MODEL EC91
OXYGEN MONITOR

II 1G Ex ia IIC T4 Ga

OPERATOR'S INSTRUCTION MANUAL

Version 5.4 15th October 2020

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Revision History

Issue	Issue Date	Changes	By
5.0	09-01-2017	Current release Date	Bryan Cummings
5.1	20-10-2017	Updated D of C	Bryan Cummings
5.2	25-10-2017	Cell Warranty, D of C and notes on maintenance	Bryan Cummings
5.3	24-10-2018	Added 090 182 to cell warranty table	Tim Keep
5.4	15 Oct. 20	ECN19033s Added Industrial Physics info. and updated compliance information	Tim Keep

1.0 INTRODUCTION

1.1 Preface

The EC91 ATEX Intrinsically Safe oxygen monitor is designed to the ATEX Directive 2014/34/EU for use in potentially explosive atmospheres. It may be mounted in a 'safe' area, as long as it is connected electrically in accordance with this manual. It should be installed under the instructions given in this instruction manual as well as the ATEX 137 Directive 1999/92/EC.

The instrument has been designed such that it:

- Does not give rise to physical injury or other harm due to contact.
- Does not produce excessive surface temperature, infra-red, electromagnetic or ionising radiation.
- Is not electrically dangerous.

The instrument is not intended to be exposed to Dust conditions. Please make sure that the equipment is installed in accordance with ALL the instructions in this manual and associated drawings and is not subjected to any mechanical or thermal stress, nor will it be attacked by existing or foreseeable aggressive substances.

We are always trying to improve our product, of which this manual is part and so we would greatly appreciate any information you can give us of any difficulties you may encounter with the monitor or the manual.

IMPORTANT

Please read this manual before attempting to install or operate the equipment.
The equipment should be electrically connected and grounded in accordance with the instructions attached.

No responsibility is accepted by Industrial Physics for accidents resulting from improper use of this equipment.

Make sure the instrument is connected to power only through an isolated or shunt diode safety barrier.

1.2 Warranty

This Instrument is guaranteed for a period of 36 months from its delivery to the purchaser covering faulty workmanship and replacement of defective parts. This assumes fair wear and tear and usage specified on the data sheet. It does not cover routine calibration and housekeeping.

Warranty covers parts and labour on a “return to base” basis. Any on-site warranty visits may be chargeable in terms of travel and expenses.

We maintain comprehensive after sales facilities and the instrument should be returned to our factory for repair, servicing or routine calibration if this is necessary. Service agreements are available and can include routine maintenance at the customers site. Please contact Industrial Physics Product Integrity for more information.

The warranty does not extend to sensors overexposed to oxygen during the warranty period, or to those whose elements have been damaged by surges of undue pressure.

The type and serial number of the instrument should always be quoted, together with full details of any fault.

Measuring Cells Warranty

Please note the Warranty code against the part number of the measuring cell installed by referring to the Spare Parts section.

Code	Warranty	Typical Life and Notes
A	6 Months from the date of supply.	The measuring cell should have a life of 4+ years. The life is very much dependent on the moisture in the gas stream. The more humid the gas (as long as it is non-condensing) the longer the life. The primary reason for premature failure is exposing the cell to air, or to subject the cell to high pressure.
C	36 months from the date of supply	The measuring cell should have a life of 5+ years.
D	Cells have a full warranty of 18 months from the date of supply.	The life is very much dependent on the moisture in the gas stream. The more humid the gas (as long as it is non-condensing) the longer the life. The primary reason for premature failure is exposing the cell to air for extended periods, or to subject the cell to high pressure. The expected life of the measuring cell should be 4+ years, provided that the cell is used as stipulated in the operation manual.
WARRANTY EXCLUSION		
In some instances, cells do not achieve their expected lifetime, failing early due to misuse: any isolation valves on the sample system left open causing ingress of high oxygen levels, or cell rupture caused high pressure being applied across the cell. Misuse of the measuring cell in this or any other way as outlined in this manual is not covered by the warranty.		

NOTE

Most cells that do not last their expected lifetime fail because: -

1. The isolation valves on the analyzer are left open, causing ingress of high ambient oxygen levels.

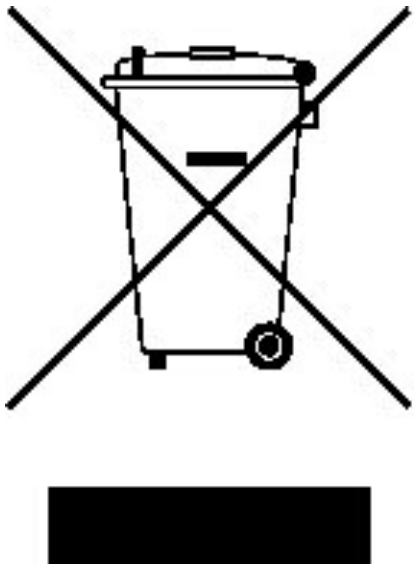
2. The cell has been ruptured caused by high pressure, usually caused by the isolation valves being operated in the wrong order. Ruptured cells can be confirmed by electrolyte solution seeping from the inlet/outlet pipes or by blackening of the same pipes.

1.3 General Information

The EC91 oxygen monitor uses an electrochemical or fuel cell type of detector which, when exhausted, is simply discarded and a replacement installed.

For trace applications the cell should last for more than four years while measuring Oxygen in percent applications should last for more than two years.

The instrument may be mounted to a wall or back plate in standard form.



Electrical equipment marked with this symbol may not be disposed of in European public disposal systems. In conformity with European local and national regulations (EU Directive 2002/96/EC), European electrical equipment users must now return old or end-of-life equipment to the manufacturer for disposal at no charge to the user. Note: For return for recycling, please contact the equipment manufacturer or supplier for instructions on how to return end-of-life equipment for proper disposal.

2.0 PRINCIPLE OF OPERATION

The detector contains an anode, electrolyte and an air cathode to which the diffusion of oxygen is limited by a diffusion barrier. At the air cathode oxygen is reduced to hydroxyl ions which in turn oxidise the metal anode.

The following reaction takes place at the cathode:

$$O_2 + 2H_2O + 4e \rightarrow 40H-$$

and at anode

$$2Pb + 4OH- \rightarrow 2Pb(OH)_2 + 4e$$

and the complete chemical reaction is represented by

$$2Pb + O_2 + 2H_2O \rightarrow 2Pb(OH)_2$$

3.0 SPECIFICATIONS

POWER SUPPLY	Nominal 24V DC supplied from a safe area through approved barriers. DO NOT CONNECT DIRECTLY TO 24V DC.	
RANGES	0-200%*,0-20.00%,0-2.000%	
	0-2000ppm ,0-200.0ppm,0-20.00ppm	
	(others on request).	
	Although the range and output will correspond to 200%, ATEX certification limits use to oxygen contents no higher than 21%.	
DISPLAY	Digital	
MEASURING CELL	Electrochemical fuel cell. Remote cell may be used in some applications	
ACCURACY	>20 ppm	±2% of reading at 20°C
		±5% of reading over the temperature range at equilibrium temperature.
	<20 ppm	±2% of reading +0.4ppm at 20°C
		±5% of reading +0.4 ppm +0.15 ppm per °C over the temperature range at equilibrium.
RESPONSE TIME	90% within 20 seconds.	
SAMPLE GAS	Pressure at inlet of analyser. Min. 0.02 Bar, Max. 0.2 Bar. See Section 4.0	
FLOW RATE	Min. 30cc/min. Max. 5Ltr/min.	
SAMPLE CONNECTIONS	1/8" o.d. compression - Swagelok.	
SAMPLE TEMPERATURE	0°C to +40°C.	
RELATIVE HUMIDITY	0-99% non-condensing.	
DIMENSIONS	200W x 200H x 175D mm.	
ENCLOSURE	IP65 enclosure (polyester).	
WEIGHT	3 Kg.	
MOUNTING	Wall.	
LIFE OF CELL	Dependent upon oxygen content of analysed gas. For ppm applications it is expected to be 36 months plus. See section 1.2	
CELL WARRANTY	6 months.	
INSTRUMENT WARRANTY	36 months.	

4.0 START UP

4.1 Installation

The instrument is intended for use in hazardous locations and should be installed electrically in accordance with the drawing B091 022.

The instrument is not intended to be exposed to Dust conditions. Please make sure that the equipment is installed in accordance with ALL the instructions in this manual and associated drawings, and is not subjected to any mechanical or thermal stress, nor will it be attacked by existing or foreseeable aggressive substances.

The instrument is capable of measuring oxygen in sub parts per million and since the atmosphere contains 209,000 parts per million of oxygen then it can be seen that all fittings and sample lines to the instrument should be high integrity, thus ensuring no ambient air is allowed to leak into the system.

It is recommended that stainless steel or copper lines be used for the sample inlet and not thermoplastics.

If a vent line (sample outlet) is fitted then this may be of nylon piping or similar, but should be installed such that no back pressure may build up due to a restricted outlet.

The inlet and outlet pipe size is 1/8" o.d. Swagelok (standard) and the instrument is supplied with the ports sealed from the atmosphere. It is important to leave the seals in place until start up since high oxygen levels entering the cell will reduce the working lifetime of the cell. While the cells are in place the cell will scavenge the oxygen present in the internal pipework.

A remote mounted cell may be used in place of the standard cell that is contained in the instrument housing. If this option has been specified see the drawing 091 068 at the rear of the manual.

The following note applies to instruments shipped without a sampling system.

4.2 Sample Pressure and Flow Requirements

Connect a good quality needle valve upstream of the instrument to regulate the flow through the analyser to between 100cc/min - 5Ltr/min. As long as a needle valve is fitted the process pressure may be as high as 3 Barg. The measuring cell and associated pipework will afford no back pressure and therefore the pressure at the sample inlet will be extremely low.

Do not obstruct the outlet which should be piped to vent or to an ambient pressure return point.

A correct installation should include isolating valves at the system inlet and outlet so that the instrument may be sealed off when not required, thereby preserving the life of the cell.

The following note applies to instruments shipped with a sampling system.

(ii) Sample Pressure and Flow Requirements

The sampling panel will be designed and built in accordance with the relevant application and customer supplied stream details.

Refer to drawing B091 026 which will be marked accordingly.

4.3 Power Connection

Power should only be applied in accordance with the drawing B091 022. The optimum voltage required at the safe end of the barrier is 24V. This voltage must not rise above 27.6V otherwise failure of the barrier will result.

When supplied through a barrier, the voltage at the transmitter end should be approximately 12.5 volts. The voltage should never be below 8.8 volts.

If using the current output, either 4-20mA or 0-20mA, then a safety barrier should be used. Alternatively an isolated barrier can be used which can provide the power and provide for the current return.

4.4 Output Current Connection

If the output current is required, it should be wired in accordance with drawing B091 022. See Section 5.1 for changes in output current specification.

5.0 CONTROLS AND CALIBRATION

The range designations are normally as follows, but reference should be made to the label attached to the modesty plate within the instrument:

RANGE SELECT	RANGE
(Switch Setting)	
1	0-200% (0-21% calibration)
2	0-20%
3	0-2%
4	0-2000 ppm
5	0-200 ppm
6	0-20 ppm

5.1 Output Current

The output current will normally have been set to 4-20mA which will correspond to the range set on the range control located on the front panel (inside door).

The output current range may be set to 0-20mA by resetting the switch positions on the printed circuit card. SW1 is an 8 way DIL switch located on the bottom left of the printed circuit board. The printed circuit board is located under the top modesty plate (range switch plate).

UNDER NO CIRCUMSTANCES ALTER ANY OTHER SWITCHES

SWITCH	4-20mA	0-20mA
1	OPEN	CLOSED
2	CLOSED	OPEN
3	OPEN	CLOSED

The best calibration will be achieved by calibrating the instrument against a known sample of oxygen in a similar background gas to that of the application.

It is suggested that the instrument will only need a check of calibration once every three to six months or a change of detector, but only experience with a particular application will confirm this.

5.2 Air Calibration

Allow air to flow through the analyser and adjust the SPAN potentiometer to obtain the correct reading on the output device, whether a display or analogue output.

For example, if range 1 = 0-100% then, 20.9% of 4-20mA = 0.209 x 16 + 4, = 7.34mA

5.3 Certified Cylinder Calibration

Certified gas cylinders may be purchased from inert gas suppliers and may be used to calibrate the instrument with the following advice.

If the certified cylinder contains low ppm oxygen, then great care should be taken in sampling from the bottle (refer to earlier comments on installation).

Bottles that are certified will, over a period of time, deteriorate and change their analysis due to absorption on the wall of the cylinder.

As in Air Calibration above, flow the sample through the instrument, switch to whichever range is required and when the instrument has stabilised, then the SPAN potentiometer may be adjusted for the correct value.

It is suggested that if this method of calibration is adopted then the bottle should be in the order of 500 - 1000 ppm.

If when trying to calibrate the instrument not enough adjustment is left on the span potentiometer, then this indicates that the sensor may need replacing. However, refer to the fault finding trouble shooting chart overleaf.

5.4 Zero Adjustment

If the sample truly contains zero oxygen and the zero potentiometer has not been adjusted since shipment, then the output will be zero.

A filter may be obtained from your supplier which, when fitted just before the sample inlet, will take out even the smallest trace of oxygen, thereby enabling a true zero to be achieved (see spare parts).

6.0 MAINTENANCE AND TROUBLESHOOTING

The instrument should be calibrated against a certified gas concentration like that of the application of the instrument, with an oxygen concentration of approximately 70% to 120% of the maximum oxygen concentration range.
It is suggested that the frequency be at least every six months. The measuring sensor should last for a considerable length of time and details can be found in sections 1.2 and 7.0.
However, in time an increasing span will be required to calibrate the sensor and the speed of response to a change in oxygen reading from low to high will be indicative that a replacement sensor will be required.
The sensor is located underneath the middle modesty plate, underneath the main printed circuit board.
It is very unusual for any issues to arise due to the circuit cards, except when commissioning due to incorrect installation, so the failure of the instrument to calibrate will normally be an indication of cell failure, due to its life or being over pressurised.
For trace application instruments with background gases other than nitrogen there will be a label on the inside panel stating what the display should indicate when calibrating on air. Calibrating on air when failure to calibrate on the certified gas will be a confirmation the measuring cell will need to be replaced.

6.1 Sensor Warranty

Please refer to Sections 1.2 and 7.0 for sensor and warranty information.

PLEASE IN ALL CASES QUOTE THE UNIT SERIAL NUMBER.

6.2 Potential Electrostatic Discharge

It is a condition of the Atex certification that the cabinet be cleaned with a damp cloth to prevent any electrostatic discharge

7.0 SPARE PARTS

Part Number	Description
091 076	Assy cell % I/S 5yr life
090 247	Assy cell Trace O2 in H2 only
091 043	Assy oxygen purifier and fittings
091 072	Assy pcb amp
091 033	Assy cell % I/S alternative
091 058	Digital panel meter*
100 398	Flowmeter 50-250cc/min, used on optional sample system
100 499	Pressure regulator, used on optional sample system
100 575	Bulkhead 1/8" o.d.

Important Note

Instruments are supplied with a measuring cell specific to the application. The cell part number can be found on its name plate. When a measuring cell is replaced this part number should be used when ordering.

The serial number of the instrument for which the spare parts are required must be quoted on all orders.

Measuring Cells

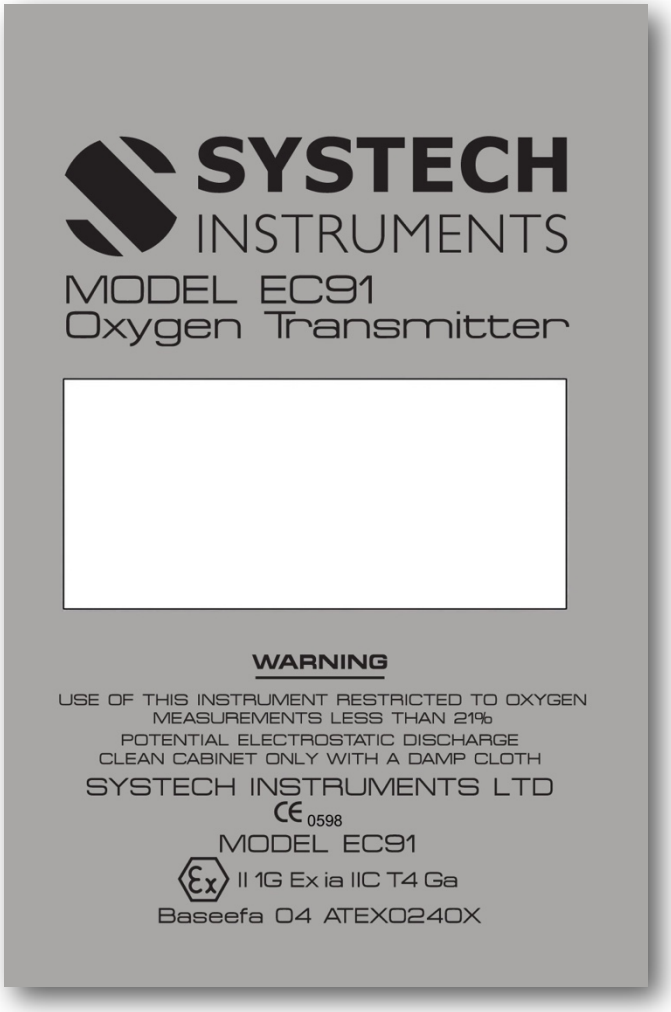
ELECTROCHEMICAL CELL WARRANTY (CURRENT INSTRUMENTS)				
Part No	**Used In**	**Application**	**Description**	**Warranty Code**
091 076	EC91	Percent – 5-year life and for use in CO2 background gas.	Assy Cell %	C
090 247	EC91	Trace O2 in inert and hydrocarbon background gas	Assy Cell Trace	A
091 033	EC91	Percent – alternative to 091 076 when speed of response is important with no CO2 present.	Assy Cell %	D
090 182	EC91	Trace O2 in inert background gas	Assy Cell Trace	A

Important Note

The serial number of the instrument for which the spare parts are required must be quoted on all orders.

8.0 ATEX LABEL INFORMATION

Relevant ATEX information is screened on the front plate of the instrument as follows.



9.0 ADDENDA

9.1 Baseefa Certification Report

CERTIFICATION REPORT

14(C)1000

REPORT ON.	Oxygen Transmitter Model EC91
DATED	25 August 2016
REGISTRATION No.	1722
CUSTOMER	Systech Instruments Limited
ADDRESS	17 Thame Park Business Centre, Wenman Rd, Thame, Oxfordshire, OX9 3XA United Kingdom

Prepared by: R. Powney, Certification Engineer

Checked and Approved by: M. Powney, Certification Manager

Where values of uncertainty of measurement are given, these are expressed at the 95% confidence level unless otherwise stated.

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INDEX FOR CERTIFICATION REPORT 14(C)1000

The signatures, date and other information on the cover sheet apply to all the above.

Those signing the front sheet of this report do so on behalf of SGS Baseefa Ltd.

Annexed Documents	No. of Pages
Baseefa reports and Baseefa subcontractors reports with own cover	
None	
Manufacturer supplied reports and information	
None	
Other reports and information	
None	

Responsibility for individual documents remains with the originator of the individual document.

CERTIFICATION REPORT No. 14(C)1000

1. INTRODUCTION

This report provides the basis for variations to the certification of the Oxygen Transmitter Model EC91, coded Ex ia IIC T4 and covered by Certificate No Baseefa04ATEX0240, supported by Report No. 03(C)0964.

2. SCOPE

The Applicant has requested the following changes relevant to the Oxygen Transmitter Model EC91:

2.1 Introduction of an alternative circuit with a new PCB. This circuit and PCB replace the original designs.

2.2 Confirmation that the equipment meets the requirements of EN 60079-0:2012+A11:2013 and EN 60079-11:2012.

3. DRAWINGS

Number	Sheet	Issue	Date	Description
091 010	1 of 1	F	03/16	Case Drilling & Machining
091 066	1 of 1	B	03/16	Label Adhesive EC91 Ser/No
091 072 ASSY	1 – 5	A	22/04/16	EC91 PCB
091 073	1 of 1	A	22/04/16	Schematic
091 074	1 of 1	A	03/16	Electrical Schematic
091 X	1 of 1	A	03/16	Assy Oxygen Monitor EC91 Mk2
X-091-038	1 of 1	D	09/06/16	EC91 Panel Artwork

4 ASSESSMENT

The new circuit design is very similar to the existing design but features different component designations and is laid out differently on a new PCB design; the optional analogue display and supporting circuitry (including current limiting resistors R8.a & R8.b) has been removed.

4.1. Spark Ignition Assessment

The new design includes an additional total of 100nF (nom.) unprotected capacitance on each of the +5V (C3) and -5V (C4) rails. A total of 200nF (nom.) may therefore be considered to charge to the maximum clamped voltage of 12.4V (5.6V+5% + 6.2V+5%). Table A.2 permits a maximum of 1.24µF at 12.4V and therefore no further considerations are required. With the exception of this additional 200nF (from C3 & C4), the existing spark ignition assessment is not affected. The inductive assessment is not affected (no sources of inductance in the original nor in the new design).

4.2. Thermal Assessment

The thermal assessment is unaffected. A temperature classification of T4 in an ambient of -20°C to +40°C remains appropriate.

4.3. Segregation

Where applicable, segregation distances meet the requirements of Table 5, EN 60079-11:2012 for a peak voltage of <30V under two layers of adherent conformal coating (CTI >100).

4.4. Ratings of Safety Components

The safety component table is reproduced with the designations changed to reflect the latest design as the assessment is unchanged (R8.a & R8.b removed).

Component Designation	Value	Rating used (W2)	Maximum Rating (W1)	RATIO W2/W1
R2, R10, R11	15Ω±1%	0.4W	0.5mW	0.001
D1, D2	13V ±5%	*2W	**1.3W	0.65

Page 3 of 4

Component Designation	Value	Rating used (W2)	Maximum Rating (W1)	RATIO W2/W1
	1N5350B			
D3, D4, D6, D7	5.6V ±5% 1N5339B	*2W	**1.3W	0.65
D8, D9	6.2V ±5% 1N5341B	*2W	**1.3W	0.65

The ratio W2/W1 does not exceed two-thirds and the components are therefore adequately rated.

*1N53xx zener diodes de-rated for mounting in free air.
** Power based on total input power to the circuit.

5 CONCLUSION

The variations to the certificate referenced above are considered to comply with the requirements of EN 60079-0:2012+A11:2013 and EN 60079-11:2012.

9.2 Baseefa Type Examination Certificate

Certificate Number
Baseefa04ATEX0240X
Issue 3

Issued 29 June 2020
Page 1 of 3

1 **EU - TYPE EXAMINATION CERTIFICATE**

2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU**

3 EU - Type Examination Certificate Number: **Baseefa04ATEX0240X – Issue 3**

3.1 In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Supplementary Certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016.

4 Product: **Oxygen Transmitter Model EC91**

5 Manufacturer: **Industrial Physics Product Integrity Limited**

6 Address: **17 Thame Park Business Centre, Wenman Road, Thame, Oxfordshire, OX9 3XA**

7 This re-issued certificate extends EC Type Examination Certificate No. Baseefa04ATEX0240X to apply to product 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.

8 SGS Fimko Oy, Notified Body number 0598, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

8.1 The original certificate was issued by SGS Baseefa Ltd (UK Notified Body 1180). It, and any supplements previously issued by SGS Baseefa Ltd have been transferred to the supervision of SGS Fimko Oy (EU Notified Body 0598). The original certificate number is retained.

The examination and test results are recorded in confidential Report No. **See Certificate History**

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

EN 60079-0: 2012 + A11: 2013 **EN 60079-11: 2012**

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 product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

11 This EU - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following:

Ex II 1G Ex ia IIC T4 Ga

SGS Fimko Oy Customer Reference No. **1722** Project File No. **20/0363**

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R S SINCLAIR
Authorised Signatory for SGS Fimko Oy

BAS-CERT-081 SGS Baseefa Limited is an associate of SGS Fimko OY Issue 2

13 **Schedule**

14 **Certificate Number Baseefa04ATEX0240X – Issue 3**

15 Description of Product

The Oxygen Transmitter Model EC91 is designed to measure and display the concentration of oxygen in a process system in parts per million or as percentage.

The Transmitter incorporates a 2-wire electrochemical cell, a printed circuit board (PCB) and terminals for external connections. It also includes a second PCB with an optional LCD display, all housed in a plastic enclosure.

Optionally the cell may be fitted with an integral cable and mounted remotely.

Input Parameters

Terminals PWR (+ & -) and OUT (+ & -)

U_i	=	28V	C_i	=	0
I_i	=	259mA	L_i	=	0
P_i	=	1.3W			

16 Report Number

See Certificate History

17 Specific Conditions of Use

1. Potential Electrostatic Discharge — Clean Cabinet only with a damp cloth

18 Essential Health and Safety Requirements

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product:

Clause	Subject	Compliance
1.2.7	LVD type requirements	Manufacturer responsibility
1.2.8	Overloading of equipment (protection relays, etc.)	User/Installer responsibility
1.4.1	External effects	User/Installer responsibility
1.4.2	Aggressive substances, etc.	User/Installer responsibility

19 Drawings and Documents

Current drawings which remain unaffected by this issue:

Number	Sheet	Issue	Date	Description
091 010	1 of 1	F	03/16	Case Drilling & Machining
091 066	1 of 1	B	03/16	Label Adhesive EC91 Ser/No
091 072 ASSY	1 – 5	A	22/04/16	EC91 PCB
091 073	1 of 1	A	22/04/16	Schematic
091 074	1 of 1	A	03/16	Electrical Schematic
091 X	1 of 1	A	03/16	Assy Oxygen Monitor EC91 Mk2
X-091-038	1 of 1	D	09/06/16	EC91 Panel Artwork

New drawings

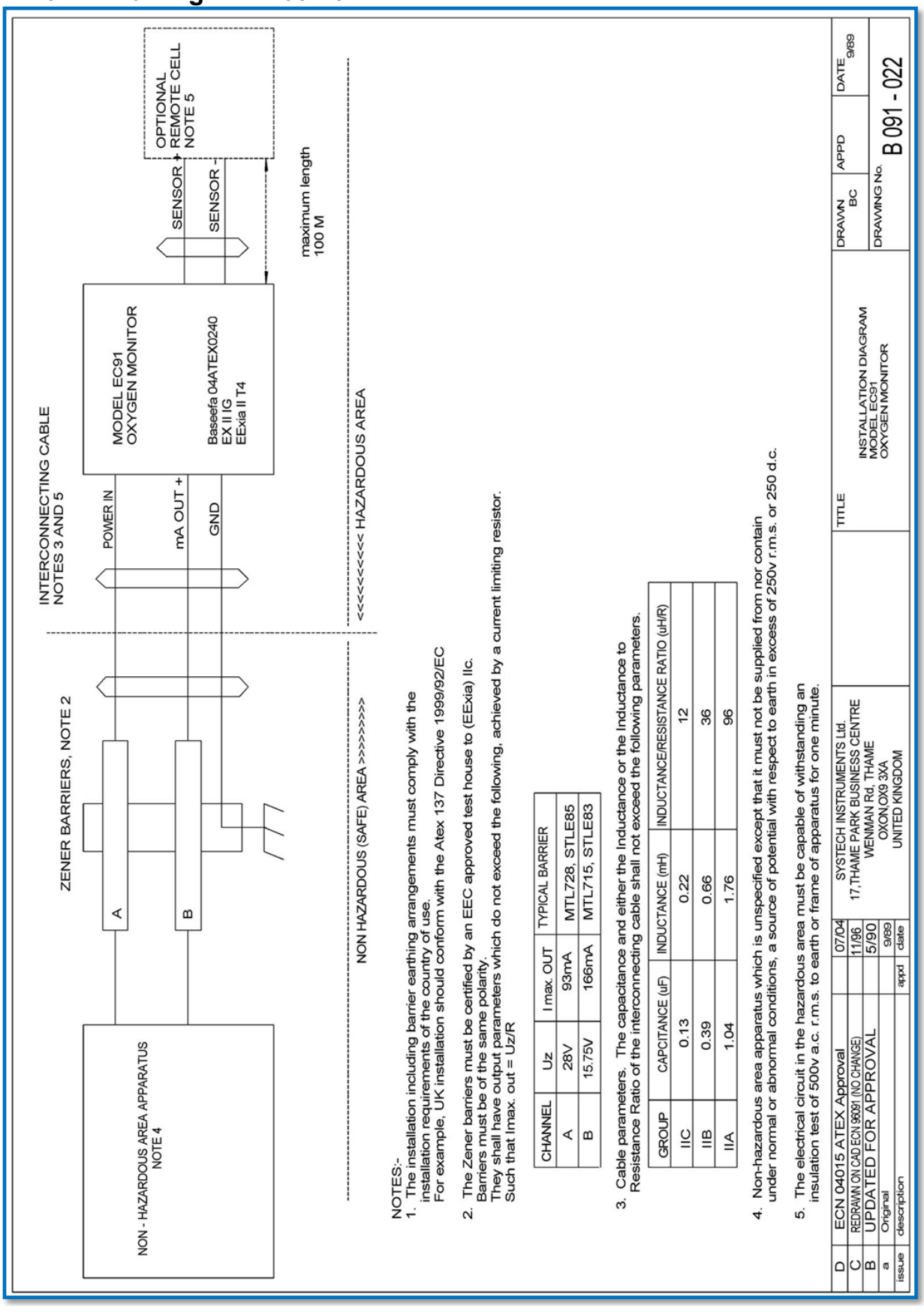
None.

20 Certificate History

Certificate No.	Date	Comments
Baseefa04ATEX0240	13 June 2006	The release of the prime certificate. The associated test and assessment is documented in Test Report No. 03(C) 0964.
Baseefa04ATEX0240/1	13 June 2006	To permit minor mechanical changes and drawing changes that does not affect the original intrinsic safety assessment.
Baseefa04ATEX0240 Issue 2	25 August 2016	This issue of the certificate incorporates the previously issued primary and supplementary certificates into one certificate, confirms the current design meets the requirements of EN 60079-0:2012+A11:2013 & EN 60079-11:2012 and permits the introduction of an alternative PCB with an alternative electrochemical cell. The associated test and assessment is documented in Test Report No. 14(C)1000. Project File No. 14/1000.
Baseefa04ATEX0240X Issue 3	29 June 2020	This document permits existing information (for example on Schedule Drawings) to be replaced by the revised certificate holders name. No other changes may be made to the certified design. Project File No. 20/0363
For drawings applicable to each issue, see original of that issue.		

10.0 Drawings

10.1 Drawing N°. B 091 022



NOTES:-

1. The installation including barrier earthing arrangements must comply with the installation requirements of the country of use.
   For example, UK installation should conform with the Atex 137 Directive 1999/92/EC
2. The Zener barriers must be certified by an EEC approved test house to (EExia) IIc.
   Barriers must be of the same polarity.
   They shall have output parameters which do not exceed the following, achieved by a current limiting resistor.
   Such that Imax. out = Uz/R

CHANNEL	Uz	I max. OUT	TYPICAL BARRIER
A	28V	93mA	MTL728, STLE85
B	15.75V	166mA	MTL715, STLE83

3. Cable parameters. The capacitance and either the Inductance or the Inductance to Resistance Ratio of the interconnecting cable shall not exceed the following parameters.

GROUP	CAPCITANCE (uF)	INDUCTANCE (mH)	INDUCTANCE/RESISTANCE RATIO (uH/R)
IIC	0.13	0.22	12
IIB	0.39	0.66	36
IIA	1.04	1.76	96

4. Non-hazardous area apparatus which is unspecified except that it must not be supplied from nor contain under normal or abnormal conditions, a source of potential with respect to earth in excess of 250v r.m.s. or 250 d.c.
5. The electrical circuit in the hazardous area must be capable of withstanding an insulation test of 500v a.c. r.m.s. to earth or frame of apparatus for one minute.

issue	description	appd	date
a	Original		9/89
B	UPDATED FOR APPROVAL		5/90
C	REDRAWN ON CAD ECN 96091 (NO CHANGE)		11/96
D	ECN 04015 ATEX Approval		07/04

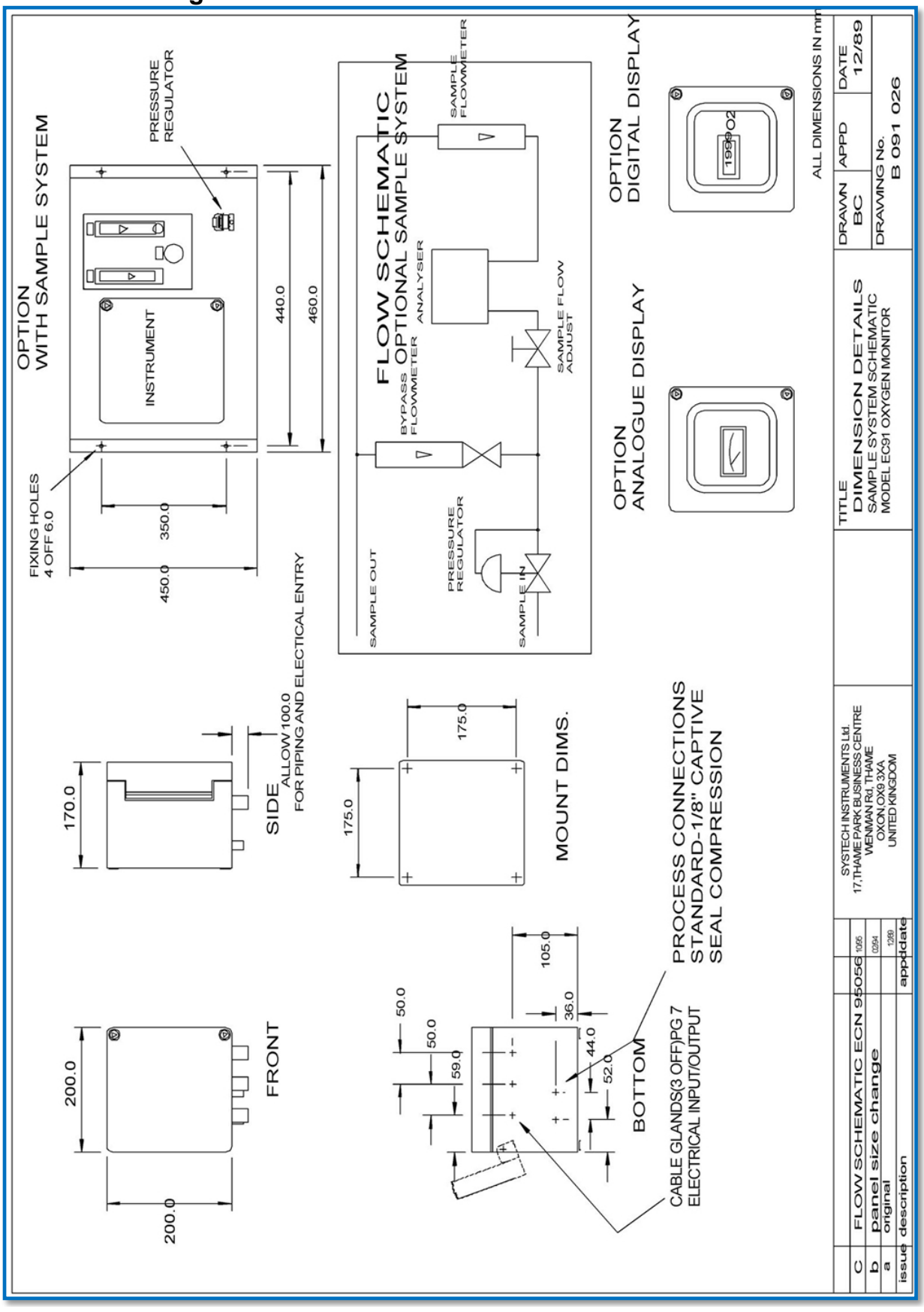
SYSTECH INSTRUMENTS Ltd.
17,THAME PARK BUSINESS CENTRE
WENMAN Rd, THAME
OXON,OX9 3XA
UNITED KINGDOM

TITLE: INSTALLATION DIAGRAM MODEL EC91 OXYGEN MONITOR

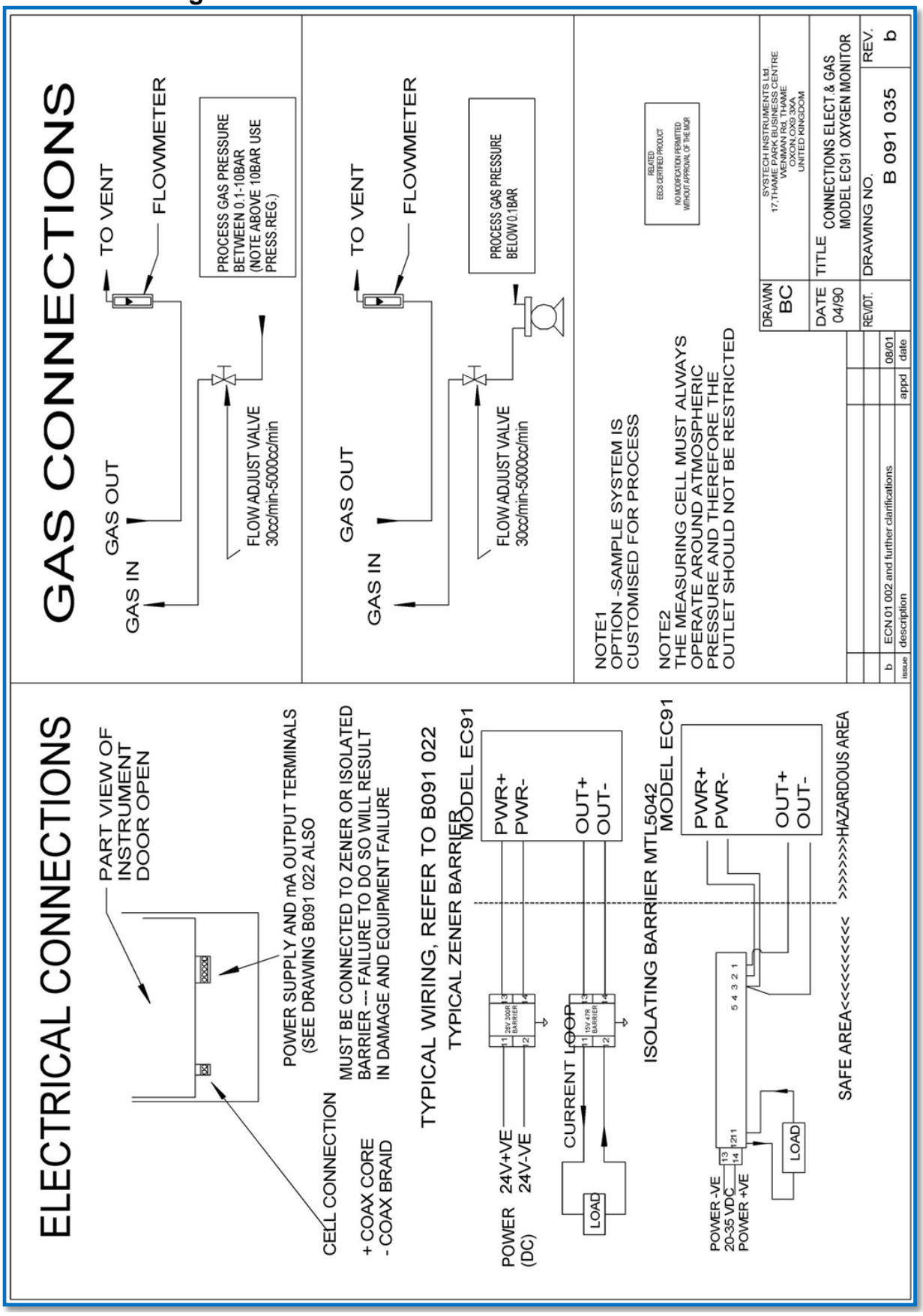
DRAWN BC | APPD | DATE 9/89

DRAWING No. B 091 - 022

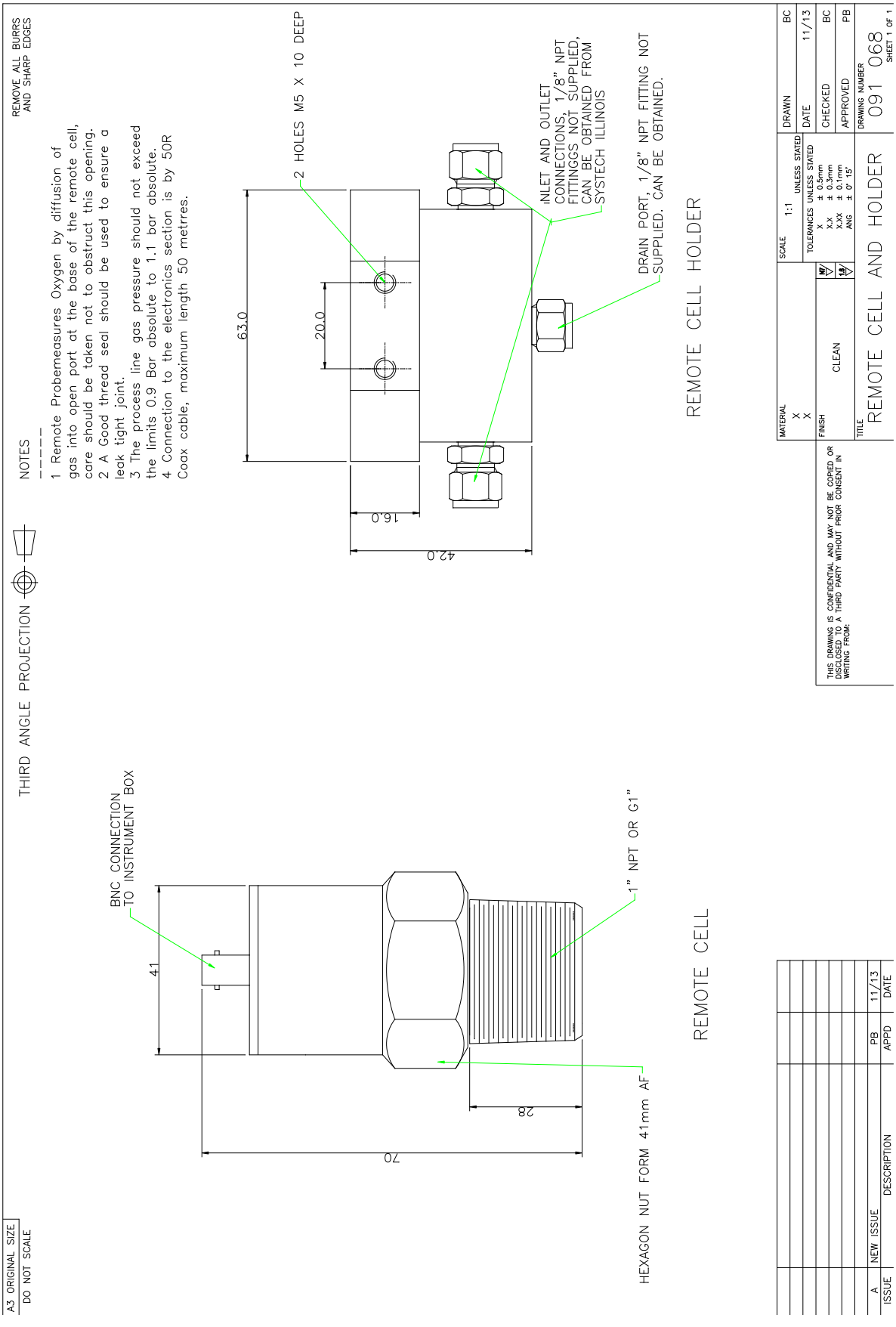
10.2 Drawing N°. B 091 026



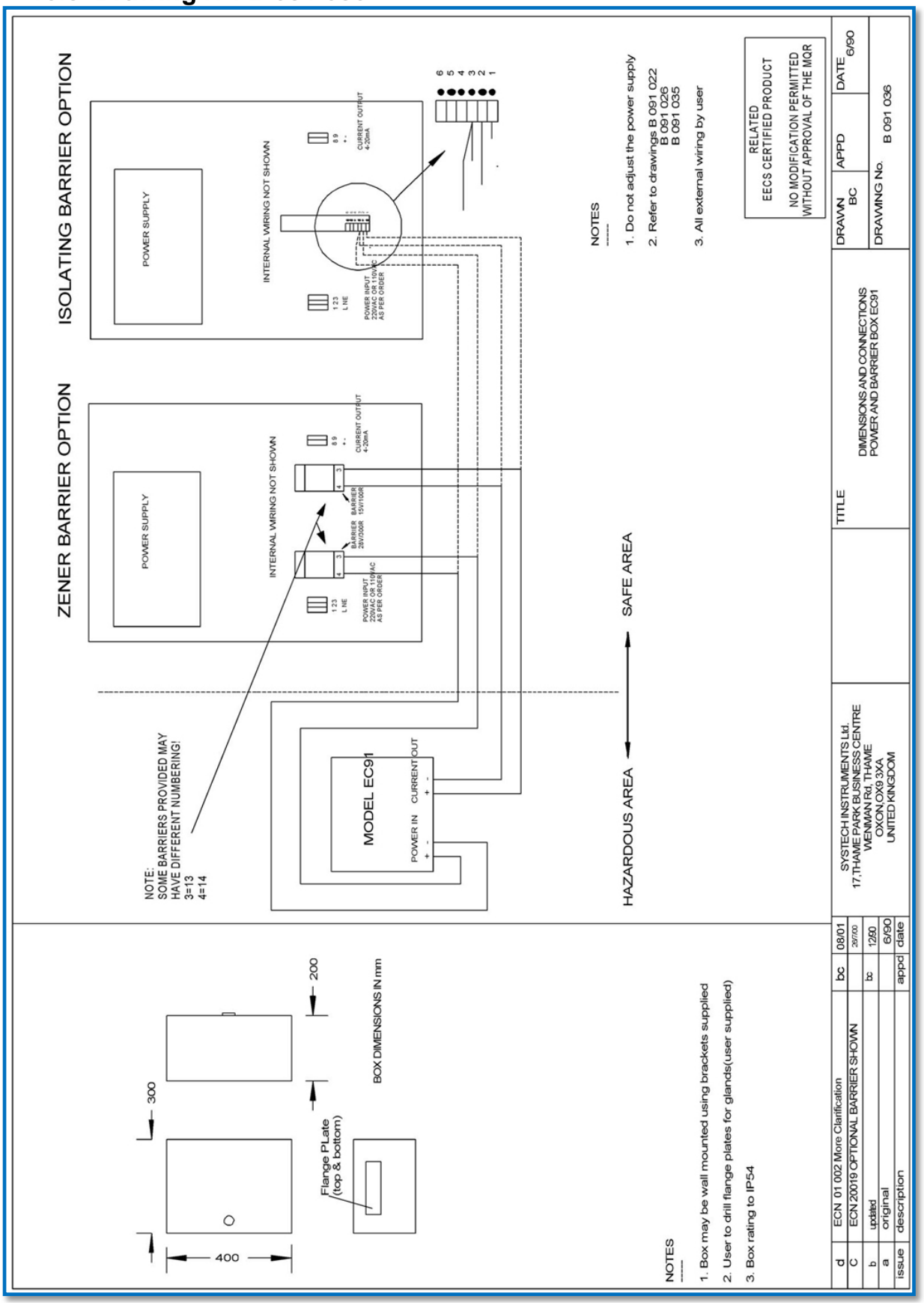
10.3 Drawing N°. B 091 035



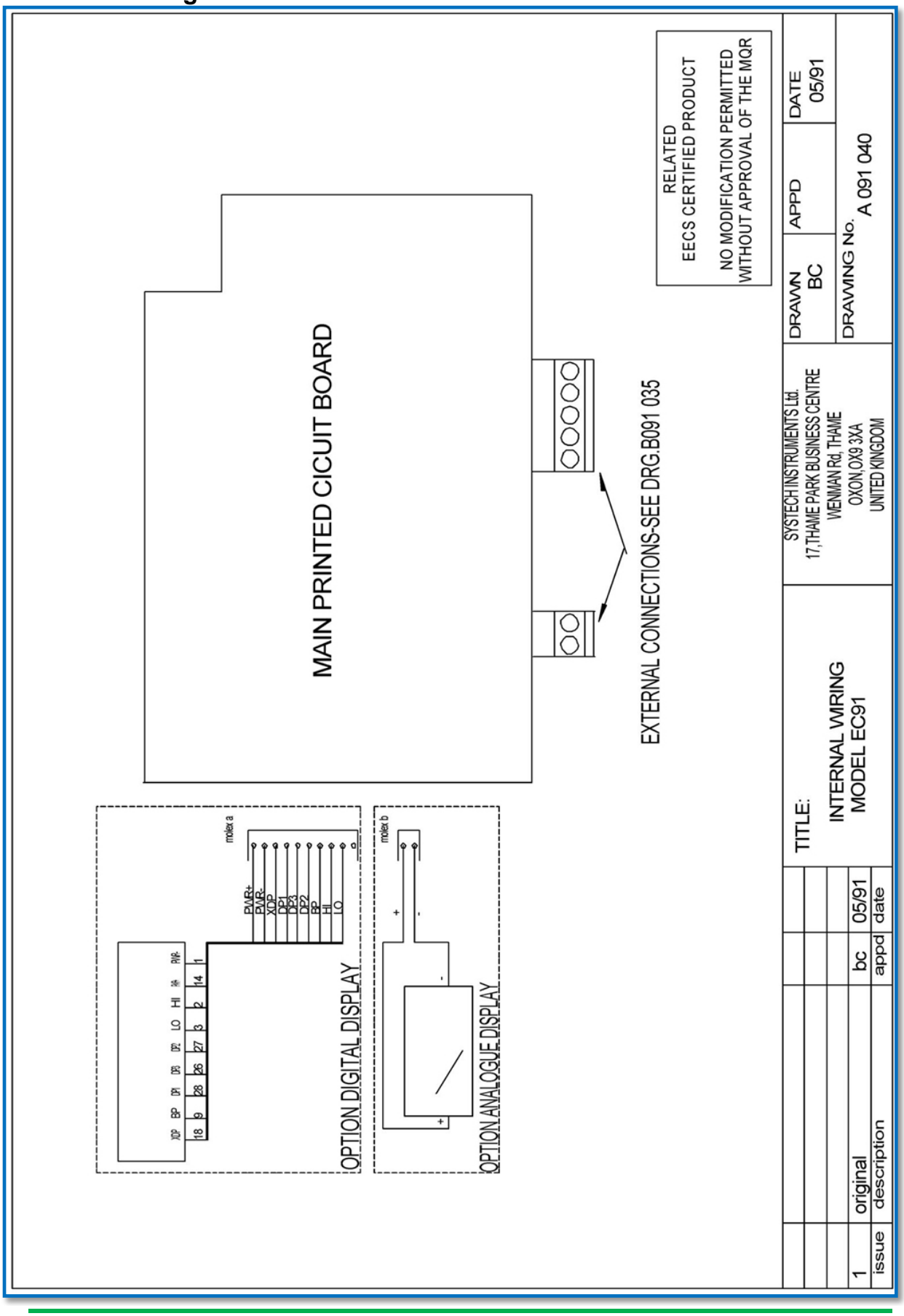
10.4 Drawing N° 091 068



10.5 Drawing N°. B 091 036



10.6 Drawing N°. A 091 040



11.0 DECLARATION OF CONFORMATION

INDUSTRIAL PHYSICS
Our brands protect your brand

Declaration of Conformity

DOC No. F984.009

Issued by: Industrial Physics Product Integrity Ltd

Product title: OXYGEN MONITOR EC91DIS

Statement of conformity

As manufacturers of the above named product, Industrial Physics Product Integrity Ltd hereby declare that the product so described conforms to the following directives/standards. The object of the declaration described above is in conformity with the relevant Union harmonisation legislation.

EU Directives:	Standards/Regulations:
Directive 2014/34/EU ATEX Marking: II 1G Ex ia IIC T4 Ga 	EN 60079-0:2012+ A11:2013 Explosive atmospheres. Equipment. General requirements EN 60079-11:2012 Explosive atmospheres. Equipment protection by intrinsic safety "i" ISO/IEC 80079-34 Explosive atmospheres – Part 34: Application of quality systems for equipment manufacture
Directive 2014/30/EU Electromagnetic Conformity (EMC)	The Electromagnetic Compatibility Regulations 2016

Industrial Physics I Product Integrity
Phone: +44 1844 216 838 (office)
Address: 17 Thame Park Business Center
Wenman Road. Thame, Oxfordshire
OX9 3XA, UK

	EN61326-1:2013 Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements
Directive 2011/65/EU & 2015/863 The Restriction of Hazardous Substances Directive (RoHS)	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (Amendment) Regulations 2019
Directive 2012/19/EU The Waste Electrical and Electronic Equipment Regulations (WEEE)	The Waste Electrical and Electronic Equipment (Amendment) Regulations 2018

RoHS Exemption No. 1(b) Lead anodes in electrochemical oxygen sensors. Annex IV, Expiry date 21/07/24

Notified body: SGS Fimko Oy
No. 0598

Address: Sarkiniementie 3, PO Box 30,
FL-00211, Helsinki, Finland

EC-type examination Certificate: Baseefa04ATEX0258X

Safety note - The apparatus enclosure is made from an aluminium alloy which must be protected against causing an ignition due to impact or friction.

The technical documentation is available from our head office in Thame.

This declaration of conformity is issued under the sole responsibility of the manufacturer.

F984.009

2

Signed for and on behalf of Industrial Physics Product Integrity Ltd by:

Name:	Leigh Butler
Signature:	
Job title:	Operations Director
Date of issue:	16/09/2020

F984.009

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