G3S GLIDER-FINAL PRODUCTION RECORD

						Schematic Rev	
SELECT ONE	X	1000M		350M		SPECIAL	
CUSTOMER	Memorial		CUST. ORDER NO.	R123614-2			

NOTE: FILL IN ALL REQ'D DATA, NO EMPTY SPACES, NO DITTOS.

ASSY / PART DESCRIPTION	DWG #	REV	SERIAL #
GLIDER ASSY (FILL IN) PN "GLD-XXX-NFC"	GLD-0107-D	NA	1	970
SHALLOW FRONT PUMP (SELECT ONE)	N/A	NA	NA	NA
FWD SECTION ASSY (SELECT ONE)	ASSY 305685-1000	305685	B	644
ALTIMETER ASSY (SELECT ONE)	G-1414	G-1414	C	60650315
PAYLOAD BAY ASSY - Fill In	PLD-0105	NA	1	1481
STACK-ON BAY - Fill In	A311627-NFC	A311627	1	1479
AFT SECTION	A311317-NFC	A311317-NFC	1	1063
AFT END CAP	ASSY 305654	305654	E	212
AFT TRAY	A311318-NFC	A311318-NFC	1	1063
PRESSURE TRANSDUCER	ASSY G-1312	3002	C	129995
RADOME FIN	ASSY 304376	304376	D	1413
THRUSTER ASSY	ASSY 302409	302409	NA	NA
Composite Hull, Fwd	ASSY G-1405-L	3135	K	2969
Composite Hull, Aft	ASSY G-1405-L	3135	K	2924

ASSY / PART DESCRIPTION	DWG #	VENDOR SERIAL #
LITHIUM BATTERY, PITCH	Assy 305523	305523	132
LITHIUM BATTERY, AFT	Assy 305524	305524	115
ENERGY BAY BATTERY	NA	NA	NA
BATTERY, EMERGENCY	306318-NFC	306318	NA
FREEWAVE	ASSY 301784	301784	973-9655

ASSY / PART DESCRIPTION	VENDOR SERIAL #
IRIDIUM SIM CARD (CUSTOMER SUPPLIED)	8988169234001174028
ARGOS ID# (CUSTOMER SUPPLIED)	Dec. 224509 Hex. 32197D4

ASSY / PART DESCRIPTION	VERSION #
FIRMWARE, COTS TESTING	10.07-RC03

HELIUM LEAK TEST

✓ PASS ☐ FAIL Initial: AM Date: 1/15/22

NOTES: AD2CP IP Address 192.168.0.240

Completion Date 1/15/22 Name (print) Adam Ritterbush Initials AM
Inspection Date 1/15/22 Name (print) Jasmin Guzman Initials JG
Review Date 1/24/22 Name (print) [signature] Initials SC

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GLIDER SERIAL #
970

Document: 4095-GRR
Rev. L

GLIDER RELEASE RECORD

TO BE COMPLETED BEFORE FACTORY ACCEPTANCE TEST (FAT)
NOTE THESE STEPS ARE LISTED IN THEIR PREFERRED (NOT REQUIRED) ORDER

Step	Test description	Initials/Date	Pass/Fail
1	Glider Ballasting Procedure, Document #4095-GBP Spreadsheet Document #4095-GBPSH	KB 1/21/22	Pass
2	Confirm ballasting in tank (Only necessary if internal ballast was changed.)	N/A	N/A
3	Document #4095-GVI Glider Visual Inspection	KB 1/28/22	Pass
4	Document #4095-FSI or #4095-FSI-I Glider Final Seal Inspection	KB 1/21/22	Pass
5	Document #301750-HLT Helium Leak Test	KB 1/27/22	Pass
6	Verify Flight Testing is Complete	KB 1/28/22	Pass
	FACTORY ACCEPTANCE TEST (FAT) WITH CUSTOMER (IF REQUIRED)		
1	Document #4095-FCP or #4095-FCP-I Functional Checkout Procedure	KB 1/28/22	Pass
2	(Optional, as requested by customer) Document #4095-CICT Customer Iridium Communications Test	N/A	N/A
3	Install science sensor covers. For Aanderaa optodes, be sure to fill rubber cover with water.	KB 1/28/22	Pass

COMMENTS:

FINAL APPROVAL FOR PRODUCT SHIPPING

Customer Witness (if Applicable)	Date:
TWR :	Date: 1/28/22
QA/ Production Supervisor Review:	Date: 1/28/22

Ballasting The Slocum Glider (Spreadsheet)

Reference Ballasting Procedure 4095-GBP

1- Fill in all fields that are shaded in blue

2- Adjust weight by amount in yellow box to go from neutrally buoyant in tank to neutrally buoyant in target water

Glider Name:	Unit 970
Ballasted by:	DS
Date:	1/21/2022
Glider Type:	G2 Deep (1000m)

Add-ons (check box for each)		
G1 Shallow Science Bay	1st	2nd
G1 Deep/G2 Science Bay	1st	2nd
G2 Extended Science/ Energy Bay (14.85")		
DVL Bay (5.75")	1st	2nd
ES Science/Energy Bay (15.75")		
Mark III Aft End Cap		
Rockland Scientific Microrider		
SUNA Nitrate Sensor		
Pond Wings		
Pinger		
Insert Glider-specific Volume Adjustment Here	11.0245	

Base Glider Displacement:	46.02	Liters
Total Glider Displacement:	67.76	Liters

	Tank Water		**Target Water**		**Weight Change**
Temperature and	19.2877	°C	19.2877	°C	0.0000 grams
(Density or	0.0000	g/L°C	0.0000	g/L°C	
Conductivity or	4.8092	s/m	4.8092	s/m	
Salinity)	0.0000	pss	0.0000	pss	
Calculated/given Salinity	35.7506	pss	35.7506	pss	
Calculated/given Density	1025.5221	g/L°C	1025.5221	g/L°C	0.0000 grams
			Total Weight Adjustment:		0.0000 grams

Drive Weight Material	
Configure 2 Drive Weights, Each Weighing (g)	

Battery Type:	Lithium	weight (kg)
Pitch Configuration	Lithium Pitch Pack	8.5222
Science/Energy Bay Configuration	N/A	NA
Aft Configuration	Lithium Aft Pack	9.8028
Nose Configuration	1 pack nose	0.5894

Note: This spreadsheet consists of 3 tabs. Complete "Ballast", "Worksheet", and the tab relevant to your particular glider.

Calculating H-moment (Roll Method)

1- Place well-ballasted glider in tank with wings.

2- Add a known amount of weight (~300 g) on one wing rail

3- Attach a spring scale to the glider on the opposite wing rail

4- Measure the weight change shown on the spring scale

5- Measure the angle of roll that the glider undergoes due to the addition of weight. For this step you can use an inclinometer (less accurate) or have the glider on and measure compass roll before and after weight addition and measure angle difference.

6- Remove the added weight, measure weight, and multiply by 0.912 if using Lead weight or by 0.875 if the weight used is stainless steel. This factor accounts for buoyancy provided by water on material.

Roll Start	0.0000	radians
Roll End	0.0000	radians
Weight on Spring	0.00	grams
Weight added on wing rail	0.00	grams
Angle of Rotation	0.00	degrees
Radius of Hull + Distance to Weight (radius of hull: 200m=107, 1000m=110)	107	mm
H-distance	#DIV/0!	mm
Weight of Pitch Battery	8.5222	kg
Total range of Pitch Battery (+/- in)	1.00	inches
Pitch Range	#DIV/0!	Degrees

Calculating H-moment (Pitch Battery method)

1- Put battery position (c_battpos) at about .25, ensure front of glider is not touching bottom of tank- adjust as necessary

2- Record m_pitch and m_battpos

3- Put battery position at 0

4- Record m_pitch and m_battpos

Weight of Pitch Battery	8.5222	kg
Pitch_1	-0.022689	radians
Battery Position_1	0.008487	inches
Pitch_2	-0.13439	radians
Battery Position_2	0.277226	inches
H-Distance	7.55	mm
Total range of Pitch Battery (+/- in)	1.00	inches
Pitch Range	31.92	Degrees

Sign: _____ **Date:** 1-28-22

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Document #:	4095-GBPSH
Rev:	G
Date:	1/0/1900
ECO #:	0

Glider Ballast Worksheet

Glider Name:	Unit 970
Ballasting Technician:	DS
Date:	1/21/2022
Glider Displacement (L):	67.8
H-Moment (mm):	7.55

TANK WATER:

Temperature (°C):	19.29
Conductivity (S/m):	4.81
Salinity (psu):	35.75
Density (g/L°C):	1025.5221

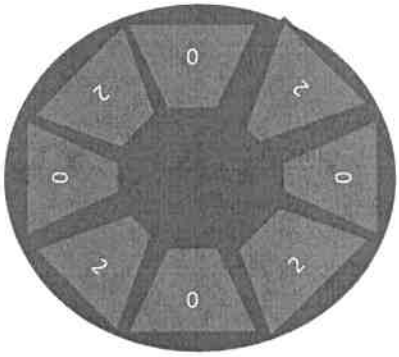
TARGET WATER

Temperature (°C):	19.29
Conductivity (S/m):	4.81
Salinity (psu):	35.75
Density (g/L°C):	1025.5221

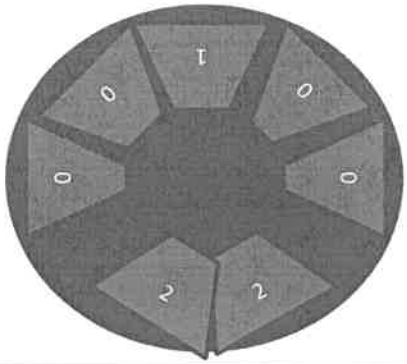
Pie Weight Locations

Pie weights can be removed or shifted around to indicate exact location. The quantity can also be changed to represent stacked pie weights.

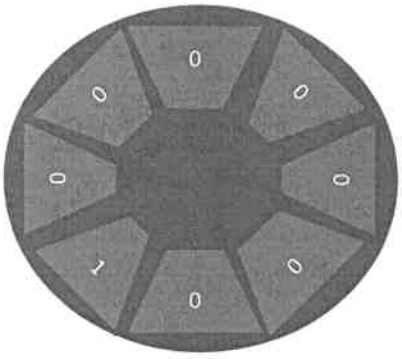
Additional Bay FWD



Science FWD

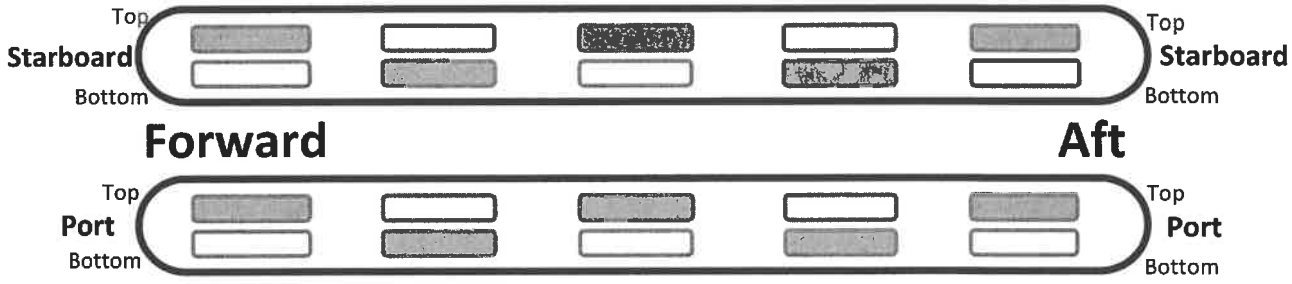


Science AFT



Wing Rail Weight Locations

Shade in the location of wing rail weights.



Final Weight Configuration As Sent to Customer

Forward	Weight (g)	Payload	Weight (g)	Aft	Weight (g)
Port Bottle	62	Top FWD		Aft Bottle STBD	151
STBD Bottle	62	Bottom FWD	800	Aft Bottle Port	116
		Add Bay Top FWD	800		
		Add Bay Bottom FWD	800		
Desiccant	0.1246	Weight Bar			
		Science Aft	200		

Pond Wings:	
Pinger Channel:	

Conductivity Calibration Certificate

RBRlegato³ C.T.D, Teledyne Webb Slocum, dry bay (1000dbar) s/n: 207969

References: Autosal8400B#66289, MS-315#15506, SSW P164, RC#002

Reference Resistance (ohm)	Reference Conductivity (mS/cm)	Voltage Ratio, V	Measured Conductivity (mS/cm)	Calibration Error (mS/cm)
open	0.0000	-0.000073	-0.0011	-0.0011
694.042	7.4240	0.038983	7.4235	-0.0006
331.926	15.5233	0.081590	15.5233	-0.0000
150.019	34.3462	0.180613	34.3477	0.0014
100.016	51.5179	0.270944	51.5197	0.0018
75.023	68.6798	0.361212	68.6798	-0.0001
55.520	92.8068	0.488122	92.8054	-0.0014

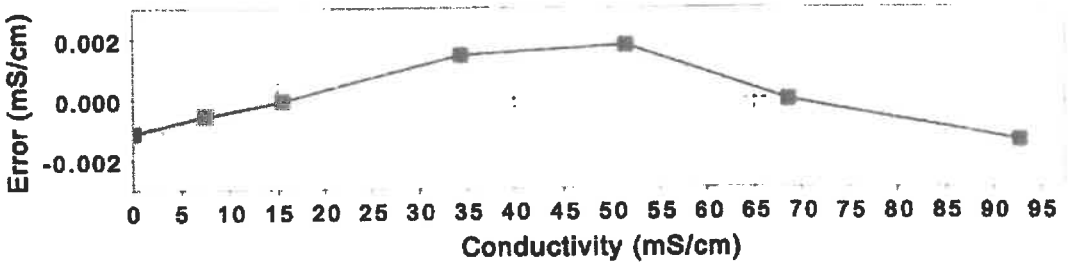
Bath	Voltage Ratio	Temperature (ITS-90)	Salinity (PSS-78)	Conductivity (mS/cm)
T15S35	0.2250136	14.87735	34.9920	42.7882
T25S35	0.2777701	24.76386	34.9969	52.8204

Cell Constant @T15S35 = 5.15259 1/cm

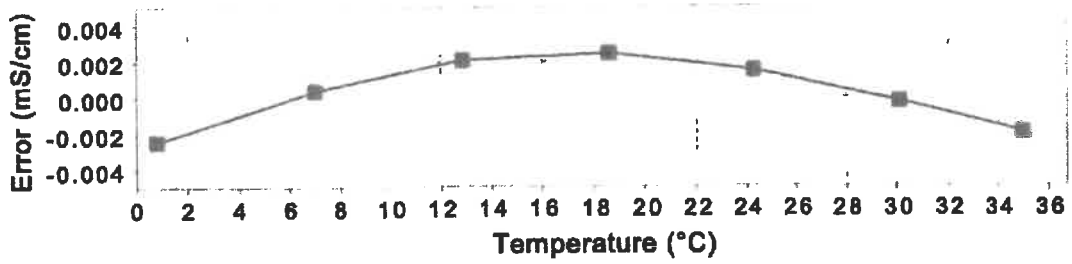
	Coefficients
C0:	12.841213E-3
C1:	190.10136
(K) C2:	1.001942
X0:	129.42121E-6
X1:	-8.2977585E-6
X2:	0.0
X3:	0.0
X4:	0.0
X5:	14.877353
X6:	10

$$C_c = \frac{C_0 + C_1 * C_2 * V - X_0 * (T - X_5)}{1 + X_1 * (T - X_5) + X_2 * (P - X_6) + X_3 * (P - X_6)^2 + X_4 * (P - X_6)^3}$$

Calibration error vs. Conductivity



Calibration error vs. Temperature



Calibration Date: 2021-08-18
Issue Date: 2021-08-18
File Name: 207969_20210818_1712C.rsk

Operator: jwang

Approver: kmalorny

RBR

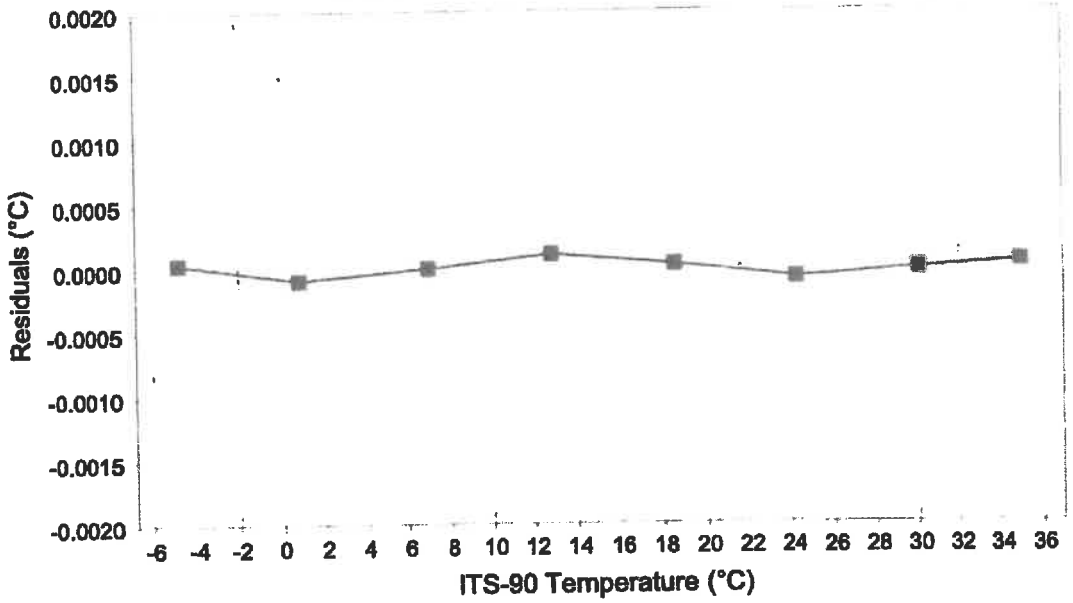
Temperature Calibration Certificate

Logger ID: RBRlegato³ Serial No: 207969 Channel No: 2

Reference Temperature, ITS-90	Voltage ratio, V	Measured Temperature, ITS-90	Calibration error
-4.78985	0.690939	-4.78981	0.00004
0.80423	0.624032	0.80414	-0.00009
6.98883	0.547163	6.98882	-0.00000
12.86468	0.474640	12.86478	0.00010
18.60966	0.407082	18.60968	0.00002
24.33581	0.345129	24.33572	-0.00009
30.11677	0.289312	30.11676	-0.00002
34.99245	0.247885	34.99248	0.00004

Coefficients	
C0:	3.521882E-3
C1:	-252.00658E-6
C2:	2.5816398E-6
C3:	-75.07101E-9

Residuals vs. Temperature



Calibration Date: 2021-08-09
Issue Date: 2021-08-10
Calibration ID: 48215

Operator: dluong

Approver: jwang

RBR

Pressure Calibration Certificate

RBRlegato³ C.T.D, Teledyne Webb Slocum, dry bay (1000dbar) s/n: 207969

Instrument rating: 1,000 dbar s/n: N009852

Nominal accuracy: 0.05%FS (0.5 dbar)

Reference instrument: Mensor CPC6000 s/n: 612676

Applied pressure, P_{app} (dbar)	Voltage ratio, V	Measured pressure, P_c (dbar)	Calibration error (dbar)
10.137	0.017519	10.1442	0.0076
110.000	0.059695	110.0066	0.0066
210.000	0.101878	210.0020	0.0020
310.000	0.144023	310.0075	0.0075
410.000	0.186126	410.0001	0.0001
510.000	0.228207	510.0144	0.0144
609.999	0.270241	609.9772	-0.0218
709.998	0.312277	709.9941	-0.0039
809.997	0.354299	810.0081	0.0111
909.998	0.396306	910.0085	0.0105
1010.000	0.438306	1009.9976	-0.0024

Coefficients

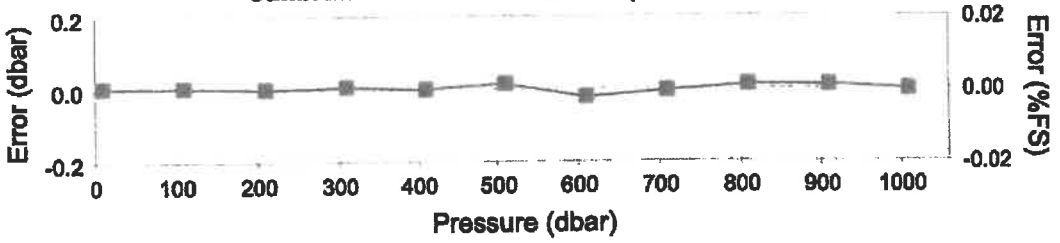
C0:	-31.065626
C1:	2.365059E3
C2:	37.59913
C3:	-30.175407
X0:	10.1366
X1:	78.56043E-3
X2:	-12.593171E-6
X3:	-212.69845E-9
X4:	-116.62482E-6
X5:	22.79612

$$P_c = X_0 + \frac{P_m - X_0 - X_1(T - X_5) - X_2(T - X_5)^2 - X_3(T - X_5)^3}{1 + X_4(T - X_5)}$$

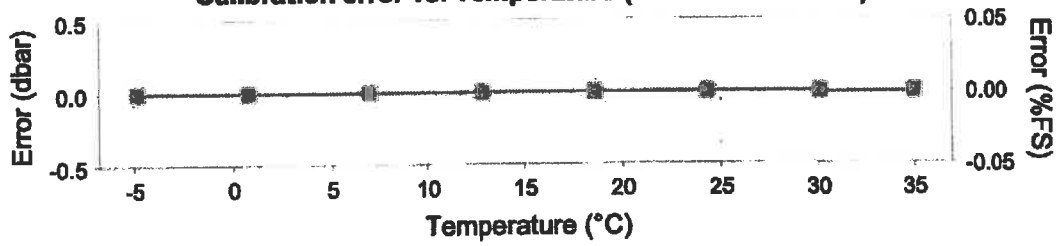
Head (mm) = 242

$$P_m = C_0 + C_1 V + C_2 V^2 + C_3 V^3$$

Calibration error vs. Pressure (Tcal = 22.8°C)



Calibration error vs. Temperature (Patm = 10.07 dbar)



Calibration Date: 2021-08-16
Issue Date: 2021-08-16
File Name: 207969_20210816_1629P.rsk

Operator: dluong

Approver: kmalorny

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CALIBRATION CERTIFICATE

Form No 830, March 2021

Certificate no: 4831_961_00181587
Foil batch no: 1824M

Product: 4831
Calibration date: 14.02.2021

Serial no: 961

Index	Temperature reference(°C)	[O2] Reference(µM)	Temperature raw data(mV)	Phase reading(°)
0	30.229	1.60	-124.913	61.22
1	20.144	1.15	200.347	62.23
2	10.107	0.95	526.513	63.05
3	0.864	0.83	805.607	63.76
4	0.949	21.03	803.180	61.08
5	1.023	42.83	801.100	58.46
6	1.085	63.30	799.333	56.24
7	1.133	110.00	797.940	51.92
8	1.169	151.47	796.940	48.77
9	1.203	217.99	795.973	44.66
10	1.234	323.87	795.080	39.81
11	1.250	436.82	794.627	36.10
12	1.262	540.06	794.293	33.53
13	10.810	16.50	504.147	60.04
14	10.713	34.69	507.260	56.95
15	10.641	51.52	509.507	54.44
16	10.592	86.46	511.073	50.08
17	10.565	122.86	511.940	46.45
18	10.544	172.50	512.620	42.52
19	10.531	262.60	513.007	37.38
20	10.520	341.25	513.360	34.22
21	10.499	430.12	514.040	31.57
22	20.672	13.31	183.040	58.89
23	20.613	27.49	184.973	55.53
24	20.568	41.88	186.453	52.61
25	20.534	67.66	187.540	48.30
26	20.505	95.26	188.500	44.65
27	20.482	138.17	189.260	40.29
28	20.462	204.25	189.900	35.59
29	20.450	273.72	190.280	32.18
30	20.440	344.86	190.607	29.65
31	30.402	10.82	-130.307	57.74
32	30.386	22.45	-129.820	54.13
33	30.380	34.04	-129.600	51.07
34	30.381	56.06	-129.660	46.37
35	30.385	79.35	-129.800	42.54
36	30.392	112.91	-130.000	38.39
37	30.409	167.14	-130.533	33.76
38	30.416	227.18	-130.733	30.31
39	30.422	284.31	-130.933	28.02

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CALIBRATION CERTIFICATE

Form No 830, March 2021

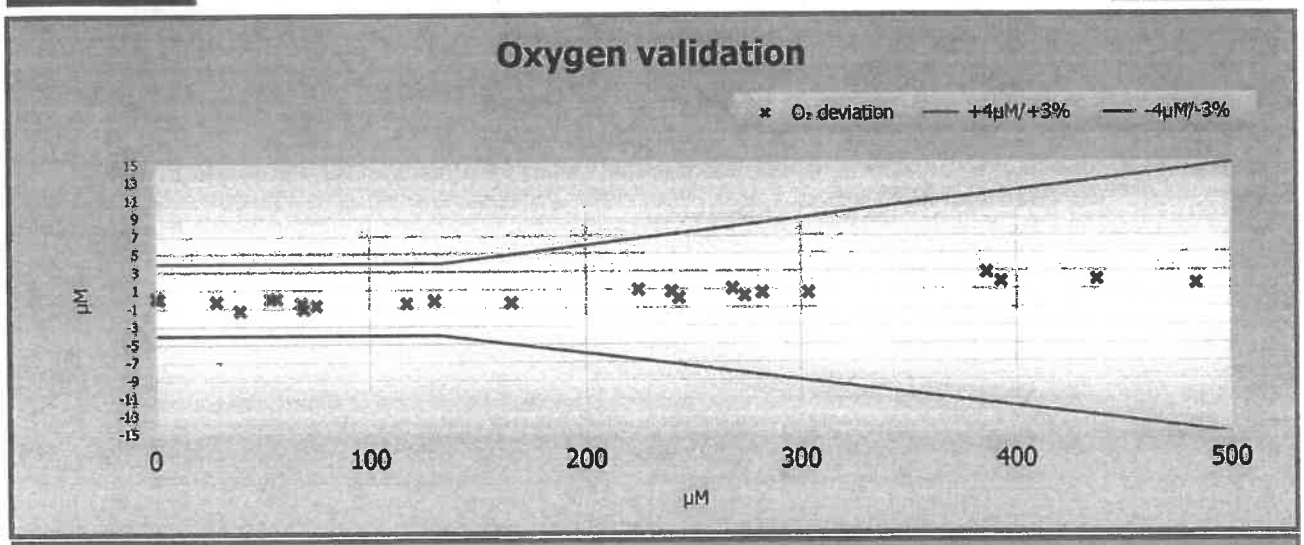
Certificate no: 4831_961_00181587
Foil batch no: 1824M

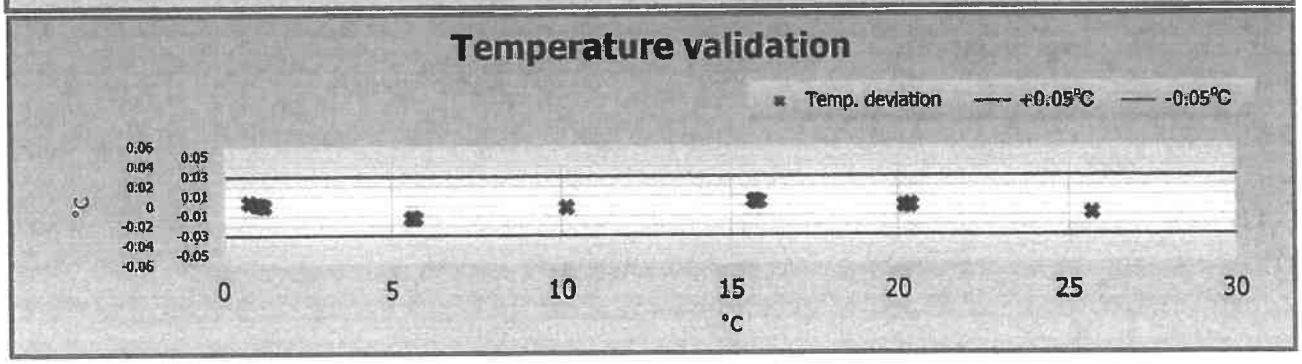
Product: 4831
Calibration date: 14.02.2021

Serial no: 961

Giving these coefficients

Index	0	1	2	3	4	5	6
SVUFoilCoef	2.74988E-03	1.13980E-04	2.55480E-06	1.00392E02	-1.38412E-01	-2.27002E01	2.01418E00
TempCoef	2.62880E01	-3.10956E-02	3.05055E-06	-4.49677E-09	0.00000E00	0.00000E00	





With following settings

Index	0	1	2	3
PhaseCoef	-2.86200E00	1.00000E00	0.00000E00	0.00000E00

Index	0 (Offset)	1 (Slope)
ConcCoef	0.00000E00	1.00000E00
Salinity	0.00	
Firmware Version	5.3.1	

Date:14.02.2021

Tor-Ove Kvalvaag

Tor-Ove Kvalvaag, Calibration Engineer

AANDERAA a xylem brand

PRESSURE CERTIFICATE

Form No. 667, Sept 2009

Product: Oxygen Optode 4831
Serial No: 961
Date: 11.02.2021

Certificate No: 181492260961

This is to certify that this product has been pressure tested with the following instrument, and we confirm that no irregularities were found during the test:

Autoklav 800 bar – sn: 0210005

Pressure readings:

Pressure (Bar)	Pressure time (hour)
600	1

Date: 11 Feb 2021

Sign:
Laila A. Skålnes

Laila Skålnes, Production Engineer

AANDERAA a xylem brand

TEST & SPECIFICATIONS

Form No. 712 V3, May 2020

Program Version: 5.3.1

Product: Oxygen Optode 4831
Serial No: 961

Visual and Mechanical Checks:

1.1 Soldering quality
1.2 Visual surface
1.3 Galvanic isolation between housing and electronics

Current Drain and Voltages:

2.1	Average current drain at 0.5 Hz sampling (Max.: 33 mA)	23.2	mA
2.2	CANBus Current drain at 0.5 Hz sampling (Max.: 33 mA)		mA
2.3	Current drain in sleep (Max.: 270 µA)	229	µA
2.4	CANBus Current drain in sleep (Max.: 180 µA)		µA
2.5	DSP IO voltage, J4.18 (3.3 ±0.15V)	3.29	V
2.6	DSP Core voltage, J4.17(1.8 ±0.05 V)	1.80	V
2.7	Excitation driver voltage, C4 Analog Board (4.3 ±0.1 V)	4.34	V

Performance test:	Channel:	Blue		Red	
3.1	Average of Receiver readings (0±150mV)	-5.2	mV	-2.7	mV
3.2	Standard Deviation of Receiver readings (Max.: 45mV/10mV)	3.52	mV	0.58	mV
3.3	Amplitude measurement with non-fluorescence foil (<60mV/650-1200mV)	8.4	mV	989.8	mV
3.4	CANBus Output test				

Function test from 0 to 40°C:	Channel:	Blue		Red	
4.1	Minimum amplitude measurement (Blue: >550 mV, Red >550 mV)	631.9	mV	785.6	mV
4.2	Maximum amplitude measurement (Blue: <1600 mV, Red <1400 mV)	984.6	mV	1258.6	mV
4.3	Minimum phase measurement (Blue: >32°, Red: >3°)	34.81	°	5.82	°
4.4	Maximum phase measurement (Blue: <45°, Red: <10°)	40.88	°	7.33	°
4.5	Maximum standard deviation of Phase measurement: (< 0.07°)	0.05	°	0.04	°
4.6	Minimum temperature raw data measurement: (<-200 mV)			-454.3	mV
4.7	Maximum temperature raw data measurement: (>450 mV)			722.9	mV

Date: 11 Feb 2021

Sign:
Laila A. Skålnes

Laila Skålnes, Production Engineer

Contents of the shipping box

Nortek order no: 46317-917

Type of system: GLIDER 1MHz

NORTEK
Vangkroken 2
N-1351 RUD
Norway
Tel: +47 6717 4500
Fax: +47 6713 6770
inquiry@nortek-as.com
www.nortek.no

Instrument type:

[ ] Aquadopp	[ ] AWAC	[ ] Vectrino	[ ] Signature100	[ ] Signature1000
[ ] Aquadopp profiler	[ ] VM AWAC	[ ] Vectrino profiler	[ ] Signature250	[X] NortekDVL
[ ] Aquadopp DW 3000/6000m	[ ] Vector	[ ] Signature55	[ ] Signature500	[ ] NLR DVL

Software version: NORTEK DISCOVER **Firmware version:** 1.4.105, 2021-10-18 **Other:**

Cable:
- [ ] 10m length
- [X] Other: 2m

Connector:
- [X] 8-pin Inline
- [ ] 12-pin UW
- [ ] 6-pin Inline
- [ ] 7-pin Sourlau
- [ ] Other:

Communication:
- [ ] RS232
- [X] Ethernet
- [ ] RS422
- [ ] Other:

Options:
- [ ] Analog input
- [ ] Synch
- [ ] Analog output
- [ ] Other:

Battery cannister:
- [ ] Paradopp battery cannister
- [ ] Single battery aluminium cannister
- [ ] Double battery aluminium cannister

Battery cables:
- [ ] 2pin Inline-2pin
- [ ] 8pin Inline-2pin
- [ ] 8pin rectangular-2pin

Accessories:
- [X] Toolkit
- [X] Quick guide
- [ ] Final test checklist
- [ ] Seeding material
- [X] USB to serial converter RS232
- [ ] Altronix AL310 USB driver
- [ ] Recorder kit/ProLog
- [ ] Battery harness for 2 batteries

Batteries:

		Extra set:
[ ] Alkaline 50Wh	13.5V	[ ]
[ ] Alkaline 100Wh	13.5V	[ ]
[ ] Alkaline 540Wh	13.5V	[ ]
[ ] Alkaline 540Wh	18V	[ ]
[ ] Alkaline 90Wh	15V (Signature1000)	[ ]
[ ] Alkaline 180Wh	18V (Signature500)	[ ]

AC/DC Power supply
- [ ] 15V standard
- [ ] 48V Signature55 Online
- [ ] 24V Vectrino
- [X] 24V DC/DC & Signature

Plug: [ ] EU [ ] UK [X] US

Other: 2m SERIAL CABLE.

Date: 13.8.2021 **Responsible:** Signature

Final test checklist AD2CP

Order number: 46317-917

Name: Glider

Instrument serial number: 102878

Frequency: 1MHz

Main board: AD2CP_3302

Firmware versions: 1.4.6056.3055_10/185

NORTEK
Vangkroken 2
N-1351 RUD
Norway
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www.nortek.no

Label checked ☒ OK

Dock test ☒ OK

Baudrate 115200 ☒ OK

Comments:

Tilt check

☒ Pitch up
☒ Roll up
☒ Status bit
☒ Pitch down
☒ Roll down

pitch & roll within +/- 0.2 °

Clock

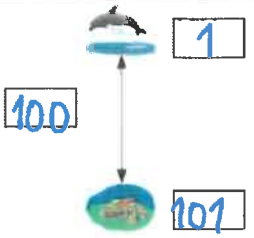
☒ Set clock

Heading

☒ Up
☒ Down

tolerance: +/- 2

Pressure



Psensortemp ☒ OK

tolerance: +/- 0.1 % of 1000 m

Temperature

☒ OK

tolerance: +/- 0.1 °

Beam check

	Correct order	Beam Imp	Noise floor	Amplitude in tank	Range
Beam 1	☒ OK	Ω	27 dB	> 80 dB	☒ OK
Beam 2	☒ OK	Ω	29 dB	> 80 dB	☒ OK
Beam 3	☒ OK	Ω	27 dB	> 80 dB	☒ OK
Beam 4	☒ OK	Ω	27 dB	> 86 dB	☒ OK
~~Beam 5~~	~~OK~~	~~Ω~~	~~dB~~	~~dB~~	~~OK~~

Velocity direction

N/A

XYZ coordinate system		ENU coordinate system	
X	☐ OK	E	☐ OK
Y	☐ OK	N	☐ OK
Z	☐ OK	U	☐ OK
Z_2	☐ OK	U_2	☐ OK

Head file

☒ Headfile checked
☒ Saved as read only

Serial communication

☐ RS422
☒ RS232

Trigger

☒ TTL
☐ RS485

Recorder erased

☒ OK

Rec size: 16.6B

Ethernet

MAC address: 8C:68:78:00:0C:E6

Static IP address:

Set host name: 102878

DHCP enabled ☒

FTP OK ☒

Licenses

Averaging mode	☒	Wave mode	☐	Vertical velocity	☐	64GB recorder	☐
Burst Five beams	☐	Echo Sounder	☐	Dual frequency low	☐	128GB recorder	☐
Bottom track	☒	Ice Measurement	☐	Dual frequency high	☐	256GB recorder	☐
High Resolution	☐	Altimeter	☐	16GB recorder	☒		

Calibration license erased ☒
Production license erased ☒
Default configuration set ☒

Cable/Harness

	Cable		Harness
Communication	☒	Communication	☒
Battery	☐	Battery	☐

Electrical isolation test

50V Ok ☒

External sensors

Power down

☒ OK

Date

Day: 13 Month: 08 Year: 2021

Signature

Certificate of Calibrations and Tests

Instrument Information

Customer Reference No.	46317-917
Instrument Type	Glider
Instrument Frequency	1000 kHz
Instrument S/N	102878
Head S/N	D-2878
Interface Board S/N	3302
Interface Board Mfr. S/N	4MO0886950064
Digital Board Mfr. S/N	4MO0870240028
Analog Board Mfr. S/N	4MO0886960030
Sensor Board Mfr. S/N	4MO0789490009
Interface Board Rev.	H-4
Digital Board Rev.	I-3
Analog Board Rev.	G-1
Sensor Board Rev.	I-0

Calibrations and tests performed

Pressure	Passed
Tilt and Compass	Passed

All the tested values are within Nortek AS specifications

August 13, 2021
Date

Reviewed and approved (sign.)

Details

Instrument Type	Glider
Instrument S/N	102878
Pressure Range	1000 dBar
Date	August 11, 2021
Operator	Faramarz Torkzad
Location	Nortek Factory Norway
Result	Passed

Description

Verification is performed in an automated pressure chamber. Fixed-point measurements are collected to verify the sensor.

Criteria of acceptance is ± 0.1% of full scale.

Reference: Paroscientific, Inc. - Digiquartz 9000-10K-101. Accuracy 0.01% of 6895dBar.

Verification Results

Reference (dBar)	Pressure Diff. (dBar)	Pressure Diff. (% of FS)
96.24	0.27	0.03
195.16	0.15	0.02
294.78	0.10	0.01
397.48	0.10	0.01
511.04	0.02	0.00
595.69	-0.01	0.00
707.20	-0.09	-0.01
802.44	-0.08	-0.01
897.53	-0.20	-0.02
1016.19	-0.27	-0.03

Tilt and Compass Report

Details

Instrument Type	Glider
Instrument S/N	102878
Date	August 11, 2021
Operator	Remy Øvereng
Location	Nortek Factory Norway
Result	Passed

Description

Calibration and verification is performed in a two axis automated jig. Continuous and fixed-point measurements are collected to calibrate and verify the sensor.

Criteria of acceptance for tilt sensor is ±0.5°.

Criteria of acceptance for compass sensor is ±3°.

Reference: Generic - Digital Protractor Series 950 Pro 3600. Accuracy ±0.05°.

Tilt Verification Results

	Diff. Up		Diff. Down	
Reference (°)	**Pitch (°)**	**Roll (°)**	**Pitch (°)**	**Roll (°)**
-30.00	-0.12	0.02	-0.11	-0.13
-15.00	-0.03	0.14	0.06	0.00
0.00	0.05	-0.06	0.11	0.08
15.00	-0.13	0.01	-0.14	-0.14
30.00	0.03	0.11	0.04	0.01

Compass Verification Results

Reference (°)	**Heading Diff. Up (°)**	**Heading Diff. Down (°)**
0.00	0.59	0.71
45.00	0.40	0.48
90.00	0.06	0.18
135.00	-0.02	-0.14
180.00	0.25	-0.28
225.00	0.46	-0.16
270.00	0.88	0.23
315.00	0.74	0.71

PRESSURE TRANSDUCER CALIBRATION DATA

Customer	Date
TELEDYNE BENTHOS	9 JUL 21
Model Number	**Serial Number**
141698-2000A	129995

Diaphragm Materials	Excitation	Pressure Range	Excitation Type
TITANIUM	5 VDC	2000 PSIA	Constant Voltage

Pressure Calibration Data all readings are in mV DC

Date of Pressure Calibration: 19 JUN 21

Pressure	Increase	Decrease	Ideal	Linearity (%FS)	Hysteresis (%FS)	STATIC ERROR BAND
0 PSIA	.31	.27	.31		.04%	± .08% FS BFSL
1000 PSIA	53.24	53.14	53.08	.15%	.09%	
2000 PSIA	105.85		105.85			
SENSITIVITY	105.54					

Thermal Calibration Data all readings are in mV DC

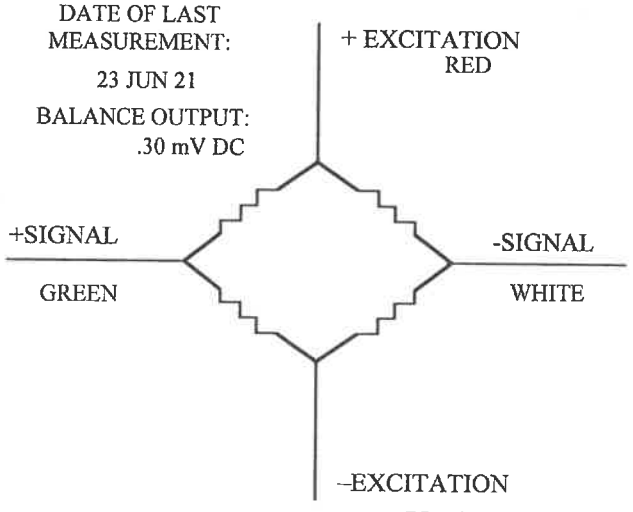
Date of Thermal Calibration: 19 JUN 21

	Low Temp.	Ambient	High Temp	Temperature Range	Thermal Balance Shift	Thermal Sensitivity Shift
Temperature	35 °F	75 °F	75 °F			
0 PSIA	.26	.28	.12	35°F to 75°F	.02%FS	-.03%FS
2000 PSIA	105.88	105.87	104.60	75°F to 75°F	-.15%FS	-1.05%FS
Sensitivity	105.62	105.59	104.48	AVERAGE	± .002% FS/°F	± .014% FS/°F

Notes

DATE OF LAST MEASUREMENT: 23 JUN 21

BALANCE OUTPUT: .30 mV DC



INPUT RESISTANCE 1499 Ohms
OUTPUT RESISTANCE 741 Ohms

Data Entered and Reviewed By	Date Data Entered
THARIN THAV	1 July 2021

4 Runway Streeet, Simi Valley, CA 93063 (805) 522-4676 • FAX (805) 522-4982 • e-mail sensors@microninstruments.com 000635

TELEDYNE
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CERTIFICATE OF COMPLIANCE

Sales Order No. R123614

This is to certify that the materials & services used for:

Customer Memorial University of N. F. Purchase Order No. P0165278

conform to the drawings, specifications and conditions called for in the above Customer Purchase Order Number and Teledyne standards.

Country of Origin – Assembled in the United States of America with U.S. & foreign components.

Model No.	REV	QTY	Product Description	Serial Number(s)
GLD-0107-D	1	1	G3S, Memorial University, 1KM RBR	970
			CTD, Optode, ASSY 306186 Lithium	
			Recharge Customer Supplied Crate and	
			Cart	

Authorized By: Shawn Green (Name (print)) _____ (Signature) 01/28/22 (Date)