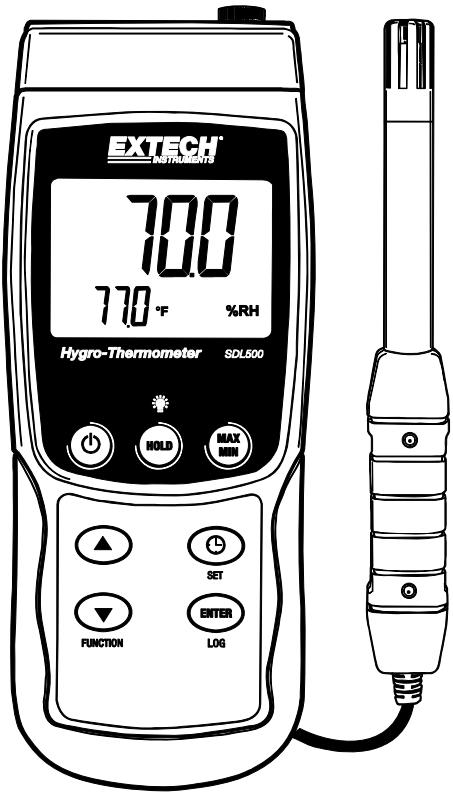
User's Guide

EXTECH®
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Hygro-Thermometer / Datalogger

Model SDL500

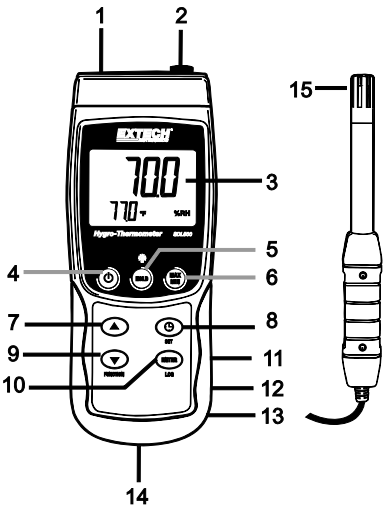


Introduction

Congratulations on your purchase of the Extech SDL500 Hygro-Thermometer, an SD Logger Series meter. This meter displays and stores Temperature and Relative Humidity readings from the supplied probe and Temperature readings from an optional Type J or K Thermocouple probe. WET BULB and DEW POINT temperature calculations can also be displayed. Logged data readings are stored on an SD card for transfer to a PC. This meter is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.

Meter Description

1. Optional Thermocouple Input jack
2. Supplied Relative Humidity / Temperature Probe input jack
3. LCD Display
4. Power ON-OFF ⏻ key
5. HOLD and Backlight 💡 key
6. MAX-MIN key
7. Up arrow ▲ key
8. SET and Clock 🕒 key
9. Down arrow ▼ / FUNCTION key
10. ENTER and LOG key
11. PC interface jack
12. Reset Button
13. Power Adaptor jack
14. SD card slot
15. Temperature and Humidity sensors



Notes: Items 11 – 13 are located behind the snap-off compartment cover on meter's right side.

Battery compartment, tilt stand, and tripod mount are located on the rear of the instrument

Getting Started

Power ON-OFF

- Power the meter by pressing and holding the power button ⏻ for at least 1.5 seconds.
- Press and hold the power button for at least 1.5 seconds to power OFF the meter.
- This meter is powered by six (6) 1.5VDC 'AA' batteries or by optional AC adaptor. If the meter will not switch ON please check that fresh batteries are installed in the rear battery compartment or, in the case of the AC adaptor, check that the adaptor is connected correctly to the meter and to an AC source.

Connecting the Supplied Relative Humidity/Temperature Probe

The supplied RH/Temperature Probe uses a keyed DIN-style plug to connect to the meter.

- Connect the supplied probe to the top right of the meter in the DIN jack labeled 'Probe Input'.
- Press and hold the FUNCTION button until the 'RH' display icon appears. Release the button when this 'RH' display icon appears. The RH reading in % are now on the upper, larger LCD digits and Temperature in degrees 'C' or 'F' are now on the lower, smaller LCD digits.
- Use the Setup Mode to further configure the meter.

Connecting an optional Thermocouple Sensor

The SDL500 accepts an optional Type 'J' or Type 'K' Thermocouple Temperature sensor.

1. Connect a thermocouple to the sub-miniature jack at the top left of the meter labeled 'Thermocouple Temp. Probe'.
2. Press and hold the FUNCTION button until the 'TP' display icon appears. Release the button when this 'TP' display icon appears. The thermocouple reading in degrees 'C' or 'F' is now on the LCD. The thermocouple type ('J' or K') and the unit of measure are also displayed.
3. Use the Setup Mode to further configure the meter.

IMPORTANT SAFETY NOTE: The SDL500 can measure and display temperature up to 1300^{o}C (2372^{o}F), however, thermocouple ratings vary widely; ensure that the thermocouple being used is rated accordingly for the temperature being measured.

If an attempt is made to measure temperatures higher than the thermocouple's rating, damage to the thermocouple and the meter can result. If measurements are made outside the range of a thermocouple personal injury is also possible.

Setup Mode

Basic settings at a glance

To view the current configuration of the date and datalogging sampling rate, press the SET button momentarily. The meter will display the configuration in quick succession. Repeat as necessary to observe all the information.

Accessing the Setup mode

1. Press and hold the SET button for at least 1.5 seconds to access the Setup menu.
2. Press the SET button momentarily to step through the available parameters. The parameter type is shown on the bottom of the LCD and the current selection for that type is shown above it.
3. When a parameter is displayed that is to be changed, use the arrow keys to change the setting. Press the ENTER button to confirm a change.
4. Press and hold the SET button for at least 1.5 seconds to exit the Setup mode. Note that the meter automatically switches out of the Setup mode if no key is pressed within 7 seconds.
5. The available Setup parameters are listed below.

   dAtE Set the clock (Year/Month/Date; Hours/Minutes/Seconds)

   SP-t Set the datalogger sampling rate from 1 to 3600 seconds)

   PoFF Automatic power-off management (Enable or disable the auto-power off function)

   bEEP Set the beeper sound ON/OFF

   dEC Set the numerical format; USA (decimal: 20.00) or European (comma: 20,00)

   SdF Format the SD memory card

   t-CF Select the temperature unit of measure (^{o}C or ^{o}F)

   tYPE Select the thermometer type ('J' or 'K')

Setting the Clock Time

1. Access the **dAtE** parameter.
2. Press the ENTER button.
3. Use the arrow buttons to change the YEAR value. Press ENTER to confirm setting.
4. Repeat step 3 above for the MONTH, DAY, HOUR, MINUTE and SECONDS.
5. Press and hold the SET button for at least 1.5 seconds to exit to the normal operation mode (or wait 7 seconds for the meter to automatically switch to the normal operating mode).
6. The clock will keep accurate time even when the meter is switched off. However, if the batteries expire the clock will have to be reset after fresh batteries are installed.

Setting the Datalogger Sampling Time (Rate)

1. Access the **SP-t** parameter.
2. Use the arrow buttons to select the desired sampling rate. The available settings are: 0, 1, 2, 5, 10, 30, 60, 120, 300, 600, 1800, and 3600 seconds.
3. Press the ENTER button to confirm the entry.
4. Press and hold the SET button for at least 1.5 seconds to exit to the normal operation mode (or simply wait 7 seconds for the meter to automatically switch to the normal operating mode).

Enabling/Disabling the Auto Power OFF Feature

1. Access the **PoFF** parameter.
2. Use the arrow buttons to select ON (enable) or OFF (disable). With the Auto Power OFF feature enabled, the meter will automatically switch OFF after 10 minutes of inactivity.
3. Press ENTER to confirm setting.
4. Press and hold the SET button for at least 1.5 seconds to exit to the normal operation mode (or simply wait 7 seconds for the meter to automatically switch to the normal operating mode).

Set the Beeper Sound ON or OFF

1. Access the **bEEP** parameter.
2. Use the arrow buttons to select ON or OFF. Press ENTER to confirm setting.
3. Press and hold the SET button for at least 1.5 seconds to exit to the normal operation mode (or simply wait 7 seconds for the meter to automatically switch to the normal operating mode).

Numerical Format (comma or decimal)

European and USA numerical formats differ. The meter defaults to USA mode where a decimal point is used to separate units from tenths, i.e. **20.00**; The European format uses a comma, i.e. **20,00** to separate units from tenths. To change this setting:

1. Access the **dEC** parameter.
2. Use the arrow buttons to select USA or EUro. Press ENTER to confirm setting.
3. Press and hold the SET button for at least 1.5 seconds to exit to the normal operation mode (or simply wait 7 seconds for the meter to automatically switch to the normal operating mode).

SD Card FORMATTING

1. Access the **Sd-F** parameter.
2. Use the arrow buttons to select YES to format the card (select NO to abort). Note that all data on the card will be lost if formatting is attempted.
3. Press ENTER to confirm selection.
4. Press ENTER again to re-confirm.
5. The meter will automatically return to the normal operating mode when formatting is complete. If not, press and hold the SET button for at least 1.5 seconds to exit to the normal operation mode.

Set the Temperature Units of Measure (°C or °F)

1. Access the **t-CF** parameter.
2. Use the arrow buttons to select °**C or** °**F**. Press ENTER to confirm setting.
3. Press and hold the SET button for at least 1.5 seconds to exit to the normal operation mode (or simply wait 7 seconds for the meter to automatically switch to the normal operating mode).

Set the Thermometer Type (K, J)

1. Access the **tYPE** parameter.
2. Use the arrow buttons to select the type. Press ENTER to confirm setting.
3. Press and hold the SET button for at least 1.5 seconds to exit to the normal operation mode (or simply wait 7 seconds for the meter to automatically switch to the normal operating mode).

Measurements and related features

Relative Humidity / Temperature Probe Measurements

1. Connect the supplied Relative Humidity/Temperature Probe to the meter as previously described.
2. Press and hold the FUNCTION button until the 'RH' display icon appears and then release the button.
3. The LCD display will now show the RH reading in % on the top of the display and the Temperature reading (measured by the probe NOT the thermocouple) displayed on the bottom in ^{o}C or ^{o}F (use the Setup Mode to change the unit of measure).
4. Dashes are displayed if the supplied Probe is not connected or if the reading is out of range.
5. Note that RH readings require a longer stabilization time to settle than Temperature readings.

Type J/K Thermocouple Measurements

The SDL500 accepts an optional Type 'J' or Type 'K' Thermocouple Temperature sensor.

1. Connect a thermocouple to the sub-miniature jack at the top left of the meter labeled 'Thermocouple Temp. Probe'.
2. Press and hold the FUNCTION button until the 'TP' display icon appears. Release the button when this 'TP' display icon appears. This allows the user to view the thermocouple reading in ^{o}C or ^{o}F. The thermocouple type ('J' or K') is also displayed.
3. Use the Setup Mode to change the unit of measure and thermocouple type and to further configure the meter. Refer to the Setup Mode section below.

   IMPORTANT SAFETY NOTE: The SDL500 can measure and display temperature up to 1300^{o}C (2372^{o}F), however, thermocouple ratings vary widely; ensure that the thermocouple being used is rated accordingly for the temperature being measured.

   If an attempt is made to measure temperatures higher than the thermocouple's rating, damage to the thermocouple and the meter can result. If measurements are attempted outside of the rated measurement range of a thermocouple personal injury is also possible.

Dew Point Temperature Calculation Display

The SDL500 can display the results of a Dew Point calculation based on Relative Humidity and Temperature measurements.

Follow the instructions for the 'Relative Humidity /Temperature Probe Measurements' section above, but release the FUNCTION key when the 'dP' icon appears. The display will now show the Dew Point Temperature.

Wet Bulb Temperature Calculation Display

The SDL500 can display the results of a Wet Bulb calculation based on Relative Humidity and Temperature.

Follow the instructions for the 'Relative Humidity /Temperature Probe Measurements' section above but release the FUNCTION key when the '_Et' display icon appears. The display will now show the Wet Bulb Temperature.

Data Hold

To freeze a measurement on the display, press the HOLD button momentarily. The meter will beep, the reading will hold, and the HOLD icon will switch on. Press the HOLD button again to release the display and exit the Data Hold mode returning the meter to the normal operating mode.

Display Backlight

To turn the display backlight ON or OFF, press and hold the backlight button for at least 1.5 seconds. The meter will beep when switching the backlight ON or OFF unless the beeper is disabled.

MAX-MIN Readings

For a given measurement session, this meter can record the highest (MAX) and the lowest (MIN) readings for later recall.

1. Press the MAX-MIN button momentarily to access this mode of operation (REC icon appears)
2. The meter is now recording the MAX and MIN readings.
3. Press the MAX-MIN button again to view the current MAX readings (MAX icon appears). The readings on the display are now the highest readings encountered since the REC icon was switched on (when the MAX-MIN button was first pressed).
4. Press the MAX-MIN button again to view the current MIN readings (MIN icon appears). The readings on the display are now the lowest readings encountered since the REC icon was switched on (when the MAX-MIN button was first pressed).
5. To exit the MAX-MIN mode, press and hold the MAX-MIN button for at least 1.5 seconds. The meter will beep, the REC-MAX-MIN icons will switch off, the MAX-MIN memory will clear, and the meter will return to the normal operating mode.

Reset Button

If the meter display or keypad locks, press the RESET button located on the meter's right side under the snap-off compartment cover. After pressing the RESET button, power the meter OFF then ON.

Datalogging

Types of Data Recording

- **Manual Datalogging:** Manually log up to 99 readings onto an SD card via push-button press.
- **Automatic Datalogging:** Automatically log data onto an SD memory card where the number of data points is virtually limited only by the card size. Readings are logged at a rate specified by the user.

SD Card Information

- Insert an SD card (from 1G size up to 16G) into the SD card slot at the bottom of the meter. The card must be inserted with the front of the card (label side) facing toward the rear of the meter.
- If the SD card is being used for the first time it is recommended that the card be formatted and the logger's clock set to allow for accurate date/time stamping during datalogging sessions. Refer to the Setup Mode section for SD card formatting and time/date setting instructions.
- European and USA numerical formats differ. The data on the SD card can be formatted for either format. The meter defaults to USA mode where a decimal point is used to separate units from tenths, i.e. **20.00**. The European format uses a comma, i.e. **20,00**. To change this setting, refer to the Setup Mode section.

Manual Datalogging

In the manual mode the user presses the LOG button to manually log a reading onto the SD card.

1. Set the sampling rate to '0' seconds as described in the Setup Mode section.
2. Press and hold the LOG button for at least 1.5 seconds; the lower portion of the display will show p-*n* (*n* = memory position number 1-99).
3. Press the LOG button momentarily to log a reading into memory. The REC icon will flash each time a data point is stored (the SCAN SD icon will appear when the meter accesses the card).
4. Use the ▲ and ▼ buttons to select one of the 99 data memory positions in which to record.
5. To exit the manual datalogging mode, press and hold the LOG button for at least 1.5 seconds.

Automatic Datalogging

In automatic datalogging mode the meter takes and stores a reading at a user-specified sampling rate onto an SD memory card. The meter defaults to a sampling rate of one second. To change the sampling rate, refer to the Setup Mode section (the sampling rate cannot be '0' for automatic datalogging):

1. To begin an automatic Datalog session press and hold the LOG button for at least 1.5 seconds.
2. The meter will scan for an SD card and verify that it can be used to store data. If a card is not inserted or if the card is defective, the meter will display SCAN SD indefinitely. In this case, switch the meter OFF and try again with a valid SD card.
3. If the SD card is valid, the display will show the LOG icon (or the LOG icon alternating with the temperature display) and then the REC icon will flash each time that a reading is stored.
4. To pause the datalogger, press the LOG button momentarily. The REC icon will stop flashing. To resume logging simply press the LOG button again momentarily.
5. To terminate the datalogging session press and hold the LOG button for at least 1.5 seconds.
6. When an SD card is used for the first time a folder is created on the card and named **HTB01**. Up to 99 spreadsheet documents (each with 30,000 readings) can be stored in this folder.
7. When datalogging begins a new spreadsheet document named **HTB01001.xls** is created on the SD card in the HTB01 folder. The data recorded will be placed in the HTB01001.xls document until 30,000 readings are reached.
8. If the measurement session exceeds 30,000 readings, a new document will be created (HTB01002.xls) where another 30,000 readings can be stored. This method continues for up to 99 documents, after which another folder is created (HTB02) where another 99 spreadsheet documents can be stored. This process continues in this same fashion with folders HTB03 through HTB10 (last allowable folder).

SD Data Card to PC Data Transfer

1. Complete a datalogging session as detailed in above in the previous sections. Hint: For the first test, simply record a small amount of test data. This is to ensure that the datalogging process is well understood before committing to critical datalogging.
2. With the meter switched OFF, remove the SD Card.
3. Plug the SD Card directly into a PC SD card reader. If the PC does not have an SD card slot, use an SD card adaptor (available at most outlets where computer accessories are sold).
4. Power the PC and run a spreadsheet software program. Open the saved documents in the spreadsheet software program.

Spreadsheet data example

	A	B	C	D	E	F	G
1	**Position**	**Date**	**Time**	**Value**	**Unit**	**Vaule**	**Unit**
2	1	8/12/2011	18:48:00	50%	RH	30.1	Degrees C
3	2	8/12/2011	18:48:01	50%	RH	30.1	Degrees C
4	3	8/12/2011	18:48:02	50%	RH	30.1	Degrees C
5	4	8/12/2011	18:48:03	50%	RH	30.1	Degrees C
6	5	8/12/2011	18:48:04	50%	RH	30.1	Degrees C
7	6	8/12/2011	18:48:05	50%	RH	30.1	Degrees C
8	7	8/12/2011	18:48:06	50%	RH	30.1	Degrees C
9	8	8/12/2011	18:48:07	50%	RH	30.1	Degrees C
10	9	8/12/2011	18:48:08	50%	RH	30.1	Degrees C
11	10	8/12/2011	18:48:09	50%	RH	30.1	Degrees C
12	11	8/12/2011	18:48:10	50%	RH	30.1	Degrees C
13	12	8/12/2011	18:48:11	50%	RH	30.1	Degrees C
14	13	8/12/2011	18:48:12	50%	RH	30.1	Degrees C
15	14	8/12/2011	18:48:13	50%	RH	30.1	Degrees C
16	15	8/12/2011	18:48:14	50%	RH	30.1	Degrees C

RS-232/USB PC Interface

The optional 407001A software kit (software and cable) allows streaming of data to a PC via the RS232 Output jack.

AC Power Adaptor

This meter is normally powered by six (6) 1.5V ‘AA’ batteries. An optional 9V power adaptor is available. When the adaptor is used, the meter is permanently powered and the power button will be disabled.

Battery Replacement and Disposal

When the low battery icon appears on the LCD, the batteries must be replaced. Several hours of accurate readings are still possible in this condition; however batteries should be replaced as soon as possible:

- Remove the two (2) Phillips screws from the rear of the meter (directly above the top of the tilt stand).
- Remove and safely place the battery compartment and screws where they will not be damaged or lost.
- Replace the six (6) 1.5V 'AA' batteries observing polarity.
- Replace the battery compartment cover with the two (2) Phillips screws.



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 the household garbage is prohibited!

Specifications

General Specifications

Display	Backlit LCD; LCD size: 52 x 38mm (2 x 1.5")
Status indicators	Over-range (----) and low battery
Probes	Supplied Relative Humidity/Temperature Probe
	Optional Thermocouple Probe types: K or J
Measurement Units	°C / °F for Temperature and % for Relative Humidity
Datalogger Sampling Rate	AUTO LOGGING: 1, 2, 5, 10, 30, 60, 120, 300, 600, 1800, 3600 seconds. Note that a one (1) second sampling rate can cause some data loss on slower computers
	MANUAL LOGGING: Set the sampling rate to '0'
Memory Card	SD memory card; 1G to 16GB size
Temperature Compensation	Auto temperature compensation for the supplied probe input and for optional thermocouple probe input
Display update rate	Approx. 1 second.
Data Output	RS-232 / USB PC computer interface; for use with optional software kit part number 407001A
Operating Temperature	0 to 50°C (32 to 122°F)
Operating Humidity	85% R.H. max.
Auto Power OFF	After 10 minutes of inactivity (can be disabled)
Power Supply	Six (6) 1.5 VDC batteries (optional 9V AC adaptor)
Power Consumption	Normal operation (backlight & datalogger OFF): approx. 3.5mA dc
	With backlight OFF and datalogging ON: approx. 28mA dc
	With backlight ON add approx. 12mA dc
Weight	345g (0.76 lbs.) meter only
Dimensions	Main instrument: 182 x 73 x 47.5mm (7.1 x 2.9 x 1.9")

Electrical Specifications (ambient temperature 23°C ± 5°C)

Humidity and Probe Temperature

Humidity	Range	5% to 95% RH
	Resolution	0.1 % RH
	Accuracy	≥70% RH: ±(3% rdg + 1% RH) <70%RH: ±3% RH
Temperature	Range	0 to 50°C (32 to 122°F)
	Resolution	0.1°C/°F
	Accuracy	±0.8°C (1.5°F)

Dew Point Temperature

°C	Range	-25.3 to 48.9°C
	Resolution	0.1°C
°F	Range	-13.5 to 120.1°F
	Resolution	0.1°F

Note: The Dew Point display value is calculated from the humidity and temperature measurements made by the moisture probe

Wet Bulb Temperature

°C	Range	-21.6 to 50.0°C
	Resolution	0.1°C
°F	Range	-6.9 to 122.0°F
	Resolution	0.1°F

Note: The Wet Bulb display value is calculated from the humidity and temperature measurements made by the moisture probe; The Wet Bulb accuracy is the sum of the humidity and temperature measurement accuracies

Thermocouple Temperature

Sensor Type	Resolution	Range	Accuracy
Type K	0.1°C	-50.0 to 1300.0°C	±(0.4 % + 0.5°C)
		-50.1 to -100.0°C	±(0.4 % + 1.0°C)
	0.1°F	-58.0 to 2372.0°F	±(0.4 % + 1.0°F)
		-58.1 to -148.0°F	±(0.4 % + 1.8°F)
Type J	0.1°C	-50.0 to 1200.0°C	±(0.4 % + 0.5°C)
		-50.1 to -100.0°C	±(0.4 % + 1.0°C)
	0.1°F	-58.0 to 2192.0°F	±(0.4 % + 1.0°F)
		-58.1 to -148.0°F	±(0.4 % + 1.8°F)

- The temperature range of the meter extends up to 1300°C (2372°F), however thermocouple sensor ranges vary greatly; be sure to select a thermocouple rated for the expected temperature measurement ranges.
- Accuracy specified for meter only. Thermocouple probes add additional measurement error.
- The above specifications are tested under an environmental RF Field Strength lower than 3 V/M and a frequency lower than 30 MHz

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