



# IECEX Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit [www.iecex.com](http://www.iecex.com)

Certificate No.:	<b>IECEX SIR 16.0050X</b>	Page 1 of 4	<u>Certificate history:</u>
Status:	<b>Current</b>	Issue No: 5	Issue 4 (2022-04-01)
Date of Issue:	2022-06-30		Issue 3 (2020-01-06)
Applicant:	<b>Emerson Process Management Limited</b> 2 Hunt Hill Cumbernauld G68 9LF <b>United Kingdom</b>		Issue 2 (2019-03-13)
Equipment:	<b>CT5100 Laser Gas Analyser</b>		Issue 1 (2017-07-19)
Optional accessory:			Issue 0 (2017-01-25)
Type of Protection:	<b>Flameproof "db", Intrinsically Safe "ia", Pressurized "pzc" &amp; Optical Radiation "op is"</b>		
Marking:	Ex db ia op is pzc [ia Ga] IIC T3 Gc Tamb = -20°C to +55°C		

Approved for issue on behalf of the IECEx  
Certification Body:

**Michelle Halliwell**

Position:

**Director Operations, UK & Industrial Europe**

Signature:  
(for printed version)

Date:  
(for printed version)

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting [www.iecex.com](http://www.iecex.com) or use of this QR Code.



Certificate issued by:

**CSA Group Testing UK Ltd**  
**Unit 6, Hawarden Industrial Park**  
**Hawarden, Deeside CH5 3US**  
**United Kingdom**





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Certificate No.: **IECEX SIR 16.0050X**

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Date of issue: 2022-06-30

Issue No: 5

Manufacturer: **Emerson Process Management Limited**  
2 Hunt Hill  
Cumbernauld G68 9LF  
**United Kingdom**

Manufacturing  
locations:

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEX Quality system requirements. This certificate is granted subject to the conditions as set out in IECEX Scheme Rules, IECEX 02 and Operational Documents as amended

## STANDARDS :

The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

[IEC 60079-0:2017](#) Explosive atmospheres - Part 0: Equipment - General requirements  
Edition:7.0

[IEC 60079-1:2014-06](#) Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"  
Edition:7.0

[IEC 60079-11:2011](#) Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"  
Edition:6.0

[IEC 60079-2:2014-07](#) Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p"  
Edition:6

[IEC 60079-28:2015](#) Explosive atmospheres - Part 28: Protection of equipment and transmission systems using optical radiation  
Edition:2

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

## TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Reports:

[GB/CSAE/ExTR22.0078/00](#)  
[GB/SIR/ExTR19.0070/00](#)

[GB/SIR/ExTR16.0311/00](#)  
[GB/SIR/ExTR19.0326/00](#)

[GB/SIR/ExTR17.0152/00](#)  
[GB/SIR/ExTR22.0061/00](#)

Quality Assessment Report:

[GB/SIR/QAR16.0005/05](#)



# IECEX Certificate of Conformity

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Date of issue: 2022-06-30

Issue No: 5

## **EQUIPMENT:**

Equipment and systems covered by this Certificate are as follows:

The CT5100 laser gas analyser and monitoring system consists of two metal enclosures, the upper enclosure being a naturally ventilated stainless steel structure with an aluminium top plate, housing the gas sampling chamber and the lower enclosure being a sealed stainless steel enclosure with approximate dimensions 406mm x 516mm x 295mm and an internal volume of 40 litres. The upper enclosure has no IP rating and the lower an IP66 rating, achieved with silicone and Viton seals.

Refer to Annexe for additional Equipment information and Conditions of Manufacture.

## **SPECIFIC CONDITIONS OF USE: YES as shown below:**

- i. The purge controller keypad mounted on the front of the equipment shall not be exposed to direct UV light sources or direct sunlight. Example methods of protection include, but are not limited to, indoor applications away from UV sources and outdoor locations under shading. As part of regular inspections, if damage to or deterioration of the membrane keypad is detected the unit is to be taken out of service for repair or replacement.
- ii. The purge controller bypass function shall only be enabled during setup or maintenance and only when the area is known to be non-hazardous.
- iii. The equipment shall be installed in an area of not more than pollution degree 2 as defined in IEC 60664-1.
- iv. The CT5100 purge controller automatically monitors the internal pressure of the enclosure and will output any fault conditions onto contact K2. It is the responsibility of the end user to connect this contact to a suitable facility such as an alarm, indicator or an automatic shutdown system.
- v. For correct operation the on-site pressurising air supply must be capable of providing at least 25 l/min for leakage compensation.
- vi. The equipment shall be installed and operated only in an environment of overvoltage category II or better according to IEC 60664-1.



# IECEX Certificate of Conformity

Certificate No.: **IECEX SIR 16.0050X**

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Date of issue: 2022-06-30

Issue No: 5

## **DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)**

**This issue, Issue 5 recognises the following change; refer to the certificate annex to view a comprehensive history:**

1. Following appropriate assessment to demonstrate compliance with the requirements of the latest standards, IEC 60079-0:2011 Ed.6 and IEC 60079-1:2007 Ed.6 are replaced with IEC 60079-0:2017 Ed.7 and IEC 60079-1:2014 Ed.7. As a result, the marking was changed.
2. Removal of label drawing M-1000-2539.
3. Acknowledgement of the use of suitably certified cable entry devices. As a result, the Specific Conditions of Use were changed.
4. Minor drawing modifications

## **Annex:**

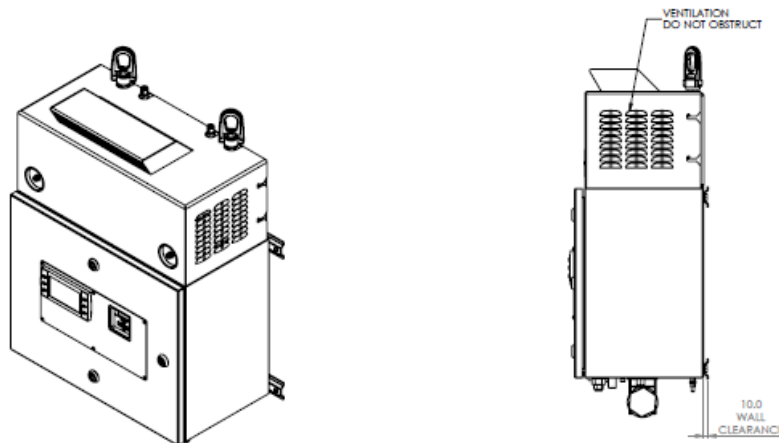
[IECEX SIR 16.0050X Issue 5 Annexe.pdf](#)

Annexe to: IECEx SIR 16.0050X Issue 5  
Applicant: Emerson Process Management Limited  
Apparatus: CT5100 Laser Gas Analyser



The Equipment description is reproduced as follows in its entirety:

The CT5100 laser gas analyser and monitoring system consists of two metal enclosures, the upper enclosure being a naturally ventilated stainless steel structure with an aluminium top plate, housing the gas sampling chamber and the lower enclosure being a sealed stainless steel enclosure with approximate dimensions 406mm x 516mm x 295mm and an internal volume of 40 litres. The upper enclosure has no IP rating and the lower an IP66 rating, achieved with silicone and Viton seals.



The lower enclosure is the only pressurized part of the equipment, this contains the electronics, purge controller and local control system (HMI). The enclosure has a hinged door in the front and gland plates on the upper and lower sides. Apertures have been made in the front entry panel for mounting of the HMI and purge controller interfaces. The enclosure is fitted with two small glass windows on the upper gland plate to allow exit and entry of the laser beam, both windows being completely covered by a bolted metallic assembly containing a mirror. The glass windows are fitted into individual metal housings and form part of the lower, pressurized enclosure.

The upper enclosure contains a gas sampling cell into which the sampled atmosphere is introduced by fixed pipes. The upper enclosure and sampling cell are not pressurized. Attached to the gas sampling cell is a certified flameproof heater and a certified pressure transducer.

#### Electronics Enclosure

The electronics enclosure uses the purge and pressurisation protection method. It houses one 12V and one 24V power supply, the purge controller, Human-Machine Interface (HMI), IS barriers, terminals, relays and various electronic modules and boards.

The HMI and purge controller both have touchscreen displays for user operation, which penetrate the main enclosure and are mounted using the OEM supplied sealing arrangement. The HMI and purge controller are both pre-certified.

#### Ratings

100-120/250Vac, 50-60Hz, single phase, 600W.

## Conditions of Manufacture

- i. The purge controller shall exhibit the following characteristics:
  - a. Maintain an overpressure of  $\geq 0.5$  mbar within the purged enclosure.
  - b. Purge with air or any suitable inert gas for a duration of at least 2 minutes 30 seconds at a flow rate of at least 280 L/min before energisation.
  - c. Prevent the internal overpressure exceeding 10 mbar.
  - d. In addition, the manufacturer shall take all reasonable steps to ensure that the user/installer complies with any restrictions and special conditions for certification associated with the purge controller; they shall also provide an appropriate copy of the certificate that is applicable to the device.
- ii. The system comprising the CT5100 laser gas analyser and the installed purge controller shall be tested by the manufacturer after assembly to check the operation of all features necessary for safe use, particularly:
  - a. Under pressure - The low pressure switch shall operate if the enclosure overpressure falls below the minimum specified above.
  - b. Purge flow failure - The purging system (including the timer) shall reset to the beginning of the purge cycle if the purging air flow rate (measured at the outlet) falls below the minimum specified above.
  - c. Supply pressure failure - The low pressure switch shall operate when or before the enclosure overpressure falls below the minimum specified above.
- iii. Each CT5100 laser gas analyser shall be subjected to a routine overpressure test of 15 mbar for a period of  $2 \text{ min} \pm 10 \text{ s}$ , in accordance with Clause 16.2 of IEC 60079-2:2014. There shall be no permanent deformation.
- iv. Each CT5100 laser gas analyser shall be subjected to a routine leakage test, in accordance with Clause 16.3 of IEC 60079-2:2014. The leakage flow rate shall not exceed 25 litre/min.
- v. There shall be no intervening valves between the overpressure safety device and the enclosure and it shall be located such that it is possible to show correct operation.
- vi. The equipment incorporates various previously certified equipment/component. It is therefore the responsibility of the manufacturer to continually monitor the status of the certification associated with these devices. The manufacturer shall inform CSA of any modifications to the devices that may impinge upon the explosion safety design of the equipment.

Manufacturer Product	Type	Certificate	Relevant standards	Relevant Ex marking
Pepperl & Fuchs Purge control unit	P5500	IECEX UL 14.0019X issue 5	IEC 60079-0:2017 IEC 60079-2:2014 IEC 60079-7:2017 IEC 60079-11:2011 IEC 60079-15:2017	Ex ic ec nC [ic Gc] [pzc Gc] IIC T4 Gc
Nass Magnet Solenoid	5500-MAN-EX01 (Pepperl & Fuchs)	IECEX PTB 04.0002X issue 1	IEC 60079-0:2007 IEC 60079-18:2009	Ex mb IIC T5
Beka Serial text display	BA 488C	IECEX ITS 07.0021X issue 1	IEC 60079-0:2011 IEC 60079-11:2011	Ex ia IIC T5 Ga
Beka Communications isolator	BA 201	IECEX ITS 07.0014 issue 1	IEC 60079-0:2017 IEC 60079-11:2011	[Ex ia Ga] IIC
ESI Technology Pressure transducer	PR3110	IECEX TRC 12.0025X issue 2	IEC 60079-0:2011 IEC 60079-11:2011	Ex ia IIC T4 Ga
Pepperl & Fuchs Resistance repeater	KCD2-RR-EX1	IECEX BAS 10.0024X issue 3	IEC 60079-0:2017 IEC 60079-11:2011	[Ex ia Ga] IIC
Pepperl & Fuchs Galvanically isolated barrier	KCD2-STC-EX1	IECEX CES 06.0001X issue 3	IEC 60079-0:2017 IEC 60079-11:2011	[Ex ia Ga] IIC
Intertec-Hess Heater	SL ***THERM DLA T3 BI	IECEX PTB 07.0055X issue 2	IEC 60079-0:2017 IEC 60079-1:2014	Ex db IIC T3 Gb
Elmess Heater	DHK58M05-T160 PTC	IECEX BVS 14.0106U Issue 1	IEC 60079-0:2017 IEC 60079-1:2014	Ex db IIC Gb

Annexe to: IECEx SIR 16.0050X Issue 5  
Applicant: Emerson Process Management Limited  
Apparatus: CT5100 Laser Gas Analyser



## Full certificate change history

Issue 1 – this Issue introduced the following changes:

- i. An alternative cell assembly arrangement was permitted to allow a laser path length of 15 metres.
- ii. A change of sealing material on the gas line bulkhead assembly was authorised.
- iii. The addition of Velcro flaps to the cell insulation jacket is approved.
- iv. Changes to nameplate drawing to consolidate markings for ATEX, IECEx and North America was acknowledged.

Issue 2 – this Issue introduced the following changes:

- i. To permit the introduction of an alternative cell assembly arrangement to allow laser path lengths of 0.2 metres and 2 metres.
- ii. To permit the removal of intermediate terminal wiring to the purge controller. All designs being directly wired to the purge controller.
- iii. To permit the introduction of alternative electrical components in the purged enclosure.
- iv. To permit the introduction of an alternative seal material for the cell assembly.
- v. To permit the introduction of an alternative PT100 fitting for the cell assembly.
- vi. To permit the introduction of an alternative marking label, which removes markings from the certification outside the scope of the IECEx certification.
- vii. The recognition of minor drawing modifications, including; additional detail, detail re-named and amended notes. These amendments are administrative or involve changes to the design that do not affect the aspects of the product that are relevant to explosion safety.

Issue 3 – this Issue introduced the following changes:

- i. Recognise the Intrinsically safe modules in the CT5100 Laser Gas Analyser and carry out an IS assessment of the modules. Subsequently the IS standard, IEC 60079-11:2011 was added and the marking was amended to include IS marking.
- ii. The IS pressure sensor, 'BD Sensor DMP331P' was removed.
- iii. The PT100 sensor on the top enclosure has been removed out of scope of this certificate and to permit connection of a suitable temperature sensor, the following IS parameters have been declared for the connections emerging from the purged enclosure.

$U_o = 12.4V$        $I_o = 17.4mA$        $P_o = 54mW$        $C_i = 0$        $L_i = 0$

The capacitance and either the inductance or L/R of the load connected to hazardous area terminals of the apparatus must not exceed the following values for Group IIC:

Capacitance = 1.24 $\mu$ F, Inductance = 117 mH and L/R ratio = 597  $\mu$ H/ohm.

The above parameters apply when one of the two conditions below is given:

- The total  $L_i$  of the external circuit (excluding the cable) is < 1% of the  $L_o$  value or
- The total  $C_i$  of the external circuit (excluding the cable) is < 1% of the  $C_o$  value.

The above parameters are reduced to 50% when both of the two conditions below are given:

- The total  $L_i$  of the external circuit (excluding the cable) is  $\geq$  1% of the  $L_o$  value or
- The total  $C_i$  of the external circuit (excluding the cable) is  $\geq$  1% of the  $C_o$  value.

Note : the reduced capacitance of the external circuit(including cable) shall not be greater than 600nF for Group IIC.

Annexe to: IECEx SIR 16.0050X Issue 5  
Applicant: Emerson Process Management Limited  
Apparatus: CT5100 Laser Gas Analyser

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Issue 4 – this Issue introduced the following change:

- i. The certificate holder and manufacturer's name and address were changed:

From:  
Cascade Technologies Ltd  
Glendevon House  
Castle Business Park  
Stirling Scotland, FK9 4TZ

To:  
Emerson Process Management Limited  
2 Hunt Hill  
Cumbernauld  
Glasgow, G68 9LF

Issue 5 – this Issue introduced the following change:

- i. Following appropriate assessment to demonstrate compliance with the requirements of the latest standards, IEC 60079-0:2011 Ed.6 and IEC 60079-1:2007 Ed.6 are replaced with IEC 60079-0:2017 Ed.7 and IEC 60079-1:2014 Ed.7. As a result, the marking was changed.
- ii. Removal of label drawing M-1000-2539.
- iii. Acknowledgement of the use of suitably certified cable entry devices. As a result, the Specific Conditions of Use were changed.
- iv. Minor drawing modifications.