Use | Meas.Range | Lead | Remarks |
|---|---|---|---|---|
| DO electrode "Cal-Memo" OE-270AA Waterproof type | Immersion/ Throw-in use | If a standard membrane is used: 0～20mg/L If a high concentration membrane is used: 0～50mg/L 0～50℃ (High concentration membrane set is sold separately.) | 3m(Standard) / 5m / 11m | Electrode with DO-31P/DM-32P fitted as standard (Lead length: 3 m) |
| DO electrode "Cal-Memo" OE-570BA Waterproof type | Immersion/ Throw-in use | | 3m(Standard) / 5m / 11m | Can be used to conduct zero flow rate measurements |
| DO electrode "Cal-Memo" OE-470AA | Incubator bottle | 0～20mg/L | 1m | Equipped with a stirring function. (Recommended for conducting BOD measurements) |
| DO electrode "Cal-Memo" OE-470BA | Incubator bottle | | 1m | Can be used to conduct zero flow rate measurements |


| Product Name | Code | Remarks |
|---|---|---|
| DO module | OEC-002 | Exclusive to OE-270AA One-touch fitting type featuring an integral construction made up of an electrode, membrane, and electrolysis solution. |
| Membrane set for OE-270AA (3 sets) | OCC00001 | For OE-270AA (standard measurement) |
| Membrane set for OE-270AA (high concentration DO) (3 sets) | OCC00002 | For OE-270AA (high concentration measurement) |
| Membrane set for OE-570BA (3 sets) | OCC00023 | For OE-570BA (standard measurement) |
| Membrane set for OE-570BA (high concentration DO) (3 sets) | OCC00024 | For OE-570BA (high concentration measurement) |
| Membrane set for OE-470AA (3 sets) | OCC00003 | For OE-470AA (measurement) |
| Membrane cartridge for OE-470AA (5 pieces) | OCT-2502 | For OE-470AA (measurement) |
| Membrane set for OE-470BA (3 sets) | OCC00022 | For OE-470BA (measurement) |
| Underwater stirrer | OSM00002 | For OE-270AA/570BA |
| Electrolysis solution R-9, 50 mL (3 bottles) | OBG00007 | For OE-270AA/570BA/470AA/470BA |
| Sodium sulfite 50 g | 143A030 | Used for preparing zero solution |

# 【Ion】

The ion sensor portion is a "Tip-Replaceable Electrode" (except membrane electrode).
Lead length is 1 m(standard).

Cal-Memo


Notes: (1) The ion electrode is not provided for waterproof function and temperature measurement function. Measurable solution temperature range is 0 - 50 ℃ .
(2) The batch measurement method is primarily used to conduct ion measurements. This method is conducted after sampling, which uses beakers and other apparatuses.
(3) In addition to the electrode, the standard solution, ionic strength adjuster, and reference electrode external solution are also required for conducting ion measurements.
(4) Make sure to contact us before you conduct ion measurements. We ask this because in certain cases it can be difficult to conduct ion measurements, such as when there are coexisting ions in the sample.

| Electrode Name | Model Name of the Replacement Tip | Meas.Range (optimal pH range) | Effect of Coexistent Ion*/Remarks |
|---|---|---|---|
| Fluoride ion combination electrode F-2021 | F-200 (Solid membrane) | 0.019~19,000mg/L $F^-$ (pH5~6) | $OH^-=10^1$ $HPO_4^{2-}$、$HCO_3^-=10^3$ (pH7~8) $Cl^-$、$Br^-$、$I^-$、$NO_3^-$、$SO_4^{2-}$、$S_2O_3^{2-}=10^5$ |
| Chloride ion combination electrode CL-2021 | CL-200B (Solid membrane) | 1~35,000mg/L $Cl^-$ (pH5~6) | $S^{2-}$=Cannot coexist $CN^-$、$I^-=10^{-5}$ $Br^-$、$S_2O_3^{2-}=10^{-2}$ $NO_3^-$、$SO_4^{2-}$、$CO_3^{2-}$、$PO_4^{3-}$、$F^-=10^3$ |
| Bromide ion combination electrode BR-2021 | BR-200 (Solid membrane) | 0.8~80,000mg/L $Br^-$ (pH5~6) | $S^{2-}$=Cannot coexist $CN^-$、$I^-=10^{-4}$ $S_2O_3^{2-}$、$SCN^-=10^0$ $Cl^-=10^2$ $NO_3^-$、$SO_4^{2-}$、$CO_3^{2-}$、$F^-=10^4$ |
| Iodide ion combination electrode I-2021 | I-200 (Solid membrane) | 0.01~127,000mg/L $I^-$ (pH5~6) | $S^{2-}$、reducing substances=Cannot coexist CN=$10^0$ $S_2O_3^{2-}=10^1$ $SCN^-=10^3$ $Br^-=10^4$ $NO_3^-$、$CO_3^{2-}$、$PO_4^{3-}$、$Cl^-$、$F^-=10^5$ |
| Cyanide ion combination electrode CN-2021 | CN-200B (Solid membrane) | 0.003~26mg/L $CN^-$ (pH12~13) | $S^{2-}$=Cannot coexist $I^-=10^{-1}$ $S_2O_3^{2-}=10^1$ $Br^-=10^3$ $NO_3^-$、$SO_4^{2-}$、$PO_4^{3-}=10^4$ $CO_3^{2-}$、$Cl^-$、$F^-=10^5$ |
| Nitrate ion combination electrode N-2031 | N-300 (Liquid membrane) | 0.62~62,000mg/L $NO_3^-$ (pH5~6) | $I^-=10^{-3}$ $Br^-$、$NO_2^-=10^0$ $Cl^-=10^1$ $CH_3COO^-$、$SO_4^{2-}$、$CO_3^{2-}$、$F^-=10^2$ |
| Sulfide ion combination electrode S-2021 | S-200 (Solid membrane) | 0.3~32,000mg/L $S^{2-}$ (pH13 or more) | — |
| Sodium ion combination electrode NA-2011 | NA-100B (Glass membrane) | 2.3~23,000mg/L $Na^+$ (pH10~11) | $Mg^{2+}$、$Ca^{2+}$、$Zn^{2+}$、$NH_4^+$、$K^+$、$Li^+=10^3$ |
| Potassium ion combination electrode K-2031 | K-300B (Liquid membrane) | 0.39~3,900mg/L $K^+$ (pH5~6) | $H^+=10^2$ $NH_4^+=3\times10^2$ $Na^+=2\times10^3$ $Li^+=10^4$ |
| Calcium ion combination electrode CA-2031 | CA-300 (Liquid membrane) | 0.4~40,000mg/L $Ca^{2+}$ (pH5~6) | $Pb^{2+}$、$Zn^{2+}=10^1$ $Mn^{2+}=10^2$ $Cu^{2+}$、$Mg^{2+}$、$Cd^{2+}$、$Ba^{2+}$、$Fe^{2+}=10^3$ $Ni^{2+}=10^4$ |
| Cadmium ion combination electrode CD-2021 | CD-200 (Solid membrane) | 0.01~1,120mg/L $Cd^{2+}$ (pH5~6) | $Hg^{2+}$、$Ag^+$、$Cu^{2+}$=Cannot coexist $Pb^{2+}$、$Fe^{3+}=10^0$ $Cr^{3+}=10^2$ $Na^+$、$K^+$、$Mg^{2+}$、$Ca^{2+}$、$Zn^{2+}$、$Al^{3+}=10^5$ |
| Copper ion combination electrode CU-2021 | CU-200 (Solid membrane) | 0.06~630mg/L $Cu^{2+}$ (pH5~6) | $Ag^+$、$Hg^{2+}$=Cannot coexist $Fe^{3+}=10^{-1}$ $Al^{3+}=10^1$ $Cr^{3+}=10^2$ $Ni^{2+}=10^3$ $Na^+$、$Mg^{2+}$、$Ca^{2+}=10^4$ |
| Silver ion combination electrodeAG-2021 | AG-200 (Solid membrane) | 0.1~108,000mg/L $Ag^+$ (pH5~6) | $Hg^{2+}$=Cannot coexist $Mg^{2+}=10^3$ $Ca^{2+}$、$Cu^{2+}$、$Pb^{2+}$、$Cd^{2+}$、$Zn^{2+}=10^4$ $Na^+$、$K^+=10^6$ |
| Ammonia combination electrode AE-2041 | — | 0.09~1,800mg/L $NH_4^+$ (pH12 or more) | Volatile amines |
| Carbon dioxide combination electrode CE-2041 | — | Dissolved gas 1.49~1,490mg/L | Dissolved gas : Volatile weak acid Airborne gas : Acid gas<br>Note : A cell for calibration (CGC-202L) and an adapter for calibration (6791140K) sold separately. |

*Effect of coexistent ion (selectivity coefficient for 0.1 mol/L ion concentration)
If an ion coexists in the solution, it can cause data errors when measuring the targeted ion. The effects of the coexistent ion are shown here.
A selectivity coefficient of 10x means that if the solution contains a coexistent ion that is 10 times greater than the value of the targeted ion that is measured, an error occurs in which the value of the targeted ion equals the coexistent ion value.
If the concentration level of the coexistent ion is high enough to affect the measured values, we recommend conducting pretreatment in order to prevent interference.

| Product Name | Code | Remarks |
|---|---|---|
| Exchange liquid junction for ion sensor (10 pieces) | OLF00001 | For all ion combination electrodes (except AE/CE-2041) |
| Exchange membrane for ammonia electrode (10 sheets) | AE-FILM | For AE-2041 |
| Membrane cartridge for carbon dioxide gas electrode (4 pieces) | CTC-211 | For CE-2041 |
| Calibration cell for carbon dioxide electrode | CGC-202L | For CE-2041 |
| Calibration adapter | 6791140K | For CE-2041 |
| Reference electrode internal solution RE-1, 100 mL | 143F230 | For the internal solutions of all ion combination electrodes (except AE/CE-2041). Reference external solution for CA-2031 and I/S//F-2021. |
| Reference electrode external solution RE-2, 100 mL | 143F238 | Reference external solution for NA-2011 and CL/BR/CN/CD/CU/AG/F-2021 |
| Reference electrode external solution RE-3, 100 mL | 143F239 | Reference external solution for K/N-2031 |
| Ammonia electrode internal solution, 50 mL (3 bottles) | 0BG00005 | For AE-2041 |
| Carbon dioxide electrode internal solution RE-11, 500 mL | 143D042 | For CE-2041 |
| Na standard solution NA-1000, 500 mL | 143E031 | For NA-2011. Na: 1000 mg/L |
| Cl standard solution CL-1000, 500 mL | 143A281 | For CL-2021. Cl: 1000 mg/L |
| Br standard solution BR-1000, 500 mL | 143C483 | For BR-2021. Br: 1000 mg/L |
| I standard solution I-1000, 500 mL | 143H091 | For I-2021. I: 1000 mg/L |
| CN standard solution, 500 mL *Toxi | CN-100 | For CN-2021. CN: 100 mg/L Hazardous Material |
| Cd standard solution CD-100, 500 mL | 143B500 | For CD-2021. Cd: 100 mg/L |
| Cu standard solution CU-100, 500mL | 143D043 | For CU-2021 |
| K standard solution K-1000, 500 mL | 143B482 | For K-2031. K: 1000 mg/L |
| Ca standard solution CA-1000, 500 mL | 143B481 | For CA-2031. Ca: 1000 mg/L |
| $NH_4$ standard solution NH4-1000, 500 mL | 143A041 | For AE-2041. $NH_4$: 1000 mg/L |
| $NH_4$-N standard solution NH4-N, 500 mL | 143A042 | For AE-2041. $NH_4$-N: 1000 mg/L |
| $NO_3$ standard solution NO3-1000, 500 mL | 143C486 | For N-2031. $NO_3$: 1000 mg/L |
| $NO_3$-N standard solution NO3-N, 500 mL | 143C487 | For N-2031. $NO_3$-N: 1000 mg/L |
| F standard solution F-1000, 500 mL | 143F391 | For F-2021. F: 1000 mg/L |
| F buffer standard solution F-10, 500 mL | 143F393 | For F-2021. F: 10 mg/L (for special use) |
| F buffer standard solution F-100 500 mL | 143F392 | For F-2021. F: 10 mg/L (for special use) |
| Carbon dioxide electrode calibration powder (10 packs) | 143D044 | For CE-2041. |
| Ionic strength adjuster ISA-NA, 500 mL | 143A338 | For NA-2021. |
| Ionic strength adjuster ISA-CL 500 mL | 143A334 | For AG/CL/BR/I-2021. |
| Ionic strength adjuster ISA-CN 500 mL | 143A335 | For CN-2021. Hazardous Material |
| Ionic strength adjuster ISA-CU 500 mL | 143A336 | For CU/CD-2021. Hazardous Material |
| Ionic strength adjuster ISA-K 500 mL | 143A337 | For K-2031. |
| Ionic strength adjuster ISA-CA 500 mL | 143A333 | For CA-2031. |
| Ionic strength adjuster TISAB-01 500 mL | 143A279 | For F-2021. For general purpose use. |
| Ionic strength adjuster TISAB-11 500 mL | 143A280 | For F-2021. For solutions that contain heavy metals. |
| Ionic strength adjuster ISA-NO 500 mL | 143A340 | For N-2031. |
| Ionic strength adjuster ISA-NH 500 mL | 143A339 | For AE-2041. Hazardous Material |
| Ionic strength adjuster ISA-CO 500 mL | 143D045 | For CE-2041. |
| Ionic strength adjuster ISA-S (powder) (10 packs) | 143A332 | For S-2021. |

Note: We do not sell silver and sulfide ion standard solutions. Customers are suggested to prepare following the steps listed in the instruction manual.
*Toxic: Cautions are needed when handling toxic products.

# Handheld Water Quality Meters P30 Series Specification and Function Table

| Product Name | Handheld pH Meter | Handheld ORP Meter | Handheld pH Meter | Handheld Electrical Conductivity Meter | Handheld DO Meter | Handheld Electrical Conductivity/pH Meter | Handheld Ion/pH Meter | Handheld DO/pH Meter |
|---|---|---|---|---|---|---|---|---|
| Model Name | HM-30P | RM-30P | HM-31P | (For general environment) CM-31P (For pure water) CM-31P-W | DO-31P | WM-32EP | IM-32P | DM-32P |
| Measuring Method | Glass electrode method | Platinum electrode method | pH : Glass electrode method ORP : Platinum electrode method | AC two-electrode method | Membrane type galvanic cell method | pH : Glass electrode method Electrical conductivity : AC two-electrode method | pH : Glass electrode method Ion : Ion electrode method | pH : Glass electrode method DO : Membrane type galvanic cell method |
| Display | Custom LCD | | | | | Custom LCD (simultaneous display of dual channel measured data) | | |
| Sensor Connection ch1 | pH | ORP | pH、ORP | Electrical Conductivity | DO | Electrical Conductivity | pH、ORP、Ion | DO |
| Sensor Connection ch2 | — | | | | | pH、ORP | pH、ORP、Ion | pH、ORP |
| Meas. Range | pH : 0.00-14.00 Temperature : 0-100.0℃ | ORP : 0-±2000mV Temperature : 0-100.0℃ | pH : 0.00-14.00 ORP : 0-±2000mV Temperature: 0-100.0℃ | [If standard cell is used] Electrical conductivity : 0.1mS/m-10S/m Electrical resistivity : 0.1Ω·m-10kΩ·m Salinity (NaCl equivalent from electrical conductivity) : 0-4.00% Temperature : 0-80.0℃ [If cell for pure water is used] Electrical conductivity : 5μS/m-20mS/m Electrical resistivity : 50Ω·m-200kΩ·m Temperature : 0-80.0℃ *If the cell for tabletop use is used, the measuring range differs according to the cell that is used. | [If standard membrane is used] DO : 0-20.00mg/L Saturation rate : 0-200% Temperature : 0-50.0℃ [If high concentration membrane is used] DO : 0-50.0mg/L Saturation rate : 0-500% Temperature : 0-50.0℃ | pH : 0.00-14.00 ORP : 0-±2000mV Temperature : 0-100.0℃ [If standard cell is used] Electrical conductivity : 0.1mS/m-10 S/m Electrical resistivity : 0.1Ω·m-10kΩ·m Salinity (NaCl equivalent obtained by electrical conductivity) : 0-4.00% Temperature : 0-80.0℃ *If the cell for tabletop use is used, the measuring range differs according to the cell that is used. | pH : 0.00-14.00 ORP : 0-±2000mV Temperature : 0-100.0℃ Ion : differs according to the electrode that is used. (Temperature measuring function is not provided.) | pH : 0.00-14.00 ORP : 0-±2000mV Temperature : 0-100.0℃ [If standard membrane is used] DO : 0-20.00mg/L Saturation rate : 0-200% Temperature : 0-50.0℃ [If high concentration membrane is used] DO:0-50.0mg/L Saturation rate : 0-500% Temperature : 0-50.0℃ |
| Display Range | pH : -2.00-16.00 Temperature : -5-110.0° C | ORP : 0-±2200mV Temperature : -5-110.0℃ | pH : -2.00-16.00 ORP : 0-±2200mV Temperature : -5-110.0℃ | Electrical conductivity : 0-200.0μS/m 0-2.000mS/m 0-20.00mS/m 0-200.0mS/m 0-2.000S/m 0-20.00S/m 0-200.0S/m Electrical resistivity : 0.005-2.000Ω·m 0-20.00Ω·m 0-200.0Ω·m 0-2.000kΩ·m 0-20.00kΩ·m 0-200.0kΩ·m 0-2.000MΩ·m 0-20.00MΩ·m Salinity(NaCl) : 0-4.04% Temperature : -5-110.0℃ *In regards to the range, the electrical conductivity/ resistivity differs according to the cell that is used. | [If standard membrane is used] DO : 0-22.00mg/L Saturation rate : 0-220% [If high concentration membrane is used] DO : 0-55.0mg/L Saturation rate : 0-550% Temperature : -5-110.0℃ | pH : -2.00-16.00 ORP : 0-±2200mV Electrical conductivity : 0-200.0μS/m 0-2.000mS/m 0-20.00mS/m 0-200.0mS/m 0-2.000S/m 0-20.00S/m 0-200.0S/m Electrical resistivity : 0.005-2.000Ω·m 0-20.00Ω·m 0-200.0Ω·m 0-2.000kΩ·m 0-20.00kΩ·m 0-200.0kΩ·m 0-2.000MΩ·m Salinity (NaCl) : 0-4.04% Temperature : -5-110.0℃ * In regards to the range, the electrical conductivity/resistivity differs according to the cell that is used | pH : -2.00-16.00 ORP : 0-±2200 mV Ion : 0.0μg/L-999 g/L Temperature : -5-110.0℃ | pH : -2.00-16.00 ORP : 0-±2200mV [If standard membrane is used] DO : 0-22.00mg/L Saturation rate : 0-220% [If high concentration membrane is used] DO : 0-55.0mg/L Saturation rate : 0-550% Temperature : -5-110.0℃ |
| Electrical Conductivity/ Resistivity Range Switching | — | | | Auto/manual | — | Auto/manual | — | |
| Electrical Conductivity/ Resistivity Unit Switching | — | | | Can switch between SI Units (S/m, Ω·m) and the previous units (S/cm, Ω·cm). | — | Can switch between SI Units (S/m, Ω·m) and the previous units (S/cm, Ω·cm). | — | |
| Repeatability (Main unit) | pH : ±0.02pH Temperature : ±0.2℃ | ORP : ±2mV Temperature : ±0.2℃ | pH : ±0.02pH ORP : ±2mV Temperature : ±0.2℃ | Electrical conductivity : ±0.5%FS Electrical resistivity : ±0.5%FS Salinity : ±0.5%FS Temperature : ±0.2℃ | [If standard membrane is used] DO : ±0.03mg/L Saturation rate : ±2% [If high concentration membrane is used] DO : ±0.2mg/L Saturation rate : ±2% Temperature : ±0.2℃ | pH : ±0.02pH ORP : ±2mV Electrical conductivity : ±0.5%FS Electrical resistivity: ±0.5%FS Salinity : ±0.5% FS Temperature : ±0.2℃ | pH : ±0.02 pH ORP : ±2 mV Ion : ±0.5%FS Temperature : ±0.2℃ | pH : ±0.02pH ORP : ±2mV [If standard membrane is used] DO: ±0.03mg/L Saturation rate : ±2% [If high concentration membrane is used] DO : ±0.2mg/L Saturation rate : ±2% Temperature : ±0.2℃ |
| Temperature Compensation | Auto/Manual | — | pH : Auto/Manual Not applied to ORP | Switch setting between Auto/Manual/None Temperature compensation method : Linear/pure water dual temperature compensation Reference temperature : 25℃ Temperature coefficient : 0-9.99% (optional setting) | Auto | pH : Auto/Manual Electrical Conductivity/ Resistivity : Switch setting between Auto/Manual/None Temperature compensation method : Linear method Reference temperature : 25℃ Temperature coefficient : 0-9.99% (optional setting) Not applied to ORP | Auto/Manual Not applied to ORP and ion | pH : Auto/Manual DO : Auto Not applied to ORP |
| Calibration | Capable of three-point calibration | — | pH:Capable of three-point calibration | Cell constant calibration | Zero/span calibration | pH : Capable of three-point calibration Electrical conductivity : Cell constant calibration | pH/ion : Capable of three-point calibration | pH : Capable of three-point calibration DO : Zero/span calibration |

| Product Name | Handheld pH Meter | Handheld ORP Meter | Handheld pH Meter | Handheld Electrical Conductivity Meter | Handheld DO Meter | Handheld Electrical Conductivity/pH Meter | Handheld ion/ pH Meter | Handheld DO/ pH Meter |
|---|---|---|---|---|---|---|---|---|
| Model Name | HM-30P | RM-30P | HM-31P | (For general environment) CM-31P (For pure water) CM-31P-W | DO-31P | WM-32EP | IM-32P | DM-32P |
| Temperature Calibration | One-point calibration | | | | | | | |
| Correction function (Called by Key Input) | — | | | | Salinity correction Atmospheric pressure correction | — | | (DO) Salinity correction Atmospheric pressure correction |
| Data Memory | 1000 data points | | | | | | | |
| Auto Hold Function | Provided (Stability threshold : Fixed) | | | | | | | |
| Clock Function | Provided (To be shown while conducting a measurement) | | | | | | | |
| Interval Memory Function | Provided (Interval: The interval can be specified between 1 sec.-99 min. 59 sec. or 2 sec.-99hr. 59 min.) | | | | | | | |
| Printing Function | — | | Can connect the external printer EPS-P30 (option) | | | | | |
| RS-232C Interface*1 (non-isolated) — Connectable Devices | — | | PC or external printer EPS-P30 (option) | | | | | |
| RS-232C Interface*1 (non-isolated) — Communication Specifications | — | | Communication system: Start-stop synchronous method Baud rate: 19,200 bps Character length: 8 bits Parity: None Stop bit: 1 bit | | | | | |
| Analog Output (non-isolated) *1 — Number of Outputs/ Items — ch1 | — | | Number of outputs : 2 Measured value and temperature | Number of outputs : 3 Measured value, temperature, and range (only for electrical conductivity/ resistivity) | Number of outputs : 2 Measured value and temperature | Number of outputs : 3 Measured value, temperature, and range (only for electrical conductivity/ resistivity) | Number of outputs : 2 Measured value (not available for ion) and temperature | Number of outputs : 2 Measured value and temperature |
| Analog Output (non-isolated) *1 — Number of Outputs/ Items — ch2 | — | | — | — | — | Number of outputs : 2 Measured value and temperature | Number of outputs : 2 Measured value (not available for ion) and temperature | Number of outputs : 2 Measured value and temperature |
| Analog Output (non-isolated) *1 — Output Specifications (Connecting Cable available separately as an option) | — | | pH : ±700mV (pH0-14) ORP : ±1V (0-±2000mV) Temperature : 0-1V (0-100℃ ) | Electrical conductivity/ electrical resistivity/ salinity : 0-1V FS (each range) Range : 100mV/range Temperature : 0-1 V (0-100℃ ) | DO/saturation rate : 0-1V FS (each range) Temperature : 0-1 V (0-100℃ ) | pH : ±700mV (pH0-14) ORP : ±1V (0-±2000mV) resistivity/ salinity : 0-1V FS (each range) Range : 100 mV/range Temperature : 0-1V (0-100℃ ) | pH : ±700mV (pH0-14) ORP : ±1V (0-±2000mV) Temperature : 0-1V (0-100℃ ) | pH : ±700mV (pH0-14) ORP : ±1V (0-±2000mV) DO/saturation rate : 0-1V FS (each range) Temperature : 0-1V (0-100℃ ) |
| Waterproof Construction | IP67 (Enabled if the sensor is connected and if the external I/O portions are masked) (Can be immersed in water for 1m and 30 min.) | | | | | | | |
| Performance Compensation Temperature | 0-45℃ | | | | | | | |
| Power Source | AA alkaline battery/ nickel-hydrogen battery (2 pieces) | | AA alkaline battery/nickel-hydrogen battery (2 pieces) or special AC adapter (6VA option) | | | | | |
| Power Consumption (If 3 volt battery is used)*2 | Approx. 0.003W | Approx. 0.003W | Approx. 0.003W | Approx. 0.009W | Approx. 0.014W | Approx. 0.009W | Approx. 0.004W | Approx. 0.014W |
| Battery Life | Approx. 2000hours | Approx. 2000hours | Approx. 2000hours | Approx. 600hours | Approx. 400hours*4 | Approx. 600hours | Approx. 1500hours | Approx. 400hours*4 |
| Outside Dimensions | Approx. 68 (w) x 35 (h) x 173 (d) mm | | | | | | | |
| Mass (Including Batteries) | Approx. 280g | | | | | Approx. 300g | | |

*1) If the sample is earthed, make sure to use RS-232C and analog output in a insulated condition.
If you want to simultaneously (realtime) use RS-232C interface and analog output, you must have the special option cable. Please contact us for details.

*2) The power consumption (consumption current) values shown are for when option devices (e.g. PC, printer) are not connected. If option devices are connected, the power consumption might be approximately twice as high as the values shown, depending on the model.

*3) Except for when the DO electrode with the stirring function is connected.

## Standard Accessories

| Product Name | Handheld pH Meter | Handheld ORP Meter | Handheld pH Meter | Handheld Electrical Conductivity Meter | Handheld DO Meter | Handheld Electrical Conductivity/pH Meter | Handheld ion/ pH Meter | Handheld DO/ pH Meter |
|---|---|---|---|---|---|---|---|---|
| Model Name | HM-30P | RM-30P | HM-31P | (For general environment) CM-31P (For pure water) CM-31P-W | DO-31P | WM-32EP | IM-32P | DM-32P |
| Standard Accessories — Only for customers placing order for full set | pH combination electrode GST-2739C (Lead length : 1m) | ORP combination electrode PST-2739C (Lead length : 1m) | pH combination electrode GST-2729C (Lead length : 1m) | [CM-31P] Electrical conductivity cell CT-27112B (Lead length : 1m) [CM-31P-W] Electrical conductivity cell CT-27111D Flow cell made of PP CEF-22A | DO electrode OE-270AA (Lead length : 3m) | Electrical conductivity cell CT-27112B (Lead length : 1m) pH combination electrode GST-2729C (Lead length : 1m) | pH combination electrode GST-2729C (Lead length : 1m) | DO electrode OE-270AA (Lead length : 3m) pH electrode GST-2729C (Lead length : 1m) |
| Standard Accessories | pH4.01 standard solution (100mL) | Reference electrode internal solution(50mL) | pH4.01 standard solution (100mL) | | | pH4.01 standard solution (100mL) | pH4.01 standard solution (100mL) | pH4.01 standard solution (100mL) |
| Standard Accessories | pH6.86 standard solution (100mL) | Polybeaker (50mL) (1piece) | pH6.86 standard solution (100mL) | | | pH6.86 standard solution (100mL) | pH6.86 standard solution (100mL) | pH6.86 standard solution (100mL) |
| Standard Accessories | Reference electrode internal solution(50mL) | | Reference electrode internal solution(50mL) | | | Reference electrode internal solution(50mL) | Reference electrode internal solution(50mL) | Reference electrode internal solution(50mL) |
| Standard Accessories | Polybeaker (50mL) (3pieces) | | Polybeaker (50mL) (3pieces) | | | Polybeaker (50mL) (3pieces) | Polybeaker (50mL) (3pieces) | Polybeaker (50mL) (3pieces) |
| Standard Accessories | AA alkaline batteries (for initial operation) ( 2 pieces), hand strap, instruction manual | | | | | | | |

# Options For Multiple User Needs, from the Field to the Lab

## For managing data on PC

| Product Name | Code Number | Remarks |
|---|---|---|
| RS-232C connecting cable | 118N062 | For PC connection. Lead length: 2 m. (Not for HM-30P and RM-30P) |

## For connecting to a recorder or other devices

| Product Name | Code Number | Remarks |
|---|---|---|
| Analog output cable | 118N063 | Lead length: 1.5 m. Side terminal for connecting to external devices (3 mmY terminal).<br>(This product cannot be used for HM-30P and RM-30P.) |

## For data recording

| Product Name | Code Number | Remarks |
|---|---|---|
| External printer (with connecting cable) | EPS-P30 | Compact sized printer with chart width of approx. 60 mm. Ordinary printing level is sufficient for long-term data storage Printer paper(1pc) and inkribbon(1pc) are included. (Cannot connect to HM-30P and RM-30P.) |
| Printer sheet (20 rolls) | P000119 | |
| Ink ribbon (1 piece) | ORD00001 | |
| Connecting cable for external | 118N061 | *You must have this cable in order to use an external printer (EPS-G/EPS-R). |

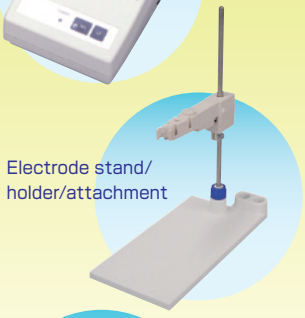
## For laboratory use

| Product Name | Code Number | Remarks |
|---|---|---|
| AC adapter | | Ask |
| Electrode stand (with column and stopper) | 6948810K | |
| Electrode holder | 0IB00001 | This product cannot be used for DO electrode. |
| Electrode attachment (DP) | 0IB00007 | Standard electrode for all P30 series products. (This product cannot be used for DO electrode.) For ELP-040. |
| Electrode attachment(G) | 0IB00004 | For sensors that are for tabletop use. |

*Please prepare an electrode stand, an electrode holder, and an electrode attachment.

## For field measurement

| Product Name | Code Number | Remarks |
|---|---|---|
| Stick holder | 0IB00009 | This product provides a lead length of 5 m or more for waterproof sensors that are immersed. If you have trouble reaching a measurement point, you use this product to safely measure from a position that is more accessible. |
| Twin stick holder | 0IB00010 | This product provides a lead length of 5 m or more for waterproof sensors that are immersed. Two sensors can be attached. |
| Anchor (AN-21P) | 0IC00001 | Can be used for waterproof sensors that are immersed. Anchor for submerging. |
| Rope for AN-21P | 0IZ00002 | $\phi$1SUS rope |
| Carrying case (with shoulder belt) | 0DA00001 | This case allows you to store and carry the main unit, sensor, and other accessories, such as the standard solution. |
| Soft case | SC-10P | This portable soft case allows you to store the main unit when it is connected to a sensor. |
| Protection cover (with shoulder belt) | 7258070K | Protect meter from shock like dropping. |





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**⚠ CAUTION** Please read the operation manual carefully before using products.