Short Form Manual
HASX2E-SFM-HS
02/2012

Gas Analyzers

X-STREAM X2 Series

Short Form Manual

ROSEMOUNT® Analytical

EMERSON™ Process Management

www.EmersonProcess.com

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.

4th edition 02/2012

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EMERSON™
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INTRODUCTION

The instruction manual contains information about the installation and startup of the X-STREAM® X2 series gas analyzers.

The manual covers several X-STREAM X2 analyzer models and so many contain information about configurations and/or options not appliccable to your analyzer.

The installation and operation of units for use in explosive environments is NOT COVERED in this manual!
Analyzers intended to be used in such environments are supplied with further instruction manuals, which must be consulted in addition to the X-STREAM X2 series instruction manual.

DEFINITIONS

The following definitions explain the use of the terms WARNING, CAUTION and NOTE in this manual.

WARNING

Indicates an operational or maintenance procedure, a process, a condition, an instruction, etc.

Failure to comply may result in injury, death or permanent health risk.

CAUTION

Indicates an operational or maintenance procedure, a process, a condition, an instruction, etc.

Failure to comply may result in damage to or destruction of the instrument, or impaired performance.

NOTE!
Indicates an imperative operational procedure, or an important condition or instruction.

TERMS USED IN THIS MANUAL

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.

NAMUR
NAMUR is an international user association of automation technology in process industries. This organisation has issued experience reports and working documents, called recommendations (NE) and worksheets (NA).

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.

SYMBOLS USED ON AND INSIDE THE EQUIPMENT

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

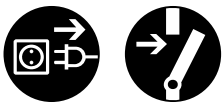
Strictly observe the given warnings, instructions and information to minimize hazards!

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

SYMBOLS USED IN THIS MANUAL

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

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

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

SAFETY INSTRUCTIONS

INTENDED USE STATEMENT

X-STREAM 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 nor as safety devices.
Using X-STREAM X2 analyzers as safety devices, requiring redundant design or SIL classification, is also not permitted.
No independent agency certifications or approvals are to be implied as covering such applications!

GENERAL SAFETY NOTICE / RESIDUAL RISK

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

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

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

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

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

ADDITIONAL LITERATURE

This manual deals with instructions on how to safely install and startup X-STREAM X2 series analyzers, intended to be operated in general purpose (safe) areas, only.
DO NOT use this manual for instruments to be installed in hazardous areas!
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 additional instruction manuals are available or referenced within this manual:
HASX2E-IM-HS X-STREAM X2 series instruction manual
HASICx-IM-H Infallible containment instruction manual
Contact your local service center or sales office when missing documents.

SAVE ALL INSTRUCTIONS FOR FUTURE USE!

AUTHORIZED PERSONNEL

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

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

It is the responsibility of the operating company to

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

Operators must

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

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

INSTALLING AND CONNECTING THIS ANALYZER

The following notices should be carefollowed to ensure compliance with the **low voltage directive (Europe) and other applicable regulations**.

1. Suitable grounding connections should be made at all connectors provided for this purpose.
2. All safety covers and grounding connections must be properly reinstated after maintenance work or troubleshooting.
3. A fuse should be provided at the installation site which will completely disconnect the unit in case of failure. Installing an isolating switch may also be beneficial. In either case, these components must be constructed to conform to recognised norms.

OPERATING AND MAINTAINING THIS ANALYZER

On leaving our factory, this instrument conformed to all applicable safety directives.
In order to preserve this state of affairs, the operator must take care to follow all the instructions and notes given in this manual and on the unit.

Before switching on the unit, ensure that the local nominal mains voltage corresponds to the factory-set operational voltage of this unit.

Any interruption of the protective earth connections, whether inside or outside of the unit, may result in exposure to the risk of electricity. Deliberately disconnected the protective earth is therefore strictly forbidden.

Removing covers may expose components conducting electric current. Connectors may also be energised. The unit should therefore be disconnected from the power supply before any kind of maintenance, repair or calibration work requiring access to the inside of the unit. Only trained personnel who are aware of the risk involved may work on an open and energized unit.

Fuses may only be replaced by fuses of an identical type and with identical ratings. It is forbidden to use repair fuses or to bypass fuses.
Take note of all applicable regulations when using this unit with an autotransformer or a variable transformer.

Substances hazardous to health may escape from the unit's gas outlet. This may require additional steps to be taken to guarantee the safety of operating staff.

WARNING

EXPLOSION HAZARD

The units described in this manual may not be used in explosive atmospheres without additional safety measures.

WARNING

ELECTRICAL SHOCK HAZARD

Do not operate without covers secure. Do not open while energized. Installation requires access to live parts which can cause death or serious injury.

For safety and proper performace this instrument must be connected to a properly grounded three-wire source of power.

WARNING

TOXIC GASES

This unit's exhaust may contain toxic gases such as (but not limited to) e.g. sulfur dioxide. These gases can cause serious injuries.
Avoid inhaling exhaust gases.

Connect the exhaust pipe to a suitable flue and inspect the pipes regularly for leaks.

All connections must be airtight to avoid leaks: page 3-2 for instructions on performing a leak test.

CAUTION

HIGH TEMPERATURES

Hot parts may be exposed when working on photometers and/or heated components in the unit.

CAUTION

HEAVY INSTRUMENT

The field housing variations intended for outside and wall mounted use weigh between 26 kg (57 lb) and 63 kg (139 lb) depending on variation and options installed.

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

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

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

CAUTION

CRUSHING HAZARD

Take care of crushing hazard when closing the front door of analyzer field housings!

Keep out of the closing area between enclosure cover and base!

CAUTION

OPERATION AT LOW TEMPERATURES

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

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

CAUTION

HIGH TEMPERATURES

Hot parts may be exposed when working on photometers and/or heated components in the unit.

GASES AND PREPARATION OF GASES

WARNING

GASES HAZARDOUS TO HEALTH

Follow the safety precautions for all gases (sample and span gases) and gas cylinders.

Before opening the gas lines, they must be purged with air or neutral gas (N_2) to avoid danger from escaping toxic, flammable, exposive or hazardous gases.

WARNING

FLAMMABLE OR EXPLOSIVE GASES

When supplying flammable gases with concentrations of more than ¼ of the lower explosion limit, we RECOMMEND implementing one or more additional safety measures:

- **purging the unit with inert gas**
- **stainless steel internal pipes**
- **flame arrestors on gas inlets and outlets**
- **inherently safe or failsafe measuring cells**

Power supply

WARNING

CONNECTING UNITS FOR PERMANENT INSTALLATION

Only qualified personnel following all applicable and legal regulations may install the unit and connect it to power and signal cables. Failure to comply may invalidate the unit's warranty and cause exposure to the risk of damage, injury or death.

This unit may only be installed by qualified personnel familiar with the possible risks.

Working on units equipped with screw-type terminals for electrical connections may require the exposure of energized components.

Wall-mounted units have no power switch and are operational when connected to a power supply. The operating company is therefore required to have a power switch or circuit breaker (as per IEC 60947-1/-3) available on the premises. This must be installed near the unit, easily accessible to operators and labelled as a power cut-off for the analyzer.

CAUTION

HAZARD FROM WRONG SUPPLY VOLTAGE

Ensure that the local power voltage where the unit is to be installed, corresponds to the unit's nominal voltage as given on the name plate label.

CAUTION

ADDITIONAL NOTES FOR UNITS WITH SCREW-TYPE TERMINALS

Cables for external data processing must be double-insulated against mains power.

If this is not possible, cables must be laid in such a way as to guarantee a clearance of at least 5 mm from power cables. This clearance must be permanently secured (e.g. with cable ties)

GENERAL OPERATING NOTES

WARNING

HAZARD TO LIFE AND EXPLOSION HAZARD BY EXHAUST GASES

Exhaust gases may contain hydrocarbons and other toxic gases such as carbon monoxide. Carbon monoxide is toxic.

Faulty gas connections may lead to explosion and death.

Ensure that all gas connections are connected as labelled and airtight.

- 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. Admissable ambient temperatures (see technical details) must be adhered to.
- Gas inlets and outlets must not be interchanged.All gases must be supplied to the unit already processed. When using this unit with corrosive sample gases, ensure that these gases do not contain components harmful to the gas lines.
- Admissable gas pressure for sample and test gases is 1500 hPa.
- 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 and terminal housing must be electrically connected; submin-D plugs and sockets must be screwed to the unit.
- When using optional external adapters (submin-D to screw-type terminal), protection from electromagnetic interference can no longer be guaranteed (CE compliance pursuant to EMC guidelines). In this case the customer or operating company functions as a maker of a system and must therefore ensure and declare compliance with EMC guidelines.

Chapter 1
Technical description

The following are the main features of the Emerson Process Management X-STREAM X2 gas analyzers in brief:

- compact design with easily accessible internal components
- customizable for a wide range of applications: different housings are available while internal construction remains largely identical
- multilingual microprocessor-controlled user interface with liquid crystal (LCD) or vacuum flourescent display (VFD) to indicate measurement value and status messages
- units for outdoor use are optionally supplied with an impact tested front panel
- widerange power supply unit for worldwide use without modification (½ 19in units with internal or external PSUs)

X-STREAM X2 gas analyzers can measure up to four different gas components using any combination of the following analyzing techniques (restrictions apply to ½19in units):

IR = non-dispersive infrared analysis
UV = ultraviolet analysis
pO_2 = paramagnetic oxygen analysis
eO_2 = electrochemical oxygen analysis
tO_2 = trace oxygen analysis
TCD = thermal conductivity analysis
tH_2O = trace moisture measurement

Modified resistant measuring cells are available for use with corrosive gases and/or gases containing solvents.

Special configurations (e.g. intrinsically safe or infallible measuring cells) for the analysis of combustible gases are also available.

WARNING

EXPLOSION HAZARD

X-STREAM X2 analyzers MUST NOT be used in explosive environments (hazardous areas) without additional safety features.

This instruction manual does NOT describe the special conditions necessary to operate gas analyzers in hazardous areas.

Please refer to the separate instruction manual, supplied with units for use in hazardous areas.

1.1 Overview

1.1.1 Housings

Different housings allow X-STREAM analyzers to be tailored to many different applications:

- Tabletop units in ½19in modular design, with IP 20 protection class. Can be installed into a rack or used as a table top instrument. Optionally featuring a handle enabling mobile measurements at different sampling points.
- Tabletop and rack mountable units in 19in modular design, with IP 20 protection class.
- Stainless steel wall mountable field housing with IP 66 / NEMA 4X protection class enables outdoor use (operating temperature -20°C to +50°C).
- Cast aluminium wall mountable field housing with IP 66 / NEMA 4X protection class for outdoor use (operating temperature -20 °C to +50 °C). Specially designed to meet hazardous area certifications, but also suitable for non-hazardous locations with requirements for robust designed equipment.

1.1.2 The Front Panel / User Interface

All X-STREAM X2 gas analyzers feature an easy-to-use LCD alphanumeric user interface, which displays measurement values, status and error messages, and menus for the input of parameters.

All analyzer types also feature three LEDs on the front panel which display status information in addition to the plain text messages.

The colors of the LEDs are based on the NAMUR NE 44 specifications. The LEDs are activated in accordance with the NE 107 standards, and indicate “Failure”, “Function check”, “Out of specification” and “Maintenance request”. For further information, see ☞ X-STREAM X2 instruction manual, chapter 8.

The analyzer software is operated by means of only six keys.

For ease of use, during operation the user can select one of three languages for the display. Beside the preselected languages English and German, a third language can be selected at time of ordering the instrument: French, Italian, Portuguese or Spanish).

Wall-mounted units can alternatively, be fitted with a vacuum fluorescent display, increasing legibility in brighter environments. Their display is protected with an impact tested glass panel.

1 4x20 character alphanumeric display
2 LED (red)
3 LED (red)
4 LED (green)
5 “Measure“ key
6 “Enter” key
7 4 keys for settings and menu navigation

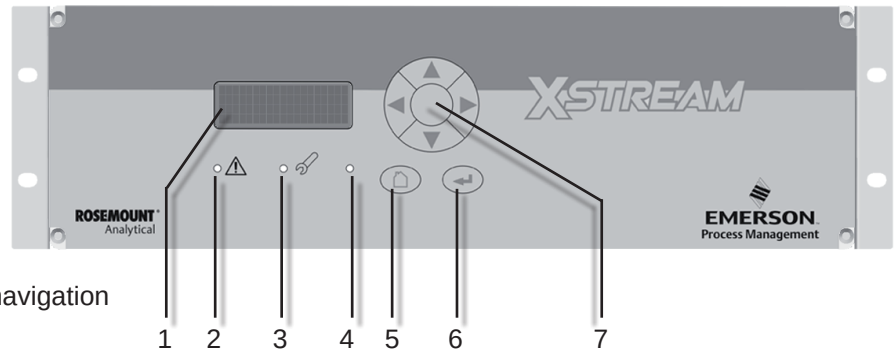


Fig. 1-1: *X-STREAM front panel (here the X-STREAM X2GP)*

1.1.3 Interfaces

All analyzer variations are fitted with one analog electrical output for each channel and four status relays as standard.

As an option, further interfaces can be added:

- additional analog outputs
- additional relay outputs
- digital inputs
- Modbus Ethernet
- Modbus serial

Depending on the unit configuration, the interfaces are accessible via either SubminD connectors or screw terminals.

1.2 Comparison of the Various X-STREAM Analyzer Models

X-STREAM X2GK	X-STREAM X2GP
	
½19 in housing, table-top or rackmountable, *optional with carrying handle* protection type: IP 20	¹⁄₁19 in housing, table-top or rackmountable, protection type: IP 20
Internal wide range power supply, **or** 24V input with external power supply unit	Internal wide range power supply unit
Max. 3 channels in many combinations max. 8 gas connections, *including 1 optional purge gas connection*	Max. 4 channels in any combination max. 8 gas connections, *1 optional extra connection for purge gas*
Options for gas lines: Valve block, sample gas pump, flow sensor, pressure sensor, infallible gas lines	*Options for gas lines: Flow sensor, pressure sensor, heating for physical components, sample gas pump, 1 or 2 valve blocks, infallible gas lines*
1–4 analog outputs, 4 relay outputs *optional:* *1 interface card with 7 digital inputs and 9 digital outputs* *1 Modbus interface (serial or Ethernet)* electrical interfaces accessible via sockets on back of unit*)*	1–4 analog outputs, 4 relay outputs *optional:* *1 or 2 interface cards, each with 7 digital inputs and 9 digital outputs* *1 Modbus interface (serial or Ethernet)* electrical interfaces accessible via sockets on back of unit, *optionally: screw-type terminal adapters (except for Ethernet)*
LCD	LCD
Operational ambient temperature: 0 °C to +50 °C (32 °F to 122 °F)	Operational ambient temperature: 0 °C to +50 °C (32 °F to 122 °F)
Available w/o front plate controls as module XCC	Available w/o front plate controls as module XCA
Size: (DxHxW): max. ca. 460x128.7x213 mm Weight: ca. 8–12 kg (17.6–26.5 lb)	Size: (DxHxW): max. ca. 411x133x482 mm Weight: ca. 11–16 kg (24–35 lb)

1.2 Comparison of Analyzer Models

X-STREAM X2XF	X-STREAM X2FD
	
Stainless steel wallmountable field housing, protection type: IP66 / NEMA 4X Single (XLF) or dual (XXF) compartment design	Cast aluminium wallmountable field housing, protection type: IP66 / NEMA 4X
Internal wide range power supply unit	Internal wide range power supply unit
Max. 4 channels in any combination max. 8 gas connections, *1 optional extra connection for purge gas*	Max. 4 channels in any combination max. 8 gas connections, *including 1 optional purge gas connection*
Options for gas lines: Flow sensor, pressure sensor, heating for physical components, sample gas pump, 1 or 2 valve blocks, infallible gas lines	*Options for gas lines: Flow sensor, pressure sensor, heating for physical components, sample gas pump, 1 or 2 valve blocks, infallible gas lines*
1–4 analog outputs, 4 relay outputs *optional:* *1 or 2 interface cards, each with 7 digital inputs and 9 digital outputs* *1 Modbus interface (serial or Ethernet)* electrical interfaces on internal screw-type terminal adapters (except for Ethernet)	1–4 analog outputs, 4 relay outputs *optional:* *1 or 2 interface cards, each with 7 digital inputs and 9 digital outputs* *1 Modbus interface (serial or Ethernet)* electrical interfaces on internal screw-type terminal adapters (except for Ethernet)
LCD, *optionally: vacuum fluorescent display, impact tested front panel*	LCD, impact tested front panel *optionally: vacuum fluorescent display*
operational ambient temperature: -20 °C to +50 °C (-4 °F to 122 °F)	operational ambient temperature: -20 °C to +50 °C (-4 °F to 122 °F)
Models available for use in explosive environments	Flameproof enclosure: approved for use in explosive areas
Size: (DxHxW): ca. 265x400 (815)x550 mm Weight: max. ca. 26/45 kg kg (57 lb)	Size: (DxHxW): max. ca. 222x512x578 mm Weight: max. ca. 63 kg (138.5 lb)
	This model is not covered by this manual! See the separate X-STREAM Ex d manual for hazardous area applications!

1.3 X-STREAM X2GK: ½ 19 Inch Table-Top Unit

This compact model for general purposes can be fitted with up to three measurement channels in various combinations. Power is supplied by an internal wide range power supply or a separate external power supply unit.

By default the units are configured for tabletop use. A carrying handle is optional available which makes it easy to take the instrument to varying sampling points. For rack mounting a X2GK is fixed by screws located at the front panel.

Connection to power supply

AC is supplied by an IEC chassis plug with power switch and fuse holders. The internal wide range power supply unit enables the analyzers to be used worldwide. Optionally DC 24 V power is supplied via a 3-pin socket at the rear of the unit.

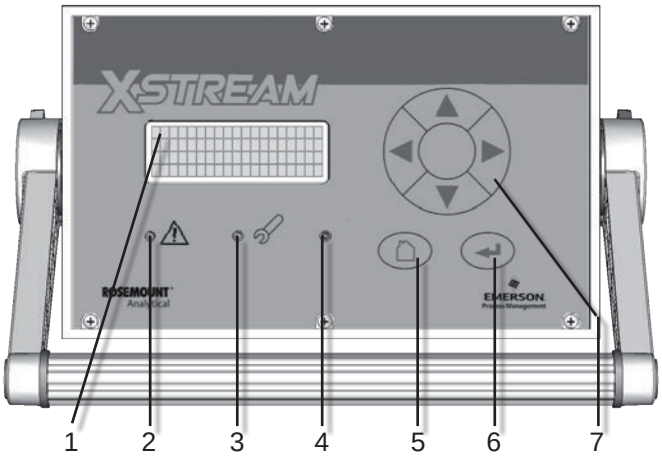
Interfaces

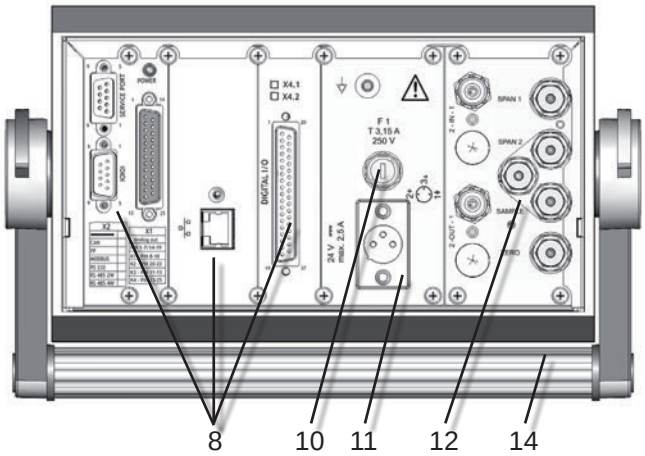
Electrical connections for interface signals are provided via submin-D and Ethernet connectors mounted on the rear panel of the device (☞ Fig. 1-2).

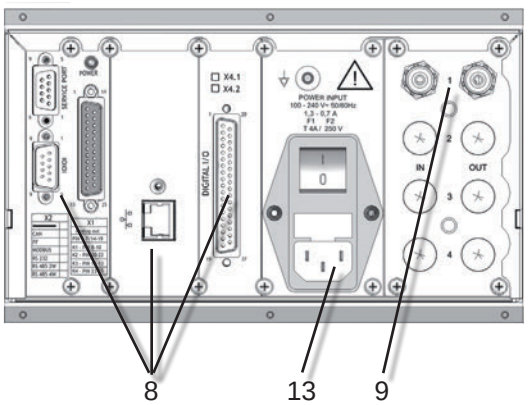
Gas connections

Depending on the configuration of the unit (number of measurement channels and serial or parallel connection), sample and calibration gases are fed into the unit via up to 8 tube fittings mounted on the rear panel. Any free tube fittings can be used for purging the device to minimize interference from the ambient atmosphere, or when measuring corrosive and/or flammable gases.

1.3 X-STREAM X2GK







Note!
Figures show optional components!

1 4x20 character alphanumeric display
2 LED (red)
3 LED (red)
4 LED (green)
5 “Measure” key
6 “Enter” key
7 4 keys for adjustment and menu selection
8 Signal connectors (some optional)
9 Gas fittings
10 DC power input fuse
11 DC power input
12 Valve block
13 AC power input
14 Carrying handle

Fig. 1-2: *X-STREAM X2GK*

1.4 X-STREAM X2GP: 19 Inch Table-Top or Rackmount Design

This model can be fitted with up to four measurement channels in any combination. The physical components can optionally be encased in a cover. This area can be held at a specific temperature of up to 60 °C to minimize interference from changes in external temperature.

Units configured for rack mounting can be converted for tabletop use by removing the lateral mounting brackets and attaching the four feet supplied as accessories.

Connection to power supply

Main power is supplied via the IEC chassis plug mounted on the rear panel, with integrated power switch and fuse holders. The internal wide range power supply unit enables the analyzers to be used worldwide.

Interfaces

Electrical connections for interface signals are provided via submin-D connectors mounted on the rear panel of the device (☞ Fig. 1-3).

For applications where screw-type terminals are preferred, optional adapters are available, which are mounted directly onto the submin-D connectors.

Up to two digital I/O cards may be installed.

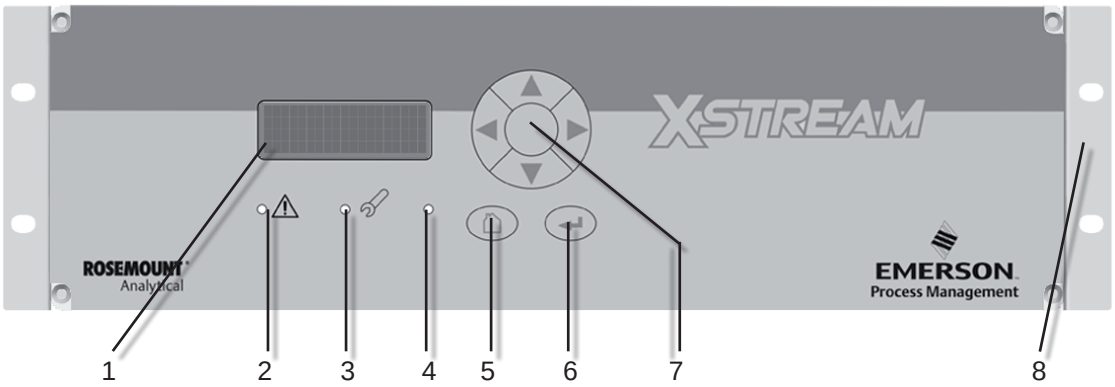
Gas connections

Depending on the configuration of the unit (number of measurement channels and serial or parallel connection), sample and calibration gases are fed into the unit via up to 8 threaded connectors mounted on the rear panel. The configuration of the connectors is indicated on an adhesive label located near the connectors.

A further optional tube fitting enables the housing to be purged to minimize interference from the ambient atmosphere, or when measuring corrosive and/or flammable gases.

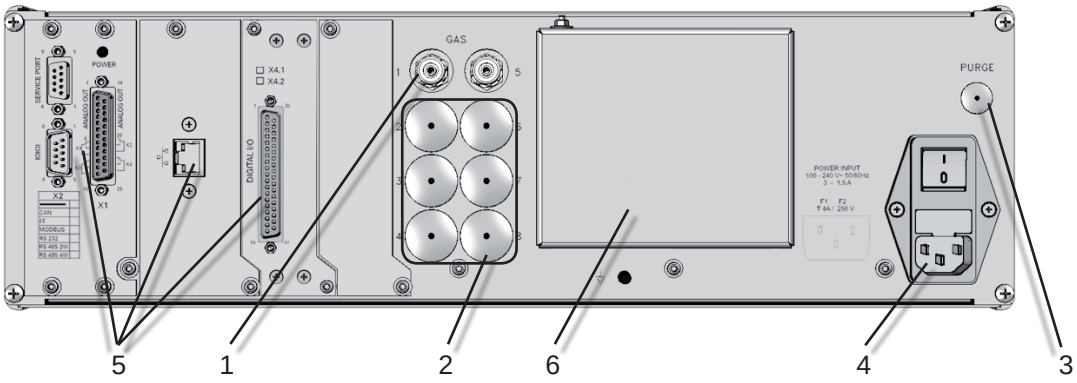
1.4 X-STREAM X2GP

Front view



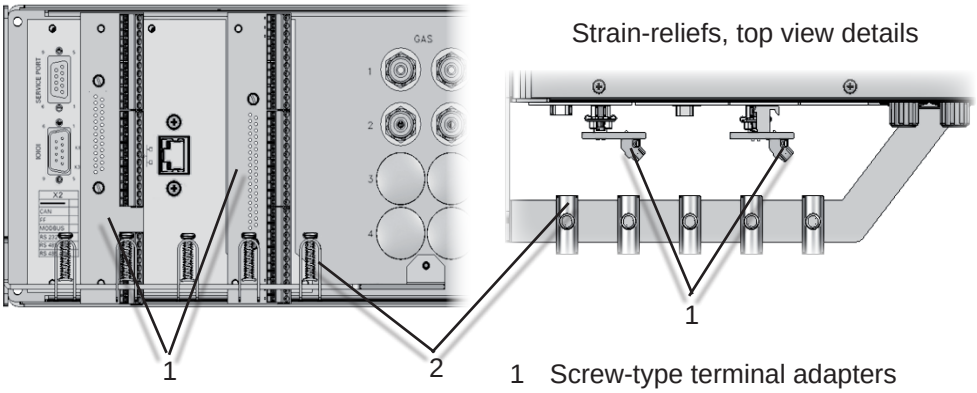
1 4x20 character alphanumeric display
2 LED (red)
3 LED (red)
4 LED (green)
5 “Measure” key
6 “Enter” key
7 4 keys for adjustment and menu selection
8 Brackets for rack mounting

Rear view



1 Gas connectors
2 Space for additional tube fittings
3 Optional purge gas inlet
4 Power inlet with filter, fuses & switch
5 Signal input/output connectors (some optional)
6 Cover for tO_2 or eO_2 sensor

Optional screw-type terminal adapter



1 Screw-type terminal adapters
2 Strain-reliefs

Fig. 1-3: *X-STREAM X2GP - Details*

1.5 X-STREAM X2XF: Field Housing With Single (XLF) or Dual (XXF) Compartment

The field housing model is conceived for outdoor use and wall-mounting. The coated stainless steel housing has a protection class rated IP66 / NEMA Type 4X, offering protection against water and dust entering the device:

*IPx**6**: In case of occasional flooding, e.g. heavy seas, water shall not enter in harmful quantities*

*IP**6**x: Protection against penetration by dust. Live or internal moving parts are completely protected.*

An X-STREAM field housing can be fitted with up to four measurement channels in any combination. The physical components can optionally be encased in a cover. This separate volume can be held at a specific temperature of up to 60 °C to minimize interference from changes in external temperature.

Front panel

The analyzer's display is covered by an impact tested glass for enhanced protection against breakage in harsh environments.

Electrical connections

Electrical connections are provided via internal tube fittings, the cables being fed through cable glands at the right side of the unit (☞ Fig. 1-5). The front cover of the housing swings open to the left once the fasteners have been released.

Connection to power supply

Mains power is supplied via screw-type terminals with integrated fuse holders at the right side of the housing, near the front. The internal wide range power supply unit allows the analyzers to be used worldwide.

Interface signals

Up to two digital I/O cards may be installed. If so, on a label nearby, they are labeled "X4.1" for the first I/O board, and "X4.2" for the second.

Gas connections

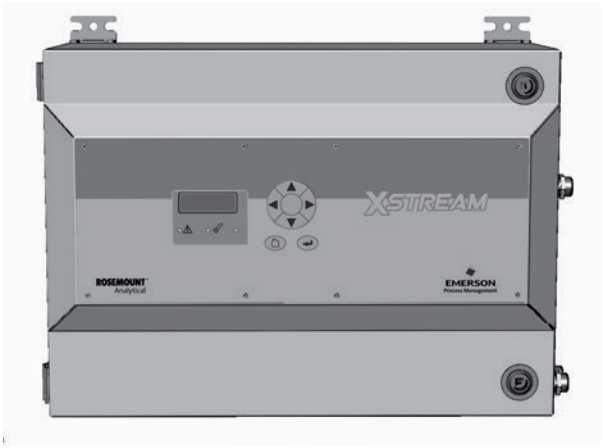
Sample and calibration gases are supplied via up to eight fittings, located at the bottom side of the enclosure. The assignment is given on a lable nearby.

An additional fittings enables purging the enclosure to minimize cross interference by ambient air, or as a protective measure when analyzing corrosive or flammable gases.

1.5 X-STREAM X2XF Field Housings

Dual compartment version XXF

The dual compartment field housing XXF not only provides more space for additional internal components, such as signal converters, etc, but also gives the option to separate the physics from the electronics: Physics is installed into the lower compartment, electronics into the upper. Also, the separation can be gas tight, e. g. for measuring corrosive gases.



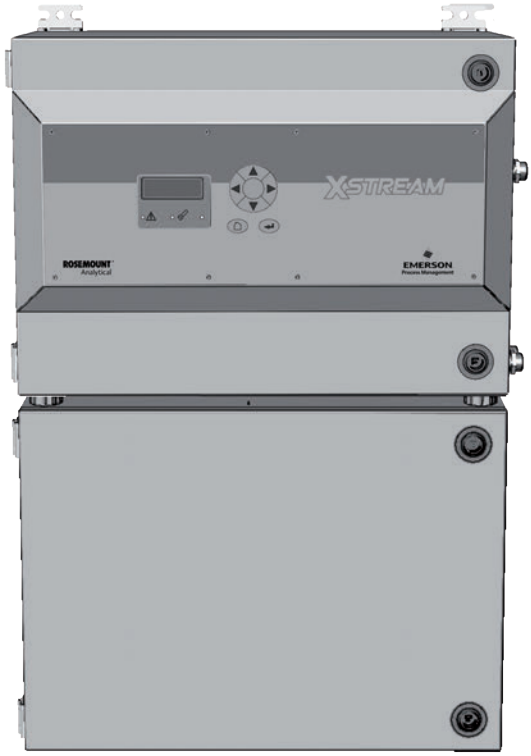


Fig. 1-4: *X-STREAM XLF / XXF- Front views*

CAUTION

HEAVY INSTRUMENT

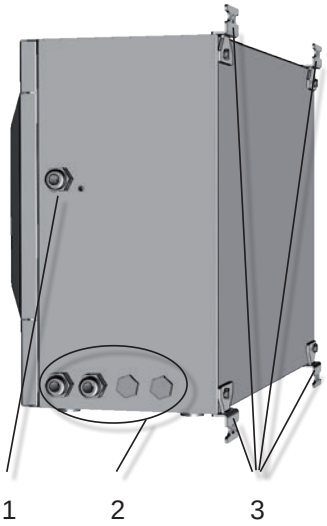
The X-STREAM field housing, intended for outside and wall mounted use, weighs approx. 26 kg/57 lb (XLF) or 45 kg/99 lb (XXF), depending on options installed.

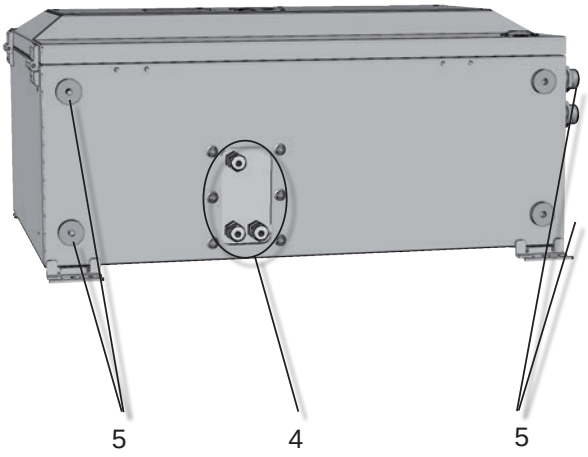
Two people and/or lifting equipment is required to lift and carry these units.

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

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

1.5 X-STREAM X2XF Field Housings





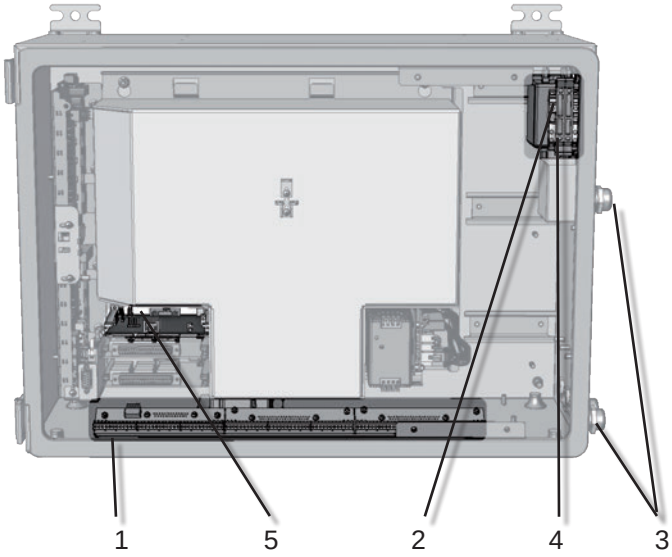
1 Cable gland for power cable
2 Cable glands for signal cables
3 4 brackets for wall-mounting
4 Gas in- & outlets (max. 8)
5 Cutouts, to combine 2 housings (here closed)

Note!
In case of XXF, the cable glands are located at the upper compartment, while the gas in- & outlets are at the bottom side of the lower compartment.
Also only 2 brackets are at each compartment.

Fig. 1-5: *X-STREAM XLF - Side and Bottom View*

Note!
In case of XXF, the terminals and connectors are located at the upper compartment, while physical components and gas fittings are in the lower compartment.

1 Screw-type terminals for signal cables
2 Power line filter
3 Cable glands
4 Power supply terminals with integrated fuses
5 Ethernet connector (option)



(shown with front panel removed)

Fig. 1-6: *X-STREAM XLF - Power Supply and signal terminals*

1.5 X-STREAM X2XF Field Housings

1.5.1 X2XF Field Housings for Installation in Hazardous Areas (Ex-Zones)

WARNING

EXPLOSION HAZARD BY MISSING PROTECTIVE MEASURES

X-STREAM XLF and XXF models MUST not be used in explosive environments (hazardous areas) without additional safety features.

This instruction manual does NOT describe the special conditions necessary to operate gas analyzers in hazardous areas.

Please refer to the separate instruction manual supplied with units for use in hazardous areas.

Special X-STREAM X2XF field housing analyzer variations can be used in Ex-zones 1, 2 or Div 2:

X-STREAM XLFN/XXFN:

These analyzer variations feature a protection concept called "non-incendive" (Ex n), which means that non-sparking and non-arcing components, installed within a protecting enclosure, enable installation in an European Ex-zone 2 for measuring non-flammable gases. No further measures, such as a supply of protective gas, are necessary.

X-STREAM XLFS/XXFS:

Equipped with a simplified pressurization system, these field housings can be used to measure non-flammable gases in European Ex-zone 2. A protective gas (e.g. pressurized air) must be supplied when operating this model.

X-STREAM XLFZ/XXFZ:

Equipped with a simplified pressurization system (z-purge), these models can be used to measure non-flammable gases in American zone Div 2. A protective gas (e.g. pressurized air) must be supplied when operating this model.

Please contact your local EMERSON Process Management office if you require analyzers for use in hazardous areas.

1.6 Measurement 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.

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

[1] Dew point below ambient temperature

[2] Higher concentrations decrease sensor lifetime

[3] Daily zero calibration required for ranges below lowest standard spec range

[4] Special "refinery" application with 0–1% H_2 in N_2 available

[5] see Tab. 1-5

Tab. 1-1: *Gas Components and Measuring Ranges, Examples*

1.6 Measurement Specifications

Measurement Performance Specifications

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

Note! *1 psi = 68.95 hPa*

[1] Related to full scale
[2] Related to measuring value
[3] From gas analyzer inlet at gas flow of 1.0 l/min (electronic damping = 0 s)
[4] Constant pressure and temperature
[5] Dependent on integrated photometer bench
[6] Depending on measuring range
[7] Pressure sensor is required
[8] Limited to atmospheric if internal sample pump
[9] Temperatures below 0 °C (-4 °F) with thermostat control only
[10] Thermost. controlled sensor: 75 °C (167 °F)
[11] Flow variation within ± 0.1 l/min
[12] Optional thermostatically controlled box with temperature 60 °C (140 °F), not X2GK
[13] Temperature variation: ≤ 10 K per hour
[14] Special conditions apply to model X2FD

Tab. 1-2: *IR, UV, VIS, TCD - Measurement Performance Specifications*

Important Notes Concerning Measurement Specification Data

The specifications given in these tables always apply to the physical measuring ranges, as listed e.g. in the INFO-RANGES.. menu (parameters „MinRange“ and „MaxRange“).

Scaling or zooming cannot improve analog output specifications to values better than specified by the physical measuring ranges

All performance data is verified during the manufacturing process for each unit by the following tests:

- Linearization and sensitivity test
- Long term drift stability test
- Climate chamber test
- Cross interference test (if applicable)

1.6 Measurement Specifications

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

Note! *1 psi = 68.95 hPa*

[1] Related to full scale
[2] Related to measuring value
[3] From gas analyzer inlet at gas flow of 1.0 l/min (electronic damping = 0 s)
[4] Constant pressure and temperature
[5] Range 0–10…200 ppm: ≤ 5 % (5 to 45 °C / 41 to 113 °F)
[6] Pressure sensor is required
[7] Limited to atmospheric if internal sample pump
[8] Temperatures below 0 °C (-4 °F) with thermostat control only
[9] Thermost. controlled sensor: 35 °C (95 °F)
[10] For ranges 0–5…100 % **and** flow 0.5…1.5 l/min
[11] Optional thermostatically controlled sensor with temperature 60 °C (140 °F)
[12] Temperature variation: ≤ 10 K per hour
[13] No sudden pressure surge allowed
[14] Special conditions apply to model X2FD

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

Tab. 1-3: *Oxygen - Standard Measurement Performance Specifications*

Note 1!

Not all data listed are applicable to all analyzer versions (e.g. 60 °C thermostatically controlled box is not available for electrochemical and trace oxygen nor for ½19 in instruments).

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.

1.6 Measurement Specifications

Trace Moisture (tH_2O)	
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_{95})	5 min (dry to wet)
Operating humidity	0 to 100 % r.h.
Sensor operating temperature	-40 to +60 °C
Temperature coefficient	Temperature compensated across operating temperature range
Operating pressure	Depending on sequential measurement system, see analyzer specification [1] max. 1500 hPa abs / 7 psig [2]
Flow rate	Depending on sequential measurement system, see analyzer specification [1] 0.2 to 1.5 Nl/min

Note! *1 psi = 68.95 hPa*

[1] If installed in series to another measurement system, e. g. IR channel
[2] Special conditions apply to model X2FD

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

Tab. 1-4: *Trace Moisture - Standard Measurement Performance Specifications*

Special Performance Specifications for Gas Purity Measurements (ULCO & $ULCO_2$)

	0–10…< 50 ppm CO 0–5…< 50 ppm CO_2	
Detection limit (4 σ) [1 2]	< 2 %	
Linearity [1 2]	< 1 %	
Zero-point drift [1 2 3]	< 2 % *resp. < 0.2 ppm* [9]	
Span (sensitivity) drift [1 2 4]	< 2 % *resp. < 0.2 ppm* [9]	
Repeatability [1 2]	< 2 % *resp. < 0.2 ppm* [9]	
Response time (t_{90}) [7]	< 10 s	
Permissible gas flow	0.2–1.5 l/min.	
Influence of gas flow [1 2]	< 2%	
Maximum gas pressure [10 11]	≤ 1500 hPa abs. (≤ 7 psig)	
Influence of pressure [5]		
– At constant temperature	≤ 0.1 % per hPa	
– With pressure compensation [8]	≤ 0.01 % per hPa	
Permissible ambient temperature	+15 to +35 °C (59 to 95 °F)	+5 to +40 °C (41 to 104 °F)
Influence of temperature [6] (at constant pressure)		
– On zero point	< 2 % per 10 K *resp. < 0.2 ppm per 10 K* [9]	
– On span (sensitivity)	< 2 % per 10 K *resp. < 0.2 ppm per 10 K* [9]	
Thermostat control	none	60 °C (140 °F)

Note! *1 psi = 68.95 hPa*

[1] Related to full scale
[2] Constant pressure and temperature
[3] Within 24 h; daily zero calibration requested
[4] Within 24 h; daily span calibration recommended
[5] Related to measuring value
[6] Temperature variation: ≤ 10 K per hour
[7] From gas analyzer inlet at gas flow of 1.0 l/min
[8] Barometric pressure sensor is required
[9] Whichever value is higher
[10] Limited to atmospheric if internal sample pump
[11] Special conditions apply to model X2FD

Tab. 1-5: *Special Performance Specifications for Gas Purity Measurements (ULCO & $ULCO_2$)*

Chapter 2
Installation

This chapter describes the proper installation procedure for the various X-STREAM analyzer versions.

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

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

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

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

2.1 Scope of Supply

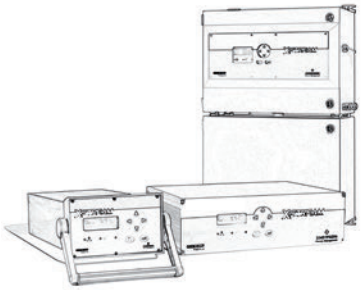
WARNING

HAZARDS FROM MISSING INFORMATION

Compare the contents of your package with the pictures below.

Analyzers for hazardous areas need additional parts, described in the accompanying documentation refering to hazardous area installations.

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

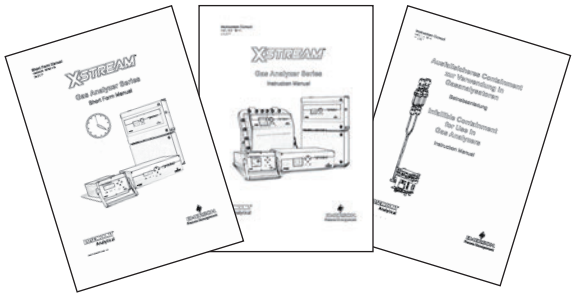


Analyzer

USB stick

external power supply with DC power cable (X2GK, option)

Trace oxygen cell (if applicable)



Manuals, some of which either as paper or electronic version on USB stick:

- this short form manual
- X-STREAM X2 series manual
- infallible containment instruction manual (if applicable to your instrument)

Fig. 2-1: *X-STREAM X2 Analyzers - scope of supply*

2.2 Introduction

WARNING

DANGER OF ELECTROCUTION

Before connecting the analyzer to mains power, please read the chapter on safety warnings and the following instructions carefully.

The place of installation must be clean, dry and protected against strong vibrations and frost. Please observe the admissable operating temperatures given in the technical data.

Units must not be subjected to direct sunlight or sources of heat.

For outdoor installation it is recommended to install the unit in a cabinet. It should at least be protected against rainfall.

In order to comply with regulations on electromagnetic compatibility, it is recommended to use only shielded cables which can be supplied by Emerson Process Management. The customer must ensure that the shielding is correctly connected to the signal cable plug housing. Submin-d plugs and sockets must be screwed to the analyzer.

The use of external submin-d to screw-type terminal adapters affects electromagnetic compatibility. In such a case the customer must take appropriate measures to comply with the regulations, and must declare conformity when this is legally required (e.g. European EMC guidelines).

2.3 Technical Data

Before intending to start to install the analyzer, verify the site of installation meets the specifications, given in the following sections!

2.3.1 Common Technical Data

Site of installation	
Humidity (non-condensing)	< 90 % RH at +20 °C (68 °F) < 70 % RH at +40 °C (104 °F)
Degree of pollution	2
Installation category	II
Elevation	0 to 2000 m (6560 ft) above sea level
Ambient atmosphere	Units may not be operated in corrosive, flammable or explosive environments without additional safety measures.
Analyzer Certifications	
Electrical safety	
CAN / USA C US 185562	CSA-C/US, based on CAN/CSA-C22.2 No. 61010-1-04 / UL 61010-1, 2nd edition
Europe CE	CE, based on EN 61010-1
Electromagnetic compatibility	
Europe	CE, based on EN 61326
Australia	C-Tick
others	NAMUR

2.3 Installation - Technical Data

2.3.2 Specific Technical Data

	X2GK		X2GP	X2XF
Temperatures				
operational	0…+50 °C 32…122 °F			0 (-20)…+50 °C 32 (-4)…122 °F
storage	-20…+70 °C -4…-158 °F			-20…+70 °C -4…158 °F
Weight, max	8…12 kg 17.6…26.5 lb		12…16 kg 26.5…35.3 lb	XLF: 25 kg / 55.1 lb XXF: 45 kg / 99.2 lb
IP or Type rating	IP 20 indoor use, protected against dripping water and direct sun light			IP 66 / Type 4X outdoor use , protected against direct sun light
Gas connections				
max number	8			
max for purging (separate / incl.)	2 incl.		1 separate, 1 incl.	1 separate, 1 incl.
material	PVDF; stainless steel (opt.)			stainless steel
sizes	6/4 mm; ¼"			
Power supply unit	external (option)	wide range, internal		
Power supply				
nominal voltage	24 V⎓	100–240 V~ 50 / 60 Hz		
voltage range	10… 30 V⎓	85–264 V~ 47–63 Hz		
nominal input current				
standard, max	2.5 A	1.3–0.7 A	1.3–0.7 A	XLF: 1.3–0.7 A XXF: 1.5–0.8 A
w/ temperature control, max	n.a.		3–1.5 A	XLF: 3–1.5 A XXF: 5.5–3 A
Power input fuses	AC 230 V T 3.15 A 5x20 mm	AC 230 V T 4 A 5x20 mm	AC 230 V T 4 A 5x20 mm	AC 230 V T 6.3 A 5x20 mm

2.4 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_2 interference or for enhanced safety when measuring corrosive or poisonous gases)

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

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

Open reference option

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

This nitrogen

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

If such gas is not available, the substitute

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

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

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

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

2.4 Installation - Gas Preparation

WARNING

TOXIC GAS HAZARDS

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

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

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

CAUTION

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

Max. admissable pressure: 1500 hPa!

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

The number of gas connections and their configration may vary according to analyzer version and installed options.

All gas connectors are labelled and can be found on the

- analyzer’s rear panel (X-STREAM X2GP, X-STREAM X2GK)
- underside of the analyzer (X-STREAM field housings)

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

	IN	OUT
1	SAMPLE	SAMPLE
2		
3		
4		PURGE GAS

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

2.4 Installation - Gas Preparation

The analyzer should be mounted close to the sample gas source to minimize transport time. A sample gas pump can be used to reduce the reaction time; this requires that the analyzer be operated in bypass mode or fitted with a pressure control valve to protect against excessive gas flow and pressure (Fig 1-2).

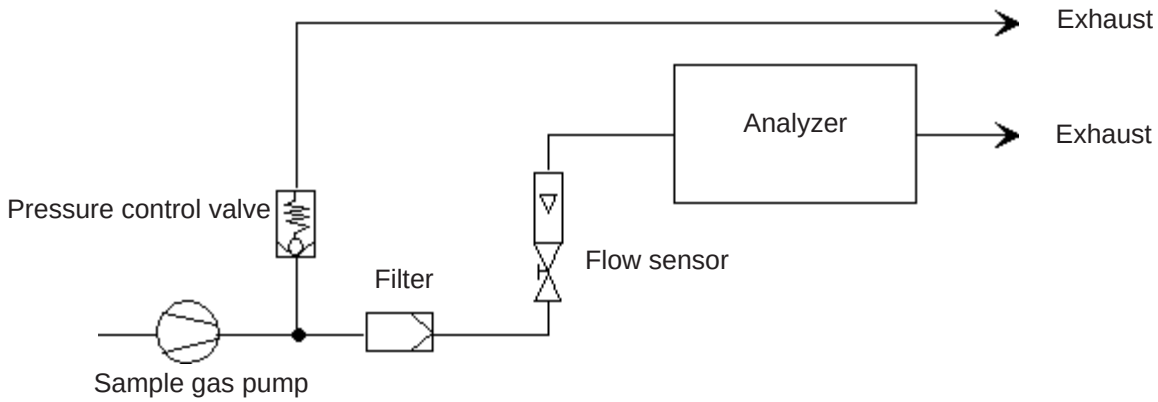


Fig. 2-3: *Installation in bypass mode*

2.5 Electrical Connections

WARNING

ELECTRICAL SHOCK HAZARD

Only qualified personnel, observing all applicable technical and legal requirements, may install these devices and connect power and signal cables.

Failure to comply may render the guarantee void and cause exposure to risk of damage, injury or death.

The devices may only be installed by personnel who are aware of the possible risks. Working on units with screw-type terminals for electrical connections may require exposure to energized components.

Wall-mounted X-STREAM analyzers are not fitted with power switches and are operational as soon as they are connected to a power supply.

For these analyzers a switch or circuit breaker (IEC 60947-1/-3) must be installed on the premises. The switch or breaker must be located near the analyzer, easily accessible and labelled as a power supply cut-off for the analyzer.

Units with screw-type terminals must be de-energized by unplugging it or operating the separate cut-off switch or circuit breaker when working on the power connections.

To avoid the risk of electrocution, all units must be earthed. For this reason, the power cable with a protective earth wire must be used.

Any break in the earth wire inside or outside the unit may cause exposure to the risk of electrocution and is therefore prohibited.

2.6 Detailed Instructions for Installation

Important note for X-STREAM X2FD!

*Due to the special conditions which must be observed when installing units in EX zones, the installation of the flameproof **X-STREAM X2FD** version is described in a separate **instruction manual HASXMDE-IM-EX**.*

Even if you do not install your X-STREAM X2FD in an EX zone, refer to this separate manual for installation instructions.

Important note for analyzers measuring traces of oxygen!

The electrochemical sensor used for this measurement is a consumable. Remaining lifetime counts down when the sensor is in contact with oxygen.

For above reasons, concerned analyzers are shipped with the sensor as extra item in a sealed bag!

The sensor must be installed before analyzer startup, according the instructions shipped with the sensor!

Installation instructions: X-STREAM X2GK, X2GP ☞ page 2-10

X-STREAM X2XF Field housings ☞ page 2-15

Notes for wiring signal inputs and outputs ☞ page 2-23

2.6 Installation - X-STREAM X2GK, X-STREAM X2GP

2.6.1 X-STREAM X2GK, X-STREAM X2GP

Plugs and sockets required for the electrical connections are on the rear panel of the units (Fig. 2-4 & Fig. 2-5).

X-STREAM X2GP analyzers provide an internal wide range power supply for worldwide use.

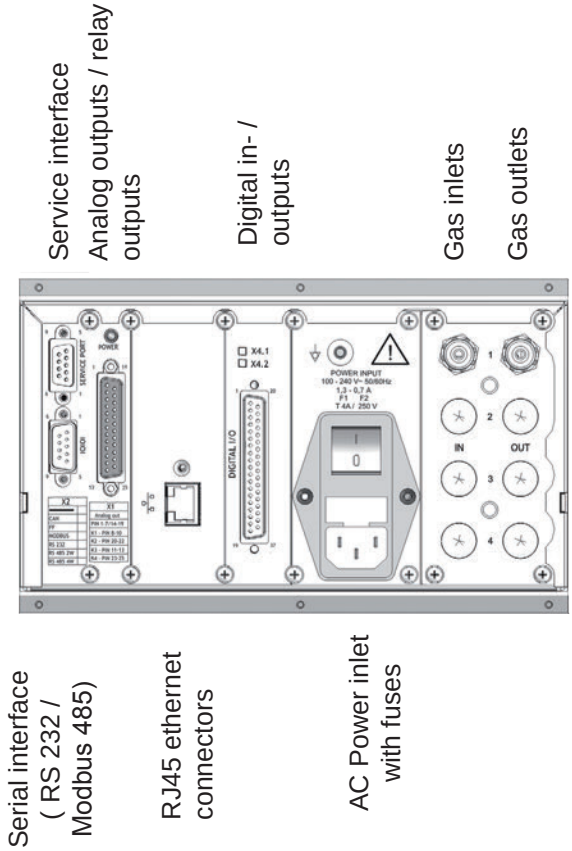
X-STREAM X2GK analyzers are powered by an internal wide range power supply for worldwide use, or by an external DC 24 V power supply unit, optionally supplied with the unit.

If an external PSU is not included in delivery, another unit can be used instead, provided it conforms to the specifications given by the X-STREAM X2 instruction manual.

X-STREAM X2GK / X2GP analyzers should be operated in a horizontal position.

Six screws at the front panel enable to install X2GK models into a rack. The external PSU is optionally available for rack mounting, too.

X2GP can be installed into a rack by adding two optional brackets to the left and right hand side of the instrument.



CAUTION

HAZARD BY RACK INSTALLATION

The front panel and its screws are not designed to carry the weight of the instrument!

Support the instrument, when installed into a rack!

Disregarding may cause personal injury and damaged equipment.

Alternative DC Power inlet and separate fuse

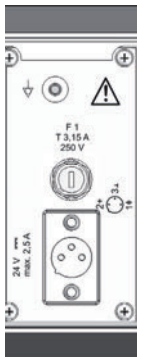


Fig. 2-4: *X-STREAM X2GK - rear panel*

2.6 Installation - X-STREAM X2GK, X-STREAM X2GP

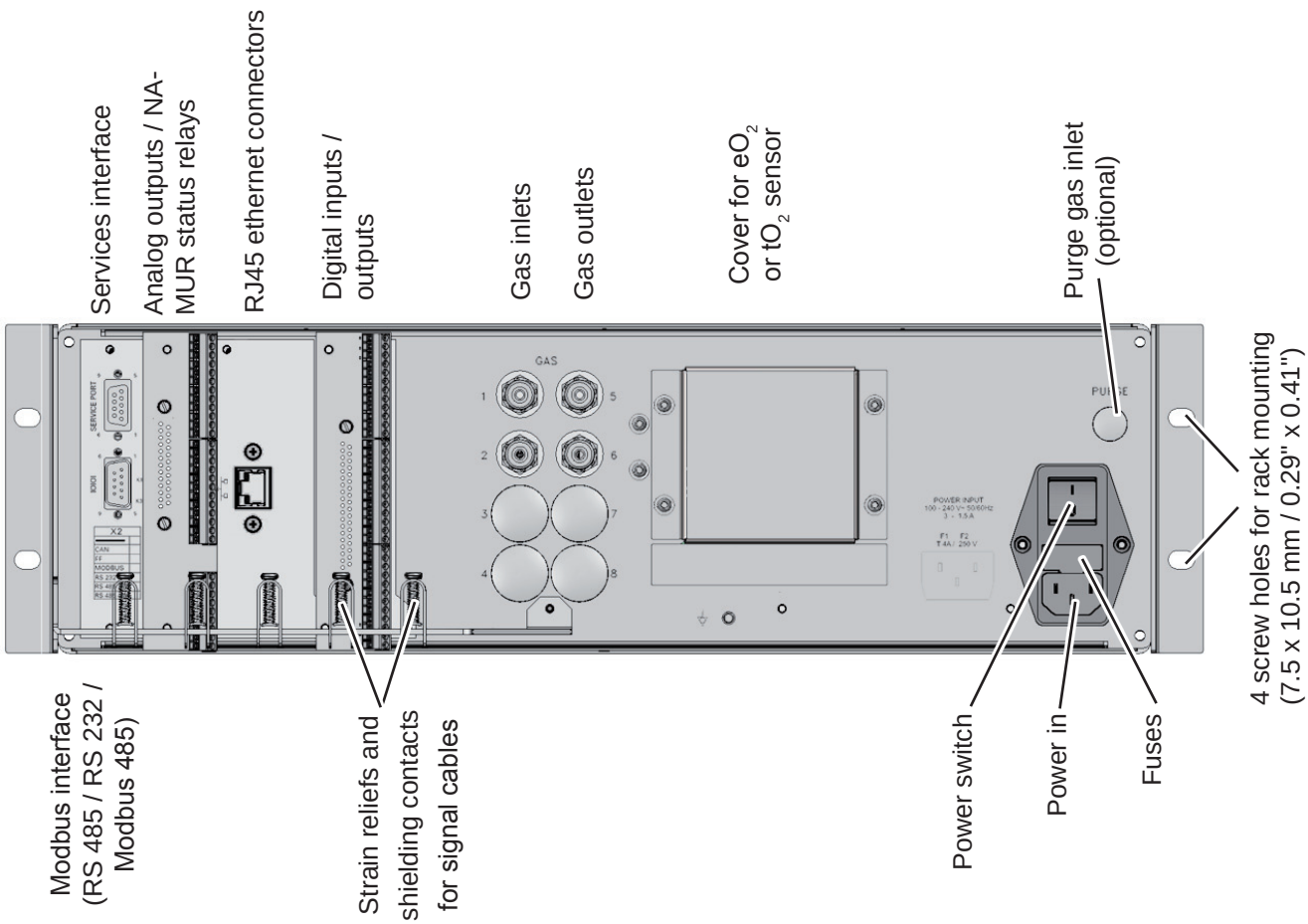


Fig. 2-5: *X-STREAM X2GP - rear panel, shown with options*

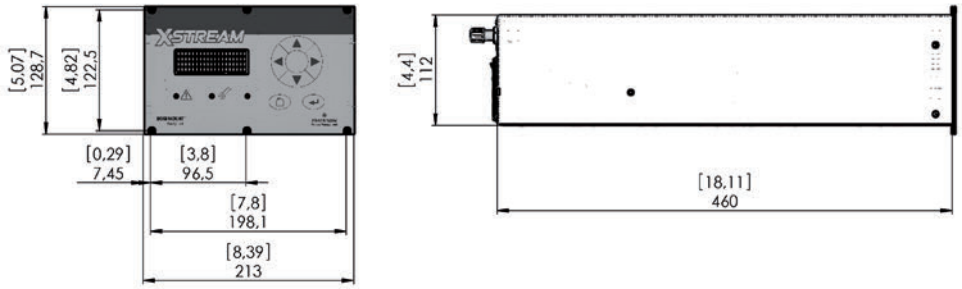
The number and configration of the gas inlets and outlets vary from model to model and are indicated on the notice on the rear of the instrument.

To simplify installation, we recommend labelling the gas lines as in the Figres above (In1, Out1, …, In4, Out4 or 1, 2, … 7, 8) .This avoids confusion in case the analyzer ever has to be disconnected.

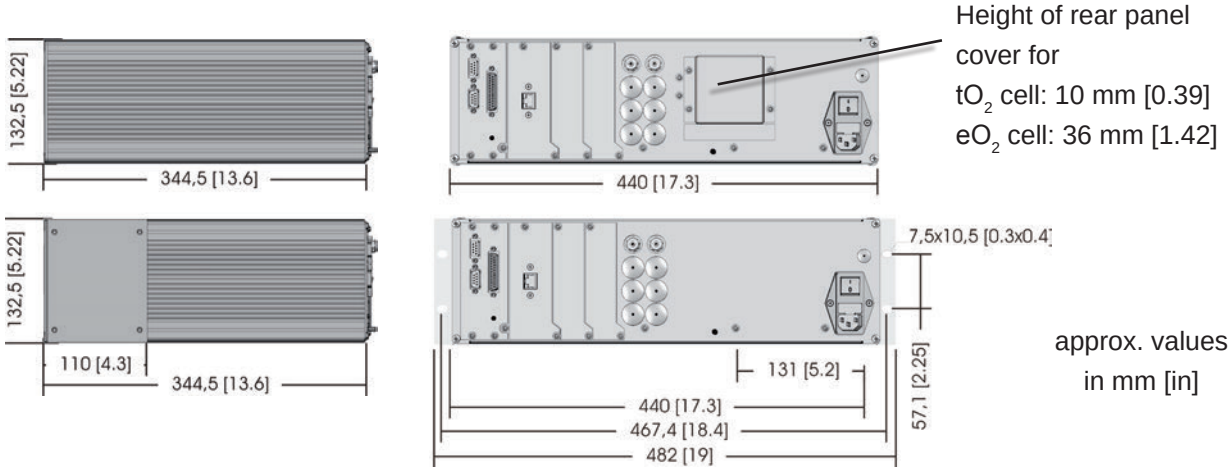
	X2GK	**X2GP**
Gas connections		
max number	8	8
max for purging (incl. / separate)	2 incl.	1 incl. & 1 separate
material	PVDF; stainless steel (opt.)	
sizes	6/4 mm; ¼"	

2.6 Installation - X-STREAM X2GK, X-STREAM X2GP

X2GK



X2GP



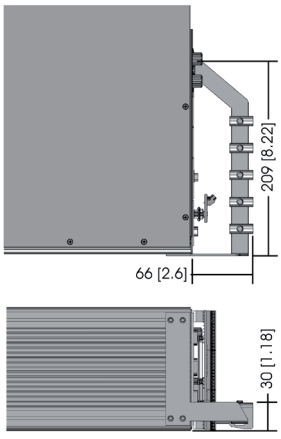
CAUTION

HAZARD BY RACK INSTALLATION

The front panel and its screws are not designed to carry the weight of the instrument!

Support the instrument, when installed into a rack!

Disregarding may cause personal injury and damaged equipment.



Strain relief bracket, detail
(model with clamping adapters)

Fig. 2-6: *X-STREAM X2GK & X2GP - dimensions*

2.6 Installation - X-STREAM X2GK, X-STREAM X2GP

Signal inputs and outputs (basic configuration)

The number of signal outputs actually available varies according to the unit's configuration.

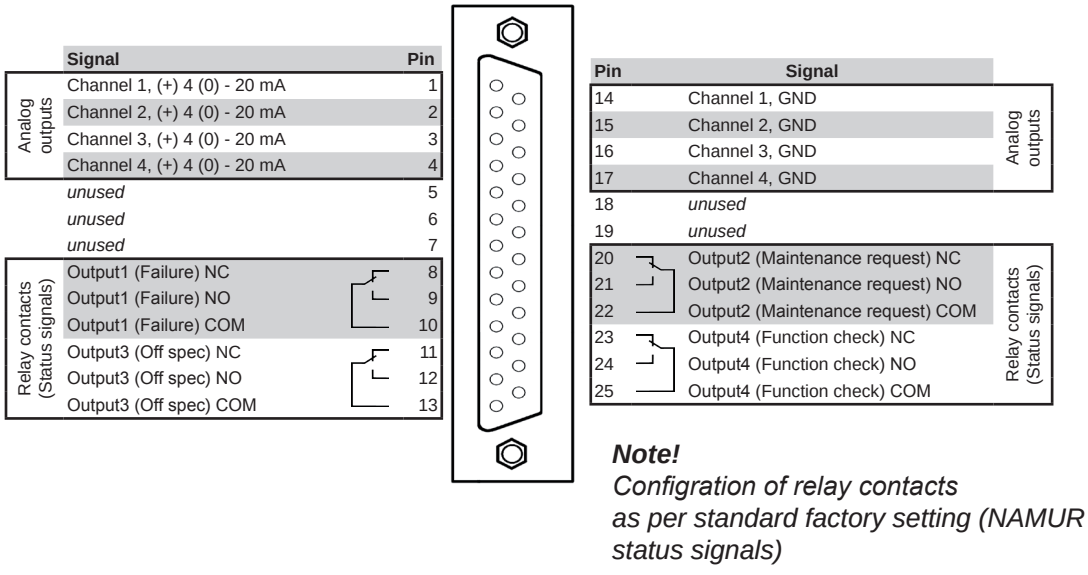
Analog signals
Relay outputs

Analog signals and relay outputs are located on a shared 25-pin submin socket X1, or on an optional terminals adaptor XSTA (☞ page 2-20; not for X2GK).

Specification of analog signal outputs:	4(0)–20 mA; burden: $R_B \leq 500\ \Omega$
Specification of relay outputs 1–4:	Dry relay change-over contacts can be used as NO or NC.
Electrical specification:	max. 30 VDC, 1 A, 30 W

Note!

- *Consider the installation notes in section 2.7.*
- *Technical data and installation information for further available interfaces are given in the X-STREAM X2 instruction manual. Connector layouts are part of the appendix of this manual.*



Note!
Configration of relay contacts as per standard factory setting (NAMUR status signals)

Fig. 2-7: *Socket X1 - Analog Outputs & Digital Outputs 1-4*

2.6 Installation - X-STREAM X2GK, X-STREAM X2GP

Power supply

X-STREAM X2GK and X2GP

AC power is supplied to the unit by means of a three-pin IEC connector on the rear panel of the instrument.

Optional DC Supply for X-STREAM X2GK

24 VDC is supplied to the unit by means of a three-pin XLR connector on the rear panel of the instrument.

Depending on the order, the following is supplied as an accessory: either

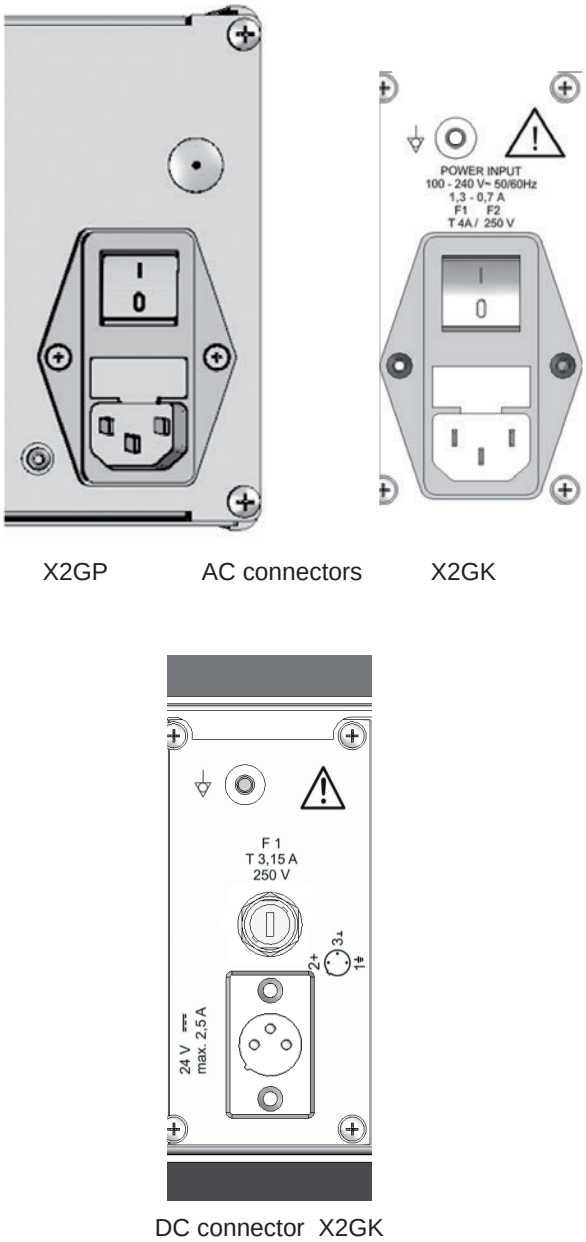
- an external power supply unit which can be connected directly to the analyzer using the supplied cable

or

- a connector which can be used with a cable and PSU as specified by the customer.

Note the configuration of the connector´s pins (☞ Fig. 2-8).

Details of any PSUs supplied with the unit are given by the X-STREAM instruction manual.



X2GP AC connectors X2GK

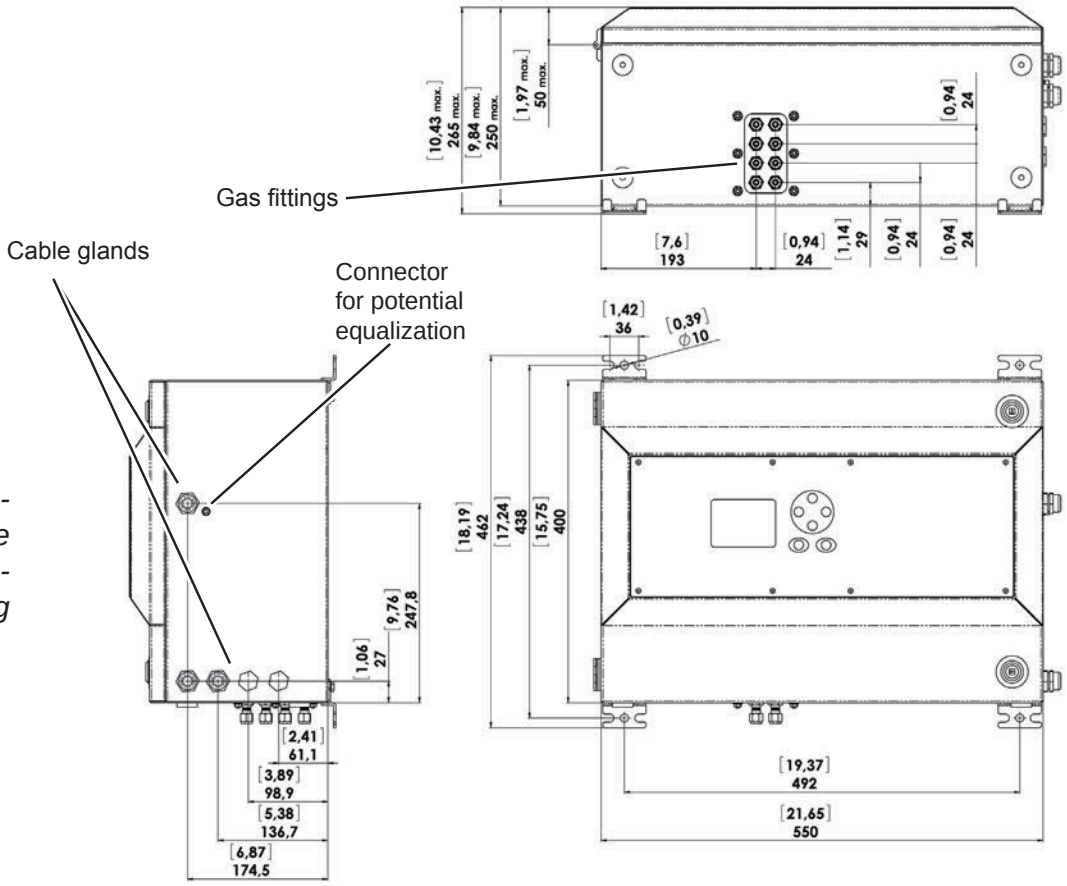
DC connector X2GK

Fig. 2-8: *Power supply connectors*

2.6 Installation - X-STREAM X2XF Field Housings

2.6.2 X-STREAM X2XF

Fitted with four eyebolts and featuring IP66/ Type 4X protection, the X-STREAM XE field housing can be mounted in the open air on a wall or frame with no extra work.



Note!
Take care to reserve space at the right side of the instrument for laying the cables!

All dimensions in mm
[inches in brackets]

Fig. 2-9: *X-STREAM XLF - dimensions for installation*

CAUTION

HEAVY INSTRUMENT

X-STREAM field housings, intended to be wall mounted or outdoor installed, weigh up to 45 kg (99 lbs), depending on the chosen options!

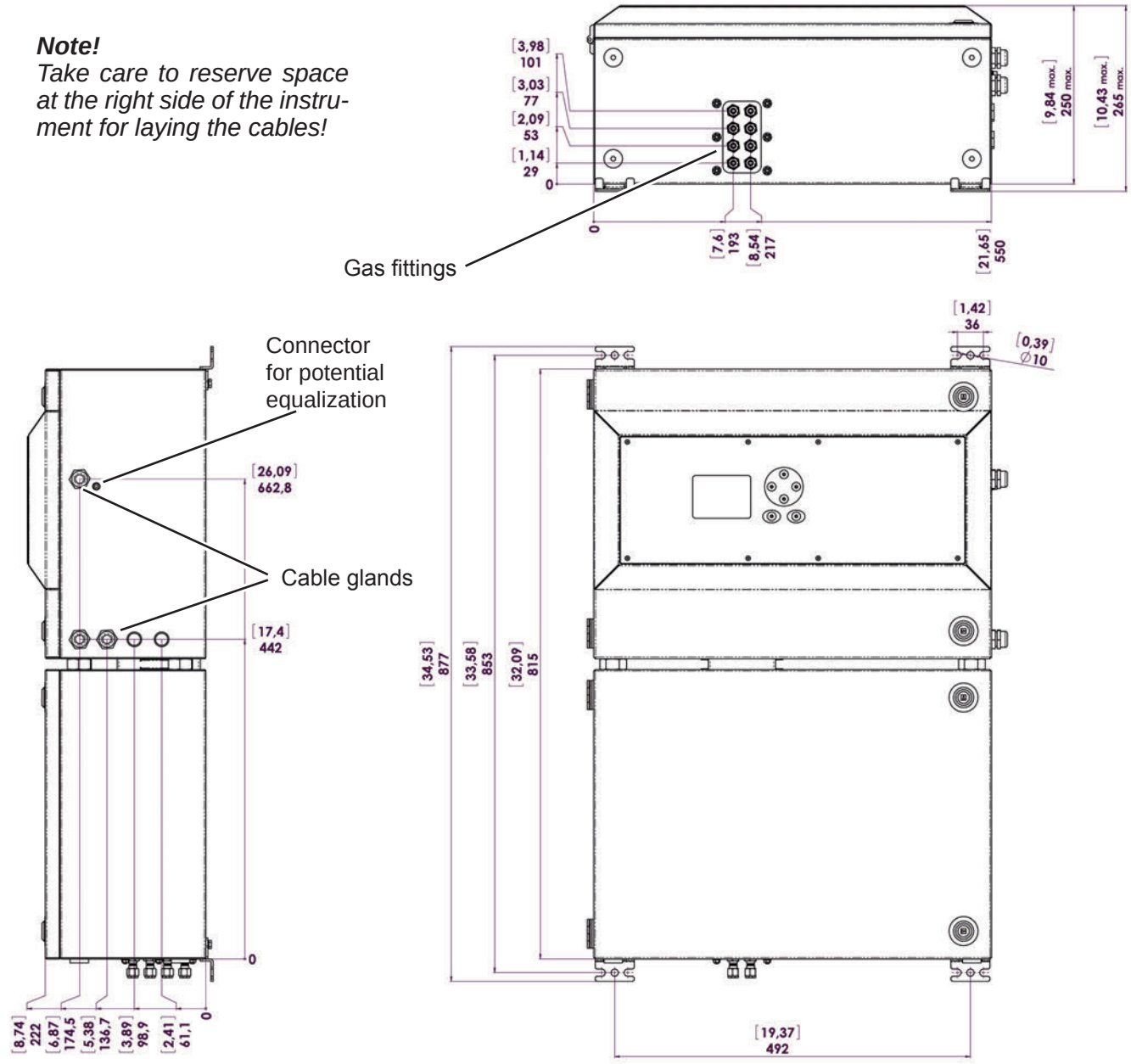
Use two persons and/or suitable tools for transportation and lifting these instruments!

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

Assure that the wall / device for installation is sufficiently attached and stable to carry the instrument!

2.6 Installation - X-STREAM X2XF Field Housings

Note!
Take care to reserve space at the right side of the instrument for laying the cables!



All dimensions in mm
[inches in brackets]

Fig. 2-10: *X-STREAM XXF - dimensions for installation*

2.6 Installation - X-STREAM X2XF Field Housings

Power and signal cables are connected using internal screw-type terminals. This requires opening the unit, which in turn requires releasing the fasteners on the housing.

Gas connectors are accessible from the outside, on the underside of the instrument.

The number and configration of the gas inlets and outlets depends on the analytical application, and is noted on a sticker on the underside of the instrument next to the connectors.

Note on XXF!
Differing from single compartment XLF,

- *the electrical connections are established in the **upper compartment**,*
- *the gas connection fittings are at the **lower compartment**.*

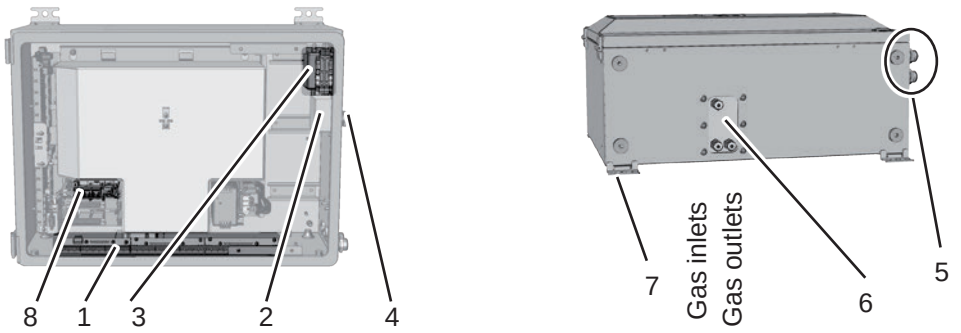
To simplify installation, we recommend labelling the gas lines in accordance with these markings. This avoids confusion should the analyzer need to be disconnected for maintenance.

CAUTION

GASKETS AT LOW TEMPERATURES

Consider that enclosure gaskets may be frozen when the instrument is installed outdoors. Carefully open the enclosure at temperatures below -10 °C to not damage the gaskets.

Damaged gaskets void the ingress protection, possibly causing property damage, personal injury or death.



1 Terminals for signal cables
2 Mains filter
3 Power connections with integrated fuses
4 Glands for power cable
5 Glands for signal cables
6 Gas inlets and outlets
7 Plugs for openings to connect housings
8 Ethernet connectors (optional)

Fig. 2-11: *X-STREAM X2XF Field housing - terminals, cable glands and gas connectors*

2.6 Installation - X-STREAM X2XF Field Housings

Gas connections

Gas connections	
max number	8
max for purging (incl. / separate)	2 incl.
material	PVDF; stainless steel (opt.)
sizes	6/4 mm; ¼"

Signal in- and outputs

Preparation of signal cables

All signal cables are connected to screw-type terminals located inside the housing. Access to the internal components is gained by releasing the two fasteners at the top of the unit and opening the front panel downwards.

All cables must be fed through cable glands and secured with a gland nut.

Properly installed, the glands act as a strain relief and guarantee EMC (electromagnetic compatibility):

Installing cable glands with shielded cables

1. Strip the cable
2. Expose braided shield

3. Feed cable through dome nut and clamping insert
4. Fold braided shield over clamping insert
5. Make sure that braided shield overlaps the O-ring by 2 mm (3⁄32“)

6. Push clamping insert into body and tighten dome nut
7. Assemble into housing and you´re done!

2.6 Installation - X-STREAM X2XF Field Housings

WARNING

ELECTRICAL SHOCK HAZARD

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

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

Verify the power cord is layed with a distance of at least 1 cm (0.4 in) to any signal cable to ensure proper insulation from signal circuits!

The number of actually available signal outputs, and also the number of built-in modules with screw-type terminals, varies according to the configration of the unit.

A maximum of three modules with 36 terminals each can be fitted.

The terminals can be accessed by opening the front panel of the instrument.

Characteristics of terminals:

Accepted wire gauge:	0.14…1.5 mm^2 (AWG 26…AWG 16), end sleeves not required
Skinning length:	5 mm (0.2")
Thread:	M2
Min. tightening torque:	0.25 Nm (2.21 in.lb)

2.6 Installation - X-STREAM X2XF Field Housings

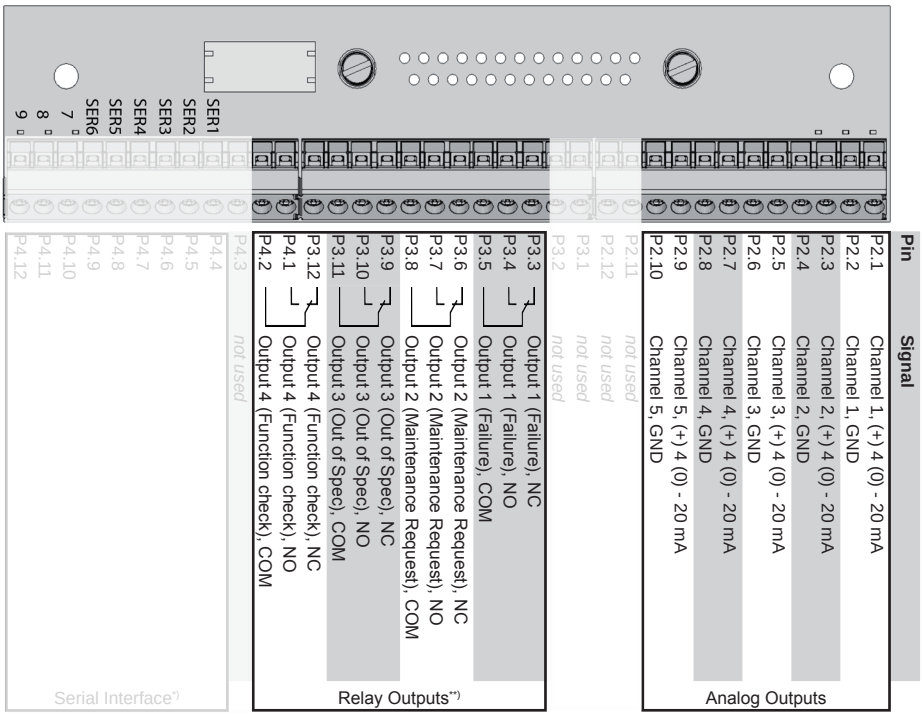
Analog signals
Relay outputs 1-4

Terminals for analog signals and relay outputs 1 - 4 are located on the outer left module (terminal block X1).

Specification of analog signal outputs:	4 (0) – 20 mA; burden: $R_B \leq 500\ \Omega$
Specification of relay outputs:	Dry relay change-over contacts can be used as NO or NC.
Electrical specification:	max. 30 VDC, 1 A, 30 W

Notes!

- *Consider*
  - *the installation notes in section 2.7*
  - *the notes on installing cable glands on ☞ page 2-18.*
- *Technical data and installation information for further available interfaces are given in the X-STREAM X2 instruction manual. Connector layouts are part of the appendix of this manual.*



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

Fig. 2-12: *Terminal block X1 - Analog Outputs & Digital Outputs 1-4 (XSTA)*

2.6 Installation - X-STREAM X2XF Field Housings

Connecting the power cord

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

Accepted wire gauge:	0.2…4 mm² (AWG 24…AWG 12)
Recommended wire gauge	min. 1.5 mm² (AWG 15), end sleeves not required
Skinning length:	8 mm (0.315")
Thread:	M3
Min. tightening torque:	0.5 Nm (4.4 in.lb)

WARNING

ELECTRICAL SHOCK HAZARD

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

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

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

Feed the power cable through the cable gland at the instrument´s right side and strip the outer insulation. Strip the individual wires and connect to the terminals (a label is located next to the terminals on the mains filter housing).

Finally, tighten the outer dome nut to secure the power cable.

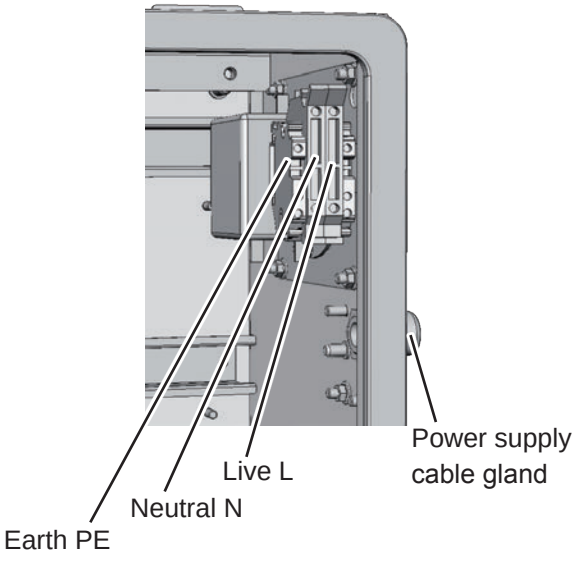


Fig. 2-13: *Power supply connections*

2.6 Installation - X-STREAM X2XF Field Housings

WARNING

ELECTRICAL SHOCK HAZARD

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

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

When all connections are correctly made and checked,

- close the front panel and secure with the two fasteners.

2.7 Notes On Wiring Signal Inputs and Outputs

Emerson Process Managament has made every effort during the development process to ensure that the X-STREAM analyzer series ensures electromagnetic compatibility (EMC) with respect to emission and interference resistance, as confirmed by EMC measurements.

However, EMC is not wholly influenced by the design of the instrument, but to a large degree by the on-site installation process. Please observe the following sections and precautions to guarantee the safe and problem-free operation of this analyzer.

2.7.1 Electrical shielding of cables

In order to minimise ambient electromagnetic interference, it is necessary to take care making all electrical connections between the analyzer and any other devices:

We recommend using only shielded signal cables. The shielding must be connected at both ends to the housing (Fig. 2-14).

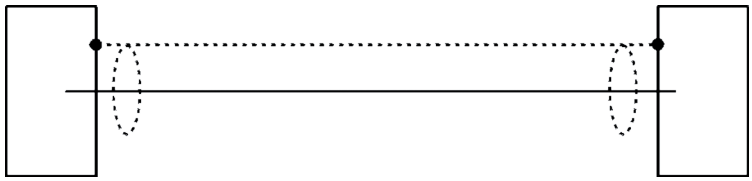


Fig. 2-14: *Shielded signal cable, shielding connected at both ends.*

On-site conditions often differ from test environments and may require special precautions. Such a case arises when strong electromagnetic fields which could induce an interference current in the shielding. This type of current creates a potential difference between the connected housings.

Two possible methods of eliminating this are described here. Fitters familiar with EMC problems must decide which method should be emplyed.

- The shielding is connected only at one end (connecting to the analyzer is recommended): this gives better protection against external interference, and interference currents are prevented because the ground loop is interrupted.

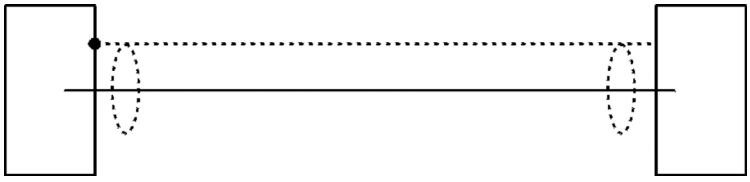


Fig. 2-15: *Shielded signal cable, shielding connected at one end.*

2.7 Installation - Notes on Wiring

- Cables with double shielding are used: in this case, one shielding is connected to the analyzer housing, the other shielding to the external device. This is advantageous when both units are supplied from different grids (e.g. when installed in different buildings).

This method is more expensive, but gives the best protection against external interference and against interference currents.

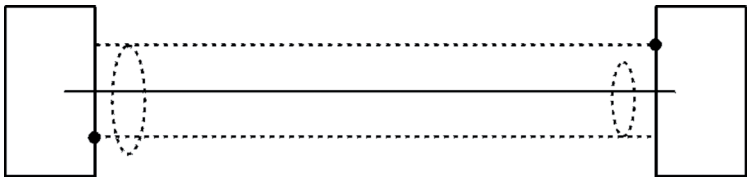


Fig. 2-16: *Signal cable with double shielding, shieldings connected at alternate ends.*

X-STREAM X2GP with XSTA or XSTD terminal adapters

In order to avoid measured values being influenced by external interference signals when terminal adapters are in use, the signal cable shieldings must be connected to the analyzer housing by means of shield connector terminals:

- uncover the signal cable shielding to a length of 20 cm (8 in),
- pull up the contact part of the shield connector terminal,
- feed through the cable as illustrated in Fig 2-17,
- bring down the contact part onto the shielding.

This results in a secure contact with the cable shielding and improves the unit's interference resistance.

The individual wires are then connected as described in seciton 2.6.

Fig. 2-17: *Shield connector terminal with cable*

The shield connector must be properly ordered to fit the cable diameter, and can be retrofitted:

Ø 1.5 - 6.5 mm: part # ETC02019
Ø 5 - 11 mm: part # ETC02020
Ø 10 - 17 mm: part # ETC02021
Ø 16 - 24 mm: part # ETC02022

2.7 Installation - Notes on Wiring

2.7.2 Wiring inductive loads

Switching inductive loads creates electromagnetic interference:

When an inductive load (e.g. relay, valve) is switched off, the magnetic field resists the change in current; this induces a high voltage across the coil contacts (several hundred volts). This impulse propogates through the connected cables and can influence any electrical devices nearby or destroy signal inputs and outputs. This can be avoided with a simple precaution:

- A silicon diode is connected in parallel to the load's contacts. The induced impulse is thus short-circuited at its source. The cathode must be connected to the positive end of the coil, the anode to the negative end (Fig 2-18).

Compatible filter components for standard valves are available on request.

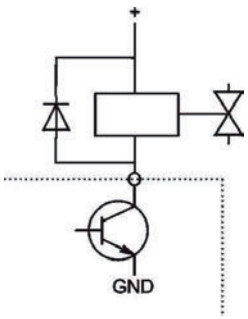


Fig. 2-18: *Suppressor diode for inductive loads.*

2.7.3 Driving high-current loads

Loads which draw a current in excess of the specifications for X-STREAM series analyzer outputs (>30 mA / >1 A) may not be directly driven from digital or relay outputs.

Such loads require external relays serving as de-coupling modules: the X-STREAM output drives the external relay, which in turn drives the load.

In order to avoid interference, we recommend supplying the analyzer and the high-current loads from different sources (Fig 2-18).

As previously described, the use of suppressor diodes for inductive loads is highly recommended.

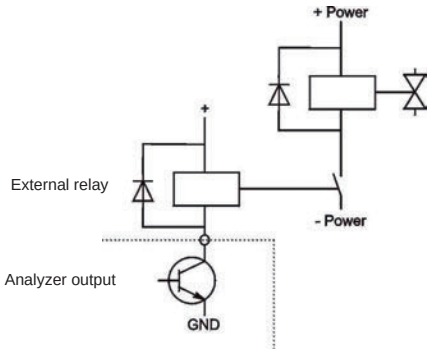


Fig. 2-19: *Driving high-current loads*

2.7 Installation - Notes on Wiring

2.7.4 Driving multiple loads

Frequently, several loads in one system are controlled by several analyzer outputs, whereby the power for the loads derives from a common source.

Special care is needed when wiring the loads to minimize interference from switching these loads:

- **avoid** connecting the loads in series:

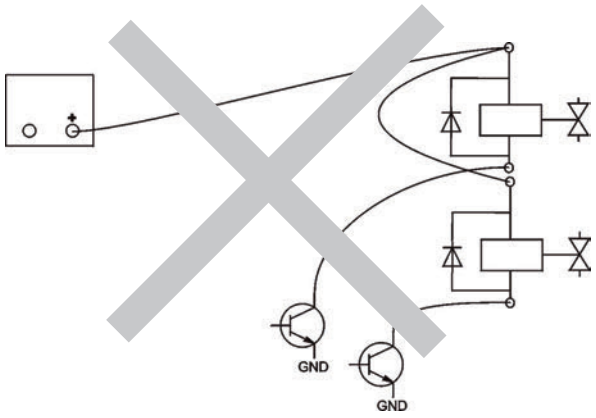


Fig. 2-20: *Loads in series*

- **It is recommended** to wire the loads in parallel, and to separately connect each load to the power supply: Beginning at the distribution point, lay both the + and the - wires for each load together to the load (Fig. 2-21). Interference is further reduced if a twisted multi-core cable is used.

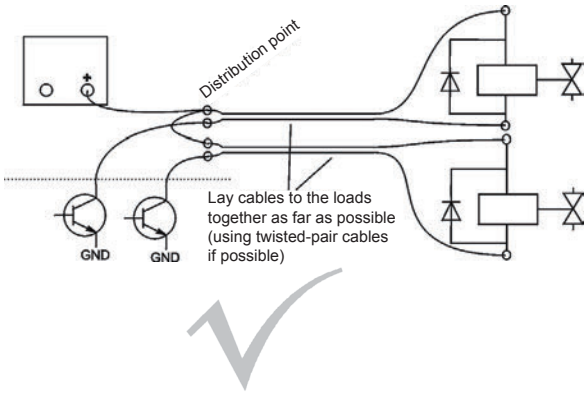


Fig. 2-21: *Loads in parallel*

Chapter 3
Startup

Once the unit has been unpacked and installed, it is recommended to make some adjustments (e.g. select the language) and to perform some basic procedures (leak test and calibrations).

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

For more detailled information on the topics described in this chapter, read chapter 5 of the X-STREAM X2 instruction manual.

CAUTION

OPERATION AT LOW TEMPERATURES

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

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

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

The USB-Stick shipped with your analyzer contains important analyzer specific data in the subfolder "Analyzer Documentation"!

To protect against data loss,

- **print out and store in a safe place all the files**

or

- **copy the subfolder to another data storage medium!**

3.1 Performing a Leak Test

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

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

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

Note!

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

Required tools

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

Procedure

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

WARNING

HAZARD FROM GASES

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

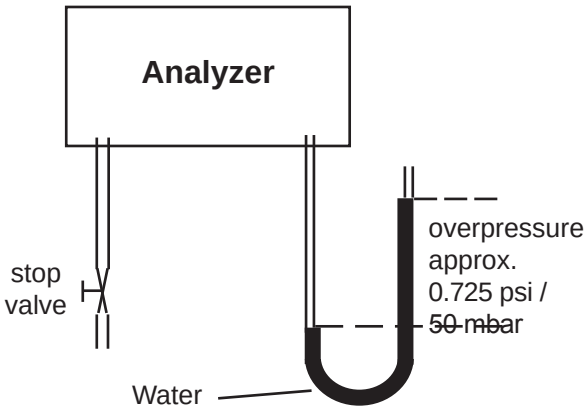


Fig. 3-1: *Leak Testing with U-turn Manometer*

Max. pressure 7.25 psig (500 mbar)!

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

3.2 The User Interface

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

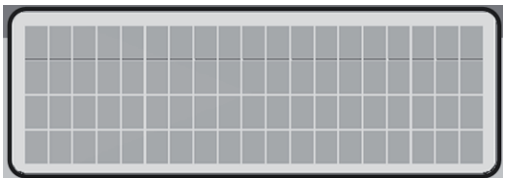
Units are operated using six keys on the front panel.

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

Fig. 3-2: *X-STREAM front panel*

3.2 The User Interface

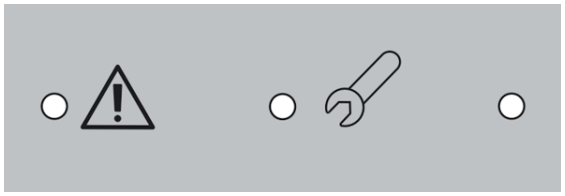
3.2.1 Display



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

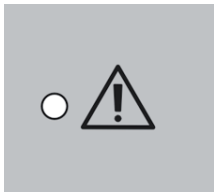
What information is displayed depends on the currently displayed menu.

3.2.2 Status LED

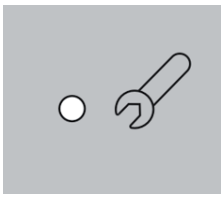


Three status LED indicate the unit's status, recognisable from a distance.

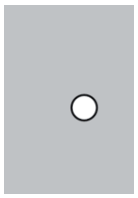
Status is indicated in accordance with the German NAMUR NE 44 recommendations.



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



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

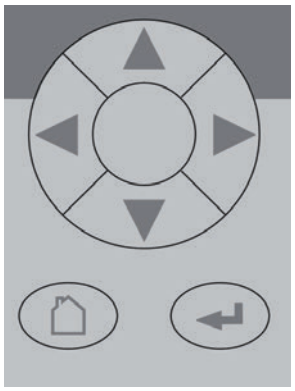


The third, green LED indicates the power supply status:

on: power supply OK

off: power supply interrupted

3.2.3 Keys



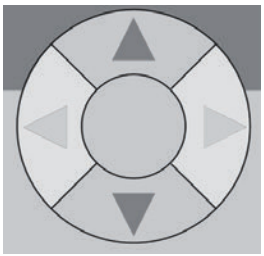
Six keys enable the use of the menu system. Depending on the operational mode (measuring, browsing menus, editing) they have the following functions:

ENTER key:

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

MEASURE key:

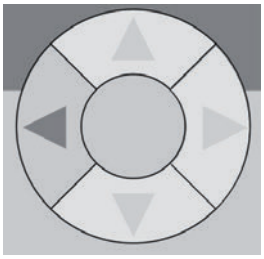
Mode	***Function***
Measuring	*(no function)*
Browsing	Returns to measurement display
Editing	Cancels entry



UP / DOWN keys:

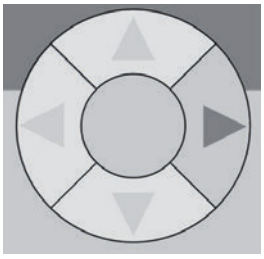
Mode	***Function***
Measuring	Leaves the measurement display
Browsing	Selects menu line
	Goes to previous/next page, when currently in a line beginning with ▲/▼
Editing	Changes current parameter

3.2 The User Interface



LEFT key:

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



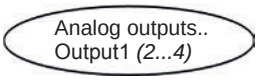
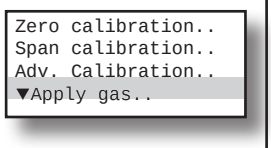
RIGHT key:

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

3.3 Symbols Used

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

Symbols and conventions used in the following sections

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

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

3.4 Software

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

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

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

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

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

3.4.1 Navigating and Editing

Selecting a line

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

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

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

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

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

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

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

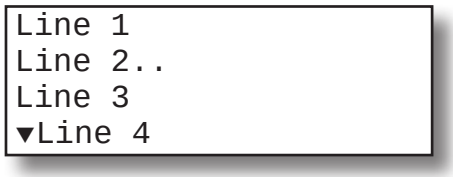
The status can be reset by acknowledging it in the “Acknowledgements” menu.

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

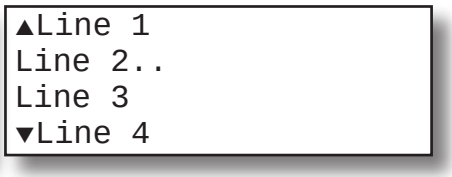
Browsing

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

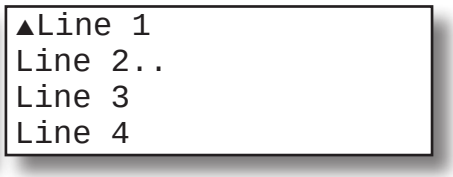
To show the following page, the cursor is placed in the line with the indicator and the UP or DOWN key pressed. Alternatively, the LEFT or RIGHT key can be used, irrespective of where the cursor is located.



Menu continues downwards..



Menu continues upwards and downwards..



Menu continues upwards.

Editing

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

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

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

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

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

There are two ways to leave editing mode:

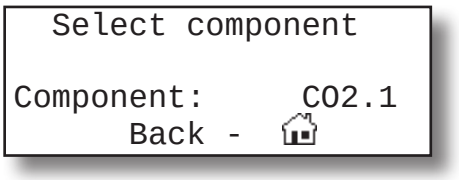
↵ key: the value is verified (e.g. min/max). If the value is possible, it is saved and the new value displayed; if not, an error message is displayed.

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

Component selection menu

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

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



3.4.2 Access Levels

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

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

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

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

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

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

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

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

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

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

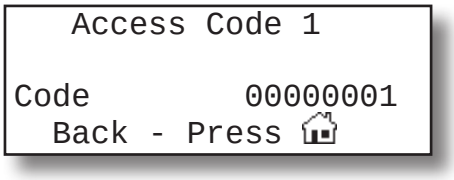
Note!

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

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

Entering access codes

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



Use

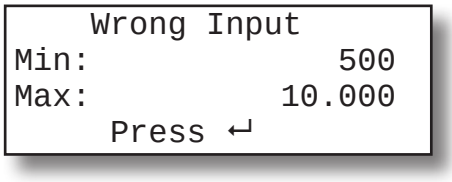
- the UP/DOWN keys to change the currently selected digit,
- the LEFT/RIGHT keys to select a different digit,
- the ENTER key to submit the code

or

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

3.4.3 Special Messages

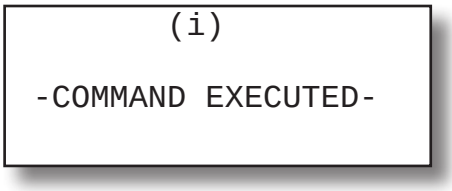
Depending on the last action performed by the user, one of the following messages may be displayed to assist or inform the user (the two confirmation messages are displayed only for a few seconds):



Information on incorrect entry:

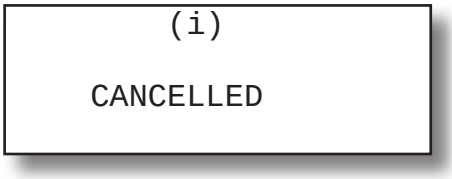
The value entered by the user is outside valid limits. The display indicates what limits apply.

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



Confirmation of execution of command:

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



Confirmation of cancellation:

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

3.5 Powering Up

3.5.1 Boot Sequence

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

3.5.2 Measurement Display

The measurement display is shown

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

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

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

The factory settings are as follows:

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

Note!

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

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

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

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

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

Note!

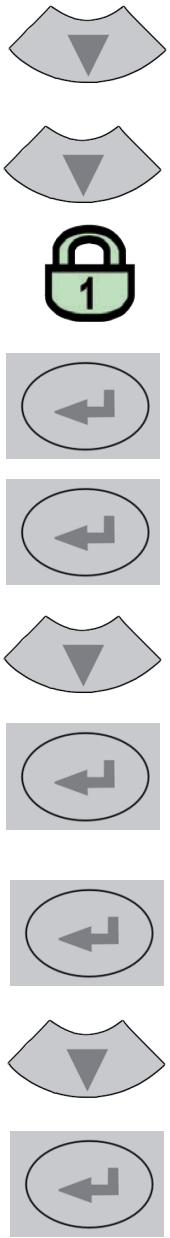
There are also functions, that do activate a relay or LED, but are not shown on the display (e.g. concentration alarms). In such cases, check the status menu for more information.

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

MEASUREMENT DISPLAY

3.6 Selecting the Language

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



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

Note!

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

Note!

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

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

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

3.7 Calibrating the Analyzer

Note!

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

Also a zero calibration must always precede a span calibration!

Zero calibration

Nitrogen (N2) or any other suitable neutral gas is supplied to the gas path. The concentration of the component of interest is declared to be "zero" and so the measured signal during zero calibrations is declared to be 0.

Span calibration

Span gases with concentrations of 80 % to 110 % of the upper measuring range limit is supplied to the gas path (lower concentrations are acceptable, but influence accuracy of measurements if later sample gas concentrations are higher). The contained concentration of the component of interest is setup as set point, and the measured value during span calibration is then declared to correspond to that concentration.

Note!

If the current concentration is known, ambient air may be used to span calibrate %-Oxygen channels.

X-STREAM gas analyzers support several calibration procedures:

Manual calibration

Typically a calibration procedure is carried out manually by supplying the gases sequentially by hand and activating the procedures via front panel keys.The operator has to take care to consider purge times and supply the proper gases in correct order.

It is the operators responsibility to not perform a span calibration without a preceding zero calibration!

Advanced calibration

Advanced calibration is a more comfortable variation of manual calibration, providing ONE KEY calibrations supported by internal and/or external valves. The analyzer automatically supplies the right gas and considers purge times.

Remote calibration

Remote calibrations may be activated by means of digital inputs or Modbus commands. Calibrations activated via digital inputs require either internal or external valves to be installed. Modbus supports both calibrations with or without valves as well as calibration sequences.

Unattended automatic calibration

Unattended automatic calibrations are activated utilizing the analyzer software time interval setting:

After a specified time interval has elapsed, the analyzer automatically carries out valve supported zero or span calibrations.

The main advantage is that no user interaction is required to start a calibration or during calibrations: The analyzer automatically supplies the right gas, considers purge times and, that a span calibration has to be preceded by a zero calibration.

The following sections describe how to carry out manual calibrations.

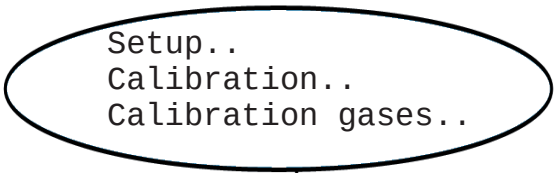
For information about other calibration procedures see the X-STREAM X2 instruction manual.

3.7 Calibrating the Analyzer

3.7.1 Preparing Calibrations

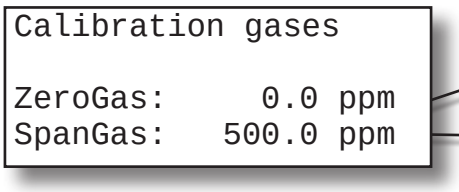
Consider the calibration notes in section "Measurement specifications"!

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



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

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



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

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

Note!

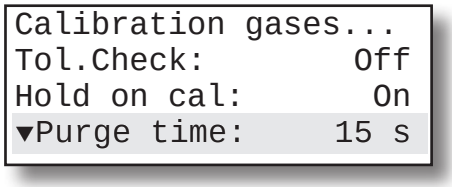
The units for the calibration gases are taken from the related entry in the display setup menu.

Multi-channel unit:

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

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

3.7 Calibrating the Analyzer



Example:

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

Situation:

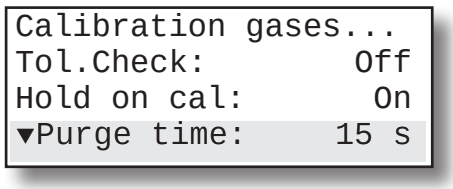
Due to a fault zero gas is supplied to carry out a span calibration, instead of span gas.

Tolerance check disabled (Off):

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

Tolerance check enabled (10%; AutoOff):

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



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

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

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

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

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

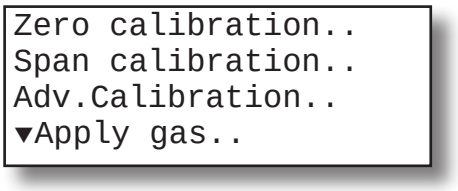
Note!

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

3.7 Calibrating the Analyzer

3.7.2 Manual Calibration

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



To start a zero calibration select the first line:

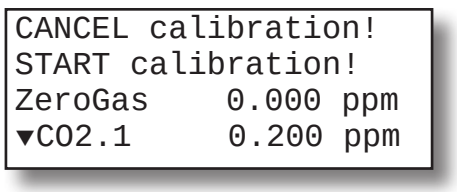
3.7.2.1 Manual Zero Calibration

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

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

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

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

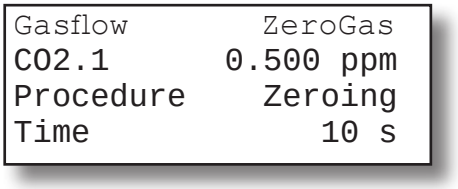


The first line gives you the choice to cancel the procedure now.

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

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

3.7 Calibrating the Analyzer



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

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

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

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

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

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

or

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

Select SPAN CALIBRATION...

3.7.2.2 Manual Span Calibration


```
CANCEL calibration!
START calibration!
SpanGas   20.000 ppm
▼CO2.1    16.200 ppm
```

```
Gasflow        SpanGas
CO2.1     20.000 ppm
Procedure   Spanning
Time             10 s
```

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

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

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

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

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

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

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

When finished, either press

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

or

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

Chapter 4
Dismounting and Disposal

4.1 Dismounting and Diposal of the Analyzer

WARNING

HAZARDS FROM DISMOUNTING

Dismounting instruments installed in hazardous area requires special documents to be issued and instructions to be followed! Do not dismount such instruments without written permit!

Failure to follow may result in explosion!

Gas lines may contain unhealthy or toxic gases, depending on the application, the instrument has been used for! Take care to purge such gas lines prior to disconnection, to remove all unhealthy or toxic components.

Failure to follow may result in personal injury or death!

WARNING

ELECTRICAL SHOCK HAZARD WHEN DISMOUNTING

Dismounting instruments installed in hazardous area requires special documents to be issued and instructions to be followed! Do not dismount such instruments without written permit!

Failure to follow may result in explosion!

Gas lines may contain unhealthy or toxic gases, depending on the application, the instrument has been used for! Take care to purge such gas lines prior to disconnection, to remove all unhealthy or toxic components.

CAUTION

HEAVY INSTRUMENT

Field housings, intended for outside and wall mounted use, weigh between 26 kg (57 lb) and 63 kg (139 lb), depending on version and options installed.

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

4 Dismounting & Disposal

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 waste disposal contractors specialised in this field. Let the instrument and the packing material duly disposed of in environmentally sound manner. Ensure the equipment is free of dangerous and harmful substances (decontaminated).

Take care of all local regulations for waste treatment.

Advice concerning the disposal of chemicals

This instrument may contain electrochemical sensors, e. g. for measuring $O_{2.}$ For these sensors applies:

- Don‘t dispose of together with household carbage.
- At the end of useful life, the instrument and the sensors must be disposed of in compliance with the wast regulations, see instructions below.

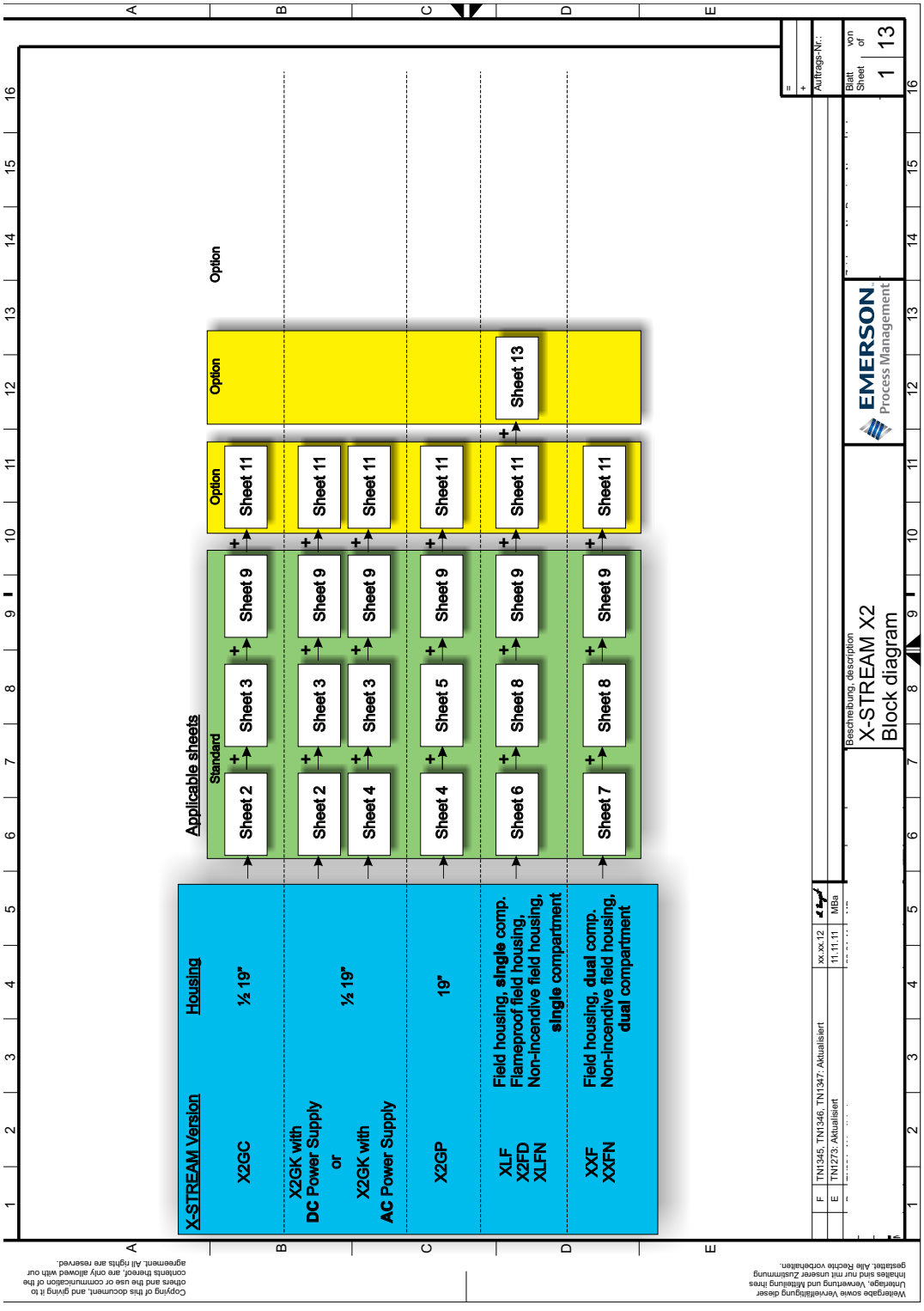
When the instrument has reached the end of its useful life,

- purge all gas lines with inert gas
- ensure all gas lines are pressureless
- disconnect all gas lines
- switch off power and signal lines
- disconnect and remove all electrical connections
- for wall mounted instruments, support the instrument before loosening the fixing screws.
- properly fill out the Declaration of Decontamination (☞ X-STREAM X2 Instruction Manual)
- hand over the dismounted instrument together with the Declaration of Decontamination to a waste disposal contractor. This contractor then has to disassemble the instrument, recycle and dispose of in compliance with all applicable waste treatment regulations.

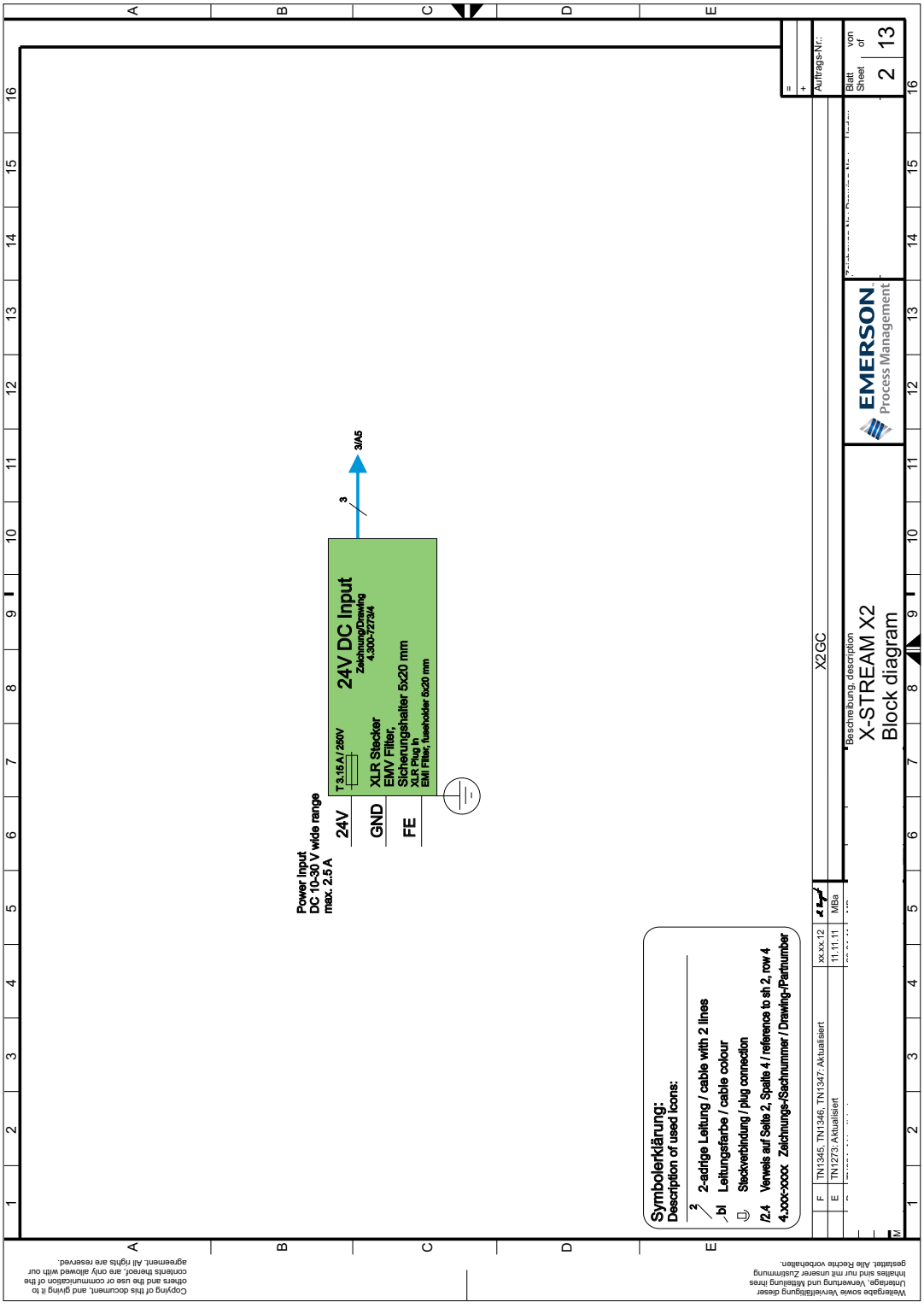
Appendix

This chapter contains

A.1 Block diagram



A.1 Block Diagram



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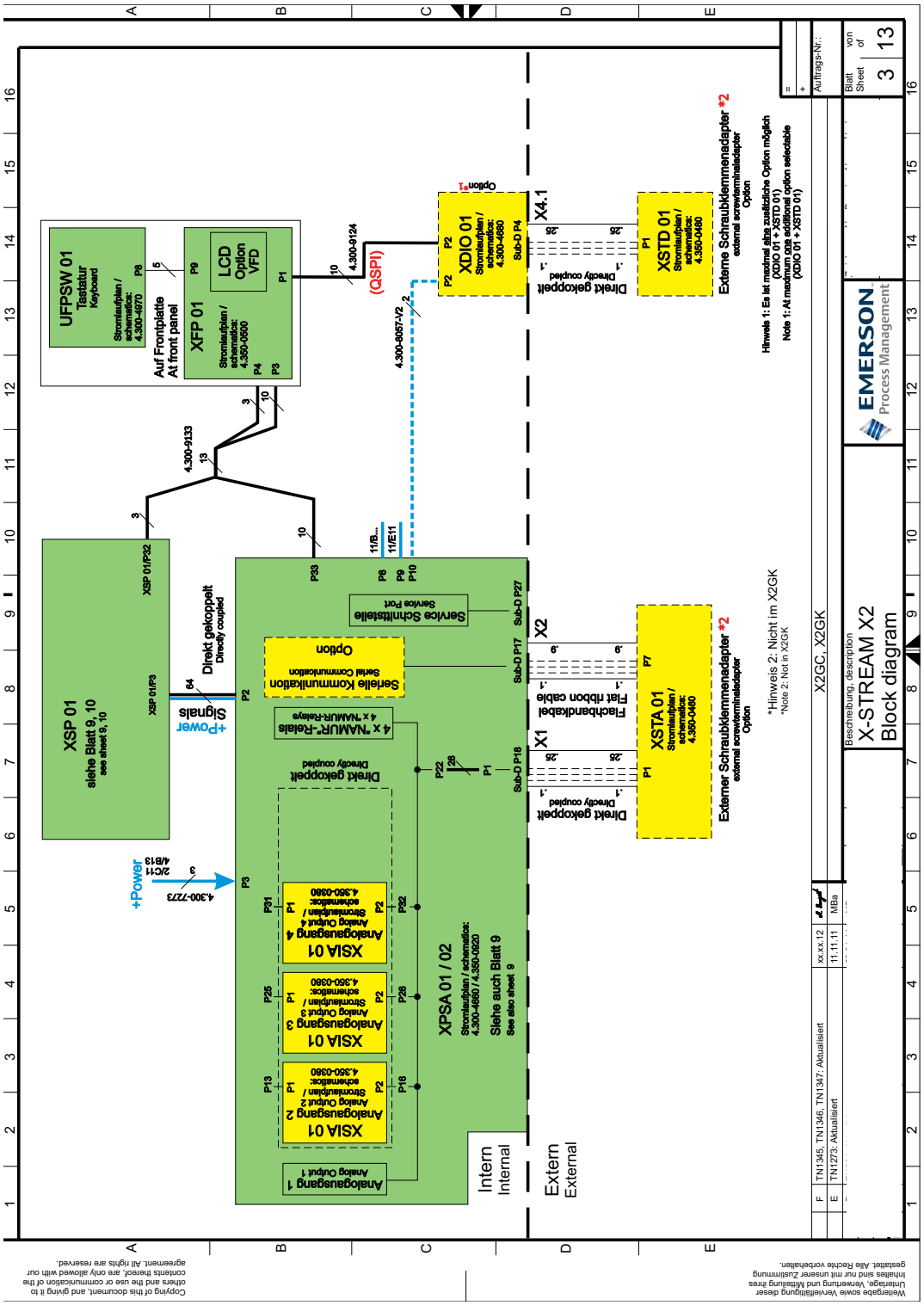

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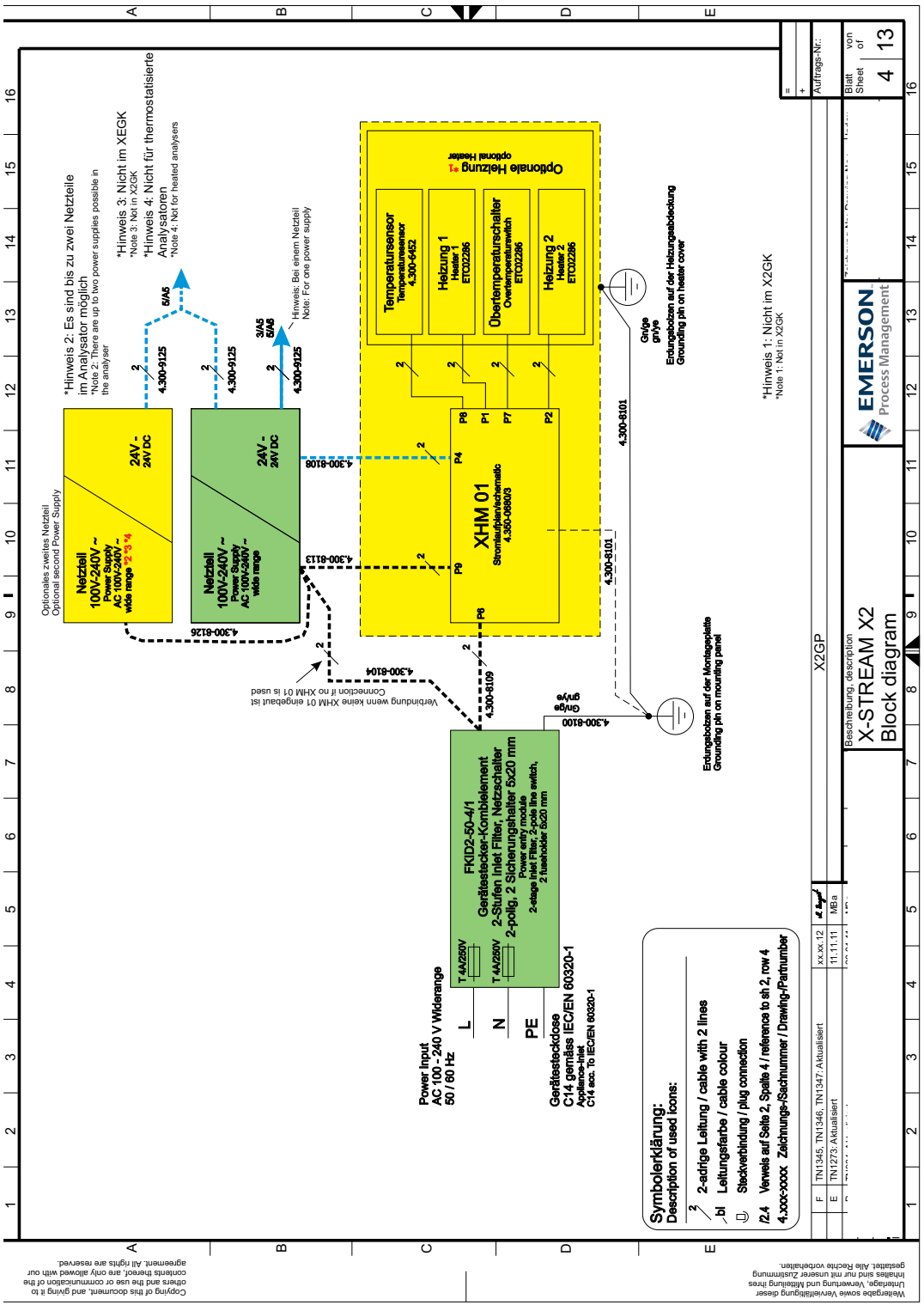

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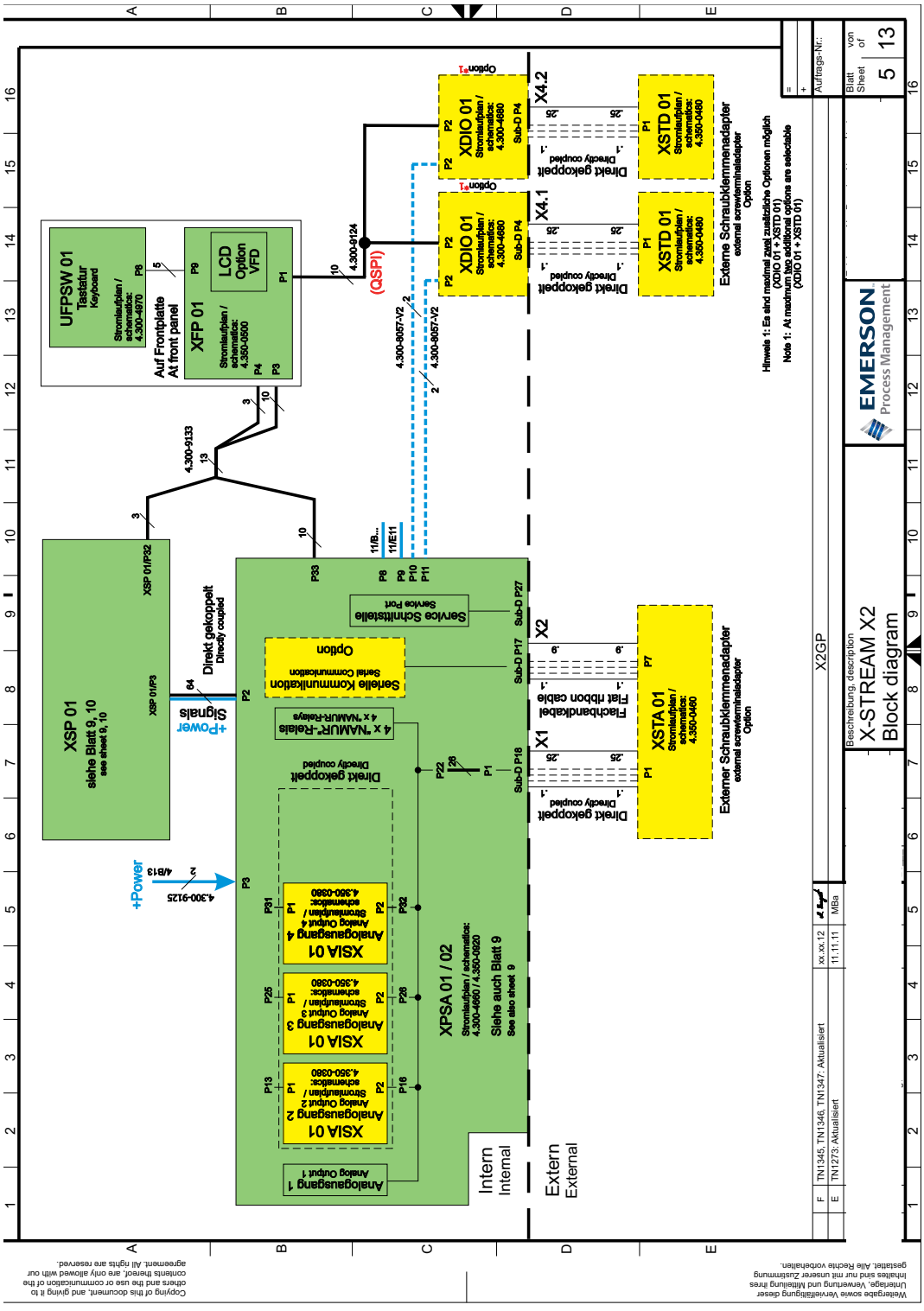

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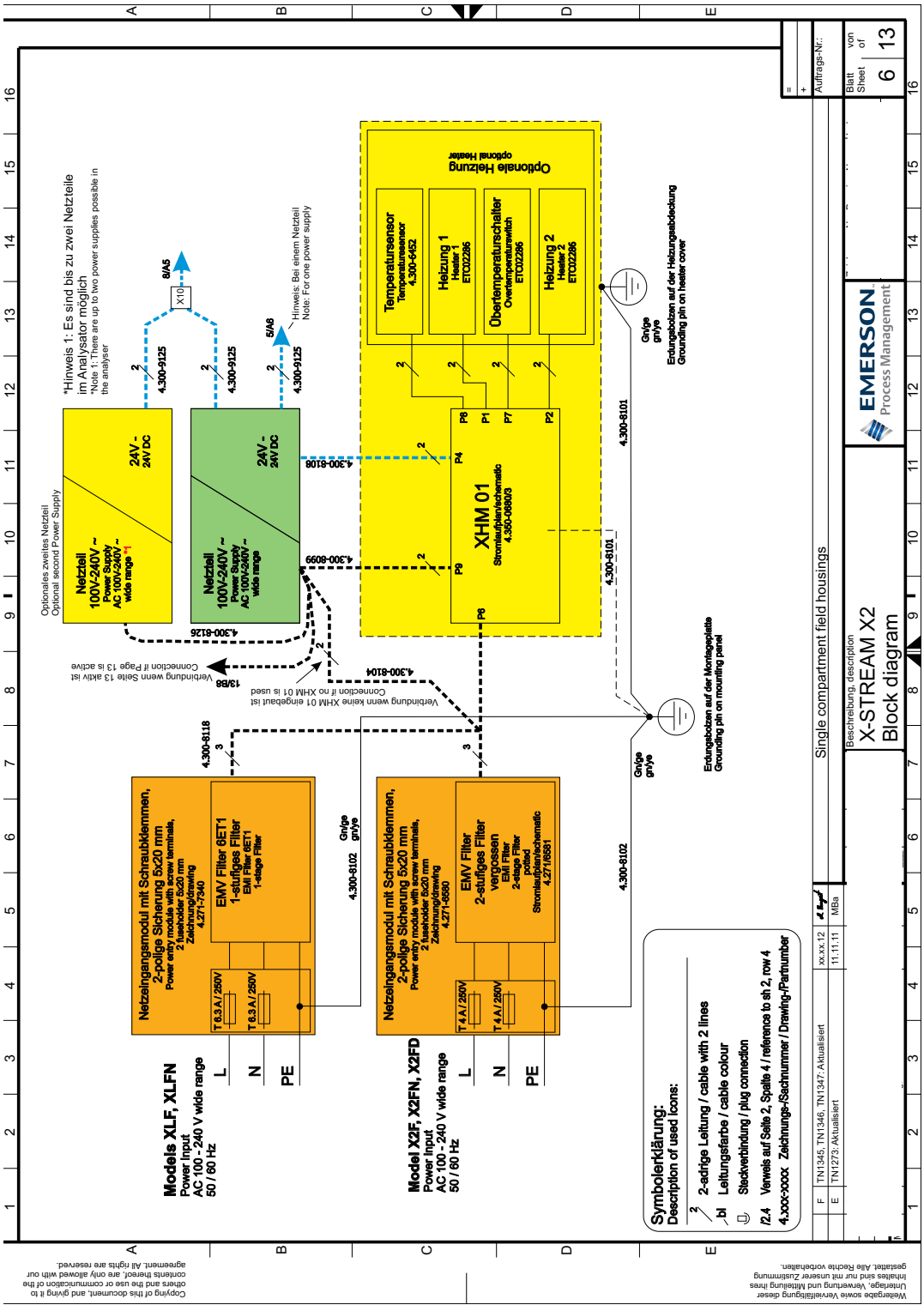

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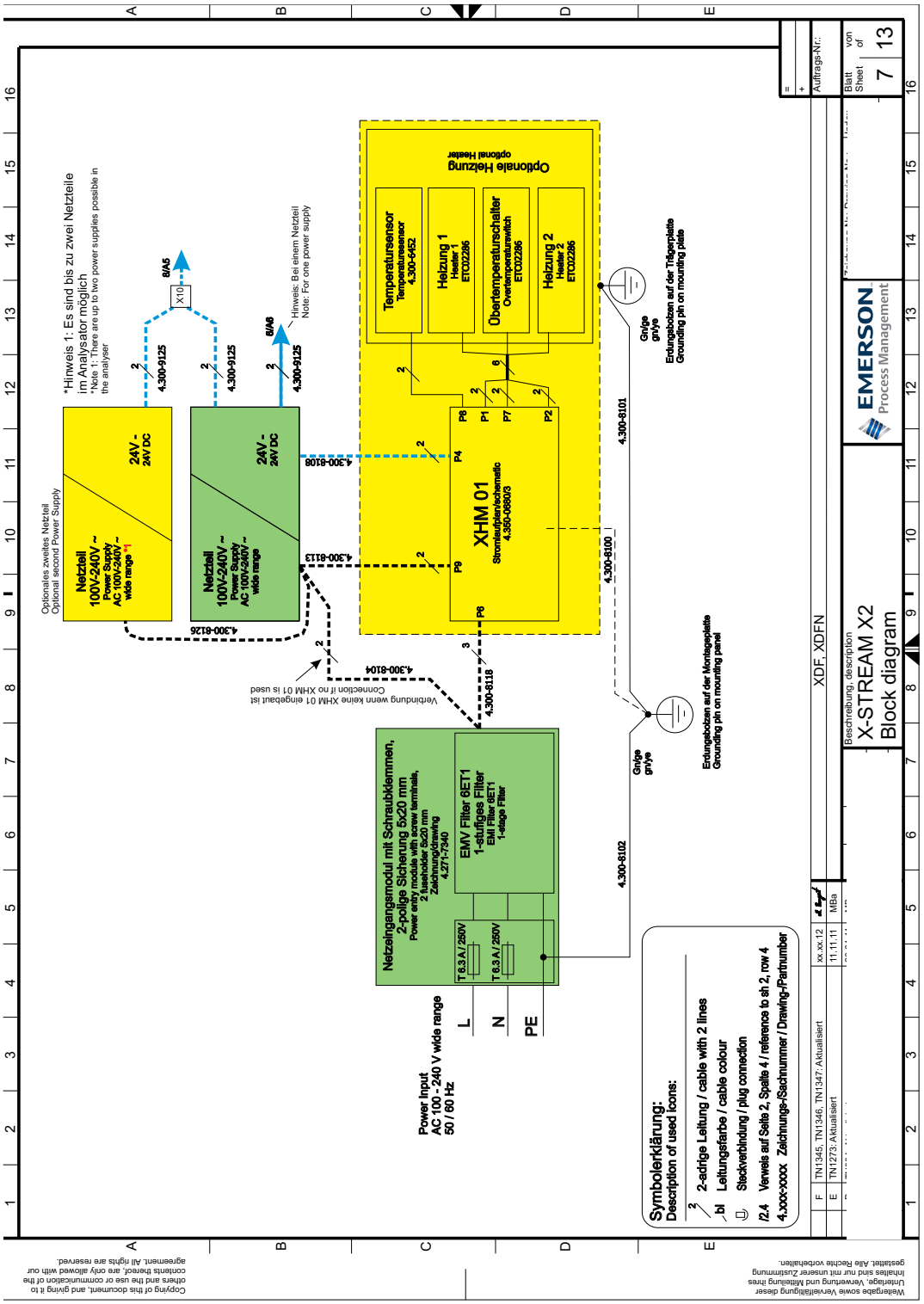
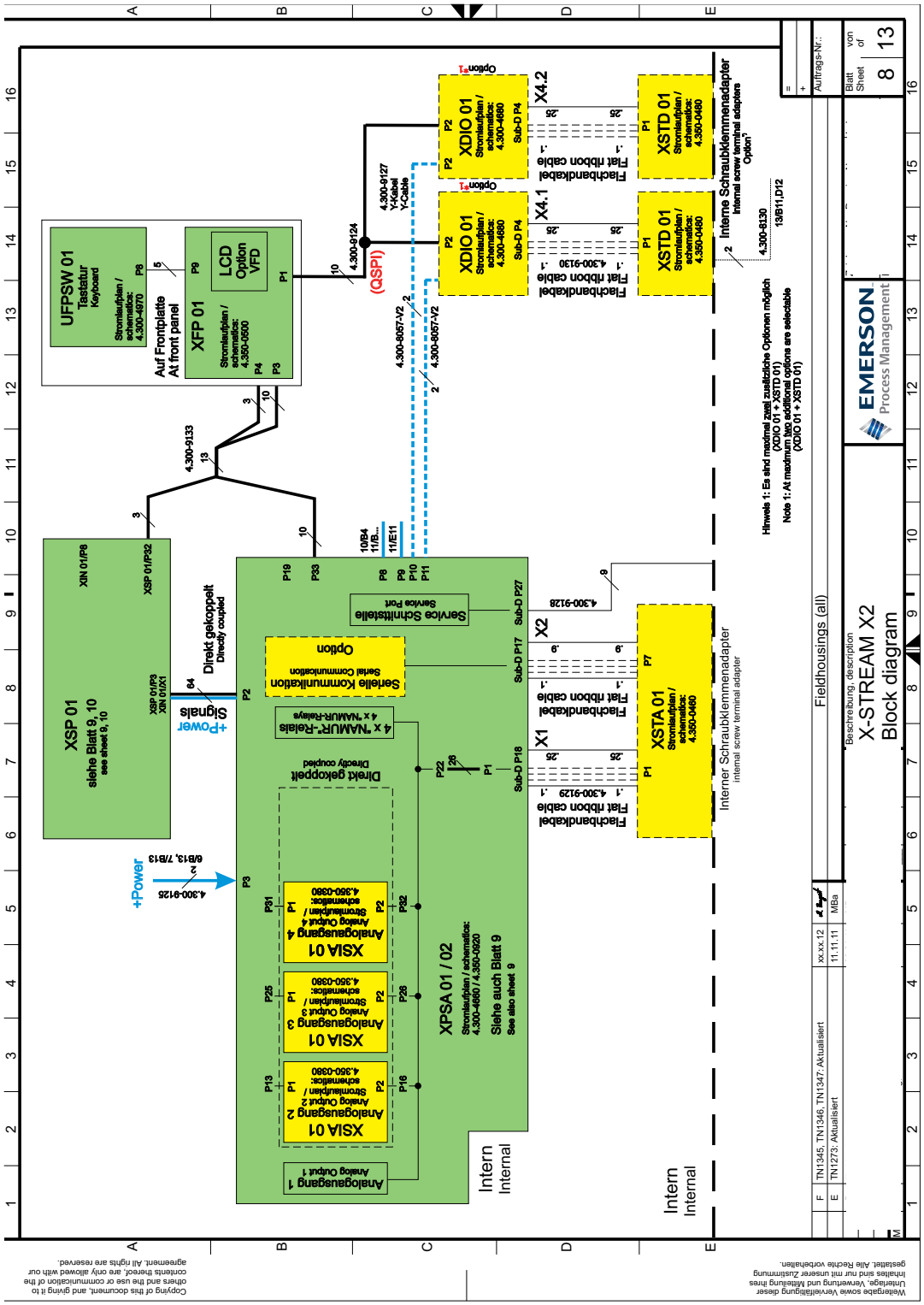
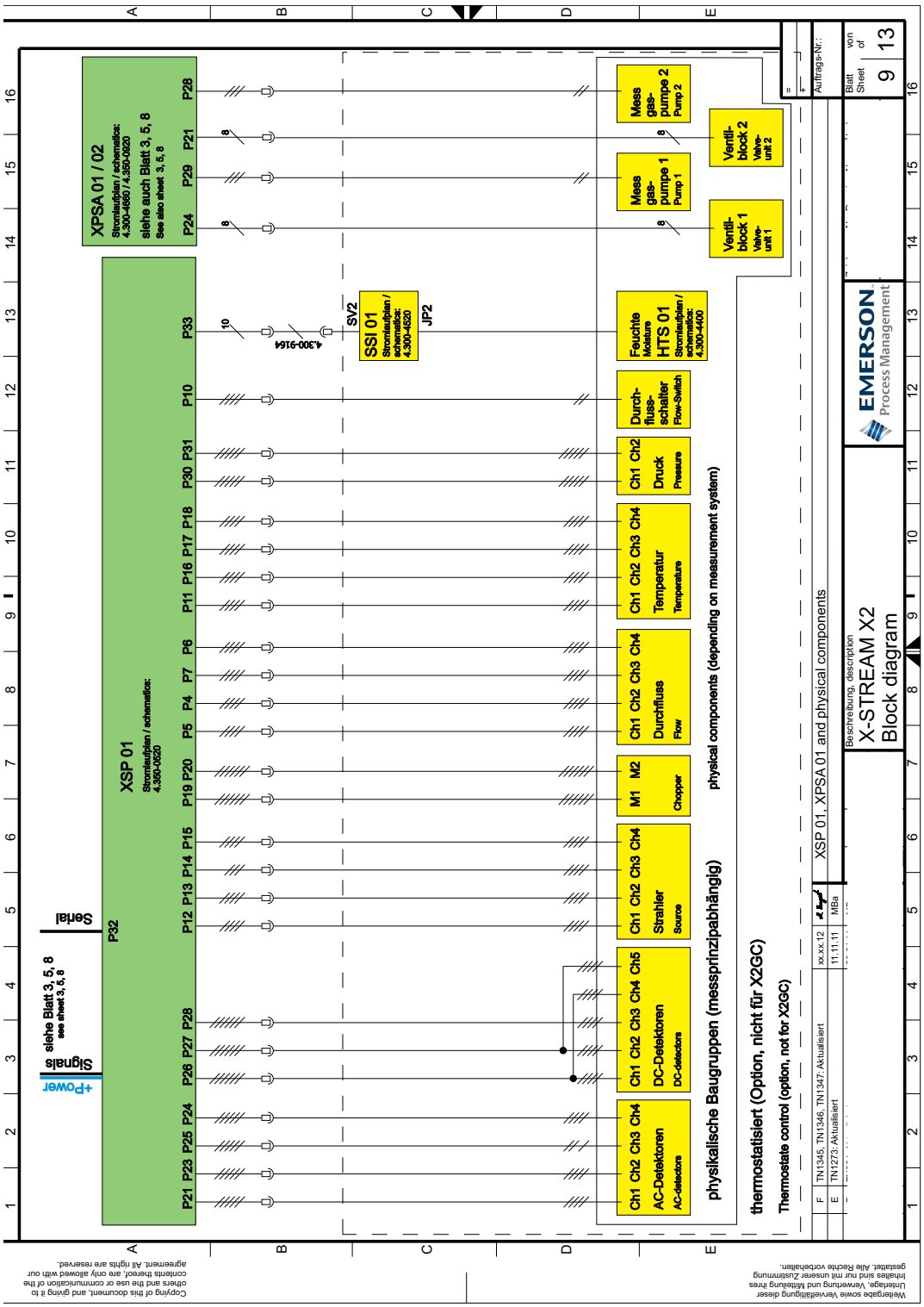


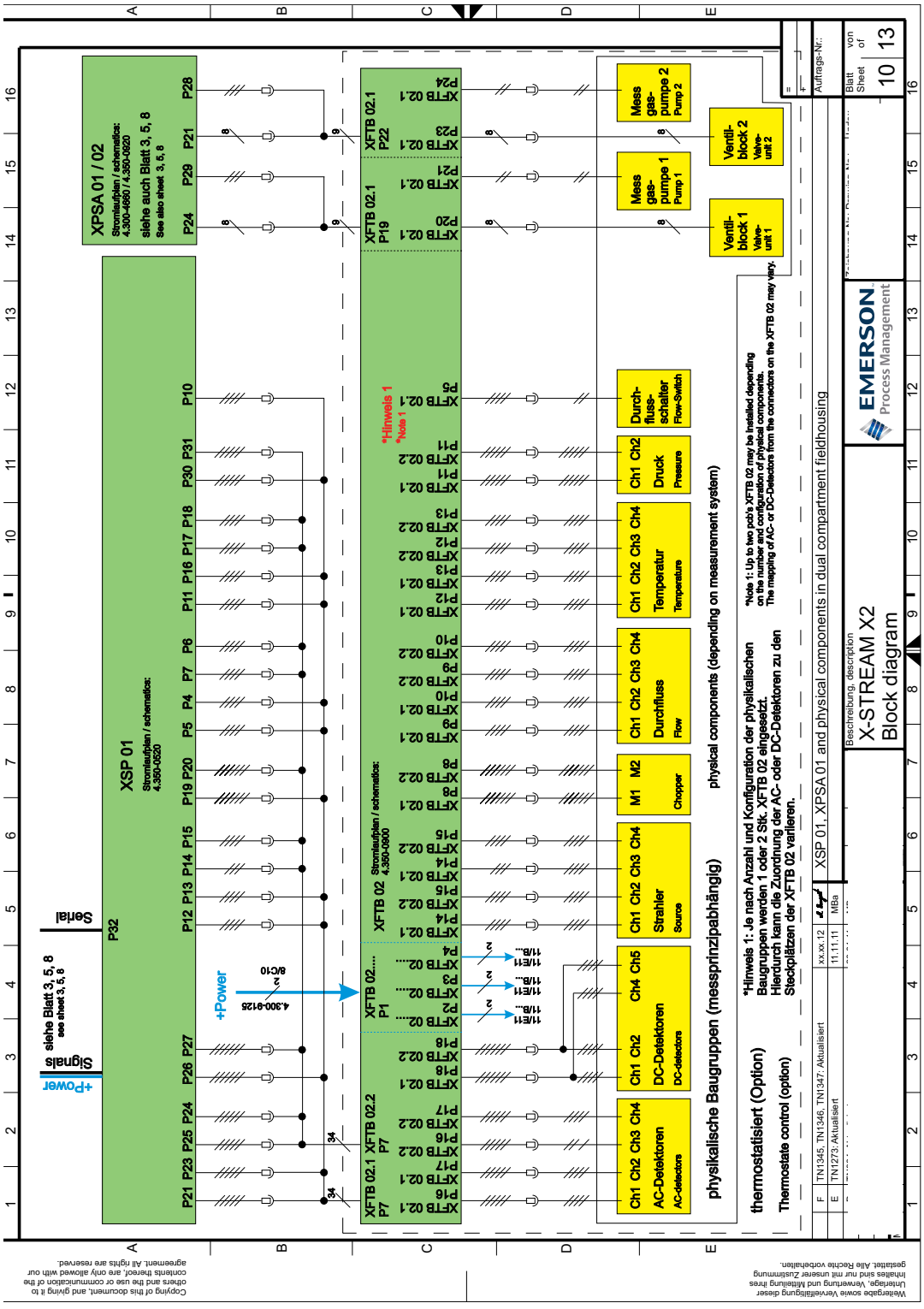
A.1 Block Diagram



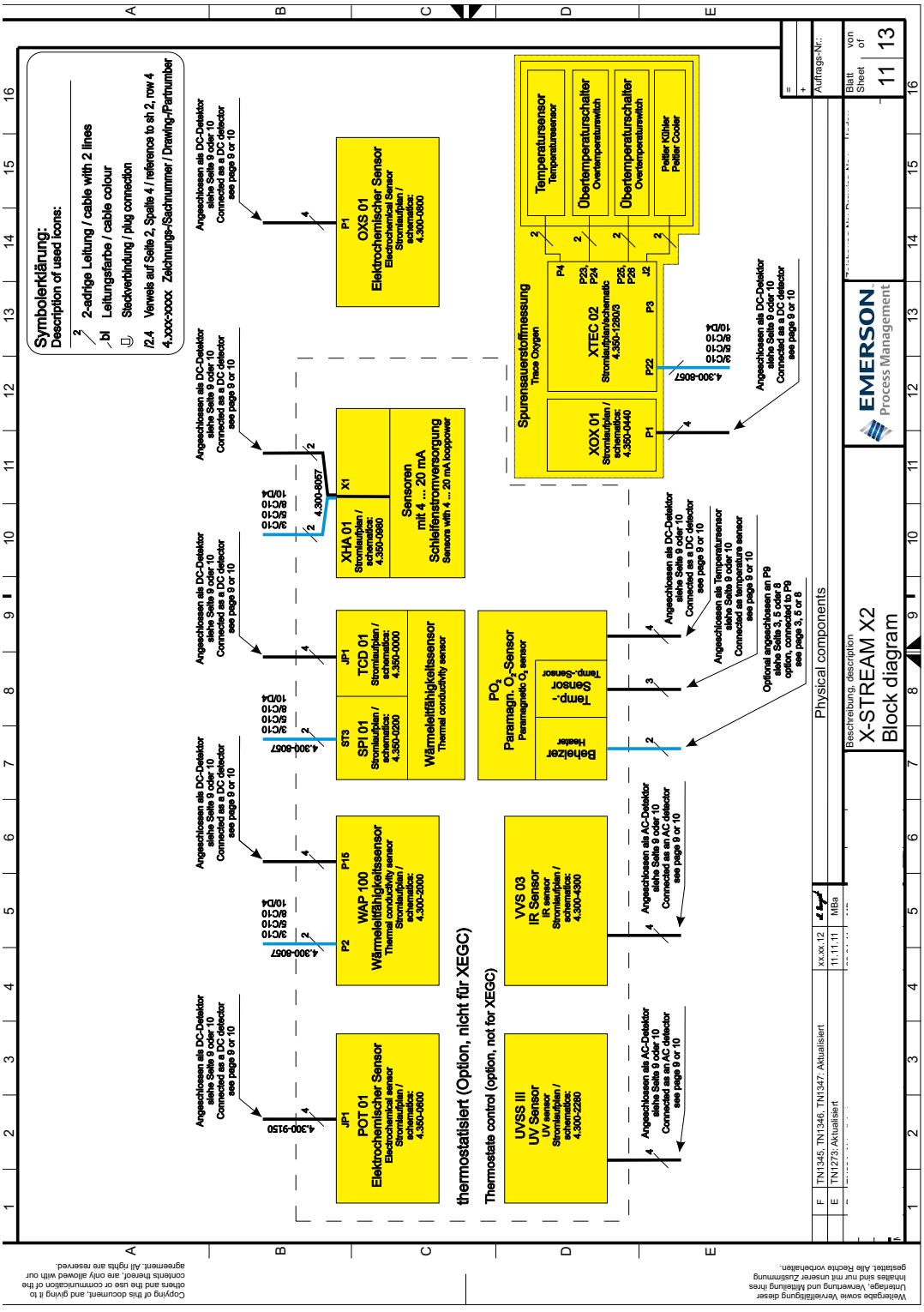
A.1 Block Diagram



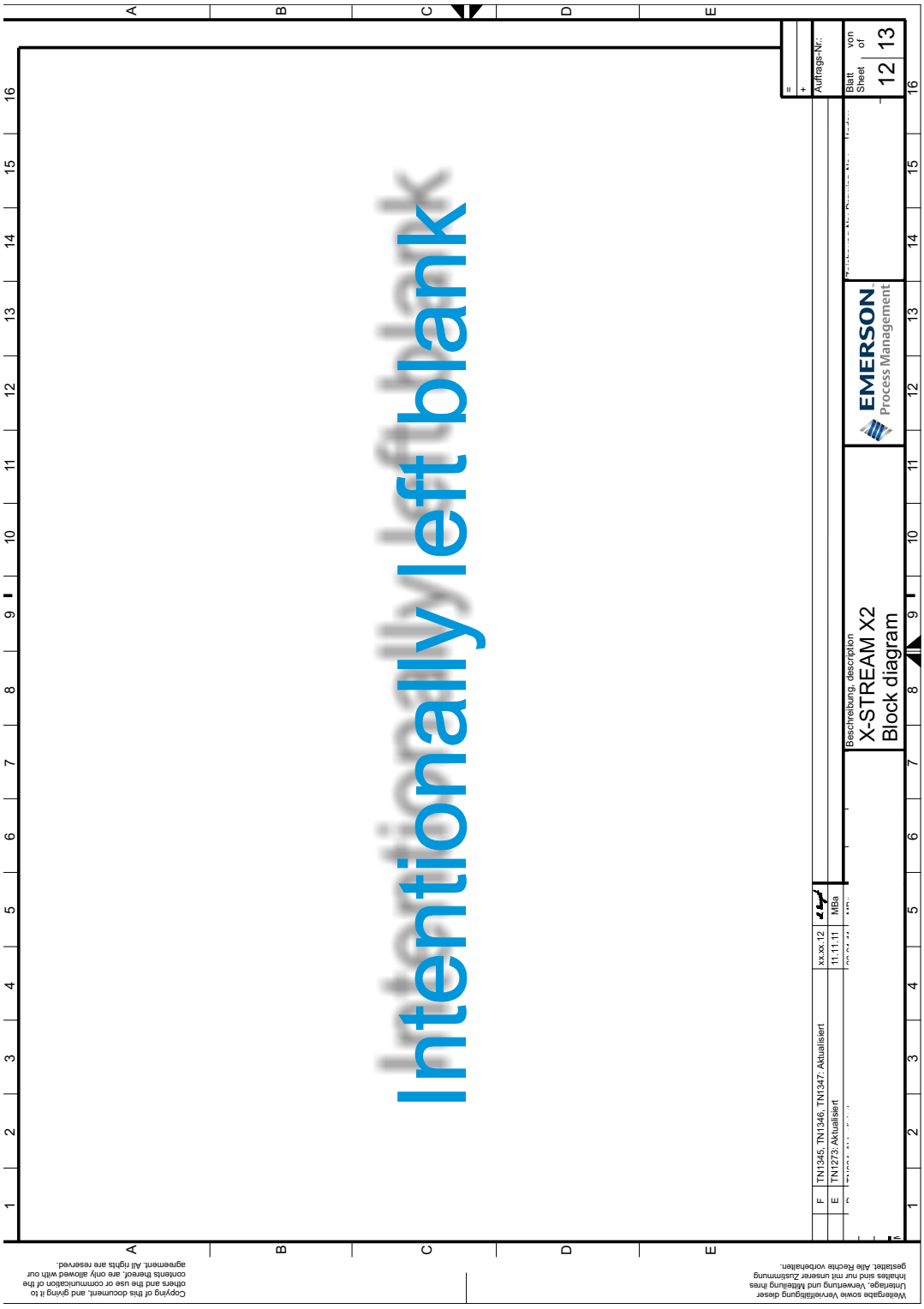
A.1 Block Diagram



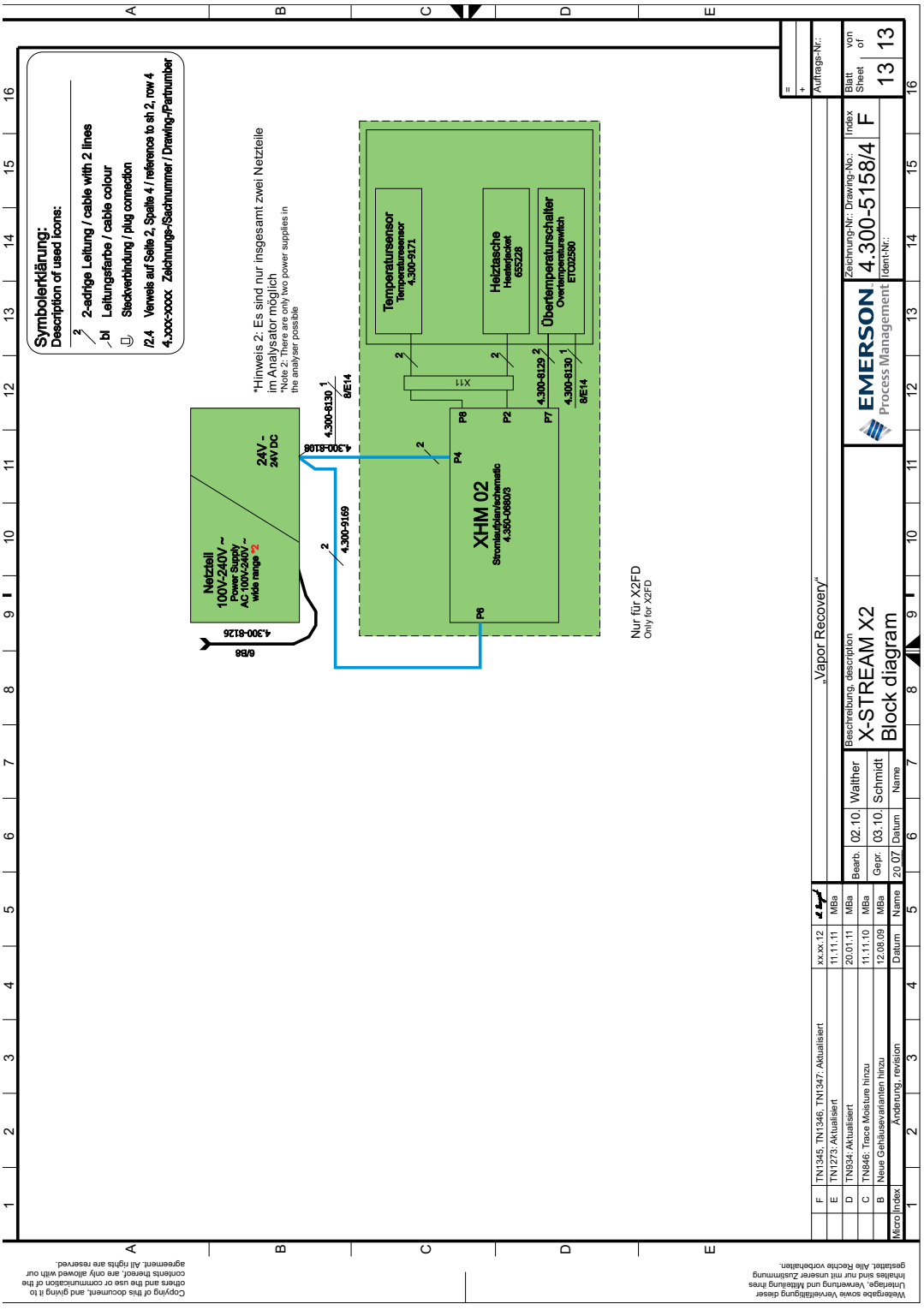
A.1 Block Diagram



A.1 Block Diagram

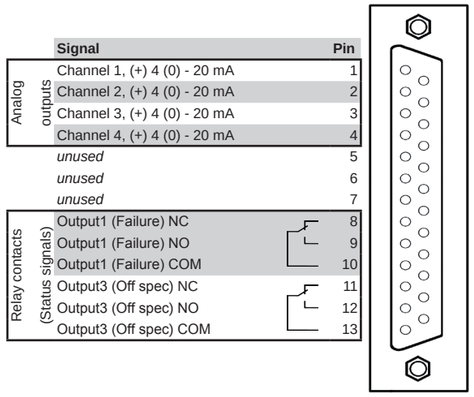


A.1 Block Diagram



A.2 Assignment Of Terminals And Sockets

A.2.1 Tabletop & Rack Mount Analyzers

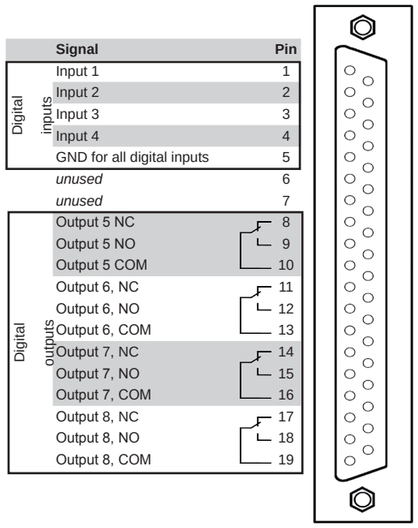


	Signal	Pin
Analog outputs	Channel 1, (+) 4 (0) - 20 mA	1
	Channel 2, (+) 4 (0) - 20 mA	2
	Channel 3, (+) 4 (0) - 20 mA	3
	Channel 4, (+) 4 (0) - 20 mA	4
	unused	5
	unused	6
	unused	7
Relay contacts (Status signals)	Output1 (Failure) NC	8
	Output1 (Failure) NO	9
	Output1 (Failure) COM	10
	Output3 (Off spec) NC	11
	Output3 (Off spec) NO	12
	Output3 (Off spec) COM	13

Pin	Signal	
14	Channel 1, GND	Analog outputs
15	Channel 2, GND	
16	Channel 3, GND	
17	Channel 4, GND	
18	*unused*	
19	*unused*	
20	Output2 (Maintenance request) NC	Relay contacts (Status signals)
21	Output2 (Maintenance request) NO	
22	Output2 (Maintenance request) COM	
23	Output4 (Function check) NC	
24	Output4 (Function check) NO	
25	Output4 (Function check) COM	

Note!
Configuration of relay contacts as per standard factory setting (NAMUR status signals)

Socket X1 - Analog outputs, relay outputs 1...4
(Assignment of screw terminals adaptor: see XSTA on next page)

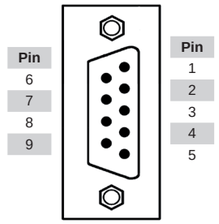


	Signal	Pin
Digital inputs	Input 1	1
	Input 2	2
	Input 3	3
	Input 4	4
	GND for all digital inputs	5
	unused	6
	unused	7
Digital outputs	Output 5 NC	8
	Output 5 NO	9
	Output 5 COM	10
	Output 6, NC	11
	Output 6, NO	12
	Output 6, COM	13
	Output 7, NC	14
	Output 7, NO	15
	Output 7, COM	16
	Output 8, NC	17
	Output 8, NO	18
	Output 8, COM	19

Pin	Signal	
20	Input 5	Digital inputs
21	Input 6	
22	Input 7	
23	Output 9, NC	Digital outputs
24	Output 9, NO	
25	Output 9, COM	
26	Output 10, NC	
27	Output 10, NO	
28	Output 10, COM	
29	Output 11, NC	
30	Output 11, NO	
31	Output 11, COM	
32	Output 12, NC	
33	Output 12, NO	
34	Output 12, COM	
35	Output 13, NC	
36	Output 13, NO	
37	Output 13, COM	

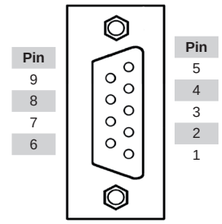
Note!
The configuration illustrated here is that of the first socket, labelled X4.1.
Inputs 8-14 and outputs 14-22, are on the second socket (X4.2), if installed.

Socket X4 - Digital I/O
(Assignment of screw terminals adaptor: see XSTD on next page)



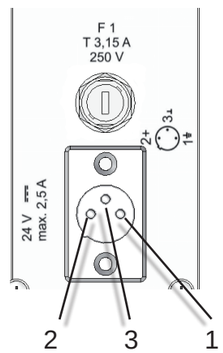
Pin no.	MOD 485/ 2 wire	MOD 485/ 4 wire	RS 232
1	Common	Common	Common
2	*not used*	*not used*	RXD
3	*not used*	*not used*	TXD
4	*not used*	RXD1(+)	*not used*
5	D1(+)	TXD1(+)	Common
6	*not used*	*not used*	*not used*
7	*not used*	*not used*	*not used*
8	*not used*	RXD0(-)	*not used*
9	D0(-)	TXD0(-)	*not used*

Connector X2 - IOIOI - Serial Modbus interface
(Assignment of screw terminals adaptor: see XSTA on next page)



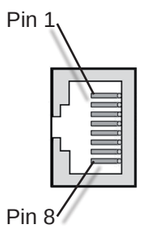
Pin no.	RS 232
1	Common
2	RXD
3	TXD
4	*not used*
5	Common
6	*not used*
7	*not used*
8	*not used*
9	*not used*

Service Port Socket - Serial RS 232 interface



1: ME
2: + 24 V⎓
3: 0 V (⊥)

DC 24 V Input (½ 19 in analyzer)



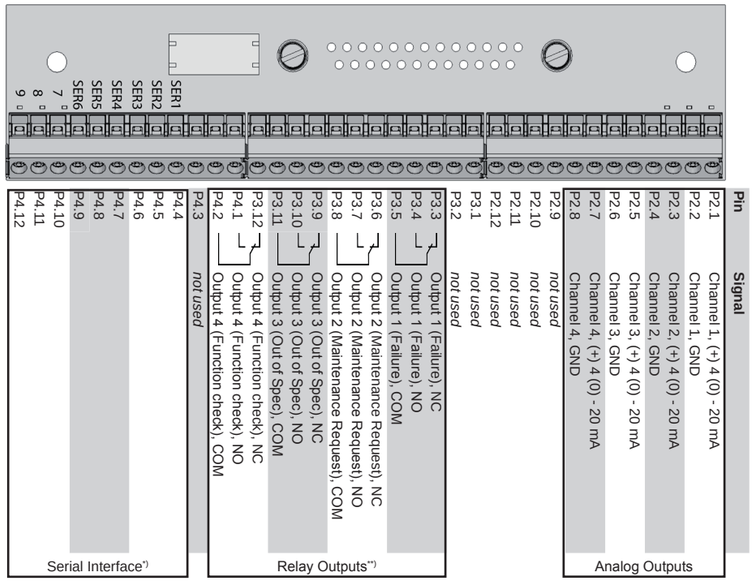
Pin no.	Signal
1	TX+
2	TX-
3	RX+
6	RX-
other	*not used*

Ethernet connector for Modbus

A.2 Assignment of Terminals and Socket

A.2.2 Field Housings

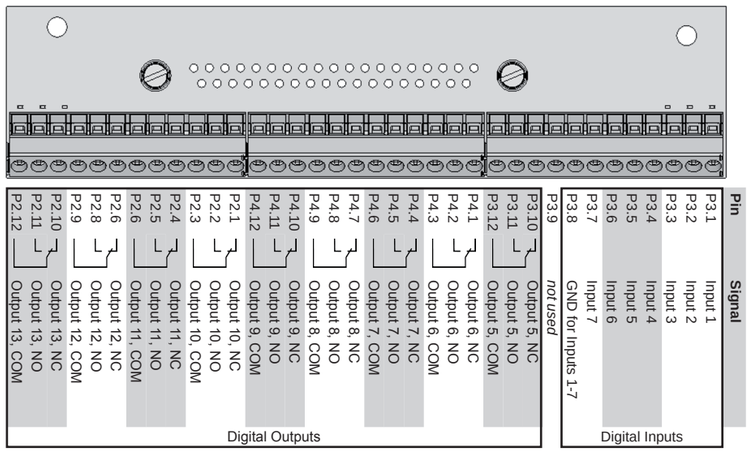
XSTA: Standard strip with standard and optional signals



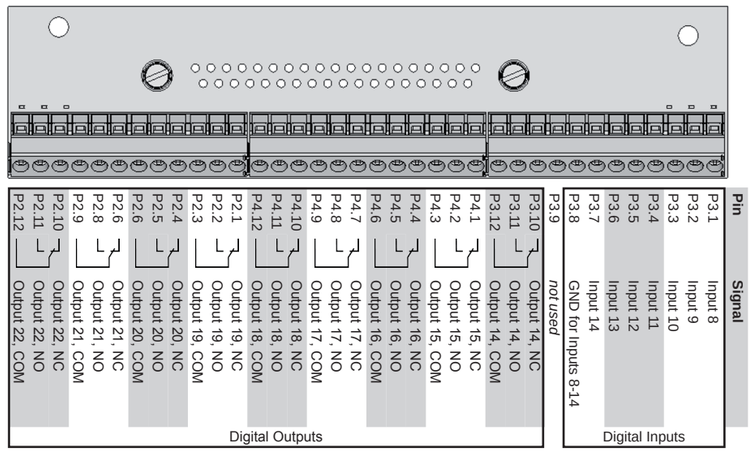
*) See table below

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

XSTD: First optional strip with optional 7 Dig Inputs and 9 Dig Outputs



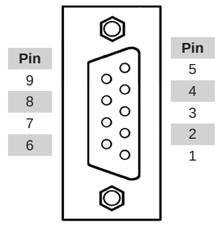
XSTD: Second optional strip with another set of optional 7 Dig Inputs and 9 Dig Outputs



Assignment of serial interface terminals

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

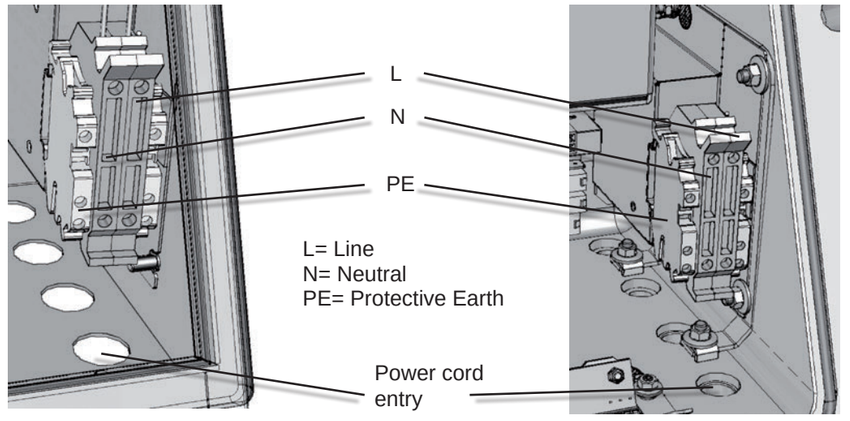
Signal Terminals Strips



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*

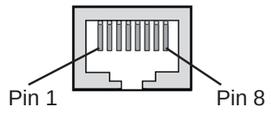
Service Port Connector - Serial RS 232 interface

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



Fieldhousing ***Flameproof (cast) housing***

Power terminals



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

Ethernet connector for Modbus

X-STREAM

Short Form Manual
HASX2E-SFM-HS
02/2012

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