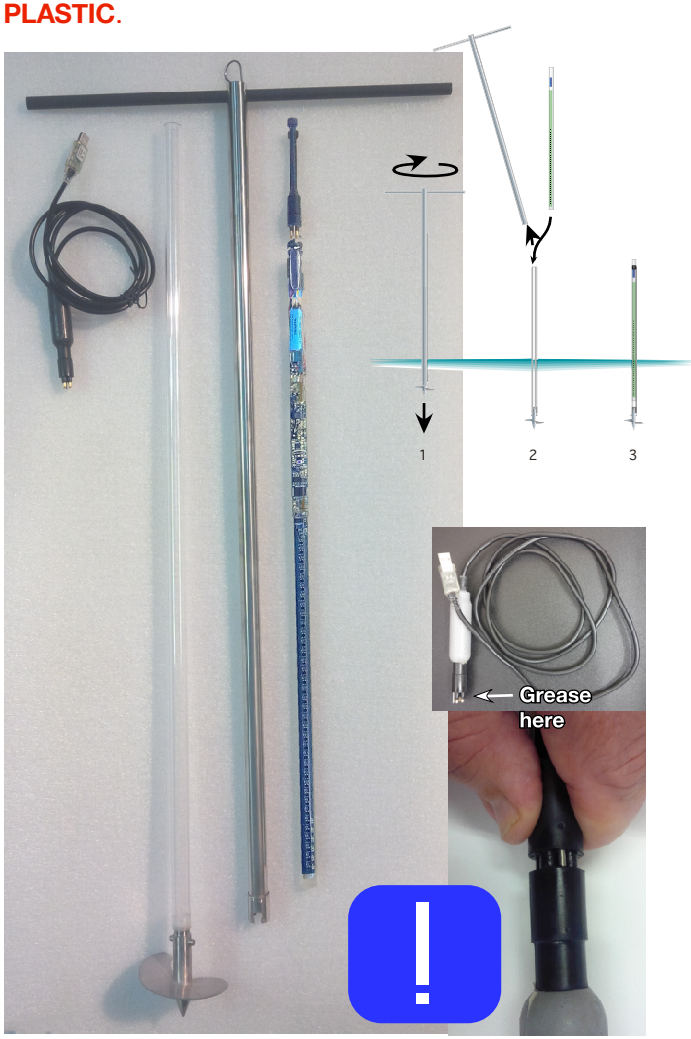
SediMeter™ SM4 manual

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 CD or as downloaded from lindorm.com
5. Use the software to **set up** the SediMeter for deployment (other side).
6. When **disconnecting** the cable from the instrument, grab the black rubber **ONLY**. **DO NOT GRAB THE PLASTIC**.



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).
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 sensor with non-abrading sponges, water, and only mild detergents. Minor scratches do not affect the capability to measure the bottom level. Hazyness can be polished away using equipment intended for polycarbonate lenses or headlights for cars.

Physical

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.

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 wtih 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. The blink duration is set in calibration. Use the cleaning tab in the control window to select how often they are to blink. (The top UVA LED is also used for the fluorescence meter in every measurement.)

VIBRATOR

The vibrator is located in the top of the instrument, between the battery and the connector. 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. While the vibration duration is set in calibration, the cleaning tab in the control window is used to select how often it will vibrate.

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 not running out of memory. The initial threshold is set in calibration.

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

Ph +1-305-888-0762 **mail@lindorm.com**
Fax +1-305-888-0978 **www.lindorm.com**

USING THE SOFTWARE

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

DEPLOYMENT

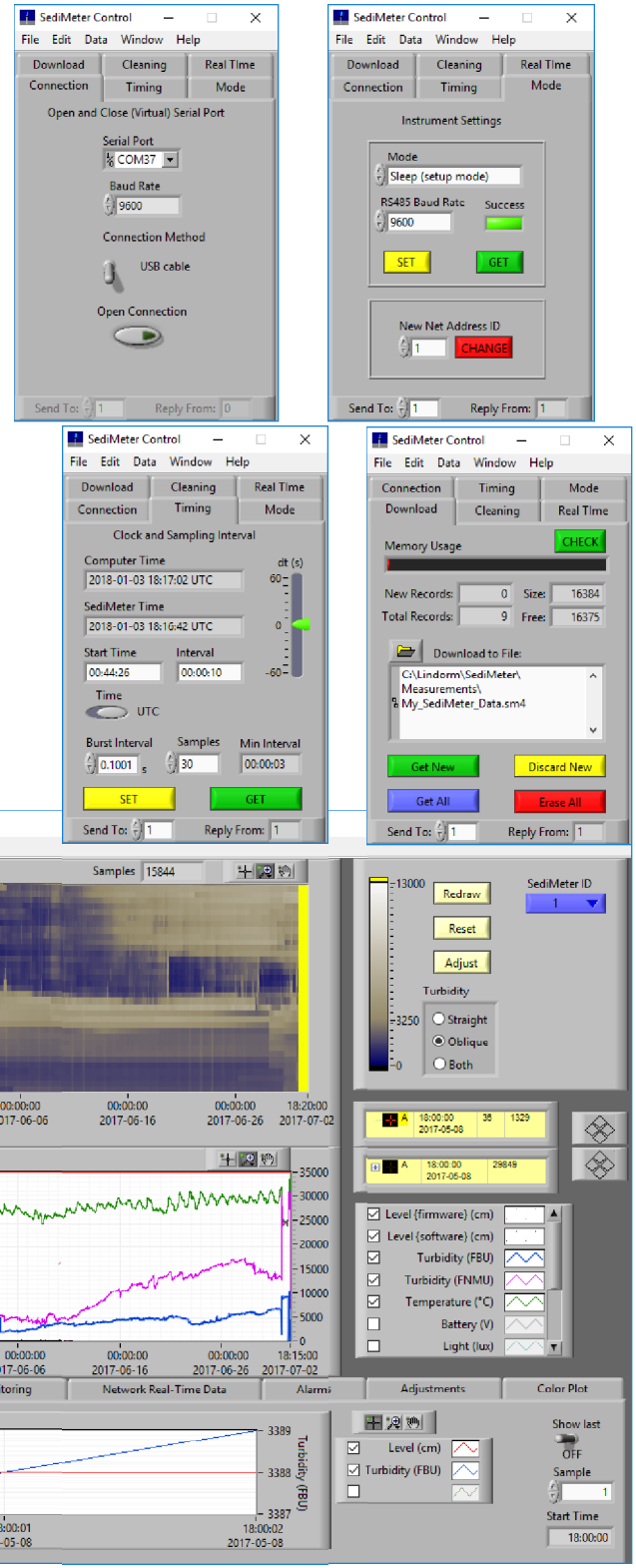
1. Go to the Timing tab and set Interval and Start time. Optionally set burst samples to more than one.
2. Optionally go to the Cleaning tab and set that.
3. Go to the Mode tab and set it to Logger mode.
4. Disconnect the instrument from the cable, plug in the blind plug, and deploy.

DOWNLOADING DATA

Connect as above, go to the Mode tab and set the unit to Sleep mode. It will fail if the command by chance is sent during an ongoing measurement. If so, try again.

1. Open the **Download** tab.
2. Click the **CHECK** button. The number of measurements in memory is shown.
3. Click the folder button. In the dialog that opens, select a file name and location for the file you are about to create.
4. 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**.
5. 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.
6. To clear the SediMeter's memory, click **Erase**. It will take about a minute.
7. Select menu **Data -> Analyze Logged…** to open the SediMeter Data window.

Refer to the software manual for further details.



RESET AND RECOVERY

Approach a strong magnet to the side of the printed circuit board where the text RESET CPU appears on the reverse side. If you know the battery to be charged, and it still will not respond to commands, or the yellow listening LED does not come on, try to reset it.

BATTERY

The battery takes a few hours for a full charge in SM4A, and up to 8 hours or more in SM4C. When the voltage drops below half, the cleanings are first shut off. When it approaches empty, the measurements are also shut off. As the battery keeps discharging, the power is cut to the electronics. If left for a substantial time without charging, the backup primary battery protects the rechargeable battery from being over-discharged for many years. However, charging it again from such a deep discharge may require keeping the CPU reset until the voltage has risen sufficiently.
If the battery does not charge after many hours, try keeping the CPU in a reset condition by leaving a strong magnet adjacent to the reset switch. This prevents the instrument from starting up while the battery is still too discharged to power the initiation sequence.

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 calculated based on these measurements.

Nephelometric Turbidimeters etc

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

Accelerometer

The SM4 also has an accelerometer. It measures the 3-axis acceleration 20 or 30 times per measurement, depending on the resolution (12 or 8 bits). It is used to calculate tilt and vibration. The raw data is plotted in the Burst Samples tab of the Data window.
Finally, the SM4 has a thermometer.