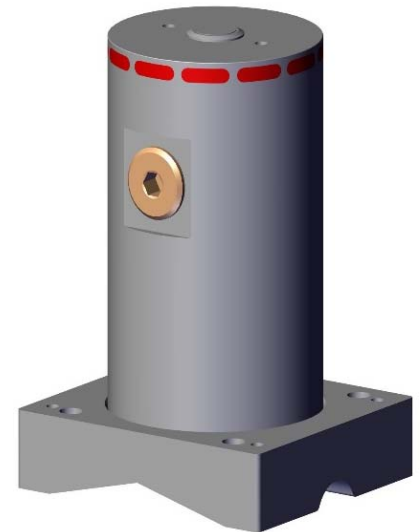


Instrument datasheet

DSP PIG Detector

1 General			Note
1.1	Model name	DSP PIG Detector	
1.2	Model number	TSE.DS2I.SA00.A11 (acoustic detection) TSE.DS2I.SA01.A11 (magnetic option)	1
1.3	Explosion protection principle	Intrinsically safe, Ex i	
1.4	Serial number	YY-MM-XXXX, unique for each unit	2

2 Physical			
2.1	Dimensions (ø × h)	80 mm × 153 mm [3.1 in × 6 in]	
2.2	Enclosure material	Stainless steel 316L	
2.3	Enclosure protective coating	None, not certified with any type of coatings	
2.4	Weight (sensor only)	2.1 kg [4.6 lb]	
2.5	Weight (with mounting bracket)	3.2 kg [7.1 lb]	
2.6	Ambient temperature	See "Approvals & certification"	
2.7	Ingress protection	IP66/IP68 (1 meter for 24 hours), in accordance with IEC 60529	
2.8	Equipment marking	Metallised polyester certification label Stainless steel tag plate where applicable	
2.9	Cable entry configuration	1 off M20 × 1.5 ISO metric fitted with Ex certified blanking element by default	3
2.10	Cable gland	None by default	3
2.11	Cable length and type	None by default	3
2.12	Local light type	Red LED, visible 360° around sensor	
2.13	Local reset type	SPST momentary push to make	



3 Electrical			Note
3.1	Power input (from a safety barrier), U_{dc}	24 V	4
3.2	Power consumption (typical/maximum), sensor + safety barrier (PSD 1001C)	1.9 W/1.9 W (no alarm, light not illuminated) 3.1 W/3.1 W (alarm, light illuminated)	
3.3	Electronics platform/generation	ClampOn DSP II	
3.4	Microprocessor	600 MIPS	
3.5	Non-volatile memory	8 MB	
3.6	Vibration accelerometer	3-axis MEMS	5

4 Operation			
4.1	Manner of operation	Real-time measurement	
4.2	Unit of measurement	Raw value	
4.3	Technology	Passive ultrasonic and/or magnetic	
4.4	Processing	DSP in sensor unit	
4.5	Calibration	All sensors are calibrated to a master signal at factory	
4.6	Design life	25 years	
4.7	Detection mode	Acoustic, magnetic, combined acoustic and/or magnetic	1, 6, 12
4.8	Detection direction	Bidirectional	
4.9	Detection algorithm (acoustic)	Fixed over Background (FoB) with trigger level, fallback level, trigger time minimum and trigger time maximum. All parameters are configurable	6, 7
4.10	Detection algorithm (magnetic)	Trigger level in magnetic raw value	1, 6, 7
4.11	Operating limits	The pig detector is capable of detecting all types of pig. The pig has to be moving with a minimum velocity of 0.3 m/s [1 ft/s], depending on type of pig, pipe configuration and installation point	
4.12	Detectable magnetic flux density	0.015 mT (0.15 G) to 1.8 mT (18 G) at detection point	1
4.13	Repeatability	Better than 1 %	
4.14	Flow conditions	Oil, water, gas, multiphase	
4.15	Pipe material	All steel alloys	8

5 Signal			6
5.1	Signal types (galvanically isolated)	RS-485, 4-20 mA, relay, VFC and reset	4
5.2	RS-485 (half duplex) protocol	Modbus RTU or proprietary DSP	
5.3	RS-485 baud rate	2.4 kbps to 115.2 kbps	
5.4	4-20 mA (passive, sink), 4-wire	Configurable raw value range up to 5 000 000. Default 0 to 500 000. 15 mA alarm level when pig detected	7
5.5	Relay1 (for local indication)	SPST, programmed NO in operation (closed in alarm mode) by default	7
5.6	Relay2 (for remote indication, VFC)	SPST, programmed NO in operation (closed in alarm mode) by default	7
5.7	Reset	Manual reset by push button. Can also be programmed with automatic reset (duration configurable). When reset, all alarms on 4-20 mA and relays return to operation mode	7

6 Installation			
6.1	Mounting	Mounting bracket clamped to pipe by non-invasive, non-intrusive stainless steel clamping bands, or welded to pipe surface. Sensor screws into the mounting bracket	8, 9
6.2	Terminal block connection data	0.25 mm ² to 1.5 mm ² [AWG 24 to AWG 16] conductor (stranded) cross section with ferrule with plastic sleeve	

Instrument datasheet

DSP PIG Detector



7 Approvals & certification		13	
7.1	Hazardous area location approval	Zone 0, 1, 2 for ATEX/IECEX installations and Zone 0, 1, 2 or Division 1 for cUL_{us} (NEC/CEC) installations	
7.2	ATEX marking	Ex II 1 G Ex ia IIB T3 Ga $-40\text{ }^{\circ}\text{C} \leq T_{amb} \leq +60\text{ }^{\circ}\text{C}$	
7.3	ATEX certificate	Presafe 17 ATEX 9492X	11
7.4	ATEX ambient temperature range	$-40\text{ }^{\circ}\text{C} \leq T_{amb} \leq +60\text{ }^{\circ}\text{C}$	10
7.5	IECEX marking	Ex ia IIB T3 Ga $-40\text{ }^{\circ}\text{C} \leq T_{amb} \leq +60\text{ }^{\circ}\text{C}$	
7.6	IECEX certificate	IECEX PRE 17.0009X	11
7.7	IECEX ambient temperature range	$-40\text{ }^{\circ}\text{C} \leq T_{amb} \leq +60\text{ }^{\circ}\text{C}$	10
7.8	cUL_{us} marking	Class I Division 1 Groups C, D T3 Class I Zone 0 AEx ia IIB T3 Ga Class I Zone 0 Ex ia IIB T3 Ga	
7.9	cUL_{us} file number	E354507	11
7.10	cUL_{us} ambient temperature range	$-40\text{ }^{\circ}\text{C} \leq T_{amb} \leq +60\text{ }^{\circ}\text{C}$	10
7.11	CE marking in conformance with	2014/34/EU (ATEX Directive) and 2014/30/EU (EMC Directive)	

- Notes**
- Magnetic PIG detection is optional and requires special add-on electronics during manufacturing.
 - Serial number breakdown: yy (year of manufacture), mm (month of manufacture), xxxxx (unique electronics ID).
 - Various solutions available.
 - Irrespective of whether in a hazardous or non-hazardous area, all signal and power connections to and from the sensor must be via certified safety barriers with intrinsically safe outputs in accordance with the Ex certificates' electrical data. Only use certified safety barriers supplied or recommended by ClampOn.
 - For vibration measurement details, see instrument datasheet addendum. Vibration output is optional and not activated in instrument by default.
 - Factory configurable software parameters via RS-485 interface. May also be configured in-field by ClampOn authorised personnel.
 - Parameters available for configuration by client/end user via RS-485 interface with "ClampOn PIG Configuration Tool" software.
 - Sensor waveguide must have metal-to-metal contact with the pipe surface.
 - Mounting bracket available in stainless steel (standard), carbon steel or duplex. Clamping bands available in stainless steel or Inconel.
 - The ambient temperature (T_{amb}) marked on the equipment refers to the temperature of the surroundings, irrespective of any external source of heating, such as process temperature, or direct sunlight. If there is a risk the ambient temperature of the surroundings will exceed T_{amb} , steps must be taken to mitigate this risk, such as installing a sunshade, insulating the pipe, or moving the equipment to another location.
 - See certificate and/or installation instructions for electrical parameters (for IS calculations), and specific conditions of use.
 - By default, the PIG detector uses acoustic detection, but magnetic detection can also be specified as an option. With magnetic detection, the instrument uses a magnetic field sensor to measure changes in the magnetic flux density near the sensor. The PIG detector can be configured to use a combination of triggering in the acoustic and/or magnetic domains before a pig is detected. Magnetic detection is only available over the RS-485 output.
 - The sensor may not be marked with all certificates at the same time.