



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

Certificate No.:	IECEx SIR 20.0035X	Page 1 of 4	<u>Certificate history:</u>
Status:	Current	Issue No: 5	Issue 4 (2023-01-04)
Date of Issue:	2024-12-12		Issue 3 (2022-10-27)
Applicant:	Endress+Hauser Optical Analysis Inc 11027 Arrow Route Rancho Cucamonga CA 91730 United States of America		Issue 2 (2022-02-28)
Equipment:	J22 TDLAS Gas Analyzer, J22 TDLAS Gas Analyzer SCS on Panel, J22 TDLAS Gas Analyzer Encl. SCS, J22 TDLAS Gas Analyzer Encl. SCS Heated		
Optional accessory:			
Type of Protection:	Flameproof db, Intrinsically Safe ia, ib, Optical Isolation op is and Mechanical		
Marking:	J22 TDLAS Gas Analyzer Ex db ia [ia Ga] ib op is IIC T4 Gb -20°C ≤ Ta ≤ +60°C J22 TDLAS Gas Analyzer SCS on Panel or J22 TDLAS Gas Analyzer Encl. SCS Ex db ia ib op is h IIC T4 Gb -20°C ≤ Ta ≤ +60°C J22 TDLAS Gas Analyzer Encl. SCS Heated Ex db ia ib op is h IIC T3 Gb -20°C ≤ Ta ≤ +60°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)

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Manufacturer: **Endress+Hauser Optical Analysis Inc**
11027 Arrow Route
Rancho Cucamonga CA 91730
United States of America

Manufacturing locations: **Endress+Hauser Optical Analysis Inc**
11027 Arrow Route
Rancho Cucamonga CA 91730
United States of America

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

[IEC TS 60079-40:2015](#) Explosive atmospheres - Part 40: Requirements for process sealing between flammable process fluids
Edition:1.0

[ISO 80079-36:2016](#) Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic methods and requirements
Edition:1.0

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/ExTR21.0012/00](#)
[GB/SIR/ExTR21.0010/00](#)
[GB/SIR/ExTR22.0205/00](#)

[GB/CSAE/ExTR22.0034/00](#)
[GB/SIR/ExTR21.0011/00](#)
[GB/SIR/ExTR24.0129/00](#)

[GB/CSAE/ExTR22.0035/00](#)
[GB/SIR/ExTR22.0171/00](#)

Quality Assessment Report:

[GB/CML/QAR21.0014/03](#)



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EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

The core model of the J22 TDLAS Gas Analyzer consists of a flameproof electronics compartment, intrinsically safe optical head and a measurement cell.

The J22 TDLAS Gas Analyzer with Sample Conditioning System, henceforth referred to as the 'SCS', on a panel combines the J22 TDLAS Gas Analyzer with the non-electrical SCS to precondition the analyte before examination within the cell.

The J22 TDLAS Gas Analyzer with SCS in an enclosure can be configured with or without a pre-certified terminal box, heater and thermostat.

The J22 TDLAS Gas Analyzer is a laser-based gas analyzer that measures the concentration of a compound or "analyte" such as H₂O. The technology employed is Tunable Diode Laser Absorption Spectroscopy (TDLAS). The measurement output is a volumetric concentration, or ratio of a specific analyte in a gas mixture such as natural gas or air. The volumetric ratio can be converted to other units of measure using internal conversion factors and calculations.

The analyzer is comprised of a sample cell, intrinsically safe optical head and an electronics assembly platform within a pre-certified flameproof enclosure. The cell is a sealed tube through which the gas mixture flows. The cell has a gas inlet and a gas outlet. On one end of the tube is a window through which a beam of infrared laser light travels, which in turn reflects from a mirror. In this arrangement, the gas mixture does not contact the laser or any other optoelectronics. Pressure, and in some cases temperature sensors, are employed in the cell assembly to compensate for the effects of pressure and temperature changes in the gas.

The optical head is mounted on top of the cell and contains the laser, optical detector and a thermoelectric cooler to control the laser temperature. The optical head also contains the optical head electronics which are directly connected to the optoelectronics in the optical head. The optical head electronics board also communicates with the electronics assembly.

The electronics assembly is mounted on top of the optical head, within a flameproof enclosure. The electronics assembly, which can be powered by 100-240 VAC $\pm$ 10% or 19.2-28.8 VDC source, contains the sensor electronics which connects to the optical head via the RS232 protocol through a 10-pin ribbon cable assembly. The sensor electronics and the optical head electronics operate on a 30V dc supply using the same 10-pin ribbon cable. The sensor electronics generate the laser drive signal that is sent through the optical head electronics and to the laser in the optical head. Signals from the detectors are amplified by the optical head electronics and sent to the sensor electronics where they are digitized. The sensor electronics process the digital data and sends the gas concentration measurements the electronics display and I/O modules.

Refer to the Annexe for additional information and the Model Code Structure

SPECIFIC CONDITIONS OF USE: YES as shown below:

1. The flameproof joints of this equipment are other than the minimums specified in IEC/EN 60079-1 and shall not be repaired by the user.
2. Adhesive labels, the powder coating of models of the equipment with an aluminium enclosure, and coated parts of the flowmeter with flow switch are non-conducting materials and may generate an ignition-capable level of electrostatic discharge under certain extreme conditions. The user should ensure that the Equipment is not installed in a location where it may be subjected to external conditions (such as high-pressure steam) which might cause a build-up of electrostatic charges on these non-conducting surfaces. Additionally, cleaning of the equipment should be done only with a damp cloth.
3. The optional stainless-steel label tag is not bonded to earth. The maximum average capacitance of the tag determined by measurement is max. 30 pF. This shall be considered by the user to determine suitability of the equipment in a specific application.
4. For models of the J22 TDLAS Gas Analyzer with SCS mounted within an enclosure, the inner sheath of the supply cable for the heater circuit shall be sheathed with thermoplastic, thermosetting, or elastomeric material. It shall be circular and compact. Any bedding or sheath shall be extruded. Fillers, if any, shall be non-hygroscopic. The minimum length of the cable shall exceed 3 meters.
5. The temperature of the process medium shall be within the ambient temperature rating of the equipment.
6. Any connection to the Intrinsically Safe Flow Switch connector shall be made via a certified M12 x 1.5 Ex eb IIC IP66 rated certified cable gland suitable for a temperature range of -20°C to +60°C, that shall be fitted in an Optical Head Enclosure entry. The connection is made to a printed circuit board mounted four Pin black connector J6 via a mating free connector using crimp type terminals. Access to the connection is gained by removal of the Optical Head Enclosure cover which shall be refitted using a fastener torque of 2Nm.
7. The equipment is not capable of passing a 500V r.m.s. dielectric strength test in accordance with Clause 6.3.13 of IEC 60079-11:2011 between the Intrinsically Safe Flow Switch connection circuits and the equipment enclosure. This shall be taken into account in any equipment installation.
8. This equipment is intended to operate at a constant pressure and has not been assessed for the effects of persistent fluctuations of pressure within the operating pressure range. Therefore, the user shall ensure that the pressure fluctuation within the Sample Cell Tube of the equipment does not routinely exceed 5 lbf/in² (psi).



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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)

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

1. Addition of alternative lens material.
2. Addition of alternative "Kalrez" O-rings in the process wetted area.
3. Addition of Wi-Fi Display.
4. Addition of alternative pressure relief valves and check valves.
5. Update of component certificates for E+H pre-certified parts used in the equipment.
6. Addition of stainless steel H328 adapter.
7. As a result of the above modifications, the Product Description and controlled drawings were updated as appropriate.

Annex:

[IECEx SIR 20.0035X Annexe Issue 5.pdf](#)

Annexe to: IECEx SIR 20.0035X Issue 5
Applicant: Endress+Hauser Optical Analysis Inc.
Apparatus: J22 TDLAS Gas Analyzer, J22 TDLAS Gas Analyzer SCS on Panel, J22 TDLAS Gas Analyzer Encl. SCS, J22 TDLAS Gas Analyzer Encl. SCS Heated

Equipment continued

The electronics assembly displays the concentration measurement on an LCD display and has a through-the-glass 3-button keypad interface for user input. The flameproof enclosure of the electronics assembly also houses the electrical terminals for field wiring connections. The J22 TDLAS Gas Analyzer comes with various analogue and digital outputs which may be employed in automation or communication systems to deliver its measurements and applicable diagnostic messages and alarms to remote devices. Additionally, the electronics assembly has a Service Port which allows interaction with the J22 TDLAS Gas Analyzer on a standard web browser using a laptop or tablet. This connection is for use by the manufacturer or trained personnel for test, repair or overhaul interaction of the equipment under non-hazardous, explosive atmosphere free conditions.

'Within the optical head enclosure there is an intrinsically safe 'flow switch' connection for connection of external equipment, and an intrinsically safe RS485 interface for future use by the manufacture for connection to additional equipment that it is intended to be incorporated as part of the SCS.'

The J22 TDLAS Gas Analyzer is used as an "extractive" measuring device, where the gas sample is extracted from a vessel or pipeline and transported to the analyzer which may be mounted up to 100 meters from the sample tap point. The J22 TDLAS Gas Analyzer may be configured without sample conditioning. Optional hardware is also available to condition the sample before it enters the gas analyzer. An optional IP66 rated enclosure may be included which surrounds the "cell" and the sample conditioning system. The sample conditioning system (SCS) is required to filter and remove solid and liquid particulate and to control the flow and pressure of the gas. In some cases, an optional heater (powered independently from the analyzer) is used to control the temperature inside the enclosed SCS. An optional pressure relief valve and purge system are available. The effectiveness of this purge system has not been assessed by CSA.

The J22 TDLAS Gas Analyzer operates at near-atmospheric pressure and at an ambient temperature between -20 to +60 degrees centigrade. After the passing through the J22 TDLAS Gas analyzer, the sample is routed and vented to a safe location in the atmosphere or vented to a flare or other apparatus.

The equipment has been separately tested against the requirements of IEC 60529 and it meets IP66.

The maximum working pressure (MWP) of the equipment is listed as 800-1200 mbara, or 800-1700 mbara (model dependant). This is the pressure range at which the manufacturer has determined the equipment can operate. However, the equipment was assessed to withstand a pressure of 100 lbf/in² (psi) against IEC TS 60079-40:2015 Edition 1.0.

J22 TDLAS Gas Analyzer

Rated: 100 - 240Vac, 50/60 Hz $\pm$ 10%, Um = 250V or 19.2 – 28.8 Vdc, max., Um 250V, 10 W.

I/O1: Terminal 26 and 27, Un = 30Vdc, Um = 250Vac

I/O2: Terminal 24 and 25, Un = 30Vdc, Um = 250Vac or Un = 30Vdc, In = 100mAdc/500mAac, Um = 250Vac

I/O3: Terminal 22 and 23, Un = 30Vdc, Um = 250Vac or Un = 30Vdc, In = 100mAdc/500mAac, Um = 250Vac

Flow Switch: J6 (Optical Head Enclosure), Uo = 5.88V, Io = 4.53mA, Po = 6.66mW, Co = 43 μ F, Lo = 1.74H (Uo may be + or – 5.88V with respect to Pin 2 of J6)

J22 TDLAS Gas Analyzer SCS on Panel & J22 TDLAS Gas Analyzer Encl. SCS

Rated: 100 - 240Vac, 50/60 Hz $\pm$ 10%, Um = 250V or 19.2 – 28.8 Vdc, max., Um 250V, 10 W.

I/O1: Terminal 26 and 27, Un = 30Vdc, Um = 250Vac

I/O2: Terminal 24 and 25, Un = 30Vdc, Um = 250Vac or Un = 30Vdc, In = 100mAdc/500mAac, Um = 250Vac

I/O3: Terminal 22 and 23, Un = 30Vdc, Um = 250Vac or Un = 30Vdc, In = 100mAdc/500mAac, Um = 250Vac

J22 TDLAS Gas Analyzer Encl. SCS Heated

Rated: 100 - 240Vac, 50/60 Hz $\pm$ 10%, Um = 250V or 19.2 – 28.8 Vdc, max., Um = 250V, 10 W.

Heater: 100 - 240 Vac, 50/60 Hz $\pm$ 10%, 80 W.

I/O1: Terminal 26 and 27, Un = 30Vdc, Um = 250Vac

I/O2: Terminal 24 and 25, Un = 30Vdc, Um = 250Vac or Un = 30Vdc, In = 100mAdc/500mAac, Um = 250Vac

I/O3: Terminal 22 and 23, Un = 30Vdc, Um = 250Vac or Un = 30Vdc, In = 100mAdc/500mAac, Um = 250Vac

Annexe to: IECEx SIR 20.0035X Issue 5
Applicant: Endress+Hauser Optical Analysis Inc.
Apparatus: J22 TDLAS Gas Analyzer, J22 TDLAS Gas Analyzer SCS on Panel, J22 TDLAS Gas Analyzer Encl. SCS, J22 TDLAS Gas Analyzer Encl. SCS Heated

Model Code Structure

J22 – ABCDEFGHIJKLMNOPQRSTUVWXYZ. The manufacturer's internal reference code is shown adjacent to each model code placeholder in brackets ().

- A (10) – Approval
 - BA - ATEX/IECEX/UKEx Zone 1
- B (20) – Analyte
- C (30) – Measurement Range
- D (40) – Measurement Range 2
- E (50) – Stream Composition
- F (60) – Venting to
- G (70) – Process Wetted Materials
 - J – 316 Stainless Steel; FFKM Seals (Analyzer Only)
 - K – 316 Stainless Steel; FFKM Seals (Analyzer with SCS)
 - V – 316 Stainless Steel; FKM Seals
- H (80) – Supply Parameters
 - A – 100-240 VAC (50/60 Hz) $\pm$ 10%
 - D – 24 VDC $\pm$ 20%
- I (90) – Output; Input 1
- J (100) – Output; Input 2
- K (110) – Output; Input 3
- L (120) – Electronics Housing
 - 1 – Coated Copper-Free Aluminum; no WLAN
 - 2 – 316 Stainless Steel; no WLAN
 - 3 – Coated Copper-Free Aluminum + WLAN
 - 4 – 316 Stainless Steel + WLAN
- M (130) – Controller Mounting
- N (140) – Sample Conditioning System (SCS)
 - A – On Panel, Aluminum
 - B – Enclosed, 304 Stainless Steel
 - C – Enclosed, 316 Stainless Steel
 - N – None
- O (150) – Filtration
- P (160) – Sample System Gas Connections
 - A – Imperial
 - B – Metric
- Q (170) – Pressure Regulation
- R (180) – Flow Meter
 - G – Armored, factory default
 - P – Armored, Krohne with flow switch
 - F – Glass Tube, factory default
 - K – Glass Tube, Krohne
 - N – None
- S (190) – Heating Options
 - 1 – Heated + Heat-Trace Boot, 100 - 240 VAC $\pm$ 10%
 - 8 – None
- T (200) – Purge
- U (500) – Operating Language Display
- V (580) – Test/Certificate/Declaration
- W (895) – Marking

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Headings without sub-options are not considered critical to the design of the equipment. Where sub options are shown, these are the only options endorsed by CSA.

Sub-options not shown within the model code, such as those indicated with a "Y", "9", "YY" or "99", are used by the manufacturer to identify non-standard product configurations within the sample conditioning system; in this case, only the J22 TDLAS Gas Analyzer is endorsed by CSA.

Conditions of Manufacture

1. The equipment covered by this certificate incorporates 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 CSA UK of any modifications of the devices that may impinge upon the explosion safety design of the equipment.

Description	Certificate Number
E+H G305 and G307 Enclosures	IECEX CSA 20.0016U
Intertec SL-***THERM Block Heater	IECEX PTB 07.0055X
Intertec TA Thermostat	IECEX PTB 07.0054X
Adalet XIHS Terminal Box	IECEX UL 12.0019U
CMP Type 737 Adapter/Reducer	IECEX CML 18.0177X
CMP A2F Cable Gland	IECEX CML 18.0179X
Hazardous Locations Solutions Type N conduit elbow	IECEX SIR 07.0044U
Proline 300/500 Electronics	IECEX CSA 16.0006U
Display Type DP-PA1c & DP-PH1c	IECEX KEM 08.0048U
KROHNE Messtechnik GmbH Variable Area Flowmeter type DK32 / R1 / .. / L / .. / .. – Ex	IECEX KIWA 18.0007X

Full certificate change history

Issue 1 – this Issue introduced the following changes:

1. Introduction of new modified versions of the ISEM Analog Board, ISEM MCU Board and OHE printed circuit board assemblies.
2. Mechanical modification to Detector Module assembly.
3. Changes to the equipment type identifications to align with those specified on the associated Certificate of Conformity CSA 80053040 and corresponding changes to the marking.
4. Update equipment description to align with that specified on the associated Certificate of Conformity CSA 80053040.
5. Update certificates to include equipment ratings.

Issue 2 – this Issue introduced the following changes:

1. Change of manufacturer name from SpectraSensors Inc. to Endress+Hauser Optical Analysis Inc.
2. Specification of intrinsic safety 'Ex ia' parameters at a previously unused flow switch connector J6 of the J22 TDLAS Gas Analyzer to cover user connection of intrinsically safe equipment at this connector. The addition of 'ia [ia Ga]' to the certification coding to cover this connection and its associated circuitry.
3. Introduction of the option for an intrinsically safe 'Ex ia' flowmeter with flow switch to be fitted as part of the Sample Conditioning System, the flow switch of the flowmeter being electrically connected to the previously unused intrinsically safe 'Ex ia' connection at connector J6 in the J22 TDLAS Gas Analyzer. The addition of 'ia' to the certification coding to cover the fitting of this flowmeter with flow switch.
4. The use of alternative internal p.c.b. assemblies, including an alternative terminal board assembly, to provide Modbus Ethernet/IP at I/O1 as an optional alternative to the Modbus RS485 at I/O1.

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5. Clarification that internal board configurations and settings can optionally provide either Relay Output or 4-20mA Input/Output (Passive/Active) at I/O2 - I/O3.
6. Modifications to the design of the TLM Module.
7. Minor modifications to an internal pressure sensor.
8. Introduction of alternative non-return valves Swagelock SS-CHS4-1/3 and DK-LOK CORP. V33A-D-4T-1/3 to the Sample Conditioning System.
9. Minor clerical error was corrected in the Conditions of Manufacture.

Issue 3 – this Issue introduced the following changes:

1. The equipment was assessed against the requirements of IEC TS 60079-40:2015. As a result of this assessment, the marking “Dual Seal Without Annunciation” was added.
2. Minor updates were made to the nomenclature in the Model Code Structure, listed under the Product Description.
3. Minor updates were made to the manufacturer’s controlled documents.

Issue 4 – this Issue introduced the following changes:

1. Recognition of a RS485 interface for future use by the manufacture for connection to additional equipment that is intended to be incorporated as part of the SCS. The Product Description is updated accordingly.
2. Minor updates to the assembly drawing.
3. Removal of the superfluous words ‘Dual Seal Without Annunciation’ from the product name in the marking section of the certificate.

Issue 5 – this Issue introduced the following changes:

1. Addition of alternative lens material.
2. Addition of alternative “Kalrez” O-rings in the process wetted area.
3. Addition of Wi-Fi Display.
4. Addition of alternative pressure relief valves and check valves.
5. Update of component certificates for E+H pre-certified parts used in the equipment.
6. Addition of stainless steel H328 adapter.
7. As a result of the above modifications, the Product Description and controlled drawings were updated as appropriate.