Conductivity Sensor 3919/4119/4120

3919
3919IW

4119

4120IW

These Sensors have a number of advantages over previous models:

• Improved depth rating of 6000 meters for 3919
• Real-time integrated calculation of salinity, density and speed of sound (see below)
• Internal pressure never exceeds 1 bar therefore electronics and sensors are unaffected by sea depth
• Rugged and Robust with minimal and simple maintenance needs

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).

The Conductivity Sensor 3919/3919IW outputs data in both RS-232 and Aanderaa SR10 format. 4119 outputs SR10 format, while 4120IW has analog output as well as RS-232.

All three sensors are available in A and B versions; version B has enhanced accuracy compared to version A. Additionally,

sensor 3919 is available in two depth ratings as well: 6000m (3919) and 2000m (3919 IW; Intermediate Water). Refer specifications on next page.

On the RS-232 output the Conductivity in mS/cm, as well as Temperature, Salinity, Density and Speed of sound may be presented.

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

Conductivity Sensor 3919 is designed to operate down to 6000 meters, 3919 IW is designed to operate down to 2000 meters, while 4119 and 4120IW are designed to operate down to 1000m.

The Conductivity Sensors are available for Recording Current Meters RCM 9, RCM 9 MkII, RCM 9 IW, RCM 9 LW and RCM 11, Recording Doppler Current Profiler RDCP 600 as well as a stand-alone RS-232 sensor for other applications.

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Specifications

	CONDUCTIVITY SENSOR 3919/3919IW	CONDUCTIVITY SENSOR 4119	CONDUCTIVITY SENSOR 4120IW	
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 (± 0.05mS/cm) ± 0.0018 S/m (± 0.018mS/cm)	± 0.005 S/m (± 0.05mS/cm) ± 0.0018 S/m (± 0.018mS/cm)	± 0.005 S/m (± 0.05mS/cm) ± 0.0018 S/m (± 0.018mS/cm)	
Response time (90%):	< 3 sec[3]	< 3 sec[3]	< 3 sec[3]	
Temperature				
Range:	-5ºC to +40ºC (23 – 104ºF)[2)4]	-5ºC to +40ºC (23 – 104ºF)[2)4]	-5ºC to +40ºC (23 – 104ºF)[2)4]	
Resolution:	0.01ºC (0.018ºF)[5]	0.01ºC (0.018ºF)[5]	0.01ºC (0-5V)	0.02ºC (4-20mA)
Accuracy:	± 0.1ºC (± 0.18ºF)[4]	± 0.1ºC (± 0.18ºF)[4]	±0.1ºC (0-5V)[4]	±0.15ºC (4-20mA)[4]
Response time (63%):	< 10 sec	< 10 sec	< 10 sec	
Operating Depth:	**A IW/B IW**: 0-2000m (0 - 6,560 ft) **A/B**: 0-6000m (0 - 19,690 ft)	0-1000m (3,280 ft) (1000-6000m: available on request)	0-1000m (0 - 3,280 ft) (1000-6000m: available on request)	
Sampling Interval:	SR10: controlled by the datalogger. RS232: From 2s to 255min	Controlled by the datalogger.	From 2 sec to 255 min	
Output Formats:	Aanderaa SR10[6] ASCII RS232[8]	Aanderaa SR10[6] (Conductivity and Temperature)	0-5V outputs: ±0.1% of FS[7] 4-20mA output: ±0.2% of FS[7] RS232[7]	
Current Consumption: *Average* *Maximum* *Quiescent*	SR10: 5mA/T where T is recording interval in min RS232: 0.16 +48 mA/S where S is recording interval in sec 110 mA 0.16 mA (SR10, 0 mA)	5mA/T where T is recording interval in min.	48mA/S +0.16mA +Ia where S is recording interval in sec. and Ia is quiescent: 5 to 45mA when analogue adaptor enabled.	
Supply Voltage:	SR10: -6 to –14 Vdc RS232: +6 to +14Vdc	SR10: -6 to –14 Vdc	Analogue: +7 to +14Vdc RS232: +5 to +14Vdc	
Dimensions (WxDxH):	36x39.5x86mm/Ø44 (1.4x1.5x3.4in)	OD44x172mm (OD1.73x6.78in)	OD44x172mm (OD1.73x6.78in)	
Weight:	240g (8.466oz)	560g (19.7oz)	560g (19.7oz)	
Materials:	Epoxy coated Titanium	Titanium	Titanium	
Accessories included:	Sensor Cable 3854 Resistor set 3719 Setup Program 4040	Setup Program 4040 Resistor set 3719	Setup Program 4040 Resistor set 3719	
Accessories not included:	Sensor Cable 3855 to PC[9]	Sensor Cable 3855 to PC[9] Fastening fixture 3823 for connection to string	Sensor Cable 3855 to PC[9]. Cable 3976 with free end, rated for 0-6000m.	
Warranty:	Two years against faulty material and workmanship (3919/3919IW, 4119, 4120IW)			

1) The range on both the SR10 outputs is user-configurable
2) For SR10. 0.1% of range or 0.0002S/m, whichever is greater
3) Dependant on flow through cell bore
4) Calibrated range is -0.1 to 36ºC (32-96.8 ºF)
5) For SR10. 0.1% of range or 0.01ºC (0.018ºF), whichever is greater
6) Aanderaa SR10 are signal protocols that are used with Aanderaa equipment only.

7) The accuracy of the Analogue Adaptor 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
8) 9600 Baud, 8 data bits, 1 stop bit, No Parity, Xon/Xoff Handshake.
9) In order to change settings or calibrating the conductivity the Sensor has to be connected to a PC. To gain access to the 4119 conductivity's RS232 signals its cylindrical body must be removed, see Operating Manual TD 222

Pin Configuration:

Receptacle, exterior view; pin = ● , bushing = ○
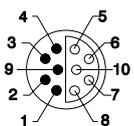
A) Ground for SR10
B) Supply for RS232
C) Ground for RS232
D) Supply for SR10

3919/3919IW	4119	4120IW	When used with Cable 3485	
			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: Analogue Output 1	6	White
4: SR10 (Temperature)	4: *Not Connected*	4: Return Ground 1	5	Blue
5: Bridge Voltage (BV)	5: Bridge Voltage (BV)	5: Analogue Output 2	4	Violet
6: Reserved, *Do Not Connect*	6: SR10 (Conductivity)	6: Return Ground 2	3	Yellow
7: RXD (RS232)	7: *Not Connected*	7: RXD (RS232)	2	Brown
8: TXD (RS232)	8: *Not Connected*	8: TXD (RS232)	1	Grey
9: Control Voltage	9: Control Voltage	9: *Not Connected*	10	Red
10: SR10 (Conductivity)	10: SR10 (Temperature)	10: *Not Connected*	9	Orange

Applications

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Conductivity Model	3919/3919IW	4119	4120IW
Description	Integrally/Direct Mounted.	Immersion Body for cable or sensor string.	Immersion Body w/ Analog and Serial Outputs.
Output	Dual Channel: RS232 data string (Conductivity, Temp.) or Single SR10 (Conductivity) channel to RCM's or RDCP.	Dual Channel: SR10 (Conductivity and Temperature).	Dual Channel: 0-5V (Conductivity, Temp.) or 4-20mA (Conductivity, Temp.) and/or RS232 (Conductivity, Temp.).
Application	Add sensor(s) to top end-plate of our RCM 9/11** , RDCP 600 or for OEM/Third party use.	For use with Aanderaa DL series datalogger's; added sensors to AWS 2700 Weather Stations, DB 4280 Data Buoys or our self-contained recording instruments.	General Purpose use with third party datalogger's, e.g. CTD's, ARGO floats, ROV's; PLC's, process industry controllers, recorders, data acquisition and control systems.
Sample Rate	Set by host. RCM: continuously* – 120min. RDCP: 1min – 8hours. Internal interval setting for input to third party RS232 interface.	Set by host. DL3960: continuously* - 180min. DL7: 1min – 180min. DB4280: continuously* - 180min. AWS 2700: continuously* - 180min.	
Multi-sensor Configuration	RCM9**: Yes, 2nd 3919/3919IW via cable 3964 and Receptacle 3622R. RCM11**: Yes, 2nd 3919/3919IW via coupling 3979, cable 3980 and Flange Terminal 3978. RDCP600: 300m version: as for RCM9 2000m version: as for RCM11	DL3960: Max 15 sensors, depending on the configuration. DL7: Max 5 sensors. DB4280: Max 15 sensors, depending on the configuration. Sensor attachment: single points on cable use 3913; In-line 5-sensor disk 3829. RCM/RDCP: contact factory.	
Stand-alone Sensor (0–1000m)	Use 3485 Cable. Output: RS232 (Conductivity, Temp.). Sampling Rate: 2s to 255 min.		User furnished datalogger or controller, 3485 Cable. Output: 0-5 Vdc; 4-20 mAdc; or RS232 (Conductivity, Temp). Sampling Rate: 1s to 255 min.
Stand-alone Sensor (1000–2000m)	Use Coupling 3979 and Cable 3976 Output: RS232 (Conductivity, Temp.). Sampling Rate: 2s to 255 min.		User furnished datalogger or controller, Coupling 3977 and Cable 3976. Output: 0-5 Vdc; 4-20 mAdc; or RS232 (Conductivity, Temp). Sampling Rate: 1s to 255 min.
Stand-alone Sensor (2000–6000m)**	As for Stand-alone Sensor 1000-2000m		Contact factory

*) Note that when the conductivity sensor is connected to an instrument like the RCM, CMB, AWS or a datalogger, the sampling rate in a continuous recording mode depends on the number of channels for storage etc.
**) Important: Take into considerations the Conductivity Sensors depth rating, refer specifications.

Setup Program 4040

We recommend our Conductivity Setup Program 4040 for configuration of the sensors, as:

– output format
– output parameters
– measurement rang

The setup program also allows you to load the last stored sensor configuraion.

The sensors can also be configured using the RS232 port and a terminal program.

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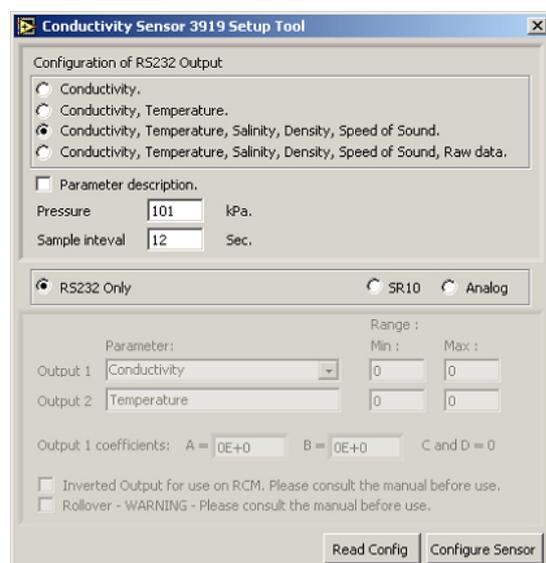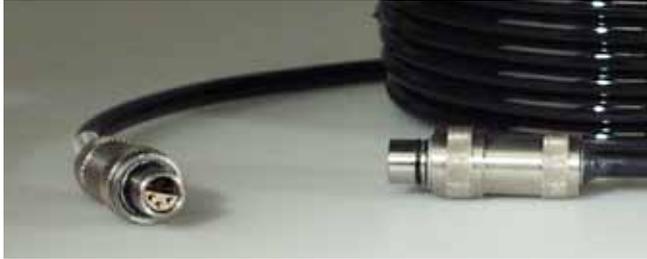
Cables

Cable 3296/3964. Connecting cable 10 pin to 6 pin
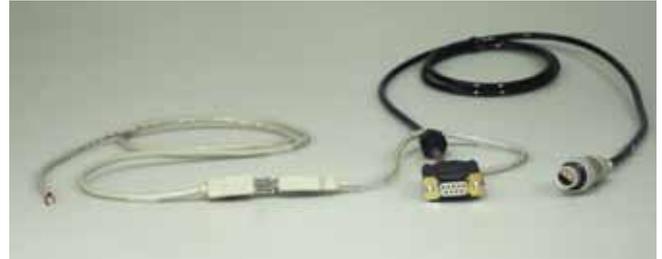
Cable 3855. Connecting cable for PC

Cable 3485. Connecting cable 10 pin to free end

Cable 3976*. Flange Connecting cable 10 pin to free end

Cable 3854. Connecting cable 10 pin to Cell Plug

Cable 3980*. Flange Connecting Cable 10 pin to 10 pin

*) used with Coupling 3979 for 36mm sensors and Coupling 3977 for 40mm sensors.

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.

Representative's Stamp

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