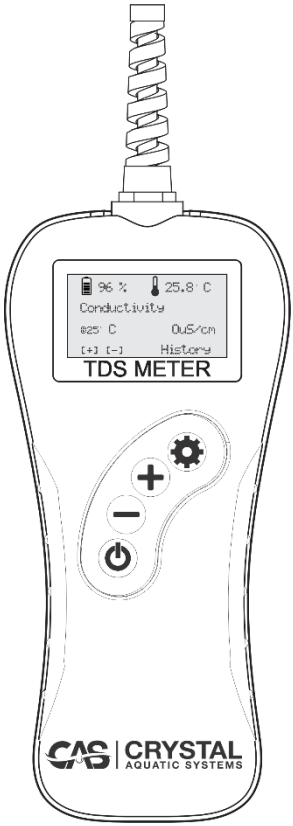
TDS-21 TDS CONDUCTIVITY METER

INSTRUCTION MANUAL

TDS/Salt/Conductivity/Resistivity/Temperature



ISO 9001: 2008

IP67 WATERPROOF

CAS Instruments by CRYSTAL AQUATIC SYSTEMS

www.crystalas.com **sales@crystalas.com** **+61 7 55935494**

TABLE OF CONTENTS

1. SAFETY 1
2. SPECIFICATIONS & DEFAULT UNIT VALUES 1
3. MAINTENANCE 1
   3.1 Cleaning the Probe 1
   3.2 Using Calibration Solution 2
   3.3 Battery Installation 2
4. TESTING / CERTIFICATION 2
5. KEYPAD FUNCTIONS 3
6. INITIAL START-UP / POWER ON 3
7. POWER OFF 4
8. MEASUREMENT MODES 4
   8.1 Dissolved Salt (NaCl) 4
   8.2 Resistivity @ 25°C 5
   8.3 Resistivity actual temperature 5
   8.4 Total Dissolved Solids (TDS) 5
   8.5 Conductivity @ 25°C 5
9. CALIBRATION / UNIT CONVERSION MODES 6
   9.1 Conductivity Units Conversion 6
   9.2 Temperature Units Conversion 6
   9.3 Salt Calibration (Adjustment) 6
   9.4 TDS Calibration (Adjustment) 7
   9.5 Temperature Coefficient Calibration (Adjustment) 7
   9.6 Water Temperature Calibration (Adjustment) 7
10. DATA HANDLING 8
   10.1 Saving Data 8
   10.2 Reading Data 8
   10.3 Clearing Data 8
11. SYSTEM RESTORE 9
12. TROUBLESHOOTING 9
13. FAQs 9
14. WARRANTY 10
15. DISCLAIMER 10

1. SAFETY

The CAS TDS Meter is designed and manufactured to the highest standard to ensure many years of hassle-free service. Please observe the following safety precautions. When changing the batteries, make sure that all seals on the meter are correctly reinstalled. The product is designed for continuous use in industrial process applications and complies with safety regulations. Improper use could lead to hazards for the user or a third party and/or adverse effects on its operator.

The probe portion of the system is 100% waterproof. Although the handheld display portion of the meter is IP67 water-resistant, it is not designed or intended to be submerged. If dropped into the water, remove immediately by pulling the probe cord to retrieve it and dry it off. Do not use the meter until the handheld portion is completely dry (which may take more than 24 hours). It is advised to remove the battery cover as well as the battery and allow the inside to dry in case there has been an entry of any moisture.

Any other use or use not mentioned herein that is incompatible with the technical specifications is deemed inappropriate. The operator is solely responsible for any damage arising from such use.



When using the TDS-21:

- Observe all applicable local and federal safety regulations.
- Take proper precautions with prescribed environmental and operational conditions.
- Consider chemical compatibility with all wetted materials.

2. SPECIFICATIONS & DEFAULT UNIT VALUES

SPECIFICATIONS	
TDS Range	1 - 40,000ppm
Temperature Range	0 - 60°C (32°F - 140°F)
Resolutions	1ppm for salt 0.1°C for temperature
Battery Life	5 years (standby) 1 year (operation)

DEFAULT UNITS/VALUES	
Dissolved Salt	ppm, K=100
Total Dissolved Salt	ppm, K=0.65
Temperature Coefficient	K=2.0%
Temperature	K=0

3. MAINTENANCE

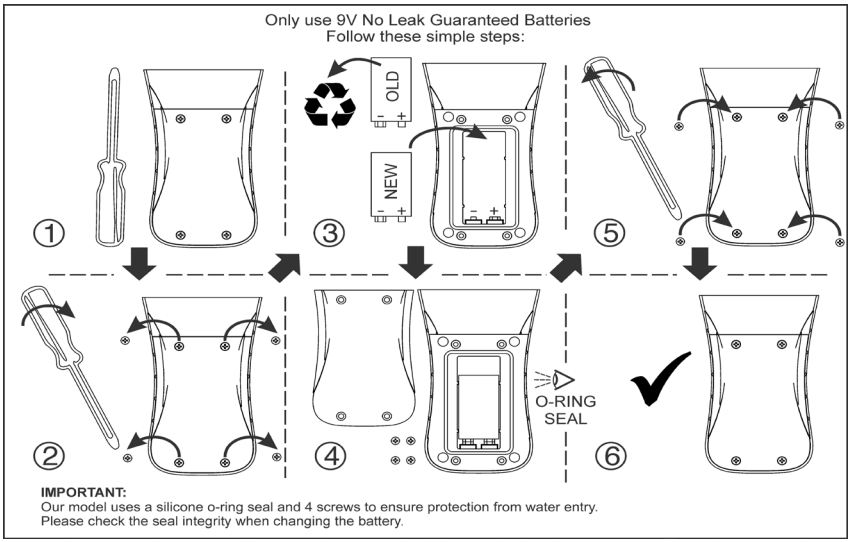
3.1 Cleaning the Probe

The probe has two carbon sensors and a temperature sensor. The probes are designed and engineered to be self-cleaning, but in certain instances, the carbon sensors may need cleaning when measurements are not stable. This can be done by rubbing a very fine 2000 grit wet & dry paper using water over the surface. It is essential that customers take care of the probes to get the most out of them. This should be carried out regularly to avoid malfunctioning of the carbon rods and inconsistent readings from the TDS meter. Rinse the probe in clean water and ensure the probe is dry when using it in calibration mode. Warning: Be careful while cleaning the temperature sensor, as this is very delicate and can easily be damaged if precautions are not implemented.

3.2 Using Calibration Solution

A commercially available calibration solution can be used to test the meter. Follow the instructions on the package.

3.3 Battery Installation



All EU users are legally bound by the battery ordinance to return all used batteries to collection points in your community or wherever batteries/accumulators are sold! Disposal in household garbage is prohibited!

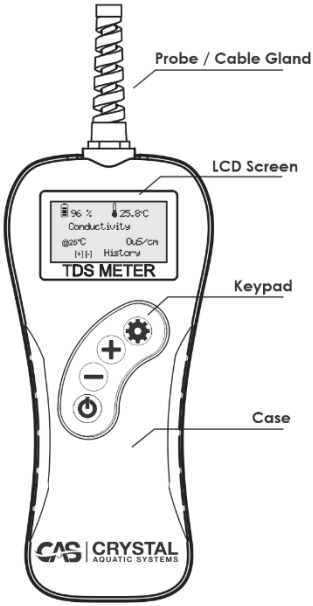
4. TESTING / CERTIFICATION

The water conditions of a typical pool were simulated, and tests based on this have been performed to determine the accuracy of the TDS-21 TDS Conductivity Meter. Further to this, significant infield testing has taken place.

Extreme water conditions (temperature under 15°C (59°F) and over 40°C (104°F) may cause accuracy to vary outside the ±2% of scale readings.

5. KEYPAD FUNCTIONS

	POWER ON/OFF • Used to turn the meter ON & OFF by "press & hold" for 2-3 seconds. • Used to enter CALIBRATION function. • Used to save newly adjusted values in CALIBRATION mode. • Used to start/stop measurements and exit in MEASUREMENT mode.
	MODE • Used to switch to different functions in MEASUREMENT & CALIBRATION modes.
	PLUS INCREASE • Used to increase the values of variables in CALIBRATION mode. • Used to save data and navigate through the saved data. • Used to perform factory resetting.
	MINUS DECREASE • Used to decrease the values of variables in CALIBRATION mode. • Used to navigate through the saved data. • Used to perform factory resetting.

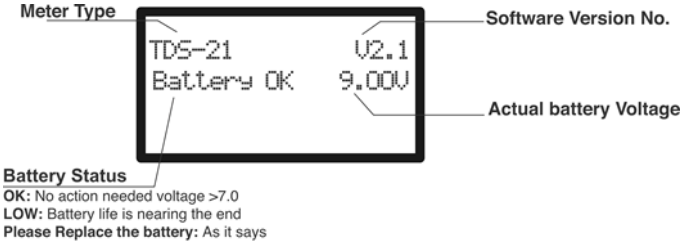


6. INITIAL START-UP / POWER ON

PROCEDURE

Press and hold the Power ON/OFF button for 2 seconds.

The initial start-up screen shows for 2 seconds:



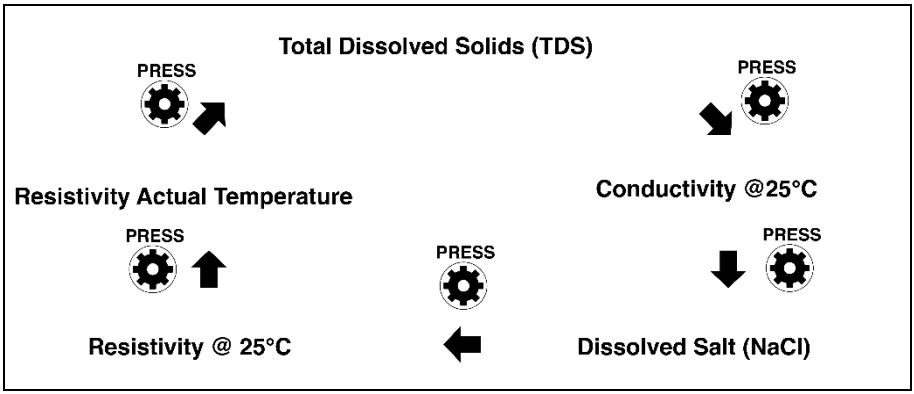
The above screen stays for 2 - 3 seconds, and the display goes automatically to the last mode in the MEASUREMENT function, which was used before it was turned OFF.

7. POWER OFF

PROCEDURE	Press and hold the Power ON/OFF button for 2 seconds. The meter will AUTO POWER OFF between 15 - 30 seconds, depending on the screen the meter displays at the time.

8. MEASUREMENT MODES

There are 5 different modes that can be accessed after the initial start-up display by pressing and cycling through the modes each time you press in the following sequence:



8.1 Dissolved Salt (NaCl)

PROCEDURE	Press during the measurement process to START & STOP measuring the Dissolved Salt. It is advised to wait about 3 - 5 seconds for the reading to stabilise.
MEASURES	Conductivity in a particular solution because of the NaCl (sodium chloride) in that solution.
UNITS	parts per million (ppm)
HANDY NOTES	The value of Dissolved Salt is always lower than that of Total Dissolved Solids.

8.2 Resistivity @ 25°C

PROCEDURE	Press ⏻ during the measurement process to START & STOP measuring the Resistivity @ 25°C. It is advised to wait about 3 - 5 seconds for the reading to stabilise.
MEASURES	Resistivity in a particular solution @ 25°C. i.e., how much resistance for the current to pass through the solution.
UNITS	ohm.cm (Ω.cm)
HANDY NOTES	A lower salt level in the solution has a higher resistance for the current to pass through.

8.3 Resistivity actual temperature

PROCEDURE	Press ⏻ during the measurement process to START & STOP measuring the Resistivity @ Actual Temperature. It is advised to wait about 3 - 5 seconds for reading to stabilise.
MEASURES	Resistivity in a particular solution @ actual temperature. i.e., how much resistance for the current to pass through the solution.
UNITS	ohm.cm (Ω.cm)
HANDY NOTES	A lower salt level in the solution has a higher resistance for current to pass through.

8.4 Total Dissolved Solids (TDS)

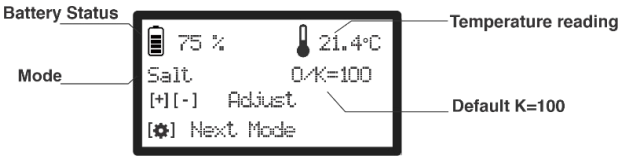
PROCEDURE	Press ⏻ during the measurement process to START & STOP measuring the Total Dissolved Solids. It is advised to wait about 3 - 5 seconds for reading to stabilise.
MEASURES	Total Dissolved Solids also measures conductivity due to other minerals and chemicals found in the solution in addition to NaCl.
UNITS	parts per million (ppm)
HANDY NOTES	The value of Total Dissolved Solids is always higher than that of Dissolved Salt.

8.5 Conductivity @ 25°C

PROCEDURE	Press ⏻ during the measurement process to START & STOP measuring the Conductivity @ 25°C. It is advised to wait about 3 - 5 seconds for reading to stabilise.
MEASURES	Conductivity is a measurement of how easily electricity can pass through solutions.
UNITS	micro-siemens per centimetre (µs/cm)
HANDY NOTES	The higher salt level in the solution has a higher conductivity for the current to pass through.

9. CALIBRATION / UNIT CONVERSION MODES

PROCEDURE	There are 6 different calibration/unit conversion modes that can be accessed. While the meter is turned off, first press and hold ⚙ for 3 seconds. While holding ⚙ press and hold ⏻ for 2 seconds, then the screen turns on and enters CALIBRATION MODE. Press ⚙ to cycle through the modes in the following sequence:



9.1 Conductivity Units Conversion

PROCEDURE	Press either ⊕ or ⊖ on calibration screen to adjust to the desired value. Press ⏻ to save the new setting and exit to the MEASUREMENT MODES.
UNIT CONVERSION	Changes from µS/cm to mS/m and vice versa.
CONVERSION	Micro-Siemens per centimetre (µS/cm) to milli-Siemens/meter (mS/m), and vice versa.

9.2 Temperature Units Conversion

PROCEDURE	Press either ⊕ or ⊖ on the calibration screen to adjust to the desired value. Press ⏻ to save the new setting and exit to the MEASUREMENT MODES.
UNIT CONVERSION	Change from °C to °F and vice versa.
CONVERSION	Degree Celsius to degree Fahrenheit, and vice versa.

9.3 Salt Calibration (Adjustment)

PROCEDURE	Press either ⊕ or ⊖ on the calibration screen to adjust "K" to the desired value. Press ⏻ to save the new setting and exit to the MEASUREMENT MODES.
ADJUSTMENT	1/K starting at 0/K=100
RANGE	Starting at 0/K=100 → 0/K=101 → 0/K=102 →, etc. from 100 - 200 pressing ⊕ or 99 - 0 pressing ⊖.

9.4 TDS Calibration (Adjustment)

PROCEDURE	Press either (+) or (−) on calibration screen to adjust "K" to the desired value. Press (⏻) to save the new setting and exit to the MEASUREMENT MODES.
ADJUSTMENT	0.01/K starting at 0/K=0.65
RANGE	Starting at 0/K=0.65 from 0.65 - 0.99 pressing (+) or 0.65 - 0.50 pressing (−).

9.5 Temperature Coefficient Calibration (Adjustment)

PROCEDURE	Press either (+) or (−) on the calibration screen to adjust "%" to the desired value. Press (⏻) to save the new setting and exit to the MEASUREMENT MODES.
ADJUSTMENT	0.1% starting at 2.0%/°C
RANGE	Starting at 2.0%/°C from 2.0 - 3.0% pressing (+) or 2.0 - 1.0% pressing (−) .

9.6 Water Temperature Calibration (Adjustment)

PROCEDURE	Press either (+) or (−) on the calibration screen to adjust "K" to the desired value from (0 to 50, default "K"=0). Press (⏻) to save the new setting and exit to the MEASUREMENT MODES.
ADJUSTMENT	1 starting at K=0
RANGE	Starting at K=0 from +1 to +50 pressing (+) or -1 to -50 pressing (−).

10. DATA HANDLING

The TDS meter allows storage and access of up to 20 data recordings.

10.1 Saving Data

PROCEDURE	Press (+) at any time in any measurement mode to save the new data. A maximum of 20 data recordings are saved. Once more than 20 data values are stored, the oldest recording will be deleted automatically. The 20 data recordings can be any of the measurement modes (e.g. [01] can show the last recorded TDS Value, and [02] can show the last recorded Salt Value, etc.).

These prompts will be displayed on the screen:	
Display	Meaning
[+] Save Data Displayed in the bottom left corner of the screen	A prompt to save your data.
[✓] Saved Displayed in the bottom left corner of the screen	Data has been saved successfully.
[XX] Displayed in the top left corner.	Indicates the number of data recordings saved. You can store a maximum of 20 recordings.

10.2 Reading Data

PROCEDURE	Press (+) or (−) at any time when the meter is turned on to enter data reading mode to access/read the saved data. Note, this does not work in measuring or calibration mode. Press (⏻) to exit the data reading mode.

Understanding the prompts displayed on the screen:	
Display:	Meaning:
[XX] Displayed in the top left corner.	Indicates the number of data recordings saved. You can store a maximum of 20 recordings.
[+][-] Up/Down Displayed in the bottom left corner.	This scrolls between the saved readings.

10.3 Clearing Data

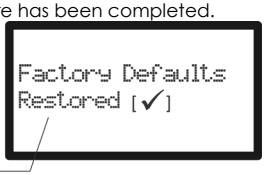
PROCEDURE	Press (⚙) while in data reading mode to clear or delete the saved/stored data. Each press deletes 1 (one) reading at a time.

Understanding the prompts displayed on the screen:	
Display:	Meaning:
[✓] Cleared Displayed in the bottom left corner.	Indicates that the data has been cleared successfully.

11. SYSTEM RESTORE

PROCEDURE

Press and hold ⊕ and ⊖ in together while the meter is in off-mode. Hold ⏻ in for 3 seconds to perform the system restore. The following screen indicates the system restore has been completed.



The meter returns to the initial start-up and resets all values to default values and factory default settings.

12. TROUBLESHOOTING

ISSUE	SOLUTION
Battery warning on the LCD screen.	Replace the battery.
Inaccurate measurement (SALT, TDS, TEMPERATURE, etc.)	1. Clean the probes. 2. Recalibrate the meter.
Meter not turning on.	1. Replace the battery. 2. Check battery connection.
Battery voltage is OK, but nothing is displayed on the screen.	1. Check the battery. 2. Contact the service agent.
Water/Moisture entry	1. Check the battery compartment seal. 2. Dry the meter out.

13. FAQs

QUESTION	SOLUTION
When measuring the TDS of my water, the reading is different on different days. Is this normal?	Yes, if it is not a big difference. There will be a slight difference in TDS reading because there are various environmental factors affecting the reading.
How will I know when the battery is not sufficient or when it is time to change the battery?	You need to keep an eye on the message displayed on the screen just after turning the meter on. You can also check the battery status

14. WARRANTY

This product is warranted for (12) twelve months against defects in workmanship and materials if used for its intended purpose and maintained according to instructions. This warranty is limited to repair or replacement, depending on the problem of the product. If the product is found to have been misused or damaged due to water entry/mechanical damage/accidental damage, this will not be covered under warranty, and, in such cases, no warranty will apply.

What is covered? Repairs/parts/factory labour, or a replacement meter if applicable.

What is not covered? Damage due to accident, misuse, water penetration of the handheld enclosure, tampering, or lack of prescribed maintenance is not covered under this limited warranty. Any sign of water or salt residue internally voids the warranty. Water entry can take place if the seal is not correctly positioned when replacing the batteries. Please refer to the battery replacement guide.

Should you need to lodge a warranty with the CAS service department, ensure to include the product serial number, purchase date, and type of failures. If returned to CAS, ensure proper packaging so that no additional damages occur during transport. The customer is liable to return the meter to CAS.

This limited warranty is the sole and complete warranty for CAS and shall be limited to the cost of the meter. In no event shall CAS be liable for incidental or consequential damages.

15. DISCLAIMER

CAS has made every attempt to ensure the accuracy and reliability of the information provided in this manual. However, the information is provided "as is". We shall not be liable for any loss or damage of whatever nature (direct, indirect, consequential, or other), which may arise due to the use of this product.

NOTES