



# **Micro SV**

## **User Manual**



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## **General Description of the Instrument**

The AML Oceanographic Micro SV is a high speed, high resolution, high accuracy instrument for measuring sound velocity in water. The Micro SV provides real-time sound velocity data in meters per second units when connected to a computer and DC power supply.

## **Which Manual do I Start With?**

AML Oceanographic's Micro SV is shipped with two manuals:

- An instrument manual (ie. This Micro SV manual) which provides an overview on how to use and maintain the instrument; and
- A software manual (ie. SeaCast) which provides instructions on how to use the software to configure the instrument and review instrument data;

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

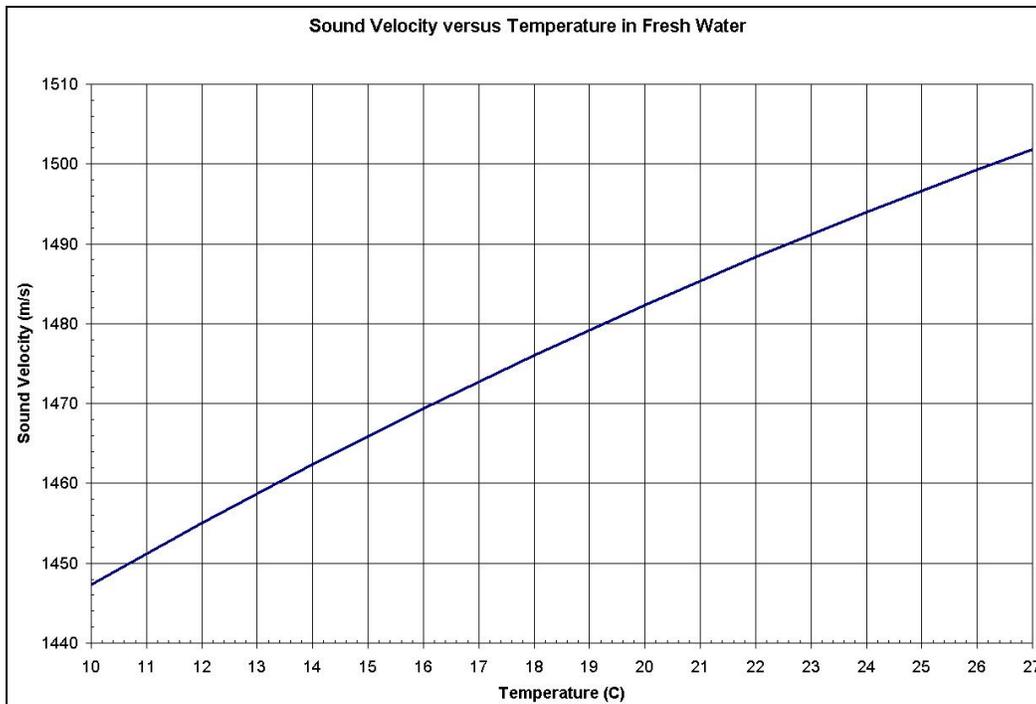
If you are focussed on instrument maintenance, we recommend you read the instrument manual.

## Shipping & Receiving

### *Receiving an Instrument*

When an instrument is received at a new location it is prudent to perform the following steps to ensure the instrument is capable of performing when required.

- Check the shipping container for signs of damage. This could indicate damage to the instrument inside.
- The shipping package should include all of the following items
  - Micro SV instrument
  - Data/Power cable
  - Manual
- Check for damage
  - Check the cable for slices or gouges
  - Check the connector for corrosion in the sockets and salt deposits
  - Check the pressure case for dents and scrapes
  - Check the sensor for cracks or dents
- Connect the instrument to a computer and a DC power supply between 8 and 26 volts using the data cable. Place the sensor in fresh water ensuring no bubbles are trapped on the transducer or reflector plates. Launch SeaCast and use the Monitor button to start the flow of data from the instrument. The instrument should return sound speed readings in agreement with the chart below.



Expected sound velocity output in fresh water

### ***Returning an Instrument to the Factory***

- If shipping for repair or recalibration obtain an RMA number from the service centre.
- Perform all the steps listed above for Receiving
- Pack the instrument in its original shipping box, if possible, to prevent damage during shipping

An RMA number can be requested using any of the following contact options:

Service Department:

Email: [service@AMLOceanographic.com](mailto:service@AMLOceanographic.com)

Phone: 1-250-656-0771

Fax: 1-250-655-3655

Website:

<http://www.AMLOceanographic.com>

Customer Portal:

RMA requests may also be submitted through the customer portal on the AML Oceanographic website.

To access the Customer Portal, please click on the Client Service & Support button, located on the left hand side of the AML Oceanographic home page.

Alternatively, the direct web login address is:

[https://na3.salesforce.com/secur/login\\_portal.jsp?orgId=00D3000000007DR&portalId=06050000000D0Vj](https://na3.salesforce.com/secur/login_portal.jsp?orgId=00D3000000007DR&portalId=06050000000D0Vj)

Mailing and Shipping Address:

AML Oceanographic.

2071 Malaview Ave.

Sidney, BC, Canada

V8L 5X6

## Using the Instrument

### *Pre-Deployment Procedures*

- 4 to 6 weeks ahead
  - Use the receiving checklist to verify the instrument is in good working order
  - Verify the calibration is valid for the duration of the deployment
  - Lubricate the connector with silicone spray
- Before leaving the jetty
  - Connect the instrument to a computer and power supply using the data cable
  - Check the instrument output in fresh water against the chart on the previous page.

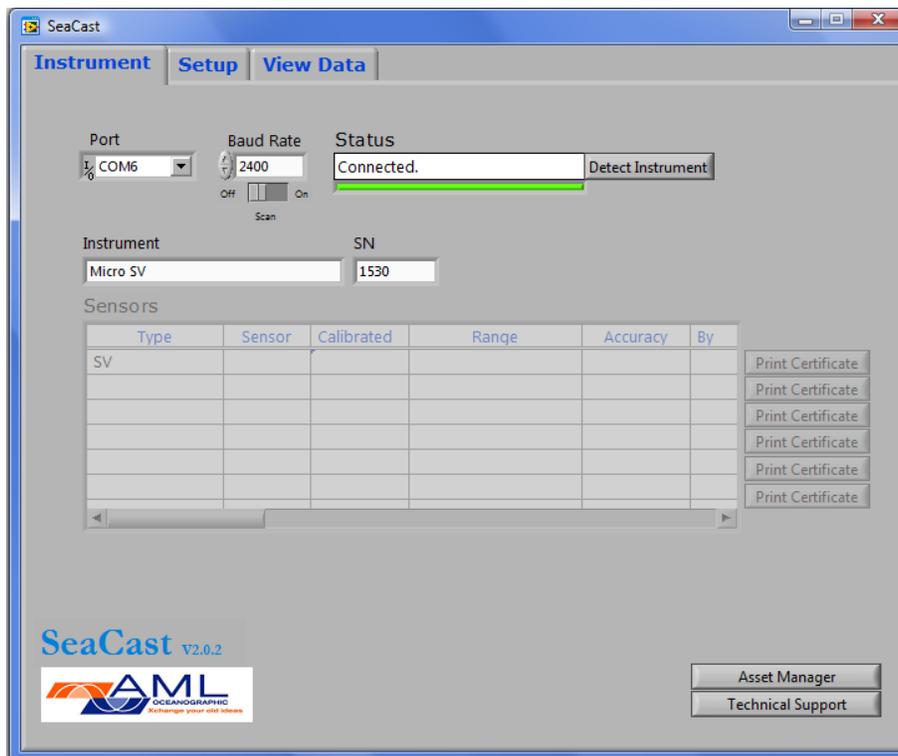
### *Configuring Sampling Parameters using SeaCast*

AML Oceanographic's SeaCast application software greatly simplifies the process of setting up an instrument to collect data. SeaCast does not require instrument configuration files and is able to generate copies of sensor calibration certificates on demand.

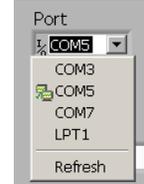
Full details on the instrument configuration process can be found in the SeaCast manual. Below please find a quick summary of that process:

### **Selecting an Instrument for Configuration**

On the Instrument Tab, the first row of fields 'Port', 'Baud Rate' and 'Status' control and display the communications with the instrument.



The 'Port' field allows the user to select the port to which the instrument is connected. If uncertain about the port the user can check the ports in the Device Manager or Hardware Manager found in the control panel in the Windows operating system. The 'Refresh' selection at the bottom of the list allows the user to force a new detection of available ports. This is useful if a USB connection is made after SeaCast is launched.



The 'Baud Rate' field is used to select the baud rate the user wishes to use while communicating to the instrument. Lower baud rates allow longer cables to be used if using RS-232/485/422. Higher baud rates shorten the data transfer times. Choose 38,400 baud whenever possible.

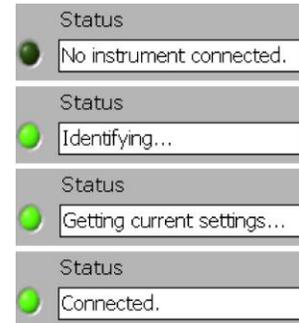


If an instrument is set to autobaud (default setting) it will detect the baud rate chosen in SeaCast and communicate at that baud rate. If the baud rate is changed in SeaCast the power to the instrument must be cycled to re-establish communications at the new baud rate.

Some instruments are set up to communicate at fixed baud rates. In this case the baud rate in SeaCast must be set to the same baud rate as the instrument. If the instrument baud rate is unknown, the 'Scan' switch below the 'Baud Rate' field can be used to have SeaCast cycle through all the baud rates to try to detect the instrument baud rate.



The "Status" field shows the status of the communications with the instrument. The green light indicates that communications have been established with the instrument. During the identification process, SeaCast is determining the type and serial number of the instrument and any connected sensors. During the settings process, SeaCast is determining the latest sampling and logging settings that were programmed into the instrument. When all the required handshaking has been completed, the 'Status' field will show "Connected" and the user may now use the instrument.

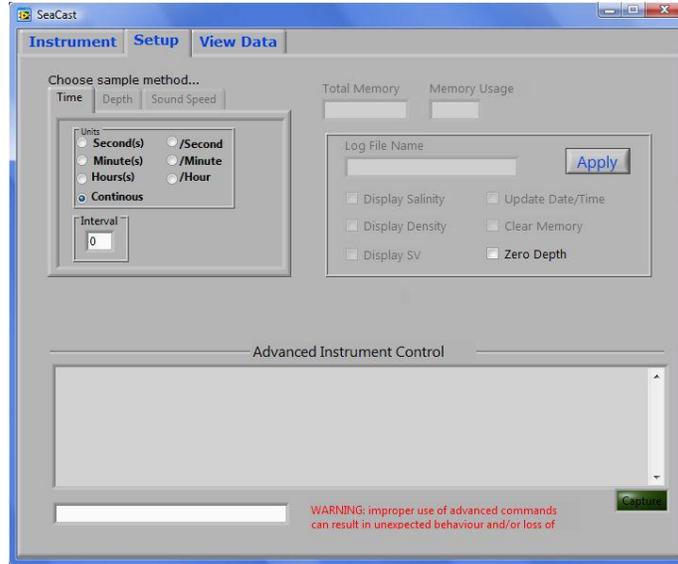


The Detect Instrument button forces SeaCast to re-detect and re-identify the instrument and its sensors.

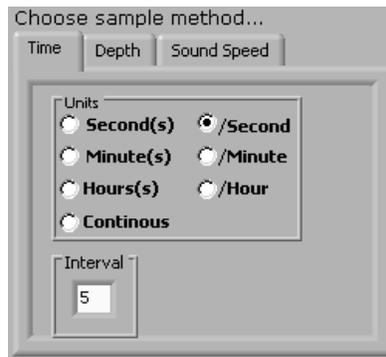


## Configuring the Selected Instrument

After the instrument has been detected by SeaCast, select the Setup tab at the top of the SeaCast window.



The box in the upper left of the Setup page controls the sampling of the instrument. The Micro SV can be programmed to sample at various sampling rates (ie. sample 10 times per second, 10 times per hour, every 5 seconds, etc.)



## ***Configuring Sampling Parameters with HyperTerminal***

Instruments can also be configured for deployment using HyperTerminal or other terminal emulation programs. As with SeaCast, communications with the instrument must be established. The following steps must be completed by issuing text commands.

Please consult the Commands section of the Appendix for full syntax details on how to issue commands. The following are typical commands issued using HyperTerminal:

|                      |  |
|----------------------|--|
| >s                   | Scan, sample 1 sound velocity reading                |
| >m                   | Monitor, sample at the programmed sampling rate      |
| >set s 2/s           | Set the sample rate to two per second                |
| >set s 1m            | Set the sample rate to 1 minute                      |
| >set startup monitor | Set the instrument to monitor on power up.           |
| >set startup prompt  | Set the instrument to wait for a command on power up |

## ***Monitoring Real Time Data***

- Ensure the pre-deployment procedures have been done
- Ensure that the sampling rate desired has been selected.
- Plug the data/power cable into the instrument. If you power the instrument over a long cable, please note the following:
  - The longer the cable the higher the voltage drop on the cable. The voltage drop on a standard AML Oceanographic cable, with a Micro SV, is about 1 volt per 200m of cable while sampling.
  - The instrument's auto shutdown voltage has a default level of 8 volts
  - The voltage at the instrument, while sampling, must be above this level for the instrument to operate
  - The instrument's maximum voltage is 26 volts
- Lower the instrument until it is just submerged. Keep the instrument at this depth for 2 minutes prior to beginning the cast. This allows the sensors time to wet and the pressure case to shed heat.
- Begin monitoring data using SeaCast or HyperTerminal.

## ***Post-Deployment Procedures***

- When the instrument is pulled from the water it should be rinsed in fresh water
- **Dry the area around the connectors with a clean cloth or compressed air prior to disconnecting the cable**
- Remove the shorting plug or cable.
- Dry the instrument and stow it, preferably in the shipping container for protection.

## Maintaining the Instrument

### *Periodic Maintenance*

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

- If the instrument is very 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 use check for nicks and cuts on the cable
- After each use
  - Clean and rinse the instrument using fresh water
  - Dry and safely store the instrument
- Monthly
  - Lubricate the connector contacts with a silicone spray
  - Lubricate the retainer rings with silicone grease
- Yearly
  - Send the instrument to a service centre for diagnostics and re-calibration

## Communications

### *PC Settings*

The Micro SV will communicate via RS-232 ASCII unless configured otherwise at the time of purchase. The computer to which the instrument is connected must be set up as follows:

- 8 bits
- 1 stop bit
- No parity
- No hardware handshaking
- Baud rate of 600, 1200, 2400, 4800, 9600, 19,200 or 38,400 baud

After power up, the Micro SV will wait for an ASCII carriage return. The instrument will automatically detect the baud rate unless specifically programmed for a fixed baud rate.

## Output Formats

### Power-up header output

On power up the Micro SV will output a header identifying the instrument, followed by a prompt.

```
Micro SV Sensor V1.42 SN:7125-SV  
Copyright 2003, Applied Microsystems Ltd.
```

>

### Data output formats

The data output format for the standard Micro SV is 4 digits followed by a decimal point followed by two digits. The sound velocity output is in units of m/s.

#### Scan output

```
1487.25  
>
```

#### Monitor output

```
1487.25  
1487.26  
1487.24
```

### Output on power up options

The using the following commands commands the instrument can be configured to output scans at the programmed sampling rate immediately after power up. Note that the power up header will be disabled.

|                     |  |
|---------------------|--|
| SET STARTUP MONITOR | Sets the instrument to monitor on power up   |
| SET DETECT 07       | Forces a baud rate of 38400. Without this command the instrument will be in autobaud mode and will wait for a user input on power up to determine the baud rate, which then interrupts the monitor mode. |

```
1487.28  
1487.25  
1487.26  
1487.24  
...
```

Hitting the ENTER or SPACE keys will interrupt the output and allow the user to send commands to the instrument.

To reset the instrument to the factory settings issue the following commands:

|                    |  |
|--------------------|--|
| SET STARTUP PROMPT | Sets the instrument to prompt for a user command on power up |
| SET DETECT A7      | Sets the instrument to autobaud mode                         |

```
Micro SV Sensor V1.42 SN:7125-SV  
Copyright 2003, Applied Microsystems Ltd.
```

>

## Customer Support

### *Troubleshooting*

Instrument fails to communicate:

- Check the cables
  - Is the data power cable connected to the instrument and computer?
  - If using a cable other than an AML Oceanographic cable, it should be configured as a null modem cable
  - If using multiple cable lengths, the extensions should not be configured as null modem cables
  - Are there any cuts in the cable?
- Is power applied? Power should be 8 to 26 volts DC at 50 mA.
- If using external power over a long cable, check the voltage drop over the cable. Measure the voltage across a ¼ watt, 200Ω, resistor across pins 1 and 4 of the cable. The voltage must be above 8 volts.
- Are the communication settings in the program used on the computer correct?
  - Comm port selection
  - 8 bits
  - 1 stop bit
  - No parity
  - No hardware handshaking
  - Baud rate between 2400 and 38,400 baud
- Are the communication settings in the instrument correct?
  - Was the instrument set to a fixed baud rate last time? If so, the user must use that baud rate to resume communications
  - Was the instrument set to RX OFF last time? If so, a carriage return must be sent to the instrument immediately after power is applied to interrupt this mode. This is most easily done by holding down the enter key as soon as power is applied. Character reception on power up can be re-enabled using the SET RXON command.
  - Was the instrument set to monitor on power up mode? If so, a carriage return must be sent to the instrument immediately after power is applied to interrupt this mode. To disable monitoring on power up use the SET STARTUP PROMPT and SET DETECT A7 commands.
- Is the connector damaged?

Instrument generates noisy data:

- Are there bubbles on the SV sensor?
- Is the SV sensor clean?
- Is there noise on the power supply? Transient noise on the power supply lines should be less than 20 mV in amplitude.
- Is there noise on the com lines? Transient noise on the communication lines should be less than 20 mV in amplitude.
- Are there close sources of electromagnetic interference, such as switching power supplies, inverters, radios, electric motors with brushes? Separate the sensor and data/power cable from the interference source.

### ***AML Oceanographic Contact Info***

#### Service:

To request an RMA or technical support

Email: [service@AMLOceanographic.com](mailto:service@AMLOceanographic.com)

Phone: 1-250-656-0771

Fax: 1-250-655-3655

#### Sales:

For all general sales inquiries

Email: [sales@AMLOceanographic.com](mailto: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 documentation, view instrument details and diagnostic reports. It also allows AML Oceanographic customers to gather technical documentation, troubleshooting guides etc. RMA requests or technical support queries may also be submitted through the portal

For access to the Customer Portal, please click on the Client Service & Support button, located on the left hand side of the AML Oceanographic home page.

Alternatively, the direct web login address is:

[https://na3.salesforce.com/secur/login\\_portal.jsp?orgId=00D3000000007DR&portalId=0605000000D0Vj](https://na3.salesforce.com/secur/login_portal.jsp?orgId=00D3000000007DR&portalId=0605000000D0Vj)

#### Mailing and Shipping Address:

AML Oceanographic.

2071 Malaview Ave.

Sidney, BC, Canada

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## Appendices

### Commands

When using SeaCast, the command set is not usually necessary. However, text commands are available. Below is a listing of commonly used commands.

| Command              | Short form                        | Description   |
|----------------------|-----------------------------------|---|
| SCAN                 | S                                 | Takes a single data sample  |
| MONITOR              | M                                 | Repeatedly takes samples at the programmed sampling rate. This can be interrupted by pressing the ENTER key.  |
| VERSION              | V                                 | Displays the instrument header information  |
| SET SAMPLE RATE n/u  | SET S C<br>SET S 10/s<br>SET S 2m | Changes the sampling rate in numbers and units. I.e. Continuous (25 per second), 10 per sec, 2 minutes, 1 hour, etc. The range is 25/s to 1 hour.   |
| DISPLAY SAMPLE RATE  | DIS S                             | Displays the current sampling rate  |
| SET STARTUP MONITOR  | SET STARTUP M                     | Instrument will start monitoring on power up.   |
| SET STARTUP PROMPT   | SET STARTUP P                     | Instrument will issue a prompt on power up and wait for a command   |
| DISPLAY COEFFICIENTS | DIS C                             | Displays the current calibration coefficients   |
| SET DETECT ab        | SET DET ab                        | Set the baudrate auto detection parameters. a is the number of detection attempts (0=fixed baudrate, 1= 1 attempt, up to F=15 attempts) and b is the baudrate to default to if autobauding is not successful (1=600, 2=1200, 3=2400, 4=4800, 5=9600, 6=19200, 7=38400, 8=57600 SV.X only, 9=115200 SV.X only) |
| SET RXON             | SET RXON                          | Enables the reception of commands at next power up  |
| SET RXOFF            | SET RXOF                          | Disables reception of characters at next power up. To exit the RXOFF mode, hold down the carriage return key and power up the unit, then from the prompt, issue the SET RXON command.   |

## Technical Specifications

### Sensors

| Time of Flight Sound Velocity Sensors |           |             |           |                  |           |            |               |
|---------------------------------------|-----------|-------------|-----------|------------------|-----------|------------|---------------|
| Status                                | Type      | Path Length | Accuracy  | Range            | Precision | Resolution | Response Time |
| Standard                              | Composite | 33 mm       | ±0.05 m/s | 1400 to 1600 m/s | ±0.03 m/s | 0.015 m/s  | 47 µs         |

### Electronics

- Standard
  - Able to operate as stand-alone units or in conjunction with a data logger board
  - Composed of 2 boards
  - Micro SV – sound velocity board
  - Micro 232 – RS-232 communications board

### Communication Protocols

| Communication Protocols |        |   |                              |                          |
|-------------------------|--------|---|------------------------------|--------------------------|
| Status                  | Type   | Communication                                   | Baud Rate                    | Serial Ports             |
| Standard                | RS-232 | Direct with computer or data logger             | Automatic (2400 to 38,400)   | Own port on host machine |
| Optional                | RS-485 | Multiple instruments communicate through 1 port | Factory Set (2400 to 38,400) | Single port              |

### Power Requirements

| External Power Supply |          |                          |                          |
|-----------------------|----------|--------------------------|--------------------------|
| Status                | Type     | Power                    | Capacity                 |
| Standard              | External | Via data/power connector | 40mA at 8 to 26 volts DC |

### Mechanical Materials

| Housing  |          |              |             |              |                   |                 |
|----------|----------|--------------|-------------|--------------|-------------------|-----------------|
| Status   | Type     | Depth Rating | Diameter    | Length       | Weight (in water) | Weight (in air) |
| Standard | Delrin   | 500m         | 33mm (1.3") | 214mm (8.4") | 50g               | 160g            |
| Optional | Titanium | 10,000m      | 33mm (1.3") | 214mm (8.4") | 240g              | 350g            |

## Connectors

| <b>Bulkhead Connectors</b> |          |       |        |          |              |
|----------------------------|----------|-------|--------|----------|--------------|
| Type                       | Status   | Pins  | Sex    | Material | Manufacturer |
| Micro                      | Standard | 6 Pin | Female | SS316    | Impulse      |
| Micro                      | Standard | 6 Pin | Female | Titanium | Impulse      |
| Circular                   | Optional | 4 Pin | Female | Brass    | Subconn      |
| IE55                       | Optional | 6 Pin | Male   | Titanium | Impulse      |
| Micro                      | Optional | 8 Pin | Female | SS316    | Impulse      |
| Micro                      | Optional | 8 Pin | Female | SS316    | Subconn      |
| Micro                      | Optional | 8 Pin | Female | Titanium | Subconn      |

### Sampling Capabilities

- Samples up to 25 times per second
- Zero response time to temperature change

### Software

- SeaCast

### Accessories

- Comes Complete With
  - 2m Data/Power Pigtail
  - Software & Manuals
- Optional Accessories
  - Instrument Suspension Bar
  - Instrument Protection Frame

### Ordering Code

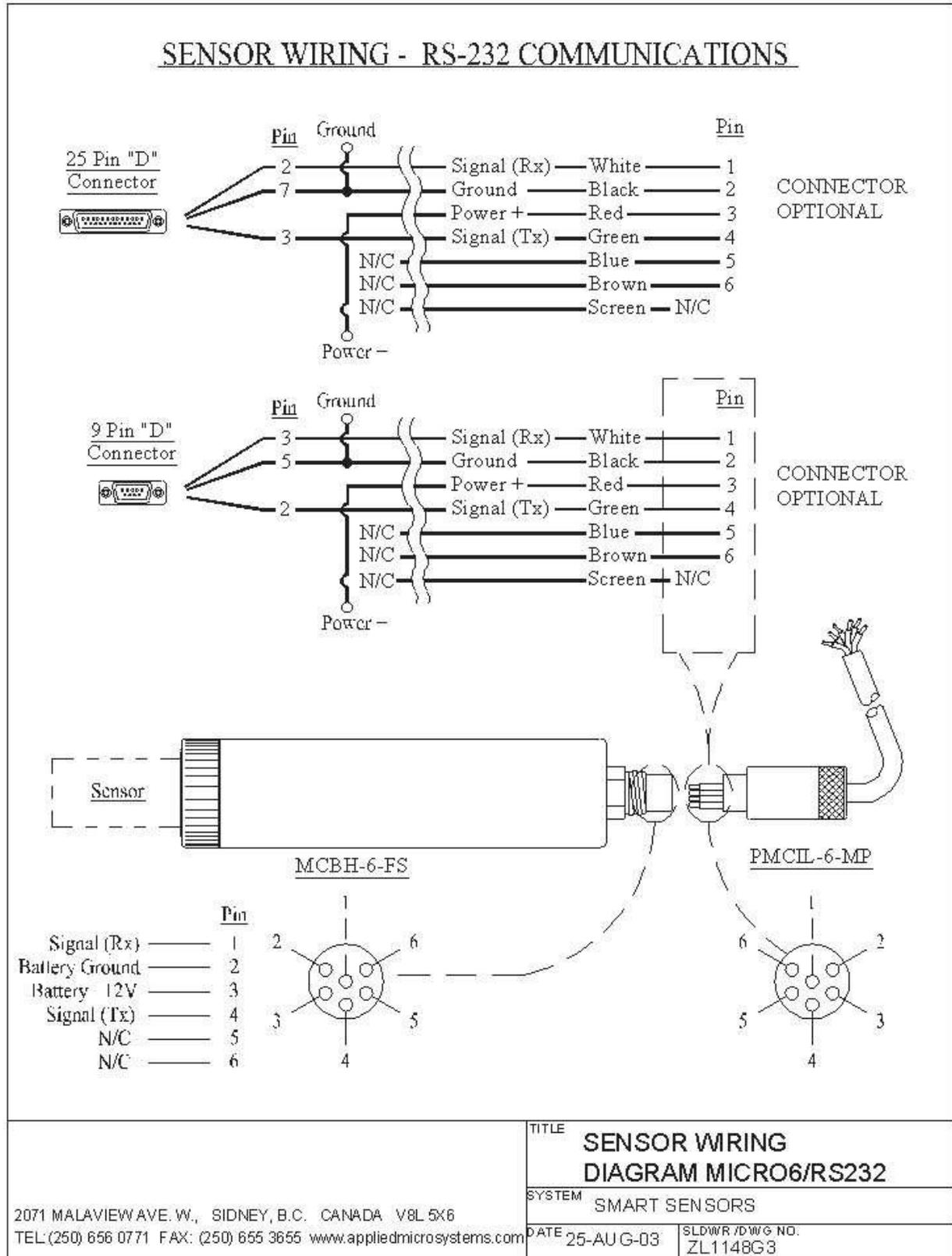
- PDC-A1100

## ***Warranty***

AML Oceanographic warrants the instrument for a period of one year from the date of delivery. AML Oceanographic will repair or replace, at its option and at no charge, components which prove to be defective. The warranty applies only to the original purchaser of the instruments. The warranty does not apply if the instrument has been damaged, by accident or misuse, and is void if repairs or modifications are made by other than authorized personnel.

This warranty is the only warranty given by AML Oceanographic. No warranties implied by law, including but not limited to the implied warranties of merchantability and fitness for a particular purpose shall apply. In no event will AML Oceanographic be liable for any direct, indirect, consequential or incidental damages resulting from any defects or failure of performance of any instrument supplied by AML Oceanographic.

**Wiring Diagram**



**Mechanical Drawing**

