

The

Palintest®

System

Instructions

MICRO 500 CONDUCTIVITY METER

MICRO 500 TDS METER

OPERATING INSTRUCTIONS

**PT 144 MICRO 500 CONDUCTIVITY METER
(Conductivity/Temperature Meter)**

**PT 142 MICRO 500 TDS METER
(TDS/Temperature Meter)**

TABLE OF CONTENTS

1	INTRODUCTION	3
1.1	Introducing the Micro 500 Series	3
2	GETTING STARTED	3
2.1	Description of Keypad Functions	3
2.2	Description of LCD Annunciations	4
2.3	Inserting & Removing the Rubber Boot	4
2.4	Inserting New Batteries	4
2.5	Battery Replacement	4
2.6	Connecting the Electrode and Temperature Sensor	5
2.7	Switching the Meter On	5
2.8	Setting the Conductivity-to-TDS Conversion Factor (Micro 500 TDS Meter Only)	5
3	CALIBRATION	6
3.1	Conductivity/TDS Calibration	6
3.2	Temperature Calibration	7
3.2.1	With Temperature Probe (for Preselected Curve)	7
3.2.2	With Temperature Probe (for Curve Selection)	8
3.2.3	Without Temperature Probe (no ATC)	9
4	MEASUREMENT	9
4.1	Taking Measurements	9
4.2	Holding a Reading	10
4.3	Releasing a Held Reading	10
5	PROBE CARE AND MAINTENANCE	10
6	TROUBLESHOOTING	11
7	SPECIFICATIONS	12
8	ACCESSORIES	13

1 INTRODUCTION

1.1 Introducing the Micro 500 Series

Thank you for purchasing the Palintest Micro 500 Conductivity or Total Dissolved Solids (TDS) meter series. These microprocessor-based hand-held meters deliver + 2% full scale accuracy and have a large custom LCD (Liquid Crystal Display) for clear and easy reading.

The Palintest Micro 500 Conductivity meter measures Conductivity ($\mu\text{S}/\text{mS}$) and Temperature ($^{\circ}\text{C}$). The Palintest Micro 500 TDS meter measures Total Dissolved Solids (TDS) and Temperature ($^{\circ}\text{C}$). These sturdy meters measure up to three different ranges with auto-ranging capability that switches to appropriate measuring range automatically.

The instruction manual is organized for quick reference with step-by-step procedures that give you thorough review of the various features and meter operations.

Included with your meter are a two-pin stainless steel conductivity electrode with built-in temperature sensor (for ATC), a rubber boot, 4 x alkaline 'AAA' batteries, instruction manual and soft carrying pouch. To order other accessories and buffer standard solutions, please refer to the section on Accessories for more information.

2 GETTING STARTED

2.1 Description of Keypad Functions

The Palintest Micro 500 Conductivity and TDS meters have six keys on a splash-proof keypad. These comprise ON/OFF, HOLD/ENTER, CAL, MODE, A and V keys.

ON/OFF: Powers the meter on and turns it off. Meter directly enters measurement mode when you switch it on.

MODE: Selects measurement mode for Conductivity/TDS or Temperature,

CAL: Allows calibration mode for Conductivity/TDS and Temperature, or to abort calibration without confirming any set value.

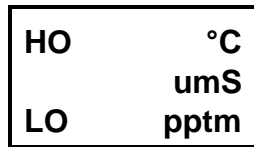
HOLD: Freezes the measured reading for easy viewing.

ENTER: Confirms calibration value.

▲ (UP) / ▼ (DOWN): Scrolls up and down to the values during calibration.

2.2 Description of LCD Annunciators

The meter has a large custom LCD that consists of 31/2-digit segments and operation annunciators for uS/mS or ppm/ppt and °C (Temperature). Other annunciators include 'HO' (when the HOLD function is activated) and 'LO' (low battery condition).



2.3 Inserting & Removing the Rubber Boot

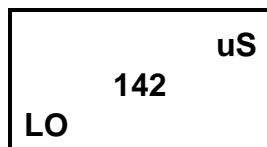
- 1 To remove meter from rubber boot, push out from the bottom edges of meter until it is completely out of boot. Ensure that the cables of Conductivity electrode or temperature probe are not connected.
- 2 To insert meter into rubber boot, slide in from the top of meter before pushing the bottom edges of meter down to set it into position. Lift up the stand at the back of meter for bench top applications if necessary.

2.4 Inserting New Batteries

The battery compartment is found at the back of instrument. To open the battery compartment, push in the direction of arrow and lift up the cover. Note the polarity of battery before inserting into position. After replacement, place cover back and press down until it locks tight.

2.5 Battery Replacement

A 'LO' annunciator in the LCD alerts you when battery power is running low. Replace with the same type as recommended by the manufacturer.



Caution: Power off the meter when changing battery.

2.6 Connecting the Electrode and Temperature Sensor

To connect electrode into meter, align the connector slots with the posts of meter's socket and rotate connector clockwise until it locks. Do not force when connecting. To remove, simply rotate the connector in anti-clockwise direction until it unlocks, and slide the connector off the socket.

Insert the mini phono jack of temperature sensor into the socket on the meter. Unplug the phono jack when not in use or you measure Conductivity or TDS without any temperature compensation.

2.7 Switching the Meter On

- 1 Press ON/OFF key to power up your meter. All LCD segments display momentarily as the meter performs a self-diagnostic test, per shown in section 2.2. The LCD switches into Conductivity or TDS measurement mode.
- 2 Press MODE key to choose your desired mode of measurement with its corresponding annunciator displays in the LCD. For temperature mode, the measured reading can be 25.0°C (factory default) or the last calibrated temperature value if there is no temperature probe, or the current measured value if a temperature probe is connected .
- 3 The LCD displays 'Ur' if the meter reading exceeds the maximum or 'Or' if under minimum possible measurement range (refer to section on Specifications).

Ur

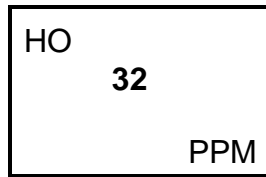
Or

2.8 Setting the Conductivity-to-TDS Conversion Factor (Micro 500 TDS Meter Only)

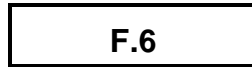
Electronic TDS measurement is based on a practical correlation between conductivity and TDS. The Micro 500 TDS meter is set to a default conversion factor of 0.67. This should give good results for most applications including natural and treated waters. You can adjust the factor for specific applications, nutrient solutions or chemical mixtures using the following procedure :

For sodium chloride (salt solutions) a factor of 0.55 is appropriate. Note that the meter allows a factor adjustment of 0.5 to 0.85.

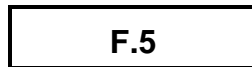
- 1 Turn meter on and press HOLD key. The 'HO' annunciator appears on the upper left corner of the LCD and the reading freezes.



- 2 Press CAL key and the LCD will display 'F.67' indicating the current factor.



- 3 Adjust the TDS factor using A (up) or V (down) key.



- 4 Press ENTER key to confirm and the meter reverts to its measurement mode.

3 CALIBRATION

3.1 Conductivity/TDS Calibration

The meter is capable of being calibrated independently on each measurement range. However for most purposes it is sufficient simply to calibrate the instrument against a single standard. If a range is not calibrated, the meter automatically detects the closest calibrated range and uses this calibration information. Palintest Standard Conductivity and TDS solutions are available as accessories for checking the instruments (see Section 8 Accessories) .

All new calibration values will automatically override existing data. Meters cannot accept calibration values less than 40 $\mu\text{S}/\text{cm}$ or 20 ppm.

If you are measuring solutions of low conductivity or TDS, or taking measurements at extreme temperatures, then weekly calibration is recommended. If you are measuring in mid-range and, washing the probe after use and storing it dry, then monthly calibration is sufficient.

Ensure that you use fresh Standard Conductivity or TDS solutions during calibration. Do not reuse standard solutions as it may be contaminated and affect the calibration and accuracy of measurements. Store solutions in a dry, cool environment if possible.

Always rinse the probe with either tap water or rinse solution before and after each calibration/sample measurement to avoid cross-contamination. For details please refer to section on Probe care and maintenance.

- 1 Pour a known standard solution e.g. 12.88 mS into a clean container. Power on the meter, and the meter will automatically enter Conductivity measurement mode.
- 2 Immerse the electrode sufficiently into one of the containers of your standard solution. Stir gently and wait for reading to stabilize (approx 30 seconds). Tap the electrode lightly on the bottom of the container to remove any air bubbles trapped.
- 3 Press **CAL** key to enter calibration mode. The LCD shows 'CA' momentarily, and display shows the factory calibrated value flashing.

CA

139 uS

- 4 Press ▲ (up) / ▼ (down) key to scroll the reading until the displayed value matches your standard solution i.e. 1413 $\mu\text{S}/\text{cm}$.
- 5 Press **ENTER** key to confirm calibration, and the LCD displays the new set reading and revert to measurement mode.

141 uS

- 6 Alternatively you can abort the new calibrated value by pressing **CAL** key to exit from calibration mode.

Important: The meter allows an adjustment tolerance of 30% of its measured reading. You will not be able to adjust reading to a value outside of this tolerance.

3.2 Temperature Calibration

3.2.1 With Temperature Probe (for Preselected Curve)

The temperature sensor included with your meter is factory-calibrated. Over time, the temperature calibration may drift and require recalibration. If you replace the probe you should calibrate temperature probe prior to Conductivity or TDS calibration.

- 1 Connect your temperature probe to the meter. Press **MODE** key to enter Temperature mode until '°C' annunciator appears in the LCD.
- 2 Compare the displayed value to a certified thermometer (such as NPL or NIST)

or other thermometer known to be accurate. For best accuracy, place probe and thermometer in a constant temperature bath.

- 3 Press **CAL** key to enter temperature calibration mode. The LCD shows 'CA' momentarily and the displayed reading flashes.



- 4 Press ▲ (up) / ▼ (down) key until the displays shows the correct temperature. The INC key will scroll to the maximum allowable value and then loop back to the minimum allowable value adjustment (maximum adjustment is + 5°C from factory default).
- 5 Press ENTER key to confirm calibration. The LCD displays 'CO' momentarily, and the meter reverts to measurement mode.

3.2.2 With Temperature Probe (with Curve Selection)

In the event the temperature probe has drifted too far from its original characteristic - due to age and use or if the probe is being replaced, it may be a good idea to match the probe to the best curve. There are 3 curves programmed in the unit. To choose the curve, proceed as follows :

- 1 Connect your temperature probe to the meter. Press **MODE** key to enter Temperature mode until '°C' annunciator appears in the LCD.
- 2 Compare the displayed value to a certified thermometer (such as NPL or NIST) or other thermometer known to be accurate. For best accuracy, place probe and thermometer in a constant temperature bath.
- 3 Press **CAL** key to enter temperature calibration mode. The LCD shows 'CA' momentarily and the displayed reading flashes.
- 4 Press **MODE** key once. Note the reading. This is with respect to the curve 1.
- 5 Press ▲ (up) key once. The display will change to a different value which is with respect to curve 2. Note the reading. Press ▲ (up) key again, the reading now will be with respect to curve 3. Choose the curve which gives its reading closest to the actual value.

- 6 Press **ENTER** key and the display blinks once. The curve selection has now been made. To match the value exactly with the standard value, press ▲ (up) / ▼ (down) key, the display can be set to the exact value. Press **ENTER** to confirm.

3.2.3 Without Temperature Probe (no ATC)

If no temperature probe is used, the meter compensates for Conductivity or TDS response based on the factory default value of 25°C or a new temperature value manually set by you as follows :

- 1 Press **MODE** key to enter into Temperature mode until °C' shows in the LCD.
- 2 Compare displayed value to a certified thermometer (such as NPL or NIST) or other thermometer known to be accurate. For best accuracy, place probe and thermometer in a constant temperature bath.
- 3 Press **CAL** key to enter temperature calibration mode. The LCD shows 'CA' momentarily and the displayed reading flashes. Note that this displayed value should either be 25.0°C or last set temperature value.

CA

25.0 C

- 4 Press ▲ (up) / ▼ (down) key until the displays shows the correct temperature. The **INC** key will scroll to the maximum allowable value and then loop back to the minimum allowable value adjustment (maximum adjustment is + 5°C from factory default).
- 5 Press **ENTER** key to confirm calibration. The LCD displays 'CO' momentarily, and the meter reverts to measurement mode.

CO

25.0 C

4 MEASUREMENT

4.1 Taking Measurements

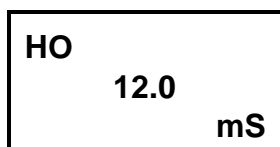
- 1 To begin measurement, rinse probe thoroughly with deionized water to remove any impurities.
- 2 Power on meter and the meter will automatically go into Conductivity/TDS

measurement mode. Press **MODE** key to select your desired mode of operation between Conductivity/TDS and Temperature.

- 3 Dip probe sufficiently, with the tip of probe completely immersed, into sample. Stir and tap it gently to remove any air bubbles trapped. Wait for the reading to stabilise. Note reading.

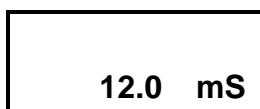
4.2 Holding a Reading

To freeze or hold your reading, press **HOLD** key once. The LCD displays 'HO' annunciator to indicate the HOLD function is activated.



4.3 Releasing a Held Reading

Press **HOLD** key again to deactivate the HOLD function or to release your frozen reading. The meter returns to measurement mode, and the 'HO' annunciator disappears from the LCD.



5 PROBE CARE AND MAINTENANCE

Keep your Conductivity probe clean. Do not strike the probe against any hard surface, and never scratch the stainless steel pins with hard material.

Wash the probe thoroughly with tap or deionised water after each use.

Do not immerse the probe in oily solutions. To remove oil films or oxidation, clean electrode with alcohol.

Clean it with a mild detergent solution. Blot it dry. Wash thoroughly in tap water and then in deionised water. Recalibrate the meter after cleaning it.

6 TROUBLESHOOTING

Problem	Cause	Solution
Power On but No Display	a) Batteries not in place.	a) Insert batteries. b) Re-insert batteries in correct polarity.
Unstable Reading	a) Dirty electrode. b) Broken electrode.	a) Clean electrode and recalibrate. b) Replace electrode.
E2	a) Erroneous calibration.	a) Recalibrate the instrument.
E3	a) Failed initialization.	a) Turn off meter and turn it on. Return if necessary.
Not Able to Calibrate	a) Display freezes. b) Faulty electrode	a) Release reading by pressing HOLD key. b) Replace electrode.

7 SPECIFICATIONS

Micro 500		Conductivity Meter	TDS Meter
Conductivity Range	0 to 199.9 μ S; 0 to 1999 μ S; 0 to 19.99 mS		
Resolution	0.1, 1 μ S; 0.01 mS		
Accuracy	\pm 2% full scale		
TDS Range	0 to 99.9, 0 to 999 ppm; 0 to 9.99 ppt		
Resolution	0.1, 1 ppm; 0.01 ppt		
Accuracy	\pm 2% full scale		
TDS Factor	0.50 to 0.85 (user-selectable - 0.67 default)		
Number of Calibration Points	1 to 3 points (1 per range)		
Temperature Range	0.0 to 100.0 C		
Resolution/ Accuracy	0.1 C; \pm 0.5 C		
Temperature Coefficient	2%/ C		
Temperature Compensation	Automatic or Manual (from 0 to 80 C)		

Note

1 mS = 1000 μ S

1 ppt = 1000 ppm (mg/l)

Features			
Auto Ranging	Yes		
Hold Function	'HO'		
Auto-Shut Off	After 15 minutes		
Low Battery Indication	'LO'		
Error Message Display	Yes		
Display	Single Custom LCD		
Operating Temperature	0 to 50 C		
Power Requirements	4 x 'AAA' alkaline batteries		
Battery Life	> 100 hours		
Meter Dimensions	14 x 7 x 3.5 cm		
Meter Weight	200g		

8 ACCESSORIES

REPLACEMENT PROBES			
PT 142/1	Conductivity/TDS Probe with ATC Sensor		
STANDARD SOLUTIONS FOR CONDUCTIVITY/TDS		Conductivity	TDS
PT 142/2	High Range	12.88 mS	8.63 ppt (8630 ppm)
PT 142/3	Mid Range	1412 μ S	946 ppm
PT 142/4	Low Range	74 μ S	50 ppm