EU Type Examination Certificate CML 19ATEX1319X Issue 2

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

2 Equipment **1801-Z1 Data Acquisition Unit**

3 Manufacturer **HMi Elements Ltd.**

4 Address **Unit A & B, Windmill Industrial Estate, Malton, North Yorkshire, YO17 6BT, United Kingdom**

5 The equipment is specified in the description of this certificate and the documents to which it refers.

6 CML B.V., Chamber of Commerce No 6738671, Koopvaardijweg 32, 4906CV Oosterhout, The Netherlands, Notified Body Number 2776, 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 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 12.

7 If an 'X' suffix appears after the certificate number, it indicates that the equipment is subject to conditions of safe use (affecting correct installation or safe use). These are specified in Section 14.

8 This EU Type Examination certificate relates only to the design and construction of the specified equipment or component. Further requirements of Directive 2014/34/EU Article 13 apply to the manufacture of the equipment or component and are separately certified.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the confidential report, has been demonstrated through compliance with the following documents:

EN IEC 60079-0:2018	EN 60079-1:2014	EN 60079-7:2015
EN 60079-11:2012	EN 60079-18:2015	

10 The equipment shall be marked with the following:

Ⓔx II 2 G

Ex db eb ib mb IIC T4 Gb

Ta = -40°C to +60°C

A Snowdon

A Snowdon
Certification Manager

11 Description

The 1801-Z1 Data Acquisition Unit is an industrial standalone data acquisition terminal for use in hazardous areas requiring equipment protection level Gb.

The equipment comprises a metallic IP66 rated enclosure with a sealed membrane front panel with OLED display and keypad. An internal flameproof compartment houses the power supply, computer unit, and multiple boards and interfaces. The display and keypad are intrinsically safe and are connected to circuits within the flameproof compartment via intrinsically safe barrier circuits.

Multiple wired and wireless outputs are provided for the connection of external equipment, including intrinsically safe connections which are connected to circuits within the flameproof compartment via intrinsically safe barrier circuits.

The equipment may be fitted with any number of intrinsically safe connectors, as detailed in the user instructions. The intrinsically safe connections may be any of the following types:

Circuit type	Description	Output parameters
Rotary Encoder SA1236	One power and two signal outputs.	All pins combined w.r.t. 0V Uo = 5.88V Io = 194mA Po = 0.283W Ci = 0 Li = 0
Load cell SA1239 or SA1916	6 off outputs	Between any two outputs Uo = 5.88V Io = 59mA Po = 0.09W Ci = 0 Li = 0
Servo SA1240	2 off AC outputs	For each AC output (between pins) Uo = 15.42V Io = 24mA Po = 0.091W Ci = 0 Li = 0
Dual horn SA1235	Two 24V switched outputs	For each output (w.r.t. 0V) Uo = 26.0V Io = 88mA Po = 0.57W Ci = 0 Li = 0

Circuit type	Description	Output parameters
Digital buttons SA1242	3 off switch inputs	For each input (between pins) Uo = 9.14V Io = 9.1mA Po = 0.021W Ci = 0 Li = 0
4-20mA loop and switches SA1238	2 off 4-20mA loop connections	For each loop Uo = 29.4V Io = 65mA Po = 0.48W Ci = 0 Li = 0
	2 off switch inputs	For each switch Uo = 29.4V Io = 33mA Po = 0.24W Ci = 0 Li = 0
NAMUR and Encoder SA1806	3 off NAMUR compatible switch inputs	For each input (between pins) Uo = 9.14V Io = 9.1mA Po = 0.021W Ci = 0 Li = 0
	One power and two signal outputs.	All pins combined w.r.t. 0V Uo = 5.88V Io = 195mA Po = 0.285W Ci = 0 Li = 0
4-20mA loop SA1909	2 off 4-20mA loop connections	For each loop Uo = 27.3V Io = 61mA Po = 0.41W Ci = 0 Li = 0
WIFI	N/A	Capacitively coupled
Antenna	N/A	Capacitively coupled

The following electrical connections to the equipment are not intrinsically safe and are made via cable glands or separately certified connectors:

Connector/entry	Rating
AC supply in	100Vac – 240Vac 50/60Hz, 1.0A
AC supply out	100Vac – 240Vac 50/60Hz, 1.0A
LAN	100Vac – 240Vac 50/60Hz, 1.0A
Dump	100Vac – 240Vac 50/60Hz, 1.0A

Variation 1

This variation introduces the following changes:

i. Changes to circuits and PCB layouts
ii. The use of alternative wire types

Variation 2

This variation introduces the following changes:

i. The introduction of new intrinsically safe I/O interfaces
ii. The introduction of a heater mat
iii. The introduction of an alternative dump valve power supply
iv. The introduction of flexible build options

12 Certificate history and evaluation reports

Issue	Date	Associated report	Notes
0	31 Oct 2019	R12413A/00 R12413B/00 R12413C/00	Issue of Prime Certificate
1	20 Nov 2020	R13652A/00	Introduction of Variation 1
2	23 May 2023	R16469A/00	Introduction of Variation 2

Note: Drawings that describe the equipment or component are listed in the Annex.

13 Conditions of Manufacture

The following conditions are required of the manufacturing process for compliance with the certification.

i. Where the product incorporates certified parts or safety critical components, the manufacturer of the product defined on this certificate shall continually monitor these parts/components for any modifications introduced by the manufacturer(s) of these constituent parts. If the manufacturer of any constituent part introduces any changes which affect the compliance of the certified product that is the subject of this certificate, the manufacturer is required to have this certificate updated.

ii. The flameproof enclosure, complete with blanking plugs, shall be subjected to an overpressure test at a minimum pressure of 25 bar in accordance with EN 60079-1:2014 clause 16. There shall be no damage or permanent deformation of the enclosure nor shall there be any leakage through the enclosure walls. The lid and base of the flameproof enclosure may be tested separately.

iii. Each fuse assembly shall be visually inspected. No damage shall be evident, such as cracks in the compound, exposure of encapsulated parts, flaking, inadmissible shrinkage, swelling, decomposition, failure of adhesion, or softening.

iv. Each fuse assembly shall be subjected to an electric strength test in accordance with EN 60079-18 Clause 9.2 using a test voltage of 1500Vac applied between the terminals and the surface of the encapsulant (covered in foil), for a period of 1 second.

Alternatively:

a) a voltage of 20% higher may be applied for 0.1 second

b) a d.c. test voltage is allowed as an alternative to the a.c. test voltage and shall be 170% of the specified a.c. r.m.s. test voltage.

Alternatively, the equipment may be subjected to batch testing in accordance with EN 60079-18 Ed. 4.1 Annex C.

v. The equipment shall be subjected to an electric strength test in accordance with the requirements of EN 60079-7 Clause 6.1 using a test voltage of 1500 Vac applied between the supply terminals and frame, for a period of 1 second.

Alternatively, a d.c. test voltage is allowed as an alternative to the a.c. test voltage and shall be 170% of the specified a.c. r.m.s. test voltage.

vi. The manufacturer shall ensure that any equipment certified cable glands, bushings, breather drains, and connectors fitted to the equipment meet the requirements of EN IEC 60079-0:2018, EN 60079-1:2014, and EN 60079-7:2015 as appropriate, and that all conditions of use and relevant ratings are adhered to. All such parts shall be suitable for use at a service temperature range -40°C to 70°C. Any such parts fitted to the exterior of the equipment enclosure shall provide a minimum ingress protection of IP66.

vii. Entries into the equipment for all non-intrinsically safe connections shall be via suitably certified cable glands or via suitably certified Ex d e plugs and sockets.

viii. The manufacturer shall ensure that the customer specific instructions provide details of the circuits and applicable intrinsically safe parameters for each of the intrinsically safe connections.

14 Specific Conditions of Use (Special Conditions)

The following conditions relate to safe installation and/or use of the equipment.

i. 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 e.g. where a charge-generating mechanism (such as wind-blown dust) is possible. In addition, the equipment shall only be cleaned with a damp cloth.

ii. The bolts securing the lid of the flameproof compartment shall be M6 x 24 mm (min) to 36 mm (max) alloy steel hexagon socket head types with a material grade of 12.9 or better.

iii. The user shall refer to the user specific instructions for details of the intrinsically safe parameters applicable to their equipment.

Certificate Annex

Certificate Number	**CML 19ATEX1319X**
Equipment	**1801-Z1 Data Acquisition Unit**
Manufacturer	**HMi Elements Ltd.**

The following documents describe the equipment or component defined in this certificate:

Issue 0

Drawing No	Sheets	Rev	Approved date	Title
D100346	1 to 8	A5	31 Oct 2019	1801_Z1 GA Drawing
D100347	1 to 3	A3	31 Oct 2019	Amphenol PT07 Jam Nut Type Connectors
D100348	1 of 1	A1	31 Oct 2019	N-Type Bulkhead connector drawing
D100350	1 to 4	A1	31 Oct 2019	1801_Z1 - Earthing arrangement
D100351	1 to 9	A6	31 Oct 2019	1801_Z1 – Ingress protection
D100352	1 of 1	A3	31 Oct 2019	1801_Z1 - General electrical schematic
D100353	1 to 7	A7	31 Oct 2019	1801_Z1 Unit internal wiring drawing
D100354	1 to 2	A0	31 Oct 2019	1801-Z1 - Dual horn barrier
D100355	1 to 2	A1	31 Oct 2019	1801-Z1 - Galvanic PSU
D100356	1 to 2	A1	31 Oct 2019	1801-Z1 - Load Cell Barrier
D100357	1 to 2	A0	31 Oct 2019	1801-Z1 - Dual Servo
D100358	1 to 2	A3	31 Oct 2019	1801-Z1 - Front Panel Barrier
D100359	1 to 2	A0	31 Oct 2019	1801-Z1 - NAMUR Switch Barrier
D100360	1 to 3	A4	31 Oct 2019	1801-Z1 -Front Panel Interface
D100361	1 to 2	A0	31 Oct 2019	1801-Z1 - Mains Monitor Barrier
D100362	1 to 2	A1	31 Oct 2019	1801_Z1 - 4-20mA input barrier
D100363	1 to 2	A3	31 Oct 2019	1801-Z1 - Quadrature Barrier
D100364	1 of 1	A3	31 Oct 2019	1801_Z1 Certification Label
D100365	1 to 2	A1	31 Oct 2019	1801_Z1 - Potted antenna barrier
D100366	1 to 2	A2	31 Oct 2019	1801_Z1 - Encapsulated fuse drawing
D100396	1 to 9	A5	31 Oct 2019	Ex-d Enclosure Assembly

Issue 1

Drawing No	Sheets	Rev	Approved date	Title
D100353	1 to 7	B0	20 Nov 2020	1801-Z1 – Unit internal wiring drawing
D100354	1 to 2	B0	20 Nov 2020	1801-Z1 - Dual horn barrier
D100355	1 to 2	B0	20 Nov 2020	1801-Z1 - Galvanic PSU
D100356	1 to 2	B0	20 Nov 2020	1801-Z1 - Load Cell Barrier
D100357	1 to 2	B0	20 Nov 2020	1801-Z1 - Dual Servo

Certificate Annex

Certificate Number **CML 19ATEX1319X**

Equipment **1801-Z1 Data Acquisition Unit**

Manufacturer **HMi Elements Ltd.**

Drawing No	Sheets	Rev	Approved date	Title
D100358	1 to 2	B0	20 Nov 2020	1801-Z1 - Front Panel Barrier
D100359	1 to 2	B0	20 Nov 2020	1801-Z1 - NAMUR Switch Barrier
D100360	1 to 3	B1	20 Nov 2020	1801-Z1 -Front Panel Interface
D100361	1 to 2	B0	20 Nov 2020	1801-Z1 – Main monitor barrier
D100362	1 to 2	B0	20 Nov 2020	1801_Z1 - 4-20mA input barrier
D100363	1 to 2	B0	20 Nov 2020	1801-Z1 - Quadrature Barrier

Issue 2

Drawing No.	Sheets	Rev	Approved /issued date	Title
D100346	1 to 9	B0	23 May 2023	1801_Z1 GA Drawing
D100352	1 to 2	A4	23 May 2023	1801_Z1 General electrical schematic
D100460	1 to 6	A1	23 May 2023	1801-Z1 – SA1806 Namur rotary encoder barrier
D100462	1 to 4	A0	23 May 2023	1801-Z1 SA1909 Dual 4-20mA barrier
D100464	1 to 3	A2	23 May 2023	1801-Z1 SA1916 Bridge load cell barrier
D100466	1 to 2	A0	23 May 2023	SA1918 - Baker TRS dump valve PSU
D100468	1 to 4	A1	23 May 2023	SA1931 – Baker TRS WiFi heater mat

NOTE – drawing D100353 is withdrawn as a result of this variation.