1 # EU - TYPE EXAMINATION CERTIFICATE

2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU**

3 EU - Type Examination Certificate Number: **Baseefa08ATEX0086X – Issue 13**

3.1 In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Supplementary Certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016.

4 Product: **HS-420 Series Accelerometers**

5 Manufacturer **Hansford Sensors Limited**

6 Address: **Artisan, Hillbottom Road, Sands Industrial Estate, Bucks, HP12 4HJ**

7 This re-issued certificate extends EC Type Examination Certificate No. Baseefa08ATEX0086X to apply to product designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

8 SGS Fimko Oy, Notified Body number 0598, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

8.1 The original certificate was issued by SGS Baseefa Ltd (UK Notified Body 1180). It, and any supplements previously issued by SGS Baseefa Ltd have been transferred to the supervision of SGS Fimko Oy (EU Notified Body 0598). The original certificate number is retained.

The examination and test results are recorded in confidential Report No. **See Certificate History**

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0: 2018 **EN 60079-11: 2012**

except in respect of those requirements listed at item 18 of the Schedule.

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

11 This EU - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following:

See Certificate Schedule for markings

SGS Fimko Oy Customer Reference No. **5943** Project File No. **21/0287**

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13 # Schedule

14 ## Certificate Number Baseefa08ATEX0086X – Issue 13

15 Description of Product

The HS-420 Series Accelerometers are designed to measure velocity or acceleration by converting the signal generated by the compression of a piezo electric crystal by a given seismic mass and output a 4 to 20mA signal proportional to velocity or acceleration to the monitoring equipment.

The accelerometer comprises a piezo electric crystal connected to a signal conditioning board all contained within a stainless-steel enclosure of various shapes measuring approximately 33cm^3. The enclosure is a fully welded construction.

Electrical connections are made to the apparatus either via an IP65 rated connector or via an integral cable which is encapsulated in the end of the apparatus.

The HS-420 & HS-422 Series Accelerometers are designed to measure velocity and acceleration respectively and have a 4 to 20mA output.

The HS-420IT & HS-422IT Series Accelerometers are variants of the HS-420 & HS-422 Series but also have an integral temperature sensor.

The HS-421 & HS423 Series Accelerometers are similar to the HS-420 & HS-422 Series but have an additional AC acceleration output.

Input Parameters

The Group II & III versions of the HS-420 & HS-422 Series Accelerometers (excluding cable) have the following terminal parameters:

U_i = 28V C_i = 0
I_i = 115mA L_i = 0
P_i = 0.65W

The Group II & III versions of the HS-421 & HS-423 Series Accelerometers (excluding cable) have the following terminal parameters:

U_i = 28V C_i = 0
I_i = 115mA L_i = 0
P_i = 0.856W

The HS-420IT or HS-422IT Accelerometer, with an integral temperature sensor and 25m of cable has the following terminal parameters for all four electrical connections considered as a single intrinsically safe circuit:

U_i = 44V C_i = 3nF
I_i = 117mA L_i/R_i = 13nH/Ω
P_i = 0.722W

The Group I versions of the HS-420 & HS-422 Series Accelerometers (excluding cable) have the following terminal parameters:

U_i = 16.5V C_i = 0
P_i = 1.74W L_i = 0

The apparatus must be powered from a power limited source such as an appropriately certified fuse assembly containing a ≤62mA fuse, 1.74W (16.5V x 62mA x 1.7).

The Group I version of the apparatus (excluding cable) has the following alternative terminal parameters:

U_i = 28V C_i = 0
I_i = 115mA L_i = 0
P_i = 0.65W

The capacitance and inductance to resistance ratio of the different versions have the following parameters:

	Integral Cable or 2-Pin Mil Spec Connector with cable				4-Pin M12 Connector
	Polyurethane Cable	Silicone Cable	Armoured Cable	PUR Cable	Polyurethane Cable
C_i	= 160pF/m	= 370pF/m	= 290pF/m	= 884pF/m	= 120pF/m
L_i	= 0.72µH/m	= 0.5µH/m	= 0.5µH/m	= 0.6µH/m	= 0.7µH/m
L_i/R_i	= 8.32µH/Ω	= 15.4µH/Ω	= 15.4µH/Ω	= 6.1µH/Ω	= 11.7µH/Ω

The above equipment is marked with the following certification markings and associated ambient temperature ranges:

Group I Accelerometers Models HS-420M, HS-420MF, HS-422M & HS-422MF:	Ex ia I Ma (-40°C ≤ T_a ≤ +60°C)
Group II & III Accelerometers Models HS-420I, HS-420IT, HS-422I & HS-422IT:	Ex ia IIC T4 Ga (-40°C ≤ T_a ≤ +110°C) Ex ia IIIC T130°C IP65 Da (-40°C ≤ T_a ≤ +110°C)
	Ex ia IIC T6 Ga (-40°C ≤ T_a ≤ +60°C) Ex ia IIIC T80°C IP65 Da (-40°C ≤ T_a ≤ +60°C)
Group II & III Accelerometers Models HS-421I & HS-423I:	Ex ia IIC T4 Ga (-40°C ≤ T_a ≤ +105°C) Ex ia IIIC T130°C IP65 Da (-40°C ≤ T_a ≤ +105°C)
	Ex ia IIC T6 Ga (-40°C ≤ T_a ≤ +55°C) Ex ia IIIC T80°C IP65 Da (-40°C ≤ T_a ≤ +55°C)

16 Report Number

See Certificate History

17 Specific Conditions of Use

1. The free end of the cable on the integral cable version of the apparatus must be terminated in an appropriately certified dust proof enclosure.

18 Essential Health and Safety Requirements

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product, and conformity is demonstrated in the report:

Clause	Subject	Compliance
1.2.7	LVD type requirements	Standards require manufacturer's declaration, supplied.
1.2.8	Overloading of equipment (protection relays, etc.)	Covered by installation rules and manufacturer's instructions
1.4.1	External effects	The Purchaser should make the manufacturer aware of such issues. Covered in Instructions
1.4.2	Aggressive substances, etc.	The Purchaser should make the manufacturer aware of such issues. Covered in Instructions

19 Drawings and Documents

New drawings submitted for this issue of certificate:

Number	Sheet	Issue	Date	Description
M06-069-E	4 & 5	E	08/07/21	General Arrangement and Product Information for Group II and Group III HS-421 & HS-423 Series Accelerometers

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Current drawings which remain unaffected by this issue:

Number	Sheet	Issue	Date	Description
HS420M	1 of 1	E	12/08/20	HS-420M/HS-422M 4-20mA Circuit
HS420-IS	1 of 1	F	12/08/20	HS-420/HS-422 4-20mA Circuit
HS420IT	1 of 1	E	12.08.20	HS-420IT/HS-422IT 4-20mA Circuit
HS421-IS	1 of 1	D	01.04.21	HS-421I/HS423I 4-20mA Circuit
M06-009-C	1 of 1	C	26/08/20	Zener Diode Arrangement HS-420 & HS-422 Series Accelerometer
M06-008-G	1 to 5	H	10/08/18	General Arrangement and Product Information for Group I, Group II and Group III HS-420 & HS-422 Series Accelerometers
M06-014-A	1 of 2	A	19.03.08	Din Rail Mounted Enclosure with a 62mA Safe-T-Fuse 259 Series F.U.W. HS-420M/HS422M Series Group I Accelerometers
M06-014-A	2 of 2	A	19.03.08	Inline Fuse with a 62mA Pico II 251 Series Fuse F.U.W. HS-420M/HS422M Series Group I Accelerometers
M06-020-D	1 to 5	E	10/08/18	General Arrangement and Product Information for Group I Fused HS-420MF & HS-422MF Series Accelerometers
M06-022-D	1 to 4	E	10/08/18	General Arrangement and Product Information for Group II HS-420IT & HS-422IT Series Accelerometers
M06-069-D	1 to 3	D	06/04/21	General Arrangement and Product Information for Group II and Group III HS-421 & HS-423 Series Accelerometers
P01-004	1 of 1	D	05.01.11	4-20mA PCB Track Layout
P02.004	1 of 1	D	05.01.11	4-20mA PCB Component Layout
P01-012	1 of 1	A	03.03.08	HS420I PCB for M12 Connector
P01-026	1 of 1	A	19.05.08	HS420M Connection PCB for M12 Connector
P02-026	1 of 1	A	19.05.08	HS420M Connection PCB
P01-027	1 of 1	B	09.09.08	HS420IT Connection PCB for M12 Connector
P02-027	1 of 1	B	09.09.08	HS420IT Connection PCB
P01.080	1 of 1	A	19/05/15	HS420I PCB for 2-Pin Connector
P02-080	1 of 1	A	19/05/15	HS420I PCB 2-Pin MS Connector Component Layout
P02.012	1 of 1	B	12.01.21	HS420I PCB M12 Connector
P01-040	1 of 1	B	11.01.21	HS-421 & HS-421I PCB Track Layout
P02-040	1 of 1	A	04.06.10	HS-421 & HS-421I PCB Component Layout
P01-098	1 of 1	A	26.10.17	HS-420I PCB for 3 Pin MS Connector
P02-098	1 of 1	B	01.04.21	HS-420I PCB for 3 Pin MS Connector
P03-098	1 of 1	B	01.04.21	HS-420I ATEX PCB for 3 Pin MS Conn.

The above drawings are associated and held with IECEx BAS 08.0034X.

20 Certificate History

Certificate No.	Date	Comments
Baseefa08ATEX0086X	10 April 2008	The release of the prime certificate. The associated test and assessment is documented in Test Report GB/BAS/ExTR08.0059/00.
Baseefa08ATEX0086/1	1 July 2008	To permit the introduction of a new mining version complete with integral fuse identified as: HS-420MFxxxyyzz or HS-422MFxxxyyzz. To permit minor non-electrical changes that do not affect the original assessment. Intrinsic safety is not affected. The associated test and assessment is documented in Test Report GB/BAS/ExTR08.0112/00.
Baseefa08ATEX0086/2	18 September 2008	To permit the introduction the HS-420IT or HS-422IT Accelerometer, with an integral temperature sensor, 25m of cable and associated electrical connections. Intrinsic safety is not affected. The associated test and assessment is documented in Test Report GB/BAS/ExTR08.0181/00.
Baseefa08ATEX0086/3	4 February 2009	To permit minor mechanical changes that do not affect the original assessment. Intrinsic safety is not affected. The associated test and assessment is documented in Test Report GB/BAS/ExTR09.0014/00.
Baseefa08ATEX0086/4	24 January 2011	To permit minor electrical changes that do not affect the original assessment. To permit minor marking changes that do not affect the original assessment. Clarification of components not fitted to PCB added to report. Intrinsic safety is not affected. The associated test and assessment is documented in Test Report GB/BAS/ExTR11.0013/00.
Baseefa08ATEX0086/5	2 February 2012	To permit the HS-420M series of the equipment (not the HS-420MF series) to be marked with alternative terminal parameters. Intrinsic safety is not affected. The associated test and assessment is documented in Test Report GB/BAS/ExTR12.0005/00.
Baseefa08ATEX0086/6	10 October 2012	To confirm that the equipment covered by this certificate also meets the requirements of EN60079-0: 2012 (IEC60079-0: 2011, Edition 6) and EN60079-11: 2012 (IEC60079-11: 2011, Edition 6) as supported by GB/BAS/ExTR12.0254/00 held on technical file IECEx BAS 07.0035X.
Baseefa08ATEX0086X Issue 7	17 June 2015	This issue of the certificate incorporates previously issued primary & supplementary certificates into one certificate and permits the following changes: To permit the use of an alternative PUR cable. To permit the use of an alternative 2-Pin connector. Intrinsic safety is not affected. The associated test and assessment is documented in Test Report GB/BAS/ExTR15.0175/00. Re-Issued 22 July 2015 to include references to 2-pin connector drawings and replace original. The associated test and assessment is documented in Test Report GB/BAS/ExTR15.0175/01.

Certificate No.	Date	Comments
Baseefa08ATEX0086X Issue 8	16 May 2017	Addition of C_i & L_i within the entity parameter information and confirmation that the equipment complies with the requirements of the Directive 2014/34/EU.
Baseefa08ATEX0086X Issue 9	1 November 2017	To permit mechanical changes to the assembly, involving the use of an inner case with no electrical changes to the circuit, not affecting the assessment. The associated test and assessment is documented in Test Report GB/BAS/ExTR17.0322/00. Project 15/0833.
Baseefa08ATEX0086X Issue 10	16 August 2018	To permit minor mechanical changes to the assembly introduced at Issue 9 of this certificate, involving the use of additional sleeving on inner wires and a change to the notes on the circuit diagram relating to total capacitance. An alternative assessment of the Mining variants is added which does not require the use of encapsulation. Additionally, an alternative Temperature Class T4 is introduced for the Group II & III variants for an increased ambient temperature (110˚C). The associated test and assessment is documented in Test Report GB/BAS/ExTR18.0140/00. Project 18/0450.
Baseefa08ATEX0086X Issue 11	10 September 2020	To permit minor circuit changes to all variants of the equipment not affecting the previous test and assessment. The associated test and assessment is documented in Certification Report No. GB/BAS/ExTR20.0138/00 (held with IECEx Certificate No. IECEx BAS 08.0034X Issue 13), Project File 20/0077.
Baseefa08ATEX0086X Issue 12	13 April 2021	This issue of the certificate permits the following: - i) To permit the introduction the HS-421 & HS-423 Series of Accelerometers. These series of accelerometers are similar in construction to the HS-420 & HS-422I Accelerometer but are fitted with an additional AC output. The Certificate Schedule was revised to include the details of the new models. The associated test and assessment is documented in Certification Report No. GB/BAS/ExTR21.0054/00 (held with IECEx Certificate No. IECEx BAS 08.0034X Issue 14), Project File 20/0588.
Baseefa08ATEX0086X Issue 13	12 July 2021	This issue of the certificate confirms: i) for Group II & III Accelerometers Models HS-421I & HS-423I: - an increase in Pi from 650mW to 856mW - a decrease in the maximum ambient temperatures from 110°C to 105°C (T4) and 60°C to 55°C (T6). ii) the current design meets the requirements of EN IEC 60079-0:2018. The associated assessment is documented in Certification Report No. GB/BAS/ExTR21.0106/00, Project File 21/0287.
For drawings applicable to each issue, see original of that issue.		