Instruction Manual

Portable DO Meter ¡NeoMet Series ¡

DO-30N (DO/O_2/Air/ Temp)

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Water Analyzer - istek, Inc.

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Chapter I. Introduction

istek¡s advanced portable meters (DO-30N) is operated by Rechargeable Battery (AAA size x 6ea) and are controlled by Microprocessor for all measurement needs.

This DO-30N features a custom LCD that simultaneously displays various functions along with measurement results and capable of storing up to 100 points in memory at once for each item. And if setting up of data-log to be ¡ON¡, it is available to receive data via RS232C interface cable at 1 sec. intervals. (Please refer to Chapter 6. Data-Log part) It is available to measure correctly by automatic compensating of ¡Altitude¡, ¡Salinity ¡ in setup mode.

DO / O_2 / Air / TEMP Meter

This model features to obtain a reliable data since its program is treated by setting in detail about compensation factor (altitude and salinity) for an accurate measurement. **DO-30N** features waterproof (IP66) housing, Backlit custom LCD display, Fast & accurate & easy to use, Simultaneous display of DO(O_2/Air), Temp and Current time. Automatic compensation for temperature, Using high sensitive polarographic DO sensor. Self diagnostics, Battery Alarm, Rechargeable Battery used.

This model displays DO, O_2, air and ATC(°C).

DO indicates concentration of oxygen presents in the sample. (Range 0.00~19.99mg/ℓ, Unit is mg/ℓ)

O_2 indicates percentage of oxygen as compared to the amount of oxygen presents in the air. (unit %)

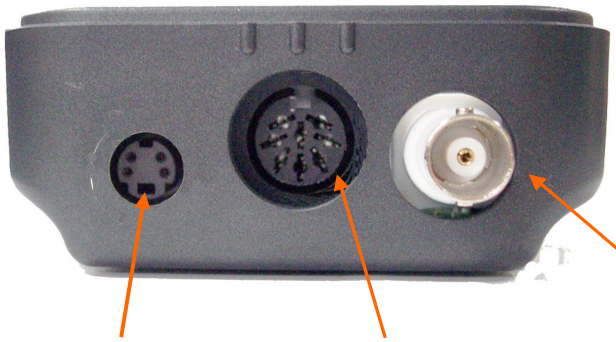
Air indicates percentage of DO or O_2 concentration. (unit %)

ATC For automatic Temperature Compensation, a temperature probe supplied by *istek* must be used. Temperature Compensation is automatically performed while measuring.

Chapter II. General Functions

1) Instrument Setup

Rear Panel



DIN4P(Adapter/RS232) DIN8P(For ATC Probe) BNC(For Sensor)

Power Source

Portable Meter is operated by Rechargeable Battery (AAA size Battery (1.2V 900mA) x 6ea & AC/DC Adaptor **(AC 220V 60Hz / DC 7.5V 300mA)**)

When it is appeared a message ¡BAT¡ on LCD, user need to charge them with electricity using AC/DC Adaptor. It takes 6~8 hours for recharging fully. When the battery has exhausted in the suburb, user can replace with rechargeable battery to open the cover which is located a lower column of the meter¡s backside.

This meter can be used in free voltages and if you would like to use this to 110V, just use a proper connector for inserting a users plug.

Electrode and ATC probe connection

Attached Electrode by sliding the BNC connector onto the sensor input then push down and turn clockwise to lock into position. And also attached the ATC Probe to the ATC Jack by sliding the connector straight on until firmly in place.

RS232C Interface Cable and Printer Connection

Insert RS232C interface cable into the RS232C Jack(DIN4P Connector). This RS232 interface cable supplies by istek, inc. Please refer Chapter 6 and Chapter 7 for getting more information.

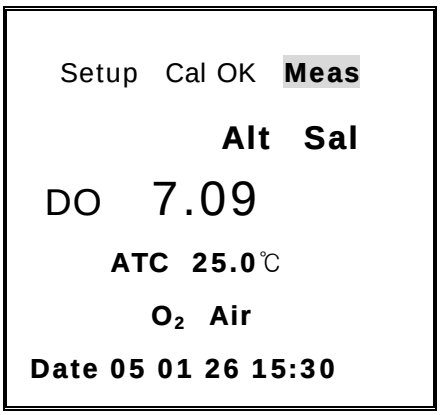
2) Key Function

■ DO-30N (*DO/O_2/Air/Temp Meter*)

Key	Description
On	Used to turn ON / OFF of POWER
Mode	Used to select operating modes (DO or O_2 or Air)
Resolution	Indicate Data¡s resolution Displayed (0.01/0.1)
Meas	Used to move from <Measure> to <Ready> or from <Ready> to <Measure>
Cal	Used this for starting of calibration or set a value of calibration, And, used to exit to initial display on the calibration.
Setup	For setting of conditions before measuring DO. Used this for setting of Data-Log, Temp and Current time.
Select	Used to <Memory Clear>
Memory	1) Data saving in <Measure> Mode 2) Data saving in <Ready> Mode 3) Exit from <Memory> Mode
Out	Used to exit from <Setup> or Print the saved data
(⩓)	Uses for increasing data in Setup & Calibration mode.
(⩔)	Uses for decreasing data in Setup & Calibration mode.

3) Display Description

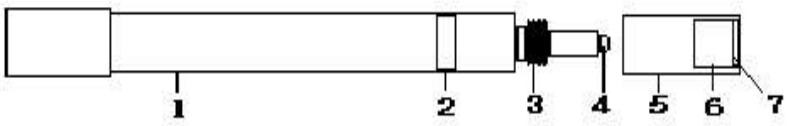
▣ DO-30N



Display	Function
DO	displays concentration of dissolved oxygen. with range of 0.00 to 19.99 mg/L.
O2	indicates percentage of oxygen as compared to the amount of oxygen presents in the air (20.9%).
Air	indicates percentage(%) of air.
Alt	indicates Altitude by meter. It is displayed in Setup mode.
Sal	indicates Salinity by PPT. It is displayed in Setup mode.
ATC (℃)	indicates Automatic Temp Compensation. Temp Compensation is performing automatically. This is present temp of sample and when it is unconnected with the meter, it displays 25℃.
Measure	indicates that meter is in <Measurement> Mode now. If this is not shown, indicates ready condition.
Ready	indicates that the meter is in <Ready> Mode now.
Cal	indicates that meter is in the condition of calibration. It is used for calibration.
Cal OK	indicates the end of calibration corresponding to number.
Error	Displays when a serious problem has arisen on the meter, sensor or buffer and it is not available to measure or calibrate accurately.

4) Electrode Structure

DO Polarographic Probe



1. Electrode Body
2. Stainless Steel Ring for sensing temperature
3. Screw for closing after fill up a filling solution
4. Sensor; position of response to oxygen
5. Membrane Cover ; containing with the filling Solution
6. Membrane Protector & Holder
7. Membrane

Probe Storage and Maintenance

DO Probe Storage (Probe storage)

Usually keep the sensor in distilled water, but this is a reason of reducing lifetime.
For longer storage, rinse the sensor clearly and keep it dry covering the membrane tip with a cap originally supplied by istek. Inc.

DO Probe Maintenance (Probe Cleaning)

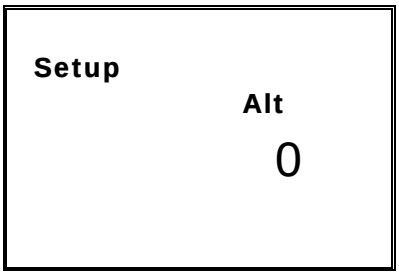
If it takes long time to response or a stable data is not obtained, check below and recover the sensor¡s condition to be normal. If air bubble is occurred on membrane, remove air bubble.
If air bubble is occurred inside of membrane, refill the filling solution and beat this several times for removing the air bubble. Check membrane for damage (i.e. holes and leak, etc.).
If membrane gets damage, replace membrane with new one.
In the case of Oil/Grease films, remove oil/Grease films with detergent, and then rinse electrode with distilled water.

Chapter III. Setup Functions

1. Setup in DO Mode

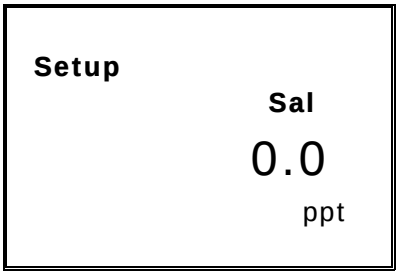
Altitude setup

In the initial display of DO, press **Setup** key to enter Setup and then the display is shown as follows.



Adjust altitude with ▲ or ▼ key and it changed by 50m. The adjusted altitude in Setup is compensated automatically when it is measuring or calibrating. If finishing the setting of conditions, press **Out** key to exit or **Setup** key to enter the next setup

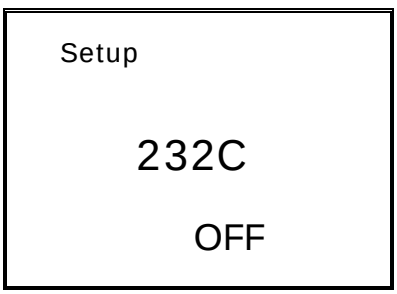
Salinity setup



After setting of Altitude, press setup key to enter below display. Adjust salinity with ▲ or ▼ key and it changed by 0.1 ppt. This settled Salinity is automatically compensated. If finishing the setting of conditions, press **Out** key to exit or **Setup** key to enter the next setup.

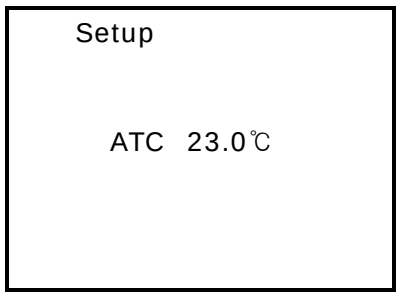
Data Logging (via Hyper Terminal)

* When user want to receive a measured data in real-time, connect the meter with PC by RS232C Interface cable, then user can be transmitted the data at 1sec. intervals (minimum) via Hyper Terminal at real-time.



After setting of Salinity, press **Setup** key to enter blow display. Set ON/OFF of data transmission by using ▲ or ▼ key. When this setup is set ¡ON¡, meter transmits data with time interval of one second. This data can be received by PC via RS232C interface cable. Press **Out** Key to exit to initial display.

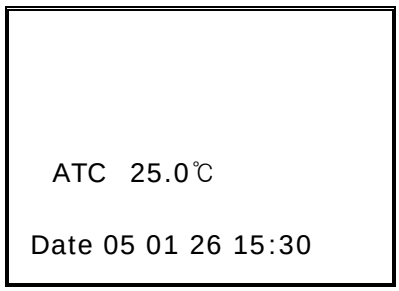
Temperature setup



If temperature on display differs from a real one, set a real temperature. After setting Data logging, press **Setup** key to enter below display. After that set real temp by using ▲ or ▼ key and press **Out** key to exit to DO initial display

Time setup

If Date and time on display differ from a real one, then set a real date and time. From the initial display of DO, press **Setup** key 4 times to enter time in setup display as below. Press **Select** Key and set correct date by using ▲ or ▼ key. After finishing setup, press **Memory** key to save it and return to DO initial display.



2. Memory Clear

When meter can not receive date from sensor, wrong time & date are settled, Data memory is wrong or want to be initialize the meter with an unknown cause, make Memory Clear as follows. If clearing all the stored data, press **Mode** key to enter O_2 mode and then press **select** key to clear. Therefore, all data which set at setup, is changed to a basic value.
When [Memory Clear] is finishing, it comes back to pH initial display automatically.

Chapter IV. Calibration and Measurement

※ There are salinity, altitude and temperature affects on DO data.
※ Because of using polarographic Electrode, it needs a time for polarization before using.
※ User needs wait about 20 mines for stabilizing before using our DO Meter after turning it on.

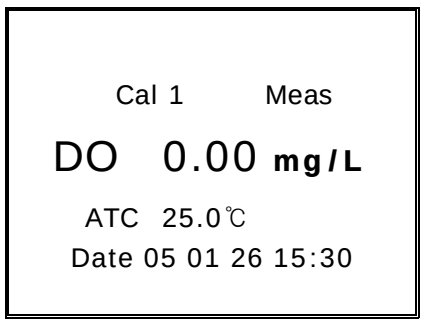
1. Calibration and Measurement in DO Mode

Preparation
Connect probe and temperature sensor to Input and ATC jack respectively.
Clearly rinse probe with distilled water and blot dry with tissue.
Prepare solution for measurement and magnetic stirrer.
It takes 1~10 minutes to polarize probe because of using polarographic probe.

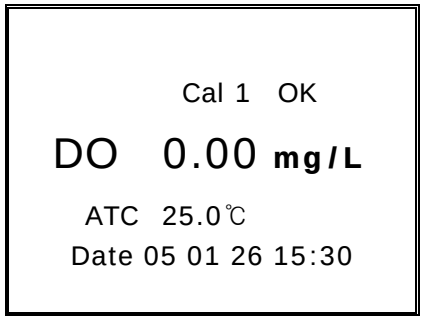
Solutions preparing
- Zero solution
  Put 0.5g of $CoCl_2$ & 5g of Na_2SO_3 in BOD bottle and fill it up with distilled water.
  Plug the bottle and blend well. Make this zero solution just before using.

- Saturated solution
  Put an ¡air bubble maker¡ in Beaker or BOD bottle and to be saturated with Oxygen enough more than 30 minutes. Put this saturated solution in BOD Bottle and cap to minimize the exposure in the air .

Zero (Cal 1) Calibration (General method)
There are two ways of zero calibration.
Separate Sensor from Meter, and press **measure** Key.

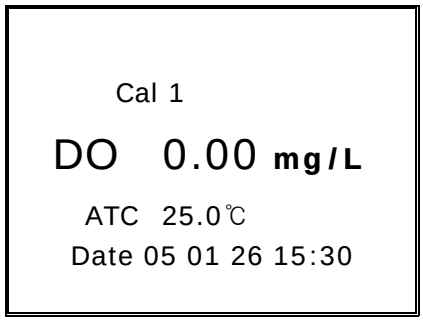


If the reading is stable, press **Cal** Key, and then ¡ Cal 1 OK¡ message is displayed in the upper field and set automatically

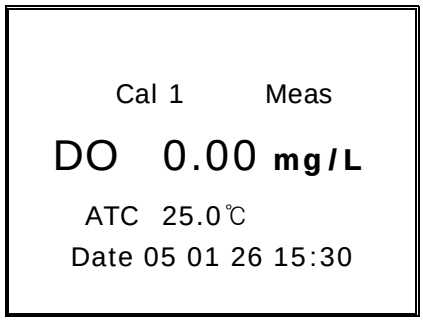


Zero (Cal 1) Calibration (By using zero solution)

In ready condition, press **Cal** key to enter calibration mode. The display is shown as follows.

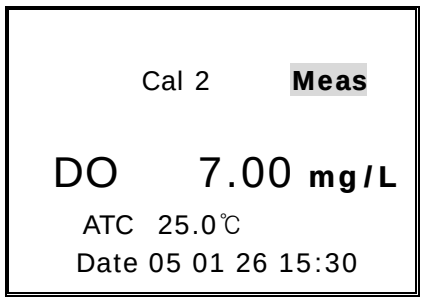


Rinse the DO sensor with distilled water and remove moisture. And put the sensor into the first buffer (Zero solution) and press **Measure** Key.
*** Should be used BOD Bottle & Adopter for preventing of contact with Oxygen in the air.



If the reading is stable, press **Cal** Key, and then ¡ Cal 1 OK¡ message is displayed in the upper field and set automatically.

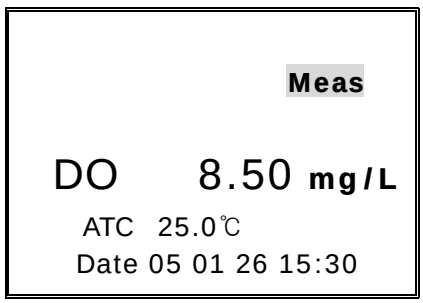
Saturated Calibration (Cal 2)



After zero calibration, rinse the sensor and dry it well. Rapidly put the probe into the prepared BOD bottle containing water saturated with air to minimize the exposure in the air. Press **Measure** key.

If the reading is stable, press **Cal** key.
And then Cal 2 OK message is displayed in the upper field and set automatically.

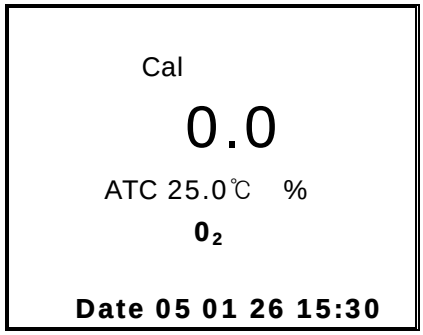
* The adjusted altitude and salinity in Setup are compensated automatically.
* After finishing calibration, change to the initial display automatically.
* Put probe into sample and press the **Measure** key, then data displays.

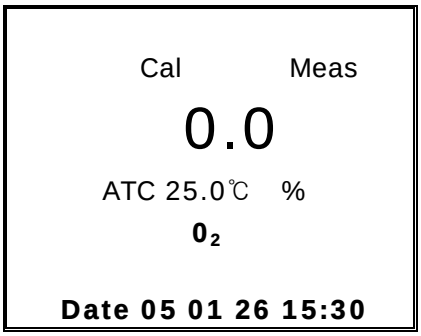


If pressing **Resolution** Key, user can change resolution.
If reading is stable, report or store it by pressing **Memory** Key.
While measuring DO, can also measure O_2 by pressing **Mode** Key.

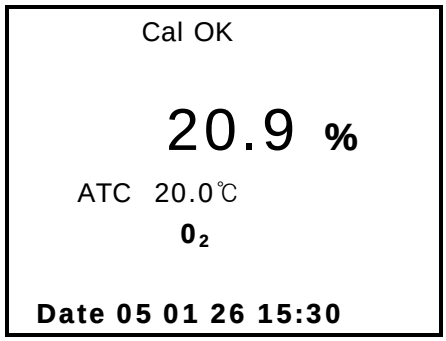
2. Calibration and Measurement in O_2 Mode

※ In DO initial display, press **Mode** Key to enter O_2 mode.
※ Rinse probe with distilled water and remove moisture in Membrane.
※ Place the probe in an airy place and press **Cal** key. Press **Measure** Key.

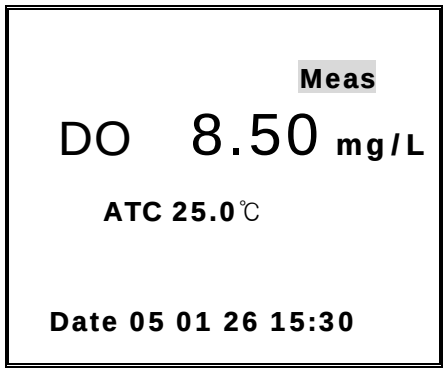




If the reading is stable, press **Cal** key. And then **Cal OK** message is displayed in the upper field and disappeared automatically.



If finishing calibration, automatically change to the O2 initial display. This is the end of O2 calibration.

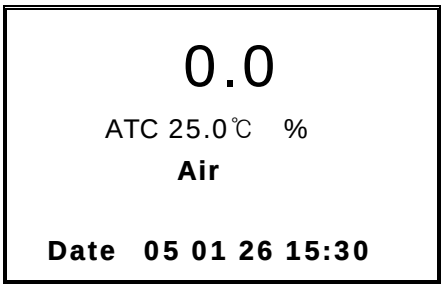


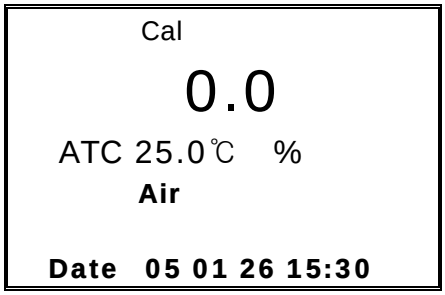
Press **Mode** Key to convert DO display as left display.
Put probe into sample and press the **Measure** key.
If the reading is stable, store or report it by pressing **Memory** Key.

While measuring DO, can also measures O2 by pressing **Mode** key.

3) Calibration and Measurement in Air Mode

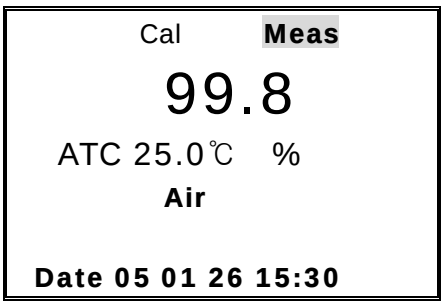
※ In O_2 Mode, change to **Air mode** using **Mode** key.



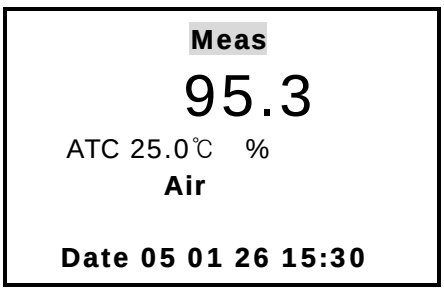


Calibration with Saturated buffer (CAL2)

* Clearly rinse probe with distilled water and dry (blot dry with tissue)
* Place probe in an airy and press **Cal** key then above right display is shown.
* Press **Measure** key.



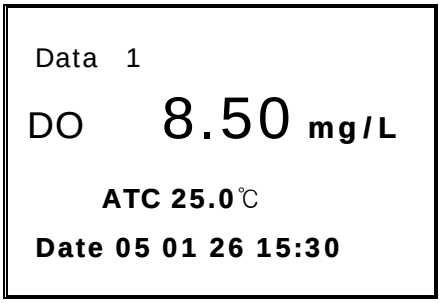
* If the reading is stable, press **Cal** key. And then **Cal OK** message is displayed in the upper field and set automatically.
* If finishing calibration, automatically change to the DO initial display. Put probe into sample and press **Measure** key to measure percentage of dissolved oxygen in it. If the reading is stable, store or report it by pressing **Memory** Key.



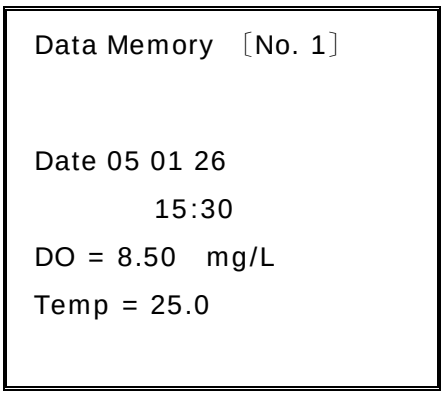
* While measuring air, you can also measure DO or O_2 by pressing **Mode** key.

Chapter V. Data-Logging

In measuring condition, the measured data is stored by pressing **Memory** key manually. The measuring data is saving in regular sequence as a follow picture. Up to 100 points is stored in memory at once. If the data stored in meter is required to print, it is available to output by using printer supplied by *istek, Inc.*



In order to print saved data, set the data ¡ON¡ condition by pressing **Setup** Key.
After that, In ready or measure condition, enter Data(Memory) Mode by **Memory** key, search data stored in meter by using ▲ or ▼ key, and press **Memory** key to save the data. The data can be printed by pressing **Out** key.
It is also available to print by using built-in printer. Press **Printer** Key to print the data
The following figure is an example of printed paper



Chapter VI. RS232 Remote Control

Data Logging (via Hyper Terminal)

When user want to receive a measured data in real-time, connect the meter with PC by **RS232C Interface cable**, then user can be transmitted the data at 1sec. intervals (minimum) via Hyper Terminal at real-time.

In ready condition, connect Meter with PC via RS232C Interface cable, and install communication program and press **Meas** Key for receiving the data.

The following messages are remote control commands for **Item /value/ temp /time.**

DO 8.50 mg/L	25.0	05/01/26	15 :30
DO 8.50 mg/L	25.0	05/01/26	15 :30
DO 8.50 mg/L	25.0	05/01/26	15 :30
DO 8.50 mg/L	25.0	05/01/26	15 :30
DO 8.50 mg/L	25.0	05/01/26	15 :30

Chapter VII. Troubleshooting & Error Descriptions

※ If problem still persists, please contact *istek¡s* **Service Dept**
Email : istek@istek.co.kr
Contact Person : Ms. Dia Hur (82-2-2108-8400)

MALFUNCTION	POSSIBLE CAUSE	REMEDY
	No power to meter	Press Power key. Check that battery is inserted correctly and polarity signs match.
Out of range reading or unstable reading	Probe failure	Clearly rinse electrode and blot dry. If air bubble is Occurred on membrane, remove air bubble. Check membrane for damage (i.e. holes and leak, etc.) If membrane gets damage, replace Membrane.

If problem still persists, please contact istek¡s Service Dept
- Please try to Memory Clear (Refer Setup Function Part for getting more information)
- The problem still persists, please contact istek, Inc Product Service Department.
(Tel : 82-2-2108-8400, E-mail : istek@istek.co.kr, Contact Person, Mr. J W LEE)

*** When using Ion Selective Electrode, Refer to ISE manual**

Chapter VIII. Specifications

MODEL		DO-30N
DO	**Range** **Resolution** **Relative Accuracy**	0.00 to 19.99 mg/L 0.01/0.1 ¡ 0.5%
O_2	**Range** **Resolution** **Relative Accuracy**	0.0 to 60.0% 0.10% ¡ 1 digit
Air Saturation (%)	**Range** **Resolution** **Relative Accuracy**	0.0 to 199.9% 0.10% ¡ 1 digit
Temperature	**Range** **Resolution** **Relative Accuracy**	-10 to 60℃ 0.1℃ ¡ 0.4℃
Salinity Correction		Available (0 to 70ppt)
Altitude Correction		Available (0 to 4000m)
Data Logging		100 Points
Temperature Compensation		Auto
Calibration		Auto, DO : 2 Points, O_2 : 1Point, Air : 1 Point
Input		BNC , DIN 8P(Temp) DIN 4P(RS232, AC/DC Adopter)
Output		DIN4(RS232C to Computer or Printer)
Power		Rechargeable Battery (AAAx6) AC/DC Power Adaptor
Standard Accessories		DO Polarographic Electrode/ATC Probe DO Membrane Kit, Filling solution Rechargeable Battery, AC/DC Power Adaptor Instruction Manual
Optional Accessories		DO Membrane Kit, BOD Adaptor RS232C Cable, Carrying Case Thermal Printer

Chapter IX. Ordering Information

A. Standard

* DO Polarographic Electrode / ATC Probe
* DO Membrane
* Filling Solution
* AC/DC Power Adaptor
* Rechargeable Battery (AAA x 6)
* Instruction Manual

B. Option

* RS232C Interface Cable
* DO Membrane Kit
* BOD Adaptor
* Thermal Printer
* Carrying Case

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