



1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: **Sira 07ATEX2178** Issue: **1**

4 Equipment: **PMG17 Vibration Energy Harvester**

5 Applicant: **Perpetuum Limited**

6 Address: Epsilon House
Chilworth Science Park
Southampton SO16 7NS
UK

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 60079-0:2006
EN 60079-11:2007

IEC 60079-26:2006

IEC 61241-0:2004
IEC 61241-11:2005

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment is defined below:



II 1GD(T100°C)
Ga Da Ex ia IIC T4
Ex iaD 20 T100°C
T_a = -40°C to +85°C

Project Number 52A15565
C. Index 16

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C Ellaby
Certification Officer



SCHEDULE

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13 DESCRIPTION OF EQUIPMENT

The PMG 17 ZZZ vibration energy harvester is a power source for low-power electronic systems such as wireless sensor nodes that employ sleep/work duty cycles. The 'ZZZ' in the name refers to the frequency of the device, which is either 100 Hz or 120 Hz. It comprises a permanent magnetic mass that moves inside an encapsulated coil thus generating a voltage; the output is clamped with zener diodes and the current limited with a resistor. The enclosure of the PMG17 is of stainless steel construction with built-in stops that limit the amplitude of the vibration of the magnetic mass and hence the voltage generated. Internally, the circuitry is fully encapsulated.



The device delivers a charging current directly to an external storage capacitor during a "sleep" cycle. During the following "work" cycle the application circuitry is enabled and performs its required function. Power for all work cycle functions is provided as the capacitor discharges, typically from 5V to 3V.


In a typical application, the device is attached to an a.c. induction motor using the single, axial threaded hole provided in the base of the device. Vibration energy is harvested only along the device axis. There is no preferred orientation of mounting.

The output is essentially a sinusoidal waveform whose amplitude becomes clipped as the vibration amplitude increases.

The PMG 17 has the following safety description:

- Ui = 0
- Uo = 11.06 V
- Io = 0.059 A
- Po = 0.147 W
- Co = 1.90 μ F
- Lo = 1 mH

The full certification code of the PMG 17 is as follows:

 II 1GD(T100°C)
Ga Da Ex ia IIC T4
Ex iaD 20 T100°C
T_a = -40°C to +85°C

However, since the third line of the marking does not add further information, for simplicity, it has been omitted from the marking on the equipment, which may be used in all gas and dust zones; for gases, a T4 temperature class applies, for dusts, the maximum surface temperature is 100°C.

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14 **DESCRIPTIVE DOCUMENTS**

14.1 **Drawings**

Refer to Certificate Annexe.

14.2 **Associated Sira Reports and Certificate History**

Issue	Date	Report no.	Comment
0	10 September 2007	R52A15565A	The release of the prime certificate.
1	12 October 2007	N.A.	The re-issue of the prime certificate to correct a typographical error.

15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

None

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

17 **CONDITIONS OF CERTIFICATION**

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

Certificate Annexe

Certificate Number: Sira 07ATEX2178
Equipment: PMG17 Vibration Energy Harvester
Applicant: Perpetuum Limited



Issue 0

Number	Sheet	Rev.	Date	Description
26042 ATEX	1 of 1	1	20 Aug 07	General assembly
26045 ATEX	1 of 1	1	20 Aug 07	Electrical sub-assembly
26200 ATEX	1 of 1	1	20 Aug 07	Schematic & artwork
26800	1 of 1	2	24 Aug 07	Marking

Issue 1

No new drawings were introduced.

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