

Conductivity Analysis Workflow

General Operating Procedure Recommendations

Expedite your SOP development by leveraging these general operating procedure recommendations for equipment setup, conductivity calibration, and conductivity measurements. In this technical note, a 2-electrode conductivity/temperature probe with a cell constant of $K=1.0$ is employed for measuring samples in the $20 \mu\text{S}/\text{cm}$ to $20 \text{mS}/\text{cm}$ conductivity range.

Recommended Equipment

- Fisherbrand™ accumet™ AB330 conductivity meter
- Fisherbrand accumet conductivity/ATC $K=1.0$ epoxy-body 2-electrode cell (Cat. No. 13-620-100)
- Conductivity standard, typically $84 \mu\text{S}$, $1413 \mu\text{S}$, 12.88mS or 111.8mS ; whichever is closest to the expected sample measurement range
- Deionized water
- 50 mL beakers

Conductivity Probe Setup

1. Remove any protective shipping materials from the conductivity probe.
2. Rinse the conductivity probe with deionized water to remove any contaminants.
























Meter Preparation

- Connect the assembled power adapter to the meter and wall outlet.
- Connect the conductivity probe to the meter.
- Select the appropriate meter settings in the meter Setup Menu:
 - In the Measure Mode, press the **Menu** key to access the meter Setup Menu.
 - The first Setup Menu item (View Logs, Data Log) will appear. To scroll through the Setup Menu list, use the ◀ and ▶ keys.
 - Press the ▶ key to scroll to the next item.
 - Press the ◀ key to scroll to the previous item.
 - The list is cyclical, so continue to press the ▶ key to scroll from the last item to the first item again.
 - To change a setting within a Setup Menu item, press the ▲ or ▼ key.

For numeric value changes:

 - Press the ▲ key once to increase the value by one least significant digit/unit.
 - Press the ▼ key once to decrease the value by one least significant digit/unit.
 - Press and hold the ▲ key to quickly increase the value.
 - Press and hold the ▼ key to quickly decrease the value.
- Once a setting is changed, press the **Enter** key to save the change.
- When viewing data logs or calibration logs, press the **Menu** key to go back to the main Setup Menu list.
- Press the **Read** key at any time to exit the Setup Menu and return to the main measure mode.

Setup Menu	Description	Default Screen/Setting
View Logs	View up to 500 data log points and active conductivity, salinity, TDS and temperature calibrations.	
Log Export Type	Set the log export type as computer or printer. If computer is selected, the logs are exported in CSV format. If printer is selected, the logs are exported in list format.	
Export All Logs	Send all saved data logs and calibration logs to the selected export device.	
Temp. Calibration or Manual Temp. Input	When an ATC probe is connected, use the Temperature Calibration menu to perform a one-point temperature offset calibration, up to ±5.0°C.	
	When no ATC probe is connected, use the Manual Temperature Input menu to enter the sample temperature value, from -5.0°C to 105.0°C.	
Measure Mode	Set the main measure mode to conductivity, salinity or TDS.	
Nominal Cell Constant	Set the nominal value for the cell constant (K) of the conductivity probe being used.	
Temperature Compensation Coefficient	Set temperature compensation to off or enter the value of the linear coefficient value for temperature compensation to apply a constant percent correction factor to every degree change in temperature.	
Reference Temperature	Set the reference temperature for temperature compensation to 15°C, 20°C, 25°C, or 30°C.	
TDS Factor	Enter the TDS factor value used to calculate the TDS (total dissolved solids) value shown in the main measure mode.	
Read Type	Set the Read Type as Continuous, Auto-Read, or Timed to define how measurements are performed and when measurements are saved and exported.	

Setup Menu	Description	Default Screen/ Setting
Timed Interval	When Timed is set as the Read Type, set the time interval from 5 seconds to 60 minutes. This time interval is used to automatically save and export measurements.	
Calibration Due Alarm	Set the calibration due alarm interval from 0 hours (off) to 60 hours. An alarm is triggered if a calibration is not performed within the specified time interval.	
Temperature Units	Set the temperature units as °C (Celsius) or °F (Fahrenheit).	
Set Date Format	Set the date format as month-day-year (MM.DD.YYYY) or day-month-year (DD.MM.YYYY).	
Set Date Value	Set the month, day, and year values. The date format used for this Setup Menu item will match the setting in the Set Date Format item.	
Set Time Value	Set the time in AM/PM format.	
Audio Mode	Set the audible beep to on or off. The audible beep is used each time an alarm is triggered.	
Sleep Mode	Set the sleep mode to on or off. When the meter sleep mode is on, the meter will enter sleep mode when no keys are pressed for 20 minutes. Once the meter is in sleep mode, press the Power key to resume using the meter.	
Clear Data	Erase all data logs or calibration logs.	
Factory Reset	Erase all data logs, calibration, logs, and settings and return the meter to its factory default state.	

Calibration Preparation

For best results, periodic calibration with known, accurate, and fresh conductivity standards is recommended. Always use fresh conductivity standards. Select a conductivity standard or standards that are closest to the expected sample conductivity value or values. Thoroughly rinse the conductivity electrode before calibration and between standards with deionized water.

When the conductivity calibration is the only calibration performed, it will be applied to all measurement modes. When a TDS calibration is performed, it will only be applied to TDS measurements. When a salinity calibration is performed, it will only be applied to salinity measurements.

During the conductivity calibration, the meter will automatically recognize conductivity standard values of 84 μS , 1413 μS , 12.88 mS, and 111.8 mS (values at 25°C). The Temperature Compensation Coefficient setting in the Setup Menu will determine how the conductivity calibration standards are displayed during the calibration:

- If temperature compensation is set to Off: Once the calibration reading is stable, the meter will display the conductivity standard value at its measured temperature (conductance)
- If temperature compensation is set to On: Once the calibration reading is stable, the meter will display the temperature compensated conductivity standard value based on the Reference Temperature selected in the Setup Menu (15, 20, 25, or 30°C)

If the conductivity reading does not correspond with an automatically recognized conductivity standard value (within $\pm 40\%$ window), once the conductivity reading is stable, the meter will display the theoretical value

of the conductivity standard according to the Nominal Cell Constant value entered in the Setup Menu. Manually enter the conductivity standard value at the measured temperature (conductance).

A maximum of one calibration point per range can be performed for the conductivity calibration.








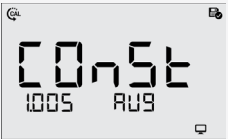



Automatic Calibration Value Reference Temperature					
	Conductivity Range	15°C	20°C	25°C	30°C
r 1	0.00 to 20.00 μS	none	none	none	none
r 2	20.01 to 300.0 μS	68.00 μS	76.00 μS	84.00 μS	92.00 μS
r 3	300.1 to 9999 μS	1147 μS	1278 μS	1413 μS	1548 μS
r 4	1.000 to 99.99 mS	10.48 mS	11.67 mS	12.88 mS	14.12 mS
r 5	100.0 to 200.0 mS	92.5 mS	102.1 mS	111.8 mS	121.8 mS

After performing a one-point conductivity calibration, the meter will apply the resulting calibration factor across all conductivity ranges. After performing a two-, three-, four-, or five-point conductivity calibration, the meter will apply the resulting calibration factor of each conductivity standard to its applicable conductivity range and apply the most relevant calibration factor to any conductivity ranges for which a standard was not used during calibration.

1. Add about 30 mL of each conductivity standard to 50 mL beakers and label each beaker.

Calibration Procedure

The following is an example of a two-point conductivity calibration using auto-recognized 84 μS and 1413 μS conductivity standards.

<p>1. Press the Cal key to start the conductivity calibration. The nominal cell constant value is shown.</p>		<p>6. Wait for the conductivity value to stabilize.</p>	
<p>2. Rinse the conductivity probe and place into the 84 μS conductivity standard.</p>		<p>7. Once the reading is stable, press the Enter key.</p>	
<p>3. Wait for the conductivity value to stabilize.</p>		<p>8. Press the Cal key to save and end the calibration. The Cal key can be pressed when either the SAVED or 3rdPt screen is shown.</p>	
<p>4. Once the reading is stable, press the Enter key.</p>		<p>9. The average calibration factor value is shown.</p>	
<p>5. Rinse the conductivity probe and place into the 1413 μS conductivity standard.</p>	 	<p>10. The meter proceeds to the main measure mode.</p>	

Sample Preparation

1. Add about 30 mL of the sample to a 50 mL beaker and label the beaker.
2. Repeat step 1 for additional samples.

Sample Measurement Procedure

1. Once the calibration is complete, prepare the samples to be measured.
2. Rinse the conductivity probe and place into the first sample solution.
3. Wait for the conductivity value to stabilize. While the reading is stabilizing, the stopwatch icon is shown and the reading flashes. When the reading is stable, the checkmark icon is shown, and the reading is solid.
4. Once the reading is stable, record the sample conductivity and temperature values.
5. Remove the conductivity probe from the sample.
6. Repeat steps 2 through 5 for all samples.
7. When all samples have been measured, store the equipment. Between samples and overnight, store the conductivity probe dry.

Ordering Information

Description	Cat. No.
accumet AB330 Conductivity Bench Meter with Electrode Stand, Universal 110-240V Power Supply	13-636-AB330
accumet AB330 Conductivity Bench Meter Kit with Conductivity/ATC K=1.0 Epoxy-Body 2-Cell Electrode, Electrode Stand, Universal 110-240V Power Supply	13-636-AB330A
accumet Conductivity/ATC K=1.0 Epoxy-Body 2-Cell Probe	13-620-100

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