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 ExTC 18.0011X**	Page 1 of 5	Certificate history:
Status:	**Current**	Issue No: 2	Issue 1 (2020-02-14) Issue 0 (2018-06-13)
Date of Issue:	2022-02-09		
Applicant:	**Compac Industries Ltd** 52 Walls Road Penrose Auckland 1061 **New Zealand**		
Equipment:	**K-Factor Display**		
Optional accessory:			
Type of Protection:	**Intrinsic Safety 'i'**		
Marking:	Ex ib IIA T4 Gb -40°C ≤ Tamb ≤ +70°C		

Approved for issue on behalf of the IECEx Certification Body: **David Price**

Position: **Certification Authority**

Signature: (for printed version)

Date: 2022-02-09

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.
3. The Status and authenticity of this certificate may be verified by visiting www.iecex.com or use of this QR Code.

Certificate issued by:

Ex Testing and Certification Pty Ltd
1/30 Kennington Drive
Tomago NSW 2322
Australia

TESTING & CERTIFICATION

IECEx Certificate of Conformity

Manufacturer: **Compac Industries Ltd**
52 Walls Road
Penrose
Auckland 1061
New Zealand

Additional manufacturing locations:

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

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:

AU/EXTC/ExTR17.0011/00 AU/EXTC/ExTR19.0009/00 AU/EXTC/ExTR19.0023/00
AU/ExTC/ExTR21.0034/00

Quality Assessment Report:

AU/TSA/QAR08.0008/08

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

The K-Factor Display comprises a CI502 K-Factor Board, either a CI252 or CI253 LCD Panel PCB directly mounted to the K-Factor Board and up to two totalisers, all housed in a plastic enclosure with a polycarbonate front cover. A metal bracket used to mount the totaliser is accessible from outside the plastic enclosure.

The K-Factor Display is designed to form part of an intrinsically safe control system and is powered via the BUS-IN connector J1. Connections are provided for 5 V and 9 V IS supplies, common ground and RS485 communications. The K-Factor Display provides three BUS-OUT connectors J2, J3 and J4 which are directly connected to BUS-IN connector J1 (though the pin numbers on J1 for the various circuits are not the same as the pin numbers on J2, J3, J4) for through connected 5 V and 9 V IS supplies, common ground and RS485 communications.

In addition to the BUS-IN and BUS OUT connectors, the K-Factor Board (CI502) provides connectors J10 and J20 for two COM Meters (separately certified, refer IECEx ExTC 17.0009X), connectors J11 to J14 and J21 to J24 for eight simple switches, connector J30 for two totalizers mounted internal to the enclosure and connector J8 for a piezo buzzer mounted on the board itself.

The K-Factor Display may optionally be fitted with a CI515 Preset Board with up to two membrane keypads connected.

SPECIFIC CONDITIONS OF USE: YES as shown below:
Refer to Annex for details.

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)
Refer to Annex for details.

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Additional information:
Job 21080

Annex:

IECEx ExTC 18.0011X-2 Annexe Final.pdf

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Annexe

Annexe for Certificate No.:	IECEx ExTC 18.0011X	Issue No.:	02

Description:

Refer to certificate.

Specific Conditions of Use pertaining to Issue 0 of this Certificate:

The following input and output parameters were determined for the various connectors to external equipment on the K-Factor Display and must be taken into account during interconnection:

Connector J1 (BUS-IN) see Note 1	
5V & RS485	**Pins 1, 2 & 6 w.r.t. Pins 3, 4, 5 & 7**
Ui	6 V
Ii	235 mA see Note 2
Pi	1.05 W see Note 2
Li	100 µH see Note 2
Ci	310 µF see Note 2
Io	5 mA see Note 3
Po	7 mW see Note 3
9V	**Pin 8 w.r.t. Pins 3, 4, 5 & 7**
Ui	10 V
Ii	1 A
Pi	10 W
Li	0
Ci	0

Note 1: Connectors J2, J3 and J4 (BUS-OUT) are connected in parallel to J1, and hence have the same parameters, with the pin numbers allocated as follows:

Circuit reference	J1 Pin #	J2, J3, J4 Pin #
9V	8	6
5V	2	3
A	6	8
B	1	4
Earth, Screen	3, 4, 5, 7	1, 2, 5, 7, 9, 10

Note 2: The supply to connectors J10, J20 are directly connected to this J2 pin 2. Hence the load connected at J10, J20 must be accounted for and added to J2 parameters when connecting in a system. Currently the Lo and Co for J10, J20 have been allocated the values of 50µH and 300µF, and these have been reflected in the Li and Ci values of J2 of 100uH and 310uF.

Note 3: The terminals on the 5V circuit may be considered under fault to be connected to an internal source of supply due to a supercapacitor that may charge up to the applied Ui but is limited by internal resistance to provide the Io and Po shown in this table. This needs to be accounted for when connecting in a system.

Connectors J10 and J20 Typically for connection of Meters and Encoders	
5V Output	**Pins 2, 4, 5, 6, 8, 9 & 10 w.r.t. Pins 1 & 3** (combined parameters for J10/J20)
Uo	6 V see Note 2 above
Io	235 mA see Note 2 above
Po	1.05 W see Note 2 above
Lo	50 µH see Note 2 above
Co	300 µF see Note 2 above

Connectors J11, J12, J13, J14, J21, J22, J23, J24 Typically for connection of simple apparatus (switches)	
5V Output	**Pin 1 w.r.t. Pin 2** (all connectors considered in parallel)
Uo	6 V
Io	5.2 mA
Po	8 mW
Lo	100 µH
Co	1 µF

Drawing list pertaining to Issue 0 of this Certificate:

Manufacturer's Documents

Title:	Drawing No.:	Pages	Rev. Level:	Date:
C5000 Displays7 Digit Display Panel Housing Assembly	ASM0143A	2	B	2017-12-15
C5000 Control Unit Labels K-Factor Displays	AP392	Sheet 4	B	2018-06-08

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Annexe

Annexe for Certificate No.:	IECEx ExTC 18.0011X	Issue No.:	02

Title:	Drawing No.:	Pages	Rev. Level:	Date:
Installation & Safety Data for K-Factor Display	AP397	5	A	2018-06-08
CI502				
CI502 C5K K-Factor Board (Schematics)	CI502	Sheets1 to 5 of 8	C	2018-04-23
C5000 K-Factor Board (Top Overlay)	CI502	Sheet 6 of 8	C	2018-04-23
C5000 K-Factor Board (Top Layer)	CI502	Sheet 7 of 8	C	2018-04-23
C5000 K-Factor Board (Bottom Layer)	CI502	Sheet 8 of 8	C	2018-04-23
CP-C5K-KFACT (BOM)	CI502P	2	C	2018-04-24
CI252				
LCD PANEL LAYOUT1 (Schematic)	CI252	1 of 5	B	2016-01-27
LCD PANEL LAYOUT1 (Top Overlay)	CI252	2 of 5	B	2016-01-27
LCD PANEL LAYOUT1 (Top Layer)	CI252	3 of 5	B	2016-01-27
LCD PANEL LAYOUT1 (Bottom Layer)	CI252	4 of 5	B	2016-01-27
LCD PANEL LAYOUT1 (Bottom Overlay)	CI252	5 of 5	B	2016-01-27
CP-DSPLY-7D1 (BOM)	CI252P-B	1	-	2017-11-03
CI253				
LCD PANEL LAYOUT2 (Schematic)	CI253	1 of 5	A	2015-10-06
LCD PANEL LAYOUT2 (Top Overlay)	CI253	2 of 5	A	2015-10-07
LCD PANEL LAYOUT2 (Top Layer)	CI253	3 of 5	A	2015-10-07

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Annexe for Certificate No.:	IECEx ExTC 18.0011X	Issue No.:	02

Title:	Drawing No.:	Pages	Rev. Level:	Date:
LCD PANEL LAYOUT2 (Bottom Layer)	CI253	4 of 5	A	2015-10-07
LCD PANEL LAYOUT2 (Bottom Overlay)	CI253	5 of 5	A	2015-10-07
CP-DSPLY-7D2 (BOM)	CI253P-B	1	-	2017-11-03

Variations permitted by Issue 1 of this certificate:

1. Inclusion of an optional CI515 Preset Board with one or two 4 x 4 membrane keypads.
2. Modification to the CI252 and CI253 LCD boards to include circuitry to control the dimming of the LCD backlights.
3. Compliance has been assessed to the latest Standards IEC 60079-0:2017, and IEC 60079-11:2011.

Specific Conditions of Use pertaining to Issue 1 of this certificate:

The following parameters were determined for the various connectors to external equipment on the K-Factor Display and must be taken into account during interconnection:

Connector J1 (BUS-IN) see Note 1	
5V & RS485	**Pins 1, 2 & 6 w.r.t. Pins 3, 4, 5 & 7**
Ui	6 V
Ii	235 mA see Note 2
Pi	1.05 W see Note 2
Li	100 µH see Note 2
Ci	310 µF see Note 2
Io	5 mA see Note 3
Po	7 mW see Note 3
9V	**Pin 8 w.r.t. Pins 3, 4, 5 & 7**
Ui	10 V
Ii	1 A
Pi	10 W
Li	0 µH
Ci	0 µF

Preset Board (CI515) Connector J100 (BUS-IN) see Note 1	
5V & RS485	**Pins 1, 2 & 6 w.r.t. Pins 3, 4, 5 & 7**
Ui	6 V
Ii	235 mA
Pi	1.05 W
Li	1 µH
Ci	8 µF
9V	**Pin 8 w.r.t. Pins 3, 4, 5 & 7**
Ui	9.6 V
Ii	1 A
Pi	10 W
Li	0 µH
Ci	0 µF

Note 1: Connectors J2, J3 and J4 (BUS-OUT) are connected in parallel to J1 in the K-Factor Board and connector J101 (BUS-OUT) is connected in parallel to J100 in the Preset Board,, and hence have the same parameters, with the pin numbers allocated as follows:

Circuit reference	J1/J100 Pin #	J2, J3, J4/J101 Pin #
9V	8	6
5V	2	3
A	6	8
B	1	4
Earth, Screen	3, 4, 5, 7	1, 2, 5, 7, 9, 10

Note 2: The supply to connectors J10, J20 are directly connected to this J2 pin 2. Hence the load connected at J10, J20 must be accounted for and added to J2 parameters when connecting in a system. Currently the Lo and Co for J10, J20 have been allocated the values of 50µH and 300µF, and these have been reflected in the Li and Ci values of J2 of 100uH and 310uF.

Note 3: The terminals on the 5V circuit may be considered under fault to be connected to an internal source of supply due to a supercapacitor that may charge up to the applied Ui but is limited by internal resistance to provide the Io and Po shown in this table. This needs to be accounted for when connecting in a system.

K-Factor Board (CI502) with Preset Board (CI515) installed Connector J1 (BUS-IN) see Note 1	
5V & RS485	**Pins 1, 2 & 6 w.r.t. Pins 3, 4, 5 & 7**
Ui	6 V
Ii	235 mA see Note 2
Pi	1.05 W see Note 2
Li	100 µH see Note 2
Ci	318 µF see Note 2
Io	5 mA see Note 3
Po	7 mW see Note 3
9V	**Pin 8 w.r.t. Pins 3, 4, 5 & 7**
Ui	10 V
Ii	1 A
Pi	10 W
Li	0 µH
Ci	0 µF

Connectors J10 and J20 Typically for connection of Meters and Encoders	
5V Output	**Pins 2, 4, 5, 6, 8, 9 & 10 w.r.t. Pins 1 & 3** (combined parameters for J10/J20)
Uo	6 V see Note 2 above
Io	235 mA see Note 2 above
Po	1.05 W see Note 2 above
Lo	50 µH see Note 2 above
Co	300 µF see Note 2 above

Connectors J11, J12, J13, J14, J21, J22, J23, J24 Typically for connection of simple apparatus (switches)	
5V Output	**Pin 1 w.r.t. Pin 2** (all connectors considered in parallel)
Uo	6 V
Io	5.2 mA
Po	8 mW
Lo	100 µH
Co	1 µF

Preset Board (CI515) Connectors J200, J201 Membrane Keypad	
Uo	6 V
Io	5.6 mA
Po	8.4 mW
Lo	10 µH
Co	0.1 µF

Drawings Associated with the Issue 1 of this Certificate:

Manufacturer's Documents

Title:	Drawing No.:	Pages	Rev. Level:	Date:
C5000 Displays 7 Digit Display Panel Housing Assembly	ASM0143D	2	D	2019-03-15
C5000 Control Unit Labels K-Factor Displays	AP392	Sheet 4	C	2020-02-07
Installation & Safety Data for K-Factor Display	AP397	6	B	2020-02-07
BUS Cable for Pre-set (CI515-J100)	AP411	1	A	2019-03-21
CI252				
LCD PANEL LAYOUT1 (Schematic)	CI252	1 and 2 of 6	D	2019-08-07
LCD PANEL LAYOUT1 (Top Overlay)	CI252	3 of 6	D	2019-08-07
LCD PANEL LAYOUT1 (Top Layer)	CI252	4 of 6	D	2019-08-07
LCD PANEL LAYOUT1 (Bottom Layer)	CI252	5 of 6	D	2019-08-07
LCD PANEL LAYOUT1 (Bottom Overlay)	CI252	6 of 6	D	2019-08-07
CP-C5K-DSPLY7D1 (BOM)	CI252P	1	D	2019-08-07
CI253				
LCD PANEL LAYOUT2 (Schematic)	CI253	1 and 2 of 6	C	2019-08-15

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Title:	Drawing No.:	Pages	Rev. Level:	Date:
LCD PANEL LAYOUT2 (Top Overlay)	CI253	3 of 6	C	2019-08-15
LCD PANEL LAYOUT2 (Top Layer)	CI253	4 of 6	C	2019-08-15
LCD PANEL LAYOUT2 (Bottom Layer)	CI253	5 of 6	C	2019-08-15
LCD PANEL LAYOUT2 (Bottom Overlay)	CI253	6 of 6	C	2019-08-15
CP-C5K-DSPLY7D2 (BOM)	CI253P-C	1	C	2019-08-15
CI515				
C5000 Preset Board (Schematic)	CI515	1 and 2 of 5	A	2018-04-06
8C5000 Preset Board (Top Overlay)	CI515	3 of 5	A	2018-04-06
C5000 Preset Board (Top Layer)	CI515	4 of 5	A	2018-04-06
C5000 Preset Board (Bottom Layer)	CI515	5 of 5	A	2018-04-06
CP-C5K-PSET (BOM)	CI515P-A	1	A	2019-05-31

Variations permitted by Issue 2 of this certificate:

1. Several changes have been made in the circuitry of the Main Board and the LCD CI252 Board.
2. Compliance has been assessed to the later Standard IEC 60079-0:2017 read with IEC 60079-11:2011

Specific Conditions of Use pertaining to Issue 2 of this certificate:

The parameters were determined for the various connectors to external equipment on the K-Factor Display and must be taken into account during interconnection:

K-Factor Board (CI502) Connector J1 (BUS-IN) see Note 1	
5V & RS485	**Pins 1, 2 & 6 w.r.t. Pins 3, 4, 5 & 7**
Ui	6V
Ii	235mA see Note 2
Pi	1.05W see Note 2
Li	100µH see Note 2
Ci	310µF see Note 2
Io	5mA see Note 3
Po	7mW see Note 3
9V	**Pin 8 w.r.t. Pins 3, 4, 5 & 7**
Ui	10V
Ii	1A
Pi	-
Li	0µH
Ci	0µF

Preset Board (CI515) Connector J100 (BUS-IN) see Note 1	
5V & RS485	**Pins 1, 2 & 6 w.r.t. Pins 3, 4, 5 & 7**
Ui	6 V
Ii	235 mA
Pi	1.05 W
Li	1 µH
Ci	8 µF
9V	**Pin 8 w.r.t. Pins 3, 4, 5 & 7**
Ui	10V
Ii	1A
Pi	10 W
Li	0 µH
Ci	0 µF

Note 1: Connectors J2, J3 and J4 (BUS-OUT) are connected in parallel to J1 in the K-Factor Board and connector J101 (BUS-OUT) is connected in parallel to J100 in the Preset Board, and hence have the same parameters, with the pin numbers allocated as follows:

Circuit reference	J1/J100 Pin #	J2, J3, J4/J101 Pin #
9V	8	6
5V	2	3
A	6	8
B	1	4
Earth, Screen	3, 4, 5, 7	1, 2, 5, 7, 9, 10

Note 2: The supply to connectors J10, J20 are directly connected to this J2 pin 2. Hence the load connected at J10, J20 must be accounted for and added to J2 parameters when connecting in a system. Currently the Lo and Co for J10, J20 have been allocated the values of 50µH and 300µF, and these have been reflected in the Li and Ci values of J2 of 100uH and 310uF. In addition, for inclusion of the Preset Board (CI515) in the table below the total parameters for the CI502 and the CI515 have been considered.

Note 3: The terminals on the 5V circuit may be considered under fault to be connected to an internal source of supply due to a supercapacitor that may charge up to the applied Ui but is limited by internal resistance to provide the Io and Po shown in this table. This needs to be accounted for when connecting in a system.

K-Factor Board (CI502) with Preset Board (CI515) installed Connector J1 (BUS-IN) see Note 1	
5V & RS485	**Pins 1, 2 & 6 w.r.t. Pins 3, 4, 5 & 7**
Ui	6 V
Ii	235 mA see Note 2
Pi	1.05 W see Note 2
Li	100 µH see Note 2
Ci	318 µF see Note 2
Io	5 mA see Note 3
Po	7 mW see Note 3
9V	**Pin 8 w.r.t. Pins 3, 4, 5 & 7**
Ui	10 V
Ii	1 A
Pi	10 W
Li	0 µH
Ci	0 µF

Connectors J10 and J20 Typically for connection of Meters and Encoders	
5V Output	**Pins 1 – 10** (combined parameters for J10/J20)
Uo	6 V see Note 2 above
Io	235 mA see Note 2 above
Po	1.05 W see Note 2 above
Lo	50 µH see Note 2 above
Co	300 µF see Note 2 above

Connectors J11, J12, J13, J14, J21, J22, J23, J24 Typically for connection of simple apparatus (switches)	
5V Output	**Pin 1 w.r.t. Pin 2** (all connectors considered in parallel)
Uo	6 V
Io	5.2 mA
Po	8 mW
Lo	100 µH
Co	1 µF

Preset Board (CI515) Connectors J200, J201 Membrane Keypad	
Uo	6 V
Io	5.6 mA
Po	8.4 mW
Lo	10 µH
Co	0.1 µF

1. The rear of the display housing is a potential antistatic hazard and is provided with a warning label. The rear of the enclosure shall only be cleaned with a damp cloth.
2. Simple switches shall be rated at least 10Vdc, 10mA, 0.1VA. The switches and associated wiring shall be subjected to a dielectric strength test in accordance with clause 6.3.13 and 10.3 of IEC 60079-11:2011 as required for the insulation between the intrinsically safe circuit and other intrinsically safe circuits, non-intrinsically safe circuits, and the frame of the electrical equipment.
3. The Preset Board and keypad shall have insulation between the intrinsically safe circuit and other intrinsically safe circuits, non-intrinsically safe circuits, and the frame of the electrical equipment, and shall be subjected to a dielectric strength test in accordance with clause 6.3.13 and 10.3 of IEC 60079-11:2011.
4. The BUS cable should only be supplied by Compac Industries Ltd. These cables need to maintain separation between I.S. circuits and should not be modified. The BUS cables may be of various lengths with the condition that the total length of all the BUS cables must be less than 33m.
5. All cabling connected to the K-Factor Display shall be securely fixed and effectively protected against damage.

Drawings Associated with the Issue 2 of this Certificate:

Manufacturer's Documents

Title:	Drawing No.:	Pages	Rev. Level:	Date:
C5000 Displays 7 Digit Display Panel Housing Assembly	ASM0143D	2	D	2019-03-15
C5000 Control Unit Labels K-Factor Displays	AP392	Sheet 4	C	2020-02-07
*Installation & Safety Data for K-Factor Display	AP397	6	C	2021-02-22
BUS Cable for Pre-set (CI515-J100)	AP411	1	A	2019-03-21
CI502				
*CI502 C5K K-Factor Board (Schematics)	CI502	Sheets 1 to 5 of 8	D	2021-02-18
*C5000 K-Factor Board (Top Overlay)	CI502	Sheet 6 of 8	D	2021-02-19
*C5000 K-Factor Board (Top Layer)	CI502	Sheet 7 of 8	D	2021-02-19
*C5000 K-Factor Board (Bottom Layer)	CI502	Sheet 8 of 8	D	2021-02-19
*CI502P-D CP-C5K-KFACT (BOM)	CI502P	3	D	2021-02-19
CI252				
*LCD PANEL LAYOUT1 (Schematic)	CI252	2	F	2021-03-04
*LCD PANEL LAYOUT1 (Top Overlay)	CI252	3 of 6	F	2021-03-04
*LCD PANEL LAYOUT1 (Top Layer)	CI252	4 of 6	F	2021-03-04
*LCD PANEL LAYOUT1 (Bottom Layer)	CI252	5 of 6	F	2021-03-04

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Annexe

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Title:	Drawing No.:	Pages	Rev. Level:	Date:
*LCD PANEL LAYOUT1 (Bottom Overlay)	CI252	6 of 6	F	2021-03-04
*CI252P-F CP-C5K-DSPLY7D1 (BOM)	CI252P	1	F	2021-03-04
CI253				
LCD PANEL LAYOUT2 (Schematic)	CI253	1 and 2 of 6	C	2019-08-15
LCD PANEL LAYOUT2 (Top Overlay)	CI253	3 of 6	C	2019-08-15
LCD PANEL LAYOUT2 (Top Layer)	CI253	4 of 6	C	2019-08-15
LCD PANEL LAYOUT2 (Bottom Layer)	CI253	5 of 6	C	2019-08-15
LCD PANEL LAYOUT2 (Bottom Overlay)	CI253	6 of 6	C	2019-08-15
CI253P-C CP-C5K-DSPLY7D2 (BOM)	CI253P	1	C	2019-08-15
CI515				
C5000 Preset (Schematic)	CI515	1 and 2 of 5	A	2018-04-06
C5000 Preset Board (Top Overlay)	CI515	3 of 5	A	2018-04-06
C5000 Preset Board (Top Layer)	CI515	4 of 5	A	2018-04-06
C5000 Preset Board (Bottom Layer)	CI515	5 of 5	A	2018-04-06
CI515P-A CP-C5K-PSET (BOM)	CI515P-A	1	A	2019-05-31

*Note: An * is included before the title of documents that are new or revised.*