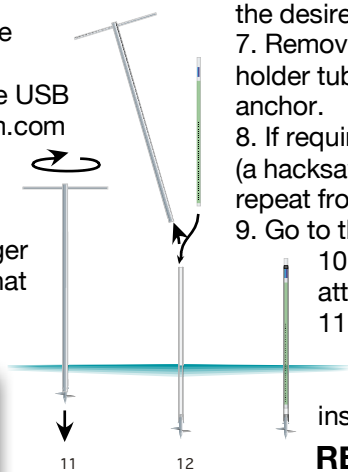
SediMeter™ SM4 manual

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 logger mode it will ignore all those commands that could change its logging parameters or memory contents.





DEPLOYMENT

1. Assemble the handle.
2. Screw the holder tube onto the anchor.
3. Plug the greased blind plug into the SediMeter.
4. Insert the SediMeter into the holder tube.
5. Place handle next to the instrument so that the bayonet lines up.
6. Place a mark, e.g. electric tape, on the handle at the desired insertion depth.
7. Remove instrument, place the handle over the holder tube and attach it to the bayonet of the anchor.
8. If required, shorten the holder tube in the top end (a hacksaw can be used, de-burr with a knife) and repeat from step 4.
9. Go to the deployment site.
10. Place the handle over the holder tube and attach it to the bayonet of the anchor.
11. Screw it down counter-clockwise to the mark you made in step 6.
12. Pull off handle and place the instrument in the holder tube.

RECOVERY

1. Bring the assembled handle to the site.
2. Excavate around the holder tube to facilitate getting the handle down.
3. Remove the instrument.
4. Place the handle over the holder tube.
5. Push down while rotating until you feel the bayonet and get it connected.
6. Screw clockwise (!) until the anchor comes free.
7. After returning to base, disassemble anchor form holder tube, and the parts of the handle.
8. Clean all parts by rinsing with fresh water and let dry before storing.

MAINTENANCE

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

Lindorm, Inc.
10699 NW 123rd Street Road
Medley, FL 33178
USA

Tlf +1-305-888-0762 mail@lindorm.com
WhatsApp +1-305-308-6334 lindorm.com

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.)

VIBRATOR

The vibrator is located in the top end of the instrument, below the battery compartment. When activated, the vibrator shakes the instrument briefly after the measurement. This can be used to dislodge bubbles and particles that may have adhered to the instrument. Use the cleaning tab in the control window to set the vibration interval in number of measurements. Also set the next wiping value to larger than zero.

CONDITIONS-BASED MONITORING (CBM)

The accelerometer is always on during logging, and will trigger an extra measurement within 1 second of detecting acceleration above a set threshold, when vertical. The threshold will increase by a small amount every time. The purpose is to capture the largest magnitude event without running out of memory. The initial threshold is set in calibration.

Physical

Memory capacity	32,768 measurements
Recommended depth	1 to 50 m
Temperature range	0°C … 50°C
Length	80 cm
Mass	280 g

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

USING THE SOFTWARE

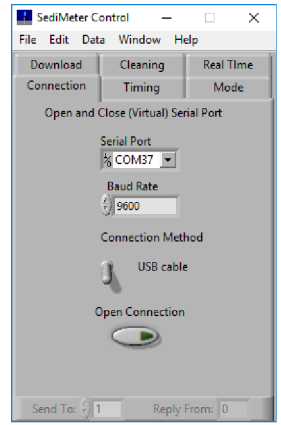
1. Connect the modem cable to the SediMeter and the computer.
2. Start SediMeter.exe ver 4 or higher.
3. Select the COM port of the modem cable in the *Serial Port* selector.
4. The *Baud Rate* is 9600 in the SM4 after a Reset.
5. Click *Open Connection*. If successful the other tabs will become unlocked.

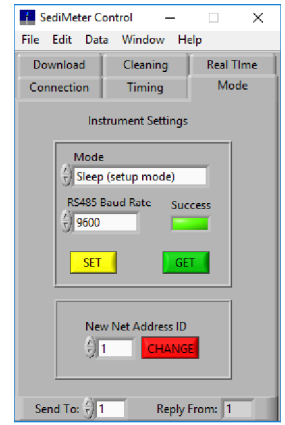
DEPLOYMENT

6. Go to the **Timing** tab and set *Start Time* and *Interval* (*Burst Interval* and *Samples* are predefined).
7. Optionally go to the **Cleaning** tab and set up *UV Blink Interval* and *Vibrator Settings*.
8. Go to the **Mode** tab and set it to *Logger* mode.
9. It is now ready for deployment.

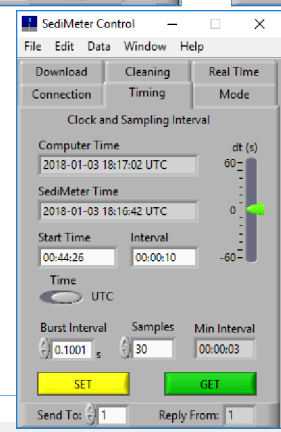
DOWNLOADING DATA

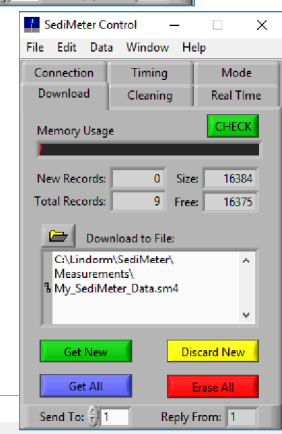
10. Connect as in points 1…5, go to the **Mode** tab and set the unit to *Sleep* mode. The command will fail if it by chance was sent during an ongoing measurement (tip: try just after the white blink).
11. Open the **Download** tab.
12. Click the *CHECK* button. The number of measurements in memory is shown.
13. Click the *folder button*. In the dialog that opens, select a file name and location for the file you are about to create.
14. 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*.
15. 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.
16. To clear the SediMeter's memory, click *Erase*. It will take about a minute.
17. Select menu **Data -> Analyze Logged…** to open the SediMeter Data window.
18. Use the help, tip strips, and pop-up menues as needed.

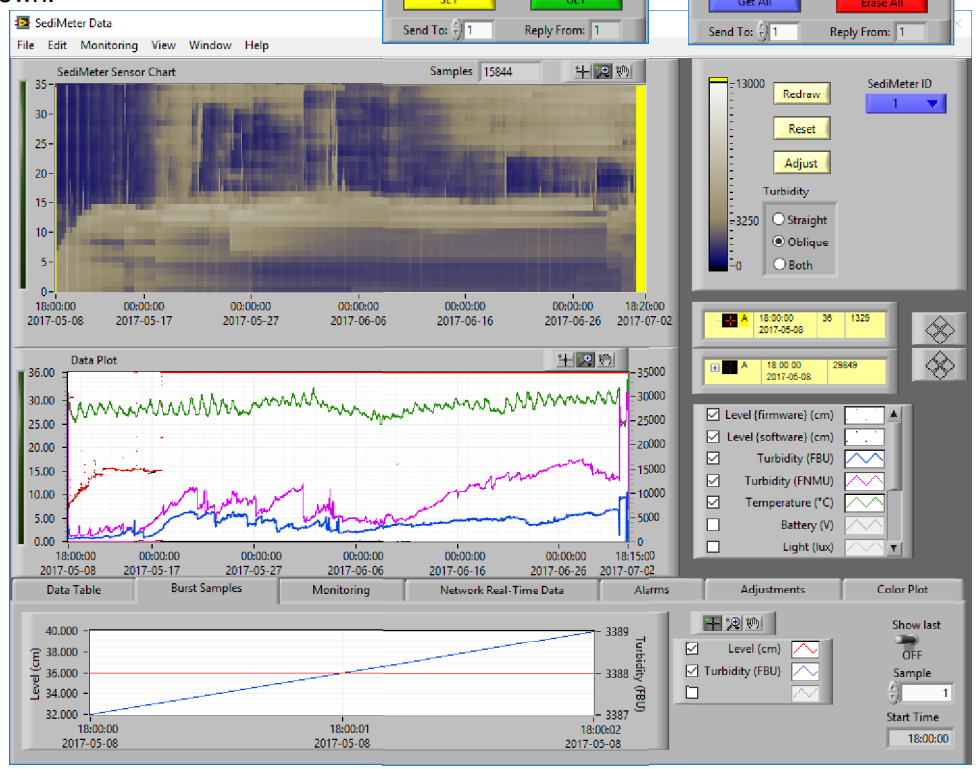












RESET

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 SM4 delivers with a recheargable AA Lithium battery as standard. Alternatively it can be equipped with a primary AA Lithium battery, or with both simultaneously in which case the primary cell acts as a backup.
The battery takes a few hours for a full charge. When the voltage drops well below half, the cleanings and the measurements are shut off. 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 backscatter (emitted at one level and measured at the adjacent level). 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. It can be set to 8 or 12 bit precision, and can be customized on request. The number of samples in each burst depends on the selected resolution.

LEGAL DISCLAIMER

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