ANZEx

Australian/New Zealand Certification Scheme
for Explosion Protected Equipment

Certificate of Conformity

Ex EQUIPMENT

Certificate No.:	**ANZEx 06.3057X**	Current Issue: 5	Date of Issue: 23 February 2018

Applicant: **Trolex Limited**
Newby Road, Hazel Grove
Stockport SK7 5DY
U.K.

Equipment: Programmable Sensor Controller Type TX9042

Type of Explosion Protection: Intrinsic safety "ia"

Explosion Protection Marking:
Trolex Ltd
TX9042 Programmable Sensor Controller
Ex ia I
ANZEx 06.3057X
Ser No. …

This certificate is granted subject to the conditions as set out in Standards Australia/Standards New Zealand Miscellaneous Publication ***MP87.1***

Signed for and on behalf of issuing body

Name & Position Debbie Wouters – Acting 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

Test Safe AUSTRALIA

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Manufacturer : **Trolex Limited**
Newby Road, Hazel Grove
Stockport SK7 5DY
U.K.

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 60079-0:2000	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.

TEST & ASSESSMENT REPORTS:

The equipment listed has successfully met the examination and test requirements as recorded in:

Test Report No. & Issuing Body:	Baseefa 06(C)0985, TestSafe 29704, Baseefa 05(C)0460, 10(C)0863, 12(C)0126, TestSafe 33925, Baseefa GB/BAS/ExTR17.0194/00
Quality Assessment Report No. & Issuing Body:	GB/SIR/QAR07.0017/07
File Reference:	2017/017016

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Schedule

Equipment Description:

The Programmable Sensor Controller Type TX9042 provides signal conditioning and monitoring for up to 8 transducers. Each transducer is connected via a dedicated Input PCB which provides the signal conditioning. A programmable microprocessor circuit monitors the conditioned signals to provide local display, monitoring and control signals, and digital data transmission.

The TX9042 is powered from an external nominal 12 V certified IS power supply ($U_i \leq 16.5$ V).

The electronic circuitry, comprising up to 13 PCBs (Power Supply module, Display PCB, Control PCB, Input PCB, Comms Module and up to 8 'Input' Modules), is housed in a moulded plastic enclosure which is itself housed in a stainless steel outer enclosure that provides facilities such as gland entries for restraining incoming cables. This enclosure has been assessed as providing a degree of protection of not less than IP54.

The Control PCB carries the microprocessor circuitry and the control relays and is mounted in the centre of the moulded enclosure; mounted over this, fixed to the top of the enclosure and connected to the Control PCB by a flat ribbon connector, is the Display PCB. An LCD is fitted on the Display PCB along with a connector to interface with a membrane keypad moulded into the top of the unit; the relay status LEDs and a piezo-electric buzzer are also mounted on the Display PCB.

Optional data link circuitry is fitted onto a small daughter board (Digital Comms, RS485 Comms) which has pins for connection onto the Control PCB.

Beneath the Control PCB is fitted an Input PCB which carries up to eight transducer 'Input Modules' which can be selected from the following list and which may be fitted in any position on the Input PCB. Each Input Module is a small PCB fitted with input terminals and signal processing circuitry.

The Input Modules comprise:

- DC Analogue Input (that can be configured for voltage, current or temperature input)
- Digital Input (with an option of Vortex input)
- Digital Input (Failsafe)
- AC (RMS) Analogue Input
- Thermocouple Input
- Strain gauge Input
- Flow Sensor Input

A Power Supply Module connects to the underside of both the Input PCB and the Control PCB.

Connections between the modules, Input PCB, Power Supply Module and Control PCB are by PCB-mounted two-part connectors.

Connections to external power sources can be made at :

i. Terminals A17, A18 - input to Power Supply Module
ii. Terminals B1 to B6 - Digital comms
iii. Terminals B7 to B18 - Relay contacts (3 contacts per relay)
iv. Terminals A1 to A16, A19 to A34 - Input Modules (4 terminals per module)

Specific Conditions of Use:

It is a condition of safe use that the following parameters shall be taken into account during installation:

Power Supply Connection

Terminals A17, A18 (Power)

U_i	16.5 V
C_i	0
L_i	0

Terminals A35, A36 (Control Function)

U_i	0
I_i	0
P_i	0
C_i	0
L_i	0

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DC Analogue Input Module Connections

This module may be configured, when ordered, for any one of three types of signal input – voltage, current or temperature:

Voltage Input:

Power Output Terminal T1 w.r.t. T4

U_o	U_i (power supply connection)
I_o	*
P_o	*
C_o	*
L_o	*
L_o/R_o	*

Note: parameters marked * are obtained from the certification documents of the power supply connected

Input Terminals T2, T3 w.r.t. T4

U_i	16.5 V
C_i	120 nF
L_i	0

U_o	6.51 V
I_o	1.3 mA
C_o	300 µF
L_o	100 mH

Current Input:

Power Output Terminal T1 w.r.t. T2

U_o	= U_i (power supply connection)
I_o	*
P_o	*
C_o	*
L_o	*
L_o/R_o	*

Note: parameters marked * are obtained from the certification documents of the power supply connected

Input Terminal T2 w.r.t. T3 or T4

U_i	16.5 V
C_i	120 nF
L_i	0

U_o	6.51 V
I_o	1.3 mA
C_o	300 µF
L_o	100 mH

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Temperature Input:

Power Output Terminal T1 w.r.t. T2, T3 or T4

U_0	= U_i (power supply connection)
I_o	*
P_o	*
C_o	*
L_o	*
L_o/R_o	*

Note: parameters marked * are obtained from the certification documents of the power supply connected

Input Terminal T2 w.r.t. T3 or T4

U_i	16.5 V
C_i	120 nF
L_i	0

U_o	6.51 V
I_o	1.3 mA
C_o	100 µF
L_o	100 mH

Digital Input Module Connections

This module can be configured as either of two versions, digital and vortex :

Digital Input:

Power Output Terminal T1 w.r.t. T4

U_0	16.5 V
I_o	40 mA
P_o	163 mW
C_o	5 µF
L_o	5 mH
L_o/R_o	100 µH/Ω

U_i	0 V

Input Terminals T2, T3

U_i	16.5 V
C_i	0
L_i	0

U_o	6.51 V
I_o	16 mA
C_o	100 µF
L_o	100 mH

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Vortex Input:

Power Output Terminal T1 w.r.t. T4

U_0	6.51 V
I_o	40 mA
P_o	153 mW
C_o	100 µF
L_o	26 mH
L_o/R_o	240 µH/Ω

Input Terminals T2, T3

U_i	16.5 V
C_i	0
L_i	0

U_o	6.51 V
I_o	7 mA
C_o	100 µF
L_o	100 mH

Digital Input (Failsafe) Module Connections

Power Output Terminals T1 or T3 w.r.t. T2 or T4

U_o	12.51 V
I_o	3.4 mA
P_o	10.5 mW
C_o	5 µF
L_o	10 mH

Ui	0 V

Input Terminals T2, T4

U_i	16.5 V
C_i	12 nF
L_i	0

U_o	6.51 V
I_o	3.6 mA
C_o	100 µF
L_o	100 mH

AC (rms) Analogue Input Module Connections

Power output Terminal T1 w.r.t. T4

U_o	= U_i (power supply connection)
I_o	*
P_o	*
C_o	*
L_o	*
L_o/R_o	*

Note: parameters marked * are obtained from the certification documents of the power supply connected

Loop power Output Terminal T2 w.r.t. T3 or T4

U_i	16.5 V
C_i	12 nF
L_i	0

U_o	= U_i (power supply connection)
I_o	121 mA at U_i = 16.5 V
P_o	497 mW at U_i = 16.5 V
C_o	*
L_o	30 mH

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Thermocouple Input Module Connections

Power output Terminal T1 w.r.t. T4

U_o	= U_i (power supply connection)
I_o	*
P_o	*
C_o	*
L_o	*
L_o/R_o	*

Note: parameters marked * are obtained from the certification documents of the power supply connected

Input Terminals T2, T3 w.r.t. T4

U_i	6.88 V
C_i	0
L_i	0

U_o	6.51 V
I_o	16 mA
C_o	100 µF
L_o	100 mH

Strain Gauge Input Module Connections

Power Output Terminal T1 w.r.t. T4

U_o	= U_i (power supply connection)
I_o	129 mA at U_i = 16.5 V
P_o	0.53 W at U_i = 16.5 V
C_o	*
L_o	*
L_o/R_o	*

Note: parameters marked * are obtained from the certification drawings of the power supply connected

Input Terminals T2, T3 w.r.t. T4

U_i	16.5 V
P_i	0.53 W
C_i	10 nF
L_i	0

U_o	6.88 V
I_o	21 mA
C_o	100 µF
L_o	100 mH

Flow Sensor Input Module Connections

Power Output Terminal T1 w.r.t. T4

U_o	7.14 V
I_o	131 mA
P_o	234 mW
C_o	100 µF
L_o	10 mH
L_o/R_o	1834 µH/Ω

Input Terminal T2 w.r.t. T4

U_i	7.14 V
C_i	1.1 nF
L_i	0

U_o	6.88 V
I_o	3.3 mA
C_o	100 µF
L_o	100 mH

Input Terminal T3 w.r.t. T4

U_i	16.5 V
C_i	1.1 nF
L_i	0

U_o	6.88 V
I_o	3.3 mA
C_o	100 µF
L_o	100 mH

RS485 Comms Connections

Terminals B2, B3 w.r.t. B1

U_o	6.88 V
I_o	154 mA
P_o	265 mW
C_o	10 µF
L_o	4 mH
L_o/R_o	139 µH/Ω

U_i	12 V
P_i	1.41 W
C_i	0
L_i	0

Up to 6 RS485 Comms Modules (in separate Programmable Sensor Controllers type TX9042) may be daisy-chained together (i.e. terminals B1 all linked together, terminals B2 all linked together and terminals B3 all linked together). Provided that the number of daisy-chained PSC's is reduced to 5, these comms lines may be connected to unspecified safe area equipment via an appropriately certified shunt zener diode safety barrier (dual channel a.c.), whose output parameters do not exceed the following per channel:

U_o = 9 V, I_o = 100 mA, P_o = 225 mW

OR U_o = 12 V, I_o = 80 mA, P_o = 240 mW

e.g. suitably certified MTL 761, MTL766, MTL7761ac, MTL7766ac.

The cable parameters shall not exceed the following: C_c = 2.8 µF, L_c/R_c = 222 µH/Ω

Digital Comms Connections

Terminal B3, B4, B6 w.r.t. B1

U_o	6.88 V
I_o	3.2 A pk (340 mA long term)
P_o	2.34 W
C_o	100 µF
L_o	100 µH
L_o/R_o	139 µH/Ω

U_i	6.88 V
P_i	0.34 W

Relay Output Connections

The relay contacts must only be connected to an IS circuit which is powered by the same IS Power Supply as the TX9042.

U_i = 16.5V

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Additional Information:

None

Variations Permitted by this Issue

Modifications have been made to the Programmable Sensor Controller Type 9042 to include the following:

- Use of an alternative component (U105 Real Time Clock) to the Control PCB
- Minor error fixed to the Control PCB schematic

This has been assessed for compliance in Baseefa test report GB/BAS/ExTR17.0194/00.

Manufacturer's Documents associated with this Issue:

Document Number	Pages / Sheets	Document Title	Revision	Date
P5423.01.ATEX.IECEx	2	Control PCB Certified Circuit Diagram	A	26 Jun 2017
P5423.300.ATEX.IECEx	1	Schematic RTC Adaptor	A	26 Jun 2017
P5423.301.ATEX.IECEx	1	PCB, RTC Adaptor	A	26 Jun 2017

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History of Issues and Variations

Issue 0 dated 21 Dec 2006

Manufacturer's Documents associated with Issue 0:

Document Number	Pages / Sheets	Document Title	Revision	Date
P5423.02	1	General Arrangement	I	10 Apr 2003
P5093.27	1	Reed Relay	C	21 Jan 1997
P5423.09	1	Power Supply PCB Certified Circuit Diagram	E Salvage	02 Dec.2003
P5423.09	2	Power Supply PCB Certified Circuit Diagram	F	07 Nov 2003
P5423.06	1	Power Supply PCB Artwork	E	21 Nov 2002
P5423-547	1	P5423.06 Issue E PCB Salvage Modifications	B	02 Dec.2003
P5423.01	2	Control PCB Certified Circuit Diagram	D	22 Jan 2003
P5423.03	1	Control PCB Artwork	C	18 Apr 1997
P5423.08	1	Display PCB Certified Circuit Diagram	A	02 Jul 1996
P5423.05	1	Display PCB Artwork	A	08 May 1996
P5423.47	1	Battery PCB Certified Circuit Diagram	B	05 Sep 2002
P5423.29	1	Battery PCB Artwork	C	22 Jul 2002
P5423.46	1	Digital Comms PCB Certified Circuit Diagram	B	05 Sep 2002
P5423.28	1	Digital Comms PCB Artwork	A	08 May 1996
P5423.45	1	RS485 Comms PCB Certified Circuit Diagram	D	22 Jan 2003
P5423.254	1	RS485 Comms PCB Artwork	D	10 Jun 2003
P5423-550	1	P5423.254 issue D PCB Salvage Modifications	A	11 Nov 2003
P5423.07	1	Input PCB Certified Circuit Diagram	C	22 Jan 2003
P5423.04	1	Input PCB Artwork	C	22 Jul 2002
P5423.42	2	Digital Input Module Certified Circuit Diagram	C	06 Sep 2003
P5423.22	1	Digital Input Module PCB Artwork	D	01 Jun 2003
P5423-549	1	P5423.22 Issue C PCB Salvage Modifications	A	11 Nov 2003
P5423.139	2	Digital Input (Fail Safe) Module Certified Circuit Diagram	B	12 Jun 2003
P5423.135	1	Fail Safe Digital Input Module PCB Artwork	B	22 Jul 2002
P5423.41	2	DC Analogue Input Module Certified Circuit Diagram	B	09 Jun 2003
P5423.21	1	DC Analogue Input Module PCB Artwork	B	22 Jul 2002
P5423.43	1	AC (rms) Analogue Input Module PCB Certified Circuit Diagram	E	22 Jan 2003
P5423.23	1	AC (rms) Analogue Input Module PCB Artwork	F	01 Jun 2003

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P5423-548	1	P5423.23 Issue E PCB Salvage Modifications	A	11 Nov 2003
P5423.248	2	Thermocouple Input Module Certified Circuit Diagram	B	03 Jun 2003
P5423.25	1	Thermocouple Input Module PCB Artwork	B	14 Jun 2003
P5423.178	2	Flow Sensor Input Module Certified Circuit Diagram	B	01 Apr 2003
P5423.179	1	Flow Sensor Input Module PCB Artwork	B	09 Jun 2003
P5423.138	2	Strain Gauge Input Module Certified Circuit Diagram	C	10 Jun 2003
P5423.131	1	Strain Gauge Input Module PCB Artwork	C	22 Jul 2002
P5423.545	1	Certification Label Details Australian	B	15 Dec 2006

Issue 1 dated 14 Jun 2007

Variations Permitted by Issue 1

Option of fitting an alternative relay in the potted relay module. This optional relay has exactly the same operating coil and protection diodes, with the only difference being that it uses a reed that is normally open only (instead of the change over type used previously). This reed is capable of carrying a higher current of 1A (instead of the 250 mA used previously).

This minor change does not affect the intrinsic safety assessment provided in the earlier report Baseefa 03(C)0683 held in TestSafe file 2003/022220

Manufacturer's Documents associated with the Issue 1:

Document Number	Pages / Sheets	Document Title	Revision	Date
P5093.27.01	1	Reed Relay	A	14 Mar 2007

Issue 2 dated 04 Dec 2007

Variations Permitted by Issue 2

Modifications have been made to the design of the power supply module within the Programmable Sensor Controllers type TX9042. Test report Baseefa 06(C)0985 provides the compliance assessment of this change.

Option of fitting an alternative LCD 'Plus Opto EW20400YLY' in the Display PCB. Test report 29704 provides the compliance assessment of this change.

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Manufacturer's Documents associated with the Issue 2:

Document Number	Pages / Sheets	Document Title	Revision	Date
P5423.06	1	PCB, Power Supply	J	19 Sep 2006
P5423.08	1	Display PCB Certified Circuit Diagram	B	31 Oct 2007
P5423.09	2	Certified Circuit Diagram Power Supply PCB	J	27 Feb 2007

Issue 3 dated 14 Mar 2012

Variations Permitted by Issue 3

Modifications have been made to the Programmable Sensor Controller Type 9042 to include the following:

- Use of an alternative Flow Sensor Input Module (Rosemount) for use with Rosemount Pressure Sensor
- Alternative Control PCB (P5423.01 Iss E or Iss F)
- Alternative LCD Module
- Alternative diode type on Battery PCB
- Correction to Digital Input Module U_o value

These modifications have been addressed in test reports Baseefa 05(C)0460 and 10(C)0863 and 12(C)0126.

Conditions of Certification pertaining to Issue 3 of this certificate:

It is a condition of safe use that, in addition to the parameters provided in the earlier issue of the certificate, the following parameters shall be taken into account during installation:

Alternative Flow Sensor Input Module (Rosemount) for use with Rosemount Pressure Sensor 3051S

Power Output Terminal T1 w.r.t. T2, T3, T4

U_o	16.5 V
I_o	242 mA
P_o	1 W
C_o	6.9 µF
L_o	4.4 mH
L_o/R_o	468 µH/Ω

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Manufacturer's Documents associated with the Issue 3:

Document Number	Pages / Sheets	Document Title	Revision	Date
P5423.01	2	Control PCB Certified Circuit Diagram	E	13 Jul 2011
P5423.01	2	Control PCB Certified Circuit Diagram	F	14 Jul 2011
P5423.02	1	General Arrangement	J	04 Jul 2011
P5423.03	1	Control PCB Artwork	D	06 My 2011
P5423.08	1	Display PCB Certified Circuit Diagram	C	23 May 2011
P5423.47	1	Battery PCB Certified Circuit Diagram	C	14 Dec 2011
P5423.554	1	Flow Sensor Input Module (Rosemount) PCB Artwork	A	28 Jul 2005
P5423.555	2	Certified Circuit Diagram Flow Sensor Input Module For Rosemount DP Sensor	A	02 Aug 2005

Issue 4 dated 06 Nov 2012

Variations Permitted by Issue 4

There are no changes to the design of the equipment.

The Relay connection parameters have been revised as provided below. The earlier restriction that the relay contacts must only be connected to an IS circuit which is powered by the same IS Power Supply as the TX9042 has been removed, and the Ui = 16.5V has now increased to 23V.

These changes have been addressed in test report 33925.

Conditions of Certification pertaining to Issue 4 of this certificate:

The Relay connection parameters have been revised to:

Relay Output Connections

U_i = 23V