

Instrument datasheet

ClampOn DSP Subsea PIG Detector



1 General			Note
1.1	Model name	ClampOn DSP Subsea PIG Detector	
1.2	Service description	Non-invasive non-intrusive acoustic (APD) or magnetic (MPD) subsea PIG detector	1
1.3	Model number	See note	2
1.4	Serial number	YY-MM-XXXX-CP, unique for each unit	3

2 Physical			
2.1	Dimensions (ø × h)	89 mm × 485 mm [3.5 in × 19.1 in]	4
2.2	Weight, in air	5.2 kg [11.5 lb]	4
2.3	Weight, in water (estimated)	4.7 kg [10.4 lb]	4
2.4	Enclosure material	Titanium grades 2 and 5	5
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	6



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]	7
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)	8
4.2	Power consumption (@ V_{nom})	1.6 W (65 mA) per electronics channel	8
4.3	Electronics platform/generation	ClampOn DSP II with CAN gateway II	
4.4	Electronics channel configuration	Single or dual (fully redundant)	9
4.5	Microprocessor	600 MIPS	
4.6	Non-volatile memory	8 MB	
4.7	Insulation resistance	>1 GΩ @50 V_{dc} (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	
5.3	Technology	Passive ultrasonic using piezoelectric transducer (magnetic sensor for magnetic pig detection)	
5.4	Processing	DSP in sensor unit	
5.5	Calibration	Instrument is factory calibrated	
5.6	Design life	30 years	
5.7	Detection mode	Acoustic, magnetic, combined acoustic and/or magnetic	1, 10, 11
5.8	Detection direction	Bidirectional	
5.9	Detection algorithm (acoustic)	Fixed over Background (FoB) with trigger level, fallback level, trigger time minimum and trigger time maximum. All parameters are configurable	10
5.10	Detection algorithm (magnetic)	Trigger level in magnetic raw value	1, 10
5.11	Detectable magnetic flux density	0.015 mT [0.15 G] to 1.8 mT [18 G] at detection point	1
5.12	Operating limits	The instrument can detect all types of pig. The pig must be moving with a minimum velocity of 0.3 m/s [1 ft/s], depending on type of pig, pipe configuration and installation point	
5.13	Repeatability	Better than 1 %	
5.14	Flow conditions	Oil, water, gas, multiphase	
5.15	Pipe material	All steel alloys	12

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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

- Magnetic PIG detection is optional and requires special add-on electronics during manufacturing.
- Available model numbers:
SSE.DS2N.SR00.B10: Acoustic PIG detector (APD) with single electronics configuration and RS-485 interface
SSE.DS2N.SR01.B10: Magnetic PIG detector (MPD) with single electronics configuration and RS-485 interface
SSE.DS2N.SC20.B10: Acoustic PIG detector (APD) with single electronics configuration and SIIS level 2 interface
SSE.DS2N.SC21.B10: Magnetic PIG detector (MPD) with single electronics configuration and SIIS level 2 interface
SSE.DS2N.DC20.B10: Acoustic PIG detector (APD) with dual (fully redundant) electronics configuration and SIIS level 2 interface
 Customization/changes to the PBOF, EFL connector or ROV handle doesn't affect the model number.
- Serial number breakdown: yy (year of manufacture), mm (month of manufacture), xxxxx (unique electronics ID), CP (Compact PIG).
- 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.
- Metal parts exposed to seawater are made of titanium grade 2. Material certificates to EN 10204 3.1.
- 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.
- 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.
- Average inrush current is <120 % of maximum rated steady state current for 500 ms.
- 1 or 2 channels (fully redundant) depending on electronics configuration. Magnetic PIG detection is only available as single electronics configuration. Electronics ESS tested to ISO 13628-6:2006 and API 17F:2017.
- Factory configurable software parameters. May also be configured in-field by client/end user with the *ClampOn PIG Configuration Tool* software via RS-485 interface or with the *ClampOn 309 Client* software on a CiA 309-3 transparent link.
- With magnetic detection, the instrument uses a magnetic field sensor to measure changes in the magnetic flux density near the sensor. The instrument can be configured to use a combination of triggering in the acoustic and/or magnetic domains before a pig is detected.
- Sensor waveguide must have metal-to-metal contact with the pipe surface.