

**4119****4120****3919**

CONDUCTIVITY SENSOR 3919 CONDUCTIVITY/TEMPERATURE 4119 CONDUCTIVITY WITH ANALOG OUTPUT 4120

are compact fully integrated sensors for measuring the electrical conductivity of seawater. The 3919 model is designed to be mounted directly on the top-end plate of RCM9/11 and RDCP as well as for stand alone operation via the SR10 or RS-232 interface. The 4119 and 4120 are models with respectively Temperature and Analog adapter.

Advantages:

- Smart sensor provides calibrated data directly
- Real-time integrated calculation of salinity, density and sound of speed
- Low maintenance needs
- Easy functionality check
- 3 depth ranges, maximum 6000 meter
- Internal pressure never exceeds 1 bar therefore electronics and sensors are unaffected by sea depth
- Output format: SR10, RS-232, Analog 0-5V/4-20mA

Conductivity is a key parameter for in-situ determination of several fundamental physical properties of seawater. For seawater, the ability to conduct electrical current is mostly dependent on temperature and the amount of inorganic dissolved solids. This means that, together with temperature and depth information, a good estimate of the salinity may be determined. Salinity is defined as the concentration of dissolved solids.

The Conductivity Sensors are based on an inductive principle. This provides for stable measurement without electrodes that are easily fouled and may wear out in the field.

Utilization of miniature components has made it possible to integrate all the required electronics. A digital signal processor calculates salinity, density and speed of sound. The salinity and density are calculated according to the UNESCO International Equation of State (IES 80).

Conductivity Sensor 3919 is available in three depth ratings as well: 6000m (3919DW; Deep Water), 2000m (3919IW; Intermediate Water) and 300 m (3919SW; Shallow Water).

4119AIW, 4119BIW, 4120AIW and 4120BIW are designed to operate down to 2000 meter. 4119ASW, 4119BSW, 4120ASW and 4120BSW are designed for 300 meter. 4119A and 4119B is designed for use with cable. using CSP. 4119 without extension is designed for use with AADI Sensor disk. 4119 can not be used with CSP (Cylindrical Sealing Plug).

3919SW/3919IW/3919DW outputs data in both RS-232 and Aanderaa SR10 format. 4119 outputs SR10 format, while 4120 has analog output as well as RS-232. All sensors are available in A and B versions; version B has enhanced accuracy compared to version A.

In RS-232 mode the output is: Conductivity in mS/cm, Temperature in °C, as well as calculated Salinity, Density and Speed of sound .

Two SR10 and analog outputs channels are available; one of the outputs can be configured to present Conductivity, Salinity, Density or Speed of Sound, while the other output presents the temperature measurement. The user may configure the range on both SR10 and analog outputs. This allows for a possibility to zoom in on the range of interest to obtain better resolution.

PARAMETER	CONDUCTIVITY SENSOR 3919ASW/3919AIW/3919ADW 3919BSW/3919BIW/3919BDW	CONDUCTIVITY SENSOR 4119/4119ASW/4119AIW 4119BSW/4119BIW	CONDUCTIVITY SENSOR 4120ASW/4120AIW 4120BSW/4120BIW
CONDUCTIVITY			
Measuring Range	0 - 7.5 S/m (0-75 mS/cm) ¹⁾	0 - 7.5 S/m (0-75 mS/cm) ¹⁾	0 - 7.5 S/m (0-75 mS/cm) ¹⁾
Resolution	0.0002 S/m (0.002mS/cm) ²⁾	0.0002 S/m (0.002mS/cm) ²⁾	0.0002 S/m (0.002mS/cm) ²⁾
Accuracy: Model A: Model B:	±0.005 S/m (±0.05 mS/cm) ±0.0018 S/m (± 0.018mS/cm)	±0.005 S/m (±0.05 mS/cm) ±0.0018 S/m (± 0.018mS/cm)	±0.005 S/m (±0.05 mS/cm) ±0.0018 S/m (± 0.018mS/cm)
Settling Time (90%)	<3sec ³⁾	<3sec ³⁾	<3sec ³⁾
TEMPERATURE			
Range	-5°C to +40°C (23°F - 104°F) ⁴⁾	-5°C to +40°C (23°F - 104°F) ⁴⁾	-5°C to +40°C (23°F - 104°F) ⁴⁾
Resolution	0.01°C (0.018°F) ⁵⁾	0.01°C (0.018°F) ⁵⁾	0.01°C (0 - 5V) 0.02°C (4 - 20mA)
Accuracy	±0.1°C (±0.18°F) ⁴⁾	±0.1°C (±0.18°F) ⁴⁾	±0.1°C (0 - 5V) ⁴⁾ ±0.15°C (4 - 20mA) ⁴⁾
Settling Time (63%)	<10sec	<10sec	<10sec
Operating Temperature	-5°C - 40°C (23 - 104°F)	-5°C - 40°C (23 - 104°F)	-5°C - 40°C (23 - 104°F)
Operating Depth SW : IW : DW:	0 - 300m (985 ft) 0-2000m (6,560 ft) 0-6000m (19,690 ft)	0 - 300m (985 ft) 0-2000m (6,560 ft) 0-6000m (19,690 ft)	0 - 300m (985 ft) 0-2000m (6,560 ft) 0-6000m (19,690 ft)
Sampling Rate	SR10: controlled by AADI data logger. RS-232: From 1s to 255 minutes	Controlled by AADI data logger	From 1s to 255 minutes
Output Formats	Aanderaa SR10 ⁶⁾ RS-232 ⁷⁾	Aanderaa SR10 ⁶⁾ (Conductivity and Temperature)	0 - 5V outputs: ±0.1% of FS ⁸⁾ 4-20mA output: ±0.2% of FS RS-232 ⁷⁾
Current Consumption: Average: Maximum: Quiescent:	SR10: 5mA/T where T is recording interval in minutes RS-232: 48mA/S +0.16mA where S is recording interval in seconds 110mA SR10: 0 mA, RS-232: 0.16mA	5mA/T where T is recording interval in minutes	48mA/S +0.16mA +Ia where S is recording interval in seconds and Ia is quiescent: 5 - 45mA when analog adapter enabled
Supply Voltage	SR10: -6 to - 14Vdc RS-232: +5 to +14Vdc	SR10: -6 to -14Vdc	Analog: +7 to +14Vdc RS-232: +5 to +14Vdc
Dimensions	Ø36 x 39.5 x 86mm / Ø44 (Ø1.42 x 3.386in)	Ø44 x 172mm(OD1.73x 6.78in)	Ø44 x 172mm(OD1.73x 6.78in)
Weight	240g (8.47oz)	560g (19.7oz)	560g (19.7oz)
Materials	Titanium	Titanium	Titanium
Accessories: (not included)	Resistor set 3719 Setup Program 4040	Resistor set 3719 Setup Program 4040 ⁹⁾	Resistor set 3719 Setup Program 4040
Accessories not included	Sensor Cable 3854 ⁸⁾ Sensor Cable 4865 to PC ⁹⁾¹⁰⁾ Sensor Cable 4762 free end ¹⁰⁾ Foil Service Kit 3853 PSt ₃	Sensor Cable 4865 to PC ⁹⁾¹⁰⁾ Sensor Cable 4762 free end ¹⁰⁾ Foil Service Kit 3853 PSt ₃	Sensor Cable 4865 to PC ⁹⁾¹⁰⁾ Sensor Cable 4762 free end ¹⁰⁾ Foil Service Kit 3853 PSt ₃

¹⁾ The range on both the SR10 outputs are user configurable.

²⁾ For SR10: 0.1% of range or 0.0002 S/m, whichever is greater

³⁾ Dependent on flow through cell bore

⁴⁾ Calibrated range is -0.1°C to +36°C (32°F - 96.8°F)

⁵⁾ For SR10: 0.1% of range or 0.01°C (0.018°F),whichever is greater

⁶⁾ SR10/VR22 are signal protocols that are used with AADI equipment only.

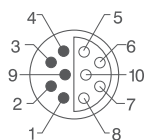
⁷⁾ 9600 Baud, 8 data bits, 1 stop bit, No Parity, Xon/Xoff Handshake.

⁸⁾ The accuracy of the Analog Adapter in 0-5V output mode is specified to 0.1% of FS. Note however that at the end of the scale (<0.0-0.07> and <4.93-5.0>) the error may be larger.

⁹⁾ In order to change settings or calibrating the Sensor has to be connected to a PC. To gain access to the 4119's RS-232 signals its cylindrical body must be removed, see Operating Manual TD222.

Pin Configuration

Receptacle, exterior view;
pin = ●, bushing = ◦



- A) Ground for SR10
B) Supply for RS-232
C) Ground for RS-232
D) Supply for SR10

3929	4119	4120	When used with Cable 4762	
			Plug	Colour
1: Positive Supply ^{A), B)}	1: System Ground	1: Positive Supply	8	Green
2: Ground ^{C)}	2: Not Connected	2: Ground	7	Black
3: -9V ^{D)}	3: -9V	3: Analog Output 1	6	White
4: SR10	4: Not Connected	4: Return Ground 1	5	Blue
5: Bridge Voltage	5: Bridge Voltage (BV)	5: Analog Output 2	4	Violet
6: Reserved, DNC	6: SR10 (Conductivity)	6: Return Ground 2	3	Yellow
7: RXD (RS-232)	7: Not Connected	7: RXD (RS232)	2	Brown
8: TXD (RS-232)	8: Not Connected	8: TXD (RS232)	1	Grey
9: Control Voltage	9: Control Voltage	9: Not Connected	10	Red
10: SR10	10: SR10 (Temperature)	10: Not Connected	9	Orange

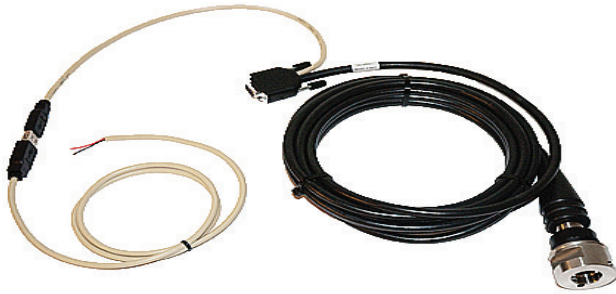
Applications

Model	3919	4119	4120
Description	Integrally/Direct Mounted or cable	Immersion Body for cable or sensor string	Immersion Body with Analog and Serial Outputs
Output	Dual Channel: RS-232 data string (Conductivity,Temp.) or SR10 (Conductivity,Temp.) to RCMs or RDCPs	Dual Channel: SR10 (Conductivity and Temperature)	Dual Channel: 0 - 5V (Conductivity, Temp.) or 4 - 20mA (Conductivity, Temp.) RS-232 (Conductivity, Temp)
Application	Add sensor(s) to Top End-plate of our RCM 9/11, RDCP 600 or for OEM/Third party use With Cable to PC or SmartGuard	4119: For use with AADI sensordisk 4130A/B: For use with Aanderaa data loggers on cable or in fastening fixture with sensor string, added sensors to Weather Stations AWS 2700, Data Buoys 4700 or our self-contained recording instruments	General Purpose use with third party data loggers, e.g. CTDs, ARGO floats, ROVs; PLCs, process industry controllers, recorders, data acquisition and control systems.
Sample Rate	Set by host. <u>RCM:</u> continuously* - 120 minute <u>RDCP:</u> 1minute - 8 hours. Internal interval setting for input to third party RS-232 interface.	Set by host. <u>3634/3660:</u> 0.5 minutes - 180 minutes <u>SmartGuard:</u> 0.5 minutes - 180 minutes <u>DB 4700:</u> continuously* - 180 minutes <u>AWS 2700:</u> continuously* - 180 minutes	
Multi-sensor Configuration	<u>RCM 9/11 or RDCP 600:</u> Yes, 2nd 3919 via Cable 4944/5089 <u>3634/3660/SmartGuard:</u> Max 4/17 sensors, depending on the configuration <u>DB 4700:</u> Max 10 sensors, depending on the configuration	<u>3634/3660/SmartGuard:</u> Max 4/17 sensors, depending on the configuration <u>DB 4700:</u> Max 10 sensors, depending on the configuration <u>Sensor attachment:</u> single points on cable use 3913; In-line 3-Sensor Disk 3822, only 4119 <u>RCM/RDCP:</u> via Cable 5088	
Stand-alone Sensor	Use Cable 4865/4762 <u>Output:</u> RS-232 (Conductivity,Temp.). <u>Sampling Rate:</u> 1s to 255 min.		User furnished data logger or controller, Analog: use 4762 Cable. RS-232: use 4865/4762 Cable <u>Output:</u> 0 - 5Vdc; 4 - 20mAdc; or RS-232 (Conductivity, Temperature) <u>Sampling Rate:</u> 1s to 255 min.

*) Note that when the sensor is connected to an instrument like the RCM, CMB, AWS or a data logger, the sampling rate in a continuous recording mode depends on the number of channels for storage etc.

Cables

Cable from sensor to:	3919	4119	4120
PC with waterproof CSP, RS-232	4865	4865 ³⁾	4865
RCM-9/11 or RDCP internal connection			
RCM-9/11 or RDCP with waterproof top end plate connection	4944/5089		
AADI datalogger 2 ch. (Conductivity, Temperature), SR-10	4941 ¹ /4939 ²	4945 ¹ /4943 ²	
AADI datalogger 1 ch. (Conductivity), SR-10	4946		
User furnished datalogger, CSP to free end	4762	4762	4762



Cable 4865. Connecting cable for PC



Cable 4762. Connecting cable with free end



Cable 3854. Connecting cable 10 pin to Cell Plug



CSP, Cylindrical Sealing Plug

Example of Application

The Conductivity Sensors are compact fully integrated sensors for measuring the electrical conductivity of seawater. They are designed to be mounted on the Recording Current Meters RCM 9, RCM 9 MkII, RCM 9 IW, RCM 9 LW, RCM 11 and Recording Doppler Current Profiler RDCP 600.

They can also be used as stand-alone sensors using RS-232 communication to different loggers and in various systems.

Two versions of this sensor are available, the B version has enhanced accuracy compared to the A version, see specifications.

Please fill in form 687 for best sensor performance, ref your order acknowledgement.



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