



# 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](http://www.iecex.com)

Certificate No.: **IECEx CML 14.0047X**

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Certificate history:

Status: **Current**

Issue No: 5

[Issue 4 \(2019-08-23\)](#)

[Issue 3 \(2018-09-05\)](#)

[Issue 2 \(2017-06-23\)](#)

[Issue 1 \(2016-07-28\)](#)

[Issue 0 \(2015-07-27\)](#)

Date of Issue: 2020-01-21

Applicant: **Abtech Ltd**  
199 Newhall Road  
Lower Don Valley  
Sheffield  
S9 2QJ  
United Kingdom

Equipment: **SX Junction Boxes**

Optional accessory:

Type of Protection: **Increased Safety "eb", Intrinsic Safety "ia", "ib", Optical Radiation "op is", "op pr", Dust Ignition "ta", "tb"**

Marking: **See Annex for all marking options**

Approved for issue on behalf of the IECEx  
Certification Body:

**R C Marshall**

Position:

**Certification Officer**

Signature:  
(for printed version)

Date:

2020-01-21

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Certificate issued by:

**Eurofins E&E CML Limited**  
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United Kingdom





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Manufacturer: **Abtech Ltd**  
199 Newhall Road  
Lower Don Valley  
Sheffield  
S9 2QJ  
United Kingdom

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 60079-0:2011** Explosive atmospheres - Part 0: General requirements  
Edition:6.0

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

**IEC 60079-28:2006-08** Explosive atmospheres - Part 28: Protection of equipment and transmission systems using optical radiation  
Edition:1

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

**IEC 60079-7:2015** Explosive atmospheres – Part 7: Equipment protection by increased safety "e"  
Edition:5.0

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:

[GB/CML/ExTR16.0101/00](#)  
[GB/CML/ExTR19.0272/00](#)

[GB/CML/ExTR17.0108/00](#)

[GB/CML/ExTR18.0097/00](#)

Quality Assessment Report:

[GB/CML/QAR16.0021/03](#)



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Date of issue: 2020-01-21

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## **EQUIPMENT:**

Equipment and systems covered by this Certificate are as follows:

The SX range of junction boxes are fitted with an arrangement of suitably certified terminals

Refer to Annex for full description and conditions of manufacture.

## **SPECIFIC CONDITIONS OF USE: YES as shown below:**

Refer to Annex for Specific Conditions of Use.



# IECEx Certificate of Conformity

Certificate No.: **IECEx CML 14.0047X**

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Date of issue: 2020-01-21

Issue No: 5

## DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)

### Issue 1

This issue introduced the following changes:

1. To allow the use of separately certified plug and socket arrangements
2. The Conditions of Manufacture have been modified to take into account of the plug and socket arrangements.
3. To allow an alternative gasket and lid sealing arrangement
4. Modification to the power rating table to correct the assigned maximum surface temperature when a +65°C upper ambient temperature limit is applied.

### Issue 2

This issue introduced the following changes:

1. To update IEC 60079-7:2006 standard to the latest edition, IEC 60079-7:2015
2. To update the marking to reflect the latest edition of IEC 60079-7:2015
3. To include an option to allow the enclosure to be painted with a coating thickness up to 2mm for 'IIB' applications. The description and marking has been modified accordingly.
4. To correct typographic errors on drawings, including number drawing references listed in earlier certificate issues.
5. To modify the Conditions of Manufacture to remove the terminal reference document

### Issue 3

This issue introduced the following changes:

1. The addition of bus-bar connection facilities.

### Issue 4

This issue introduced the following changes:

1. To update QAR reference

### Issue 5

This issue introduced the following change:

1. To introduce the addition of a Wave Division Multiplexer

### Annex:

[IECEx CML 14.0047X Iss. 5 Certificate Annex.pdf](#)

**Annexe to:** IECEx CML 14.0047X Issue 5  
**Applicant:** Abtech Limited  
**Apparatus:** SX Range of Junction Boxes



## Description

The SX range of junction boxes are fitted with an arrangement of suitably certified terminals. Before the junction box is installed, its total power for particular application will be calculated in accordance with EN 60079-7, Annex E, E.2 and will not exceed the values given in the table below:

<b>Table 1. Ratings for all Junction Boxes options</b>					
SX Ref.	EPL	Max. Power Dissipation (W), Temperature Class, Max. Surface Temp. & Ta Max. (See Table 2 below for power limits applied to equipment marked 'op is').			
		(a) T6/T85°C @40°C (b) T5/T100°C @55°C (c) T4/T135°C @80°C	(a) T6/T85°C @55°C (b) T5/T100°C @70°C (a) T4/T135°C @60°C (e) T3/T200°C @80°C	(a) T6/T85°C @60°C (b) T5/T100°C @75°C (b) T4/T135°C @80°C (b) T3/T200°C @80°C	(a) T6/T85°C @65°C (b) T5/T100°C @80°C (a) T4/T135°C @60°C (d) T3/T200°C @175°C
SX0	Ga, Gb, Db	19	3.34	2.23	1.84
	Da	9.5	1.67	1.115	0.92
SX0.5	Ga, Gb, Db	22	3.9	2.8	2.1
	Da	11	1.95	1.4	1.05
SX1	Ga, Gb, Db	29	4.97	3.86	2.7
	Da	14.5	2.485	1.93	1.35
SX1.5	Ga, Gb, Db	32	5	4	2.8
	Da	16	2.5	2	1.4
SX2	Ga, Gb, Db	36	5.64	4.23	2.88
	Da	18	2.82	2.115	1.44
SX3	Ga, Gb, Db	42	5.9	4.1	3
	Da	21	2.95	2.05	1.5
SX4	Ga, Gb, Db	44	6.1	4.36	3.19
	Da	22	3.05	2.18	1.595
SX5	Ga, Gb, Db	50	9.35	6.19	4.2
	Da	25	4.675	3.095	2.1
SX6	Ga, Gb, Db	57	10.1	7.97	5.6
	Da	28.5	5.05	3.985	2.8
SX7	Ga, Gb, Db	68	17.14	9.36	6.67
	Da	34	8.57	4.68	3.335
SX8	Ga, Gb, Db	119	15.95	15.17	10.74
	Da	59.5	7.975	7.585	5.37
SX225*	Ga, Gb, Db	359	-	103	-
	Da	179.5	-	51.5	-
SX45	Ga, Gb, Db	8	1.65	1.57	1.28
	Da	4	0.825	0.785	0.64

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<b>Table 1. Ratings for all Junction Boxes options</b>					
SX Ref.	EPL	Max. Power Dissipation (W), Temperature Class, Max. Surface Temp. & Ta Max. (See Table 2 below for power limits applied to equipment marked 'op is').			
		(a) T6/T85°C @40°C (b) T5/T100°C @55°C (c) T4/T135°C @80°C	(a) T6/T85°C @55°C (b) T5/T100°C @70°C (a) T4/T135°C @60°C (e) T3/T200°C @80°C	(a) T6/T85°C @60°C (b) T5/T100°C @75°C (b) T4/T135°C @80°C (b) T3/T200°C @80°C	(a) T6/T85°C @65°C (b) T5/T100°C @80°C (a) T4/T135°C @60°C (d) T3/T200°C @175°C
SX64	Ga, Gb, Db	10	0.7	0.5	0.3
	Da	5	0.35	0.25	0.15
SX66	Ga, Gb, Db	14	2	1.9	1.5
	Da	7	1	0.95	0.75

<b>Table 2 – Optical Power</b>	
'op pr' applications	'op is' applications
T6/T85°C at a maximum ambient of ≤ 60°C	T6/T85°C at a maximum ambient of ≤ 65°C or T4/T100°C at a maximum ambient of ≤ 80°C
When 'op pr' is used with or without terminals, the splice case is limited to 100mW and a -40°C to 60°C ambient temperature.	When 'op is' is used with or without terminals.  Fibre optic source is limited for all T classes to a maximum irradiance of 5 mW/mm <sup>2</sup> (surface area not exceeding 400 mm <sup>2</sup> )  Signal power is limited to 15 mW @T6 and 35 mW @T4.
Notes: (a), (b), (c), (d) & (e) indicated in the table above relate to the limiting temperature of the terminal insulation, refer to the 'Conditions of Manufacture'.	

**Table 3**

Busbar size (Width x Thickness) (mm)	Max. current (A) for a Δ30K rise	Max. current (A) for a Δ40K rise	Max. current (A) for a Δ50K rise	Max. current (A) for a Δ60K rise	Max. current (A) for a Δ70K rise	Max. current (A) for a Δ80K rise
25 x 6.3	372	438	496	548	601	655
50 x 4	515	607	687	763	830	904
50 x 6.3	654	771	874	971	1057	1150
63 x 6.3	791	933	1057	1173	1277	1390
80 x 6.3	975	1151	1305	1447	1576	1715
63 x 10	1017	1173	1364	1512	1649	1795
80 x 10	1216	1436	1631	1806	1969	2413
100 x 10	1443	1705	1936	2143	2336	2541
125 x 10	1710	2021	2294	2538	2767	3008
Max. allowable ambient	Up to 90°C	Up to 80°C	Up to 70°C	Up to 60°C	Up to 50°C	40°C
Temperature Class and Max. ambient	T4@90°C T5@60°C T6@50°C	T4@80°C T5@50°C T6@40°C	T4@70°C T5@40°C	T4@60°C	T4@50°C	T4@40°C

Busbar sizes may be manufactured to sizes not specified to sizes in the table 3 above, including larger sizes in accordance with drawing 33712. The maximum allowable ambient and current will be marked on each arrangement.

The enclosures may also be manufactured to sizes not specified in the above Table 1. This assumes that any given dimension is not larger than the respective dimension of the largest or smaller than the respective dimension of the smallest enclosure. The power rating applied to a junction box of intermediate size is that of the next smallest enclosure.

Cable entries may be provided on the base, top, sides or back of the enclosure and alternatively, threaded bosses may be provided. An external and optional internal earth stud of minimum size M6 is provided on all enclosures.

The terminal boxes may be fitted with slotted trunking, an approved anti-condensation heater, plug and socket arrangements, bus-bars, as well as 'op pr' fibre optical splice cases and other 'op is' cable jointing facilities. Additionally, a Wave Division Multiplexer (WDM) is also permitted, but limited to T6 application.

Optionally, the enclosure may be painted and junction boxes marked T6/T85°C may be provided with a glass window.

## Marking:

### Without fibre optics

Ex eb IIB/IIC T# Gb  
Ex tb IIIC T#°C Db  
(Ta = -#°C to +#°C)

Ex ib IIB/IIC T# Gb  
Ex tb IIIC T#°C Db  
(Ta = -#°C to +#°C)

Ex ia IIB/IIC T# Ga  
Ex ta IIIC T#°C Da  
(Ta = -#°C to +#°C)

### With fibre optics

Ex eb op is IIB/IIC T# Gb  
Ex tb IIIC T#°C Db  
(Ta = -#°C to +#°C)

Ex ib op is IIB/IIC T# Gb  
Ex tb IIIC T#°C Db  
(Ta = -#°C to +#°C)

Ex ia op is IIB/IIC T# Ga  
Ex ta IIIC T#°C Da  
(Ta = -#°C to +#°C)

Ex op is IIB/IIC T# Ga  
Ex ta IIIC T#°C Da  
(Ta = -#°C to +#°C)

Ex eb op pr IIB/IIC T# Gb  
Ex tb IIIC T#°C Db  
(Ta = -40°C to +#°C)

Ex ib op pr IIB/IIC T# Gb  
Ex tb IIIC T#°C Db  
(Ta = -40°C to +#°C)

Ex ia op pr IIB/IIC T# Gb  
Ex tb IIIC T#°C Db  
(Ta = -40°C to +#°C)

Ex op pr IIB/IIC T# Gb  
Ex tb IIIC T#°C Db  
(Ta = -40°C to +#°C)

### Notes:

'#' – The temperature classes and associated ambient temperature allowable is related to the type of terminal fitted and EPL and power as indicated in Table 1 in the equipment description. See Table 2 for Optical power applications

## Conditions of Manufacture

The following are conditions of manufacture:

- 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.
- ii. Where the equipment is marked with both 'Ga' and 'Da', the maximum allowable power indicated on the label shall be either the lower of the two or both shall be included.
- iii. When the equipment is marked for 'op pr' the maximum ambient temperature that can be marked is -40°C to +60°C.
- iv. When trunking is fitted, it may be sited as required and the minimum creepage and clearance distances shall still be met.
- v. When marked for 'Ex ta', if terminals fitted are not suitable for a SCCA of 10kA or above, then max short circuit current is to be marked on the label.
- vi. The product may be fitted with an anti-condensation heater. The heater shall be IECEx approved for an ambient temperature range that matches or exceeds that for the terminal box and shall be compete with a thermostat which prevents the operation of the heater at temperatures above +30°C.
- vii. When terminals are supplied with the enclosure, they shall be IECEx approved components, having a maximum insulation temperature as below. All terminals shall be installed in accordance with their Conditions of Safe Use/Schedule of Limitations/Conditions of Certification and the relevant codes of practice/wiring regulations, specifically to the minimum creepage and clearance requirements and to any limitations to ratings that may be observed due to method of installation.

The letter in the brackets next to the Temperature class and associated upper ambient relates to the following maximum operating temperatures required of the terminals fitted.				
(a)	(b)	(c)	(d)	(e)
≥85°C	≥100°C	≥120°C	≥190°C	≥105°C
All terminals fitted shall be suitable for the lower operating temperature marked on the certification label.				

- viii. When plug and sockets are fitted that are certified 'Ex d e' or 'Ex db eb', then the junction box marking shall include the symbol 'd' as part of the label marking code, as well as the appropriate gas/dust group marking if not 'IIC' and 'IIIC', as defined by the plug and socket approval. Any plugs and sockets shall be equipment approved.
- ix. The window option stated on the construction specification document is not permitted on the flanged lid enclosure arrangements.
- x. This certificate does not cover any plug and socket arrangements that may be fitted to the enclosure. All plug and socket arrangements fitted shall be appropriately designed for this type of apparatus. Additionally, the plug and socket arrangements shall:
  - Be suitable for the intended temperature range of the junction box.
  - Be suitable to maintain the required creepage and clearances in accordance with IEC 60079-7.



- Have a minimum ingress protection rating of IP54 or IP64 (if the boxes are marked for dust applications).
  - Have a declared contact resistance or power dissipation rating.
- xi. Be installed in accordance with their certificate conditions and the relevant codes of practice/wiring regulations.
- xii. When busbar arrangements are provided, the maximum current, ambient temperature, as well as the corresponding temperature class shall be marked for the specific arrangement. Additionally, the appropriate cable entry temperature shall be marked.
- xiii. When intermediate or larger size busbar arrangements are provided, the calculated temperature rise shall be in accordance with drawing 33712 and not exceed a rise of 80K.

## Specific Conditions of Use

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

- i. When used for Ex ia, Ex ib and Ex ta applications, over-power fault protection shall be provided and shall take into account the 'EPL' fault requirements necessary:
  - Ex ia – Two countable faults is to be applied to the current and/or voltage limiter.
  - Ex ib or Ex ta – Gb and Da applications – One countable fault is to be applied to the current and/or voltage limiter.
- ii. When used for Ex ia or Ex ib applications an anti-condensation heater may only be fitted when space permits the separation of the heater power conductors from the Ex ia or Ex ib conductors by a minimum of 50 mm.
- iii. When fitted with 'op pr' splice case, the fibre cable outside the enclosure shall be installed such, that mechanical damage is prevented.
- iv. When marked 'Ex op is', the fibre optic source supplying this equipment shall be suitably certified as compliant with IEC 60079-28:2006 and provide an inherently safe optical source (op is), EPL Gb, subsequently the parameters in Table 2 apply.
- v. When marked 'Ex e op pr', the fibre ST connectors contained within the increased safety enclosure must not be separated whilst energised if an explosive atmosphere may be present.
- vi. If not used fibre ST connectors within the increased safety enclosure must have dust covers fitted.
- vii. The fibre cables entering or exiting the increased safety enclosure must be suitably protected from breakages and satisfy the requirements of IEC 60079-28 'op pr'.
- viii. When the enclosure is provided with busbar arrangements, they shall be installed in accordance with the user instructions only.
- ix. Wave Division Multiplexer can only be fitted in T6 rated terminal boxes.