ANZEx

Australian/New Zealand Certification Scheme
for Explosion Protected Equipment

Certificate of Conformity
Ex EQUIPMENT

Certificate No.: **ANZEx 11.3004X**	*Current Issue:* 2	*Date of Issue:* 2024-01-19

Applicant: **Trolex Limited**
Newby Road, Hazel Grove
Stockport, Cheshire, SK7 5DY
UK

Equipment: TX91xx Trip Amplifiers

Type of Explosion Protection: Intrinsic safety “ia”

Explosion Protection Marking: Ex ia I

This certificate is granted subject to the requirements as set out in
Joint Accreditation System of Australia and New Zealand Publications
ANZEx System Rules 2020 & ANZEx Certified Equipment Scheme Rules 2021

Signed for and on behalf of issuing body .....

Name & Position Ujen Singh - Quality & Certification Manager

This certificate is not transferable and remains the property of the issuing body.
The status of this certificate can be confirmed through the database located at www.anzex.com.au

Certificate issued by:

TestSafe Australia
919 Londonderry Road, Londonderry NSW 2753 Australia

JAS-ANZ
WWW.JAS-ANZ.ORG/REGISTER

NSW GOVERNMENT SafeWork NSW Test Safe AUSTRALIA

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Manufacturer : **Trolex Limited**
Newby Road, Hazel Grove
Stockport, Cheshire, SK7 5DY
UK

Additional Manufacturing Location(s): None.

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 60079-0:1998	Electrical apparatus for explosive gas atmospheres	Part 0: General requirements
IEC 60079-11:1999	Electrical apparatus for explosive gas atmospheres	Part 11: Intrinsic safety 'i'

This Certificate does not indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

This ANZEx certificate was issued on the basis of an existing AUSEx Certificate of Conformity (Ex 00.3693X-4) in accordance with Clause 3.3 of MP87.1:2008. Certificate AUSEx 00.3693X-4 was first issued on 19 Oct 2000.

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Schedule

Equipment Description:

The TX91xx Programmable Trip Amplifiers are intended to accept signals from a range of external sensors (e.g. 4-20 mA signals, 0.4-2 V signals, temperature sensors, flammable gas sensors, accelerometers, etc.)

They are housed in an inner ABS housing protected by an outer painted steel enclosure. They contain a standard control PCB that is connected to one of a range of I/O PCBs depending on the application.

The Control PCB, which is the same for all Trip Amplifiers, contains a micro-controller, EPROM and EEPROM memories, other logic circuits and an alpha-numeric LCD module which is mounted directly onto the PCB. A keypad is fitted to the front panel of the Trip Amplifier and is connected to the Control PCB via a flexible ribbon cable.

They also contain an alpha-numeric LCD module, and a keypad. There are 12 terminals for external connections to this apparatus. These are labelled 1 to 12. The marking label is placed on the front panel.

The versions of the Trip Amplifier are:

TX9131: 4-20 mA Input Trip Amplifier
TX9132: Voltage Input Trip Amplifier
TX9133: Thermocouple Input Trip Amplifier
TX9134: PT100 Temperature Sensor Input Amplifier
TX9135: Semiconductor Temperature Sensor Input Trip Amplifier
TX9136: Bridge Input Trip Amplifier
TX9137: A.C. (Peak) Input Trip Amplifier
TX9137: A.C. (RMS) Input Trip Amplifier

Each of the above trip amplifiers has four variants for the outputs:
A. Dual relay output
B. 4-20 mA output
C. 0.4-2 V output
D. 5-15 Hz output

TX9139: Interposing Relay Trip Amplifier
This version has the two variants:
A. Relay Control
B. Relay Repeater

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TX9151: Liquid Flow Trip Amplifier
This is typically designed to interface with a Liquid Flow Sensor (LFS) via a sensor measuring the differential pressure inside the LFS; this parameter is then used to calculate the flow rate. This gives a voltage output up to 5 V at 10 mA maximum. In conjunction with this, a second sensor measures the line pressure.

This version has 5 variants of the Output PCB, depending on the output at terminals T9-10:
A. Dual relay output
B. 4-20 mA output
C. 0.4-2 V output – standard
D. 0.4-2 V output – PD543
E. 5-15 Hz output

Electrical Ratings/Parameters

TX9131, TX9132, TX9135:

T1-T4 (sensor)	T5-T6 (supply)	T7-T8 (relay)	T9-T10 (output)				T11-T12 (relay reset / power on delay)
			Dual relay	4-20 mA	0.4-2 V	5-15 Hz	
Uo = 16.5V Ci = 3.6 nF Li = 0	Ui = 16.5V Ci = 3.6nF Li = 0	Uo = 0 Ui = 20V Pi = 2.3W Ci = 0 Li = 0	Uo = 0 Ui = 20V Pi = 2.3W Ci = 0 Li = 0	Uo = 16.5V Ci = 0 Li = 0	Uo = 16.5V Ci = 0 Li = 0	Uo = 0 Ui = 20V Pi = 2.5W Ci = 0 Li = 0	Uo = 16.5V Rsource>980Ω Co = 12μF Lo/Ro=50μH/Ω Ui = 0 Ci = 0 Li = 0

Note: Terminals T1 and T2 are connected directly to the supply terminals T5-6, and so have the same output parameters as the power supply that is used to power the apparatus.

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TX9133:

T1-T4 (sensor)	T5-T6 (supply)	T7-T8 (relay)	T9-T10 (output)				T11-T12 (relay reset / power on delay)
			Dual relay	4-20 mA	0.4-2 V	5-15 Hz	
Uo = 16.5V Ci = 2.4 nF Li = 0	Ui = 16.5V Ci = 2.4 nF Li = 0	Uo = 0 Ui = 20V Pi = 2.3W Ci = 0 Li = 0	Uo = 0 Ui = 20V Pi = 2.3W Ci = 0 Li = 0	Uo = 16.5V Ci = 0 Li = 0	Uo = 16.5V Ci = 0 Li = 0	Uo = 0 Ui = 20V Pi = 2.5W Ci = 0 Li = 0	Uo = 16.5V Rsource>980Ω Co = 12µF Lo/Ro=50µH/Ω Ui = 0 Ci = 0 Li = 0

Note: Terminals T1 and T2 are connected directly to the supply terminals T5-6, and so have the same output parameters as the power supply that is used to power the apparatus.

TX9134:

T1-T4 (sensor)	T5-T6 (supply)	T7-T8 (relay)	T9-T10 (output)				T11-T12 (relay reset / power on delay)
			Dual relay	4-20 mA	0.4-2 V	5-15 Hz	
Uo = 16.5V Io = 1.163A Po = 1.75W Co = 80 nF Lo/Ro = 50µH/Ω Ci = 3.6 nF Li = 0	Ui =16.5V Ci =1.2nF Li = 0	Uo = 0 Ui = 20V Pi = 2.3W Ci = 0 Li = 0	Uo = 0 Ui = 20V Pi = 2.3W Ci = 0 Li = 0	Uo = 16.5V Ci = 0 Li = 0	Uo = 16.5V Ci = 0 Li = 0	Uo = 0 Ui = 20V Pi = 2.5W Ci = 0 Li = 0	Uo = 16.5V Rsource>980Ω Co = 12µF Lo/Ro=50µH/Ω Ui = 0 Ci = 0 Li = 0

TX9136:

T1-T4 (sensor)	T5-T6 (supply)	T7-T8 (relay)	T9-T10 (output)				T11-T12 (relay reset / power on delay)
			Dual relay	4-20 mA	0.4-2 V	5-15 Hz	
Uo = 7.14V Io = 1.158A Co = 80 nF Lo/Ro = 20 µH/Ω Ci = 1200µF Li = 0	Ui = 16.5V Ci = 1.2nF Li = 165µH	Uo = 0 Ui = 20V Pi = 2.3W Ci = 0 Li = 0	Uo = 0 Ui = 20V Pi = 2.3W Ci = 0 Li = 0	Uo = 16.5V Ci = 0 Li = 0	Uo = 16.5V Ci = 0 Li = 0	Uo = 0 Ui = 20V Pi = 2.5W Ci = 0 Li = 0	Uo = 16.5V Rsource>980Ω Co = 12µF Lo/Ro=50µH/Ω Ui = 0 Ci = 0 Li = 0

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TX9137:

T1-T4 (sensor)	T5-T6 (supply)	T7-T8 (relay)	T9-T10 (output)				T11-T12 (relay reset / power on delay)
			Dual relay	4-20 mA	0.4-2 V	5-15 Hz	
Uo = 16.5V Io = 183mA Po = 752mW Co = 80nF Lo/Ro = 50µH/Ω Ci = 1.2 nF Li = 0	Ui = 16.5V Ci = 1.2nF Li = 0	Uo = 0 Ui = 20V Pi = 2.3W Ci = 0 Li = 0	Uo = 0 Ui = 20V Pi = 2.3W Ci = 0 Li = 0	Uo = 16.5V Ci = 0 Li = 0	Uo = 16.5V Ci = 0 Li = 0	Uo = 0 Ui = 20V Pi = 2.5W Ci = 0 Li = 0	Uo = 16.5V Rsource>980Ω Co = 12µF Lo/Ro=50µH/Ω Ui = 0 Ci = 0 Li = 0

TX9139:

T1-T3, T7-T12 (relay)	T4 & T6 (signal)	T5-T6 (supply)
Uo = 0 Ui = 20V Pi = 2.3W Ci = 0 Li = 0	Uo = 16.5V Io = 8 mA Po = 33 mW Co = 11 µF Lo/Ro = 20 µH/Ω Ci = 0 Li = 0	Ui = 16.5V Ci = 1.2nF Li = 0

TX9151:
Terminals T1-T8, T11-T12:

T1 (sensor 1 supply), T2 (sensor 1 signal in) & T6 (zero volts)	T5 (supply), T4 (sensor 2 signal in)	T5 (supply), T6 (zero volts)	T7-T8 (relay)	T11 (relay reset) & T6 (zero volts)	T12 (power on delay) & T6 (zero volts)
Uo = 7.14 V I_o = 7 mA P_o = 0.31 W C_o = 5 µF L_o = 100 µH	Ui = 16.5 V Ci = 1.2 nF Li = 0 Uo = 16.5 V I_o= 5 mA P_o = 20 mW C_o = 120 nF Lo/Ro = 50µH/Ω	Ui = 16.5 V Ci = 1.2 nF Li = 0	Uo = 0 Ui = 20 V Pi = 2.3W Ci = 0 Li = 0	Uo = 16.5 V I_o = 5 mA P_o = 20 mW C_o = 120 nF Lo/Ro = 50µH/Ω Ui = 0 Ci = 0 Li = 0	Uo = 16.5 V I_o = 5 mA P_o = 20 mW C_o = 120 nF Lo/Ro = 50µH/Ω Ui = 0 Ci = 0 Li = 0

Note: For the purpose of system assessment, it should be noted that cable connected to terminal T5 from the supply also feeds sensor 2 (typically a line pressure sensor).

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Terminals T9/T10: the parameters depend on the variant as follows:

Dual relay (TX9151.31)	4-20 mA (TX9151.32)	0.4-2 V (TX9151.33) [standard version]	0.4-2 V (TX9151.33.PD543)	5-15 Hz (TX9151.34)
Uo = 0 Ui = 20 V Pi = 2.3W Ci = 0 Li = 0	Uo = 16.5 V Io = 472 mA Po = 1.95 W Co = 120 nF Lo/Ro = 50μH/Ω	Uo = 16.5 V Io = 50 mA Po = 0.21 W Co = 120 nF Lo/Ro = 50μH/Ω	Uo = 7.14 V Io = 50 mA Po = 0.21 W Co = 56 μF Lo/Ro = 20μH/Ω	Uo = 0 Ui = 20 V Pi = 2.5 W Ci = 0 Li = 0 (Same as other Trip Amps)

Specific Conditions of Use:

1. It is a condition of safe use that all circuits connected to different sets of terminals be treated as separate intrinsically safe circuits and adequate provision of segregation be provided between them.

2. It is a condition of safe use that the apparatus shall be installed in an enclosure which complies with IEC 60079-0:1998 Clauses 7.3 and 8.1 and which provides an ingress protection of at least IP54. The enclosure shall be marked in a clearly visible external location with the information specified in drawing P5460.128 and with the Australian certificate number ANZEx 11.3004X.

3. Where the external enclosure may have a plastic window, it is a condition that surface area of the window shall not exceed 100 cm^2.

Additional Information:

None.

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Register of Issues and Variations
includes the current issue

Issue 0 dated 2011-10-04

Test & Assessment Reports relevant for this issue:

TR No. & Issuing CBs: Sira reports R52L6190A Rev 3, R52L6190B Rev 2, R52L6190C Rev 2, R52L8368B Parts 1 and 2, 27738, 32376; TestSafe Australia

QAR No. & Issuing CB: GB/SIR/QAR07.0017/02

File Reference: 2011/003396

Manufacturer's Documents/Drawings associated with this issue:

Document Number	Pages / Sheets	Document Title	Revision	Date
All versions				
P5093.27	1	Reed relay	C	1997-01-21
P5460.01	1	Circuit diagram Control P.C.B.	A	1997-07-07
P5460.07	1 of 2	General assembly	D	2002-02-20
P5460.07	2 of 2	General Arrangement of Enclosure	B	1999-02-25
P5460.45	1	Interconnection Block Diagram	A	1998-01-21
P5460.109	1	Circuit Diagram 5-15 Hz Module P.C.B.	A	1998-05-18
P5460.128	1	Label Details Australia	B	2011-09-27
TX9131/2/5				
P5460.29	7	Output PCB (Artwork)	A	1998-01-09
P5460.38	3	Circuit Diagram Output P.C.B. (V, I, KTY81 Input)	A	1998-01-09
TX9133				
P5460.40	7	Output PCB (Artwork)	A	1998-01-09
P5460.100	3	Circuit Diagram Output P.C.B. (Thermocouple Input)	A	1998-01-09
TX9134				
P5460.82	7	Output PCB (Artwork)	A	1998-01-09
P5460.41	3	Circuit Diagram Output P.C.B. (PT100 Input)	A	1998-01-09
TX9136				
P5460.28	7	Output PCB (Artwork)	A	1998-01-09
P5460.37	1 of 3	Circuit Diagram Output P.C.B. (Bridge Input)	B	2002-02-06
P5460.37	2 & 3 of 3	Circuit Diagram Output P.C.B. (Bridge Input)	A	1998-01-09
P5460.32	1	S/A of Output PCB Single Relay + 0.4 – 2V	B	2003-05-02
P5460.142	3	Circuit Diagram Strain Gauge Output P.C.B.	A	2010-02-09

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TX9137 A.C. (RMS)				
P5460.5	7	Output PCB (Artwork)	A	1998-01-09
P5460.02	3	Circuit Diagram Output P.C.B. (A.C. RMS Input)	A	1998-01-09
TX9137 A.C. (Peak)				
P5460.23	7	Output PCB (Artwork)	A	1998-01-09
P5460.26	3	Circuit Diagram Output P.C.B. (A.C. Peak Input)	A	1998-01-09
TX9139				
P5460.113	5	Output PCB (Artwork)	A	1999-02-25
P5460.114	1	Certified Circuit Diagram	A	1999-02-26
TX9151				
P5514.01	3	Certified Circuit Diagram Output PCB (Flow Sensor Input)	B	2002-02-04
P5514.03	1	Output PCB, Flow Sensor Input [artwork]	B	2002-02-04

Issue 1 dated 2017-12-20

Variations Permitted by this Issue

- Due to the obsolescence of the main processor, associated components and the LCD, the Control PCB has been redesigned (replaced with new Control PCB Circuitry). Output PCBs have not been changed. This has been assessed for compliance in test report 36097.

Test & Assessment Reports relevant for this issue:

TR No. & Issuing CBs: 36097; TestSafe Australia
QAR No. & Issuing CB: GB/SIR/QAR07.0017/07; SIRA

File Reference: 2017/016568

Manufacturer's Documents/Drawings associated with this issue:

Document Number	Pages / Sheets	Document Title	Revision	Date
P5460.01.ANZEx	2	ANZEx Certification Schematic Control PCB	A	2017-10-26
P5460.03.ANZEx	3	Control PCB ANZEx Certification PCB Layout	A	2017-12-14

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Issue 2 (Current issue)

Variations Permitted by this Issue

- Add an alternative LCD module WDO0550-YYB.
- Introduce a revised Control PCB to accommodate the new LCD part.
- R3 modified from 0402 63 mW to 1206 250 mW.

This has been assessed for compliance in test report 38138.

Test & Assessment Reports relevant for this issue:

TR No. & Issuing CBs: 38138; TestSafe Australia
QAR No. & Issuing CB: GB/SIR/QAR07.0017/12; SIRA

File Reference: 2023/014805

Manufacturer's Documents/Drawings associated with this issue:

Drawing/Document No.:	Page/ s:	Title:	Revision Level:	Date: yyyy-mm-dd
All versions				
P5093.27	1	Reed relay	C	1997-01-21
P5460.01	1	Circuit diagram Control P.C.B.	A	1997-07-07
P5460.07	1 of 2	General assembly	D	2002-02-20
P5460.07	2 of 2	General Arrangement of Enclosure	B	1999-02-25
P5460.45	1	Interconnection Block Diagram	A	1998-01-21
P5460.109	1	Circuit Diagram 5-15 Hz Module P.C.B.	A	1998-05-18
P5460.128	1	Label Details Australia	B	2011-09-27
P5460.01.ANZEx	2	ANZEx Certification Schematic Control PCB	A	2017-10-26
P5460.03.ANZEx	3	Control PCB ANZEx Certification PCB Layout	A	2017-12-14
TX9131/2/5				
P5460.29	7	Output PCB (Artwork)	A	1998-01-09
P5460.38	3	Circuit Diagram Output P.C.B. (V, I, KTY81 Input)	A	1998-01-09
TX9133				
P5460.40	7	Output PCB (Artwork)	A	1998-01-09
P5460.100	3	Circuit Diagram Output P.C.B. (Thermocouple Input)	A	1998-01-09
TX9134				
P5460.82	7	Output PCB (Artwork)	A	1998-01-09
P5460.41	3	Circuit Diagram Output P.C.B. (PT100 Input)	A	1998-01-09
TX9136				

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Drawing/Document No.:	Page/ s:	Title:	Revision Level:	Date: yyyy-mm-dd
P5460.28	7	Output PCB (Artwork)	A	1998-01-09
P5460.37	1 of 3	Circuit Diagram Output P.C.B. (Bridge Input)	B	2002-02-06
P5460.37	2 & 3 of 3	Circuit Diagram Output P.C.B. (Bridge Input)	A	1998-01-09
P5460.32	1	S/A of Output PCB Single Relay + 0.4 – 2V	B	2003-05-02
P5460.142	3	Circuit Diagram Strain Gauge Output P.C.B.	A	2010-02-09
TX9137 A.C. (RMS)				
P5460.5	7	Output PCB (Artwork)	A	1998-01-09
P5460.02	3	Circuit Diagram Output P.C.B. (A.C. RMS Input)	A	1998-01-09
TX9137 A.C. (Peak)				
P5460.23	7	Output PCB (Artwork)	A	1998-01-09
P5460.26	3	Circuit Diagram Output P.C.B. (A.C. Peak Input)	A	1998-01-09
TX9139				
P5460.113	5	Output PCB (Artwork)	A	1999-02-25
P5460.114	1	Certified Circuit Diagram	A	1999-02-26
TX9151				
P5514.01	3	Certified Circuit Diagram Output PCB (Flow Sensor Input)	B	2002-02-04
P5514.03	1	Output PCB, Flow Sensor Input [artwork]	B	2002-02-04
Revised drawings				
P5460.200.ANZEx	2	*Control PCB - Revised Display ANZEx Certification Schematic	A	2024-01-15
P5460.201.ANZEx	3	*Control PCB - Revised Display ANZEx Certification PCB Layout	A	2023-09-04

*Note: An * is included before the title of documents that are new or revised.*