

Instruction Manual  
HASXEDE-IM-EX  
03/2012

# XSTREAM<sup>®</sup>

## Gas Analyzer

X-STREAM Enhanced Series

Flameproof Variation

For Use in Zone 1 and Division 2 Hazardous Areas

Instruction Manual Addendum



**ROSEMOUNT**<sup>®</sup>  
Analytical

[www.EmersonProcess.com](http://www.EmersonProcess.com)

  
**EMERSON**<sup>™</sup>  
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.

5<sup>th</sup> edition 03/2012

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

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## INTRODUCTION

This instruction manual provides information about installing, operating and maintaining/servicing X-STREAM series flame proof 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 series flame proof gas 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.

|  |   |
|--|---|
|  |  <b>WARNING</b>        |
|  | <b>HIGHLIGHTS AN OPERATION OR MAINTENANCE PROCEDURE, PRACTICE, CONDITION, STATEMENT, ETC.</b>             |
|  | <b>If not strictly observed, could result in injury, death, or long-term health hazards of personnel.</b> |

|  |   |
|--|---|
|  |  <b>CAUTION</b>                |
|  | <b>HIGHLIGHTS AN OPERATION OR MAINTENANCE PROCEDURE, PRACTICE, CONDITION, STATEMENT, ETC.</b>                     |
|  | <b>If not strictly observed, could result in damage to or destruction of equipment, or loss of effectiveness.</b> |

### **NOTE!**

*Highlights an essential operating procedure, condition or statement.*

## Terms Used In This Instruction 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 (similar 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   |
|---|---|
|    | <b>dangerous voltages</b> may be accessible. Removing covers is permitted only, if the instrument is disconnected from power - and even in this case by qualified personnel only!                               |
|    | <b>hot surfaces</b> 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. |
|  | <b>more detailed information available:</b> see instruction manual before proceeding!   |
|  | <b>more detailed information available:</b> 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   |
|---|---|
|    | <b>dangerous voltages</b> may be exposed  |
|    | <b>hot surfaces</b> may be exposed  |
|   | possible <b>danger of explosion</b>   |
|  | <b>toxic substances</b> may be present  |
|  | <b>substances harmful to health</b> may be present  |
|  | indicates notes relating to <b>heavy instruments</b>  |
|  | electrical components may be destroyed by <b>electrostatic discharges</b>   |
|  | units must be <b>disconnected from the power source</b>   |
|  | indicates special instructions or information for operation at <b>low temperatures</b> .  |
|  | indicates basic conditions or procedures are being described.<br>This symbol may also indicate information important for achieving accurate measurements. |

## **SAFETY INSTRUCTIONS**

### **Intended Use Statement**

X-STREAM XE 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 XE 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.

### **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 appropriate 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!

## Safety Instructions

### 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.

### Additional Literature

**This manual covers aspects specific for using flameproof X-STREAM XEFD 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:

HASXEE-IM-HS X-STREAM XE 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!**

Safety Instructions

|   |   |
|---|---|
|  | <p style="text-align: center;"><b>⚠ WARNING</b></p> <p style="text-align: center;"><b>EXPLOSION HAZARD BY CONNECTIONS</b></p> <p>Consider the waiting time statement on the front door label before opening, if the analyzer is configured with selected measurement principles!</p> <p>Do not open instrument when energized.</p> <p>Ensure that external circuitry is disconnected or de-energized before opening the instrument.</p> <p>Ensure that all gas connections are made as labeled and are leak free. Improper gas connections could result in explosion and death.</p> |
|---|---|

Safety Instructions



|   |  |
|---|--|
|  | <p style="text-align: center;"><b>⚠ WARNING</b></p> <p style="text-align: center;"><b>EXPLOSION HAZARD BY MODIFICATION</b></p> <p>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.</p> <p>Any modifications to the device not meeting these requirements, will void the product certification(s).</p> <p>Contact Emerson Process Management's customer service center for return authorization.</p> |
|---|--|

|   |   |
|---|---|
|  | <p style="text-align: center;"><b>⚠ WARNING</b></p> <p style="text-align: center;"><b>EXPLOSION HAZARD BY SAMPLE HANDLING</b></p> <p>The X-STREAM analyzer may utilize not only sample gas but one or more pressurized carrier gases and/or calibration gases.</p> <p>If an external flowmeter is required for flow control, legislative requirements and instructions for installation in hazardous (classified) areas must be considered.</p> |
|---|---|

**Safety Instructions**

|   |  |
|---|--|
|   | <b> WARNING</b>   |
|  | <p><b>ELECTRICAL SHOCK HAZARD</b></p> <p>Installation, and connecting mains and signal cables are subject to qualified personnel only, taking into account all applicable standards and legislative requirements!</p> <p>Failure to follow may cause warranty invalidation, property damage and/or personal injury or death! Connecting mains and signal cables to internal screw terminals requires working at open housing near live parts!</p> <p>Installation of this instrument is subject to qualified personnel only, familiar with the resulting potential risks!</p> <p>The gas analyzers do not provide a mains power switch and are operable when connected to power.</p> <p>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 disconnecter for the analyzer.</p> |

|  |   |
|--|---|
|  | <b> WARNING</b>  |
| <br> | <p><b>EXPLOSION and ELECTRICAL SHOCK HAZARD BY INSTALLATION</b></p> <p>These instruments provide a protective earth terminal. To prevent electrical shock and explosion hazards, the instrument must be connected to a protective earth.</p> <p>Therefore the instrument has to be connected to mains by using a three wire mains cable with earth conductor!</p> <p>Any interruption of the earth connector inside or outside the instrument or disconnecting the earth terminal may cause potential electrical shock hazard!</p> <p>Intended interruption of protective earth connections is not permitted!</p> |

Safety Instructions

|   |   |
|---|---|
|    | <p style="text-align: center;"><b>⚠ WARNING</b></p> <p style="text-align: center;"><b>EXPLOSION HAZARD BY DAMAGED FLAME PATHS</b></p> <p>Take care to not damage the housing nor threads, and to not produce scratches on the flange, as threads and flange function as flame paths!<br/>       Violation may result in explosion and personal injury!</p>  |
|    | <p style="text-align: center;"><b>⚠ WARNING</b></p> <p style="text-align: center;"><b>ELECTRICAL SHOCK HAZARD WHEN CONNECTING TO MAINS</b></p> <p>Before connecting the analyzer to mains power, please read the chapter on safety warnings and the following instructions carefully.</p>   |
| <br><br> | <p style="text-align: center;"><b>⚠ WARNING</b></p> <p style="text-align: center;"><b>ELECTRICAL SHOCK HAZARD WHEN OPERATED OPENED</b></p> <p>Do not operate without covers secure. Do not open while energized. Installation requires access to live parts which can cause death or serious injury.</p> <p>For safety and proper performance this instrument must be connected to a properly grounded three-wire source of power.</p> <p>Violation may cause explosion and personnel injury!</p> |
| <br>  | <p style="text-align: center;"><b>⚠ WARNING</b></p> <p style="text-align: center;"><b>EXPLOSION HAZARD WHEN OPEN</b></p> <p>Do NOT operate the instrument with doors 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.</p> <p>Use ALL 20 screws to fix the cover!</p> <p>Violation may cause an explosion hazard!</p>                               |

**Safety Instructions**

|  |  |
|--|--|
|   |  <b>WARNING</b> |
| <p><b>EXPLOSION HAZARD BY HIGH PRESSURE</b></p> <p><b>Risk of internal overpressure under leakage conditions!</b></p> <p><b>For the purge or high sample gas 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!</b></p> <p><b>Take care of special conditions for safe use, and gas parameter specifications (☞ S-11 and ☞ 1-12 )!</b></p> |  |

|  |   |
|--|---|
| <br>   |  <b>WARNING</b> |
| <p><b>EXPLOSION AND ELECTRICAL SHOCK HAZARD</b></p> <p><b>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)!</b></p> <p><b>The power and signal cables must be separated by a distance of minimum 1 cm (0.4 in) inside and outside the analyzer!</b></p> |   |

|   |  |
|---|--|
|    |  <b>WARNING</b> |
| <p><b>EXPLOSION HAZARD</b></p> <p><b>Startup, operation and service must not be performed, before reading and understanding all instructions!</b></p> <p><b>Especially all warnings in this and the associated manuals have to be considered! Inspection, maintenance and service must be carried out considering all related standards e.g. for „Inspection and maintenance of electrical installations in hazardous areas“ or „Equipment repair, overhaul and reclamation“.</b></p> |  |

Safety Instructions

|   |   |
|---|---|
|    | <p style="text-align: center;"><b>! WARNING</b></p> <p style="text-align: center;"><b>EXPLOSION HAZARD: VAPOR RECOVERY APPLICATION</b></p> <p>Consider the waiting time statement on the front door label before opening!<br/>         Disregarding the waiting time statement may result in explosion!<br/>         Temperatures of components for this application installed into the analyzer exceed the analyzer's temperature classification for hazardous areas!</p>  |
|  | <p style="text-align: center;"><b>! CAUTION</b></p> <p style="text-align: center;"><b>HEAVY INSTRUMENT HAZARD</b></p> <p>X-STREAM XEFD 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!<br/>         Use two people and/or suitable tools for transportation and lifting these instruments!<br/>         Take care to use anchors and bolts specified to be used for the weight of the units!<br/>         Take care the wall or stand the unit is intended to be installed at is solid and stable to hold the units!</p> |
|  | <p style="text-align: center;"><b>! CAUTION</b></p> <p style="text-align: center;"><b>HIGH TEMPERATURES HAZARD</b></p> <p>While working at internal components hot surfaces may be accessible, even after the instrument has been disconnected from power!</p>  |

**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 with the directive, consider the following clarification sheet released by the European ATEX Notified Body Group (see next page):

**Safety Instructions**

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

**European ATEX Notified Bodies Group**

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

*Original in English*

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

\*Step refers to ExNB Rules

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|   |                                     |
|---|-------------------------------------|
| ■ authorised<br><b>Date of application : 16/06/99</b> | Chairman : M. BRÉNON<br>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 Enclosure » 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 activated.
  - 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

Safety Instructions

|   |  |
|---|--|
|  | <b>⚠ WARNING</b>   |
|   | <b>EXPLOSION HAZARD BY INTERNAL BATTERY</b><br>This analyzer contains an internal battery!<br>Do NOT OPEN the analyzer enclosure if explosive atmosphere may be present!<br>Disregarding may cause explosion even if the analyzer is de-energized! |

|   |  |
|---|--|
|  | <b>⚠ CAUTION</b>   |
|   | <b>CRUSHING HAZARD</b><br>Take care of crushing hazard when closing the front door of analyzer field housings!<br>Keep out of the closing area between enclosure cover and base! |

|   |   |
|---|---|
|  | <b>⚠ CAUTION</b>  |
|   | <b>OPERATION AT LOW TEMPERATURES</b><br>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!<br>Violation may result in condensation inside the gas paths or damaged pump diaphragm! |

|   |  |
|---|--|
|  | <b>⚠ CAUTION</b>   |
|   | <b>HIGH TEMPERATURES</b><br>Hot parts may be exposed when working on photometers and/or heated components in the unit. |

**General Operating Notes**

**GENERAL OPERATING NOTES**

|  |   |
|--|---|
|  |  <b>WARNING</b>  |
|  | <b>HAZARD TO LIFE AND EXPLOSION HAZARD BY EXHAUST GASES</b>   |
| <br> | <p><b>Exhaust gases may contain hydrocarbons and other toxic gases such as carbon monoxide.</b></p> <p><b>Faulty gas connections may lead to explosion and death.</b></p> <p><b>Ensure that all gas connections are connected as labelled and airtight.</b></p> |

- The unit must be installed in a clean and dry area, protected from strong vibrations and frost.
- The unit must not be exposed to direct sunlight and sources of heat. Admissible ambient temperatures (see technical details) must be adhered to.
- Gas inlets and outlets must not be interchanged. All gases must be conditioned, before supplied to the unit. When using this unit with corrosive sample gases, ensure that these gases do not contain components harmful to the gas lines.
- Admissible pressure for all applied gases is 1500 hPa (consider special conditions for safe use)!
- Exhaust lines must be laid inclined downwards, depressurized, protected from frost and according to applicable regulations.
- If it is necessary to disconnect the gas lines, the unit's gas connectors must be sealed with PVC caps to avoid polluting the internal gas lines with condensate, dust, etc.
- To ensure electromagnetic compatibility (EMC), only shielded cables (supplied by us on request, or of equivalent standard) may be used. The customer must ensure that the shielding is correctly fitted. Shielding must be electrically connected.

## Chapter 1 Technical Description

### 1.1 Overview

The new X-STREAM flameproof gas analyzers are designed to be used in hazardous areas. The flameproof enclosure can be installed at Zone 1 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 XEFD 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 flameproof analyzer features:

- a cast aluminum enclosure, designed to
  - withstand an internal explosion,
  - quench flames resulting from an internal explosion (thus preventing a surrounding explosive atmosphere 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.

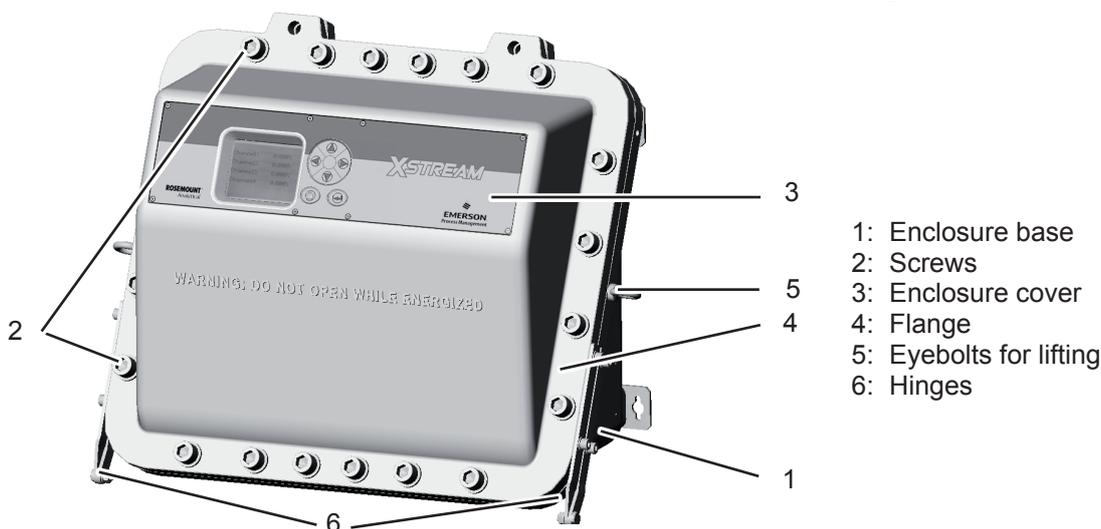


Fig. 1-1: Frontal View

## 1.3 Protective Measures in Detail

### 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 flame path between the flange parts is manufactured with very low tolerances and best flatness, to ensure the function of quenching flames. For this reason, it is of particular importance to keep the flanges surfaces free of scratches and other damages!

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 ( $\frac{1}{8}$ " ) or 6.35 mm ( $\frac{1}{4}$ " ) outer diameter (OD).

Optionally a clamping ring for 6 mm OD may be used, replacing the 6.35 mm version.

Cables are fed into the enclosure utilizing up to 4 cable glands, located at the enclosure's bottom right side. The approved glands accept 3 different internal elastomeric sealing rings with different internal diameters, supporting a wide range of cables.

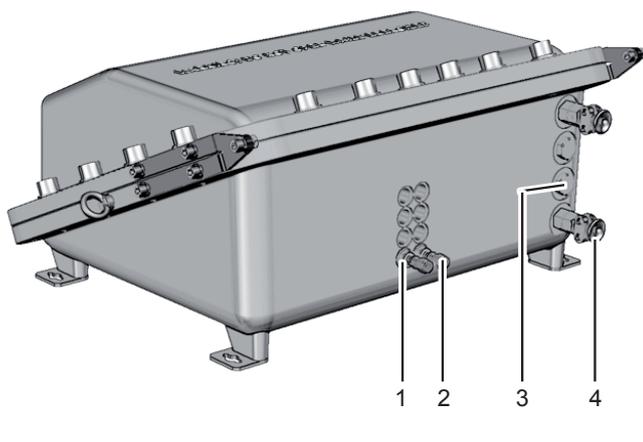
For installation in North America cable glands are replaced by a combination of conduits and metric-to-NPT thread adapters.

**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 series instruction manuals for more information about common gas analyzers features, and special features of the X-STREAM XEFD.*



- 1: Plugged when not used
- 2: Gas fitting (part of flame arrestor)
- 3: Plug
- 4: Cable gland (or conduits)

**Fig. 1-2:** Bottom View

## 1.4 High Pressure Option / Purge Option

### 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 interfere 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 flameproof 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:

**High 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 so 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.

|   |   |
|---|---|
|  |  <b>WARNING</b>  |
|   | <b>EXPLOSION HAZARD</b><br><b>When making use of any of above mentioned options, take care of the special conditions given in the technical data section, and in chapter 2 (installation instructions)!</b> |

## 1.5 Compliances

### 1.5 Explosion Protection Compliances

These products are available in two different variations, separately certified by agencies for the use in hazardous (classified) areas:

The one variation, 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.

The following certification markings apply to the products:

#### European Union (EU, ATEX)

Category 2, Zone 1:

Ex d IIB+H<sub>2</sub> T4 Gb

#### EC ATEX Type Examination Certificate:

FTZU 08 ATEX 0028 X.

#### IECEx

Ex d IIB+H<sub>2</sub> T4 Gb

 0035  II 2 G  
 FTZU 08 ATEX 0028X  
 IECEx FTZU 08.0004X  
 Ex d IIB+H<sub>2</sub> T4 Gb  
 -30 °C ≤ T<sub>amb</sub> ≤ +50 °C  
 IP 66 Type 4X

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<sub>2</sub> T3

Class I, Division 2, Group BCD T3

#### Canada

Class I, Zone 1, Ex d IIB+H<sub>2</sub> T3

Certificate of Compliance 1714037X

 <sup>US</sup>  
 1714037X  
 Class I Zone 1  
 AEx d IIB+H<sub>2</sub> T3  
 Ex d IIB+H<sub>2</sub> T3  
 Class I, Division 2  
 Groups BCD T3  
 -30 °C ≤ T<sub>amb</sub> ≤ +50 °C  
 IP 66 Type 4X  
 Explosionproof seal at enclosure  
 or within 2" of enclosure  
 Joint anti-déflagrant à la clôture ou  
 à moins de 2" de la clôture

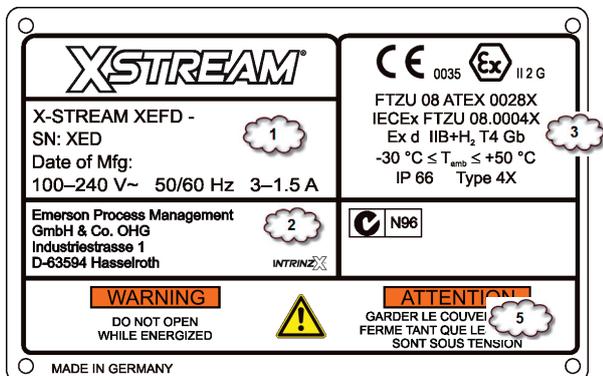
## 1.5 Compliances

### 1.5.1 Special Conditions for Safe Use

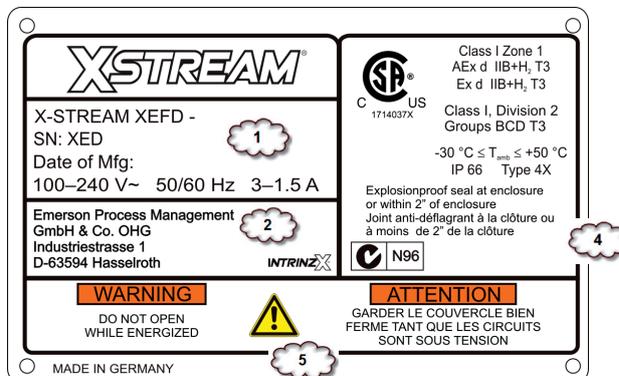
- Only screws M16x45 ISO 4762 A2-70 as specified in the maintenance section of this manual shall be used (spare part # 42716945).
- The flame joints correspond to the drawing No. 4.271-7112/1 and do not comply with the dimensions mentioned into the Tab. 1 and Tab. 2 of EN 60079-1 ed.2.
- The gas path 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.  
Concentration of gases must be below 25 % LEL.
- Depending on the particular application all appropriate 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

### 1.6 Nameplate Label



ATEX version



CSA-C/US version

| Area | Description   | Area | Description                  |
|------|---|------|------------------------------|
| 1    | The analyzer's electrical data, manufacturing data and serial number            | 2    | Manufacturer address         |
|      | <b>Certification Data</b>   | 3    | <b>IECEX / EU (ATEX)</b>     |
|      | <b>Area classification</b>  |      | <b>4 North America (CSA)</b> |
|      | <b>Protection concepts</b>  |      |                              |
|      | <b>Additional Division Marking, if applicable</b>                               |      |                              |
|      | <b>Certificate numbers</b>  |      |                              |
|      | <b>Other</b>  |      |                              |
| 5    | Additional warning: Do not open the instrument while energized. Consult manual! |      |                              |

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

1.7 Technical Data

1.7 Technical Data

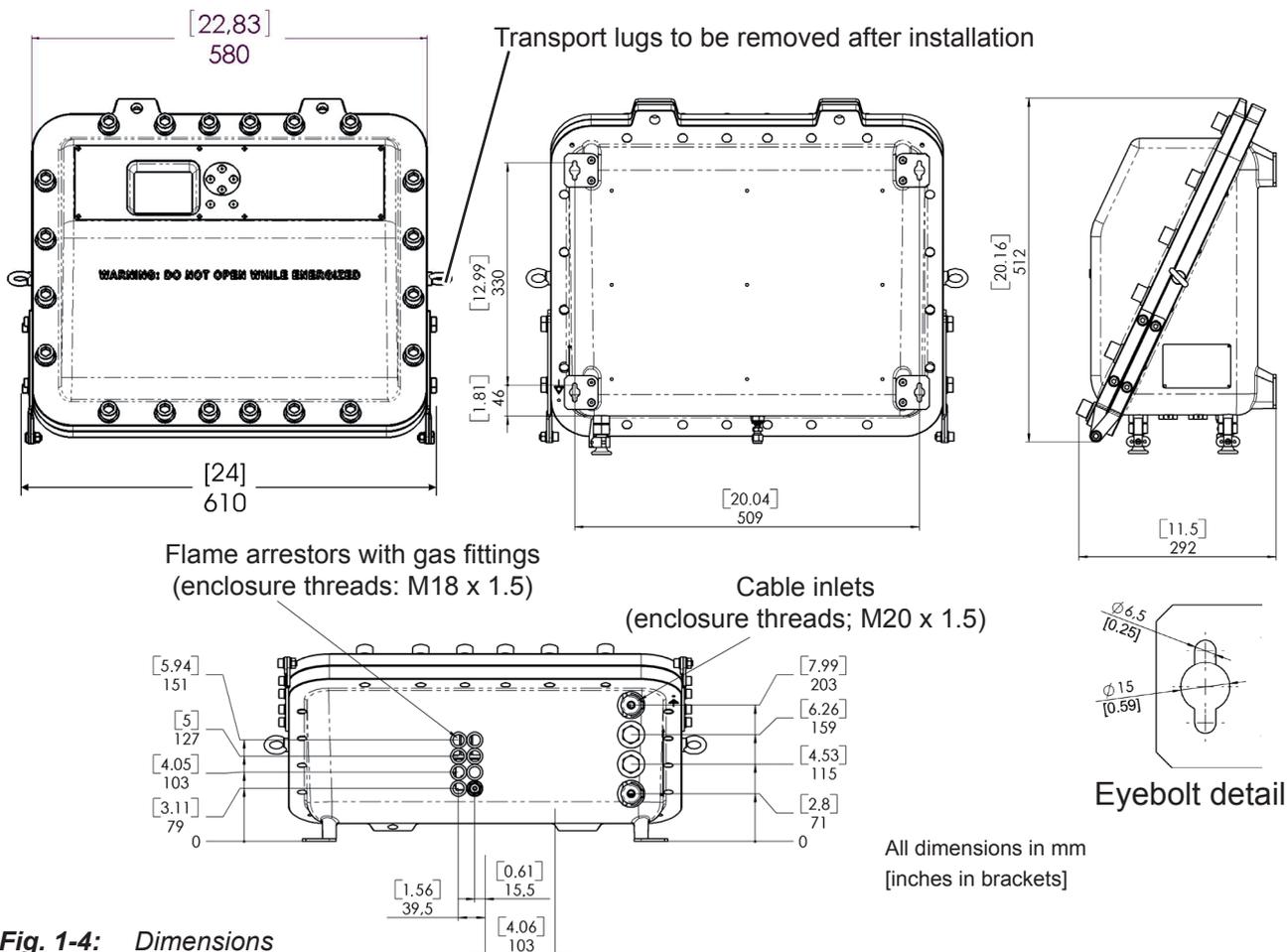


Fig. 1-4: Dimensions

| Housing   |  |
|---|--|
| Permissible operating ambient temperature range | -30 °C to +50 °C (-22 °F to +122 °F)   |
| Permissible storing ambient temperature range   | -30 °C to +70 °C (-22 °F to +158 °F)   |
| Weight  | approx. up to 63 kg (139 lbs),<br>(depending on analyzer configuration)                                  |
| Protection class                                | IP 66 (EN 60529) / Type 4X for outdoor installation.<br>Analyzer must not be exposed to direct sun light |

## 1.7 Technical Data

| Site of installation   |   |
|--|---|
| Humidity<br>(non-condensing)   | < 90 % r.h. at +20 °C (68 °F)<br>< 70 % r.h. at +40 °C (104 °F)                             |
| Pollution degree   | 2   |
| Installation category  | II  |
| 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  |   |
| Canada / USA  | CSA-C/US, based on<br>CAN/CSA-C22.2 No. 61010-1-04 /<br>UL 61010-1, 2 <sup>nd</sup> Edition |
| Europe       | CE, based on EN 61010-1   |
| Electromagnetic compatibility  |   |
| Europe   | CE, based on EN 61326   |
| Australia  | C-Tick  |
| others   | NAMUR   |
| Power supply   |   |
| Rated input voltage  | 100 - 240 V $\sim$ 50 / 60 Hz   |
| Input voltage range  | 85 - 264 V $\sim$ 47 - 63 Hz  |
| Nominal input current  |   |
| standard   | 1.3 - 0,7 A   |
| with temperature control   | 3 - 1.5 A   |
| Gas connections  |   |
| Quantity   | max. 8  |
| Specification  | flame arrestors with fittings   |
| Sizes  | connections: 6/4 mm or 1/4", stainless steel  |

**Tab. 1-1:** Generic Analyzer Data

**1.7 Technical Data**

| <b>Standard interfaces</b>  |                          |  |
|---|--------------------------|--|
| up to 5 analog outputs<br>(standard: 1 analog output per channel) | electrical specification | 4 (0)–20 mA ( $R_B \leq 500 \Omega$ )<br>optically isolated from each other and from analyzer electronics  |
|   | function                 | user-configurable activation and deactivation of concentration levels<br>support for NAMUR NE 43 operation modes, configurable via keypad and Modbus   |
| 4 relay outputs   | electrical specification | dry contacts<br>max. load. 30 V; 1 A; 30 W resistive   |
|   | function                 | Each output can be configured to provide any of the functions listed in chapter 6 of the X-STREAM XE instruction manual. These functions include, but are not limited to<br>NAMUR NE 107 status signals 'Failure', 'Maintenance request', 'Out of specification', 'Function check',<br>concentration alarms,<br>control signals for external valves or pumps,<br>and many more |
| 2 Modbus interfaces   |                          | Ethernet (RJ45 sockets), 10/100 MBit   |
| 2 USB ports   | specification            | USB 1.0  |
|   | function                 | 1 USB connector type A,<br>for connecting external storage devices<br>1 USB connector type mini AB,<br>for connecting external computers   |

**Tab. 1-2:** Standard Interfaces Data

**1.7 Technical Data**

| <b>Optional interfaces</b>       |                          |   |
|----------------------------------|--------------------------|---|
| Digital I/O board                |                          |   |
| 7 or 14 digital inputs           | electrical specification | max. 30 V, internally limited to 2.3 mA<br>HIGH: min. 4 V; LOW: max. 3 V<br>common GND  |
|                                  | function                 | Each input can be configured to any of the functions listed in chapter 6 of the X-STREAM XE instruction manual, e. g.<br>Open valve<br>Activate sample gas pump<br>Zero calibrate all channels<br>Span calibrate all channels<br>Zero and span calibrate all channels<br>Abort calibration  |
| 9 or 18 additional relay outputs | electrical specification | Dry relay change-over contacts can be used as NO or NC<br>max. load. 30 V; 1 A; 30 W resistive  |
|                                  | function                 | Each output can be configured to provide any of the functions listed in chapter 6 of the X-STREAM XE instruction manual.<br>These functions include, but are not limited to<br>NAMUR NE 107 status signals 'Failure', 'Maintenance request', 'Out of specification', 'Function check',<br>concentration alarms,<br>control signals for external valves or pumps,<br>and many more |

**Tab. 1-3:** *Optional Interfaces Data*

1.7 Technical Data

| Optional interfaces |                          |   |
|---------------------|--------------------------|---|
| 2 Analog inputs     | electrical specification | 0–1 V, 0–10 V (software selectable)<br>$R_{in} = 100\text{ k}\Omega$<br>optional (requires to fit wire bridges,  Chapter 2 'Installation'):<br>4 (0)–20 mA ; $R_{in} = 50\ \Omega$<br>optically isolated from analyzer GND<br>protected against overload up to $\pm 15\text{ V}$ or $\pm 20\text{ mA}$ |
|                     | function                 | Input analog signals from external devices, such as e.g.<br>pressure transmitters,<br>flow sensors,<br>analyzers, etc.<br>for compensation or other purposes  |
| 1 Interface         | electrical specification | 9-pin, optically isolated from analyzer electronics   |
|                     | function                 | RS232C, RS485 or Modbus   |
| 1 Service interface | electrical specification | RS232C,<br><b>NOT optically isolated from analyzer electronics</b>  |
|                     | function                 | <b>Only to be used by Emerson personnel</b>   |

Tab. 1-3: Optional Interfaces Data (cont'd)

## 1.7 Technical Data

| Increased sample and calibration gas pressure |   |
|---|---|
| Increased 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 safe area.   |



**Consider the special conditions for safe use (👉 1-5 )**

*Tab. 1-4: Increased Pressure Data*

| Purging the housing to reduce cross-interference |   |
|--|---|
| 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.        |



**Consider the special conditions for safe use (👉 1-5 )**

*Tab. 1-5: Purging Gas Data*

1.7 Technical Data

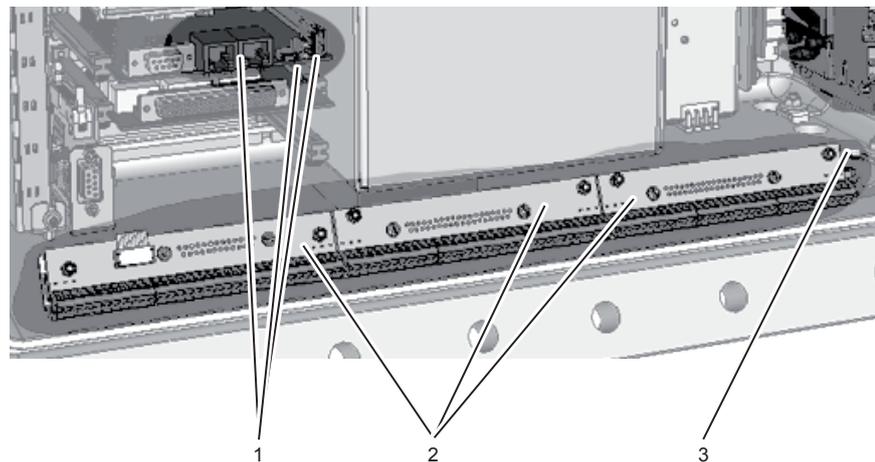
Signal inputs and outputs

| Signal connections               |   |
|----------------------------------|---|
| Analog and digital I/O           | screw terminals max. 1.5 mm <sup>2</sup> (14 AWG); end sleeves not required |
| Other                            | Ethernet: RJ45 sockets; USB-connections <sup>*)</sup>                       |
| Cable glands                     |   |
| Types                            | Cable entry via, IP 68, or conduits with metric-to-NPT adaptor              |
| Permissible outer cable diameter | 3...13 mm (0.11 to 0.5 inch), see cable gland / conduit specification       |

Techn. Description

1

Detailed terminals configuration  2 Installation



- 1 Ethernet & USB
- 2 Analog & digital I/O terminal strips
- 3 Max. 3 signal cables entries

**Note!**

Depending on the actual analyzer configuration not all shown, or different terminals may be provided!

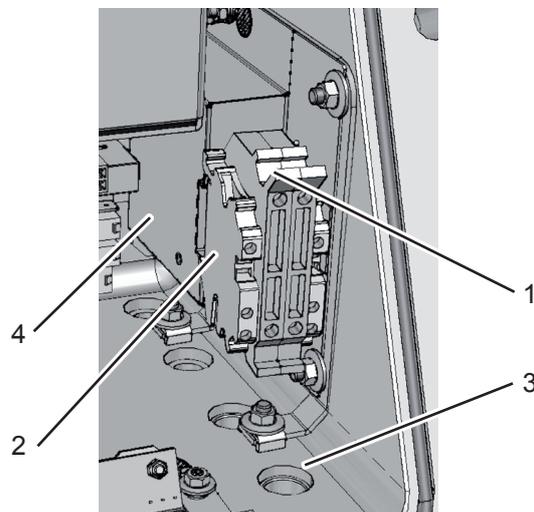
Fig. 1-5: Signals Terminals

## 1.7 Technical Data

### Power Connection

| Power connections                |  |
|----------------------------------|--|
| Power supply                     | Connection via internal screw terminals near cable entries, max 4mm <sup>2</sup> (10 AWG), end sleeves not required. |
| Power supply fuses               |  |
| Fuse ratings                     | AC 230 V / T 4 A / 5x20 mm   |
| Cable glands                     |  |
| Types                            | Cable gland, classified IP 68 or suitable conduit with metric-to-NPT adaptor   |
| Permissible outer cable diameter | 3...13 mm (0.11 to 0.5 inch), see cable gland / conduit specification  |

- 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

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<br>or Conditions | Standard Specs<br>(see Tab. 1-7 – 1-9) | Enhanced Specs<br>(see Tab. 1-7 & 1-9) |                           |
|---------------------------------|-----------------------------------|--------------|--------------------------------|--|--|---------------------------|
|                                 |                                   |              | Lowest<br>Range                | Lowest<br>Range                        | Lowest<br>Range                        | Highest<br>Range          |
| Acetone <sup>1</sup>            | CH <sub>3</sub> COCH <sub>3</sub> | UV           |                                | 0–400 ppm                              | 0–800 ppm                              | 0–3 %                     |
| Acetone <sup>1</sup>            | CH <sub>3</sub> COCH <sub>3</sub> | IR           |                                | 0–500 ppm                              | 0–1000 ppm                             | 0–3 %                     |
| Acetylene                       | C <sub>2</sub> H <sub>2</sub>     | IR           |                                | 0–3 %                                  | 0–6 %                                  | 0–100 %                   |
| Ammonia                         | NH <sub>3</sub>                   | IR           |                                | 0–100 ppm                              | 0–200 ppm                              | 0–100 %                   |
| Argon                           | Ar                                | TCD          |                                | 0–50 %                                 | 0–100 %                                | 0–100 %                   |
| Carbon dioxide                  | CO <sub>2</sub>                   | IR           | 0–5 ppm <sup>5</sup>           | 0–50 ppm                               | 0–100 ppm                              | 0–100 %                   |
| Carbon monoxide                 | CO                                | IR           | 0–10 ppm <sup>5</sup>          | 0–50 ppm                               | 0–100 ppm                              | 0–100 %                   |
| Chlorine                        | Cl <sub>2</sub>                   | UV           |                                | 0–300 ppm                              | 0–600 ppm                              | 0–100 %                   |
| Ethane                          | C <sub>2</sub> H <sub>6</sub>     | IR           |                                | 0–1000 ppm                             | 0–2000 ppm                             | 0–100 %                   |
| Ethanol <sup>1</sup>            | C <sub>2</sub> H <sub>5</sub> OH  | IR           |                                | 0–1000 ppm                             | 0–2000 ppm                             | 0–10 %                    |
| Ethylene                        | C <sub>2</sub> H <sub>4</sub>     | IR           |                                | 0–400 ppm                              | 0–800 ppm                              | 0–100 %                   |
| Helium                          | He                                | TCD          |                                | 0–10 %                                 | 0–20 %                                 | 0–100 %                   |
| Hexane <sup>1</sup>             | C <sub>6</sub> H <sub>14</sub>    | IR           |                                | 0–100 ppm                              | 0–200 ppm                              | 0–10 %                    |
| Hydrogen <sup>4</sup>           | H <sub>2</sub>                    | TCD          |                                | 0–1 %                                  | 0–2 %                                  | 0–100 %                   |
| Hydrogen Sulfide                | H <sub>2</sub> S                  | UV           |                                | 0–2 %                                  | 0–4 %                                  | 0–10 %                    |
| Hydrogen Sulfide                | H <sub>2</sub> S                  | IR           |                                | 0–10 %                                 | 0–20 %                                 | 0–100 %                   |
| Methane                         | CH <sub>4</sub>                   | IR           |                                | 0–100 ppm                              | 0–200 ppm                              | 0–100 %                   |
| Methanol <sup>1</sup>           | CH <sub>3</sub> OH                | IR           |                                | 0–1000 ppm                             | 0–2000 ppm                             | 0–10 %                    |
| n-Butane                        | C <sub>4</sub> H <sub>10</sub>    | IR           |                                | 0–800 ppm                              | 0–1600 ppm                             | 0–100 %                   |
| Nitrogen dioxide <sup>1</sup>   | NO <sub>2</sub>                   | UV           | 0–25 ppm <sup>3</sup>          | 0–50 ppm                               | 0–100 ppm                              | 0–10 %                    |
| Nitrogen monoxide               | NO                                | IR           |                                | 0–100 ppm                              | 0–200 ppm                              | 0–100 %                   |
| Nitrous oxide                   | N <sub>2</sub> O                  | IR           |                                | 0–100 ppm                              | 0–200 ppm                              | 0–100 %                   |
| Oxygen                          | O <sub>2</sub>                    | electrochem. |                                | 0–5 %                                  | –                                      | 0–25 % <sup>2,6</sup>     |
| Oxygen                          | O <sub>2</sub>                    | paramagn.    |                                | 0–1 %                                  | 0–2 %                                  | 0–100 %                   |
| Oxygen, Trace                   | O <sub>2</sub>                    | electrochem. |                                | 0–10 ppm                               | –                                      | 0–10 000 ppm <sup>6</sup> |
| Propane                         | C <sub>3</sub> H <sub>8</sub>     | IR           |                                | 0–1000 ppm                             | 0–2000 ppm                             | 0–100 %                   |
| Propylene                       | C <sub>3</sub> H <sub>6</sub>     | IR           |                                | 0–400 ppm                              | 0–800 ppm                              | 0–100 %                   |
| Sulfur dioxide                  | SO <sub>2</sub>                   | UV           | 0–25 ppm <sup>3</sup>          | 0–50 ppm                               | 0–130 ppm                              | 0–1 %                     |
| Sulfur dioxide                  | SO <sub>2</sub>                   | IR           |                                | 0–1 %                                  | 0–2 %                                  | 0–100 %                   |
| Sulfur hexafluoride             | SF <sub>6</sub>                   | IR           | 0–5 ppm <sup>3</sup>           | 0–20 ppm                               | 0–50 ppm                               | 0–2 %                     |
| Toluene <sup>1</sup>            | C <sub>7</sub> H <sub>8</sub>     | UV           |                                | 0–300 ppm                              | 0–600 ppm                              | 0–5 %                     |
| Vinyl chloride                  | C <sub>2</sub> H <sub>3</sub> Cl  | IR           |                                | 0–1000 ppm                             | 0–2000 ppm                             | 0–2 %                     |
| Water vapor <sup>1</sup>        | H <sub>2</sub> O                  | IR           |                                | 0–1000 ppm                             | 0–2000 ppm                             | 0–8 %                     |
| Water vapor, Trace <sup>1</sup> | H <sub>2</sub> O                  | capacitive   |                                | 0–100 ppm                              | –                                      | 0–3000 ppm <sup>6</sup>   |

<sup>1</sup> Dew point below ambient temperature

<sup>2</sup> Higher concentrations decrease sensor lifetime

<sup>3</sup> Daily zero calibration required for ranges below lowest standard specs range

<sup>4</sup> Special "refinery" application with 0–1% H<sub>2</sub> in N<sub>2</sub> available

<sup>5</sup> see Tab. 1-10

<sup>6</sup> standard specs only

Tab. 1-6: Gas Components and Measuring Ranges, examples

**1.8 Measurements Specifications**

**Standard and Enhanced Performance Specifications**

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

Note! 1 psi = 68.95 hPa

<sup>1</sup> Related to full scale  
<sup>2</sup> Related to measuring value  
<sup>3</sup> From gas analyzer inlet at gas flow of 1.0 l/min (electronic damping = 0 s)  
<sup>4</sup> Constant pressure and temperature  
<sup>5</sup> Dependent on integrated photometer bench

<sup>6</sup> Depending on measuring range  
<sup>7</sup> Pressure sensor is required  
<sup>8</sup> Special conditions for > 1.100 hPa abs.  
<sup>9</sup> Limited to atmospheric if internal sample pump  
<sup>10</sup> Temperatures below 0 °C (-4 °F) with thermostat control only

<sup>11</sup> Thermost. controlled sensor: 75 °C (167 °F)  
<sup>12</sup> Flow variation within ± 0.1 l/min  
<sup>13</sup> Optional thermostatically controlled box with temperature 60 °C (140 °F)  
<sup>14</sup> Temperature variation: ≤ 10 K per hour

**Tab. 1-7: IR, UV, VIS, TCD - Standard and Enhanced Measurement Performance Specifications**

| Trace Moisture (tH <sub>2</sub> O) |   |
|------------------------------------|---|
| Measurement range                  | -100 to -10 °C dew point (0–100...3000 ppm)   |
| Measurement accuracy               | ±2 °C dew point   |
| Repeatability                      | 0.5 °C dew point  |
| Response time (t <sub>95</sub> )   | 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 <sup>2</sup>    | Depending on sequential measurement system, see analyzer specification <sup>1</sup><br>max. 1500 hPa abs / 7 psig |
| Flow rate                          | Depending on sequential measurement system, see analyzer specification <sup>1</sup><br>0.2 to 1.5 NI/min          |

Note! 1 psi = 68.95 hPa

<sup>1</sup> If installed in series to another measurement system, e. g. IR channel  
<sup>2</sup> Special conditions apply to pressures above 1100 hPa (1.5 psig) up to 1500 hPa (7 psig)

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

**Tab. 1-8: Trace Moisture - Standard Measurement Performance Specifications**

1.8 Measurements Specifications

|  | Oxygen Sensors                           |                  |                                    |                             |
|--|--|------------------|------------------------------------|-----------------------------|
|  | Paramagnetic (pO <sub>2</sub> )          |                  | Electrochemical (eO <sub>2</sub> ) | Trace (tO <sub>2</sub> )    |
|  | Standard Spec                            | Enhanced Spec    |                                    |                             |
| Detection limit (4 σ) <sup>1 4</sup>                               | ≤ 1 %                                    | ≤ 0.5 %          | ≤ 1 %                              | ≤ 1 %                       |
| Linearity <sup>1 4</sup>   | ≤ 1 %                                    |                  | ≤ 1 %                              | ≤ 1 %                       |
| Zero-point drift <sup>1 4</sup>                                    | ≤ 2 % per week                           | ≤ 1 % per week   | ≤ 2 % per week                     | ≤ 1 % per week              |
| Span (sensitivity) drift <sup>1 4</sup>                            | ≤ 1 % per week                           | ≤ 0.5 % per week | ≤ 1 % per week                     | ≤ 1 % per week              |
| Repeatability <sup>1 4</sup>                                       | ≤ 0.5 %                                  |                  | ≤ 1 %                              | ≤ 1 %                       |
| Response time (t <sub>90</sub> ) <sup>3</sup>                      | < 5 s                                    |                  | approx. 12 s                       | 20 to 80 s                  |
| Permissible gas flow   | 0.2–1.5 l/min                            |                  | 0.2–1.5 l/min.                     | 0.2–1.5 l/min.              |
| Influence of gas flow <sup>1 4</sup>                               | ≤ 2 % <sup>11</sup>                      |                  | ≤ 2 %                              | ≤ 2 %                       |
| Maximum gas pressure <sup>7 8</sup>                                | ≤ 1500 hPa abs. (≤ 7 psig) <sup>14</sup> |                  | ≤ 1500 hPa abs. (≤ 7 psig)         | ≤ 1500 hPa abs. (≤ 7 psig)  |
| Influence of pressure <sup>2</sup>                                 |  |                  |                                    |                             |
| – At constant temperature  | ≤ 0.10 % per hPa                         |                  | ≤ 0.10 % per hPa                   | ≤ 0.10 % per hPa            |
| – With pressure compensation <sup>6</sup>                          | ≤ 0.01 % per hPa                         |                  | ≤ 0.01 % per hPa                   | ≤ 0.01 % per hPa            |
| Permissible ambient temperature <sup>9</sup>                       | 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 <sup>1 13</sup><br>(at constant pressure) |  |                  |                                    |                             |
| – On zero point  | ≤ 1 % per 10 K   ≤ 0.5 % per 10 K        |                  | ≤ 1 % per 10 K                     | ≤ 1 % per 10 K <sup>5</sup> |
| – On span (sensitivity)  | ≤ 1 % per 10 K                           |                  | ≤ 1 % per 10 K                     | ≤ 1 % per 10 K <sup>5</sup> |
| Thermostat control   | 60 °C (140 °F) <sup>12</sup>             |                  | none                               | none <sup>10</sup>          |
| Warm-up time   | Approx. 50 minutes                       |                  | -                                  | Approx. 50 minutes          |

Note! 1 psi = 68.95 hPa

<sup>1</sup> Related to full scale  
<sup>2</sup> Related to measuring value  
<sup>3</sup> From gas analyzer inlet at gas flow of 1.0 l/min (electronic damping = 0 s)  
<sup>4</sup> Constant pressure and temperature  
<sup>5</sup> Range 0–10...200 ppm: ≤ 5 % (5 to 45 °C / 41 to 113 °F)  
<sup>6</sup> Pressure sensor is required  
<sup>7</sup> Special conditions for > 1100 hPa abs. (1.5 psig)  
<sup>8</sup> Limited to atmospheric if internal sample pump  
<sup>9</sup> Temperatures below 0 °C (-4 °F) with thermostat control only  
<sup>10</sup> Thermost. controlled sensor: 35 °C (95 °F)  
<sup>11</sup> For ranges 0–5...100 % and flow 0.5...1.5 l/min  
<sup>12</sup> Optional thermostatically controlled sensor with temperature 60 °C (140 °F)  
<sup>13</sup> Temperature variation: ≤ 10 K per hour  
<sup>14</sup> No sudden pressure surge allowed

**Note! Take care of the tO<sub>2</sub> sensor's documentation, providing important calibration instructions!**

Tab. 1-9: Oxygen - Standard and Enhanced 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.



1.9 Vapor Recovery Application

1.9 Vapor Recovery Application (Simultaneous Measurement of CH<sub>4</sub> and Non-CH<sub>4</sub>)

This application is served by a special configuration of the 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 (536 °F).

Techn. Description

⚠ **WARNING**

**EXPLOSION HAZARD BY HOT COMPONENTS**

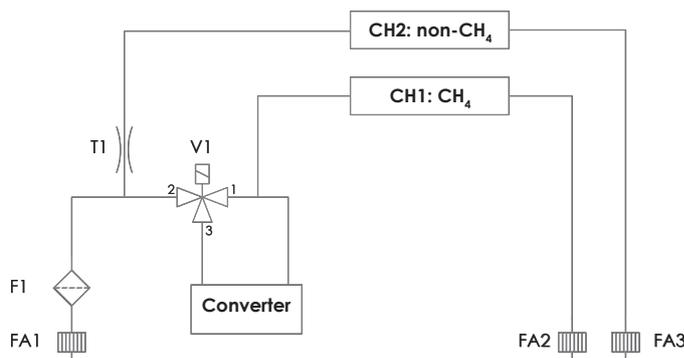
**Temperatures inside an analyzer for VAPOR RECOVERY applications exceed the analyzer's temperature classification for hazardous areas!**

**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<sub>4</sub> measurement. The other is supplied to a solenoid valve, normally forwarding the gas to the converter. Within the converter, hydrocarbons higher than CH<sub>4</sub> are converted into H<sub>2</sub>O and CO<sub>2</sub>. The converter outlet is connected to a second IR measurement system, analyzing the remaining amount of hydrocarbons (mainly CH<sub>4</sub>) in the sample gas.



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



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

Fig. 1-7: Vapor Recovery Gas Flow Diagram

## 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.

For the ease of use, special PLC and calculator programs are provided with analyzers for vapor recovery applications, automatically calculating the efficiency each time after a calibration has been performed. The calculated value shows up as a measurement result on the measurement display.

To calculate the efficiency without a preceding calibration, you can also start the PLC program manually from the webbrowser interface.

 4 Maintenance section of this manual for instructions about when and how to replace the converter material. The appendix contains listings of the PLC and calculator programs, enabling automatic converter efficiency calculation.

## 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

|  |  |
|--|--|
|  |  <b>WARNING</b>   |
|  | <p><b>HAZARDS FROM MISSING INFORMATION</b></p> <p>Compare the content of your package with the pictures below.</p> <p>Analyzers for hazardous areas need additional parts, described in the accompanying documentation referring to hazardous area installations.</p> <p>Call your local sales office if something is missing, and <b>DO NOT</b> continue to install your analyzer, until all parts are at hand!</p> |

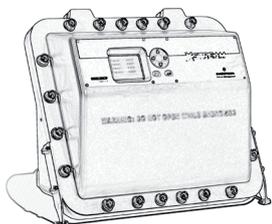
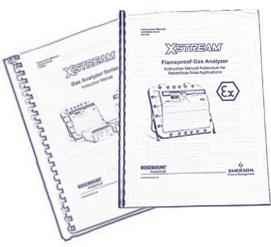
|  |   |   |
|--|---|---|
|                   | Allen key for flange screws   |  <p>Analyzer</p>  |
|                   | Cable glands for ATEX approved analyzers (amount meets number of non sealed threads).         |   |
|                   | Metric-2-NPT adaptors for CSA approved analyzers (amount meets number of non sealed threads). |  <p>Instruction manuals:<br/>         - This manual addendum<br/>         - X-STREAM XE instruction manual (on USB stick)</p> |
|  <p>USB stick</p> | Trace oxygen cell (if applicable)   |   |

Fig. 2-1: Scope of Supply

**2.2 Installation - Analyzer**

**2.2 Installing the Analyzer**

|   |  |
|---|--|
|  |  <b>WARNING</b>   |
|   | <p><b>EXPLOSION HAZARD</b></p> <p>Installing and wiring this instrument must comply with all relevant national legislative requirements and regulations.</p> <p>Neither housing nor threads must be damaged, also scratches on flanges are not permitted, as all these are part of the explosion protection concept!</p> <p>Consider all safety instructions within this on hand manual and all associated analyzer instruction manuals!</p> |

|   |  |
|---|--|
|  |  <b>WARNING</b>   |
|   | <p><b>EXPLOSION HAZARD WHEN OPEN</b></p> <p>Installing this analyzer requires opening the housing and working at open instrumen! This is permitted only if no hazardous atmosphere is present and the instrument and connected circuitry is deenergized!</p> <p>Depending on the local regulation, this may require a competent hot work supervisor to issue a hot work permit.</p> <p>Use ALL 20 screws to fix the cover!</p> <p>Violation may cause an explosion hazard!</p> |

|   |   |
|---|---|
|  |  <b>CAUTION</b>  |
|   | <p><b>HEAVY INSTRUMENT HAZARD</b></p> <p>X-STREAM XEFD 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!</p> <p>Use two people and/or suitable tools for transportation and lifting these instruments!</p> <p>Take care to use anchors and bolts specified to be used for the weight of the units!</p> <p>Take care the wall or stand the unit is intended to be installed at is solid and stable to hold the units!</p> |

**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.

**! WARNING**

**EXPLOSION HAZARD**

**When installing the analyzer take care to have an area of min. 40 mm (1.6") surrounding the flange free of any solid components not part of the instrument, to ensure proper function of the flange!**



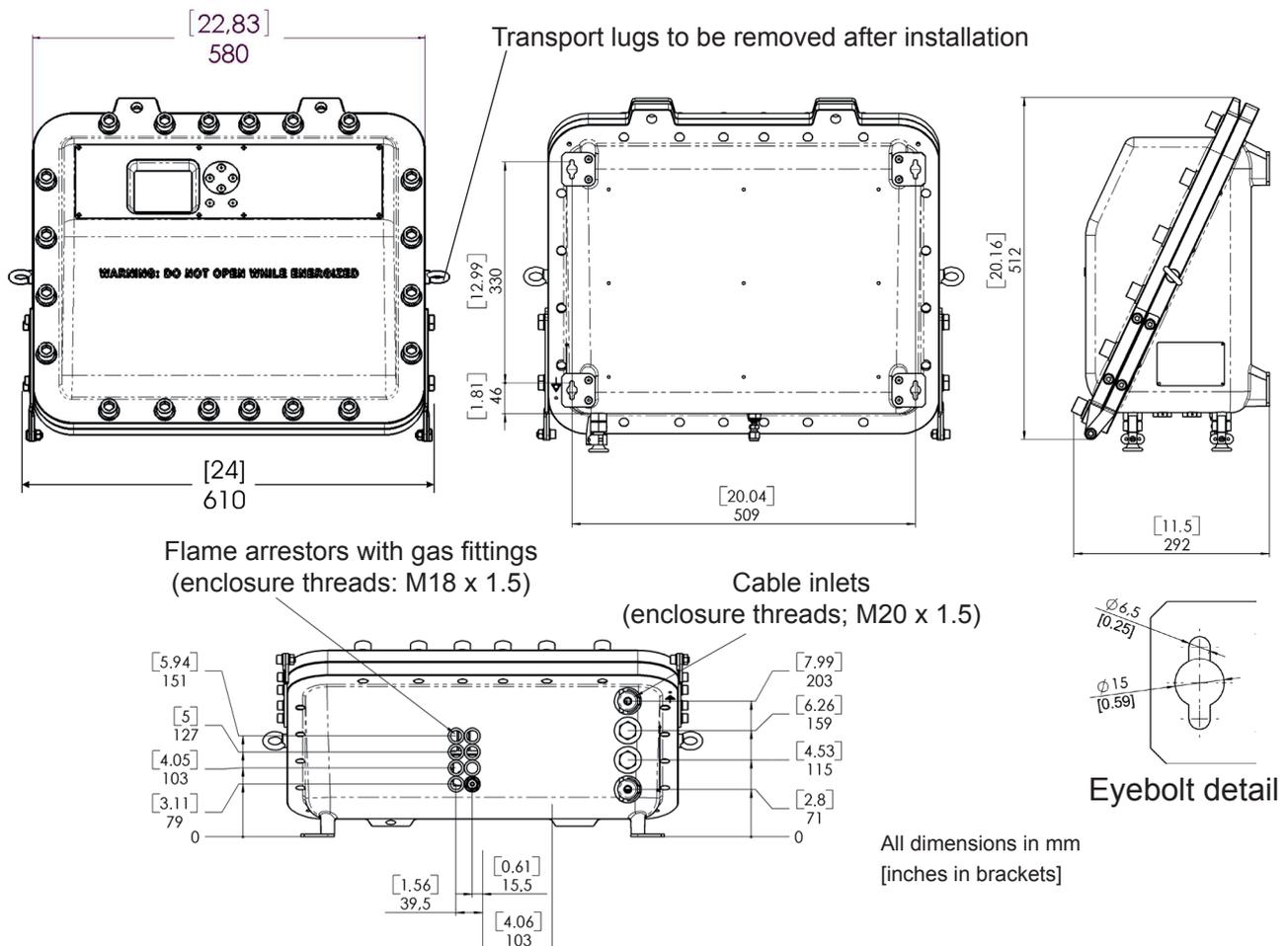


Fig. 2-2: Dimensions

## 2.3 Installation - Gas Lines

### 2.3 Connecting Gas Lines

Gas inlets and outlets are protected by flame arrestors, supporting stainless steel pipes of either 3.18 mm (1/8") or 6.35 mm (1/4") outer diameter (OD). The 1/4" 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.

|   |  |
|---|--|
|   | <b>! WARNING</b>   |
|  | <p><b>POSSIBLE EXPLOSION HAZARD</b></p> <p><b>Take care not to damage the threats, this may void the instrument's safety and cause hazards!</b></p> <p><b>Ensure unused entries remain sealed with approved plugs!</b></p> |

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

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

**Maximum permitted fastening torque: 40 Nm!**

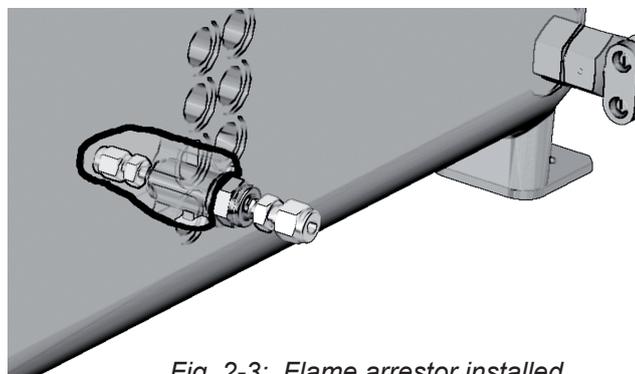
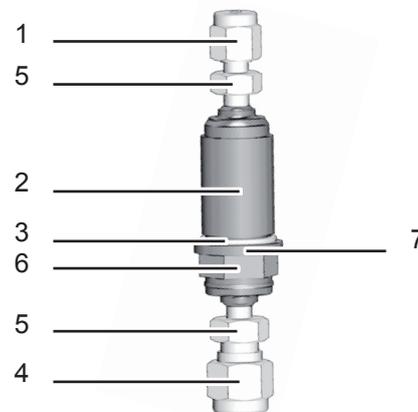


Fig. 2-3: Flame arrestor installed into instrument enclosure



- 1: Gas fitting 1/8" (inside instrument) \*)
- 2: M18 male thread (inside enclosure wall)
- 3: O-ring (optional)
- 4: Gas fitting 1/4" or 1/8" (outside instrument) \*)
- 5: Hexagon for counter holding while tightening
- 6: Hexagon for wrench when mounting into a M18 thread
- 7: O-ring shoulder

\*) FA 01 with 1/4" (outside instrument) and 1/8" (inside)  
 FA 02 with 1/4" at both ends  
 FA 03 with 1/8" at both ends

Fig. 2-4: Flame arrestor elements, considering as example FA 01

**2.3 Installation - Gas Lines**

Gas fittings are accessible at the instrument's outer bottom side. The number and assignment of gas inlet and outlet fittings depends on the application and is given on a label attached to the analyzer's bottom side adjacent to the fittings.

For simple installation we recommend to mark the gas lines according to the marking on the analyzer label. This avoids confusion during re-installation if the analyzer had to be disconnected for whatever reason.

**2.3.1 Special Conditions**

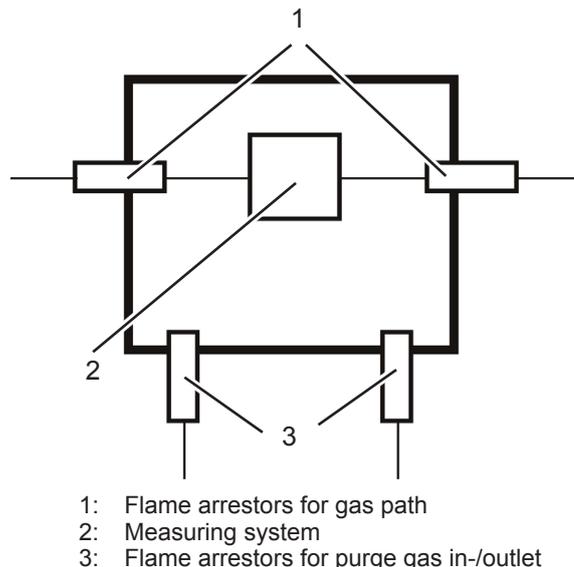
**2.3.1.1 Purging the Housing with Clean Gas when e.g. Measuring Low Concentrations**

|   |   |
|---|---|
|  |  <b>WARNING</b>  |
|   | <p><b>EXPLOSION HAZARD BY HIGH PRESSURE</b></p> <p><b>Risk of internal overpressure under leakage conditions!</b></p> <p><b>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!</b></p> <p><b>Take care of special conditions for safe use, and gas parameter specifications (S-5 and 1-12)!</b></p> |

The purge medium must be supplied via a separate flame arrester (purge gas inlet), installed into the analyzer enclosure. Another flame arrester 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.



*Fig. 2-5: Exemplary diagram for a single channel unit with purge option*

## 2.3 Installation - Gas Lines

### 2.3.1.2 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  1-12 ). These inline flame arrestors need to be installed outside the analyzer and in addition to the flame arrestors provided by the analyzer.

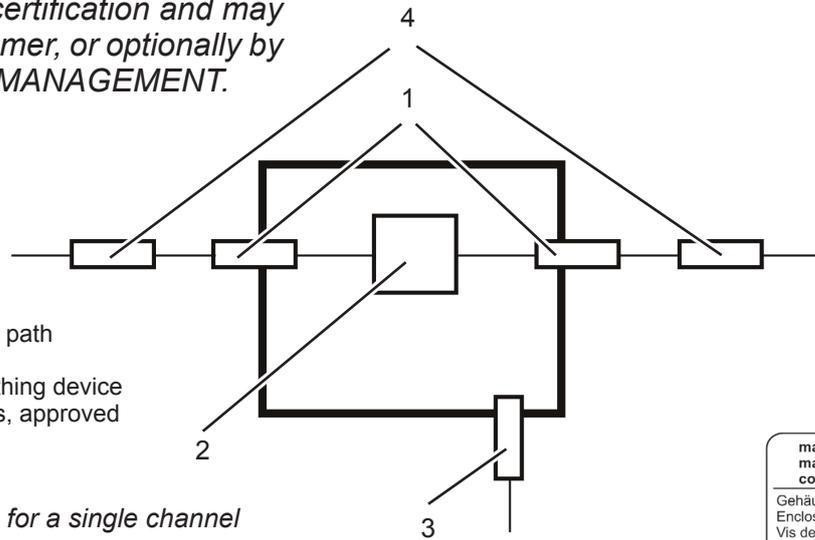
**Note!**

*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. 2-6: Exemplary diagram for a single channel instrument for high gas pressure

### 2.3.1.3 Fastening Torques for Enclosure Components

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

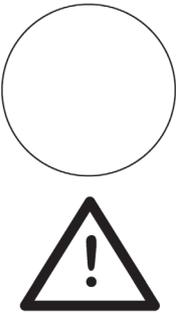
|   |                |
|---|----------------|
| <b>max. Anzugsmoment<br/>max. fastening torque<br/>couple maximal</b>                 |                |
| Gehäuseschrauben<br>Enclosure screws<br>Vis de logement                               | <b>M16 x 2</b> |
| <b>25 Nm / 221 in.lb</b>  |                |
| <b>Gasein- /ausgänge<br/>gas in- /outlets<br/>entrée /sortie de gaz</b>               |                |
| <b>M18 x 1,5</b>  |                |
| <b>40 Nm / 354 in.lb</b>  |                |
| <b>Kabelverschraubungen<br/>cable in- /outlets<br/>boulonnages par câble</b>          |                |
| <b>M20 x 1,5</b>  |                |
| <b>40 Nm / 354 in.lb</b>  |                |
|  |                |

Fig. 2-7: Label with fastening torques, installed at the instrument

## 2.3 Installation - Gas Lines

### 2.3.2 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.

#### Case purge option

The purge medium (e.g. to minimize CO<sub>2</sub> 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).**

For safety reasons, consider section 2.3.1 when making use of this option!

#### 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  $\geq 99.999$  %.**

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 Installation - Electrical**

**2.4 Electrical Installation**

|  <b>WARNING</b>  |  |
|---|--|
| <br><br><br><br><br><br><br> | <p style="text-align: center;"><b>EXPLOSION AND ELECTRICAL SHOCK HAZARD</b></p> <p>Failure to follow the instructions provided below may cause warranty invalidation, property damage and personal injury or death!</p> <p>Installation and connecting power and signal cables are subject to qualified personnel only taking into account all applicable standards and legislative requirements!</p> <p>Take care of the relevant installation standards, as there are (but not limited to) e.g. EN 60079-14 (Europe), National Electrical Code (NEC-NFPA 70; USA), Canadian Electrical Code (CEC; Canada), IEC 60079-14 (International) and others, and all corresponding standards.</p> <p>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!</p> <p>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 disconnecter for the analyzer.</p> <p>Disconnect instruments with screw terminals from power when working at power terminals (operate power switch / circuit breaker in building installation)!</p> <p>Connecting and disconnecting flameproof X-STREAM analyzers is permitted only, if the instrument and all associated power &amp; signal lines are de-energized!</p> <p>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!</p> <p>Any interruption of the earth connector inside or outside the instrument or disconnecting the earth terminal may cause potential electrical shock hazzard!</p> <p>The analyzers do not provide a power switch and are operable when connected to power.</p> |

2.4 Installation - Electrical

|   |  |
|---|--|
|    | <p style="text-align: center;"><b>⚠ WARNING</b></p> <p style="text-align: center;"><b>EXPLOSION HAZARD WHEN ENERGIZED</b></p> <p>Do not open instrument when energized.</p> <p>Ensure that external circuitry is disconnected or de-energized before opening the instrument.</p> <p>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)!</p>   |
|   | <p style="text-align: center;"><b>⚠ CAUTION</b></p> <p style="text-align: center;"><b>SELECT THE CORRECT TYPE OF CABLE ENTRY</b></p> <p>Before starting to install the analyzer, verify what type of cable entry is required at your site of installation:</p> <p>X-STREAM flameproof 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).</p>  |
|  | <p style="text-align: center;"><b>⚠ WARNING</b></p> <p style="text-align: center;"><b>EXPLOSION HAZARD WHEN INSTALLING CONDUITS</b></p> <p>X-STREAM flameproof gas analyzers provide metric threads for installing cable entries. Installing conduits requires using metric-to-NPT adaptors!</p> <p>To stay compliant with the North-American certification use only flameproof certified adaptors, e.g. the following type:</p> <p style="text-align: center;">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.</p> <p>Select a type of conduit according the local code, suitable for above mentioned adaptors and the site of installation.</p> <p>During installation follow the instructions provided by the manufacturer of the conduits!</p> <p>Unused entries must be provided with flameproof plugs, secured in place with thread locking compound!</p> |

2.4 Installation - Electrical

|   |   |
|---|---|
|  | <b>! WARNING</b>                            |
|   | <b>EXPLOSION HAZARD BY INTERNAL BATTERY</b> |

**This analyzer contains an internal battery!**  
**Do NOT OPEN the analyzer enclosure if explosive atmosphere may be present!**  
**Disregarding may cause explosion even if the analyzer is de-energized!**

|   |  |
|---|--|
|  | <b>! WARNING</b>                                     |
|   | <b>EXPLOSION HAZARD WHEN INSTALLING CABLE GLANDS</b> |

**When using the ADL type cable glands: Take care to use the correct cable gland internal elastomeric ring with an internal diameter supporting the cable to be used! The supported cable diameters are noted on the sealing ring.**  
**Use only cables as specified in the cable glands installation instruction, and carefully follow the installation instructions!**

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 !*

**2.4 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.

## 2.4 Installation - Electrical

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

Owner 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.

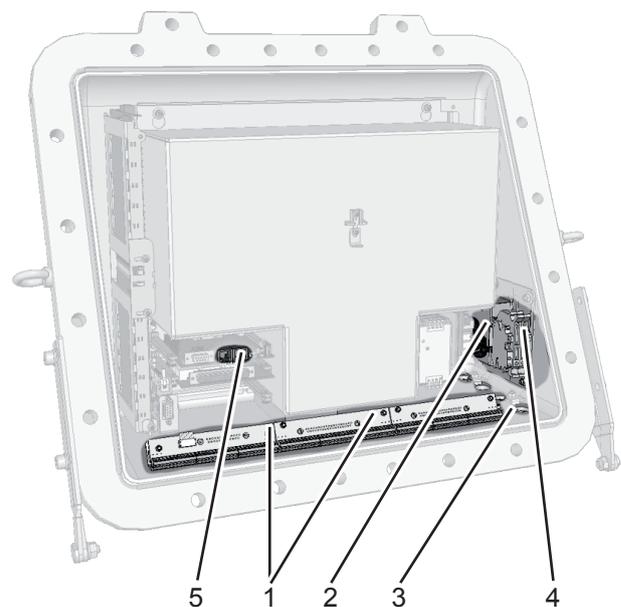
Installation under CSA certification requires the use of approved conduits and suitable metric-to-NPT adaptors. .

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 and USB connectors

Fig. 2-8: Allocation of terminals

**2.4 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 sets and plugs for not used entries (see accessory kit).

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 USB and ethernet connectors, located inside the analyzer.

| <b>Screw Terminals Data</b>    |   |
|--------------------------------|---|
| Supported wire cross sections: | 0.14 to 1.5 mm <sup>2</sup> (26 to 15 AWG), no need to use wire end sleeves |
| Cable skinning length:         | 5 mm  |
| Screw thread:                  | M2  |
| Tightening torque, min:        | 0.25 Nm (2.3 in.lb)   |

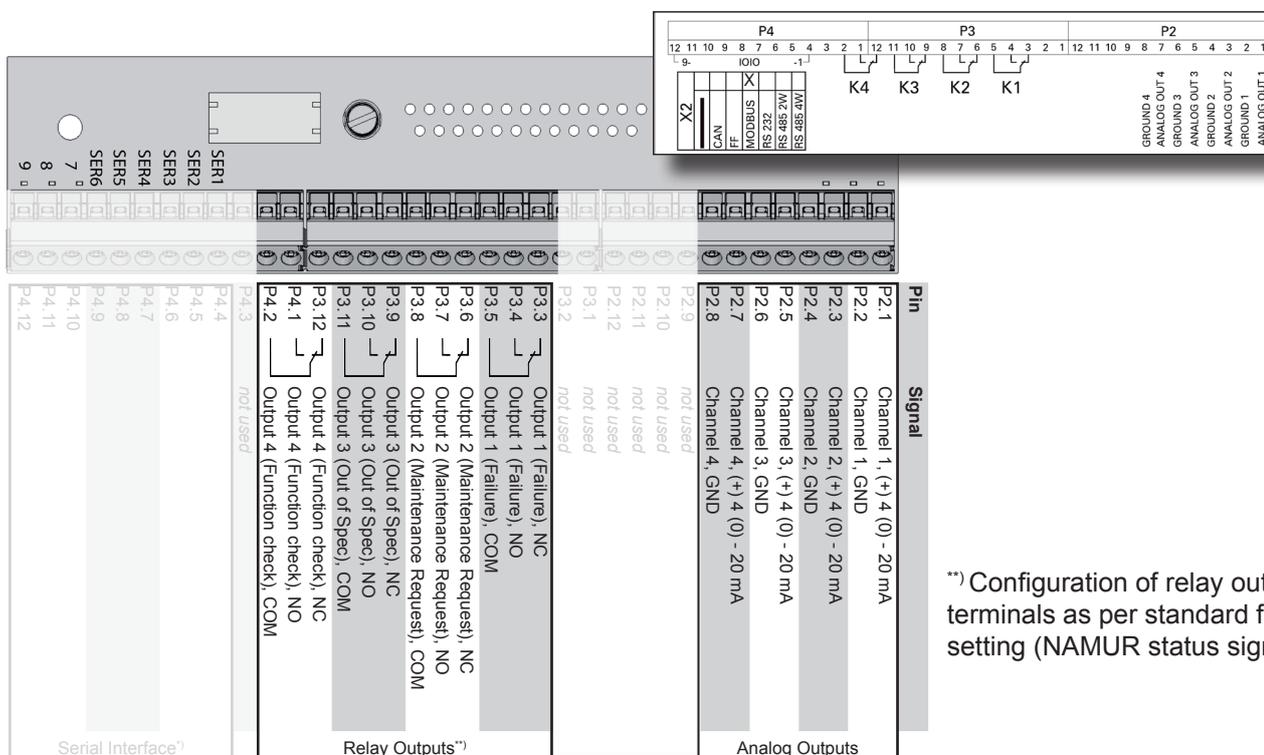
## 2.4 Installation - Electrical

### Analog Outputs Relay Outputs 1 - 4

Terminals for analog signals and relays outputs 1 - 4 are located at the leftmost terminal module (terminal block X1; fig. 2-9).

|                                     |   |
|-------------------------------------|---|
| Analog output specification:        | 4 (0)–20 mA ( $R_B \leq 500 \Omega$ )<br>optically isolated from each other and from analyzer electronics |
| Specification of relay outputs 1-4: | Dry relay change-over contacts, can be used as NO or NC.  |
| Electrical data:                    | max. 30 VDC, 1 A, 30 W resistive  |

**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)

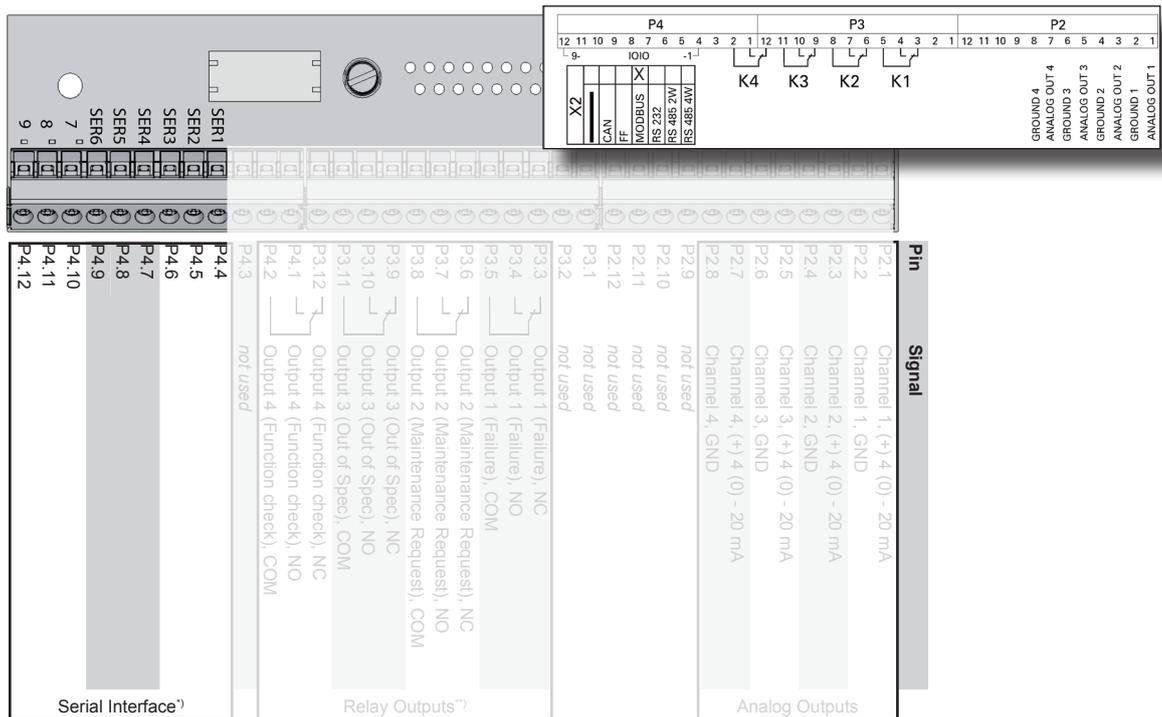
Fig. 2-9: Terminals block X1 - analog signals and relay outputs 1-4

2.4 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/<br>2 wire | MOD 485/<br>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 |

Fig. 2-10: 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).

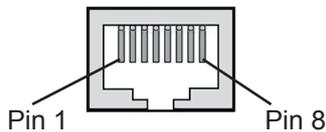
## 2.4 Installation - Electrical

### Modbus RJ45 connection

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.



| Pin no.      | Signal          |
|--------------|-----------------|
| 1            | TX+             |
| 2            | TX-             |
| 3            | RX+             |
| 6            | RX-             |
| <i>other</i> | <i>not used</i> |

Fig. 2-11: Modbus Interface - Ethernet connector

**2.4 Installation - Electrical**

Digital inputs and outputs

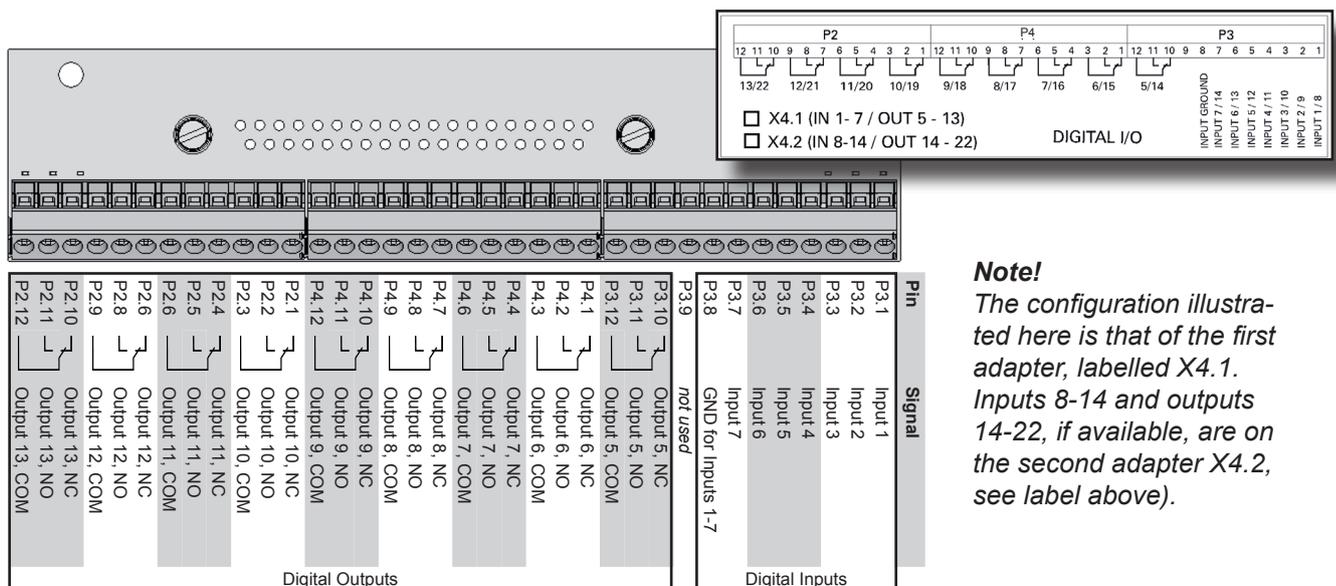
|                                    |                 |  |
|------------------------------------|-----------------|--|
| 7 or 14 digital inputs             | electrical data | max. 30 V, internally limited to 2,3 mA, H Signal: min. 4 V; L Signal: max. 3 V<br>common ground (GND), optically isolated chassis earth |
| 9 or 18 additional digital-outputs | electrical data | max. 30 VDC, 1 A, 30 W resistive   |
|                                    | mechanical data | dry change-over relay contacts, can be used as NO or NC<br>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 XE 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. 2-12: Terminal blocks X4.1 and X4.2 - Digital inputs and outputs

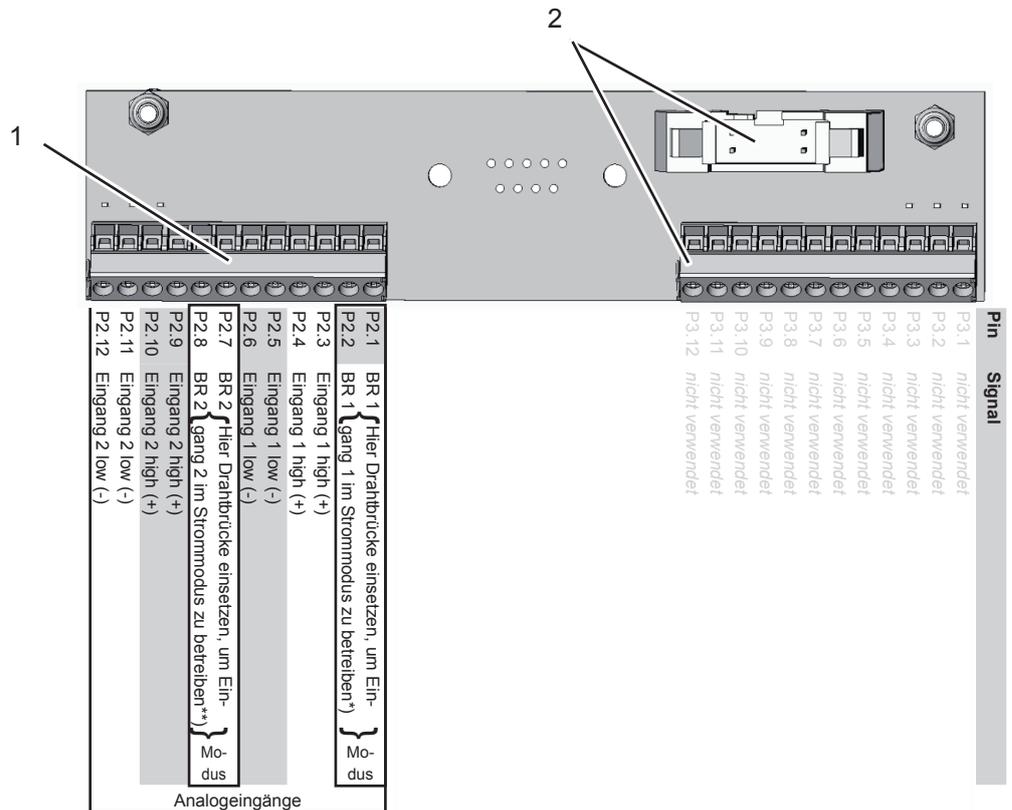
## 2.4 Installation - Electrical

### Analog inputs

|                        |   |
|------------------------|---|
| <b>2 analog inputs</b> | <p>0 - 1 (10) V, configurable via software; <math>R_{in} = 100\text{ k}\Omega</math><br/>         optional (requires the use of wire-bridges, see. Fig.):<br/>         4 (0) - 20 mA ; <math>R_{in} = 50\ \Omega</math><br/>         Galvanically isolated from analyzer-GND<br/>         Protected against overload to <math>\pm 15\text{ V}</math> or rather. <math>\pm 20\text{ mA}</math></p> |
|------------------------|---|

**Note!**

Follow the installation instructions in Chapter 4 of the X-STREAM XE Instruction-Manual!



- 1 Screw terminals
- 2 Reserved for future application

Fig. 2-13: Terminal block X5 - analog inputs

2.4 Installation - Electrical

**Connecting the power cord**

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

| Electrical Connections              |   |
|-------------------------------------|---|
| Power terminals                     | Schraubklemmen mit integrierten Sicherungshaltern<br>max. 4 mm <sup>2</sup> |
| Supported wire cross sections       | 0.2 to 4 mm <sup>2</sup> (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<br>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.

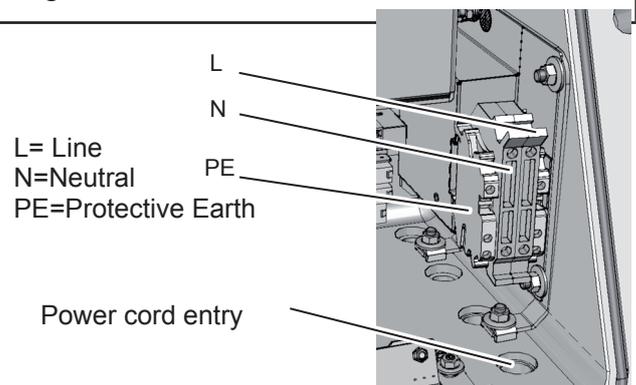


Fig. 2-14: Power terminals

|  |  |
|--|--|
|  | <b>WARNING</b>   |
|  | <p><b>ELECTRICAL SHOCK HAZARD</b></p> <p><b>Verify the power supply at installation site meets the specification given on the analyzer's nameplate label, before installing the instrument!</b></p> <p><b>Verify power cables are disconnected and/or instrument is de-energized prior to working at the terminals!</b></p> <p><b>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!</b></p> |

## 2.4 Installation - Electrical

### 2.4.1 Equipotential bonding conductor

The X-STREAM XEFD enclosure provides an additional terminal for connecting an equipotential conductor, located at the base part flange's rear side (see fig. 2-15), near the nameplate label.

Screw thread: M5 x 10 mm

Conductor cross section: min. 4 mm<sup>2</sup>

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.

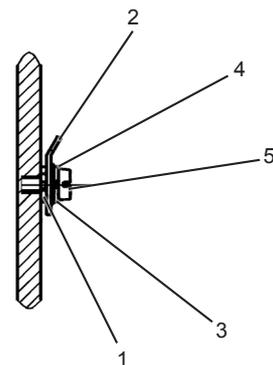
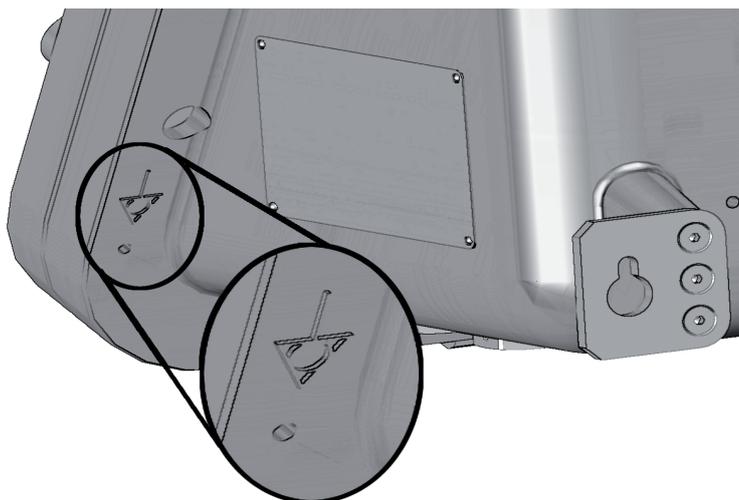


**The bonding conductor must be at least the same section as the power supply cable!**



**The thread depth is 10 mm.**

**Use a screw with a matching thread length to make sure that the ring terminal (2) of the bonding conductor is securely connected!**



- |                 |               |
|-----------------|---------------|
| 1 Lock washer   | 4 Lock washer |
| 2 Ring terminal | 5 Screw M5    |
| 3 Flat washer   |               |

Fig. 2-15: Equipotential bonding conductor terminal

2.4 Installation - Electrical

|   |  |
|---|--|
|  |  <b>WARNING</b>   |
|   | <b>ELECTRICAL SHOCK HAZARD</b><br>Before completing the electrical connection of the instrument, verify cables are inserted and connected in correct manner!<br>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)

|  |  |
|--|--|
| <br> |  <b>WARNING</b>   |
|  | <b>EXPLOSION HAZARD WHEN OPEN</b><br>Do NOT operate the instrument with doors 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.<br>Use ALL 20 screws to fix the cover!<br>Violation may cause an explosion hazard! |



Chapter 3  
Start up

|   |   |
|---|---|
|  |  <b>WARNING</b>  |
|   | <p style="text-align: center;"><b>EXPLOSION HAZARD</b></p> <p>Ensure all covers, plugs and housing parts are in place and secured properly before supplying power and signal voltages!</p> <p>Ensure all requirements given by the clarification sheet for performing gas analysis within a flameproof enclosure are considered <b>BEFORE</b> supplying gases (☞ S-11 )!</p> <p>The sheet also gives instructions for the sequence of supplying gases during process and analyzer startup .</p> |

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.

|   |   |
|---|---|
|  |  <b>CAUTION</b>  |
|   | <p style="text-align: center;"><b>OPERATION AT LOW TEMPERATURES</b></p> <p>When operating an instrument at temperatures below 0 °C (32 °F), do <b>NOT</b> apply gas nor operate the internal pump before the warmup time has elapsed!</p> <p>Violation may result in condensation inside the gas paths or damaged pump diaphragm!</p> |

## 3.2 Leak Test

### 3.2 Performing a Leak Test

To achieve best and proper measuring results you must ensure the gas path system does not have leaks.

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!**

We recommend 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<sub>2</sub>) 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!

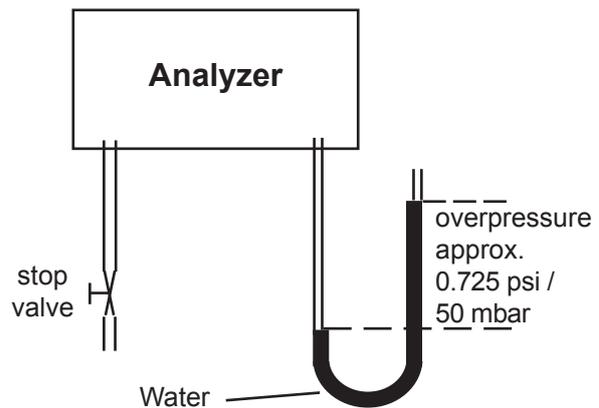
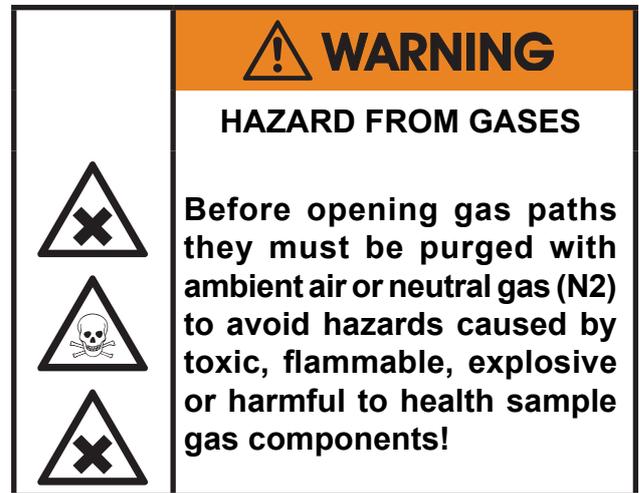


Fig. 3-1: Leak Testing With U-Turn Manometer

**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

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 perform a leak test, 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.

|   |   |
|---|---|
|  |  <b>WARNING</b>   |
|   | <b>EXPLOSION HAZARD</b><br><b>Before applying power and signals:</b> <ul style="list-style-type: none"><li>• <b>Verify for proper installation</b></li><li>• <b>Verify that all covers and plugs are properly installed and in place!</b></li><li>• <b>Verify that all gas connections are tight.</b></li></ul> <b>Violation may result in explosion, personal injury or death!</b> |

Switch on the analyzer by applying power.

## 3.3 Symbols Used

### 3.4 Symbols and Typographical Conventions

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

| Symbol                             | Description  |
|------------------------------------|--|
| <b>Within Process Descriptions</b> |  |
|                                    | Menu title   |
|                                    | Parent (SETUP) and current menu (ANALOG OUTPUTS)   |
|                                    | As an example, the menu for Output1 is shown; the menus for outputs 2 to 5 look identical  |
|                                    | To access the current menu, access level code 3 has to be entered somewhere in the menu history  |
| <br><br><br>                       | Access levels:<br><br>Access level 1<br><i>(user)</i><br><br>Access level 2<br><i>(expert)</i><br><br>Access level 3<br><i>(administrator)</i><br><br>Access level 4<br><i>(service level)</i> |
|                                    | Screen shot<br>(here: MAIN MENU)   |

| Convention                            | Description   |
|---------------------------------------|---|
| <b>Within Text</b>                    |   |
| <i>(MENU TITLE)</i><br>6-12           | For a detailed description of <i>MENU</i> , see page 6-12.      |
| <b>CONTROL</b>                        | Identifies the CONTROL menu, e.g. "press ENTER to open CONTROL" |
| <b>CONTROL - RANGES</b>               | From within the CONTROL menu, select the RANGES menu.           |
| <i>"Valves"</i><br><i>"Control.."</i> | Parameter or menu line name                                     |
| <b>Never, 1 min</b>                   | Values to be selected   |
| <b>0 ... 2000</b>                     | Value to be entered   |
| <i>ENTER</i>                          | press key (here: <i>ENTER</i> key)                              |

3.5 Front Panel Elements

3.5 Front Panel Elements

All X-STREAM XE gas analyzers feature an easy-to-use graphical user interface, which displays measurement values, status and error messages, and menus for the input of parameters.

For ease of use, the operator can select one of three languages for the display: By default

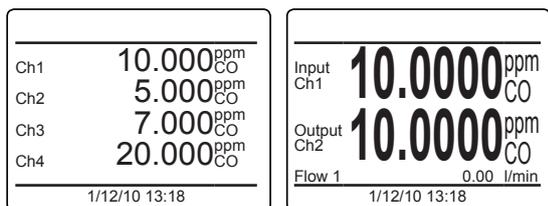
any analyzer is configured with English and German language sets, while a third can optionally be added. Currently available or under preparation: French, Italian, Portuguese and Spanish.

The units are operated by six keys on the front panel.



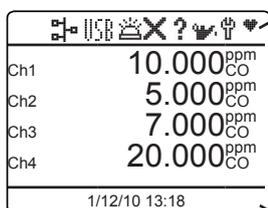
Fig. 3-2: Front Panel

3.5.1 Display



The measurement display can be configured to various layouts. The figure to the left exemplarily shows a 4 channel layout and a 2 channel layout with additional information and differing letter sizes.

3.5.2 Status Line and Text Message Line



Status information is provided by different icons in the display's first line:

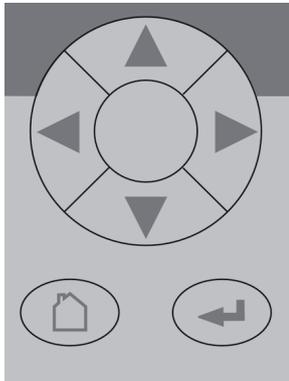
- USB = USB device is attached
- Bell = 'Alarm'
- Cross = 'Failure'
- Question mark = 'Off spec'
- Oil can = 'Maintenance request'
- Tool = 'Function check'
- Heart = the analyzer's 'heart beat', indicating the instrument is operating.

**Note!**  
 During an active webserver session, the heart symbol is replaced by a network symbol:

Clear text messages appear in the bottom line, replaced by current analyzer date & time if no messages are to be displayed.

## 3.5 Front Panel Elements

### 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:

| <b>Mode</b> | <b>Function</b>                          |
|-------------|--|
| Measuring   | Enter main menu                          |
| Browsing    | Open submenu (..) or execute command (!) |
| Editing     | Confirm new entry                        |



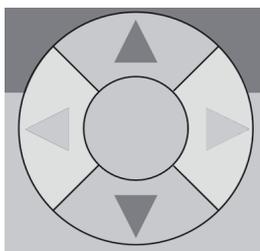
*HOME* key:

| <b>Mode</b> | <b>Function</b>               |
|-------------|-------------------------------|
| Measuring   | (no function)                 |
| Browsing    | Return to measurement display |
| Editing     | Abort entry                   |

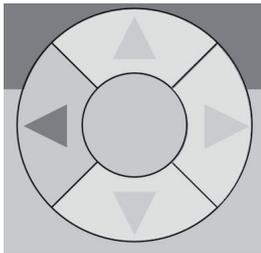


*UP / DOWN* keys:

| <b>Mode</b> | <b>Function</b>  |
|-------------|--|
| Measuring   | Enter main menu  |
| Browsing    | Highlight next menu line   |
|             | Open the previous/next page, when currently a line beginning with ▲/▼ is highlighted |
| Editing     | Change current parameter   |



**3.5 Front Panel Elements**

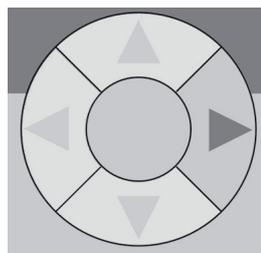


*LEFT* key:

| <b>Mode</b> | <b>Function</b>  |
|-------------|--|
| Measuring   | Enter main menu or open 2 <sup>nd</sup> measurement display page (if configured) |
| Browsing    | Go up 1 level or page in menu system   |
| Editing     | Move cursor 1 char to the left   |
|             | Leave channel selection  |
|             | Cancel editing of given parameter  |
|             | Go to previous menu page, if ▲ shows in first menu line                          |

Startup

**3**



*RIGHT* key:

| <b>Mode</b> | <b>Function</b>  |
|-------------|--|
| Measuring   | Enter main menu or open 2 <sup>nd</sup> measurement display page (if configured) |
| Browsing    | Open submenu (..)  |
| Editing     | Go to next menu page, when ▼ shows in last menu line                             |
|             | Move cursor 1 char to the right  |

## 3.6 Software

### 3.6 Software

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

The software is organised hierarchically: The topmost level is called MEASUREMENT DISPLAY, followed by a MAIN MENU; all other menus and submenus are arranged below.

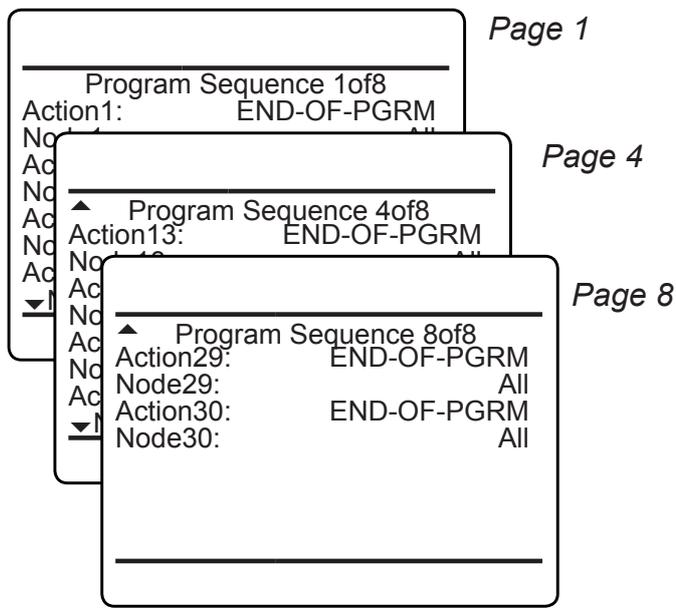
Menu lines can perform different functions, to be distinguished by the following characteristics:

| Function                        | Description   |
|---------------------------------|---|
| Text                            | Simple text (not selectable with cursor)  |
| Editable variables / parameters | <p>A variable description shows a colon; the line can be made up of up to 3 elements:</p> <ol style="list-style-type: none"> <li>1. description</li> <li>2. value (number or text)</li> <li>3. unit (optional)</li> </ol> <p><i>Examples:</i></p> <p style="padding-left: 20px;">Span gas: 2000 ppm<br/>Tol.Check: Off</p> <p>Pressing <i>ENTER</i> in an editable variable line highlights the value to be changed.</p> <p>The optional unit can only be changed utilizing a setup menu.</p> <p>Variables shown without a colon cannot be edited, they are for information only.</p> |

| Function           | Description  |
|--------------------|--|
| Executable command | <p>A command line text ends in an exclamation mark; pressing <i>ENTER</i> with such a line highlighted, the command is executed, e.g. a calibration procedure.</p> <p><i>Example:</i></p> <p style="padding-left: 40px;">Start calibration !</p> |
| Selectable submenu | <p>A menu line text ends in two dots. Press <i>ENTER</i> with a menu line highlighted to open the submenu.</p> <p><i>Example:</i></p> <p style="padding-left: 40px;">Setup..</p>   |

**3.6 Software**

**Browsing**



Some menus have more entries than can displayed at once. In these menus, an indicator in the last (▼) and/or first (▲) line indicates the direction the menu continues in.

In the example to the left

- page 1 continues downwards
- page 4 continues upwards and downwards
- page 8 continues upwards.

To show the next page (indicator ▼ )

- place the cursor in the last accessible line and press *DOWN* or
- press *RIGHT*, irrespective of where the cursor is located.

To show the previous page (indicator ▲ )

- place the cursor in the first accessible line and press *UP* or
- press *LEFT*, irrespective of where the cursor is located.

## 3.6 Software

### **Editing**

The editing mode enables changing parameters. It is initiated by pressing *ENTER*.

If the selection is a **parameter list**, the current entry is highlighted and may be changed by *UP* and *DOWN*.

If the selection is a **value**, the cursor is placed over the last character. Use *UP* and *DOWN* to change it.

Use *LEFT* and *RIGHT* to select another character.

The type of available characters 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 exit the data entry mode:

*ENTER*: the entry is verified. If it is accepted, it is saved and the new value displayed; if not, an error message is displayed.

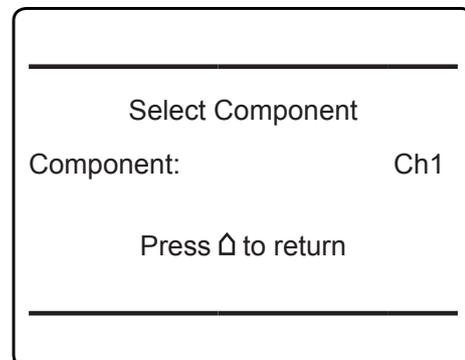
*HOME*: Cancel: all settings and changes are reset to their former values.

### **Component selection menu**

Within the analyzer software, one can distinguish between analyzer related and component related menus: While the first contain entries, relevant for the analyzer (e.g. time setting), the second contain entries relevant for a specific component (channel) only (e.g. calibrating a channel).

For single channel analyzers, editing any channel specific parameter will only effect this one channel.

Different for multi-channel analyzers: Such instruments require selecting a channel prior to changing channel related parameters. When a channel related menu entry is selected, automatically a **SELECT COMPONENT** menu shows up, to select the component of interest, or to cancel the current action.



Select the component / channel you want to work with, and press *ENTER*.

This menu does not show on single-channel units.

Within menu descriptions, the following points out, that for multi-channel instruments a selection is required:



*Multi-channel unit:  
In SELECT COMPONENT select the channel to be ...*

3.6 Software

3.6.1 Access Levels & Codes

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** gives access to system admin parameters, e.g. for configuring data acquisition systems communication.

**Level two** covers the expert settings, e.g. basic settings for calibrations and measurements.

**Level one** is the user level and includes

- parameters which should be set by trained personnel only.
- functions, not to be started by any person (e.g. start calibrations).

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

Within this manual, the descriptions of the menus and procedures also indicate, which level the menus are assigned. 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 |
|-----------|-------------|--------|
| 100000001 |             | Off    |
| 200000002 |             | Off    |
| 300000003 |             | Off    |



**We recommend to set new access codes, if you want to use this option!**

**Notes!**

*If a low level is **locked** (status **On**), all higher levels will also be **locked**.*

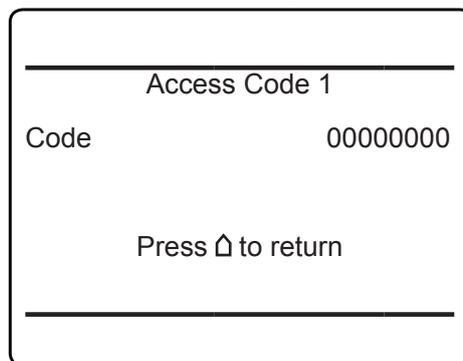
*If a high level is **accessible** (code entered when requested by a menu page), automatically all lower levels are also **accessible**.*

*For above reasons, it is always possible to enter a higher code than requested, to gain access to a menu (e.g. if access code 1 is requested, you may also enter access code 2).*

Startup  
3

**Entering access codes**

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



To enter the code, press

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

or

- *HOME* to exit the edit mode and return to the previous display.

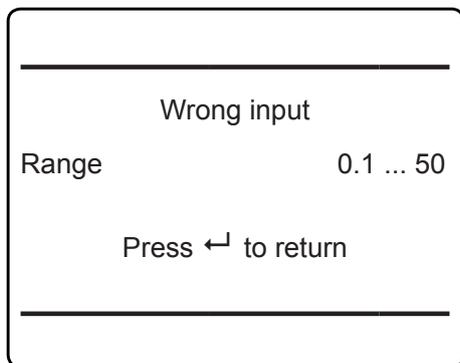
## 3.7 Start Up

### 3.6.2 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.

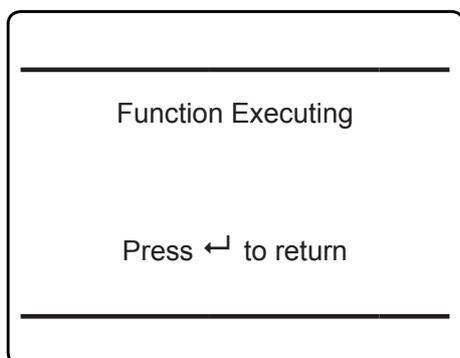
**Information on incorrect entry:**

The value entered by the user is outside valid limits. The display indicates what limits apply. Press  $\leftarrow$  to return to the previous screen to enter an acceptable value.



**Confirmation of execution of function:**

Confirms that a function or procedure (e.g. calibration) has been started, or cancelled. The message automatically disappears after a few seconds.



### 3.7 Start 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 remaining time counts down in the display.

#### 3.7.2 Measurement Display

The measurement display is shown

- automatically on completion of the boot sequence
- when *HOME* 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
- secondary 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 measurement results for these channels are available for selection.*

**3.7 Start Up**

SETUP enables several additional configurations, e.g.

- 2 pages measurement display
- different font sizes

The very first display line shows

- a flashing heart, showing the instrument is operating
- one or more status pictograms, if (NAMUR) status are active. Some of these are explained by a text message in the last line
- a channel indicator, if the current menu page is related to a specific channel only.

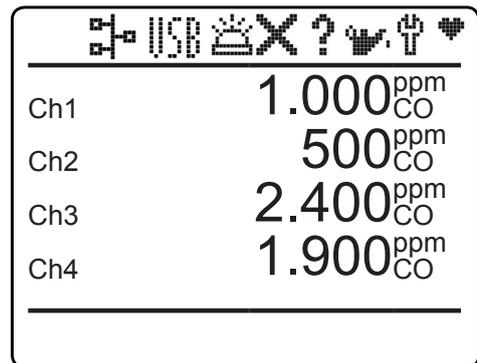
The display's bottom line shows plain text status information (errors, maintenance requests, function checks or off-spec performance).

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

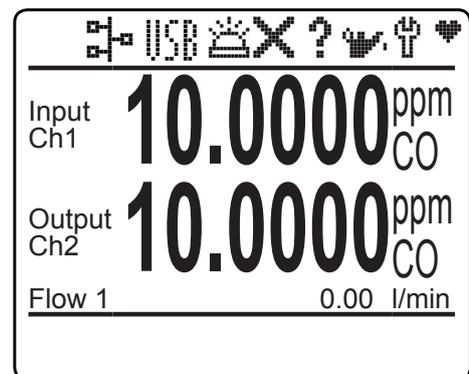
Most messages also activate a NAMUR relay (if a relay has been assigned to that NAMUR function;  X-STREAM XE instruction manual).

**Note!**

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



4 lines display



2 lines display with additional secondary parameter line

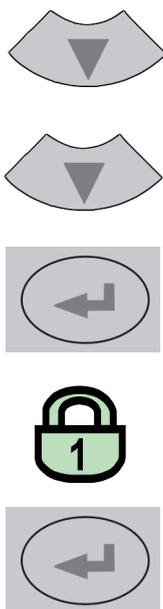
**MEASUREMENT DISPLAY**

## 3.8 Language Settings

### 3.8 Language Settings

If the analyzer is operational and it becomes clear that the incorrect language has been set, which is unintelligible to the operator, the

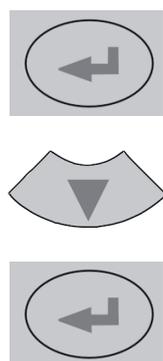
following sequence of keypresses (starting at the measurement display) can be used to set the language.



*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!**

*Pressing ENTER the 3<sup>rd</sup> time in this sequence highlights the "Language" line.*

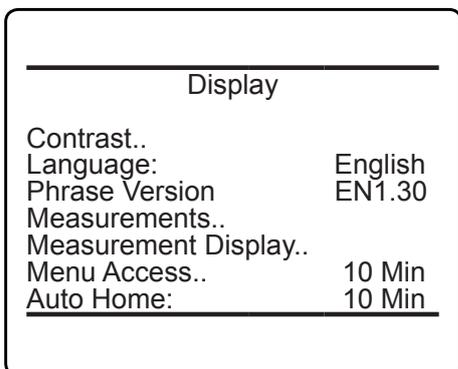
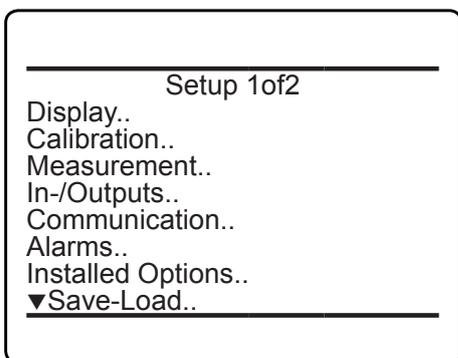
- DOWN changes the language.
- ENTER sets this language and the display is updated accordingly.
- If the selected language is not the intended, repeat the last three steps until the intended language is set.

3.9 Checking the Settings

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 properly functioning.



Starting with the measurement display (  3-12 ), pressing any key except HOME will access the MAIN MENU; from here, follow these steps:

(If the display is showing anything other than the measurement display, press HOME to return to the measurement display first).

**Note!**

If you are unfamiliar with the language set:  3-14 shows the sequence of keys 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.

## 3.9 Checking the Settings

### 3.9.1 Installed Options



| Installed Options 1of2 |      |
|------------------------|------|
| Licenses..             |      |
| Valves:                | None |
| Pumps:                 | None |
| DIO#1 installed:       | No   |
| DIO#2 installed:       | No   |
| Anal. Outputs:         | 4    |
| ▼AIN installed:        | No   |

| Installed Options 2of2 |  |
|------------------------|--|
| Flow..                 |  |
| Pressure..             |  |

| Licenses   |      |
|------------|------|
| Key 1:     | 0    |
| Key 2:     | 0    |
| Key 3:     | 0    |
| Package    | None |
| Trial Days |      |

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 *LEFT* to return to SETUP, highlight "*Installed options*" and press *ENTER*.

**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.**

**Initial access to this menu should be to gain information on the configuration of the unit.**

This 2 pages menu indicates, which of the possible optional components are installed in the unit. The values displayed on your unit may differ from those illustrated here.

**Note!**  
*Multichannel instruments require to select a component (channel) to enter the second menu page.*

„Licenses.“ opens another menu where you can check or enter license codes to unlock optional software features.

3.9 Checking the Settings

3.9.2 Configuring the Display



**Do yet not change entries here. This first access to the menu is intended to provide information on the analyzer configuration only.**



**Wrong entries may result in wrong measurements or affect analyzer efficiency.**

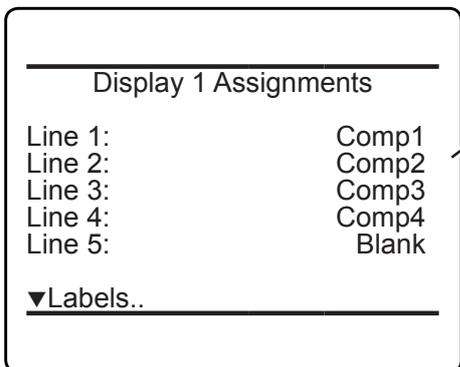
Press *LEFT* to return to SETUP.

Check the settings for the measurement display, temperature and pressure units, and for menu access: press *ENTER* to open DISPLAY..., select "Measurement display.." and press *ENTER*.

If a setting does not meet your requirements, access that menu and adjust the parameter.

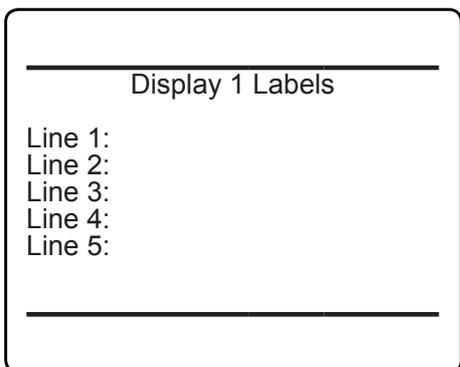
Select the value to be displayed in each line of the measurement display. The following options are available:

- Comp1 ... Comp5,**
- Temp1 ... Temp5,**
- Press1 ... Press5,**
- Flow1 ... Flow5**
- Blank (nothing)**



**Note!**  
*X-STREAM currently supports one pressure sensor only. Values **Press1** to **Press5** thus refer to the same sensor.*

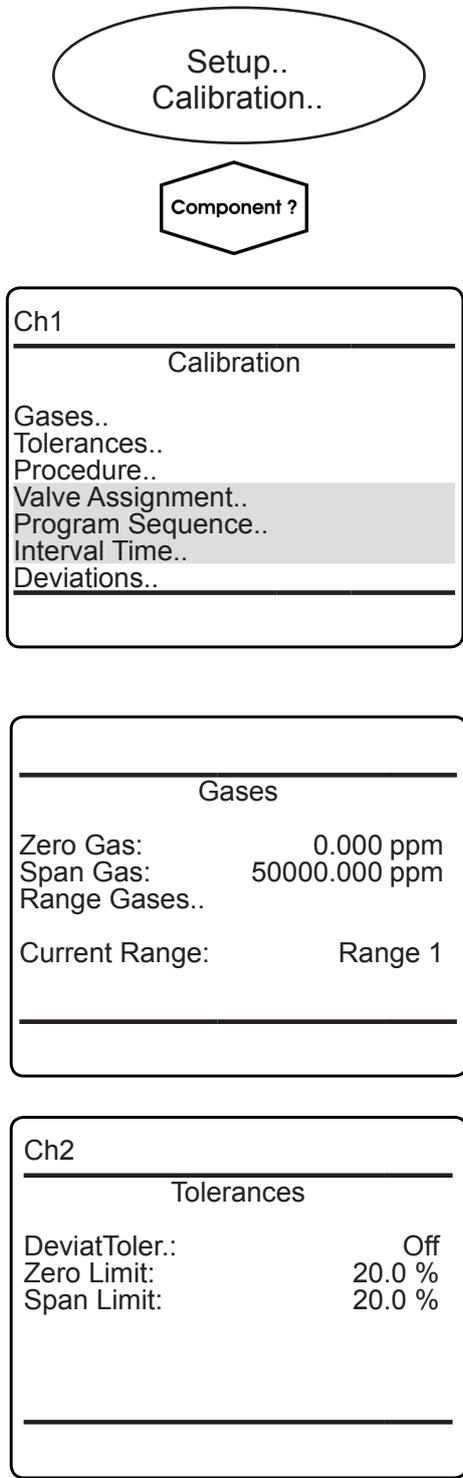
When entering LABELS., you may change the channel's label, that is the first text phrase in a line showing a measurement value: If here nothing is entered, the default phrases (Ch1 ... Ch4) are used.



**Note!**  
*Notice the headlines of the menus showing a "1": This indicates that you can setup more than 1 measurement display page.*

3.9 Checking the Settings

3.9.3 Calibration Setup



Once the display settings have been checked, press *LEFT* to return to SETUP and open CALIBRATION to check the calibration settings.

*Multi-channel unit:*  
 Select the component to be set in the gas component selection menu.

**Note!**  
 For more detailed information about calibration procedures, see X-STREAM XE instruction manual.

In CALIBRATION - GASES, enter the values for zero and span gas:

- See gas supplier's certificate for correct values.
- Values must be correctly set for results to be accurate.
- Multi-channel units: the values for each channel must be entered separately.

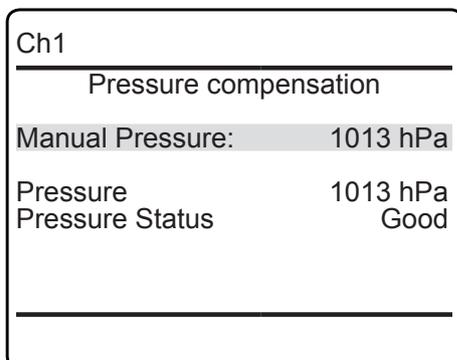
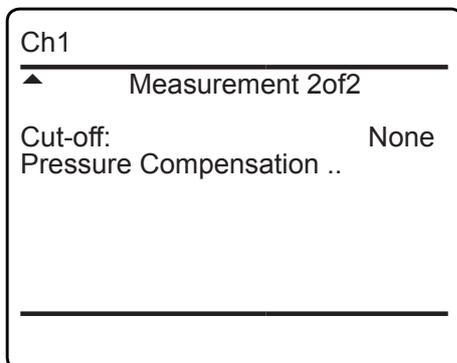
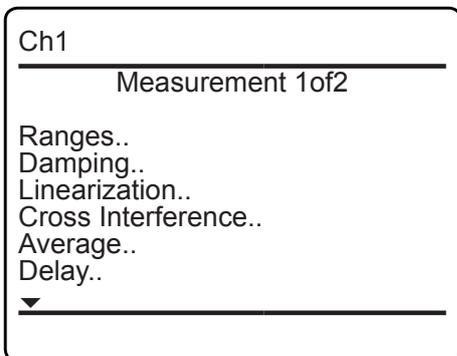
Press *LEFT* to return to CALIBRATION, and enter TOLERANCES .

By default the 'Deviation Tolerance check' option is set inactive (**Off**).

With "*DeviatToler*" set to **On**,

- during calibration the analyzer checks whether the values set for zero and span gas conform to the concentration of the gas currently being supplied.
- If the concentrations differ more than the percentage of range entered in the following lines, the calibration is aborted. 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.

3.9 Checking the Settings



Press *LEFT* several times to return to SETUP and open MEASUREMENT.

Signal damping (set in DAMPING) allows smoothing the output signal, but also affects the response time of outputs and display:

- The factory setting is 0 seconds.
- The maximum possible  $t_{90}$  time is limited by the size of the internal sampling buffer and the sampling rates of the installed measuring principles/sensors.
- Multi-channel units: the value for each channel must be entered separately.

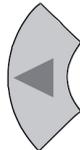
The second page's last line enables the user

- to enter the current ambient pressure manually, if no pressure sensor is installed, or
- to view the current pressure, if a sensor is installed (👉 INSTALLED OPTIONS).

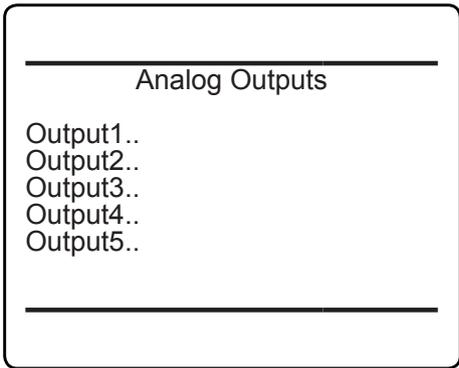
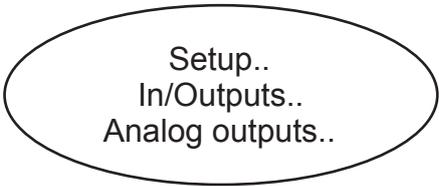
If no pressure sensor is installed, enter the current ambient pressure here and adjust it, when significant changes take place: this improves the accuracy of the instrument.

## 3.9 Checking the Settings

### 3.9.4 Setting the Analog Outputs



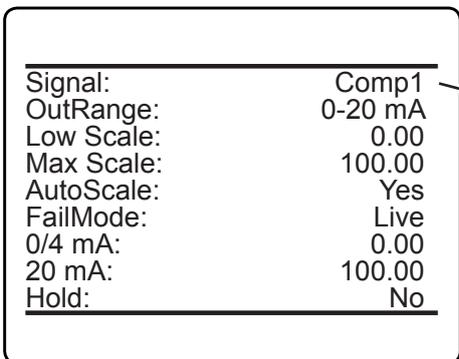
Press *LEFT* to return to SETUP, and then open IN/OUTPUTS. and from there enter ANALOG OUTPUTS.



Select the analog output you like to check.

**Note!**  
*The following section only in brief describes the entries currently of interest!*

 *X-STREAM XE instruction manual, Chapter 6 for a more detailed description.*



"Signal" specifies the value associated with the selected output. The following options (partly dependent on the number of measuring channels and sensors installed) are available:

3.9 Checking the Settings

| Signal <sup>*)</sup> | Description  |
|----------------------|--|
| None                 | The analog output is deactivated   |
| 0 mA                 | A 0 or 4 mA signal is generated, e.g. to check the signal processing in an external system. Whether a 0 or 4 mA signal is generated, is set by the "Out range" line (👉 next page). |
| 20 mA                | A 20 mA signal is generated, e.g. to check the signal processing in an external system.  |
| Comp1 ... 5          | Gas concentration  |
| Temp1 ... 5          | Temperature  |
| Press1 ... 5         | Pressure   |
| Flow1 ... 5          | Flow   |
| CalcA ... D          | Result of calculator   |
| RawVal1 ... 5        | Raw value  |
| RangID1 ... 5        | ID of selected range   |

*\*) Numbers 1 to 5 refer to components [channels] 1 to 5: In case of secondary parameters, this means, the selected value is that of the sensor assigned to the given component (Press2 is the pressure value of the sensor assigned to component 2).*

*In contrast, capital letters A to D imply that these calculator results are component [channel] independent (Calc C is the result of calculator C).*

3.9 Checking the Settings

|            |         |
|------------|---------|
| Signal:    | Comp1   |
| OutRange:  | 0-20 mA |
| Low Scale: | 0.00    |
| Max Scale: | 100.00  |
| AutoScale: | Yes     |
| FailMode:  | Live    |
| 0/4 mA:    | 0.00    |
| 20 mA:     | 100.00  |
| Hold:      | No      |

Next, select the output range:

- **0-20 mA** (dead zero) generates a 20 mA signal, if a concentration is measured at the upper limit of the signal range. A 0 mA signal is generated if the sample gas concentration equals the value specified with "LowScale" .
- **4-20 mA** (life zero): A 4 mA signal is generated if the concentration equals the value specified with "Low Scale", thus enabling to detect e.g. a broken cable.

If „Signal“ is assigned a concentration signal , and „Auto scale“ is set to **No**, in the next lines enter the concentrations to output 0/4 mA („Low scale“) or 20 mA („High scale“).

If either „Auto scale“ is **Yes**, or „Signal“ not assigned a concentration signal, the levels are set with default values and not editable.

"FailMode" selects the output's behaviour under failure conditions, considering or not, the NAMUR recommendation NE 43.

Available options:

**Track:** NE 43 not considered; output always correlates with the measured value.

**HIGH + 10%:** NE 43 failure signal level: 'above'.

**LOW - 10%:** NE 43 failure signal level: 'below'.

Further information on NE 43 is provided on the next page.

3.9 Checking the Settings

Operation Modes acc. NAMUR NE 43

The common modes for analog outputs do not support 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 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 "FailMode" to **HIGH + 10%** or **LOW - 10%** defines specific analog output signals in case of a failure. Since these values are not output under normal operation conditions, a

data acquisition system is enabled to distinguish between the following situations:

- valid measured value (signal within range as per Table 3-1)
- 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 provides a summary of all available operational modes.

| "OutRange" | "FailMode"  | Failure signal level acc. NE 43 | Output signal, if       |   |  |                              |                  |
|------------|-------------|---------------------------------|-------------------------|---|--|------------------------------|------------------|
|            |             |                                 | Measured value is valid | Measured value is below lower limit ("Low scale") | Measured value is above upper limit ("High scale") | An internal failure occurred | Cable is severed |
| 0-20 mA    | Track       | -                               | 0...20 mA               | < -19 mA  | > 21.7 mA  | undefined                    | 0 mA             |
| 4-20 mA    | Track       | -                               | 4...20 mA               | < -19 mA  | > 21.7 mA  | undefined                    | 0 mA             |
| 0-20 mA    | LOW - 10 %  | below                           | 0...20 mA               | -0.20 mA*<br>(-1.80...-0.01 mA)**                 | 20.50 mA*<br>(20.01...21.50 mA)**                  | -2 mA                        | 0 mA             |
| 4-20 mA    | LOW - 10 %  | below                           | 4...20 mA               | 3.80 mA*<br>(2.20...3.99 mA)**                    | 20.50 mA*<br>(20.01...21.50 mA)**                  | 2 mA                         | 0 mA             |
| 0-20 mA    | HIGH + 10 % | above                           | 0...20 mA               | -0.20 mA*<br>(-1.80...-0.01 mA)**                 | 20.50 mA*<br>(20.01...21.50 mA)**                  | > 21.7 mA                    | 0 mA             |
| 4-20 mA    | HIGH + 10 % | above                           | 4...20 mA               | 3.80 mA*<br>(2.20...3.99 mA)**                    | 20.50 mA*<br>(20.01...21.50 mA)**                  | > 21.7 mA                    | 0 mA             |

**Note!**

The application of values marked \* or \*\* depends on the setting of "Cut Mode" (for more information  Chapter 6 of the X-STREAM XE instruction manual).

**Tab. 3-1:** Analog Output Signals Settings and Operational Modes

## 3.9 Checking the Settings

|            |         |
|------------|---------|
| Signal:    | Comp1   |
| OutRange:  | 0-20 mA |
| Low Scale: | 0.00    |
| Max Scale: | 100.00  |
| AutoScale: | Yes     |
| FailMode:  | Live    |
| 0/4 mA:    | 0.00    |
| 20 mA:     | 100.00  |
| Hold:      | No      |

"0/4 mA" and „20 mA“ enable to finetune the analog output to compensate possible deviations based on electronics tolerances:

- Set "Signal" to **0 mA or 20 mA**
- measure the output current,
- adjust it to the expected value.

Accepted range: **-10,000 ... +10,000**

"Hold" selects the output's behaviour during calibrations.

If set to **Yes**,

- the analog output is fixed to the last measured value;
- concentration alarms, which may otherwise be triggered by the concentrations of the calibration gases, are suppressed.

If set to **No**,

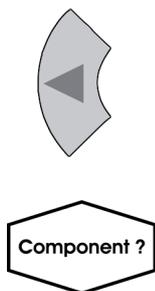
- the analog output signal always corresponds to the actual measured value during calibration; this may trigger alarms if limits are exceeded.

**Note!**

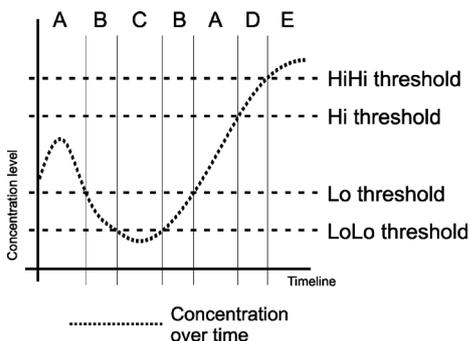
*This behaviour may be undesirable if e.g. the unit is connected to a data acquisition system.*

3.9 Checking the Settings

3.9.5 Setting Concentration Alarms



|                |             |
|----------------|-------------|
| Ch1            |             |
| Concentration  |             |
| Alarm Monitor: | On          |
| LoLo Level:    | 50.000 ppm  |
| Lo Level:      | 100.000 ppm |
| Hi Level:      | 400.000 ppm |
| HiHi Level:    | 600.000 ppm |
| Hysteresis:    | 10.000 ppm  |
| States..       |             |



**Note!**  
*HiHi and LoLo designate pre-alarms,  
 Hi and Lo designate main alarms.*

Fig. 3-3: Arrangement of Concentration Thresholds

**Note!**

*If concentration alarms are not being used, continue with 3-26.*

Press *LEFT* until SETUP is displayed, then open ALARMS - CONCENTRATION

*Multi-channel unit:  
 Select the channel to be setup in SELECT COMPONENT.*

Four concentration limits can be set for each channel:

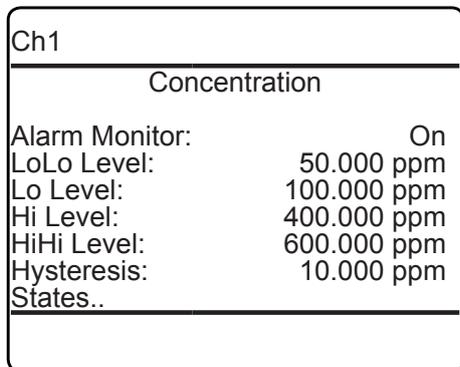
- "Lo" and "Hi" enframe the expected gas concentration,
- "LoLo" equals or is below "Lo",
- "HiHi" equals or is above "Hi".

See the figure to the left for an explanation. If you enter values for any threshold, the above given order has to be considered. A message is displayed, if an entered value does not comply with this condition.

Should the measured concentration go beyond one of the threshold levels (areas B, C, D & E in the figure), a message is displayed in the message line of the measurement display, the NAMUR pictogram appears (bell) and a corresponding digital output is activated, if assigned.

A hysteresis avoids oscillating alarms in case the concentration is fluctuating around a threshold.

## 3.9 Checking the Settings



You may turn the alarm function **On** or **Off** separately for each channel ("*Alarm Monitor*"). It's also possible to use some of the thresholds only. In this case, set the not used to a level outside the range limits (for this, "*Lo*" and "*LoLo*" support entering negative values). In case of an alarm, you may like to enter the STATES submenu, to check which one is triggered.

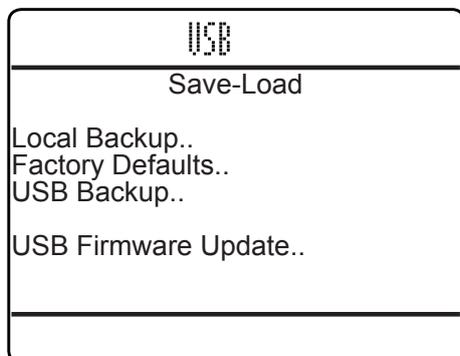
### 3.9.6 Backup the Settings

The most important settings have now been checked and the unit is configured to suite your needs.

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



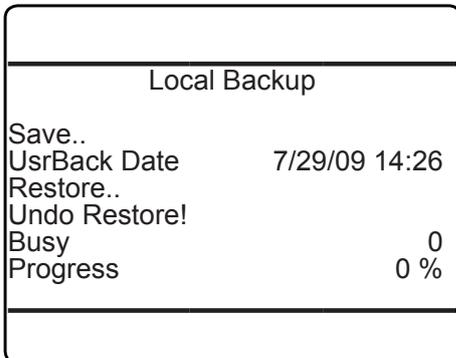
Press *LEFT* until SETUP and then open SAVE-LOAD.



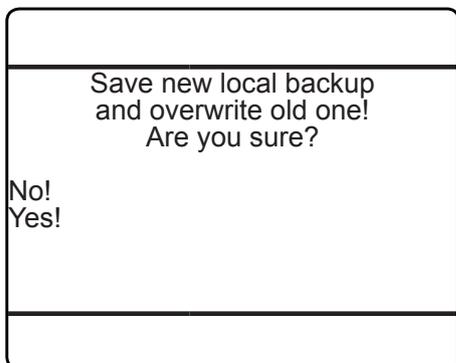
This menu gives you the choice, to either

- make a local backup to a protected memory area
- restore the factory default settings, or
- make a backup to an external USB device.

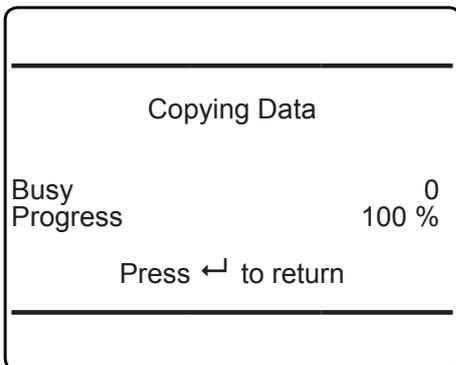
3.9 Checking the Settings



For now, make a local backup:  
Enter LOCAL BACKUP and then select "Save..".



Confirm the operation (select "Yes!").



Wait until "Progress" shows **100 %**, then press *ENTER* to return to LOCAL BACKUP.



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

 4-15 for information on how to perform a manual calibration. If your instrument features

**Congratulations!**  
You've now successfully completed checking the unit's setup!

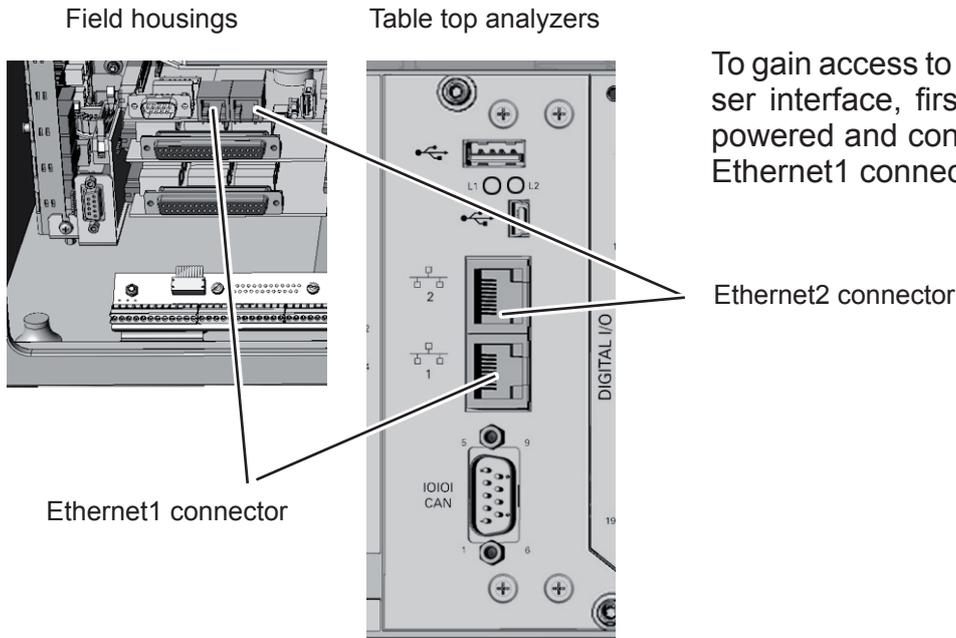
- Press *HOME* to return to the **MEASUREMENT DISPLAY**.

a valve block,  X-STREAM XE instruction manual for a comprehensive description of calibration procedures.

## 3.10 Web Browser

### 3.10 Web Browser

#### 3.10.1 Connection Via Network



To gain access to the instrument's web browser interface, first ensure the instrument is powered and connected to your network via Ethernet1 connector (Fig. 3-4)

**Fig. 3-4:** Ethernet Connectors

Ethernet2 connector

Ethernet1 connector

By factory default settings the analyzer is configured to receive a valid network address by a DHCP server.

Next enter INFO, to check if the instrument has been assigned a valid network IP address:

| Info                |                |
|---------------------|----------------|
| Firmware            | 1.0            |
| DSP version         | 1.0            |
| Serial no           | 123456789      |
| Components..        |                |
| Installed options.. |                |
| Ethernet1 IP        | 123.456.78.9   |
| Ethernet2 IP        | 192.168.1.2    |
| ▼ Time              | 10/01/10 14:00 |

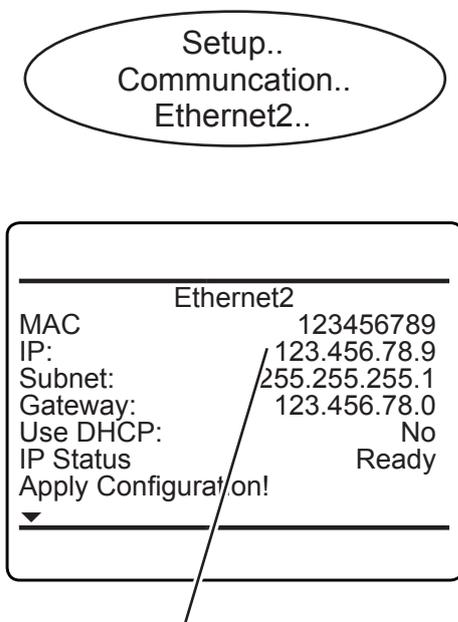
IP address for Ethernet1 connector

If no network IP address has been assigned, check the network settings (👉 X-STREAM instruction manual, page 6-79 )

Connect your computer to the network, open a web browser and enter the instrument's IP address. If everything is configured properly, the analyzer's logon screen shows up (👉 3-30).

3.10 Web Browser

3.10.2 Connection to Single Computer



IP address for Ethernet2 connector

To directly gain access to the instrument's web browser interface, first ensure the instrument is powered. Next connect it to the computer's network adapter via Ethernet2 connector (see Fig. 3-4) by means of an **Ethernet cross-over cable**. Standard Ethernet cables do NOT support direct connections!

- For Ethernet2 connector set "Use DHCP" to **No** (see figure to the left).

Depending on settings possibly carried out earlier, the analyzer may now show an IP (see figure to the left). If so, setup your computer's IP the same way, only differing in the last group (here e.g. to 123.456.78.10).

Alternatively you may use the analyzer's fixed IP, that is not shown on any menu page and is accessible via Ethernet2 only:

- The analyzer is now assigned the IP 192.168.1.88.
- Configure your computer's IP to meet the same net (192.168.1.) and assign a new IP (e. g. 192.168.1.10). Do not use the same IP as is assigned to the analyzer.

**Configuring an IP Address for Computers Running Microsoft Windows**

- **To configure your computer you need an administrator account!**
- Go to Start > Control Panel > Network Connections
- Right-click on your LAN connection and click "Properties"
- Under the heading "This connection uses the following items", click "Internet Protocol (TCP/IP)"
- Click "Properties"
- A new window should pop up, click "Alternate Configuration"
- Click "User Configured" radio button
- Setup the IP Address as 192.168.1.10, Subnet Mask as 255.255.255.0 and Default Gateway as 192.168.1.1.
- Click "OK"
- Click "Close" in "LAN connection properties".

On your computer open a web browser and enter the instrument's IP address. If everything is configured properly, the analyzer's logon screen shows up (👉 next page ).

## 3.10 Web Browser

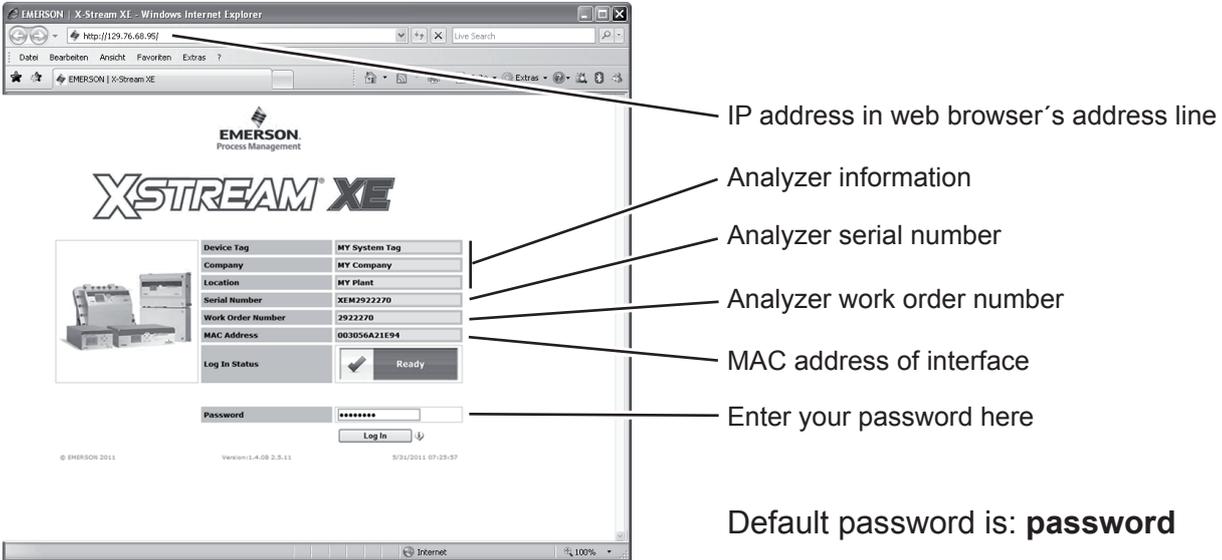


Fig. 3-5: Web Browser Logon Screen



**We recommend to set new passwords, to limit access to critical submenus (see online help).**

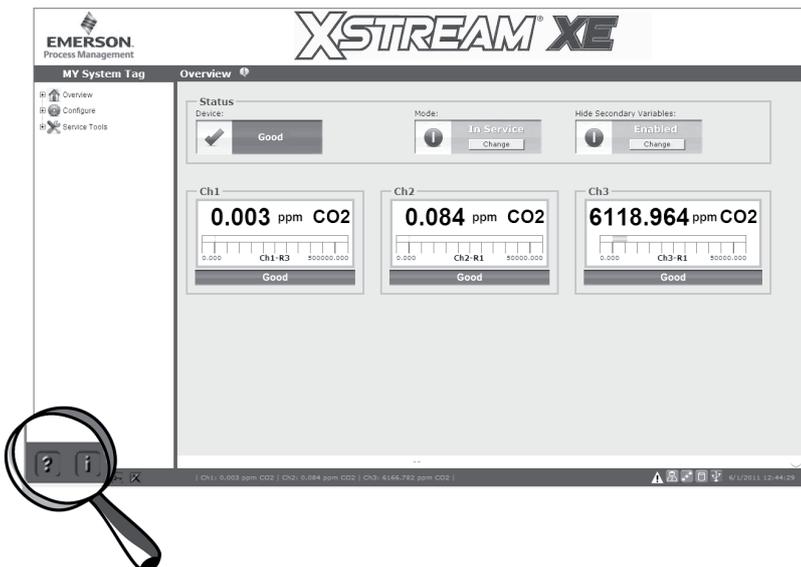


Fig. 3-6: Web Browser Measurements Screen

After logon, the measurements screen appears.

Click on the left most icon (question mark) in the status bar, to receive comprehensive online help on the X-STREAM XE web browser interface.

## Chapter 4 Service and Maintenance

**Note!**

*This chapter deals with service and maintenance procedures related to explosion protection only! More detailed instructions about servicing and maintaining general purpose components of X-STREAM XE gas analyzers are subject of the X-STREAM XE analyzer instruction manual.*

|   |  |
|---|--|
|  | <b>! WARNING</b>   |
|   | <b>EXPLOSION HAZARD</b><br>Inspection, maintenance and service must be carried out considering all related standards e.g. for „Inspection and maintenance of electrical installations in hazardous areas“or „Equipment repair, overhaul and reclamation. |

|  |   |
|--|---|
| <br> | <b>! WARNING</b>  |
|  | <b>EXPLOSION HAZARD BY OPEN HOUSING</b><br>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!<br>Depending on the local regulation this may require a competent hot work supervisor to issue a hot work permit.<br>Consider the waiting time statement on the front door label before opening, if the analyzer is configured for vapor recovery measurements! |

|   |   |
|---|---|
|  | <b>! WARNING</b>  |
|   | <b>EXPLOSION HAZARD BY UNAUTHORIZED REPLACEMENTS</b><br>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.<br>Parts essential for explosion protection must not be repaired, they must be replaced if defective!<br>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

|   |  |
|---|--|
|  |  <b>WARNING</b>   |
|   | <p style="text-align: center;"><b>EXPLOSION HAZARD BY FLAMMMABLE GASES</b></p> <p><b>Leaks may cause explosion when measuring flammable gases!</b></p> <p>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.</p> <p>See the analyzer instruction manual for instructions on how to carry out leak tests.</p> |

|  |   |
|--|---|
| <br> |  <b>WARNING</b>  |
|  | <p style="text-align: center;"><b>HAZARDS BY HAZARDOUS GASES</b></p> <p>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.</p> <p>Violation may cause an explosion and/or personal injury or death!</p> |

|   |  |
|---|--|
|  |  <b>WARNING</b>   |
|   | <p style="text-align: center;"><b>EXPLOSION HAZARD BY UNAUTHORIZED MODIFICATION</b></p> <p>Modifications affecting the integrity of type of protection (e.g. affixing additional threads, replacing the flame arrestors by other model) are <b>NOT PERMITTED!</b></p> <p>Violation may cause an explosion and/or personal injury or death!</p> |

**4.1 Verifications and Tests**

**Contents**

4.1 Verifications and Tests . . . . . 4-3  
 4.2 Replacement of Parts . . . . . 4-6  
 4.3 Vapor Recovery Application - Special Information . . . . . 4-8  
 4.4 Perform a calibration . . . . . 4-15

**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.

**4.1.1 Routine Tests**

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, threads and external analyzer components.

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

|   |   |
|---|---|
|  |  <b>WARNING</b>  |
|   | <p><b>EXPLOSION HAZARD BY DAMAGED ANALYZER</b></p> <p><b>Do not continue to operate a damaged analyzer!</b></p> <p><b>Call for service!</b></p> <p><b>Violation may cause an explosion and/or personal injury or death!</b></p> |

**4.1.1.2 Detailed Inspection**

Check cable inlets (glands or conduits): If the cable moves, e. g. tighten the cap nut. If tightening is ineffective, replace the cable gland or conduit.

Also consider the original manufacturer's instructions for maintenance!

## 4.1 Verifications and Tests

### 4.1.1.3 Tests on Flame Arrestors

|   |  |
|---|--|
|      |  <b>WARNING</b> |
| <p><b>EXPLOSION HAZARD AND GASES HAZARDOUS TO HEALTH</b></p> <p><b>Maintaining the flame arrestor must be carried out considering all applicable safety and legislative rules. Maintenance should be carried out by instructed and trained personnel only!</b></p> <p><b>Before opening gas paths they must be purged with safe air or neutral gas (N<sub>2</sub>) to avoid hazards caused by toxic, flammable, explosive or harmful to health sample gas components!</b></p> |  |

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

#### 4.1.1.3.1 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<sub>2</sub>) 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!**

4.1 Verifications and Tests

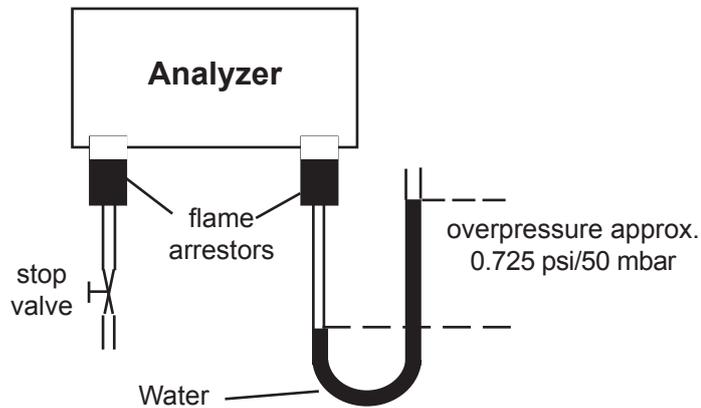


Fig. 4-1: Leak Testing with U-tube Manometer (Flame arrestor)

4.1.1.3.2 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.**

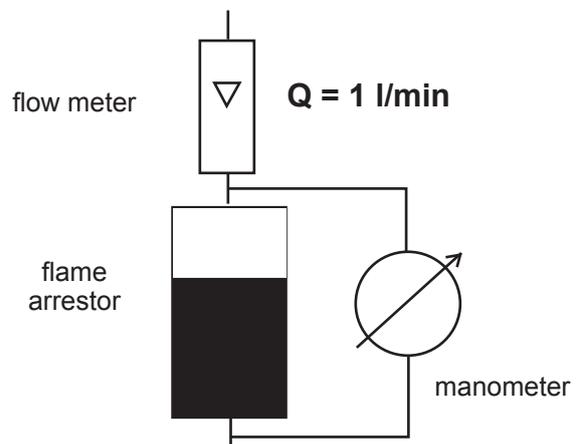


Fig. 4-2: Pressure Drop Test

4.2 Replacement of Parts

4.2 Replacement of Parts

|   |  |
|---|--|
|  |  <b>WARNING</b>   |
|   | <p><b>EXPLOSION HAZARD BY REPLACEMENTS PARTS</b></p> <p>Replacement of parts found defective is permitted only by using original parts!</p> <p>Violation voids the approvals and may cause explosions!</p> |

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

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

4.2 Replacement of Parts

| <b>Specifically for CSA-C/US approved analyzers</b> |   |
|---|---|
| <b>Metric-to-NPT adapters</b>                       | Any CSA-C/US certified flameproof type<br>Male thread: M20 x 1,5<br>Female thread: ½" or ¾" per request<br>e.g.<br>- AD-U series by Redapt Ltd.<br><br>¾" version spare part # ETC01877 |
| <b>Cable entries stopping plugs</b>                 | Any CSA-C/US certified flameproof type<br>Male thread: M20 x 1,5<br>e.g.<br>- PD-U by Redapt Ltd.<br><br>Spare part # ETC01878  |
| <b>For ATEX and CSA analyzers</b>                   |   |
| <b>Flame arrestors</b>                              | Type: FA 01, FA 02, FA 03<br>by EMERSON PROCESS MANAGEMENT<br>FA 01: Spare part # 42716625<br>FA 02: Spare part # 42716625-V1<br>FA 03: Spare part # 42716625-V2                        |
| <b>Enclosure screws</b>                             | Material: stainless steel A2-70<br>Thread: M16 x 45 ISO 4762 A2<br>Modified to drawing 4.271-6945<br>by EMERSON PROCESS MANAGEMENT<br>Spare part # 42716945                             |
| <b>Internal Battery</b>                             | Type: CR2032 by Varta;<br>Lithium button cell<br>3Vdc; 230 mAh  |

## 4.3 Vapor Recovery Application - Special Information

### 4.3 Vapor Recovery Application - Special Information

|   |   |
|---|---|
|  | <p><b>WARNING</b></p> <p><b>EXPLOSION HAZARD BY HOT COMPONENTS</b></p> <p><b>Consider the waiting time statement on the front door label before opening!</b></p> <p><b>Do not open the instrument when energized.</b></p> <p><b>Ensure that external circuitry is disconnected or de-energized before opening the instrument.</b></p> |
|---|---|



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

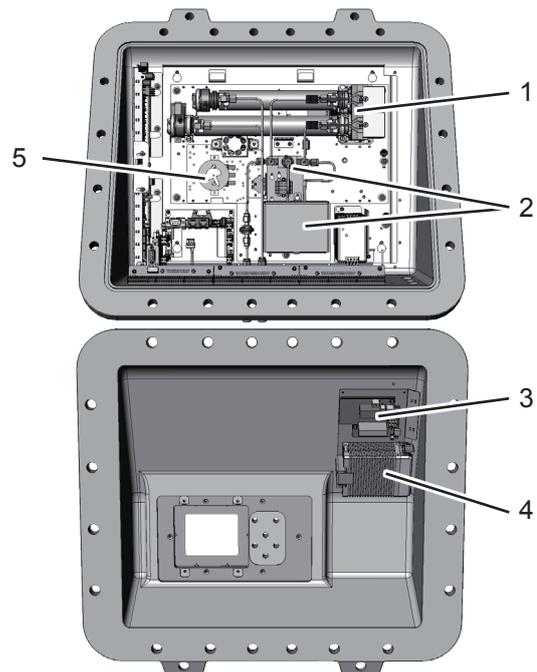
Accessible components still may be hot and harmful to humans!

XEFD analyzers, intended for vapor recovery applications (measuring CH<sub>4</sub> and non-CH<sub>4</sub>), 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

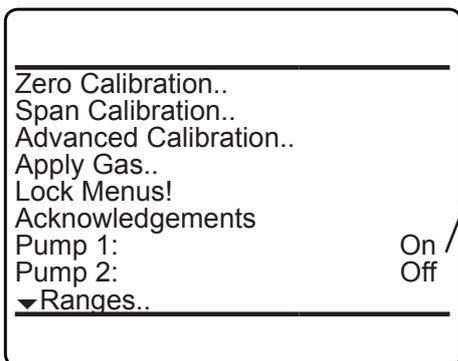
4.3 Vapor Recovery Application - Special Information

4.3.1 Determining the converter efficiency

**Note!**

The analyzer is configured to measure CH<sub>4</sub> at channel 1 (CH1), with the converter installed in front of its measurement cell.

The total content of hydrocarbons (C<sub>n</sub>H<sub>m</sub>) within the sample gas is measured at channel 2 (CH2).



- Ensure „Pump 1“ within the control menu is set to **ON**.

**Note!**

„Pump 1“ is used to disable (**Off**) or enable (**On**) the gas flow through the converter!

- Apply the calibration gas for CH2 (e. g. C<sub>6</sub>H<sub>14</sub>). 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<sub>4</sub> channel **with converter**)
- Now change „Pump1“ to **Off**, to let the gas bypass the converter.
- When stabilized, write down the measurement reading of CH1 (CH<sub>4</sub> 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 1“ is set to **Off**, the NAMUR status Function Check is activated.

Don't forget to set „Pump 1“ to **On** again, after finishing the calculation of converter efficiency!

## 4.3 Vapor Recovery Application - Special Information

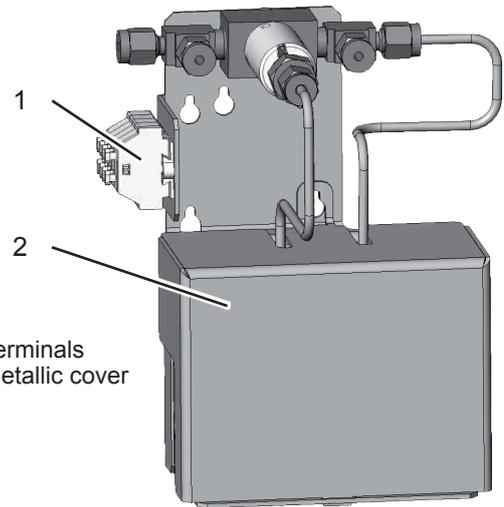
### 4.3.2 Replacement Instructions

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).



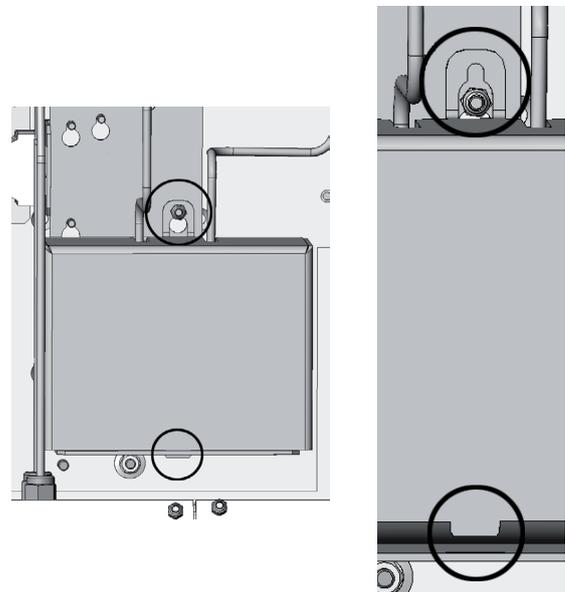
1: Terminals  
 2: Metallic cover

**Fig. 4-4:** Converter assembly



**Heating elements are inside the isolating jacket!**

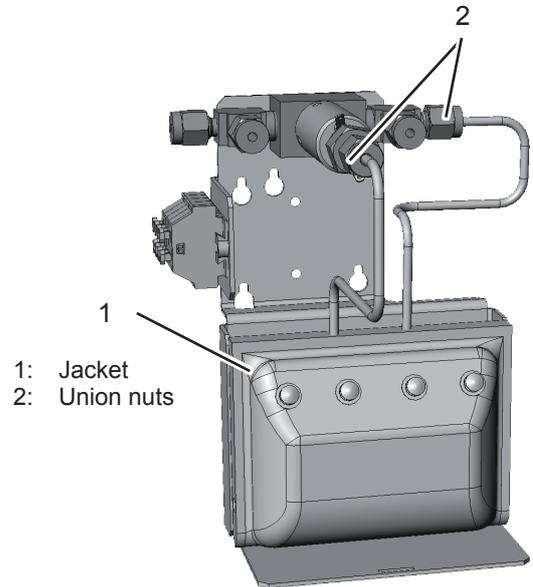
**Accessible components still may be hot and harmful to humans!**



**Fig. 4-5:** Converter assembly details

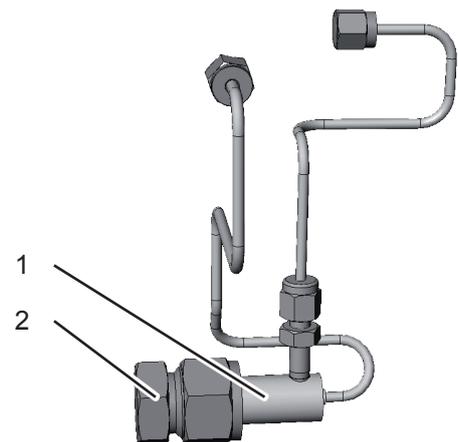
**4.3 Vapor Recovery Application - Special Information**

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. 4-7).



**Fig. 4-6:** Heated jacket

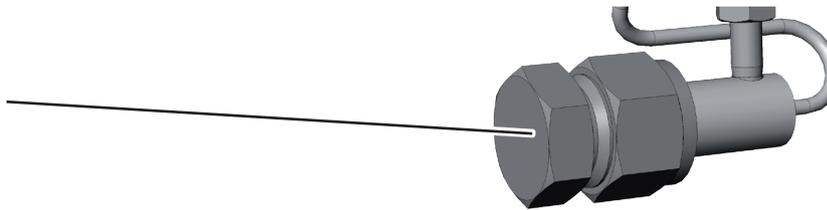
4. Take the converter vessel with connected gas lines out of jacket and analyzer.



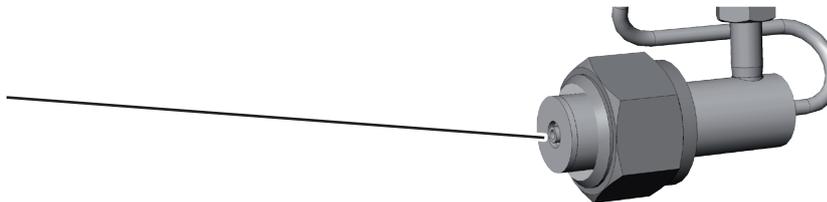
1: Converter vessel  
2: End cap  
**Fig. 4-7:** Converter, laid open

## 4.3 Vapor Recovery Application - Special Information

5. Remove the end cap.

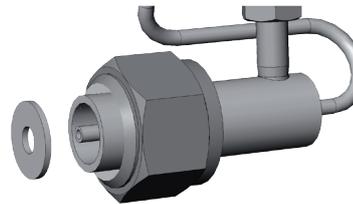


6. Remove the washer.

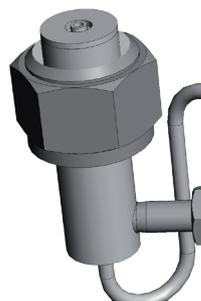


Behind the washer, the vessel is filled with converter material.

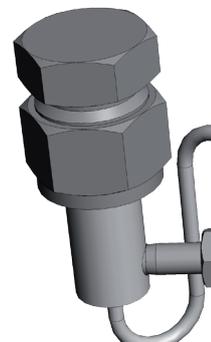
7. Remove this old material and fill the vessel with new converter material, considering to
- hold the vessel vertically while filling
  - completely fill the vessel
  - keep the inner pipe free of converter material.



8. Put the washer on top of the vessel / new material.



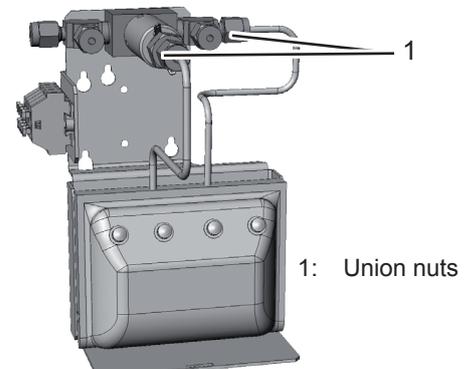
9. Install the end cap.



**Fig. 4-8:** Converter filling sequence

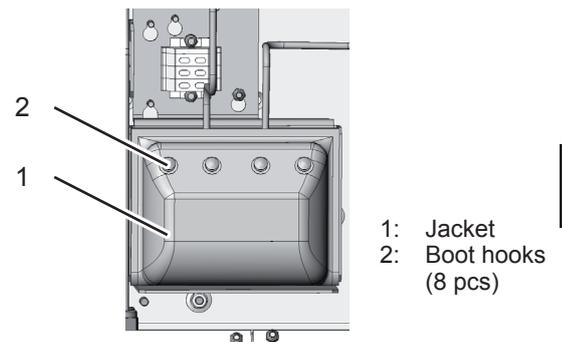
**4.3 Vapor Recovery Application - Special Information**

- 10. Insert the converter vessel into the jacket and place it into the assembly.
- 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 to ensure the gas connections are tight! If some are not, they are accessible now.



**Fig. 4-9:** Jacket in converter assembly

- 13. Lay the lace cord around the boot hooks and close the jacket.



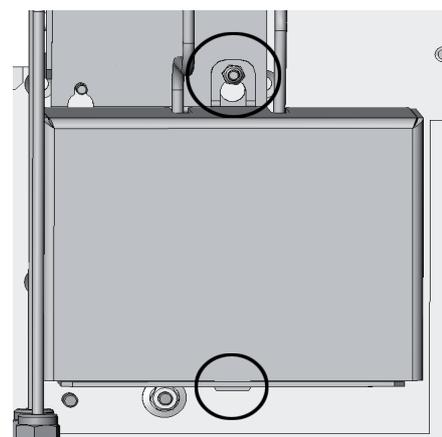
**Fig. 4-10:** Heated jacket

- 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.
- 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:**



- 17. You're done!



**Fig. 4-11:** Converter metallic cover

## 4.3 Vapor Recovery Application - Special Information

### 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!**

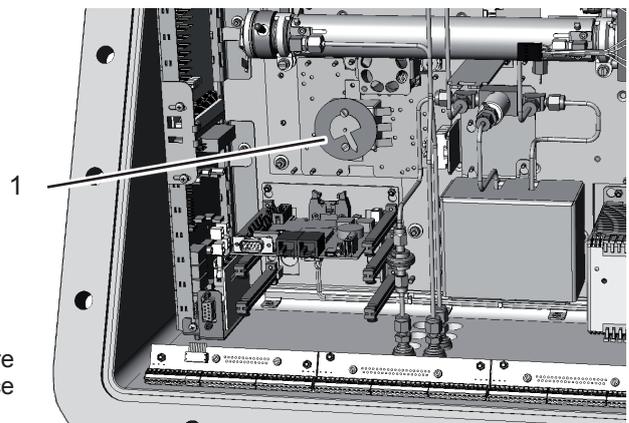
|  |  |
|--|--|
|  | <b>WARNING</b>   |
|  | <b>EXPLOSION HAZARD BY HOT COMPONENTS</b>  |
|  | <p><b>Consider the waiting time statement on the front door label, if opening the analyzer is required!</b></p> <p><b>Do not open instrument when energized.</b></p> <p><b>Ensure that external circuitry is disconnected or de-energized before opening the instrument.</b></p> |



**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

4.4 Perform a Calibration

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

The following steps describe, how to perform a manual calibration. If your instrument

features a valve block,  X-STREAM XE instruction manual for a comprehensive description of calibration procedures.

|   |  |
|---|--|
|  |  <b>CAUTION</b>   |
|   | <b>OPERATION AT LOW TEMPERATURES</b><br><b>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!</b><br><b>Violation may result in condensation inside the gas paths or damaged pump diaphragm!</b> |

 **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 is configured to be excluded from autocalibration procedures, by default calibrating all channels. **This exclusion is done by factory setup and cannot be changed.**

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

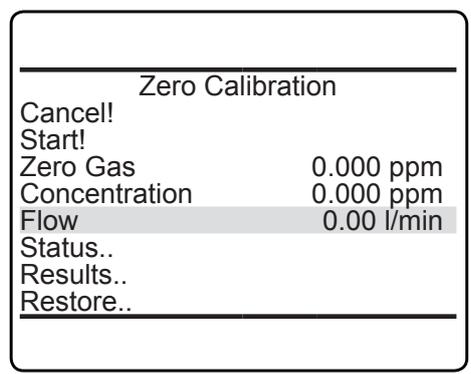
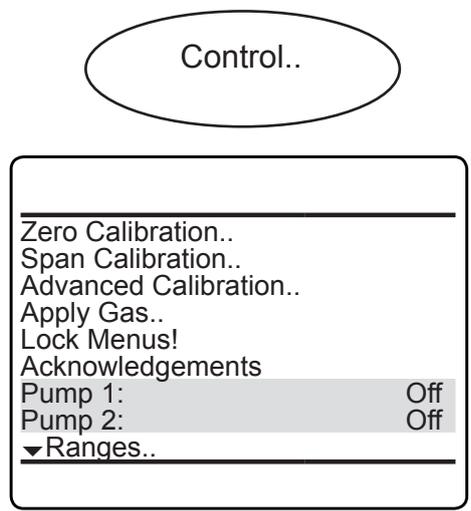
**Before performing any actions**, make sure the required calibration gas is applied and flowing!

 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,  measurement specifications in section 1.7!

## 4.4 Manual Calibration

### 4.4.1 Manual Zero Calibration



Starting from the MEASUREMENT SCREEN press *DOWN* to open the MAIN MENU and enter CONTROL.

To start a zero calibration select the first line:

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

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

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

- The next lines show
- the calibration gas setup (here: required zero gas concentration is 0.000 ppm),
  - the currently measured gas concentration
  - the current gas flow.

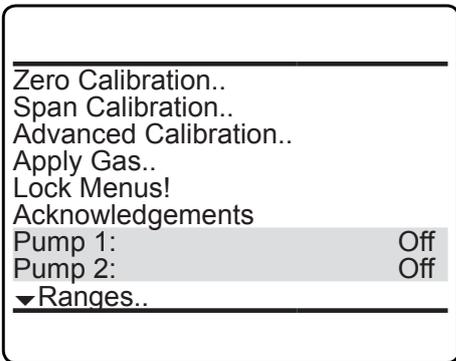
When finished press *LEFT* several times to return to **either**

**SELECT COMPONENT** (multi channel analyzer only), to perform a zero calibration for another channel,

**or**  
to **CONTROL**, where you may start a span calibration. The procedure and screens look similar to those of a zero calibration:

**4.4 Manual Calibration**

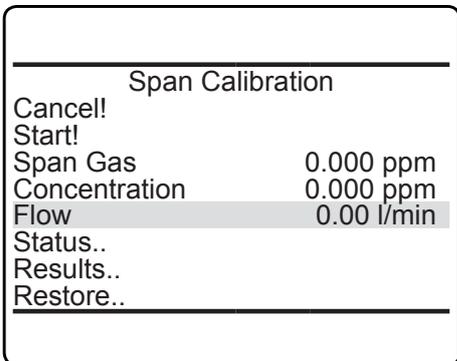
**4.4.2 Manual Span Calibration**



Select "Span Calibration.."



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



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

SPAN CALIBRATION offers the similar options as ZERO CALIBRATION.

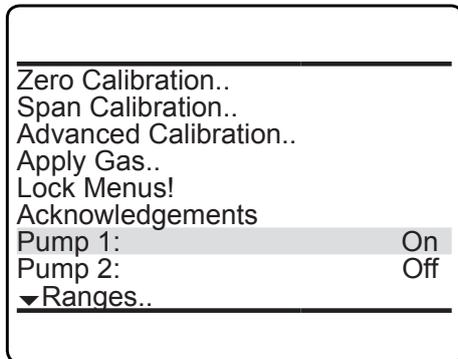
When finished, press *LEFT* several times to return to **SELECT COMPONENT** (multi channel analyzer only), to perform a span calibration for another channel,

**or**

press *HOME* to return to the **MEASUREMENT SCREEN**, to finish with manual calibration procedures.

## 4.4 Manual Calibration

### 4.4.3 Manual Calibration for Vapor Recovery Applications



**1. The measurement system for this applications includes a converter, therefore calibration span gas must contain oxygen for the converter to work properly.**



**2. During channel 1 calibrations, the calibration gas must go through the converter. Therefore, before starting calibrations, ensure „Pump 1“ within the control menu is set to ON.**

**Note!**

„Pump 1“ is used to disable (**Off**) or enable (**On**) the gas flow through the converter!

Recommended specification of calibration gases:

- Zero gases for both channels:  
Nitrogen or air, free of hydrocarbons
- Span gas for channel 1:  
CH<sub>4</sub> in air, concentration should be about 90...100 % of measuring range
- Span gas for channel 2:  
Suitable hydrocarbons (C<sub>n</sub>H<sub>m</sub>) in air, concentration should be about 90...100 % of measuring range.

Perform the zero and span calibrations following the procedures described in sections 4.4.1 and 4.4.2.

## Chapter 5 Dismounting and Disposal

### 5.1 Dismounting and Disposal of the Analyzer

|  |   |
|--|---|
| <br>     |  <b>WARNING</b>  |
|  | <b>HAZARDS FROM DISMOUNTING</b>   |
|  | <p>Dismounting instruments installed in hazardous area requires special instructions to be followed!</p> <p>Only trained personnel, observing all applicable technical and legal requirements, and aware of the possible risks is permitted to dismount these analyzers.</p> <p>Failure to follow may result in explosion, death or personal injury!</p>  |
| <br> |  <b>WARNING</b>  |
|  | <b>EXPLOSION HAZARD WHEN OPEN</b>   |
|  | <p>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!</p> <p>Depending on the local regulation this may require a competent hot work supervisor to issue a hot work permit.</p> <p>Failure to follow may result in explosion!</p>  |
|   |  <b>CAUTION</b>  |
|  | <b>HEAVY INSTRUMENT</b>   |
|  | <p>X-STREAM XEFD 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!</p> <p>Support the instrument before loosening the fixing screws (risk of dropping instrument).</p> <p>Two people and/or lifting equipment is required to lift and carry these units.</p> <p>Failure to follow may result in personal injury!</p> |

5.1 Dismounting & Disposal

|   |  |
|---|--|
|    |  <b>WARNING</b> |
| <b>GASES HAZARDOUS TO HEALTH</b>  |  |
| <p><b>Follow the safety precautions for all applied gases and gas cylinders.</b></p> <p><b>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.</b></p> |  |

**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 given in the X-STREAM XE instruction manual for dismounting and disposal!**

**Advice concerning the disposal of batteries**

- This instrument contains a CR primary lithium button cell battery of size CR 2032.
- The battery is soldered to an electronics board and usually does not need to be replaced during the instrument’s lifetime.
- At the end of lifetime, the instrument must be disposed in compliance with the waste regulations, see instructions below.

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

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• purge all gas lines with inert gas</li> <li>• ensure all gas lines are pressureless</li> <li>• disconnect all gas lines</li> <li>• switch off power and signal lines</li> <li>• disconnect and remove all electrical connections</li> <li>• fill out the Declaration of Decontamination (  X-STREAM XE instruction manual) properly</li> </ul> | <ul style="list-style-type: none"> <li>• hand over the dismantled 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 and the contained battery in compliance with all applicable waste treatment regulations.</li> </ul> |
|--|--|

## Appendix

This chapter contains

|                                      |   |                |
|--------------------------------------|---|----------------|
| EC Declaration of Conformity         |  | A.1, page A-2  |
| ATEX EC Type Examination Certificate |  | A.2, page A-3  |
| CSA Certificate of Compliance        |  | A.3, page A-12 |
| Block diagram                        |  | A.4, page A-19 |
| Assignment of Terminals and Socket   |  | A.5, page A-25 |

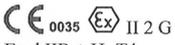
## A.1 EC Declaration of Conformity

### A.1 EC Declaration of Conformity

**EC DECLARATION OF CONFORMITY**

Document number: RAE/XEFD-ATEX-E3  
Date: February 2011

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 XEFD,**  
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

  
Ex d IIB + H<sub>2</sub> T4  
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

---

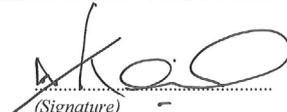
**94/9/EC Equipment and protective systems in potentially explosive atmospheres**  
with the application of the harmonized standards including the latest amendments:  
EN 60079-0: 2006, EN 60079-1 :2007

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 2006/95/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, February 2011

  
(Signature)  
Andy Kemish  
(Name)  
VP Rosemount Analytical Europe  
(Function name)



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

A.2 ATEX EC Type Examination Certificate

 **Physical Technical Testing Institute**   
**Ostrava-Radvanice**

**EC-Type Examination Certificate**

(1) **Equipment or Protective Systems Intended for use**  
(2) **in Potentially Explosive Atmospheres**  
**Directive 94/9/EC**

(3) EC-Type Examination Certificate Number:  
**FTZÚ 08 ATEX 0028 X**

(4) Equipment or protective system: **Flameproof Gas Analyzer Type X-STREAM 2FD**

(5) Manufacturer : **Emerson Process Management GmbH & Co. OHG**

(6) Address: **Industriestrasse 1, D-63594 Hasselroth, Germany**

(7) This equipment or protective system and any of acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The Physical Technical Testing Institute, notified body number 1026 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential Report N°  
**08/0028 dated March 2008**

(9) Compliance with Essential Health and Safety Requirements has been assured by compliance with:  
**EN 60079-0:2006 EN 60079-1:2007**

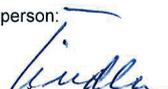
(10) If the sign „X” is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-TYPE EXAMINATION CERTIFICATE relates only to the design, examination and testing of the specified equipment or protective system in accordance to the directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

(12) The marking of the equipment or protective system shall include the following:

 **II 2G Ex d IIB+H<sub>2</sub> T4**

This EC-Type Examination Certificate is valid till: **30.04.2013**

Responsible person:   
Dipl. Ing. Sinder Jaroslav  
Head of certification body



Date of issue: 09.04.2008

Number of pages: 1/3

This certificate is granted subject to the general conditions of the Physical Technical Testing Institute.  
This certificate may only be reproduced in its entirety and without any change, schedule included.

FTZÚ, Pikartská 7, 716 07 Ostrava Radvanice, tel +420 596 232 715, fax +420 596 232 672, e-mail: ftzu@ftzu.cz

## 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<sub>amb</sub> ≤ + 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 Jarosláv  
 Head of certification body



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   |



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## A.2 ATEX EC Type Examination Certificate



Physical Technical Testing Institute  
Ostrava-Radvanice



### Supplement No. 1 to EC-Type Examination Certificate

(1)

(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:

**Ex II 2G Ex d IIB+H<sub>2</sub> T4**

(12) This type examination certificate is valid till: **30. 04. 2014**

Responsible person:

  
Dipl. Ing. Šindler Jaroslav  
Head of certification body



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



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

  
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



**Supplement No. 2 to  
EC-Type Examination Certificate**

- (1)
- (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<sub>2</sub> T4 Gb**
- (12) This type examination certificate is valid till: **27.01.2017**

Responsible person:

  
Dipl. Ing. Šindler Jaroslav  
Head of certification body



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<sub>4</sub> and non-CH<sub>4</sub>.

*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:

  
Dipl. Ing. Sindler Jaroslav  
Head of certification body



Date of issue: 27.01.2012

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A.2 ATEX EC Type Examination Certificate



Physical Technical Testing Institute  
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(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. Šindler Jaroslav  
Head of certification body



Page: 3/3

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## A.3 CSA Certificate of Compliance

### A.3 CSA Certificate of Compliance



**CSA INTERNATIONAL**

# Certificate of Compliance

|  |                                    |
|--|------------------------------------|
| <b>Certificate:</b> 1714037 (LR 105173)  | <b>Master Contract:</b> 185562     |
| <b>Project:</b> 2507282  | <b>Date Issued:</b> March 14, 2012 |
| <b>Issued to:</b> Emerson Process Management<br>GmbH & Co. OHG<br>Industriestrasse 1<br>Hasselroth, 63594<br>Germany<br>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.*



*Nicholas Cameron*  
Issued by: Nicholas Cameron

**PRODUCTS**

**CLASS 2258 02** - PROCESS CONTROL EQUIPMENT - For Hazardous Locations  
**CLASS 2258 82** - PROCESS CONTROL EQUIPMENT - For Hazardous Locations - Certified to US Standards  
**CLASS 8721 05** - LABORATORY EQUIPMENT - Electrical  
**CLASS 8721 85** - ELECTRICAL EQUIPMENT FOR LABORATORY USE - Certified to US Standards

**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);

DQD 507 Rev. 2009-09-01 Page: 1

A.3 CSA Certificate of Compliance



Certificate: 1714037 (LR 105173)

Master Contract: 185562

Project: 2507282

Date Issued: March 14, 2012

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

## A.3 CSA Certificate of Compliance



**Certificate:** 1714037 (LR 105173)

**Master Contract:** 185562

**Project:** 2507282

**Date Issued:** March 14, 2012

XFD-abcdefghijklmnp

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

**A.3 CSA Certificate of Compliance**



**Certificate:** 1714037 (LR 105173)

**Master Contract:** 185562

**Project:** 2507282

**Date Issued:** March 14, 2012

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, 4, 5 or 6

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

## A.3 CSA Certificate of Compliance



**Certificate:** 1714037 (LR 105173)

**Master Contract:** 185562

**Project:** 2507282

**Date Issued:** March 14, 2012

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-abcdefghijklmnpqrstuv

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 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

**A.3 CSA Certificate of Compliance**



**Certificate:** 1714037 (LR 105173)

**Master Contract:** 185562

**Project:** 2507282

**Date Issued:** March 14, 2012

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/Analog Inputs: 0, 1, 2, 5 or A

p = Communication Interface: 0, A or B

q = Advanced Software capabilities: 0, 1, 2 or 3

r = Sample Handling: 0, 1, 2, 3, 4, 5 or 6

s = Gas Path Sensors: 0, 1, 3, 5, 7 or 9

t = Gas Path Tubing: E, F, G, H, I, J, K or L

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 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**

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

## A.3 CSA Certificate of Compliance



**Certificate:** 1714037 (LR 105173)

**Master Contract:** 185562

**Project:** 2507282

**Date Issued:** March 14, 2012

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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

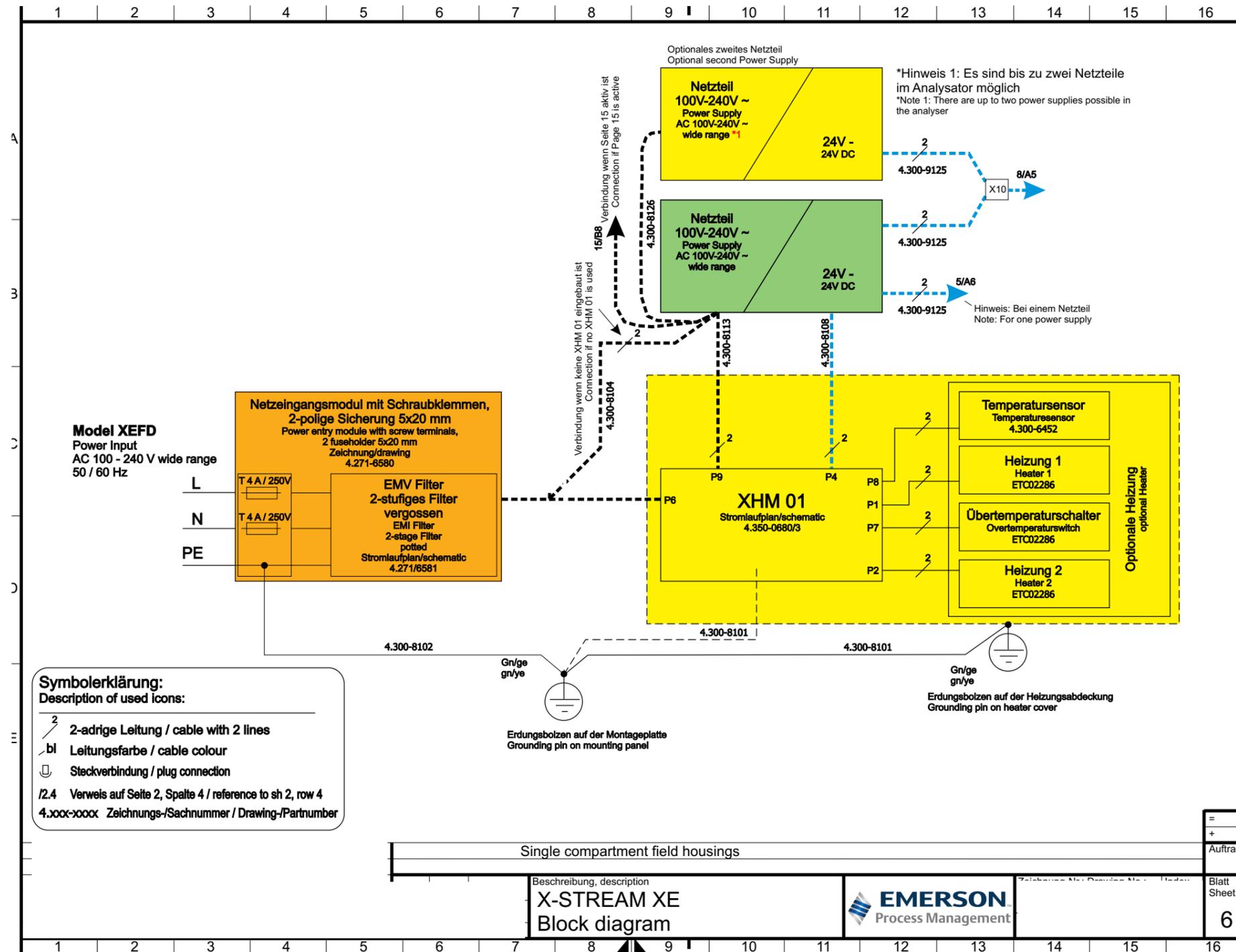
IEC 60529 Edition 2.1-2001-02 - Degrees of protection provided by enclosure (IP Code)

UL 50 11th Edition - Enclosures for Electrical Equipment

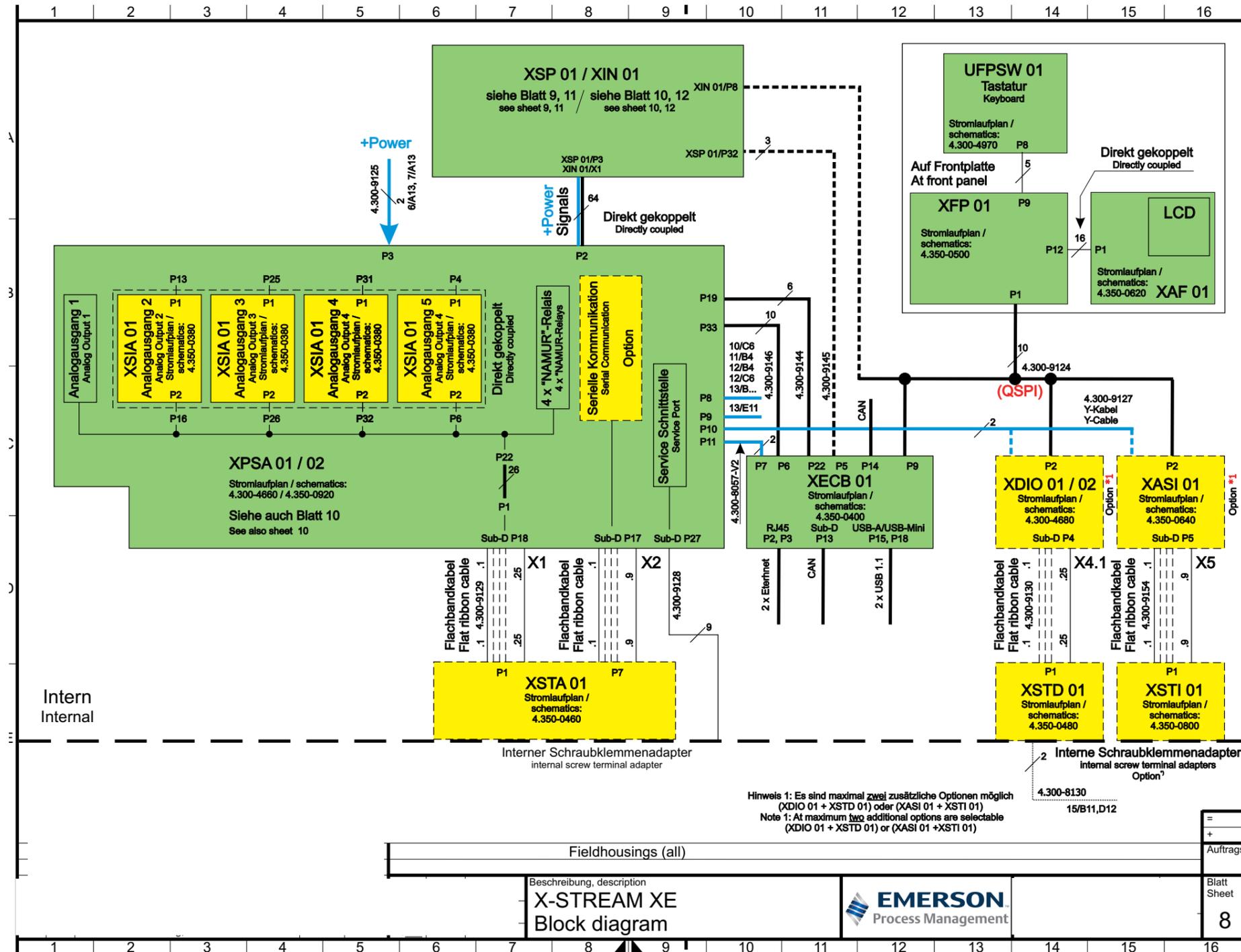
ANSI/ISA 12.12.01-2011 - Non-Incendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations

A.4 Block Diagram

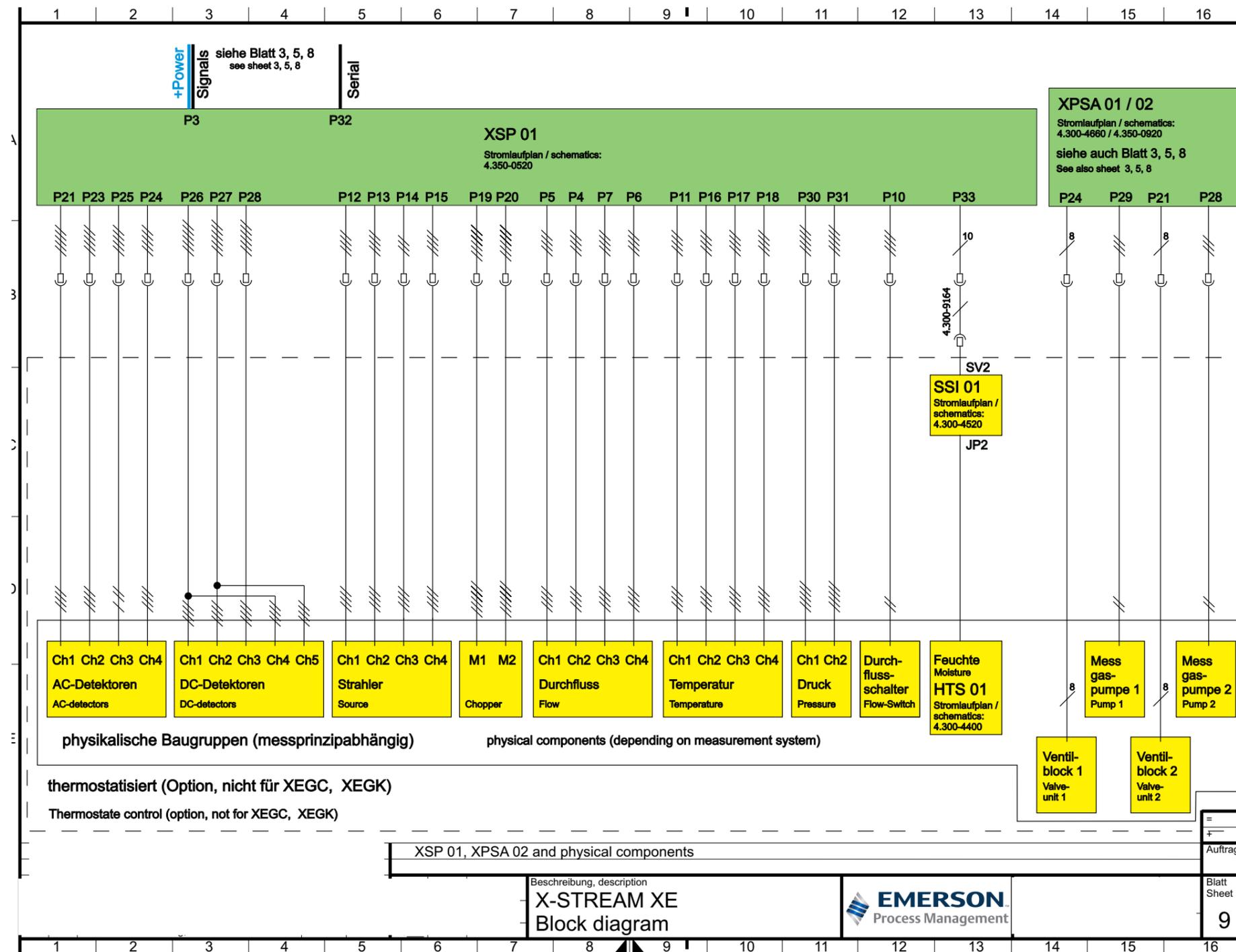
A.4 Block Diagram



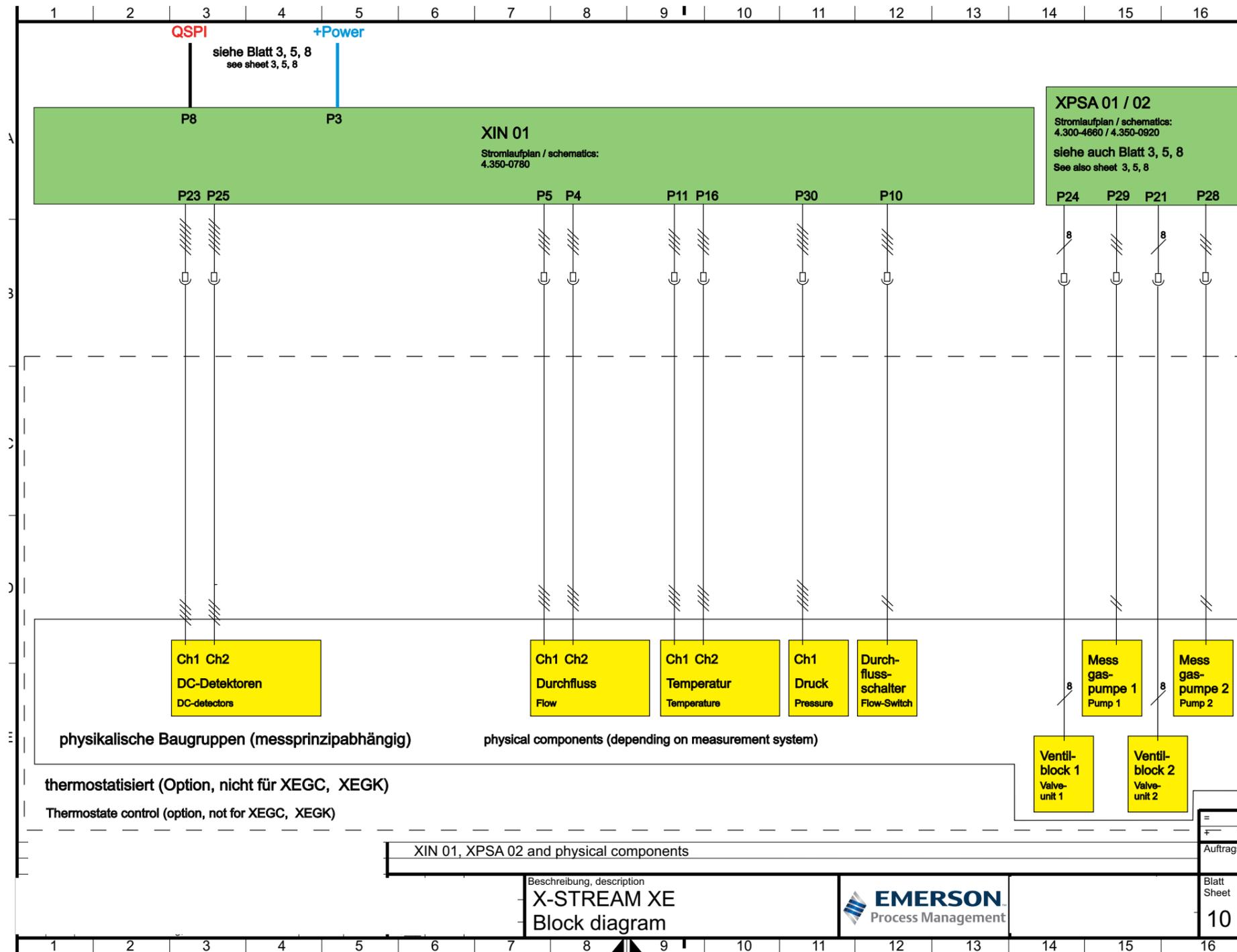
A.4 Block Diagram



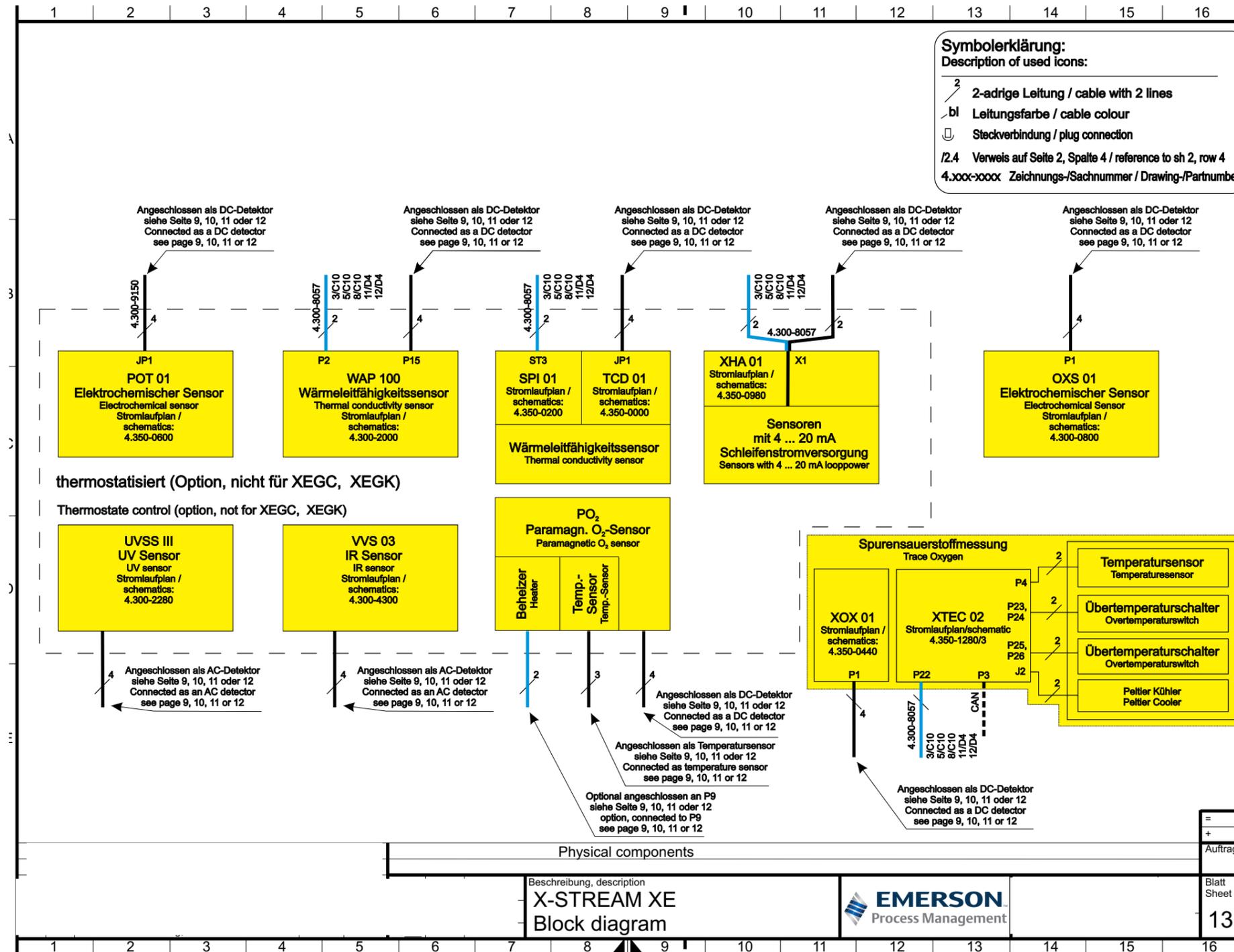
A.4 Block Diagram



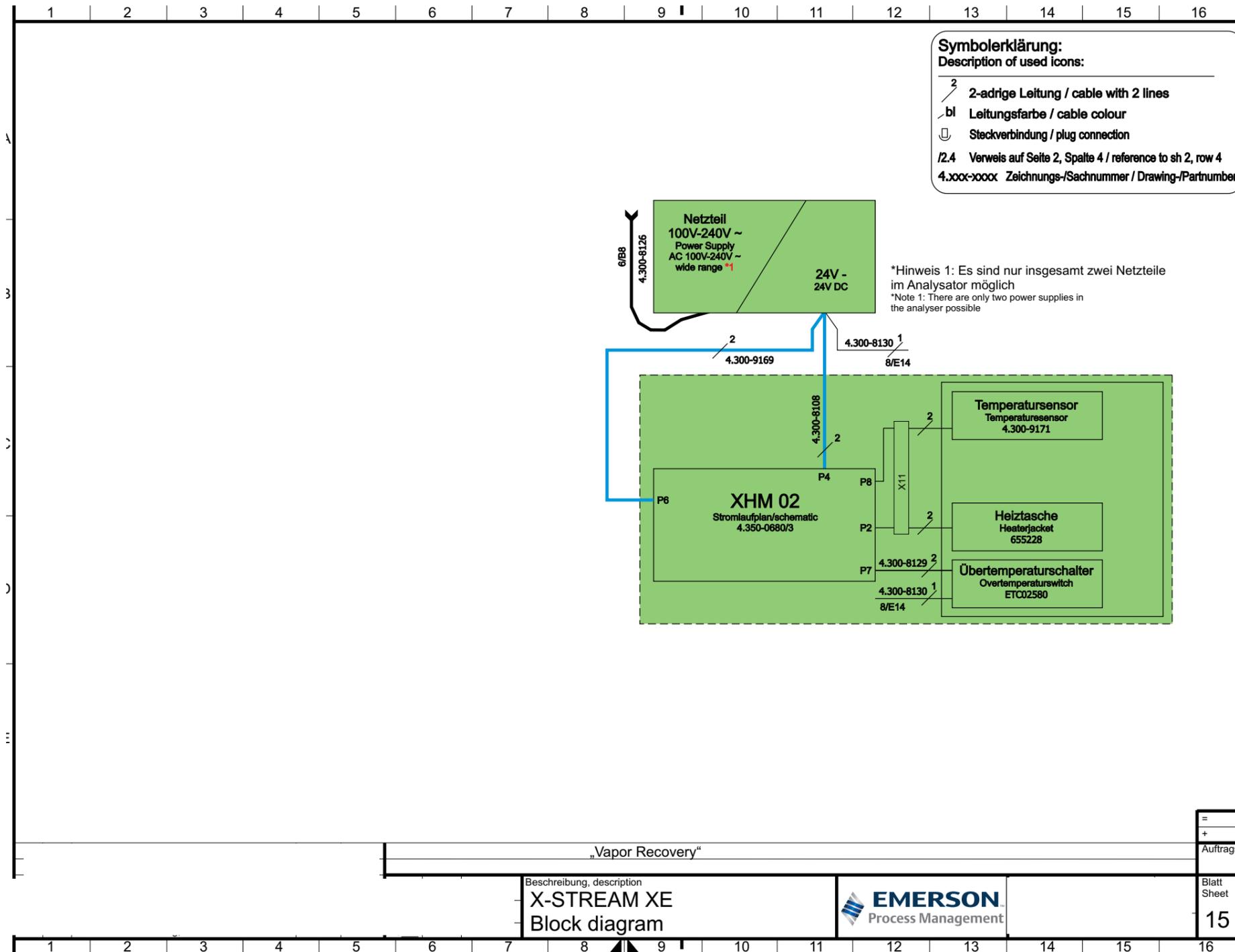
A.4 Block Diagram



A.4 Block Diagram



A.4 Block Diagram



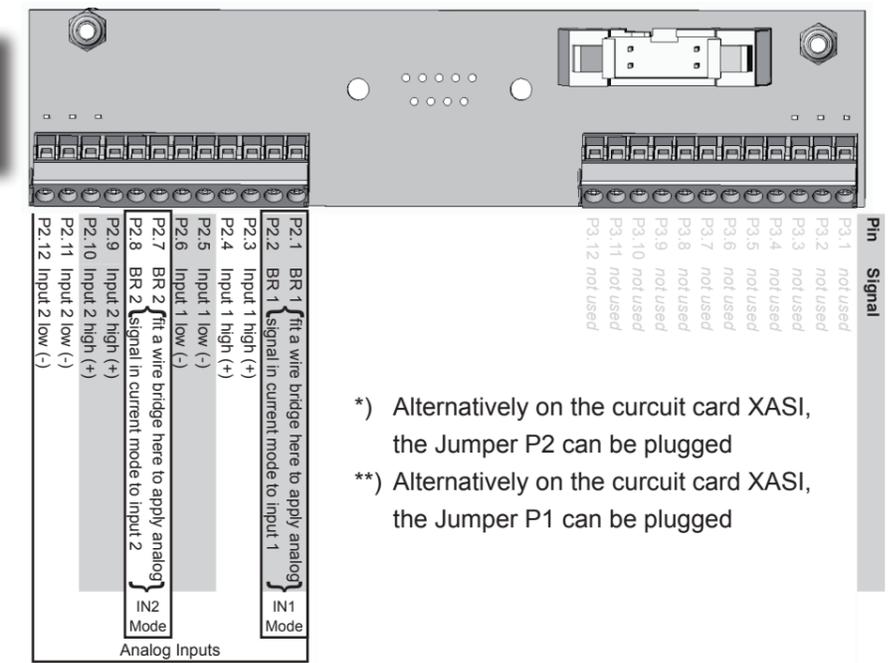
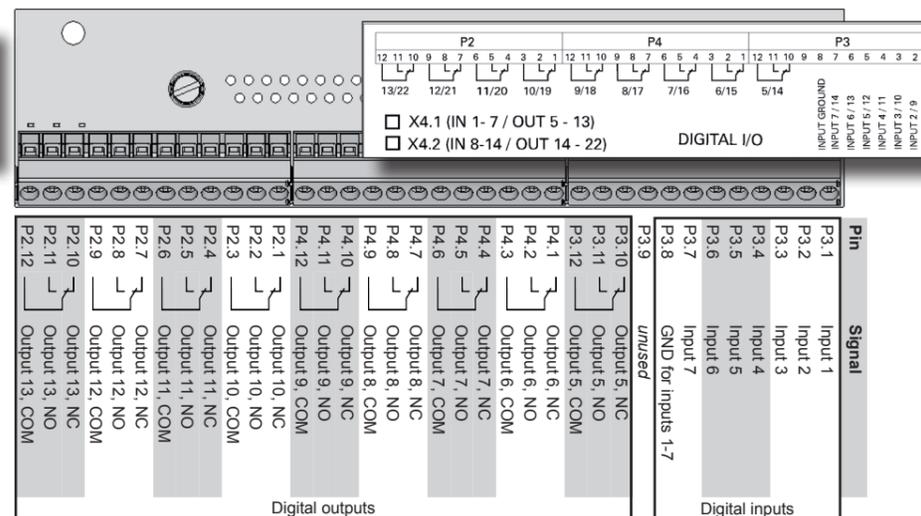
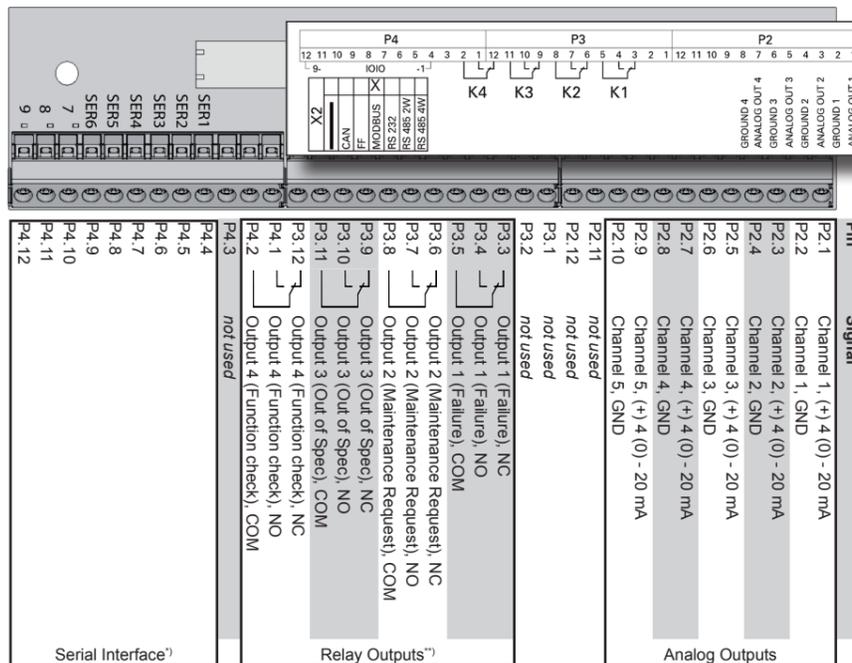
A.5 Assignment of Terminals and Socket

A.5 Assignment of Terminals and Sockets

XSTA: Standard strip with standard and optional signals

XSTD: Optional strips with  
7 Dig Inputs and 9 Dig Outputs each

XSTI: Analog inputs



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

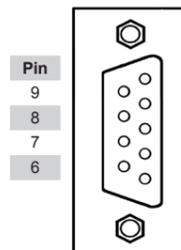
\*) Alternatively on the circuit card XASI, the Jumper P2 can be plugged  
\*\*) Alternatively on the circuit card XASI, the Jumper P1 can be plugged

<sup>1)</sup> See table below

<sup>2)</sup> Configuration of relay output terminals as per standard factory setting (NAMUR status signals)

Assignment of serial interface terminals

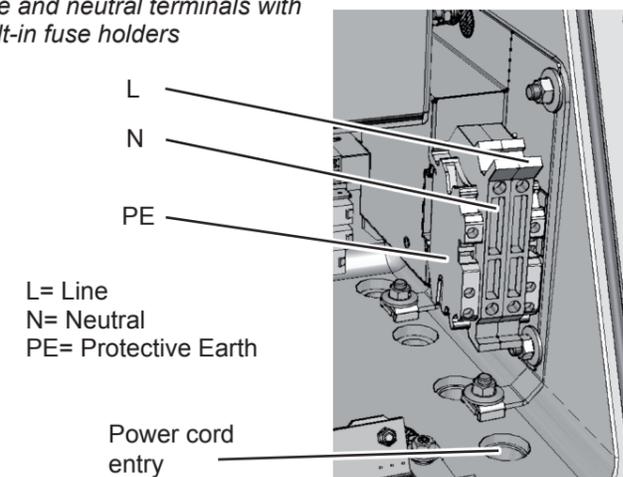
| Terminal | MOD 485/ 2 wire | MOD 485/ 4 wire | RS 232   |
|----------|-----------------|-----------------|----------|
| P4.4     | SER1            | Common          | Common   |
| P4.5     | SER2            | not used        | RXD      |
| P4.6     | SER3            | not used        | TXD      |
| P4.7     | SER4            | not used        | RXD1(+)  |
| P4.8     | SER5            | D1(+)           | TXD1(+)  |
| P4.9     | SER6            | not used        | not used |
| P4.10    | 7               | not used        | not used |
| P4.11    | 8               | not used        | RXD0(-)  |
| P4.12    | 9               | D0(-)           | TXD0(-)  |



| 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 |

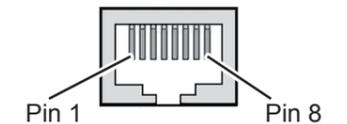
Service Port Connector - Serial RS 232 interface

**Note!**  
Line and neutral terminals with built-in fuse holders



Power terminals

Flameproof housing



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

Ethernet connector for Modbus





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