

# Seanet System (Attitude Sensor) Supplement

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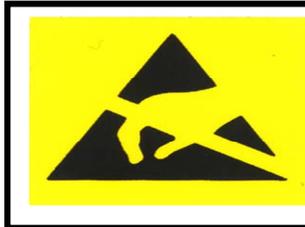
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## Handling of Electrostatic-Sensitive Devices



### Attention

Observe Precautions for handling  
Electrostatic Devices

### Caution

## Handling of Electrostatic-Sensitive Devices

Certain semiconductor devices used in the equipment are liable to damage due to static voltages.

Observe the following precautions when handling these devices in their unterminated state, or sub-units containing these devices:

- Persons removing sub-units from any equipment using electrostatic sensitive devices must be earthed by a wrist strap via a 1M $\Omega$  resistor to a suitable discharge reference point within the equipment.
- Soldering irons used during any repairs must be low voltage types with earthed tips and isolated from the Mains voltage by a double insulated transformer. Care should be taken soldering any point that may have a charge stored.
- Outer clothing worn must be unable to generate static charges.
- Printed Circuit Boards (PCBs) fitted with electrostatic sensitive devices must be stored and transported in appropriate anti-static bags/containers.

F110.0

## Warranty Statement

**Tritech International Limited** herein after referred to as **TIL**

TIL warrants that at the time of shipment all products shall be free from defects in material and workmanship and suitable for the purpose specified in the product literature.

The unit/system warranty commences immediately from the date of customer acceptance and runs for a period of 365 days. Customer acceptance will always be deemed to have occurred within 72 hours of delivery.

**Note:** Any customer acceptance testing (if applicable) must be performed at either TIL premises or at one of their approved distributors unless mutually agreed in writing prior to despatch.

### Conditions:

**These include, but are not limited to, the following:**

- 1 The warranty is only deemed to be valid if the equipment was sold through TIL or one of its approved distributors.
- 2 The equipment must have been installed and commissioned in strict accordance with approved technical standards and specifications and for the purpose that the system was designed.
- 3 The warranty is not transferable, except or as applies to Purchaser first then to client.
- 4 TIL must be notified immediately (in writing) of any suspected defect and if advised by TIL, the equipment subject to the defect shall be returned by the customer to TIL, via a suitable mode of transportation and shall be freight paid.
- 5 The warranty does not apply to defects that have been caused by failure to follow the recommended installation or maintenance procedures. Or defects resulting from normal wear & tear, incorrect operation, fire, water ingress, lightning damage or fluctuations in vehicles supply voltages, or from any other circumstances that may arise after delivery that is out with the control of TIL.  
(**Note:** The warranty does not apply in the event where a defect has been caused by isolation incompatibilities.)
- 6 The warranty does not cover the transportation of personnel and per diem allowances relating to any repair or replacement.
- 7 The warranty does not cover any direct, indirect, punitive, special consequential damages or any damages whatsoever arising out of or connected with misuse of this product.
- 8 Any equipment or parts returned under warranty provisions will be returned to the customer freight prepaid by TIL.
- 9 The warranty shall become invalid if the customer attempts to repair or modify the equipment without appropriate written authority being first received from TIL.
- 10 TIL retains the sole right to accept or reject any warranty claim.
- 11 Each product is carefully examined and checked before it is shipped. It should therefore be visually and operationally checked as soon as it is received. If it is damaged in anyway, a claim should be filed with the courier and TIL notified of the damage.

**Note:** TIL reserve the right to change specifications at any time without notice and without any obligation to incorporate new features in instruments previously sold.

**Note:** If the instrument is not covered by warranty, or if it is determined that the fault is caused by misuse, repair will be billed to the customer, and an estimate submitted for customer approval before the commencement of repairs.

F167.1

## Safety Statements



**Caution!**

Throughout the manual certain safety or operational related comments and requirements will be highlighted to the operator by indications identified by the adjacent symbol and text.

## Technical Support

### Contact your local agent or Tritech International Ltd

	<b>Mail</b>	<i><b>Tritech International Ltd.</b></i> Peregrine Road, Westhill Business Park, Westhill, Aberdeen, AB32 6JL, UK
	<b>Telephone</b>	++44 (0)1224 744111
	<b>Fax</b>	++44 (0)1224 741771
	<b>Email</b>	support@tritech.co.uk
	<b>Web</b>	www.tritech.co.uk

**An out-of-hours emergency number is available by calling the above telephone number**

If you have cause to use our Technical Support service, please ensure that you have the following details at hand **prior** to calling:

- System Serial Number (if applicable)
- Fault Description
- Any remedial action implemented

Due to the expansion of equipment capabilities and the fact that new sub-modules are continually being introduced, this manual cannot detail every aspect of the operation.

The name of the organisation which purchased this system is held on record at *Tritech International Ltd.* Details of new software and hardware packages will be announced at regular intervals. Depending on the module, free upgrades will be offered in keeping with our policy of maintaining the highest levels of customer support.

*Tritech International Ltd* can only undertake to provide software support for systems loaded with Operating System and Tritech Seanet software in accordance with the instructions given in the System Re-installation section of this manual. It is the customers responsibility to ensure the compatibility of any other package that they may choose to load unless with the prior consent of *Tritech.*

## **SECTION 1**

### **1.1.1 General Overview**

The Trittech Attitude Sensor connects to the ArcNet LAN alongside Sonars, Profilers and Bathy. It therefore shares the same communications pair and has a unique ArcNet Node number. It is powered from the same 24VDC as other SeaKing devices on the network.

The Attitude angle data is sampled at a rate of 10Hz, which incidentally can be adjusted in the surface software Setup if desired although 10Hz is a good optimum. At the surface the Attitude angle data is applied to the Profiler data and the Profiler display is corrected. The Attitude data can also be transmitted out the surface unit's serial port in order to be applied to other systems and devices.

### **1.2 Attitude Sensor Specifications**

Total range	:	+/-60°	
Linear range	:	+/-45°	
Threshold	:	0.001°	
Linearity	:	+/-0.1° (Null to 10°)	+/-1° (10° to 45°)
Null repeatability	:	0.05°	
Time Constant	:	0.3 sec	
Freq. response (-3dB)	:	0.5 Hz	
Operating temp	:	-10 to +35°C	
Storage temp	:	-50 to +50°C	
Voltage	:	18-36 VDC	
Weight in Air	:	3.0 kg	
Weight in Water	:	1.8 kg	
Length	:	187 mm	
Diameter	:	110 mm	
Communications	:	ArcNet	

## **SECTION 2**

### **2.1 Installation & Configuration Details**

The electronics are contained within the body tube in dry air at one atmosphere pressure. The body is machined from aluminium alloy, and has a hard-anodised coating.

The SEAKING and SUPER SEAKING heads are supplied with their own water-block / connector with a length of polyurethane jacketed cable. Depending on the specification of the system, this cable will either need to be terminated to a suitable connector appropriate to the operators equipment, or may be supplied with a cable assembly to one or more additional connectors.

The water-block is fastened to the body tube of the head, and provides a 4000metre rated pressure bulkhead. This will protect the electronics from water ingress in case the connector is damaged or fitted incorrectly. The connector may be disconnected from the heads by unscrewing the four securing screws and removing the connector from the water-block.



**Caution!**

**It is not necessary to remove the water block when removing the connector or taking the head apart.** Whilst the connector is removed from the head, the blanking plugs supplied should be fitted to prevent the ingress

#### **2.1.1 Seanet Software**

The **SEANET** Windows® software will be provided either on an Installation CD (for SKIM-100 interface to user PC/Laptop) or pre-installed on the Seanet SCU.

For the CD Installation, if Setup does not auto-run on disc insertion, run the SETUP.EXE file from the disc to start the installation. Details for installing or re-installing software can be found in the System section of the manual.

### **2.2 Installing the Attitude Sensor**

Although the SEAKING and SUPER SEAKING heads are rugged, they should be handled with care. The Attitude Sensor should be secured by clamping on the cylindrical body section. Any metallic clamps should be electrically insulated from the body by means of rubber or plastic strips or mount brackets of at least 3-mm thickness and extending at least 3 mm beyond the clamp boundary to reduce any galvanic corrosion effect. Non-metallic clamps are preferable: if metallic clamps are used (especially if they are other than aluminium) they should be painted or lacquered with at least two or three coatings. Brass or bronze materials should be avoided unless they have aluminium content as their copper content may cause serious corrosion problems when in proximity to aluminium components.



**Caution!**

**Care should be taken when mounting the Attitude Sensor to ensure it is mounted as close to the true horizontal as possible in relation to the trim position of the vehicle. The Attitude Sensor should be mounted on the vehicle with the connector port facing the rear of the vehicle (see example on next page).**

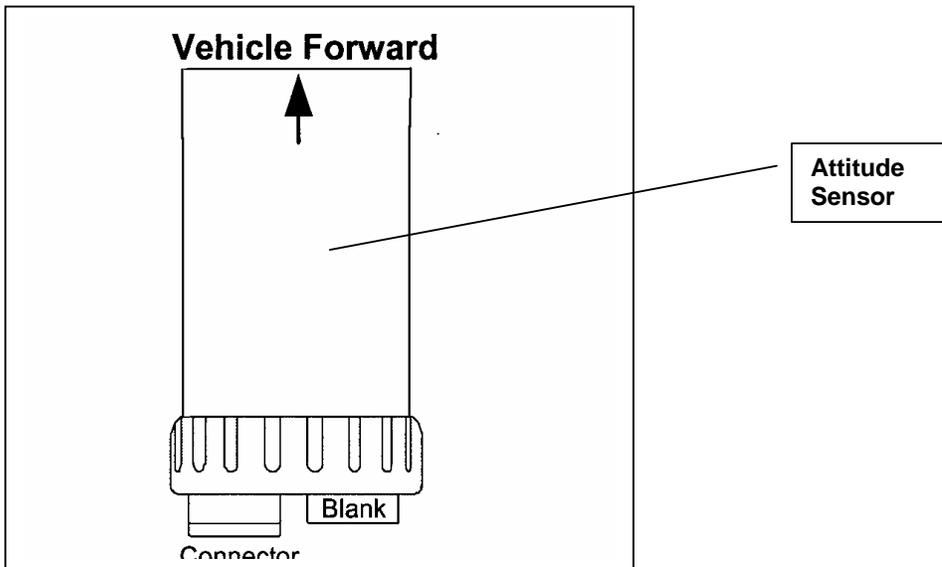
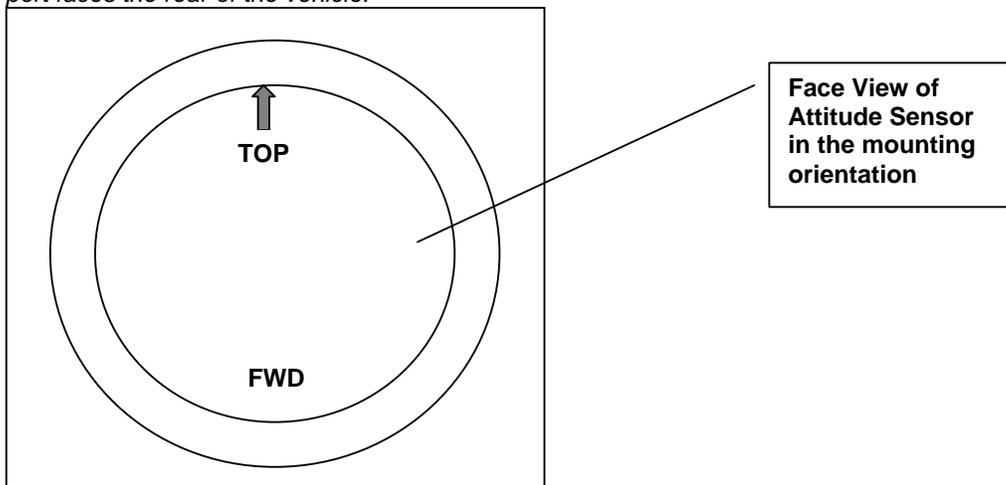


Fig 2.1 Attitude Sensor Orientation

**Note:** This is the same as the normal mounting orientation for the Profilers, where the connector port faces the rear of the vehicle.



Also, on the face of the Attitude Sensor bottle is marked the 'TOP' orientation position. This should be adhered to when mounting;

## 2.2.1 SeaKing Communication Configuration

The Attitude Sensor head may form part of an ArcNet multi-drop network of sensors that are normally interfaced to the Surface Unit through the internal AIF interface PCB (located in slot 7 of the SCU) or external SKIM-100 serial interface module. Full details of all the connections are contained in the main System manual.

Normal communications with the Attitude Sensor is via a customised version of the ARCNET network system and requires a good quality balanced twisted pair cable. It is possible to interface the ARCNET to wide band multiplexer systems, contact Tritech for details.



**Caution!**

*The 'ARCNET' requires termination resistors to be fitted at each end of the umbilical. Normally this is supplied fitted within the D connector at the surface, and is left for the user to fit at the subsea end in a convenient 'J' box. This is the easiest method to adopt when using multiple sensors on the network. However, if just one device is in use it may be more convenient to fit the resistor inside that unit. Devices fitted with a termination resistor should be appropriately labelled - the user can check by measuring the resistance between pins 1 and 2 on the waterblock connector.*

The SEANET SCU and SEAKING heads cannot be used with RS-232 / RS-485 AIF Cards as used in earlier WINSON based SCU-3 systems. They must be used with SeaKing AIF ArcNet cards (AIFV3/V4). Conversely, RS-232/RS-485 Series 2 Sonar, Profiler and other heads cannot be directly used with SEAKING/SEANET systems. Contact Tritech or local agent for details.

An optional RS-232 interface can be provided to allow telemetry connection through a fibre optic system capable of 115kbaud transmission. The RS-232 interface is available in the guise of an RS-232 to ARCNET 'converter' PCB that is installed in a dry pod on the vehicle. Alternatively, an intelligent 4000m pressure rated Junction Box will provide the RS-232 interface to the network of SeaKing ARCNET devices.



**Caution!**

*There is a single-head RS-232 option built into SeaKing heads but this is not multi-drop.*

## 2.2.2 Subsea Sensor Electrical Installation

The Super SeaKing and SeaKing ranges of Subsea Sensors are designed to work from a smoothed DC power supply of 18v-36v DC (Absolute Maximum 36v DC).

If using a rectified transformer PSU, the output of the PSU must have a filter capacitor of not less than 470µF, for each head being powered. If an unregulated PSU is used, then make sure that the voltage value measured at the head is in the range 18-36v DC, in power on/off and running conditions. If powering the head(s) down a long lead or umbilical, the maximum recommended loop resistance of the power line must not exceed 10Ω for one head, 5Ω for two heads, and 3Ω for three heads. If the supplied voltage is less than 18v dc the head may not operate correctly.



**Caution!**

**Never try to make the Super SeaKing, SeaKing or SeaPrince system heads work down a long cable by increasing the PSU output voltage above 36v DC. A 48VDC PSU Option is available that will allow operation up to 70VDC for long line applications.**

### 2.2.3 Ground Fault Monitoring Equipment

The power supply within SEAKING subsea heads includes an electrically isolated DC-DC converter front-end, There is a small capacitive connection to the sonar chassis which should not noticeably affect any impressed current ground fault indicator (GFI) equipment.

### 2.2.4 Profiler Head Subsea Interconnect Cabling

The Underwater Connector supplied is Tritech 6-way. The wiring code is shown below.



**Caution!**

The numbers shown relate to all schematic diagrams (not a DIN style format). Ignore any moulded numbers by the pins.

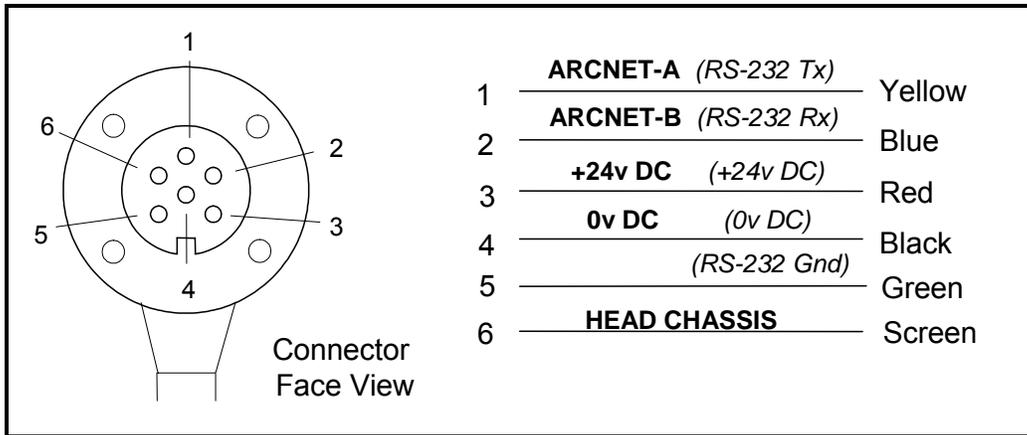


Fig 2.2 Tritech 6-Way Underwater Connector - ARCNET Wiring Configuration

*Pin-outs for optional single-node RS-232 communications are shown in italics.*

Refer to the “Seanet Pro Sensor Communication Manual” for more information on RS232 configuration and baud setup.

### 2.2.5 ArcNet Line Termination

The ArcNet communication link normally requires termination resistors to be installed at each end of the umbilical cable. These resistors are fitted between each line of the twisted pair.

For twisted pair cables that are below 100 metres in length, it is only necessary to install one termination resistor of value between 47 to 100 ohms (68 ohms nominally).

For twisted pair cables that are greater than 100 metres in length, two termination resistors should be installed, one at either end of the cable. At the surface SKIM-100 connection point, a **270 ohm** resistor should be fitted. At the subsea end of the cable, a **39 ohm** resistor should be fitted – if there is more than one Sensor connected then this resistor should be fitted at the junction / splice point of the cable.

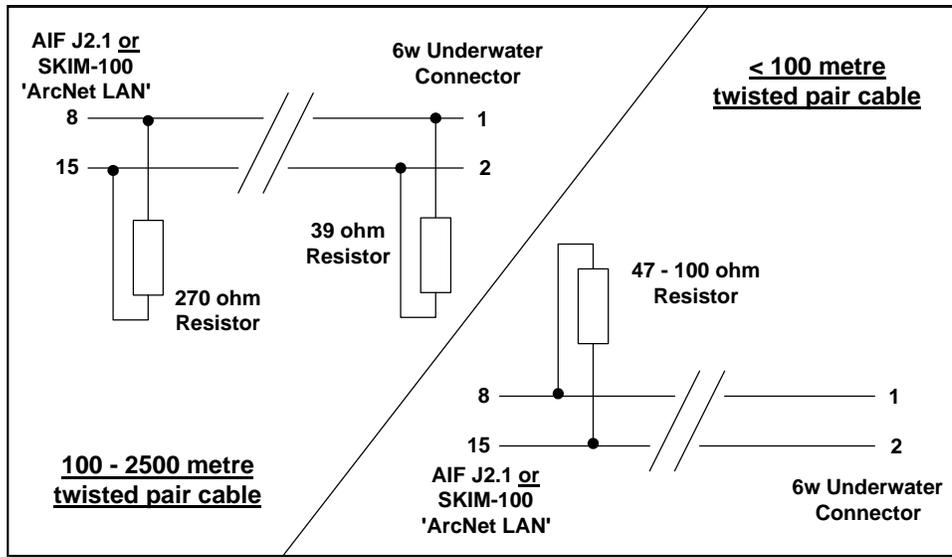


Fig 2.3 SeaKing Communication wiring diagram



**Caution!**

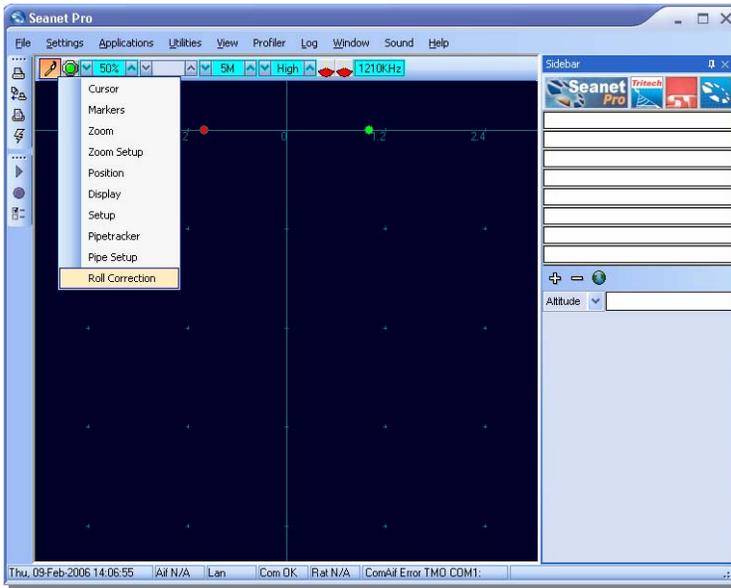
For twisted pair cabling that is greater than around 1200m in length, the ArcNet 'Half baud' rate of 78.1kBaud should be configured (consult System manual).

### 2.3 Using the Attitude Sensor

The Attitude Sensor was introduced in the Seanet Pro software V1.13. It is an ancillary device that will connect alongside SeaKing, Super SeaKing and SeaPrince Profiler head(s). The profiler display data will be corrected with the angular data received from the Attitude Sensor. The Attitude data can then be forwarded out a serial port using the REMV4 application. Roll Angle data will also be appended at the end of the REMV4 Profiler data strings whenever the Attitude Sensor is connected and is operational.

The Attitude Sensor connects to the SeaKing network as a standalone device. Its nodal address is **Node 60**.

When a Profiler application is selected, the Attitude Sensor can be enabled from within the **Profiler Tools** menu;



Click on the 'Roll Correction' item which will open the following 'Roll Correction' page;



To enable the Attitude Sensor and apply angular corrections to the Profiler data, enable the '**Roll Correct**' check-box.

When 'Roll Correct' is enabled, the Profiler will be instructed to transmit a data reply to the surface that includes an appended data string. This appended data string will contain time data for each of the pings (points) within the profile. For instance, if a profile has 201 points, the profiler will send to the surface a data reply with a 201 point record which has 201 ping times appended at the end of the message.

The Attitude Sensor transmits its angle data with a time stamp and at the surface, the Attitude angle data and Profiler data will be synchronised using each of the ping times and the Attitude angle time-stamps. This therefore means that each point within the profile will be corrected with the Attitude angle at the time the point was sampled.

Inside the Attitude Sensor and Profilers is an onboard clock which are synchronised on startup (the Seanet Pro software sends down a Time message to each node applied), therefore Profiler and Attitude Sensor sample times will be closely synchronised.

### **2.3.1 Profiler Serial Data Output**

When a Profiler application is run which has the 'Roll Correct' enabled, there will be appended data attached to the end of the standard Profiler (REMV4) data message transmitted out the surface unit's serial port. This appended data will be one of 2 forms dependant on whether or not the Attitude Sensor is active and producing valid data. The appended data will start with '#' or '\*' to signify the form of the data.

The Profile Data Points at the end of the standard Profiler message are always uncorrected for Attitude. When the Attitude Sensor is active, the appended data that will follow will include all the Attitude angle corrections that should be applied to correct each of the Profile Data Points. By appending this Attitude data separately, the user has the choice whether or not to apply them to the uncorrected Profile Data Points. If the Attitude Sensor is not activated, the appended data will be of the form that states the ping times for each of the Profile Data Points. The option is therefore available to integrate and synchronise the time-stamped data with another 3<sup>rd</sup> part Attitude sensor.

Details of the REMV4 Profiler data string can be found in the Seanet Remote Communications operator's manual.