APPLIED ACOUSTICS
Underwater Technology

Streamer Hydrophone
Operation Manual

Applied Acoustic Engineering Ltd
Marine House, Marine Park
Gapton Hall Road
Great Yarmouth NR31 0NB
United Kingdom

T +44(0)1493 440355
F +44(0)1493 440720
E general@appliedacoustics.com
W www.appliedacoustics.com

Revision History

Issue	Change No.	Reason for change	Date
7	868	Inclusion of Hydrophone Model AH610/24 LF.	13/01/11
8	904	Update of Material Safety Data Sheet 561 Silicon Transformer Liquid. Replace version 1.8 (02.02.2009) with updated version 2 (20.09.2010)	07/04/11
9	1403	Inclusion of Hydrophone Model AH1000/20 LF.	29/10/13

Table of Contents

Thank you for choosing Applied Acoustic Engineering as one of your subsea equipment suppliers. We hope you experience many years of reliable operational use from our products.

If you do encounter any technical issues with any of our products then please don't hesitate to contact our Technical Team via the following methods.

Tel: +44 (0)1493 440355
Fax: +44 (0)1493 440720

Email: techsupport@appliedacoustics.com

Applied Acoustic Engineering Ltd has made every effort to ensure that the information contained in this manual is correct at time of print. However our policy of continual product improvement means that we cannot assume liability for any errors which may occur.

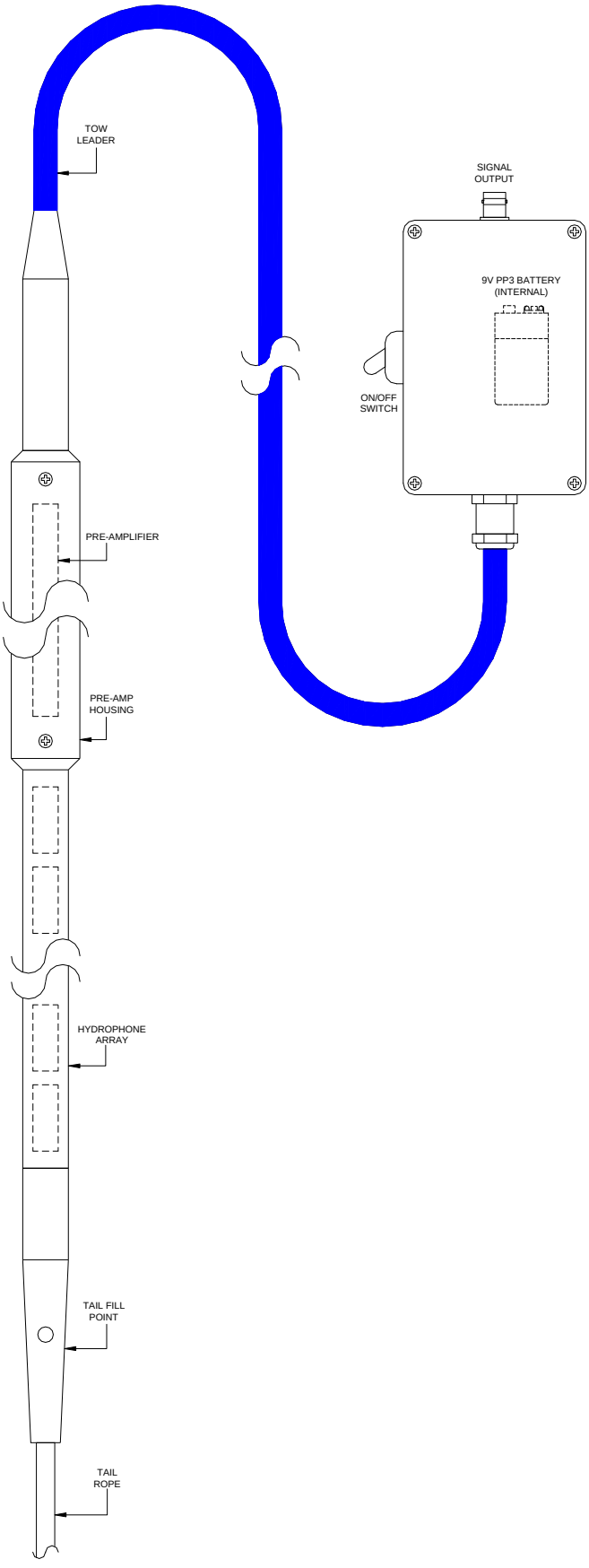
These written instructions must be followed fully for reliable and safe operation of the equipment that this manual refers to. Applied Acoustic Engineering Ltd cannot be held responsible for any issues arising from the improper use or maintenance of equipment referred to in this manual or failure of the operator to adhere to the instructions laid out in this manual. The user must be familiar with the contents of this manual before use or operation.

1. Introduction

Streamer Hydrophones consist of a number of hydrophone elements which are wired together and fitted inside a fluid filled polyurethane tube. A pre-amplifier is employed to boost the signal and drive an electrical cable which also acts as the tow-leader.

The quantity of elements and their relative spacing's are used to control the receiving beam pattern of the streamer hydrophone and its receiving frequency band.

2. Parts Designation



3. Theory of Operation

The term ‘streamer’ is used to denote the fact that the device ‘streams’ behind the towing vessel. A tail rope is utilised at the rear end of the assembly to assist in towing stability.

The beam pattern of the streamer is designed for maximum attenuation along ships; to reduce the effect of ship noise when towing behind a vessel, and has maximum gain athwart ship (port to starboard) in order to detect the maximum signal possible from the seabed.

Streamer hydrophones by their very nature consist of a number of sensitive piezo-ceramic receiving elements. These elements are brittle and can be damaged by crushing, sharp blows or general abuse. Likewise the tow-leader, although robust should be handled in a way that undue abrasion is avoided, and should any cuts appear on the skin are repaired at the earliest opportunity.

The fluid inside the tube is known by its brand name of DC561, and should there be air bubbles inside the tube, standard de-odorised kerosene as used in some other streamers is not a suitable substitute. Should air bubbles be present, the lower end requires unscrewing and filled until all the air bubbles have dispersed.

4. Models Available

The Applied Acoustics’ mini-streamers are specifically designed for the broad frequency spectrum emitted by the AAE sound sources.

The following types are built for stock as the most common designs used by most organisations for usual water depths:-

Model	Number of Elements	Spacing
AH1	1	n/a
AH360/8	8	360mm
AH250/12	12	250mm
AH150/20	20	150mm
AH365/20	20	365mm
AH610/24 LF	24	610mm
AH1000/20 LF	20	1000mm

Hydrophone streamers can be made with different element spacing’s and different quantities of elements.

The standard pre-amplifier in the streamer includes a small degree of filtering to reduce unwanted noise below 140Hz and above 10 kHz. Other filters can be supplied if required.

The hydrophone pre-amplifier fitted to the Low Frequency streamer has a switchable filter to reduce unwanted noise below 115Hz and above 7.2 kHz. The Low Frequency model utilises an electrically differential signal drive for improved noise immunity with programmable pre-amplifier and top side signal conditioning.

5. Operation Considerations

An acoustically quiet towing position for the mini-streamer is critical for the quality of data acquisition. Usually, the quietest and least disturbed position with respect to the vessel is found at the stern at the either side of the propeller wash.

In practice this position can be achieved by towing the mini-streamer from a boom of perhaps some 4 – 5 metres long mounted close to the stern. In case the survey vessel has two propellers, the offset between the turbulent wake and the streamer may be increased by using one engine only while surveying.

The optimum towing position of the streamer must be considered as the determining factor for the overall source-streamer geometry, and some experimentation is usually required for an unfamiliar vessel.

The towing depth of the streamer below the water surface is of prime importance for the final shape of the reflected seismic signal as sensed by the streamer and ultimately displayed by the processor / recorder system. The streamer must be towed at such a depth that the up-travelling reflected seismic signal and the down travelling surface ghost will interfere constructively.

This is achieved at a depth corresponding to a time lag (T) equal to the time between the first minimum and the first maximum of the reflected pulse. For example if T is around 0.25ms. Assuming water velocity V = 1500 m/s, T corresponds to a path of 0.375m. From this follows that the optimum streamer depth will be 0.375 / 2 = 0.1875m.

As mentioned previously, it requires trial and error and experience to balance the streamer at the relevant depth. The weight of the tow-leader can be buoyed up with the help of close cell foam pipe insulation (Armstrong Armaflex is a suitable brand which is supplied in 2 metre lengths) which must be taped to avoid turbulence around the ends of the material. A faster tow speed will tend to lift the bow of the streamer. Additional weight or additions to the tail-rope may be required to keep the stern of the streamer at the correct level.

Vessel noise, water depth and seabed type are also inter-related. A combination of a hard bottom, relative shallow depth and a noisy vessel may result in sufficient reverberation that the overall noise will practically exceed the reflected seismic signal.

It is generally considered that the optimum survey speed for surface towed seismic profiling is approx 3 knots (Speed over the ground). At survey speeds above 4 knots, the noise on the streamer may result in severe degeneration of the data quality.

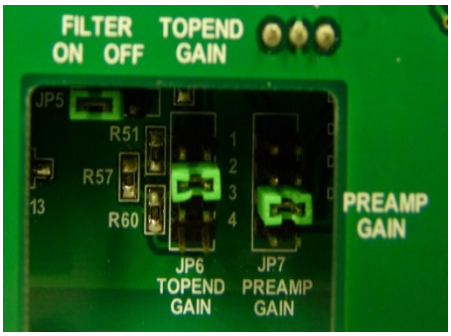
6. Operation

AH 1, 360, 250 and 150 Hydrophones

- Insert PP3 9VDC battery
- Connect BNC signal cable to seismic recorder
- Switch Hydrophone ON

AH 610 / 24 LF & AH 1000 / 20 LF Hydrophones

Configuration



- Select Filter In or Out via jumper
- Select Pre Amp Gain Level JP 7

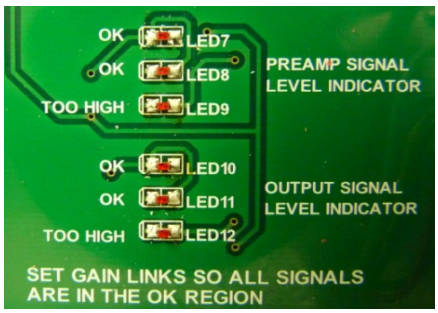
POS	GAIN
1	6dB
2	14dB
3	20dB
4	26dB

- Select Topside Amp Gain Level JP 6

POS	GAIN
1	-3dB
2	3dB
3	6dB
4	9dB

Operation

Signal Level Indicators:



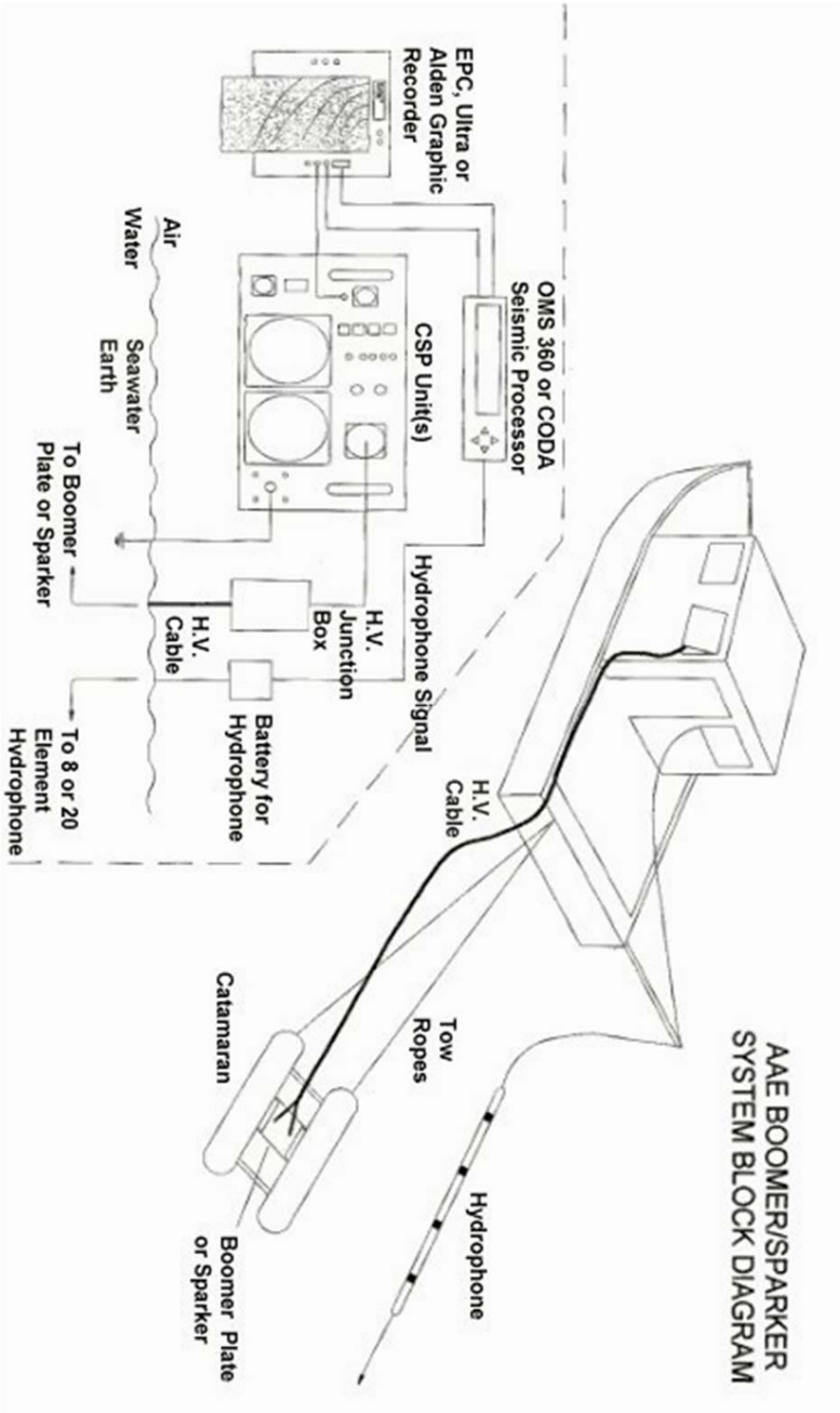
- Pre-Amp Signal Level Indicator
  Adjust gain levels so that amplifiers are not saturated indicated by LED 9

- Output Signal Level Indicator
  Adjust gain levels so that amplifiers are not saturated indicated by LED 12

Connections

- Connect Hydrophone to Power / Pre-amp Control
- Box Connect Ground to Ships Ground
- Connect 24VDC Input. (Positive connection = centre pin)
- Connect BNC signal cable to seismic recorder

7. Acquisition Configuration Example



8. Maintenance Procedures

The below procedures are advisory guidelines that are recommended.

Inspection Intervals

- **Pre-Deployment:**
  The recommended interval for a visual inspection is on every deployment of the streamer.
- **Monthly:**
  It is recommended that the streamer is electrically checked.

Visual Inspection (Pre Deployment)

- Check condition of hydrophone array for signs of water / air ingress.
- Check for mechanical damage / insecure fastenings.
- Check for water ingress into pre-amp housing – visual only.

Monthly Inspection (Pre Survey)

- Verify operation of hydrophone by performing ‘tap test.’
- Check condition of hydrophone array for signs of water / air ingress.
- Check for mechanical damage / insecure fastenings.

The Applied Acoustic Engineering Streamer hydrophones do not require regular servicing with the exception above operational inspections.

When storing for long periods it is recommended the unit is cleaned with fresh water.

9. Product Recycling / Disposal

Within the EU all electronic components and batteries must be taken for separate collection at the end of their working life under EU WEEE directives. Applied Acoustics as a manufacturer within the EU will responsibly dispose of any returned end of life Applied Acoustics components / batteries through a registered WEEE scheme. In order to prevent uncontrolled waste disposal and promote re-cycling please return any end of life Applied Acoustic components postage paid by sender to our UK head office. Please contact Tech Support for a RMA number prior to shipping.

10. Fault Identification and Rectification

Loss of data quality and electrical failure are the main faults that occur as a result of mechanical damage or component failure. These are generally identified by inspection or whilst acquiring sub bottom data. Environmental conditions can affect the performance of the hydrophone.

Below is a simple guide to identifying common faults that can occur.

Symptoms
- Intermittent or no data received on hydrophone.

Possible Causes
- Low Battery Voltage
- Hydrophone damage.
- Mechanical damage / Water Ingress to Pre-Amp.
- Source Malfunction.

Solution
- Inspect hydrophone assembly for damage.
- Verify operation of hydrophone by tap test / check battery SEE OVER PAGE FOR PROCEEDURE.
- If data intermittent check hydrophone array and cabling for continuity.

Symptoms
- Reduction in signal intensity.

Possible Causes
- Battery expired.
- Water Ingress.
- Mechanical damage.

Solution
- Replace battery if battery voltage is below 8V.
- Inspect hydrophone assembly for damage.

Symptoms
- Reduction in data quality.

Possible Causes
- Battery expired.
- Air in hydrophone resulting in noise and incorrect tow depth.
- Water in hydrophone resulting in noise and incorrect tow depth.
- Water Ingress / pre-amp malfunction.
- Mechanical damage.

Solution
- Replace battery if battery voltage is below 8V.
- Inspect hydrophone assembly for damage.
- Inspect hydrophone array for air / water ingress – re fill with ISOPAR and find leak. Rebalance if required.

Fault Identification and Rectification Cont

Tips:

A simple test can be carried out to ensure in air functionality. With a fresh battery inserted in the battery box, and the unit switched on, an oscilloscope can be used to check for a waveform each time the hydrophone is tapped.

If performance is poor, check that all cables or cable connections are electrically secure and sound. (Switch off CSP unit before checking).

Check that the unit is sitting in the water at the recommended depth (see deployment).

Rough sea conditions will cause signal deterioration.

Please quote the serial number of the unit and model number when contacting the factory.

Wiring Details (AH 1, 360, 250, 150 Only)

COLOUR	DESCRIPTION
WHITE	SIGNAL O/P
BLACK	GROUND
ORANGE	+9VDC

11. Technical Specifications

Streamer Type		: Fluid filled with multi-elements.
Tow-Leader		: 50 metres as standard.
Tube Type		: Polyurethane.
Tube Length		: 4.5 metres AH 1, 360, 250, 150 : 14 metres AH610/24 LF : 21 metres AH1000/20 LF
Fluid type		: Polydimethylsiloxane / DC561
Depth Rating		: 50 metres (element crush depth).
Battery Type		: PP3 / MN1604 (AH 1, 360, 250, 150) : External 24VDC Power (AH610/24 LF & AH1000/20 LF)
Battery Life		: >5 Days for good quality Alkaline cells.
Elements		: Spacing and quantity vary according to model.
Sensitivity	8 element	: -176 dB ref 1v per µPa (typ.)
	12 element	: -163 dB ref 1v per µPa (typ.)
	20 element	: -167 dB ref 1v per µPa (typ.)
	Wide Band 20 element	: -192 dB ref 1v per µPa (typ.)
	AH610 /24 LF element	: -187 dB ref 1v per µPa (typ.)
	AH1000 /20 LF element	: -164 dB ref 1v per µPa (typ.)
Frequency Response		: 140Hz to 10 kHz (-3dB). AH 1, 360, 250, 150 : 115Hz to 7.2 kHz (-3dB) AH610/24 LF & AH1000/20 LF
Signal Output		: Up to 8 volts peak to peak. (AH 1, 360, 250, 150)
Connector type		: BNC connector. 50 or 75 ohm cable can be used.

Appendix A

DOW CORNING

SAFETY DATA SHEET

According to article 31 and Annex II of the EU REACH Regulation

Version: 2.0
Revision Date: 20.09.2010
Superseded date: 02.02.2009

DOW CORNING(R) 561 SILICONE TRANSFORMER LIQUID

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

1.1 Product name	:	DOW CORNING(R) 561 SILICONE TRANSFORMER LIQUID	
1.2 Identified uses	:	Electrical and electronic applications Insulating agents	
Uses advised against	:	None known.	
1.3 Company	:	Dow Corning Europe S.A. rue Jules Bordet - Parc Industriel - Zone C B-7180 Seneffe Belgium	
E-mail address (Safety Data Sheet)	:	sdseu@dowcorning.com	
Customer Service	:	English Deutsch Français Italiano Español	Tel: +49 611237507 Tel: +49 611237500 Tel: +32 64511149 Tel: +32 64511170 Tel: +32 64511163 Fax: +32 64888683
1.4 Emergency Phone Number	:	Dow Corning (Barry U.K. 24h) Dow Corning (Wiesbaden 24h) Dow Corning (Seneffe 24h)	Tel: +44 1446732350 Tel: +49 61122158 Tel: +32 64 888240

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

According to Regulation (EC) No. 1272/2008:

Not hazardous.

According to EU Directives 67/548/EEC or 1999/45/EC:

Not hazardous.

2.2 Label elements

No special packaging or labelling requirements.

1 of 7

DOW CORNING

SAFETY DATA SHEET

According to article 31 and Annex II of the EU REACH Regulation

Version: 2.0
Revision Date: 20.09.2010
Superseded date: 02.02.2009

DOW CORNING(R) 561 SILICONE TRANSFORMER LIQUID

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical characterization: Silicone

According to EU Directives 67/548/EEC or 1999/45/EC:

Name	CAS-No.	EINECS/ ELINCS No.	REACH Registration Number	Conc. (% w/w)	Classification

No hazardous ingredients.

According to Regulation (EC) No. 1272/2008:

Name	CAS-No.	EINECS/ ELINCS No.	REACH Registration Number	Conc. (% w/w)	Classification
Polydimethylsiloxane	63148-62-9	Exempt or not available	-	100.0	-

CLP classifications are based on all current available data including from known international organizations. These classifications are subject to revision as more information becomes available.

4. FIRST AID MEASURES

4.1 Description of First Aid Measures:

On contact with eyes : No first aid should be needed.

On skin contact : No first aid should be needed.

If inhaled : No first aid should be needed.

On ingestion : No first aid should be needed.

5. FIRE-FIGHTING MEASURES

5.1 Suitable extinguishing media : On large fires use dry chemical, foam or water spray (fog). On small fires use carbon dioxide (CO2), dry chemical or water spray. Water can be used to cool fire exposed containers.

Unsuitable extinguishing media : None known.

5.2 Hazards during fire fighting : None known.

Hazardous Combustion Products : Thermal breakdown of this product during fire or very high heat conditions may evolve the following decomposition products: Silica. Carbon oxides and traces of incompletely burned carbon compounds. Formaldehyde.

5.3 Special protective equipment/procedures : A self-contained respirator and protective clothing should be worn. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool.

DOW CORNING

SAFETY DATA SHEET

According to article 31 and Annex II of the EU REACH Regulation

Version: 2.0
Revision Date: 20.09.2010
Superseded date: 02.02.2009

DOW CORNING(R) 561 SILICONE TRANSFORMER LIQUID

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures	:	Wear proper protective equipment.
6.2 Environmental precautions	:	Prevent from spreading or entering into drains, ditches or rivers by using sand, earth or other appropriate barriers.
6.3 Methods and materials for containment and cleaning up	:	Determine the need to evacuate or isolate the area according to your local emergency plan. Very large spills should be contained by bunding, etc... procedures. Mop, wipe or soak up with absorbent material and place in a container with a lid. The spilled product produces an extremely slippery surface.

7. HANDLING AND STORAGE

7.1 Advice on safe handling	:	Avoid eye contact. General ventilation is recommended. Do not empty into drains.
7.2 Advice on storage	:	Do not store with oxidizing agents. Storage temperature: minimum -30 °C, maximum 60 °C
7.3 Specific uses	:	Refer to technical data sheet available on request.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Name	CAS-No.	Exposure Limits

None of the components have assigned exposure limits.

8.2 Exposure controls

Engineering Controls	:	Ventilation : Refer to Section 7.1
Personal protection equipment		
Respiratory protection	:	Respiratory protection is not normally required.
Hand protection	:	Gloves are not normally required.
Eye/face protection	:	Safety glasses should be worn.
Skin protection	:	Protective equipment is not normally necessary.

DOW CORNING

SAFETY DATA SHEET

According to article 31 and Annex II of the EU REACH Regulation

Version: 2.0
Revision Date: 20.09.2010
Superseded date: 02.02.2009

DOW CORNING(R) 561 SILICONE TRANSFORMER LIQUID

Hygiene measures	:	Exercise good industrial hygiene practice. Wash after handling, especially before eating, drinking or smoking.
Additional information	:	These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions. For further information regarding the use of silicones / organic oils in consumer aerosol applications, please refer to the guidance document regarding the use of these types of materials in consumer aerosol applications that has been developed by the silicone industry (www.SEHSC.com) or contact the Dow Corning customer service group.
Environmental exposure controls	:	Refer to section 6 and 12.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	:	Liquid
Colour	:	Colorless
Odour	:	Characteristic odour
Boiling point/range	:	> 65 °C
Flash point	:	> 101 °C (Closed Cup)
Explosive properties	:	No
Specific Gravity	:	0.96
Viscosity	:	50 cSt at 25°C.
Oxidizing properties	:	No

The above information is not intended for use in preparing product specifications. Contact Dow Corning before writing specifications.

10. STABILITY AND REACTIVITY

10.1 Reactivity	:	None known.
10.2 Stability	:	Stable under normal usage conditions.
10.3 Possibility of hazardous reactions	:	None known.
10.4 Conditions to avoid	:	None established.
10.5 Materials to avoid	:	Can react with strong oxidising agents.
10.6 Hazardous decomposition products	:	Thermal breakdown of this product during fire or very high heat conditions may evolve the following decomposition products: Silica. Carbon oxides and traces of incompletely burned carbon compounds. Formaldehyde.

DOW CORNING

SAFETY DATA SHEET
According to article 31 and Annex II of the EU REACH Regulation

Version: 2.0
Revision Date: 20.09.2010
Superseded date: 02.02.2009

DOW CORNING(R) 561 SILICONE TRANSFORMER LIQUID

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

On contact with eyes	:	May cause temporary discomfort.
On skin contact	:	No adverse effects are normally expected.
If inhaled	:	No adverse effects are normally expected.
On ingestion	:	No adverse effects are normally expected.

Chronic toxicity:

On skin contact	:	No adverse effects are normally expected.
If inhaled	:	No adverse effects are normally expected.
On ingestion	:	No adverse effects are normally expected.
Toxicokinetics, metabolism and distribution	:	No specific information is available.

[1] Based on product test data.
[2] Based on test data from similar products.

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity effects

No adverse effects on aquatic organisms.

12.2 Persistence and degradability

Siloxanes are removed from water by sedimentation or binding to sewage sludge. In soil, siloxanes are degraded.

12.3 Bioaccumulation

No bioaccumulation potential.

12.4 Release to waters / Mobility in soil

Fate and effects in waste water treatment plants:

Removed > 90% by binding onto sewage sludge. No adverse effects on bacteria. The siloxanes in this product do not contribute to the BOD.

12.5 Results of PBT and vPvB assessment

Not applicable.

DOW CORNING

SAFETY DATA SHEET

According to article 31 and Annex II of the EU REACH Regulation

Version: 2.0
Revision Date: 20.09.2010
Superseded date: 02.02.2009

DOW CORNING(R) 561 SILICONE TRANSFORMER LIQUID

13. DISPOSAL CONSIDERATIONS

Product and packaging disposal : Dispose of in accordance with local regulations. According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.

14. TRANSPORT INFORMATION

Road / Rail (ADR/RID)

Not subject to ADR/RID.

Sea transport (IMDG)

Not subject to IMDG code.

Air transport (IATA)

Not subject to IATA regulations.

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Status

EINECS	:	All ingredients listed, exempt or notified (ELINCS).
TSCA	:	All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.
AICS	:	All ingredients listed, exempt or notified.
IECSC	:	All ingredients listed or exempt.
KECL	:	All ingredients listed, exempt or notified.
PICCS	:	All ingredients listed, exempt or notified.
DSL	:	All ingredients listed or exempt.

DOW CORNING

SAFETY DATA SHEET

According to article 31 and Annex II of the EU REACH Regulation

Version: 2.0
Revision Date: 20.09.2010
Superseded date: 02.02.2009

DOW CORNING(R) 561 SILICONE TRANSFORMER LIQUID

16. OTHER INFORMATION

This product safety data sheet was prepared in compliance with article 31 and Annex II of the EU REACH Regulation as well as its relevant amendements, on the approximation of laws, regulations and administrative provisions relative to the classification, packaging and labelling of dangerous substances and preparations.

It is the responsibility of persons in receipt of this Product Safety Data Sheet to ensure that the information contained herein is properly read and understood by all people who may use, handle, dispose or in any way come in contact with the product. If the recipient subsequently produces a formulation containing the Dow Corning product, it is the recipient's sole responsibility to ensure the transfer of all relevant information from the Dow Corning Product Safety Data Sheet to their own Product Safety Data Sheet in compliance with article 31 and Annex II of the EU REACH Regulation.

All information and instructions provided in this Safety Data Sheet (SDS) are based on the current state of scientific and technical knowledge at the date indicated on the present SDS. Dow Corning shall not be held responsible for any defect in the product covered by this SDS , should the existence of such defect not be detectable considering the current state of scientific and technical knowledge.

As stated above, this Safety Data Sheet has been prepared in compliance with applicable European law. If you purchase this material outside Europe, where compliance laws may differ, you should receive from your local Dow Corning supplier a SDS applicable to the country in which the product is sold and intended to be used. Please note that the appearance and content of the SDS may vary - even for the same product - between different countries, reflecting the different compliance requirements. Should you have any question, please refer to your local Dow Corning supplier.

Source of information: Internal data and publically available information

Appendix B

User Manual for Depth Sensor Integrated into 12-Element Hydrophone Streamer

WARNINGS

The streamer is for sub-surface application only and should on no account be used at depths exceeding 20 metres, as this will cause permanent damage to the elements.

The supplied Universal Input Plug top Adaptor has an input range of 100-240VAC.

No user serviceable parts inside.

The depth sensor integrated into the 12-Element Hydrophone Streamer is pre-calibrated and needs no adjustment.

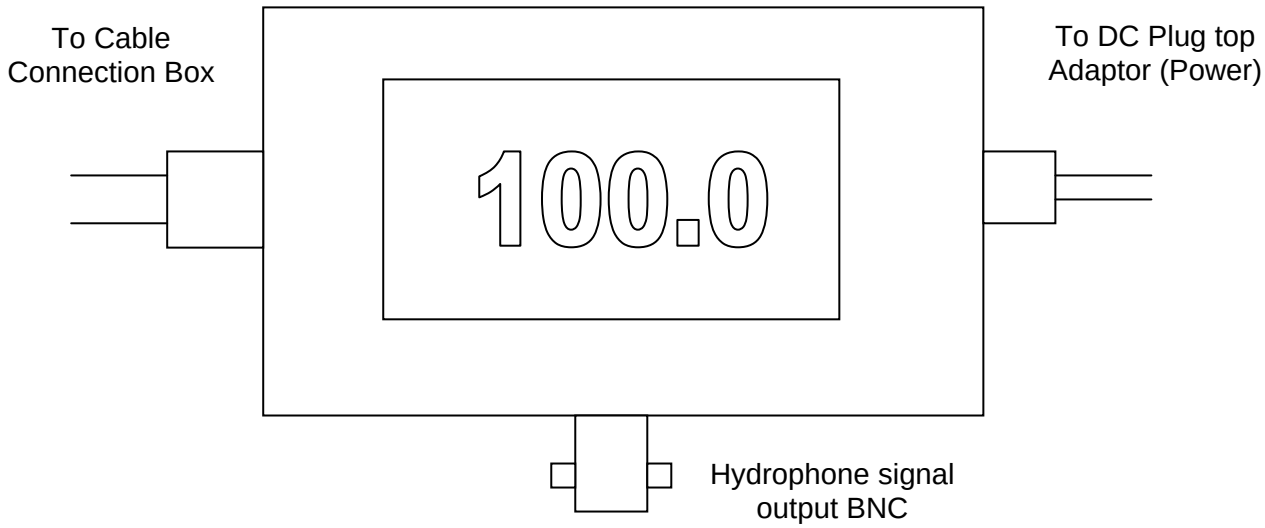


Fig. 1 Simplified view of Depth Readout Meter

Fig. 1 shows the Depth Readout Meter. It has three connectors:

- The DC power socket on the right should be connected to the 24VDC output, universal input Plug top Adaptor included with the kit. This provides all of the power requirements for the Hydrophone Pre-amplifier and depth sensor.
- The centre connector supplies the Hydrophone signal output and should be connected to the relevant instrumentation.
- The connector on the left is connected to the plastic cable connection box, which in turn is connected to the 75m soft-tow cable to the Hydrophone Streamer. This connector may be removed by unscrewing the knurled part anti-clockwise and withdrawing. To re-connect, align the locating tag, insert and turn knurled part clockwise until finger tight.

When all equipment is connected (Fig 2.) and the power switched on, the Depth Readout Meter will display the depth of the sensor under water in Metres, to a resolution of 0.1m

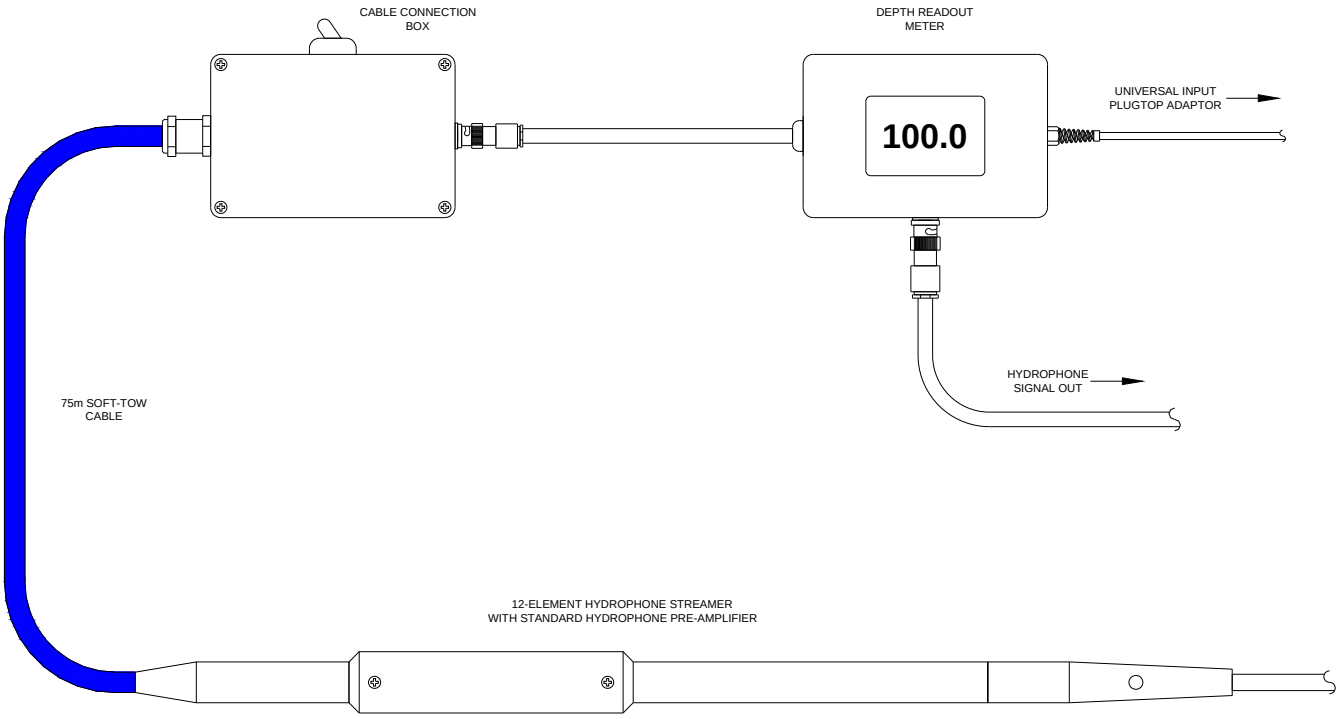


Fig. 2 Representation of Cable connection scheme

Applied Acoustic Engineering is a leading company in the design and manufacture of a wide range of subsea navigation and positioning products, and marine seismic survey equipment.

The extensive product range includes the innovative USBL tracking system, Easytrak, a variety of positioning and release beacons and seismic devices for offshore geotechnical and seabed analysis known as sub-bottom profiling.

All products use acoustics, underwater sound waves, in location, positioning, navigation and data acquisition applications.system, Easytrak, a variety of positioning and release beacons and seismic devices for offshore geotechnical and seabed analysis known as sub-bottom profiling.

Certificate No. 6447
BS: EN: ISO9001 : 2000

APPLIED ACOUSTICS
Underwater Technology

Due to continual product improvement, specification information may be subject to change without notice.