applied acoustics

underwater technology

Dura-Spark L80
Operation Manual

European Quality Assurance
UKAS MANAGEMENT SYSTEMS
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ISO9001:2015

Revision History

Issue	Change No.	Reason for change	Date
A	-	Draft	03/09/20

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Thank you for choosing applied acoustics ltd as one of your equipment suppliers. We hope you experience many years of reliable operational use from our products.

modulus technology ltd carries out all technical support, servicing and repairs. If you have any technical issues with our products please contact the modulus technology team:

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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.

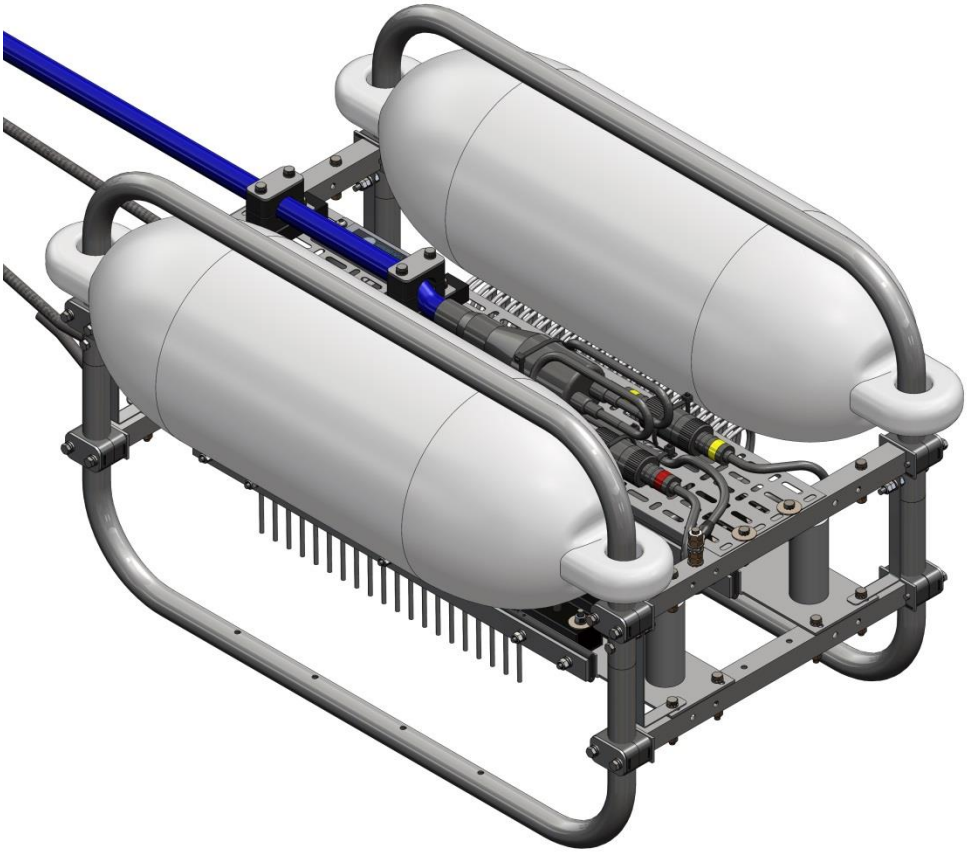
These written instructions must be followed fully for reliable and safe operation of the equipment that this manual refers to. Applied Acoustic Engineering Ltd cannot be held responsible for any issues arising from the improper use or maintenance of equipment referred to in this manual or failure of 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 to the Dura Spark Sound Source

The Dura-Spark has been designed to provide a stable, repeatable sound source for sub-bottom geophysical surveys. The long life, durable electrodes produce a consistent pulse signature and keep operational maintenance to a minimum. This provides increased survey efficiency and equipment reliability as the sparker tips rarely need replacement.

The Dura-Spark L80 is based on the CAT100 catamaran, providing a stable platform whilst under tow. The Dura-Spark L80 consists of 2 arrays of 40 tips forming a single array of 80 tips, providing a powerful high resolution sound source.

The typical operational bandwidth of the Dura-Spark L80 is 500Hz to 5KHz. When coupled with the CSP-Nv Seismic Power Supply the system offers 2000J/s peak discharge rate, as well as industry leading design and safety standards.



2. Components

- Dura Spark Catamaran complete with 2 x40 Tip Long Life Sparker Arrays.
- HVC2002 High Voltage Cable complete with HVJ2001 Junction Box.

3. Theory of Operation

The sound wave is generated by the electrical energy in the capacitors of the CSP-Nv discharging across the sparker tips to the earth of the tow-body, through the sea water to produce a pressure wave.

With increased energy levels a secondary discharge pulse is generated after the initial discharge. The time delay between initial and secondary is proportional to the level of energy being discharged. The secondary pulse is commonly known as the 'bubble pulse'.

The joule per tip rating should not be exceeded, each sparker tip is rated to 8-10joule maximum. This is a total max power of 350joule. Exceeding this level will result in damage to the sparker tip.

Note: - To prevent the bubble pulse the tip to power ratio should not exceed 2-3J per tip.

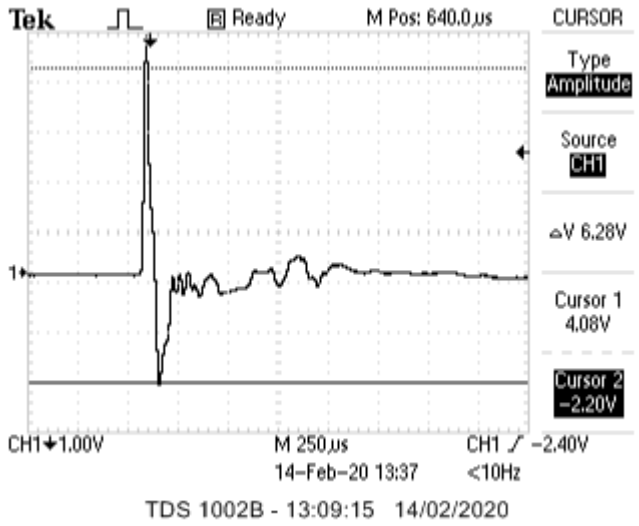
The joule per tip rating should not be exceeded, each sparker tip is rated to 8-10joule maximum. This is a total max power of 350joule. Exceeding this level will result in damage to the sparker tip.

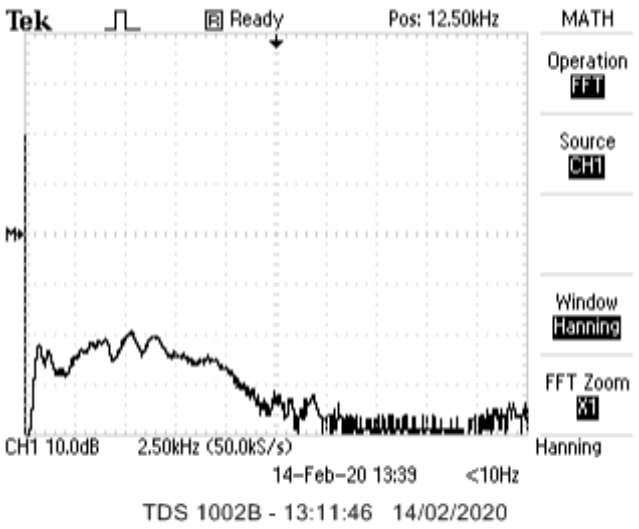
4. Dura Spark L80 Power Levels

	80 Tips
Min	100J
Max	350J
Typical	200J

5. Pulse Signature

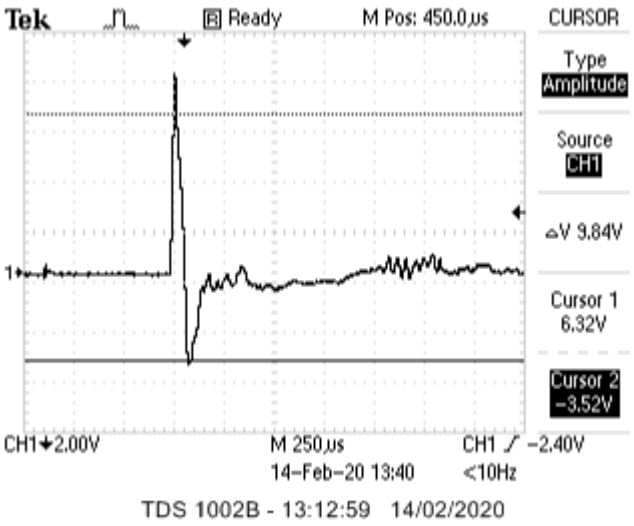
100J

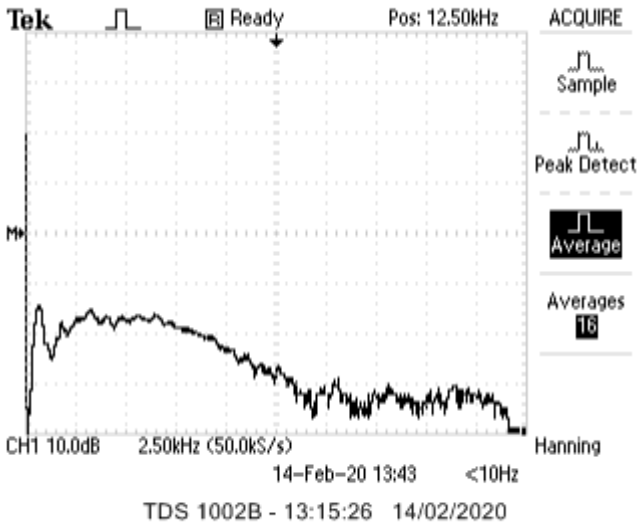




Pulse Width =	250	uSec	
V peak to peak =	6.28	V	
Source Level =	1.08837	V/Bar	At 1M
	220.736	dB re 1.0V/uPa	At 1M

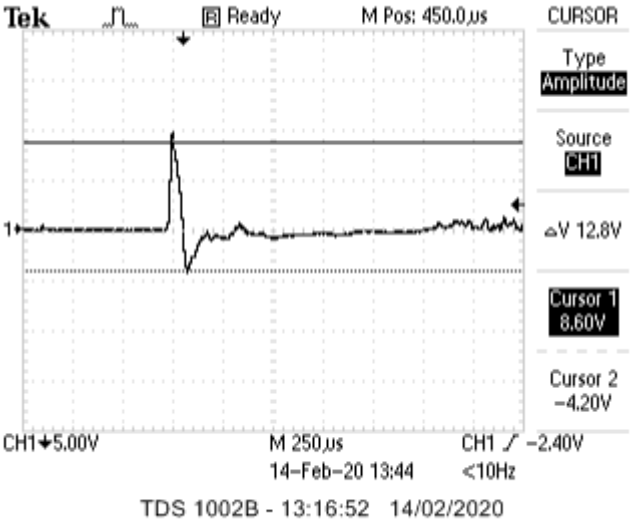
200J

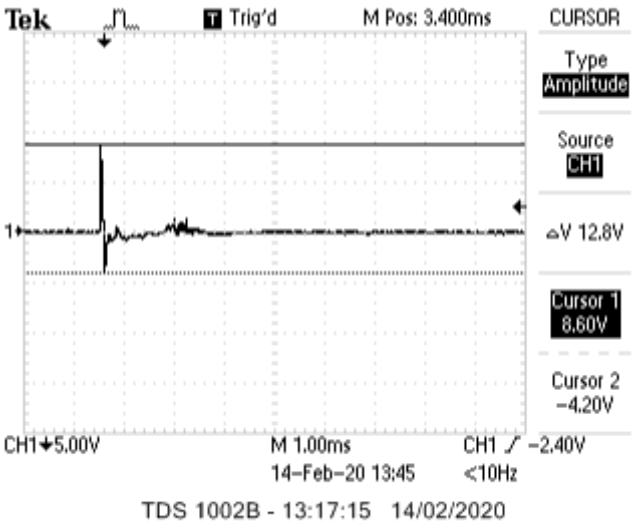


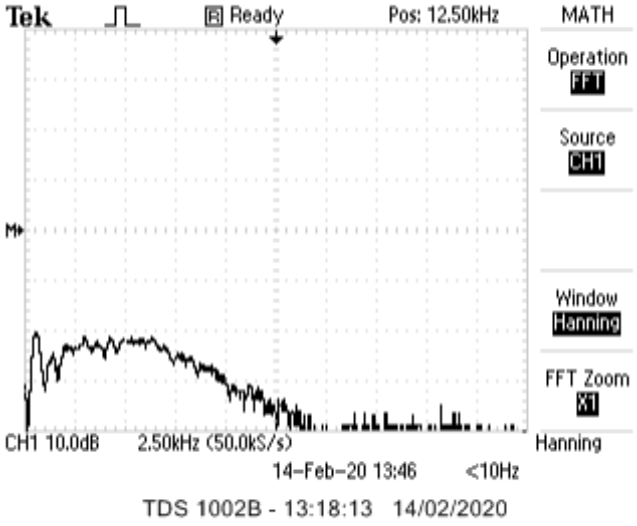


Pulse Width =	250	uSec	
V peak to peak =	9.84	V	
Source Level =	1.70534	V/Bar	At 1M
	224.636	dB re 1.0V/uPa	At 1M

300J

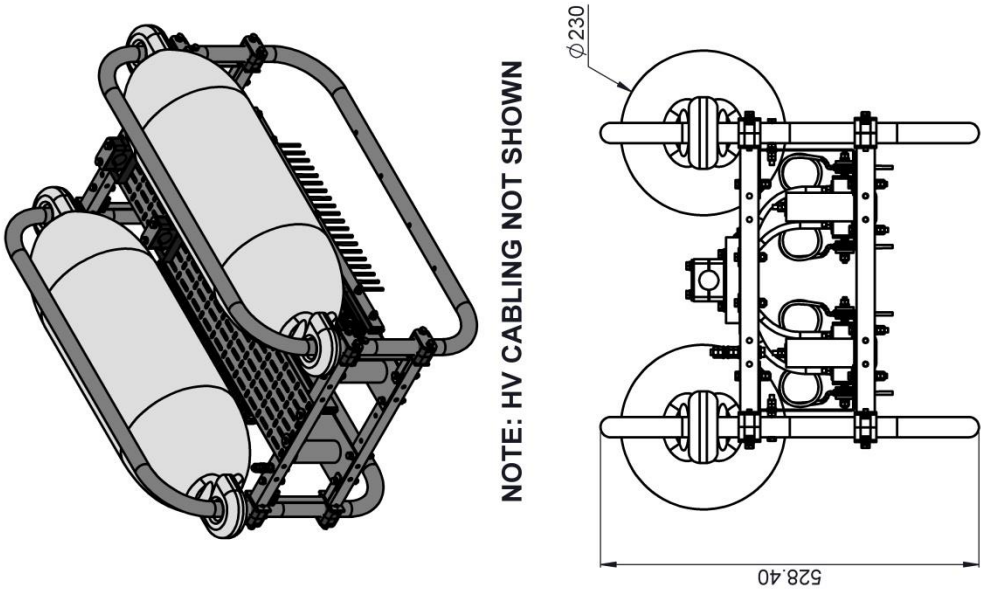


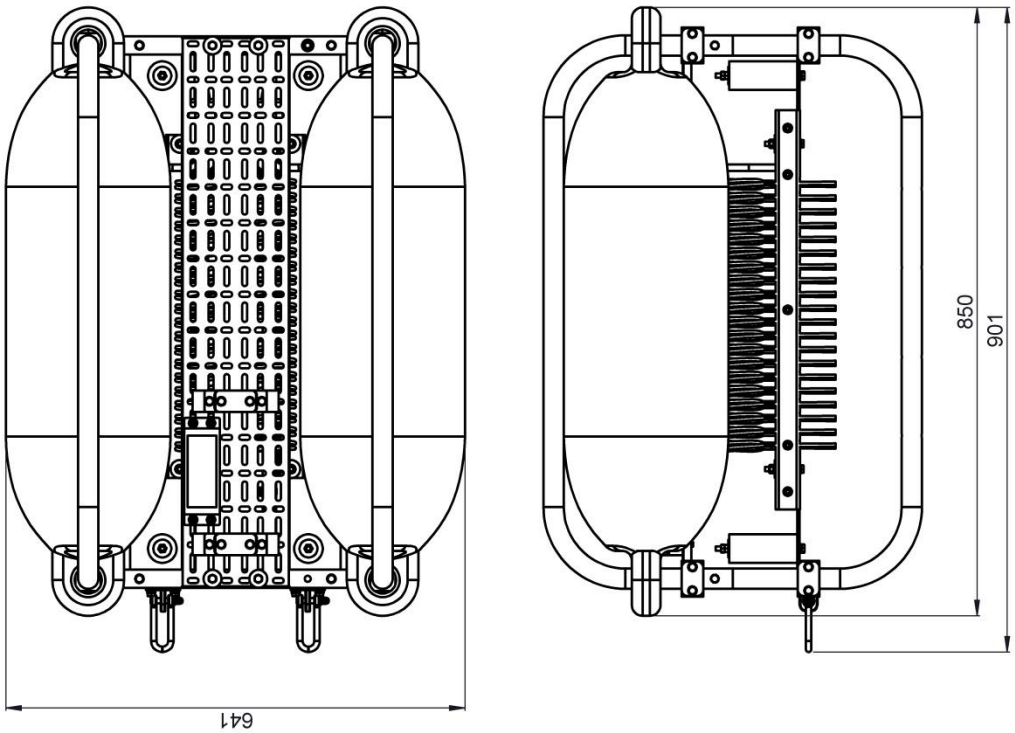




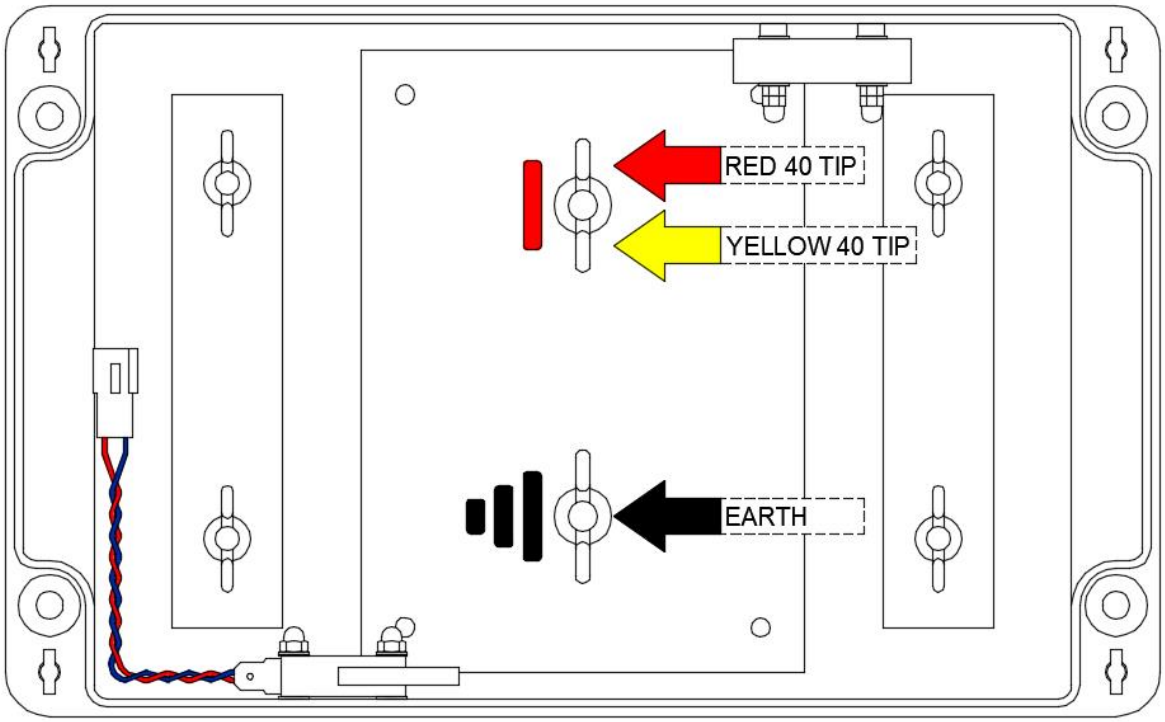
Pulse Width =	250	uSec	
V peak to peak =	12.8	V	
Source Level =	2.21833	V/Bar	At 1M
	226.921	dB re 1.0V/uPa	At 1M

6. Dimensions



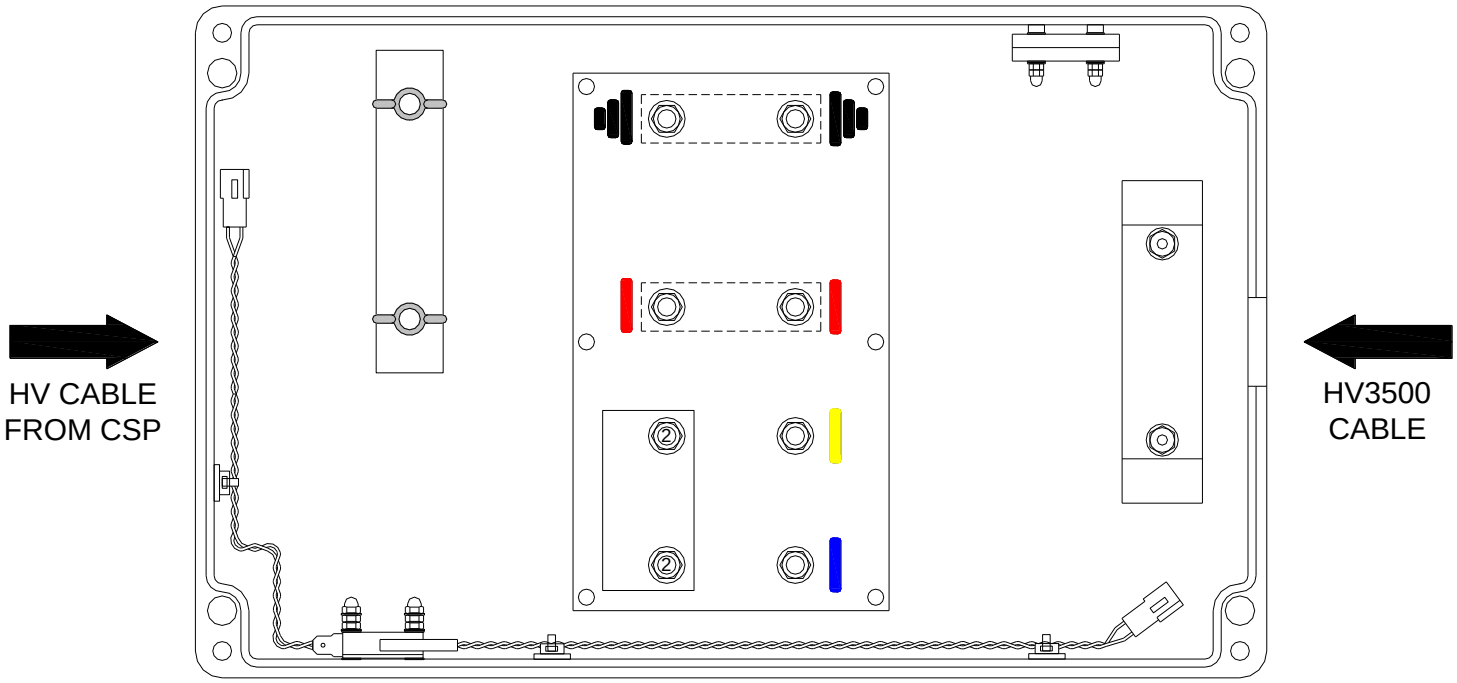


7. Cabling and Connections



HVJ2001 Junction Box Layout and Connections

HVJ3001 Junction Box Layout



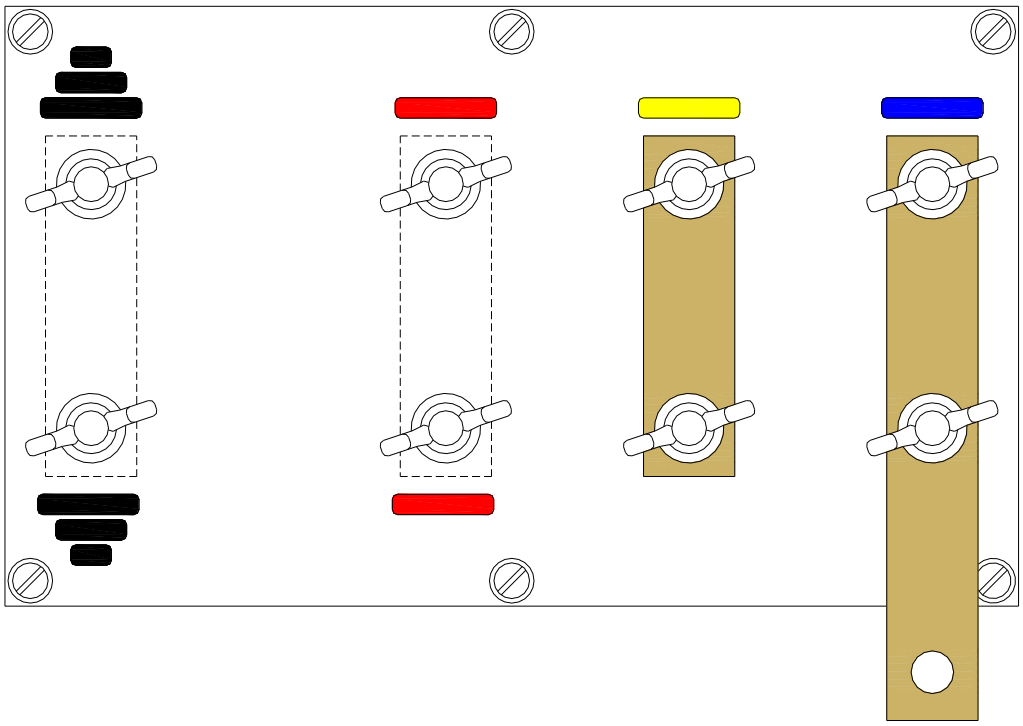
AAE REFERENCE - HVJ-3001-7000/2

HVJ3001 Junction Box Buzz Bar Arrangement

Before attempting to configure the HV3001 junction box with any of the following arrangements, ensure that all HV equipment is turned off and the HV cable from the CSP unit is disconnected.

Please note that the two bottom right studs are not common connections and must be used to store the HV buzz bars when not in use.

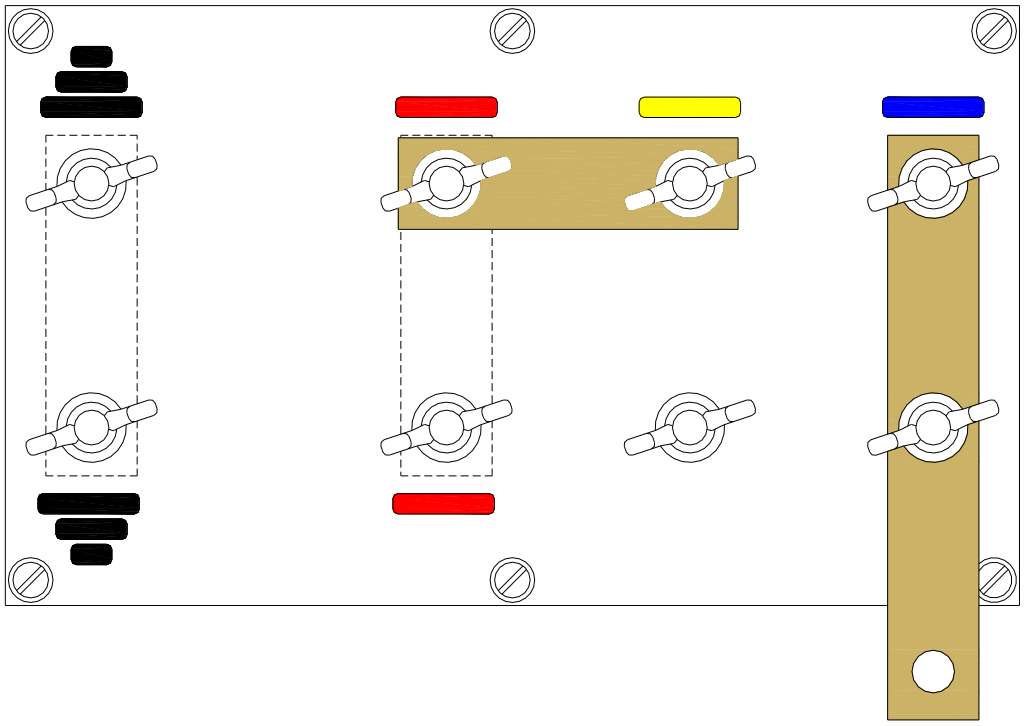
Dura Spark 80 - 40 Tip Arrangement



Connect the Red Live terminal to the Red lead of the HVC-2002, Yellow terminal to the yellow lead (not in circuit) and the Black GND terminal to the Black lead of the HVC-2002.

The Blue Terminal is not used with the Dura Spark L80.

Dura Spark 80 - 80 Tip Arrangement

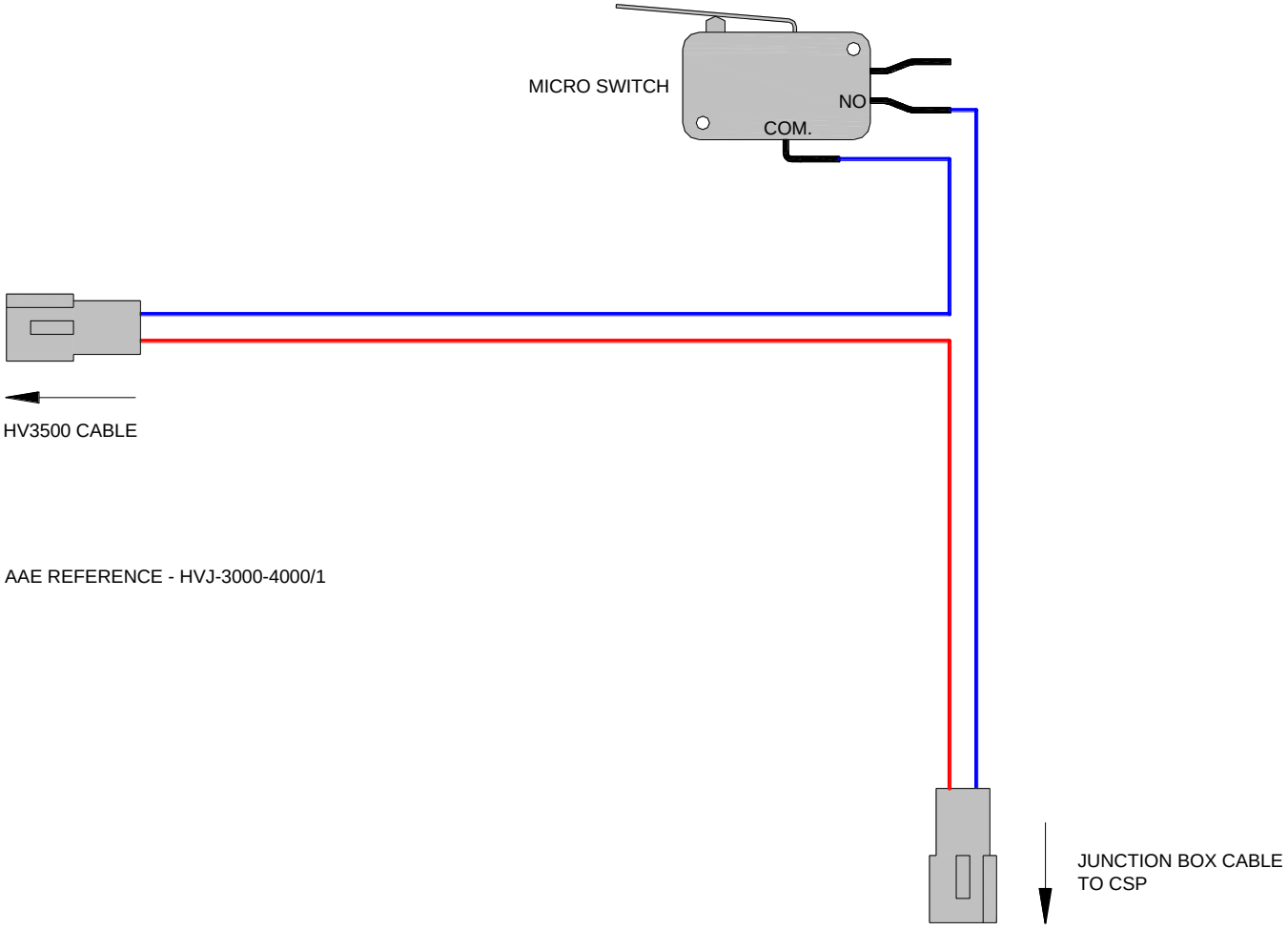


Connect the Red Live terminal to the Red lead of the HVC-2002, Yellow terminal to the yellow lead and the Black GND terminal to the Black lead of the HVC-2002.

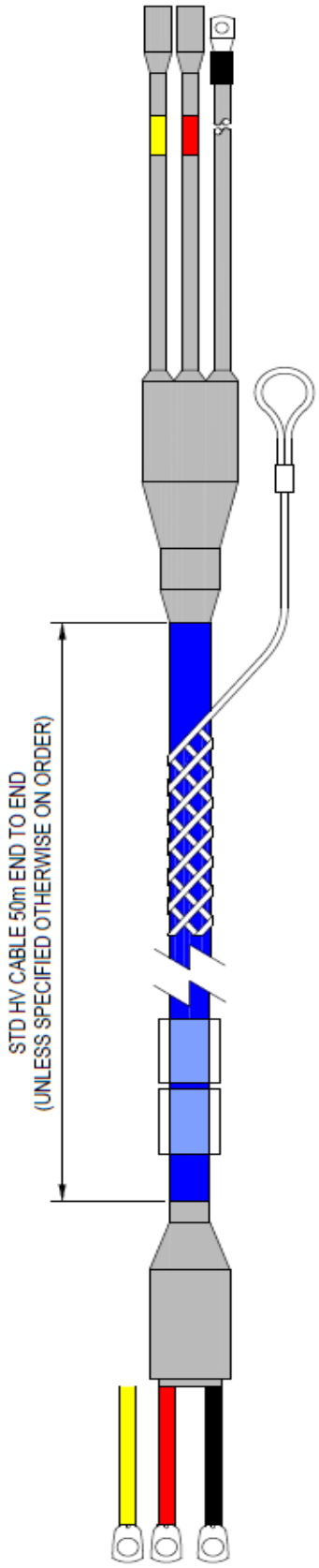
The Blue Terminal is not used with the Dura Spark L80.

HVJ3000 Junction Box Interlock Wiring

Note: When used with the Dura Spark the subsea interlock is by-passed using the link provided.



HVC2002 Cable



WIRING TABLE			
DRY END	CABLE	L200 / L80	ID COLOUR
25mm² BLACK CABLE	BLUE 2 SCREEN	25mm² WELDING CABLE	GND
RED (LIVE)	YELLOW 1 YELLOW 2	FEMALE RMK 1/0	RED
YELLOW (LIVE)	BLUE 1 YELLOW 3	FEMALE RMK 1/0	YELLOW

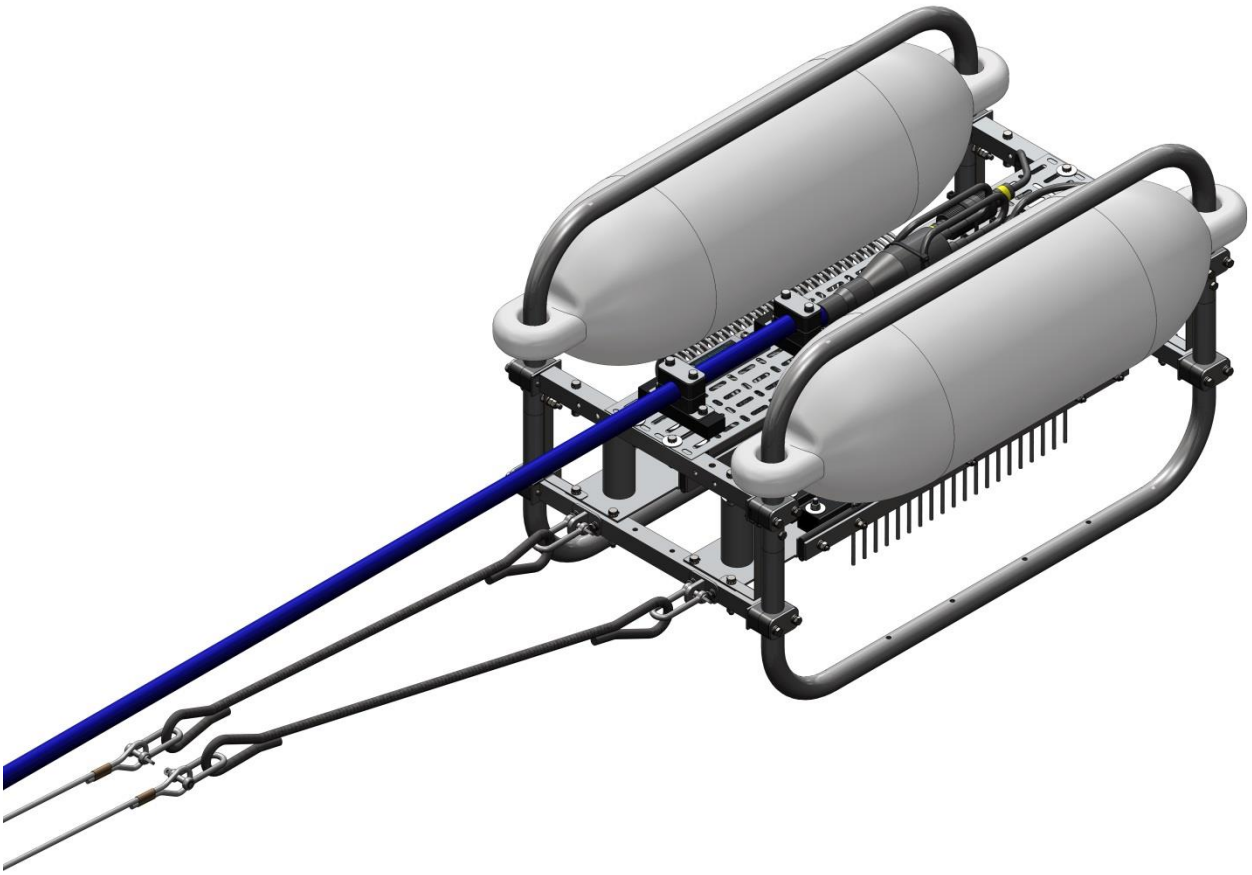
8. Deployment / Installation

The towing bridle should be secured to the catamaran using two stainless shackles on the two lower tow points and connected to the HV Cable Grip.

The cable tow point should be adjusted so that no load is applied to the electrical connections or cable clamp.

Note: No stress should be applied to the electrical connections whilst the unit is undertow as this may cause failure during operation.

A quick sea trial should be undertaken to check the floatation / towing characteristics of the catamaran underway at roughly 3-5 Knots.



9. Maintenance Procedures

Tip Wear

Although Sparker tip wear is very low the sparker tips should be inspected prior to deployment to ensure tip spacing is secure and electrode insulation is adequate. If insulation has deteriorated remove excess tip and re-align tip.

Mechanical

The below procedures are advisory guidelines that are recommended.

Pre-Deployment:

- The recommended interval for a visual inspection is on every deployment of the catamaran.

Visual Inspection (Pre Deployment)

- Check Electrical Connections are secure.
- Check Earth Connection to frame.
- Check for mechanical damage to fastenings and tow points.
- Check the floats.
- Check condition of anodes, replace if expired.

The Applied Acoustic Engineering Dura Spark does not require regular servicing with the exception above operational inspections.

Note: - When storing for long periods it is recommended the catamaran is cleaned with fresh water.

10. End of Life Recycling / Disposal

Within the UK, all electronic components and batteries must be taken for separate collection at the end of their working life under the Waste Electrical and Electronic Equipment (WEEE) Regulations 2013 and Waste Batteries and Accumulators Regulations 2009 respectively. The AAE Technologies Ltd group (AAE Tg) of companies as UK manufacturers will responsibly dispose of any returned end of life AAE Tg components/batteries through registered/approved recycling schemes. In order to prevent uncontrolled waste disposal and promote recycling, please contact Technical Support for a RMA number and return any end of life items (if safe to do so) carriage paid by the sender to our UK head office

11. Specification

Physical

Dura-Spark L80	Length 770mm Height 537mm Width 382mm Frame 740mm including floatation Weight 37kg

Electrical Specification

Dura-Spark L80 component	200J, 2-3J per tip to minimise bubble collapse 350J Maximum

Compatibility

Source	Seismic Power Supply	HV Cable
Dura-Spark L80	CSP-N 1200 Negative	HVC-2002
Dura-Spark L80	CSP-NP 350 Negative	HVC-2002

Performance

Sound Output	80 Tip 220dB Typical
Pulse Length	0.2mS depending on power
Number of Tips	80 Total. 2 x 40
Connector Type	RMK 1/0

Note:- Specification is subject to change without notice

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Applied Acoustic Engineering Limited 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 sub-bottom profiling equipment for offshore geotechnical and seabed analysis.

All products use acoustics, underwater sound waves, in location, positioning, navigation and data acquisition applications.

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