

Instrument datasheet

ClampOn DSP Subsea Particle Monitor



1 General Note

1.1	Model name	ClampOn DSP Subsea Particle Monitor	
1.2	Service description	Non-invasive non-intrusive subsea particle monitor (ASD)	
1.3	Model number	SSE.DS2N.SR00.B10 (RS-485, single electronics) SSE.DS2N.SC20.B10 (CAN, single electronics) SSE.DS2N.DC20.B10 (CAN, fully redundant)	
1.4	Serial number	YY-MM-XXXX-CS, unique for each unit	1

2 Physical

2.1	Dimensions (ø × h)	89 mm × 485 mm [3.5 in × 19.1 in]	2
2.2	Weight, in air	5.2 kg [11.5 lb]	2
2.3	Weight, in water (estimated)	4.7 kg [10.4 lb]	2
2.4	Enclosure material	Titanium grades 2 and 5	3
2.5	ROV handle type	Paddle, fishtail, T-bar or hex nut (for diver)	
2.6	ROV handle coating	NORSOK M-501, system 7B, RAL 2004 orange (other coatings on request)	
2.7	PBOF hose interface	Siemens MK2 M25 or ODI ¾" per SAE J1926	
2.8	Filling/ventilation port interface	Siemens MK2-2 or ODI ½" per SAE J1926	
2.9	PBOF hose type	Siemens AquaTRON 50 or client specification	
2.10	PBOF hose length	To client specifications but must be minimum 1.5 m [4.9 ft] for pressure compensation	
2.11	EFL connector type	To client specifications, Tronic or ODI	
2.12	Cathodic protection	None	
2.13	Equipment marking	ClampOn marking label, client info label where applicable	
2.14	Sealing type	EB-weld and O-rings	4



3 Environmental Note

3.1	Maximum installation depth	3 000 m [9 843 ft]	
3.2	Maximum test pressure	330 bar [4 786 psi]	
3.3	Operating temperature	-5 °C to +40 °C [+23 °F to +104 °F]	
3.4	Pipe surface temperature	-40 °C to +150 °C [-40 °F to +302 °F]	5
3.5	Storage temperature	-18 °C to +50 °C [0 °F to +122 °F]	
3.6	Shock/vibration	Qualified (Q1 and Q2) in accordance with ISO 13628-6:2006 and API 17F:2017	

4 Electrical

4.1	Rated voltage range, U_{dc}	18 V to 30 V, 24 V_{nom} (electronics equipped with inverse polarity and transient protection)	6
4.2	Power consumption (@ V_{nom})	1.6 W (65 mA) per electronics channel	6
4.3	Electronics platform/generation	ClampOn DSP II with CAN gateway II	
4.4	Electronics channel configuration	Single or dual (fully redundant)	8
4.5	Microprocessor	600 MIPS	
4.6	Non-volatile memory	8 MB	
4.7	Insulation resistance	>1 GΩ @50 V_{dc} and the readings recorded 60 seconds after application of the test voltage	
4.8	Penetrator type	Glass-to-titanium seal, 8 × single pin	
4.9	Penetrator wire cross section	Maximum 1.5 mm ² [AWG 16]	

5 Operation

5.1	Manner of operation	Real-time measurement	
5.2	Unit of measurement	Raw value (and g/s if SandQ+ algorithm is configured)	12
5.3	Technology (for particle measurement)	Passive ultrasonic using piezoelectric transducer	
5.4	Technology (for vibration measurement)	3-axis MEMS accelerometer	7
5.5	Processing	DSP in sensor unit	
5.6	Calibration	Instrument is factory calibrated	
5.7	Design life	30 years	
5.8	Repeatability	Better than 1 %	9
5.9	Flow conditions	Oil, water, gas, multiphase	
5.10	Minimum flow velocity	0.5 m/s [1.6 ft/s]	10
5.11	Minimum particle size	Oil: 25 μm, gas: 15 μm	9
5.12	Minimum sand rate	0.01 g/s	9
5.13	Pipe material	All steel alloys	11

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6 Signal

6.1	Physical layer/signal types	RS-485 or SIIS level 2 (low-speed fault-tolerant CANbus, ISO 11898-3)
6.2	Communication protocol	RS-485: Modbus RTU according to Modicon PI-MBUS-300 or proprietary DSP SIIS level 2: CANopen according to CiA 443 profile 3.0.1
6.3	Communication bit rate	RS-485: 1 200 bps to 115 200 bps SIIS level 2: 50 kbps or 125 kbps

7 Installation

7.1	Mounting	Installed in a ClampOn compact funnel (by ROV, diver or manually topside)
7.2	Locking mechanism	Spring-loaded in funnel J-slots
7.3	Installation torque (typical)	30 N m [22.1 ft lb]
7.4	Retrieval torque (typical)	50 N m [36.9 ft lb]
7.5	Damage torque	>200 N m [147.5 ft lb]

8 Approvals & compliance

8.1	CE marking in conformance with	2014/30/EU (EMC Directive)
8.2	RCM marking in conformance with	Radiocommunications Act 1992
8.3	EMC generic standards	IEC/EN 61000-6-2 and IEC/EN 61000-6-4
	Conducted emissions	CISPR 32/EN 55032
	ESD immunity	IEC/EN 61000-4-2, criteria A
	Electric fast transient/burst immunity	IEC/EN 61000-4-4, criteria A
	Conducted RF disturbance immunity	IEC/EN 61000-4-6, criteria A

Notes

1. Serial number breakdown: yy (year of manufacture), mm (month of manufacture), xxxxx (unique electronics ID), CS (Compact Sand).
2. Weight and dimensions listed is for a typical sensor with dual electronics configuration and paddle handle ROV interface. For other ROV handle types minor adjustments to weight and dimensions will apply.
3. Metal parts exposed to seawater are made of titanium grade 2. Material certificates to EN 10204 3.1.
4. Electronics enclosed in nitrogen gas-filled (N₂) 1 atmospheric chamber, sealed by EB-welding and helium leak tested. Oil-filled volume sealed by double O-ring barriers.
5. Pipe surface temperature listed is when instrument has ambient water cooling. Temperature calculation shall be carried out if applying insulation around the instrument in order to verify acceptable temperature for the electronics.
6. Average inrush current is <120 % of maximum rated steady state current for 500 ms.
7. For vibration measurement details, see instrument datasheet addendum. Vibration output is optional and not activated in instrument by default.
8. 1 or 2 channels depending on electronics configuration. Electronics ESS tested to ISO 13628-6:2006 and API 17F:2017.
9. Depends on flow conditions.
10. Minimum velocity for particle detection depends on flow medium, particle size and pipe configuration.
11. Sensor waveguide must have metal-to-metal contact with the pipe surface.
12. The sensor can be configured to calculate the sand rate, totals, and alarms internally using live flow input from a control system. The SandQ+ algorithm used by the sensor for this calculation is a simplified version of that used when running the calculation in ClampOn monitoring software on a centralized controller.