### General

1. **Model name**
   ClampOn DSP PIG Detector

2. **Model number**
   - TSE.DS2.I.SA00.A11 (acoustic detection)
   - TSE.DS2.I.SA01.A11 (magnetic option)

3. **Explosion protection principle**
   Intrinsically safe, Ex i

4. **Serial number**
   YY-MM-XXXXX, unique for each unit

### Physical

1. **Dimensions (⌀ × h)**
   80 mm × 153 mm [3.1 in × 6 in]

2. **Enclosure material**
   Stainless steel 316L

3. **Enclosure protective coating**
   None, not certified with any type of coatings

4. **Weight (sensor only)**
   2.2 kg [4.9 lb]

5. **Weight (with mounting bracket)**
   3.3 kg [7.3 lb]

6. **Ambient temperature**
   See “Approvals & certification”

7. **Ingress protection**
   IP66/IP68 (1 meter for 24 hours), in accordance with IEC 60529

8. **Equipment marking**
   Metallised polyester certification label

9. **Cable entry configuration**
   1 off M20 × 1.5 ISO metric fitted with Ex blanking element by default

10. **Cable gland**
    None by default

11. **Cable length and type**
    None by default

12. **Local light type**
    Red LED, visible 360° around sensor

13. **Local reset type**
    SPST momentary push to make

### Electrical

1. **Rated voltage**
   24 V

2. **Power consumption**
   - sensor + safety barrier (PSD 1001C)
     1.9 W (no alarm/light not illuminated)
     3.3 W (alarm/light illuminated)

3. **Electronics platform/generation**
   ClampOn DSP II

4. **Microprocessor**
   600 MIPS

5. **Non-volatile memory**
   8 MB

6. **Vibration accelerometer**
   3-axis MEMS

### Operation

1. **Manner of operation**
   Real-time measurement

2. **Unit of measurement**
   Raw value

3. **Technology**
   Passive ultrasonic using piezoelectric transducer (magnetic sensor for magnetic PIG detection)

4. **Processing**
   DSP in sensor unit

5. **Calibration**
   All sensors are calibrated to a master signal at factory

6. **Design life**
   25 years

7. **Detection mode**
   Acoustic, magnetic, combined acoustic and/or magnetic

8. **Detection direction**
   Bidirectional

9. **Detection algorithm (acoustic)**
   Fixed over Background (FoB) with trigger level, fallback level, trigger time minimum and trigger time maximum. All parameters are configurable

10. **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

11. **Detectable magnetic flux density**
    0.015 mT (0.15 G) to 1.8 mT (18 G) at detection point

12. **Repeatability**
    Better than 1 %

13. **Flow conditions**
    Oil, water, gas, multiphase

14. **Pipe material**
    All steel alloys

### Signal

1. **Signal types (galvanically isolated)**
   RS-485, 4-20 mA, relay, VFC and reset

2. **RS-485 (half duplex) protocol**
   Modbus RTU or proprietary DSP

3. **RS-485 baud rate**
   2.4 kbps to 115.2 kbps

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

5. **Relay1 (for local indication)**
   SPST, programmed NO in operation (closed in alarm mode) by default

6. **Relay2 (for remote indication, VFC)**
   SPST, programmed NO in operation (closed in alarm mode) by default

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

### Installation

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

2. **Terminal block connection data**
   0.5 mm² to 1.5 mm² [AWG 20 to AWG 16] conductor (stranded) cross section with ferrule with plastic sleeve
## Approvals & certification

| 7.1 | Hazardous area location approval | Zone 0, 1, 2 for ATEX/IECEx installations and Zone 0, 1, 2 or Division 1 for .ULus (NEC/CEC) installations |
| 7.2 | ATEX certificate | Presafe 17 ATEX 9492X |
| 7.3 | ATEX marking | Ex II 1 G Ex ia IIB T3 Ga −40 °C ≤ T<sub>amb</sub> ≤ +60 °C |
| 7.4 | ATEX ambient temperature range | −40 °C ≤ T<sub>amb</sub> ≤ +60 °C |
| 7.5 | IECEx certificate | IECEx PRE 17.0009X |
| 7.6 | IECEx marking | Ex ia IIB T3 Ga −40 °C ≤ T<sub>amb</sub> ≤ +60 °C |
| 7.7 | IECEx ambient temperature range | −40 °C ≤ T<sub>amb</sub> ≤ +60 °C |
| 7.8 | .ULus file number | E354507 |
| 7.9 | .ULus 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 |
| 7.10 | .ULus ambient temperature range | −40 °C ≤ T<sub>amb</sub> ≤ +60 °C |
| 7.11 | CE marking in conformance with | 2014/34/EU (ATEX Directive) and 2014/30/EU (EMC Directive) |

### Notes

1. Magnetic PIG detection is optional and requires special add-on electronics during manufacturing.
2. Serial number breakdown: yy (year of manufacture), mm (month of manufacture), xxxxx (unique electronics ID).
3. Various solutions available.
4. 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.
5. For vibration measurement details, see instrument datasheet addendum. Vibration output is optional and not activated in instrument by default.
6. Factory configurable software parameters via RS-485 interface. May also be configured in-field by ClampOn authorised personnel.
7. Parameters available for configuration by client/end user via RS-485 interface with "ClampOn PIG Configuration Tool" software.
8. Sensor waveguide must have metal-to-metal contact with the pipe surface.
9. Mounting bracket available in stainless steel (standard), carbon steel or duplex. Clamping bands available in stainless steel or Inconel.
10. The ambient temperature (T<sub>amb</sub>) marked on the equipment refers to the temperature of the surroundings, irrespective of any external source of heating, such as process temperature (T<sub>pipe</sub>), or direct sunlight. Equipment is certified for process temperature ≤ +125 °C. If there is a risk the ambient temperature of the surroundings will exceed T<sub>amb</sub>, steps must be taken to mitigate this risk, such as installing a sunshade, insulating the pipe, or moving the equipment to another location.
11. See certificate and/or installation instructions for electrical parameters (for IS calculations), and specific conditions of use.
12. 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.
13. The sensor may not be marked with all certificates at the same time.