



#### 1 EC TYPE-EXAMINATION CERTIFICATE

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

3 Certificate Number: Sira 07ATEX2064X Issue: 4

Equipment: 9400 Series Ethernet Modules
 Applicant: Controlled Systems Limited

6 Address: Ryder Close

Cadley Hill Swadlincote

Derbyshire DE11 9EU

UK

- 7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
- 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 the confidential reports listed in Section 14.2.

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 60079-0:2006 IEC 60079-26:2006 IEC 61241-0:2004 EN 60079-28:2007

EN 60079-11:2007 EN 50303:2000 IEC 61241-11:2005

- If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.
- 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:

#### 9461 & 9466 Modules

 $\langle \epsilon_x \rangle$ 

I M1 II 1GD Ma Ex ia I Ga Ex ia IIC T4 Ex iaD 20 T135°C (Ta = -40°C to +70°C)

#### 9465 Module



I M1
II 1GD
Ma Ex ia I
Ma Ex ia op is I
Ga Ex ia IIC T4
Ga Ex ia op is IIC T4
Ex iaD 20 T135°C
(Ta = -40°C to +70°C)

9469 Module



I M1 II 1GD Ma Ex ia I Ga Ex ia IIC T4 Ex iaD 20 T135°C (Ta = -40°C to +60°C)

D R Stubbings BA MIET Certification Manager

Project Number 25385

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#### 13 DESCRIPTION OF EQUIPMENT

The 9400 Series Ethernet Modules are designed to extend an Ethernet network into a hazardous area and also to act as an interface between an Ethernet network and equipment having a wireless connection or a serial communication port.

The following 4 types of Modules are intended to be located in the hazardous area:

The **9461-ET Module** is configured as an Ethernet gateway to enable existing equipment having a serial communications port to be connected to an Ethernet network.

The **9465-ET** Module is configured as a 10/100 Mbps Fibre to Copper Media Converter to allow an Ethernet network to be extended over a greater distance. The fibre optic link may be up to 2 kilometres in length when running at 100 Mbps and, due to the use of 1300 nm optics, an extended distance of 5 kilometres is achievable at 10 Mbps. Longer distances may be obtained by connecting a **9466-ET** (10/100 Mbps Ethernet Switch) between two **9465-ET** media converters, effectively giving a 'repeater' function (This also provides 3 x UTP ports available for local network connectivity and is the 'typical' configuration encountered). The fibre optics of the **9465-ET** Module also permits 9400 Series Ethernet Modules in the non-hazardous area to communicate with other 9400 Series Ethernet Modules in the hazardous area and vice versa.

The 9466-ET Module is configured as a 10/100 Mbps Ethernet Switch to allow the interconnection of the 9400 Series Ethernet Modules via its five, Ethernet connectors. The 9466-ET Module also enables an Ethernet network to span a greater distance when used in conjunction with 9465-ET Module media converters. This is achieved by the low latency 'store and forward' mechanism integral to the switch that only transmits 'good' packets of data and ensures that the stringent timing associated with Ethernet is maintained. Each connection of the 9466-ET Module is effectively a 'point-to-point' network segment unlike the older generation hubs that were simple 'dumb' repeaters.

The 9469-ET Module is configured as a wireless communication unit having a microwave output less than 500 mW. The aerial may be either omnidirectional or unidirectional depending upon application. The 9469-ET Module also permits communication between a 9469-ET Module in the non-hazardous area to communicate with a 9469-ET Modules in the hazardous area.

The 9400 Series Ethernet Modules comprise electronic components mounted on printed circuit boards all completely encapsulated within a plastic enclosure designed for mounting on a DIN rail. External electrical connections are made via screw type terminals and/or connectors mounted on the front of the enclosure.

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#### Apparatus supply and Input/Output parameters

The 9461 Ethernet Gateway Module has the following safety description:

# (Supply input)

Terminals T1, T2 wrt T3, T4

 $\begin{array}{lll} \mbox{Ui} & = & 15.4 \ \mbox{V} \\ \mbox{Ci} & = & 0 \\ \mbox{Li} & = & 0 \end{array}$ 

#### (RS485/422 Port 3)

Terminals T6 wrt T10, T7 wrt T10, T8 wrt T10, T9 wrt T10

Ui 7.2 V Ci 0 Ιi 0 = Uo 5.88 V lo 111 mA Po 163 mW = Co 20 µF = 3 mH Lo =

#### (RS485/422 Port 4)

Terminals T11 wrt T15, T12 wrt T15, T13 wrt T15, T14 wrt T15

Ui 7.2 V Ci 0 = Li 0 = 5.88 V Uo lo 111 mA Po 163 mW = Co 20 μF = Lo = 3 mH

# (TTL/RS232 Port 1)

(Connector CON1)

#### Pin 9 wrt Pin 5

Ui 0 = Ci 0 = Li 0 Uo 5.88 V lo 188 mA = 276 mW Po = Co 20 µF 2.26 mH Lo

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#### Pin 3 wrt Pin 5, Pin 4 wrt Pin 5, Pin 7 wrt Pin 5

Ui 5.88 V Ci 0 = Li 0 5.88 V Uo lo 16 mA = Po 24 mW Co = 20 µF Lo 138 mH

## Pin2 wrt Pin 5, Pin 1 wrt Pin 5

Ui 12.5 V Ci 0 Li 0 = Uo 3.15 V lo 3.4 mA Po 2.7 mW = Co 50 µF = 1.0 H Lo =

## (TTL/RS232 Port 2) (Connector CON2)

# Pin 9 wrt Pin 5

Ui 0 = Ci 0 = Li 0 Uo 5.88 V lo 188 mA = Ро 276 mW = Co 20 µF 2.26 mH Lo

## Pin 3 wrt Pin 5, Pin 4 wrt Pin 5, Pin 7 wrt Pin 5

Ui 5.88 V Ci 0 = Li 0 = Uo 5.88 V lo 16 mA = 24 mW Po =  $20 \mu F$ Co = Lo 138 mH

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#### Pin 2 wrt Pin 5, Pin 1 wrt Pin 5

12.5 V Ci 0 = Li 0 3.15 V Uo 3.4 mA lo = Po 2.7 mW Co 50 µF Lo 1.0 H

# RJ45 Connector (10/100 Base T)

Ui = 15.4 V Maximum (PoEx)

The 9465 10/100 Media Converter Module has the following safety description:

#### (Supply input)

Terminals T1, T2 wrt T3, T4

Ui = 15.4 V Ci = 0 Li = 0

#### Fibre-optic transmitter

(HFBR1312 or AFBR-5803AZ or AFCT-5179CZ)

Po = 5 mW maximum Optical

# RJ45 Connector (10/100 Base T)

Ui = 15.4 V Maximum (PoEx)

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The 9466 10/100 5 Port Switch Module has the following safety description:

#### (Supply input)

Terminals T1, T2 wrt T3, T4

Ui = 15.4 V Ci = 0 Li = 0

# (PoEx Supply inputs)

Terminals T6 wrt T7, T8 wrt T9, T10 wrt T11, T12 wrt T13, T14 wrt T15

# mini DIN 8-way connector

(Connector CON1)

(Management Port)

Pin 5 wrt Pins 4 and 8

Ui 12.5 V Ci 0 Li 0 Uo 3.15 V 3.4 mA lo Po = 2.7 mW Co 50 µF = 1.0 H Lo

#### Pins 1, 3 and 4 wrt Pins 5 and 6

0 Ui 0 Ci Li 0 = 5.88 V Uo = 48 mA lo Po 72 mW 20 µF Co Lo 15 mH

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#### **RJ45 Connector A** (10/100 Base T)

Uo 0 lo 0 Po Ci  $0.075 \mu F$ Ιi 0 Ui = 0 (PoEx)

Uo Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T6 wrt T7 for the PoEx output parameters

Refer to the certified parameters of the intrinsically safe power supply connected to lo Terminals T6 wrt T7 for the PoEx output parameters

Pο Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T6 wrt T7 for the PoEx output parameters

Refer to the certified parameters of the intrinsically safe power supply connected to Co Terminals T6 wrt T7 for the PoEx output parameters

Refer to the certified parameters of the intrinsically safe power supply connected to Lo Terminals T6 wrt T7 for the PoEx output parameters

Lo/Ro Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T6 wrt T7 for the PoEx output parameters

## **RJ45 Connector B** (10/100 Base T)

Uo 0 lo 0 Po 0 Ci 0.075µF Li = Ui 0 (PoEx) =

Refer to the certified parameters of the intrinsically safe power supply connected to Uo Terminals T8 wrt T9 for the PoEx output parameters

Refer to the certified parameters of the intrinsically safe power supply connected to lo = Terminals T8 wrt T9 for the PoEx output parameters

Refer to the certified parameters of the intrinsically safe power supply connected to Po Terminals T8 wrt T9 for the PoEx output parameters

Refer to the certified parameters of the intrinsically safe power supply connected to Co = Terminals T8 wrt T9 for the PoEx output parameters

Refer to the certified parameters of the intrinsically safe power supply connected to Lo Terminals T8 wrt T9 for the PoEx output parameters

Lo/Ro Refer to the certified parameters of the intrinsically safe power supply connected to =

Terminals T8 wrt T9 for the PoEx output parameters

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#### **RJ45 Connector C** (10/100 Base T)

Uo 0 lo 0 Po Ci  $0.075 \mu F$ Ιi n Ui = 0 (PoEx)

Uo Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T10 wrt T11 for the PoEx output parameters

Refer to the certified parameters of the intrinsically safe power supply connected to lo Terminals T10 wrt T11 for the PoEx output parameters

Pο Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T10 wrt T11 for the PoEx output parameters

Refer to the certified parameters of the intrinsically safe power supply connected to Co Terminals T10 wrt T11 for the PoEx output parameters

Refer to the certified parameters of the intrinsically safe power supply connected to Lo Terminals T10 wrt T11 for the PoEx output parameters

Lo/Ro Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T10 wrt T11 for the PoEx output parameters

## **RJ45 Connector D** (10/100 Base T)

Uo 0 I٥ n Pο 0 Ci  $0.075 \mu F$ Li Ui 0 (PoEx)

Uo Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T12 wrt T13 for the PoEx output parameters

lo Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T12 wrt T13 for the PoEx output parameters

Pο Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T12 wrt T13 for the PoEx output parameters

Refer to the certified parameters of the intrinsically safe power supply connected to Co Terminals T12 wrt T13 for the PoEx output parameters

Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T12 wrt T13 for the PoEx output parameters

Lo/Ro Refer to the certified parameters of the intrinsically safe power supply connected to = Terminals T12 wrt T13 for the PoEx output parameters

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# RJ45 Connector E (10/100 Base T)

Uo = Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T14 wrt T15 for the PoEx output parameters

Io = Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T14 wrt T15 for the PoEx output parameters

Po = Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T14 wrt T15 for the PoEx output parameters

Co = Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T14 wrt T15 for the PoEx output parameters

Lo = Refer to the certified parameters of the intrinsically safe power supply connected to Terminals T14 wrt T15 for the PoEx output parameters

Refer to the certified parameters of the intrinsically safe power supply connected to

Terminals T14 wrt T15 for the PoEx output parameters

The 9469 WLAN AP/Bridge Module has the following safety description:

## (Supply input)

Lo/Ro

Terminals T1, T2 wrt T3, T4

Antenna "A"
TNC Connector

Antenna "B"
TNC Connector

Po = 500 mW maximum RF Po = 500 mW maximum RF

**NOTE**: The type and length of the antenna cable and the antenna are classified as simple apparatus, and are not required to be specified by this certificate.

# RJ45 Connector (10/100 Base T)

Ui = 12.8 V Maximum (PoEx)

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Variation 1 - This variation introduced the following changes:

- i. The type 9465-ET Ethernet Module was modified to allow the use of an extended range of fibre optic transmitter and transmitter/receiver devices.
- ii. The optical output associated with the type 9465-ET Ethernet Module was assessed against the 'op is' requirements of EN 60079-28:2007 and its marking was modified to show information that is required by this standard.

#### Variation 2 - This variation introduced the following changes:

- i. The replacement of the existing TNC antenna connectors with the smaller SMA connectors was allowed. Versions with this new connector will now be designated as a 9469-ET<sub>PLUS</sub> or 9469-ET+, the + sign signifying the enhance model.
- ii. The blocking capacitors C13 to C16 were approved to be replaced from the existing 10nF capacitors with 100pF capacitors.
- iii. The introduction of minor changes not affecting the intrinsic safety assessment, these include changing the type of diode used for D1 & D2 and removing component FB3.
- iv. PCB layout changes to cover the component changes above were endorsed.
- v. The introduction of a note clarifying the situation of the antennae was inserted on page 9 of this issue.

#### 14 DESCRIPTIVE DOCUMENTS

#### 14.1 Drawings

Refer to Certificate Annexe.

#### 14.2 Associated Sira Reports and Certificate History

I	ssue	Date	Report no.	Comment
(	)	16 August 2007	R52L14824C	The release of the prime certificate.
-	1	8 January 2008	R52L14824E	Report number R52L14824C was replaced by 52L14824E.
2	2	20 August 2009	R52L19919A	The introduction of Variation 1.
3	3	26 October 2009	R52L19919B	Report number R52L19919B replaced R52L19919A.
4	4	26 July 2011	R25385A/00	The introduction of Variation 2.

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

- 15.1 When used with Group I gases, the Modules shall each be mounted within an enclosure providing a degree of protection of at least IP54, in accordance with EN 60529, and in a manner that does not impair the existing creepage and clearance distances. The enclosure shall also comply with the requirements of Clauses 7 and 8 of EN 60079-0:2006.
- The connectors do not meet the ingress protection rating of IP20, therefore, this shall be taken into consideration during the installation of the 9400 Series Ethernet Modules when used with Group II gases, and each module shall be provided with an enclosure that is commensurate with the environment into which it is installed.
- 15.3 The supply to the modules must be derived from a suitably certified, intrinsically safe supply.

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## 16 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

#### 17 CONDITIONS OF CERTIFICATION

- 17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.
- 17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.
- 17.3 The products covered by this certificate incorporate previously certified devices, it is therefore the responsibility of the manufacturer to continually monitor the status of the certification associated with these devices, and the manufacturer shall inform Sira of any modifications of the devices that may impinge upon the explosion safety design of their products.
- 17.4 Assembly DB1 shall be constructed from 2 zener diodes type 1N5339B connected in parallel.
- 17.5 The manufacturer shall only use the following optical transmitters or combined transmitters/receivers with the type 9465-ET Ethernet Module, these devices are fitted on the media convertor board for the component with designation FO3:

Permitted device types	Device description
Agilent or Avago Technologies HFBR-14x2xx	Fibre optic transmitter
Agilent or Avago Technologies HFBR-14x4xx	
Agilent or Avago Technologies HFBR-1312T	Fibre optic transmitter and receiver
Agilent or Avago Technologies HFBR-1312TZ	
Agilent or Avago Technologies AFBR-5803Z	Fibre optic transmitter and receiver
Agilent or Avago Technologies AFBR-5803AZ	
Agilent or Avago Technologies AFBR-5803TZ	
Agilent or Avago Technologies AFBR-5803ATZ	
Agilent or Avago Technologies AFCT-5179xZ	Fibre optic transmitter and receiver

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# **Certificate Annexe**

Certificate Number: Sira 07ATEX2064X

Equipment: 9400 Series Ethernet Modules
Applicant: Controlled Systems Limited



Issues 0 to 3 - The drawings associated with this Issue were replaced by those listed in Issue 1.

#### Issue 1

Number	Sheet	Rev.	Date	Description
			(yyyy/mm/dd)	
9400Haz-ATEX Label	1 of 1	2	2007/12/10	Label Details, 9400 Series Ethernet
CSL-ZENER	1 of 1	3	2003/01/28	Zener diode assembly
13003-PCB	1 of 1	Orig.	2002/08/23	Zener PCB
9461-ASSY	1 of 1	1	2007/03/14	General Assembly, Ethernet Gateway
9461-PSU	1 of 1	2	2007/12/11	Circuit Diagram, Ethernet Gateway PSU Board
9461-CPU	1 of 1	3	2007/12/11	Circuit Diagram, Ethernet Gateway CPU Board
9461-PSU PCB	1 of 1	2	2007/03/23	Ethernet Gateway PSU Board Artworks
9461-CPU PCB	1 to 2	3	2007/08/08	Ethernet Gateway CPU Board Artworks
9465-ASSY	1 of 1	1	2007/03/14	General Assembly, Ethernet 10/100 Media Converter
9465-PSU	1 of 1	2	2006/11/22	Circuit Diagram, Ethernet 10/100 Media Converter PSU Board
9465-FO	1 of 1	3	2007/12/11	Circuit Diagram, Ethernet 10/100 Media Converter Main Board
9465-OPTIC	1 of 1	1	2006/02/16	Circuit Diagram, Ethernet 10/100 Media Converter Optic Board
9465-PSU PCB	1 of 1	2	2007/03/23	Ethernet 10/100 Media Converter PSU Board Artworks
9465-FO PCB	1 of 1	3	2007/08/08	Ethernet 10/100 Media Converter FO Board Artworks
9465-OPTIC PCB	1 of 1	1	2007/03/23	Ethernet 10/100 Media Converter OPTIC Board Artworks
9466-ASSY	1 of 1	2	2007/12/10	General Assembly, Ethernet 10/100 5 Port Switch
9466-PSU	1 of 1	2	2006/11/24	Circuit Diagram, Ethernet 10/100 5 Port Switch PSU Board
9466-SW	1 of 1	4	2007/12/11	Circuit Diagram, Ethernet 10/100 5 Port Switch SW Board
9466-LED	1 of 1	3	2007/12/11	Circuit Diagram, Ethernet 10/100 5 Port Switch LED Board
9466-FLEX	1 of 1	1	2007/10/24	Circuit Diagram, Ethernet 10/100 5 Port Switch SW Flex
				Connector
9466-PSU PCB	1 of 1	2	2007/03/29	Ethernet 10/100 5 Port Switch PSU Board Artworks
9466-SW PCB	1 to 2	4	2007/10/04	Ethernet 10/100 5 Port Switch SW Board Artworks
9466-LED PCB	1 of 1	3	2007/10/24	Ethernet 10/100 5 Port Switch LED Board Artworks
9466-FLEX PCB	1 of 1	1	2007/10/24	Ethernet 10/100 5 Port Switch FLEX Connector Artworks
9469-ASSY	1 of 1	1	2007/03/14	General Assembly, Ethernet WLAN A/P Bridge
9469-PSU	1 of 1	2	2007/12/11	Circuit Diagram, Ethernet WLAN A/P Bridge PSU Board
9469-WL	1 of 1	3	2007/12/11	Circuit Diagram, Ethernet WLAN A/P Bridge Main Board
9469-PSU PCB	1 of 1	2	2007/03/23	Ethernet WLAN A/P Bridge PSU Board Artworks
9469-WL PCB	1 of 1	3	2007/08/08	Ethernet WLAN A/P Bridge WL Board Artworks

# Issue 2

Number	Sheet	Rev.	Date (yyyy/mm/dd)	Description
9400Haz-ATEX Label	1 of 1	3	2009/08/07	9400 Ethernet (Haz) ATEX Certification Label Drawing

Issue 3 (No new drawings were introduced.)

# Issue 4

Number	Sheets	Rev.	Date (yyyy/mm/dd)	Description
9469-WL	1 of 1	4	2011/06/14	WLAN AP/Bridge Main Board Circuit Diagram
9469-WL PCB	1 of 1	4	2011/07/05	WLAN AP/Bridge Main Board Artwork
9400Haz-ATEX Label	1 of 1	4	2011/07/06	9400 Ethernet (Haz) ATEX Certification Label Drawing

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