Instruction Manual
HASXMDE-IM-EX
01/2015

Gas Analyzer

X-STREAM X2 Series

Flameproof Variation
For Use in Zone 1 and Division 2 Hazardous Areas

Instruction Manual Addendum

ROSEMOUNT® Analytical

www.EmersonProcess.com

EMERSON™ Process Management

ESSENTIAL INSTRUCTIONS
READ THIS PAGE BEFORE PROCEEDING!

Emerson Process Management (Rosemount Analytical) designs, manufactures and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you **MUST properly install, use, and maintain them** to ensure they continue to operate within their normal specifications. The following instructions **MUST be adhered to** and integrated into your safety program when installing, using and maintaining Emerson Process Management (Rosemount Analytical) products. Failure to follow the proper instructions may cause any one of the following situations to occur: Loss of life; personal injury; property damage; damage to this instrument; and warranty invalidation.

- **Read all instructions** prior to installing, operating, and servicing the product.
- If you do not understand any of the instructions, **contact your Emerson Process Management (Rosemount Analytical) representative** for clarification.
- **Follow all warnings, cautions, and instructions** marked on and supplied with the product.
- **Inform and educate your personnel in the proper installation, operation, and maintenance of the product**.
- **Install your equipment as specified in the Installation Instructions of the appropriate Instruction Manual and per applicable local and national codes**. Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, **use qualified personnel** to install, operate, update, program, and maintain the product.
- When replacement parts are required, ensure that qualified people use replacement parts specified by Emerson Process Management (Rosemount Analytical). Unauthorized parts and procedures can affect the product's performance, place the safe operation of your process at risk, **and VOID YOUR WARRANTY**. Look-alike substitutions may result in fire, electrical hazards, or improper operation.
- **Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury**.

The information contained in this document is subject to change without notice.

9th edition 01/2015

Original Instruction Manual for the purpose of the European Directive 94/9/EC.

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EMERSON
Process Management

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PREAMBLE

This instruction manual provides information about installing, operating and maintaining/ servicing X-STREAM X2 series gas analyzers in hazardous (classified) areas and shall be read in conjunction with the basic analyzer instruction manual only!

This instruction manual covers several X-STREAM X2FD series analyzer variations and therefore may describe configurations and/or options not part of your specific analyzer.

DEFINITIONS

The following definitions apply to WARNINGS, CAUTIONS and NOTES found throughout this publication.

WARNING

HIGHLIGHTS AN OPERATION OR MAINTENANCE PROCEDURE, PRACTICE, CONDITION, STATEMENT, ETC.

If not strictly observed, could result in injury, death, or long-term health hazards of personnel.

CAUTION

HIGHLIGHTS AN OPERATION OR MAINTENANCE PROCEDURE, PRACTICE, CONDITION, STATEMENT, ETC.

If not strictly observed, could result in damage to or destruction of equipment, or loss of effectiveness.

NOTE

Highlights an essential operating procedure, condition or statement.

TERMS USED IN THIS MANUAL

ATEX

Directive 94/9/EC, commonly called the ATEX („Atmosphères Explosibles“) directive, dealing with equipment intended to be used in potentially explosive atmospheres.

This directive is valid for equipment to be sold into and/or installed and operated in the European Union (EU).

Division 2

Where ignitable concentrations of flammable gases are not likely to exist under normal operating conditions (similiar to Zone 2).

Explosive Gas(es)

Flammable Gases and gas mixtures in a mixture with air within the explosive limits.

Flammable Gas(es)

Gases and gas mixtures are assigned to be flammable if they might become ignitable when in a mixture with air.

Infallible Containment

This term is derived from the standards of explosion protection especially from the requirements for pressurized housings: thus an infallible containment can be characterized by no intended leakage into the gas paths enabling gas to enter the inner compartment of the analyzer housing.

Intrinsically Safe Cell (IS Cell)

Cells supplied with an intrinsically safe power signal, approved by a Test Institute, to operate with explosive gases.

The design ensures the IS cells remains safe even in case of failure and explosive gases are not ignited.

Lower Explosion Limit (LEL)

Volume ratio of flammable gas in air below which an explosive gas atmosphere will not be formed: the mixture of gas and air lacks sufficient fuel (gas) to burn.

Protection Class IP66 / NEMA 4X

Both terms are used to specify conditions for equipment to be installed outdoor.

IP stands for Ingress Protection, the first number specifies protection against solid objects (**6. = dust tight**) while the second number specifies the degree of protection against liquids (.**6 = heavy seas**).

NEMA stands for National Electrical Manufacturers Association. **4X** specifies a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, and hose-directed water; and that will be undamaged by the external formation of ice on the enclosure

Upper Explosion Limit (UEL)

Volume ratio of flammable gas in air above which an explosive gas atmosphere will not be formed: the mixture of gas and air is too rich in fuel (deficient in oxygen) to burn.

Zone 1

Where ignitable concentrations of flammable gases can exist some of the time under normal operating conditions.

(A guideline value [not part of a standard] is 10 to 1.000 hours per year.)

Zone 2

Where ignitable concentrations of flammable gases are not likely to exist under normal operating conditions.

(A guideline value [not part of a standard] is less than 10 hours per year.)

Symbols used on and inside the unit

Wherever one or more of the following symbols appear on or inside the instrument, be careful and read the instructions given in the accompanying manuals!

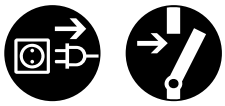
Strictly observe the given warnings, instructions and information to minimize hazards!

This symbol at the instrument ...	... means
	**dangerous voltages** may be accessible. Removing covers is permitted only, if the instrument is disconnected from power - and even in this case by qualified personnel only!
	**hot surfaces** may be accessible. Removing covers by qualified personnel is permitted only, if the instrument is disconnected from power. Nevertheless several surfaces may remain hot for a limited time.
	**more detailled information available:** see instruction manual before proceeding!
	**more detailled information available:** see instruction manual before proceeding!

Symbols used in this manual

Where one or more of the following symbols appear within this manual, carefully read the related information and instructions!

Strictly observe the given warnings, instructions and information to minimize hazards!

This symbol used in the manual ...	... means
	**dangerous voltages** may be exposed
	**hot surfaces** may be exposed
	possible **danger of explosion**
	**toxic substances** may be present
	**substances harmful to health** may be present
	indicates notes relating to **heavy instruments**
	electrical components may be destroyed by **electrostatic discharges**
	units must be **disconnected from the power source**
	indicates special instructions or information for operation at **low temperatures**.
	indicates basic conditions or procedures are being described. This symbol may also indicate information important for achieving accurate measurements.

SAFETY INSTRUCTIONS

Intended Use Statement

X-STREAM flameproof analyzers are intended to be used in hazardous (classified) areas of Zone 1 or Division 2, depending on the nameplate label marking. Installation in Zone 0 or Division 1 is not permitted and causes risk of explosion!

X-STREAM series gas analyzers are intended to be used as analyzers for industrial purposes. They must not be used in medical, diagnostic or life support applications. Using X-STREAM analyzers as safety devices is prohibited where redundancy and/or SIL classification or equivalent is needed. No independent agency certifications or approvals are to be implied as covering such applications!

General Safety Notice / Residual Risk

If this equipment is used in a manner not specified in these instructions, protective systems may be impaired.

Despite of incoming goods inspections, production control, routine tests and application of state-of-the-art measuring and test methods, an element of risk remains when operating a gas analyzer!

Even when operated as intended and observing all applicable safety instructions some residual risks remain, including, but not limited to, the following:

- An interruption of the protective earth line, e.g. in an extension cable, may result in risk to the user.
- Live parts are accessible when operating the instrument with doors open or covers removed.
- The emission of gases hazardous to health may even be possible when all gas connections have been correctly made.

Avoid exposure to the dangers of these residual risks by taking particular care when installing, operating, maintaining and servicing the analyzer.

Additional Literature

This manual covers aspects specific for using flameproof X-STREAM X2FD gas analyzers in hazardous (classified) areas, only.

For comprehensive information on operating and maintain/service the instrument in a safe manner it is MANDATORY to read all additional instruction manuals, if not provided as printed version, see the accompanying USB stick for an electronic version (PDF)!

The following instruction manuals are available and/or referenced within this manual at hand:

HASX2E-IM-HS X-STREAM X2 series instruction manual

HASICx-IM-H Infallible Containment

The original manufacturer's cable gland or conduit instruction manual, depending on what is used.

Contact your local service center or sales office when missing documents.

SAVE ALL INSTRUCTIONS FOR FUTURE USE!

Authorized Personnel

In-depth specialist knowledge is an absolutely necessary condition for working with and on the analyzer.

Authorized personnel for installing, operating, servicing and maintaining the analyzer are instructed and trained qualified personnel of the operating company and the manufacturer.

It is the responsibility of the operating company to

- train staff,
- observe safety regulations,
- follow the instruction manual.

Operators must

- have been trained,
- have read and understood all relevant sections of the instruction manual before commencing work,
- know the safety mechanisms and regulations.

To avoid personal injury and loss of property, do not install, operate, maintain or service this instrument before reading and understanding this instruction manual and receiving appropriate training.

Special Conditions for Safe Use

- Only specified screws M16x45 ISO 4762 A2-70 as specified in the maintenance section of this manual shall be used (spare part # 42716945).
- The flame joints correspond to the drawing No. 4.271-7112/1 and do not comply with the dimensions mentioned into the Tab. 1 and Tab. 2 of EN 60079-1 ed.2.
- The gas path for the sample gas shall be equipped with additional appropriate flame arrestors in case of gas pressure above 1100 hPa to 1500 hPa.
- Appropriate certified cable glands shall be used in accordance with IEC/EN 60079-14.
- Vapor recovery application:
  Pressure of gases not to exceed 1100 hPa. Concentrations of gases must be below 25 % LEL.
- Depending on the particular application all approbriate safety instructions mentioned in this instruction manual on hand must be considered!
- Take special care of formation of flammable gas at the outlet of breathing and/or purging devices, if the sample gas concentration is above 25% LEL! If need be, such outlets have to end in a safe area!

WARNING

POSSIBLE EXPLOSION HAZARD

Do not open instrument when energized.

Ensure that external circuitry is disconnected or de-energized before opening the instrument.

Ensure that all gas connections are made as labeled and are leak free. Improper gas connections could result in explosion and death.

WARNING

EXPLOSION HAZARD BY MODIFICATION

Any addition, substitution, or replacement of components installed on or in this device, must be certified to meet the hazardous area classification that the device was certified to prior to any such component addition, substitution, or replacement. In addition, the installation of such device or devices must meet the requirements specified and defined by the hazardous area classification of the unmodified device.

Any modifications to the device not meeting these requirements, will void the product certification(s).

Contact Emerson Process Management's customer service center for return authorization.

WARNING

EXPLOSION HAZARD

The X-STREAM X2FD analyzer may utilize not only sample gas but one or more pressurized carrier gases and/or calibration gases.

If an external flowmeter is required for flow control, legislative requirements and instructions for installation in hazardous (classified) areas must be considered.

WARNING

ELECTRICAL SHOCK HAZARD

Installation and connecting mains and signal cables are subject to qualified personnel only taking into account all applicable standards and legislative requirements!

Failure to follow may cause warranty invalidation, property damage and/or personal injury or death! Connecting mains and signal cables to internal srew terminals requires working at open housing near life parts!

Installation of this instrument is subject to qualified personnel only, familiar with the resulting potential risks!

The gas analyzers do not provide a mains power switch and are operable when connected to power.

The gas analyzers do not provide a mains switch! A mains switch or circuit breaker (to comply with IEC 60947-1 /-3) has to be provided in the building installation. This switch has to be installed near by analyzer, must be easily operator accessible and has to be assigned as disconnector for the analyzer.

WARNING

EXPLOSION and ELECTRICAL SHOCK HAZARD

These instruments provide a protective earth terminal. To prevent electrical shock and explosion hazards, the instrument must be connected to a protective earth.

Therefore the instrument has to be connected to mains by using a three wire mains cable with earth conductor!

Any interruption of the earth connector inside or outside the instrument or disconnecting the earth terminal may cause potential electrical shock hazard!

Intended interruption of protective earth connections is not permitted!

WARNING

EXPLOSION HAZARD BY HOT COMPONENTS

Temperatures inside an analyzer for VAPOR RECOVERY applications exceed the analyzer‘s temperature classification for hazardous areas!

Special conditions apply to handling and operating this analyzer, consider the safety instructions at the beginning of this manual!

CAUTION

HEAVY INSTRUMENT

The analyzer model X-STREAM X2FD, to which this manual relates, intended to be wall mounted and/or outdoor installed, weighs up to approx. 63 kg (139 lbs), depending on included options!

Use two people and/or suitable tools for transportation and lifting these instruments!

Take care to use anchors and bolts specified to be used for the weight of the units!

Take care the wall or stand the unit is intended to be installed at is solid and stable to hold the units!

CAUTION

HIGH TEMPERATURES

While working at internal components hot surfaces may be accessible, even after the instrument has been disconnected from power!

HOW TO STAY IN COMPLIANCE WITH THE EUROPEAN DIRECTIVE 94/9/EC ("ATEX") WHEN PERFORMING GAS ANALYSIS WITHIN A FLAMEPROOF ENCLOSURE.

Special conditions apply to using a flameproof enclosure analyzer under the scope of the "European Directive for Equipment used in Explosive Atmosphere" (Directive 94/9/EC; ATEX). To stay compliant to the directive consider the following clarification sheet released by the European ATEX Notified Body Group (see next page):

E_xNB	Co-ordination of Notified Bodies Electrical Equipment for use in potentially explosive atmospheres on Council Directive 94/9/EEC	EOTC/00/007 Issued: February 10, 2000 CS/99/06/069

European ATEX Notified Bodies Group

Interpretation/Clarification Sheet N° 99/06/069/CS Edition 1.0

Original in English

Status : Step* 5.2.1■ question ExNB/98(EECS)002 Date : 20/04/98
Step* 5.2.3■ proposal **Proposer :** DMT Date : 05/06/98
Step* 5.2.4■ **Received for publication** Date : 15-16/06/99

*Step refers to ExNB Rules

■ authorised **Chairman : M. BRÉNON**
Date of application : 16/06/99 **Signature :**

SUBJECT : **EN 50018 : 1994** **Gas analysis performed within a flameproof enclosure**

Question : ***What restrictions are necessary on the contents of the gas system/process line in order to validate the use of « Flameproof Enlcosure » as the protection concept.***

Answer :

1 Oxygen shall be present in the process line only as a constituent of an inert/oxygen gas mixture of which the oxygen represents no more than that normally present in air.

2 The gas mixture in process line shall not be within the explosive limits continuously, for long periods or frequently.

If the gas mixture is above UEL in normal service, gas leakage into the main enclosure due to failure of the gas containment shall not remain undetected for long periods.

If the gas mixture is above UEL in normal service and if the gas measuring system contains potential ignition sources (e.g. heated wires) in the process line, the line shall be purged with process gas before the measuring system is activated and the measuring system shall be de-activated before shut down of the process.

3 If the pressure in the process line in normal operation is higher than 1.1 bar, the following applies :

3.1 The gas mixture shall not be within the explosive limits in normal operation. This can be realized e.g. by purging the line with process gas or with inert gas before the measuring system is actived.

3.2 Even in case of total leakage of the gas containment, the pressure in the main enclosure shall not be higher than 1.1 bar.

3.3 The process line shall not contain potential sources of ignition and, taking into account the maximum pressure in service, the breathing devices shall be tested with respectively precompressed mixtures.

This ExNB Interpretation/Clarification Sheet has the sole purpose of clarifying the application of the EN Standards and/or of the requirements of Directive 94/9/EC and related documents. It does not in any way change the content of the standards and/or of the requirements. It remains valid until an official answer is received from the European Commission or the relevant standardization bodies.

ExNB03/S87/Autres

Chapter 1
Technical Description

1.1 Overview

The new X-STREAM X2FD gas analyzer is designed to be used in hazardous areas. Its flameproof enclosure can be installed at Zone 1, Zone 2 and Division 2 locations without the need of any additional protective measures, e.g. purge gas supply.

1.2 Design Features

Packaged into a cast aluminum enclosure, the X-STREAM X2FD gas analyzer provides all the measurement options available for general purpose instruments, but for installation at locations, where explosive gas atmosphere might be present frequently (Zone 1) or occasionally (Zone 2, Division 2).

The basic concept used to protect the surrounding atmosphere from being ignited if an internal failure results in high temperatures, flames or even an explosion, is to keep the explosion inside the enclosure and quench all flames possibly passing through the flange.

To provide adequate explosion protection the X-STREAM X2FD analyzer features:

- a cast aluminum enclosure, designed to
  - withstand an internal explosion,
  - quench flames resulting from an internal explosion (thus preventing a surrounding explosive atmoshere from being ignited).
- flame arrestors avoiding flame transmission from the gas paths into the surrounding atmosphere.
- approved cable glands (option: conduits), protecting the cable inlets and outlets.

1: Enclosure base
2: Screws
3: Enclosure cover
4: Flange
5: Eyebolts for lifting
6: Hinges

Fig. 1-1: Frontal View

1.3 Protective Measures in Detail

The cast aluminum enclosure consists of two parts: base and cover, connected by hinges.

The area where the two parts are in contact is designed to work as a flange, quenching flames entering the small path between them. When operated, the analyzer enclosure has to be closed and secured by 20 screws evenly arranged all over the flange. The only openings penetrating the enclosure are threads, to be used for gas and cable in- and outlets:

Depending on the measurement application the instrument provides up to 8 gas in- and outlets, each protected by an approved flame arrestor. These arrestors are installed into threads at the bottom side of the enclosure base. Two fitting sizes are available for external connection of gas pipes with 3,18 mm (1/8“) or 6,35 mm (1/4“) outer diameter (OD). Optionally a clamping ring for 6 mm OD may be used, replacing the 6,35 mm version. Unused threads are closed with blind plugs which are certfied within the emerson approvals.

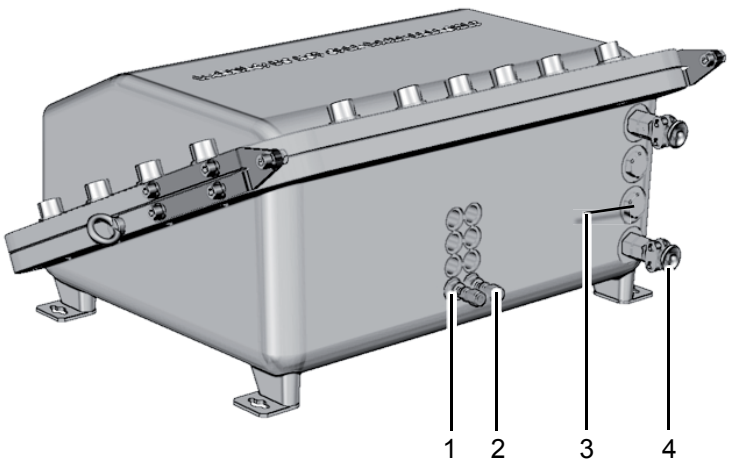
Cables are fed into the enclosure utilizing up to 4 cable glands, located at the enclosure`s bottom right side.

For installation in North America cable glands are replaced by a combination of conduits and metric-to-NPT thread adapters.

All threads are designed to act as a flame path of a length ensuring that possibly entering flames are quenched before exiting to the external atmosphere. For this reason, avoid to damage the threads, neither externally nor internally!

Unused threads must be closed with plugs when the instrument is operated to ensure explosion protection.

Note!
See the X-STREAM X2 series instruction manual for more information about common X-STREAM X2 series gas analyzers features and special features of the X-STREAM X2FD.



1: Plugged when not used (plugs certified by emerson)
2: Gas fitting (part of flame arrestor)
3: Plug

Fig. 1-2: Bottom view

1.4 High Pressure Option / Purge Option

Normally flameproof housings are permitted to operate under atmospheric conditions only, that is within an ambient pressure range between 800 and 1100 hPa.

For analyzers this pressure range also applies to the gas pressure within the containment system. While the lower limit is not critical, the higher is, because it lowers the permitted sample gas (and calibration gases) pressures by 400 hPa, compared to general purpose analyzers. This results in higher requirements for the sample handling system, as it has to safely reduce the process gas pressure to the permitted range.

Another aspect to take care for when operating flameproof analyzers is the option of applying a purge gas to the enclosure when measuring low concentrations of gases, being constituent of the ambient air: The ambient air inside the analyzer enclosure cross interferese with the sample gas and influences the measuring results. By purging the housing with a gas free of the measured component, this can be avoided, but could increase the pressure inside the analyzer and so would violate the atmospheric pressure condition.

X-STREAM X2FD analyzers have been subjected to additional tests to support both situations:

- higher sample and calibration gas pressures

as well as

- purging the housing with a gas for best measuring results at low concentrations.

To permit this, special additional conditions must be taken into account:

Higher sample and calibration gas pressures

Higher gas pressure is specified to be within the range of 1100 hPa to 1500 hPa. The maximum permitted flow is 1,5 l/min, depending on the installed measurement system lower limits may apply.

The gas paths need additionally to be protected by suitable inline flame arrestors, designed and approved for the applied higher gas pressure and for the area of installation. These flame arrestors need to be installed outside the analyzer and in addition to the flame arrestors provided by the analyzer.

Note!

The external inline flame arrestors are not subject of the analyzer certification and may be provided by the customer, or optionally by EMERSON PROCESS MANAGEMENT.

A separate analyzer flame arrestor has to be installed, operating as a breathing device and thus limiting the increase of pressure in the enclosure in case of internal leakage.

Purging the housing with clean gas when measuring low concentrations

The maximum permitted gas flow is 2 l/min. The gas must be supplied via a separate flame arrestor. Another flame arrestor must be installed, operating as a breathing device and so limiting the increase of pressure in the enclosure.

WARNING

EXPLOSION HAZARD

When making use of any of above mentioned options, take care of the special conditions for safe use given on the next page!

1.5 Explosion Protection Compliances

This product is available in two different variations, separately certified by agencies for the use in hazardous (classified) areas:

The one version, to be equipped with cable glands, is certified by Fyzikálně technický zkušební ústav, s.p (FTZÚ), an European Notified Body under the Directive 94/9/EC („ATEX“) and conforms to the provisions of EN 60079-0 and EN 60079-1. See appendix for a copy of the EC type examination certificate.

The second variation, to be equipped with metric-to-NPT adapters and conduits (these components are not part of the instrument certification), is certified by the Canadian Standards Association, an „OSHA Nationally Recognized Testing Laboratory“ (NRTL), for Canada and USA and conforms to the provisions of CAN/CSA-E60079-0:02 (R2006), CAN/CSA-E60079-1:02 (R2006), ANSI/ISA-12.00.01-2002 (IEC 60079-0 Mod), ANSI/ISA-12.22.01-2002 (IEC 60079-1 Mod). Furthermore, these X-STREAM X2FD analyzers are certified for use in Class I, Division 2, Group BCD T3 areas.

See appendix for a copy of the CSA Certificate of Compliance.

IECEx certification enables worldwide approvals with minimized need of testing. Furthermore, based on this approval several national approvals are granted.

For a comprehensive list of applicable certificates visit our website at

www.emersonprocess.com.

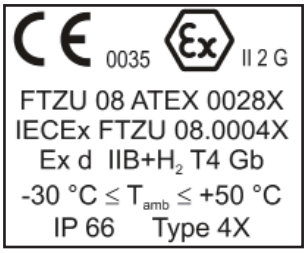
The following certification markings apply to the products:

European Union (EU, ATEX)
Category 2, Zone 1:
Ex d IIB+H_2 T4 Gb

EC ATEX Type Examination Certificate:
FTZU 08 ATEX 0028 X.

IECEx

Ex d IIB+H_2 T4 Gb



Conforms to the provisions of the „Equipment intended for use in Potentially Explosive Atmospheres (ATEX)“ Directive 94/9/EC, EMC Directive 2004/108/EC and CE Directive 93/68/EEC.

USA
Class I, Zone 1, AEx d IIB+H_2 T3
Class I, Division 2, Group BCD T3

Canada
Class I, Zone 1, Ex d IIB+H_2 T3
Certificate of Compliance 1714037X

1.5 Compliances

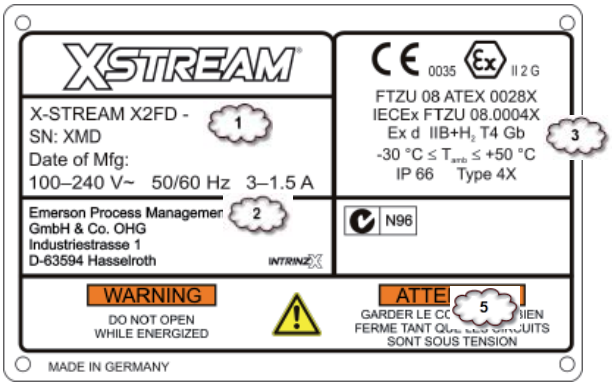
EAC Certificate Russia
1 Ex d IIB + H2 T4 X
Certificate no.:ТС RU C-DE.ГБ04.В.00327
Approved by: СТВ

KGS Korea
Ex d IIB+H2 T4
Certificate no.: 13-GA4BO-0649X
Approved by KGS

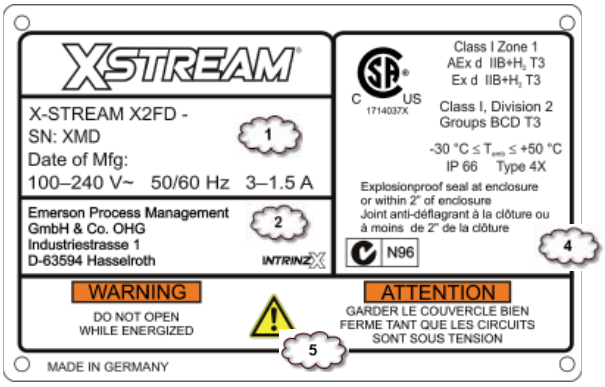
1.5.1 Special conditions for safe use

- Only specified screws M16x45 ISO 4762 A2-70 as specified in the maintenance section of this manual shall be used (spare part # 42716945).
- The flame joints correspond to the drawing No. 4.271-7112/1 and do not comply with the dimensions mentioned into the Tab. 1 and Tab. 2 of EN 60079-1 ed.2.
- The gas path for the sample gas shall be equipped with additional appropriate flame arrestors in case of gas pressure above 1100 hPa to 1500 hPa.
- Appropriate certified cable glands shall be used in accordance with IEC/EN 60079-14.
- Vapor Recovery application:
  Pressure of gases not to exceed 1100 hPa. Concentrations of gases must be below 25 % LEL.
- Depending on the particular application all approbriate safety instructions mentioned in this instruction manual on hand must be considered!
- Take special care of formation of flammable gas at the outlet of breathing and/or purging devices, if the sample gas concentration is above 25% LEL! If need be, such outlets have to end in a safe area!

1.6 Nameplate Label (Examples)



ATEX/IECEx version



CSA-C/US version

Area	Description	Area	Description
1	The analyzer´s electrical data, manufacturing data and serial number	2	Manufacturer address

		3 IECEx / EU (ATEX)	4 North America (CSA)
	Certification Data		
	Area classification	***II*** other than mines ***2*** Category **2** Equipm. (Zone 1) ***G*** for explosive **G**as atmosphere	***Class I*** Flammable gases, vapors or liquids ***Zone 1*** Zone 1 areas
	Protection concepts	***Ex*** Explosion protected ***d*** flameproof ***IIB+H_2*** Group **II**, Gas Group **B** plus **Hydrogen** ***T4*** Temperature Class (135 °C) ***Gb*** Equipment Protection Level ***T_{amb}*** Ambient Temperature Range ***IP66***, ***Type 4X*** Enclosure Rating (outdoor use)	***AEx*** Explosion protected (US) ***Ex*** Explosion protected (CAN) ***d*** flameproof ***IIB+H_2*** Group **II**, Gas Group **B** plus **Hydrogen** ***T3*** Temperature Class (200 °C) ***T_{amb}*** Ambient Temperature Range ***IP66***, ***Type 4X*** Enclosure Rating (outdoor use)
	Additional Division Marking, if applicable	--	***Class I*** Flammable gases, vapors or liquids ***Division 2*** Division 2 areas ***Groups BCD*** all Gases, except Acetylene ***T3*** Temperature Class (200 °C)
	Certificate numbers	IECEx FTZU 08.0004X FTZU 08 ATEX 0028 X	1714037X
	Other	CE mark, number of Notified Body for Quality assessment	Instruction note where to install the explosion proof seal
5	Additional warning: Do not open the instrument while energized. Consult manual!		

Fig. 1-3: Nameplate Label Details (exemplary)

1.7 Technical Data

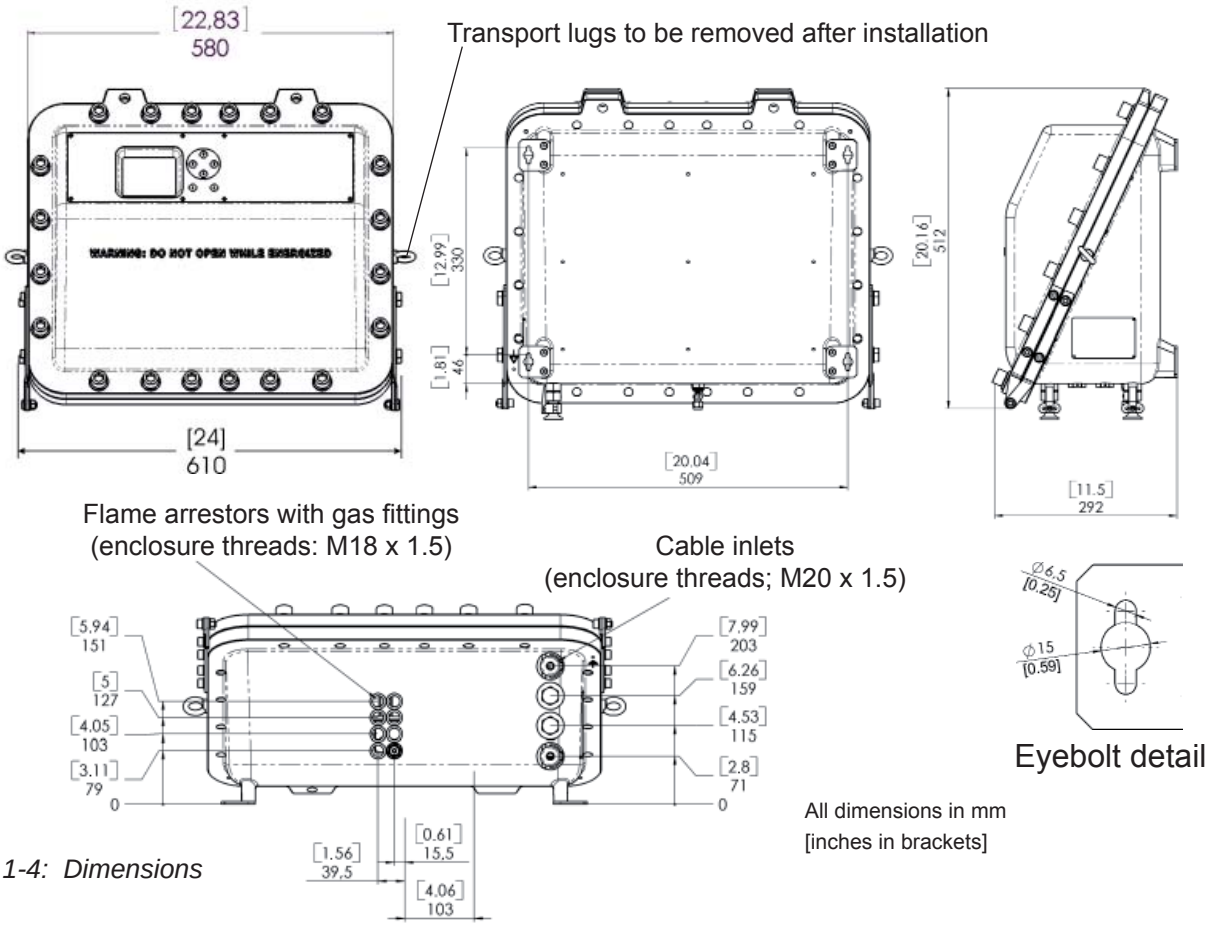


Fig. 1-4: Dimensions

Housing

Permissible operating ambient temperature range, max.*)	-20 °C to +50 °C (-4 F to +122 F)
Permissible storage ambient temperature range	-30 °C to +70 °C (-22 F to +158 F)
Weight:	approx. up to 63 kg (139 lbs) (depending on analyzer configuration)
Protection class:	IP 66 (EN 60529) / Type 4X for outdoor installation (if applicable, see nameplate label !) Analyzer must not be exposed to direct sun light
Gas fittings:	quantity: max. 8 specification: flame arrestors with fittings connections: 6/4 mm or ¼“, stainless steel

*): *Limitations apply to selected measurement principles and ranges,*
☞ *Measurement specifications!*

1.7 Technical Data

Site of installation

Humidity (non condensing)	< 90 % r. h. at +20 °C (68 F) < 70 % r. h. at +40 °C (104 F)
Pollution degree	2
Installation category	I I
Altitude	0 to 6560 ft (2000 m) above sea level
Sourrounding atmosphere	Analyzers must not be operated in corrosive atmosphere.

General Purpose Compliances

Electrical safety	CAN / USA	CSA-C/US, based on CAN/CSA-C22.2 No. 61010-1-04 / UL 61010-1, 2nd Edition
	Europe	CE, based on EN 61010-1
Electromagnetic compatibility		
	Europe	CE, based on EN 61326
	other	NAMUR

Power supply

Rated input voltage	100 - 240 V~ 50/60 Hz, wide range input Power supply voltage fluctuations are not to exceed +/- 10 % of the nominal supply voltage!
Input voltage range	85 - 264 V~, 47 - 63 Hz
Nominal input current	
standard	1.3 - 0.7 A max.
with temperature control	3 - 1.5 A max.

1.7 Technical Data

Interfaces, signal inputs / outputs

up to 4 analog outputs (Standard: 1 analog output per channel)	4 (0) - 20 mA ($R_B \leq 500\ \Omega$) optically isolated from each other and from other electronic components; user-configurable activation and deactivation concentration levels; support for NAMUR NE 43 operation modes, configurable via keypad and Modbus
4 relay outputs	dry contacts, max. load. 30 V; 1 A; 30 W resistive
Each output can be configured to one of the following functions:	NAMUR NE 107 status signal “Failure” “Maintenance request” “Out of specification” “Function check” 1 of 2 concentration limits per channel, Control signals for external valve V1 ... V8, external sample gas valve external pump Zoom status for analog outputs

Optional interfaces for all models

1 Modbus interface	RS 485 (2 or 4 wire) *optional:* *RS 232* *Ethernet (RJ45 socket)*

Digital inputs and outputs

7 or 14 digital outputs	max. 30 V, internally limited to 2.3 mA HIGH: min. 4 V; LOW: max. 3 V (common GND)

1.7 Technical Data

Each input can be configured to one of the following functions:	Open valve V1 ... V8 Open sample gas valve Activate sample gas pump Zero calibrate all channels Span calibrate all channels Zero and span calibrate all channels Abort calibration Zoom analog output 1 Zoom analog output 2 Zoom analog output 3 Zoom analog output 4
9 or 18 additional relay outputs	dry contacts, max. load. 30 V; 1 A; 30 W resistive
Each output can be configured to one of the following functions:	NAMUR NE 107 status signal “Failure” “Maintenance request” “Out of specification” “Function check” 1 of 2 concentration limits per channel, Control signals for external valve V1 ... V8, external sample gas valve external pump Zoom status display for analog outputs

1.7 Technical Data

High sample and calibration gas pressures

High gas pressure	Above 1100 hPa to max. 1500 hPa (take care of the measurement principles limits!)
Maximum flow	1,5 l/min.
Special conditions:	The gas paths need additionally to be protected by suitable inline flame arrestors, designed and approved for the applied higher gas pressure. These inline flame arrestors need to be installed outside the analyzer and in addition to the flame arrestors provided by the analyzer. A separate analyzer flame arrestor has to be installed, operating as a breathing device.
Connection of breathing device:	The external output of the breathing device (exhaust) can be open to the ambience of the analyzer, if the measured gas concentration is below 25 % V-V LEL. Otherwise it must end in a safe area.

Purging the housing with clean gas when e.g. measuring low concentrations

Maximum gas flow	2 l/min.
Permitted purge medium:	Inert gas or air. Dry, clean, free of corrosives or components containing solvents, and free of components to be measured. Its temperature must correspond to the ambient temperature of the analyzer, but be at least within the range 20–35 °C (68–95 °F).
Special conditions:	The medium must be supplied via a separate flame arrestor. Another flame arrestor must be installed, operating as a breathing device.
Connection of breathing device:	The external output of the breathing device (exhaust) can be open to the ambience of the analyzer if inert gas is used as purge medium. If air is used, the output must end in a safe area, if the measured gas concentration is above 25 % V-V LEL.

Take care of special conditions for safe use (☞ S-6 or ☞ 1-5) !

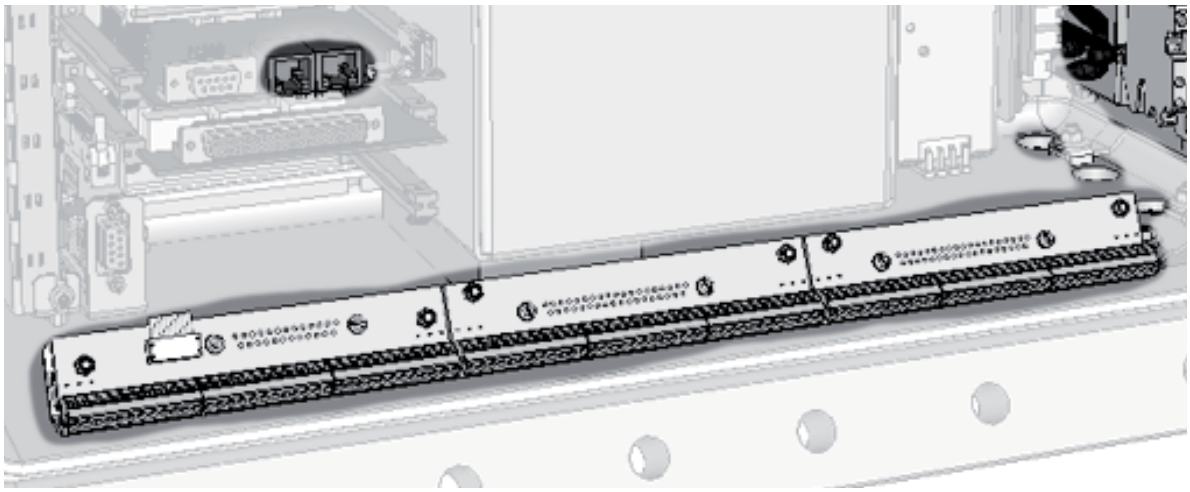
1.7 Technical Data

Signal inputs and outputs

All signal cables are connected to internal
screw-type terminals (fig. 1-5), except the optional RJ45 ethernet connector.

Cable cross-section:		max. 1.5 mm² (14 AWG), end sleeves not required.
Cable entry via		three IP 68 cable glands or conduits
Permissible cable outer diameter:		see cable gland / conduit specification
Available signals:	standard:	Analog signal outputs Relay status signals Modbus interface (RS232; RS 485)
	optional:	Digital inputs/outputs Modbus RJ45 ethernet connector

Detailed terminals configuration ☞ „Chapter 2 Installation“



Note!
Depending on the actual analyzer configuration not all shown terminals may be provided!

Fig. 1-5: Signals terminals

1.7 Technical Data

Power Connection

Connection via internal screw terminals near cable entries, (fig. 1-6).	
Cross section:	max. 4 mm² (10 AWG), end sleeves not required
Cable entry via	1 cable gland, classified IP 68 or suitable conduit with metric-to-NPT adaptor
Permissible outer cable diameter for power cord:	see cable gland / conduit specification

Power supply fuses

The power terminals integrate fuse holders.	
Fuse ratings:	AC 230 V / T 4 A / 5x20 mm

1 Power terminals with integrated fuse holders
2 Protective earth terminal (PE)
3 Power cable entry
4 EMI power supply filter

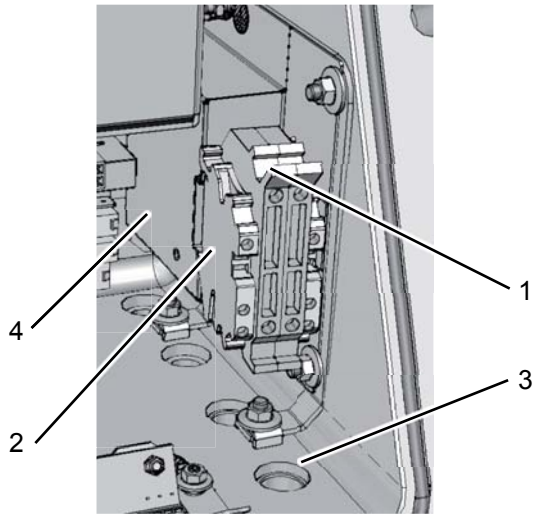


Fig. 1-6: Power terminals / fuse holders

1.8 Measurements Specifications

Sample gas components and measuring ranges (standard configurations)

In total, more than 60 gases are detectable, so the following table gives an overview only. Consult with Emerson for gases / configurations not listed.
Not all data is applicable to all analyzer variations. The sample gas(es) and measuring ranges for your specific analyzer are given by the order acknowledgement and on the analyzer's name plate label.

Gas component		Principle	Special Specs or Conditions	Standard Specs (see Tab. 1-2 – 1-4)	
			Lowest Range	Lowest Range	Highest Range
Acetone [1]	CH_3COCH_3	UV		0–400 ppm	0–3 %
Acetone [1]	CH_3COCH_3	IR		0–500 ppm	0–3 %
Acetylene	C_2H_2	IR		0–3 %	0–100 %
Ammonia	NH_3	IR		0–100 ppm	0–100 %
Argon	Ar	TCD		0–50 %	0–100 %
Carbon dioxide	CO_2	IR	0–5 ppm [5]	0–50 ppm	0–100 %
Carbon monoxide	CO	IR	0–10 ppm [5]	0–50 ppm	0–100 %
Chlorine	Cl_2	UV		0–300 ppm	0–100 %
Ethane	C_2H_6	IR		0–1000 ppm	0–100 %
Ethanol [1]	C_2H_5OH	IR		0–1000 ppm	0–10 %
Ethylene	C_2H_4	IR		0–400 ppm	0–100 %
Helium	He	TCD		0–10 %	0–100 %
Hexane [1]	C_6H_{14}	IR		0–100 ppm	0–10 %
Hydrogen [4]	H_2	TCD		0–1 %	0–100 %
Hydrogen Sulfide	H_2S	UV		0–2 %	0–10 %
Hydrogen Sulfide	H_2S	IR		0–10 %	0–100 %
Methane	CH_4	IR		0–100 ppm	0–100 %
Methanol [1]	CH_3OH	IR		0–1000 ppm	0–10 %
n–Butane	C_4H_{10}	IR		0–800 ppm	0–100 %
Nitrogen dioxide [1]	NO_2	UV	0–25 ppm [3]	0–50 ppm	0–10 %
Nitrogen monoxide	NO	IR		0–100 ppm	0–100 %
Nitrous oxide	N_2O	IR		0–100 ppm	0–100 %
Oxygen	O_2	electrochem.		0–5 %	0–25 % [2]
Oxygen	O_2	paramagn.		0–1 %	0–100 %
Oxygen, Trace	O_2	electrochem.		0–10 ppm	0–10 000 ppm
Propane	C_3H_8	IR		0–1000 ppm	0–100 %
Propylene	C_3H_6	IR		0–400 ppm	0–100 %
Sulfur dioxide	SO_2	UV	0–25 ppm [3]	0–50 ppm	0–1 %
Sulfur dioxide	SO_2	IR		0–1 %	0–100 %
Sulfur hexafluoride	SF_6	IR	0–5 ppm [3]	0–20 ppm	0–2 %
Toluene [1]	C_7H_8	UV		0–300 ppm	0–5 %
Vinyl chloride	C_2H_3Cl	IR		0–1000 ppm	0–2 %
Water vapor [1]	H_2O	IR		0–1000 ppm	0–8 %
Water vapor, Trace [1]	H_2O	capacitive		0–100 ppm	0–3000 ppm

[1] Dew point below ambient temperature
[2] Higher concentrations decrease sensor lifetime
[3] Daily zero calibration required for ranges below lowest standard specs range
[4] Special "refinery" application with 0–1% H_2 in N_2 available
[5] see Tab. 1-5

Tab. 1-1: Gas Components and Measuring Ranges, examples

1.8 Measurements Specifications

Standard Performance Specifications

	NDIR/UV/VIS	Thermal Conductivity (TCD)
Detection limit (4 σ) [1] [4]	≤ 1 %	≤ 1 %
Linearity [1] [4]	≤ 1 %	≤ 1 %
Zero-point drift [1] [4]	≤ 2 % per week	≤ 2 % per week
Span (sensitivity) drift [1] [4]	≤ 0.5 % per week	≤ 1 % per week
Repeatability [1] [4]	≤ 1 %	≤ 1 %
Response time (t_{90}) [3]	4 s ≤ t_{90} ≤ 7 s [5]	15 s ≤ t_{90} ≤ 30 s [6]
Permissible gas flow	0.2–1.5 l/min.	0.2–1.5 l/min. (± 0.1 l/min)
Influence of gas flow [1] [4]	≤ 0.5 %	≤ 1 % [12]
Maximum gas pressure [8] [9]	≤ 1500 hPa abs. (≤ 7 psig)	≤ 1500 hPa abs. (≤ 7 psig)
Influence of pressure [2]		
– At constant temperature	≤ 0.10 % per hPa	≤ 0.10 % per hPa
– With pressure compensation [7]	≤ 0.01 % per hPa	≤ 0.01 % per hPa
Permissible ambient temperature [10]	0 (-20) to +50 °C (32 (-4) to 122 °F)	0 (-20) to +50 °C (32 (-4) to 122 °F)
Influence of temperature [1] [14] (at constant pressure)		
– On zero point	≤ 1 % per 10 K	≤ 1 % per 10 K
– On span (sensitivity)	≤ 5 % (0 to +50 °C / 32 to 122 °F)	≤ 1 % per 10 K
Thermostat control [6] [13]	none / 60 °C (140 °F) [5]	none / 60 °C (140 °F) [11]
Warm-up time [6]	15 to 50 minutes [5]	approx. 50 minutes

Note! 1 psi = 68.95 hPa

[1] Related to full scale
[2] Related to measuring value
[3] From gas analyzer inlet at gas flow of 1.0 l/min (electronic damping = 0 s)
[4] Constant pressure and temperature
[5] Dependent on integrated photometer bench
[6] Depending on measuring range
[7] Pressure sensor is required
[8] Special conditions for > 1100 hPa abs. (1.5 psig)
[9] Limited to atmospheric if internal sample pump
[10] Temperatures below 0 °C (-4 °F) with thermostat control only
[11] Thermost. controlled sensor: 75 °C (167 °F)
[12] Flow variation within ± 0.1 l/min
[13] Optional thermostatically controlled box with temperature 60 °C (140 °F)
[14] Temperature variation: ≤ 10 K per hour

Tab. 1-2: NDIR/UV/VIS, TCD - Standard Measurement Performance Specifications

	Trace Moisture (tH_2O)
Measurement range	-100 to -10 °C dew point (0–3000 ppm)
Measurement accuracy	±2 °C dew point
Repeatability	0.5 °C dew point
Response time (t_{95})	5 min (dry to wet)
Operating humidity	0 to 100 % r.h.
Sensor operating temperature	-40 to +60 °C
Temperature coefficient	Temperature compensated across operating temperature range
Operating pressure	Depending on sequential measurement system, see analyzer specification [1] max. 1500 hPa abs / 7 psig [2]
Flow rate	Depending on sequential measurement system, see analyzer specification [1] 0.2 to 1.5 l/min

Note! 1 psi = 68.95 hPa

[1] If installed in series to another measurement system, e. g. IR channel
[2] Special conditions for > 1100 hPa abs. (1.5 psig)

Note! Do not calibrate, see special calibration notes in the X-STREAM X2 instruction manual!

Tab. 1-3: Trace Moisture - Standard Measurement Performance Specifications

1.8 Measurements Specifications

	Oxygen Sensors		
	Paramagnetic (pO_2)	**Electrochemical (eO_2)**	**Trace (tO_2)**
Detection limit (4 σ) [1] [4]	≤ 1 %	≤ 1 %	≤ 1 %
Linearity [1] [4]	≤ 1 %	≤ 1 %	≤ 1 %
Zero-point drift [1] [4]	≤ 2 % per week	≤ 2 % per week	≤ 1 % per week
Span (sensitivity) drift [1] [4]	≤ 1 % per week	≤ 1 % per week	≤ 1 % per week
Repeatability [1] [4]	≤ 1 %	≤ 1 %	≤ 1 %
Response time (t_{90}) [3]	< 5 s	approx. 12 s	20 to 80 s
Permissible gas flow	0.2–1.5 l/min [11]	0.2–1.5 l/min.	0.2–1.5 l/min.
Influence of gas flow [1] [4]	≤ 2 % [11]	≤ 2 %	≤ 2 %
Maximum gas pressure [7] [8]	≤ 1500 hPa abs. (≤ 7 psig) [14]	≤ 1500 hPa abs. (≤ 7 psig)	≤ 1500 hPa abs. (≤ 7 psig)
Influence of pressure [2]			
– At constant temperature	≤ 0.10 % per hPa	≤ 0.10 % per hPa	≤ 0.10 % per hPa
– With pressure compensation [6]	≤ 0.01 % per hPa	≤ 0.01 % per hPa	≤ 0.01 % per hPa
Permissible ambient temperature [9]	0(-20) to +50 °C (32 (4) to 122 °F)	5 to +45 °C (41 to 113 °F)	5 to +45 °C (41 to 113 °F)
Influence of temperature [1] [13] (at constant pressure)			
– On zero point	≤ 1 % per 10 K	≤ 1 % per 10 K	≤ 1 % per 10 K [5]
– On span (sensitivity)	≤ 1 % per 10 K	≤ 1 % per 10 K	≤ 1 % per 10 K [5]
Thermostat control	60 °C (140 °F) [12]	none	none [10]
Warm-up time	Approx. 50 minutes	-	Approx. 50 minutes

Note! 1 psi = 68.95 hPa

[1] Related to full scale
[2] Related to measuring value
[3] From gas analyzer inlet at gas flow of 1.0 l/min (electronic damping = 0 s)
[4] Constant pressure and temperature
[5] Range 0–10…200 ppm: ≤ 5 % (5 to 45 °C / 41 to 113 °F)
[6] Pressure sensor is required
[7] Special conditions for > 1100 hPa abs. (1.5 psig)
[8] Limited to atmospheric if internal sample pump
[9] Temperatures below 0 °C (-4 °F) with thermostat control only
[10] Thermost. controlled sensor: 35 °C (95 °F)
[11] Flow variation within ± 0.1 l/min
[12] Optional thermostatically controlled sensor with temperature 60 °C (140 °F)
[13] Temperature variation: ≤ 10 K per hour
[14] No sudden pressure surge allowed

Note! Take care of the tO_2 sensor's documentation, providing important calibration instructions!

Tab. 1-4: Oxygen - Standard Measurement Performance Specifications

Note 1!

Not all data listed are applicable to all analyzer versions (e.g. 60 °C thermostatically controlled box is not available for electrochemical and trace oxygen).

Note 2!

For NDIR/UV/VIS measurements, take into account that

- *sample gas may diffuse or be released by leakages into the analyzer enclosure*
- *if existent in the analyzer surroundings, the component to be measured may enter the enclosure.*

Concentrations then may increase inside the enclosure. High concentrations of the component to be measured inside the enclosure may influence the measurement by unintended absorption, which could cause drift of the measurement.

A remedy for this issue is to purge the housing with gas not containing the component of interest.

1.8 Measurements Specifications

Special Performance Specifications for Gas Purity Measurements (ULCO & ULCO$_2$)

	0–10…< 50 ppm CO **0–5…< 50 ppm CO_2**	
Detection limit (4 σ) [1] [2]	< 2 %	
Linearity [1] [2]	< 1 %	
Zero-point drift [1] [2] [3]	< 2 % *resp. < 0.2 ppm* [9]	
Span (sensitivity) drift [1] [2] [4]	< 2 % *resp. < 0.2 ppm* [9]	
Repeatability [1] [2]	< 2 % *resp. < 0.2 ppm* [9]	
Response time (t_{90}) [7]	< 10 s	
Permissible gas flow	0.2–1.5 l/min.	
Influence of gas flow [1] [2]	< 2%	
Maximum gas pressure [10]	≤ 1500 hPa abs. (≤ 7 psig)	
Influence of pressure [5]		
– At constant temperature	≤ 0.1 % per hPa	
– With pressure compensation [8]	≤ 0.01 % per hPa	
Permissible ambient temperature	+15 to +35 °C (59 to 95 °F)	+5 to +40 °C (41 to 104 °F)
Influence of temperature [6] (at constant pressure)		
– On zero point	< 2 % per 10 K *resp. < 0.2 ppm per 10 K* [9]	
– On span (sensitivity)	< 2 % per 10 K *resp. < 0.2 ppm per 10 K* [9]	
Thermostat control	none	60 °C (140 °F)

Note! 1 psi = 68.95 hPa

[1] Related to full scale
[2] Constant pressure and temperature
[3] Within 24 h; daily zero calibration requested
[4] Within 24 h; daily span calibration recommended
[5] Related to measuring value
[6] Temperature variation: ≤ 10 K per hour
[7] From gas analyzer inlet at gas flow of 1.0 l/min
[8] Barometric pressure sensor is required
[9] Whichever value is higher
[10] Limited to atmospheric if internal sample pump; special conditions for > 1100 hPa abs. (1.5 psig)

Tab. 1-5: Special Performance Specifications for Gas Purity Measurements

1.9 Vapor Recovery Application (Simultaneous Measurement of CH_4 and Non-CH_4)

This application is served by a special configuration of the X-STREAM X2FD flameproof analyzer.

The configuration consists of a dual channel IR measurement, connected to the inlet and outlet of a converter. This converter is installed inside the X-STREAM analyzer and is heated to about 280 °C (536 °F).

WARNING

EXPLOSION HAZARD BY HOT COMPONENTS

Temperatures inside an analyzer for VAPOR RECOVERY applications exceed the analyzer's temperature classification for hazardous areas!

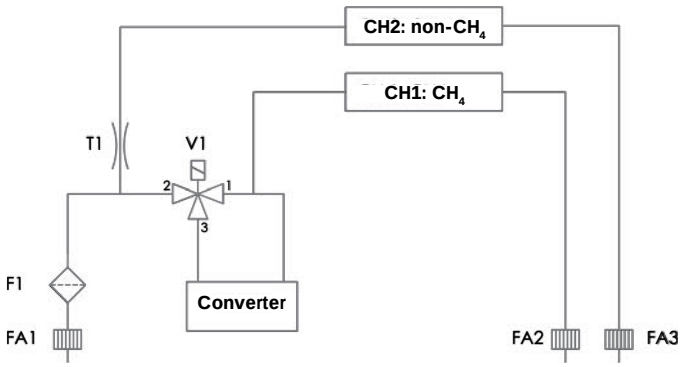
Special conditions apply to handling this analyzer, consider the safety instructions at the beginning of this manual and the special conditions for safe use (☞ 1-5)

Consider the waiting time statement on the front door label before opening!

Principle of measurement

The sample gas is taken towards a converter. At it's inlet the gas stream is divided into two: one is directly fed to a non-CH_4 measurement. The other is supplied to a solenoid valve, normally forwarding the gas to the converter.

Within the converter, hydrocarbons higher than CH_4 are converted into H_2O and CO_2. The converter outlet is connected to a second IR measurement system, analyzing the remaing amount of hydrocarbons (mainly CH_4) in the sample gas.



FA1: Analyzer's inlet flame arrestor
FA2...3: Analyzer's outlet flame arrestors
F1: Filter
T1: Throttle
V1: Valve

Fig. 1-7: Vapor Recovery Gas Flow Diagram

After switching power on, wait about 50 min. for the converter to reach its operating temperature before applying gases!

1.9 Vapor Recovery Application

Converter efficiency

The measurement accuracy is highly dependent on the converter efficiency: If this is too low, the converter material needs replacement.

To measure the converter efficiency, one has to compare the measurement values of CH1 with and without having the gas flowing through the converter. This requires activating the valve V1.

☞ 4 Maintenance section of this manual for instructions about when and how to replace the converter material.

Chapter 2
Installation

On receipt, check the packaging and its contents thoroughly for damage.

Inform the carrier immediately of any damage to packaging or contents, and keep damaged parts until clarification.

Store the instrument at a dry and clean place, considering the acceptable environmental conditions.

We recommend to keep the packaging available for future transportation, because only the original packaging ensures proper protection!

2.1 Scope of Supply

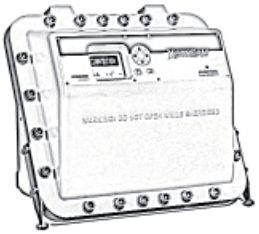
WARNING

HAZARDS FROM MISSING INFORMATION

Compare the content of your package with the pictures below.

Call your local sales office if something is missing, and DO NOT continue to install your analyzer, until all parts are at hand!

Allen key for flange screws



Analyzer

Metric-2-NPT adaptors for CSA approved analyzers (amount meets number of non sealed threads).

USB stick

Instruction manuals:
- This manual addendum
- X-STREAM X2 instruction manual (on USB stick)

Fig. 2-1: Scope of Supply

2.2 Installing the Analyzer

WARNING

POSSIBLE EXPLOSION HAZARD

Installing and wiring this instrument must comply with all relevant national legislative requirements and regulations.

Consider all safety instructions within this on hand manual and all associated analyzer instruction manuals!

WARNING

POSSIBLE EXPLOSION HAZARD

Installing this instrument requires opening the enclosure and working at the open instrument. This is permitted only when both no hazardous atmosphere is present and the instrument and connected external circuitry are de-energized!

Depending on the local regulation, this may require a competent hot work supervisor to issue a hot work permit.

CAUTION

HEAVY INSTRUMENT

The analyzer model X-STREAM X2FD, to which this manual relates, intended to be wall mounted and/or outdoor installed, weighs up to approx. 63 kg (139 lbs), depending on included options!

Use two people and/or suitable tools for transportation and lifting these instruments!

Take care to use anchors and bolts specified to be used for the weight of the units!

Take care the wall or stand the unit is intended to be installed at is solid and stable to hold the units!

WARNING

EXPLOSION HAZARD

Failure to follow this instruction and operating the analyzer without properly threaded components may result in explosion hazards!

WARNING

EXPLOSION HAZARD

Consider the permitted fastening torques when installing components to the enclosure or closing the cover, as given in this section and on a label at the instrument (☞ 2-6)!

2.2 Installation - Analyzer

Install the analyzer to a stand or a wall by means of 4 eyebolts, provided at the instruments rear side.

It is recommended to install the analyzer in an upright (vertical) position; other orientations may affect the measuring results.

IMPORTANT NOTE

When installing the analyzer take care to have an area of min. 40 mm surrounding the flange free of any solid components not part of the instrument, to ensure proper function of the flange!

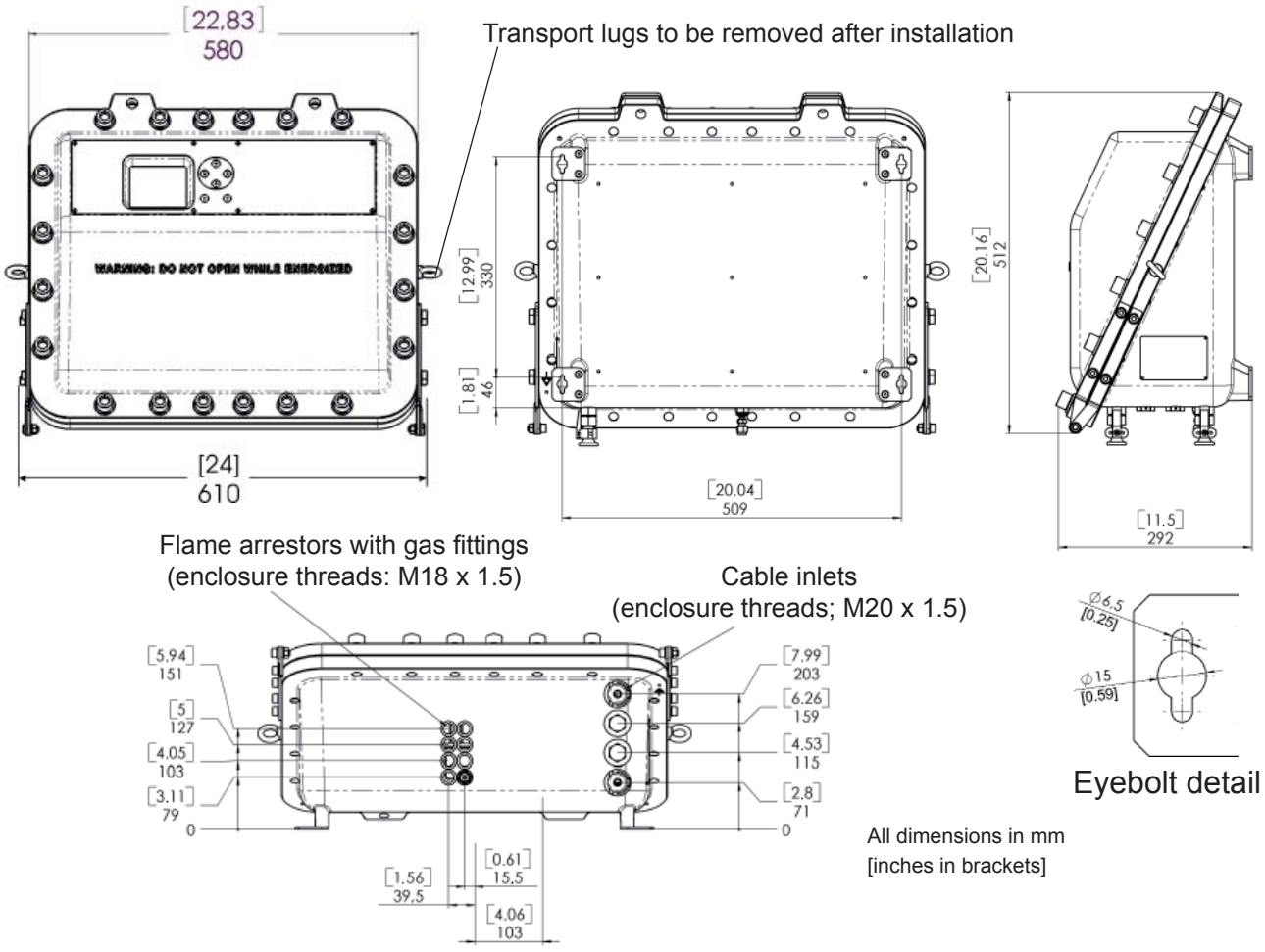


Fig. 2-2: Dimensions

2.3 Gas Conditioning

In order to ensure trouble-free operation, special attention must be paid to the preparation of the gases:

All gases must be conditioned before supplying to the analyzer, to be

- **dry,**
- **free of dust and**
- **free of any aggressive components which may damage the gas lines (e.g. by corrosion or solvents).**

Pressure and gas flow must remain within the values given in the ☞ „Measurement Specifications“ section within this manual.If moisture cannot be avoided, it is necessary to ensure that the dew point of the gases is at least 10 °C (18 °F) below the ambient temperature to avoid condensate in the gas lines.

Hints for selected gases

- **Calibration gases for CO and NO** need to be moistured by supplying them via a cooler.

WARNING

EXPLOSION HAZARD

Do not supply gases harmful to explosion protection safety components like flame arrestors, cable glands or analyzer enclosure!

Violation may result in explosion!

2.3 Installation - Gas Conditioning

Enclosure purge option

The purge medium (e.g. to minimize CO_2 interference or for enhanced safety when measuring corrosive or poisonous gases)

- **must be dry, clean and free of corrosives or components containing solvents.**
- **has to be free of components to be measured, to minimize cross interferences.**

Its temperature must correspond to the ambient temperature of the analyzer, but be at least within the range 20…35 °C (68…95 °F).

Consider the Special Conditions for Safe Use.

We recommend to always purge the analyzer enclosure, if gases are supplied, which may harm analyzer components, if due to a leak released into the analyzer enclosure!

Open reference option

In some cases, the measuring cell has an open reference side, to be supplied with nitrogen.

This nitrogen

- **at least should be of quality 5.0, which means nitrogen of purity ≥ 99.999 %.**

If such gas is not available, the substitute

- **must be dry, clean and free of corrosives or components containing solvents.**
- **has to be free of components to be measured, to minimize cross interferences.**

In any case, the gas temperature must correspond to the ambient temperature of the analyzer, but at least be within the range 20…35 °C (68…95 °F).

Pressure and gas flow must remain within the values given in the ☞ „Measurement Specifications“ section within this manual.

Perform a calibration each time the source of this gas (e. g. bottle) has changed!

2.4 Gas Connections

WARNING

TOXIC GAS HAZARDS

Take care that all external gas pipes are connected in the described way and that they are gastight to avoid leakages!

Faulty connected gas pipes lead to explosion hazard or even to mortal danger!

Don‘t take a breath of the emissions! Emissions may contain hydrocarbons or other toxic components (e.g. carbon monoxide)! Carbon monoxide may cause headache, sickness, unconsciousness and death.

CAUTION

Do not confuse gas inlets and outlets. All gases supplied must be prepared beforehand. When supplying aggressive gases, ensure that the gas lines are not damaged.

Max. admissable pressure: 150 kPa / 7 psig; atmospheric with internal pump!

Exhaust lines must be installed to incline downwards and be unpressurized and protected against frost, and conform to legal requirements.

TRACE OXYGEN MEASUREMENTS

**The sensor for trace oxygen measurements is a consumable.
Remaining lifetime counts down when the sensor is in contact with oxygen.**

For above reasons, the analyzer is shipped with the sensor as extra item in a sealed bag! The sensor must be installed before analyzer startup, according the instructions shipped with the sensor!

Do not use plastic tubing for trace oxygen measurements as it can permeate oxygen from the ambient air and cause higher than expected oxygen readings.

2.4 Installation - Gas Connections

The number of gas connections and their configuration varies according to the installed options. All gas connectors are labelled and can be found on a label inside the analyzer.

Should it be necessary to open the gas lines, the gas connectors should be sealed with PVC caps to prevent pollution by moisture, dust, etc.

	IN	OUT
1	SAMPLE	SAMPLE
2		
3		
4		PURGE GAS

Fig. 2-3: Labelling of gas connectors (example)

The analyzer should be mounted close to the sample gas source to minimize transportation time. A sample gas pump can be used to reduce the reaction time; this requires that the analyzer be operated in bypass mode or fitted with a pressure control valve to protect against excessive gas flow and pressure (Fig. 2-4).

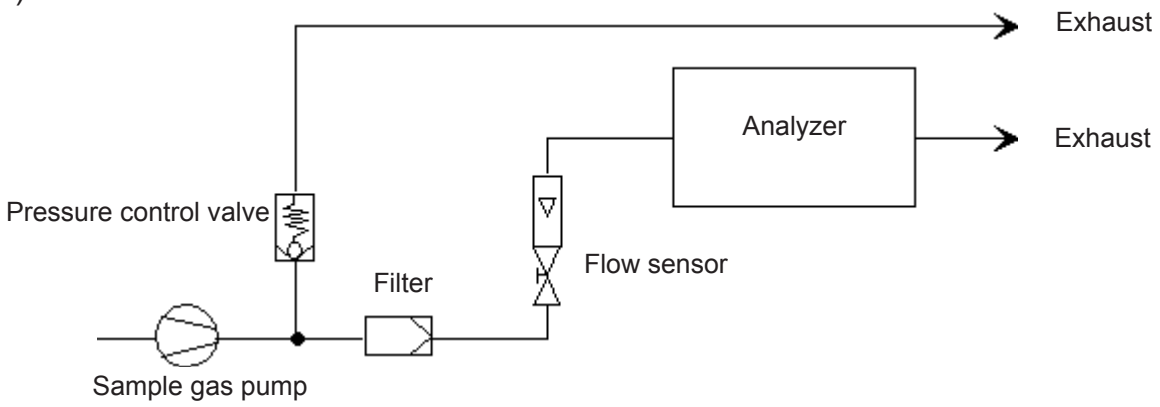


Fig. 2-4: Installation in bypass mode

2.4 Installation - Gas Connections

Gas inlets and outlets are protected by flame arrestors, supporting stainless steel pipes of either 3,18 mm (⅛“) or 6,35 mm (¼“) outer diameter (OD). The ¼“ fitting may optionally be supplied with a clamping ring for 6 mm OD pipes.

The instrument provides up to 8 gas inlets and outlets, depending on the ordered configuration. Unused entries are closed by approved plugs.

WARNING

POSSIBLE EXPLOSION HAZARD

Take care not to damage the threats, this may void the instrument´s safety and cause hazards!

Ensure unused entries remain sealed with approved plugs!

When thightening the fitting, counterhold the flame arrestor with a wrench placed at the hexagon (items 5 of fig. 2-3) next to the cap nut (items 1, 4) to be tightened.

Always counterhold the flame arrestor while thightening fittings; otherwise the flame arrestor may be damaged!

Maximum permitted fastening torque: 40 Nm!

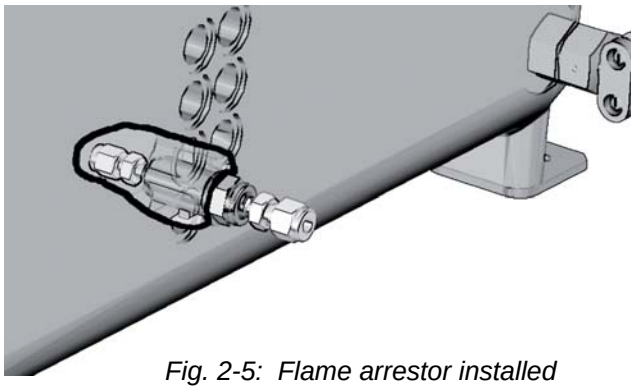
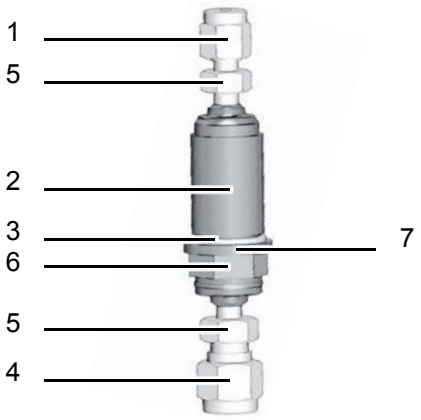


Fig. 2-5: Flame arrestor installed into instrument enclosure



1: Gas fitting ⅛“ (inside instrument) *)
2: M18 male threat (inside enclosure wall)
3: O-ring (optional)
4: Gas fitting ¼“ or ⅛“ (outside instrument) *)
5: Hexagon for counter holding while thightening
6: Hexagon for wrench when mounting into a M18 threat
7: O-ring shoulder

*) *FA 01 with ¼“ (outside instrument) and ⅛“ (inside)*
FA 02 with ¼“ at both ends
FA 03 with ⅛“ at both ends

Fig. 2-6: Flame arrestor elements, exemplarly considering FA 01

2.4 Installation - Gas Connections

2.4.1 Special Conditions

2.4.1.1 Purging the Housing with Clean Gas when e.g. Measuring Low Concentrations

WARNING

POSSIBLE EXPLOSION HAZARD

Risk of internal overpressure under leakage conditions!

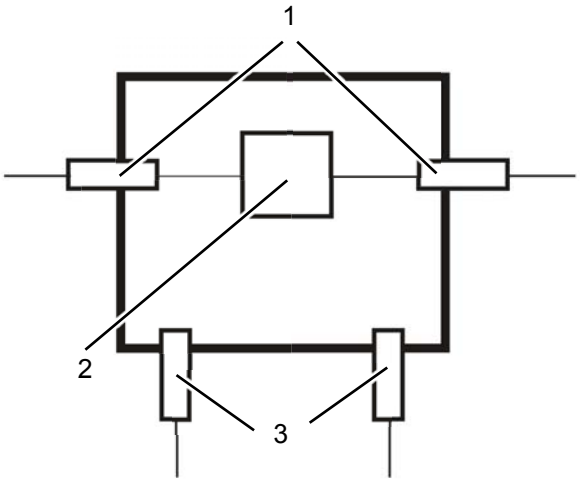
For the following option, take care to limit the total of purge gas flow and highest flow of sample gas lines into the instrument to max. 2 l/min!

Take care of special conditions for safe use, and gas parameter specifications (☞ S-5 and ☞ 1-10) !

The purge medium must be supplied via a separate flame arrestor (purge gas inlet), installed into the analyzer enclosure. Another flame arrestor must be installed, operating as a breathing device (purge gas outlet).

Connection of breathing device:

The external output of the breathing device (exhaust) can be open to the ambience of the analyzer, if inert gas is used as purge medium. If air is used, the output must end in a safe area, if the measured gas concentration is above 25 % V/V LEL.



1: Flame arrestors for gas path
2: Measuring system
3: Flame arrestors for purge gas in-/outlet

Fig. 2-7: Exemplary diagram for a single channel unit with purge option

2.4.1.2 High Sample and Calibration Gas Pressures

The gas paths need additionally to be protected by suitable external inline flame arrestors, designed and approved for the installation area and for the applied higher gas pressure (above 1100 hPa to max. 1500 hPa; see gas parameter specification ☞ 1-10). These inline flame arrestors need to be installed outside the analyzer and in addition to the flame arrestors provided by the analyzer.

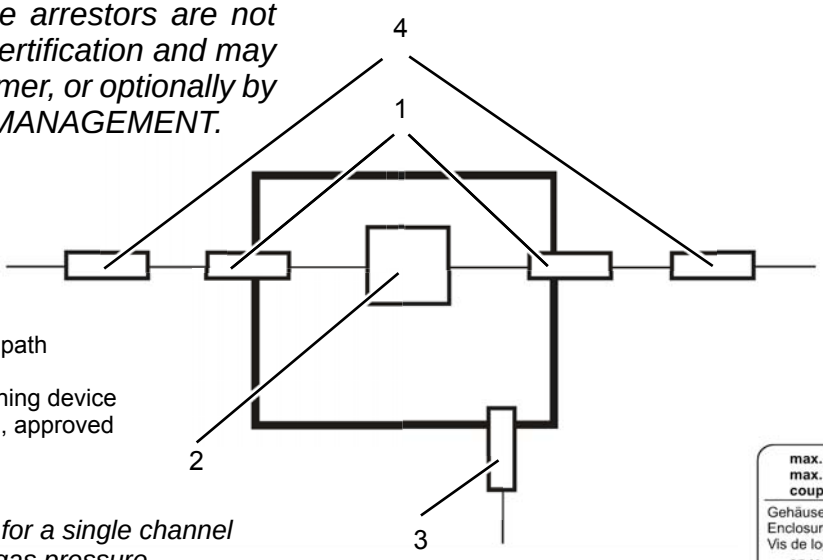
Note!

The external inline flame arrestors are not subject of the analyzer certification and may be provided by the customer, or optionally by EMERSON PROCESS MANAGEMENT.

A separate analyzer flame arrestor has to be installed, operating as a breathing device, limiting the internal pressure rise in case of gas path leakage.

Connection of breathing device:

The external output of the breathing device (exhaust) may be open to the ambience of the analyzer, if the measured gas concentration is below 25 % V/V LEL. Otherwise it must end in a safe area.



1: Flame arrestors for gas path
2: Measuring system
3: Flame arrestor as breathing device
4: External flame arrestors, approved for higher pressure

Fig. 2-8: Exemplary diagram for a single channel instrument for high gas pressure

2.4.1.3 Fastening Torques for Enclosure Components

Consider the permitted fastening torques, when installing components to the enclosure, as given on a label at the instrument!

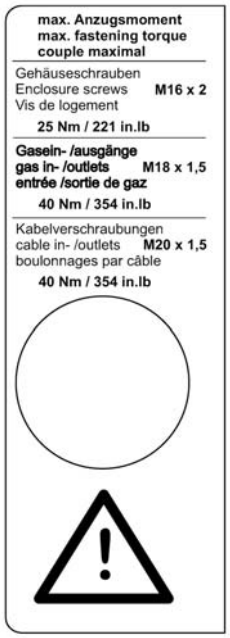


Fig. 2-9: Label with fastening torques, installed at the instrument

2.5 Electrical Installation

WARNING

ELECTRICAL SHOCK HAZARD

Installation and connecting power and signal cables are subject to qualified personnel only, taking into account all applicable standards and legislative requirements!

Failure to follow may cause warranty invalidation, property damage and/or personal injury or death!

Installation of these instruments is subject to qualified personnel only, familiar with the resulting potential risks! Instruments providing screw terminals for electrical connections may require working near live part!

X-STREAM X2FD gas analyzers do not provide a power switch!

A power switch or circuit breaker (complying with IEC 60947-1/-3) has to be provided in the building installation. This switch has to be installed near by analyzer, must be easily operator accessible and has to be assigned as disconnector for the analyzer.

Disconnect instruments with screw terminals from power when working at power terminals (pull power plug or operate power switch/ circuit breaker in building installation)!

The analyzers provide a protective earth terminal. To prevent electrical shock hazards the instruments must be connected to a protective earth. Therefore the instruments must be connected to power by using a three wire power cable with earth conductor!

Any interruption of the earth connector inside or outside the instrument or disconnecting the earth terminal may cause potential electrical shock hazzard!

The analyzers do not provide a power switch and are operable when connected to power.

2.5 Installation - Electrical

WARNING

EXPLOSION HAZARD

Do not open instrument when energized.

Ensure that external circuitry is disconnected or de-energized before opening the instrument.

All cables (power and signal) must end (be connected) in either a safe (non-hazardous) area or in a protecting enclosure (e.g. Ex e junction box)!

CAUTION

SELECT THE CORRECT TYPE OF CABLE ENTRY

Before starting to install the analyzer, verify what type of cable entry is required at your site of installation:

X-STREAM X2FD gas analyzers may be equipped with cable glands (regulated e.g. for installations covered by ATEX) or may be installed with conduits (e.g. in North-America).

WARNING

INSTALLATION USING CONDUITS

X-STREAM X2FD analyzers provide metric threads for installing cable entries. Installing conduits requires using metric-to-NPT adaptors!

To stay compliant with the North-American certification use only flameproof certified adaptors, e.g. the following type:

Redapt AD-U series, stainless steel with captive o-ring seals, size male M20 x 1.5 to female 3/4-NPT or 1/2-NPT.

Select a type of conduit according the local code, suitable for above mentioned adaptors and the site of installation.

During installation follow the instructions provided by the manufacturer of the conduits!

Unused entries must be provided with flameproof plugs!

2.5 Installation - Electrical

WARNING

INSTALLATION USING CABLE GLANDS

X-STREAM Flameproof analyzers are shipped without certified cable glands.

Cable glands have to be selected while preparing the installation according all applicable standards, e. g. EN 60079-14 or IEC 60079-14.

Use only cables as specified in the cable glands installation instruction, and carefully follow the original manufacturer‘s installation instructions, accompanying the cable glands!

The next page shows

- the English installation instructions for type AD-U adapters, reprinted with the permission of

  Redapt Ltd

Note!

See the documentation delivered together with your analyzer for an original version of the cable gland or adapter installation instructions, whatever is applicable !

2.5 Installation - Electrical

Type AD-U adapter installation instructions

Installation Guide

1. All Redapt products should be installed in accordance with all relevant Installation Standards and Codes of Practice.
2. BS EN 60079-14: 1997. Electrical Installations in hazardous areas (other than mines)
3. Installation of Redapt products should only be carried out by an engineer trained in cable gland installation.
4. Under no circumstances should installation be carried out under live conditions.
5. The installer should ensure that no damage occurs to any thread or form of seal during installation. Where component is plated care should be taken to prevent damage or chipping.
6. Threaded Entries – Components can be installed directly into threaded entries and the recommended torque applied.
7. Clearance Holes – Clearance holes should be 0.5 mm to 1mm larger than the major diameter of the male thread. Components installed in clearance holes should be secured with an appropriate sized locknut to recommended torque.
8. Maintaining IP 54 Rating – In order to maintain such an IP rating the installer should ensure that parallel threads engage to 6 full threads and tapered thread to 5 full threads.
9. Maintaining IP 66-67-68 Rating – In order to maintain the IP Rating of a component, the above thread engagement must be attained. The surface of the enclosure should also be clean and free from dust or moisture before assembly. In order to maintain IP 66-67-68 the installer must ensure that either the sealing washer is in the correct position or that the 'O' Ring seal is seated in the groove provided. A non-hardening thread sealant may be used to provide protection.
10. If a serrated washer is used it should not be installed in such a way that it may impair any IP Rating.
11. Recommended Installation Torque – In order to maintain the integrity of the enclosure it is important that an installation torque as detailed below be applied.

Installation Torque

Redapt adaptors and reducers should be installed to the recommended torque values detailed in the following table. Torque values apply to non-metric thread equivalents.

Male Thread Size	Metallic Components (Nm)	GF Nylon Components (Nm)
M16 & M20 and Equivalents	32.5	7
M25 and Equivalents	47.5	10
M32 and Equivalents	55.0	10
M40 and Equivalents	65.0	15
M50 and Equivalents	80.0	25
M63 and Equivalents	95.0	30
M75 and Equivalents	110.0	45
M80 Threads and Above	Major Dia. x 2 (i.e. for M80 – 160 Nm)	-

Routine Checking and Maintenance

1. All Redapt products should be checked during routine maintenance of the enclosure.

2.5 Installation - Electrical

ATEX approved analyzers provide 4 cable entries (M20 x 1.5) and are shipped with a set of 2 plugs.

Owners of such analyzers are responsible to provide suitable cable glands according all applicable standards (e. g. IEC/EN 60079-14).

See maintenance section of this manual for recommended cable glands.

Unused entries during installation have to be provided with plugs!

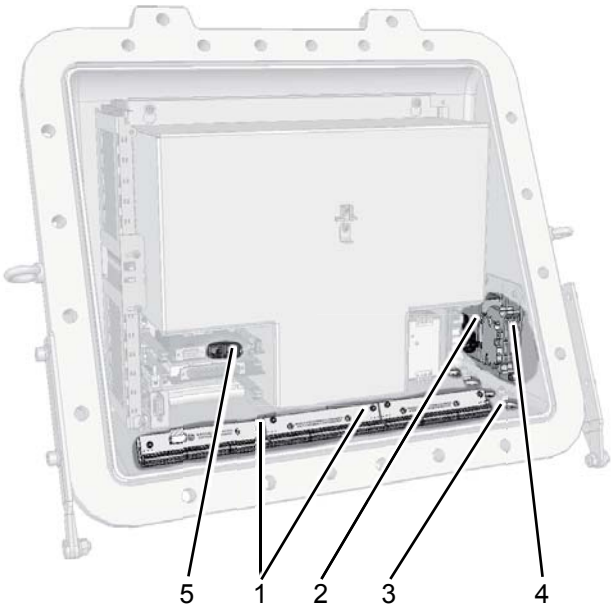
Installation under CSA certification requires the use of approved conduits and suitable metric-to-NPT adaptors. .

Both plugs and cable entries must be installed properly and fixed by applying the prescribed torque.

The instrument provides internal screw terminals for connecting power and signal cables. This requires opening the instrument during installation:

- Unsrew the 20 screws located on the enclosure flange.
- Flap down the cover part to gain access to the analyzer inside.

Inside the enclosure, keep all cables as short as possible to prevent from interferences.



1 Terminals for signal cables
2 Power EMI filter
3 4 cable entries for power and signal cables
4 Power terminals with integrated fuses
5 Ethernet connector (option)

Fig. 2-10: Allocation of terminals

2.5 Installation - Electrical

Installation with conduits

Ensure all required parts are available:

Adaptors, suitable conduits, compound and plugs for not used entries (see accessory kit).

Install the required number of adaptors into the related cable entries:The 3 rear entries are reserved for signal cables, the first one is for the power cord.

Tightening torque:
max. 354 in.lb / 40 Nm!

Ensure the explosionproof seal is placed at the analyzer enclosure or within 2“ from enclosure.

All cables need to be fed properly through conduits when entering the instrument and connected to the terminals (☞ warning notes, page 2-8).

To seal the cable entries proceed according to the installation instruction given in the related conduits manufacturer documentation.

Keep the original manufacturer‘s documentation available for future reference!

Seal unused entries utilizing the flameproof certified plugs.

Installation with cable glands

Ensure all required parts are available:

Cable glands and plugs for not used entries.

Verify the provided cable gland is designed for your type of cable (e. g. armoured, non-; diameter), see marking on the cable gland.

Install the required number of cable glands according the manufacturers instruction into the related cable entry:The 3 rear entries are reserved for signal cables, the first one is for the power cord.

Tightening torque:
max. 354 in.lb / 40 Nm!

All cables need to be fed properly through the cable glands when entering the instrument and connected to the terminals (☞ warning notes, page 2-8).

To seal the cable entries proceed according to the installation instruction given in the related cable glands manufacturer documentation.

Keep the original manufacturer‘s documentation available for future reference!

Seal unused entries utilizing the flameproof certified plugs.

Preparation of signal cables

All signal cables are to be connected via screw terminals, except the optional ethernet connector, located inside the analyzer.

Supported wire cross sections:	0,14 to 1,5 mm² (26 to 15 AWG) , no need to use wire end sleeves
Cable skinning length:	5 mm (0.2 inch)
Screw thread:	M 2
Tightening torque, min:	0,25 Nm (2.3 in.lb)

2.5 Installation - Electrical

Analog Outputs
Relay Outputs 1 - 4

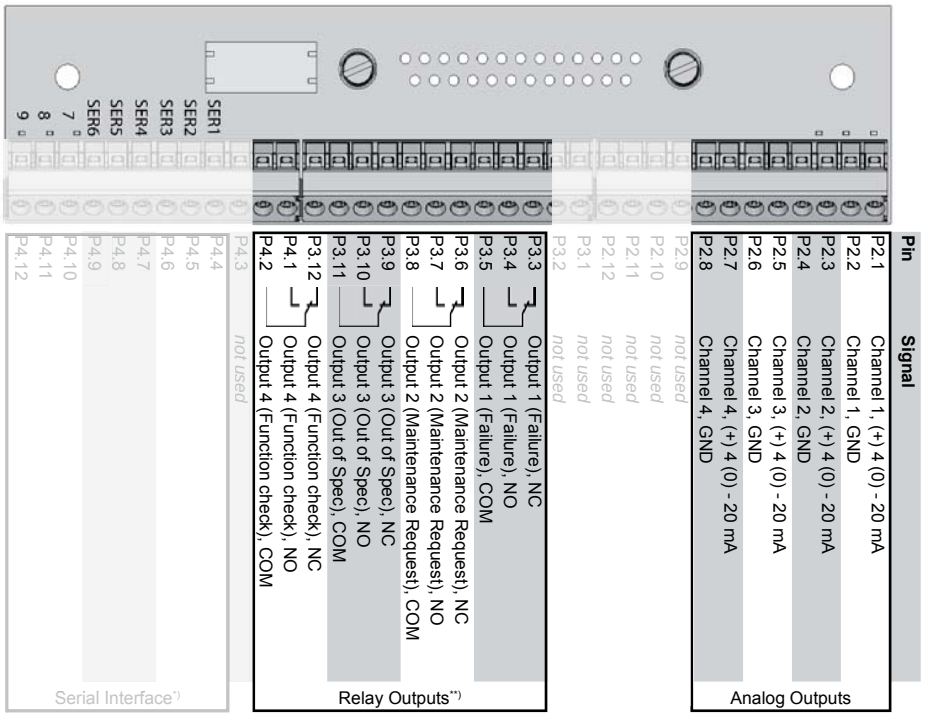
Terminals for analog signals and relais outputs 1 - 4 are located at the leftmost terminal module (terminal block X1; fig. 2-5).

Analog outputs specification: 4 (0) - 20 mA; burden: $R_B \leq 500\ \Omega$

Specification of relay outputs 1-4: Dry relay change-over contacts can be used as NO or NC.

Electrical specification: max. 30 VDC, 1 A, 30 W

Note!
Take care of the special installation instructions in section 4.5 of the X-STREAM gas analyzer series manual!



**) Configuration of relay output terminals as per standard factory setting (NAMUR status signals)

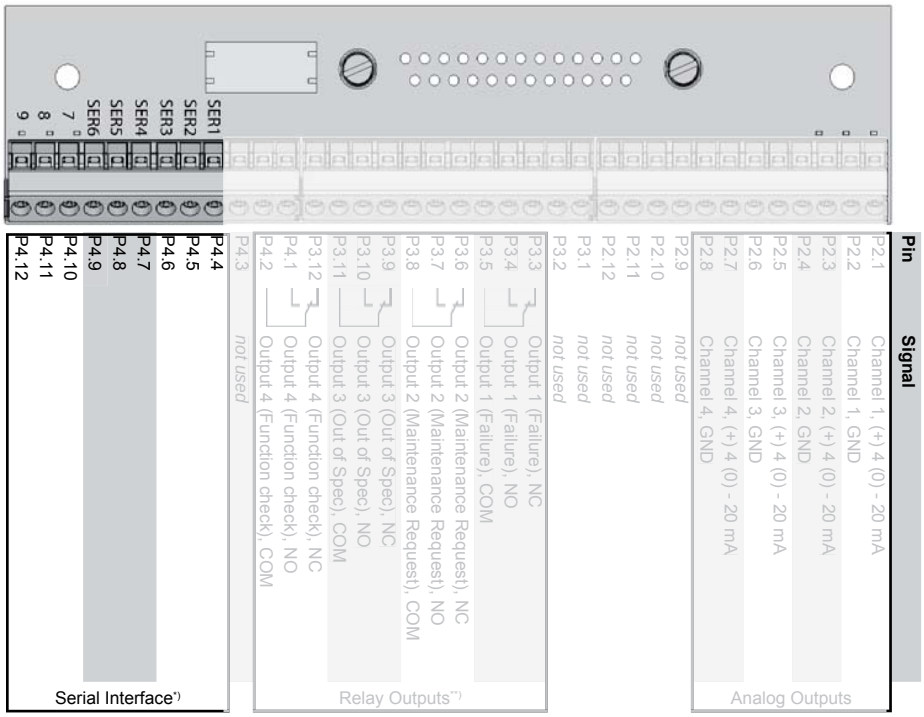
Fig. 2-11: Terminals block X1 - analog signals and relay outputs 1-4

2.5 Installation - Electrical

Modbus Interface

Specification and interface control:
☞ Analyzer instruction manual, chapter 9

The 9 terminals on the left (28 - 36) of the strip next to the power connections carry the Modbus interface signals.



*) See table below

Assignment of serial interface terminals

Terminal	MOD 485/ 2 wire	MOD 485/ 4 wire	RS 232
P4.4	Common	Common	Common
P4.5	*not used*	*not used*	RXD
P4.6	*not used*	*not used*	TXD
P4.7	*not used*	RXD1	*not used*
P4.8	D1	TXD1	Common
P4.9	*not used*	*not used*	*not used*
P4.10	*not used*	*not used*	*not used*
P4.11	*not used*	RXD0	*not used*
P4.12	D0	TXD0	*not used*

Fig. 2-12: Terminals block X1 - Modbus interface

Note!

Take care of the special installation instructions in section 4.5 of the X-STREAM gas analyzer series instruction manual!

Note 2!

X-STREAM analyzers are to be considered a DTE (Data Terminal Equipment).

Optional Modbus RJ45 connection

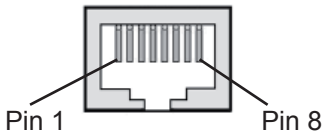
If fitted, the optional RJ45 connection is located on an electronics board in the card cage section of the unit (fig. 2-4.

To install this connection, a cable must be fed through the cable entry **without** a connector.

The connector can be wired on when the free end has been fed into the instrument:

We recommend the VARIOSUB RJ45 QUICK-ON connector (PHOENIX CONTACT), which is supplied with the unit and requires no special tools. Wiring instructions can be found in the separate manual supplied with the connector.

Note!
Take care that the Modbus terminals (☞ 2-19) are still installed but not connected!



Pin no.	Signal
1	TX+
2	TX-
3	RX+
6	RX-
other	*not used*

Fig. 2-13: Modbus Interface - Ethernet connector

2.5 Installation - Electrical

Digital inputs

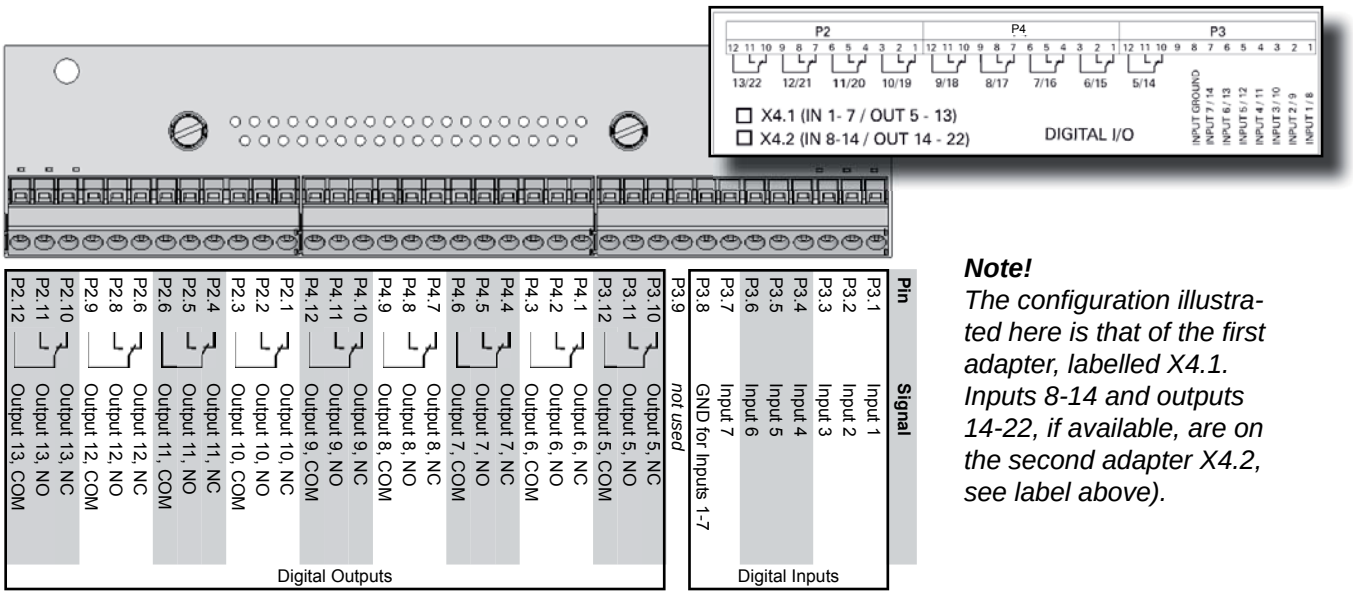
Quantity:	7 (1 terminal block) or 14 (2 terminal blocks)
Electrical specification:	max. 30 V⎓, internally limited to 2.3 mA H Signal: min. 4 V; L Signal: max. 3 V common ground (GND), electrically isolated from chassis earth

Digital outputs

Quantity:	9 (1 terminal block) or 18 (2 terminal blocks), dry change-over relay contacts, can be used as NO or NC
Electrical specification:	max. 30 VDC, 1 A, 30 W

Notes!
Depending on configuration, an analyzer can be fitted with up to two of these terminal blocks (the unit will then feature 14 digital inputs and 18 digital outputs). To aid identification, the sockets are labelled X4.1 and X4.2.

Note!
Take care of the special installation instructions in section 4.5 of the X-STREAM gas analyzer series manual!



Note!
The configuration illustrated here is that of the first adapter, labelled X4.1. Inputs 8-14 and outputs 14-22, if available, are on the second adapter X4.2, see label above).

Fig. 2-14: Terminal blocks X4.1 and X4.2 - Digital inputs and outputs

2.5 Installation - Electrical

Connecting the power cord

The power cord is connected to screw-type terminals located inside the housing.

Electrical Connections	
Power terminals	Screw terminals with integrated fuse holders max. 4 mm² (12 AWG)
Supported wire cross sections	0.2 to 4 mm^2 (24 to 12 AWG) no need to use wire end sleeves
Cable skinning length	8 mm (0.315 inch);
Tightening torque, min .	0.5 Nm (4.4 in.lb)
Power Inlet Fuses	
Data	AC 230 V / T 4 A / 5x20 mm
Cable Inlets	
Variations	Cable glandes, IP 68, or Conduits with adaptors (metric-2-NPT)
Outer cable diameter (cable glands)	depending on cable gland

To install the cable proceed according to the installation instructions for either conduits or cable glands, given on page 2-11.

Insert the power cord through the foremost entry, strip the outer insulation, skin and connect the conductors to the terminals (a descriptive label is attached nearby the terminals), by inserting them from the bottom sides.

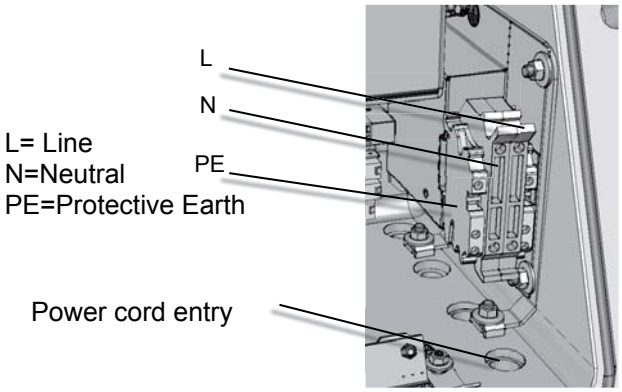


Fig. 2-15: Power terminals

WARNING

ELECTRICAL SHOCK HAZARD

Verify the power supply at installation site meets the specification given on the analyzer´s nameplate label, before installing the instrument!

Verify power cables are disconnected and/or instrument is de-energized prior to working at the terminals!

Verify the power cord is layed with a distance of at least 1 cm (0.5“) to any signal cable to ensure proper insulation from signal circuits!

Connecting an optional equipotential bonding conductor

The X-STREAM X2FD enclosure provides an additional terminal for connecting an equipotential conductor, located at the base part flange´s rear side (see fig. 2-14), near the nameplate label.

Screw thread: M5 x 10 mm

Conductor cross section: min. 4 mm²

The installation has to comply with sound engineering practice (see example to the right). Take care of contact corrosion due to the aluminum cast enclosure.

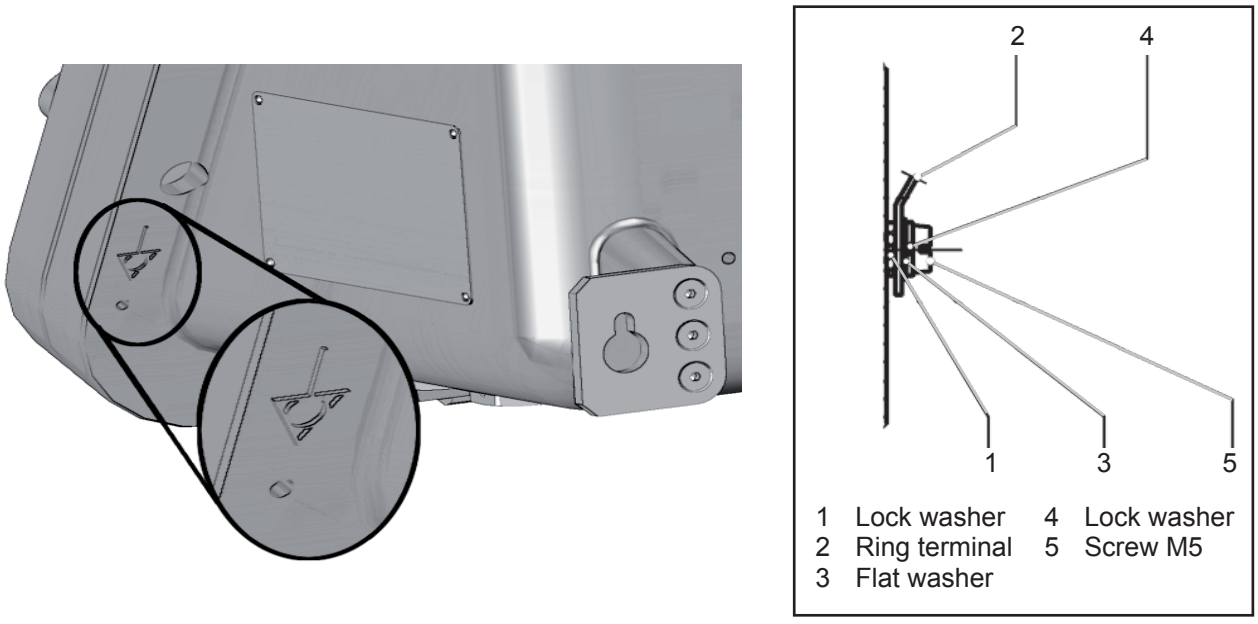


Fig. 2-16: Equipotential bonding conductor terminal

2.5 Installation - Electrical

WARNING

ELECTRICAL SHOCK HAZARD

Before completing the electrical connection of the instrument, verify cables are inserted and connected in correct manner!

Ensure the earthing conductor (protective earth; PE) is connected!

After all connections are established in the specified manner, and verified,

- fix the cables according to the installation instruction given in the cable glands / conduits manufacturer documentation.
- All cable entries must be sealed by means of either Ex d approved cable glands, conduits or sealing plugs.
- Install the analyzer´s cover by means of ALL 20 screws!

Tightening torque:

25 Nm (221 in.lb)

WARNING

EXPLOSION HAZARD

Do NOT operate the instrument with doors, sealing plugs or covers open! This is permitted only when no hazardous atmosphere is present!

Depending on the local regulation, this may require a competent hot work supervisor to issue a hot work permit.

Use ALL 20 screws to fix the cover! Violation may cause an explosion!

Chapter 3
Startup

WARNING

EXPLOSION HAZARD

Ensure all covers, plugs and housing parts are in place and secured properly before supplying power and signal voltages!

Ensure all requirements given by the clarification sheet for performing gas analysis within a flameproof enclosure are considered BEFORE supplying gases (☞ page S-10)!

The sheet also gives instructions for the sequence of supply-ing gases during process and analyzer startup .

3.1 Final Check

Ensure that the analyzer has been installed according to the descriptions in chapter 2, and that all covers and doors are closed and fastened.

CAUTION

OPERATION AT LOW TEMPERATURES

When operating an instrument at temperatures below 0 °C (32 °F), do NOT apply gas nor operate the internal pump before the warmup time has elapsed!

Violation may result in condensation inside the gas paths or damaged pump diaphragm!

Consider the related instructions in the X-STREAM X2 series manual!

3.2 Performing a Leak Test

Before starting up the instrument, it appears to be appropriate to perform a leak test, thus ensuring the gas path system does not have leaks, and to achieve best and proper measuring results.

The following procedure describes how to perform a leak test with focus on the instrument.

The gas path system should be leak tested at least on a bimonthly basis and after maintenance, replacement or repair of gas path parts.

Note!

It is recommended to include external equipment (e.g. cooler, dust filters, etc.) into a leak test!

Required tools

- U-turn manometer for max. 1.45 psi (100 mbar)
- Stop valve

Procedure

- Connect the water filled u-turn manometer to the analyzer‘s sample gas output (disconnect external gas lines).
- Install the stop valve between gas input fitting and a Nitrogen (N_2) supply.
- Open the stop valve until the internal gas path is under pressure of approx. 0.725 psi/50 mbar (corresponding to 19.7 inch/500 mm water column)
- Close the stop valve. After a short time for the water to balance, the water level must not change over a time period of approx. 5 minutes!

WARNING

HAZARD FROM GASES

Before opening gas paths they must be purged with ambient air or neutral gas (N_2) to avoid hazards caused by toxic, flammable, explosive or harmful to health sample gas components!

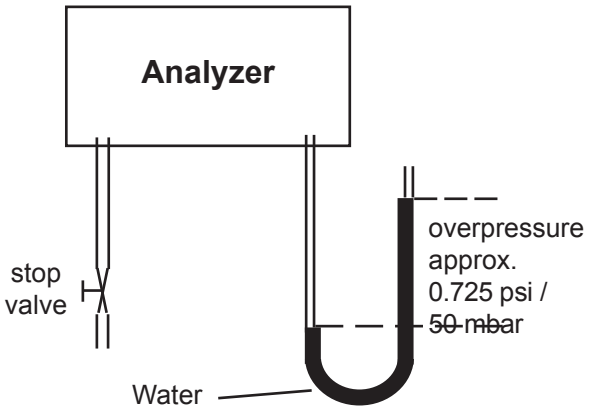


Fig. 3-1: Leak Testing with U-turn Manometer

Max. pressure 7.25 psig (500 mbar)!

Multi channel instruments: Analyzers with parallel tubing require separate leak tests for each gas path !

3.3 Switching On

Once the unit has been unpacked and installed, we recommend to first check the settings, and if necessary adjust them to the user's needs. e.g:

- What hardware is installed?
- Is the unit configured to your needs (alarms, inputs, outputs, etc.)

In order for the information in this chapter to be of any relevance, the unit must have been installed according to the instructions in chapter 2.

The following pages describe how to navigate through the menus and what is to be observed when configuring the unit. For the first startup after installation, follow the step-by-step instructions for navigating the menus, allowing you to familiarise yourself with the unit and its software, and if necessary adjust the settings to your needs.

WARNING

EXPLOSION HAZARD

Before applying power and signals:

- **Verify for proper installation**
- **Verify that all covers and plugs are properly installed and in place!**
- **Verify that all gas connections are tight.**

Violation may result in explosion, personal injury or death!

WARNING

EXPLOSION HAZARD BY HOT COMPONENTS

Temperatures inside an analyzer for VAPOR RECOVERY applications exceed the analyzer's temperature classification for hazardous areas!

Special conditions apply to handling and operating this analyzer, consider the safety instructions at the beginning of this manual!

Switch on the analyzer by applying power.

3.4 Symbols used

In the following sections, the symbols and typographical conventions described below are used to describe the software menus and navigation.

Symbols and conventions used in the following sections

Symbol	Meaning
Within descriptions of procedures	
Setup..	Menu title
Setup.. Analog outputs..	Parent (*Setup*) and current Menu (*Analog outputs*)
Analog outputs.. Output1 *(2...4)*	As an example, the menu for Output1 is displayed; the menus for outputs 2 to 4 are identical
Zero calibration.. Span calibration.. Adv. Calibration.. ▼Apply gas..	Display ***Note!*** *Menus or lines on a grey background are optional or context-dependent, and are not always displayed*
	Access levels: Access level 1 *(user)*
	Access level 2 *(expert)*
	Access level 3 *(administrator)*
	Access level 4 *(service level)*

Convention	Meaning
Within descriptions	
(Menu title) 6.2.2, page 6-12	For a detailed description of this *Menü*, see section 6.2.2 on page 6-12
CONTROL - ZOOM..	Navigate from the main menu via the CONTROL menu to the ZOOM.. menu
„Valves“	Parameter name
Never, 1 min	Selectable values
0 ... 2000	Range of values

3.5 The user interface

All X-STREAM gas analyzers have an alphanumeric display with four lines of 20 characters to display measuring and status information and the easy-to-use menu-based user interface for entering parameters. For ease of understanding, the user can at any time select one of three languages stored in the unit (currently available: English, French, German, Italian and Spanish in various combinations).

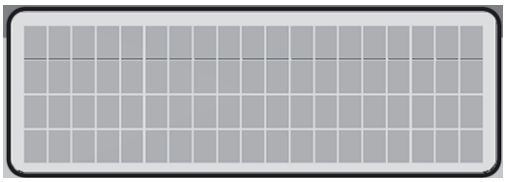
Units are operated using six keys on the front panel.

Three LEDs on the front panel enable the operating status to be recognised instantly.

Fig. 3-2: Front Panel

3.5 The user interface

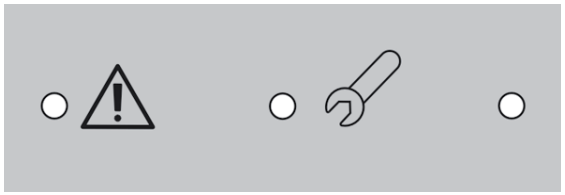
3.5.1 Display



The display has 4x20 characters, either liquid crystal or vacuum fluorescent (LCD or VFD).

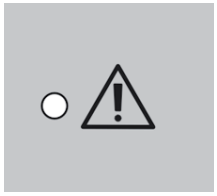
What information is displayed depends on the currently displayed menu.

3.5.2 Status LED

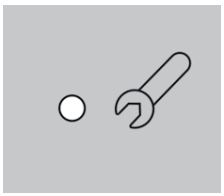


Three status LED indicate the unit's status, recognisable from a distance.

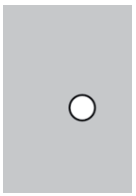
Status is indicated in accordance with the German NAMUR NE 44 recommendations.



"Failure" is indicated when this red LED is lit.



A flashing red LED in the middle indicates "Maintenance request", "Function check" or "Off-spec operation".

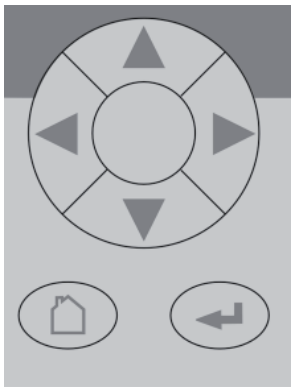


The third, green LED indicates the power supply status:

on: power supply OK

off: power supply interrupted

3.5.3 Keys



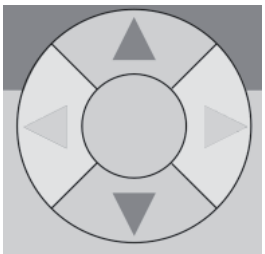
Six keys enable the use of the menu system. Depending on the operational mode (measuring, browsing menus, editing) they have the following functions:

ENTER key:

Mode	***Function***
Measuring	Leaves the measurement display
Browsing	Accesses submenu (..) or executes command (!)
Editing	Confirms new entry

MEASURE key:

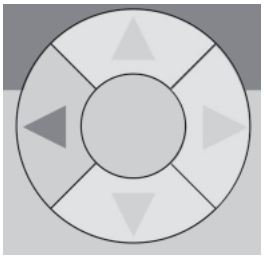
Mode	***Function***
Measuring	*(no function)*
Browsing	Returns to measurement display
Editing	Cancels entry



UP / DOWN keys:

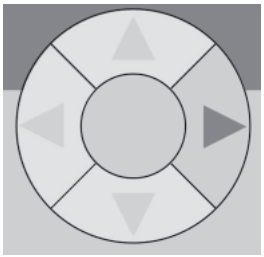
Mode	***Function***
Measuring	Leaves the measurement display
Browsing	Selects menu line
	Goes to previous/next page, when currently in a line beginning with ▲/▼
Editing	Changes current parameter

3.5 The user interface



LEFT key:

Mode	***Function***
Measuring	Leaves the measurement display
Browsing	Goes up 1 level or page in menu system
Editing	Moves cursor 1 space
	Leaves channel selection
	Cancels editing of given parameter
	Goes to previous page, when ▲ showing in first line



RIGHT key:

Mode	***Function***
Measuring	Leaves the measurement display
Browsing	Accesses submenu (..)
Editing	Goes to next page, when ▼ showing in fourth line
	Moves cursor 1 space

3.6 Software

The analyzer software displays measurement results and status messages, allows parameters to be set and edited and allows maintenance functions (e.g. calibration) to be carried out.

To make it possible to perform all these functions on a 4x20 display, the software is organised hierarchically: measurement display is on the topmost level, while menus and submenus are below (☞ X-STREAM X2 series instruction manual).

The following methods are used to distinguish between various functions, e.g. executing commands:

Function	Description
Displaying TEXT	Simple text (not selectable with cursor)
Editing VARIABLES	A variable description ends with a colon and the line can be made up of up to 3 elements: 1. description 2. value: number or text 3. unit (optional) *Examples:* Span gas: 2000 ppm Tol.Check: Off Variables without a colon cannot be edited.

Function	Description
Executing COMMANDS	A command line text ends in a colon; when this line is selected and ENTER pressed, a command is executed, e.g. a calibration procedure. *Example:* Start calibration !
Selecting a MENU	A menu line text ends in two dots; when this line is selected and ENTER pressed, a submenu is opened. *Example:* Setup..

3.6.1 Navigating and editing

Selecting a line

Lines are selected using the ↑↓ (UP/DOWN) keys.

The cursor is displayed over the first character of the selected line. It is moved down with the DOWN key and up with the UP key.

If the cursor is in the first line, pressing the ↑ key will move it to the last line.

If the cursor is in the last line, pressing the ↓ key will move it to the first line.

An action in the selected line is initiated by pressing the ↵ key, i.e. opening a new menu, starting a procedure or entering edit mode.

If a selected parameter has been changed, the “function check” status is set, with the following consequences:

- the middle LED lights
- the NAMUR relay is activated.

The status can be reset by acknowledging it in the “Acknowledgements” menu.

A “function check” message set off by editing a parameter is **automatically** reset upon returning to the measurement display.

Browsing

Some menus have more than four entries, and these cannot all be displayed at once. In these menus, an indicator in the last (▼) or first (▲) line indicates the direction the menu continues in.

To show the following page, the cursor is placed in the line with the indicator and the UP or DOWN key pressed. Alternatively, the LEFT or RIGHT key can be used, irrespective of where the cursor is located.

Line 1 Line 2.. Line 3 ▼Line 4	▲Line 1 Line 2.. Line 3 ▼Line 4	▲Line 1 Line 2.. Line 3 Line 4
Menu continues downwards..	Menu continues upwards and downwards..	Menu continues upwards.

Editing

Editing mode enables the setting of a parameter. It is initiated by pressing the ↵ key.

The cursor is now placed over the last character of the current value. Pressing the ↑↓ keys change the selected character; if it is a list of possible values, the entire value is changed.

The ← and → keys are used to select a specific character for editing.

Which characters are available depends on the position of the cursor:

- It is not possible to select the minus sign or decimal point as the last character.
- It is not possible to select the decimal point in integer values.
- For decimal numbers, the decimal point can be placed anywhere within certain limits.

There are two ways to leave editing mode:

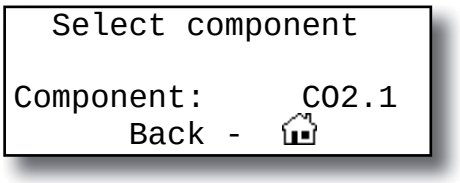
↵ key: the value is verified (e.g. min/max). If the value is possible, it is saved and the new value displayed; if not, an error message is displayed.

 key: Cancel: all settings and changes are reset to their former values.

Component selection menu

A single channel analyzer has only one measurement channel (component): editing any parameter will only effect this one channel.

A multi-channel analyzer requires that a channel must be selected before its parameters can be changed. When this selection is necessary, a menu is automatically displayed; it is not displayed on single-channel units.



3.6.2 Access levels

Access levels can be used to prevent changes to parameters by unauthorised personnel. The X-STREAM menu system supports **four prioritized** access levels which can be activated and deactivated separately, and should be supplied with their own access codes.

Level four has the highest priority and is used for factory settings — only qualified EMERSON service personnel have access to this level.

Level three allows access to system admin parameters, e.g. for data capture and processing systems.

Level two covers the expert settings, e.g. basic settings for calibration.

Level one is the user level and includes parameters which should be set by trained personnel.

Any menus not assigned to one of these levels are not editable or are of minor relevance.

In this chapter, the descriptions of the individual menus also indicate which level the menus are in. These assignments cannot be changed.

Access codes for levels 1 to 3 can be defined, activated and deactivated by the client. The analyzer is delivered with the following settings:

Level	Access code	Status
1	00000001	Off
2	00000002	Off
3	00000003	Off

It is recommended to set new access codes if they are to be activated.

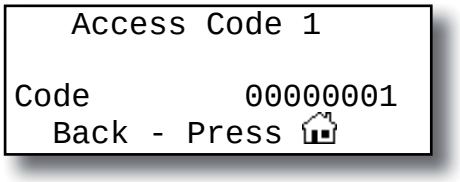
Note!

*If a lower level is **locked** (i.e. its code activated), all higher levels will also be **locked.***

*If a higher level is **unlocked** (i.e. its code deactivated), all lower levels will also be automatically **unlocked**.*

Entering access codes

If an access code is required for a menu, the following message is displayed:



Use

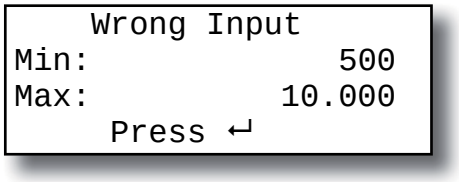
- the UP/DOWN keys to change the currently selected digit,
- the LEFT/RIGHT keys to select a different digit,
- the ENTER key to submit the code

or

- the MEASURE key to leave edit mode and return to the previous display.

3.6.3 Special messages

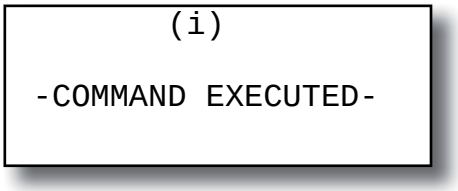
Depending on the last action performed by the user, one of the following messages may be displayed to assist or inform the user (the two confirmation messages are displayed only for a few seconds):



Information on incorrect entry:

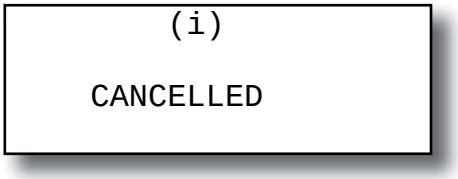
The value entered by the user is outside valid limits. The display indicates what limits apply.

Pressing ↵returns the display to the previous screen to allow a valid setting to be entered.



Confirmation of execution of command:

Confirms that a procedure (e.g. calibration) has been started.



Confirmation of cancellation:

Confirms that a procedure (e.g. calibration) has been aborted.

3.7 Powering up

3.7.1 Boot sequence

When the unit is powered up, a series of internal tests is automatically performed. During this time the front panel keys are disabled, while the time remaining for the boot sequence counts down in the display.

3.7.2 Measurement display

The measurement display is shown

- automaticaly on completion of the boot sequence
- when the MEASURE key is pressed
- automatically after a set period of time of inactivity (i.e. with no keys being pressed).

The information displayed in the four lines of the measurement display can be determined by the operator:

- Sample gas components, measuring results and measuring units for each channel
- additional measurements, e.g. pressure, gas flow, temperature
- nothing (empty line)

The factory settings are as follows:

Line 1: measured value of channel 1
Line 2: measured value of channel 2
Line 3: measured value of channel 3
Line 4: measured value of channel 4

Note!

If less than four channels are installed in the unit, only the values of the available channels will be shown.

Line 4 is also used to display plain text status information (errors, maintenance requests, function checks or off-spec performance).

If such messages are active, line 4 alternates between the messages and the parameter selected for line 4.

Active messages are stored in an internal buffer. If there is more than one message in the buffer, the display will cycle through them.

Each message is not just shown in the display as text, but also indicated by the appropriate LED on the front panel and the activation of the appropriate NAMUR relay (if a relay has been assigned to that NAMUR function; ☞ X-STREAM X2 series instruction manual).

Note!

There are also functions, that do activate a relay or LED, but are not shown on the display (e.g. concentration alarms). In such cases, check the status menu for more information.

```
CO2.1      135.1 ppm
O2.2     201952 ppm
CO.3        58.8 ppm
H2.4         1.5 %
```

MEASUREMENT DISPLAY

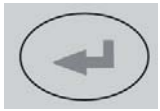
3.8 Selecting the language

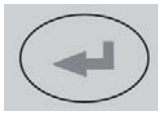
If the analyzer is operational and it becomes clear that the incorrect language has been set, which is unintelligible to the operator, the following sequence of keypresses (starting at the measurement display) can be used to set the language.

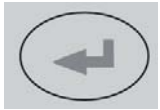
If the system has been set up accordingly, the code for access level 1 must be entered at this point to enable access to the following menu.

Note!

The factory setting for this unit is "no code required". For ease of operation, it is recommended to use the factory settings for access codes while setting up the unit for the first time. In the following sections, therefore, no more reference will be made to any need for entering a code.







Note!

The fourth press of the ENTER key in this sequence access the "Language" parameter line.

The DOWN key changes the language. Pressing ENTER will set this language and the display is updated accordingly.

If the selected language is not the intended one, the previous three steps can be repeated until the intended language is set.

3.9 Checking the settings

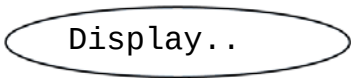
The following sections are structured so that the user can work through them one by one after powering up the unit. After completing these steps, the unit will be configured to the user's needs and functioning correctly.

Starting with the measurement display, pressing any key except the MEASURE key will access the MAIN MENU; from here, the following steps are to be followed:

(If the display is showing anything other than the measurement display, pressing the MEASURE key will return to the measurement display).

Note!

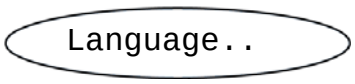
If you are unfamiliar with the language set: ☞ page 3-14 shows the sequence to be used to set a different language.



If the system has been set up accordingly, the code for access level 1 must be entered at this point to enable access to the following menu.

Note!

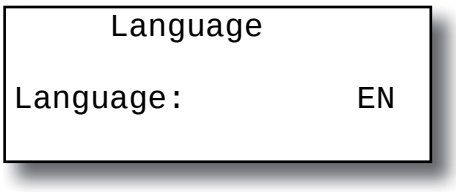
The factory setting for this unit is "no code required". For ease of operation, it is recommended to use the factory settings for access codes while setting up the unit for the first time. In the following sections, therefore, no more reference will be made to any need for entering a code.



Set the preferred language for the software; each analyzer shipped with 3 out of below list of available languages.

Currently available (may be extended by future software versions.):

EN: English, **FR**: French, **DE**: German, **IT**: Italian, **ES**: Spanish, **PT**: Portuguese



3.9 Checking the settings

3.9.1 Installed options

All X-STREAM gas analyzers can be fitted with a variety of optional components: follow these steps to see which options are installed on your analyzer.

Press the LEFT key several times to return to the SETUP menu.

```
▲InstalledOptions..
Communication..
Alarms..
▼Save-Load..
```

The cursor is now in the “In/Outputs” line over an arrowhead. Press the DOWN key to display the next menu page and open the INSTALLED OPTIONS submenu.

```
Valves:     Internal
COM-Interf:      Yes
Pump:            Yes
▼Flow monitor:   Yes
```

Page 1

This menu is in two columns and indicates which of the possible optional components are installed in the unit. The values displayed on your unit may differ from those illustrated here.

Do not edit any entries in these menus without special knowledge.

Incorrect entries may result in incorrect results or impair the performance of the unit.

This initial access to this menu is intended to gain information on the configuration of the unit.

```
▲DigitalIO:        1
Pressure:   Internal
Analog outputs     4
More..
```

Page 2

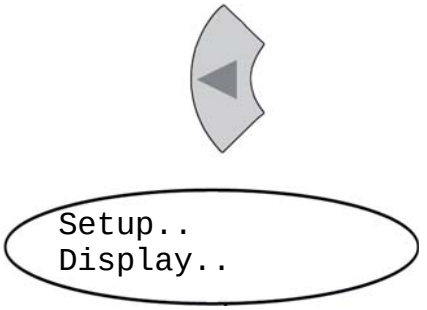
```
Protocol:   MODB RTU
MODB Mode:     32Bit
ID number:         2
▼Interface: RS485/2w
```

In the two pages of the COMMUNICATION menu, you can verify the parameters of the serial interface, and if necessary select the protocol to be used for data transfer.

```
▲Baud rate:    19200
Parity:           No
```

Press the LEFT key twice to return to the SETUP menu.

3.9.2 Configuring the display

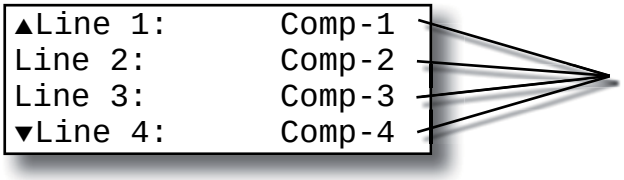


Press the LEFT key to return to the display setup menu.

Check the settings for the measurement display, temperature and pressure units, and for menu access: use the DOWN and ETER keys to access the submenus.

If a setting is not in accordance with your requirements, access that menu ad adjust the parameter.

Select the value to be displayed in each line of the measurement display. The following options are available:



Page 2

Comp-1 ... Comp-4,
Temp-1 ... Temp-4,
Press-1 ... Press-4,
Flow-1 ... Flow-4
Blank (nothing)

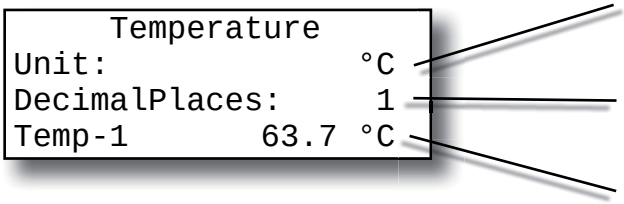
Note!

X-STREAM currently supports only one pressure sensor. Values Press-1 to Press-4 thus refer to the same sensor .

Page 3

The measurement units for the displayed values can be changed in the submenus on page 3.

For example, here are the options for the display of temperature values:



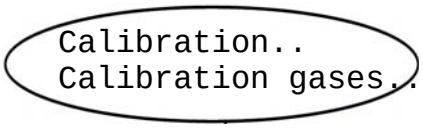
Set temperature unit
Options available: **°C, °F**

Set number of decimal places for temperature display: **0 to 4**

Current temperature; here: sensor 1.

3.9 Checking the settings

3.9.3 Calibration setup

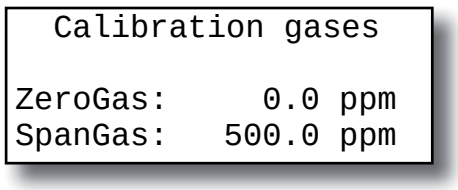


Once the display settings have been checked, press the LEFT key to return to the SETUP menu, then open the CALIBRATION menu where e.g. the calibration gas concentrations can be entered..

Note!
For more detailed information about the calibration procedure, see ☞ Chapter 4.

Multi-channel unit:

Select the component to be set in the gas component selection menu.



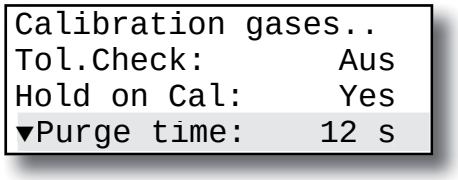
In the CALIBRATION GASES menu, the values for zero and span gas should be entered: these values should be taken from the gas supplier's certification. Values must be correctly set for results to be accurate.

In multi-channel units, the values for each channel must be entered separately.

Press the LEFT key to return to the CALIBRATION menu, and check the entry for "Tol. Check".The "Tol.Check" (tolerance check) option is set to inactive (**Off**) by default.

When the tolerance check is active (**10 %**), the analyzer checks during calibration whether the values set for zero and span gas conform to the concentration of the gas currently being supplied. If the concentration varies by more than 10% of the range from the value set, the calibration is aborted.

3.9 Checking the settings



Page 1

This prevents calibration from being performed when the incorrect gas is supplied (e.g. span gas calibration using zero gas), which would result in an incorrectly configured unit.

"Hold on Cal": Specifies behaviour of analog outputs and concentration limits alarms during calibrations (follow measured value or not)..

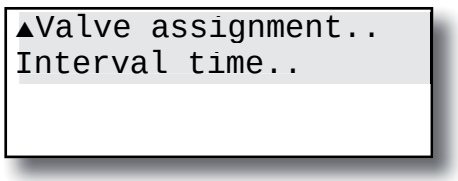
“Purge time”: When gas flow is controlled by internal or external valves, these allow the appropriate calibration gas to flow into the unit as soon as the calibration procedure is started. Due to the limited gas flow and the distance between valves and measuring cell, some time is required before the measuring cell is filled with the calibration gas: this is the purge time, which is to be entered here. If the calibration is started earlier, the gas lines will still contain other components and the calibration will be inaccurate.

Note!

*The line “*Purge time*” and the second menu page are only displayed if the “*Valves*” parameter in the INSTALLED OPTIONS menu is not set to* ***none****.*

"Valve assignment": This line is to assign internal and/or external valves the function of either zero or span gas valve. Instruments with internal valves are already factory setup.

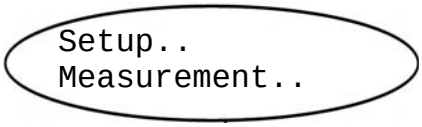
If any of these parameters need to be changed, ☞ X-STREAM X2 instruction manual for more information.

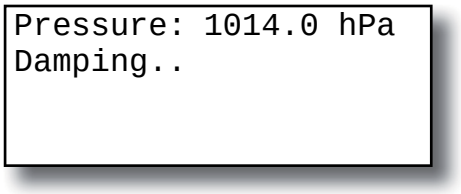


Page 2

3.9 Checking the settings

Press the LEFT key to return to the SETUP menu and from there open the MEASUREMENT MENU.





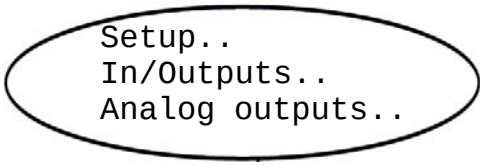
The first line allows the user to enter the current air pressure manually when no pressure sensor is installed, or to read the current pressure if a sensor is installed (☞ INSTALLED OPTIONS menu). The measurement unit is set in the DISPLAY SETUP menu.

If no pressure sensor is installed, enter the current air pressure here and adjust it when significant changes take place: this improves the accuracy of the instrument.

Signal damping (set in the DAMPING menu) allows the smoothing of the measuring signal, but also affects the reactio time of outputs and display. The factory setting is 0 seconds. and any value between 0 and 28 seconds can be set. In multi-channel units, the value for each channel must be entered separately.

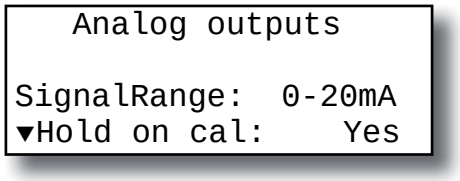
3.9.4 Setting the analog outputs

Press the LEFT key to return to the SETUP menu, and then open the IN/OUTPUTS menu. and from there the ANALOG OUTPUTS menu.



Page 1 shows settings which are relevant for all available analog outputs:

The “SignalRange” parameter sets the signal range for the analog outputs. This entry also allows the analog outputs to be set according to the NAMUR NE43 recommendations:



Page 1

The **0-20 mA** operational mode generates a 20 mA signal when the concentration is measured at the upper limit of the signal range. A 0 mA signal is generated when the sample gas concentration is at 0 (dead zero).

However, a severed cable would also result in a signal of 0, and so an external data capture system would not be able to recognise such a failure, instead registering a gas concentration of 0.

The usual method to detect a severed cable is to use an offset current: when the concentration reaches the lower limit of the range, an analog signal of 4 mA is sent. This allows the detection of a severed cable.

This (life zero) mode is activated by setting the “SignalRange” parameter to **4-20 mA**.

Operational modes conforming to NAMUR 43 recommendations (NE 43)

The modes described so far do not generate any signal which would allow the detection of a failure in the measurement system. In such a case, the behaviour of the output signal is undefined: either the last value is held, or a random value is sent. System failures cannot then be detected by an external data capture system.

NE43 includes recommendations for such cases, but also for the configuration of analog outputs to detect other measurement states. X-STREAM analyzers incorporate these recommendations as follows:

Setting the “SignalRange” parameter to a value other than **0-20 mA** or **4-20 mA** defines specific analog output signal levels for system failures. Since these values are not sent during normal operation, a data capture system is able to distinguish between the following situations:

- valid measured value (signal within range as per Table 5-1)
- signal out of range (signal slowly rises or falls towards the limits given in table 5-1, and holds that value until the concentration returns to within the measuring range).
- failure (signal out of range as per table 5-1, but not 0)
- severed cable (no signal (0 mA)),

Table 3-1 shows an overview of all available operational modes.

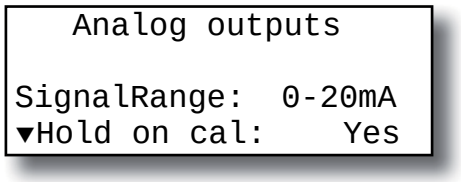
			Output signal, if				
"Signal-Range“	**Operation Mode**	**Failure Signal Level acc. NE 43**	**Measured value is valid**	**Measured value is below lower range limit**	**Measured value is above upper range limit**	**An internal failure occured**	**Cable is broken**
0-20 mA	Dead-Zero	-	0 ... 20 mA	< -19 mA	> 21.7 mA	undefined	0 mA
4-20 mA	Live-Zero	-	4 ... 20 mA	< -19 mA	> 21.7 mA	undefined	0 mA
0-20 mAL	similar Dead-Zero	below	0 ... 20 mA	-0.2 mA* (-1.8 … -0.01 mA)**	20.5 mA* (20.01 ... 21.5 mA)**	-2 mA	0 mA
4-20 mAL	similar Live-Zero	below	4 ... 20 mA	3.8 mA* (2.2 ...3.9 mA)**	20.5 mA* (20.01 ... 21.5 mA)**	2 mA	0 mA
0-20 mAH	similar Dead-Zero	above	0 ... 20 mA	-0.2 mA* (-1.8 … -0.01 mA)**	20.5 mA* (20.01 ... 21.5 mA)**	> 21.7 mA	0 mA
4-20 mAH	similar Live-Zero	above	4 ... 20 mA	3.8 mA* (2.2 ...3.9 mA)**	20.5 mA* (20.01 ... 21.5 mA)**	> 21.7 mA	0 mA

Note!

*The application of values marked * or ** depends on the setting of "SignalRange" (☞ Analog outputs menu, page 6-31).*

Tab. 3-1: Analog output signals: settings and operational modes

3.9 Checking the settings



Page 1

The behaviour of the outputs during calibration can also be set on page 1 of the ANALOG OUTPUTS menu (“Hold on cal” parameter):

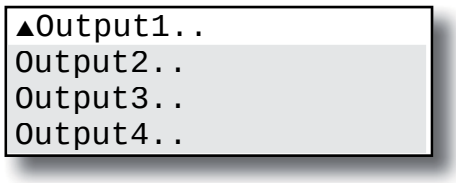
When the parameter is set to **Yes**, the following occurs during calibration:

- the analog outputs are “frozen”; i.e., the output signals remain constant, irrespective of the actual measured concentrations;
- concentration alarms, which may otherwise be set off by the concentrations of the calibration gases, are supressed.

When **No** is set, the analog output signal always corresponds to the actual measured value during calibration; this may mean that alarms are triggered when limits are exceeded.

Note!

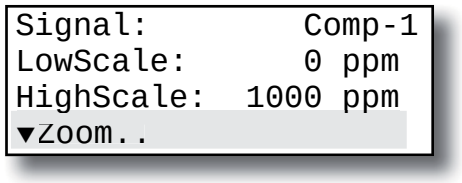
This behaviour may be undesireable if for example the unit is connected to a data capture system.



Page 2

The submenus on page 2 allow further analog output parameters to be set. The number of lines displayed will depend on the number of available anaogue outputs. All these submenus are identical:

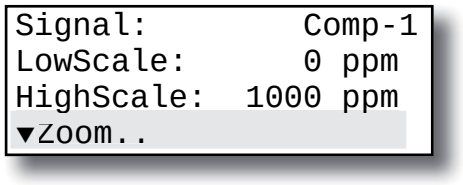
3.9 Checking the settings

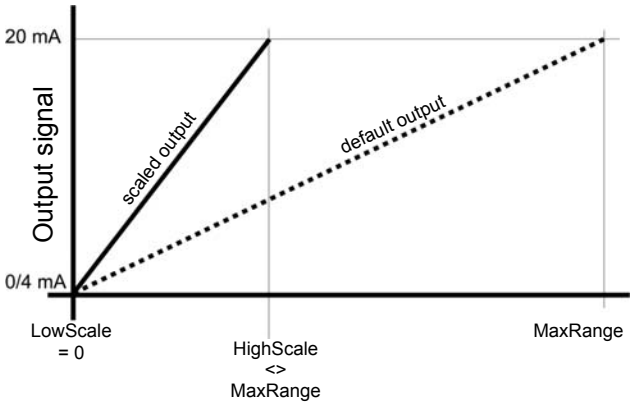


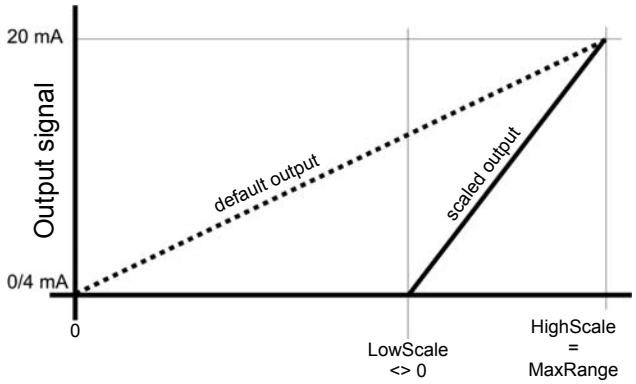
The “Signal” parameter defines the value to be sent to the selected output. The following options (partly dependent on the number of measuring channels and sensors installed) are available:

Value	Description
None	The analog signal is deactivated
0/4 mA	Either a 0 mA or 4 mA signal is generated, for example to be used to test the processing in a subsequent system. The actual type of generated signal is setup in the previous menu in the “SignalRange” line (☞ previous page).
20 mA	A 20 mA signal is generated, with which, for example, the processing of a signal can be tested.
Comp-1, Comp-2, Comp-3, Comp-4	Gas component of channel 1 to 4
Temp-1, Temp-2, Temp-3, Temp-4	Measured value from temperature sensor
Press-1, Press-2, Press-3, Press-4	Measured value from pressure sensor
Flow-1, Flow-2, Flow-3, Flow-4	Measured value from flow sensor
Zoom-C1, Zoom-C2, Zoom-C3, Zoom-C4	A “zoomed” signal is sent from the selected measuring channel (C1 to C4). If one of these options is selected, the “Zoom..” line appears in the menu (see above), which allows a zoom to be set.

3.9 Checking the settings







The “LowScale” and “HighScale” parameters allow a concentration value to be set to correspond to the lower (0 or 4 mA) or upper signal value (20 mA). The limits for these parameters are given by the "MinRange" and "MaxRange" parameters, specifying the physical measuring ranges of each instrument.

Concentrations outside the range defined by "LowScale" and "HighScale" are not supported by an analog output.

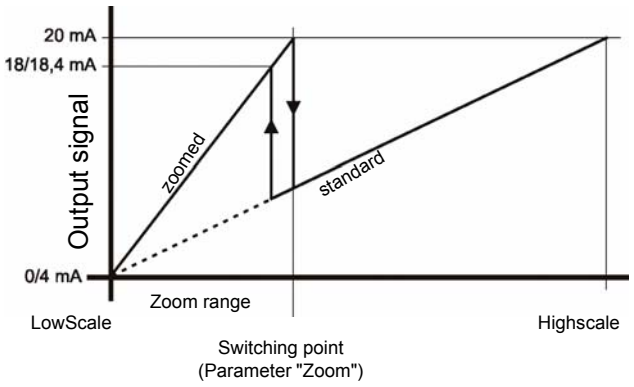
Note!
Scaling may affect the analog outputs accuracy!

Carefully read the information, given on (☞ page 3-28 before scaling analog outputs!

The last line on this menu allows the zoom function of the analog output to be set when that output has been assigned the **Zoom** signal.

This function allows a part of the signal range, specified by “LowScale” and “HighScale”, to be “magnified” on the analog output. Unlike the scaling function, here the output is switched automatically, the moment the switching point concentration is reached.

3.9 Checking the settings



This allows to increase the resolution (concentration/mA) for a selected range of the entire measuring range.

Note!
Zooming may affect the analog outputs accuracy!
Carefully read the information, given *page 3-28 before scaling analog outputs!*

X-STREAM analyzers support the zooming of analog outputs with the following options:

The zoom function can be activated in different ways; this is set in the “Switching” line:

- **Manual**: The operator must activate the zoom function manually, with either
  - the “Status” parameter in the last line of this menu

  or
  - a parameter in the CONTROL - ZOOM.. menu
- **Auto**: The analog output is switched depending on the measured concentration.
- **Inputs**: This requires setting a digital input. If an external signal is present at that input, the analog output is switched.

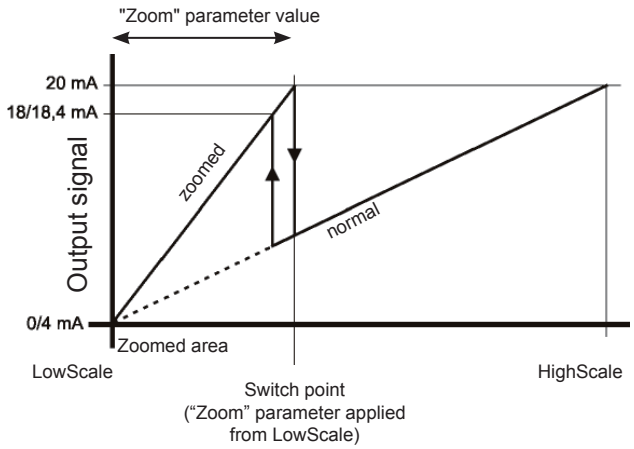
```
Switching:    Manual
Zoom:           50 %
Position:   LowScale
Status:          Off
```

In the second line of the menu the zoomed area can be set to between 1 and 99 % of the range previously set in the “LowScale” and “HighScale” functions.

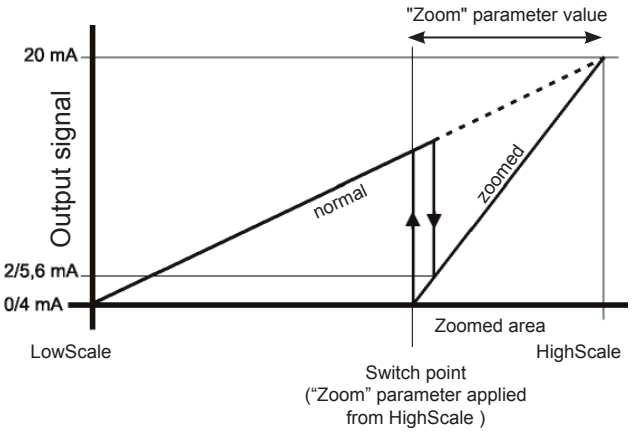
3.9 Checking the settings

Note!
For both figures given below, the "Zoom" parameter is set to the same value (here: about 37 %), but, depending on parameter "Position", is once applied from the LowScale end, and once from the HighScale end!

Position: LowScale



Position: HighScale



Additionally, the “Position” parameter allows the X-STREAM analyzer to zoom either the lower or the higher end of the range.

If the parameter is set to **LowScale**, the zoomed area is at the lower end of the measurement range.

When switching is set to **automatic**, a hysteresis of 10 % of the output signal range is applied to the switch point:

Output signal range	Switch point in mA, measured in zoomed area	
	rising concentration	falling concentration
0 ... 20 mA	20 mA	18 mA
4 ... 20 mA	20 mA	18.4 mA

If the parameter is set to **HighScale**, the zoomed area is at the upper end of the measurement range.

When switching is set to **automatic**, a hysteresis of 10 % of the output signal range is applied to the switch point:

Output signal range	Switch point in mA, measured in zoomed area	
	rising concentration	falling concentration
0 ... 20 mA	2 mA	0 mA
4 ... 20 mA	5,6 mA	4 mA

3.9.4.1 References to the accuracy of the analog outputs

Scaling or zooming relates to the analog outputs only and does not affect front panel display nor serial (Modbus) interface output of measuring results!

X-STREAM analyzers are shipped with predefined physical measuring ranges, as listed e.g. in the INFO-RANGES.. menu (parameters „MinRange“ and „MaxRange“):

All measurement specifications like repeatability, drift, etc. are related to these physical measuring ranges only! Scaling or zooming cannot improve analog output specifications to values better than specified by the physical measuring ranges!

Furthermore the tables apply only to analog output scaling meeting the form „0 ... MinRange“ to „0... MaxRange“ (means always **0** as "LowScale" value)!

If "LowScale" is set to a value other than **0,** specifications are not longer applicable to **analog outputs**! The same applies to the zoom parameter "Position" (☞ previous page), if set to **HighScale**!

Example
Analyzer data:
MinRange: 500 ppm
MaxRange: 5000 ppm

	Low Scale	***High Scale***	***Statement***
Scaling settings, where tables are applicable	*0*	*500*	*Parameter "LowScale" is **0** and "HighScale" within the limits of "MinRange" and "MaxRange"*
	0	*1000*	
	0	*2375*	
	0	*5000*	
Scaling settings, where tables are NOT applicable	*100*	*500*	*Parameter "LowScale" different **0***
	500	*1000*	
	375	*2500*	
	4000	*5000*	
	0	*300*	*Parameter "HighScale" lower than "MinRange"*
	0	*5100*	*Parameter "HighScale" higher than "MinRange"*

Tab. 3-2: Analog outputs - Scaling (examples)

3.9.5 Setting concentration alarms

Note!

If concentration alarms are not being used,go straight to page 5-34.

Press the LEFT key until the SETUP menu is displayed, then select “Alarms” and open the submenu. If you are using a multi-channel analyzer, select the channel to be modified.


```
Level1:      100 ppm
 Function:       Low
Level2:      500 ppm
 Function:      High
```

Two concentration limits can be set for each channel. Valid settings for limit levels depend on the measuring range and the value of the “SpanRange” parameter (☞ next page):

An error message is displayed if an invalid setting is input.

Should the measured concentration go beyond one of the limits, a message is displayed in the fourth line of the measurement display and the corresponding digital output is activated if programmed to do so.

The “SpanRange” parameter is displayed in the INFO - RANGE menu and is always given as the percentage of the upper range limit of the selected channel.

The “SpanRange” parameter is preset and cannot be modified by the operator. It is used for various functions:

Firstly, this parameter determines the **maximum possible value of the span gas**:

A SpanRange of e.g. 220 % means that the greatest permitted value of the span gas for the selected channel is 220 % of the maximum measuring range.

Example 1:

The oxygen measuring range is 10 %. If the SpanRange is set to 220 %, the maximum permissable span gas concentration is 22 %, enabling to use ambient air (21 % O_2) as a span gas.

Furthermore, the “SpanRange” parameter determines the **range for concentration limits**. 100 percentage points are subtracted from the value of this parameter: The result determines by how much above or below the measuring range limits may be set.

Example 2:

Range upper limit: 1000 ppm,

SpanRange: 100 %.

This means that the span gas range coincides with the measuring range. Limits may not lie outside this range: only limits betweeb 0 ppm and 1000 ppm are admissable.

Example 4:

Range upper limit: 1000 ppm,

SpanRange: 110 %.

This means that the span gas range exceeds the upper measuring range limit by 10 %. The lower limit may therefore be 10 % below the lower range limit: limits of between -100 ppm and +1100 ppm are admissable.

Example 4:

Range upper limit: 1000 ppm,

SpanRange: 220 %.

This means that the span gas range exceeds the measuring range by 120 % in both directions (220 % - 100 % = 120 %): the limits may be set between -1200 ppm (-120 % of 1000 ppm) and +2200 ppm (+220 % of 1000 ppm).

	Range: 0 ... 1000 ppm				
	Parameter "Span range"	**Span range exceeds measuring range by**		**Permissible concentration limits**	
		relative value	**absolute value**	**lower limit**	**upper limit**
Example 2 (see text)	100 %	0 %	0 ppm	0 ppm	1000 ppm
Example 3 (see text)	110 %	10 %	100 ppm	-100 ppm	1100 ppm
Example 4 (see text)	220 %	120 %	1200 ppm	-1200 ppm	2200 ppm

Tab. 3-3: Influence of “SpanRange” parameter on concentration alarm limits

The function of each limit can be set in the “Function” parameter:

Low: An alarm is triggered if the measured value drops below the set limit.
The alarm relay is activated.

High: An alarm is triggered if the measured value exceeds the set limit.
The alarm relay is activated.

Off: The alarm function is deactivated and the corresponding relay is not activated (remains dead).

The “Function” parameter also supports the “Failsafe” operational mode:

Fail**s**afe (**FS**) means that the alarm relay is activated during **normal operation**. This is the reverse of the usual function in which a relay is activated when an alarm is triggered.

In FS mode, if an alarm is triggered, the relay is switched off. In this way, an alarm is also triggered if, for example, the analyzer loses power. Cable breaks can also be detected in this way. Options are:

Low FS: An alarm is triggered if the measured value drops below the set limit.
The alarm relay is deactivated.

High FS: An alarm is triggered if the measured value exceeds the set limit.
The alarm relay is deactivated.

Off FS: The alarm function is deactivated and the corresponding relay is activated.

Various different behaviours can be programmed using combinations of operational modes and limit settings:

- Window mode: An alarm is triggered, if the concentration drops below or exceeds the limits of a concentration window, .
- High pre-alarm and main alarm: A pre-alarm and a main alarm are set for rising concentrations.
- Low pre-alarm and main alarm: A pre-alarm and a main alarm are set for falling concentraions.

For more detailed information on alarm settings, please see the following instructions and illustrations.

Note!

Off FS *is preset by default unless otherwise specified on time of order.*

3.9 Checking the settings

- **Defining a window**

If a window between an upper and a lower limit is defined, an alarm is issued when the concentration exceeds the upper level (area D) or drops below the lower limit (area B).

Only one alarm can be active per channel at any one time.

Standard mode:

An alarm results in the assigned relay being activated.

Settings:

- Level 1 > Level 2
- Level 1-Function: High
- Level 2-Function: Low

Failsafe mode:

An alarm results in the assigned relay being deactivated.

Settings:

- Level 1 > Level 2
- Level 1-Function: High FS
- Level 2-Function: Low FS

If an alarm is active, a corresponding message is displayed in line 4 of the measurement display.

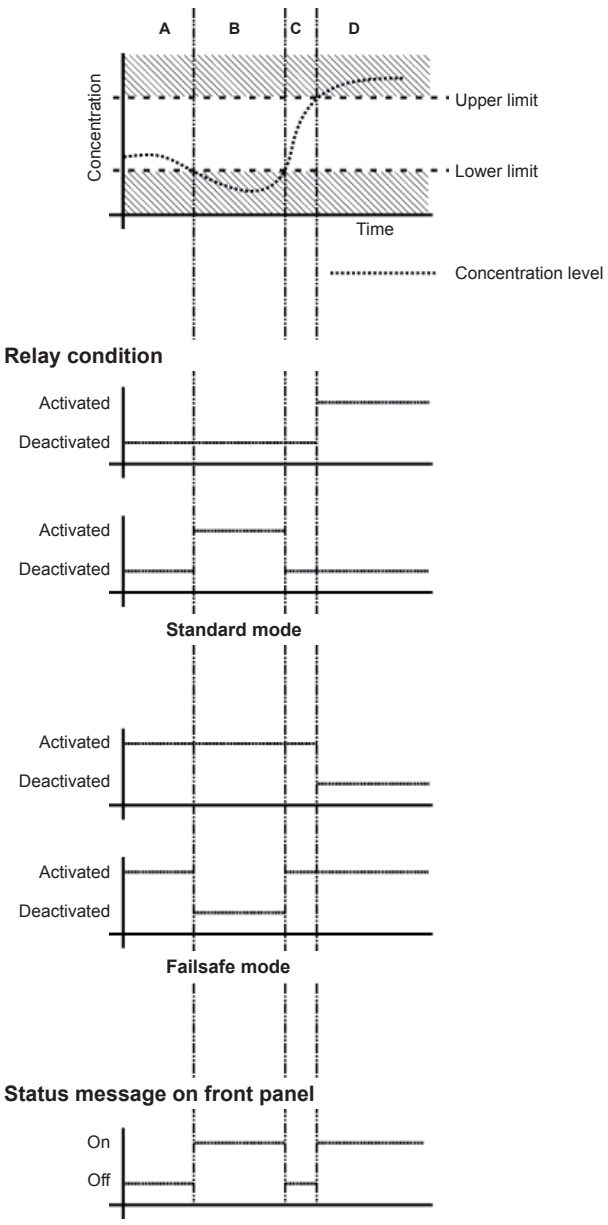


Fig. 3-3: Limits defining a window for valid concentrations

- **Defining high pre-alarm and main alarm**

If two upper limits are set with one limit higher than the other, a pre-alarm is triggered when the measured concentration exceeds the first limit (area B). If no corrrective measures are taken and the concentration exceeds the second limit (area C), a main alarm is triggered.

Up to two alarms may be active per channel at any one time.

Standard mode:

An alarm results in the assigned relay being activated.

Settings:

- Level 1 > Level 2
- Level 1-Function: High
- Level 2-Function: High

Failsafe mode:

An alarm results in the assigned relay being deactivated.

Settings:

- Level 1 > Level 2
- Level 1-Function: High FS
- Level 2-Function: High FS

If an alarm is active, a corresponding message is displayed in line 4 of the measurement display.

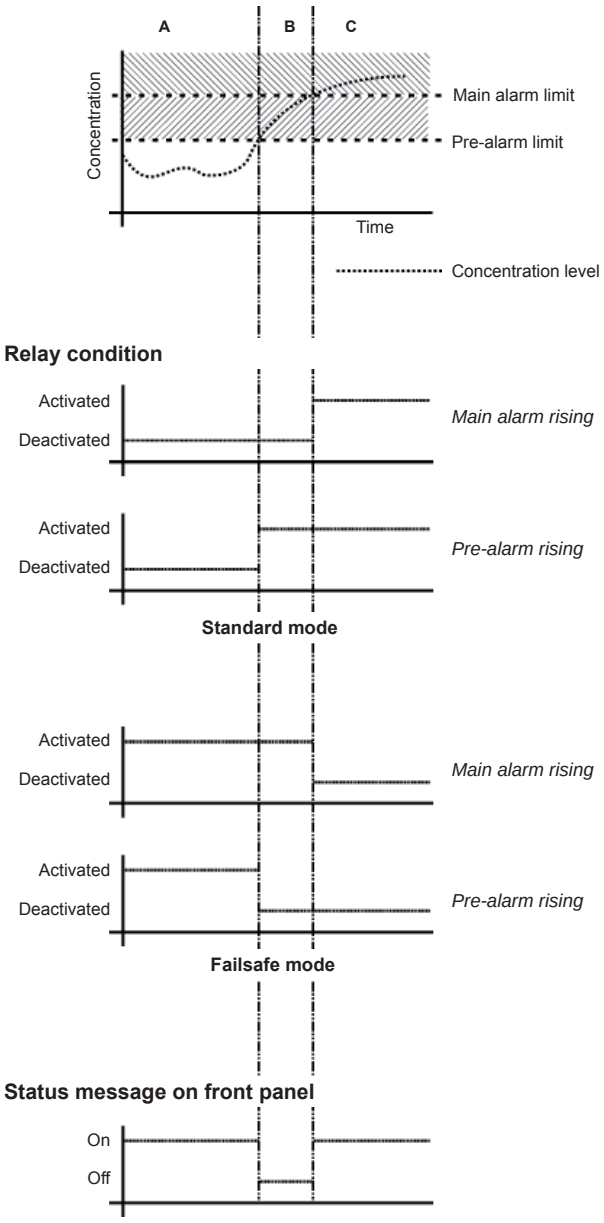


Fig. 3-4: High pre-alarm and main alarm

3.9 Checking the settings

- **Defining low pre-alarm and main alarm**

If two lower limits are set with one limit lower than the other, a pre-alarm is triggered when the measured concentration falls below the first limit (area B). If no corrective measures are taken and the concentration falls below the second level (area C), a main alarm is triggered.

Up to two alarms may be active per channel at any one time.

Standard mode:

An alarm results in the assigned relay being activated.

Settings:

- Level 1 > Level 2
- Level 1-Function: Low
- Level 2-Function: Low

Failsafe mode:

An alarm results in the assigned relay being deactivated.

Settings:

- Level 1 > Level 2
- Level 1-Function: Low FS
- Level 2-Function: Low FS

If an alarm is active, a corresponding message is displayed in line 4 of the measurement display.

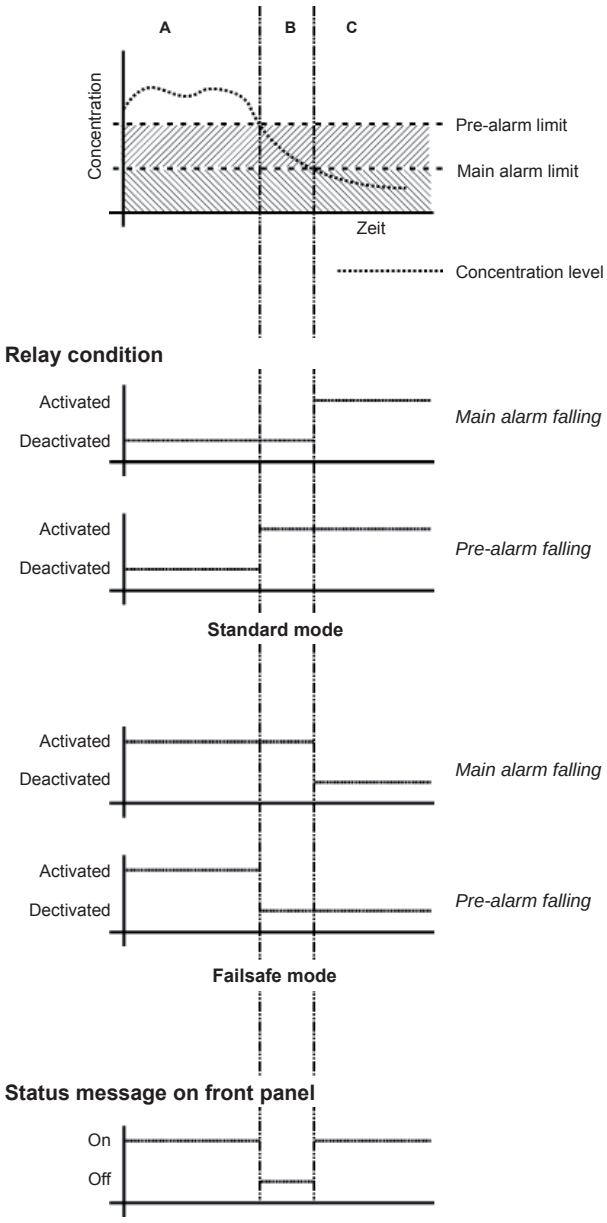


Fig. 3-5: Low pre-alarm and main alarm

3.9.6 Backing up the settings

The most important parameters have now been checked and the unit's settings adjusted to your needs.

A backup copy of these configuration data can now be made and saved.

Press the LEFT key until the SETUP menu is displayed, and from there open the SAVE-LOAD menu.

```
▲Installed options..
Communication..
Alarms..
Save-Load..
```

Page 2

```
      Save-Load
CfgData > SvcPort!
SvcPort > CfgData..
▼Verify!
```

Page 1

Press the DOWN key to reach page 2.

```
▲
FactData > CfgData..
CfgData > UserData..
UserData > CfgData..
```

Page 2

Now select the "CfgData > UserData" line and press ENTER.

```
  CfgData>UserData
  Are you sure?
No!
Yes!
```

A new window comes up to confirm the action: Select the line **Yes!** and press the ENTER key: Another windows shows the current status.

3.9 Checking the settings

```
   Copying data
  - PLEASE WAIT -

Procedure     X:E000
```

The unit is now saving a copy of the current configuration data (the so-called **CfgData** dataset) in a special area of memory labelled **UserData**. This dataset can be used to reset the unit later if, for example, later incorrect settings render the unit unusable.

If, during the analyzer startup up, the **CfgData** checksum is found to be incorrect, the **UserData** dataset is loaded, to ensure the instrument remains usable.

Further changes to the configuration will only be stored in the **CfgData** dataset until manually saved to **UserData**.

```
        (i)

 -COMMAND EXECUTED-
```

Upon completion of the saving process a confirmation message will be displayed.

You have now completed checking the analyzer setup: Press the MEASURE key to return to the measurement display.

We recommend to perform at least a zero calibration, after startup of the instrument, to ensure proper measuring results.

See Chapter 4 for information on how to perform a manual calibration.

If your instrument features a valve block, ☞ X-STREAM X2 instruction manual for a comprehensive description of calibration procedures.

Chapter 4
Service and Maintenance

Note!

This chapter deals with service and maintenance procedures related to explosion protection only!

More detailled instructions about servicing and maintaining general purpose components of X-STREAM gas analyzers are subject of the X-STREAM analyzer instruction manual.

WARNING

POSSIBLE EXPLOSION HAZARD

Inspection, maintenance and service must be carried out considering all related standards e.g. for „Inspection and maintenance of electrical installations in hazardous areas“.

WARNING

POSSIBLE EXPLOSION HAZARD

Service or replacement of safety related components or requiring to open the instrument are permitted only if no hazardous atmosphere is present and both the instrument and connected circuitry are de-energized!

Depending on the local regulation this may require a competent hot work supervisor to issue a hot work permit.

WARNING

POSSIBLE EXPLOSION HAZARD

After maintenance or replacement of parts concerning explosion protection an authority on explosion protection has to verify that the analyzer still meets the requirements for explosion protection before it is switched on again.

Parts essential for explosion protection must not be repaired, they must be replaced if defective!

The authority has to issue a certificate for this and/or attach a test label to the equipment before startup after maintenance or replacement of parts.

4 Service and Maintenance

WARNING

FLAMMABLE GASES - EXPLOSION HAZARD

Leaks may cause explosion when measuring flammable gases!

When measuring flammable gases it is recommended to perform a leak test on all gas paths, connections and components before startup or applying power. Leak tests should be carried out on a 2 month‘s regular basis and after repair/maintenance.

See the analyzer instruction manual for instructions on how to carry out leak tests.

WARNING

HAZARDOUS GASES

When measuring flammable and / or toxic gases it is recommended to purge the system with air or an inert gas, e.g. nitrogen, prior to opening the gas paths.

Violation may cause an explosion and/or personal injury or death!

WARNING

EXPLOSION HAZARD

Modifications affecting the integrity of type of protection (e.g. affixing addtional threads, replacing the flame arrestors by other model) are NOT PERMITTED!

Violation may cause an explosion and/or personal injury or death!

Contents

4.1 Verifications and Tests

Modifications made on the electrical apparatus affecting the integrity of the type of protection or the temperature of the apparatus shall be permitted only if the modified apparatus is resubmitted to a testing station.

In the case of repairs affecting the type of protection, the parts which have been repaired should be subjected to new routine verifications and tests. These tests need not necessarily be made by the manufacturer.

WARNING

EXPLOSION HAZARD

Do not continue to operate a damaged analyzer!

Call for service!

Violation may cause an explosion and/or personal injury or death!

4.1.1 Routine Tests on Analyzer

The following tests shall be performed on a regular basis:

4.1.1.1 Visual Inspection

The instrument shall be visually checked for damages to the enclosure, flange and external analyzer components.

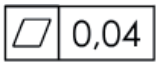
Especially take care that there are no scratches on the flanges surfaces!

See section 4.1.1.2 for more information on how to verify the flanges‘ compliances with the certification requirements, if the results of the visual inspection is not clear.

Compare the installed components with the list shown in section 4.2 of this manual: Unauthorized replacement of parts is not permitted, may affect the safety of the analyzer and violates the certification!

4.1.1.2 Detailed Inspection

- Check cable inlets (glands or conduits): If the cable moves, e. g. thighten the cap nut. If tightening is ineffective, replace the cable gland or conduit.
  Also consider the original manufacturer‘s instructions for maintenance!
- Damages to the flanges have to be seen critical, as the flanges act as flame paths. If need be, submit the unit to one or more of the following measurements to confirm compliance with the certification requirements:
  - Evenness of flange surfaces:
    max. accepted 0.04 mm per flange



  - Roughness Ra of flanges:
    max. accepted 6.3 µm

  If one or both of above measurements show non-compliances,
  - take the analyzer out of service by disconnecting all electrical connections
  - submit the unit to the Emerson service center or to another company certified for maintenance for flameproof (Ex d) equipment..

4.1.2 Tests on Flame Arrestors



WARNING

EXPLOSION HAZARD AND HAZARD FROM GASES !

Maintaining the FA shall be carried out considering all applicable safety and legislative rules. Maintenance should be carried out by instructed and trained personnel only!

Before opening gas paths they must be purged with safe air or neutral gas (N_2) to avoid hazards caused by toxic, flammable, explosive or harmful to health sample gas components!

Maintenance is limited to performing visual inspections, leak testing and pressure drop tests on at least a regular basis. The time interval has to be operator defined, considering operating conditions and composition of supplied gases.

The flame arrestor is completely welded, no inner parts are user accessible. Therefore the flame arrestor has to be replaced by a new one, if

- a fire occurred on the flame arrestor element
- the housing or the fittings show visible mechanical damages
- contamination of inner elements is detected (e.g. by pressure drop test)
- the flame arrestor did not pass leak testing

4.1.2.1 Leak Testing

The following procedure describes how to perform a leak test with the flame arrestor installed at the instrument.

Required tools

- Manometer for max. 7.25 psi (500 mbar)
- Stop valve

Procedure

- Connect the manometer to the analyzer‘s sample gas outlet to the flame arrestor´s outlet fitting (disconnect external gas lines).
- Install the stop valve between gas inlet fitting and a Nitrogen (N_2) supply.
- Open the stop valve until the internal gas path is under pressure of approx. 0.725 psi/50 mbar (corresponding to approx. 19.7 inch/500 mm water column)
- Close the stop valve. After a short time for the pressure to balance, the level must not change over a time period of approx. 5 minutes!

When using a water filled u-tube manometer prevent water from entering backwards into the flame arrestor!

Don‘t exceed the maximum pressure applicable to the analyzer as specified in it´s instruction manual!

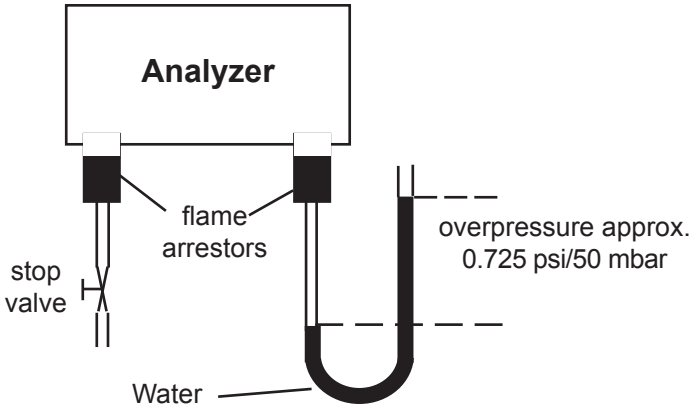


Fig. 4-1: Leak Testing with U-tube Manometer (Flame arrestor)

4.1.2.2 Pressure Drop Test

To measure the pressure drop at a flame arrestor

- disconnect internal and external gas lines
- connect a flow meter in series to the flame arrestor
- connect an air or nitrogen supply to the flow meter
- connect a manometer in a way to measure the pressure at the flame arrestor inlet against the outlet
- adjust the flow to **1 l/min** and compare the resulting pressure drop to the following **reference value: (5.1 ± 1) hPa**.

Replace the flame arrestor if the measured pressure value differs more than 10 % from the reference value given above.

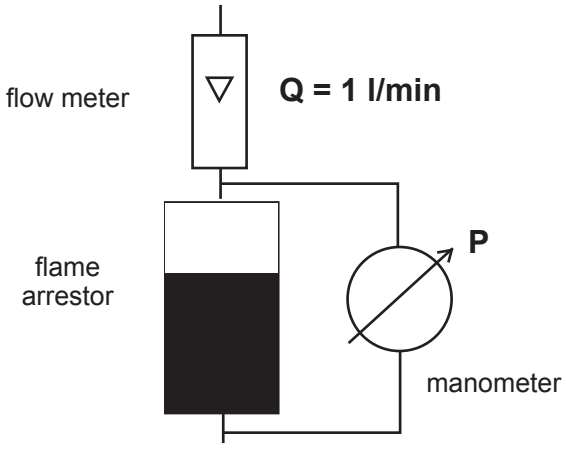


Fig. 4-2: Pressure Drop Test

4.2 Replacement of Parts

WARNING

EXPLOSION HAZARD !

Replacement of parts found defective is permitted only by using original parts, or suitable approved parts, if permitted by the table below!

Violation voids the approvals and may cause explosions!

Parts beside the cast enclosure, the safety of the X-STREAM X2FD relies on:

Specifically for ATEX approved analyzers	
Cable glands **NOT FOR analyzers for vapor recovery applications!**	Any ATEX approved flameproof type without compound, suitable according EN 60079-14, e. g. - 8163/2 A2F M20 by Stahl
Cable glands **for all ATEX approved variations**	Any ATEX approved flameproof type with compound, suitable according EN 60079-14, e. g. - ADE 1FC ISO 20 No. 05 by CAPRI, or - 8163/2–PXSS2K M20 by Stahl
Cable entries stopping plugs	Any ATEX approved flameproof type, e. g. - 120209 by CAPRI Male thread: M20 x 1,5 Spare part # ETC01754

4.2 Replacement of Parts

Specifically for CSA-C/US approved analyzers	
Metric-to-NPT adapters	Any CSA-C/US certified flameproof type Male thread: M20 x 1,5 Female thread: ½“ or ¾“ per request e.g. - AD-U series by Redapt Ltd. ¾“ version spare part # ETC01877
Cable entries stopping plugs	Any CSA-C/US certifed flameproof type Male thread: M20 x 1,5 e.g. - PD-U by Redapt Ltd. Spare part # ETC01878

For ATEX and CSA analyzers	
Flame arrestors	Type: FA 01, FA 02, FA 03 by EMERSON PROCESS MANAGEMENT FA 01: Spare part # 42716625 FA 02: Spare part # 42716625-V1 FA 03: Spare part # 42716625-V2
Enclosure screws	Material: stainless steel A2-70 Thread: M16 x 45 ISO 4762 A2 Modified to drawing 4.271-6945 by EMERSON PROCESS MANAGEMENT Spare part # 42716945

4.3 Vapor Recovery Application - Special Information

WARNING

EXPLOSION HAZARD BY HOT COMPONENTS

Consider the waiting time statement on the front door label before opening!

Do not open the instrument when energized.

Ensure that external circuitry is disconnected or de-energized before opening the instrument.

The waiting time is calculated to ensure, temperatures of hot components are below the analyzer temperature class for hazardous areas!

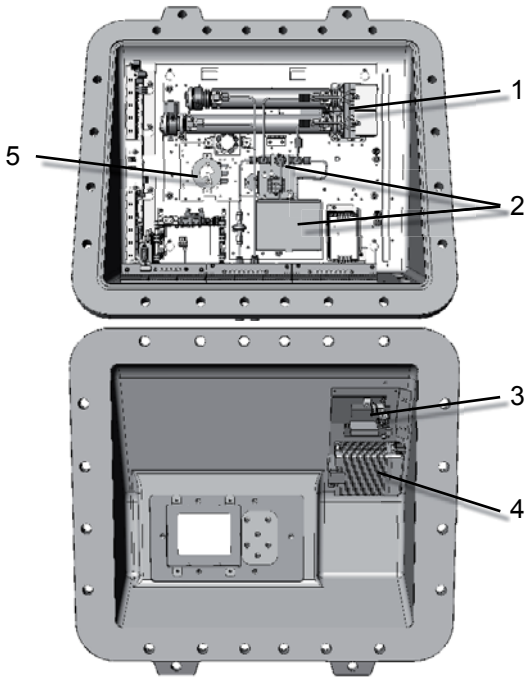
Accessible components still may be hot and harmful to humans!

X2FD analyzers, intended for vapor recovery applications (measuring CH_4 and non-CH_4), contain additional components and have a special configuration:

- Below the two IR channels a converter assembly is installed, thermostated to about 270 °C.
- Inside the front door a second power supply unit and another electronics board is installed to supply the converter.

An overtemperature switch limits the temperature of the converter in case of failure of the temperature control board.

Inside the converter assembly there is a small stainless steel vessel, filled with catalytic converter material, which is a consumable and needs to be replaced depending on the required converter efficiency:



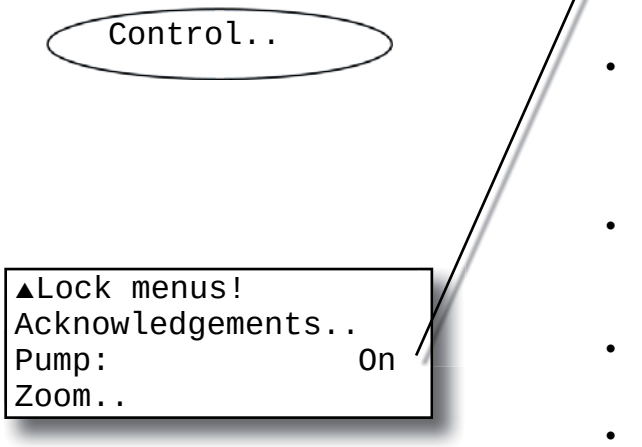
1: IR measurement
2: High temperature converter assembly
3: Additional temperature control
4: Additional power supply unit
5: Overtemperature switch

Fig. 4-3: Vapor recovery application setup

4.3 Vapor Recovery Application - Special Information

4.3.1 Determining the converter efficiency

Note!
The analyzer is configured to measure CH_4 at channel 1 (CH1), with the converter installed in front of its measurement cell.
The total content of hydorcarbons (C_nH_m) within the sample gas is measured at channel 2 (CH2).



- Ensure *„Pump“* within the control menu is set to **On**.

  Note!
  „Pump“ *is used to disable (**Off**) or enable (**On**) the gas flow through the converter!*
- Apply the calibration gas for CH2 (e. g. C_6H_{14}). As CH1 and CH2 inside the analyzer are piped in parallel, this gas now goes through the converter.
- When stabilized, write down the measurement reading of CH1 (CH_4 channel **with converter**)
- Now change *„Pump“* to **Off**, to let the gas bypass the converter.
- When stabilized, write down the measurement reading of CH1 (CH_4 channel **without converter**)
- Calculate the converter efficiency:

$$\eta = 1 - \frac{\text{reading with converter}}{\text{reading without converter}}$$

- If the result is below 0.9 (90 %), the converter material should be replaced as described in the next section.

Part number for converter replacement material: ETC02579

Notes!
While „Pump“ *is set to* **Off**, *the NAMUR status* Function Check *is actvated.*

Don‘t forget to set „Pump“ *to **On** again, after finishing the calculation of converter efficieny!*

4.3 Vapor Recovery Application - Special Information

4.3.2 Replacement Instructions

To replace the converter material:

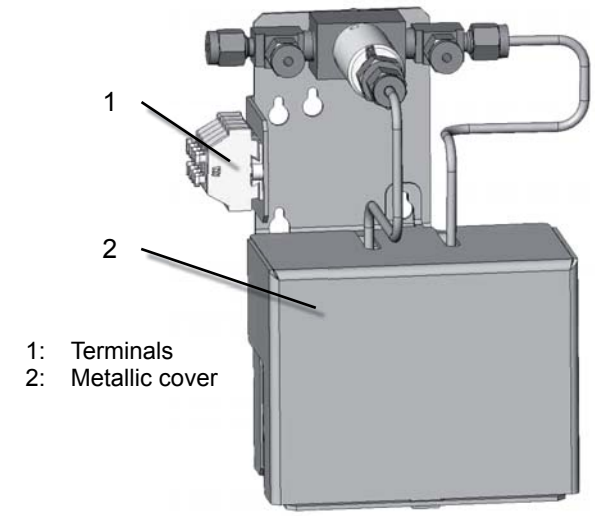
- consider all applicable safety instructions and measures to switch off the analyzer and connected signals
- read the waiting time label on the front door and wait for the time specified
- carefully open the front door (High weight! Take care not to damage the door!)

The converter is installed behind a metallic cover, which is fixed with a screw nut and a key (Fig. 4-5). Loosen the screw nut a few turns (don‘t remove it) and push the cover upwards until the key is free to remove the cover (Fig. 4-6).

Now you have access to the inner thermostated jacket (Fig. 4-6).

Heating elements are inside the isolating jacket!

Accessible components still may be hot and harmful to humans!



1: Terminals
2: Metallic cover

Fig. 4-4: Converter assembly

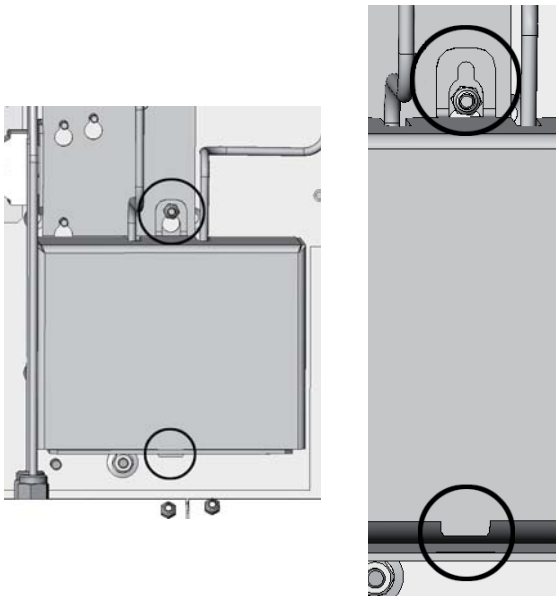


Fig. 4-5: Converter assembly details

4.3 Vapor Recovery Application - Special Information

1. Loosen the lace cord that keeps the jacket closed.
2. Open the jacket to get access to the converter.
3. Loosen the union nuts of the fittings that connect the gas lines from the converter to the solenoid valve (Fig. 4-6).

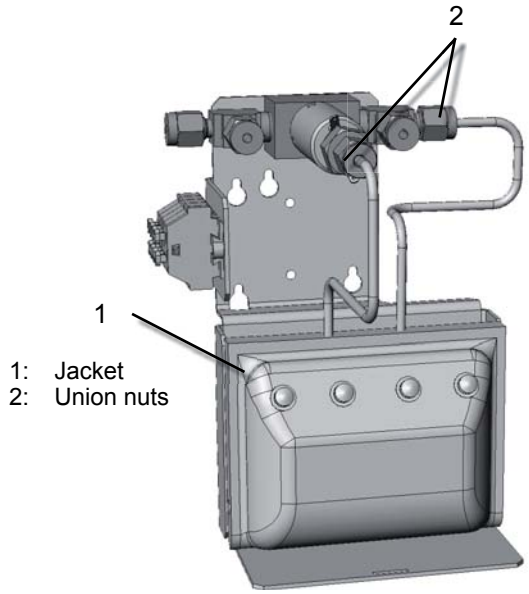
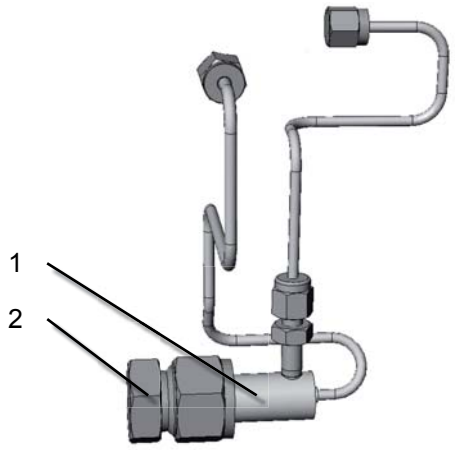


Fig. 4-6: Heated jacket

4. Take the converter vessel with connected gas lines out of jacket and analyzer.



1: Converter vessel
2: End cap

Fig. 4-7: Converter, laid open

4.3 Vapor Recovery Application - Special Information

5. Remove the end cap.

6. Behind the washer, the vessel is filled with converter material. Remove the washer.

7. Remove this old material and fill the vessel with new converter material, considering to
   - hold the vessel vertically while filling
   - completely fill the vessel
   - keep the inner pipe free of converter material.
8. Put the washer on top of the vessel / new material.
9. Install the end cap.

10. Insert the converter vessel into the jacket and place it into the assembly.

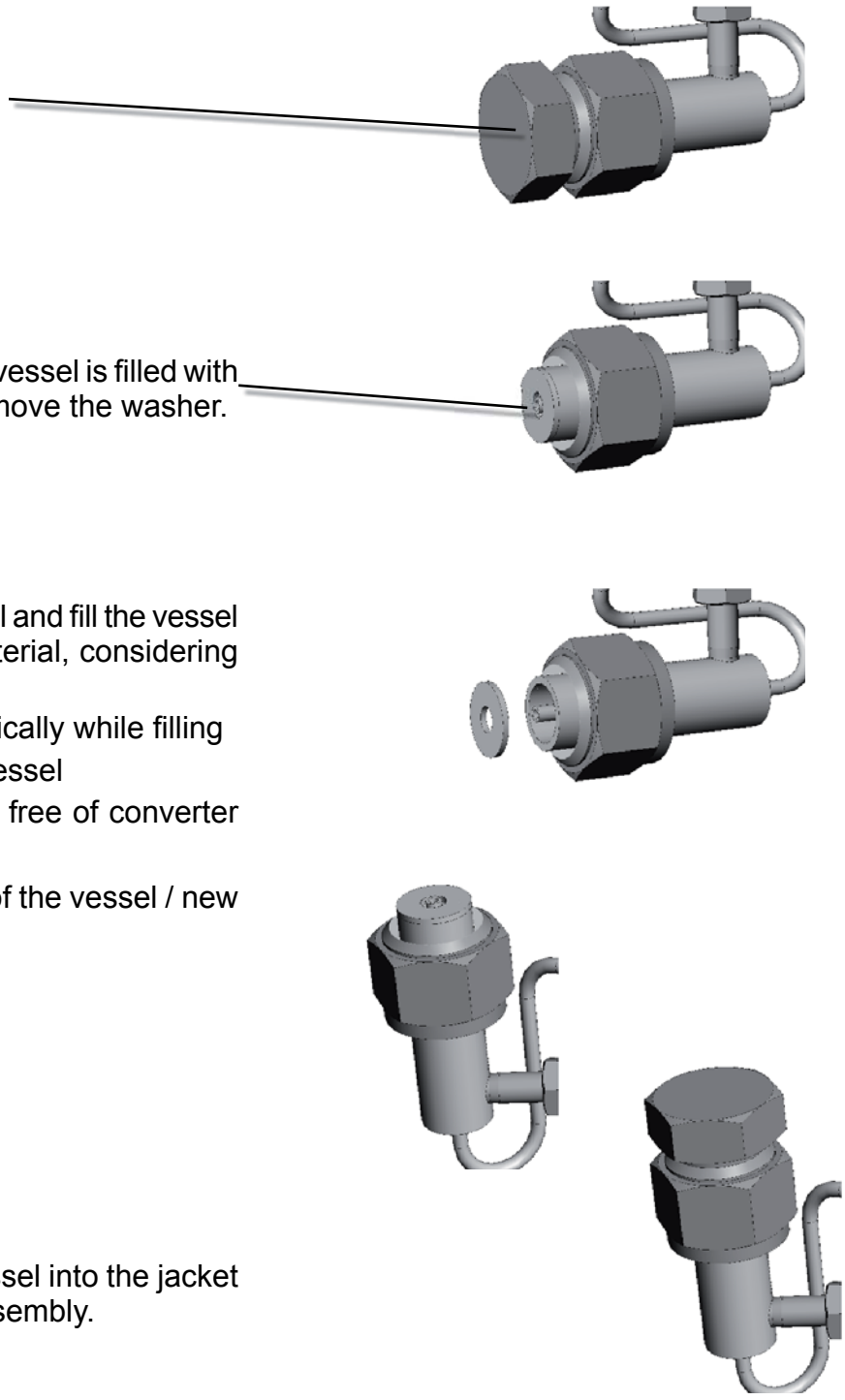
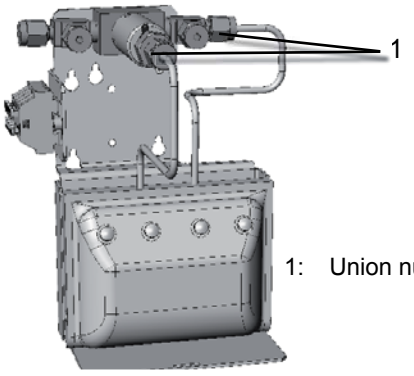


Fig. 4-8: Converter filling sequence

4.3 Vapor Recovery Application - Special Information

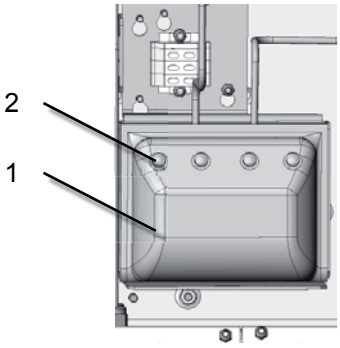
11. Connect the open gas lines to the fittings of the solenoid valve (Fig. 4-9). Carefully fix the union nuts.
12. At this point we recommend to perform a leak test (page 3-2), to ensure the gas connections are tight! If some are not, they are accessible now.



1: Union nuts

Fig. 4-9: Jacket in converter assembly

13. Lay the lace cord around the boot hooks and close the jacket (Fig. 4-10).



1: Jacket
2: Boot hooks (8 pcs)

Fig. 4-10: Heated jacket

14. Install the metallic cover in such a way, that when it is pushed downwards, the key fits into the small slot and the screw nut is on top of the butt strap (Fig. 4-11).
15. Fix the cover with the screw nut.
16. Make sure all installation has been done properly and close the front door. Fix the door by means of ALL 20 screws.

    Tightening torque:

    25 Nm (221 in.lb)

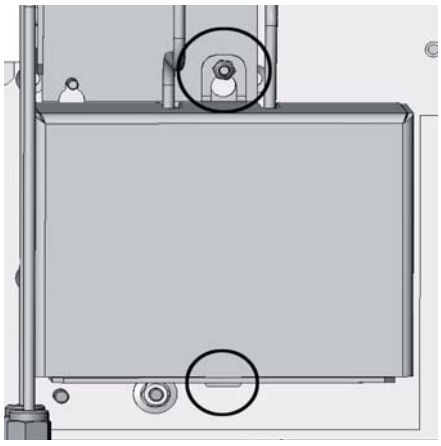


Fig. 4-11: Converter metallic cover

17. You‘re done!

4.3.3 Failure Situation

Separated from the converter assembly an independent over temperature protection device is installed. This device is setup to take control of the jacket heaters if the measured temperature inside the jacket exceeds about 310 °C (590 °F), e. g. due to a failure with the temperature control board.

The overtemperature device is self-resetting, so the heaters are not continuously disconnected from power, but only as long as the measured temperature is above the limit. If the temperature goes below this limit, the jacket heaters again are powered. This behaviour results in a failure operating temperature of 300 to 315 °C (572 to 600 °F).

Also, the overtemperature protection device is connect to a X-STREAM digital input. This digital input is setup to provide a failure signal if the overtemperature protection device has taken control of the jacket heaters.

If a failure status is active, check the jacket heaters temperature control. Continuously operating the converter material at a temperature above 280 °C (536 °F) affects the concentration measurement accuracy!

WARNING

EXPLOSION HAZARD BY HOT COMPONENTS

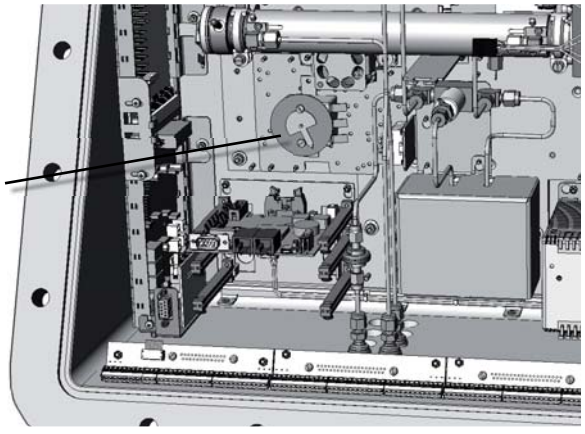
Consider the waiting time statement on the front door label before opening!

Do not open the instrument when energized.

Ensure that external circuitry is disconnected or de-energized before opening the instrument.

The waiting time is calculated to ensure, temperatures of hot components are below the analyzer temperature class for hazardous areas!

Accessible components still may be hot and harmful to humans!



1: Overtemperature protection device

Fig. 4-12: Location of Overtemperature Protection Device

4.4 Perform a Calibration

The following steps describe, how to perform a manual calibration. If your instrument features a valve block, ☞ X-STREAM X2 instruction manual for a comprehensive description of calibration procedures.

Note!

To achieve best and proper measuring results, it is recommended to perform zero and span calibrations on a regular weekly basis.

Also, a span calibration must always be preceded by a zero calibration!

Zero calibration

To perform a zero calibration supply either nitrogen (N_2) or another suitable zero gas [conditioned ambient air or industrial air (NOT for oxygen measurement!)] to the gas path. The concentration of the component of interest is specified as set point and during zero calibration, the actual value is assigned this concentration

Span calibration

Supply span gases with concentrations of 80 % to 110 % of the upper measuring range limit to the gas path. (*Using lower concentrations may decrease accuracy when measuring above the span gas concentration)* The concentration of the component of interest is specified as set point, and during span calibration the actual value is assigned this concentration!

Note!

If the oxygen concentration is known, ambient air may be used for an oxygen channel span calibration.

4.4 Perform a Calibration

4.4.1 Preparing Calibrations

CAUTION

OPERATION AT LOW TEMPERATURES

When operating an instrument at temperatures below 0 °C (32 °F), do NOT apply gas nor operate an internal pump before the warmup time has elapsed!

Violation may result in condensation inside the gas paths or damaged pump diaphragm!

Do NOT calibrate the TRACE OXYGEN sensor without prior reading the instructions!

Together with each sensor an installation manual is shipped, also giving comprehensive calibration information.

Read these information prior intending to activate calibration procedures!

Do NOT calibrate the TRACE MOISTURE sensor!

The sensor is completely calibrated with all calibration data stored in its flash memory and does not require recalibration:

If the sensor is included into a calibration procedure, it might end up with a wrong calibration and unusable sensor. Therefore the analyzer's trace moisture measurement channel has to be excluded from any autocalibration procedures! **You have to care for not calibrating the trace moisture sensor each time a calibration is performed!**

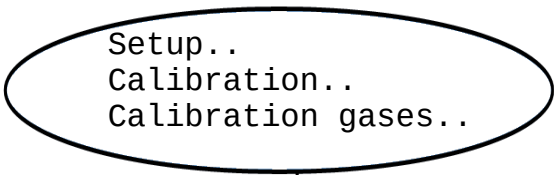
For proper measurement results we recommend to exchange the sensor regularly after 12 months of operation. For instructions on how to exchange, ☞ X-STREAM X2 instruction manual

Before performing any actions, make sure the required calibration gas is applied and flowing!

Supply all calibration gases with the same flow and pressure as the sample gas (recommended: approx. 1 l/min), and utilizing the correct gas fitting.

Ensure the warm-up time after switching on has elapsed! Warm-up time depends on installed measuring system and configuration, ☞ „1.8 Measurements Specifications“ at page 1-14!

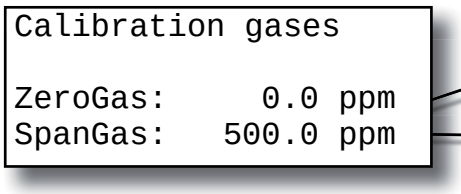
4.4 Perform a Calibration



Before starting calibrations it is required to tell the instrument the calibration gas concentrations.

Starting from the measurement screen press the DOWN key to open the MAIN MENU, enter the SETUP-CALIBRATION.. menu and directly enter the CALIBRATION GASES.. menu.

Multi-channel unit:
Select the channel to be calibrated in the SELECT COMPONENT menu.



Enter the concentration value for the zero gas to be used during zero calibration.

Enter the concentration value for the span gas to be used during span calibration.

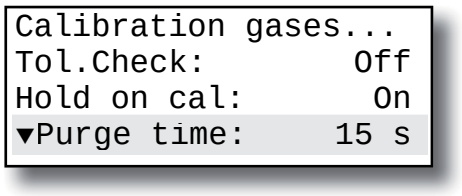
Note!

The units for the calibration gases are taken from the related entry in the display setup menu.

Multi-channel unit:

Press the ← key to enter the SELECT COMPONENT menu to change the settings for a different channel.

When done, press the ← key to return to the CALIBRATION menu.



Example:

Measuring range: 0 ... 50 %
Zero gas: 0 %
Span gas: 50 %

Situation:

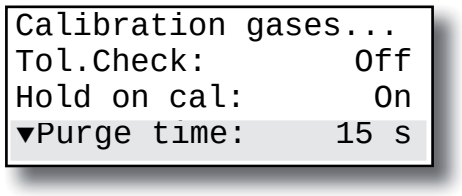
Due to a fault zero gas is supplied to carry out a span calibration, instead of span gas.

Tolerance check disabled (Off):

The analyzer calibrates the span with the wrong gas resulting in an analyzer out of tune.

Tolerance check enabled (10%; AutoOff):

Starting a span calibration with zero gas connected instead of span gas, the analyzer gives an error message and stops calibrating because the measured (expected span gas) value differs more than 10 % from the upper measuring range limit.



By default the option "Tol.Check" (tolerance check) is disabled (**Off**).

So tolerance check helps avoiding calibrating with a wrong gas applied (e.g. starting a span calibration while zero gas is flowing) resulting in an instrument out of tune (see example to the left side).

With tolerance check enabled (**10%**) during calibration the analyzer checks that the entered (setpoint) values for zero gas and span gas are reasonable compared to the currently flowing calibration gas. If this gas concentration differs more than 10 % of measuring range from zero gas (during zero calibration) or span gas setup (during span calibration), calibration is aborted and a maintenance request alarm is set (LED and optional relay output). Resetting the alarm requires to perform a valid calibration or to confirm it within the CONTROL - ACKNOWLEDGEMENTS.. screen.

The 3rd option (**AutoOff**) has the same functionality as **10%** except that the maintenance request is reset after 2-3 minutes.

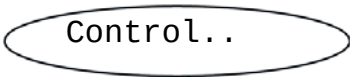
There are still situations when tolerance check must be disabled, e.g. when calibrating after changing the span gas concentration. In this cases select **Off**.

Note!

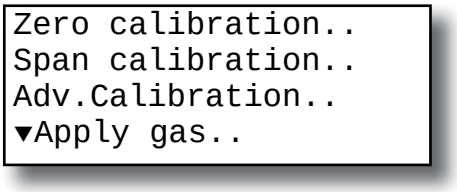
*The last line ("purge time") shows up only if the valve option is other than **none** (see INSTALLED OPTIONS menu) and is used for advanced, remote and unattended calibrations only..*

4.4 Perform a Calibration

4.4.2 Manual Calibration



Starting from the measurement screen press the DOWN key to open the MAIN MENU and enter the CONTROL.. menu.



To start a zero calibration select the first line:

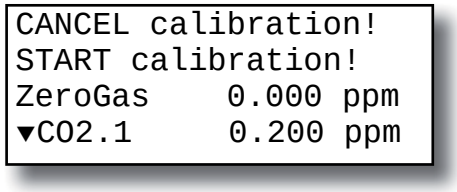
4.4.2.1 Manual Zero Calibration

Before selecting any further line make sure the required calibration gas is applied and flowing!

Supply all calibration gases with the same flow as the sample gas (recommeded approx. 1 l/min), pressureless and utilizing the right gas fitting.

Ensure the warm-up time after switching on has elapsed! Warm-up time is 15 to 50 minutes depending on installed measuring system and configuration!

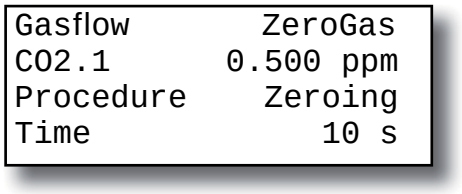
Multi-channel unit:
Select the channel to be calibrated in the SELECT COMPONENT menu.



The first line gives you the choice to cancel the procedure now.

Select the second line to **start the calibration**.

Line 3 shows the calibration gas setup (here: required zero gas concentration is



0.000 ppm), while line 4 shows the currently measured gas concentration.

After having started the calibration, watch the screen for information about the status:

The first lines shows the gas (channel) to be calibrated as well as the currently measured concentration (after zero calibration this value should be set to "0").

The line "Procedure" shows what's currently happening (**Zeroing** = calibration ongoing; **Purging** = waiting for measuring system to be filled with currently flowing gas**; None** = calibration finished), while the last line shows the remaining time till end of calibration (countdown starting from 40 seconds).

When finished press the LEFT key two times to return to **either**

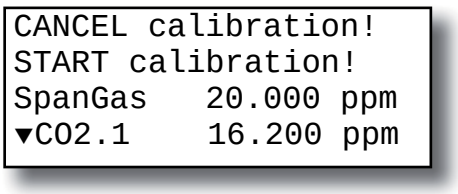
the SELECT COMPONENT menu (multi channel analyzer only), select another channel to perform the steps described above to zero calibrate this channel, too,

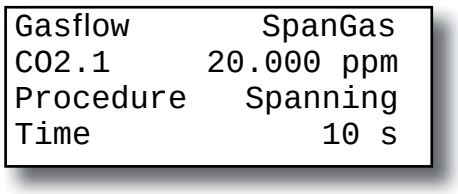
or

the CONTROL.. menu, which allows you to start a span calibration. The procedure and screens look similiar to those of a zero calibration:

Select SPAN CALIBRATION...

4.4.2.2 Manual Span Calibration





Before selecting any further line make sure the required calibration gas is applied and flowing!

Multi-channel unit:
Select the channel to be calibrated in the SELECT COMPONENT menu.

The first line gives you the choice to immediately cancel the procedure.

Select the second line to **start the calibration**.

Line 3 shows the calibration gas setup (here: required span gas concentration is 20 ppm), while line 4 shows the currently measured gas concentration.After having started the calibration watch the screen for status information:

The display shows the currently flowing gas, the gas (channel) to be calibrated as well as the currently measured concentration (after span calibration it should be set to the expected value) and a countdown for the current procedure:

The line "Procedure" shows what's currently happening (**Spanning** = calibration ongoing; **Purging** = waiting for measuring system to be filled with currently flowing gas**; None** = calibration finished), while the last line shows the remaining time till end of calibration (countdown starting from 40 seconds).

When finished, **either** press

the LEFT key two times to return to the SELECT COMPONENT menu (multi channel analyzer only), select another channel and perform the steps described above to zero calibrate this channel, too,

or

the HOME key to return to the measurement screen to finish with manual calibration procedures.

Chapter 5
Dismounting and Disposal

5.1 Dismounting and Diposal of the Analyzer

WARNING

HAZARDS FROM DISMOUNTING

Dismounting instruments installed in hazardous area requires special instructions to be followed!

Only trained personnel, observing all applicable technical and legal requirements, and aware of the possible risks is permitted to dismount these analyzers.

Failure to follow may result in explosion, death or personal injury!

WARNING

EXPLOSION HAZARD WHEN OPEN

Dismounting requires to open the instrument and is permitted only if no hazardous atmosphere is present and both the instrument and connected circuitry are de-energized!

Depending on the local regulation this may require a competent hot work supervisor to issue a hot work permit.

Failure to follow may result in explosion!

CAUTION

HEAVY INSTRUMENT

X-STREAM X2FD analyzers, to which this manual relates, intended to be wall mounted and/or outdoor installed, weigh up to approx. 63 kg (139 lbs), depending on included options!

Support the instrument before loosening the fixing screws (risk of dropping instrument).

Two people and/or lifting equipment is required to lift and carry these units.

Failure to follow may result in personal injury!

5.1 Dismounting & Disposal

WARNING

GASES HAZARDOUS TO HEALTH

Follow the safety precautions for all applied gases and gas cylinders.

Before opening the gas lines, they must be purged with air or neutral gas (N2) to avoid danger from escaping toxic, flammable, explosive or hazardous gases.

When the instrument has reached the end of its useful life, do not throw it in a trash can!

This instrument has been made of materials to be recycled by recyclers specialised in this field. Let the instrument and the packing material duly and environmentally friendly be disposed of. Ensure the equipment is free of dangerous and harmful substances (decontaminated).

Take care of all local regulations for waste treatment.

Consider all instructions regarding dismounting and disposal!

When the instrument has reached the end of its useful life,

- purge all gas lines with inert gas
- ensure all gas lines are pressureless
- disconnect all gas lines
- switch off power and signal lines
- disconnect and remove all electrical connections
- support the instrument before loosening the fixing screws (risk of dropping instrument) and take it off its stand or wall
- fill out the Declaration of Decontamination (☞ X-STREAM X2 instruction manual) properly
- hand over the dismounted instrument together with the Declaration of Decontamination to a disposal specialist. The disposal specialist then has to disassemble the instrument, and recycle and dispose it in compliance with all applicable waste treatment regulations.

Appendix

This chapter contains

A.1 EC Declaration of Conformity

EC DECLARATION OF CONFORMITY

Document number: RAE/X2FD-ATEX-E6
Date: October 2014

We,

Emerson Process Management GmbH & Co. OHG

located at

Industriestrasse 1, D-63594 Hasselroth, Germany

declare under our sole responsibility that our gas analyzer, type

X-STREAM X2FD,

with flameproof enclosure, approved for service in hazardous locations

by FTZU (NB 1026), Pikartská 7, CZ 716 07 Ostrava - Radvanice, The Czech Republic

and marked

CE 0035 Ex II 2 G
Ex d IIB + H_2 T4 Gb
FTZÚ 08 ATEX 0028X

conforms to the provisions of the following European Directives:

2004/108/EC **EMC Directive**
with the application of the harmonized standards including the latest amendments:
EN 61326-1:2006

94/9/EC **Equipment and protective systems in potentially explosive atmospheres**
with the application of the harmonized standards including the latest amendments:
EN 60079-0: 2009, EN 60079-1 :2007

Production is monitored according annex IV by
TÜV RHEINLAND INDUSTRIE SERVICE GMBH
Am Grauen Stein, D-51105 Köln, Germany
Notified Body of the European Union under directive 94/9/EC, identification no. 0035

The standards published in the EC's OFFICIAL JOURNAL with reference to directive 73/23/EC (e.g. EN 61010-1) have been used to fulfill 1.2.7 of Annex II of directive 94/9/EC to eliminate electrical risks.

Hasselroth, October 2014

(Signature)

Andy Kemish
(Name)

VP Rosemount Analytical Europe
(Function name)

ROSEMOUNT Analytical

EMERSON. Process Management

This declaration confirms the compliance with announced directives but does not include the assurance of properties.
The safety and installation instructions of the documentation have to be followed.

A.2 ATEX EC Type Examination Certificate

Physical Technical Testing Institute
Ostrava-Radvanice

(13) **Schedule**

(14) **EC-Type Examination Certificate N° FTZÚ 08 ATEX 0028X**

(15) Description of Equipment or Protective System:

Analyzer type X-STREAM 2FD is designed with flameproof enclosure and consists of enclosure body and cover with sight glass. The body and cover are made of Al alloy and fastened by bolts. There are six threaded insert in the enclosure cover providing passage of control rod. The enclosure has four threaded holes for cable glands or plugs and eight threaded holes for flame arresters or their closing devices.

Technical parameters:

Ambient temperature: - 30 °C ≤T_{amb} ≤ + 50 °C

Power supply: 100 – 240 VAC; 50/60 Hz; 3 – 1 ,5 A

(16) Report No. : FTZÚ 08/0028 ... 2+10+12 pages

(17) Special conditions for safe use: --

Specified screws M16x45 ISO 4762 A2-70 in compliance with drawing No: 4.271-6945 /4

The gaps correspond to drawing No: 4.271-7112 /1

(18) Essential Health and Safety Requirements:

Covered by standards mentioned in (9) of this certificate.

Responsible person:

Dipl. Ing. Šindler Jaroslav
Head of certification body

PHYSICAL-TECHNICAL TESTING INSTITUTE
FTZÚ Ex
AO 210
NB 1026

Date of issue: 09.04.2008

Number of pages: 2/3

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A.2 ATEX EC Type Examination Certificate

Physical Technical Testing Institute
Ostrava-Radvanice

(13) **Schedule**

(14) **EC-Type Examination Certificate N° FTZÚ 08 ATEX 0028X**

(15) Description of Equipment or Protective System:

Analyzer type X-STREAM 2FD is designed with flameproof enclosure and consists of enclosure body and cover with sight glass. The body and cover are made of Al alloy and fastened by bolts. There are six threaded insert in the enclosure cover providing passage of control rod. The enclosure has four threaded holes for cable glands or plugs and eight threaded holes for flame arresters or their closing devices.

Technical parameters:

Ambient temperature: - 30 °C ≤T_{amb} ≤ + 50 °C

Power supply: 100 – 240 VAC; 50/60 Hz; 3 – 1 ,5 A

(16) Report No. : FTZÚ 08/0028 ... 2+10+12 pages

(17) Special conditions for safe use: --

Specified screws M16x45 ISO 4762 A2-70 in compliance with drawing No: 4.271-6945 /4

The gaps correspond to drawing No: 4.271-7112 /1

(18) Essential Health and Safety Requirements:

Covered by standards mentioned in (9) of this certificate.

Responsible person:

Dipl. Ing. Sindler Jaroslav
Head of certification body

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Date of issue: 09.04.2008

Number of pages: 2/3

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A.2 ATEX EC Type Examination Certificate

Physical Technical Testing Institute
Ostrava-Radvanice

(13) **Schedule**

(14) **EC-Type Examination Certificate N° FTZÚ 08 ATEX 0028X**

(19) **LIST OF DOCUMENTATION**

➢ Drawing No	4.271-7120/4	...	on 24.01.08
	4.271-6974/1	...	on 24.07.07
	4.271-6957/1	...	on 11.10.07
	4.271-6636/2	...	on 03.06.05
	4.271-6949/3	...	on 03.12.07
	4.271-7112/1	...	on 16.11.07
	4.271-6969/4	...	on 19.07.07
	4.271-6970/4	...	on 10.01.08
	4.271-6971/4	...	on 22.11.07
	4.271-6945/4	...	on 08.01.08
	4.271-6984/4	...	on 01.08.07
	4.271-6891/4	...	on 16.04.07
➢ Description		...	on 24.1.2008
➢ Instruction for use		...	on 02/2008

PHYSICAL-TECHNICAL TESTING INSTITUTE FTZÚ AO 210 NB 1026

Page 3/3

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A.2 ATEX EC Type Examination Certificate

Physical Technical Testing Institute
Ostrava-Radvanice

(1) **Supplement No. 1 to**
EC-Type Examination Certificate

(2) **Equipment or Protective Systems Intended for use in Potentially Explosive Atmospheres Directive 94/9/EC**

(3) EC-Type Examination Certificate Number:

FTZÚ 08 ATEX 0028X

(4) Equipment or protective system: **Analyzer Type X-STREAM XEFD and X-STREAM X2FD**

(5) Manufacturer: **Emerson Process Management GmbH & Co. OHG**

(6) Address: **Industriestrasse 1, D-63594 Hasselroth, Germany**

(7) This supplement of certificate is valid for: - new model (variant) – extension of series

(8) Modification of certified apparatus (protective system) and any of its approved variants are specified in documentation, list of which is mentioned in schedule of this certificate.

(9) This supplement to type examination certificate is valid only for type examination of design and construction of product sample in accordance with Annex 3 Paragraph 6) of Directive No. 94/9/EC. The Directive contains further requirements, which manufacturer shall fulfil before products are placed on market or introduced in service.

(10) Safety requirements of modified parts were fulfilled by satisfying the following standards:

EN 60079-0:2006 **EN 60079-1:2007**

(11) Marking of equipment shall contain symbols:

II 2G Ex d IIB+H_2 T4

(12) This type examination certificate is valid till: **30. 04. 2014**

Responsible person:

Dipl. Ing. Šindler Jaroslav
Head of certification body

PHYSICAL-TECHNICAL TESTING INSTITUTE FTZÚ AO 210 NB 1026

Date of issue: 30.04.2009

Number of pages: 3
Page: 1/3

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A.2 ATEX EC Type Examination Certificate

Physical Technical Testing Institute
Ostrava-Radvanice

(13) **Schedule**

(14) **Supplement No. 1 to**
EC-Type Examination Certificate N° FTZÚ 08 ATEX 0028X

(15) Description of Equipment: X-STREAM is the process analyzer protected by the flame proof enclosure. Internal volume of the analyzer can be purified by the synthetic gas or by the inert gas through flame arrestors installed on the inlet and the outlet of purification path. The analyzer is equipped by the breathing devices formed by the flame arrestor in the case of gas analyzed pressure above from 1100 hPa to 1500 hPa. Analyzer marked as "....X2FD" is equipped with the alpha-numeric display. Analyzer marked as "...XEFD" is equipped with the graphic display. Other small modifications concern the internal mechanical layout as well as the internal interconnection of I/O boards not having influence on the level of protection.

Technical parameters:

Ambient temperature	- 30 °C to + 50 °C
Power supply	100-240 VAC; 50/60 Hz; 3-1,5 A
Pressure of the analyzed gas	max. 1500 hPa
Flow rate of the analyzed gas	max. 1,5 liter/min.
Flow rate of the purging gas	max. 2 liter/min.

(16) Report No.: FTZÚ 08/0028 ... 2+10+12 pages + FTZÚ 08/0028 D1 ... 2+10+12 pages

(17) Special conditions for safe use:

Special conditions for the safe use are specified at the chapter 1.5.1 of the Instruction Manuals of the manufacturer No. HASXMDE-IM-EX 4/2009 and HASXEDE-IM-EX 9/2009

(18) Essential Health and Safety Requirements:

Covered by standards mentioned in (9) of this certificate.

Responsible person:

Dipl. Ing. Šindler Jaroslav
Head of certification body

PHYSICAL-TECHNICAL TESTING INSTITUTE FTZÚ AO 210 NB 1026

Date of issue: 30.04.2009

Number of pages: 3
Page: 2/3

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A.2 ATEX EC Type Examination Certificate

Physical Technical Testing Institute
Ostrava-Radvanice

(13) **Schedule**

(14) **Supplement No. 1 to**
EC-Type Examination Certificate N° FTZÚ 08 ATEX 0028X

(19) **LIST OF DOCUMENTATION**

➢ Drawing No	4.271-6949/3c	...	on 02.02.09
	4.271-7012/2c	...	on 03.02.09
	4.271-6957/1b	...	on 02.02.09
➢ Description		...	on 04.02.2009
➢ Instruction for use HASXMDE-IM-EX		...	on 4/2009
➢ Instruction for use HASXEDE-IM-EX		...	on 9/2009

Responsible person: Date of issue: 30.04.2009

PHYSICAL-TECHNICAL TESTING INSTITUTE FTZÚ AO 210 NB 1026

Dipl. Ing. Šindler Jaroslav
Head of certification body

Number of pages: 3
Page: 3/3

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A.2 ATEX EC Type Examination Certificate

Physical Technical Testing Institute
Ostrava-Radvanice

(1) **Supplement No. 2 to**
EC-Type Examination Certificate

(2) **Equipment or Protective Systems Intended for use in Potentially Explosive Atmospheres Directive 94/9/EC**

(3) EC-Type Examination Certificate Number:

FTZÚ 08 ATEX 0028X

(4) Equipment: **Analyzer type X-STREAM XEFD and X-STREAM X2FD**

(5) Manufacturer: **Emerson Process Management GmbH & Co. OHG**

(6) Address: **Industriestrasse 1, D-63594 Hasselroth, Germany**

(7) This supplement of certificate is valid for:
- new model (variant) – extension of series
- verification according to a standard EN 60079-0:2009
- prolongation of certificate validity

(8) Modification of certified apparatus (protective system) and any of its approved variants are specified in documentation,a list of which is mentioned in the schedule of this certificate.

(9) This supplement to type examination certificate is valid only for type examination of design and construction of product sample in accordance with Annex 3 Paragraph 6) of Directive No. 94/9/EC. The Directive contains other requirements which manufacturer shall fulfil before products are placed on market or introduce in service.

(10) Safety requirements of modified parts were fulfilled by satisfying the following standards:

EN 60079-0:2009; EN 60079-1:2007

(11) Marking of equipment shall contain symbols:

II 2G Ex d IIB+H_2 T4 Gb

(12) This type examination certificate is valid till: **27.01.2017**

Responsible person:

Dipl. Ing. Šindler Jaroslav
Head of certification body

PHYSICAL-TECHNICAL TESTING INSTITUTE FTZÚ AO 210 NB 1026

Date of issue: 27.01.2012

Number of pages: 3
Page: 1/3

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A.2 ATEX EC Type Examination Certificate

Physical Technical Testing Institute
Ostrava-Radvanice

(13) **Schedule**

(14) **Supplement No. 2 to**
EC-Type Examination Certificate N° FTZÚ 08 ATEX 0028X

(15) Description of Equipment:

The object of this supplement is as follow:
Extension of new variant – vapour recovery application.
This application is served by a special configuration of the X-STREAM X2FD and X-STREAM XEFD flameproof analyzer. The configuration consists of a dual channel IR measurement, connected to the inlet and outlet of a converter. This converter is installed inside the X-STREAM analyzer and is heated to about 280°C. This application is used for simultaneous measurement of CH_4 and non-CH_4.
Technical parameters:

Ambient temperature	-30 °C to +50 °C
Power supply	100-240V AC; 50/60 Hz; 3-1.5 A

Verification of analyzer X-STREAM according to a new standard EN 60079-0:2009.

(16) Report No.: 08/0028 D2 dated 26.01.2012

(17) Special conditions for safe use:
Special conditions for safe use are specified at the chapter 1.5.1 of the Instruction Manuals of the manufacturer No. HASXMDE-IM-EX 01/2012 and HASXEDE-IM-EX 01/2012.
Appropriate certified cable glands shall be used accordance with EN 60079-14.

(18) Essential Health and Safety Requirements:
Covered by standards mentioned in (10) of this certificate.

Responsible person: Date of issue: 27.01.2012

Dipl. Ing. Šindler Jaroslav
Head of certification body

PHYSICAL-TECHNICAL TESTING INSTITUTE FTZÚ AO 210 NB 1026

Page: 2/3

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A.2 ATEX EC Type Examination Certificate

Physical Technical Testing Institute
Ostrava-Radvanice

(13) **Schedule**

(14) **Supplement No. 2 to**
EC-Type Examination Certificate N° FTZÚ 08 ATEX 0028X

(19) LIST OF DOCUMENTATION

➢ Drawings No	4.271-6957/1c	19.10.2011
	4.271-7389/2	10.02.2009
	4.271-8080/3	27.07.2011
	4.271-8081/3	28.07.2011
	4.271-8121/4	15.12.2011
	655228/3h	27.11.2009
➢ Description		21.12.2011
➢ Instruction for use HASXMDE-IM-EX		01/2012
➢ Instruction for use HASXEDE-IM-EX		01/2012

Responsible person: Date of issue: 27.01.2012

Dipl. Ing. Sindler Jaroslav
Head of certification body

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Page: 3/3

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A.2 ATEX EC Type Examination Certificate

Physical Technical Testing Institute
Ostrava-Radvanice

(1)

Supplement No. 3 to EC-Type Examination Certificate

(2) **Equipment or Protective Systems Intended for use in Potentially Explosive Atmospheres Directive 94/9/EC**

(3) EC-Type Examination Certificate Number:

FTZÚ 08 ATEX 0028X

(4) Equipment: **Analyzer Type X-STREAM XEFD and X-STREAM X2FD**

(5) Manufacturer: **Emerson Process Management GmbH & Co. OHG**

(6) Address: **Industriestrasse 1, D-63594 Hasselroth, Germany**

(7) This supplement of certificate is valid for: - modification of certified apparatus

(8) Modification of certified apparatus (protective system) and any of its approved variants are specified in documentation, a list of which is mentioned in schedule of this certificate.

(9) This supplement to type examination certificate is valid only for type examination of design and construction of product sample in accordance with Annex 3 Paragraph 6) of Directive No. 94/9/EC. The Directive contains other requirements which manufacturer shall fulfil before products are place on market or introduce in service.

(10) Safety requirements of modified parts were fulfilled by satisfying the following standards:

EN 60079-0:2009 **EN 60079-1:2007**

(11) Marking of equipment shall contain symbols:

II 2G Ex d IIB+H_2 T4 Gb

(12) This type examination certificate is valid till: **27.01.2017**

Responsible person:

Dipl. Ing. Lukáš Martinák
Head of certification body

Date of issue: 10.09.2012

Number of pages: 2
Page: 1/2

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A.2 ATEX EC Type Examination Certificate

Physical Technical Testing Institute
Ostrava-Radvanice

(13) **Schedule**

(14) **Supplement No. 3 to**
EC-Type Examination Certificate N° FTZÚ 08 ATEX 0028X

(15) Description of Equipment:
Technical drawings were changed, see list of documentation. This Modification of documentation does not affect the type of protection.
Technical parameters of equipment remain unchanged.

(16) Report No.: 08/0028 D3 dated 07.09.2012

(17) Special conditions for safe use:
17.1 Special conditions for safe use are specified at the chapter 1.5.1 of the Instruction Manuals of the manufacturer No. HASXMDE-IM-EX 01/2012 and HASXEDE-IM-EX 01/2012.
17.2 Appropriate certified cable glands shall be used accordance with EN 60079-14.

(18) Essential Health and Safety Requirements:
Covered by standards mentioned in (10) of this certificate.

(19) LIST OF DOCUMENTATION
- Drawing No. 4.271-6957/1d 31.08.2012
  4.271-6974/1b 31.08.2012

Responsible person:
Dipl. Ing. Lukáš Martinák
Head of certification body

PHYSICAL-TECHNICAL TESTING INSTITUTE FTZÚ Ex AO 210 NB 1026

Date of issue: 10.09.2012

Page: 2/2

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A.2 ATEX EC Type Examination Certificate

Physical Technical Testing Institute
Ostrava – Radvanice

(1) **Supplement No. 4 to**
EC-Type Examination Certificate

(2) **Equipment or Protective Systems Intended for Use in Potentially Explosive Atmospheres (Directive 94/9/EC)**

(3) EC-Type Examination Certificate Number:

FTZÚ 08 ATEX 0028X

(4) Equipment: **Analyzer, type X-STREAM XEFD and X-STREAM X2FD**

(5) Manufacturer: **Emerson Process Management GmbH & Co. OHG**

(6) Address: **Industriestrasse 1, D-63594 Hasselroth, Germany**

(7) This supplement of certificate is valid for: - modification of certified apparatus

(8) Modification of certified apparatus (protective system) and any of its approved variants are specified in documentation, a list of which is mentioned in the schedule of this certificate.

(9) This supplement to type examination certificate is valid only for type examination of design and construction of product sample in accordance with Annex 3 Paragraph 6) of Directive No. 94/9/EC. The Directive contains other requirements, which manufacturer shall fulfil before products are placed on the market or introduce in service.

(10) Safety requirements of modified parts were fulfilled by satisfying the following standards:

EN 60079-0:2009; EN 60079-1:2007

(11) Marking of equipment shall contain symbols:

II 2G Ex d IIB+H_2 T4 Gb

(12) This type examination certificate is valid till: **27.01.2017**

Responsible person:
Dipl. Ing. Lukáš Martinák
Head of Certification Body

PHYSICAL-TECHNICAL TESTING INSTITUTE
FTZÚ Ex
AO 210
NB 1026

Date of issue: 11.02.2013

Page: 1/2

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tel +420 595 223 111, fax +420 596 232 672, ftzu@ftzu.cz, www.ftzu.cz

A.2 ATEX EC Type Examination Certificate

Physical Technical Testing Institute
Ostrava – Radvanice

(13) **Schedule**

(14) **Supplement No. 4 to**
EC-Type Examination Certificate N° FTZÚ 08 ATEX 0028X

(15) Description of Equipment or Protective System:
Alternatively use of new cast material is verified by this supplement. Rest of technical parameters and construction parameters remain unchanged.

(16) Report No.: 08/0028-4 dated 11.02.2013

(17) Special conditions for safe use:
Special conditions for safe use are specified at the chapter 1.5.1 of the Instruction Manuals of the manufacturer No. HASXMDE-IM-EX 01/2012 and HASXEDE-IM-EX 01/2012.
Appropriate certified cable glands shall be used accordance with EN 60079-14

(18) Essential Health and Safety Requirements:
Covered by standards mentioned in (10) of this certificate.

(19) List of Documentation:
- Drawings No. 4.271-6957/1e 12.12.2012
  4.271-6974/1c 12.12.2012

Responsible person:
Dipl. Ing. Lukáš Martinák
Head of Certification Body

PHYSICAL-TECHNICAL TESTING INSTITUTE FTZÚ AO 210 NB 1026

Date of issue: 11.02.2013

Page: 2/2

FTZÚ, s.p., Pikartská 1337/7, 716 07 Ostrava-Radvanice, Czech Republic,
tel +420 595 223 111, fax +420 596 232 672, ftzu@ftzu.cz, www.ftzu.cz

A.3 CSA Certificate of Compliance

Certificate of Compliance

Certificate: 1714037 (LR 105173) **Master Contract:** 185562

Project: 2607135 **Date Issued:** March 13, 2013

Issued to: **Emerson Process Management**
GmbH & Co. OHG
Industriestrasse 1
Hasselroth, 63594
Germany
Attention: Uwe Schmidt

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.

C US

James Lim

Issued by: James Lim

PRODUCTS

CLASS 2258 82 - PROCESS CONTROL EQUIPMENT - For Hazardous Locations - Certified to US Standards
CLASS 2258 02 - PROCESS CONTROL EQUIPMENT - For Hazardous Locations
CLASS 8721 85 - ELECTRICAL EQUIPMENT FOR LABORATORY USE - Certified to US Standards
CLASS 8721 05 - LABORATORY EQUIPMENT - Electrical

CLASS 8721 05 - LABORATORY ELECTRICAL EQUIPMENT

CLASS 8721 85 - ELECTRICAL EQUIPMENT FOR LABORATORY USE (Certified to U.S. Standards)

Gas analyzer, Model: X-STREAM, rated 100-240Vac, 50/60 Hz, 3 - 1.5A, Class I, Pollution Degree II.

- **X-STREAM (XLF) or X-STREAM Enhanced Field Housing Gas Analyzer (XEF)**: Wall mounting with field wiring terminals, for outdoor use type 4 & IP66 and display;
- **X-STREAM (X2GP) or X-STREAM Enhanced (XEGP) General Purpose Gas Analyzer:** Table Top or Rack Mount with appliance inlet for indoor use and display (optional with field wiring terminals for indoor use);
- **X-STREAM Gas Analyzer Core (XCA)** Table Top or Rack Mount with appliance inlet for indoor use and no display (optional with field wiring terminals for indoor use);

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A.3 CSA Certificate of Compliance

Certificate: 1714037 (LR 105173) **Master Contract:** 185562

Project: 2607135 **Date Issued:** March 13, 2013

Gas analyzer, Model: X-STREAM, rated 100-240Vac, 50/60 Hz, 1.3 - 0.7A, Class I, Pollution Degree II.

- **X-STREAM Gas Analyzer Core Compact (XCK)** Table Top or Rack Mount with appliance inlet for indoor use and no display (optional with field wiring terminals for indoor use);
- **X-STREAM (X2GK) or X-STREAM Enhanced (XEGK) General Purpose Compact Gas Analyzer:** Table Top or Rack Mount with appliance inlet for indoor use and display (optional with field wiring terminals for indoor use);
- **X-STREAM X100 Compact Gas Analyzer (X100GK):** Table Top or Rack Mount with appliance inlet for indoor use and display (optional with field wiring terminals for indoor use);

Gas analyzer, Model: X-STREAM, rated 100-240Vac, 50/60 Hz, 5.5 - 3A, Class I, Pollution Degree II.

- **X-STREAM (XXF) or X-STREAM Enhanced Field Housing Gas Analyzer (XDF)**: Wall mounting with field wiring terminals, for outdoor use type 4 & IP66 and display;

Gas analyzer, Model: X-STREAM, rated 24Vdc, 2.5A, Class I, Pollution Degree II.

- **X-STREAM (X2GC or X2GK)or X-STREAM Enhanced (XEGC or XEGK)General Purpose Compact Gas Analyzer** Table Top or Rack Mount with 24Vdc in connector and display;
- **X-STREAM Compact Gas Analyzer Core (XCC or XCK):** Table Top or Rack Mount with 24Vdc in

Conditions of Acceptability

- For the X-STREAM Models X2GP, XCA and XEGP and the AC powered versions of X2GK, X2CK, XEGK and X100GK the equipment is supplied with an approved power supply cord set or power supply cord with plug that is acceptable to the authorities in the country where the equipment is to be used. Units supplied without a power cord and that are not permanently connected are considered as component. Component-type units must be provided with a Fire, Mechanical and Electrical enclosure and must be re-evaluated by CSA.

- The plug/connector is used as the disconnected device. The switch for X2GP/XCA/XEGP/XCK/X2GK/XEGK/X100GK is not considered the disconnect device. All units must be provided with a disconnect device.

CLASS 2258-02 PROCESS CONTROL EQUIPMENT – For Hazardous Locations

CLASS 2258-82 PROCESS CONTROL EQUIPMENT – For Hazardous Locations – Certified to U.S. Standards.

X-Stream FD (XFD): Flameproof for Hazardous Locations

Class I, Zone 1, Ex d IIB+H2, T3 and/or Class I, Division 2, Groups B, C, and D, T3

Class I, Zone 1, AEx d IIB+H2, T3 and/or Class I, Division 2, Groups B, C, and D, T3

Gas analyzer, Model: X-Stream, rated 100-240Vac, 50/60 Hz, 2–1 A. Class I, Pollution Degree II; Type 4 & IP66

Ambient Temperature Range: -30°C to +50°C Maximum internal case pressure = 110kpa

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A.3 CSA Certificate of Compliance

Certificate: 1714037 (LR 105173) **Master Contract:** 185562

Project: 2607135 **Date Issued:** March 13, 2013

XFD-abcdefghijklmnop

a = Language: A, B, C, D or E

b = Ambient Conditions: 1, 2, 3, 4, 5 or 6

c = Instrument: 1, 2, 3, 4, 5, 6 or 7

d = Bench 1: any combination of 2 or 3 alpha-numeric characters

e = Bench 1 – Special Linearization or Calibration: 0, 1, 2, 3, 4 or 5

f = Bench 2: any combination of 2 or 3 alpha-numeric characters

g = Bench 2 – Special Linearization or Calibration: 0, 1, 2, 3, 4 or 5

h = Enclosure: 1, 2, 3, 4, 5 or 6

i = Hazardous Area Options and Special Approvals: B or D

B = CSA Certification

D = CSA Certification with a Breathing Device for Venting (Same Device as option “p”)

j = Input/Output Options: 1, 2, 5 or 6

k = Communication Interface: A, B, C or D

l = Sample Handling: 0, 1, 3, 5 or 7

m = Gas Path Sensors: 0, 1, 2, 3, 4 or 5

n = Gas Path Tubing: A, B, C, D or E

o = Gas Path Fittings: 3, 4, 5 or 6

p = Flame Arrestors: 2, 3, 4, 5, 6, 7 or 8

X-Stream FD (X2FD): Flameproof for Hazardous Locations

Class I, Zone 1, Ex d IIB+H2, T3 and/or Class I, Division 2, Groups B, C, and D, T3

Class I, Zone 1, AEx d IIB+H2, T3 and/or Class I, Division 2, Groups B, C, and D, T3

Gas analyzer , Model: X-Stream, rated 100-240Vac, 50/60 Hz, 3 - 1.5A, Class I, Pollution Degree II; Ambient Temperature Range: -30°C to +50°C

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A.3 CSA Certificate of Compliance

Certificate: 1714037 (LR 105173) **Master Contract:** 185562

Project: 2607135 **Date Issued:** March 13, 2013

X-Stream FD (X2FD) has same electronics as the X-STREAM General Purpose Gas Analyzer (X2GP) with new Hazardous Locations Enclosure.

X2FD-abcdefghijklmnopqrstuv

a = Language: A, B, C, D, E or F

b = Ambient Conditions: 1, 2, 3, 4, 5 or 6

c = Instrument: 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14 or 15

d = Bench 1: any combination of 2 or 3 alpha-numeric characters

e = Bench 1 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

f = Bench 2: any combination of 2 or 3 alpha-numeric characters

g = Bench 2 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

h = Bench 3: any combination of 2 or 3 alpha-numeric characters

i = Bench 3 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

j = Bench 4: any combination of 2 or 3 alpha-numeric characters

k = Bench 4 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

l = Enclosure: 1, 2, 3 or 4

m = Hazardous Area Options and Special Approvals: B or D

B = CSA Certification

D = CSA Certification with a Breathing Device for Venting (Same Device as option “v”)

n = Analog Outputs: 1, 2, 3 or 4

o = Digital Inputs/Relay Outputs: 0, 1 or 2

p = Communication Interface: 0, A, B, C or D

q = Spare: 0

r = Sample Handling: 0, 1, 2, 3, 4, 5 or 6

s = Gas Path Sensors: 0, 1, 2, 3, 4, 5, 6, 7 or 8

t = Gas Path Tubing: A, B, C, D, E, F, G, H or I

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A.3 CSA Certificate of Compliance

Certificate: 1714037 (LR 105173) **Master Contract:** 185562

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u = Gas Path Fittings: E, F, G, H, I, J, K or L

v = Flame Arrestors: 2, 3, 4, 5, 6, 7 or 8

X-STREAM FD (XEFD): Flameproof for Hazardous Locations

Class I, Zone 1, Ex d IIB+H2, T3 and/or Class I, Division 2, Groups B, C, and D, T3

Class I, Zone 1, AEx d IIB+H2, T3 and/or Class I, Division 2, Groups B, C, and D, T3

Gas analyzer , Model: X-STREAM, rated 100-240Vac, 50/60 Hz, 3 - 1.5A, Class I, Pollution Degree II; Ambient Temperature Range: -30°C to +50°C

X-STREAM FD Enhanced (XEFD) has same electronics as the X-STREAM Enhanced General Purpose Gas Analyzer **(XEF)** with same Hazardous Locations Enclosure as X-STREAM X2FD.

XEFD-abcdefghijklmnopqrstuv

a = Language: A, B, C, D, E, F or G

b = Ambient Conditions: 1 or 4

c = Instrument: 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15 or 16

d = Bench 1: any combination of 2 or 3 alpha-numeric characters

e = Bench 1 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

f = Bench 2: any combination of 2 or 3 alpha-numeric characters

g = Bench 2 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

h = Bench 3: any combination of 2 or 3 alpha-numeric characters

i = Bench 3 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

j = Bench 4: any combination of 2 or 3 alpha-numeric characters

k = Bench 4 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

l = Bench 5: any combination of 2 or 3 alpha-numeric characters

m = Bench 5 - Special Linearization or Calibration: 0, 1, 2, 3, A, B, C or D

A.3 CSA Certificate of Compliance

Certificate: 1714037 (LR 105173) **Master Contract:** 185562

Project: 2607135 **Date Issued:** March 13, 2013

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n = Enclosure: 1, 2, 3, or 4

o = Hazardous Area Options and Special Approvals: B or D

B = CSA Certification

D = CSA Certification with a Breathing Device for Venting (Same Device as option "v")

p = Analog Outputs: 1, 2, 3 or 4 or 5

q = Digital Inputs/Relay Outputs: 0, 1, 2 or A/Analog Inputs: 0, 5 or A

r = Communication Interface: 0, A, B or C

s = Advanced Software capabilities: 0, 1, 2 or 3

t = Sample Handling: 0, 1, 2, 3, 4, 5 or 6

u = Gas Path Sensors: 0, 1, 3, 5, 7, 9 or A

v = Gas Path Tubing: A, B, C, D, E, F, G, H, or I

w = Gas Path Fittings: E, F, G, H, I, J, K or L

x = Flame Arrestors: 2, 3, 4, 5, 6, 7 or 8

X-STREAM FN (XLFN, XXFN, XEFN, XDFN): Non-Incendive for Hazardous Locations

Class 1 Zone 2 Ex nAC IIC T4

Class 1 Zone 2 AEx nAC IIC T4

Class I Div 2 Groups ABCD

-20 °C to +50 °C IP66 Enclosure Type 4X

- **X-STREAM (XLFN) or X-STREAM Enhanced (XEFN)Field Housing Gas Analyzer:**

Gas analyzer, Model: X-STREAM, rated 100-240Vac, 50/60 Hz, 3 - 1.5A, Class I, Pollution Degree II

- **X-STREAM (XXFN) or X-STREAM Enhanced Dual (XDFN) Field Housing Gas Analyzer**:

Gas analyzer, Model: X-STREAM, rated 100-240Vac, 50/60 Hz, 5.5 - 3A, Class I, Pollution Degree II

APPLICABLE REQUIREMENTS

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A.3 CSA Certificate of Compliance

Certificate: 1714037 (LR 105173) **Master Contract:** 185562

Project: 2607135 **Date Issued:** March 13, 2013

CAN/CSA-C22.2 No. 61010-1-04 - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements

UL Std No. 61010-1, 2nd Edition - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements

CAN/CSA-E60079-0:02 (R2006) - Electric Apparatus for Explosive Gas Atmospheres, Part 0: General Requirements

CAN/CSA-E60079-1:02 (R2006) - Electric Apparatus for Explosive Gas Atmospheres, Part 1: Construction and Verification Test of Flameproof Enclosures of Electrical Apparatus “d”

CAN/CSA-E60079-15:02 (R2006) - Electric Apparatus for Explosive Gas Atmospheres, Part 15: Type of protection "n"

CSA C22.2 No 213-M1987 - Non-Incendive Electrical Equipment for Use in Class I,Division 2 Hazardous Locations

CAN/CSA-C22.2 No. 94-M91 (R2006) - Special Purpose Enclosures

CAN/CSA C22.2 No. 60529:05 - Degrees of protection provided by enclosure (IP Code)

ANSI/ISA-12.00.01-2002 (IEC 60079-0 Mod) - Electric Apparatus for Use in Class I, Zones 0, 1 & 2 Hazardous (Classified) Locations: General Requirements

ANSI/ISA-12.22.01-2002 (IEC 60079-1 Mod) - Electric Apparatus for Use in Class I, Zones 1 Hazardous (Classified) Locations Type of Protection – Flameproof “d”

UL 60079-15:2009 - Electric Apparatus for Explosive Gas Atmospheres, Part 15: Construction, Test and Marking of Type of Protection ’n’ Electrical Apparatus

IEC 60529 Edition 2.1-2001-02 - Degrees of protection provided by enclosure (IP Code)

UL 50 11th Edition - Enclosures for Electrical Equipment

ANSI/ISA 12.12.01-2011 - Non-Incendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations

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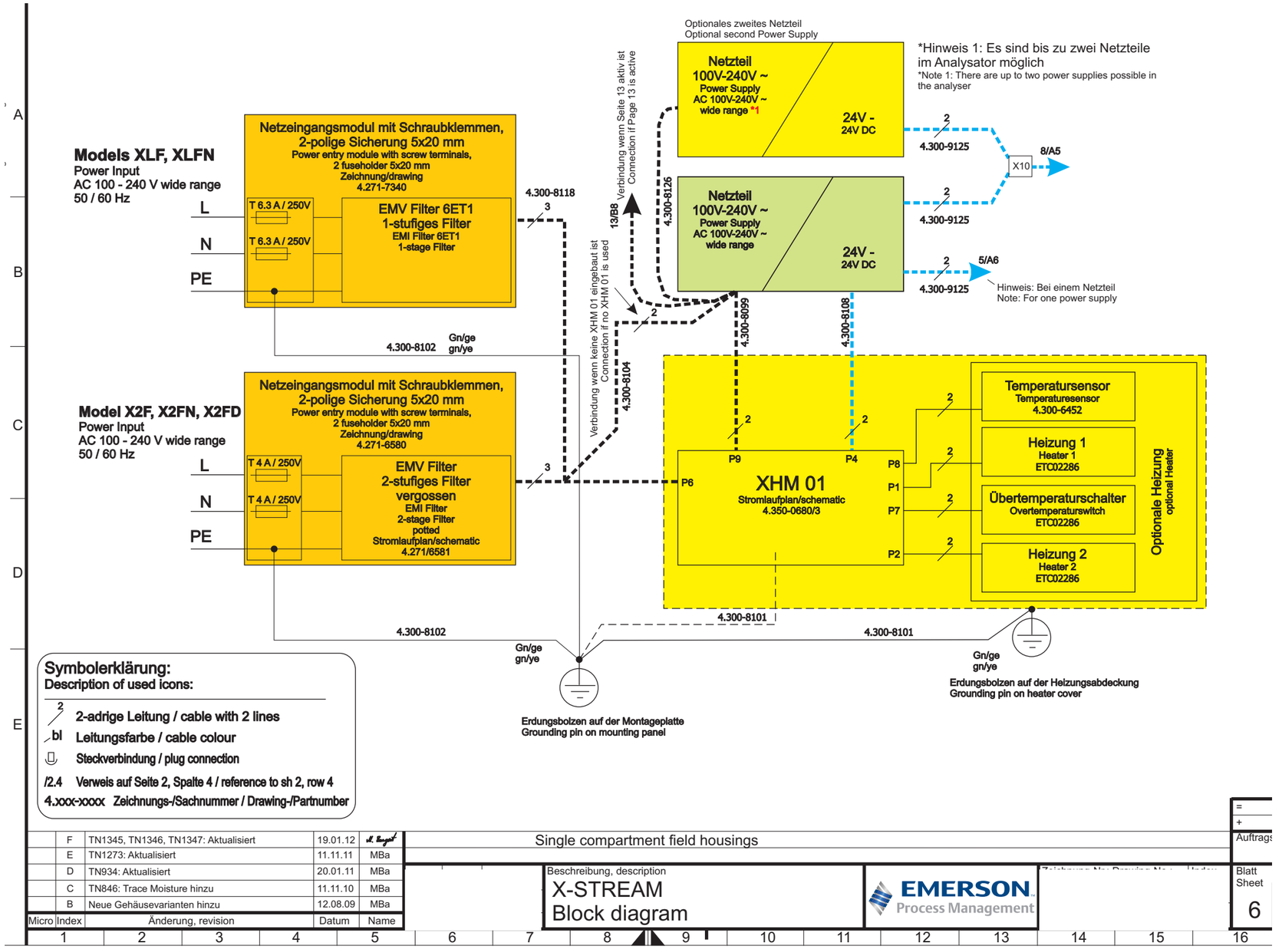
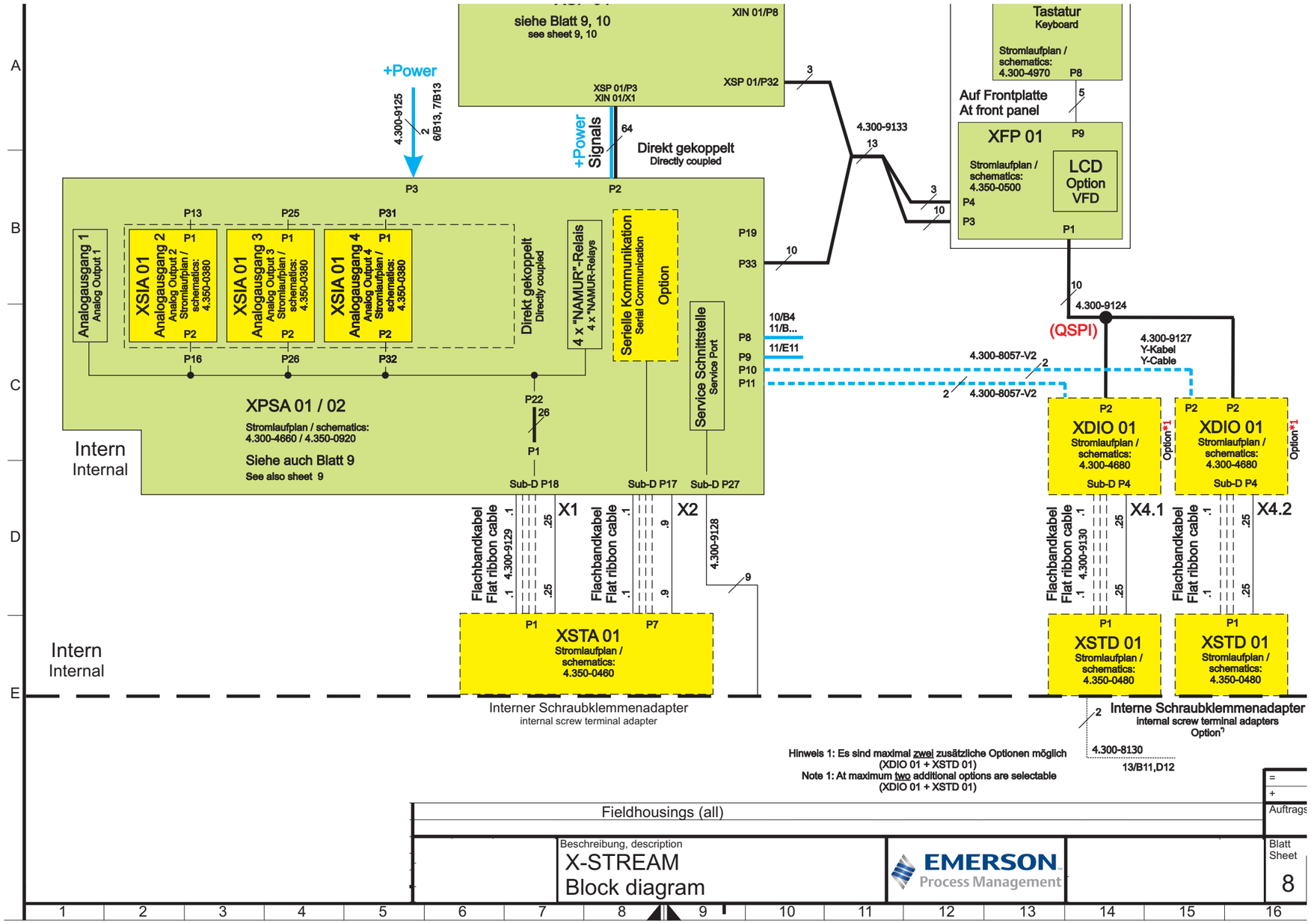
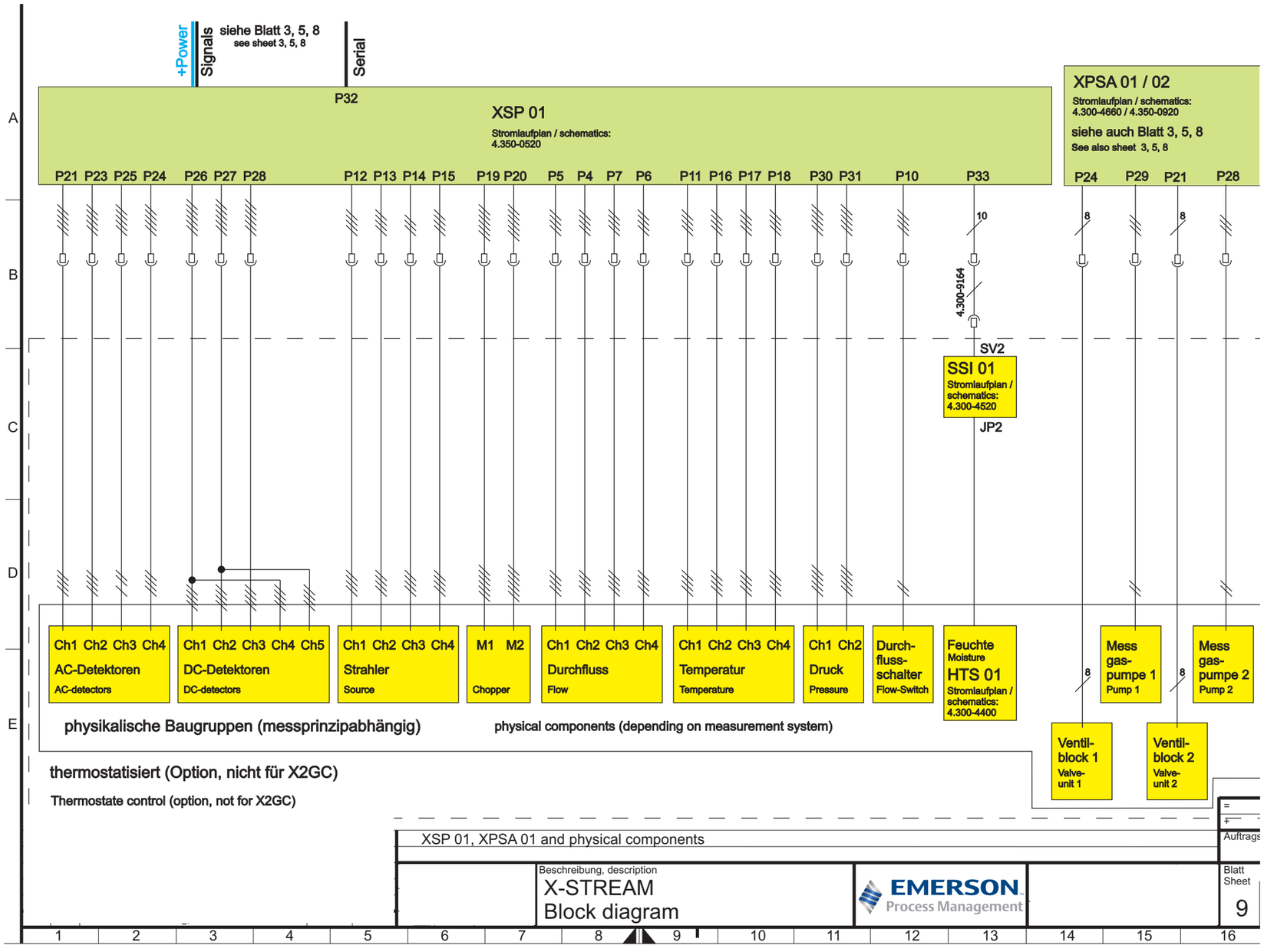
A.4 Block diagram



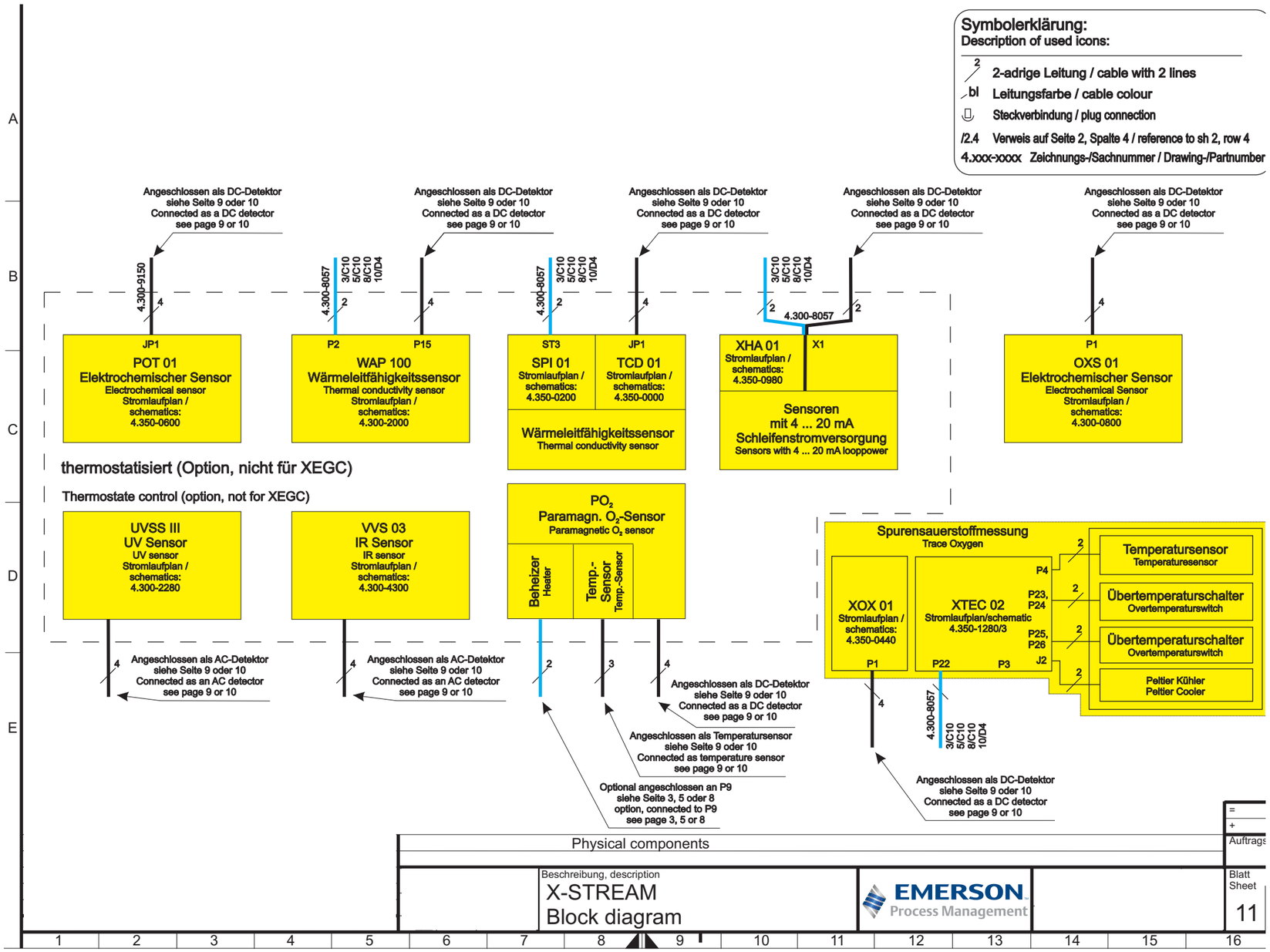
A.4 Block Diagram



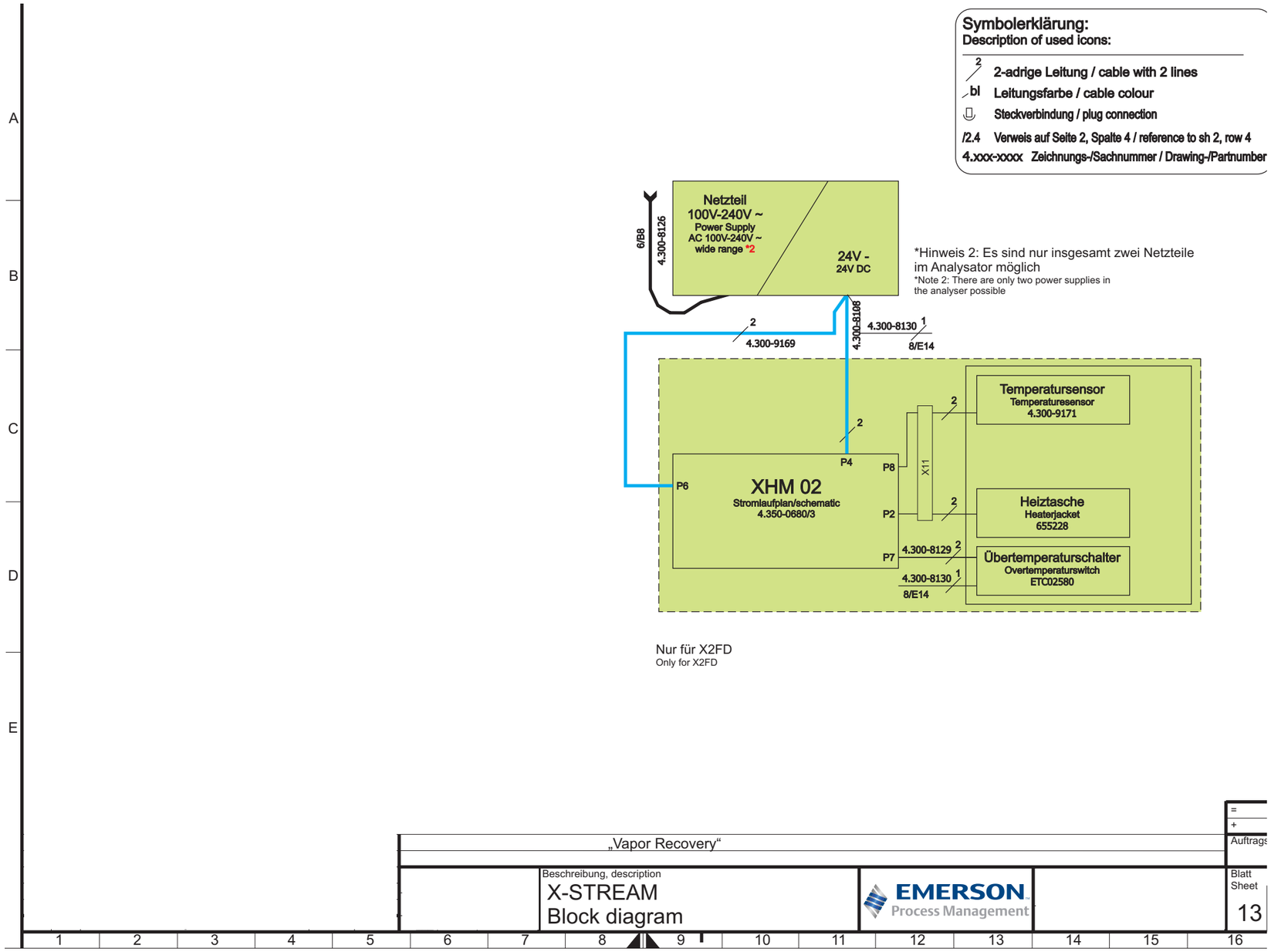
A.4 Block Diagram



A.4 Block Diagram

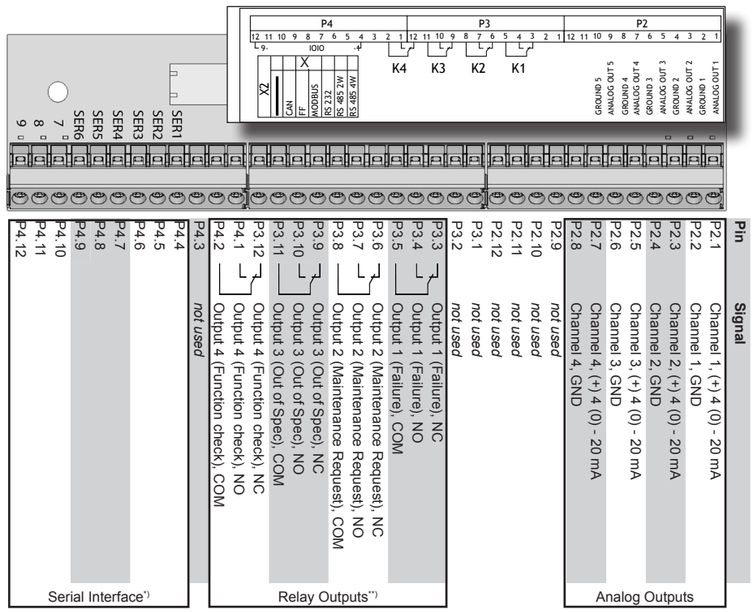


A.4 Block Diagram



A.5 Assignment of Terminals and Sockets

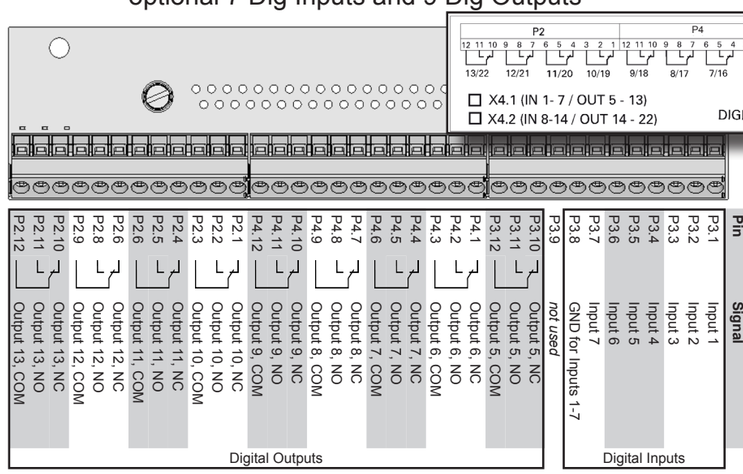
XSTA: Standard strip with standard and optional signals



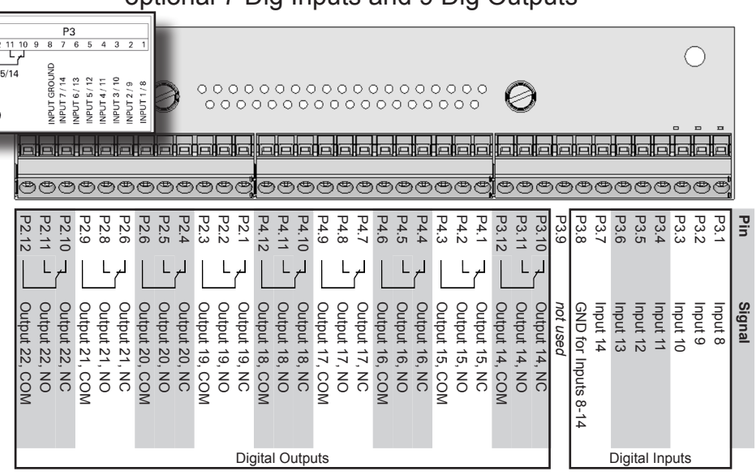
*) See table below

**) Configuration of relay output terminals as per standard factory setting (NAMUR status signals)

XSTD: First optional strip with optional 7 Dig Inputs and 9 Dig Outputs



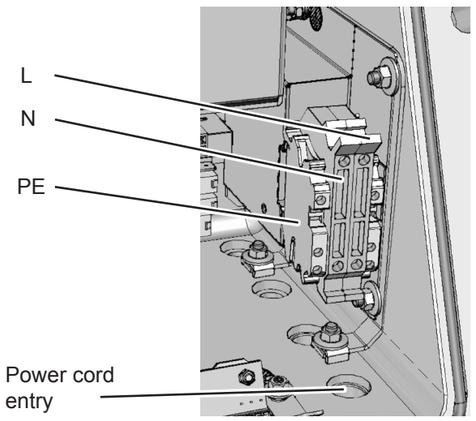
XSTD: Second optional strip with another set of optional 7 Dig Inputs and 9 Dig Outputs



Assignment of serial interface terminals

Terminal		MOD 485/ 2 wire	MOD 485/ 4 wire	RS 232
P4.4	*SER1*	Common	Common	Common
P4.5	*SER2*	*not used*	*not used*	RXD
P4.6	*SER3*	*not used*	*not used*	TXD
P4.7	*SER4*	*not used*	RXD1(+)	*not used*
P4.8	*SER5*	D1(+)	TXD1(+)	Common
P4.9	*SER6*	*not used*	*not used*	*not used*
P4.10	*7*	*not used*	*not used*	*not used*
P4.11	*8*	*not used*	RXD0(-)	*not used*
P4.12	*9*	D0(-)	TXD0(-)	*not used*

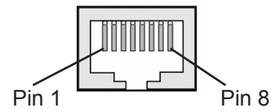
Signal Terminals Strips



L = Line
N = Neutral
PE = Protective Earth

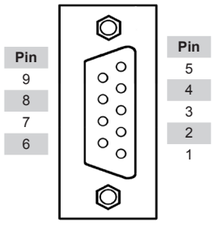
Note!
Line and neutral terminals with built-in fuse holders

Power terminals



Pin no.	Signal
1	TX+
2	TX-
3	RX+
6	RX-
other	*not used*

Ethernet connector for Modbus



Pin no.	RS 232
1	Common
2	RXD
3	TXD
4	*not used*
5	Common
6	*not used*
7	*not used*
8	*not used*
9	*not used*

Service Port Connector - Serial RS 232 interface

Instruction Manual
HASXMDE-IM-Ex
01/2015

X-STREAM X2FD

X-STREAM X2FD

Instruction Manual
HASXMDE-IM-Ex
01/2015

EUROPE

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