



# TEST & SPECIFICATIONS

Form No. 784, July 2008

AANDERAA DATA INSTRUMENTS

Layout No: 1372A, 1374A, 1376  
Circuit Diagram No: : V-3979A, V3977A, V-3980  
Program Version: V1.22.1

Product: Oxygen Optode 4330IE  
Serial No: 199

QC  
121  
ACC

### 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)	26.4	mA
2.2 CANBus Current drain at 0.5 Hz sampling (Max.: 33 mA)	21.8	mA
2.3 Current drain in sleep (Max.: 180 $\mu$ A)	111	$\mu$ A
2.4 CANBus Current drain in sleep (Max.: 180 $\mu$ A)	106	$\mu$ A
2.5 DSP IO voltage, J4.18 (3.3 $\pm$ 0.15V)	3.28	V
2.6 DSP Core voltage, J4.17(1.8 $\pm$ 0.05 V)	1.81	V
2.7 Excitation driver voltage, C4 Analog Board (4.5 $\pm$ 0.15 V)	4.59	V

### Performance test:

	Channel:	BLUE	RED
3.1 Average of Receiver readings (0 $\pm$ 150mV)		-78.0 mv	-18.5 mv
3.2 Standard Deviation of Receiver readings (Max.: 45mV/10mV)		102.86 mv	7.42 mv
3.3 Amplitude measurement with non- fluorescence foil(<110mV/1200-1200mV)		76.8 mv	2316.2 mv
3.4 Amplitude measurement with fluorescence foil (700-1200mV)		805.7 mv	893.8 mv
3.5 CANBus Output test			

### Function test at 0°C Temperature (In air with reference foil):

	Channel:	BLUE	RED
4.1 Amplitude measurement (Blue: 300 – 900mV, Red 300-900mV)		665.4 mv	679.6 mv
4.2 Phase measurement (Blue: 4 $\pm$ 2°, Red: 4 $\pm$ 2°)		6.2 °	4.6 °
4.3 Standard deviation of Phase measurement: (Max: 0.02°)		0.013 °	0.005 °
4.4 Raw data temperature measurement: (600 $\pm$ 200mV)			647.4 mv

### Function test at 20°C Temperature (In air with reference foil):

	Channel:	BLUE	RED
5.1 Amplitude measurement (Blue: 300 – 900mV, Red 300-900mV)		680 mv	499 mv
5.2 Phase measurement (Blue: 5 $\pm$ 2°, Red: 5 $\pm$ 2°)		6.5 °	5.0 °
5.3 Standard deviation of Phase measurement: (Max: 0.02°)		0.008 °	0.003 °
5.4 Raw data Temperature measurement: (0 $\pm$ 200mV)			-105 mv

### Function test at 40°C Temperature (In air with reference foil):

	Channel:	BLUE	RED
6.1 Amplitude measurement (Blue: 300 – 900mV, Red 300-900mV)		634.1 mv	414.1 mv
6.2 Phase measurement (Blue: 5 $\pm$ 2°, Red: 5 $\pm$ 2°)		6.6 °	5.1 °
6.3 Standard deviation of Phase measurement: (Max: 0.02°)		0.010 °	0.004 °
6.4 Raw data Temperature measurement: (-400 $\pm$ 200mV)			- mv

### Pressure test :

7.1 Pressure (IW version: 20MPa, DW version 60MPa)	60MPa
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Date: 27 August 2009

Sign:

*Jan Øyvind Trellevik*

Jan Øyvind Trellevik,  
Production Engineer

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# CALIBRATION CERTIFICATE

Form No. 710, Dec 2005

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Sensing Foil Batch No: 2808  
Certificate No:

Product: Oxygen Optode 4330IE  
Serial No: 199  
Calibration Date: 20 August 2009

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

**Parameter: Internal Temperature:**

**Calibration points and readings:**

Temperature (°C)	1.00	11.96	23.98	35.97	
Reading (mV)	721.44	369.42	-31.89	-402.54	

**Giving these coefficients**

Index	0	1	2	3	4	5
TempCoef	2.30117E01	-3.03997E-02	2.81608E-06	-4.12565E-09	0.00000E00	0.00000E00

**Parameter: Oxygen:**

	O <sub>2</sub> Concentration	Air Saturation
Range:	0-500 µM <sup>1)</sup>	0 - 120%
Accuracy <sup>1)</sup> :	< ±8µM or ±5% (whichever is greater)	±5%
Resolution:	< 1 µM	< 0.4%
Settling Time (63%):	< 25 seconds	

**Calibration points and readings<sup>2)</sup>:**

	Air Saturated Water	Zero Solution (Na <sub>2</sub> SO <sub>3</sub> )
Phase reading (°)	3.11958E+01	6.24029E+01
Temperature reading (°C)	9.92290E+00	1.94021E+01
Air Pressure (hPa)	1.01620E+03	

**Giving these coefficients**

Index	0	1	2	3
PhaseCoef	-2.74571E00	1.03430E00	0.00000E00	0.00000E00

<sup>1)</sup> Valid for 0 to 2000m (6562ft) depth, salinity 33 - 37ppt

<sup>2)</sup> The calibration is performed in fresh water and the salinity setting is set to: 0

Date: 21 August 2009

Sign:

Tor-Ove Kvalvaag, Calibration Engineer

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# CALIBRATION CERTIFICATE

Form No 770, Jun 2008

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Certificate No: 3853\_2808F\_39784  
Batch No: 2808F

Product: O2 Sensing Foil PST3  
Calibration Date: 2 December 2008

Serial No: 2808

## Calibration points and phase readings

Index	Temperature (°C)	Phase Reading (°)	Oxygen reference (µM)	Index	Temperature (°C)	Phase Reading (°)	Oxygen reference (µM)
0	3.315	63.024	0.00	32	39.680	33.609	85.05
1	3.318	59.314	18.88	33	39.686	25.499	177.73
2	3.315	56.083	37.76	34	39.680	22.036	255.14
3	3.315	48.522	94.41	35	6.782	62.775	0.00
4	3.315	40.556	188.82	36	6.783	58.912	17.34
5	3.312	31.479	394.67	37	6.781	55.556	34.68
6	3.312	27.327	566.51	38	6.780	47.820	86.70
7	10.248	62.526	0.00	39	6.780	39.796	173.41
8	10.247	58.510	15.80	40	6.778	30.786	362.45
9	10.247	55.030	31.60	41	6.776	26.703	520.28
10	10.246	47.117	79.00	42	15.172	62.139	0.00
11	10.244	39.036	158.00	43	15.171	57.895	14.21
12	10.243	30.093	330.23	44	15.171	54.257	28.42
13	10.240	26.079	474.04	45	15.171	46.135	71.06
14	20.096	61.751	0.00	46	15.170	38.029	142.11
15	20.096	57.281	12.62	47	15.170	29.206	297.02
16	20.095	53.484	25.25	48	15.168	25.291	426.36
17	20.096	45.153	63.12	49	25.017	61.341	0.00
18	20.096	37.023	126.23	50	25.016	56.662	11.47
19	20.096	28.319	263.82	51	25.016	52.720	22.94
20	20.096	24.503	378.68	52	25.016	44.230	57.34
21	29.938	60.931	0.00	53	25.017	36.105	114.67
22	29.937	56.042	10.31	54	25.018	27.553	239.66
23	29.937	51.956	20.62	55	25.018	23.827	344.01
24	29.936	43.306	51.56	56	34.811	60.495	0.00
25	29.938	35.188	103.12	57	34.810	55.443	9.41
26	29.940	26.788	215.51	58	34.811	51.237	18.82
27	29.940	23.150	309.34	59	34.809	42.477	47.04
28	39.684	60.059	0.00	60	34.809	34.398	94.08
29	39.684	54.843	8.50	61	34.813	26.143	196.62
30	39.686	50.518	17.01	62	34.810	22.593	282.24
31	39.682	41.649	42.52	63			

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## Giving these coefficients

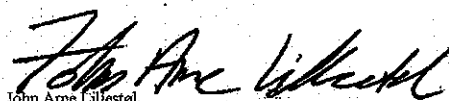
Index	FoilCoefA	FoilCoefB
0	-3.738569E-06	5.316652E-07
1	-8.656474E-06	3.832035E+03
2	2.206881E-03	-3.871124E+01
3	-2.269625E-01	1.475505E-01
4	7.958563E-04	-3.303319E-04
5	-6.780085E-07	2.289283E-05
6	1.189709E+01	-5.008295E-07
7	-6.533028E-02	0.000000E+00
8	1.284304E-04	0.000000E+00
9	-2.894669E-07	0.000000E+00
10	-3.249648E+02	0.000000E+00
11	2.497815E+00	0.000000E+00
12	-7.050041E-03	0.000000E+00
13	-1.363821E-05	0.000000E+00

## Using the following monomial degrees

Index	FoilPolyDegI	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: 2 December 2008

Sign:



John Arne Lillestøl,  
Automation Engineer

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