



---

# **Pulsarguard 201x Series**

## **INSTRUCTION MANUAL**

# **PULSARGUARD 201X SERIES (SIXTH EDITION)**

Dec 2016

Part Number M-201x-007P

## **COPYRIGHT**

© Pulsar Process Measurement Limited, 2000-10. All rights reserved. No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form without the written permission of Pulsar Process Measurement Limited.

## **WARRANTY AND LIABILITY**

Pulsar Process Measurement Limited guarantee for a period of 2 years from the date of delivery that it will either exchange or repair any part of this product returned to Pulsar Process Measurement Limited if it is found to be defective in material or workmanship, subject to the defect not being due to unfair wear and tear, misuse, modification or alteration, accident, misapplication or negligence.

## **DISCLAIMER**

Pulsar Process Measurement Limited gives nor implies any process guarantee for the this product, and shall have no liability in respect of any loss, injury or damage whatsoever arising out of the application or use of any product or circuit described herein.

Every effort has been made to ensure accuracy of this documentation, but Pulsar Process Measurement Limited cannot be held liable for any errors.

Pulsar Process Measurement Limited operates a policy of constant development and improvement and reserves the right to amend technical details as necessary.

## **TECHNICAL ENQUIRIES**

Please contact Pulsar Process Measurement Limited for technical support.

## **COMMENTS AND SUGGESTIONS**

If you have any comments or suggestions about this product, then please contact:

### **Pulsar Process Measurement Limited**

Cardinal Building  
Enigma Commercial Centre  
Sandy's Road  
Malvern  
Worcestershire  
WR14 1JJ  
United Kingdom

Tel: + 44 (0) 1684 891371

Fax: + 44 (0) 1684 575985

Web Site: <http://www.pulsar-pm.com>

e-mail: [info@pulsar-pm.com](mailto:info@pulsar-pm.com) (general information)

e-mail: [support@pulsar-pm.com](mailto:support@pulsar-pm.com) (product support)

### **Pulsar Process Measurement Inc.**

PO Box 5177  
Niceville  
FL 32578-5177  
USA

Tel: + 1 850 279 4882

Fax: + 1 850 279 4886

Web Site: <http://www.pulsar-pm.com>

e-mail: [info.usa@pulsar-us.com](mailto:info.usa@pulsar-us.com) (general information)

e-mail: [support.usa@pulsar-pm.com](mailto:support.usa@pulsar-pm.com) (product support)



# Contents

Chapter 1 Start Here.....	1
About this Manual.....	1
About the Pulsarguard 201x series.....	2
General Description.....	2
Product Range.....	3
Options.....	3
Approvals.....	4
Construction.....	5
Product Specification.....	6
<i>Physical</i> .....	6
<i>Mounting</i> .....	6
<i>Environmental</i> .....	6
<i>Hazardous Area Approval</i> .....	6
<i>Outputs</i> .....	7
<i>Supply</i> .....	7
Chapter 2 Installation.....	9
Sensor Positioning.....	9
Power Supply Requirements.....	10
Wiring Detail.....	10
Instructions specific to hazardous area installations.....	11
<b>Identification:</b> .....	12
EU DECLARATION OF CONFORMITY.....	15





Congratulations on your purchase of a Pulsarguard 201x sensor. This quality product has been developed over many years and represents the latest in ultrasonic monitoring technology.

It has been designed to give you years of trouble-free performance, and a few minutes spent reading this operating manual will ensure that your installation is as simple as possible.

### **About this Manual**

It is important that this manual is referred to for correct installation and operation.

There are various parts of the manual that offer additional help or information as shown:

#### **Tips**



#### **TIP**

At various parts of this manual you will find tips to help you.

#### **Additional Information**

##### **Additional Information**

At various parts of the manual, you will find sections like this that explain specific items in more detail.

## About the Pulsarguard 201x series

### General Description



Pulsarguard 2010 (green) and 2011 (blue, hazardous area approved)

The 201x series sensor uses state of the art soundwave technology to detect change in structure borne acoustic emissions from equipment and materials in motion.

The sensor listens to the high frequency sound generated by impacts, cavitation and friction within a system.

100 to 600kHz is the bandwidth of the sensor making it immune to audible noise or vibration caused by plant machinery.

Instant reaction to process variation provides a change in output level to alert the user that an abnormal or different condition has been detected.



## **Product Range**

<b>Product Name</b>	<b>Comment</b>
PULSARguard 2010	Standard version
PULSARguard 2010HT	High temperature version -40 °C to +125 °C. Identified by “HT” stamped on mounting tab.
PULSARguard 2011Z	Suitable for use with Zener barriers only (Certificate No. Sira 04ATEX2121X). This system requires connection to an intrinsically safe earth. Zener barriers are a cheaper option to galvanic isolating barriers. Identified by “Z” stamped on mounting tab.
PULSARguard 2011G	Suitable for use with Galvanically isolating barriers only (Certificate No. Sira 04ATEX2121X). This system does not require connection to an intrinsically safe earth. Galvanic isolating barriers are a more expensive option to zener barriers. Identified by “G” stamped on mounting tab.

## **Options**

<b>Option</b>	<b>Comment</b>
<i>Additional Cable standard sensor</i>	Standard version comes with 4m cable, if a different length is required please specify when ordering. The additional cable is charged per metre.
<i>Additional Cable Hi temp sensor</i>	Standard version comes with 4m cable, if a different length is required please specify when ordering. The additional cable is charged per metre.
<i>Flexible Conduit</i>	Includes 4m flexible steel armoured conduit including all glands (M16) connected to the sensor by means of an adaptor (PG7 to M16), other lengths available on request.

## **Approvals**

- CE approval on all versions PULSARguard 201x series sensors (Certificate of Conformity available on request).
- PULSARguard 201x series sensor housing rated to IP68 / NEMA 4.
- ATEX Intrinsically safe certificates held for PULSARguard 2011 sensors to:  
EEx ia IIC T6 T<sub>amb</sub> = -20 °C to 40°C or  
EEx ia IIC T5 T<sub>amb</sub> = -20 °C to 75°C or  
EEx ia IIC T4 T<sub>amb</sub> = -20 °C to 92°C  
This sensor is also approved for Group I (mining approval) applications.  
Certifying body SIRA Certification Services.  
Certificate No. Sira 04ATEX2121X.

## **Construction**

- Rugged two part housing in cast Type 316 stainless steel.
- Cap casting is polyester powder coated, in Green RAL 6029. (Cornflower Blue on both PULSARguard 2011 versions).
- Neoprene O-ring (Viton in PULSARguard 2010HT).
- Electronics on a double sided Surface Mount PCB encapsulated in an epoxy potting compound inside cap casting.
- Piezo-electric transducer assembly (alumina wearplate, PZT disc & copper cap) bonded to base casting using a structural adhesive. (A special high temperature rated adhesive used on PULSARguard 2010HT).
- Polycarbonate reverse printed badge bonded to cap casting.
- 4 metre screened, PVC jacketed 4 core PVC insulated cores cable assembly. OD 6 mm nominal. ( High temperature jacket and PTFE insulated cores used on PULSARguard 2010HT).

## Product Specification

### Physical

Dimensions overall

125 (long) x 31 (height) x 65 (wide) mm

Weight

Nominal 0.5 kg (excluding cable)

Case material/description

**Type 316** Stainless Steel (investment casting)

### Mounting

14mm hole in tab, suitable for 12mm or ½” threaded fixing

### Environmental

IP Rating (electronics housing)

IP68

Max. & Min. temperature (electronics)

-40 °C to +85 °C

CE approval

EMC approval to

BS EN 50081-1:1992 for emissions

BS EN50082-2: 1995 for immunity

### Hazardous Area Approval

**ATEX IS**

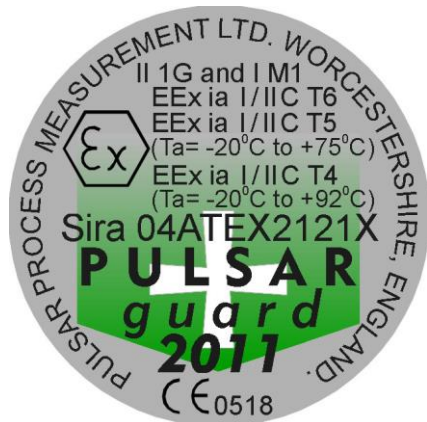
**II 1 G and I M1,**

EEx ia IIC T6 (T<sub>amb</sub>= -20°C to+40°C)

EEx ia IIC T5 (T<sub>amb</sub>= -20°C to+75°C)

EEx ia IIC T4 (T<sub>amb</sub>= -20°C to+92°C)

Cert No. Sira04ATEX2121X



**Outputs**

**Analogue output**

0-10 VDC.

**Supply**

**Power supply**

23 to 30VDC (Hazardous area versions 24 to 26V via suitable galvanic or Zener barriers)

**Current Consumption**

Typically 15mA

This page left blank intentionally

## Sensor Positioning



*Sensor Positioning*

It is important that the sensor is sited correctly for each application. The sensor must be installed near to where the acoustic energy is being generated.

The stainless steel housing has a tab with a 14mm hole through it, this is for mounting the 201x, but it is also to hold the transducer in intimate contact with the process being monitored. Good contact will maximise the voltage output.

To make the contact as good as possible try to fit on a flat clean surface, if necessary remove any rust or paint prior to fitting. A couplant such as silicon grease will also help to make a more reliable coupling.

If you are looking for particles in a liquid or solids travelling in a pipe then fit the transducer near a bend on the side of the pipe where most impact will occur.

If you are listening to a bearing then fit near the bearing mount.

It may be necessary to experiment with the sensor position to obtain the best results.

**The mounting of the sensor is critical to operation, it must be tight, in the right place and mounted on a clean rust and paint free surface, use of a couplant such as silicon grease will help reliability.**

## Power Supply Requirements

The standard 2010 and HT version run on 24VDC and draw approx. 15mA. A suitable DC supply will be required.

The 2011Z or G are a hazardous area product and certified to be used in Zone 0, therefore it must be supplied via a suitable 28V safety barrier, either zener or galvanic.

## Wiring Detail

The 201x is supplied with a captive cable, 4m long, if other cable lengths are required then specify when placing an order.

The 4 core cable is connected as follows for all PULSARguard 201x series sensors:

Colour		Description
Standard + IS	High Temp	
Brown	Red	Power in (24VDC nominal)
Green	Black	Power Ground
White	White	Voltage signal output (0-10VDC)
Yellow	Green	Signal Ground
Green/Yellow	Green/Yellow	Cable screen

The supply is connected to Brown (+ve) and Green (0V)

The signal connections, White (+ve) and Yellow (0V) should be connected to a voltage measuring/monitoring device.

The green/yellow wire should be connected to a suitable ground.

For hazardous area connection see Page 11.



## Instructions specific to hazardous area installations



Hazardous area version (blue)

(Reference European ATEX Directive 2014/34/EU, Annex II, 1.0.6.)

The following instructions apply to equipment covered by certificate number Sirs 04ATEX2121X:

1. The equipment may be used with flammable gases and vapours with apparatus groups IIC, IIB, and IIA with temperature classes; T1, T2, T3, T4 maximum ambient temperature range  $-20^{\circ}\text{C}$  to  $+92^{\circ}\text{C}$ , T5 maximum ambient temperature range  $-20^{\circ}\text{C}$  to  $+75^{\circ}\text{C}$ , and T6 maximum ambient temperature range  $-20^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$ , and Group I maximum ambient temperature  $-20^{\circ}\text{C}$  to  $+92^{\circ}\text{C}$ .
2. The equipment is only certified for use in ambient temperatures in the range  $-20^{\circ}\text{C}$  to  $+92^{\circ}\text{C}$  and should not be used outside this range
3. Installation shall be carried out in accordance with the applicable code of practice by suitably-trained personnel
4. Repair of this equipment shall be carried out in accordance with the applicable code of practice.
5. Certification marking as detailed in drawing number D-804-0599-A.
6. If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.

Aggressive Substances - e.g. acidic liquids or gases that may attack metals or solvents that may affect polymeric materials.

Suitable Precautions - e.g. regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals.

7. The certificate number has an 'X' suffix that indicates that the following special condition of certification applies;

When the equipment circuits are earthed (screen connected version, Type 'G'), it shall only be supplied from galvanic isolating barriers.

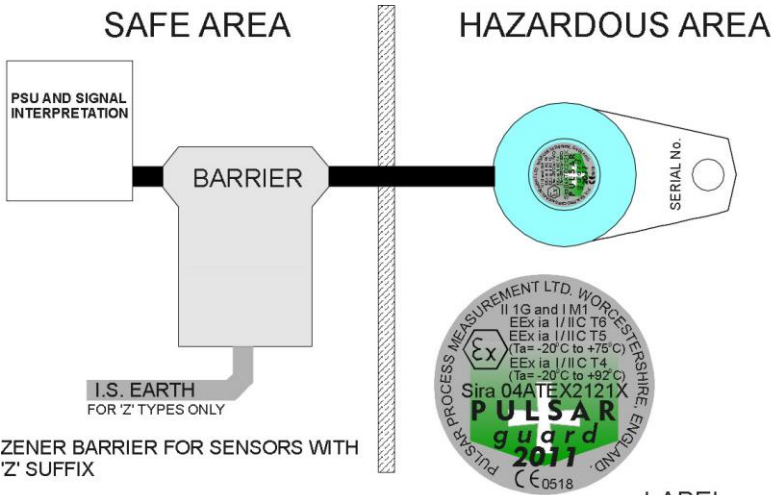
Because non-conductive plastic materials are used on the surface of the equipment (i.e. the label is  $>4\text{cm}^2$  in area), under certain extreme circumstances, these non-metallic parts may generate an ignition capable level of electrostatic charge. Therefore, when it is used in applications that specifically require group II, category 1 equipment, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. Additionally, the equipment shall only be cleaned with a damp cloth.

8. The manufacturer should note that, on being put into service, the equipment must be accompanied by a translation of the instructions in the language or languages of the country in which the equipment is to be used and by the instructions in the original language.

**Identification:**

The hazardous area versions 2011G and 2011Z are light blue and have labels bearing the Certificate No. Sira 04ATEX2121X.

Another distinguishing feature is that the serial number on the tab of the transducer is stamped with a suffix G (for use with galvanic isolators) or Z (for use with Zener barriers).



BARRIER PARAMETERS	SENSOR LABELLING
<b>POWER SUPPLY</b> $U_0=28\text{ V}$ $I_0 = 93.3\text{ mA}$ $P_0 = 0.635\text{ W}$	<b>ZONE 0: CERT No. Sira 04ATEX2121X</b> EEx ia I/II C T6 (Tamb= -20°C to +40°C) EEx ia I/II C T5 (Tamb= -20°C to +75°C) EEx ia I/II C T4 (Tamb= -20°C to +92°C)
<b>SIGNAL SUPPLY</b> $U_0=18\text{ V}$ $I_0=15.3\text{ mA}$ $P_0=0.07\text{ W}$	

This page left blank intentionally

## EU DECLARATION OF CONFORMITY

### Pulsar Process Measurement Ltd.

Pulsar Process Measurement Ltd. Declares under our sole responsibility that the product(s) listed below conform with the relevant provisions of directive 2014/34/EU of 29th March 2014.

Product(s): Pulsarguard 2011G and Pulsarguard 2011Z Sensor

Notified Body: Sira Certification Service (0518)  
Rake Lane  
Eccleston  
Chester  
CH4 9JN

Conformity has been demonstrated with reference to the following documentation:

EC type examination certificate Sira 04ATEX2121X dated 4<sup>th</sup> May 04

Quality Assurance Notification Sira 02ATEXM230 dated 11<sup>th</sup> December 02

Compliance with the Essential Health & Safety Requirements has been assessed by reference to the following standards:

EN 60079-0:2012+A11:2013  
EN 60079-11:2012  
EN 60079-26:2015  
EN 50303:2000

*S. Lycett* Date 02-12-2016

Steve Lycett – Engineering Manager, Pulsar Process Measurement Ltd,  
Cardinal Building, Enigma Commercial Centre, Sandy's Road, Malvern,  
Worcestershire, WR14 1JJ.