DSP-06 Particle Monitor
Instrument Datasheet

SYSTEM DESIGN

ClampOn DSP-06 Particle Monitor, Ex de version (also available in Ex ia version), is designed to detect particles within a flowing medium and provide real-time sand rate data. The sensor is non-intrusive and clamped on the pipe surface; hence no parts are in contact with the flow. All ClampOn sensors have two-way communication via RS-485, can be upgraded / customized by software download, contain no moving parts and are easy to relocate. An optional computer running ClampOn software can be used to handle data storage and communication to client control system.

ClampOn DSP-06 Particle Monitor, Ex de

INSTRUMENT DATA

GENERAL

1.0 Manufacturer ClampOn AS
1.1 Model description DSP-06 particle monitor, Ex de
1.2 Part number 920-22xx-xxx

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.

INSTRUMENT LAYOUT

PHYSICAL

3.0 Dimensions (ø x h) 101 mm x 211 mm [4 in x 8.3 in]
3.1 Material AISI 316 Stainless Steel
3.2 Weight (approximate) 7 kg [15.4 lb]
3.3 Ingress protection IP68
3.4 Operating temperature -40 °C to 150 °C [-40 °F to 302 °F]
3.5 Ambient temperature -20 °C to 60 °C [-4 °F to 140 °F]
3.6 Protective coating None
3.7 Mounting Clamp on to pipe surface
3.8 Cable entry 3 off M25 x 1.5 ISO Metric
3.9 Cable gland 3 off M25 stopping plug
3.10 Cable None

HARDWARE AND CERTIFICATION

4.0 Supply voltage 12 VDC to 28 VDC
4.1 Power consumption Typical / max: 1.3 W / 2.1 W
4.2 Hazardous area Zone 1, 2
4.3 Certification code EEx de IIC T5
4.4 Equipment code II 2 G
4.5 Ex certificate number Nemko 02ATEX382
4.6 Signal output RS-485 and / or 4-20 mA
4.7 Protocol See note 9
4.8 Baud rate See note 9
4.9 Microprocessor 66 MIPS
4.10 Memory 4 Mb onboard flash
4.11 Diagnostic features Self-testing

OPERATION

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
5.4 Uncertainty ±5 %
5.5 Repeatability Better than 1 %
5.6 Flow conditions Oil / water / gas / multiphase
5.7 Flow velocity >0,5 m/s [1.6 ft/s]
5.8 Minimum particle size Oil: 25 μm, gas: 15 μm
5.9 Minimum sand rate 0.01 g/s
5.10 MTBF >30 years

NOTES

1 X notation subject to change according to signal output, cable type/length, and coating.
2 Weight including mounting accessories.
3 ATEX-certified for pipe surface temperature up to 100 °C [212 °F]. Temperature class depends on pipe surface temperature. See certificate for details.
4 Operating temperature stated for 15 °C [59 °F] ambient temperature.
5 Delivered with mounting skid and clamping bands. Clamping band length 2 m [6.6 ft], covering pipe OD <600 mm DN [24 inch NPS].
6 Terminals inside termination enclosure suitable for multi stranded wires with maximum cross-section 4 mm² [AWG 12]. Using single stranded wires maximum cross-section is 6 mm² [AWG 10].
7 Complete assembly according to Nemko 02ATEX382.
8 Additional certification available, GOST-R or Inmetro;
   • GOST-R Certification code: 2ExdellICT5
     Ex certificate no.: PCC NO.F605.B02469
     See certificate for details.
   • Inmetro Certification code: BR-Ex de IIC T5 IP68
     Ex certificate no.: MC, AEX-6764 Revisão 01
     See certificate for details.
9 Proprietary DSP protocol (1 200 bps to 57 600 bps)
   Modbus RTU (9 600 bps to 38 400 bps)
   4-20 mA, passive (4-wire) or active (3-wire)
   RS-485 with proprietary DSP protocol (9 600 bps)
   baud rate and passive 4-20 mA (0 to 500 000 range) is ClampOn standard setup.
10 Internal self-testing of analogue filters, amplifiers and flash memory.
11 All sensors are calibrated to a master sensor at factory, enabling use of standard algorithm.
12 Minimum velocity for particle detection depends on flow medium, particle size, and pipe configuration.
13 Minimum detectable particle size and sand rate depends on flow medium and flow velocity.

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