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 16.0099X

Issue No: 5

Status: **Current**

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

Certificate history:
Issue No. 5 (2019-08-16)
Issue No. 4 (2019-02-19)
Issue No. 3 (2018-01-04)
Issue No. 2 (2017-05-26)
Issue No. 1 (2017-01-12)
Issue No. 0 (2016-12-09)

Applicant: **Abtech Ltd**
199 New Hall Road
Sheffield
S9 2QJ
United Kingdom

Equipment: **ABJB High Voltage Junction Box**
Optional accessory:

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

Marking:
Ex sb IIC T4 Gb or Ex sb IIB T4 Gb
Ex tb III C T##°C Db
Ex * op is IIC / IIIC T##°C Gb/Db or Ex * op is IIB / IIIC T##°C Gb/Db
Up to -50°C to +55°C
(## and * dependent on application, see description)

Approved for issue on behalf of the IECEx Certification Body: Helen 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.

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** 199 New Hall Road Sheffield S9 2QJ S9 2UA **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”
IEC 60079-7 : 2006-07 Edition:4	Explosive atmospheres - Part 7: Equipment protection by increased safety "e"

*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/ExTR16.0127/00 GB/CML/ExTR17.0004/00 GB/CML/ExTR17.0093/00
GB/CML/ExTR18.0001/00 GB/CML/ExTR19.0033/00

Quality Assessment Report:

GB/CML/QAR16.0021/00 GB/CML/QAR16.0021/02

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Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The ABJB are a range of High Voltage Junction Boxes

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 correct a typographic error to the drawing list in the report

Issue 2

This issue introduced the following changes:

1. To allow an alternative ABJB-8* bus bar layout arrangement.
2. To include an option to allowed the enclosure to be painted with a coating thickness up to 2mm for 'IIB' applications.

Issue 3

This issue introduced the following changes:

1. To allow the terminal and optical arrangements to be fitted in an alternative Nautilus enclosure. The description has been modified accordingly.

Issue 4

This issue introduced the following changes:

1. To clarify the minimum distances for the insulator arrangements.

Issue 5

This issue introduced the following changes:

1. To update QAR reference

Annex:

Certificate Annex IECEx CML 16.0099X Issue 5.pdf

Description of Equipment

The ABJB 15kV Range of High Voltage Junction Boxes are available in the following sizes:

Table 1 – Ratings for High Voltage Enclosure

Junction box reference	Ambient Temperature Range	Maximum power dissipation (W)	T Class	Dust Surface Temperature Marking
ABJB-7*	-20°C to +40°C	259 W	T4	T70°C
	-50°C to +55°C	215 W	T4	T80°C
ABJB-8*	-20°C to +40°C	346 W	T4	T70°C
	-50°C to +55°C	288 W	T4	T80°C
ABJB-125	-20°C to +40°C	346 W	T4	T70°C
	-50°C to +55°C	288 W	T4	T80°C

Note: Where* is either 2 (2 Way), 3 (3 Way) or 4 (4 Way)

Table 2 – Optical Power

'op pr' applications	'op is' applications
T4/T70ºC at a maximum ambient of ≤40ºC T4/T80ºC at a maximum ambient of ≤55ºC	T4/T70ºC at a maximum ambient of ≤40ºC T4/T80ºC at a maximum ambient of ≤55ºC
When 'op pr' is used with or without terminals, the splice case is limited to 100mW and a -40ºC to 55ºC 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 empty enclosures used for the ABJB Junction Boxes are the Type SX Range of Enclosures, covered under IECEx CML 15.0039U and marked Ex e IIC Gb / Ex tb IIIC Db. Alternatively, the terminal and optical arrangements may be fitted inside a Nautilus enclosure.

Inside the enclosure, the ABJB Range of Junction Boxes has an arrangement of up to four copper busbars to provide connection facilities.

The busbars are supported on insulators and may accommodate up to three cables per phase, a single cable per phase or a combination, depending on the arrangement. The connecting cables are terminated via cable lugs that are fitted between busbars and have insulated partitions to provide creepage and clearance distances between live parts.

The ABJB Junction Boxes may be fitted with a suitably certified and dimensioned heater and may have an optional isolated earth connection.

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Optionally, an additional side terminal compartment may be provided for connection of fibre optic cables and a separate break-out box can be included to aid cable connections at the bottom of the main high voltage enclosure. The side terminal enclosure may be fitted with 'op pr' fibre optical splice cases and other 'op is' cable jointing facilities.

Cable entries used for the ABJB Junction Box Enclosures shall be Ex eb IIC Gb and/or Ex tb IIIC Db, depending on the explosive atmosphere and shall be suitable for the lower ambient and 30°C above the upper ambient.

Marking

High Voltage Terminal Enclosure	**Optical Connection Enclosure 'op is'**	**Optical Connection Enclosure 'op pr'**
Ex sb IIC T4 Gb or Ex sb IIB T4 Gb 50°C≤Tamb≤+55°C	Ex * op is IIC T4 Gb or Ex * op is IIB T4 Gb -40°C≤Tamb≤+55°C	Ex * op pr IIC T4 Gb or Ex * op pr IIB T4 Gb or -40°C≤Tamb≤+55°C
Ex tb IIIC T70°C Db -20°C≤Tamb≤+40°C or	Ex * op is IIIC T70°C Db or -20°C≤Tamb≤+40°C	Ex * op pr IIIC T70°C Db or -20°C≤Tamb≤+40°C
Ex tb IIIC T70°C/ T80°C Db -50°C≤Tamb≤+55°C	Ex * op is IIIC T80°C Db -40°C≤Tamb≤+55°C	Ex * op pr IIIC T80°C Db -40°C≤Tamb≤+55°C

Ex * op is IIB/IIC/IIIC T4/T70°C or T80°C Gb/Db or Ex * op pr IIB/IIC/IIIC T4/T70°C or T80°C Gb/Db
* where enclosure also has an electrical connections, marking will also include Ex e marking. (adjacent optical enclosure only – where applicable)

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 many 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 30°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.

iii When fitted with high voltage (15 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.

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 ambient temperature of the equipment is dependent on the model and maximum power dissipation/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.

vii When optional adjacent non-metallic optical enclosure is fitted, non-carbon loaded enclosures shall be fitted with the static warning label required under its component approval.

Specific Conditions of Certification

The following are conditions of safe use / installation.

i. For junction boxes used at voltage over 11kV and installed in a location where an explosive atmosphere is considered present under normal circumstances (Zones 1 or 21), the installer/user shall consider and take account of any additional risks posed by the location or the environment which may exacerbate electrical breakdown or corona discharge, such as humidity, condensation, or contaminants such as dusts, oils or greases. Additionally, the installer shall determine that the cables to be installed do not increase the ignition risk, (materials, size and secureness of connections). Cable sleeves and connection covers should be considered as a part of the cable termination.

ii. During installation the main supply screen (copper shield tape or braid) shall be twisted and crimped to a terminal lug at the end prior to being covered with heat shrink sleeving, and connected to the internal enclosure earth stud or the earth bar (where provided). When provided and used, dedicated insulated earth lead with suitable crimped terminal lugs at each end shall be provided between the earth bar and the enclosure earth stud. If an isolated earth bar is provided, e.g. for the connection of remote screen current monitoring, the main supply screen may be connected to this instead of to the enclosure earth stud.

iii. When one or more isolated earth bars are provided and used for cable screens and/or cable armour, the user must ensure that a dedicated insulated earth lead is provided between the isolated earth bars then exiting the enclosure via a suitably certified IP66 cable gland. The cross section of the earth leads must be at least half that of the main supply conductors. All earth lead connection must include a crimped terminal lug and cables must be secured to the support rails to prevent reduction of the creepage and clearance distances

iv. The following minimum creapage and clearance distances shall be maintained:

Location	Creepage	Clearance
Phase to phase	194 mm	150 mm
Phase to earth	115 mm	90 mm

v. Under certain extreme circumstances, the non-metallic parts of the optical enclosure (when fitted) of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. In addition, the equipment shall only be cleaned with a damp cloth.

vi. When 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. Aditionally, the optical supply shall provide over-power fault protection suitable for an ELP level ‘Gb’.

vii. When 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 optical enclosure must be suitably protected from damage/breakages and satisfy the requirements of IEC 60079-28 ‘op pr’.

ix. The ABJB Junction Boxes shall be installed in accordance with manufactures instructions document ABTQ-80.