R3000SD

REED INSTRUMENTS

Data Logging pH/ORP Meter

WARRANTY 1 YEAR WARRANTY

Instruction Manual

REED Instruments
1-877-849-2127 | info@reedinstruments.com | www.reedinstruments.com

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Introduction

Thank you for purchasing your REED R3000SD Data Logging pH/ORP Meter. Please read the following instructions carefully before using your instrument. By following the steps outlined in this manual your meter will provide years of reliable service.

Product Quality

This product has been manufactured in an ISO9001 facility and has been calibrated during the manufacturing process to meet the stated product specifications. If a certificate of calibration is required please contact the nearest authorized REED distributor or authorized Service Center. Please note an additional fee for this service will apply.

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Safety

Never attempt to repair or modify your instrument. Dismantling your product, other than for the purpose of replacing batteries, may cause damage that will not be covered under the manufacturer's warranty. Servicing should only be provided by an authorized service center.

Features

- Measures pH and ORP levels in water
- Manual or automatic temperature compensation (with optional ATC probe, R3000SD-ATC)
- 3-point calibration ensures best accuracy
- Accepts pH/ORP Electrodes with BNC connector
- Real time datalogger with integrated SD memory card (optional)
- User selectable sampling rate
- Easy-to-read backlit LCD display
- Data hold and Min/Max functions
- Tripod mount for long-term monitoring
- Low battery indicator and auto shut off

Included

- Soft Carrying Case
- Batteries

Specifications

Temperature

Automatic Temperature Compensation (ATC):	Manual: 33.8 to 212°F (1 to 100°C) Optional ATC Probe (R3000SD-ATC): 32 to 149°F (0 to 65°C)

ORP (mV)

Measuring Range:	-1999 to 1999mV
Accuracy:	±(0.5% +2 dgt)
Resolution:	1 mV

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pH	
Measuring Range:	0.00 to 14.00
Accuracy:	±(0.02 pH +2 dgt)
Resolution:	0.01 pH
pH Electrode Compatibility:	Any pH electrode with BNC connector
General Specifications	
Display:	Dual Display, LCD
Backlit Display:	Yes
Data Hold:	Yes
Min:	Yes
Max:	Yes
Datalogging Capabilities:	Yes
Real-Time Clock and Date Stamp:	Yes
Sampling Rate:	Yes (1 second to 8 hours, 59 minutes and 59 seconds)
External Memory:	Yes, expandable up to 16GB with SD card (optional)
Auto Shut-off:	Yes (after 10 minutes/off)
Kick Stand:	Yes
Tripod Mountable:	Yes
Low Battery Indicator:	Yes
Power Supply:	6 x AA batteries or AC Adapter (optional)
Data Output:	Yes (RS-232)
Battery Life:	Sampling Time Dependent
Product Certifications:	CE
Operating Temperature:	32 to 122°F (0 to 50°C)
Storage Temperature:	14 to 140°F (-10 to 60°C)
Operating Humidity Range:	10 to 80%
Dimensions:	7 x 2.7 x 1.9" (177 x 68 x 45mm)
Weight:	1.1lb (489g)

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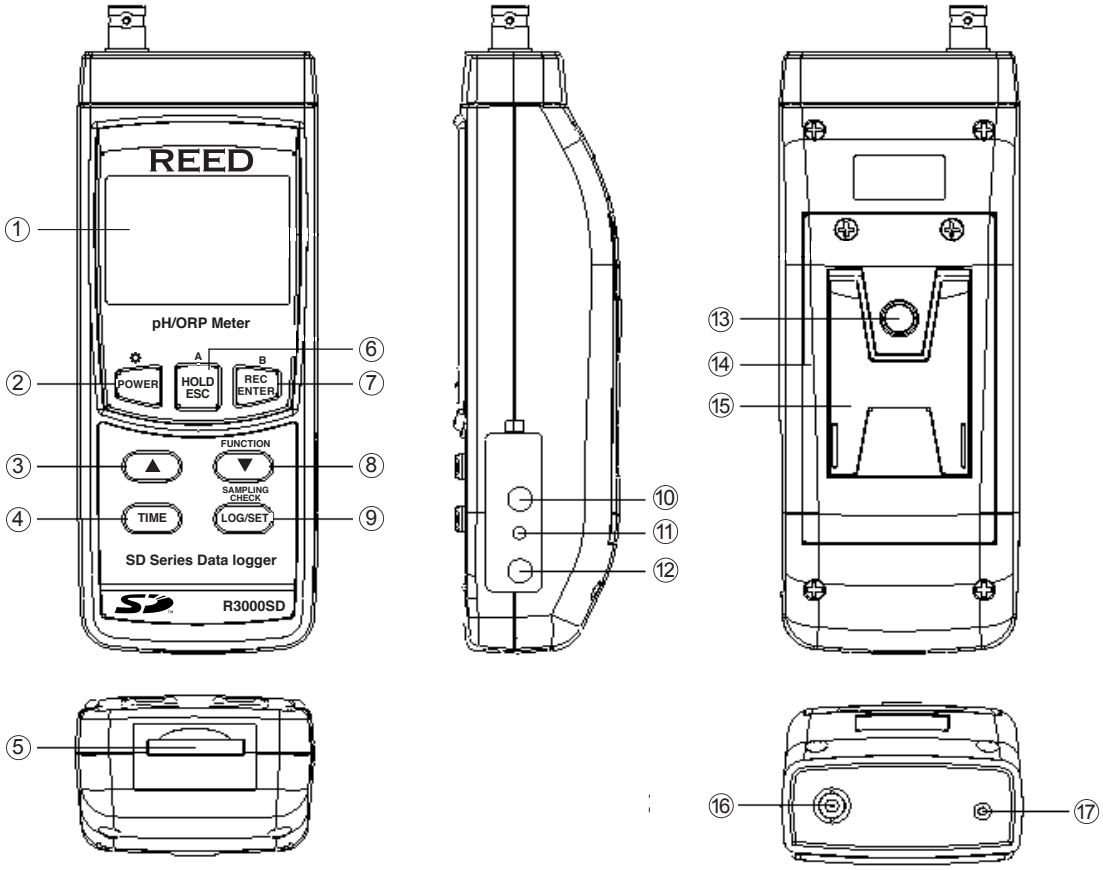
Instrument Description



1. LCD Display
2. POWER/Backlight Button
3. Up Button
4. TIME Button
5. SD Card Slot
6. HOLD/ESC Button
7. REC/ENTER Button
8. Down/FUNCTION Button
9. LOG/SET/SAMPLING CHECK Button
10. RS-232 Output Jack
11. Reset Pin
12. Power Adapter Input Jack
13. Tripod Mounting Screw
14. Battery Cover
15. Kickstand
16. pH/ORP Electrode Input (BNC) Jack
17. Temperature Probe Input Jack

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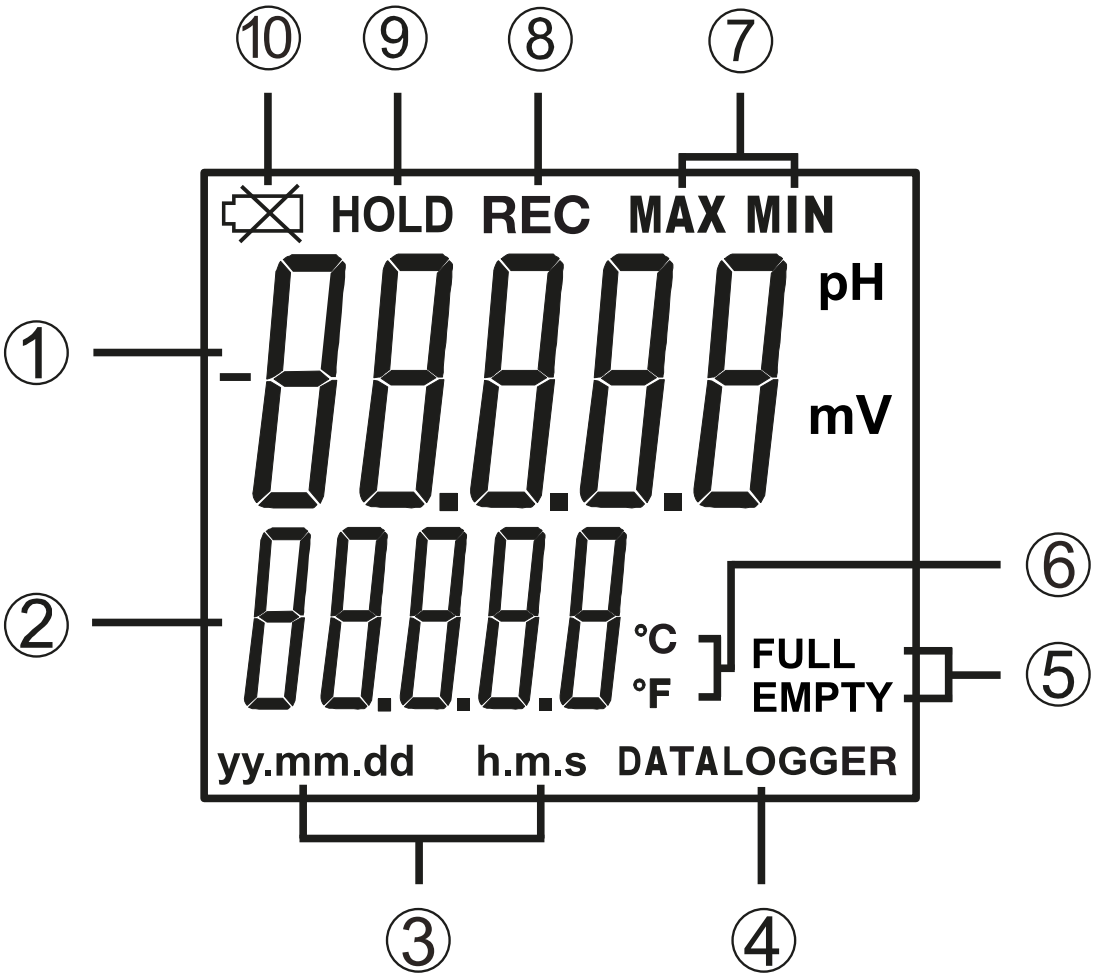
Display Description



1. pH/ORP (mV) Measurement Reading
2. Date & Time Values/Temperature Measurement Reading
3. Date/Time Stamp
4. Data Logging Status Indicator
5. SD Card Status Indicator
6. Temperature Unit of Measure
7. Maximum and Minimum Indicator
8. Record Mode Indicator
9. Data Hold Indicator
10. Low Battery Indicator

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Operating Instructions

Prior to first use with the meter, the pH electrode should be calibrated. Refer to the *pH Calibration* section of this manual for further instructions.

Power ON/OFF

Turn the meter on by pressing the **POWER** button. To turn the meter off, press, hold and release the **POWER** button for 2 seconds.
Note: This meter can be powered by either six (6) "AA" batteries or AC adapter (sold separately).

pH or ORP Modes

This meter offers pH and ORP modes of measurement capable of measuring 0.00 to 14.00 pH and 0 to 1999 mV (ORP).

pH measurements achieve better results when the temperature of the solution being tested is known and a temperature compensation factor is applied. This can be attained using manual or automatic temperature compensation.

For manual temperature compensation, an external temperature probe is not connected to the meter and the temperature of the solution under test is manually entered. The temperature compensation value appears on the lower part of the LCD display.

For automatic temperature compensation, an external temperature probe is connected to the meter (R3000SD-ATC) and inserted into the solution under test. The temperature compensation value will also appear on the lower part of the LCD display.

pH Measurement Mode (Manual Temperature Compensation)

1. Connect the Optional pH Electrode into the pH/ORP Input BNC Jack.
2. Press the **FUNCTION** button to select pH mode.
3. Set the pH Manual Temperature Compensation value. Refer to *Setup Mode* for details.
4. Place the pH electrode into the measured solution, so that the tip of the electrode and junction are fully immersed and stir at a moderate, uniform rate. The top of the LCD will display the pH value while the bottom part of the LCD will display the setting for the manual temperature compensation value.

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pH Measurement Mode (Automatic Temperature Compensation)

1. Connect the optional temperature probe into the temperature input jack.
2. Connect the optional pH electrode into the pH/ORP input BNC jack.
3. Press the **FUNCTION** button to select pH mode.
4. Place both the temperature probe and pH electrode into the measured solution, so that the tip of the electrode and junction are fully immersed and stir at a moderate, uniform rate. The top of the LCD will display the pH value while the bottom part of the LCD will display the setting for the manual temperature compensation value.

Note: When measurements have been completed, be sure to store the pH electrode in its protective cap.

mV Measurement Mode

This meter has a built in mV (millivolt) measurement function, which enables you to make ion-selective, ORP (oxidation-reduction potential) in the range of ±1999 mV.

1. Connect the Optional ORP Electrode into pH/ORP Input BNC Jack.
2. Press the **FUNCTION** button to select mV (ORP) mode.
3. The top of the LCD will display the mV value.

Data Hold

1. While taking a measurement, press the **HOLD** button to freeze the current readings on the display.
2. While in this mode a HOLD symbol will appear.
3. Press the **HOLD** button again to resume normal operation.

Note: When the Data Hold feature is active all buttons except the **POWER** button are disabled.

Recording Maximum and Minimum Readings

1. Press the **REC** button to enter recording mode as indicated by "REC" on the LCD. The meter will now begin recording maximum and minimum readings.
2. While in recording mode;

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A) Press the **REC** button once and the maximum value will appear on the display as indicated by "REC MAX".

B) Press the **REC** button again and the minimum value will appear on the display as indicated by "REC MIN".

C) To exit recording mode and resume normal operation, press and hold the **REC** button for two seconds.

When in recording mode the **POWER** button is disabled and the meter cannot be turned off.

Backlight

After powering the meter ON, the LCD Backlight will turn on automatically. Press the BACKLIGHT button to turn the LCD Backlight on or off.

Setup Mode

1. Press and hold the **SET** button for 2 seconds to enter Setup Mode.
2. Press the **SET** button continuously to scroll through the following parameters.

Parameter	Description
Sd F	Format the SD memory card
dAtE	Set the time and date
SP-t	Set the data logging sampling rate
PoFF	Enable or disable the auto-power off function
bEEP	Turn the beeper on or off
dEC	Set the decimal format (USA (20.00) or European (20,00))
t-CF	Select the temperature unit of measure (°C or °F)
t-SEt	Set pH manual Temp. compensation value, pH only
ESC	Exit Setup mode

3. Once the appropriate parameter has been selected, follow the instructions below.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation.

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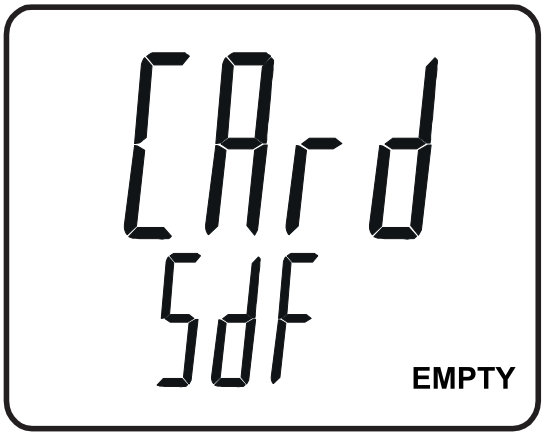
Formatting the SD Card (Sd F)

Follow steps 1 through 4 when "Sd F" appears on the LCD.

1. Press the ▲ and ▼ buttons to select "YES" to format the card. Select "NO" to abort.
2. Press the **ENTER** button to confirm selection.
3. Press the **ENTER** button again to re-confirm.
4. The meter will format the SD card and automatically return to the Setup menu when formatting is complete.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation. It is recommended that new SD cards should be formatted prior to first use. If the formatting process fails or if no card is inserted, the meter will display:



Setting the Time and Date (dAtE)

Follow steps 1 through 4 when "dAtE" appears on the LCD.

1. Press the ▲ and ▼ buttons to adjust the year as indicated by "YY."
2. Press the **ENTER** button to confirm selection.
3. Repeat steps 1 and 2 for month, day, hour, minute and seconds as indicated by (mm/dd/h/m/s).
4. Press the **SET** button to save the time stamp and jump to next parameter.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation. The internal clock will keep accurate time when the meter is powered off. When new batteries are installed the clock will have to be reset.

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Setting the Data Logging Sampling Rate (SP-t)

Follow steps 1 through 4 when "SP-t" appears on the LCD.

1. The sampling rate can be set from "0" seconds (manual log mode only) up to 8 hours, 59 minutes and 59 seconds.
2. Press the ▲ and ▼ buttons to adjust the required sampling rate by hours, minutes or seconds as indicated by (h/m/s).
3. Press the **ENTER** button to confirm each selection.
4. Press the **SET** button to save the selected sampling rate and jump to next parameter.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation.

Enabling/Disabling Auto Power Off (PoFF)

Follow steps 1 through 3 when "PoFF" appears on the LCD.

1. Press the ▲ and ▼ buttons to select between ON (enabled) or OFF (disabled). With the Auto Power OFF feature enabled, the meter will automatically switch OFF after 10 minutes of inactivity to preserve battery life.
2. Press the **ENTER** button to confirm selection.
3. Press the **SET** button to save and jump to next parameter.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation.

Enabling/Disabling the Beeper (bEEP)

Follow steps 1 through 3 when "bEEP" appears on the LCD.

1. Press the ▲ and ▼ buttons to select between ON (enabled) or OFF (disabled).
2. Press the **ENTER** button to confirm selection.
3. Press the **SET** button to save and jump to next parameter.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation.

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Setting Data Decimal Format (dEC)

Numeric formats vary in different countries. By default the meter is set to bASIC mode where a decimal point is used to separate units, (i.e. 20.00). The European format uses a comma (i.e. 20,00) to separate units. To change this setting, follow steps 1 through 3 when the "dEC" parameter appears on the LCD.

1. Press the ▲ and ▼ buttons to select between bASIC and Euro.
2. Press the **ENTER** button to confirm selection.
3. Press the **SET** button to save and jump to next parameter.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation.

Selecting the Temperature Unit of Measure (t-CF)

Follow steps 1 through 3 when "t-CF" appears on the LCD.

1. Press the ▲ and ▼ buttons to select between °C and °F.
2. Press the **ENTER** button to confirm selection.
3. Press the **SET** button to save and jump to next parameter.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation.

Setting pH manual Temperature Compensation Value

Ph measurements are more accurate when the temperature of the solution being tested is known. This can be achieved by applying a manual or automatic temperature compensation factor to the measurement. Please follow the steps below to manually set the pH temperature compensation value.

Follow steps 1 through 3 when "t-Set" appears on the LCD.

1. Press the ▲ and ▼ buttons to select the select the temperature of the solution being tested in °C or °F. By default, the meters temperature compensation factor is set to 25°C or 77°F.
2. Press the **ENTER** button to confirm selection.
3. Press the **SET** button to save and jump to next parameter.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation.

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ESC

Press the **SET** button when "ESC" appears on the LCD to exit the Setup mode and resume normal operation.

Note: At any time, you can press the **ESC** button to exit the Setup mode and resume normal operation.

Verify Set Time and Date

During normal operation, press the **TIME** button once to display the hour, minute, seconds. Press the button again to display the year, month and day.

Verify Sampling Rate

During normal operation, press the SAMPLING CHECK button to view the selected sampling rate.

Data Logging

Data Recording Modes

Manual Data Logging: Press the **LOG** button to manually log up to 99 readings on a SD memory card (see *Manual Data Logging Mode* for details).

Automatic Data Logging: Setup the meter parameters in order to automatically log data on a SD memory card. The number of data points is limited by the size of the memory card.

Note: It is recommended to use a class 4 SDHC memory card between 1 and 16Gb. Insert the SD memory card in the slot at the bottom of the meter. The card must be inserted with the label side facing the rear of the meter.

Manual Data Logging Mode

In manual mode, the **LOG** button is pressed to manually log a reading on the inserted SD card at any time. In order to setup the meter for manual data logging, follow steps 1 through 7 below.

1. Set the data logging sampling rate to "0" seconds.
2. Press the **REC** button and "REC" will appear on the LCD.
3. Press the **LOG** button to enter manual data logging function as indicated by "DATALOGGER".

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4. The meter will also display P-X (X = memory position number between 1 and 99).
5. Press the ▲ and ▼ buttons to select one of the 99 data memory positions in which to record.
6. Press the **LOG** button again to save a reading to memory. "DATALOGGER" will flash each time a data point is stored.
7. To exit manual data logging mode, press and hold the **REC** button 2 seconds to resume normal operation.

Automatic Data Logging Mode

In automatic mode the desired data logging sampling rate can be set between 1 second to 8 hours, 59 minutes and 59 seconds prior to recording. In order to setup the meter for automatic data logging, follow steps 1 through 5 below.

1. Press the **REC** button and "REC" will appear on the LCD.
2. Press the **LOG** button to enter automatic data logging function as indicated by "DATALOGGER".
3. The "DATALOGGER" icon will appear on the LCD and will flash every time a reading is stored.
4. To pause the data logging session press the **LOG** button and "DATALOGGER" will stop flashing. To resume press the **LOG** button again.
5. To end the current data logging session, press and hold the **REC** button for 2 seconds.

Transferring Data from the SD Memory Card to a Computer

1. While the meter is powered Off remove the SD memory card from the SD card slot.
2. Insert the SD memory card into the computer.
3. Open the file(s) with Excel. See sample below:

Position	Date	Time	Ch1_Value	Ch1_Unit	Ch2_Value	Ch2_Unit
1	19-07-10	11:00:39	3.45	pH	25	Degree_C
2	19-07-10	11:00:43	3.45	pH	25	Degree_C
3	19-07-10	11:00:47	3.52	pH	25	Degree_C
4	19-07-10	11:00:51	3.48	pH	25	Degree_C
5	19-07-10	11:00:55	3.5	pH	25	Degree_C
6	19-07-10	11:00:59	3.46	pH	25	Degree_C
7	19-07-10	11:01:03	3.45	pH	25	Degree_C
8	19-07-10	11:01:07	3.56	pH	25	Degree_C
9	19-07-10	11:01:11	3.45	pH	25	Degree_C
10	19-07-10	11:01:15	3.45	pH	25	Degree_C
11	19-07-10	11:01:19	3.45	pH	25	Degree_C
12	19-07-10	11:01:23	14	pH	30	Degree_C

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The raw data can be used to create a graph in Excel. See sample below:

pH Calibration

This meter has been manufactured for use with a pH electrode that generates 0mV at pH7.00 (177.4mV at pH4). If your pH electrode does not meet stated specifications or is being used for the first time, calibration procedures are necessary. Calibration also ensures accurate measurements. It is always recommended to carry out a two point calibration for better accuracy.

Required Equipment for Calibration

1. pH Electrode (See *Accessories and Replacement Parts*)
2. pH Buffer Solutions (See *Accessories and Replacement Parts*)

Calibration Procedure

1. Prepare buffer solutions for calibration. It is recommended to start with calibration buffer pH 7.00 pH, followed by either pH 4.00 or pH 10.00 (whichever is nearest to the expected sample value). Use the pH 4.00 and pH 7.00 buffer solutions when measurements are expected to be on the lower side of the pH scale. Use the pH 7.00 and pH 10.00 buffer solutions when measurements are expected to be on the higher side of the pH scale.
2. Connect the optional pH electrode into the pH input jack
3. Turn the meter on by pressing the **POWER** button.

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4. Manually adjust the temperature compensation value to make it same as the temperature value of the pH buffer solution. Refer to the *Setup Mode* section of this manual for instructions. For automatic temperature compensation, plug in the optional ATC probe.
5. Rinse the electrode with distilled water to remove any residual solution.
6. Place the electrode into the pH 7.00 buffer solution, so that the tip of the electrode and junction are fully immersed in the buffer solution, and stir at a moderate, uniform rate. If using an ATC probe, both probes should be placed into the solution together.
7. When calibration has stabilized, a pH value will appear at the top of the display.
8. Press and hold both the **REC** and **HOLD** buttons until the screen displays "PH" at the top of the screen, and "CAL" on the lower part of the screen and release to enter the calibration mode.
9. Press the ▲ and ▼ buttons to scroll to pH 7.00 or whichever screen matches your buffer solution.
10. Press the Enter button to save your selection.
11. Repeat steps 5 through 10 for the pH 4.00 and pH 10.00 buffer solutions.

Clearing pH Calibration Data

1. While under normal, press and hold both the **REC** and **HOLD** buttons until the screen displays "PH" at the top of the screen, and "CAL" on the lower part of the screen and release to enter the calibration mode.
2. Press the ▲ and ▼ buttons to until "CLr" appears on the display.
3. Press the **ENTER** button to confirm and erase all calibration data.
4. The display will continuously blink while the calibration data is being erased.
5. When complete, the meter will resume normal operation.

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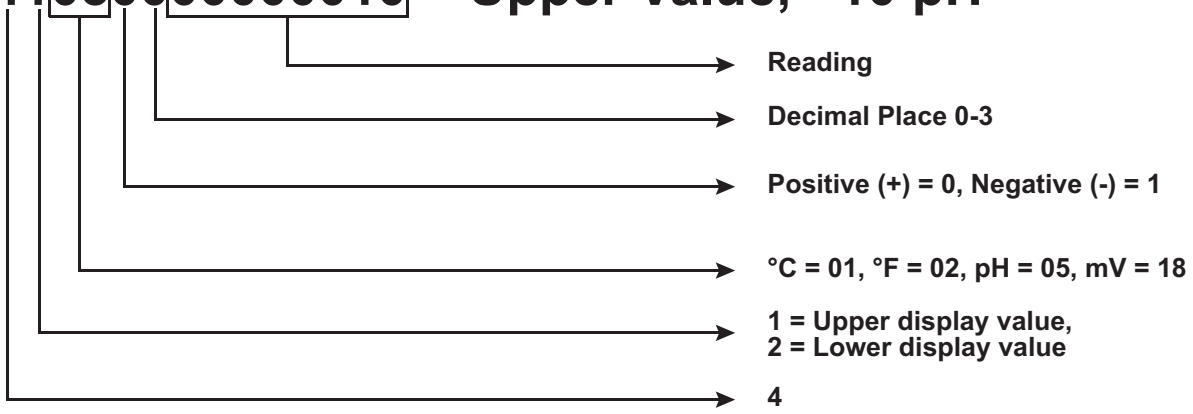
Data Stream Output

Using Terminal application, a data stream can be viewed from the RS-232 output, connect RS-232/USB cable between the product and terminal/PC and use the following setting to view the data stream.

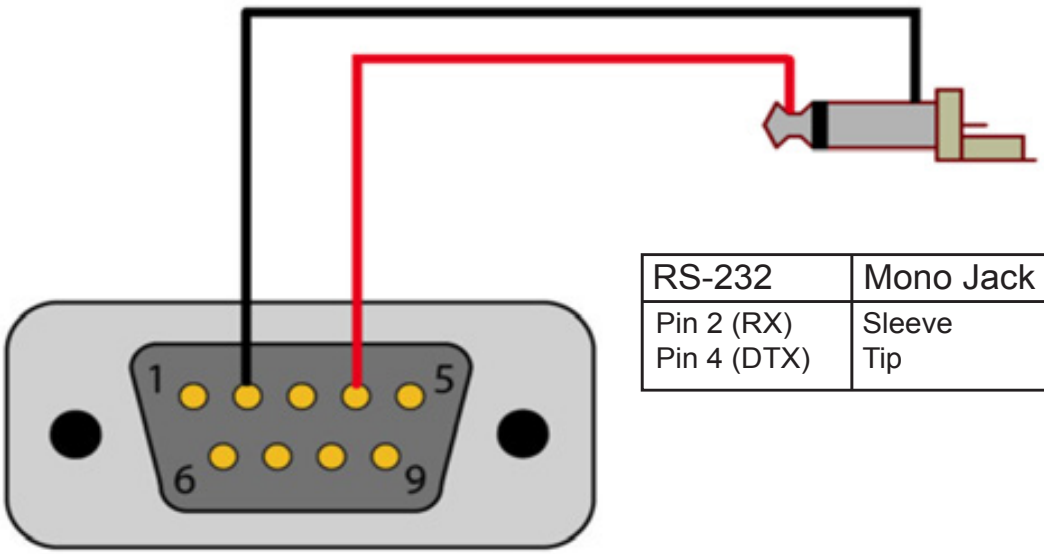
Terminal Settings:

- Bits per second: 9600
- Data bits: 8
- Parity: None
- Stop bits: 1

41050000000010 = Upper Value, +10 pH



3.5mm Terminal to RS-232 Serial Connection



RS-232	Mono Jack
Pin 2 (RX) Pin 4 (DTX)	Sleeve Tip

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System Reset

If the meter becomes unresponsive or if the display freezes, the Reset pin can be used to reset the instrument.

1. Use a paper clip or any similar small object to press the Reset pin.
2. After pressing the Reset pin, power the meter back up by holding the **POWER** button for 2 seconds.
3. If resetting the meter does not resolve the issue, please return the meter to the nearest authorized REED distributor or authorized Service Center for repair.

Battery Replacement

When the low battery icon appears on the LCD, the batteries must be replaced.

1. Remove the two (2) Phillips screws on the back of the meter directly located above the top of the kickstand.
2. Remove the battery cover.
3. Replace 6 x "AA" batteries.
4. Secure the battery cover with the two (2) Phillips screws.

Applications

- Water conditioning
- General purpose pH measurement
- Aquariums
- Wastewater monitoring
- Beverage production

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Accessories and Replacement Parts

R3000SD-PH1 Professional pH Electrode
R3000SD-PH2 General Purpose Electrode
R3000SD-ORP Professional ORP Electrode
R3000SD-ATC Automatic Temperature Compensation Probe
R1404 pH Buffer Solution, 4.01, 500ml
R1407 pH Buffer Solution, 7.0, 500ml
R1410 pH Buffer Solution, 10.0, 500ml
R1420 Electrode Storage Solution, 500ml
R1425 Electrode Cleaning Solution, 500ml
R1500 Tripod
RSD-ADP-NA Power Supply, 110V
RSD-ADP-EU Power Supply, 220V
CA-05A Soft Carrying Case
R8888 Deluxe Hard Carrying Case
SD-4GB 4GB Class 4 SDHC Memory Card
RSD-16GB 16GB Micro SD Memory Card w/ Adapter

Don't see your part listed here? For a complete list of all accessories and replacement parts visit your product page on www.reedinstruments.com.

Frequently Asked Questions (FAQ's)

I cannot turn off my meter, do you know why?

Often times, the meter cannot be turned off because it is in recording mode ("REC" mode). Make sure to exit that function by holding down the **REC** button before attempting to turn the meter off.

Can I set an alarm to go off at a specific temperature?

The meter does not have an alarm function.

continued...

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How long can I record for?

Battery life will depend on a number of factors:
-Quality of Battery
-Whether the beeper is ON or OFF
-Whether the backlight is ON or OFF
-Environmental Conditions during data logging
As a reference, using alkaline batteries with both the backlight and beeper on while automatic data logging at a 2 second sampling rate; the batteries lasted approx. 14 hours.

What is the exact ingredient of the ORP probe storing solution?

The ORP probe storing solution is made up of 30% Potassium Chloride & 70% Water.

Product Care

To keep your instrument in good working order we recommend the following:

- Store your product in a clean, dry place.
- Change the battery as needed.
- If your instrument isn't being used for a period of one month or longer please remove the battery.
- Clean your product and accessories with biodegradable cleaner. Do not spray the cleaner directly on the instrument. Use on external parts only.

Product Warranty

REED Instruments guarantees this instrument to be free of defects in material or workmanship for a period of one (1) year from date of shipment. During the warranty period, REED Instruments will repair or replace, at no charge, products or parts of a product that proves to be defective because of improper material or workmanship, under normal use and maintenance. REED Instruments total liability is limited to repair or replacement of the product. REED Instruments shall not be liable for damages to goods, property, or persons due to improper use or through attempts to utilize the instrument under conditions which exceed the designed capabilities. In order to begin the warranty service process, please contact us by phone at 1-877-849-2127 or by email at info@reedinstruments.com to discuss the claim and determine the appropriate steps to process the warranty.

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Product Disposal and Recycling

	Please follow local laws and regulations when disposing or recycling your instrument. Your product contains electronic components and must be disposed of separately from standard waste products.

Product Support

If you have any questions on your product, please contact your authorized REED distributor or REED Instruments Customer Service by phone at 1-877-849-2127 or by email at info@reedinstruments.com.

Please visit **www.REEDINSTRUMENTS.com** for the most up-to-date manuals, datasheets, product guides and software.

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