1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: **Sira 03ATEX2102** Issue: **8**

4 Equipment: **Detective +**

5 Applicant: **Crowcon Detection Instruments Limited**

6 Address: 172 Brook Drive
Milton Park
Abingdon
Oxon OX14 4SD
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 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 50014:1997 + Amds 1 & 2 EN 50018:2000 EN 50020:2002 IEC 61241-11:2005

The above list of documents may detail standards that do not appear on the UKAS Scope of Accreditation, but have been added through Sira's flexible scope of accreditation, which is available on request.

10 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.

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:

II 2G
Ex ib d IIC T4
T_a = -20°C to +50°C

Project Number 70008482

A G Boyes
Certification Support Officer

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Web: www.siracertification.com

13 **DESCRIPTION OF EQUIPMENT**

The Detective+ is a battery powered, transportable, multiple gas detector. There are various possible combinations of oxygen, toxic, biased toxic, thermal conductivity, flammable and infra-red sensors. A cluster of LEDs mounted on top of the instrument and an audible sounder provide alarm status. A continuous display is provided on an LCD panel mounted on the side of the instrument. The circuits are housed within an ABS enclosure, which is mounted within a steel tripod. The electronic circuits are located on two main circuit boards, with up to four daughter boards located adjacent to the gas sensors. The oxygen and toxic sensors are electrochemical and the thermal conductivity and flammable sensors are flameproof component-certified devices.

The unit is supplied from two internal battery packs each containing two 6 V lead-acid batteries and has an integral charger that may be connected to a 110 Vac or 240 Vac mains supply, depending on the factory setting of the supply voltage. Charging or replacement of the batteries is only permitted in a non-hazardous area. The unit also has a single rechargeable 2.4V back-up cell.

The Detective+ incorporates a data logger and has an RS232 port for connection to a computer interface for the downloading of data when in the non-hazardous area. A single unit can be used alone or a number linked together via the two four-pin DIN sockets located on the back of the instrument, thus providing protection for a larger area. The safety description for these interface socket is as follows:

	Intrinsically safe		**Non-intrinsically safe**
	Second Detective+ (JP6 1-3)	**Third Detective+ (JP6 4-6)**	**Computer RS232 (safe area) (JP6 9-12)**
U_i	7.05 V	7.05 V	±25 V o/c
I_i	18 mA	18 mA	
P_i	0.028 W	0.028 W	120 mW
C_i	0	0	-
L_i	0	0	-
U_o	7.05 V	7.05 V	-
I_o	18 mA	18 mA	-
P_o	0.028 W	0.028 W	-

Variation 1 - This variation introduced the following change:

i. The use of Robnor epoxy type PX439N/NC as a replacement encapsulant for the converter board.

Variation 2 - This variation introduced the following changes:

i. Addition of a Hosiden Besson Audible Warning Unit Type IS28 Mk 4 as an alternative to an MEDC Type DB5 sounder
ii. The use of a SAFT 40RF207 Ni-MH 2.4 V 70mAh battery as an alternative to a SAFT 40RF206 Ni-Cad 2.4 V 60mAh battery

Variation 3 - This variation introduced the following change:

i. The use of 1N5817 as an alternative to BYV10-20 diodes.

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Variation 4 - This variation introduced the following changes:

i. An alternative front keypad and label to be used.
ii. The product name to be changed to 'Detective +'.
iii. An alternative pump motor to be used.
iv. Encapsulated fuse material correction.
v. Amendments to the critical parts list.

Variation 5 - This variation introduced the following changes:

i. Two, alternative battery types to be used.
ii. The introduction of alternative mounting arrangement for the sounder.
iii. The instrument to be limited to one IR Module per unit.
iv. The introduction of a new label arrangement.
v. The circuit diagram drawing to be amended to reflect changes in parts modified in previous assessments.

Variation 6 - This variation introduced the following change:

i. The introduction of an alternative battery type, the Camden Type BEL060120.

Variation 7 - This variation introduced the following changes:

i. The recognition of a change of company address from 2 Blacklands Way, Abingdon, OX14 1DY to 172 Brook Drive, Milton Park, Abingdon, Oxon OX14 4SD.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report number	Comment
0	27 June 2003	R52A9051A	The release of the prime certificate.
1	22 September 2003	R52V10522A	The introduction of Variation 1
2	08 December 2003	R52V11077A	The introduction of Variation 2
3	23 February 2004	52V11592	The introduction of Variation 3
4	11 October 2005	R52A13546A	The introduction of Variation 4
5	26 January 2006	R52A13970A	The introduction of Variation 5
6	07 March 2006	R52A14243A	The introduction of Variation 6
7	24 October 2006	R52A14778A	Reissued to incorporate the changes described in report number R52A14778A, as a result variations 1 to 6 dated 22 September 2003, 8 December 2003, 23 February 2004, 11 October 2005, 26 January 2006 and 7 March 2006 respectively, together with their associated reports including report number R52A9051A, are not required.

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 03ATEX2102
Issue 8

Issue	Date	Report number	Comment
8	06 August 2014	R70008482A	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 8, Issues 0 to 7 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format. • The introduction of Variation 7

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

None

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 Gas Detectors 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 the Gas Detectors.

17.4 The equipment shall only be fitted with one IR Module.

17.5 If a suitably-certified sounder is fitted, it shall be compatible the Detective+ connection port, which has the following safety description:

U_i = 0
U_o = 27.3 V
I_o = 0.047 A
P_o = 0.154 W
C_o = 88 nF
L_o = 16.095 mH

17.6 The charging voltage shall be adjusted at manufacture so as not to exceed 7.35 V at the battery connection to the 6V line.

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17.7 The following sub-assemblies covered by certification drawings to the previous production issues may also be used in the Detective:

- Detective main board
- Bias toxic module board
- Toxic module board
- Oxygen module board
- Flammable ('explosive') module board
- Thermal conductivity module board

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Certificate Annexe

Certificate Number: **Sira 03ATEX2102**

Equipment: **Detective+**

Applicant: **Crowcon Detection Instruments Limited**

sira CERTIFICATION

Issue 0

Drawing No.	Sheet	Rev.	Date	Title
CUS-2107-A4	1 of 1	4	Jun 03	Fuse encapsulation
DTV-1904-PCA	1 of 1	8	Dec 96	DTV main board solder side
DTV-1904-PCB	1 of 1	8	Dec 96	DTV main board component side
DTV-1904-SS	1 of 1	9	Jun 03	DTV main board silkscreen
DTV-1905-PCA	1 of 1	5	Dec 96	Voltage converter board solder side
DTV-1905-SS	1 of 1	5	Dec 96	Voltage converter board silk screen
DTV-1917-A4	1 of 1	4	Mar 03	Certification label
DTV-1931-A2	1 of 1	3	Oct 95	Battery assembly
DTV-1932-CD	1 to 2	13	Feb 03	P/S & alarm PCB schematic
DTV-1933-CD	1 of 1	7	Apr 03	Voltage converter PCB schematic
DTV-1937-A3	1 of 1	3	May 03	Converter PCB potting
DTV-2332-A3	1 of 1	3	Apr 03	Interface socket label
DTV-3615-A1	1 of 1	1	Mar 03	General arrangement & block diagram
DTV-3616-A4	1 to 2	2	02 Jun 03	Critical parts list
IRSM-5152-A3	1 of 1	1	Dec 02	IR PCB schematic
TRP-1630-PCA	1 of 1	9	Nov 02	Main PCB layer 1 artwork
TRP-1630-PCB	1 of 1	9	Nov 02	Main PCB layer 2 artwork
TRP-1630-PCC	1 of 1	9	Nov 02	Main PCB layer 3 artwork
TRP-1630-PCD	1 of 1	9	Nov 02	Main PCB layer 4 artwork
TRP-1630-SS	1 of 1	9	Nov 02	Main PCB Silk Screen
TRP-1636-CD	1 of 1	10	Nov 02	Main PCB schematic
TRP-1638-CD	1 of 1	3	Nov 02	Explosive PCB schematic
TRP-1639-CD	1 of 1	5	Nov 02	Toxic PCB schematic
TRP-1640-CD	1 of 1	5	Nov 02	Oxygen PCB schematic
TRP-1663-CD	1 of 1	5	Nov 02	Biased toxic PCB schematic
TRP-1688-CL	1 of 1	6	Sept 02	Biased toxic PCB component location
TRP-1688-PCA	1 of 1	6	Sept 02	Biased toxic PCB component side copper
TRP-1688-PCB	1 of 1	6	Sept 02	Biased toxic PCB layer 2 copper
TRP-1688-PCC	1 of 1	6	Sept 02	Biased toxic PCB layer 3 copper
TRP-1688-PCD	1 of 1	6	Sept 02	Biased toxic PCB solder side copper
TRP-2317-CD	1 of 1	4	Nov 02	TCS PCB schematic

Issue 1

Drawing No.	Sheet	Rev	Date	Description
DTV-1937-A3	1 of 1	4	Jul 03	Converter board potting arrangement

Issue 2

Drawing No.	Sheet	Rev	Date	Description
DTV-3616-A4	1 to 2	3	04 Dec 03	Critical parts list

Issue 3

Drawing No.	Sheet	Rev	Date	Description
DTV-3616-A4	1 to 2	4	19 Feb 04	Critical parts list

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Certificate Annexe

Certificate Number: **Sira 03ATEX2102**

Equipment: **Detective+**

Applicant: **Crowcon Detection Instruments Limited**

Issue 4

Drawing No.	Sheet	Rev	Date	Description
DTVP-3244-A2	1 of 1	2	Jul 99	Detective +, Membrane keypad detail
DTVP-5460-A4	1 of 1	1	May 05	Detective +, Certification label
DTV-3616-A4	1 and 2	5	23 Aug 05	Detective +, Critical parts list
P5109-A4	1 of 1	1	Oct 04	Fuse encapsulation details

Issue 5

Drawing No.	Sheet	Rev	Date	Description
DTV-3615-A1	1 of 1	3	Oct 05	Detective +, general arrangement
DTV-1924-A2	1 of 2	9	Oct 05	Detective +, internal arrangement
DTV-1924-A2	2 of 2	9	Oct 05	Detective +, wiring diagram
DTVP-5649-A2	1 of 1	1	Aug 05	Detective +, battery assembly
DTV-1932-CD	1 of 2	14	Aug 05	Main, Power supply module
DTV-1932-CD	2 of 2	14	Aug 05	Main, Alarm circuit
DTV-3616-A4	1 to 3	6	13 Oct 05	Detective +, Critical parts list
DTVP-5640-A3	1 of 1	3	Oct 05	Detective +, Certification label

Issue 6

Drawing No.	Sheet	Rev	Date	Description
DTVP-5649-A2	1 of 1	3	Feb 06	Detective +, battery assembly

Issue 7

Drawing No.	Sheet	Rev.	Date yyyy/mm/dd	Description
DTV-1904	1 to 3	10	2006/10/06	Detective main PCB artwork
DTV-1905	1 to 2	5	2006/06/21	Voltage converter board solder side
DTV-1924-A2	1 to 2	12	2006/10	General arrangement & block diagram
DTV-1931-A2	1 of 1	3	1995/10	Battery assembly
DTV-1932-CD	1 to 2	17	2006/09	Detective main PCB schematic
DTV-1933-CD	1 of 1	7	2003/04	Voltage converter PCB schematic
DTV-1937-A3	1 of 1	4	2003/07	Converter PCB potting
DTV-2332-A3	1 of 1	3	2003/04	Interface socket label
DTV-3615-A1	1 of 1	3	2005/10	General assembly
DTVP-3244-A2	1 of 1	3	2006/04	Detective +, membrane keypad detail
DTVP-5640-A3	1 of 1	4	2006/04	IECEx certification label
DTVP-5649-A4	1 of 1	5	2006/10	Detective+ battery lead assembly
DTVP-5681	1 of 3	1	2006/03/06	Detective+ LED board schematic
DTVP-5681	2 of 3	1	2006/03/06	Detective+ LED board schematic
DTVP-5662-A4	1 to 3	1	2006/10/11	Detective+ IECEx critical parts list
IRSM-5152-A3	1 of 1	2	2005/09	IR PCB schematic
P5109-A4	1 of 1	1	2004/10	Fuse encapsulation details
TRP-1630-CL	1 of 1	9	2002/11	Triple+ PCB layer 1 silkscreen
TRP-1630-PCA	1 of 1	9	2002/11	Triple+ PCB layer 1 artwork
TRP-1630-PCB	1 of 1	9	2002/11	Triple+ PCB layer 2 artwork
TRP-1630-PCC	1 of 1	9	2002/11	Triple+ PCB layer 3 artwork
TRP-1630-PCD	1 of 1	9	2002/11	Triple+ PCB layer 4 artwork
TRP-1630-SS	1 of 1	9	2002/11	Triple+ PCB Silk Screen
TRP-1636-CD	1 of 1	12	2006/04/21	Triple+ PCB schematic

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Certificate Annexe

Certificate Number: **Sira 03ATEX2102**

Equipment: **Detective+**

Applicant: **Crowcon Detection Instruments Limited**

Drawing No.	Sheet	Rev.	Date yyyy/mm/dd	Description
TRP-1638-CD	1 of 1	4	2004/12/21	Triple+ Flammable Sensor schematic
TRP-1639-CD	1 of 1	6	2004/12/23	Toxic PCB schematic
TRP-1640-CD	1 of 1	8	2005/01/05	Oxygen PCB schematic
TRP-1663-CD	1 of 1	8	2005/01/05	Biased toxic PCB schematic
TRP-1688-A3	1 of 1	8	2005/01/05	Biased toxic PCB ARTWORK
TRP-2317-CD	1 of 1	5	2005/01/05	Thermal conductivity PCB schematic
TRP-3665-A3	1 of 1	1	2001/13	Thermal conductivity sensor artwork
TRP-3669-A3	1 of 1	1	2006/04	Triple + Main Board Rework Detail

Issue 8

Drawing No.	Sheets	Rev.	Date (Sira stamp)	Title
DTVP-5640-A3	1 of 1	5	06 Aug 14	Detective+ ATEX Certification Label

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1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: Sira 03ATEX2102

4 Equipment: Detective+ Gas Detector

5 Applicant: Crowcon Detection Instruments Limited

6 Address: 2 Blacklands Way
Abingdon
OX14 1DY
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 R52A14778A.

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 + Amds 1 & 2
EN 50018:2000
EN 50020:2002

10 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.

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:

II 2G
Ex ib d IIC T4
T_a = -20°C to +50°C

Project Number 52A14778
Date 27 June 2003
Latest Issue 24 October 2006
C. Index 14

C Ellaby
Certification Officer

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Reissued 24 October 2006 to incorporate the changes described in report number R52A14778A, as a result variations 1 to 6 dated 22 September 2003, 8 December 2003, 23 February 2004, 11 October 2005, 26 January 2006 and 7 March 2006 respectively, together with their associated reports including report number R52A9051A, are not required.

13 DESCRIPTION OF EQUIPMENT

The Detective+ is a battery powered, transportable, multiple gas detector. There are various possible combinations of oxygen, toxic, biased toxic, thermal conductivity, flammable and infra-red sensors. A cluster of LEDs mounted on top of the instrument and an audible sounder provide alarm status. A continuous display is provided on an LCD panel mounted on the side of the instrument. The circuits are housed within an ABS enclosure, which is mounted within a steel tripod. The electronic circuits are located on two main circuit boards, with up to four daughter boards located adjacent to the gas sensors. The oxygen and toxic sensors are electrochemical and the thermal conductivity and flammable sensors are flameproof component-certified devices.

The unit is supplied from two internal battery packs each containing two 6 V lead-acid batteries and has an integral charger that may be connected to a 110 Vac or 240 Vac mains supply, depending on the factory setting of the supply voltage. Charging or replacement of the batteries is only permitted in a non-hazardous area. The unit also has a single rechargeable 2.4V back-up cell.

The Detective+ incorporates a data logger and has an RS232 port for connection to a computer interface for the downloading of data when in the non-hazardous area. A single unit can be used alone or a number linked together via the two four-pin DIN sockets located on the back of the instrument, thus providing protection for a larger area. The safety description for these interface socket is as follows:

	Intrinsically safe		**Non-intrinsically safe**
	Second Detective+ (JP6 1-3)	**Third Detective+ (JP6 4-6)**	**Computer RS232 (safe area) (JP6 9-12)**
U_i	7.05 V	7.05 V	±25 V o/c
I_i	18 mA	18 mA	
P_i	0.028 W	0.028 W	120 mW
C_i	0	0	-
L_i	0	0	-
U_o	7.05 V	7.05 V	-
I_o	18 mA	18 mA	-
P_o	0.028 W	0.028 W	-

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE Sira 03ATEX2102

14 **DESCRIPTIVE DOCUMENTS**

14.1

Drawing No.	Sheet	Rev.	Date yyyy/mm/dd	Description
DTV-1904	1 to 3	10	2006/10/06	Detective main PCB artwork
DTV-1905	1 to 2	5	2006/06/21	Voltage converter board solder side
DTV-1924-A2	1 to 2	12	2006/10	General arrangement & block diagram
DTV-1931-A2	1 of 1	3	1995/10	Battery assembly
DTV-1932-CD	1 to 2	17	2006/09	Detective main PCB schematic
DTV-1933-CD	1 of 1	7	2003/04	Voltage converter PCB schematic
DTV-1937-A3	1 of 1	4	2003/07	Converter PCB potting
DTV-2332-A3	1 of 1	3	2003/04	Interface socket label
DTV-3615-A1	1 of 1	3	2005/10	General assembly
DTVP-3244-A2	1 of 1	3	2006/04	Detective +, membrane keypad detail
DTVP-5640-A3	1 of 1	4	2006/04	IECEx certification label
DTVP-5649-A4	1 of 1	5	2006/10	Detective+ battery lead assembly
DTVP-5681	1 of 3	1	2006/03/06	Detective+ LED board schematic
DTVP-5681	2 of 3	1	2006/03/06	Detective+ LED board schematic
DTVP-5662-A4	1 to 3	1	2006/10/11	Detective+ IECEx critical parts list
IRSM-5152-A3	1 of 1	2	2005/09	IR PCB schematic
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TRP-3665-A3	1 of 1	1	2001/13	Thermal conductivity sensor artwork
TRP-3669-A3	1 of 1	1	2006/04	Triple + Main Board Rework Detail

14.2 Report number R52A14778A

Date 27 June 2003
Latest Issue 24 October 2006

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 03ATEX2102

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

None

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 report number R52A14778A.

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U_o = 27.3 V
I_o = 0.047 A
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C_o = 88 nF
L_o = 16.095 mH

17.6 The charging voltage shall be adjusted at manufacture so as not to exceed 7.35 V at the battery connection to the 6V line.

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- Detective main board
- Bias toxic module board
- Toxic module board
- Oxygen module board
- Flammable ('explosive') module board
- Thermal conductivity module board

Date 27 June 2003
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