

DSP-06 Particle Monitor

Instrument Datasheet



INSTRUMENT DATA

GENERAL

1.0	Manufacturer	ClampOn AS	
1.1	Model description	DSP-06 particle monitor, Ex ia	
1.2	Part number	920-123xx-xxx	
1.3	Serial number		

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)	80 mm x 144 mm [3.1 in x 5.7 in]	
3.1	Material	AISI 316 Stainless Steel	
3.2	Weight	Approximate 3 kg [6.6 lb]	2
3.3	Ingress protection	IP68	
3.4	Operating temperature	-40 °C to 150 °C [-40 °F to 302 °F]	3, 4
3.5	Ambient temperature	-40 °C to 60 °C [-40 °F to 140 °F]	
3.6	Protective coating	None	
3.7	Mounting	Clamp on to pipe surface	5
3.8	Cable entry	1 off M20 x 1,5 ISO Metric	
3.9	Cable gland	None	
3.10	Cable	None	6

HARDWARE AND CERTIFICATION

4.0	Supply voltage	12 VDC to 25 VDC (from I.S PSU)	7
4.1	Power consumption	Typical / max: 1,5 W / 2,1 W	
4.2	Hazardous area	Zone 0, 1, 2	
4.3	Certification code	EEx ia IIB T2-T5	3, 8
4.4	Equipment code	Ex II 1 G	
4.5	Ex certificate number	DNV-99-ATEX-1004X	8
4.6	Signal output	RS-485 and / or 4-20 mA	9
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	10

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	11
5.4	Uncertainty	±5 %	11
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]	12
5.8	Minimum particle size	Oil: 25 µm, gas: 15 µm	13
5.9	Minimum sand rate	0,01 g/s	13
5.10	MTBF	>30 years	

Number of cable entries and size, enclosure material, and cable/cable gland type adaption's available on request. Ask supplier for details.



INSTRUMENT LAYOUT

NOTES

- 1 The last 5 digits will change according to type of signal output, protocol, baud rate and cable entry.
- 2 Weight including mounting accessories.
- 3 ATEX-certified for pipe surface temperature up to 225 °C [437 °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 meters [78.7 in], covering pipe OD <610 mm [24 in]. It's recommended to use square skid with pipe OD >254 mm [10 in]. Extension clamping band for pipe OD >610 mm [24 in] and / or square skid, ask supplier for details. For installation of the sensor there must be a minimum of 30 cm [≈12 in] free space above the pipe. Sensor front must have metal to metal contact with the pipe surface. See installation instructions for further details.
- 6 Terminals inside sensor enclosure suitable for wire cross section 0,14 mm² to 1,5 mm² [AWG 25 to 16].
- 7 According to ATEX-certificate the sensor has to be powered from an intrinsically safe power supply. Use only I.S power supply supplied or approved by ClampOn.
- 8 Additional certification available, CSAc&us or Inmetro;
 - CSAc&us
Certification code: Class 1 Div 1, Group C & D, T5
Ex certificate no.: 1298002
See certificate for details.
 - Inmetro
Certification code: BR-Ex ia IIB T2-T5 IP68
Ex certificate no.: MC, AEX-6763-X
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 (2-wire) RS-485 with proprietary DSP protocol (9 600 bps) baud rate 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.

SYSTEM DESIGN

ClampOn DSP-06 Particle Monitor, Ex ia version (also available in Ex de 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.