

**Australian/New Zealand
Certification Scheme for
EXPLOSION-PROTECTED ELECTRICAL EQUIPMENT
ANZEx Scheme**

Certificate of Conformity

Certificate No.: ANZEx 06.3057X	Issue No: 4	Date of Issue: 2012-11-06
	Issue No: 0	Date of Issue: 2006-12-21

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

Electrical Apparatus: Programmable Sensor Controller Type TX9042

Type of Protection: Ex ia

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

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

Manufacturing Location(s): As above

The EPEE certification database located at <http://www.anzex.com.au> shows the validity of this Certificate.

 <p>Test Safe AUSTRALIA</p>	<p>Certificate issued by:</p> <p><i>TestSafe Australia</i> 919 Londonderry Road, Londonderry NSW 2753 Australia Phone: +61 2 4724 4900 Fax: +61 2 4724 4999 http://www.testsafe.com.au</p>	 <p>JAS-ANZ</p> <p>www.jas-anz.org/register</p>
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This certificate and schedule shall not be reproduced except in full

Australian/New Zealand
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This certificate is granted subject to the conditions as set out in Standards Australia/Standards New Zealand Miscellaneous Publication MP87.1:2008.

STANDARDS:

The electrical 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 60079.0:2000 | Electrical apparatus for explosive gas atmospheres – Part 0: General requirements (including Amendment 1) |
| IEC 60079.11:1999 | Electrical apparatus for explosive gas atmospheres – Part 11: Intrinsic safety ‘i’ |

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standard(s) listed above.*

ASSESSMENT & TEST REPORTS:

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

- | | |
|---|--|
| Test Report No. and Issuing Body: | Baseefa 06(C)0985, TestSafe 29704, Baseefa 05(C)0460, 10(C)0863, 12(C)0126, TestSafe 33925 |
| Quality Assessment Report No. and Issuing Body: | GB/SIR/QAR07.0017/02 |
| File Reference: | 2012/016979 |



Ujen Singh

Signed for and on behalf of issuing body

06 November 2012

Date of Issue

Quality & Certification Manager

Position

This certificate is not transferable and remains the property of the issuing body and must be returned in the event of it being revoked or not renewed

Australian/New Zealand

Certification Scheme for

EXPLOSION-PROTECTED ELECTRICAL EQUIPMENT

ANZEx Scheme

Certificate of Conformity

Certificate No.: ANZEx 06.3057X	Issue No: 4	Date of Issue: 2012-11-06
	Issue No: 0	Date of Issue: 2006-12-21

Schedule

EQUIPMENT:

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
- Straingauge Input
- Flow Sensor Input

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

**Australian/New Zealand
Certification Scheme for**

EXPLOSION-PROTECTED ELECTRICAL EQUIPMENT

ANZEx Scheme

Certificate of Conformity

Certificate No.: **ANZEx 06.3057X**

Issue No: **4**

Date of Issue: **2012-11-06**

Issue No: **0**

Date of Issue: **2006-12-21**

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)

CONDITIONS OF CERTIFICATION:

1. 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

**Australian/New Zealand
Certification Scheme for**

EXPLOSION-PROTECTED ELECTRICAL EQUIPMENT

ANZEx Scheme

Certificate of Conformity

Certificate No.: **ANZEx 06.3057X**

Issue No: **4**

Date of Issue: **2012-11-06**

Issue No: **0**

Date of Issue: **2006-12-21**

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	*

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 μ F
L_o	100 mH

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

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	*

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 μ F
L_o	100 mH

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

**Australian/New Zealand
Certification Scheme for**

EXPLOSION-PROTECTED ELECTRICAL EQUIPMENT

ANZEx Scheme

Certificate of Conformity

Certificate No.: ANZEx 06.3057X	Issue No: 4	Date of Issue: 2012-11-06
	Issue No: 0	Date of Issue: 2006-12-21

Temperature Input:

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

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

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 μ F
L_o	100 mH

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

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_o	16.5 V
I_o	40 mA
P_o	163 mW
C_o	5 μ F
L_o	5 mH
L_o/R_o	100 μ H/ Ω

U_i	0
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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 μ F
L_o	100 mH

**Australian/New Zealand
Certification Scheme for**

EXPLOSION-PROTECTED ELECTRICAL EQUIPMENT

ANZEx Scheme

Certificate of Conformity

Certificate No.: **ANZEx 06.3057X**

Issue No: **4**

Date of Issue: **2012-11-06**

Issue No: **0**

Date of Issue: **2006-12-21**

Vortex Input:

Power Output Terminal T1 w.r.t. T4

U_o	6.51 V
I_o	40 mA
P_o	153 mW
C_o	100 μ F
L_o	26 mH
L_o/R_o	240 μ H/ 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 μ F
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 μ F
L_o	10 mH

U_i	0 V
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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 μ F
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	*

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

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

**Australian/New Zealand
Certification Scheme for**

EXPLOSION-PROTECTED ELECTRICAL EQUIPMENT

ANZEx Scheme

Certificate of Conformity

Certificate No.: **ANZEx 06.3057X**

Issue No: **4**

Date of Issue: **2012-11-06**

Issue No: **0**

Date of Issue: **2006-12-21**

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	U_o	6.51 V
C_i	0	I_o	16 mA
L_i	0	C_o	100 μ F
		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	U_o	6.88 V
P_i	0.53 W	I_o	21 mA
C_i	10 nF	C_o	100 μ F
L_i	0	L_o	100 mH

**Australian/New Zealand
Certification Scheme for**

EXPLOSION-PROTECTED ELECTRICAL EQUIPMENT

ANZEx Scheme

Certificate of Conformity

Certificate No.: ANZEx 06.3057X

Issue No: 4

Date of Issue: 2012-11-06

Issue No: 0

Date of Issue: 2006-12-21

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	U _o	6.88 V
C _i	1.1 nF	I _o	3.3 mA
L _i	0	C _o	100 μF
		L _o	100 mH

Input Terminal T3 w.r.t. T4

U _i	16.5 V	U _o	6.88 V
C _i	1.1 nF	I _o	3.3 mA
L _i	0	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

**Australian/New Zealand
Certification Scheme for**

EXPLOSION-PROTECTED ELECTRICAL EQUIPMENT

ANZEx Scheme

Certificate of Conformity

Certificate No.: **ANZEx 06.3057X**

Issue No: **4**

Date of Issue: **2012-11-06**

Issue No: **0**

Date of Issue: **2006-12-21**

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:

$$U_o = 9 \text{ V}, I_o = 100 \text{ mA}, P_o = 225 \text{ mW}$$

OR $U_o = 12 \text{ V}, I_o = 80 \text{ mA}, P_o = 240 \text{ mW}$

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

The cable parameters shall not exceed the following: $C_c = 2.8 \mu\text{F}$, $L_c/R_c = 222 \mu\text{H}/\Omega$

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 $\mu\text{H}/\Omega$

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.

$$U_i = 16.5\text{V}$$

**Australian/New Zealand
Certification Scheme for**

EXPLOSION-PROTECTED ELECTRICAL EQUIPMENT

ANZEx Scheme

Certificate of Conformity

Certificate No.: **ANZEx 06.3057X**

Issue No: **4**

Date of Issue: **2012-11-06**

Issue No: **0**

Date of Issue: **2006-12-21**

DOCUMENTS:

Drawing No	Drawing Title	Issue	Date
P5423.02	General Arrangement	I	10.04.03
P5093.27	Reed Relay	C	21.01.97
P5423.09	Power Supply PCB Certified Circuit Diagram	E Salvage	02.12.03
P5423.09 2 shts.	Power Supply PCB Certified Circuit Diagram	F	07.11.03
P5423.06	Power Supply PCB Artwork	E	21.11.02
P5423-547	P5423.06 Issue E PCB Salvage Modifications	B	02.12.03
P5423.01 2 shts.	Control PCB Certified Circuit Diagram	D	22.01.03
P5423.03	Control PCB Artwork	C	18.04.97
P5423.08	Display PCB Certified Circuit Diagram	A	02.07.96
P5423.05	Display PCB Artwork	A	08.05.96
P5423.47	Battery PCB Certified Circuit Diagram	B	05.09.02
P5423.29	Battery PCB Artwork	C	22.07.02
P5423.46	Digital Comms PCB Certified Circuit Diagram	B	05.09.02
P5423.28	Digital Comms PCB Artwork	A	08.05.96
P5423.45	RS485 Comms PCB Certified Circuit Diagram	D	22.01.03
P5423.254	RS485 Comms PCB Artwork	D	10.06.03
P5423-550	P5423.254 issue D PCB Salvage Modifications	A	11.11.03
P5423.07	Input PCB Certified Circuit Diagram	C	22.01.03
P5423.04	Input PCB Artwork	C	22.07.02
P5423.42 2 shts.	Digital Input Module Certified Circuit Diagram	C	06.09.03
P5423.22	Digital Input Module PCB Artwork	D	01.06.03
P5423-549	P5423.22 Issue C PCB Salvage Modifications	A	11.11.03
P5423.139 2 shts.	Digital Input (Fail Safe) Module Certified Circuit Diagram	B	12.06.03
P5423.135	Fail Safe Digital Input Module PCB Artwork	B	22.07.02
P5423.41 2 shts.	DC Analogue Input Module Certified Circuit Diagram	B	09.06.03
P5423.21	DC Analogue Input Module PCB Artwork	B	22.07.02
P5423.43	AC (rms) Analogue Input Module PCB Certified Circuit Diagram	E	22.01.03

**Australian/New Zealand
Certification Scheme for**

EXPLOSION-PROTECTED ELECTRICAL EQUIPMENT

ANZEx Scheme

Certificate of Conformity

Certificate No.: **ANZEx 06.3057X**

Issue No: **4**

Date of Issue: **2012-11-06**

Issue No: **0**

Date of Issue: **2006-12-21**

Drawing No	Drawing Title	Issue	Date
P5423.23	AC (rms) Analogue Input Module PCB Artwork	F	01.06.03
P5423-548	P5423.23 Issue E PCB Salvage Modifications	A	11.11.03
P5423.248 2 shts.	Thermocouple Input Module Certified Circuit Diagram	B	03.06.03
P5423.25	Thermocouple Input Module PCB Artwork	B	14.06.03
P5423.178 2 shts.	Flow Sensor Input Module Certified Circuit Diagram	B	01.04.03
P5423.179	Flow Sensor Input Module PCB Artwork	B	09.06.03
P5423.138 2 shts.	Strain Gauge Input Module Certified Circuit Diagram	C	10.06.03
P5423.131	Strain Gauge Input Module PCB Artwork	C	22.07.02
P5423.545	Certification Label Details Australian	B	15.12.06

Variations permitted by Issue 1 of this certificate:

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

Documents pertaining to Issue 1 of this certificate:

Drawing No	Drawing Title	Issue	Date
P5093.27.01	Reed Relay	A	14.03.07

**Australian/New Zealand
Certification Scheme for**

EXPLOSION-PROTECTED ELECTRICAL EQUIPMENT

ANZEx Scheme

Certificate of Conformity

Certificate No.: **ANZEx 06.3057X**

Issue No: **4**

Date of Issue: **2012-11-06**

Issue No: **0**

Date of Issue: **2006-12-21**

Variations permitted by Issue 2 of this certificate:

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.

Documents pertaining to Issue 2 of this certificate:

Drawing No	Drawing Title	Issue	Date
P5423.06	PCB, Power Supply	J	2006/09/19
P5423.08	Display PCB Certified Circuit Diagram	B	2007/10/31
P5423.09 2 sheets	Certified Circuit Diagram Power Supply PCB	J	2007/02/27

Variations permitted by Issue 3 of this certificate:

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 Uo value

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

**Australian/New Zealand
Certification Scheme for**

EXPLOSION-PROTECTED ELECTRICAL EQUIPMENT

ANZEx Scheme

Certificate of Conformity

Certificate No.: ANZEx 06.3057X	Issue No: 4	Date of Issue: 2012-11-06
	Issue No: 0	Date of Issue: 2006-12-21

CONDITIONS OF CERTIFICATION pertaining to Issue 3 of this certificate:

1. It is a condition of safe use that, in addition to the parameters provided in Issue 1 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

Documents pertaining to Issue 3 of this certificate:

Document No.	Sheets	Document Title	Issue	Date (yyyy-mm-dd)
P5423.01	2	Control PCB Certified Circuit Diagram	E	2011-07-13
P5423.01	2	Control PCB Certified Circuit Diagram	F	2011-07-14
P5423.02	1	General Arrangement	J	2011-07-04
P5423.03	1	Control PCB Artwork	D	2011-05-06
P5423.08	1	Display PCB Certified Circuit Diagram	C	2011-05-23
P5423.47	1	Battery PCB Certified Circuit Diagram	C	2011-12-14
P5423.554	1	Flow Sensor Input Module (Rosemount) PCB Artwork	A	2005-07-28
P5423.555	2	Certified Circuit Diagram Flow Sensor Input Module For Rosemount DP Sensor	A	2005-08-02

Australian/New Zealand
Certification Scheme for

EXPLOSION-PROTECTED ELECTRICAL EQUIPMENT

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Variations permitted by Issue 4 of this certificate:

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 $U_i = 16.5V$ 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

$U_i = 23V$

Documents pertaining to Issue 4 of this certificate: No changes or new documents