IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	**IECEx CML 15.0097X**	Page 1 of 4	Certificate history:
Status:	**Current**	Issue No: 8	Issue 7 (2020-11-10) Issue 6 (2019-03-08) Issue 5 (2018-06-28) Issue 4 (2018-02-23) Issue 3 (2018-01-30) Issue 2 (2017-02-17) Issue 1 (2016-05-27) Issue 0 (2016-03-01)
Date of Issue:	2022-04-14		
Applicant:	**HMI Elements Limited** Unit A & B Windmill Industrial Estate Showfield Lane Malton, North Yorkshire, YO17 6BT **United Kingdom**		
Equipment:	**470-Z1 HMI Module**		
Optional accessory:			
Type of Protection:	**Encapsulation, Increased safety, Intrinsic Safety, Optical Radiation and Dust Protected**		
Marking:	Ex e ib mb IIC T4 Gb (Without 'IS' and Optical Interfaces) Up to -40°C to +60°C **See Annex for full marking and ambient options**		

Approved for issue on behalf of the IECEx Certification Body: **L A Brisk**

Position: **Certification Officer**

Signature: (for printed version)

Date: (for printed version) 2022-04-14

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
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Certificate issued by:

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United Kingdom

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Manufacturer: **HMI Elements Limited**
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Showfield Lane, Malton
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United Kingdom

Manufacturing locations: **HMI Elements Limited**
Unit A & B Windmill Industrial Estate
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This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements.This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

STANDARDS :
The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

IEC 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

IEC 60079-11:2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
Edition:6.0

IEC 60079-18:2017 Explosive atmospheres - Part 18: Protection by encapsulation "m"
Edition:4.1

IEC 60079-28:2015 Explosive atmospheres - Part 28: Protection of equipment and transmission systems using optical radiation
Edition:2

IEC 60079-31:2013 Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"
Edition:2

IEC 60079-7:2017 Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
Edition:5.1

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Reports:

GB/CML/ExTR16.0008/00
GB/CML/ExTR16.0065/00
GB/CML/ExTR17.0018/00
GB/CML/ExTR17.0236/00
GB/CML/ExTR18.0028/00
GB/CML/ExTR18.0140/00
GB/CML/ExTR19.0049/00
GB/CML/ExTR20.0223/00
GB/CML/ExTR22.0066/00

Quality Assessment Report:

NO/DNV/QAR09.0001/08

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EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

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.

See Annex for full description and Conditions of Manufacture

SPECIFIC CONDITIONS OF USE: YES as shown below:
See Annex for Conditions of Certification.

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)

Issue 1

This variation introduces the following modifications:

1. To allow two additional alternative PSU arrangements.

Issue 2

This variation introduces the following modifications:

1. To allow alternative thermal fuses to be utilised.

Issue 3

This variation introduces the following modifications:

1. Change of the manufacturer's name to HMI Elements Limited.
2. Removal of reference to the previous company name from the equipment name/model number.

Issue 4

This variation introduces the following modifications:

1. To allow an alternative power cable arrangement to be included
2. To allow an alternative MIO CPU module to be used
3. To allow an alternative Optical radiation media converter arrangement and external fibre connectors to be used.
4. The description and marking has been updated in accordance with the modifications above.

Issue 5

This variation introduces the following modifications:

1. Alternative separate internal encapsulated optical transmitter
2. Correction of drawing typographic errors

Issue 6

This variation introduces the following modifications:

1. To allow an alternative touchscreen controller to be used.
2. To correct drawing revision errors, as well as include a drawing reference omitted from previous variation.
3. The IEC 60079-7 and IEC 60079-18 standards are updated to current editions. .

Issue 7

This variation introduces the following modification:

1. Update IEC 60079-0 Ed 6 to IEC 60079-0 Ed 7

Issue 8

This variation introduces the following modifications:

1. The introduction of an alternative display
2. Changes to the PCB layout of the SA606 and SA731 interfaces
3. The introduction of a new WiFi option
4. The introduction of an alternative internal programming connector
5. The introduction of an alternative RF isolator
6. Changes to the touchscreen controller mounting arrangement
7. Update to equipment marking

Annex:

IECEx CML 15.0097X, Issue 8- Annex.pdf

Annexe to:	IECEx CML 15.0097X, Issue 8
Applicant:	HMI Elements Limited
Apparatus:	470-Z1 HMI Module

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 module will be provided via an 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

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- 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

Design Option		
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)	

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.

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.