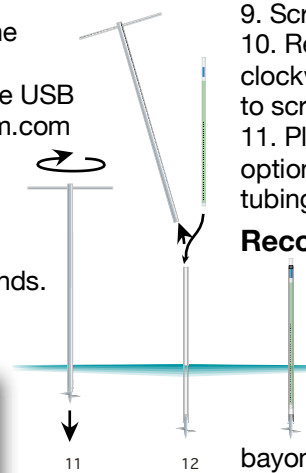
SediMeter™ SM4 Guide

1. Apply insulating **grease** to the under-water connector or blind plug prior to plugging it in to the SediMeter. If plugging it in under water, connect the power last.
2. Install the **driver** for the USB-to-RS485 cable. See lindorm.com/downloads
3. Connect the cable to the computer. The SediMeter battery will start **charging**.
4. Install the SediMeter **software** from the USB memory stick or download it from lindorm.com
5. Use the software to **set up** the SediMeter for deployment (cf. reverse side).
6. Note that while the SediMeter is in a logging mode it will ignore many commands. Set it back to Sleep first.





DEPLOYMENT with screw anchor: SM4

1. Assemble the handle.
2. Screw the anchor onto the holder tube.
3. Grease and cover the connector of the SediMeter.
4. Optionally place a mark, e.g. electric tape, on the handle at the desired insertion depth.
6. Place the handle over the holder tube and attach it to the bayonet of the anchor.
9. Screw it down counter-clockwise.
10. Release the handle from the bayonet with a clockwise turn and pull it straight up taking care not to scratch the plastic.
11. Place the instrument in the holder tube. You may optionally secure it with a hose clamp or rubber tubing.

Recovery

1. Bring the assembled handle to the site.
2. Excavate around the tube to facilitate getting the handle down.
3. Remove the instrument.
4. Place the handle over the tube.
5. Push down while rotating until you feel the bayonet and get it connected.
6. Screw clockwise (!) until the anchor comes free.
7. Back on land, disassemble and rinse with fresh water. Store dry.

DEPLOYMENT with push anchor: SM4P

1. Screw the rubber bushing and brass tip onto the instrument.
2. Grease and cover the connector of the SediMeter.
3. Place the push tube over the instrument.
4. Push and if needed hit the tube with a mallet.
5. Pull the tube straight up taking care not to scratch the plastic.

To recover the instrument simply pull it up, if necessary after excavating around it first.

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COPPER TAPE



By placing copper tape on the reverse side of the holder tube, and around the entire circumference where there are no optical sensors, biofouling can be significantly reduced. The recommended type is 1 inch wide, conducting. The area of OBS #1 to #36 must be kept free, as well as the area shown on the photo to the right, over the turbidimeters.

UVA ANTI-FOULING

The optical window of the turbidimeters on this photo is equipped with UVA LEDs, one on each side of the light barrier. UVA light is damaging to certain organic molecules (including in the human eye), and has been shown to delay fouling under water. Use the cleaning tab in the control window to select the blinking interval in seconds. (The UVA is also used for measuring fluorescence—do not look at the blinking light without glasses on.)

MAINTENANCE

Clean the instrument surface with only non-abrading sponges and water. Minor scratches do not affect the capability to measure the bottom level. Haziness can be polished away using equipment intended for polycarbonate headlights for cars.

BURSTS

The SediMeter can be programmed to take up to 255 measurements in a burst, at an interval from 8 to 0.05 seconds (0.125 to 20 Hz). At rates higher than 1 Hz some sensors are turned off and others are sped up. Note that the ability to measure fast and continuously is duty cycle limited by the battery capacity.

CBM and SediSond™

The accelerometer can be set up to trigger a measurement either by shock (wake-up) or by freefall. This is known as conditions-based monitoring, CBM. The SM4P can be used as a freefall SediSond™ with the appropriate tip mounted.

Specifications

Memory capacity	32,768 measurements
Recommended depth	1 to 50 m
Temperature range	0°C … 50°C

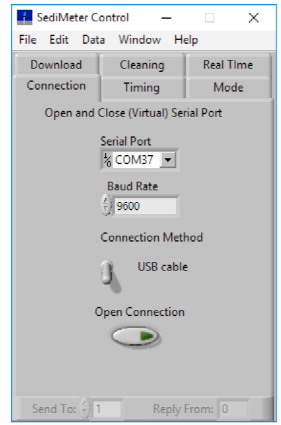
May overheat if left in direct sunshine. Do not bend.

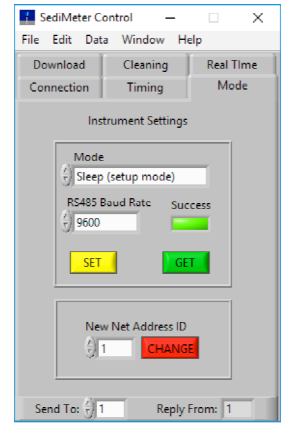
USING THE SOFTWARE

1. Connect the modem cable to the SediMeter and the computer.
2. Start SediMeter.exe ver 6 or higher.
3. Select the COM port of the modem cable in the *Serial Port* selector.
4. The *Baud Rate* is 9600 in the SM4 after a Reset.
5. Click *Open Connection*. If successful the other tabs will become unlocked.
6. Optionally go to the **Menu** Edit -> Advanced -> Reconfigure Accelerometer... and set it up.
7. Go to the **Timing** tab and set *Start Time* and *Interval,* and optionally *Burst Interval* and *Samples*.
8. Go to the **System** tab and set it to the desired mode (not *Sleep*)
9. Disconnect and deploy.

DOWNLOADING DATA

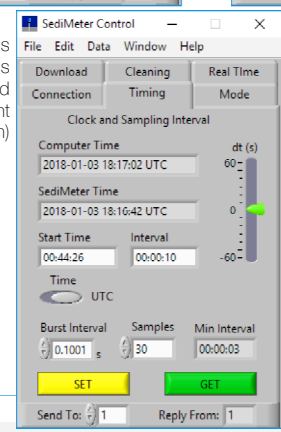
10. Connect as in points 1…5, go to the **Mode** tab and set the unit to *Sleep* mode. The command will fail if it was sent during an ongoing measurement (if the instrument is measuring continuously and you do not want to wait, reset it).
11. Open the **Download** tab.
12. Click the *folder button*. In the dialog that opens, select a file name and location for the file you are about to create.
13. To download only the new records, click *Get New*. To download all records, click *Get All*. To discard the new records without downloading them, click *Discard*.
14. After all the requested data has been downloaded and saved to a file you get a confirmation. Click *OK*. The data remains in memory until you close the application.
15. To clear the SediMeter's memory, click *Erase*. It will take about a minute.
16. Select menu **Data -> Analyze Logged…** to open the SediMeter Data window.
17. Use the help, tip strips, and pop-up menues as needed.

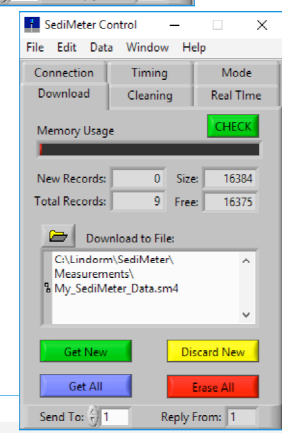


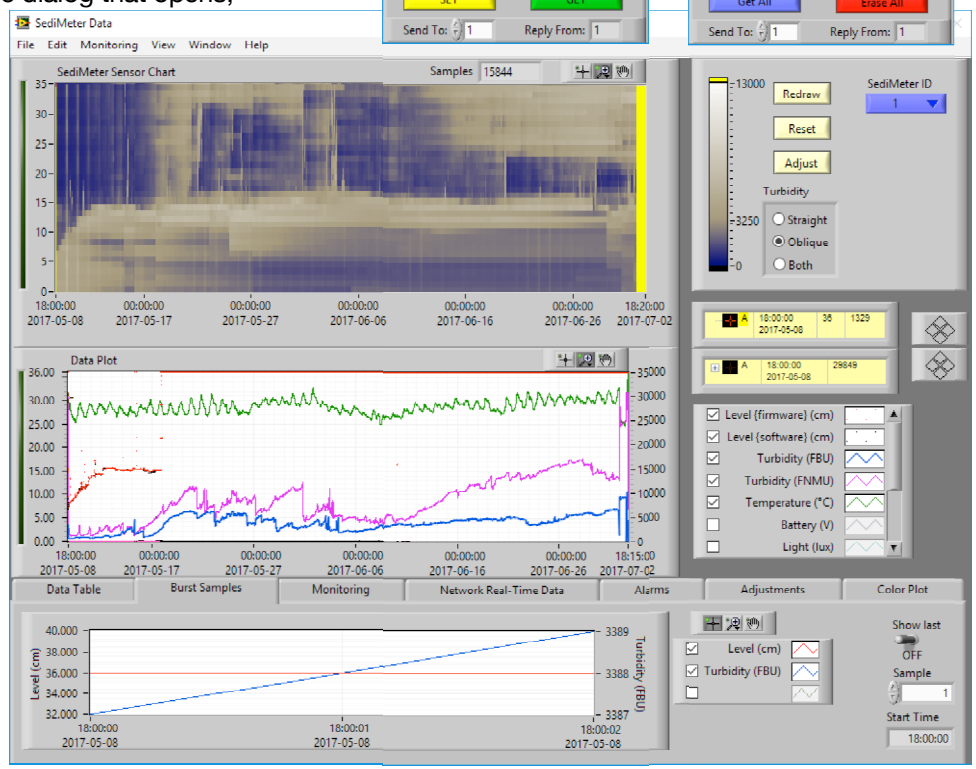




(Illustrations from a previous software and instrument version)







RESET

To reset, approach the supplied magnet to the side of the printed circuit board where the text "RESET CPU" appears on the reverse side. The contents of the memory is not affected by a reset.

BATTERY

The internal lithium battery takes a few hours for a full charge. When the voltage drops too far, the measurements are shut off. During a burst with too high duty cycle the instrument may turn off due to voltage drop. When charging the instrument from a deep discharge it may be necessary to keep the CPU in the reset condition for up to an hour using the magnet until the voltage has risen sufficiently.

ABOUT THE SENSORS

SediMeter

The sensor consists of an array of 36 optical backscatter (OBS) detectors, 1 cm apart. The turbidity is measured at each of these 36 levels, and also in between by measuring oblique reflections (emitted at one level and measured at the adjacent level). In export data the backscatter and oblique data are interleaved. The bottom level is estimated with 0.01 cm resolution based on the backscatter measurements.

Nephelometric Turbidity Meters

The SM4 has an ISO style nephelometric turbidimeter (NIR light), an EPA style nephelometric turbidimeter (white light), and a nephelometric fluorescence meter (emits UVA, measures white light), all mounted at the same location so as to measure the same volume of water. It also measures light in lux, and background NIR light.

Accelerometer

The SM4 3-axis accelerometer is used for estimating tilt and vibration. The raw data is plotted in the Burst Samples tab of the Data window. The accelerometer can be reconfigured by the user. It has two channels that are configured to trigger freefall interrupts and wakeup (shake) interrupts, respectively.

LEGAL DISCLAIMER

No part of the hardware, firmware, or software may be reverse engineered or otherwise investigated or divulged. All rights reserved.

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