Instrument datasheet
ClampOn CEM® Corrosion-Erosion Monitor

1	General		Note
1.1	Model name	ClampOn CEM® Corrosion-Erosion Monitor	
1.2	Model number	TSE.CE2M.SR00.G10	
1.3	Explosion protection principle	Increased safety, Ex e Encapsulation, Ex m Non-incendive, NI	
1.4	Serial number	YY-MM-7XXXX, unique for each unit	1

2	Physical		Note
2.1	Dimensions (w × h × d)	406 mm × 406 mm × 163 mm [16 in × 16 in × 6.4 in]	2
2.2	Enclosure material	Stainless steel 316L	
2.3	Enclosure protective coating	None, not certified with any type of coatings	
2.4	Weight	15 kg (±1 kg) [33.1 lb (±2.2 lb)]	
2.5	Ambient temperature	See "Approvals & certification"	
2.6	Ingress protection enclosure	IP66, in accordance with IEC 60529	
2.7	Ingress protection cable glands	IP66/IP68 (30 meters for 7 days), in accordance with IEC 60529	
2.8	Equipment marking	Metallised polyester certification label Stainless steel tag plate where applicable	
2.9	Number of EMAT transducers	4 to 32	3
2.10	Cable entry configuration	8, 16, 24 or 32 off Ø16 mm clearance holes, depending on number of EMAT transducers. Unused entries fitted with Ex certified blanking elements by default	4
2.11	Cable gland	321 series or ADE 1F2 series Ex cable gland for EMAT transducers	4

3	Electrical		Note
3.1	Rated voltage range, U_{dc}	18 V to 32 V, 24 V_{nom} (electronics equipped with inverse polarity and transient protection)	5
3.2	Power consumption (@V_{nom})	6.5 W operational (4.5 W in standby/idle)	
3.3	Electronics platform/generation	CEMAT II	
3.4	Processor	FPGA (close to front-end and with 58 DSP resources)	
3.5	Non-volatile memory	16 MB	
3.6	Sampling	8 × 24 bit ADCs, parallel sampled with FPGA	
3.7	ADC sampling rate	4 mega samples per second	

4	Operation		
4.1	Manner of operation	Real-time wall thickness trending using guided waves	6
4.2	Unit of measurement	Remaining wall thickness (mm)	
4.3	Design life	25 years	
4.4	Sensitivity	0.1 %	7
4.5	Wall thickness range	8 mm to 50 mm [0.3 in to 2.0 in] depending on EMAT transducer	8
4.6	Coverage distance	Typical 30 cm to 100 cm [11.8 in to 39.4 in]	8
4.7	Coverage area	Typical 0.3 m² to 1 m² [3.2 ft² to 10.8 ft²]	8
4.8	Minimum pipe OD	114 mm [4 inch NPS] with no limitation in maximum pipe diameter	8
4.9	Flow conditions	Any	
4.10	Pipe material	All steel alloys	

5	Signal		
5.1	RS-485 (half duplex) protocol	Modbus RTU	9, 10
5.2	RS-485 baud rate	115.2 kbps	

6	Installation	
6.1	Mounting	To be installed in close vicinity of pipe using mounting lugs attached to the enclosure exterior
6.2	Terminal block connection data	0.25 mm² to 2.5 mm² [AWG 24 to AWG 12] conductor (stranded) cross section with ferrule with plastic sleeve

7	Approvals & certification		14
7.1	Hazardous area location approval	Zone 1, 2 for ATEX/IECEx installations and Division 2 for $_{c}UL_{US}$ (NEC/CEC) installations	
7.2	ATEX marking	Ex II 2 G Ex eb mb IIC T6… T3 Gb	12
7.3	ATEX certificate	DEMKO 16 ATEX 1530X	13
7.4	ATEX ambient temperature range	-40 °C ≤T_{amb} ≤+60 °C (head unit) -40 °C ≤T_{amb} ≤+180 °C (transducer)	11
7.5	IECEx marking	Ex eb mb IIC T6… T3 Gb	12
7.6	IECEx certificate	IECEx ULD 16.0024X	13
7.7	IECEx ambient temperature range	-40 °C ≤T_{amb} ≤+60 °C (head unit) -40 °C ≤T_{amb} ≤+180 °C (transducer)	11
7.8	$_{c}UL_{US}$ marking	Class I Division 2 Groups A, B, C, D, T6… T3	12
7.9	$_{c}UL_{US}$ certificate	E354507	13
7.10	$_{c}UL_{US}$ ambient temperature range	-40 °C ≤T_{amb} ≤+60 °C (head unit) -40 °C ≤T_{amb} ≤+180 °C (transducer)	11
7.11	CE marking in conformance with	2014/34/EU (ATEX Directive) and 2014/30/EU (EMC Directive)	

Notes

1. Serial number breakdown: yy (year of manufacture), mm (month of manufacture), 7xxxx (unique electronics ID).
2. Listed dimensions excluding cable entry components.
3. Two transducer rings with 2 to 16 transducers in each ring. Separation between the rings is from 2 × OD to 5 × OD, depending on system configuration. Transducers are typically mounted equidistantly around the circumference of the pipe. Numbers of transducers and their positions are project dependent.
4. Various solutions/configurations available.
5. The head unit must be powered from a safety extra low voltage (SELV) power supply and with an external fuse rated 10 A, 230 V, 1 500 A breaking capacity, supplied or approved by ClampOn.
6. For system designs, an automation controller/computer running ClampOn CEM® Server is required to handle communication with the instrument, data processing, and (if applicable) communication with the client control system.
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. ClampOn CEM® Client software for Windows is required for system configuration. Supported operating systems for CEM® Client software is XP (SP3, 32 bit), Windows Vista, Windows 7, Windows 8/8.1, or Windows 10 (32 bit and 64 bit).
10. Communication protocol according to Modicon PI-MBUS-300.
11. The ambient temperature (T_{amb}) marked on the equipment refers to the temperature of the surroundings, irrespective of any external source of heating, such as process temperature, or direct sunlight. If there is a risk the ambient temperature of the surroundings will exceed T_{amb}, steps must be taken to mitigate this risk, such as installing a sunshade, insulating the pipe, or moving the equipment to another location.
12. Head unit is T5 classified at listed T_{amb} while the EMAT transducers are T6… T3 classified depending on T_{amb}. See certificate and/or installation instructions for correlation between T_{amb} and temperature class.
13. See certificate and/or installation instructions for specific conditions of use.
14. The head unit may not be marked with all certificates at the same time.