1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: **Sira 99ATEX3177** Issue: **12**

4 Equipment: **Busbar Junction Box**

5 Applicant: **ABTECH Ltd**

6 Address: Sanderson Street
Lower Don Valley
Sheffield S9 2UA
UK

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 60079-0:2012 EN 60079-7:2007 EN 60079-31:2009

The above list of documents may detail standards that do not appear on the UKAS Scope of Accreditation, but have been added through Sira's flexible scope of accreditation, which is available on request.

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

II 2 G D
Ex e IIC T* Gb (Ta –40°C to +*°C)
Ex tb IIIC T*°C Db (Ta –40°C to +*°C)
* These values depend on the application of the product, refer to the tables in the Certificate Schedule.

Project Number 32260

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Deputy Certification Manager

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13 **DESCRIPTION OF EQUIPMENT**

The Ex e Busbar Enclosure comprises an enclosure manufactured from 316 or 316L stainless steel with a minimum thickness of 2 mm measuring a minimum of 675 mm long by 770 mm wide by 770 mm deep and a maximum of 1250 mm long by 1250 mm wide by 770 mm deep. The enclosure has openings located on three of the faces. The lid, which is hinged, is secured by a minimum of eight fixings, these consist of M6 x 20 mm slotted or slotted/hexagonal captive screws that locate to M6 cage nuts and M6 by 30 mm tank bush fixing screws. Sealing is provided by an adhesive backed, closed cell silicone seal as SX range to SIRA 99ATEX3170U. Two of the faces, which are adjacent to the lid, are provided with two 5 mm thick stainless steel 316L or brass CZ112 removable gland plates. They are each secured by a minimum of eighteen M8 x 16 mm hexagonal headed screws, which screw into M8 welded tank bushes. Sealing is provided by a closed cell silicone gasket as SX range to SIRA 99ATEX3170U. Either an M16 or M10 x 50 mm external/internal earthing facility is located on the non-removable face opposite to the face which supports the lid hinges. An additional earthing facility may be fitted on the non-removable face which supports the lid hinges. Anti-loosening facilities are provided by appropriately sized spring and plain washers. Inside the enclosure, there are four 12.5 mm thick, 100 mm wide, copper busbars. Each busbar comprises two identical copper bars, one adjacent to the other with a space between. The busbars are designed to be drilled to suit the users requirements with respect to the securing of crimped cables. When drilled for crimp lugs, the securing bolt passes through a copper spacer, which is positioned between the two busbars. The busbars are supported by an insulating frame manufactured from 20 mm and 12 mm thick Glastic® grade UTR laminate part N° 1494. In all cases, the interfaces are sealed with cement to guarantee the maintenance of the appropriate creepage and clearance distances. The enclosure has a maximum rating of 11 kV and 3000 A. The temperature classification is dependent upon the power dissipation and the ambient range as per the table below:

Ambient range	Power dissipation	T Class	Temp. marking for dust
-40°C to +60°C	74.7 W	T6	T65°C
-40°C to +40°C	74.7 W	T6	T55°C
-40°C to +40°C	167.5 W	T5	T55°C

When three cables are connected per phase (i.e. six lugs per busbar) the following maximum ratings apply:

Ambient range	T class	No of cables	Maximum enclosure surface temp.	Maximum current per busbar	Max power dissipation (I^2R losses)
-40°C to +40°C	T5	Three	T63°C	2439 A	192.0 W
-40°C to +40°C	T6	Three	T51°C	2022 A	132.0 W
-40°C to +60°C	T6	Three	T65°C	1509 A	73.6 W
-40°C to +45°C	T5	Three	T56°C	2124 A	145.8 W

When four cables are connected per phase (i.e. eight lugs per busbar, 3200 A) the following maximum ratings apply:

Ambient range	T class	No of cables	Maximum enclosure surface temp.	Maximum current per busbar	Max power dissipation (I^2R losses)
-40°C to +40°C	T5	Four	T55°C	1847.5 A	245 W

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE **Sira 99ATEX3177**
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Variation 1 - This variation introduced the following change:

i. The introduction of an alternative size of enclosure that has the same depth and width as the previously certified enclosures but the height has been increased 1250 mm maximum.

Variation 2 - This variation introduced the following changes:

i. The re-calculation of the power dissipation figures and to replace the table of ambient range/power dissipation/temperature class/temperature marking for dust in which these figures are quoted.
ii. To permit the use of smaller cable lugs and/or to increase the number of connections per bus bar

Variation 3 - This variation introduced the following changs:

i. The recognition of three cables to be connected per phase and the introduction of an alternative certification coding, EEx e II T5 (T_a = -40°C to +45°C), when assembled in this manner.

Variation 4 - This variation introduced the following changes:

i. To permit a suitably certified and dimensioned heater to be fitted, this heater is defined as "Any suitably certified and dimensioned heater that is fitted with a thermostat set to a maximum of 25°C".
ii. The sizes of the of the busbar box to be increased.

Variation 5 - This variation introduced the following change:

i. Following appropriate re-assessment to demonstrate compliance with the requirements of the EN 60079 and the EN 61241 series of standards, the documents originally listed in section 9, EN 50014:1997 (amendments A1 to A2), EN 50019:2000 and EN 50281-1-1:1998, were replaced by EN 60079-0:2006, EN 60079-7:2003, EN 61241-0:2006 and EN 61241-1:2006, the markings in section 12 were updated accordingly.

Variation 6 - This variation introduced the following changes:

i. An increase in maximum permitted current of up to 3200 A at a maximum voltage of 11 kV was endorsed, hence the following ratings were recognised:
When four cables are connected per phase (i.e. eight lugs per busbar) at the following maximum ratings:

Ambient range	T class	No of cables	Maximum enclosure surface temp.	Maximum current per busbar	Max power dissipation (I^2R losses)
-40°C to +40°C	T5	Four	T55°C	1847.5 A	245 W

Variation 7 - This variation introduced the following changes:

i. The addition of optional modified bus-bar spacers fitted with 25mm diameter earthing balls for the connection of portable earthing equipment and an optional acrylic shield with windows for the insertion of dead check hot stick were approved.
ii. The operation, up to and including 8.8 kV, when the bus-bar mounting frame does not have any adhesive fitted was endorsed. Where adhesive is used the maximum rating is raised to 11 kV.
iii. Correction of Conditions Of Certification 17.3 and the inclusion of a new Condition was ratified.
iv. The listed dust standard, EN 61241-1:2006, was corrected to show the correct date.

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Variation 8 - This variation introduced the following changes:

i. Following appropriate re-assessment to demonstrate compliance with the requirements of the latest EN 60079 series of standards, the documents originally listed in section 9, EN 60079-0: 2006, EN 60079-7: 2003, EN 61241-0: 2006 and EN 61241-1:2004, were replaced by those currently listed, the markings in section 12 and Conditions of Certification were updated accordingly.

ii. The changes to the Conditions of Certification that were recommended in the previous Issue were not implemented in section 17, this has been rectified.

Variation 9 - This variation introduced the following changes:

i. It was retrospectively recognised that drawing ABT 10330 Rev. B changed the seal materials as detailed below:
   - Gland Plate Gasket – Previously neoprene bonded cork now a closed cell silicone gasket as used in the SX Range of enclosures certified as SIRA 99ATEX3170U.
   - Lid Seal – Previously adhesive backed, closed cell neoprene now an adhesive backed, closed cell silicone seal as used in the SX Range of enclosures certified as SIRA 99ATEX3170U.

   The Description was modified accordingly.

Variation 10 - This variation introduced the following changes:

i. The following aspects of construction were retrospectively recognised:
   - The enclosure is permitted to be manufactured from 316 or 316L Stainless Steel with a minimum thickness of 2 mm.
   - Drawing numbers ABT10330 and ABT16373 detail:
     - The enclosure measures a minimum of 675 mm long by 770 mm wide by 770 mm deep and a maximum of 1250 mm long by 1250 mm wide by 770 mm deep.
     - A minimum of 8 fixing screws, dependant on size, are used to secure the hinged lid to the enclosure.
     - A minimum of 18 fixing screws, dependant on size, are used to secure the gland plates to the enclosure.
     - An additional earthing facility may be fitted on the non-removable face which supports the lid hinges.

   The Description was modified accordingly.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report/File no.	Comment
0	13 March 2000	R51A6055A	The release of the prime certificate.
1	11 May 2000	53V6876	The introduction of Variation 1 (This document was re-issued 18 December 2006 recognise the re-issue of the prime certificate).
2	23 August 2000	53V7181	The introduction of Variation 2 (This document was re-issued 18 December 2006 recognise the re-issue of the prime certificate).

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Issue	Date	Report/File no.	Comment
3	15 November 2000	R53A7393A	The introduction of Variation 3 (This document was re-issued 18 December 2006 recognise the re-issue of the prime certificate).
4	15 August 2006	R51A15308A	The introduction of Variation 4 (This document was re-issued 18 December 2006 recognise the re-issue of the prime certificate).
5	18 December 2006	R51A6055A	Re-issued 18 December 2006 to amend the product description.
6	28 February 2008	R51A17090B	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 6, Issues 0 to 5 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format. • The introduction of Variation 5. • The change of the company name from AB Controls and Technology, first recognised 31 January 2007.
7	04 October 2010	R22188A/00	The introduction of Variation 6.
8	02 September 2011	R25407A/00	The introduction of Variation 7.
9	24 January 2013	R29085A/00	The introduction of Variation 8.
10	4 December 2013	R32260A/00	This Issue covers the following changes: • Change ii in Variation 8 was amended to recognise that a new Condition of Certification was not added, but it was the correction of an administrative oversight. • The introduction of Variation 9.
11	9 January 2014	R32260B/00	The introduction of Variation 10.
12	30 March 2016	N/A	This Issue covers the following changes: • The introduction of Variation 9.The necessary marking specified by this certificate was made generic thereby allowing it to cover all options that are made. This is an administrative change that needed no technical assessment, therefore a report was not required. • At the request of the manufacturer, the rating table introduced in Variation 6 was added to the Description of Equipment.

15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

None

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

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SCHEDULE

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17 **CONDITIONS OF CERTIFICATION**

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

17.3 The power dissipation of the enclosure shall be calculated in accordance with Appendix E.2 of EN 60079-7:2006. The calculation shall take into account the contact resistance of any connection as well as the cable resistance. The power shall be dissipated evenly throughout the enclosure.

17.4 This certificate relies on the following previously certified products. When used as part of an SX Junction Box that 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 number	Key attributes
Anti-condensation heater fitted with a thermostat	As appropriate	Suitably certified by a notified body as a piece of equipment with a T6 temperature classification.

The manufacturer shall ensure that the previously certified heater that includes a thermostat is being used within the scope, the ratings and any special conditions for safe use that are specified in its associated certificate.

17.5 An electric strength test shall be carried out only when the terminals are fitted with cable. This test shall be carried out according to EN 60079-7:2006 clause 7.1.

17.6 The Busbar Junction Box approved by this certificate is rated for use at 11 kV unless the bus-bar mounting frame does not have any adhesive fitted, in which case, the maximum voltage is limited to 8.8 kV.

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Certificate Annexe

Certificate Number: **Sira 99ATEX3177**

Equipment: **Busbar Junction Box**

Applicant: **ABTECH Ltd**

Issue 0

Drawing	Sheet	Rev.	Date	Description
ABT 10264	1 of 1	A	21 Dec 99	External Label (Busbar)
ABT 10330	1 of 1	A	06 Dec 99	Busbar Enclosure
ABT 10331	1 of 1	A	06 Dec 99	Busbar Clamp
ABT 10332	1 of 1	A	06 Dec 99	Busbar Support Plates
ABT 10333	1 of 1	A	06 Dec 99	Phase Seperators
ABT 10334	1 of 1	A	06 Dec 99	Busbar Enclosure
ABT 10335	1 of 1	A	06 Dec 99	Busbars

Issue 1

Drawing	Sheet	Rev.	Date	Description
ABT 10551	1 of 1	A	11 May 00	Busbar Enclosure

Issue 2

No new drawings were introduced.

Issue 3

No new drawings were introduced.

Issue 4

Drawing No.	Sheet	Rev.	Date (Sira stamp)	Description
ABT16373	1 of 1	A	11 July 06	Extended BusBar Box

Issue 5

Drawing	Sheet	Rev.	Date	Description
ABT 10264	1 of 1	A	21 Dec 99	External Label (Busbar)
ABT 10330	1 of 1	A	06 Dec 99	Busbar Enclosure
ABT 10331	1 of 1	A	06 Dec 99	Busbar Clamp
ABT 10332	1 of 1	A	06 Dec 99	Busbar Support Plates
ABT 10333	1 of 1	A	06 Dec 99	Phase Seperators
ABT 10334	1 of 1	A	06 Dec 99	Busbar Enclosure
ABT 10335	1 of 1	A	06 Dec 99	Busbars

Issue 6

Drawing No.	Sheet	Rev.	Date	Description
ABT 16373	1 of 1	B	06 Dec 07	Extended Busbar Enclosure
ABT 10264	1 of 1	B	06 Dec 07	Certification Label

Issue 7

Drawing No.	Sheets	Rev.	Date (Sira stamp)	Title
ABT 16373	1 of 1	C	27 Sept 10	Extended Busbar Enclosure
ABT 21677	1 of 1	A	27 Sept 10	High Current Busbar

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Certificate Annexe

Certificate Number: **Sira 99ATEX3177**

Equipment: **Busbar Junction Box**

Applicant: **ABTECH Ltd**

Issue 8

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
ABT 16373	1 of 1	D	02 Sep 11	Extended Busbar Enclosure with earthing points
ABT 22199	1 of 1	A	04 Aug 11	Acrylic Shield
ABT 10264	1 of 1	C	02 Sep 11	Certification Label

Issue 9

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
ABT 10264	1 of 1	D	14 Jan 13	External Label (Busbar)
ABT 10330	1 of 1	B	14 Jan 13	Busbar Enclosure

Issue 10 - No new drawings were introduced.

Issue 11 - No new drawings were introduced.

Issue 12 - No new drawings were introduced.

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