APPLIED ACOUSTICS
Underwater Technology

S-Boom System
Operation Manual

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Revision History

Issue	Change No.	Reason for change	Date
A	N/A	Draft	19/12/11
1	1158	Junction box layout and interlock wiring added. Amend interlock splice & HV3000 cable.	27/06/12
2	1300	Addition of recommended lifting arrangement for the CAT303 Drawing updates	14/03/13
3	1416	New boomer plate model (AA252) added. Addition of negative connection HV Junction Box plates. Other minor amendments	17/12/13
4	2347	Weights of CAT-0303 and AA252 Boomer Plate updated	27/04/20

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
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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 to the S-Boom System

The S-Boom system is a high power hi-resolution repeatable sound source and when deployed with a CSP-S 1200, the system can be operated at fast repetition rates. The transmitted energy is focused by the array geometry to improve the directivity and beam pattern giving an improvement over traditional seismic sound sources.

The frequency of operation and transmitted power levels allow the system to be used with both single and multi-channel streamer hydrophone arrays for high resolution geological surveys for construction, mapping, research and geo hazard.

The S-Boom sound source consists of 3 AA252 boomer plates complete with thermal interlock for safe operation, a HVC3000 cable and a CAT303 catamaran. The system is powered by the CSP range of seismic power supplies.

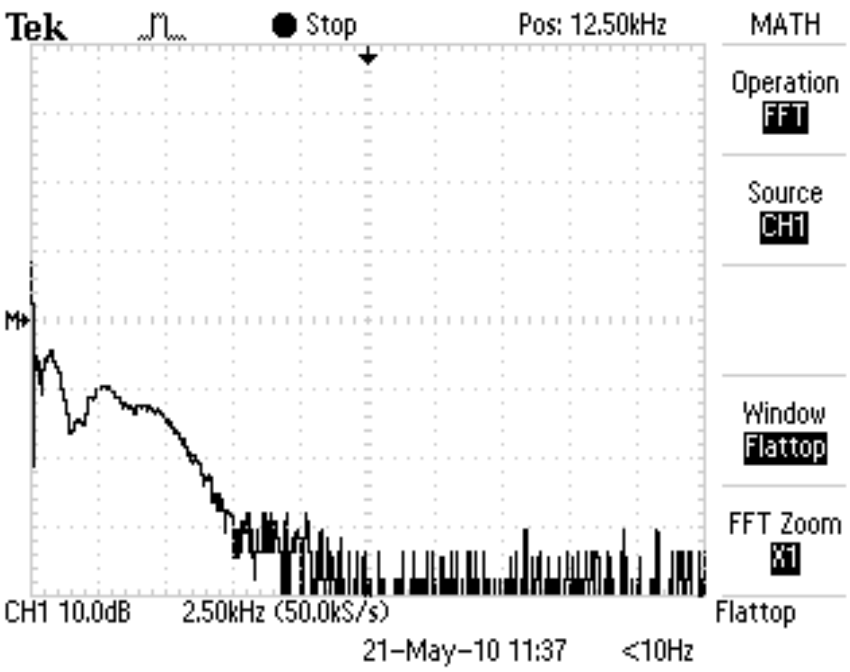
2. Components

- 3 x AA252 boomer plates complete with thermal interlock for safe operation.
- HVC3000 High Voltage Cable complete with HVJ3000 Junction Box.
- CAT303 Catamaran

3. Theory of Operation

Each of the AA252 Boomer plates consist of an electrical coil, which is magnetically coupled to the plate (metallic disc) situated behind a diaphragm. Energy contained in the electrical storage capacitors in the CSP unit is discharged into the Boomer plate coil. This creates a mechanical response on the diaphragm plate due to eddy currents on the plate. The resultant acoustic pressure pulse is broad spectrum in nature. The Acoustic Pulse shape and reverberation is controlled by damping springs.

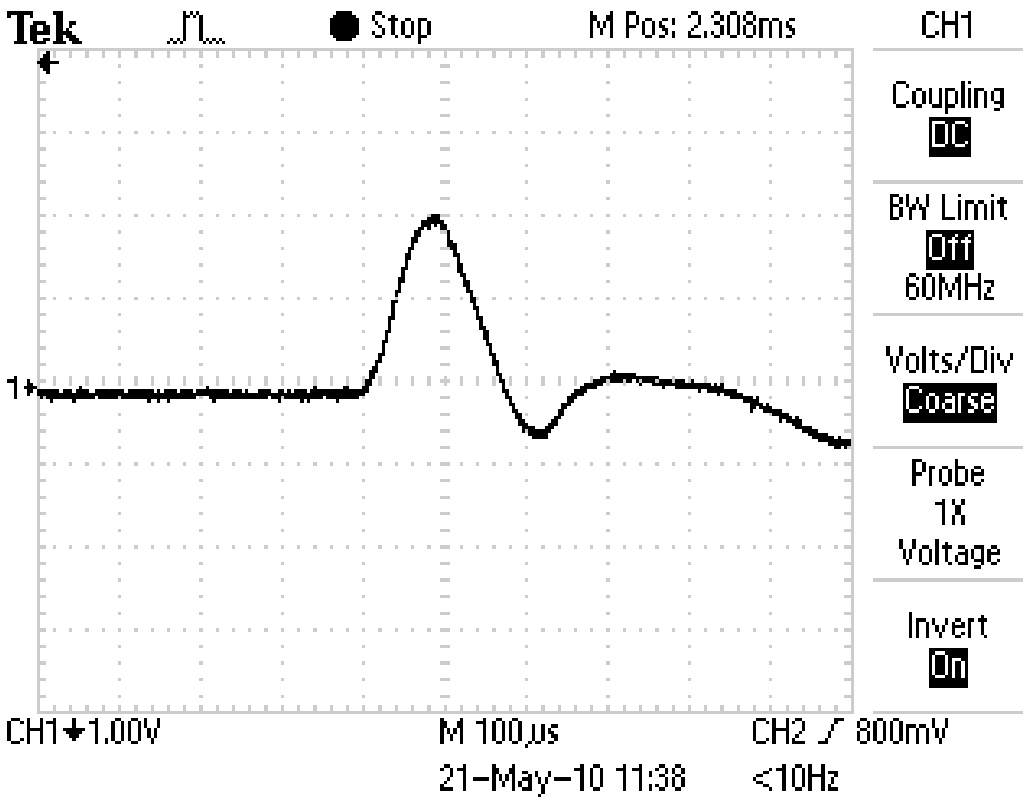
Using a single CSP-S power source for all of the boomer plates results in the timing of the transmissions being accurate to 2µs. Combining the 3 Boomer plates in a planar array forms a directional beam pattern with a ~6dB improvement in directivity index compared to a single Boomer plate. The resulting sound pressure level is increased whilst retaining resolution.



S-Boom Frequency Response

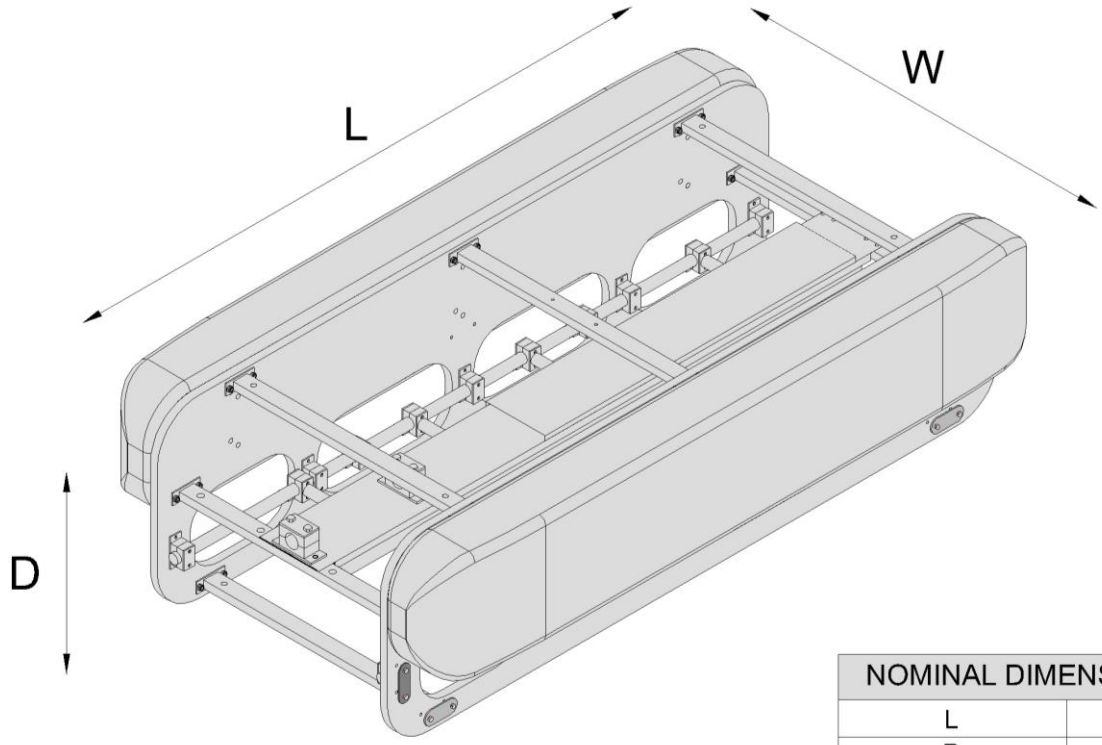
4. Pulse Signature

Typical S-Boom Pulse Signature at 1000J



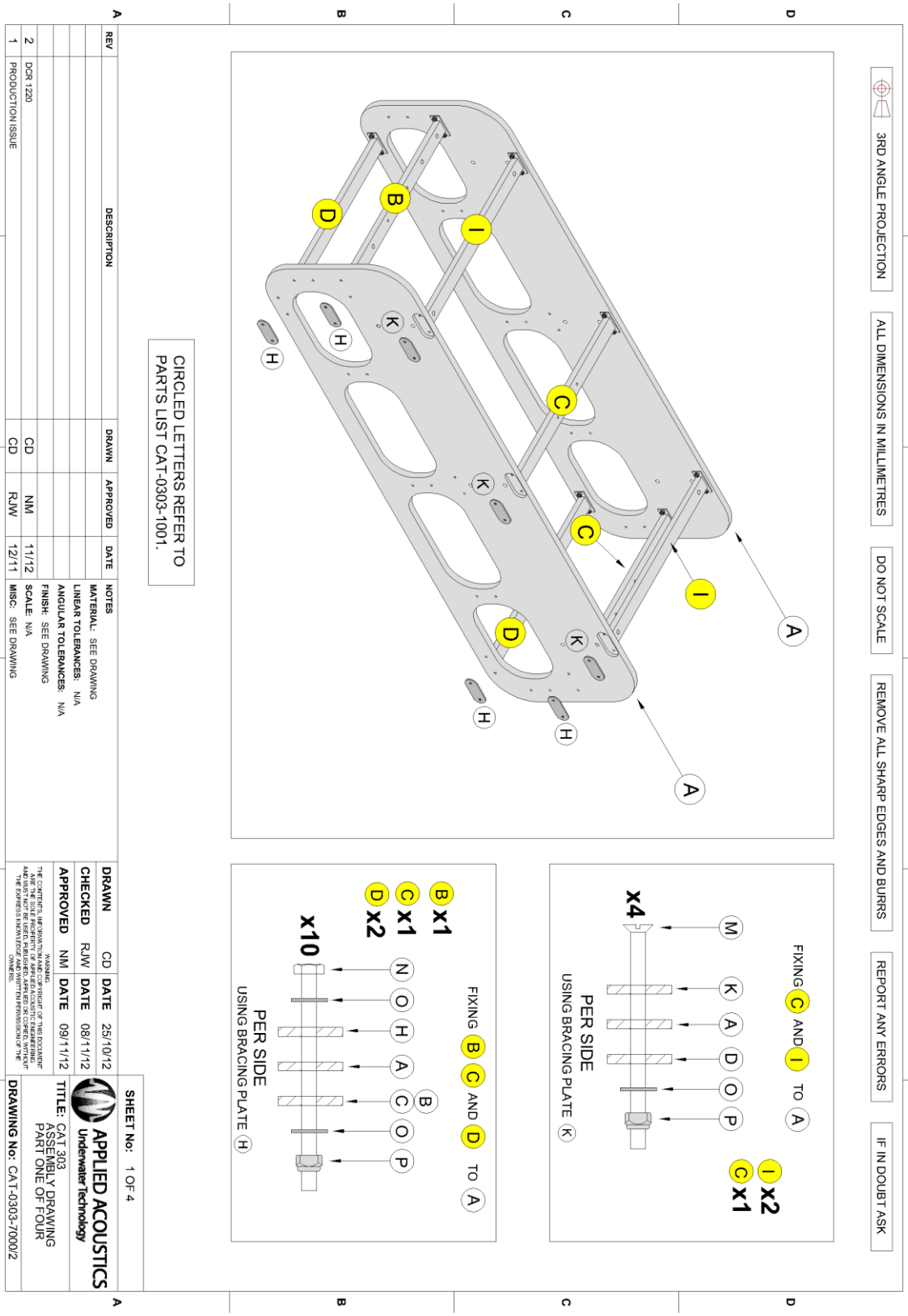
Pulse Width =	300	uSec	
V peak to peak =	2.7	V	
Source Level =	1.34462	V/Bar	At 2.5M
	222.572	dB re 1.0V/uPa	At 2.5M

5. Dimensions



NOMINAL DIMENSIONS (mm)	
L	1700
D	500
W	960

6. Catamaran Assembly



3RD ANGLE PROJECTION | ALL DIMENSIONS IN MILLIMETRES | DO NOT SCALE | REMOVE ALL SHARP EDGES AND BURRS | REPORT ANY ERRORS | IF IN DOUBT ASK

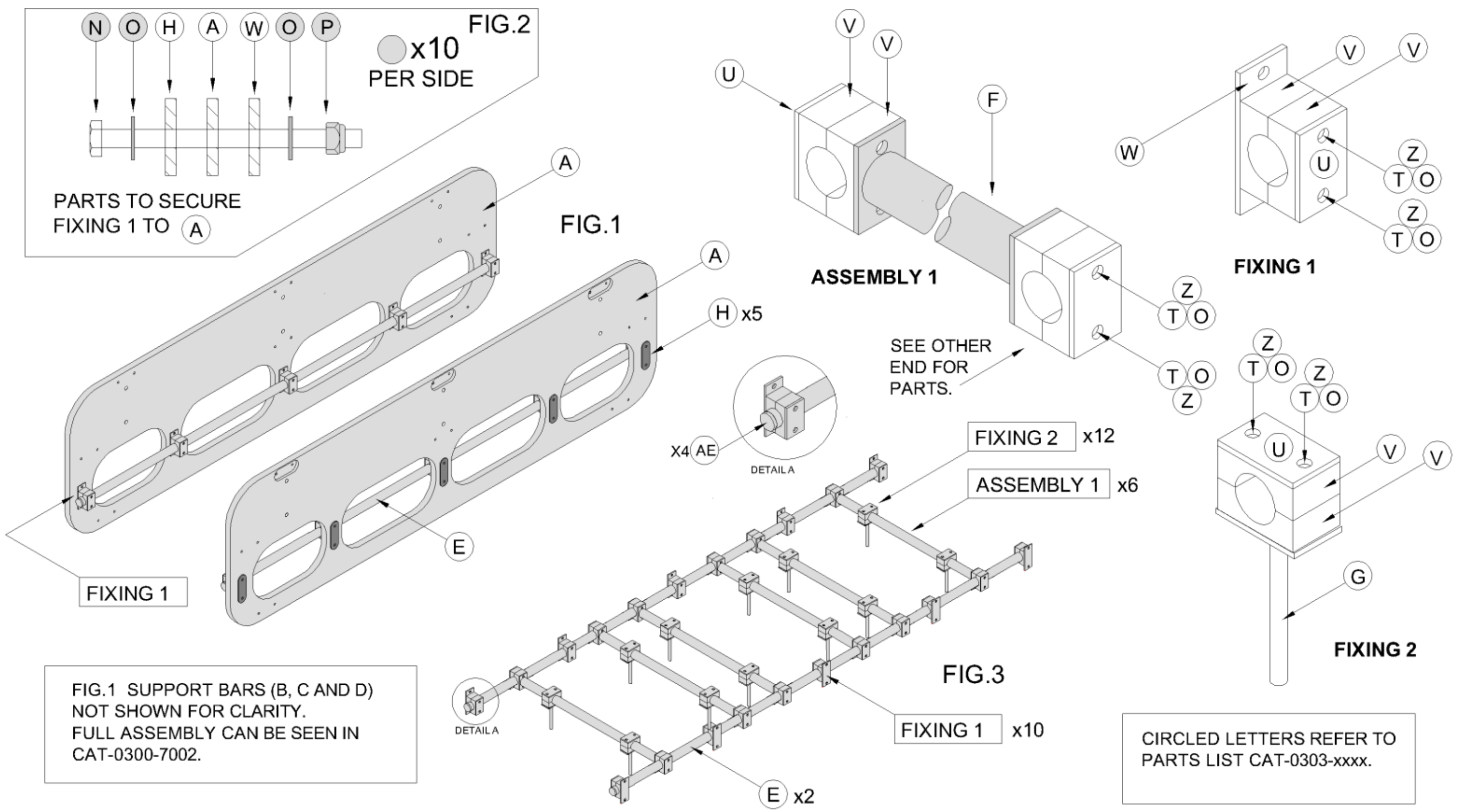


FIG.1 SUPPORT BARS (B, C AND D) NOT SHOWN FOR CLARITY.
FULL ASSEMBLY CAN BE SEEN IN CAT-0300-7002.

CIRCLED LETTERS REFER TO PARTS LIST CAT-0303-xxxx.

1. SECURE (E) ONTO EACH SIDE SUPPORT PANEL (A) BY FIXING 1 (5 OFF) AS FIG.1,2
2. FIT ASSEMBLY 1 (6 OFF) TO (E) OF EACH SIDE SUPPORT PANEL (A) SEE FIG.3
3. SECURE FIXING 2 (12 OFF) TO ASSEMBLY 1 AS FIG.3. POSITION OF FIXING 2 NOT CRITICAL AS WILL BE ADJUSTED WHEN FITTING BOOMER PLATES.

REV	DESCRIPTION	DRAWN	APPROVED	DATE
1	PRODUCTION ISSUE	CD	RJW	12/11

NOTES
MATERIAL: SEE DRAWING
LINEAR TOLERANCES: N/A
ANGULAR TOLERANCES: N/A
FINISH: SEE DRAWING
SCALE: N/A
MISC: SEE DRAWING

DRAWN	CD	DATE	02/12/11
CHECKED	NM	DATE	06/12/11
APPROVED	RJW	DATE	06/12/11

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SHEET No: 2 OF 4

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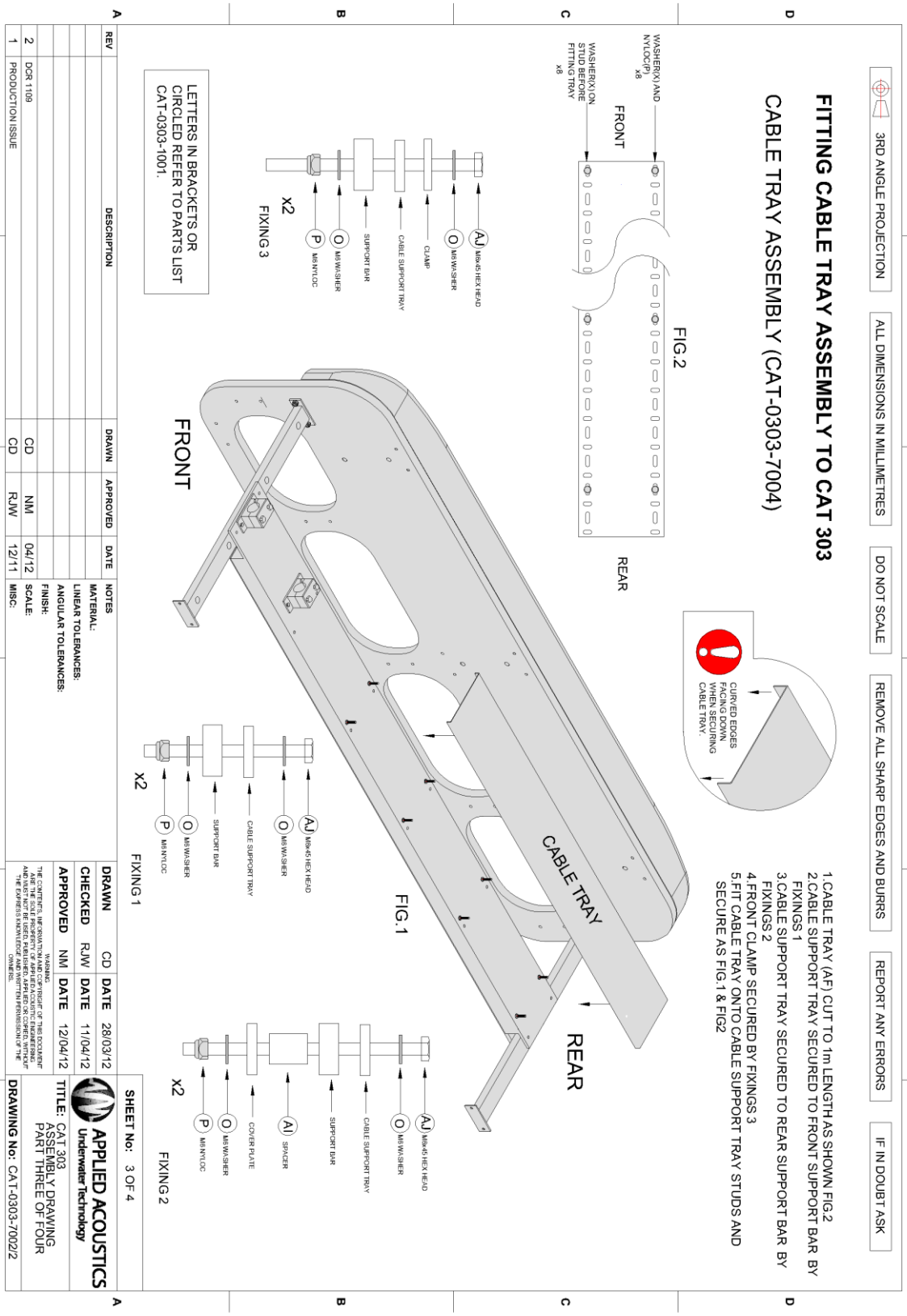
TITLE: CAT 0303 ASSEMBLY DRAWING PART TWO OF FOUR

DRAWING No: CAT-0303-7001/1


3RD ANGLE PROJECTION
ALL DIMENSIONS IN MILLIMETRES
DO NOT SCALE
REMOVE ALL SHARP EDGES AND BURRS
REPORT ANY ERRORS
IF IN DOUBT ASK
FITTING CABLE TRAY ASSEMBLY TO CAT 303
CABLE TRAY ASSEMBLY (CAT-0303-7004)
1.CABLE TRAY (AF) CUT TO 1m LENGTH AS SHOWN FIG.2
2.CABLE SUPPORT TRAY SECURED TO FRONT SUPPORT BAR BY FIXINGS 1
3.CABLE SUPPORT TRAY SECURED TO REAR SUPPORT BAR BY FIXINGS 2
4.FRONT CLAMP SECURED BY FIXINGS 3
5.FIT CABLE TRAY ONTO CABLE SUPPORT TRAY STUDS AND SECURE AS FIG.1 & FIG2
CURVED EDGES FACING DOWN WHEN SECURING CABLE TRAY.
FIG.2
WASHER(X) AND NYLOC(P) X8
WASHER(X) ON STUD BEFORE FITTING TRAY X8
FRONT
REAR
FIG.1
CABLE TRAY
FRONT
REAR
LETTERS IN BRACKETS OR CIRCLED REFER TO PARTS LIST CAT-0303-1001.
FIXING 1
x2
FIXING 2
x2
FIXING 3
x2
(AJ) M8x45 HEX HEAD
(O) M8 W/SHER
(P) M8 NYLOC
CABLE SUPPORT TRAY
SUPPORT BAR
(AI) SPACER
COVER PLATE
CLAMP
REV
DESCRIPTION
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APPROVED
DATE
2 DCR 1109 CD NM 04/12
1 PRODUCTION ISSUE CD RJW 12/11
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ANGULAR TOLERANCES:
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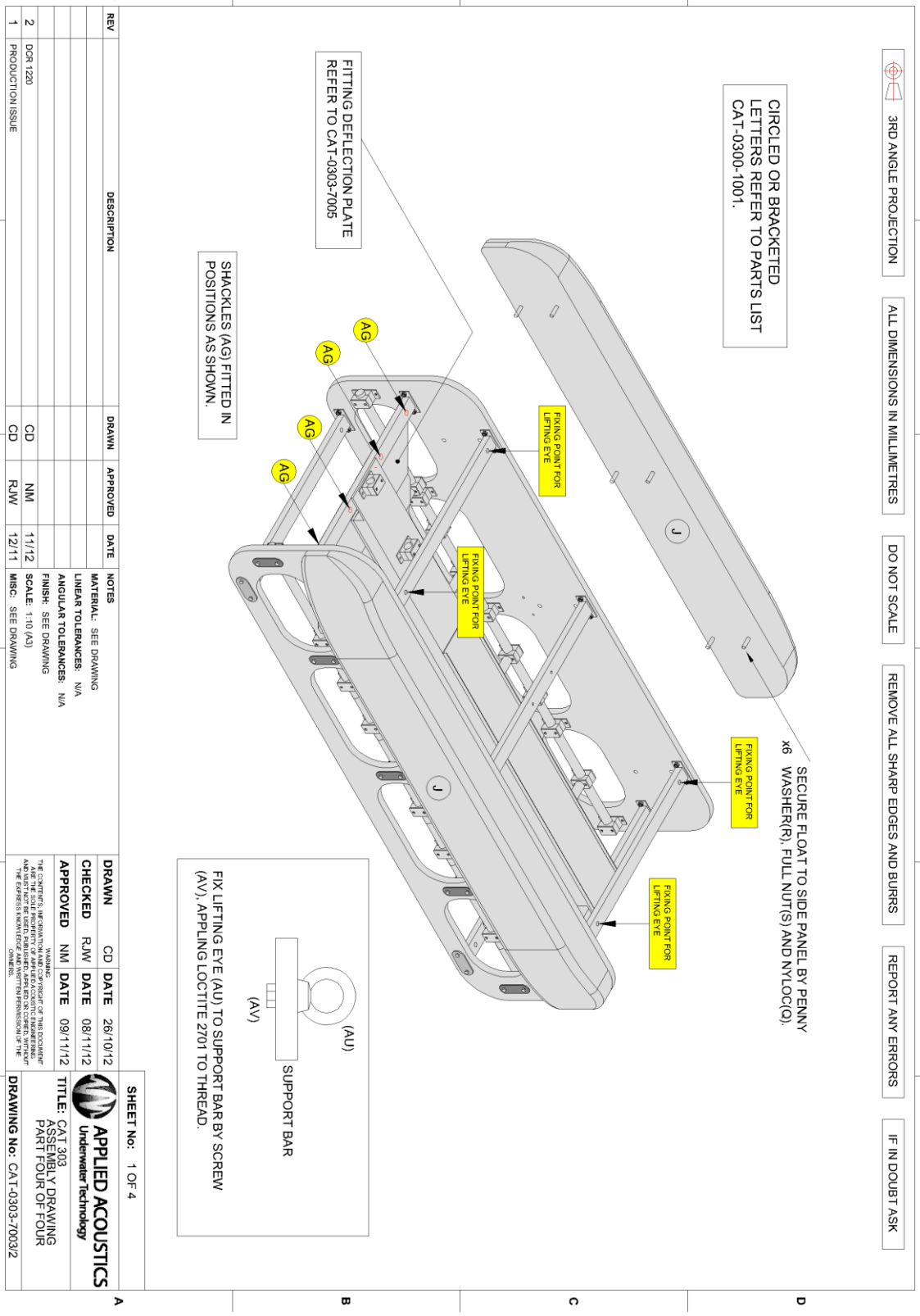
Underwater Technology
TITLE: CAT 303
ASSEMBLY DRAWING
PART THREE OF FOUR
SHEET No: 3 OF 4
DRAWING No: CAT-0303-7002/2


3RD ANGLE PROJECTION
ALL DIMENSIONS IN MILLIMETRES
DO NOT SCALE
REMOVE ALL SHARP EDGES AND BURRS
REPORT ANY ERRORS
IF IN DOUBT ASK
CIRCLED OR BRACKETED LETTERS REFER TO PARTS LIST CAT-0300-1001.
FITTING DEFLECTION PLATE REFER TO CAT-0303-7005
SHACKLES (AG) FITTED IN POSITIONS AS SHOWN.
FIXING POINT FOR LIFTING EYE
FIXING POINT FOR LIFTING EYE
FIXING POINT FOR LIFTING EYE
SECURE FLOAT TO SIDE PANEL BY PENNY x6 WASHER(R), FULL NUT(S) AND NYLOC(Q).
(AU)
SUPPORT BAR
(AV)
FIX LIFTING EYE (AU) TO SUPPORT BAR BY SCREW (AV), APPLING LOCTITE 2701 TO THREAD.
REV
DESCRIPTION
DRAWN
APPROVED
DATE
2 DCR 1220 CD NM 11/12
1 PRODUCTION ISSUE CD RJW 12/11
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ANGULAR TOLERANCES: N/A
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SCALE: 1:10 (A3)
MISC: SEE DRAWING
DRAWN CD DATE 26/10/12
CHECKED RJW DATE 08/11/12
APPROVED NM DATE 09/11/12
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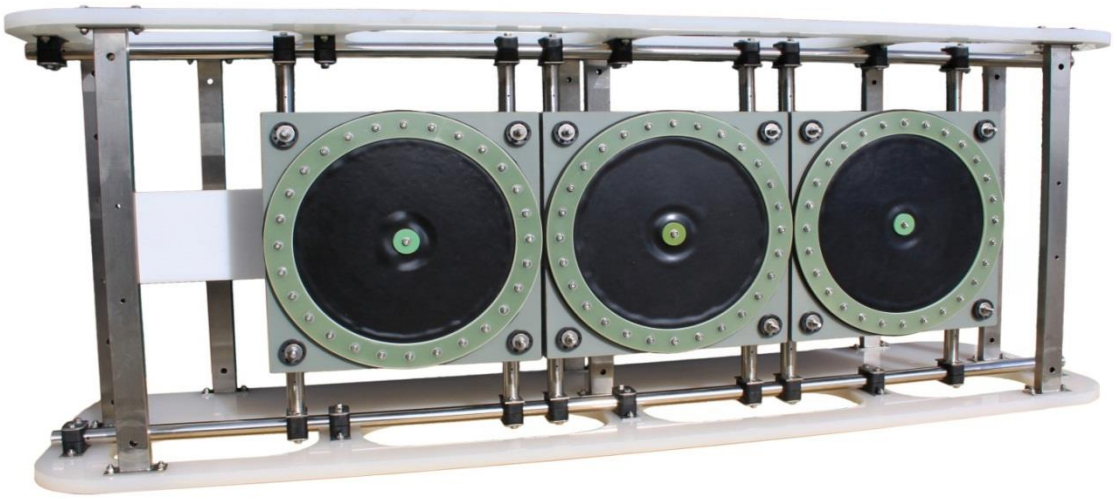
APPLIED ACOUSTICS Underwater Technology
TITLE: CAT 303 ASSEMBLY DRAWING PART FOUR OF FOUR
SHEET No: 1 OF 4
DRAWING No: CAT-0303-7003/2

7. Configuration

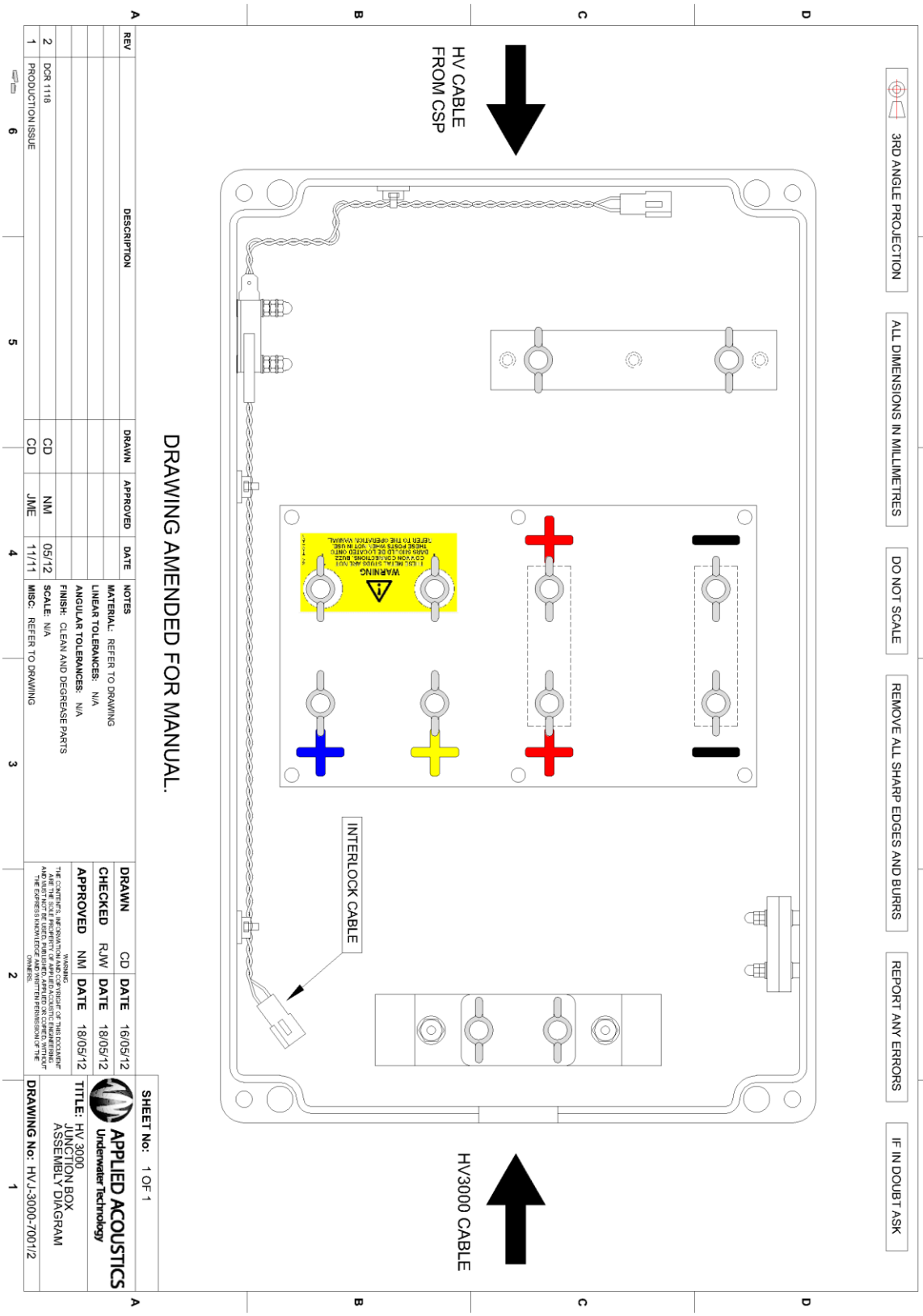
The Boomer Plates are configured in a planar array and identified through the HVC3000 cabling to the HVJ3000 Junction Box by colour code.

Forward AA252 = RED
Middle AA252 = YELLOW
Aft AA252 = BLUE

The S-Boom can be configured from the HVJ3000 Junction Box to use 1, 2 or 3 of the fitted Boomer plates.



HVJ3000 Junction Box Layout

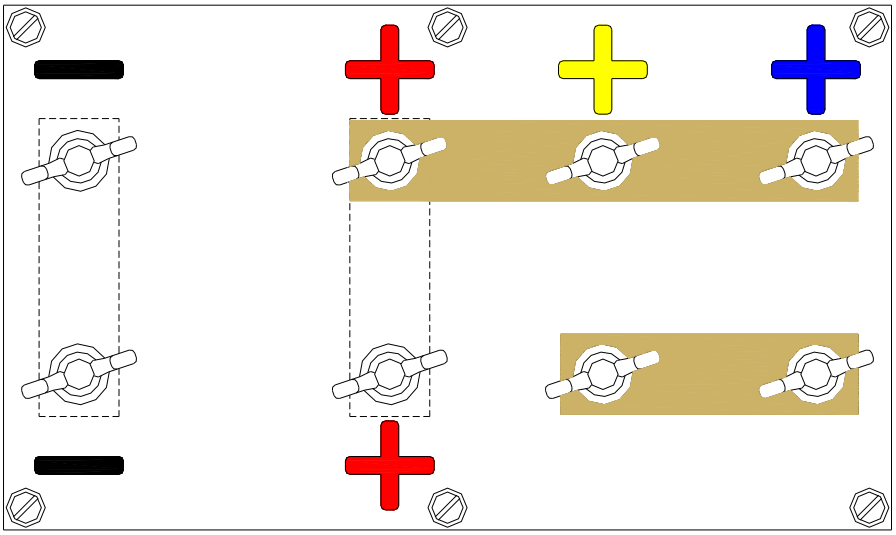


HVJ3000 Junction Box Buzz Bar Arrangement

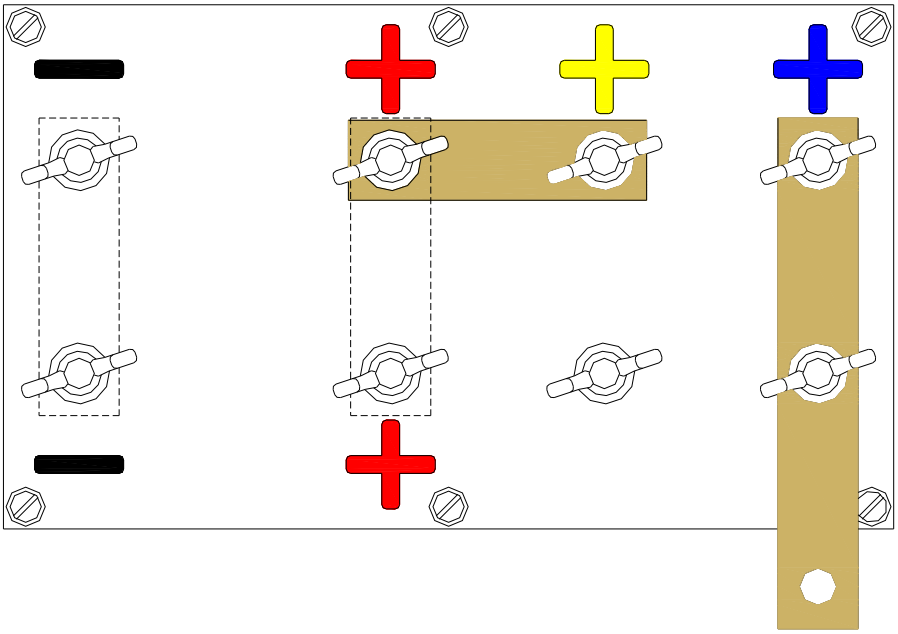
Before attempting to configure the HVJ3000 junction box with any of the following arrangements, ensure that all HV equipment is turned off and the HV cable from the CSP unit is disconnected.

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.

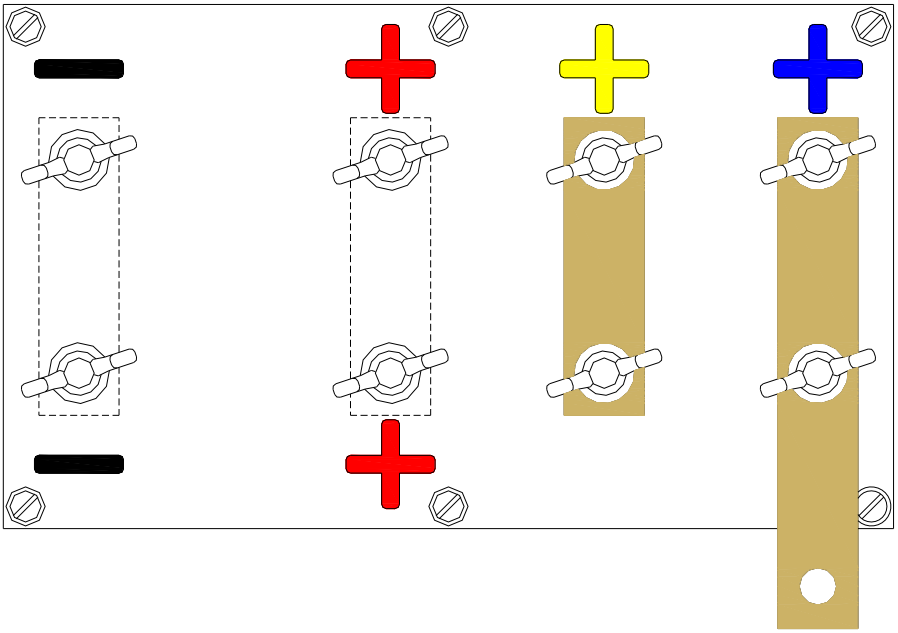
S-Boom Triple Boomer Arrangement (Positive Connection)



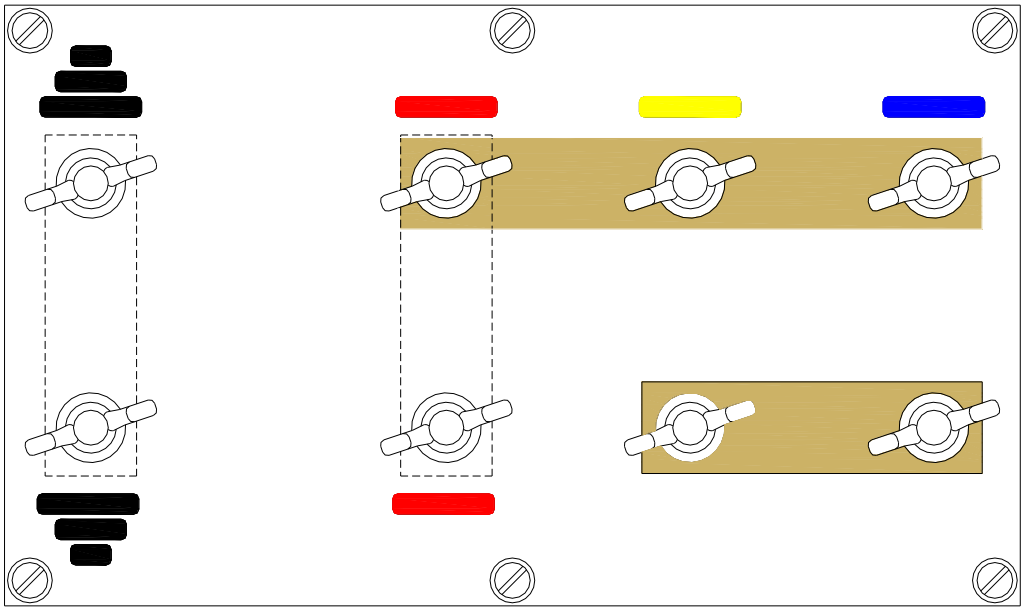
Double Boomer Arrangement (Positive Connection)



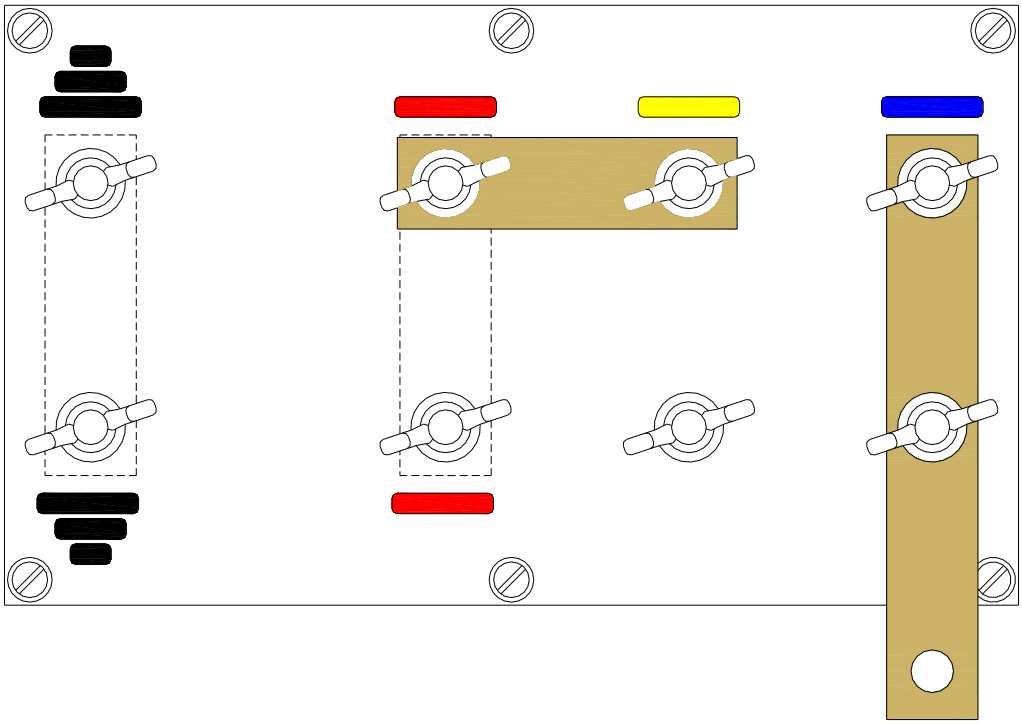
Single Boomer Arrangement (Positive Connection)



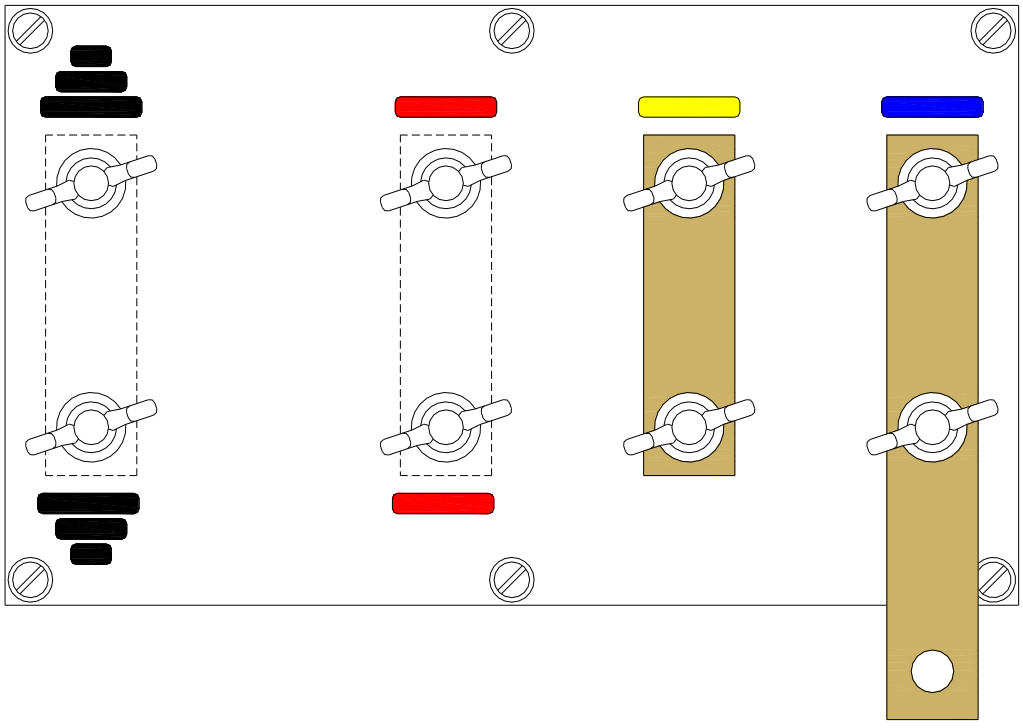
Triple Boomer Arrangement (Negative Connection)



Double Boomer Arrangement (Negative Connection)

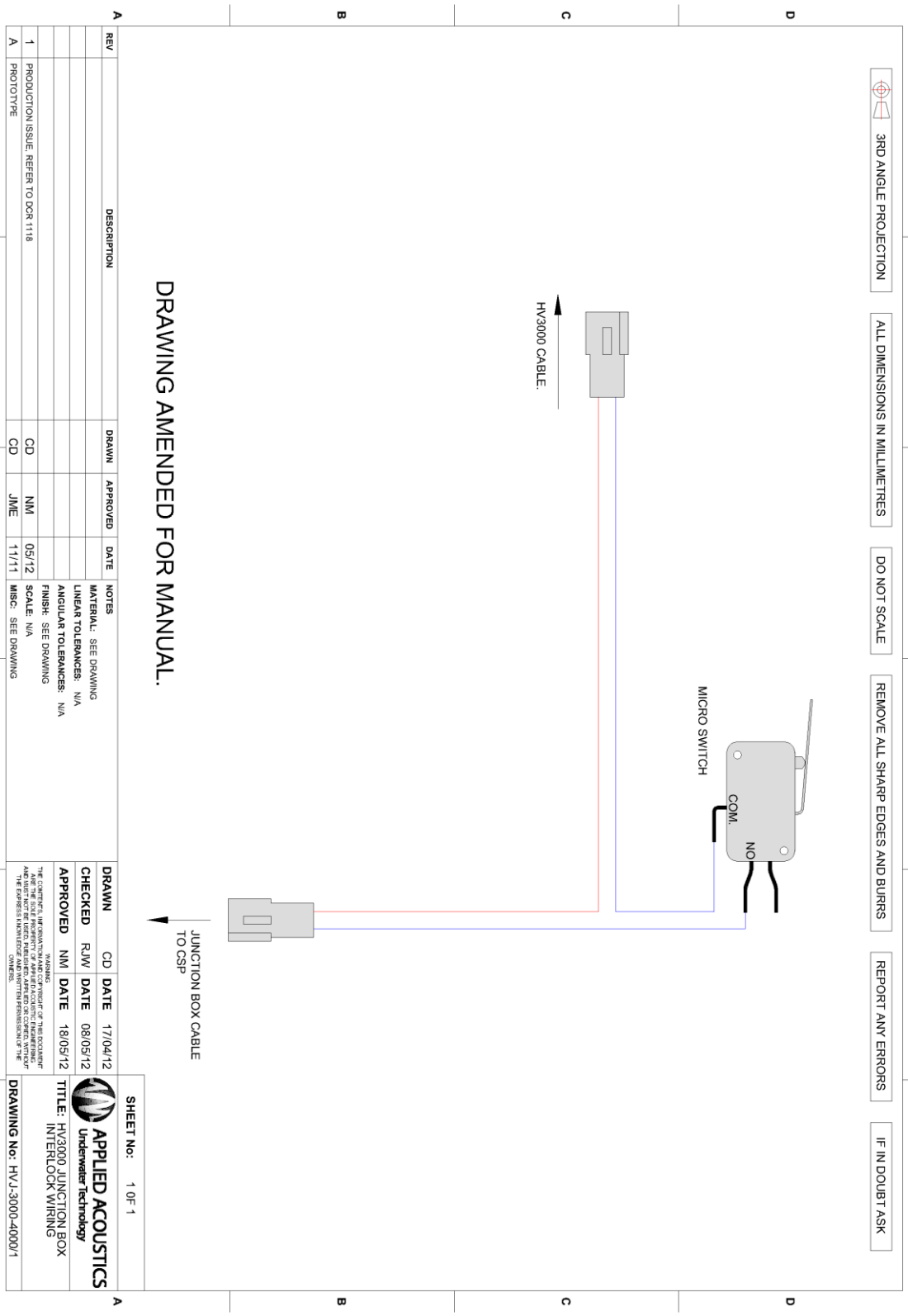


Single Boomer Arrangement (Negative Connection)

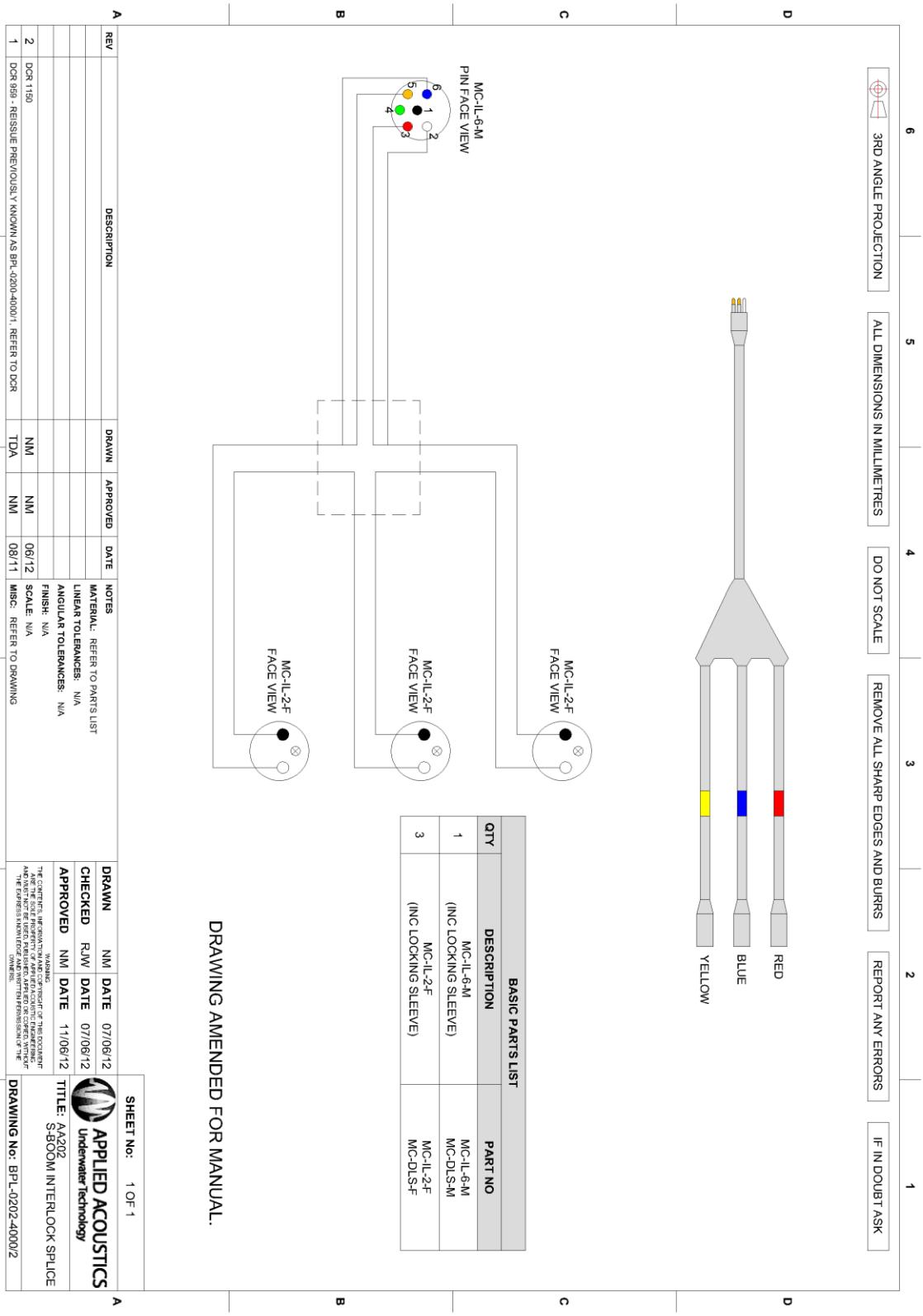


8. Cabling

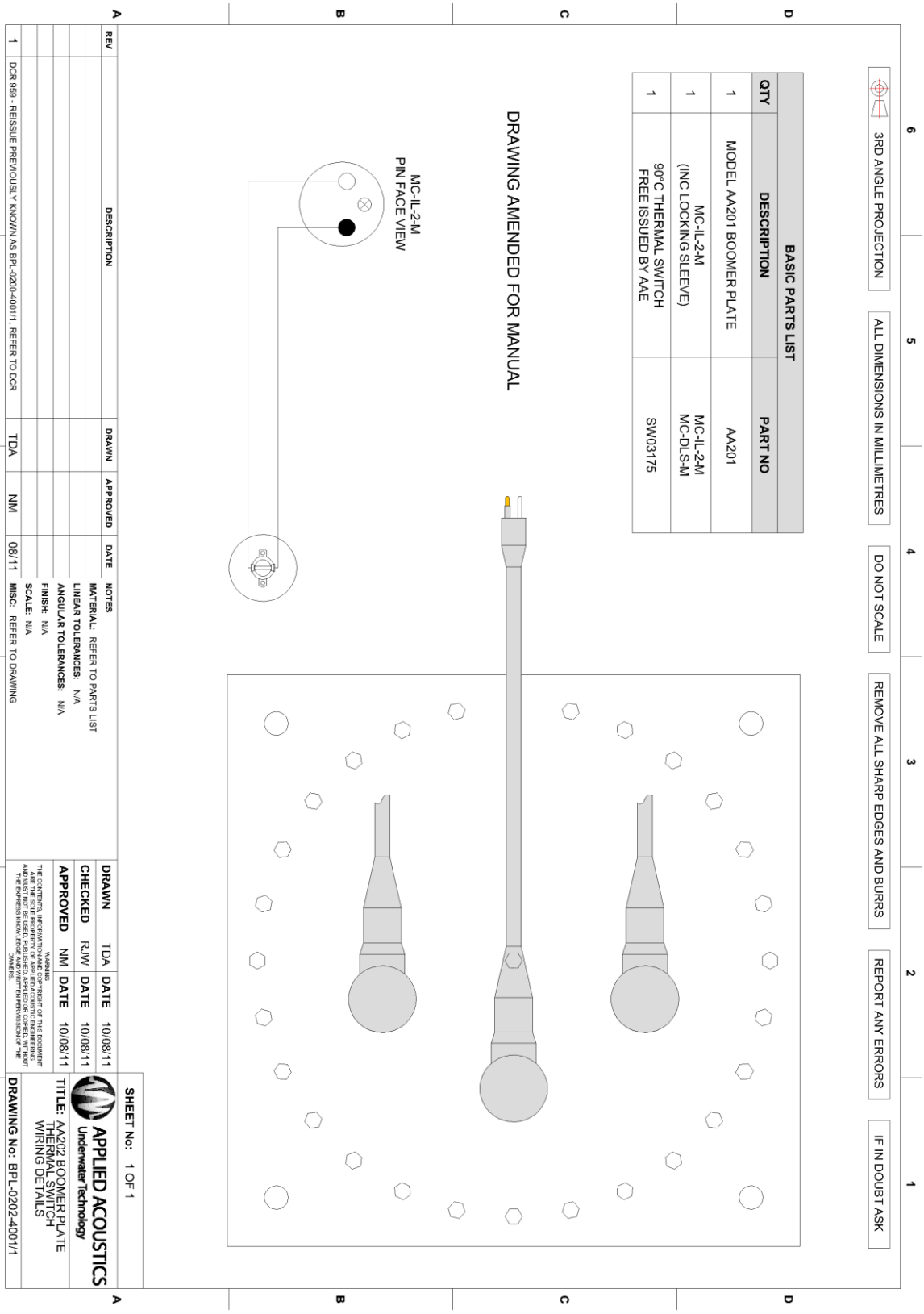
HVJ3000 Junction Box Interlock Wiring



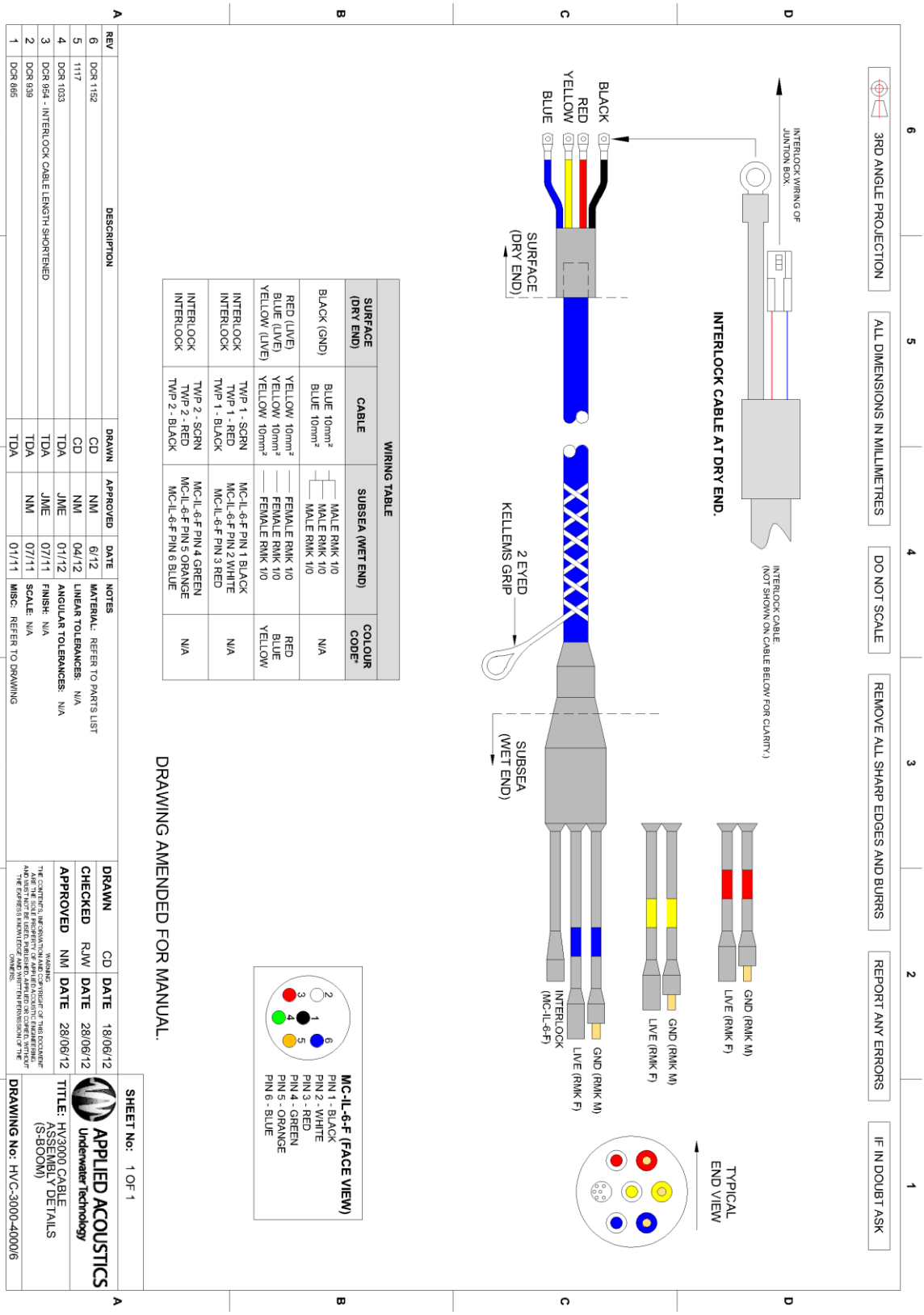
Interlock Cabling Subsea



AA252 Thermal Interlock Wiring



HVC3000 Cable



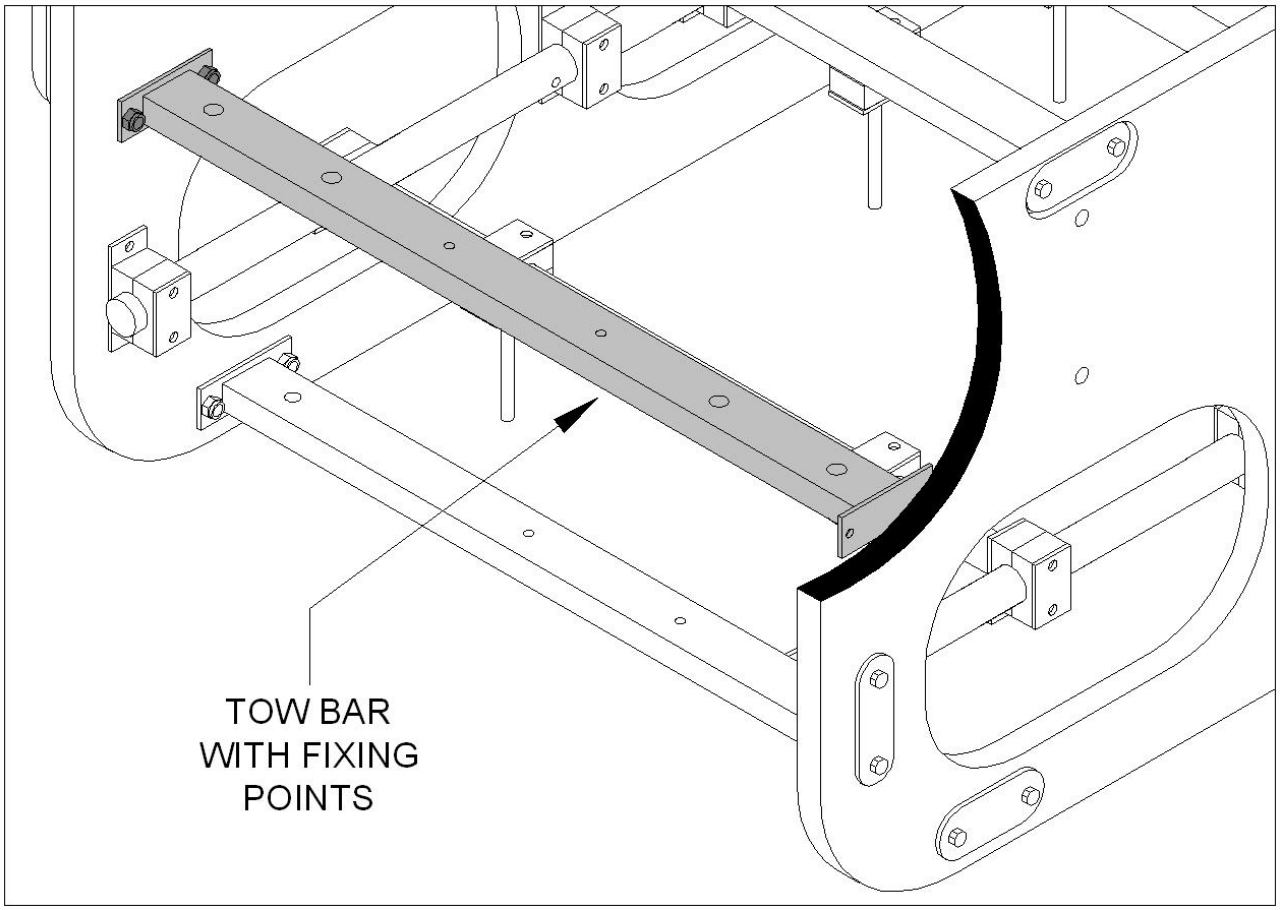
9. Deployment / Installation

Two towing ropes should be secured to the catamaran using two stainless shackles on the two points. The towropes can provide a degree of steerage by adjusting the tension on each rope.

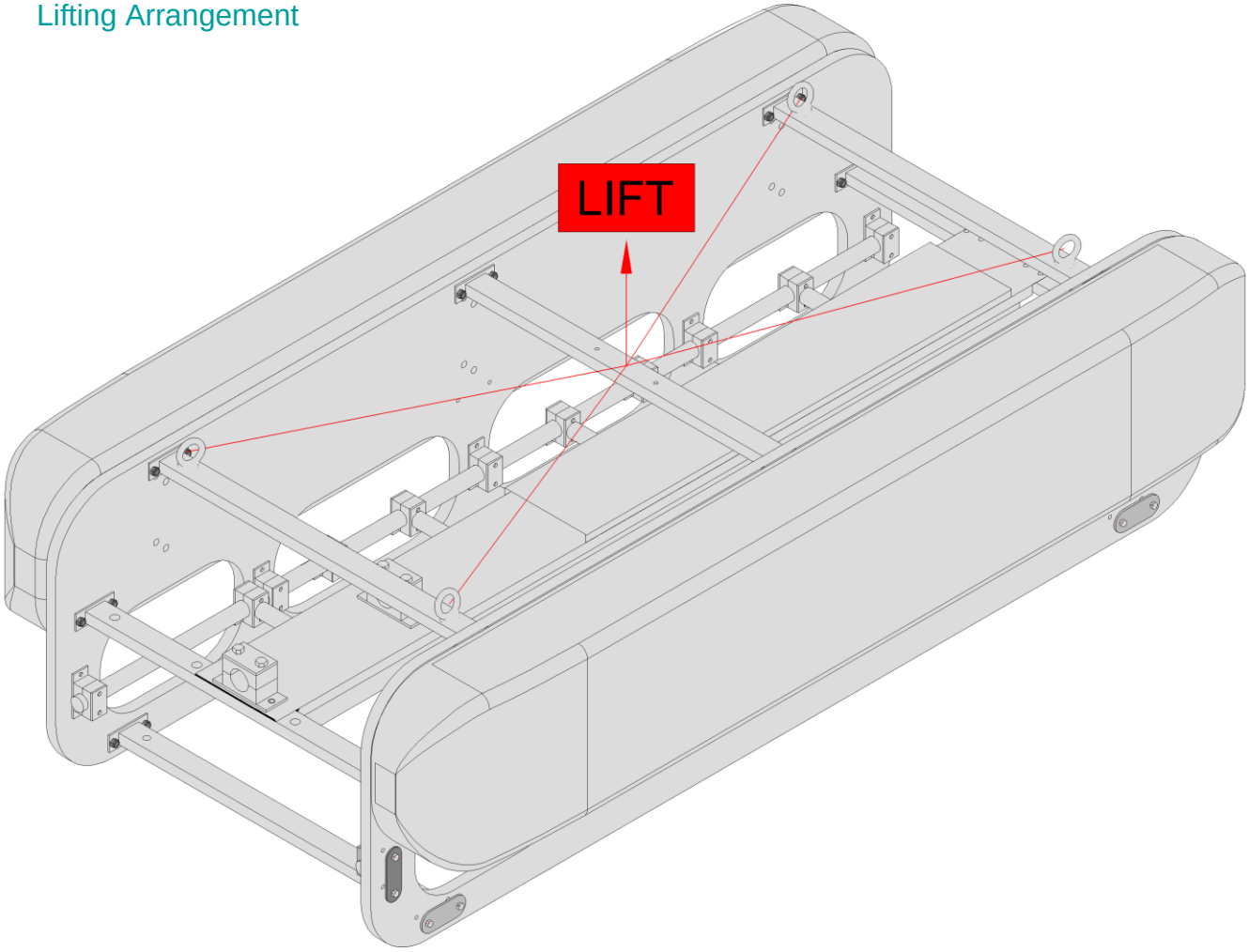
NOTE: No stress should be applied to the electrical connections whilst the unit is undertow as this may cause failure during operation.

The HV Cable Grip should be connected to the tow points and adjusted so that in case of tow rope failure no load is applied to the electrical connections or cable clamp.

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



Lifting Arrangement



The above diagram shows the recommended lifting arrangement using 4 lifting eyes in a 4 point lift.

This arrangement has been tested to the following specification.

Tare Weight (S-Boom Product inc. 3x AA252 Boomer Plates)	150kg
Gross Weight	250kg S.W.L.
Payload Weight (Allowance for HVC-3000 Cable to be attached)	100kg
Proof Load Weight	500kg

NOTE: A 75m HVC3000 Cable can be included within the lift.

The lifting eyes (and any additional lifting accessories used) are subject to the end users own country's lifting equipment regulations and should be thoroughly examined at regular intervals. For users in the UK, this is a six month interval.

10. Maintenance Procedures

The below procedures are advisory guidelines that are recommended.

Inspection Interval

Pre-Deployment:

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

Visual Inspection (Pre Deployment)

- Check for mechanical damage / insecure fastenings.
- Check the floats.

The Applied Acoustic Engineering CAT300 unit 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.

11. End of Life 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.

12. Specification

Physical

CAT303 Catamaran

Overall length	: 1700mm
Overall width	: 960mm
Maximum height	: 500mm
Weight	: 81 Kg
Material	: Stainless Steel 316 metalwork fixings, other parts plastic.
Fixings	: All Stainless Steel 316, 2 spanners supplied.

AA252 Boomer

Overall length	: 380mm
Overall width	: 380mm
Weight	: 20.67 Kg (Air)
Connector	: RMK c/w locking collar.

HVC3000 Cable

Overall length	: 75m (Standard)
Diameter	: 26mm
Connector	: RMK c/w locking collar.

Sound Output

Source Level	: Typically 222dB re 1uPa at 2 meters with 1000J
Pulse Length	: 300 to 500uS depending upon energy applied
Reverberation	: <10% of initial pulse

Compatibility

Energy Source	: CSP-S 1250 other CSP-Ds can be used.

Electrical Input

Power Level	: 700 to 1000J per shot
Max Power Level	: 1000J
Max Power Rate	: 3000J per Second

Thermal Interlock Protection interfaced to energy source

Note: Specification is subject to change without notice

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.

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