AANDERAA a xylem brand

TEST & SPECIFICATIONS

Form No. 847, Oct 2014

Product: SeaGuard II 5750 DW
Serial No: 1343

Component	Serial No.	Remarks
Main Assembly SeaGuard II 5655	3648	
HV HUB SeaGuard II Rev.D	20210088	
Doppler Current Sensor 4520DW	1595	
Pressure Sensor 4117F	2304	
Oxygen Optode Sensor 4330DW	4115	On a separate PDF

1. Visual and Mechanical Checks

1.1. Sensors fixed in correct position
1.2. Watertight receptacle and plugs connected
1.3. HUB connectors connected to main board
1.4. Pressure sensor filled with oil (only if installed)
1.5. Epoxy coating intact
1.6. Zinc anode installed
1.7. O-ring groove inspected, cleaned and greased

2. Pre-performance Setup

2.1. Hardware and sensors configured
2.2. Sensors detected and displayed in Real-Time Collector
2.3. Analog channels configured if used
2.4. Battery indicator calibrated
2.5. SD card operation
2.6. S-Flash operation
2.7. USB Connection to PC
2.8. Clock adjusted to correct UTC
2.9. Analog switch in correct position

3. Performance test

3.1. Current drain idle (max 30 mA) 14.6 mA
3.2. Current drain in Power Down Mode (max 1.4 mA) 0.77 mA
3.3. Pressure test
3.4. Field test and data analysis
3.5. Operation test, -5°C to +35°C (all sensors, 16 hours, data on SD)

Windows CE License-Key : 02219-110-240-865

Date: 05 Jan 2023

Sign:

Sonya Antonova, Production Engineer

AANDERAA a xylem brand

TEST & SPECIFICATIONS

Form No. 728, Oct 2007

Product: SeaGuard II 5750 DW
Serial No: 1343

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1. Final Check prior to Shipment: (point 1.1 – 1.10 depending on sensors installed)

1.1. Doppler Current Sensor is tested with Test Unit 3731
1.2. Temperature readings correspond to room temperature
1.3. Conductivity Sensor reads correct with seawater loop
1.4. Check that the pressure sensor is oil filled
1.5. Pressure Sensor gives correct reading at air pressure
1.6. Turbidity reading increases when a reflector is placed 20cm in front of it
1.7. The oxygen sensor reads maximum in air
1.8. Inspect O-ring groove and clean and grease O-ring
1.9. Battery in lower slot,
   a) Type:
   b) Open loop voltage: V
   c) Voltage with 100 ohms load: V
1.10. Battery in upper slot,
   d) Type:
   e) Open loop voltage: V
   f) Voltage with 100 ohms load: V

Date: 05 Jan 2023

Sign:

Sonya Antonova, Production Engineer

AANDERAA a xylem brand

PRESSURE CERTIFICATE

Form No. 667, Sept 2009

Product: SeaGuard II 5750 DW
Serial No: 1343
Date: 04.01.2023

Certificate No: 2093693261343

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: 04 Jan 2023

Sign:

Sonya Antonova, Production Engineer

AANDERAA a xylem brand

TEST & SPECIFICATIONS

Form No. 848, Oct 2014

Product Name: Main Assembly SeaGuard II 5655 **Serial No:** 3648

Main Board Seaguard 9341 Serial No: 3648
Panel Board 9754 Serial No: 20220132

Mainboard
Main Board tested according to *Seaguard test main board 9341.xls*

1. Visual component check prior to assembly in covers

2. Initial hardware test after bootloader and image loaded and test display

2.1 Current drain after bootloader start-up (max 70mA) 24.00mA
2.2 Current drain with image loaded (max 130mA) 77.00mA
2.3 Voltage 3.3V (3.3V ± 0.1V) 3.30V
2.4 Voltage 1.25V (1.25V ± 0.13V) 1.27V
2.5 Check that the SD card is detected and found
2.6 Check that the S-Flash is present

3. Hardware test with covers

3.1 Current drain with image loaded (max 130mA) 77.00mA
3.2 Voltage 3.3V (3.3V ± 0.1V) 3.30V
3.3 Check that the SD card is detected and found
3.4 Check that the S-Flash is present
3.5 Check that the USB port is working

Main assembly with Main Board and Panel Board
Main assembly tested according to form *SeaGuard II test main assembly.xls*

4. Seaguard Main assembly test

4.1 Current drain with Panel Board connected (max 50mA) 14.2mA
4.2 Current drain in Sleep Mode (max 350µA) 324.0µA
4.3 Clock setting (check new clock setting after switching power on)
4.4 Battery setting (check battery setting after power off)
4.5 Compact flash storage
4.6 SD card storage
4.7 USB connection to PC
4.8 RS422 connection to PC
4.9 Status LEDs
4.10 Power spec test
4.11 Temperature test
4.12 Sensor setup test
4.13 Data collection test

Date: 05 Jan 2023 Sign:

Sonya Antonova, Production Engineer

AANDERAA a xylem brand

TEST & SPECIFICATIONS

Form No. 846, Oct 2014

Product Name: HV HUB SeaGuard II Rev.D **Serial No:** 20210088

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1. Visual component check prior to test

2. Hardware test

2.1	Output Voltage @12V input, no load (12.0V ± 0.2V)	12.1V
2.2	Current drain @12V input, no load (300µA ± 100µA)	240.0µA
2.3	Output Voltage @12V input, 8 ohm load, start (11.8V ± 0.2V)	11.6V
2.4	Output Voltage @12V input, 8 ohm load, after 1 min. (11.8V ± 0.3V)	11.7V
2.5	Output Voltage @24V input, no load (12.0V ± 0.2V)	12.1V

Date: 14 Sep 2022 Sign:

Sonya Antonova, Production Engineer

AANDERAA a xylem brand

TEST & SPECIFICATIONS

Form No. 769, Jun 2008

Layout No:
Circuit Diagram No:

Product: Doppler Current Sensor 4520DW
Serial No: 1595

Digital Board

1. Tested according to Test Procedure Form 754.

Analog Board

2. Tested according to Test Procedure Form 757.

Complete Sensor

3. Tested according to Test Procedure Form 759.

Performance test and results from Test Procedure Form 759

4. Visual Check

- 4.1. Inspection of o-ring grove.
- 4.2. Pressure tested.
- 4.3. Electrical isolation to flange after pressure test (only 4520).
- 4.4. Communication tested (AiCaP, Rs-232/Rs-422).

5. Current Consumption

5.1.	Quiescent, no ping (maximum 265 µA)	160.00µA
5.2.	Total with one ping each second (maximum 14.5 mA)	14.00mA

6. Compass and Tilt sensor

- 6.1. Compass calibrated and verified to be within ±2.0° at 0° tilt and ±3.5° at 30° tilt.

7. Tilt Compensation

- 7.1. Tilt sensor calibrated and verified to be within ±1.0° in the range from +35° to -35° on both axes.

8. Performance test

- 8.1. The sensor is tested with Test Unit 3731 during climatic tests to control sensor performance over the whole temperature range.
- 8.2 The direction data is also controlled by changing the direction of the Test Unit 3731.

Date: 02 Jan 2023

Sign:
Halvard Skurve
Halvard Skurve, Production Engineer

AANDERAA a xylem brand

PRESSURE CERTIFICATE

Form No. 667, Sept 2009

Product: Doppler Current Sensor 4520DW **Certificate No:** 2093701641595
Serial No: 1595
Date: 04.01.2023

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: 04 Jan 2023

Sign:

Sonya Antonova, Production Engineer

AANDERAA a xylem brand

TEST & SPECIFICATIONS

Form No. 764, February 2021

Layout No: 10
Circuit Diagram No: 8607369
Program Version: 8.4.1

Product: Pressure Sensor 4117F
Serial No: 2304

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1. **Visual and Mechanical Checks**:

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

2. **Voltages and Current Drain performance**:

2.1.	DSP IO voltage, Tp3 (3.3±0.07V)	3.32	V
2.2.	DSP core voltage, Tp2 (1.9±0.04V)	1.92	V
2.3.	Analog voltage, Tp7 (3.3±0.15V)	3.31	V
2.4.	RS232 Average current at 0.5Hz (Max: 6mA)	2.3	mA
2.5.	RS232 Peak current (Max: 50mA)	35	mA
2.6.	RS232 Sleep current (Max: 200µA)	174	µA
2.7.	AiCaP Average current at 0.5Hz (Max: 6mA)	2.2	mA
2.8.	AiCaP Peak current (Max: 50mA)	16	mA
2.9.	AiCaP Sleep current (Max: 200µA)	144	µA
2.10.	RS422 Average current at 0.5Hz (Max: 7mA)	N/A	mA
2.11.	RS422 Peak current (Max: 50mA)	N/A	mA
2.12.	RS422 Sleep current (Max: 1500µA)	N/A	µA

3. **Electronic performance test:**:

3.1.	Raw data pressure reading at air pressure (-500000 to +1000000)	-68917	LSB
3.2.	Raw data temp. reading in room temperature (6500000 to 10000000)	8607369	LSB
3.3.	Noise on pressure raw data (Max: 400LSB)	10	LSB
3.4.	Noise on temperature raw data (Max: 5000 LSB)	477	LSB

Date: 13 Dec 2022

Sign:

Erlend S. Lid

Erlend Lid, Production Engineer

AANDERAA a xylem brand

CALIBRATION CERTIFICATE

Certificate No:4117F_2304_44917
Range: 0 - 60000 kPa

Product: Pressure Sensor 4117F
Serial No: 2304
Calibration Date: 22 Dec 2022

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

ASL Digital Thermometer model CTR2000	Serial No. 056784-01
Platinum Resistance Thermometer	Serial No. 241012/2
Calibration Bath model FNT 321-1-40	
Budenberg Dead-Weight Tester 480 DX	Serial No.Serial No. 26291

Parameter: Temperature

Calibration points and readings:

Temperature (°C)	1.070	13.948	26.928	39.870
Reading (LSB)	12452451	10406164	8225810	6223549

Giving these coefficients

Index	0	1	2	3
TempCoef	2.59419E+01	-5.06529E+01	7.87921E+00	-1.91948E+01

Parameter: Pressure

Giving these coefficients

Index	0	1	2	3
R1Coef0	7.13483E+02	-1.04348E+01	1.07312E+01	-3.08801E+01
R1Coef1	7.43467E+04	-8.33460E+03	1.39024E+03	-3.13162E+03
R1Coef2	-1.22212E+03	3.39911E+02	-3.71810E+02	1.38654E+02
R1Coef3	8.63314E+02	-4.26989E+02	6.65775E+02	-5.40274E+02
R1Coef4	-2.07029E+01	1.20413E+02	-3.89463E+02	4.37016E+02

Date: 22 Dec 2022

Sign:

Tor-Ove Kvalvaag, Calibration Engineer

AANDERAA a xylem brand

PRESSURE CERTIFICATE

Form No. 667, Sept 2009

Product: Pressure Sensor 4117F
Serial No: 2304
Date: 14.12.2022

Certificate No: 2087601032304

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: 14 Dec 2022

Sign:

Magnus Holsen

Magnus Holsen, System Engineer