



1 **EC - TYPE EXAMINATION CERTIFICATE**

2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres
Directive 94/9/EC**

3 EC - Type Examination Certificate Number: **Baseefa03ATEX0292X**

4 Equipment or Protective System: **PROGRAMMABLE SENSOR CONTROLLER TYPE TX9042**

5 Manufacturer: **TROLEX LTD**

6 Address: **Stockport, Cheshire, SK7 5DY**

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Baseefa (2001) Ltd. Notified body number 1180, in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential Report No. **02(C)0346**

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014:1997 + Amendments 1 & 2 EN 50020:2002 EN 50303:2000

except in respect of those requirements listed at item 18 of the Schedule.

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 or protective system. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include the following :

 **IM1 EEx ia I**

This certificate may only be reproduced in its entirety, without any change, schedule included.

Baseefa (2001) Ltd. Customer Reference No. **1159**

Project File No. **02/0346**

This certificate is granted subject to the general terms and conditions of Baseefa (2001) Ltd. It does not necessarily indicate that the equipment may be used in particular industries or circumstances.

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On behalf of
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Re-issued 26 January 2004 to replace original



13

Schedule

14

Certificate Number Baseefa03ATEX0292X

15 Description of Equipment or Protective System

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 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)



Power Supply Connection

Terminals A17, A18 (Power)

$$\begin{aligned}U_i &= 16.5 \text{ V} \\C_i &= 0 \\L_i &= 0\end{aligned}$$

Terminals A35, A36 (Control Function)

$$\begin{aligned}U_i &= 0 \\I_i &= 0 \\P_i &= 0 \\C_i &= 0 \\L_i &= 0\end{aligned}$$

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

$$\begin{aligned}U_o &= U_i \text{ (power supply connection)} \\I_o &= * \\P_o &= * \\C_o &= * \\L_o &= * \\L_o/R_o &= *\end{aligned}$$

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

$$\begin{aligned}U_i &= 16.5 \text{ V} & U_o &= 6.51 \text{ V} \\C_i &= 120 \text{ nF} & I_o &= 1.3 \text{ mA} \\L_i &= 0 & C_o &= 300 \text{ }\mu\text{F} \\ & & L_o &= 100 \text{ mH}\end{aligned}$$

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

Current Input:

Power Output Terminal T1 w.r.t. T2

$$\begin{aligned}U_o &= U_i \text{ (power supply connection)} \\I_o &= * \\P_o &= * \\C_o &= * \\L_o &= * \\L_o/R_o &= *\end{aligned}$$

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

$$\begin{aligned}U_i &= 16.5 \text{ V} & U_o &= 6.51 \text{ V} \\C_i &= 120 \text{ nF} & I_o &= 1.3 \text{ mA} \\L_i &= 0 & C_o &= 300 \text{ }\mu\text{F} \\ & & L_o &= 100 \text{ mH}\end{aligned}$$

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

Temperature Input:

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

$$\begin{aligned}U_o &= U_i \text{ (power supply connection)} \\I_o &= * \\P_o &= * \\C_o &= * \\L_o &= * \\L_o/R_o &= *\end{aligned}$$

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

$$\begin{aligned}U_i &= 16.5 \text{ V} & U_o &= 6.51 \text{ V} \\C_i &= 120 \text{ nF} & I_o &= 1.3 \text{ mA} \\L_i &= 0 & C_o &= 100 \text{ }\mu\text{F} \\ & & L_o &= 100 \text{ mH}\end{aligned}$$

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

$U_o = U_i$ (power supply connection)
 $I_o = 40$ mA
 $P_o = 163$ mW
 $C_o = 5$ μ F
 $L_o = 5$ mH
 $L_o/R_o = 100$ μ H/ Ω

Input Terminals T2, T3

$U_i = 16.5$ 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

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 $U_o = 6.51$ V
 $C_i = 0$ $I_o = 7$ mA
 $L_i = 0$ $C_o = 100$ 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 $U_i = 0$ V
 $I_o = 3.4$ mA
 $P_o = 10.5$ mW
 $C_o = 5$ μ F
 $L_o = 10$ mH

Input Terminals T2, T4

$U_i = 16.5$ V $U_o = 6.51$ V
 $C_i = 12$ nF $I_o = 3.6$ mA
 $L_i = 0$ $C_o = 100$ 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 $U_o = U_i$ (power supply connection)
 $C_i = 12$ nF $I_o = 121$ mA at $U_i = 16.5$ V
 $L_i = 0$ $P_o = 497$ 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.



Thermocouple Input Module Connections

Power output Terminal T1 w.r.t. T4

$$\begin{aligned}U_o &= U_i \text{ (power supply connection)} \\I_o &= * \\P_o &= * \\C_o &= * \\L_o &= * \\L_o/R_o &= *\end{aligned}$$

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

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

$$\begin{aligned}U_i &= 6.88 \text{ V} & U_o &= 6.51 \text{ V} \\C_i &= 0 & I_o &= 16 \text{ mA} \\L_i &= 0 & C_o &= 100 \text{ }\mu\text{F} \\& & L_o &= 100 \text{ mH}\end{aligned}$$

Strain Gauge Input Module Connections

Power Output Terminal T1 w.r.t.T4

$$\begin{aligned}U_o &= U_i \text{ (power supply connection)} \\I_o &= 129 \text{ mA at } U_i = 16.5 \text{ V} \\P_o &= 0.53 \text{ W at } U_i = 16.5 \text{ V} \\C_o &= * \\L_o &= * \\L_o/R_o &= *\end{aligned}$$

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

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

$$\begin{aligned}U_i &= 16.5 \text{ V} & U_o &= 6.88 \text{ V} \\P_i &= 0.53 \text{ W} & I_o &= 21 \text{ mA} \\C_i &= 10 \text{ nF} & C_o &= 100 \text{ }\mu\text{F} \\L_i &= 0 & L_o &= 100 \text{ mH}\end{aligned}$$

Flow Sensor Input Module Connections

Power Output Terminal T1 w.r.t.T4

$$\begin{aligned}U_o &= 7.14 \text{ V} \\I_o &= 131 \text{ mA} \\P_o &= 234 \text{ mW} \\C_o &= 100 \text{ }\mu\text{F} \\L_o &= 10 \text{ mH} \\L_o/R_o &= 1834 \text{ }\mu\text{H}/\Omega\end{aligned}$$

Input Terminal T2 w.r.t.T4

$$\begin{aligned}U_i &= 7.14 \text{ V} & U_o &= 6.88 \text{ V} \\C_i &= 1.1 \text{ nF} & I_o &= 3.3 \text{ mA} \\L_i &= 0 & C_o &= 100 \text{ }\mu\text{F} \\& & L_o &= 100 \text{ mH}\end{aligned}$$

Input Terminal T3 w.r.t. T4

$$\begin{aligned}U_i &= 16.5 \text{ V} & U_o &= 6.88 \text{ V} \\C_i &= 1.1 \text{ nF} & I_o &= 3.3 \text{ mA} \\L_i &= 0 & C_o &= 100 \text{ }\mu\text{F} \\& & L_o &= 100 \text{ mH}\end{aligned}$$

RS485 Comms Connections

Terminals B2,B3 w.r.t. B1

$$\begin{aligned}U_o &= 6.88 \text{ V} & U_i &= 12 \text{ V} \\I_o &= 154 \text{ mA} & P_i &= 1.41 \text{ W} \\P_o &= 265 \text{ mW} & C_i &= 0 \\C_o &= 10 \text{ }\mu\text{F} & L_i &= 0 \\L_o &= 4 \text{ mH} \\L_o/R_o &= 139 \text{ }\mu\text{H}/\Omega\end{aligned}$$



Relay Output Connections

The relay contacts may be connected to an IS circuit which is powered by the same IS Power Supply as the PSC or by a separate power supply provided the sum of the two power supply output voltages does not exceed 30V.

16 Report Number

02(C)0346

17 Special Conditions for Safe Use

1. The Programmable Sensor Controller Type TX9042 must be mounted in a secondary enclosure as shown on drawing P5423.02 or in an alternative metal enclosure (not light alloys) which is appropriately certified as providing a degree of protection of IP54.

2. Up to 11 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 10, 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 to BAS01ATEX7202 or MTL7761ac, MTL7766ac to BAS01ATEX7217.

For the purposes of this certificate, these shunt zener safety barriers may be considered equivalent to Category I (M1) equipment.

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

3. For the purposes of this certificate, a P+F inductive sensor to PTB00ATEX2048X to Category II 1G EEx ia IIC T6 connected to terminals T1 to T4 of a Digital Input Module may be considered equivalent to Category I M1. In this instance, the power supply selected to power the PSC must have an output voltage not exceeding 16V.

18 Essential Health and Safety Requirements

All relevant Essential Health and Safety Requirements are covered by the standards listed at item 9.

19 Drawings and Documents

Number	Sheet	Issue	Date	Description
P5423.02	1	I	10.04.03	General Arrangement
P5423.270	1	A	13.06.03	Certification Label details
P5093.27	1	C	21.01.97	Reed Relay
P5423.09	1 & 2	E Salvage	02.12.03	Power Supply PCB certified Circuit Diagram - Salvage
P5423.06	1	E	21.11.02	Power Supply PCB Artwork
P5423.547	1	B	02.12.03	P5423.06 Issue E PCB Salvage Modifications
P5423.01	1 & 2	D	22.01.03	Control PCB Certified Circuit Diagram
P5423.03	1	C	18.04.97	Control PCB Artwork
P5423.08	1	A	02.07.96	Display PCB



Number	Sheet	Issue	Date	Description
P5423.05	1	A	08.05.96	Display PCB Artwork
P5423.47	1	B	05.09.02	Battery PCB Certified Circuit diagram
P5423.29	1	C	22.07.02	Battery PCB Artwork
P5423.46	1	B	05.09.02	Digital Comms PCB Certified Circuit Diagram
P5423.28	1	A	08.05.96	Digital Comms PCB Artwork
P5423.45	1	D	22.01.03	RS485 Comms PCB Certified Circuit Diagram
P5423.254	1	D	10.06.03	RS485 Comms PCB Artwork
P5423.550	1	A	11.11.03	P5423.254 issue D PCB Salvage Modifications
P5423.07	1	C	22.01.03	Input PCB Certified circuit Diagram
P5423.04	1	C	22.07.02	Input PCB Artwork
P5423.42	1 & 2	C	06.09.03	Digital Input Module Certified Circuit Diagram
P5423.22	1	D	06.09.03	Digital Input Module PCB Artwork
P5423.549	1	A	11.11.03	P5423.22 Issue C PCB Salvage Modifications
P5423.139	1 & 2	B	12.06.03	Digital Input (Fail Safe) Module Certified Circuit Diagram
P5423.135	1	B	22.07.02	Fail Safe Digital Input Module PCB Artwork
P5423.41	1 & 2	B	09.06.03	DC Analogue Input Module Certified Circuit Diagram
P5423.21	1	B	22.07.02	DC Analogue Input Module PCB Artwork
P5423.43	1	E	22.01.03	AC (rms) Input Module PCB Certified Circuit Diagram
P5423.23	1	F	01.06.03	AC (rms) Analogue Input Module PCB Artwork
P5423.548	1	A	11.11.03	P5423.23 Issue E PCB Salvage Modifications
P5423.248	1 & 2	B	03.06.03	Thermocouple Input Module Certified Circuit Diagram
P5423.25	1	B	03.06.03	Thermocouple Input Module PCB Artwork
P5423.178	1 & 2	B	01.04.03	Flow Sensor Input Module Certified Circuit Diagram
P5423.179	1	B	09.06.03	Flow Sensor Input Module PCB Artwork
P5423.138	1 & 2	C	10.06.03	Strain Gauge Input Module Certified Circuit Diagram
P5423.131	1	C	22.07.02	Strain Gauge Input Module PCB Artwork



1 **SUPPLEMENTARY EC - TYPE EXAMINATION CERTIFICATE**

2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres
Directive 94/9/EC**

3 Supplementary EC - Type Examination Certificate Number: **Baseefa03ATEX0292X/1**

4 Equipment or Protective System: **Programmable Sensor Controller Type TX9042**

5 Manufacturer: **Trolex Ltd**

6 Address: **Stockport, Cheshire, SK7 5DY**

7 This supplementary certificate extends EC – Type Examination Certificate No. Baseefa03ATEX0292X to apply to equipment or protective systems designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

This supplementary certificate shall be held with the original certificate.

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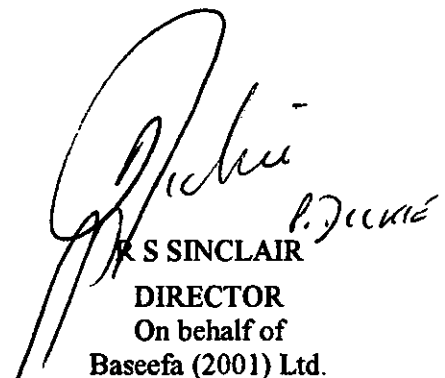
Baseefa Customer Reference No. 1159

Project File No. 05/0460

This certificate is granted subject to the general terms and conditions of Baseefa (2001) Ltd. It does not necessarily indicate that the equipment may be used in particular industries or circumstances.

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On behalf of
Baseefa (2001) Ltd.



13

Schedule

14

Certificate Number Baseefa03ATEX0292X/1

15 Description of the variation to the Equipment or Protective System

Variation 1.1

To permit the addition of an alternative Flow Sensor Input Module for connection to a Rosemount Pressure Sensor 3051S to Certificate No. Baseefa05ATEX0193U.

Output Parameters:

$U_o = 16.5V$ $C_i = 0$
 $I_o = 242mA$ $L_i = 0$
 $P_o = 1W$

16 Report Number

05(C)0460

17 Special Conditions for Safe Use

None additional to those listed previously.

18 Essential Health and Safety Requirements

Compliance with the Essential Health and Safety Requirements is not affected by this variation.

19 Drawings and Documents

Number	Sheet	Issue	Date	Description
P5423.555	1 & 2	A	02/08/05	Circuit Diagram Flow Sensor Input Module for Rosemount DP Sensor
P5423.554	1	A	28/07/05	Flow Sensor Input Module (Rosemount) PCB Artwork



1 **SUPPLEMENTARY EC - TYPE EXAMINATION CERTIFICATE**

2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres
Directive 94/9/EC**

3 Supplementary EC - Type Examination Certificate Number: **Baseefa03ATEX0292X/2**

4 Equipment or Protective System: **Programmable Sensor Controller Type TX9042**

5 Manufacturer: **Trolex Ltd**

6 Address: **Stockport, Cheshire, S K7 5DY**

7 This supplementary certificate extends EC – Type Examination Certificate No. Baseefa03ATEX0292X to apply to equipment or protective systems designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

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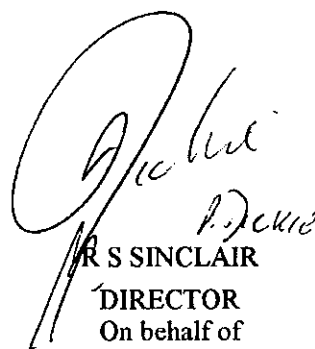
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Project File No. 06/0985

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On behalf of
Baseefa (2001) Ltd.



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Schedule

14

Certificate Number Baseefa03ATEX0292X/2

15 Description of the variation to the Equipment or Protective System

Variation 2.1

To permit a re-design of the Power Supply Module; the Input/Output parameters are not affected.

16 Report Number

06(C)0985.

17 Special Conditions for Safe Use

None

18 Essential Health and Safety Requirements

Compliance with the Essential Health and Safety Requirements is not affected by this variation.

19 Drawings and Documents

Number	Sheet	Issue	Date	Description
P5423.09	1 & 2	J	27/02/07	Certified Circuit Diagram Power Supply PCB
P5423.06	1	J	19.09.06	PCB, Power Supply