



IECEX Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

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

Certificate No.: IECEx CML 16.0111X

Issue No: 3

Certificate history:

Issue No. 3 (2019-08-16)

Issue No. 2 (2018-03-28)

Issue No. 1 (2018-03-02)

Issue No. 0 (2017-05-31)

Status: **Current**

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Date of Issue: **2019-08-16**

Applicant: **Abtech Ltd**
Lower Don Valley,
Sheffield, S9 2QJ
United Kingdom

Equipment: **4TJB High Voltage Junction Box**

Optional accessory:

Type of Protection: **Ex sb, Ex op pr, Ex tb**

Marking:

High Voltage Enclosure - Ex sb IIC T4 Gb or Ex sb IIB T4 Gb

Optical Signal Enclosure:

Ex * op is IIC T4 Gb or Ex * op is IIB T4 Gb &/or Ex op is IIC T70°C/ T80°C Db or

Ex * op pr IIC T4 Gb or Ex * op pr IIB T4 Gb &/or Ex op pr IIC T70°C/ T80°C Db

* where enclosure also has an electrical connections, marking will also include Ex eb marking

Ta= Up to -50°C to +55°C (See description)

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

H Amos

Position:

Technical Manager

*Signature:
(for printed version)*

Date:

August 16, 2019

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 the [Official IECEx Website](http://www.iecex.com).

Certificate issued by:

Eurofins E&E CML Limited
Unit 1, Newport Business Park
New Port Road
Ellesmere Port, CH65 4LZ
United Kingdom





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Manufacturer: **Abtech Ltd**
Lower Don Valley,
Sheffield, S9 2QJ
United Kingdom

Additional Manufacturing location(s):

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 apparatus 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 Edition:6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-28 : 2015 Edition:2	Explosive atmospheres - Part 28: Protection of equipment and transmission systems using optical radiation
IEC 60079-31 : 2013 Edition:2	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"
IEC 60079-33 : 2012 Edition:1.0	Explosive atmospheres – Part 33: Equipment protection by special protection "s"

*This Certificate **does not** indicate compliance with electrical 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 Report:

[GB/CML/ExTR16.0114/00](#) [GB/CML/ExTR18.0062/00](#) [GB/CML/ExTR18.0076/00](#)

Quality Assessment Report:

[GB/CML/QAR16.0021/02](#)



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Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The 4TJB Junction Boxes are high voltage 3 Phase junction boxes, which are rated up to a maximum of 45kV and 346W, depending on the ambient temperature.

See Annex for full description and Conditions of Manufacture

SPECIFIC CONDITIONS OF USE: YES as shown below:

See Annex for Specific Conditions of Use



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

Issue 1

This issue introduced the following changes:

1. To recognise clarifications in the documentation with regards to the enclosure sizes and types of connection facilities that are permitted.

Issue 2

This issue introduced the following changes:

1. To allow a description change to reflect the clarification modification listed in Issue 1 above

Issue 3:

This issue introduced the following changes:

1. To update QAR reference only

Annex:

[Certificate Annex IECEx CML 16.0111X Issue 3.pdf](#)

Annexe to: IECEx CML 16.0111X Issue 3
Applicant: Abtech Ltd
Apparatus: 4TJB 45kV High Voltage Junction Box



Description of Equipment

The 4TJB Junction Boxes are high voltage 3 Phase junction boxes, which are rated up to a maximum of 45kV and 346W, depending on the ambient temperature.

Table 1 – Ratings for High Voltage Enclosure				
Ambient temperature range (°C)	Maximum Voltage rating (Volts)	Maximum Current rating (A)	Maximum Power Dissipation (Watts)	Temperature class
-50°C to +40°C	45kV	980A	346W	T4 / T135°C
-50°C to +55°C	45kV	882A	288W	T4 / T135°C

Table 2 – Optical Power	
‘op pr’ applications	‘op is’ applications
T4/T70°C at a maximum ambient of $\leq 40^{\circ}\text{C}$ T4/T80°C at a maximum ambient of $\leq 55^{\circ}\text{C}$	T4/T70°C at a maximum ambient of $\leq 40^{\circ}\text{C}$ T4/T80°C at a maximum ambient of $\leq 55^{\circ}\text{C}$
When ‘op pr’ is used with or without terminals, the splice case is limited to 100mW and a -40°C to 55°C ambient temperature.	When ‘op is’ is used with or without terminals. Fibre optic source is limited to a maximum irradiance of 5 mW/mm ² (surface area not exceeding 400mm ²) Signal power is limited to 35 mW@T4.

The 4TJB Junction Boxes use the Abtech Ltd, SX225 enclosures, which are component approved IECEx CML 15.0039U and marked Ex e IIC Gb / Ex tb IIIC Db.. Typical dimensions are 1300mm x 1500 mm x 500mm, but may be up to 2000mm x 2000mm x 500mm.

There are three bus bars available, one per phase, each providing connections for either two, three or four conductors per phase. Each bus bar is supported by two insulators and each phase is separated by an insulated base and cover partitions, as well as partitions on both sides to ensure adequate creepage and clearance distances are met.

The terminals can be sized either M10 or M20, the manufacturer supplies the cable lugs for use by the end user. The cable lugs are not part of this approval.

The 4TJB Junction Boxes can also be supplied with appropriately Ex e approved IECEx anti-condensation heater and thermostat.

The 4TJB option consists of a main HV enclosure as above, but additionally includes a separate signal enclosure fitted to the side, covered under IECEx CML 14.0047X.

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Conditions of Manufacture

The following are conditions of manufacture:

- i The products covered by this certificate incorporate separately certified devices, it is therefore the responsibility of the manufacturer to continually monitor the status of the certification associated with these devices. The manufacturer shall inform CML of any modifications of the devices that may impinge upon the explosion safety of their design.

In addition, this certificate relies on the following previously certified products. When the Junction Box is fitted with anti-condensation heater that includes a thermostat; the key attributes listed in the table below shall still be maintained by their original certificate.

Description	Certificate No.	Key Attributes
Anti-Condensation heater fitted with a thermostat	As appropriate	Suitably certified by a notified/certification body as a piece of equipment Ex e, with a T6 temperature class and suitable for the exposed ambient temperature. The integral thermostat of the incorporated heater shall have a limiting temperature set to no higher than 25°C. Appropriate creepage and clearances are still maintained

- ii If the terminals are fitted with cables/wiring by the manufacturer; then a routine dielectric strength test shall be carried out on each unit in accordance with IEC 60079-7:2015, clause 7.1.

The test voltage shall be determined on the basis of the marked maximum rated voltage, with the appropriate safety factor and test duration applied in accordance with IEC 60079-7:2015, clause 6.1.

No flashover or breakdown shall occur.
- iv When the equipment is marked for 'op pr' the extreme ambient temperature limit marking that can be applied is -40°C to +55°C
- v Junction Boxes that are marked with the ambient range -50°C to +55°C shall only be constructed using an SX component enclosure with a minimum depth of 300 mm, without windows and fitted with silicone gaskets, as approved by IECEx CML15.0039U.
- vi The maximum Power of the equipment is dependent on the ambient and current rating. The maximum ambient, power and voltage ratings shall be marked in accordance with the Description on this certificate and with the approved drawings listed on this certificate.



Specific Conditions of Use

The following are conditions of safe use / installation.

- i. For junction boxes used at voltages over 11kV (Zone 1) or 15kV (Zone 2) and installed in a location where an explosive atmosphere is considered present under normal operation or fault conditions (Zones either 1, 2, 21 or 22), the installer/user shall take into account any additional risks the location/environmental conditions and installation may pose to electrical breakdown or corona discharge, such as moisture/condensation and contaminates (dust, oils/greases, etc). Additionally, the installer shall consider the cables installed to ensure they do not increase any ignition risks, (materials, size and secureness of connections, it is additionally considered that the high voltage cables should be armoured and screened, as well as used with appropriate connection sleeves) Although above points should be adhered to, a responsible site engineer shall be consulted to address these risks within each installation application.
- ii. When fitted with high voltage (45 kV maximum working voltage) terminals, the maximum dissipated power of the Junction Boxes shall be calculated in accordance with IEC 60079-7:2015, Annex E.2, and shall not exceed the maximum power rating defined in the Description on this certificate.
- iii. An electric strength test shall be carried out on the 4TJB Junction Boxes after it has been installed. The test shall be carried out at a value of 91 kVac r.m.s. in accordance with IEC 60079-7:2015, clause 7.1.
- iv. Moisture and condensation may reduce the effectiveness of the creepage distances, to reduce the risk, the environmental conditions during installation and maintenance activities shall be observed. The enclosure shall only be opened when the local ambient temperature is between 5°C and 40°C with a maximum relative humidity of 80% to temperatures up to 31°C, decreasing linearly to 50% at 40°C.
- v. The following minimum creepage and clearance distances shall be maintained:

Location	Creepage	Clearance
Phase to phase	828	534
Phase to earth	564	454
- vi. When the separate optical signal enclosure is marked 'Ex op is', the fibre optic source supplying this equipment shall be suitably certified as compliant with at least IEC 60079-28:2006 or later and provide an inherently safe optical source (op is), EPL Gb, subsequently the parameters in Table 2 in the description apply. Additionally, the optical supply shall provide over-power fault protection suitable for an ELP level 'Gb'.
- vii. When the separate optical signal enclosure is marked 'Ex e op pr', the fibre ST connectors contained within the optical enclosure must not be separated whilst energised if an explosive atmosphere may be present. Any fibre ST connectors within the optical enclosure which are not used must have dust covers fitted.
- viii. The fibre cables entering or exiting the separate optical enclosure must be suitably protected from damage/breakages and satisfy the requirements of EN 60079-28 'op pr'.



- ix. When Anti-condensation heaters and thermostats are fitted, the user/installer shall ensure the local ambient inside the junction box does not exceed the upper ambient temperature limit.
- x. The 4TJB Junction Boxes shall be installed in accordance with manufacturer's instructions document ABTQ-120.