Compact DSP Pig Detector
Instrument Datasheet

CLAMPON
ULTRASONIC INTELLIGENT SENSORS

INSTRUMENT DATA

GENERAL

			NOTE
1.0	Manufacturer	ClampOn AS	
1.1	Model description	DSP pig detector	
1.2	Part number	923-2xxx0-xxx	1

CLIENT DATA

2.0	Customer	
2.1	Project title	
2.2	Field / installation	
2.3	P.O. number	
2.4	Part number	
2.5	Tag number	
2.6	Document number / rev.	
2.7	Pipe OD	
2.8	Jumper length	
2.9	Connector	

PHYSICAL

			NOTE
3.0	Dimensions (ø x h)	89 mm x 489 mm [3.5 in x 19.3 in]	
3.1	Material	Titanium grade 2	2
3.2	Weight (approximate)	In air: 5 kg [11 lb] In water: 4 kg [8.8 lb]	
3.3	Protective coating	None	3
3.4	Cathodic protection	None	
3.5	Operating temperature	-40 °C to 150 °C [-40 °F to 302 °F]	4, 5
3.6	Ambient temperature	-40 °C to 60 °C [-40 °F to 140 °F]	
3.7	Max design pressure	330 bar [4 786 psi]	
3.8	Max water depth	3 000 m [9 842 ft]	
3.9	Mounting	Clamp on to pipe surface	6
3.10	Sealing	Welded 1 atmospheric chamber	7
3.11	Jumper interface	See note	8
3.12	Filling / ventilation port	See note	8

HARDWARE

			NOTE
4.0	Supply voltage	12 VDC to 28 VDC	9
4.1	Power consumption	60 mA @ 24 VDC (typical)	9
4.2	Electronic	Single or independent redundant	
4.3	Signal output	RS-485 and / or 4-20 mA	10, 11
4.4	Protocol	See note	10, 11
4.5	Baud rate	See note	10, 11
4.6	Microprocessor	66 MIPS	
4.7	Memory	4 Mb onboard flash	
4.8	Vibration	2-axis	11
4.9	Diagnostic features	Self-testing	12
4.10	Insulation resistance	>10 GΩ @ 50 VDC	
4.11	Penetrator	Glass to titanium seal, 8 pin	13
4.12	Max wire cross-section	1,5 mm^2 [AWG 16]	

OPERATION

			NOTE
5.0	Manner of operation	Real-time measurement	
5.1	Technology	Passive ultrasonic	
5.2	Processing	DSP in sensor unit	
5.3	Calibration	Factory calibrated	14
5.4	Uncertainty	See note	15
5.5	Repeatability	Better than 1 %	
5.6	Flow conditions	Oil / water / gas / multiphase	
5.7	Operating limits	See note	15
5.8	MTBF	>30 years	

INSTALLATION

			NOTE
6.0	Installation method	By ROV or diver	
6.1	ROV handle	See note	16
6.2	Locking	Spring-loaded in J-slot	17
6.3	Installation torque	Typical / max: 30 N m / 100 N m [22 ft lb$_f$ / 74 ft lb$_f$]	
6.4	Retrieval torque	Typical / max: 50 N m / 100 N m [37 ft lb$_f$ / 74 ft lb$_f$]	

INSTRUMENT LAYOUT

NOTES

1. X notation subject to change according to type of jumper interface, signal output, protocol, and baud rate.
2. All major parts exposed to seawater are made of titanium grade 2. Material certificates according to EN 10204 3.1.
3. ROV handle coating according to NORSOK M-501, system 7 RAL 2004 (orange) if specified.
4. Maximum pipe surface temperature 200 °C [392 °F].
5. Operating temperature stated for 15 °C [59 °F] ambient temperature.
6. Funnel has to be made to fit actual installation and installed manually at the surface.
7. Electronics encapsulated in nitrogen gas-filled (N_2) 1 atmospheric chamber, welded by electronic beam welding and helium leak tested.
8. Bennex Omnitec Mk II Anguila M25 system or Ocean Design Inc. ¾" SAE Boss interface
9. Inrush current worst case @ 24 VDC: ≈1 300 mA for <1 ms, thereafter ≈70 mA for <2 seconds.
10. Proprietary DSP protocol (1 200 bps to 57 600 bps)
Modbus RTU (9 600 bps to 38 400 bps)
FMC KOS 150 protocol, 21 byte string (2 400 bps)
Proprietary 13 byte m/s binary mode (2 400 bps)
4-20 mA, passive (4-wire) or active (3-wire)
11. Can be supplied if requested;
    - CANopen:
50 000 bps / 100 000 bps / 125 000 bps)
    - Profibus DP:
9 600 bps / 19 200 bps / 93 750 bps / 187 500 bps
    - Vibration:
0 G to 5 G, 0,25 Hz to 1 024 Hz
Vibration output on RS-485 Modbus RTU at speeds 9 600 bps to 38 400 bps or proprietary DSP protocol at speeds 1 200 bps to 57 600 bps.

    Ask supplier for details.
12. Internal self-testing of analogue filters, amplifiers and flash memory.
13. See sensor GA drawing for details.
14. All sensors are checked and adjusted to factory default.
15. The pig detector is capable of detecting all types of pig. The pig has to be in motion with a minimum velocity 0,3 m/s [1 ft/s], depending on type of pig, pipe configuration and installation spot.
16. ROV handle, paddle handle according to ISO 13628-8. Other types of handle available on request:
    - T-bar, extended T-bar, fishtail, or Hex-nut.

    Ask supplier for details.
17. See funnel GA drawing for details.

SYSTEM DESIGN

ClampOn Deepwater DSP Pig Detector is designed to detect passages from all types of pigs. It can also be used to indicate the amount of debris pushed ahead by the pig. The sensor is non-intrusive and clamped on the pipe surface; hence no parts are in contact with the flow. All ClampOn subsea sensors have two-way communication via RS-485, can be upgraded / customized by software download and contain no moving parts.