

# Instrument Datasheet

## ClampOn Corrosion-Erosion Monitor (CEM®)



### 1 General Note

1.1 Model description	ClampOn Corrosion-Erosion Monitor (CEM®)	
1.2 Explosion protection principle(s)	Increased safety, Ex e Encapsulation, Ex m Non-incendive, NI	
1.3 Part number	Various depending on model type and mechanical configuration	
1.4 Serial number	YY-MM-7XXXX, unique for each unit	1

### 2 Physical

2.1 Dimensions (w x h x d)	406 mm x 406 mm x 163 mm [16 in x 16 in x 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, 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	Depending on number of EMAT transducers	4
2.11 Cable gland	Glands for EMAT transducers. Unused entries fitted with Ex certified blanking elements	4



### 3 Electrical Note

3.1 Power input	18 VDC to 32 VDC (electronics equipped with inverse polarity and transient protection)	5
3.2 Power consumption (@24 VDC)	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 x 24 bit ADCs, parallel sampled with FPGA	
3.7 ADC sampling rate	4 mega samples per second	
3.8 Diagnostic features (with software)	Internal self-testing of analogue filters, amplifiers, and flash memory	

### 4 Operation

4.1 Manner of operation	Real-time wall thickness trending using guided waves	6
4.2 Unit of measurement	Change in wall thickness (mm)	
4.3 Repeatability	Better than 1 %	7
4.4 Wall thickness range	8 mm to 50 mm [0.3 in to 2.0 in] depending on EMAT transducer	8
4.5 Coverage distance	Typical 30 cm to 100 cm [11.8 in to 39.4 in]	8
4.6 Coverage area	Typical 3 m <sup>2</sup> [32 ft <sup>2</sup> ]	8
4.7 Minimum pipe OD	114 mm [4 inch NPS] with no limitation in maximum pipe diameter	8
4.8 Pipe material	Metals and alloys	
4.9 Flow conditions	Any	

### 5 Signal

5.1 RS-485 (half duplex) protocol	Modbus RTU	
5.2 RS-485 baud rate	115 200 bps	9, 10

### 6 Installation

6.1 Mounting	To be installed in close vicinity of pipe	
6.2 Conductor (stranded) wire cross section	0.25 mm <sup>2</sup> to 2.5 mm <sup>2</sup> [AWG 24 to AWG 12] with ferrule with plastic sleeve	

### 7 Approvals & certification

7.1 Hazardous area location approval	Zone 1, 2 for ATEX/IECEx, and Division 2 for cUL <sub>US</sub> (NEC/CEC)	
7.2 ATEX marking	Ex II 2 G Ex e mb IIC T6... T3 Gb	11, 12
7.3 ATEX certificate	DEMKO 16 ATEX 1530X	13
7.4 ATEX ambient temperature range	Sensor: -40 °C ≤ T <sub>amb</sub> ≤ +60 °C   Transducer: -40 °C ≤ T <sub>amb</sub> ≤ +180 °C	
7.5 IECEx marking	Ex e mb IIC T6... T3 Gb	11, 12
7.6 IECEx certificate	IECEx ULD 16.0024X	13
7.7 IECEx ambient temperature range	Sensor: -40 °C ≤ T <sub>amb</sub> ≤ +60 °C   Transducer: -40 °C ≤ T <sub>amb</sub> ≤ +180 °C	
7.8 cUL <sub>US</sub> marking	Class I, Division 2, Groups A, B, C, D, T6... T3	12
7.9 cUL <sub>US</sub> certificate	E354507	13
7.10 cUL <sub>US</sub> ambient temperature range	Sensor: -40 °C ≤ T <sub>amb</sub> ≤ +60 °C   Transducer: -40 °C ≤ T <sub>amb</sub> ≤ +180 °C	
7.11 CE marking in conformance with	2014/34/EU (ATEX Directive) and 2014/30/EU (EMC Directive)	

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### Notes

1. Serial number breakdown: yy (year of manufacture), mm (month of manufacture), 7xxx (unique electronics ID).
2. Listed dimensions excluding cable glands.
3. Two transducer rings with 2 to 16 transducers in each ring. Separation between the rings is from 2 x OD to 5 x 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 mechanical solutions/configurations available.
5. The sensor 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. Refers to wall thickness change from correctly set baseline value.
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. Temperature class is given at maximum ambient temperature (including any external source of heating, typically process temperature, where applicable).
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.