General

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

3 Electrical

3.1 Power input 18 VDC to 32 VDC (electronics equipped with inverse polarity and transient protection)

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

4.2 Unit of measurement Change in wall thickness (mm)

4.3 Repeatability Better than 1 %

4.4 Wall thickness range 8 mm to 50 mm [0.3 in to 2.0 in] depending on EMAT transducer

4.5 Coverage distance Typical 30 cm to 100 cm [11.8 in to 39.4 in]

4.6 Coverage area Typical 3 m² [32 ft²]

4.7 Minimum pipe OD 114 mm [4 inch NPS] with no limitation in maximum pipe diameter

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

6 Installation

6.1 Mounting To be installed in close vicinity of pipe

6.2 Conductor (stranded) wire cross section 0.25 mm² to 2.5 mm² [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 ULc (NEC/CEC)

7.2 ATEX marking Ex II 2 G Ex e mb IIC T6... T3 Gb

7.3 ATEX certificate DEMKO 16 ATEX 1530X

7.4 ATEX ambient temperature range Sensor: -40 °C ≤ Tamb ≤ +60 °C | Transducer: -40 °C ≤ Tamb ≤ +180 °C

7.5 IECEx marking Ex e mb IIC T6... T3 Gb

7.6 IECEx certificate IECEx ULD 16.0024X

7.7 IECEx ambient temperature range Sensor: -40 °C ≤ Tamb ≤ +60 °C | Transducer: -40 °C ≤ Tamb ≤ +180 °C

7.8 ULc marking Class I, Division 2, Groups A, B, C, D, T6... T3

7.9 ULc certificate E354507

7.10 ULc ambient temperature range Sensor: -40 °C ≤ Tamb ≤ +60 °C | Transducer: -40 °C ≤ Tamb ≤ +180 °C

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 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.
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.