

# DSP-06 Particle Monitor

## Instrument Datasheet



### INSTRUMENT DATA

#### GENERAL

1.0	Manufacturer	ClampOn AS
1.1	Model description	DSP-06 particle monitor, Ex de
1.2	Part number	920-22xx4-xxx

#### NOTE

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#### 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.

#### 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	Ex 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
4.8	Baud rate	See note
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

**Cable type/length and cable gland type adaption's available on request. Skid for welding in ST-52 (carbon steel) or SS 316 and coating can also be supplied. Ask supplier for details.**

### INSTRUMENT LAYOUT



### NOTES

- X notation subject to change according to signal output, cable type/length, and coating.
- Weight including mounting accessories.
- ATEX-certified for pipe surface temperature up to 100 °C [212 °F]. Temperature class depends on pipe surface temperature. See certificate for details.
- Operating temperature stated for 15 °C [59 °F] ambient temperature.
- Delivered with mounting skid and clamping bands. Clamping band length 2 m [6.6 ft], covering pipe OD <600 mm DN [24 inch NPS]. Extension clamping band for larger pipe OD, ask supplier for details. For installation of the sensor there must be a minimum of 50 cm [20 in] free space above the pipe. Sensor front must have metal to metal contact with the pipe surface. See installation instructions for further details.
- Terminals inside termination enclosure suitable for multi stranded wires with maximum cross-section 4 mm<sup>2</sup> [AWG 12]. Using single stranded wires maximum cross-section is 6 mm<sup>2</sup> [AWG 10].
- Complete assembly according to Nemko 02ATEX382.
- Additional certification available, GOST-R or Inmetro;
  - GOST-R  
Certification code: 2ExdeIICT5  
Ex certificate no.: POCC NO.ГБ05.В02469  
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.
- 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.
- Internal self-testing of analogue filters, amplifiers and flash memory.
- All sensors are calibrated to a master sensor at factory, enabling use of standard algorithm.
- Minimum velocity for particle detection depends on flow medium, particle size, and pipe configuration.
- Minimum detectable particle size and sand rate depends on flow medium and flow velocity.

### 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.