UK Type Examination Certificate CML 21UKEX3067X Issue 1

United Kingdom Conformity Assessment

1 Product or Protective System Intended for use in Potentially Explosive Atmospheres UKSI 2016:1107 (as amended) – Schedule 3A, Part 1

2 Equipment **470-Z1 Module**

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 Eurofins E&E CML Limited, Newport Business Park, New Port Road, Ellesmere Port, CH65 4LZ, United Kingdom, Approved Body Number 2503, in accordance with Regulation 43 of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016, UKSI 2016:1107 (as amended), 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 Schedule 1 of the Regulations.

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 specific conditions of use (affecting correct installation or safe use). These are specified in Section 14.

8 This UK Type Examination certificate relates only to the design and construction of the specified equipment. Further requirements of the Regulations apply to the manufacturing process and supply of the product. These are not covered by this certificate.

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 60079-0:2018	EN 60079-11:2012	EN 60079-18:2015+A1:2017
EN 60079-28:2015	EN 60079-31:2014	EN IEC 60079-7:2015+A1:2018

Ref EN 60079-1:2007

10 The equipment shall be marked with the following:


II 2 G D

Ex eb ib mb IIC T4 Gb

Ex tb IIIC T135ºC Db

Ta= Up to -40ºC to +60ºC


II 2 (2) G D

See description for alternative marking and ambient options

11 Description

The 470-Z1 is a mains supplied, transportable hazardous area computer with a touchscreen and keypad control interface, as well as optional keyboard/mouse, USB, Wi-Fi, Ethernet or Optical interface connections. An internal USB connection point is provided for software updates in safe area use.

The 470-Z1 consists of an aluminium enclosure, which has the supply / interface connections either via the bottom side or enclosure back panel.

The 470-Z1 consists of three main parts, an increased safety terminal/connection section, and an encapsulated section in the base and an encapsulation hinged lid section.

The increased safety section interfaces the input and output connections (when fitted) via separately certified terminals and intrinsically safe connections.

The encapsulated section in the base contains the power supply, the computer processor, hard drive, memory and interface circuits, as well as the intrinsically safe barrier and limiting circuits for the optional Wi-Fi, USB, Ethernet LAN and optical peripheral communications.

The lid section contains the low power projected capacitance touchscreen, LCD panel adaptor, touchscreen controller, back light LEDs and Bluetooth module. The lid section also includes two keypads, indicating LEDs and the keypad encoder board.

External connections

- The mains input supply will be via either a separately approved in-line connector or cable gland (various options).
- The external keyboard/mouse interface (when fitted) is provided by a PS/2 connector and protected by an Intrinsically Safe Zener barrier with entity parameters shown in Table 1 below.
- One Ethernet port (when fitted) is provided by either:
  - Non-Intrinsically safe 10/100/1000 Mbps - a separately certified connector or cable gland.
  - 10/100 Mbps – an Ex d socket, entity parameters shown in Table 4
  - Ex ia (IS993 galvanically isolated) Copper 10/100 Mbps – Ex d socket or gland, entity parameters shown in Table 3
- One Fibre-optic (when fitted) is provided by either:
  - Energy limited (op is) optical – an optical connector, entity parameters shown in Table 5
- Optionally, one Wi-Fi modules will be provided via a N-type socket:
  - Ex ia (IS752 or iSOLATE501 barrier), WiFi 2.4GHz Zcomax
  - Ex ia (IS752 or iSOLATE501 barrier), WiFi 2.4GHz Zigbee
  - Ex ia (IS752 or iSOLATE501 barrier), WiFi 2.4GHz + 5GHz Sparklan
- Optionally, one of the following external USB is provided:
  - USB2.0 – a separately certified , ROTA DR4/DE2 Ex d USB memory stick/connector (Gas atmospheres only), CEAG Exlink, or Hawke ControlEx/InstrumEx connectors
  - USB2.0 – Fischer 103 core series connection (Safe area use only).
- Optional, RS232 port, via a separately certified gland or connector
- Always present is a Bluetooth 2.0 + EDR. Transmitter is located under the lid encapsulation behind left hand keypad.

Some optional connectors are via separately certified flameproof equipment, where these are utilised, the equipment has flameproof parts which does not form part of the equipment marking.

The equipment has the following safety description:

Um = 100-240V ac, 50-60 Hz, 2A

Table 1		
PS/2 Interface (Where fitted)		
Uo	=	5.355 Vdc
Io	=	0.155 A
Po	=	0.572 W
Ci	=	17.05 µF
Co	=	47.95 µF
Li	=	0
Lo	=	0.4 mH
Note:	**NOT galvanically isolated**	

Table 2		
Wi-Fi- Interface (IS752 RF barrier)		
Uo	=	6.51 Vdc
Io	=	1.031 A (at 2.4Ghz)
Po	=	1.69 W
Co	=	<22 µF
Lo	=	<33 µH
Ci	=	10.5pF
Li	=	0
Note:	**NOT galvanically isolated**	

Table 3						
IS993 Ethernet Isolator (where fitted) – only for IIB or IIA applications						
10/100 Ethernet TX (output)				**10/100 Ethernet RX (input)**		
Uo	=	4.935 Vdc		Ui	=	5.88 Vdc
Io	=	1.176 A		Ii	=	1.666 A
Po	=	1.451 W		Pi	=	Any value
Co	=	999 µF		Ci	=	908 nF
Lo	=	12.8 µH or		Li	=	0
Lo / Ro	=	31 µH / Ω (Note 1)				

Note 1: The quoted value of Lo/Ro can only be used if the connected Ethernet device has a terminal inductance (Li) of zero. The quoted value of Lo/Ro takes into account the total current from the IS993 Ethernet isolator, plus the connected Ethernet device and is calculated on the basis of a IIB system. If the connected Ethernet device quotes a lower value of Lo/Ro, this lower value should be used in the selection of a suitable cable.

Note 2: The Ethernet port connected to the IS993 Ethernet Isolator shall be resistively-limited, with a source resistance $R_s \geq U_o/I_o$

Table 4 – Only suitable for -20ºC ambient		
Solexy Ethernet Barrier (where fitted)		
10/100 Ethernet TX (output)		
Um	=	250 V
Uo	=	3.4 V
Io	=	701 mA
Co	=	100 µF
Lo	=	85 µH

Table 5	
Optical (Output) TOSA-E168-9010-ELC	
Po	30 µW
62.5/125µm MM Fibre	
Optical (Output) Cotsworks Module	
Po	< 35mW
Wave length	850 nm

Marking

Design Option		
Gas Marking		
1	**With 'IS' and Optical interfaces**	Ex eb ib mb [ib] [op is] IIC T4 Gb
2	**Without 'IS' and Optical interfaces**	Ex eb ib mb IIC T4 Gb
3	**With Optical interfaces only**	Ex eb ib mb [op is] IIC T4 Gb
4	**With Solexy Ethernet Coupler (op is not available)**	Ex eb ib mb [ib] IIC T4 Gb
5	**With Solexy Ethernet Coupler & Ex I PS2**	Ex eb ib mb [ib] IIC T4 Gb
Dust Marking		
1	**With Rota DE2/DR4 Connector(s)**	N/A
2	**With 'IS' and Optical interfaces**	Ex tb [ib] [op is] IIIC T135ºC Db
3	**Without 'IS' and Optical interfaces**	Ex tb IIIC T135ºC Db
4	**With Optical interfaces only**	Ex tb [op is] IIIC T135ºC Db
5	**With Solexy Ethernet Coupler (op is not available)**	Ex tb [ib] IIIC T135ºC Db
6	**With Solexy Ethernet Coupler & Ex I PS2**	Ex tb [ib] IIIC T135ºC Db
Notes:	(1) Options fitted with Rota DE2 / DR4 Couplers are not to be marked 'Dust Protected – 'Ex tb' (2) When either the Wi-Fi (IS752) and/or the IS993 (iSiS-Ex Ethernet Barrier) are fitted, the Ex codes will be those shown in line 5 of the gas table and line 6 of the dust table above. (3) When the IS993 is fitted, the Gas group shall be downgraded to IIB. (4) Some optional connectors are separately certified flameproof equipment, where these are utilised, the equipment has flameproof parts, this is not marked on the equipment	
Ambient	Ta = -40°C to +60°C Ta = -20°C to +60°C (with Solexy Ethernet Couplers) Ta = -40°C to +55°C (with Rota DE2 Couplers) Ta = -40°C to +55°C (with Main Power cable plug arrangement)	

Variation 1

This variation introduces the following modification:

i. The introduction of an alternative display
ii. Changes to the PCB layout of the SA606 and SA731 interfaces
iii. The introduction of a new WiFi option
iv. The introduction of an alternative internal programming connector
v. The introduction of an alternative RF isolator
vi. Changes to the touchscreen controller mounting arrangement
vii. Update to equipment marking

12 Certificate history and evaluation reports

Issue	Date	Associated report	Notes
0	18 Jan 2022	R13624D/00	Issue of the prime certificate. CML 15ATEX3203X, Issue 8 is attached and shall be referred to in conjunction with this certificate.
1	14 Apr 2022	R12439A/00	To introduce variation 1

Note: Drawings that describe the equipment are listed or referred to 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 shall ensure that any changes to those parts or components do not affect the compliance of the certified product that is the subject of this certificate. A copy of the certification and instructions shall be provided for the separately certified items fitted.

ii. The equipment shall be subjected to an electric strength test using a test voltage of 1500Vac applied between the input circuits (90V peak or above) and frame, for a period of 60 secs.

iii. Each section of 'm' encapsulated equipment shall be subjected to a visual inspection. No damage shall be evident, such as cracks in the compound, exposure of the encapsulated parts, flaking, inadmissible shrinkage, swelling, decomposition, failure of adhesion or softening.

14 Specific Conditions of Use

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

i. The Apparatus intrinsically safe output circuits are not capable of withstanding the 500V insulation test required by Clause 6.3.12 of IEC 60079-11. This must be taken into account when installing the equipment.

ii. When supplied, the Non-Intrinsically Safe Ethernet or RS232 cable shall be protected from damage or breakage in accordance with IEC 60079-14.

iii. The internal USB connection shall only be used within the safe (non-hazardous) area.

iv. The external USB connection (when supplied) shall only be used within the hazardous area if fitted Ex d USB interface or Ex d connector, when the non Ex d option is provided, this shall be used in the safe area only.

Certificate Annex

Certificate Number	**CML 21UKEX3067X**
Equipment	**470-Z1 Module**
Manufacturer	**HMI Elements Ltd.**

The following documents describe the equipment defined in this certificate:

Issue 0

For all drawings, refer to certificate CML 15ATEX3203X Issue 8.

Issue 1

Drawing No.	Sheets	Rev	Approved date	Title
D100194	1 to 5	C3	14 Apr 2022	General arrangement
D100194	6 to 9	C4	14 Apr 2022	470 Z-1 General arrangement
D100195	1 to 3	A1	14 Apr 2022	470 GA Case front
D100198	1 to 6	E1	14 Apr 2022	4*0-Z1 Protection concepts
D100209	1 to 2	D1	14 Apr 2022	470-Z1 Wiring diagram
D100211	1 to 2	A1	14 Apr 2022	470 SA606 Certification drawing
D100214	1 to 2	A1	14 Apr 2022	470-Z1 WiFi Carrier Board Assembly Drawing
D100220	1 to 2	E1	14 Apr 2022	470-Z1 Block diagram with power indications
D100224	1 to 3	C0	14 Apr 2022	470_Z1 SA849 Assembly drawing
D100234	1 to 4	C0	14 Apr 2022	470_Z1 Lid thermal fuse reference drawing
D100240	1 to 4	B0	14 Apr 2022	470_Z1 LCD thermal fuse position drawing
D100241	1 to 2	A1	14 Apr 2022	SA731 certification drawing
D100250	1 to 2	A1	14 Apr 2022	SA735 certification drawing (schematics)
D100242	1 of 1	G0	14 Apr 2022	470-Z1 Specification plate and warning label