

Rosemount™ PDS42 Acoustic Pig Detector

Non-intrusive Pig Detection



Rosemount PDS42 PIG Detector supports pipe inspection and cleaning operations at your facility by providing real-time signal of PIG passing at key points through pipelines, utilizing passive acoustic technology.

Rosemount PDS42 is a non-intrusive device with no moving parts and minimum maintenance requirements, that enables you to run safe and cost-effective pigging operation.

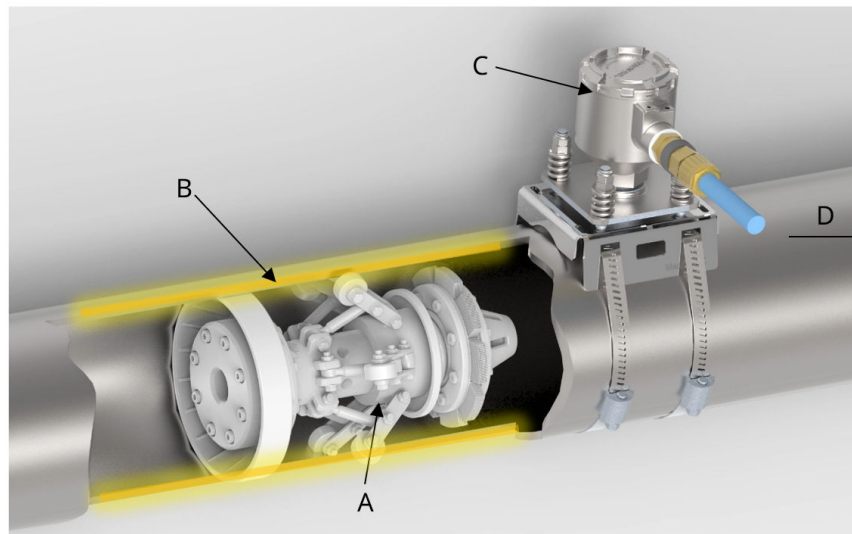
- Provides **real-time** pig passage with direct connection to DCS, and no software requirement
- **Compact** and **Explosion proof** design facilitating a simple deployment in-field
- **High Temperature** performance enables safe operations in high-temperature applications
- **Identifies debris** removal when executing pipeline cleaning operations
- Detects **all types of PIGs** in **all types of fluids**

Working Principle

The Rosemount PDS42 PIG Detector is a non-intrusive acoustic device that detects the noise generated by the PIGs (Pipeline Inspection Gauges) as they travel through the pipe. The friction between the PIG and the pipe generates a characteristic noise.

Pipeline Inspection Gauges (PIGs), in general, generate sufficient noise to allow detection at velocities at a minimum 0.05 m/s depending on the PIG material. Noise within the ultrasonic frequency band of the sensor will be largely dominated by the noise induced by the passing PIGs. Contributions from other external sources are negligible, which minimizes the risk for false readings.

Figure 1: PDS42 Working Principle

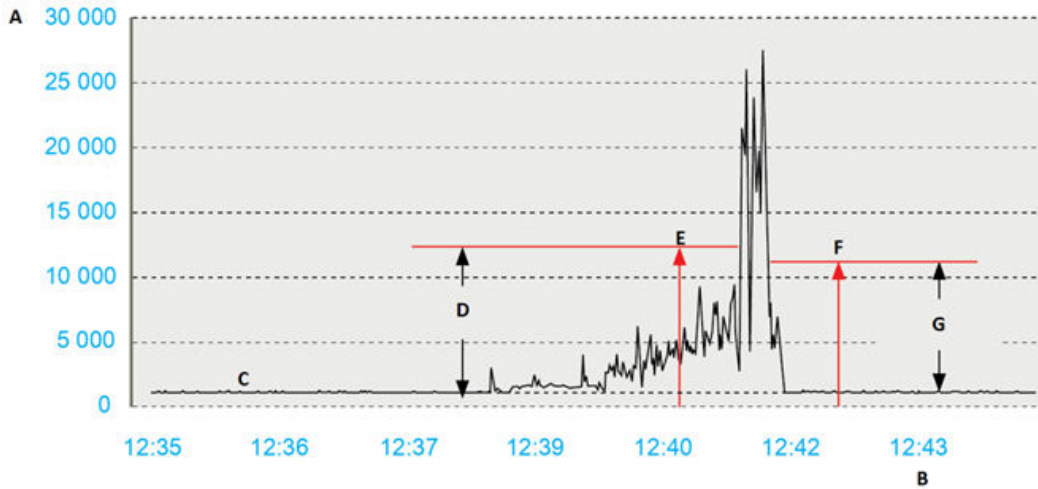


- A. Moving PIG
- B. PIG - Generated noise in the pipe wall
- C. Rosemount PDS42 Pig Detector
- D. Output to DCS

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Figure 2: Noise Levels of a PIG and Signal Pattern of a PIG Passage Event

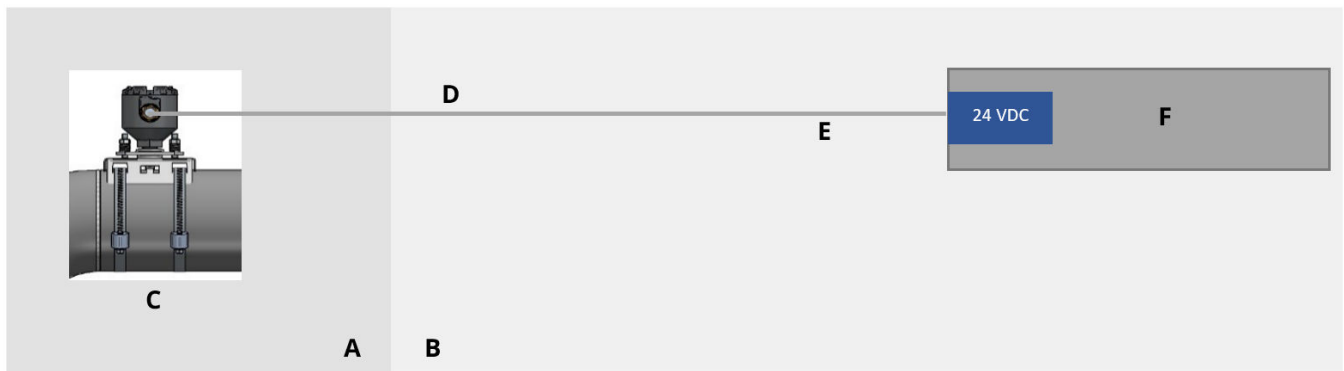


- A. Raw signal in microvolts
- B. Time
- C. Average noise level
- D. Approach threshold
- E. Limit in - triggering the "Pig Approaching" message
- F. Limit out - triggering the "Pig Passed" message
- G. Passed threshold

Field block diagram

Explosion proof installation with remote digital indication

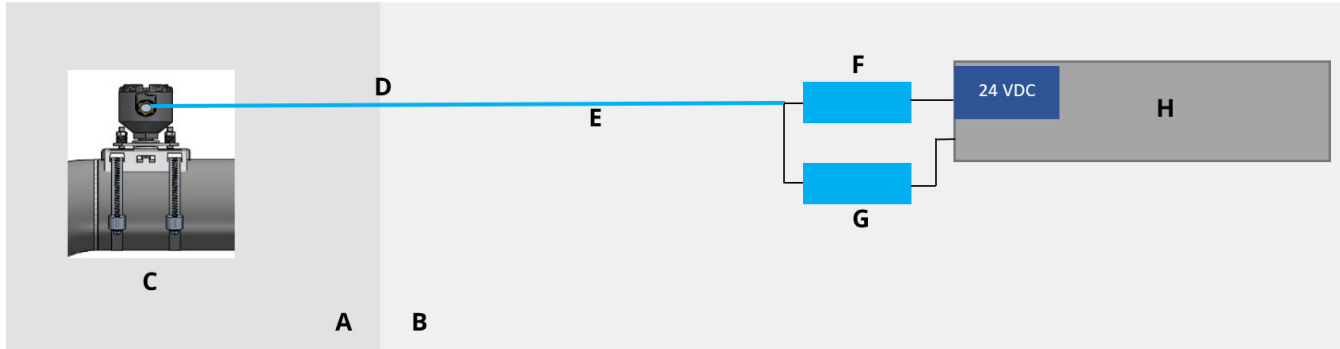
The PDS42 Ex db variant without local indication requires no electronics wired in the field. The Pig Approach/Pig Passed message and alarms are delivered from the detector to client DCS via Ex db cable.



- A. Hazardous area
- B. Safe area
- C. PDS42 Acoustic Pig Detector
- D. Pig Approaching, Pig Passed, Debris Indication
- E. Ex db cable 2 pairs
- F. Customer Control System (DCS)

Intrinsically safe installation with remote digital indication

The PDS42 Ex ia variant without local indication requires a safety barrier to be mounted in safe area to ensure the intrinsically safe circuit. The Pig Approaching/Pig Passed message and alarms are delivered from the detector to client DCS via Ex ia cable.



- A. Hazardous area
- B. Safe area
- C. PDS42 Acoustic Pig Detector
- D. Pig Approaching, Pig Passed, Debris Indication
- E. Ex ia cable 2 pairs
- F. Safety barrier 1 - Power
- G. Safety barrier 2 - Data
- H. Customer Control System (DCS)

Product specifications

Applicable for both Ex ia and Ex db detectors

Item	Description
Communication specifications	
Protocol	Modbus® RTU RS485
Transmit rate	1 second
Output	<ul style="list-style-type: none"> ▪ Pig Approaching message in DCS ▪ Pig Passed message in DCS ▪ Debris indication value in DCS ▪ Pig count value in DCS Other diagnostic features are available. Refer to the <i>Rosemount PDS42 Pig Detector Quick Start Guide</i> for details.
Alarms	Can be set in DCS by customer for any of the output values
Indication type	Digital in DCS
Performance specifications	
Repeatability	Better than 1% ⁽¹⁾ , meaning that the sensor signal will read the same values repeatedly with less than 1% deviation
Uncertainty	Up to ± 2 seconds, depending on flow regimes and calibration level

Item	Description
Minimum required flow velocity	Minimum 0.05 m/s depending on PIG material <ul style="list-style-type: none"> Steel PIG: minimum 0.05 m/s Polymer PIG: > 0.5 m/s
Pipe surface temperature	<ul style="list-style-type: none"> Standard temperature: -40 °F (-40 °C) to 266 °F (130 °C) High temperature: -40 °F (-40 °C) to 554 °F (290 °C)
Ambient temperature	-40 °F (-40 °C) to 167 °F (75 °C) for T6 -40 °F (-40 °C) to 176 °F (80 °C) for T2-T5
Storage temperature	-4 °F (-20 °C) to 104 °F (40 °C)
Environmental conditions	This equipment is suitable for outdoor use under the following environmental conditions: <ul style="list-style-type: none"> Maximum altitude: 6561.7 ft. (2000 m) 0 to 100% relative humidity
Pipe diameter	2 in. (50 mm) to 48 in. (1200 mm)
Flow	<ul style="list-style-type: none"> Liquid Gas Multiphase flow
External power supply	24 VDC nominal voltage, 9 V–28 V rated voltage range or 100–240 VAC (In this case, a separate power supply unit is available upon request.) I _{max} 20 mA (maximum input current)
Power consumption	0.13 W
Direction of detection	Bidirectional
Physical specifications	
IP rating	IP66, IP68 (ingress tested at 10 meters depth for 7 days), Enclosure Type 4X
Transmitter housing material	SS 316
Spring material	Stainless steel
Base flange material	Flange: ASTM A479 UNS S31600/S31603 (316/316L)
Mounting socket and strap	SS 316
U-bolt for 2-in. pipe mounting	SS 316
Cable entry (detector housing)	M20
Size	3.08 in. (78 mm) OD x 5.42 in. (138 mm) for standard temperature 3.08 in. (78 mm) OD x 6.2 in. (158 mm) for high temperature
Weight	~ 6.6 lb. (3 kg)
Field cable recommended	Ex d: 20110626 BFOU(I) M 250V 2 pair 0.75 mm ² S3/S7/S103 GREY. OD 0.57 in. (14.5 mm) Ex ia: 20104969 BFOU(I) M 250V 2 pair 0.75 mm ² S3/S7/S103 BLUE. OD 0.57 in. (14.5 mm) For North America, cables must comply with UL 44 or UL 88/ CSA C22.2 No. 75. 2 pair cable includes one pair for communication and one pair for power.
Cable gland	Ex d and Ex ia: Hawke 501/453/Universal, Class1 Div 2, Metric 20 available in brass, nickel-plated brass and stainless steel. For North America only: Hawke ICG/653/Universal, Class1 Div 1, Metric 20, available in stainless steel. Note Alternative cable glands may be used as long as they are suitably rated for the installation location.

Item	Description
Terminal connection block	Connection socket with four ports: two for communication 485, and two for power. Refer to the <i>Rosemount PDS42 Pig Detector Quick Start Guide</i> for details.
Software compatibility	
Software requirement	PDS42 has a digital signal processing embedded in the device, converting raw signal into pigging-relevant alarms without requiring a software.
Data	Processed data is sent from device directly to DCS. Utilizes dedicated Modbus map. Refer to the <i>Rosemount PDS42 Pig Detector Quick Start Guide</i> for details.
Compatibility with other software	Fieldwatch
Approvals	
	<p>Hazardous locations:</p> <ul style="list-style-type: none"> ▪ Ex d: Zone 1 ATEX, IECEx, and Class 1 Div 1 for USA and Canada ▪ Ex i: Zone 0 for ATEX, IECEx <p>Ordinary locations:</p> <ul style="list-style-type: none"> ▪ USA and Canada <p>Refer to the <i>Rosemount PDS42 Pig Detector Quick Start Guide</i> for details on certification, marking and EMC standards and geography.</p>

(1) Performance measured in reference test conditions.

Installation requirements

Rosemount PDS42 Acoustic Pig Detector is mounted on a straight pipeline section, normally after the PIG launcher and before the PIG receiver. Excessive levels of unwanted noise may compromise the measurement. Care should be taken to avoid installation near valves, or close to the PIG receiver/launcher.

Ordering information

Specifications and options

The purchaser of the equipment must make the specification and selection of product materials, options, or components.

Model code

Model codes contain the details related to each product. Exact model codes will vary; an example of a typical model code is shown in [Figure 3](#).

Figure 3: Model code example



1. Required model components (choices available on most)

2. Additional options (variety of features and functions that may be added to products)

Optimizing lead time

The starred offerings (★) represent the most common options and should be selected for the fastest delivery times. The non-starred offerings are subject to additional delivery lead time.

Required model components

Model

Code	Description	
PDS42	Acoustic Pig Detector	★

Functional properties

Code	Description	
ST	Standard temperature version: -40 °F (-40 °C) to 266 °F (130 °C)	★
HT	High temperature version: -40 °F (-40 °C) to 554 °F (290 °C)	

Main material (sensor housing)

Code	Description	
A	Stainless Steel 316L	★

Detector Approvals

Code	Description	
I1	ATEX Intrinsically Safety	★
I7	IECEX Intrinsically Safe	★
E1	ATEX Flame proof Ex d	★
E7	IECEX Flame proof Ex d	★
E5	U.S.A. Explosion proof Ex d	★
E6	Canada Explosion proof Ex d	★

Communication interface/ supply voltage required

Code	Description	
A1	Modbus® RTU / 24 VDC	For 100–240 VAC, 50/60 Hz, power supply is offered separately. ★

Additional options

Barrier

Code	Description	
B0	No barrier (for Ex d) Client Provided barrier (for Ex ia)	★
B1 ⁽¹⁾	Zener barrier (IS)	
B2 ⁽¹⁾	Galvanic isolator barrier (Non ISE)	

(1) Not available with Detector Approvals, options E1, E5, E6, and E7.

Pipe size

Code	Description	
P1	Mounting fixture for 2-in. (50 mm) pipe size	
P2	Mounting fixtures from 2 ½-in. (65 mm) to 48-in. (1200 mm) pipe size	★

Field cable gland/ field cable size range

Code	Description	
	Field cable ⁽¹⁾ gland and size range	
G0	No gland (client provided)	★
M2	Brass, M20, Hawke 501/453/Universal Cable size range: OD: 0.49 - 0.81 in. (12.5–20.5 mm) ⁽²⁾ , ID: 0.33 - 0.56 in. (8.4–14.3 mm) Class 1 Div. 2	★
M3	Nickel-plated brass, M20, Hawke 501/453/Universal Cable size range: OD: 0.49 - 0.81 in. (12.5–20.5 mm) ⁽²⁾ , ID: 0.33 - 0.56 in. (8.4–14.3 mm) Class 1 Div. 2	★
M4	SS316, M20, Hawke 501/453/Universal Cable size range: OD: 0.49 - 0.81 in. (12.5–20.5 mm) ⁽²⁾ , ID: 0.33 - 0.56 in. (8.4–14.3 mm) Class 1 Div. 2	
M5	SS316, M20, Hawke ICG/653/Universal Cable size range: OD: 0.49 - 0.81 in. (12.5–20.5 mm) ⁽²⁾ , ID: Max. 0.55 in. (14 mm) Class 1 Div. 1	

(1) The field cable is not part of the model code for the transmitter, and the option must be communicated to the sales representative to include it in the quotation.

(2) For cable sizes above 0.81 in. (20.5 mm) OD, a suitable cable gland must be used. Refer to [Field cable and glands specification](#).

Local indication

Code	Description	
U0	No local indication. Digital indication to DCS.	

Tag plates

Code	Description	
T0	No tag — Customer information not required.	★

Code	Description	
T1	Instrument tagging — Customer information required (max. 30 characters), Dim 60 x 15 mm, SS	

Product specific options

Code	Description	
C0	No coating	★
C6	Standard coating for SS (Sensor housing)	

Spare parts and accessories

Part number	Description
ROXA20101159	Strap kit
ROXA20101171	U-bolt for 2-in. (50 mm) pipe x 2.95 in. (75 mm) THD M5 - KIT
ROXA20102233	Mounting socket ST - KIT
ROXA20102234	Mounting socket HT - KIT
ROXA20101162	Fixing mounting socket kit
ROXA20102952	Cover O-ring kit, BUNA-N, 146, 5 pcs.
ROXA20102320	Cable BFOU(I) M 250 V 2 pair 18 AWG (0.75 mm ²) S3/S7/S103 gray, Ex d
ROXA20102321	Cable BFOU(I) M 250 V 2 pair 18 AWG (0.75 mm ²) S3/S7/S103 blue, Ex ia
ROXA20077447	Exd gland kit M20, Brass, Hawke 501/453/Univ, for cable size 0.49 - 0.81 in. (12.5–20.5 mm) OD / 0.33 - 0.56 in. (8.4–14.3 mm) ID, Class 1 Div. 2
ROXA20077448	Exd gland kit M20, Nickel-plated brass, Hawke 501/453/Univ, for cable size 0.49 - 0.81 in. (12.5–20.5 mm) OD / 0.33 - 0.56 in. (8.4–14.3 mm) ID, Class 1 Div. 2
ROXA20083511	Exd gland kit M20, SS316, Hawke 501/453/Univ, for cable size 0.49 - 0.81 in. (12.5–20.5 mm) OD / 0.33 - 0.56 in. (8.4–14.3 mm) ID, Class 1 Div. 2
ROXA20103878	Exd gland kit M20, SS316, Hawke ICG/653/Univ, for cable size 0.49 - 0.81 in. (12.5–20.5 mm) OD / 0.55 in. (14 mm) max. ID, Class 1 Div. 1
ROX000085499	Safety barrier MTL7787+
ROX000085514	Isol. barrier MTL5541, repeater power supply
ROXA20105428	Loctite SI 5990, 40 mL
ROXA20104373	SAM42 / PDS42 Installation kit extended
ROXA20105350	SAM42 / PDS42 Installation kit essentials
ROXA20105331	Sealing washer M20, Material-nylon, 5 pcs
ROXA20105824	SAM42 / PDS42 Sun shield kit

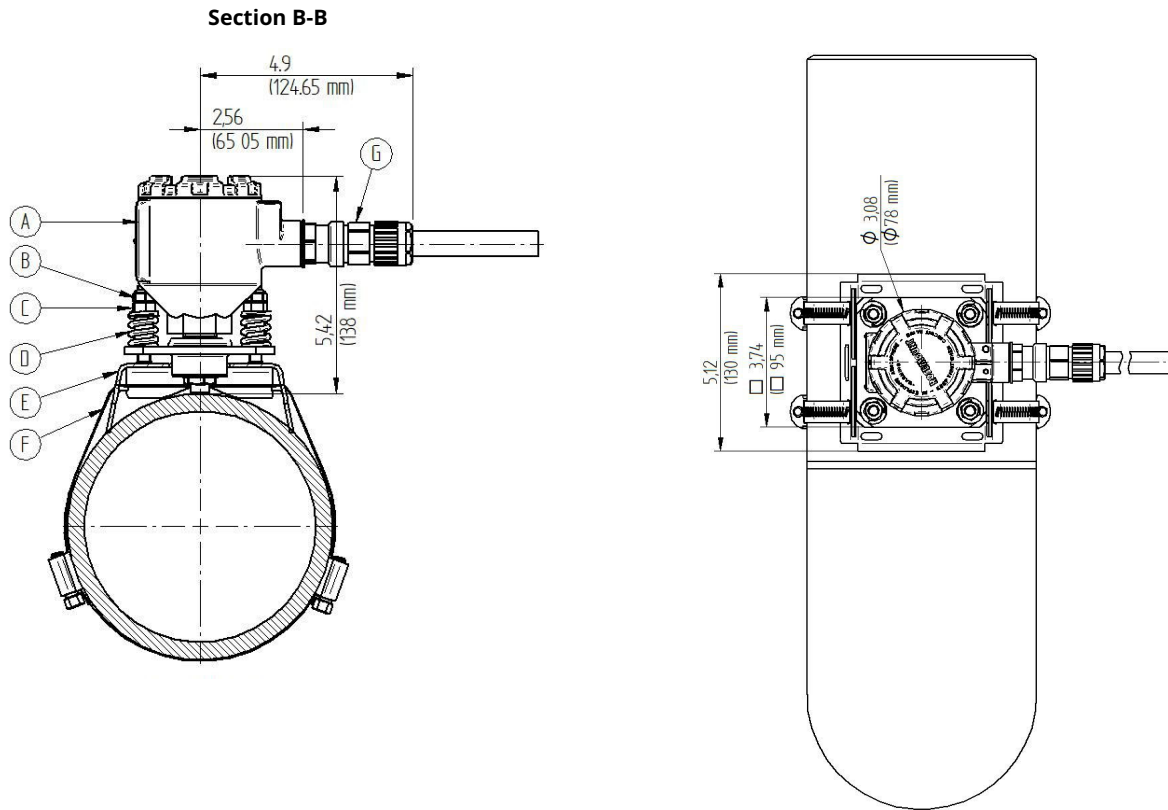
Product certifications

For Rosemount PDS42 product certifications, see the *Rosemount PDS42 Pig Detector Quick Start Guide*.

Detector dimensions and main components

PDS42 Standard Temperature version

Figure 4: Dimensions for PDS42 Standard Temperature version (side and top view)



- A. PDS42 Detector housing
- B. Lock nuts
- C. Compression nuts
- D. Tensioning spring
- E. Mounting socket
- F. Mounting strap with tightening worm
- G. Cable gland for field cable

Dimensions are in inches (mm).

For more information: [Emerson.com/global](https://emerson.com/global)

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