1 **EU-TYPE EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

3 Certificate Number: **Sira 01ATEX2189X** Issue: **6**

4 Equipment: **Type 4-20 mA ABS Absolute Shaft Encoder**

5 Applicant: **Hohner Automation Limited**

6 Address: Whitegate Industrial Estate
Wrexham LL13 8UG
UK

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

8 CSA Group Netherlands B.V., Notified Body Number 2813 in accordance with Articles 17 and 21 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, 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 EN 60079-26:2007 EN 61241-0:2006 EN 61241-11:2006
EN 60079-0:2009 (used for marking guidance)

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

11 This EU-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 shall include the following:

II 1G D
Ex ia IIC T4 Ga ($T_a$ = -20ºC to +60ºC)
Ex iaD 20 T135° Da
Tamb -20°C to +60°C when Pi =0.7W or
Tamb -20°C to +40°C when Pi =0.76W

I M1
Ex ia I Ma ($T_a$ = -20ºC to +60ºC)

Project Number 80043167

Signed: J A May

Title: Director of Operations



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**SCHEDULE**

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13 **DESCRIPTION OF EQUIPMENT**

The **Type 4-20 mA ABS Absolute Shaft Encoder** is designed to indicate the angular movement of a shaft. Movement is detected optically by shining light produced by LEDs through a graduated disc that rotates with the shaft. User connections are by means of an external plug-and-socket.

The circuit comprises two PCBs, the top board being mainly at the supply voltage and the lower board being exclusively powered from the nominally 5 V rail. The assembly is contained within a metallic enclosure with an ingress protection rating of at least IP54.

The equipment is a 2-wire device, utilising pins 1 and 2, with the following safety description:

$U_i$ = 28 V
$I_i$ = 100 mA
$P_i$ = 0.7 W
$C_i$ = 12 nF
$L_i$ = 0

The screen may be connected to pin 4, which is galvanically isolated from the enclosure. Pin 3 is not used.

There are two builds, differing in the number of LEDs and the physical arrangement of the PCBs:

10-bit hollow shaft encoder
10-bit solid shaft encoder

**Variation 1** - This variation introduced the following changes:

i. The number of zener diodes was reduced to two per voltage clamp and the specification of 1N5339B as an alternative to MLL5919 5.6 V.
ii. The high voltage board artworks were changed to accommodate the alternative zener diode.

**Variation 2** - This variation introduced the following change:

i. The high voltage board circuit was changed.

**Variation 3** - This variation introduced the following change:

i. Alternative safety parameters were recognised, Ii and Pi have been changed as detailed below:

$U_i$ = 28 V
$\mathbf{I_i}$ = **150 mA**
$\mathbf{P_i}$ = **0.76 W**
$C_i$ = 12 nF
$L_i$ = 0



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**Variation 4** - This variation introduced the following changes:

i. The recognition that the enclosure has been increased in size.
ii. The inclusion of a plastic enclosure option was endorsed.
iii. A new PCB assembly has been introduced.
iv. The Type 11 bit shaft encoder build has been removed from the description above and the drawings have been modified accordingly.
v. An assessment of the Type 4-20 mA ABS Absolute Shaft Encoder against the Dust Standards.
vi. Following appropriate re-assessment to demonstrate compliance with the requirements of the EN 60079 series of standards, the documents originally listed in section 9, EN 50014:1997 (amendments 1 and 2), EN 50020:1994, EN 50284:1999 and EN 50303:2000, were replaced by those currently listed, the markings were updated accordingly and the conditions were modified to recognise the requirements of the latest standards, resulting in an 'X' condition being applied.

Revised entity parameters

| Gas @ 60°C ambient | | | | Dust @ 60°C ambient | | | | Dust @ 40°C ambient | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $U_i$ | = | 28 V | | $U_i$ | = | 28 V | | $U_i$ | = | 28 V |
| $I_i$ | = | 150 mA | | $I_i$ | = | 100 mA | | $I_i$ | = | 150 mA |
| $P_i$ | = | 0.76 W | | $P_i$ | = | 0.7 W | | $P_i$ | = | 0.76 W |
| $C_i$ | = | 12 nF | | $C_i$ | = | 12 nF | | $C_i$ | = | 12 nF |
| $L_i$ | = | 0 | | $L_i$ | = | 0 | | $L_i$ | = | 0 |

**Variation 5** - This variation introduced the following change:

i. To permit the introduction of updated marking label drawing as a result of a change of notified body number from "0518" to "2813". Drawing IA-LB2W-420ABS-03 iss. 03 is replaced with IA-LB2W-420ABS-04 iss. 4.0.

## 14 DESCRIPTIVE DOCUMENTS

### 14.1 Drawings

Refer to Certificate Annexe.

### 14.2 Associated Sira Reports and Certificate History

| Issue | Date | File/report no. | Comment |
|---|---|---|---|
| 0 | 14 June 2002 | R52A8132A | The release of the prime certificate. |
| 1 | 5 September 2002 | 52V9373 | The introduction of Variation 1. |
| 2 | 12 November 2002 | 52V9696 | The introduction of Variation 2. |
| 3 | 25 April 2008 | R52A18095A | This Issue covers the following changes:<br>• All previously issued certification was rationalised into a single certificate, Issue 3, Issues 0 to 2 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format.<br>• The introduction of Variation 3. |
| 4 | 02 November 2010 | R22617A/00 | The introduction of Variation 4. |



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| Issue | Date | File/report no. | Comment |
|---|---|---|---|
| 5 | 15 October 2019 | 2689 | • Transfer of certificate Sira 01ATEX2189X from Sira Certification Service to CSA Group Netherlands B.V.<br>• EC Type-Examination Certificate in accordance with 94/9/EC updated to EU Type-Examination Certificate in accordance with Directive 2014/34/EU. *(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. Variations to such EC Type-Examination Certificates may continue to bear the original certificate number issued prior to 20 April 2016.)* |
| 6 | 18 June 2020 | R80043167A | The introduction of Variation 5. |

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

15.1 Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, 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. This is particularly important if the equipment is installed in a zone 0 location. In addition, the equipment shall only be cleaned with a damp cloth.

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.



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# Certificate Annexe

**Certificate Number:** **Sira 01ATEX2189X**

**Equipment:** **Type 4-20 mA ABS Absolute Shaft Encoder**

**Applicant:** **Hohner Automation Limited**

**Issue 0**

| Number | Sheet | Rev. | Date | Description |
|---|---|---|---|---|
| GA-ABS2W-HOLLOW-01 | 1 of 1 | 1.0 | 25 Mar 02 | General assembly |
| GA-ABS2W-SOLID -01 | 1 of 1 | 1.0 | 29 Apr 02 | General assembly |
| HV10BIT SCHEMATIC | 1 of 1 | 1.0 | 18 Jul 01 | Schematic – high voltage 10-bit PCB |
| HV11BIT SCHEMATIC | 1 of 1 | 1.0 | 05 Apr 02 | Schematic – high voltage 11-bit PCB |
| HV-10BIT-55-ART | 1 to 2 | 1.0 | 21 Mar 02 | Artwork – 10-bit hollow shaft |
| HV-10BIT-S3-ART | 1 to 2 | 1.0 | 30 Apr 02 | Artwork – 10-bit solid shaft |
| HV-11BIT-14-ART | 1 to 2 | 1.0 | 15 Apr 02 | Artwork – 11-bit hollow shaft |
| HV-10BIT-55-PARTS | 1 to 2 | 1.0 | 21 Mar 02 | Silkscreen – 10-bit hollow shaft |
| HV-10BIT-S3-PARTS | 1 to 2 | 1.0 | 30 Apr 02 | Silkscreen – 10-bit solid shaft |
| HV-11BIT-14-PARTS | 1 to 2 | 1.0 | 15 Apr 02 | Silkscreen – 11-bit hollow shaft |
| LB-ABS55-001-01 | 1 of 2 | 1.0 | 14 Dec 01 | Marking |
| LV10BIT | 1 to 4 | 1.0 | 20 Sep 01 | Schematic – low voltage 10-bit PCB |
| LV11BIT* | 1 to 4 | 1.0 | 05 Apr 02 | Schematic – low voltage 11-bit PCB |

* Sheet 4 was-amended by Sira on 10 June 2002.

**Issue 1**

| Number | Sheet | Rev. | Date | Description |
|---|---|---|---|---|
| HV10BIT SCHEMATIC | 1 of 1 | 1.1 | 08 Aug 02 | Schematic – high voltage 10-bit PCB |
| HV11BIT SCHEMATIC | 1 of 1 | 1.1 | 08 Aug 02 | Schematic – high voltage 10-bit PCB |
| HV-10BIT-55-ART | 1 to 2 | 1.1 | 08 Aug 02 | Artwork – 10-bit hollow shaft |
| HV-10BIT-55-PARTS | 1 to 2 | 1.1 | 08 Aug 02 | Silkscreen – 10-bit hollow shaft |
| HV-10BIT-S3-ART | 1 to 2 | 1.1 | 08 Aug 02 | Artwork – 10-bit solid shaft |
| HV-10BIT-S3-PARTS | 1 to 2 | 1.1 | 08 Aug 02 | Silkscreen – 10-bit solid shaft |
| HV-11BIT-14-ART | 1 to 2 | 1.1 | 08 Aug 02 | Artwork – 11-bit hollow shaft |
| HV-11BIT-14-PARTS | 1 to 2 | 1.1 | 08 Aug 02 | Silkscreen – 11-bit hollow shaft |

**Issue 2**

| Number | Sheet | Rev. | Date | Description |
|---|---|---|---|---|
| HV10BIT SCHEMATIC | 1 of 1 | 1.2 | 10 Oct 02 | Schematic – high voltage 10-bit PCB |
| HV11BIT SCHEMATIC | 1 of 1 | 1.2 | 10 Oct 02 | Schematic – high voltage 11-bit PCB |
| HV-10BIT-55-ART | 1 to 2 | 1.2 | 10 Oct 02 | Artwork – 10-bit hollow shaft |
| HV-10BIT-S3-ART | 1 to 2 | 1.2 | 18 Oct 02 | Artwork – 10-bit solid shaft |
| HV-11BIT-14-ART | 1 to 2 | 1.2 | 21 Oct 02 | Artwork – 11-bit hollow shaft |
| HV-10BIT-55-PARTS | 1 to 2 | 1.2 | 10 Oct 02 | Silkscreen – 10-bit hollow shaft |
| HV-10BIT-S3-PARTS | 1 to 2 | 1.2 | 18 Oct 02 | Silkscreen – 10-bit solid shaft |
| HV-11BIT-14-PARTS | 1 to 2 | 1.2 | 21 Oct 02 | Silkscreen – 11-bit hollow shaft |

**Issue 3**

| Number | Sheet | Rev. | Date | Description |
|---|---|---|---|---|
| LB2W-420ABS-02 | 1 of 2 | / | 24 Apr 08 | 2 Wire 4-20mA Absolute Label |



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# Certificate Annexe

**Certificate Number:** **Sira 01ATEX2189X**

**Equipment:** **Type 4-20 mA ABS Absolute Shaft Encoder**

**Applicant:** **Hohner Automation Limited**

**Issue 4**

| Drawing | Sheets | Rev. | Date (Sira stamp) | Title |
|---|---|---|---|---|
| AS-HS-003-01 | 1 & 2 | 01 | 08 Oct 10 | 4-20mA Hollow Shaft General Assembly |
| AS-SS-002-01 | 1 & 2 | 01 | 08 Oct 10 | 4-20mA Hollow Shaft General Assembly |
| HV 10BIT Schematic | 1 of 6 | 1.3 | 05 Oct 10 | 4-20mA Absolute LED PCB Schematic (HV 10 Bit) |
| LV 10BIT Schematic | 2 of 6 | 1.0 | 05 Oct 10 | 4-20mA Absolute Photo Transistor cct |
| LV 10BIT Schematic | 3 of 6 | 1.0 | 05 Oct 10 | 4-20mA Absolute Comparator cct |
| LV 10BIT Schematic | 4 of 6 | 1.0 | 05 Oct 10 | 4-20mA Absolute Gray and DAC cct |
| LV 10BIT Schematic | 5 of 6 | 1.0 | 05 Oct 10 | 4-20mA Absolute Conn. And Test Point cct |
| Interconnection Schematic | 6 of 6 | 1.0 | 05 Oct 10 | 4-20mA Absolute Interconnection Schematic |
| HV 10BIT & LV 10BIT | 1 to 9 | 1.3 | 05 Oct 10 | 4-20mA Absolute (08ABS2W420-001-03) PCB-051 PCB tracking |
| IA-LB2W-420ABS-03 | 1 of 1 | 03 | 05 Oct 10 | 2 wire 4-20mA absolute label |

**Issue 5.** No new drawings were introduced.

**Issue 6.**

| Drawing | Sheets | Rev. | Date (Stamp) | Title |
|---|---|---|---|---|
| IA-LB2W-420ABS-04 | 1 of 1 | 4.0 | 09 Jun 20 | 2 wire 4-20mA Absolute label |



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