



USER MANUAL



**GOOD
DESIGN
AWARD®
WINNER**

V1.0 2023

CONTENTS

- 1 OUT OF THE BOX
- 2 TAKING MEASUREMENTS
- 3 HANDHELD SETTINGS
 - ABOUT
 - DATE TIME
 - POWER
 - DISPLAY
 - LOGGING
- 4 PH
 - SETTINGS
 - CALIBRATION
- 5 ORP
 - SETTINGS
 - CALIBRATION
- 6 EC
 - SETTINGS
 - CALIBRATION
- 7 DO
 - SETTINGS
 - CALIBRATION
- 8 ACCESSORIES / SPARE PARTS LISTING
- 9 SPECIFICATIONS
- 10 WARRANTY



Out of the box

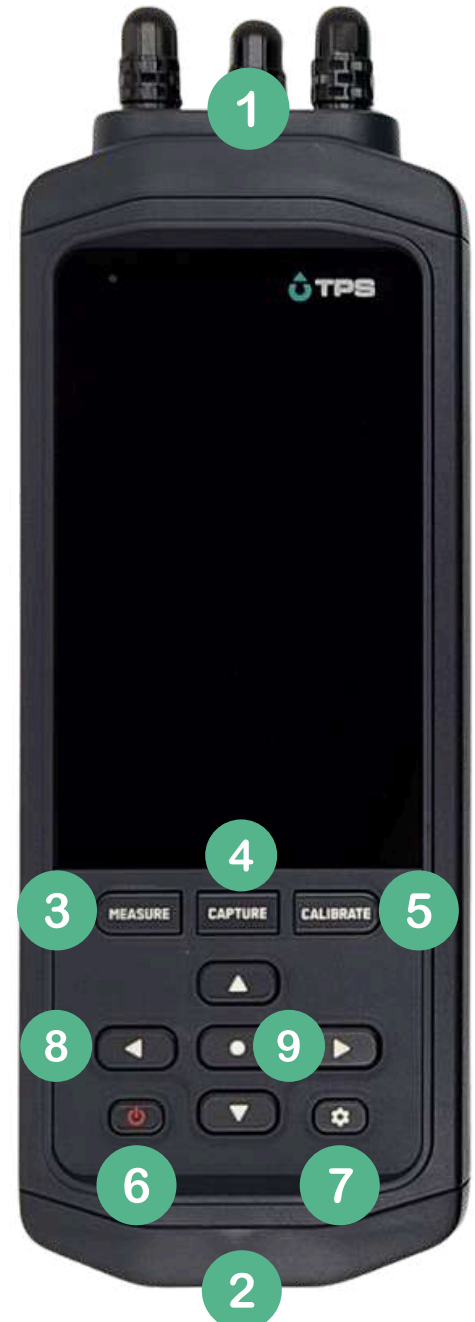
- 1 Sensor ports - Push/Pull connectors. IP67 waterproof.
Keep protector caps on when ports are not in use to reduce fouling from debris
- 2 Charge / Data port - Magnetic connector. IP67 waterproof.
- 3 MEASURE - Shows Measurement screen
- 4 CAPTURE - Short press Captures measurements at that point in time. Long press for data logging.
- 5 CALIBRATE - Enters Calibration mode
- 6 Power - Long press (3 seconds) on/off
- 7 Settings
- 8 Navigation
- 9 Selection
- 10 Wall plug
- 11 Charge/Data Cable
- 12 Power Adapter

Extras

Sensor
Sensor cable



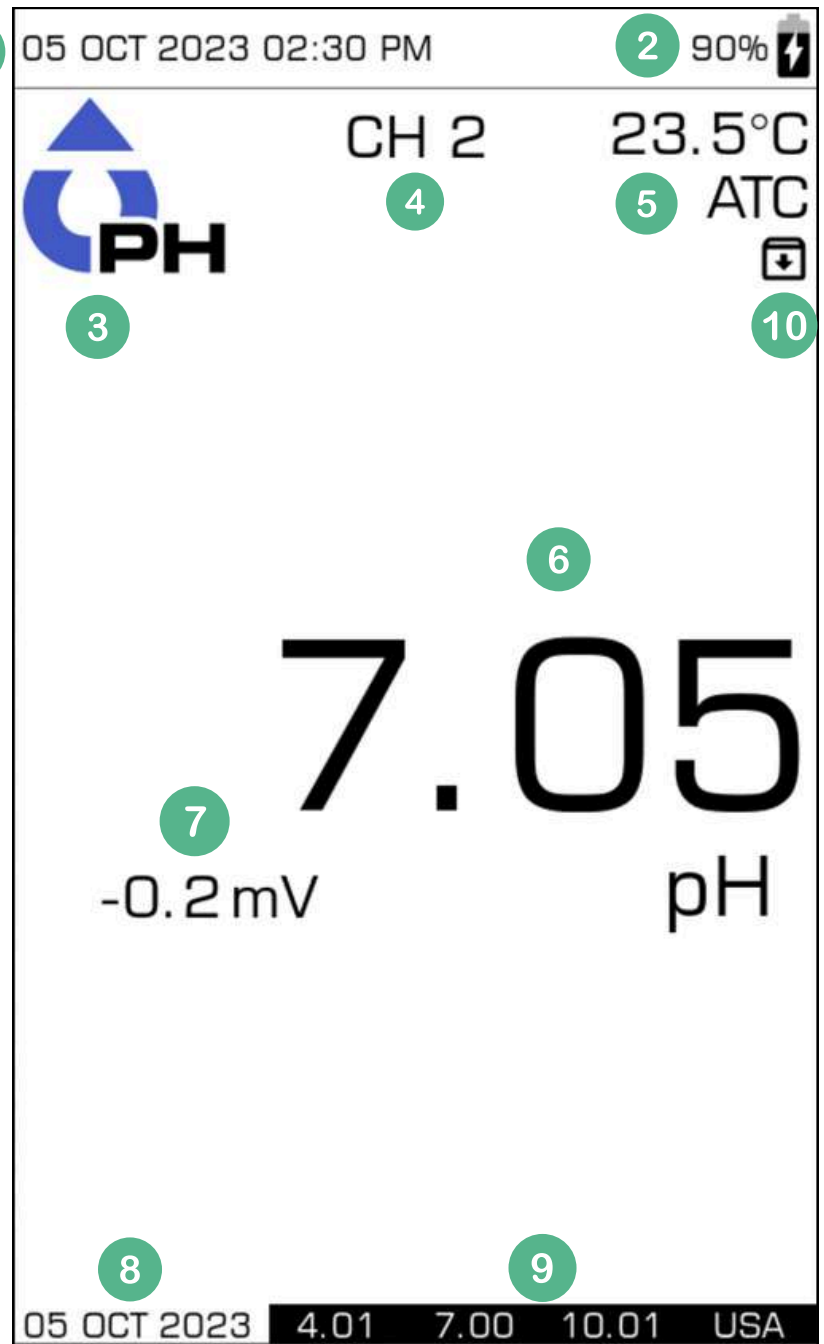
Sensor ports



Charge/Data port

Measurement screen

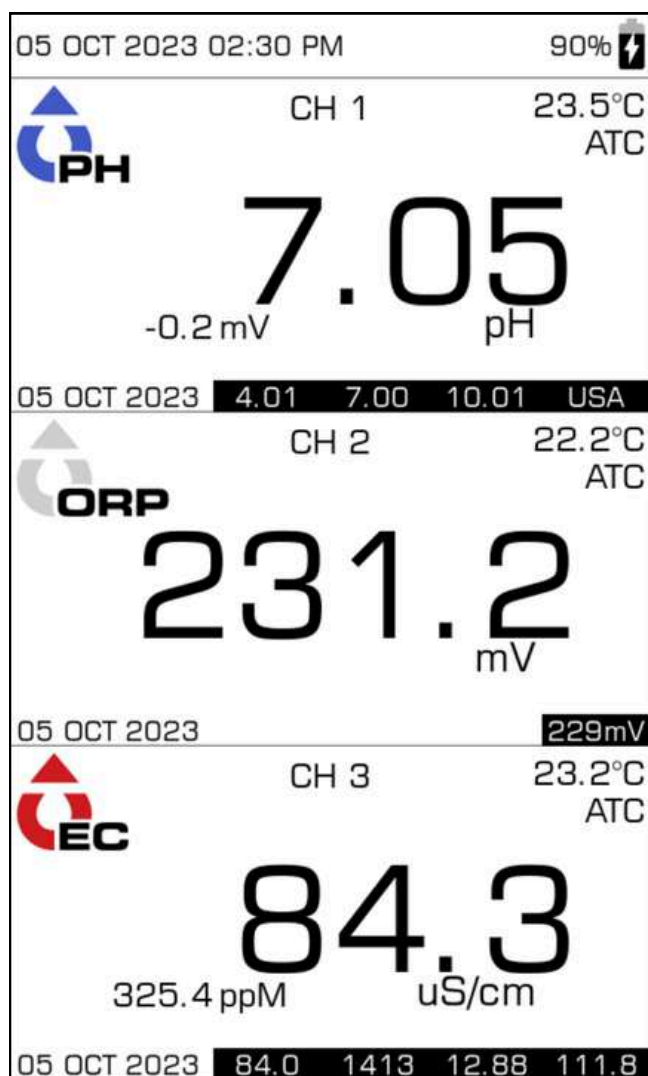
- 1 Current date/time
- 2 Battery indicator
- 3 Symbol of parameter connected
- 4 Channel
- 5 Temperature reading for the sensor and Automatic (ATC) or Manual (MTC) Compensation
- 6 Primary reading
- 7 Secondary reading (if selected)
- 8 Most recent calibration date/time
- 9 Most recent calibration buffers/standards used
- 10 Data logging icon (if active)



Taking measurements

To take measurements on the TPS Ranger, connect the cable to the sensor and handheld. The Ranger will auto-detect, initialise the sensor, and display the sensor values. As you connect more or less sensors the screen will adjust to fit. The sensors are shown on the screen in order of the port number they were connected to. Remove the protective cover from the sensor and add the sensor to the sample to measure.

Note: TPS recommends sensors be calibrated before use.



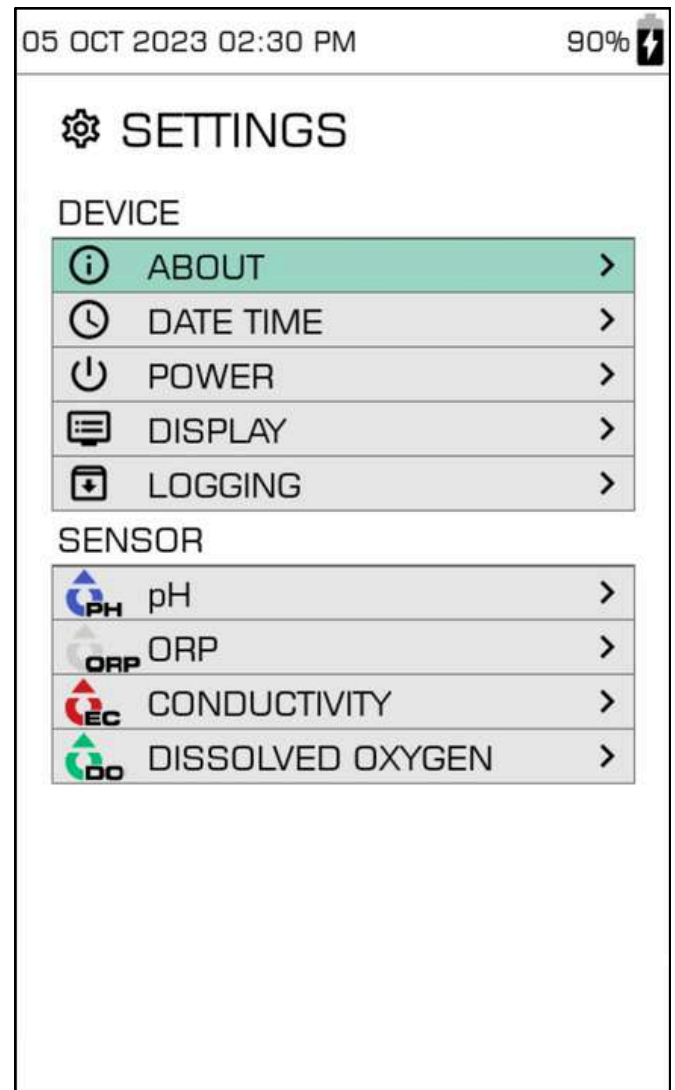
05 OCT 2023 02:30 PM

90% 

PLEASE
CONNECT
SENSOR

Ranger settings

Press the settings button to go to the settings screen. This screen shows all the options for the Ranger device and sensors.



ABOUT

Displays information about the Ranger

- MODEL NAME
- MODEL NUMBER
- SERIAL NUMBER
- HW VERSION - Hardware version
- FW VERSION - Firmware version
- FW Update - This option is for updating the Ranger firmware. See instructions at the end of the manual.
- FACTORY RESET- This option will reset the Ranger to factory settings and shutdown. Calibration is saved to the sensors. Factory reset will not reset sensor calibration.
- REGULATORY INFORMATION

05 OCT 2023 02:30 PM 90% 

ⓘ ABOUT

< SETTINGS

MODEL NAME	RANGER
MODEL NUMBER	WP-103
SERIAL NUMBER	
HW VERSION	000.000.001
FW VERSION	000.001.008
FW UPDATE	>
FACTORY RESET	>
FILE EXPORT	>

05 OCT 2023 02:30 PM 90% 

🕒 DATE TIME

< SETTINGS

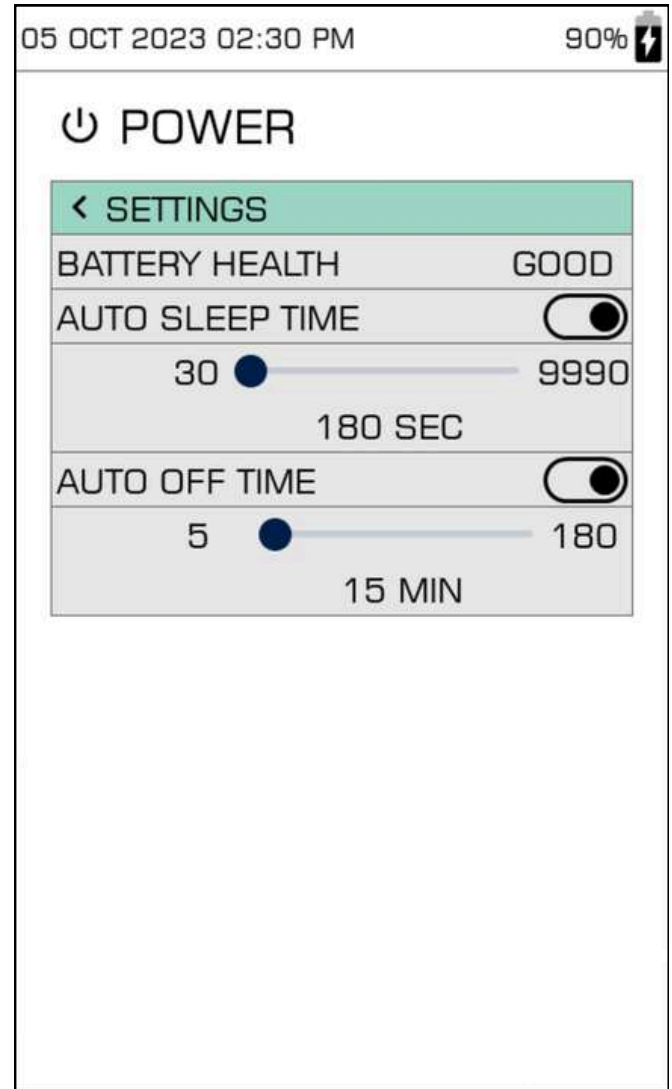
DATE	05 OCT 2023	<
	< 05 >	
	< OCT >	
	< 2023 >	
TIME	02:30 PM	<
	< 02 >	
	< 30 >	
	AM	☐
	PM	☒
DATE FORMAT	DDMMYYYY	☒
	MMDDYYYY	☐
TIME FORMAT	12HR	☒
	24HR	☐

DATE TIME

- DATE - Change the date
- TIME - Change the time
- DATE FORMAT - Choose between DDMMYYYY and MMDDYYYY
- TIME FORMAT - Choose between 12hr and 24hr

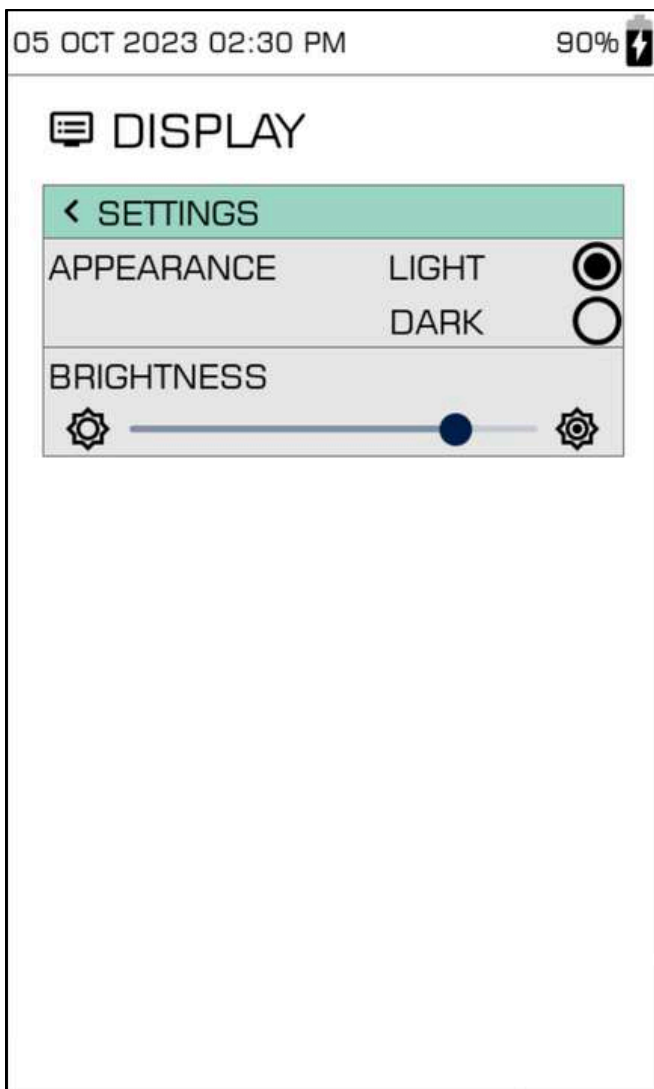
Power

- BATTERY HEALTH - Describes the condition of the battery
- AUTO SLEEP TIME - On/Off. Adjust between 30 seconds - 9990 seconds. Sets the amount of time until the screen automatically enters sleep mode to save battery. Default 180 seconds
- AUTO OFF TIME - On/Off Adjust between 5 mins - 180 mins. Sets the time for the Ranger to automatically power down. Default 15 minutes.



Display

- APPEARANCE - Choose between LIGHT/DARK
- BRIGHTNESS - Adjust the brightness of the screen



LOGGING

- **DISK SIZE** - Shows how much space is available
- **FILE EXPORT** - This option is for downloading captured measurement data to a computer. See instructions at the end of the manual.
- **TOTAL POINTS** - Total data points saved
- **LOGGING ACTIVE** - Select on/off
- **INTERVAL** - Select between minutes and seconds. Adjust the value between 1 and 60
- **END AFTER** - Choose between INDEFINITE (Keep logging until memory is full) and # of SAMPLES (Number of samples)
- **DURATION** - Choose the range (x1 x10 and x100) and set the value. The Ranger will automatically calculate the total time.

Notes

When logging is active an icon will appear on the measurement screen.

The Ranger will also display the logging status in the logging menu.

Aside from these settings, logging will stop if

- Memory is full
- Unit shuts down
- Cable is unplugged
- User enters calibration mode

05 OCT 2023 02:30 PM

90% 

 LOGGING

< SETTINGS

DISK SIZE50% used

FILE EXPORT>

TOTAL POINTS228

LOGGING ACTIVE

INTERVAL15< SECONDS>

160

END AFTERINDEFINITE

of SAMPLES

DURATION< x1 >

1100

100

25 MIN



pH settings

PRIMARY UNITS - Select the primary unit of measurement

SECONDARY UNITS - Enable/disable the display of secondary units on the measurement screen. The ranger will default to the opposite of the primary units.

RESOLUTION - Set the number of displayed decimal points. Affects pH units only. Does not affect accuracy.

TEMPERATURE - Set the type of temperature compensation. ATC (Automatic) compensates based on the sensor built-in temperature sensor. MTC (Manual) compensates based on user-defined temperature. Choose between 0°C - 100°C

BUFFER SET - Select the buffer set that you will be using for calibration.

USA	NIST	NIST10
1.68	1.68	1.68
4.01	4.01	4.01
7.00	6.86	6.86
10.01	9.18	10.01
12.45	12.45	12.45

STABILITY

STABILITY THRSH - The speed at which the stability function operates

- SLOW = Less than 0.005 pH change per 10 seconds
- MEDIUM = Less than 0.015 pH change per 10 seconds
- FAST = Less 0.05 pH change per 10 seconds
- OFF - No stability function

05 OCT 2023 02:30 PM 90%

< SETTINGS

PRIMARY UNITS	pH	☒
	mV	☐
SECONDARY UNITS		☒
RESOLUTION	0.1	☐
	0.01	☒
TEMPERATURE	ATC	☒
	MTC	☐
BUFFER SET	USA	☒
	NIST	☐
	NIST10	☐
STABILITY		>

05 OCT 2023 02:30 PM 90%

< pH

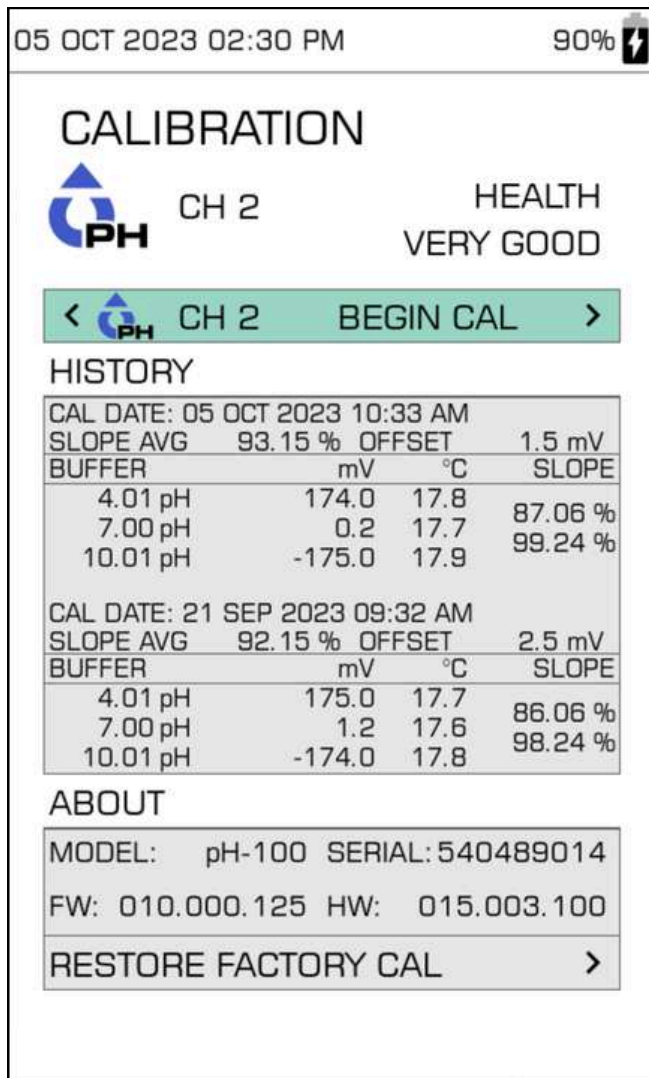
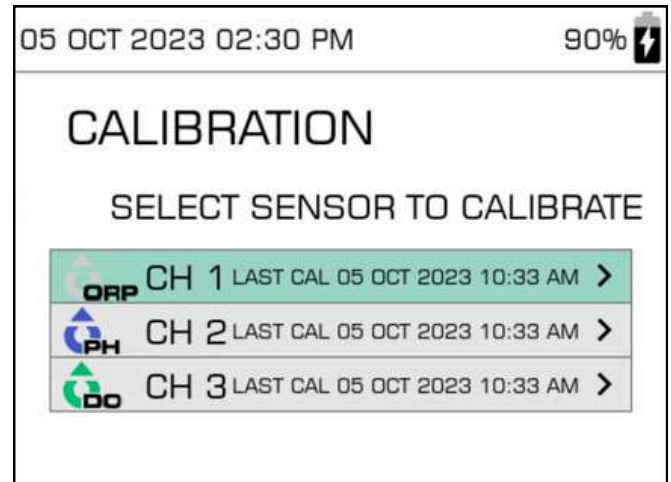
STABILITY THRSH	SLOW	☐
	MEDIUM	☒
	FAST	☐
	OFF	☐

Calibration

Press CALIBRATE to enter calibration mode. The sensor selection screen displays sensors that are currently connected. Select the sensor you wish to calibrate.

The pre calibration screen shows

- Sensor parameter
- Sensor health status
- Option to begin calibration
- Calibration history
- Information about the sensor
- Option to restore factory calibration. This restores the sensor to its original non-calibrated state.



1. Select BEGIN CAL. Ensure you have the same buffer set and primary buffer displayed on the screen. If not, change the buffer set or change the pH settings on the Ranger to match the buffers you have.
2. Rinse the sensor with DI water and blot dry, being careful not to touch the glass tip.
3. Place in a fresh sample of the primary buffer you are using. First buffer must be pH 7 or pH 6.86.
4. Wait until the reading has stabilised and select CAPTURE FIRST POINT.
5. Rinse the sensor with DI water.
6. At this point, you can choose to APPLY 1-POINT CAL, CANCEL or continue on with a 2-point calibration. For the 2-point calibration place the sensor in the second buffer. The Ranger will auto-detect and begin stabilising. Once stabilised select CAPTURE SECOND POINT
7. Rinse the sensor with DI water.
8. At this point you can choose to APPLY 2-POINT CAL, CANCEL or continue on with a 3rd point calibration. For the 3rd point calibration place the sensor in the tertiary buffer. The Ranger will auto detect and begin stabilising. Once stabilised select CAPTURE THIRD POINT. The Ranger will then ask you to APPLY the calibration or CANCEL. Rinse the sensor with DI water.

When the calibration process is complete you can review the record from the calibration menu.

Auto-detection of buffers/standards means that if the sensor is faulty the calibration will not proceed.



ORP settings

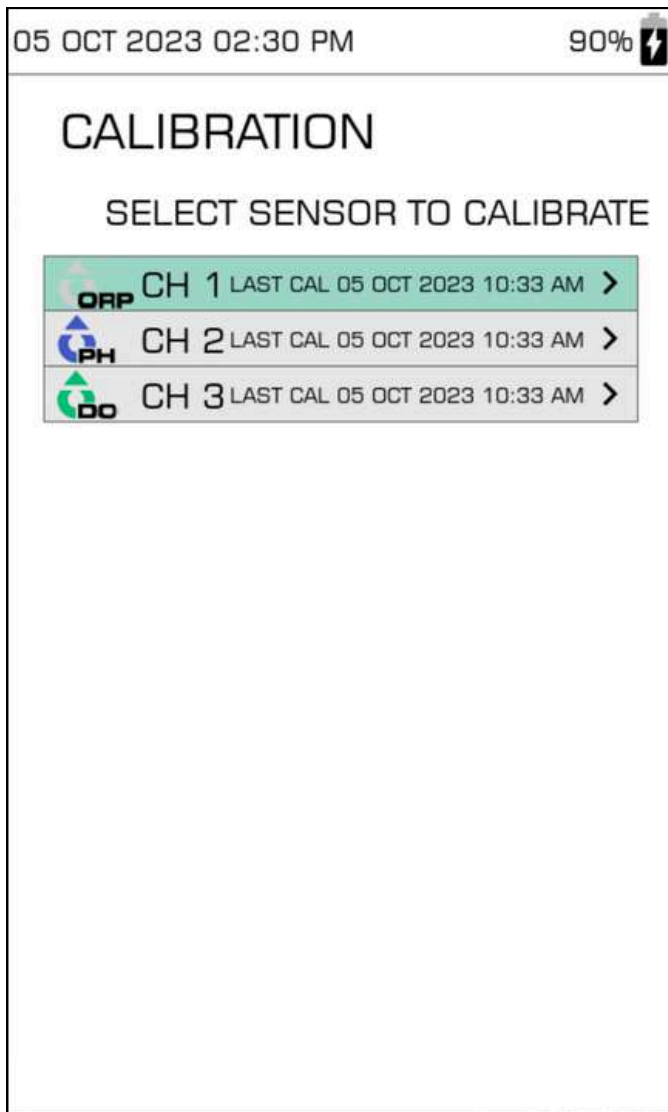
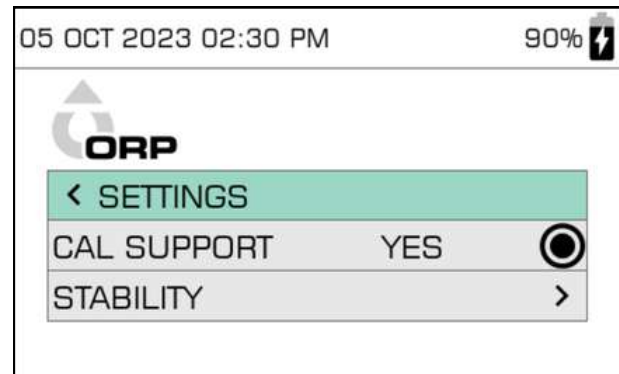
CAL SUPPORT

- ORP Calibration is supported

STABILITY

STABILITY THRSH - The speed at which the stability function operates

- SLOW = Less than 0.5 mV change per 10 seconds
- MEDIUM = Less than 1 mV change per 10 seconds
- FAST = Less than 3 mV change per 10 seconds
- OFF - No stability function



Calibration

Press CALIBRATE to enter calibration mode. The sensor selection screen displays sensors that are currently connected. Select the sensor you wish to calibrate.



The pre calibration screen shows

- Sensor parameter
- Sensor health status
- Option to begin calibration
- Calibration history
- Information about the sensor
- Option to restore factory calibration. This restores the sensor to its original non-calibrated state.

1. Select BEGIN CAL. Ensure you have Zobell 229mV @ 25°C to calibrate with.
2. Rinse the sensor with DI water and blot dry.
3. Place in a fresh sample of the buffer. Wait until the reading has stabilised and select CAPTURE. The Ranger will then ask you to APPLY the calibration or CANCEL.

When the calibration process is complete you can review the record from the calibration menu.

05 OCT 2023 02:30 PM

90% 



CH 1

HEALTH
EXCELLENT

<  CH 1

BEGIN CAL

>

HISTORY

CAL DATE: 05 OCT 2023 10:33 AM		
STANDARD	OFFSET	°C
229 mV	1.2 mV	17.7

CAL DATE: 21 SEP 2023 09:32 AM		
STANDARD	OFFSET	°C
229 mV	1.3 mV	17.6

ABOUT

MODEL: ORP-100	SERIAL: 540489014
FW: 020.000.118	HW: 015.003.100

RESTORE FACTORY CAL >



EC settings

EC - See below

TDS - See below

Salinity - See below

PRIMARY UNITS - Select the primary unit of measurement

SECONDARY UNITS - Enable/disable the display of secondary units on the measurement screen. The Ranger will default to the opposite of the primary units.

STABILITY

STABILITY THRSH - The speed at which the stability function operates

- SLOW = Less than 0.1% change of max value in current range per 10 seconds
- MEDIUM = Less than 1% change of max value in current range per 10 seconds
- FAST = Less than 10% change of max value in current range per 10 seconds
- OFF - No stability function

05 OCT 2023 02:30 PM 90%

< SETTINGS

EC	>
TDS	>
SALINITY	>
PRIMARY UNITS	EC ☒ TDS ☐ SAL ☐ RES ☐
SECONDARY UNITS	☒
STABILITY	>

05 OCT 2023 02:30 PM 90%

< EC

EC UNITS	S/cm ☒ S/m ☐
RANGING	AUTO ☒ mS ☐ uS ☐
TEMPERATURE	ATC ☒ MTC ☐
TEMP COMP	☒
0% 4% 2.00%	
TEMP REFERENCE	☒
15°C 30°C 25°C	

EC

EC UNITS - Choose between S/cm and S/m. Default S/cm

RANGING - Choose between Auto or lock to mS/cm (millisiemens) or uS/cm (microsiemens). Default Auto

TEMPERATURE - Set the type of temperature compensation. ATC (Automatic) compensates based on the sensor built-in temperature sensor. MTC (Manual) compensates based on user defined temperature. Choose between 0°C - 100°C Default Auto

TEMP COMP - Enable/Disable. Set between 0.00% and 4.00% Temperature correction based on known coefficient. Increases the EC reading by the set % per degree of temperature. Default 2.00%

TEMP REFERENCE - Enable/Disable. Set at 15°C, 20°C, 25°C or 30°C Changes the reference temperature at which the EC reading is calculated. Default 25°C.



SALINITY

SALINITY UNITS - Choose between PPT (Parts Per Thousand) and %. Default PPT

SAL TYPE - Default seawater

05 OCT 2023 02:30 PM 90% 



< EC

SAL UNITS	PPT	☒
	%	☐

TDS

TDS UNITS - Choose between ppM (Parts Per Million) and mg/L (Milligrams per Litre)

TDS CURVE - Linear Indicates the method used to calculate TDS

TDS CONSTANT - Set between 0.00 and 0.99. Coefficient used for determining the TDS reading. Default 0.50

05 OCT 2023 02:30 PM 90% 



< EC

TDS UNITS	ppM	☒
	mg/L	☐
TDS CURVE	LINEAR	☒

TDS CONSTANT

0.00

0.99

0.50

Calibration

Press CALIBRATE to enter calibration mode. The sensor selection screen displays sensors that are currently connected. Select the sensor you wish to calibrate.

The pre-calibration screen shows

- Sensor parameter
- Sensor health status Option to begin calibration
- Calibration history
- Information about the sensor
- Option to restore factory calibration. This restores the sensor to its original non-calibrated state.

1. Select BEGIN CAL. Rinse the sensor with DI water and blot dry.
2. Starting with the lowest standard you have, place the sensor in the first sample, and the Ranger will auto-detect.
3. Confirm it is the correct standard and wait for it to stabilise.
4. When stabilised, press CAPTURE FIRST POINT. You then have the option to apply the 1-point calibration or go on to complete a 2, 3 or 4-point calibration.

When the calibration process is complete you can review the record from the calibration menu.

Note the compatible EC standards are 84 $\mu\text{S}/\text{cm}$, 1413 $\mu\text{S}/\text{cm}$, 12.88 mS/cm , and 111.8 mS/cm

05 OCT 2023 02:30 PM

90%

CALIBRATION

CH 3

HEALTH
EXCELLENT

< CH 3 BEGIN CAL >

HISTORY

CAL DATE: 05 OCT 2023 10:33 AM		
STANDARD	K CM-1	°C
84.0 μS	0.410	17.8
1413 μS	0.420	17.9
12.88 mS	0.430	18.9
111.8 mS	0.440	19.0

CAL DATE: 21 SEP 2023 09:32 AM		
STANDARD	K CM-1	°C
84.0 μS	0.400	17.7
1413 μS	0.410	17.8
12.88 mS	0.420	18.8
111.8 mS	0.430	18.9

ABOUT

PN:	EC-100	SN:	540489014
FW:	030.003.075	HW:	030.003.100

RESTORE FACTORY CAL >



DO settings

PRIMARY UNITS - Select the primary unit of measurement

SECONDARY UNITS - Enable/disable the display of secondary units on the measurement screen.

SALINITY COMP - Choose manual/off. Set between 0.1 PPT and 55 PPT Default 35.0. Coefficient used for determining the Oxygen reading in salt water.

STABILITY

STABILITY THRS - The speed at which the stability function operates

- SLOW = Less than 0.05 mg/L change per 10 seconds
- MEDIUM = Less than 0.1 mg/L change per 10 seconds
- FAST = Less than 0.2 mg/L change per 10 seconds
- OFF - No stability function

05 OCT 2023 02:30 PM

90% 



< SETTINGS

PRIMARY UNITS

mg/L

☒

%

☐

SECONDARY UNITS

☒

SALINITY COMP

MANUAL

☐

OFF

☒

STABILITY

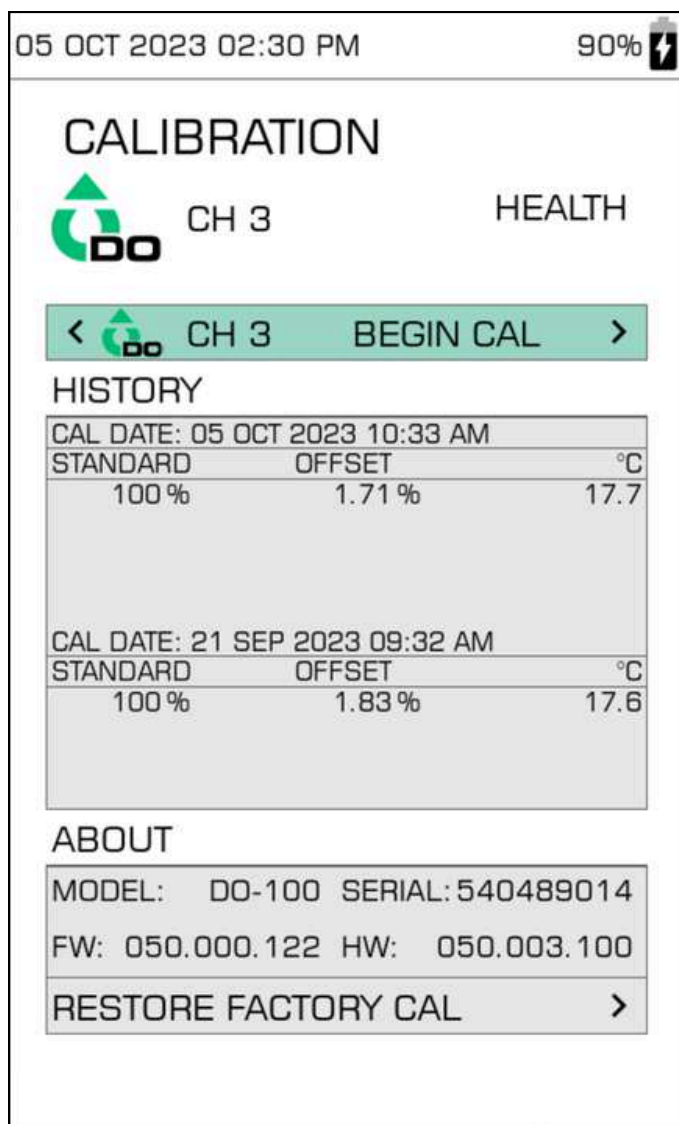
>



Calibration

Press **CALIBRATE** to enter calibration mode. The sensor selection screen displays sensors that are currently connected. Select the sensor you wish to calibrate. The pre calibration screen shows

- Sensor parameter
- Sensor health status Option to begin calibration
- Calibration history
- Information about the sensor
- Option to restore factory calibration. This restores the sensor to its original non-calibrated state.



1. Select BEGIN CAL. Rinse the sensor with DI water. You can place the sensor in either air saturated water or water saturated air
2. Wait until the reading has stabilised and select CAPTURE. The Ranger will then ask you to APPLY the calibration or CANCEL. Rinse the sensor with DI water.

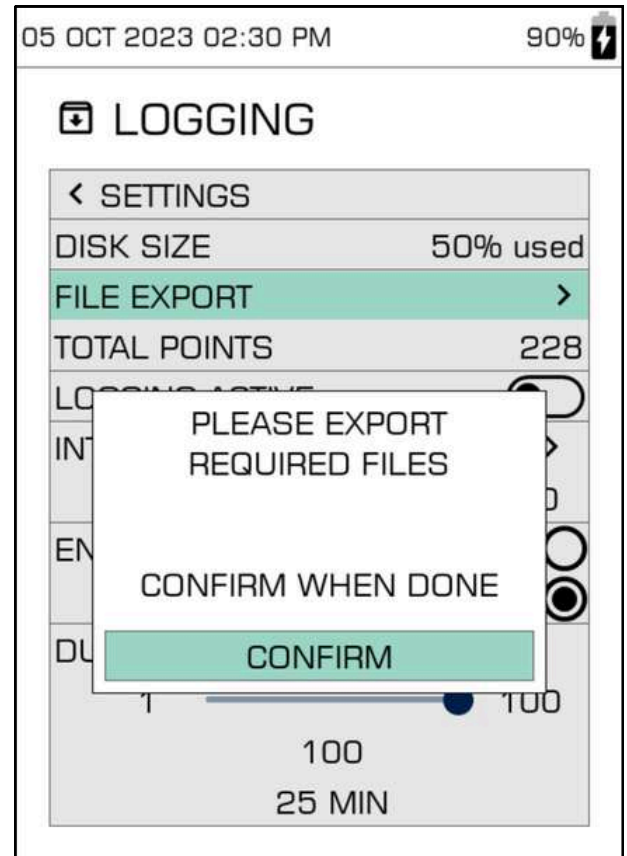
When the calibration process is complete you can review the record from the calibration menu.

Data / Updates

FILE EXPORT

This option is for downloading captured measurement data to a computer.

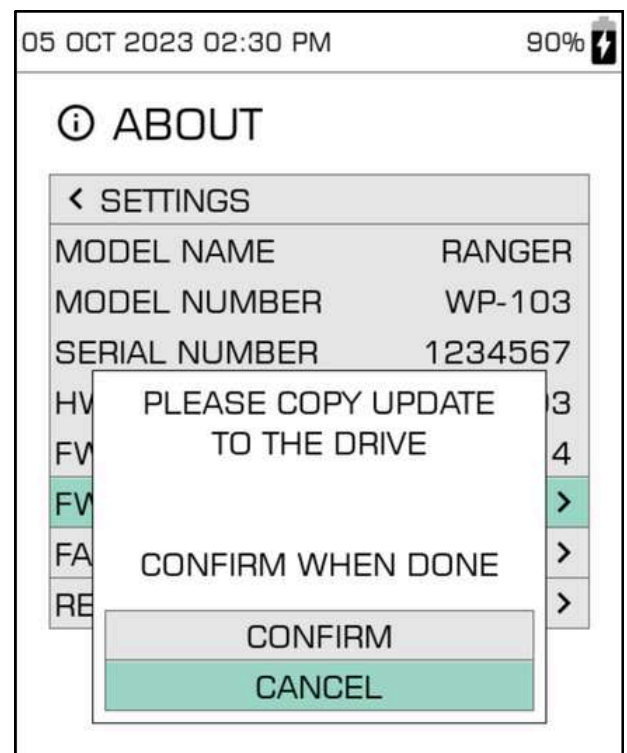
1. Connect the Ranger to the computer via the charge/data USB-C cable.
2. From the Logging settings select FILE EXPORT. The Ranger will now make itself available on the computer as a drive.
3. Copy off the files you want to keep. Any files no longer needed can be manually deleted from the drive.
4. Select Confirm. The Ranger will then disconnect from the computer ready for more measurements.



FW UPDATE

This option is for updating the Ranger firmware.

1. Download an updated firmware file from tps.com.au onto a computer.
2. Connect the Ranger to the computer via the charge/data USB-C cable and keep it connected for the entire process.
3. From the ABOUT screen select FW UPDATE, the Ranger will now make itself available on the computer as a drive.
4. Copy the updated firmware file onto the Ranger drive. Select Confirm.
5. The Ranger will then proceed to update the firmware and shutdown. Once completed, power on and the new firmware will be installed.



Accessories / spare parts listing

Each TPS Ranger comes with a charge/data cable and wall plug included.

Part	Product Code
Ranger Handheld	WP-103
pH Sensor	pH-100
ORP Sensor	ORP-100
EC Sensor	EC-100
DO Sensor	DO-100
1m Sensor Cable	CBL-SNS101
3m Sensor Cable	CBL-SNS103
5m Sensor Cable	CBL-SNS105
10m Sensor Cable	CBL-SNS110
Rugged Sleeve	ACC-SLV-100
Carry case	ACC-CSE-100
Charge/Data Cable	CBL-USB101
Power Adapter	ACC-USB102
Snap caps (3 pack)	ACC-SNP-100

Care and Maintenance

Each TPS Ranger comes with a charge/data cable and wall plug included.

Part	Product Code
Ranger Handheld	WP-103
pH Sensor	pH-100
ORP Sensor	ORP-100
EC Sensor	EC-100
DO Sensor	DO-100
1m Sensor Cable	CBL-SNS101
3m Sensor Cable	CBL-SNS103
5m Sensor Cable	CBL-SNS105
10m Sensor Cable	CBL-SNS110
Rugged Sleeve	ACC-SLV-100
Carry case	ACC-CSE-100
Charge/Data Cable	CBL-USB101
Power Adapter	ACC-USB102
Snap caps (3 pack)	ACC-SNP-100

Specifications

RANGER

Channels	3x Universal Isolated Sensor Channels
Connectors	Light Weight Aluminium PushPull Connectors
Charging & Data Transfer	Magnetic USB-C Cable
Display	High Resolution, Sunlight Readable 4.0" , 480x800, 233ppi, with Gorilla Glass
Keypad	Mechanical Switches rated to 500,000 key presses
Battery	Built In Fast Charge Lithium Battery. 20%-80% in 2 Hrs Recharge
Battery Life	Approximately 1 week of average use
Data Logging	Up To 10,000 Data Records CSV Format
GLP Features	Date, Time, Calibration, Sensor Identification, Handheld Identification
Body Material	Polycarbonate (Main Body), Silicone (Protective Sleeve)
Operating Temperature Range	0 - 50 °C (Operating), 0 - 40 °C (Charging)
Weight	Approx - 490 grams (Without Protective Sleeve) Approx - 590 grams (With Protective Sleeve)
Size	225mm (L), 85mm (W), 40mm (H) (Without Protective Sleeve) 228mm (L), 91mm (W), 45mm (H) (With Protective Sleeve)
Ingress Protection	IP67



pH Range	0 - 14 pH
pH Resolution	0.01 pH
pH Accuracy	±0.01 pH
pH Response Time	< 30 seconds to 95% of full response
pH Sensor Type	Double Junction w/ceramic & pellaon, Ag/AgCl, Gel - Bulb Tip
Calibration Buffer Sets	USA, NIST, NIST10, Auto Buffer Recognition
Temperature Sensor	Integrated
Temperature Sensor Resolution	0.1 °C
Temperature Sensor Accuracy	±0.2 °C
Sensor Body Material	Polycarbonate
Sensor Wetted Material	Epoxy
Operating Temperature Range	0 - 80 °C
Weight	93 grams
Size	25mm (Diameter), Length-252mm (L)
Ingress Protection	IP67



DO Range	DO - 0.00 to 50.00 mg/L Saturation - 0.0 to 500.0 %
DO Resolution	0.01 mg/L, 0.1%
DO Accuracy	±0.2 mg/L, ±2 %
DO Response Time	< 90 seconds to 95% of full response
DO Sensor Type	Optical
DO Calibration	1 Point (100%) Auto Buffer Recognition
Temperature Sensor	Integrated
Temperature Sensor Resolution	0.1 °C
Temperature Sensor Accuracy	±0.2 °C
Sensor Body Material	Polycarbonate
Sensor Wetted Material	ABS and Stainless
Operating Temperature Range	0 - 50 °C
Weight	89 grams
Size	25mm (Dia), Length-252mm (L)
Ingress Protection	IP67



ORP Range	± 1500 mV
ORP Resolution	1 mV
ORP Accuracy	± 1 mV
ORP Response Time	< 30 seconds to 95% of full response
ORP Sensor Type	Platinum Disc, DJ w/ceramic & pellaon, Ag/AgCl, Gel
Temperature Sensor	Integrated
Temperature Sensor Resolution	0.1 °C
Temperature Sensor Accuracy	±0.2 °C
Sensor Body Material	Poly carbonate
Sensor Wetted Material	Epoxy
Operating Temperature Range	0 - 80 °C
Weight	94 grams
Size	25mm (Dia), Length-252mm (L)
Ingress Protection	IP67



EC Range	0 - 200 mS/cm
TDS Range	0 - 100 g/L (100ppt)
Salinity Range	0.00 to 80.00 ppt 0.000 to 8.000 %
Resolution	Auto Ranging Up to 4 Significant Digits
Accuracy	±0.5% < 200mS/cm
EC Sensor Type	4 Cell Graphite K 0.42
Calibration Points	Up to 4 Points Auto Detection
Temperature Sensor	Integrated
Temperature Sensor Resolution	0.1 °C
Temperature Sensor Accuracy	±0.2 °C
Sensor Body Material	Polycarbonate
Sensor Wetted Material	Epoxy and Stainless
Operating Temperature Range	0 - 80 °C
Weight	82 grams
Size	25mm (Dia), Length-252mm (L)
Ingress Protection	IP67

Service information

TPS recommends the Ranger be serviced at the factory on a yearly basis for verification and temperature calibration. The service form can be found at tps.com.au

Part	Recommended factory service interval
Ranger Handheld	12 months
pH Sensor	12 months
ORP Sensor	12 months
EC Sensor	12 months
DO Sensor	12 months

Warranty

The Ranger and sensors are covered by a 12 month warranty. Contact us for more information.



LinkedIn:



Facebook:



Instagram:



Website: tps.com.au
 Ph: +61 7 3205 8027
 Address: Unit 1, 8 Bult Drive, Brendale QLD 4500 Australia

