



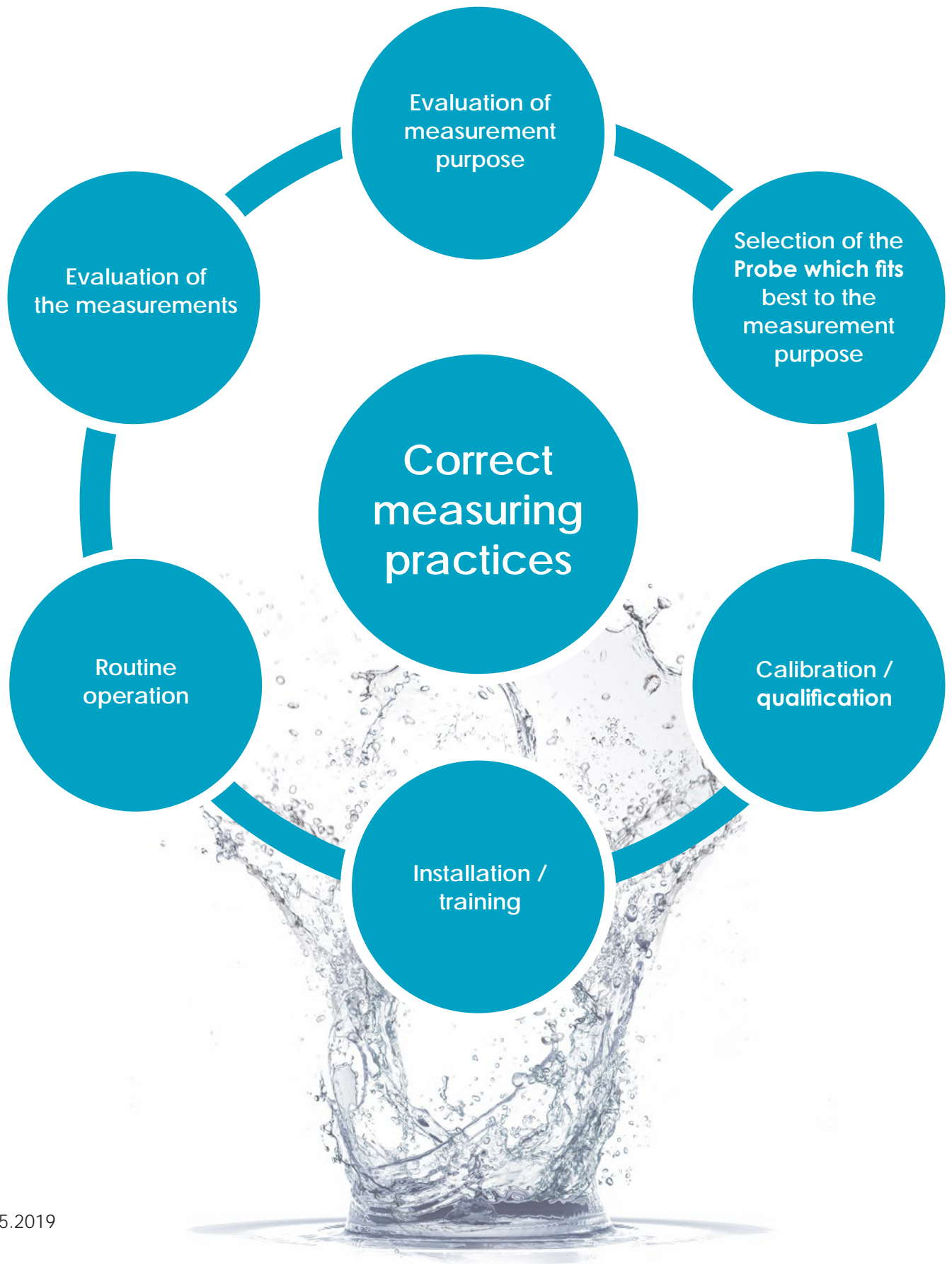
Sea & Sun
Technology

User Tips for correct measurings

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Content

Content	3
I. User Tips for correct measurings.....	4
a) New Probe.....	4
Evaluation of measurement purpose	4
Selection of the Probe which fits best to the measurement purpose	4
Calibration / qualification.....	5
Installation / training	5
Routine operation	7
Evaluation of the measurements	7
b) Already existing probe	8
General	8
Application	10
Getting started	12
Technical.....	12
Care.....	14
Calibration	15
Maintenance.....	16
II) Pointer for the specific sensor.....	17
Temperature sensor.....	17
Conductivity sensor.	17
Pressure sensor.....	17
pH sensor	18
Redox sensor.....	18
Oxygen sensor	18
Chlorophyll sensor	18
Turbidity sensor	18

I. User Tips for correct measurements

a) New Probe

Evaluation of measurement purpose

Before you start with a measurement, you should be sure to know your measurement purpose exactly. In which geographical region would you like to make your measurements? This means at which depth, in which temperature conditions, and in what type of water (salt water, sweet water, ground water, polluted water, fresh water), will you be measuring.

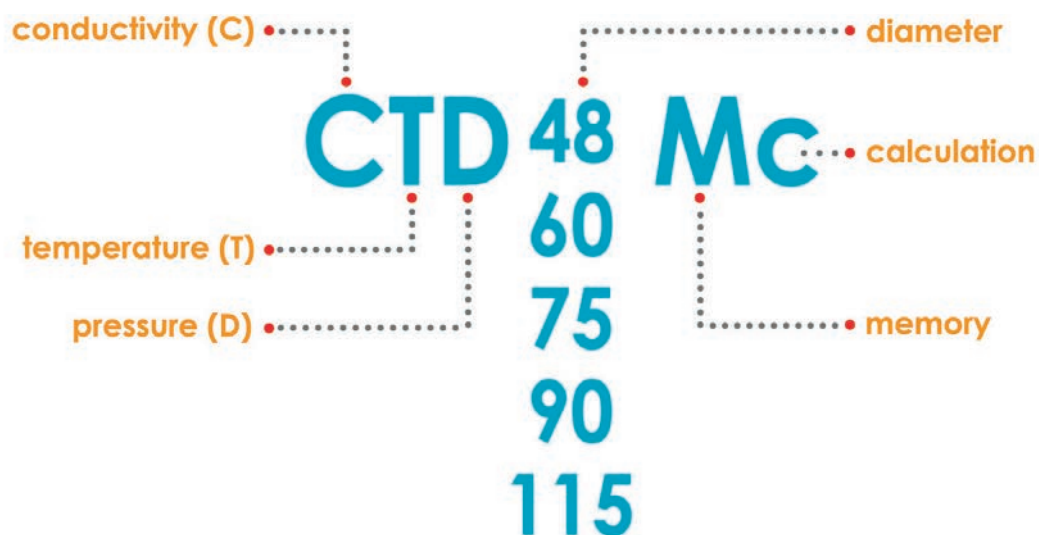
Selection of the Probe which best fits the measurement purpose

For selecting the right probe, you first need to check if you require:

- an online probe
- a memory probe

Next consider how many sensors you require for your measurements. This will give you the diameter of the required probe.

- 48 (up to 4 sensors of the bottom cap);
- 75 (up to 8 sensors of the bottom cap);
- 90 (up to 9 sensors of the bottom cap);
- 115 (up to 11 sensors of the bottom cap).



For selecting the right sensors you have to evaluate if the sensors have to be H₂S resistant.

Then check the probes for the right depth and conductivity range you want to work in.

After you have chosen the needed power supply you have selected the right probe.

At the end you can choose accessories like the Bluetooth cable drum and Sea & Sun Datawatch (a Smart watch, which displays your measurement data right on your wrist).

If you have doubts about your choice please contact our Sea & Sun Sales Team (sales@sea-sun-tech.com).

Calibration /Qualification

Every new probe from Sea & Sun Technology is tested and calibrated at the precision calibration lab of Sea & Sun Technology. Included with each probe you will also receive the original calibration data of each specific probe.

The qualification of the probe is provided by the ISO 9001 certification and for secure use by the CE certification. Only UNESCO standards are used for calculating the values of the measurements.

Installation / Training

Before you start with the installation process of your probe, ensure to register your probe on the SST Homepage*. The registration will give you access to the lifetime files and original calibration files of your probe. Registering your probe will increase the warranty from 2 years to 10 years including information about software updates and reminders to send your probe back to SST at the correct time for recalibration.

*coming soon

With your probe you will receive a data stick. This stick contains the necessary program files and the CalUp Software. These enable you to calibrate the sensors and to calculate your own regression. If you are missing the data stick please contact the SST Team (sales@sea-sun-tech.com). They will help you to get quick access to the needed files.

To install the programs, use either the „Autorun“ function, which starts automatically, or start the „StartMenu“ file:

1. Install SST-SDA Software



2. After you have confirmed your choice of the language, the SST Standard Data Acquisition window will open. After connecting the probe, choose the COM Port for the probe. Now you are ready for measurements.

Count	Press	Cond	Temp	NTC	NTC1P	SHE1	SHE2	ACC	SAL IN	SIG IN	SOUND	IntB	IntT
[]	[dbar]	[mS/cm]	[°C]	[°C]	[°C]	[]	[]	[n/s ²]	[PSU]	[kg/m ³]	[n/s]	[Date]	[Time]
4557	97.10	-0.10	28.98	13.26	29.15	1888	32898	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
5413	97.10	-0.10	28.98	13.26	29.15	1888	32900	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
6437	97.08	-0.10	28.98	13.26	29.15	1888	32897	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
7861	97.09	-0.10	28.98	13.27	29.15	1889	32899	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
8317	97.09	-0.10	28.98	13.27	29.15	1889	32900	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
9597	97.10	-0.10	28.98	13.26	29.15	1889	32898	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
10621	97.09	-0.10	28.98	13.27	29.15	1888	32901	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
11645	97.09	-0.10	28.98	13.27	29.15	1889	32899	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
12581	97.09	-0.10	28.98	13.27	29.15	1889	32898	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
13525	97.08	-0.10	28.98	13.26	29.15	1889	32900	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
14549	97.09	-0.10	28.98	13.27	29.15	1888	32899	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
15661	97.08	-0.10	28.98	13.26	29.15	1888	32899	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
16685	97.07	-0.10	28.98	13.26	29.15	1888	32898	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
17789	97.09	-0.10	28.98	13.27	29.15	1888	32899	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
18733	97.08	-0.10	28.98	13.27	29.15	1887	32900	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
19589	97.07	-0.10	28.98	13.26	29.15	1890	32900	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
20869	97.08	-0.10	28.98	13.27	29.15	1888	32900	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
21893	97.07	-0.10	28.98	13.26	29.15	1888	32898	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
22749	97.09	-0.10	28.98	13.27	29.15	1888	32898	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
23773	97.08	-0.10	28.98	13.26	29.15	1886	32899	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
24797	97.07	-0.10	28.98	13.27	29.15	1889	32899	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
26077	97.07	-0.10	28.98	13.27	29.15	1888	32899	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
26933	97.07	-0.10	28.98	13.26	29.15	1887	32899	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
27749	97.08	-0.10	28.98	13.26	29.15	1889	32899	-25.02	0.05	-3.58	1508.65	06.06	2018 15:00:15
28981	97.08	-0.10	28.98	13.27	29.15	1888	32900	-25.02	0.05	-3.58	1508.65	06.06	2018 15:01:00
29837	97.07	-0.10	28.98	13.26	29.15	1889	32899	-25.02	0.05	-3.58	1508.65	06.06	2018 15:01:00
31117	97.07	-0.10	28.98	13.26	29.15	1889	32901	-25.02	0.05	-3.58	1508.65	06.06	2018 15:01:00
32141	97.07	-0.10	28.98	13.27	29.15	1889	32900	-25.02	0.05	-3.58	1508.65	06.06	2018 15:01:00
32997	97.08	-0.10	28.98	13.26	29.15	1889	32900	-25.02	0.05	-3.58	1508.65	06.06	2018 15:01:00
34021	97.07	-0.10	28.98	13.26	29.15	1889	32899	-25.02	0.05	-3.58	1508.65	06.06	2018 15:01:00
35045	97.07	-0.10	28.98	13.27	29.15	1888	32899	-25.02	0.05	-3.58	1508.65	06.06	2018 15:01:00
36069	97.09	-0.10	28.98	13.26	29.15	1887	32901	-25.02	0.05	-3.58	1508.65	06.06	2018 15:01:00
37181	97.07	-0.10	28.98	13.26	29.15	1889	32901	-25.02	0.05	-3.58	1508.65	06.06	2018 15:01:00
38205	97.07	-0.10	28.98	13.26	29.15	1889	32900	-25.02	0.05	-3.58	1508.65	06.06	2018 15:01:00
39229	97.07	-0.10	28.98	13.27	29.15	1890	32901	-25.02	0.05	-3.58	1508.65	06.06	2018 15:01:10
40085	97.07	-0.10	28.98	13.26	29.15	1889	32901	-25.02	0.05	-3.58	1508.65	06.06	2018 15:01:10
41109	97.07	-0.10	28.98	13.26	29.15	1888	32901	-25.02	0.05	-3.58	1508.65	06.06	2018 15:01:10

To use all of your probe's capabilities, we recommend you open the provided documentation and start to read the CTD Standard Manual.

SST recommends all new users of SST Probes to get proper training. SST provides this training free of charge at the SST headquarter or as in house training at the customer's site. In this case, the cost of training will be charged to the customer. In the training you will get detailed knowledge about operating your probe.

Routine Operation

After you have registered your new probe and you have installed the software on your computer you are ready to connect your probe with the special USB configuration cable to your computer.

Now start the SST-SDA software and place your probe into the water where you would like to take your measurements. On your computer in the SDA software you can now see the measured values (for details please refer to the SDA handbook).

If you have a type „M“ probe the probe stores the measured values within the internal memory after activating the memory mode in the SDA software (for detailed description please have a look to the SDA software user manual).

Evaluation of the Measurements

The data from the probe measurements are stored in the SST-SDA software. From there, the data can be exported as ASCII files (TOB, SVA, CAL, CSV, APF) to the customer's measurement evaluation software.

For detailed information which capabilities you have with the measured values please refer to the SST-SDA manual.

b) Already existing probe

General

Be sure to use the probes only in the measurement range the probe is designed for. Outside this range, a strong deviation in the linearity of the sensors can occur, so that the measured values are no longer reliable.

Before larger measurement campaigns, it is advisable to calibrate the sensors at SST and have them maintained.

These probes are precision measuring instruments and always require good maintenance in order to maintain the full functionality of the probe. Therefore, calibrate the probe before a measurement campaign at the manufacturer and have it properly maintained. This includes keeping the O-rings in the probe lubricated, lubricating the seals of the cable connections and cleaning the sensors carefully.

For memory probes, check the condition of the batteries and replace them as necessary. Please ensure to take with you enough spare batteries in case of taking measurements below 5 °C. The capacity of the batteries and rechargeable batteries may decrease to half the normal capacity.

Even the best precision probes can fail due to external damage (e.g. hitting the side of the ship). In this case we recommend taking a backup probe (possibly rented probe) to a measurement campaign.

I only have a short measurement-campaign and after that no use of a probe anymore, what can I do?

Sea & Sun Technology also rents out the probes, even if necessary with operators for the probes. The advantage to renting is that even without an investment budget, a probe can be used. You can make the payment from the current budget without having to make any requests for a purchase. You only pay for the time used.

For more information about renting, please contact us by e-mail:
(sales@sea-sun-tech.com)

What are the benefits of a product registration?

Upon registration of your products, we will send you a guarantee card with the extension of the warranty period from 2 years to 10 years (see warranty conditions); receive free software updates; online access to the lifetime file of your product; receive e-mail news about your product, and SST will remind you of recommended maintenance dates.

What spare parts should we keep available for our SST probes?

Each probe is delivered with the most important spare parts. It should always be ensured that these spare parts are supplemented from time to time.

What certificates do SST probes have?

All SST probes are ISO certified, which includes the „Shock-Test“ certificate (MIL) and bear the CE mark. The probes are also certified with the Metrology Certificate issued by the Russian Federal Technical Regulation and Metrology (Rosstandard).

What training opportunities does SST offer to customers?

SST offers training for customers at the company headquarters in Trappenkamp (Germany), or for a training fee directly at the customer's site.

Application

Can I use my CTD in limnological waters also (in fresh water)?

Each SST probe can be modified and calibrated by SST for use in limnological waters. Without special calibration, the use of the probes is only conditionally possible. This calibration can be done with customer-specific standards.

What is the temperature range in which I can use SST probes?

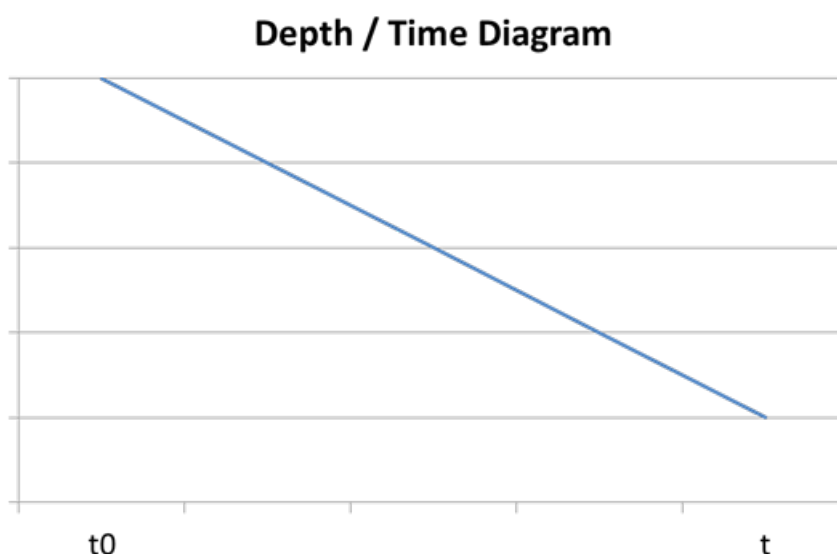
The linear measurement range is guaranteed from -2°C till $+36^{\circ}\text{C}$. Other range is on request. Please pay attention – at low temperatures the capacity of the batteries will be lower (at 0°C the battery capacity is only half of the capacity at room temperature).

With which maximum lowering speed can I profile with SST probes?

The maximum full rate should be adjusted to the response time of the slowest sensor. SST recommends using 1m/sec to easing.

How can I check if my lowering speed was appropriate?

Record a depth (pressure)/time graph. The resulting curve should just yield line.



Why can we use SST probes to accurately detect minimum thermocline?

The CTD75M and CTD90(M) probes have multiple AD-converters. For this reason, the values for conductivity, pressure and temperature can be measured at the same time at the same place. As a result, the calculated values such as salinity, density and sound velocity are also recorded at the same time. With a measurement rate of 10 Hz, this means that every 10 cm a record is won (the MSS probes from SST work at a measuring rate of 1024 Hz. This means that one record is obtained about every millimeter). In this way, even minimum thermocline can be determined exactly.

CTD48(M) probes work with one AD-converter and measure serially. At a rate of 10 Hz, this means that a complete record (CTD) is determined every 20 cm. However, this happens with a delay of the individual parameters. The parameters are determined each in the order of Voltage; Pressure; Temperature and Conductivity.

How long can the data transmission cable of the probe be?

With an RS-232 interface, the maximum possible cable length is between 200 m and 300 m. For an RS-485 interface, the range of the cable length is up to several 1000 meters. (depending on the cable and on the data transfer rate).

Is it possible to connect SST probes under water with a cable?

In urgent cases the SUBCONN connectors can be connected under water. SST is not recommending a connection under water, because there could be a risk of leakage.

Why do SST probes not require pumping?

The diameters of the conductivity cells of SST probes are so large that the flow is guaranteed during regular use.

For this reason, the conductivity cell of the SST probes does not require the assistance of external pumps.

Getting Started

Where can I find the software to operate my probe?

Each probe comes with a USB-stick that includes the software.

Use the autorun mode of the installation software or start the startmenu.exe file. There will be *.prb and *.spj files that have manuals and a installation option of the SST-SDA software with all files needed to work on your computer. The software can be installed for an unlimited number of different users and on different devices.

Technical

Is a Bluetooth cable drum something like a WLAN cable 😊 ?

Unlike the wireless cable, the Bluetooth cable drum is not a joke 😊 ! The Bluetooth cable drum connects your probe via cable (up to 220 m) with a Bluetooth transmitter located in the cable drum.

The data of your probe will be transmitted directly via Bluetooth to your computer or your Sea & Sun DataWatch (range approx. 10m). No cable clutter on the ship.

How can I tell to what depth I can use my SST probe?

From the calibration data sheets of the probe you can find the pressure range for which the pressure sensor has been calibrated.

The probe itself is not marked with a depth of use.

How long does the battery supply power for my probe?

For probes with lithium ion rechargeable batteries, the CTD48M probe (with 3 sensors) is powered for approx. 450 hours (approx. 18 days) (depending on temperature and number of additional sensors) at low temperatures – 50%

If the probe is equipped with conventional 1.5 batteries, the working time is approx. 148 hours or approx. 6 days) For probes with lithium ion rechargeable batteries, the CTD probe (3 sensors) is powered for approx. 450 hours (approx. 18 days) (depending on temperature and number of additional sensors) at low temperatures.

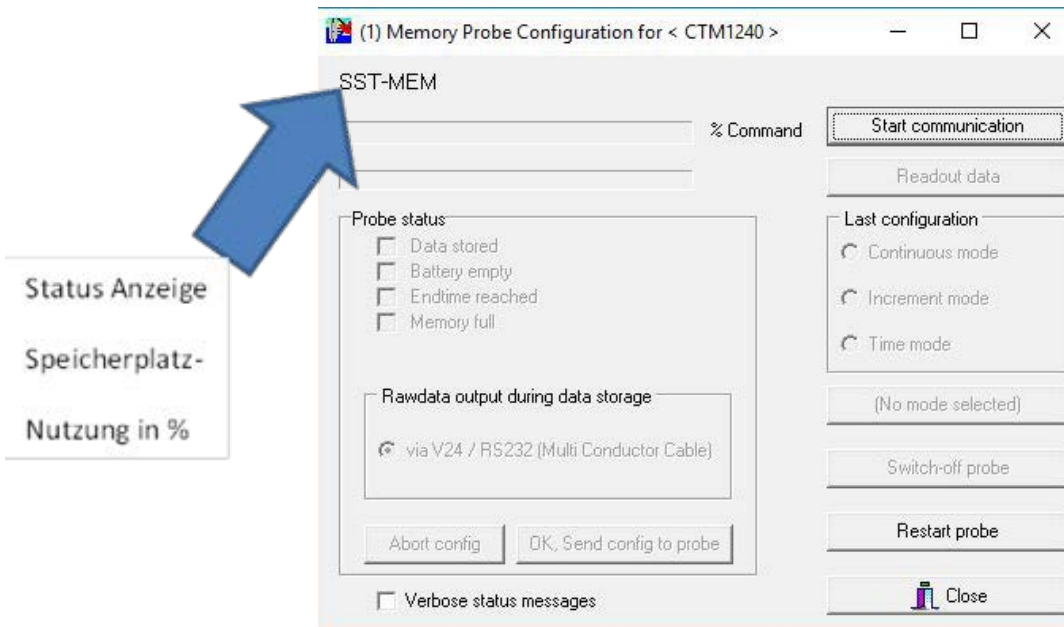
Why has my probe stopped working?

SST probes stop working due to following reasons:

- 1) The probe has reached the end of a preset measurement time.
- 2) The storage capacity of the probe has been reached – the storage is full (this is valid only for memory probes).
- 3) The batteries need to be replaced (or charged).

How do I know how much storage capacity is still available in the memory probe?

In the SST-SDA software, under the menu item "Options", select the sub-item "Memory Probe" and click on the indicated probe. Another window will open, showing what percentage of the memory is already used.



What happens when I open the pressure sensor?

This can only be achieved with special tools without damaging the sensor. You will probably have difficulty closing the pressure sensor again after opening it. For this reason, please do not allow the sensor to be opened by anyone other than SST.

How much data can be stored?

Probes with 32 GB memory can store up to 5.5 billion data sets per channel or for CTD 3 sensors = 3 channels 1.8 billion records.

Up to 22 million data sets per channel or for CTD 3 sensors = 3 channels) 7.5 million records with 128 MB of memory can be stored.

SST 8 MB CTD48M 2 million data sets 1 channel or CTD 300,000 records.

Care

How often must be the plug contacts greased?

The rubber seals of the male plugs must be greased after each use with some silicone grease to ensure that the seals do not wear quickly.

The protective covers (female) must be placed on the plugs to protect the plugs from damage. Original protection silicone is supplied after every maintenance or recalibration. If you need additional protection silicone, you can order it at Sea & Sun Technology GmbH.

How do I grease an O-ring properly?

Add some silicone grease to your thumb and index finger and pull the O-ring through both fingers with light pressure.

How do you properly store a memory probe?

The memory probes contain batteries and rechargeable batteries. If a memory probe is to be stored for a longer period of time, it is advisable to remove the batteries and/or rechargeable batteries from the probe and store them separately. There is a risk that the batteries could leak during prolonged storage and thus damage the inside of the probe.

Calibration

Can I calibrate my probe myself?

We do not recommend that you calibrate the probes yourself. Only trained specialists are able to calibrate individual sensors themselves (e.g. pH sensors in the area of limnological measurements). If you are interested in this, you are welcome to book the appropriate training with us. In this case, please contact our Technical Service (sales@sea-sun-tech.com).

By using the included CalUp-Software you are able to calibrate some sensors yourself (e.g. pH, ORP and Oxygen).

Can I replace the sensors of my SST probe by myself?

SST probes are high-precision measuring instruments. By having the sensors replaced by unauthorized personnel, these instruments can be damaged. After replacing a sensor, a recalibration must be carried out. Trust our service that handles the exchange of sensors for you professionally and ensures that the lifetime file of your device is maintained accordingly.

How often should I have the probe recalibrated at the manufacturer?

A recalibration should take place once a year, at least every 2 years, by Sea & Sun Technology GmbH.

If the manufacturer does not perform the recalibration and maintenance, the guarantee period of 10 years is reduced to 2 years.

What is the best way to send my probe to Sea & Sun Technology GmbH?

Please contact the SST-Team. You will receive a mail address with the correct shipping address by e-mail. After cleaning the probe from the outside, if possible, pack the probe into the original packaging and ship the probe to SST with UPS, DHL, FedEx or other forwarder.

How long does it take to recalibrate my probe at Sea & Sun Technology GmbH?

The recalibration at SST takes between 1 week (rush order) and 2-3 weeks.

Maintenance

How often should I update the software for my probe?

Software updates are provided by Sea & Sun Technology GmbH at irregular intervals. Registered users will be informed by email about upcoming software updates.

Where can I get a software update?

All registered users are informed by e-mail about software updates. Registered Software-Updates can be downloaded at the login area of our homepage.

II) Tips for Specific Sensors

Temperature Sensor

The temperature sensor is sensitive to mechanical force. In the case of dirt, encrustations and calcification please clean the sensor with diluted acetic acid.

Conductivity Sensor

How should I clean the conductivity sensor?

Twist woodfree paper, for example Kleenex or kitchen paper, slightly and pull it through the opening of the conductivity sensor. In the case of heavier dirt, calcification and encrustations, clean the sensor with diluted acetic acid. Let soak in the acid for 5-10 minutes, then clean with a cloth as described earlier. Ensure you rinse the sensor after with distilled water.

What happens if I use the conductivity sensor outside of liquid?

This has no negative effect on the sensor.

Pressure Sensor

Please do not press on the sensor with any objects or tools. The membrane is very sensitive and could be damaged.

If the sensor is dirty, clean it carefully with water. Do not use any mechanical tools for cleaning!

The sensor can only be used within the calibrated pressure range, otherwise it will be damaged.

How can I convert dbar into bar, pascal and torr?

1 Bar = 10 dbar; 1 dbar = 100 mbar; 1 mbar = 100 Pa = 1 Hektopascal = 0,750 Torr

Why can deviations at depth measurement happen?

Without air pressure compensation and with the fact that dbar is not equal with meter, deviations can happen..

pH Sensor

The pressure dependence of the diaphragm in the pH sensors is the limiting factor concerning the water depth. The maximum water depth for SST probes with pH sensors is 6.000 m. For these cases the pH sensors are resistant to H₂S. Please take care, that the opening to the diaphragm is not dirty or plugged.

For cleaning please use distilled water and woodfree paper or a microfiber cloth.

Please ensure that the pH sensor is stored in 3M KCl solution!

Redox Sensor

The redox sensor is virtually identical to the pH-sensor. You can identify it by the silver-ion ring located under the probe's collar.

Oxygen Sensor

Which cleaning procedure is suggested for the oxygen sensor?

The SST-DO Oxygen sensor is an optic sensor. If the sensor is dirty, clean it with diluted acetic acid and woodfree paper or the optics with microfiber cloth.

Is there any suggested maintenance except cleaning?

SST-DO doesn't require any regular maintenance, except for replacing the film (membrane) on the glass of the light detector periodically. This applies to all of the optic SST sensors.

Chlorophyll Sensor

This sensor is an optic sensor. If the sensor is dirty, carefully clean the optics with a microfiber cloth or with a cotton swab.

Turbidity Sensor

How do you clean the turbidity sensor?

The turbidity sensor should be cleaned carefully with a microfiber cloth to avoid damaging the optics.