AML OCEANOGRAPHIC
Xchange your old ideas

SV•Xchange™

User Manual

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Table of Contents

General Description of the Sensor

The AML Oceanographic's SV•Xchange™ sensor is the industry's only field swappable time-of-flight sound velocity sensor.

The SV•Xchange™ sensors store all pertinent sensor manufacturing and calibration data within the sensor. This allows the sensor to be swapped between any SV•Xchange™ enabled instruments without having to manually update the calibration coefficients. Calibration sheets can be printed on demand by any instrument connected to the SeaCast software. Re-calibrations only require the sensor, not the instrument, to be shipped to the service centre.

Which Manual do I Start With?

AML Oceanographic's instruments may be shipped with several manuals:

- An instrument manual (ie. SV Plus v2, Micro SVT&P) which provides an overview on how to use and maintain the instrument;
- A software manual (ie. SeaCast) which provides instructions on how to use the software to configure the instrument and review instrument data; and
- Xchange sensor manuals (for those instruments that have been Xchange enabled) which provide an overview on how to install and maintain Xchange sensors.

If you are configuring an instrument for field use or lab test, we recommend that you begin with the SeaCast manual. If you are focussed on instrument maintenance, we recommend that you

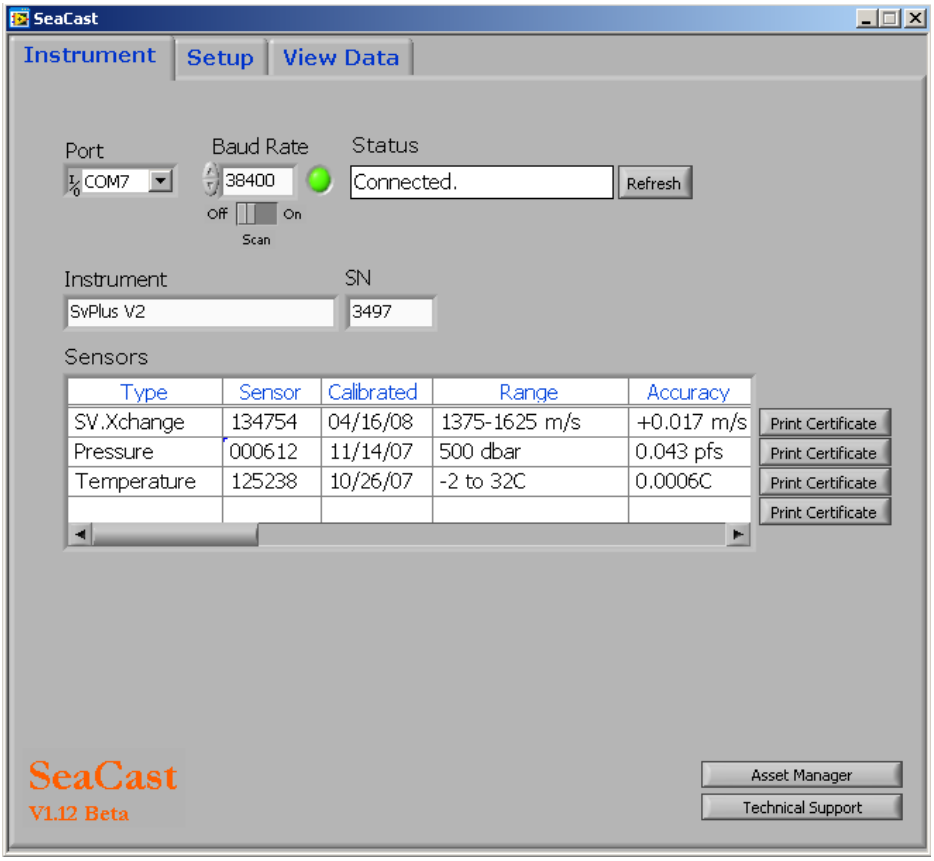
begin with the instrument manual. If you are wishing to swap an SV•Xchange™ sensor, we recommend that you read this manual.

Shipping and Receiving

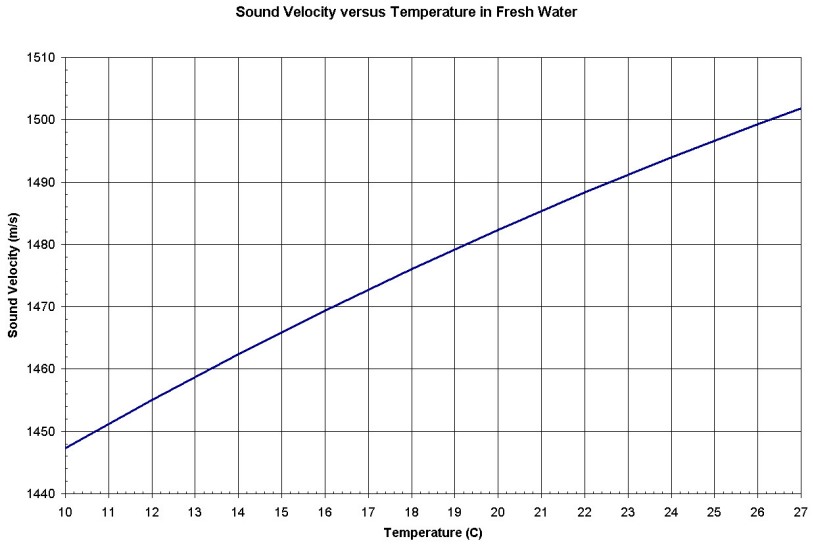
Receiving the Sensor

When the sensor is received at a new location it is prudent to perform the following steps to ensure the sensor has not been damaged in transit:

- Check the shipping container for signs of damage
- Check for damage on the sensor itself
  - Check the sensor for cracks, dents or dirt.
  - Check the connector for corrosion or dirt
- Connect the sensor to an instrument. Connect the instrument to a computer using the data cable. Launch SeaCast, AML Oceanographic's application software. Verify that the instrument tab in SeaCast is displaying accurate SV•Xchange™ sensor information. The SV•Xchange™ sensor serial number and last calibration date should be displayed.



- Immerse the sensor (on the instrument) in fresh water. Ensure there are no bubbles on the sensor reflector or transducer face. Take a scan, the sound velocity output should agree with the graph below.



Shipping the Sensor

- If shipping for repair or recalibration, obtain an RMA number from the service centre. Please refer to page 8 for contact details.
- Pack the instrument in its original shipping box to prevent damage during shipping.

Using the SV•Xchange™

This section of the manual discusses how to attach and disconnect the SV•Xchange™ sensor. This section also identifies pre-deployment and post-deployment procedures, as well as periodic maintenance requirements.

Attaching the SV•Xchange™ Sensor

- Ensure that the instrument socket is clean and dry
- Check the sensor's o-ring for cleanliness (see below, Inspecting & Replacing O-Rings)
- Align the sensor to the sensor mount
- Place the sensor into the mount
- Rotate the sensor until it drops down into the mount enough to allow the blue locking sleeve threads to engage the mount threads
- Screw down the blue locking sleeve until it stops. The bottom of the sleeve should be within 1 mm of the instrument end cap

Removing the SV•Xchange™ Sensor

- Dry the sensor
- Unscrew the blue locking sleeve
- Lift the sensor out of the mount
- Ensure that the instrument socket is dry and clean, using compressed air if necessary
- Insert the blanking plug in the SV•Xchange™ socket on the end-cap OR immediately insert a replacement SV•Xchange™ sensor

Pre-Deployment Procedures

- 4 to 6 weeks ahead
    - Use the receiving checklist on page 2 to verify the sensor is in good working order.
    - Verify the calibration is valid for the duration of the deployment. Have the sensor re-calibrated if required or swap with another calibrated SV•Xchange™ sensor.
- Before leaving the jetty
    - Ensure the SV•Xchange™ sensor is properly mounted on the instrument. The blue locking sleeve should be full threaded onto the sensor mount of the instrument.
    - Test the instrument in fresh water to ensure the SV•Xchange™ sensor is functioning properly.

Post-Deployment Procedures

- Ensure the sensor is clean and dry before storage

Periodic Maintenance

Periodic maintenance will prolong the life of the sensor. The following is recommended:

- If the sensor is dirty or oily use warm soapy water and allow the instrument to soak before cleaning with a rag or soft brush. Rinse with fresh water.
- Before each deployment
    - Check the sensor is properly seated on the instrument
    - Check the sensor for cleanliness or damage
- After each deployment
    - Clean and rinse the sensor using fresh water
- Before installing on an instrument
    - Check the sensor for cleanliness or damage
    - Check the o-ring under the blue locking sleeve of the sensor for cleanliness and silicon grease
- Removing from an instrument
    - Ensure the sensor is clean and dry before removing
    - Install a new sensor or blanking plug into the instrument to protect the contacts of the sensor mount
    - Safely store the sensor
- Yearly
    - Send the sensor to a service centre for diagnostics and re-calibration

Inspecting & Replacing the O-ring

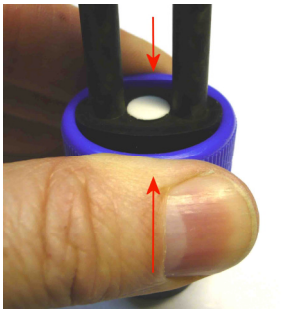
It is crucial to keep the SV•Xchange™ sensor's O-ring clean and greased. Any fibres or dirt on the o-ring will allow water into the connector and damage both the sensor and the sensor mount. To gain access to the o-ring, perform the following steps:

- Remove the sensor from the instrument
- Use a small screw driver to remove the retaining ring from the top of the blue locking sleeve
- Slide the retaining ring over the transducer plate
- Pinch the blue locking sleeve and slide it over the transducer plate
- The o-ring should be slick with grease. If the o-ring is dry re-grease it with silicone grease
- Inspect the o-ring for dirt. Clean and re-grease if necessary
- Inspect the o-ring for nicks and cracks. If any are found the o-ring must be replaced. Use a 2-116-N70D Buna Nitrile o-ring. Grease the o-ring with silicone grease before replacing.

> Caution: Do not use a sharp instrument to remove the o-ring. If the o-ring groove is scratched the o-ring will not provide a waterproof seal.

- Slide the blue locking sleeve back over the o-ring
- Re-install the retaining ring

Remove Retainer



Pinch Hard and Lift Sleeve

Check O-ring

SV•Xchange™ Commands

When using AML's SeaCast application software, knowledge of the instrument command set is not usually necessary. However, the operator can issue text commands to the instrument as well as to specific sensors on an instrument. This can be done from SeaCast or any terminal emulation program such as HyperTerminal.

There is additional functionality on SV•Xchange™ equipped instruments with respect to the command set. To use these commands, the user must first establish direct communication with the SV•Xchange™ sensor.

Talking to the SV•Xchange™ Sensor

There are two ways to accomplish direct communication with the SV•Xchange™ sensor. They are:

1. On a Micro SV instrument with the SV•Xchange™ option, the SV•Xchange™ commands can be given directly to the instrument. Simply type the commands into the terminal emulation program.
2. On any SV Plus, Minos or Smart instrument that has the SV•Xchange™ option, the "TALK" command is used to direct communications to the SV•Xchange™ sensor. Use the following procedure to accomplish this:

   Entering Talk Mode
   - Establish communications with the instrument
   - Send a "DETECT" command to the instrument. The instrument will return a list of sensors detected on each slot of the instrument. The SV•Xchange™ is usually in slot one but on instruments equipped with conductivity sensors the SV•Xchange™ may be located in a different slot.
   - Send a "TALK 1" command to the instrument. Replace the 1 with the appropriate slot number if required. This command directs subsequent communications directly to the sensor board.

   Exiting Talk Mode
   - To exit talk mode simultaneously press the CTRL and C keys

Specific Commands of Interest

- DIS OPTIONS — Displays the current settings for the SV•Xchange™
- DIS SV CAL — Displays the calibration sheet for the sensor
- SET FORMAT 43 — Sets the SV format to 4 digits ahead of the decimal place and 3 digits after the decimal place
- SET FORMAT 42 — Sets the SV format to 4 digits ahead of the decimal place and 2 digits after the decimal place
- SET FORMAT 41 — Sets the SV format to 4 digits ahead of the decimal place and 1 digits after the decimal place
- SET FORMAT 40 — Sets the SV format to 4 digits with no decimal

The full set of commands can be found in the Command Summary document, which is available from the AML Oceanographic's customer portal on the internet or by contacting the AML service department.

Customer Support

Troubleshooting

Instrument fails to detect the sensor

- Is the sensor properly mounted on the instrument?
    - Check the connector on both the sensor and the instrument for corrosion or damaged contacts
    - Cycle the instrument power
- Call the nearest service center for support

SV sensor reads 0 m/s

- Is the sensor immersed in water?
- Are there bubbles on the reflector plate or transducer face?
- Is the acoustic path obstructed by dirt or biofouling?
- Is the sensor damaged?
- Is the water excessively turbid?
- Call the nearest service center for support
- Is there electrical noise on the power or communication lines? There should be no transient spikes greater than 20 mV.

SV sensor is noisy

- Check the connector on both the sensor and the instrument for corrosion or damaged contacts
- Check the sensor for bubbles on the reflector and transducer surfaces
- Are there small scale thermal or salinity eddies or stratification of the water being tested?
- Is the water excessively turbid?
- Is there a nearby source of electromagnetic interference? Examples are arcing brushes on electric motors, radio transmitters, and faulty cathode ray tube monitors. Check for electrical noise on the power and communication lines with respect to ground. There should be no transient spikes greater than 20 mV.

AML Contact Info

Service:
To request an RMA or technical support
Email: service@AMLoceanographic.com
Phone: 1-250-656-0771
Fax: 1-250-655-3655

Sales:
For all general sales inquiries
Email: sales@AMLoceanographic.com
Phone: 1-250-656-0771
Fax: 1-250-655-3655

Website:
http://www.AMLoceanographic.com

Customer Portal:
The Customer Portal allows AML Oceanographic customers to download calibration certificates and other related instrument/sensor documentation, view instrument/sensor details and diagnostic reports. It also allows AML customers to gather technical documentation, troubleshooting guides etc. RMA requests or technical support queries may also be submitted through the portal.

To access the Customer Portal, please navigate to the 'Support' button, located on the top right hand side of AML Oceanographic home page, select the 'Customer Centre' from the options on the drop down menu and follow the instructions provided.

Mailing and Shipping Address:
AML Oceanographic
2071 Malaview Ave.
Sidney, BC, Canada
V8L 5X6