



1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: **Sira 01ATEX2229X** Issue: **10**

4 Equipment: **TX6641 Intrinsically Safe Power Supply Chassis**

5 Applicant: **Trolex Limited**

6 Address: **Newby Rd
Hazel Grove
Stockport
Cheshire SK7 5DY
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 60079-0:2006 EN 60079-11:2007
IEC 60079-0:2007 Edition 5 (used for guidance in respect of marking)

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:

 I (M1)
[Ex ia Ma] I Ta = -20°C ≤ Ta ≤ +55°C

Project Number 31651

C Ellaby
Deputy Certification Manager

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13 DESCRIPTION OF EQUIPMENT

The TX6641 Power Supply Chassis is primarily designed to provide an intrinsically safe supply to intrinsically safe equipment. It comprises a printed circuit board (PCB) that accommodates an intrinsically safe transformer, voltage clamping components, current and power limiting circuitry.

The following options are available:

- Current output options - 0.5A, 1.0A, 1.4A and 1.8A
- Voltage output options - 7.5V and 12V
- Input supply options - 230 Vrms, 110 Vrms or 24 Vrms

The connection to external hazardous area equipment is made via connector J7 and the electrical output parameters are as follows:

7.5 V PSU (Uo = 8.5 V o/p crowbar)	Short circuit current, Io in A	Max output Power, Po in W	Lo/Ro Ratio in $\mu\text{H}/\Omega$	Capacitance, Co in μF
0.5 A	0.873	5.28	72.69	646
1.0 A	1.76	10.63	36.17	560
1.4 A	1.76	10.63	36.17	560
1.8 A	1.76	10.63	36.17	560

12.0 V PSU (Uo = 13.0 V o/p crowbar)	Short circuit current, Io in A	Max output Power, Po in W	Lo/Ro Ratio in $\mu\text{H}/\Omega$	Capacitance, Co in μF
0.5 A	0.873	6.33	72.6	32.0
1.0 A	1.76	12.73	36.17	30.29
1.4 A	2.38	17.23	26.72	19.46
1.8 A	2.38	17.23	26.72	19.46

The TX6641 may optionally be fitted with up to two relay boards providing up to 4 relay interfaces that have the following electrical parameters:

Option 1

I.S. circuit terminals 3, 5, 7, 9 wrt 0V

Ui = 13 V (for the 12 V relays)

Ui = 8.5 V (for the 9 V relays)

Non-I.S. circuits to relay contact terminals a, b and c of Relays 1-4

Um = 375V peak

Im = 5A

Option 2 (Note: introduced by Variation 1)

Non-I.S. circuit terminals 3, 5, 7, 9 wrt 0V

Ui = 13 V (for the 12 V relays)

Ui = 8.5V (for the 9 V relays)

I.S. circuits to relay contact terminals a, b and c of Relays 1-4

Um = 30 V peak

Im = 5 A

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Sira Certification Service

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Variation 1 - This variation introduced the following changes:

- i. The value of the mains fuses were increased in value from 2 amps to 3.15 amps.
- ii. The authorisation that the upper ambient temperature may be increased from +40°C to +55°C.
- iii. The change in value of some non-safety related components was approved.
- iv. An alternative arrangement of connecting the relays is endorsed. The electrical parameters are modified as follows:

Option 1 (original parameters, unchanged)

I.S. circuit terminals 3, 5, 7, 9 wrt 0 V	Non I.S. circuits to relay contact terminals a, b and c of Relays 1 – 4
U _i = 12.35 V (for the 12 V relays)	U _m = 375 V _{peak}
U _i = 7.7 V (for the 9 V relays)	I _m = 5 A

Option 2 (new parameters)

Non-I.S. circuit terminals 3, 5, 7, 9 wrt 0 V	I.S. circuits to relay contact terminals a, b and c of Relays 1 – 4
U _m = 12.35 V (for the 12 V relays)	U _i = 30 V
U _m = 7.7 V (for the 9 V relays)	I _i = 5 A

- v. An additional special conditions for safe use was introduced.

Variation 2 - This variation introduced the following change:

- i. The component parts list to be changed to recognise that the value specified for some of the safety resistors is now defined by their minimum resistance.

Variation 3 - This variation introduced the following change:

- i. The modification of the output crowbar circuit was recognised.

Variation 4 - This variation introduced the following changes:

- i. The use of a re-settable regulator circuit that resets the crowbar circuits in the event that they are triggered by electrical noise or spurious transients is approved.
- ii. The breaking current value, I_n, of fuses F1 and F4 to be increased to 5A is endorsed.

Variation 5 - This variation introduced the following change:

- i. The recognition that the crowbar circuits are modified to increase the operational voltage and speed, the value of the output resistor R26 has been also changed; the electrical parameters for the power supplies are modified as follows:

7.5 V PSU (8.5V o/p crowbar)	Short circuit current, I _o in A	Max output Power, P _o in W	L _o /R _o Ratio in μH/Ω	Capacitance, C _o in μF
0.5 A	0.873	5.28	72.69	646
1.0 A	1.76	10.63	36.17	560
1.4 A	1.76	10.63	36.17	560
1.8 A	1.76	10.63	36.17	560
12.0 V PSU (13.0 V o/p crowbar)	Short circuit current, I _o in A	Max output Power, P _o in W	L _o /R _o Ratio in μH/Ω	Capacitance, C _o in μF
0.5 A	0.873	6.33	72.6	32.0
1.0 A	1.76	12.73	36.17	30.29
1.4 A	2.38	17.23	26.72	19.46
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Variation 6 - This variation introduced the following change:

- i. The introduction of salvage modifications to the re-settable regulator were approved.

Variation 7 - This variation introduced the following change:

- i. The recognition of modifications to the re-settable regulator.

Variation 8 - This variation introduced the following change:

- i. Following appropriate re-assessment to demonstrate compliance with the requirements of the EN 60079 series of standards, the documents originally listed in section 9, EN 50014:1997 (amendments 1 and 2) and EN 50020:1994, were replaced by those currently listed, the markings in section 12 were updated accordingly and the conditions were modified to recognise the requirements of the latest standards.

Variation 9 - This variation introduced the following changes:

- i. Capacitor C25 (120 nF max) was added to the power supply circuit board.
- ii. Capacitor C7 (120 nF max) was added to the Parts List; this change did not alter the construction of the Power Supply, as the capacitor is has been previously shown on the schematic.
- iii. The change of electrical parameters as detailed in Variation 1 was retrospectively recognised, this was first introduced in the product description in Issue 9.
- iv. A typographical in the list of supporting standards was corrected.
- v. The certificate History was clarified.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report no.	Comment
0	11 January 2002	R52A7663A	The release of the prime certificate.
1	28 March 2002	R52M8692B	The introduction of Variation 1. (This was document re-issued 24 February 2004 to recognise the re-issue of the prime certificate and to allow report number R52M8692A to be replaced by R52M8692B)
2	16 April 2002	R52M8976A	The introduction of Variation 2. (This document was re-issued 24 February 2004 to recognise the re-issue of the prime certificate)
3	24 May 2002	R52A9098A	The introduction of Variation 3. (This document was re-issued 24 February 2004 to recognise the re-issue of the prime certificate)
4	25 June 2003	R52M10169A	The introduction of Variation 4. (This document was re-issued 24 February 2004 to recognise the re-issue of the prime certificate)
5	24 February 2004	R52A7663B	Re-issued to allow report number R52A7663A to be replaced by report number R52A7663B.
6	3 November 2004	R52A11948A	The introduction of Variation 5.
7	3 November 2004	R52A11035A	The introduction of Variation 6.
8	4 April 2005	R52A13139A	The introduction of Variation 7.

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Issue	Date	Report no.	Comment
9	9 September 2010	R22160A/00	This Issue covers the following changes: <ul style="list-style-type: none">All previously issued certification was rationalised into a single certificate, Issue 9, Issues 0 to 8 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 8.
10	9 September 2013	R31651A/00	The introduction of Variation 9.

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

15.1 The TX6641 Power Supply Chassis shall be housed in an enclosure in accordance with the following criteria:

Safe area applications - The enclosure shall have a degree Ingress of Protection of at least IP20 and the circuits of the TX6641 shall have infallible creepage and clearance distances to the enclosure walls, as defined by clause 6.3 of EN 60079-11:2007.

Hazardous area applications - The enclosure shall be certified and suitable for use in the hazardous area application; the arrangement of the TX6641 with the enclosure shall be re-certified by a notified body.

15.2 The connections to the relay boards must both be configured as either Option 1 or Option 2. It is not permitted to mix the connection of these relays.

15.3 The wiring carrying non-hazardous area circuits to the relays must be routed to ensure that they are segregated from hazardous area circuits, maintaining compliance with Table 5 of EN 60079-11:2007, namely 6mm of clearance through air and/or 1mm clearance through solid insulation for voltages up to 375V.

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.

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 mains transformer shall be subjected to routine tests and be able to withstand a test voltage of at least 2500Vrms applied between primary and secondary windings and at least 1500Vrms applied between all windings and the core or screen.

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Certificate Annexe

Certificate Number: Sira 01ATEX2229X
Equipment: TX6641 Intrinsically Safe Power Supply Chassis
Applicant: Trolex Limited



Issue 0

Drawing No.	Sheet	Rev	Date	Description
P5531.01	1 and 2	A	26 Nov 01	Power supply, certified circuit diagram and parts list
P5531.02.01	1 of 1	A	10 Oct 01	TX6641 Power Supply Chassis, General Arrangement
P5531.03.01	1 of 1	A	21 Sep 01	PCB bottom layer
P5531.03.02	1 of 1	A	21 Sep 01	PCB bottom overlay
P5531.03.03	1 of 1	A	21 Sep 01	PCB inner layer 1
P5531.03.04	1 of 1	A	21 Sep 01	PCB inner layer 2
P5531.03.05	1 of 1	A	21 Sep 01	PCB Top layer
P5531.03.06	1 of 1	A	21 Sep 01	PCB Top overlay
P5531.04	1 of 1	B	26 Nov 01	Transformer (certification details)
P5531.04.01	1 of 1	B	26 Nov 01	Transformer, 24Vac, (certification details)
P5531.06	1 of 1	A	10 Oct 01	Relay PCB connections
P5531.07	1 of 1	A	10 Oct 01	TX6641 Certification label details
P5111.89	1 of 1	A	11 Dec 96	PCB artwork, relay board

Issue 1

Drawing No.	Sheet	Rev	Date	Description
P5531.01	1 and 2	B	05 Mar 02	Power supply, certified circuit diagram and parts list
P5531.04	1 of 1	C	16 Jan 02	Transformer (certification details)
P5531.04.01	1 of 1	C	16 Jan 02	Transformer, 24Vac, (certification details)
P5531-02-01	1 of 1	B	18 Mar 02	General arrangement (TX6641 Power Supply Chassis)
P5531.07	1 of 1	B	05 Mar 02	TX6641 Certification label details

Issue 2

Drawing No.	Sheet	Rev	Date	Description
P5531.01	1 and 2	C	05 Apr 02	Power Supply, Certified Circuit Diagram And Parts List

Issue 3

Drawing No.	Sheet	Rev	Date	Description
P5531.01	1 and 2	D	22 May 02	Power Supply, Certified Circuit Diagram And Parts List

Issue 4

Drawing No.	Sheet	Rev	Date	Description
P5531.01	1 of 2	E	11 Mar 03	Power supply, certified circuit diagram
P5531.01	2 of 2	E	11 Jun 03	Power supply, parts list
P5531-02-01	1 of 1	C	16 Jun 03	General arrangement
P5531.107	1 and 2	A	11 Mar 03	Input regulator and reset circuit diagram
P5531.106	1 of 1	A	04 Jun 03	Regulator reset PCB

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Certificate Number: Sira 01ATEX2229X
Equipment: TX6641 Intrinsically Safe Power Supply Chassis
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Issue 5

Drawing No.	Sheet	Rev	Date	Description
P5531.01	1 and 2	A	26 Nov 01	Power supply, certified circuit diagram and parts list
P5531.02.01	1 of 1	A	10 Oct 01	TX6641 Power Supply Chassis, General Arrangement
P5531.03.01	1 of 1	A	21 Sep 01	PCB bottom layer
P5531.03.02	1 of 1	A	21 Sep 01	PCB bottom overlay
P5531.03.03	1 of 1	A	21 Sep 01	PCB inner layer 1
P5531.03.04	1 of 1	A	21 Sep 01	PCB inner layer 2
P5531.03.05	1 of 1	A	21 Sep 01	PCB Top layer
P5531.03.06	1 of 1	A	21 Sep 01	PCB Top overlay
P5531.04	1 of 1	B	26 Nov 01	Transformer (certification details)
P5531.04.01	1 of 1	B	26 Nov 01	Transformer, 24Vac, (certification details)
P5531.06	1 of 1	A	10 Oct 01	Relay PCB connections
P5531.07	1 of 1	A	10 Oct 01	TX6641 Certification label details
P5111.89	1 of 1	A	11 Dec 96	PCB artwork, relay board

Issue 6

Drawing No.	Sheet	Rev	Date	Description
P5531.01	1 and 2	A	26 Nov 01	Power supply, certified circuit diagram and parts list
P5531.02.01	1 of 1	A	10 Oct 01	TX6641 Power Supply Chassis, General Arrangement
P5531.03.01	1 of 1	A	21 Sep 01	PCB bottom layer
P5531.03.02	1 of 1	A	21 Sep 01	PCB bottom overlay
P5531.03.03	1 of 1	A	21 Sep 01	PCB inner layer 1
P5531.03.04	1 of 1	A	21 Sep 01	PCB inner layer 2
P5531.03.05	1 of 1	A	21 Sep 01	PCB Top layer
P5531.03.06	1 of 1	A	21 Sep 01	PCB Top overlay
P5531.04	1 of 1	B	26 Nov 01	Transformer (certification details)
P5531.04.01	1 of 1	B	26 Nov 01	Transformer, 24Vac, (certification details)
P5531.06	1 of 1	A	10 Oct 01	Relay PCB connections
P5531.07	1 of 1	A	10 Oct 01	TX6641 Certification label details
P5111.89	1 of 1	A	11 Dec 96	PCB artwork, relay board

Issue 7

Drawing No.	Sheet	Rev.	Date	Description
P5531.122	1 of 1	A	06 Feb 04	Input regulator and reset salvage schematic excluding 1.8A version
P5531-111	1 of 1	C	07 Oct 03	Input regulator and reset PCB Salvage drawing excluding 1.8A version
P5531.121	1 of 1	A	15 Jan 04	Input regulator and reset salvage schematic for 1.8 A types
P5531-111-02	1 and 2	B	06 Jan 04	Input regulator and reset PCB Salvage drawing for 1.8 A types

Issue 8

Drawing No.	Sheet	Rev.	Date	Description
P5531-106	1 of 1	B	15 Jan 04	Regulator reset PCB
P5531-107	1 and 2	C	20 Nov 03	Input regulator and reset PCB circuit diagram and parts list

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Certificate Annexe

Certificate Number: Sira 01ATEX2229X
Equipment: TX6641 Intrinsically Safe Power Supply Chassis
Applicant: Trolex Limited



Issue 9

Drawing No.	Sheets	Rev.	Date (Sira stamp)	Description
P5531.03.01	1 of 1	A	25 Aug 10	PCB bottom layer
P5531.03.02	1 of 1	A	25 Aug 10	PCB bottom overlay
P5531.03.03	1 of 1	A	25 Aug 10	PCB inner layer 1
P5531.03.04	1 of 1	A	25 Aug 10	PCB inner layer 2
P5531.03.05	1 of 1	A	25 Aug 10	PCB top layer
P5531.03.06	1 of 1	A	25 Aug 10	PCB top overlay
P5111.89	1 of 1	A	25 Aug 10	PCB artwork, relay board
P5531.04	1 of 1	C	25 Aug 10	Transformer (certification details)
P5531.04.01	1 of 1	C	25 Aug 10	Transformer, 24Vac (certification details)
P5531.07	1 of 1	C	25 Aug 10	TX6641 Certification label details
P5531-02-01	1 of 1	C	25 Aug 10	General arrangement
P5531.01	1 and 2	F	25 Aug 10	Power supply circuit diagram and parts list
P5531.06	1 of 1	A	25 Aug 10	Relay PCB Connections
P5531.106	1 of 1	B	25 Aug 10	Regulator reset PCB
P5531.107	1 and 2	C	25 Aug 10	Input regulator & reset PCB circuit diagram & parts list

Issue 10

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
P5531.01	1 to 2	G	23 Aug 2013	Power Supply Certified Circuit Diagram

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