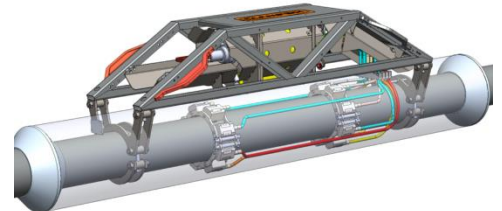


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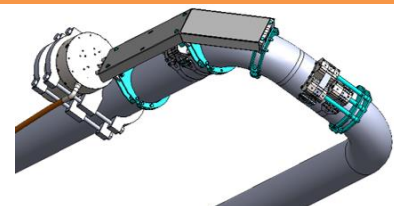
DSP Subsea Corrosion-Erosion Monitor (CEM®)

1 General		
1.1	Model name	ClampOn Subsea Corrosion-Erosion Monitor (CEM®)
1.2	Model number	Depends on model type and mechanical configuration
1.3	Serial number	YY-MM-XXXXX, unique for each unit
1.4	Qualifications	ISO 13628-6 and API17F

2 Physical properties, ROV retrievable concept			Note
2.1	Dimensions (l x w x h)	Varies, typically 2.4 m x 0.6 m x 0.8 m	1
2.2	Weight, including frame	Varies, typically 450 kg	1
2.3	Weight, electronics canister	60 kg	
2.4	ROV handle	Typically V-notched paddle	
2.5	Installation/retrieval torque	80 Nm to 120 Nm	
2.6	Damage torque	Over 200 Nm	
2.7	Typical application	Corrosion, erosion: live data transmitted to SCM, or logged internally	



3 Physical properties, permanent installation concept			
3.1	Dimensions canister (l x w x h)	Approximately 0.7 m x 0.4 m x 0.4 m	2
3.2	Clearance around pipe	70 mm, for transducer and tool access	
3.3	Weight, system	Varies, typically 75 kg	
3.4	Typical application	Corrosion, erosion: live data transmitted to SCM	



4 Physical properties, general			Note
4.1	Installation concept	Most commonly used shown above, contact ClampOn for other options	5, 6
4.2	Number of EMAT transducers	6 to 16	4
4.3	Equipment marking	Metallised polyester marking label. Stainless steel tag plate where applicable	
4.4	Material	Electronics canister: Titanium and PEHD. Transducer assembly: Titanium and PEEK. Funnel and protection frame: Carbon steel with welded anodes, depending on CP scheme	3
4.5	Maximum design depth	3048 m	
4.6	Maximum test pressure	338 bar (According to ISO 13628-6 and API17F)	
4.7	Temperature ranges	-5 °C ≤ T _{oper} ≤ +40 °C (seawater) -5 °C ≤ T _{pipe} ≤ +120 °C (pipe surface)	
4.8	Installation	On spool piece at ClampOn production facility, or on module/spool at client yard	5, 6

5 Electrical			
5.1	Power input	19 VDC to 28 VDC or Battery operation	1
5.2	Power consumption (@24 VDC)	Varies by configuration. Typically 8 W idle, 15 W peak	
5.3	Electronics platform/generation	ClampOn DSP CEMAT	
5.4	Processor	480 MIPS	
5.5	Non-volatile memory	32 GB Flash	
5.6	Insulation resistance	>1 GΩ @ 50 VDC	
5.7	Design life	30 years	

6 Operation			
6.1	Manner of operation	Real-time wall thickness monitoring by active ultrasonic guided waves	11
6.2	Unit of measurement	Remaining wall thickness (mm)	
6.3	Sensitivity	0.1 %	7
6.4	Wall thickness range	8 mm to 50 mm [0.3 in to 2.0 in] depending on EMAT transducer	8
6.5	Coverage distance	Typical 30 cm to 100 cm [11.8 in to 39.4 in]	8
6.6	Coverage area	Typical 3 m ² [32 ft ²]	8
6.7	Minimum pipe OD	114 mm [4 inch NPS] with no limitation in maximum pipe diameter	8
6.8	Pipe material	Metals and alloys	
6.9	Flow conditions	Oil/water/gas/multiphase/none	
6.10	Maximum coating thickness	3 mm	
6.11	Communication	Modbus RTU RS-485 or Modbus TCP/IP or SIIS L3. SIIS L3 is recommended.	1, 9, 10

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Notes

1. Typical field proven examples shown. Details tailored according to application and system integration.
2. Excluding transducer installation point. Exact measurements dependent on installation brackets.
3. Parts made of titanium are isolated from pipe. More information available in project specific GA drawing. Material certificates for metals are according to EN 10204 3.1, and for PEEK/PEHD according to EN 10204 2.1.
4. Two transducer rings with 3 to 8 transducers in each ring. Separation between the rings is from 2 x OD to 5 x OD, depending on system configuration.
5. Option for installation on pipe laying vessel is available. Contact ClampOn for details.
6. Completely ROV-installable system is available. Contact ClampOn for details.
7. Sensitivity refers to wall thickness change, relative to correctly set baseline wall thickness. The repeatability of single measurements is <1 %.
8. Limitations depend upon pipe geometry and configuration.
9. Transparent link from canister to a topside computer with ClampOn CEM® Client software for Windows is required for system configuration.
10. Communication protocol according to Modicon PI-MBUS-300.
11. See installation instructions for specific conditions of use.