



1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: Sira 00ATEX2001X

4 Equipment: TX6141 and TX6143 Pressure Sensor/Transmitter

5 Applicant: Trolex Limited

6 Address: Newby Road
Hazel Grove
Stockport
ST7 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 confidential report number R52A6575A.

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 50014:1997 including Amendments A1 to A2
EN 50020:1994
EN 50284:1999

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment or protective system 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	EEx ia I (T _a = -20°C to +60°C)	or
	II 1G	EEx ia IIC T4 (T _a = -20°C to +60°C)	

Project Number 52A6575
Date 28 April 2000
C. Index 12

M D Shearman
Certification Manager

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Sira Certification Service

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATION

Sira 00ATEX2001X

13 DESCRIPTION OF EQUIPMENT

The Trolex TX614x-Series Pressure Sensors/Transmitters are designed to measure differential, gauge and absolute pressure in process pipeline, atmosphere and tank monitoring applications. The sensor element comprises a ceramic or stainless steel diaphragm in contact with strain gauge resistive elements in a Wheatstone Bridge configuration; in the case of the differential pressure sensor, there is a second diaphragm. Any deflection of the diaphragm due to changes in pressure difference across it will unbalance the bridge and result in a voltage signal proportional to the pressure difference. The bridge excitation is either voltage or current depending on the type of sensor. The signal voltage is converted to a digital value using an analog-to-digital converter and is read by the micro-controller. The micro-controller software calculates the true scaled pressure reading and performs other functions such as linearisation and temperature compensation as well as conversion of the displayed pressure reading in units other than bar.

The scaled pressure reading is displayed on an LCD module, which also allows users to re-calibrate the apparatus as well as change the default settings affecting operation. The scaled reading is also converted into a standard process signal such as 0.4 - 2 V, 5 - 15 Hz and 4 - 20 mA for use in monitoring and control processes.

The two types of TX614x-Series covered by the certificate are:

- 1 TX6141: gauge or absolute pressure
- 2 TX6143: differential pressure

The apparatus is housed in a polycarbonate enclosure with a polycarbonate window glued into a recess to allow viewing of an LCD.

Each of the two types of TX614x can be manufactured in one of five versions:

- A Group I: 4 to 20 mA version (4-wire)
- B Group I: 0.4 to 2 V version (4-wire)
- C Group I: 5 to 15 Hz version (4-wire)
- D Group I: 4 to 20 mA version (2-wire)
- E Group II: 4 to 20 mA version (2-wire)

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The TX614x has the following safety descriptions:

Version	T3/T4 (supply)	T1/T2 (signal out) [See notes 1-3]
Group I: 4 - 20 mA version	$U_i = 16.5 \text{ V}$, $C_i = 4 \text{ nF}$ $L_i = 0$	$U_i = 16.5 \text{ V}$, $P_i = 1.72 \text{ W}$ $C_i = 15 \text{ nF}$, $L_i = 0$. $U_o = 16.5 \text{ V}$, $I_o = 220 \text{ mA}$ $P_o = 0.91 \text{ W}$, $C_o = 11.9 \mu\text{F}$, $L_o = 2.6 \text{ mH}$.
Group I: 0.4 - 2 V version	$U_i = 16.5 \text{ V}$; $C_i = 4 \text{ nF}$ $L_i = 0$	$U_i = 16.5 \text{ V}$, $P_i = 1.72 \text{ W}$ $C_i = 15 \text{ nF}$, $L_i = 0$ $U_o = 16.5 \text{ V}$, $I_o = 41 \text{ mA}$ $P_o = 0.17 \text{ W}$, $C_o = 11.9 \mu\text{F}$ $L_o = 2.6 \text{ mH}$
Group I: 5-15 Hz version	$U_i = 16.5 \text{ V}$ $C_i = 4 \text{ nF}$ $L_i = 0$	$U_i = 16.5 \text{ V}$ $P_i = 1.72 \text{ W}$ $C_i = 0$, $L_i = 0$, $U_o = 0$
	T1 & T4 (supply/signal out) [T2 & T3 are not connected]	
Group I: 4-20 mA version (2-wire)		$U_i = 16.5 \text{ V}$ $C_i = 18.3 \text{ nF}$ $L_i = 0$
Group II: 4 - 20 mA version (2-wire) – HART and non-HART		$U_i = 28 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 0.7 \text{ W}$ $C_i = 18.3 \text{ nF}$ $L_i = 0$

Note 1: In some applications, T1 and T2 are inputs, in which case these output parameters are not relevant.

Note 2: For Group I builds, the connections to terminals T1/T2 and T3/T4 shall be from the same power supply. The user should note that the power to terminals T1/T2 must be limited to 1.72 W via a supply with a minimum source resistance of 40 Ω . There is no specific power limitation to terminals T3/T4, so terminals T1/T2 and T3/T4 should be regarded as separate intrinsically safe circuits.

Note 3: The installer should refer to the parameters of the equipment connected to terminals T1/T2 and compare these to the parameters listed in the table. The more onerous set of parameters should be used.

Note 4: terminals 5-8 are not used

The equipment has not been assessed as a 'safety device' as referenced in Directive 94/9/EC, Annex II, clause 1.5.

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATION

Sira 00ATEX2001X

14 DESCRIPTIVE DOCUMENTS

14.1	Drawing No.	Sheet	Issue	Date	Description
	P5430.01	1 of 1	A	03 Nov 97	Control PCB Certified Circuit Diagram
	P5430.04	1 of 1	A	22 Jan 98	Output PCB
	P5436.01	1 of 1	B	10 Apr 00	Output PCB Certified Circuit Diagram
	P5436.02	1 of 1	C	06 Apr 00	General Arrangement
	P5436.08	1 of 1	A	17 Mar 98	Certified Block Diagram
	P5436.16	1 of 1	A	21 Apr 98	Interface PCB – Gauge/Absolute Pressure Certified Circuit Diagram
	P5436.17	1 of 1	A	21 Apr 98	Interface PCB – Differential Pressure Certified Circuit Diagram
	P5436.19	1 of 1	A	17 Mar 98	Certified Block Diagram
	P5436.21	1 of 1	A	21 Apr 98	Interface PCB – Differential Pressure Certified Circuit Diagram
	P5436.22	1 of 1	A	17 Mar 98	Certified Block Diagram
	P5436.60	1 of 1	A	06 Apr 00	Certification Labels
	P9000.100	1 of 1	B	06 Apr 00	Alternative Housing Arrangement

14.2 Report No. R52A6575A

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

15.1 Some parts of the enclosure are non-conducting and may generate an ignition capable level of static charge under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as high-pressure steam) that might cause a build up of static charge on non-conducting surfaces. Additionally, cleaning of the equipment should only be done with a damp cloth.

16 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II (EHSR'S)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in Report No. R52A6575A.

17 CONDITIONS OF CERTIFICATION

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

17.2 This certificate relies on the following previously-certified products. When used as part of the TX614x Pressure Sensors/Transmitters, the key attributes listed in the table below shall still be maintained by their original certificate.

Product	Certificate number	Key attributes
Littelfuse fuse	BAS Ex 832302U	EEx ia IIC
Bedford OPI1264-series opto-isolator	BAS Ex 89C2096U/2	EEx ia IIC

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EC TYPE-EXAMINATION CERTIFICATE VARIATION

CERTIFICATE NUMBER Sira 00ATEX2001X Dated 28 April 2000

VARIATION NUMBER 1 (ONE) Dated 14 June 2000

VARIATION TO EQUIPMENT

To permit:

- 1 The use of pad printing as an alternative method of marking.

DESCRIPTIVE DOCUMENTS


Number	Sheet	Rev	Date	Description
P9000.100	1 of 1	C	7 Jun 00	Alternative Housing Arrangement

ADDITIONAL CONDITIONS OF CERTIFICATION

None

File No 52V6965

Report No. NA


R Cooper Eng LInstMC
Deputy Chief Executive

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EC TYPE-EXAMINATION CERTIFICATE VARIATION

CERTIFICATE NUMBER Sira 00ATEX2001X Dated 28 April 2000

VARIATION NUMBER 2 (TWO) Dated 18 December 2001

VARIATION TO EQUIPMENT

To permit:

- The output PCB circuit to be modified.
- The safety description to be changed as detailed below:

Version	T3/T4 (supply)	T1/T2 (signal out) [See notes 1 & 3]		
Group I: (4-wire) 4 - 20 mA version	U _i = 16.5 V C _i = 4 nF L _i = 0 [See note 2]	U _i = 16.5 V C _i = 4 nF L _i = 0.	U _o = 16.5 V I _o = 223 mA P _o = 0.921 W	C _o = 7 μF L _o = 0.6 mH
Group I: 0.4 - 2 V version	U _i = 16.5 V C _i = 4 nF L _i = 0 [See note 2]	U _i = 16.5 V C _i = 4 nF L _i = 0	U _o = 16.5 V I _o = 41 mA P _o = 0.17 W	C _o = 7 μF L _o = 0.6 mH
Group I: 5-15 Hz version	U _i = 16.5 V C _i = 4 nF L _i = 0	U _i = 16.5 V C _i = 0 L _i = 0	U _o = 0	
	T1 & T4 (supply/signal out) [T2 & T3 are not connected]			
Group I: (2-wire) 4 - 20 mA version	U _i = 16.5 V	C _i = 8 nF	L _i = 0	
Group II: (2-wire) 4 - 20 mA version	U _i = 28 V P _i = 0.84 W	C _i = 8 nF I _i = 120 mA	R _{min} ≥ 233 Ω L _i = 0	

Note 1: The signal terminals T1/T2 may be connected to a powered or non-powered load

Note 2: For all builds, the connections to terminals T1/T2 and T3/T4 are assumed to be from the same power supply. The signal terminals of 4-wire builds may be supplied from a different power supply, in which case, for system assessment purposes, the supply terminals T3/T4 shall be regarded as a 16.5 V source with one countable fault via a series resistance as below:

Group I 4-20 mA 4-wire: 73.9 Ω

Group I 0.4-2 V: 404 Ω

Group I 5-15 Hz: No galvanic connection between the supply and signal terminals

Note 3: The installer should refer to the parameters of the equipment connected to terminals T1/T2 and compare these to the parameters listed in the table. The more onerous set of parameters should be used.

Note 4: Terminals 5-8 are not used in any build.

- The addition of a special condition for safe use and a condition of certification.

- The removal of the option of a die cast enclosure.

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EC TYPE-EXAMINATION CERTIFICATE VARIATION

CERTIFICATE NUMBER Sira 00ATEX2001X Dated 28 April 2000

VARIATION NUMBER 2 (TWO) Dated 18 December 2001

DESCRIPTIVE DOCUMENTS

Number	Sheet	Rev	Date	Description
P5430.04	C	1 of 1	22 Oct 01	Output PCB
P5436.01	C	1 of 6	12 Nov 01	Output PCB Overall Circuit Diagram
P5436.01	C	2 of 6	12 Nov 01	Output PCB GpI 0.4 to 2V Output Version
P5436.01	C	3 of 6	12 Nov 01	Output PCB GpI 4 to 20mA Output (2 wire)
P5436.01	C	4 of 6	12 Nov 01	Output PCB GpI 4 to 20mA Output (4 wire)
P5436.01	C	5 of 6	12 Nov 01	Output PCB GpI 5 to 15Hz Output Version
P5436.01	C	6 of 6	12 Nov 01	Output PCB GpII 4 to 20mA Output (2 wire)
P5436.02	d	1 of 1	25 Jun 01	General Arrangement

ADDITIONAL CONDITION OF CERTIFICATION

15.2 The manufacturer shall take all reasonable steps to ensure that the user/installer complies with the Special Conditions for Safe Use and shall clearly identify the safety parameters that are applicable to each individual TX614x Pressure Sensor/Transmitter.

ADDITIONAL SPECIAL CONDITION FOR SAFE USE

17.3 The safety description of the TX614x Pressure Sensor/Transmitter has changed as a result of variation 2. Consequently, the products that incorporate these modifications may not be suitable as a direct replacement for those that are manufactured to the previous design, therefore, the user/installer shall ensure that the TX614x Pressure Sensor/Transmitter is compatible with the equipment to which it is intended to be connected.

File No 52A8420

Report No. R52A8420A

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EC TYPE-EXAMINATION CERTIFICATE VARIATION

CERTIFICATE NUMBER Sira 00ATEX2001X Dated 28 April 2000

VARIATION NUMBER 3 (THREE) Dated 24 March 2003

VARIATION TO EQUIPMENT

To permit:

- 1 The use of 'Faradex' stainless steel filled nylon 6 as an alternative anti-static enclosure material.

DESCRIPTIVE DOCUMENTS

Number	Sheet	Rev	Date	Description
P5436.02	1 of 1	E	04 Feb 03	General arrangement

ADDITIONAL CONDITIONS OF CERTIFICATION

None

File No 52A9400

Report No. R52A9400A

C Ellaby
Certification Officer

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