AANDERAA a xylem brand

TEST & SPECIFICATIONS

Form No. 712 V2,March 2014

Program Version: 04.09.2001

Product: Oxygen Optode 4831

Serial No: 643

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.: 180 µA)	240	µA
2.4	CANBus Current drain in sleep (Max.: 180 µA)		µA
2.5	DSP IO voltage, J4.18 (3.3 ±0.15V)		V
2.6	DSP Core voltage, J4.17(1.8 ±0.05 V)	1.82	V
2.7	Excitation driver voltage, C4 Analog Board (4.5 ±0.15 V)	4.60	V

Performance test:	Channel:	Blue		Red	
3.1	Average of Receiver readings (0±150mV)	-3.3	mV	-0.7	mV
3.2	Standard Deviation of Receiver readings (Max.: 45mV/10mV)	1.74	mV	0.37	mV
3.3	Amplitude measm. with non-fluorescence foil (<60mV/650-1200mV)	11.4	mV	898	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 >650 mV)	791	mV	722.9	mV
4.2	Maximum amplitude measurement (Blue: <1600 mV, Red <1400 mV)	1162.5	mV	1136.9	mV
4.3	Minimum phase measurement (Blue: >24°, Red: >1°)	35.02	°	7.9	°
4.4	Maximum phase measurement (Blue: <34°, Red: <5°)	40.62	°	8.87	°
4.5	Maximum standard deviation of Phase measurement: (< 0.02°)	0.03	°	0.02	°
4.6	Minimum temperature raw data measurement: (<-200 mV)			-415.7	mV
4.7	Maximum temperature raw data measurement: (>450 mV)			689.7	mV

Pressure test :

5.1	Pressure (IW version: 20MPa, DW version 60MPa)	60MPa

Date: 08 Nov 2016

Sign:

Laila A. Skålnes

Laila Skålnes, Production Engineer

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CALIBRATION CERTIFICATE

Form No. 710, Nov 2013

Sensing Foil Batch No:
Certificate No: 4831_643_00123043

Product: Oxygen Optode 4831
Serial No: 643
Calibration Date: 07 Sep 2016

This is to certify that this product has been calibrated using the following instruments:

Parameter: Internal Temperature:

Calibration points and readings:

Temperature (°C)	0.96	11.90	23.85	35.86
Reading (mV)	791.60	465.40	85.34	-280.79

Giving these coefficients

Index	0	1	2	3	4	5
TempCoef	2.65538E01	-3.19441E-02	3.04548E-06	-4.46879E-09	0.00000E00	0.00000E00

Parameter: Oxygen:

	O2 Concentration	Air Saturation
Range:	0-500 µM [1)]	0 - 120%
Accuracy[1)]:	< ±8µM or ±5% (whichever is greater)	±5%
Resolution:	< 1 µM	< 0.4%
Settling Time (63%):	< 25 seconds	

Calibration points and readings[2)]:

	Air Saturated Water	Zero Solution (Na_2SO_3)
Phase reading (°)	3.17464E+01	6.30294E+01
Temperature reading (°C)	9.91240E+00	2.11813E+01
Air Pressure (hPa)	9.97014E+02	

Giving these coefficients

Index	0	1	2	3
PhaseCoef	-2.55700E00	1.00000E00	0.00000E00	0.00000E00
ConcCoef	-5.86659E00	9.04138E-01		

[1)] *Valid for 0 to 2000m (6562ft) depth, salinity 33 - 37ppt*

[2)] *The calibration is performed in fresh water and the salinity setting is set to:* 0

Date: 08 Sep 2016

Sign:

Tor-Ove Kvalvaag, Calibration Engineer

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PRESSURE CERTIFICATE

Form No. 667, Sept 2009

Product: Oxygen Optode 4831
Serial No: 643
Date: 21.09.2016

Certificate No: 123519260643

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: 08 Nov 2016

Sign:
Laila A. Skålnes

Laila Skålnes, Production Engineer

AANDERAA a xylem brand

CALIBRATION CERTIFICATE

Form No 770. , Jun 2008

Certificate No: 3853_1517E_42135 **Product:** O2 Sensing Foil PSt3 **Serial No:** 1517
Batch No: 1517E **Calibration Date:** 11 May 2015

Calibration points and phase readings

Index	Temperature (°C)	Phase Reading (°)	Oxygen reference (µM)	Index	Temperature (°C)	Phase Reading (°)	Oxygen reference (µM)
0	0.704	63.914	2.03	32	30.082	53.033	21.79
1	0.702	61.285	16.73	33	30.092	49.618	32.39
2	0.719	57.139	43.34	34	30.101	44.269	53.76
3	0.738	54.421	63.59	35	30.106	40.346	74.79
4	0.760	49.766	105.29	36	30.116	35.622	109.76
5	0.772	46.081	146.71	37	30.121	30.977	161.70
6	0.784	41.507	213.10	38	30.120	27.955	212.00
7	0.794	36.385	317.95	39	30.121	25.389	273.03
8	0.807	32.902	419.27	40	5.293	63.610	1.72
9	0.820	30.250	523.15	41	5.433	60.690	15.39
10	9.883	63.306	1.42	42	5.413	56.465	38.58
11	10.165	60.095	14.05	43	5.401	53.624	56.77
12	10.107	55.791	33.82	44	5.396	48.810	94.29
13	10.064	52.826	49.96	45	5.390	45.160	130.52
14	10.031	47.854	83.29	46	5.385	40.458	191.09
15	10.007	44.239	114.32	47	5.382	35.518	282.30
16	9.987	39.409	169.08	48	5.383	32.070	373.06
17	9.970	34.651	246.64	49	5.387	29.438	466.83
18	9.959	31.238	326.85	50	14.836	62.930	1.39
19	9.954	28.625	410.51	51	15.061	59.491	12.90
20	19.789	62.555	1.37	52	15.002	55.063	30.47
21	19.957	58.887	11.74	53	14.954	52.000	44.98
22	19.896	54.335	27.11	54	14.917	46.968	74.66
23	19.843	51.173	40.00	55	14.893	43.238	103.04
24	19.804	46.081	66.03	56	14.875	38.421	152.17
25	19.780	42.237	91.76	57	14.860	33.797	220.64
26	19.764	37.433	135.25	58	14.844	30.439	292.58
27	19.750	32.944	194.65	59	14.836	27.878	367.95
28	19.730	29.641	258.31	60	24.944	61.916	1.83
29	19.718	27.130	325.40	61	25.014	58.346	10.72
30	30.100	61.278	2.30	62	24.989	53.684	24.45
31	30.072	57.804	9.69	63			

Giving these coefficients

Index	FoilCoefA	FoilCoefB
0	-2.679283E-06	-1.861349E-06
1	-7.483597E-06	3.814899E+03
2	1.960006E-03	-3.222806E+01
3	-2.072853E-01	-1.678000E-01
4	6.012464E-04	1.894820E-02
5	-6.604267E-07	-6.901433E-04
6	1.118020E+01	1.042693E-05
7	-5.148064E-02	0.000000E+00
8	6.898504E-05	0.000000E+00
9	8.465013E-07	0.000000E+00
10	-3.143506E+02	0.000000E+00
11	2.051116E+00	0.000000E+00
12	-2.987026E-03	0.000000E+00
13	-4.449771E-06	0.000000E+00

Using the following monomial degrees

Index	FoilPolyDegT	FoilPolyDegO
0	1	4
1	0	5
2	0	4
3	0	3
4	1	3
5	2	3
6	0	2
7	1	2
8	2	2
9	3	2
10	0	1
11	1	1
12	2	1
13	3	1
14	4	1
15	0	0
16	1	0
17	2	0
18	3	0
19	4	0
20	5	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0

Date: 11 May 2015

Sign:

Tor-Ove Kvalvaag, Calibration Engineer