HACH CAx440EX Field Transmitter Instruction Manual

Contents

HACH CAx440EX Field Transmitter

Certifications: Certified to CSA C22.2: #213, #60079-0, #60079-11, #61010-1-12

Section 1 Introduction
This document is an addendum to the CAx440EX Field Transmitter User Instructions. This document supplies the safety precautions for installation of the CAx440EX field transmitter (LXV449.97.01010) in hazardous locations. Fully read the CAx440EX Field Transmitter User Instructions and GS1440, GS2440EX H2S Sensor User Manual before the installation or operation of the sensor or field transmitter is started.

Section 2 Specifications

Specifications are subject to change without notice. For the full specifications, refer to the CAx440EX Field Transmitter User Instructions.
Safety/Hazardous location: cETLus safety listed (5022889)
Enclosure: Polycarbonate, IP64/IP67
Electrical ratings:

- **Option 1:** Uo: 29.2 V, Io: 85 mA, Po: 0.67 W, Lo: 4.9 mH, Co: 0.07 F
- **Option 2:** Uo: 6.3 V, Io: 18.72 mA, Po: 0.30 W, Lo: 100 mH, Co: 14 F

Specification	Details
Safety/Hazardous location	cETLus safety listed (5022889)
Enclosure	Polycarbonate, IP64/IP67
Electrical ratings	One of the options that follow: • Battery: 3.6 V, 19 Ah 2 A maximum • DC: 9–28 VDC, 1 A maximum
Power/4–20 mA connector (intrinsically safe outputs)	Uo: 29.2 V, Io: 85 mA, Po: 0.67 W, Lo: 4.9 mH, Co: 0.07 µF
RS-232 connector (intrinsically safe outputs)	Uo: 6.3 V, Io: 18.72 mA, Po: 0.30 W, Lo: 100 mH, Co: 14 µF
Operating temperature	-20 to 60 °C (-4 to 140 °F)
Storage temperature	-20 to 60 °C (-4 to 140 °F)
Humidity	0 to 100% relative humidity
Altitude	2000 m (6562 ft)
North America certifications (US/Canada)	Class I, Division 2, Groups A-D, T4 Class I, Zone 2, Group IIC, T4 Equipment that provides intrinsically safe outputs: [Ex ia] Class I, Division 1, Groups A-D [AEx ia Ga] IIC and [Ex ia Ga] IIC -20 °C ≤ Tamb ≤ +60 °C Certificate: ETL23CA104847186X
UL standards (US)	Conforms to UL: 121201, 60079-0, 60079-11, 913, 61010-1
CSA standards (Canada)	Certified to CSA C22.2: #213, #60079-0, #60079-11, #61010-1-12

Section 3 General Information

In no event will the manufacturer be liable for damages resulting from any improper use of product or failure to comply with the instructions in the manual. The manufacturer reserves theright to make changes in this manual and the products it describes at any time, without notice or obligation. Revised editions are found on the manufacturer's website.

Safety Precautions
Safety Information
The manufacturer is not responsible for any damages due to misapplication or misuse of this product including, without limitation, direct, incidental and consequential damages, and disclaims such damages to the full extent permitted under applicable law. The user is solely responsible to identify critical application risks and install appropriate mechanisms to protect processes during a possible equipment malfunction. Please read this entire manual before unpacking, setting up or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment. Make sure that the protection provided by this equipment is not impaired. Do not use or install this equipment in any manner other than that specified in this manual.

Use of hazard information

DANGER: Indicates a potentially or imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION: Indicates a potentially hazardous situation that may result in minor or moderate injury.
NOTICE: Indicates a situation which, if not avoided, may cause damage to the instrument. Information that requires special emphasis.

Precautionary Labels
Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol on the instrument is referenced in the manual with a precautionary statement.

-  This is the safety alert symbol. Obey all safety messages that follow this symbol to avoid potential injury. If on the instrument, refer to the instruction manual for operation or safety information.
-  This symbol indicates that a risk ofelectrical shock and/or electrocution exists.
-  This symbol indicates that the marked item requires a protective earth connection. If the instrument is not supplied with a ground plug on a cord, make the protective earth connection to the protective conductor terminal.
-  This symbol indicates the presence of devices sensitive to Electro-static Discharge (ESD) and indicates that care must be taken to prevent damage with the equipment.
-  Electrical equipment marked with this symbol may not be disposed of in European domestic or public disposal systems. Return old or end-of-life equipment to the manufacturer for disposal at no charge to the user.

Confined space precautions
DANGER
RExplosion hazard. Training in pre-entry testing, ventilation, entry procedures, evacuation/rescue procedures and safety work practices is necessary before entering confined spaces. The information that follows is supplied to help users understand the dangers and risks that are associated with entry into confined spaces. On April 15, 1993, OSHA's final ruling on CFR 1910.146, Permit Required Confined Spaces, became law. This standard directly affects more than 250,000 industrial sites in the United States and was created to protect the health and safety of workers in confined spaces.

Definition of a confined space:
A confined space is any location or enclosure that has (or has the immediate potential for) one or more of the following conditions:

- An atmosphere with an oxygen concentration that is less than 19.5% or more than 23.5% and/or a hydrogen sulfide (H2S) concentration that is more than 10 ppm.
- An atmosphere that can be flammable or explosive due to gases, vapors, mists, dusts or fibers.
- Toxic materials which upon contact or inhalation can cause injury, impairment of health or death.

Confined spaces are not designed for human occupancy. Confined spaces have a restricted entry and contain known or potential hazards. Examples of confined spaces include manholes, stacks, pipes, vats, switch vaults and other similar locations. Standard safety procedures must always be obeyed before entry into confined spaces and/or locations where hazardous gases, vapors, mists, dusts or fibers can be present. Before entry into a confined space, find and read all procedures that are related to confined space entry.

Product overview

DANGER
Do not use the GS1440 or GS2440EX sensor as a safety device to identify the hydrogen sulfide concentration in an area. Obey all applicable regulations and occupational health and safety precautions before entry into confined spaces and toxic hazard environments. Get advice from the occupational health and safety department at the workplace or the government regulatory body to identify the possible hazards and safety standards.

NOTICE
The GS1440 sensor is not approved for use in hazardous locations.The GS2440EX sensor continuously measures the hydrogen sulfide (H2S) concentration in liquids (0–5 mg/L H2S) and air (0–1000 ppm H2S). The CAx440EX field transmitter is an accessory for use in explosion hazardous areas (Division 2) and can be used as an Ex barrier (Division 1) for equipment (e.g., GS2440EX sensor). The field transmitter is a power supply and a cellular communication device. The field transmitter supplies power to the GS2440EX sensor and transmits data from the GS2440EX sensor to the Hach H2S Data cloud server. Two batteries or a DC power supply are used to supply power to the CAx440EX field transmitter. The enclosure of the CAx440EX field transmitter is an IP64/IP67 rated, polycarbonate (PC) case that can be hung or attached to a wall during use. The I.S. components supply parameters of the I.S. output entity with an “4-20mA SENSOR CABLE” terminal and an “RS-232 SENSOR CABLE” terminal.

Installation

Refer to the CAx440EX Field Transmitter User Instructions for detailed installation steps.

DANGER
Explosion hazard. Trained personnel only must install or commission the equipment.
This chapter includes only the installation information for hazardous location use. For the installation, operation, and replacement part and accessory information for non-hazardous location use, refer to the CAx440EX Field Transmitter User Instructions.

Precautions for hazardous location installations

DANGER
Obey all North American Classification Certificate specifications and the national and local regulations. Obey the safety warnings of the other intrinsically safe (Ex) equipment installed near the field transmitter.

DANGER
Explosion hazard. Installation into hazardous locations must be done so that no friction can be generated between the sensor or field transmitter and any surrounding surfaces.

DANGER
Explosion hazard. To ensure safety, the installation of instruments in hazardous locations must follow the specifications in the control drawings. Any modification to the instrumentation or to the installation may result in

life threatening injury and/or damage to facilities.
The field transmitter is a power supply and a cellular communication device. The field transmitter supplies power to the GS2440EX sensor and transmits data from the GS2440EX sensor to the Hach H2S Data cloud server. The field transmitter is made for use in explosion hazardous areas and can be installed in the “safe area” as an “associated apparatus” or as non-incendive electrical equipment in Division 2 areas with intrinsically safe outputs to Division 1 (Zone 0) equipment (e.g., GS2440EX sensor). The field transmitter can be battery-powered, or used with external DC and SCADA, when installed in hazardous locations (Division 2). The CAx440EX field transmitter (LXV449.97.01010) is listed as “non-incendive” safe for Class I, Division 2 hazardous area for the gas group, protection method, equipment protection level and temperature class, and the port parameters in Specifications on page 4. As an alternative, the CAx440EX field transmitter is listed as “non-incendive” safe for Class I, Zone 2 hazardous areas. The basic concept of protection utilized means that the equipment cannot, under usual operating conditions, cause ignition of the specified flammable gas, vapor, dust, fibers, or flying objects caused by arcing or thermal sources. Usual operation includes opening, shorting or grounding of the field wiring. Make sure to read all of the safety precautions, installation and wiring practices in this document before the field transmitter and associated equipment is installed. It is important for the safety of the user that the installation instructions from the manufacturer are obeyed. If the applicable safety precautions are not obeyed, or if the equipment is not installed correctly, there is a dangerous potential for an explosion. Only qualified personnel must supply oversight in all hazardous location installations.

Safety guidelines for hazardous locations
WARNING

- Explosion hazard. Batteries must only be changed in an area free of ignitible concentrations.
- Explosion hazard. Do not connect or disconnect when energized.
- Explosion hazard. Do not disconnect while the circuit is live or unless the area is free of ignitible concentrations.

WARNING
Intrinsic safety

- Batteries must only be changed in an area free of ignitible concentrations.
- Only use batteries from Hach, LXZ449.99.00003.
- To reduce the risk of explosion, only install new batteries.

Hazardous location installation requirements
Installation of this equipment must obey local electrical code requirements as shown in the hazardous location control drawings. Installation is subject to final approval by the authority that has jurisdiction.

Specific conditions of use:

- It is end user’s responsibility to select proper external antenna with an ingress protection rating of at minimum IP54 according to IEC60529.
- Inductance and capacitance values specified for connection Power/4-20mA and RS232 have not been assessed for simultaneous combination. Care shall be taken to ensure that the combination of resistive, inductive and capacitive energies cannot result in an incendive spark. Refer to IEC 60079-25 for de-rating instructions.

Hazardous location control drawings
DANGER: Explosion hazard. Never connect items to the CAx440EX field transmitter that are not specified on the control drawing. Do not connect or disconnect any equipment unless power has been switched off or the area is known to be non-hazardous.

Follow the control drawing provided and all codes and regulations for connection to the CAx440EX field transmitter in the hazardous location. Refer to Approved CAx440EX installation drawing on page 9 for the control drawing.

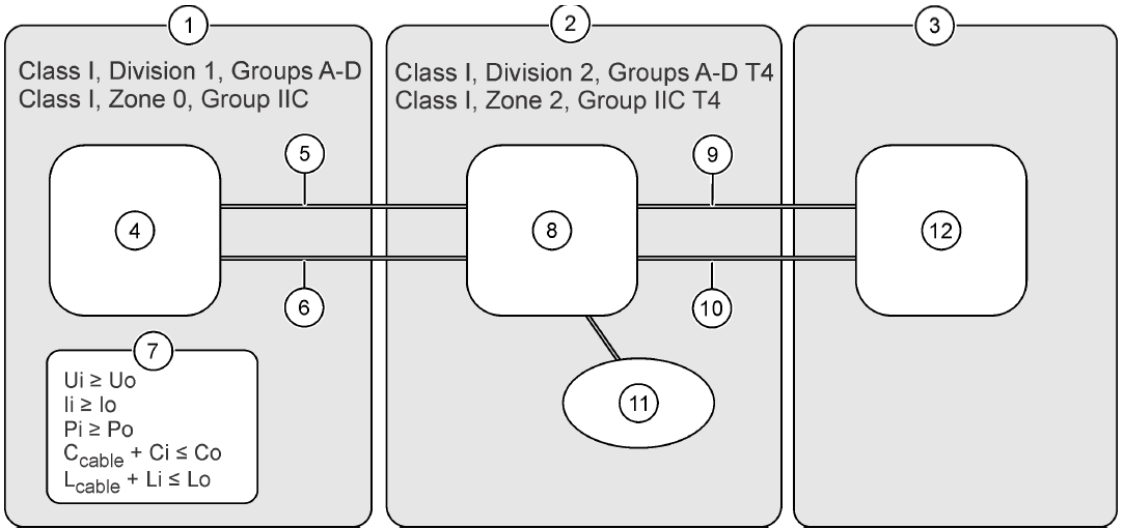
Installation guidelines

- Keep the field transmitter away from direct sunlight, heat sources, corrosive chemicals or gases (all but H2S), mechanical impacts, abrasive materials, vibrations, shocks, dust and radioactive emissions.
- Do not use the field transmitter outside the specified electrical, mechanical, and thermal parameters, or outside the measurement range. Refer to Specifications in the field transmitter user instructions.

Install the sensor
DANGER: Gas exposure hazard. Hydrogen sulfide is a highly toxic gas. Put on the personal protective equipment identified in the safety data sheet (MSDS/SDS). Refer to the current safety data sheets (MSDS/SDS) for safety protocols.

Approved CAx440EX installation drawing
DANGER: Any installation or sensor configuration that is not specifically detailed on the following control drawing is not allowed. In all cases, the local authority having jurisdiction shall have the final say.
Figure 1 is the approved hazardous location “control” drawing for the CAx440EX field transmitter. This certified drawing shows the ONLY approved method of installing the CAx440EX field transmitter.

Installation Control Drawing—Hach North American CAx440EX field transmitter



1	Hazardous classified location	**5**	Power/4–20 mA	**9**	4–20 mA (optional)
2	Unclassified (non-hazardous) location or hazardous classified location	**6**	RS-232 (optional)	**10**	DC power (optional)
3	Unclassified (non-hazardous) location	**7**	Intrinsic safety parameters (refer to the details that follow)	**11**	External antenna (optional) ***Note:*** *LXZ449.99.00009 must be used to keep certifications.*
4	Simple apparatus or intrinsically safe apparatus	**8**	CAx440EX field transmitter (LXV449.97.01010)	**12**	SCADA/DC Power

Power/4-20 mA connector (intrinsically safe parameters): Uo: 29.2 V, Io: 85 mA, Po: 0.67 W, Lo: 4900 µH, Co: 0.07 µF
RS-232 connector (intrinsically safe parameters): Uo: 6.3 V, Io: 18.72 mA, Po: 0.30 W, Lo: 100 mH, Co: 14 µF
Note: The GS2440EX H2S sensor may be used as “intrinsically safe” apparatus.”

FAQ

Q: Where can I find the full specifications for the CAx440EX Field Transmitter?
A: The full specifications can be found in the CAx440EX Field Transmitter User Instructions.

Q: What certifications does the CAx440EX Field Transmitter have?
A: The CAx440EX Field Transmitter is certified to CSA C22.2: #213, #60079-0, #60079-11, #61010-1-12.

Q: Are there any safety precautions I should be aware of?
A: Yes, please refer to the “Safety Precautions” section for important safety information.

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Documents / Resources

	HACH CAx440EX Field Transmitter [pdf] Instruction Manual CAx440EX Field Transmitter, CAx440EX, Field Transmitter, Transmitter

References

- Geräte und Reagenzien für die Wasserqualitätsanalyse | Hach
- Hach | Hach
- User Manual