Instruction Manual
HASXEE-IM-HS
10/2010

XSTREAM®

Gas Analyzer Series

Instruction 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.

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EMERSON
Process Management

SHORT FORM GUIDE FOR THIS MANUAL

To find information about **see chapter**

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INTRODUCTION

The instruction manual contains information about the component assembly, function, installation, operation and maintenance of the X-STREAM® series gas analyzers.

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

The installation and operation of units for use in explosive (hazardous) environments is not covered in this manual.
Analyzers intended to be used in such environments are supplied with further instruction manuals, which should be consulted in addition to this.

DEFINITIONS

The following definitions apply to the terms WARNING, CAUTION and NOTE, and the symbol ☞, as used 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, an important condition or instruction.

The symbol ☞ , together with a page number (☞ 6-5) or chapter headline (☞ Startup) refers to more information, provided on the indicated page or chapter.

TERMS USED IN THIS INSTRUCTION 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 out of 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.

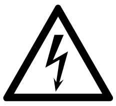
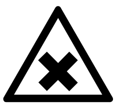
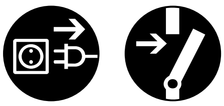
SYMBOLS USED ON AND INSIDE THE UNIT

This symbol attached to the unit ...	... means
	**dangerous voltages** may be exposed. Covers may only be removed when power to the unit is disconnected, and only be trained personnel.
	**hot surfaces** may be exposed. Covers may only be removed by trained personnel and when power is disconnected. Certain surfaces may remain hot.
	**further information and instructions** are required: read the instruction manual.

SYMBOLS USED IN THIS MANUAL

Wherever one or more of the following symbols are used in this instruction manual, read the accompanying information and instructions carefully.

Follow these warnings and notes carefully to minimize risk.

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 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 XE 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.

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.

DISPOSAL OF BATTERIES

- **This instrument contains a Li battery (button cell) of type CR 2032.**
- **The battery is soldered and usually does not need to be replaced during the instrument´s lifetime.**
- **At the end of lifetime, the instrument must be disposed in compliance with the wast regulations. The disposal specialist then has to disassemble the instrument and dispose the battery in compliance with the regulations.**

INSTALLING AND CONNECTING THE UNIT

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 UNIT

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.

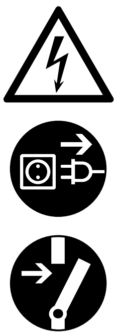
Substances hazardous to health may escape from the unit's gas outlet. This may require additional steps to be taken to guarantee the safety of operating staff.

Safety Instructions

WARNING

EXPLOSION HAZARD

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

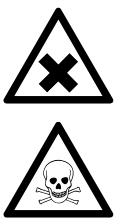


WARNING

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; **7-4 for instructions on performing a leak test.**

Safety Instructions

⚠ CAUTION

HEAVY INSTRUMENT

The models intended for outside and wall mounted use (X-STREAM XEF, XDF and XEFD) weigh between 26 kg (57 lb) and 63 kg (139 lb) 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!

⚠ 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!

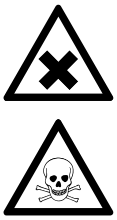
Violation may result in condensation inside the gas paths or damaged pump diaphragm!

⚠ 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 (N2) to avoid danger from escaping toxic, flammable, exposive or hazardous gases.

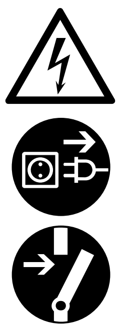
⚠ WARNING

FLAMMABLE OR EXPLOSIVE GASES

When supplying explosive gases or flammable gases with concentrations of more than 25 % 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**
- **infallible 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.

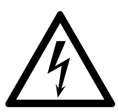
Working on units equipped with screw-type terminals for electrical connections may require the exposure of energized components.

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.



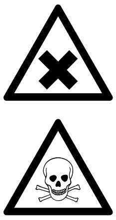
⚠ CAUTION

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

EXPLOSION HAZARD

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 1,500 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 system builder and must therefore ensure and declare compliance with EMC guidelines.

Chapter 1
Technical Description

The following are the main features of the new Emerson Process Management X-STREAM 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
- a highly integrated mainboard contains all interfaces and basic functions for the operation of the unit
- multilingual microprocessor-controlled user interface with liquid crystal (LCD) 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 external PSUs)

The new X-STREAM gas analyzers can measure up to five different gas components using any combination of the following analyzing techniques (restrictions apply to ½ 19in units):

IR = non-dispersive infrared analysis
UV = ultraviolet analysis
pO_2 = paramagnetic oxygen analysis
eO_2 = electrochemical oxygen analysis
TC = thermal conductivity analysis

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.

☞ Chapter 3 gives a detailed description of the various measuring techniques.

Standard applications

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

- Tabletop units in ½ 19in modular design, with IP 20 protection class
- 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 for 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).

The various analyzer types are described in more detail beginning with ☞ 1-13.

Installation in hazardous areas

X-STREAM analyzers in field housings, when fitted with various protective devices, can also be installed and operated in hazardous areas. Available options are:

- Pressurized enclosure conforming to ATEX directive 94/9/EC, for installation in Zone 2.

- Non-incendive assembly for installation in Zone 2 and Div 2 for the measurement of non-flammable gases.
- Simplified purge system (Z-purge) for installation in North American Div 2 environments.

The cast aluminium field housing is designed to withstand an explosion and intended to be used in hazardous areas of Zone 1.

More information about EX-analyzers can be obtained from your Emerson Process Management sales office.

Note*!*

These instructions do not detail the installation nor operation of X-STREAM analyzers in hazardous areas. ***If you intend to use your analyzer for such purposes, pay attention to the separate instruction manuals supplied with analyzers to be used in hazardous areas.***

1.1 Overview

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

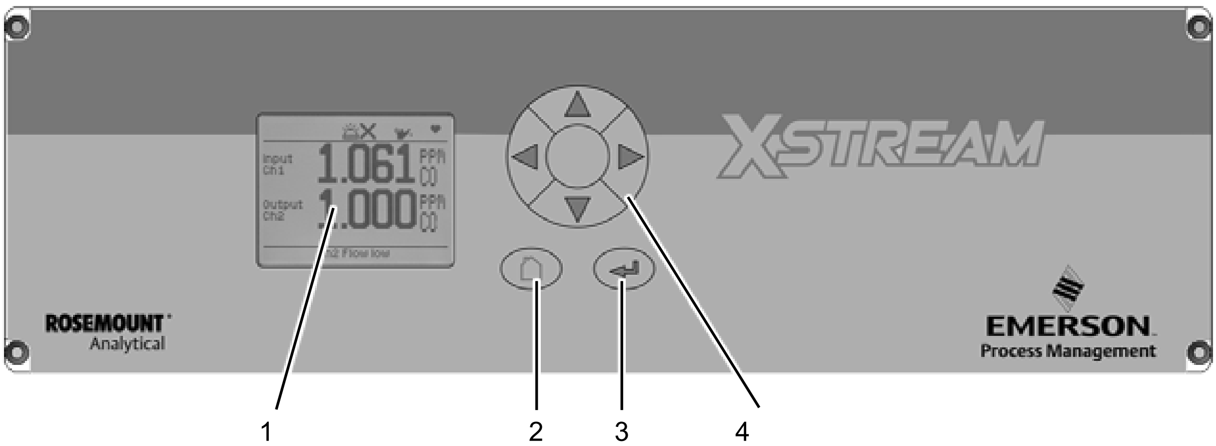
For ease of use, the operator can select one of three languages for the display: By default any analyzer is configured with English and German language sets, while a third can optionally be added. Currently available: French, Italian, Portuguese and Spanish..

1.1.1 The Front Panel

The graphic LCD shows measurement and status information with plain text and symbols.

The symbols are designed to indicate the different status 'Failure', 'Function check', 'Out of specification' and 'Maintenance request' as specified by the NE 107 standard. For further information, ☞ chapter 8.

The analyzer software is operated by means of only six keys.
Depending on the analyzer model, the display is protected with an impact tested glass panel, to withstand even harsher conditions and to provide a higher IP protection class of up to IP66 / NEMA Type 4X.



1 Graphic display
2 “Measure“ key
3 “Enter” key
4 4 keys for settings and menu navigation

Fig. 1-1: *X-STREAM Front Panel (here the X-STREAM XEGP)*

1.1 Overview

Further analyzer features include (some of them optional):

- Configurable measurement display:
  - gas measurements results and/or secondary results (e.g. flow)
  - one or two independently configurable pages
- Configurable measurement units
  - user configurable units and conversion factors from ppm to user unit
- 3 software access levels with individual password protection, and administrator selectable activation
  - protection against unauthorized configuration changes
- Unattended zero and span calibrations
  - enables operation without user interaction
- Communication via serial interface and Ethernet
  - enables remote operation
- Web browser interface
  - for remote operation with full analyzer control
- Realtime clock (supports time server synchronization)
  - enables time controlled operation
- Data logger with configurable logging periods
  - for legislative and quality documentation
- Event logger with configurable events list
  - keep monitoring the analyzer, even when not present
- Log files sizes only limited by free memory on an internal SD card
  - up to 2 GB for up to 1 year logging without storage problems
  - replaceable *(not by operator, as the card is also used for storage of analyzer operating software files)*
- Export of log files via USB, ethernet and webbrowser
  - export to text files
  - enables external data analysis
- Save and load analyzer configuration to/ from an internal protected memory area and USB stick
  - save a functional configuration to protect it against changes or for reference
  - restore a functional setup in case of misconfiguration or crashes
- Calculator for 'virtual' channels or measurement calculations
  - setup a virtual measurement channel by calculating results of existing real channels (e.g. summarize NO and NO_2 to show NO_x)
- PLC (programmable logic controller) for enhanced functionality
  - no need to add an external PLC to control external valves, pumpes, etc.
  - supports uploading externally written PLC text files into the analyzer

See the related sections in this manual for more detailled information on these features.

1.2 Configuration of Gas Lines

Various materials are available to allow the analyzer to be customized to your needs. The materials used are selected based on the characteristics of the sample gas, e.g. diffusion rate, corrosiveness, temperature and pressure.

1.2.1 Materials Used

The physical and chemical properties of the sample gas as well as the conditions under which measurement takes place influence the choice of materials. Among those available are Viton®, PFA and stainless steel.

1.2.2 Safety Filter

The analyzers are generally fitted with an internal stainless-steel filter. This filter is not a replacement for any dust filter in the preparation of the gas, but represents a last line of defence.

1.2.3 Gas Inlets and Outlets

Rackmounted and tabletop devices are fitted with PVDF inlets and outlets (ø 6/4 mm) as standard. Alternatively, Swagelok™ or stainless steel fittings (ø 6/4 mm or ¼ in).

Wall-mounted field housings are supplied with Swagelok™ or stainless steel fittings (ø 6/4 mm or ¼ in).

Other materials available on request.

X-STREAM XEFD units are always supplied with flame arrestors and stainless steel fittings (ø 6/4 mm or ¼ in).

1.2.4 Tubing

Unless otherwise specified, the analyzers are supplied with Viton® or PVDF piping (ø 6/4 mm or ¼ in). Other materials (e.g. stainless steel) can be used, depending on the application.

1.2.5 Infallible Containments

Infallible containments are gas lines which, due to their design, can be regarded as permanently technically tight. This is achieved by, for example, welded joints, or metallically sealing joints (e.g. tap connectors and binders), providing they are seldom disconnected. Gas lines configured in this manner can be used for measuring noxious, flammable and explosive gases. At the time of going to press, infallible containments are available for thermal conductivity analysis (TC) only. Further information about infallible containments can be found in the separate instruction manual supplied with these units.

Infallible containments do not render it unnecessary to test for leaks regularly, e.g. following lengthy breaks in service, substantial alterations, repairs and modifications.

Read the separate instruction manual giving detailed instructions on the configuration, operation and maintenance of units fitted with infallible containments.

1.2.6 Optional Components for Gas Lines

The analyzers can, as an option, be fitted with further components. Not all components are available for all analyzer types:

- internal sample gas pump
- internal valve block
- internal flow sensors
- internal flow monitor switch
- internal barometric pressure sensor
- internal temperature sensors.

1.2.6.1 Internal Sample Gas Pump

An internal sample gas pump is used when the sample gas is under insufficient pressure. It ensures a constant flow of sample gas (max. 2.5 l/min through the analyzer).

When in internal pump is fitted, the relevant parameter in the software setup dialog is set to **Yes** (☞ 6-88). The pump can be controlled either manually through a software menu or optionally by a digital input.

Note!
Gas pressure is limited to atmospheric, if an internal pump is used!

1.2.6.2 Internal Valve Block

An internal valve block allows all necessary gas lines (zero gas, span gas, sample gas) to remain permanently connected to the analyzer. Valves are then activated automatically when required (e.g. during automatic calibration).

When an internal valve block is fitted, this is shown in the relevant software setup dialog as either **Internal** or **Int+Ext** (☞ 6-88). The valves are controlled by either a software menu, optionally by digital input, or automatically during autocalibration.

Depending on the model, up to two valve bocks can be fitted.

1.2.6.3 Internal Flow Sensor

Up to two internal flow sensors can measure the flow of gas and, compared to the flow monitor switch can provide a flow reading. They also can activate an alarm signal in the event of a failure.

The alarm level for flow sensors is operator adjustable to up to 2000 ml/min. Depending on the model, up to two sensors can be fitted and evaluated separately.

When a sensor is fitted, the relevant parameter in the software setup dialog is set to **Yes** (☞ 6-90).

If the current flow rate is too low, a status message is displayed and the parameter under CHECK REQUESTS.. is set to **Yes** (☞ Chapter 8 'Troubleshooting').

1.2.6.4 Internal Flow Monitor Switch

An internal flow switch monitors the gas flow and activates an alarm signal in case it is not sufficient. Compared to the flow sensore it does not provide a flow reading, but only indicates if the flow is sufficient, or not.

The alarm level for the internal flow switch is fixed and not operator adjustable. Additional external switches may be used and connected via digital inputs. All fitted flow switches are evaluated to share a common alarm.

When an internal flow switch is fitted, the relevant parameter in the software setup dialog is set to **Yes** (☞ 6-85).

If the current flow rate is too low, a status message is displayed and the parameter under CHECK REQUESTS.. is set to **Yes** (☞ Chapter 8 'Troubleshooting').

1.2.6.6 Internal Barometric Pressure Sensor

Varying atmospheric pressure has an influence also on the density of the gases applied to the measuring system: Higher density correlates with more molecules per volume and thus influences the measuring results.

To compensate such influences. an internal barometric pressure sensor can be installed. It´s reading is used to electronically compensate the atmospheric pressure variation (☞ measurement specification, page 3-14).

If such a sensor is installed in the unit, the related menu shows the entry **Internal** (☞ 6-91).

1.2.6.5 Internal Temperature Sensors

In the same way as pressure variations, varying temperatures influence the measuring results: Higher temperature results in lower gas density and thus in less molecules per volume. To compensate temperature influence, internal temperature sensors can be installed to electronically compensate temperature variations (☞ page 3-14 ,measurement specification).

Depending on the configuration of the unit or the demands of the application, temperature sensors can measure the unit's internal temperature or selected measurement channel components.

If such sensors are installed in the unit, this is indicated in the installed options menu (☞ 6-85).

1.2.6.7 Optional Heated Area

The physical components can be optionally separated from the electrical components by means of a special box (not an option for ½ 19 in units). This can be done for one or both of the following purposes:

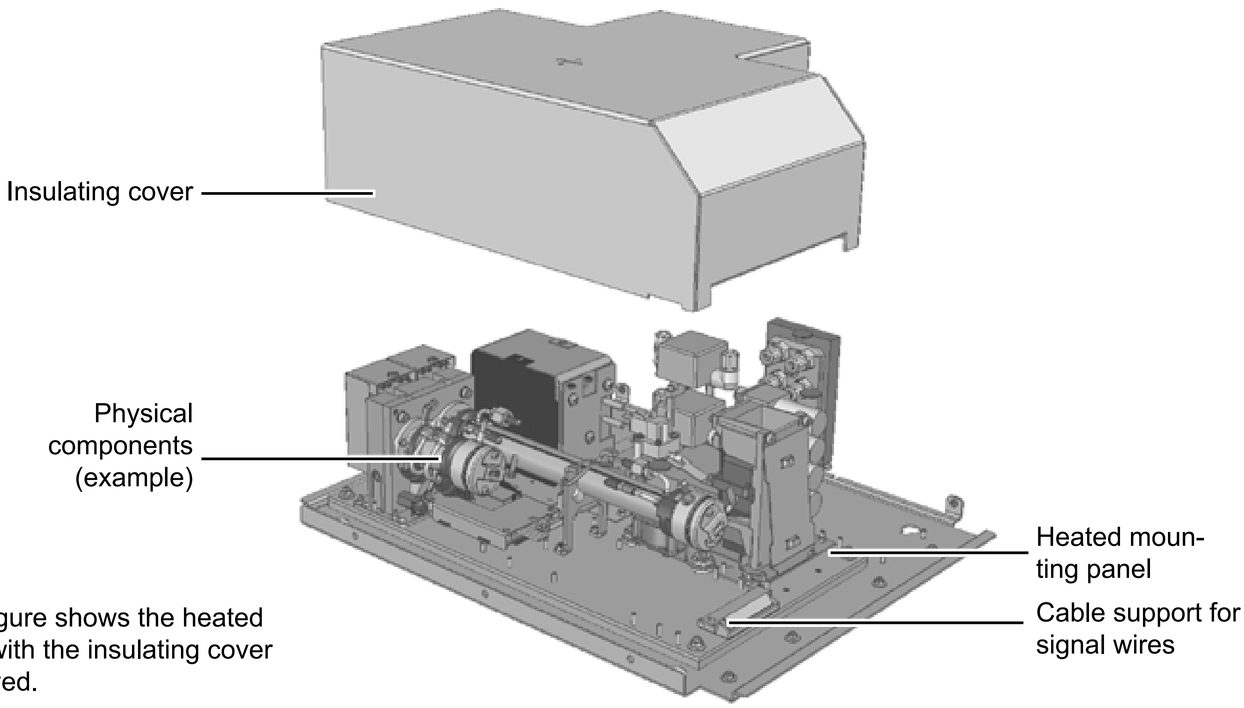
Firstly, the box allows the physical components to be regulated to a temperature of approx. 60 °C, avoiding condensation of gases or minimizing the influence of varying environmental temperatures.

Secondly, the box can be purged with, for example, inert gas. The purge gas is first fed through a separate fitting, purges the electronic components, then floods the box and leaves the instrument via another fitting.

Purging in this manner can be useful when measuring very low concentrations (e.g. of CO or CO_2): the expulsion of ambient air avoids adulterant outside influences.

Alternatively, purging can be used to secure enhanced protection for electronic parts and operators from corrosive or toxic gases: any leaking gas is expelled from the housing and does not escape into the vicinity of the unit or come into contact with any electronic components located outside the box.

In either case, the purge gas outlet should be connected to an exhaust gas line.



The figure shows the heated area with the insulating cover removed.

Fig. 1-2: *Optional Heated Area*

1.2 Configuration of Gas Lines

1.2.7 Alternative Configurations

Depending on the application and the selected analyzer options, alternative gas line configurations are available, exemplified in the following diagram of a dual-channel analyzer:

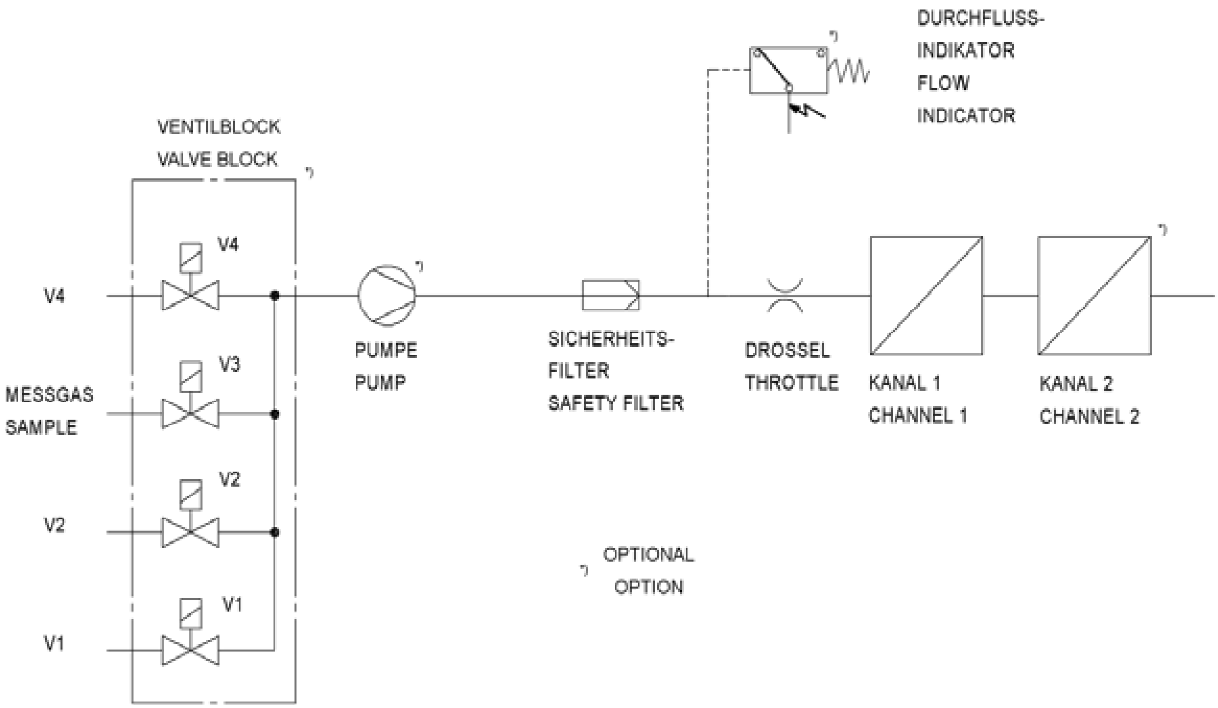


Fig. 1-3: *Gas Flow Diagram**: Single Channel Or in Series***

1.3 Interfaces

All analyzer types are fitted with one analog electrical output for each channel, four status relays, 2 Ethernet interfaces and a serial service interface as standard.

As an option, further interfaces can be added.

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

1.3.1 Analog Outputs

By default each X-STREAM analyzer is fitted with one output per channel, which can transmit data on concentration levels to an external data acquisition system. Up to four analog outputs can be installed.

The analog outputs support several operation modes, such as 4-20 mA, 0-20 mA, as well as the NAMUR NE 43 specifications (incl. Live Zero). Operation modes can be set in a software menu (☞ 6-63).

The factory setting for analog outputs is 4-20 mA.

X-STREAM analyzers support up to four analog outputs, which, however, do not always need to be assigned to measurement channels which are physically present: If a unit features less than four channels, the remaining analog outputs can be used to transmit concentration levels with a different resolution; for example, a single-channel analyzer could be set up as follows:

Output 1: 0 ... 100 % CO_2 = 4 ... 20 mA
Output 2: 0 ... 25 % CO_2 = 4 ... 20 mA

1.3.2 Status Relays

By default each analyzer provides four relays outputs, preconfigured to signal the current status of the unit according to the NAMUR NE 44 specification ('Failure', “Maintenance request”, 'Out of specification' and 'Function check'). However, the operator can assign different functions to the relays via software menus. For a comprehensive list of available functions, ☞ 6-68.

Note!
Any NE 44 status is also indicated by symbols appearing in the display´s 1st line. These symbols remain conformant to NE 44 even when the status relays are software assigned different functions.

Electrical details:

maximum load of 30 V / 1 A / 30 W,

can be operated as normally open (NO) or normally closed (NC).

Further information on the status relays is provided in the chapter 'Technical Data' ☞ 2-2.

1.3.3 Modbus Interface, Ethernet

The Ethernet Modbus interface offers the same form of communication with a data acquisition system as does a serial interface. Furthermore this interface enables to connect the analyzer to a network, providing web-browser access.

This interface is electrically isolated from the unit's electronic components and enables the construction of a network of several analyzers.

All supported Modbus parameters are listed in chapter 9.

Information about web-browser access is provided in chapter 7

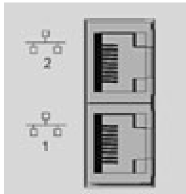


Fig. 1-4: *Ethernet Interface Marking*

Note!
All analyzers provide 2 Ethernet connectors: the upper marked "2" is configured to be used for network connection. The lower, marked "1" is for service purpose only!
Simultaneously connecting Ethernet and serial interface is not supported!

1.3.4 Serial Interface

A serial interface with the Modbus protocol allows communication with external data acquisition systems. The interface enables the exchange and modification of measurement and analyzer signals, analyzer status monitoring as well as remote activation of procedures.

The serial interface is electrically isolated from the unit's electronic components. RS 485 facilitates the construction of a network of several analyzers. RS 232 interface only supports communication between two end devices.

All supported Modbus parameters are listed in chapter 9.

A table nearby the connector shows the interface configuration (here: MODBUS)

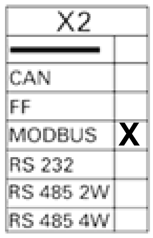


Fig. 1-5: *Serial Interface Marking*

1.3.5 USB Interfaces

Two USB connectors enable connecting

- storage devices to the bigger port for external data and analyzer configuration storage
- external computers to the smaller Mini USB port.

Chapter 7 provides more information on how to use USB ports.

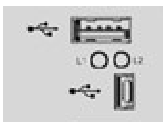


Fig. 1-6: *USB Interfaces*

1.3.6 Optional Interfaces

1.3.6.1 Analog Inputs

Two d. c. analog inputs enable connection to external devices. Their signals can be used for e.g.

- cross compensation
- pressure compensation, or
- handled as a separate measurement channels.

Electrical details:

0 - 1 (10) V , R_{in} = 100 kΩ

or

0 (4) - 20 mA, R_{in} = 50 Ω

The inputs are protected against overload up to ± 15 V or ± 20 mA.

1.3.6.2 Digital Outputs

In addition to the 4 default digital outputs, analyzers can optionally be upgraded with 9 or 18 more digital outputs (☞ 1-13), to be used for various purposes, e.g.:

- Triggering concentration alarms: Process control systems can detect when limits are exceeded and trigger appropriate actions.
- Switching external components: For example, during automatic calibration, the necessary valves can be activated directly by the analyzer.

The different functions can be assigned via software menus. For a comprehensive list of available functions, ☞ 6-68.

Electrical details:

maximum load of 30 V / 1 A / 30 W,

can be operated as normally open (NO) or normally closed (NC).

1.3.6.3 Digital Inputs

Digital inputs can be integrated into the units in groups of 7 or 14 (☞ 1-13).

Digital inputs can be used to:

- trigger calibration procedures, for example by a process control system
- remotely control valves and the optional sample gas pump (in concert with correctly configured digital outputs).

The different functions can be assigned via software menus. For a comprehensive list of available functions, ☞ 6-71 .

Electrical details:

D. C. inputs

LOW: $U_{in} \leq 1{,}5$ V

HIGH: $U_{in} \geq 4{,}5$ V

R_{in}: 57,5 kΩ

Common ground for all outputs (“IN-GND”)

The inputs are protected against excess voltages of up to approx. 40 V. An open (not wired) input has LOW potential.

1.4 Comparison of the Various X-STREAM Analyzer Models

X-STREAM XEGC

X-STREAM XEGP

½ 19 in housing, table-top or rackmountable, protection type: IP 20	1/1 19 in housing, table-top or rackmountable, protection type: IP 20
24V input with external power supply unit	Internal wide range power supply unit
Max. 3 channels: 2 photometer + 1 WLD/O_2 max. 6 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: 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, 2 Modbus Ethernet interfaces, 2 USB connectors *optional:* *1 interface card with 7 digital inputs and 9 digital outputs* *1 interface card with analog inputs* electrical interfaces accessible via sockets on back of unit, *optionally: screw-type terminal adapters (except for Ethernet & USB)*	1-4 analog outputs, 4 relay outputs, 2 Modbus Ethernet interfaces, 2 USB connectors *optional:* *1 or 2 interface cards, each with 7 digital inputs and 9 digital outputs* *1 interface card with analog inputs* electrical interfaces accessible via sockets on back of unit, *optionally: screw-type terminal adapters (except for Ethernet & USB)*
LCD	LCD
Operating ambient temperature: 0 °C to +50 °C (32 °F to 122 °F)	Operating ambient temperature: 0 °C to +50 °C (32 °F to 122 °F)
Size: (DxHxW): max. ca. 440x130x220 mm Weight: ca. 8 - 12 kg (17.6 - 26.5 lb)	Size: (DxHxW): max. ca. 411x133x482 mm Weight: ca. 11 - 16 kg (24.3 - 35.3 lb)
For more detailed information: 1-15	For more detailed information: 1-17

1.4 Comparison of Analyzer Models

X-STREAM XEF / XDF

X-STREAM XEFD

X-STREAM XEF / XDF	X-STREAM XEFD
Stainless steel wallmountable field housing, protection type: IP66 / NEMA 4X Single or dual 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 2 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, 2 Modbus Ethernet interfaces, 2 USB connectors *optional:* *1 or 2 interface cards, each with 7 digital inputs and 9 digital outputs* *1 interface card with analog inputs* electrical interfaces on internal screw-type terminal adapters (except for Ethernet & USB)	1-4 analog outputs, 4 relay outputs, 2 Modbus Ethernet interfaces, 2 USB connectors *optional:* *1 or 2 interface cards, each with 7 digital inputs and 9 digital outputs* *1 interface card with analog inputs* electrical interfaces on internal screw-type terminal adapters (except for Ethernet & USB)
LCD, impact tested front panel	LCD, impact tested front panel
Operating ambient temperature: -20 °C to +50 °C (-4 °F to 122 °F)	Operating 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 hazardous areas (explosive environments)
Size: (DxHxW): ca. 265x400 (815)x550 mm Weight: max. ca. 25 (45) kg / 55.1 (99.2) lb	Size: (DxHxW): max. ca. 222x512x578 mm Weight: max. ca. 63 kg (138.9 lb)
For more detailed information: ☞ 1-19	For more detailed information: ☞ 1-24

1.5 X-STREAM XEGC: ½ 19 Inch Table-Top Unit

This compact model for general purposes can be fitted with up to three photometer measurement channels (IR or UV) and one additional non-photometer channel (eO_2, pO_2 or WLD). Power is supplied by a separate external power supply unit.

By default the units are configured for tabletop use. For rack mounting an accessory kit can be ordered to either install 2 units alongside, or one single unit together with a blind plate.

Connection to power supply

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 connectors, Ethernet and USB connectors mounted on the rear panel of the device (fig. 1-5).
For applications where screw-type terminals are preferred, optional adapters are available, which are mounted directly onto the submin-D connectors.

Interface signals

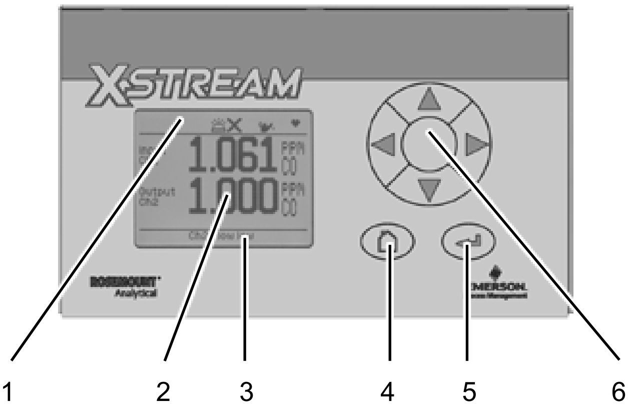
Detailed technical details on the various interfaces can be found at ☞ 1-10. The configuration of the connectors and the optional screw-type terminal adapters are described in ☞ chapter 4 'Installation' and the software settings in ☞ chapter 6 'Software'.

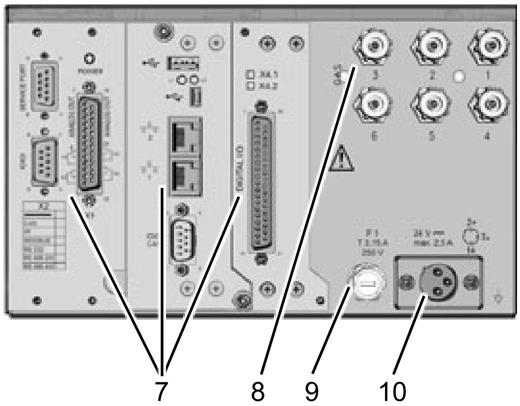
Gas connections

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 6 tube fittings mounted on the rear panel. The configuration of the fittings is indicated on an adhesive label located near the tube fittings.

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.

1.5 X-STREAM XEGC





1	Status line
2	Graphic display
3	Messages line
4	*HOME* key
5	*ENTER* key
6	4 keys for adjustment and menu selection

7	Signal connectors (some optional)
8	Gas fittings
9	Power input fuse
10	Power input connector

Fig. 1-7: *X-STREAM XEGC - Views*

1.6 X-STREAM XEGP: 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 1-6).

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

Interface signals

Detailed technical details on the various interfaces can be found at ☞ 1-10. The configuration of the connectors and the optional screw-type terminal adapters are described in ☞ chapter 4 'Installation' and the software settings in ☞ chapter 6 'Software'.

Up to two digital I/O cards may be installed, where the first digital I/O card is marked "X4.1" while the second is "X4.2" on the rear panel, right above the connector (fig. 1-6, rear view).

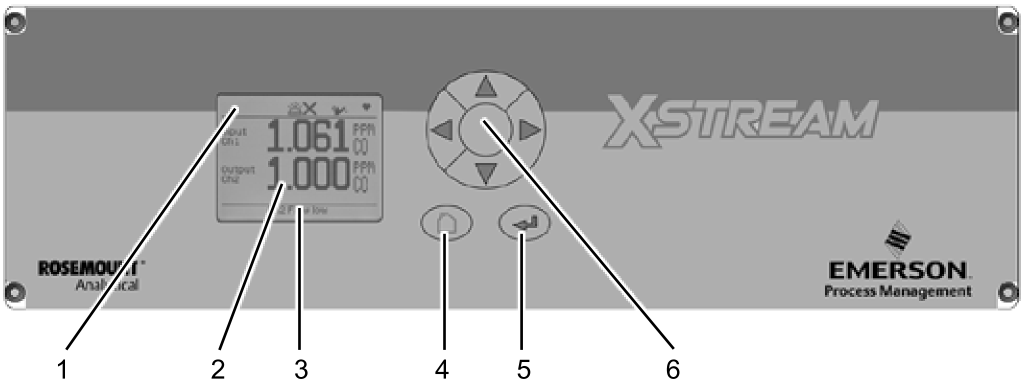
Gas connections

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.

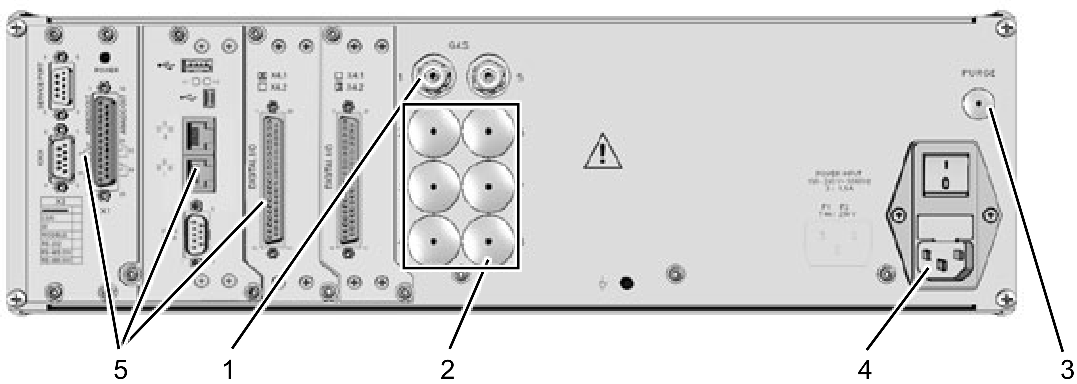
A further optional tube fitting enables the housing to be purged to minimize interference from the ambient atmosphere, or when measuring corrosive and/or flammable gases.

For further information, see ☞ 1-5.

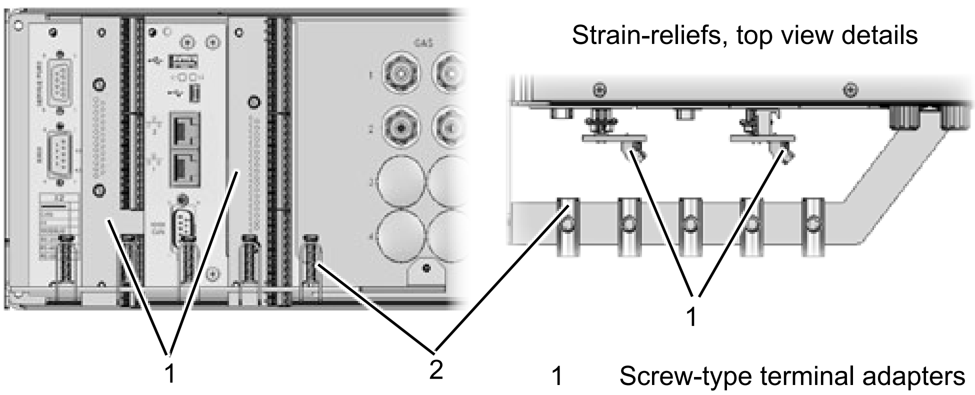
1.6 X-STREAM XEGP



1	Status line	4	*HOME* key
2	Graphic display	5	*ENTER* key
3	Messages line	6	4 keys for adjustment and menu selection



1	Gas connector fittings	4	Power inlet with filter, fuses & switch
2	Space for additional fittings	5	Signal input/output connectors (some optional)
3	Optional purge gas inlet		



1 Screw-type terminal adapters
2 Strain-reliefs

Fig. 1-8: *X-STREAM XEGP - Details*

1.7 X-STREAM XEF/XDF: Field Housing With Single Or Dual 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 XEF 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 on the underside of the unit (fig. 1-8). 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 of the housing, near the front. The wide range power supply unit mounted internally enables 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.

Detailed technical details on the various interfaces can be found at ☞ 1-10. The configuration of the screw-type terminal adapters are described in ☞ chapter 4 'Installation' and the software settings in ☞ chapter 6 'Software'.

Gas connections

Depending on the configuration of the unit (number of channels, series or parallel piping), up to eight tube fittings are provided for the supply of sample and calibration gases. The assignments of the fittings is given on an adhesive label situated near the fittings.

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.

For further information, see ☞ 1-5.

Dual compartment variation XDF

The dual compartment variation XDF supports separating electronics and physics, e.g. for measurement of corrosive or solvent gases. For such applications the electronics are installed in the upper compartment, while measurement physics are in the lower compartment.
XDF also provides more space e.g. for installation of optional signal converter elements for system integrators.

1.7 X-STREAM XE Field Housing

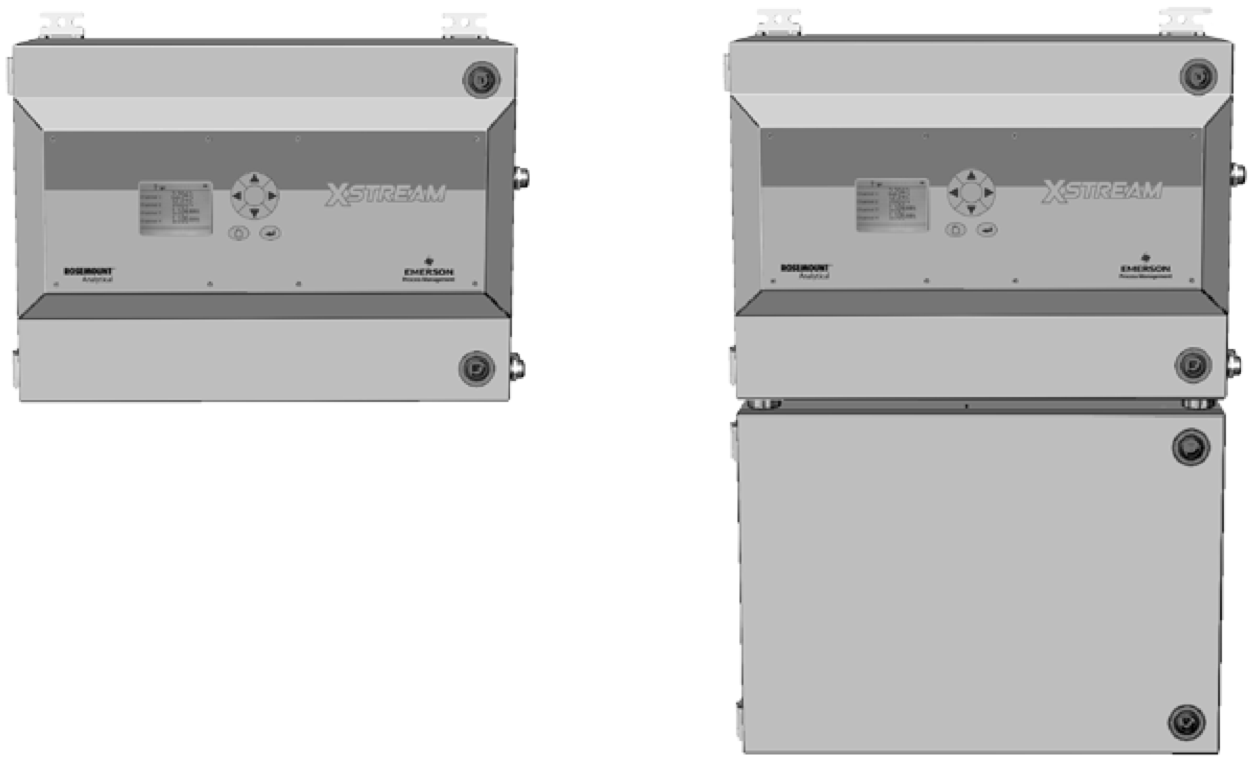


Fig. 1-9: *X-STREAM XEF / XDF- Front Views*

⚠ CAUTION

HEAVY INSTRUMENT

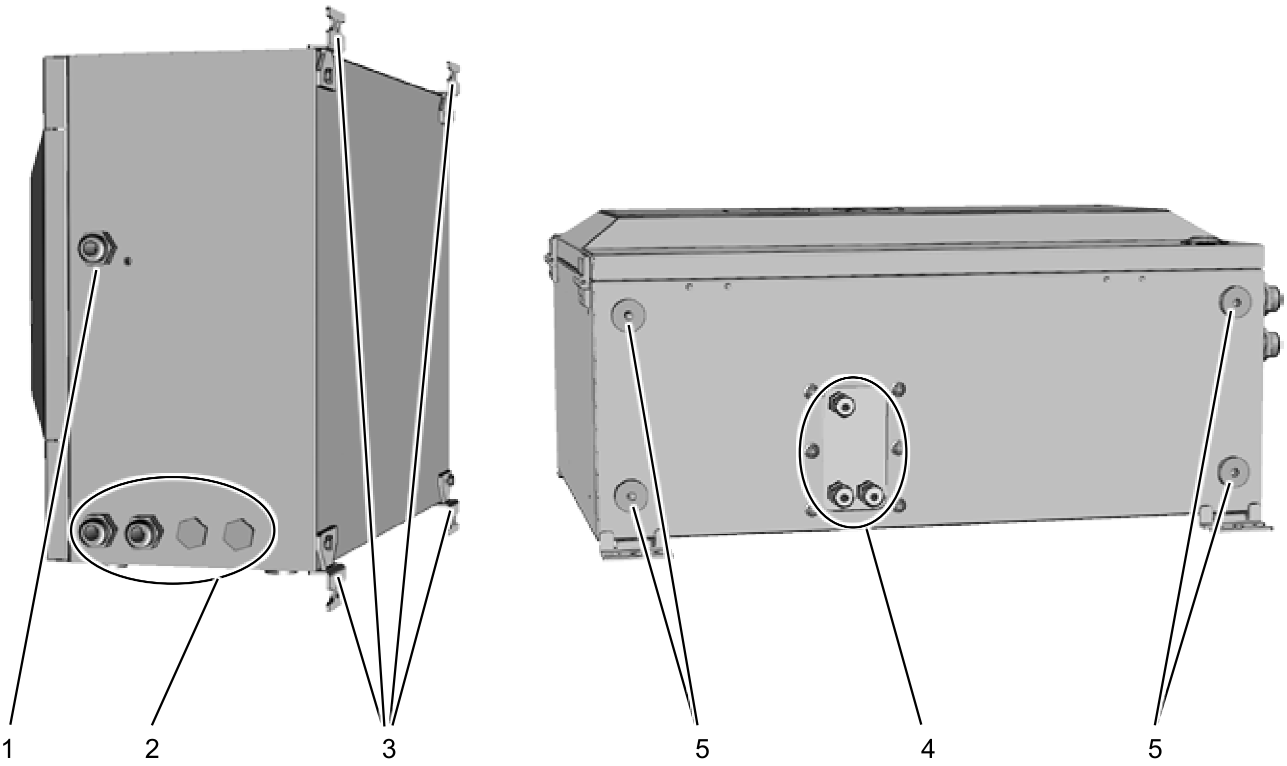
X-STREAM field housings, intended for outside and wall mounted use, weigh approx. (XEF) 26 kg (57 lb) or (XDF) 45 kg (99 lb), depending on options installed.

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!

1.7 X-STREAM XE Field Housing

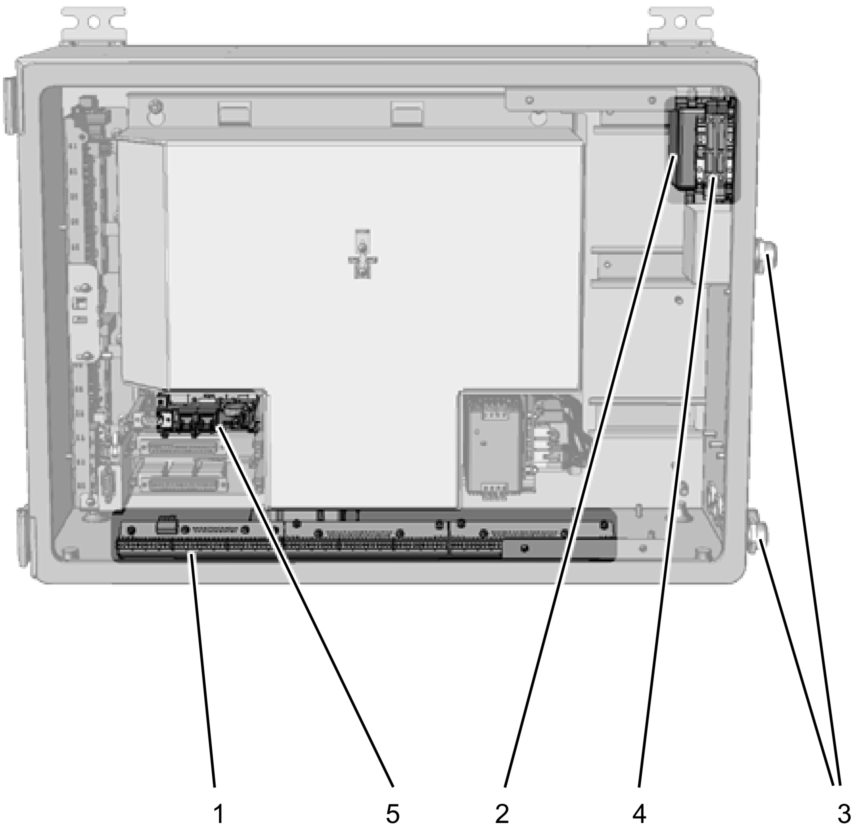


1 Cable gland for power cable
2 Cable glands for signal cables
3 4 brackets for wall-mounting
4 Gas in- & outlets (max. 8)
5 Cutouts, to combine 2 housings (here closed)

Note!
In case of XDF, 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. 1-10: *X-STREAM XEF - Right Side and Bottom View*

1.7 X-STREAM XE Field Housing



(shown with front panel removed)

1 Screw-type terminals for signal cables
2 Power line filter
3 Cable glands
4 Power supply terminals with integrated fuses
5 Ethernet and USB connectors

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

Fig. 1-11: *X-STREAM XEF - Power Supply and Signal Terminals*

1.7 Field Housings in Hazardous Areas

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

WARNING

EXPLOSION HAZARD

X-STREAM XEF and XDF models CAN 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 field housing analyzer models can be used in Ex-zones 1, 2 or Div 2:

X-STREAM XEFN/XDFN:

These analyzer variations feature a protection concept called "non-incendive", 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 XEFS/XDFS:

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 XEFZ/XDFZ:

Equipped with a simplified pressurization system, 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.

1.8 X-STREAM XEFD: Cast Aluminum Flameproof Housing

The most obvious X-STREAM XEFD analyzer feature is its flameproof housing (fig. 1-10). This enables its use in Ex-zone 1 hazardous environments. With a protection type of IP66/ NEMA Type 4X and sturdy cast aluminum housing designed for wall-mounting, it can also be used in other tough environments.

*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.*

Up to four measuring channels in any combination can be installed in the X-STREAM XEFD. Optionally, a cover can be installed over the physical components. This separate volume can be heated up to a maximum temperature of 60 °C to minimize the effects of changes in external temperature.

Front panel

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

Electrical connections

Electrical connections are made via internal screw-type terminals; the corresponding cables are fed through cable inlets on the underside of the unit into the housing (fig. 1-12). The front of the unit opens downwards once the screws located on the surrounding flange are removed.

Connection to power supply

Mains power is connected via screw-type terminals with integrated fuses, located in the front right-hand area of the housing. The internally mounted wide range power supply unit ensures, the analyzers can be used worldwide.

Interface signals

Up to two digital I/O cards may be installed, where terminal strip for the first digital I/O card is marked "X4.1" while the second is "X4.2" on a label near the terminals.

Detailed technical details on the various interfaces can be found at ☞ 1-10. The configuration of the screw-type terminal adapters are described in ☞ chapter 4 'Installation' and the software settings in ☞ chapter 6 'Software'.

Gas connections

Depending on the configuration of the unit (number of channels, series or parallel piping), up to eight flame arresters are provided for the supply of sample and calibration

⚠ WARNING

EXPLOSION HAZARD

The special conditions for installing and operating analyzers in hazardous areas are not covered by this manual!

Read the separate instruction manuals shipped together with instruments intended to be installed in hazardous area!

1.8 X-STREAM XEFD

gases. The assignments of the connectors is given on an adhesive label situated near the connectors.

Optional two of the fittings may be used to purge the housing to minimize interference from the ambient atmosphere, or when measuring corrosive and/or flammable gases. In this situation special conditions apply for operation in hazardous areas, described in the separate manual addendum for hazardous areas.

For further information on operation in general purpose environments, see ☞ 1-5.

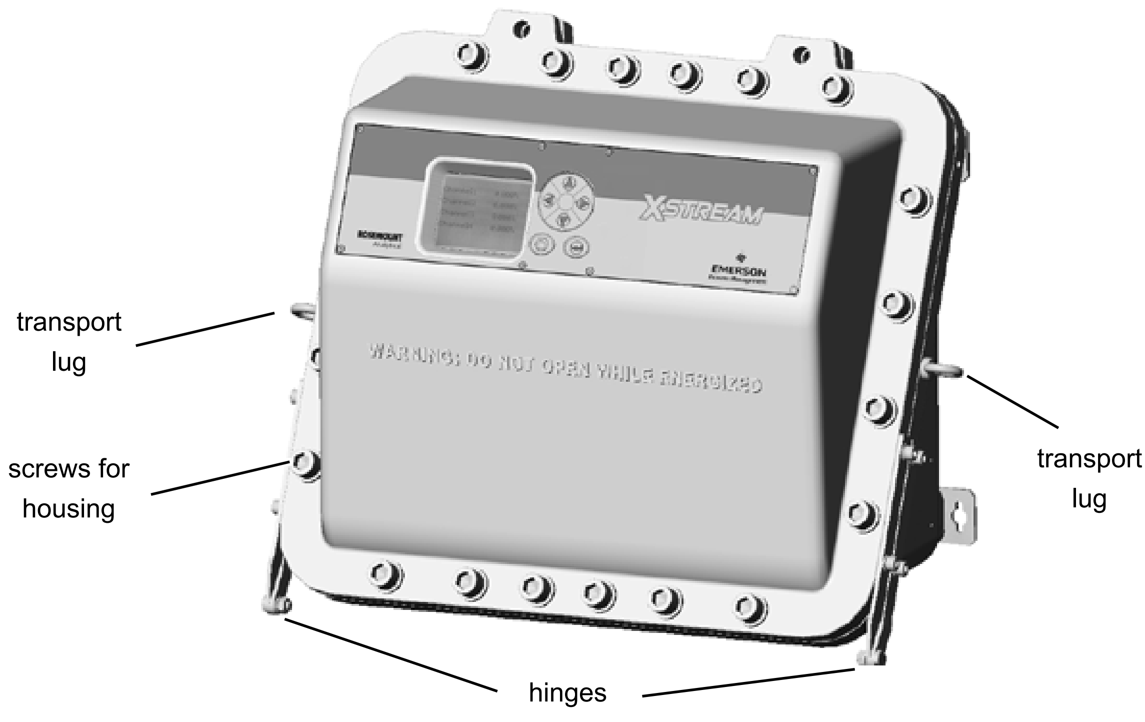
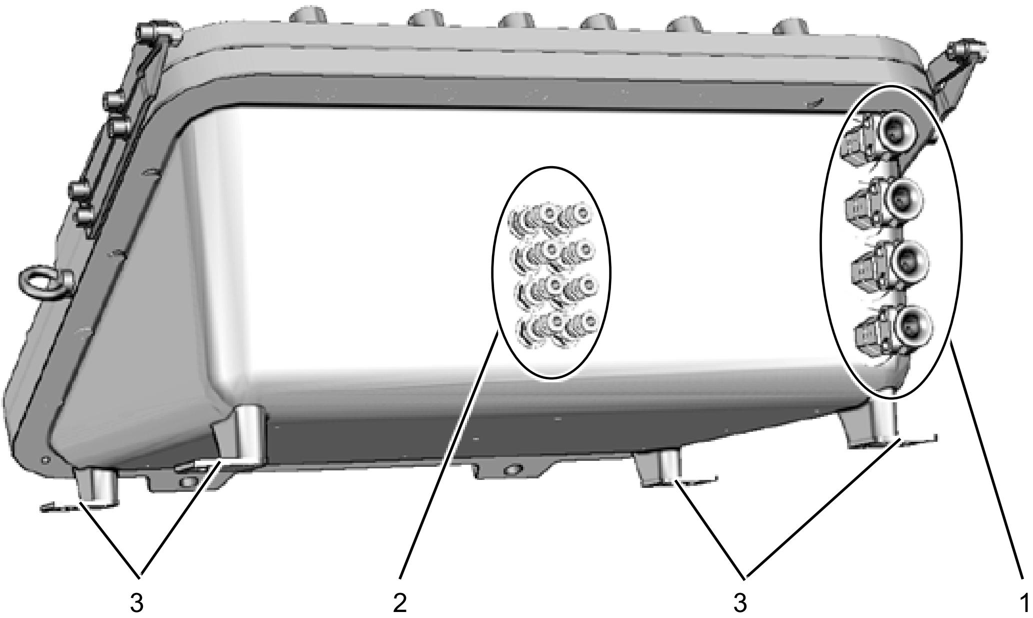


Fig. 1-12: *X-STREAM XEFD - Front View*

1.8 X-STREAM XEFD



1 Cable inlets for power and signal cables
2 Gas tube fittings, protected by flame arrestors
3 4 brackets for wall mounting

Fig. 1-13: *X-STREAM XEFD - Bottom View*

CAUTION

HEAVY INSTRUMENT

The model X-STREAM XEFD, intended for outside and wall mounted use, weighs approx. 63 kg (139 lb), depending on options installed.

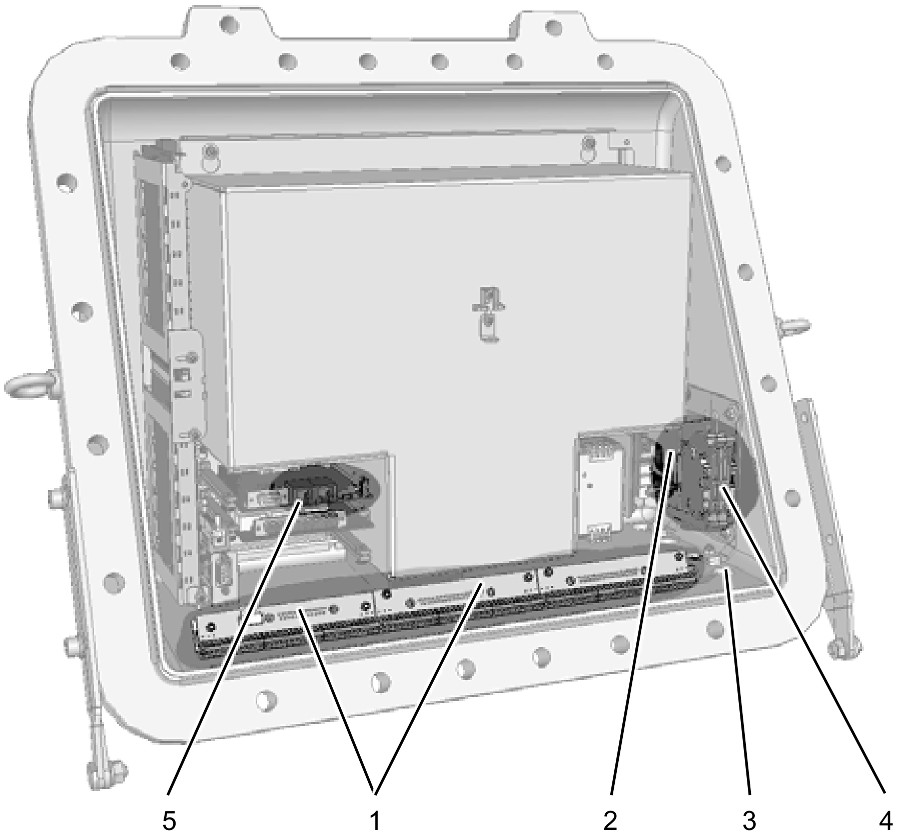
Two people and/or lifting equipment is required to lift and carry these units. Use the transport lugs located on the sides of the instrument.

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!

1.8 X-STREAM XEFD

(shown with front
panel removed)



1 Terminals for signal cables (shown fully populated)
2 Power line filter
3 Cable inlets for power and signal cables
4 Power supply terminals with integrated fuses
5 Ethernet and USB connectors

Fig. 1-14: *X-STREAM XEFD - Terminals*

Chapter 2
Technical Data

This chapter contains all the technical details of the analyzers, divided into common and model-specific data.

2.1 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 (except flameproof XEFD) without additional safety measures.
Certification	
Electrical safety	
CAN / USA	CSA-C/US, based on CAN/CSA-C22.2 No. 61010-1-04 / UL 61010-1, 2nd edition
Europe	CE, based on EN 61010-1
Electromagnetic compatibility	
Europe	CE, based on EN 61326
Australia	C-Tick
others	NAMUR

Gas parameters

Chapter 3 “Measuring principles”

Purging option

The purging 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.**

To minimize cross interferences the purge gas also has to be free of components to be measured.

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

For information about values for pressure and flow, please contact your nearest EMERSON Process Management sales office.

2.1 Common Technical Data

Interfaces, signal inputs and outputs

Interface signals are accessed in different ways depending on the analyzer model:

X-STREAM XEGC, XEGP: standard: subminD plugs and sockets
optional: screw-type terminal adapters

X-STREAM XEF, XDF, XEFD: internal screw-type terminals

All versions provide a 2 RJ45 plugs for Ethernet connections as well as 1 USB and 1 mini USB connector (field housings internally only).

All models are supplied with		
up to 5 analog outputs (standard: 1 analog output per channel)	electrical specification	4 (0) - 20 mA ($R_B \leq 500\ \Omega$) optically isolated from each other and from analyzer electronics
	function	user-configurable activation and deactivation of concentration levels support for NAMUR NE 43 operation modes, configurable via keypad and Modbus
4 relay outputs	electrical specification	dry contacts max. load. 30 V; 1 A; 30 W resistive
	function	Each output can be configured to one of the following functions: NAMUR NE 107 status signal 'Failure' 'Maintenance request' 'Out of specification' 'Function check' 1 of 2 concentration limits per channel, Control signals for external valve V1 ... V8, external sample gas valve external pump zoom status for analog outputs
2 Modbus interfaces		Ethernet (RJ45 sockets)
2 USB ports	specification	USB 1.0
	function	1 USB connector type A, for connecting external storage devices 1 USB connector type mini AB, for connecting external computers

2.1 Common Technical Data

Optional interfaces for all models		
Digital I/O board		
7 or 14 digital inputs (X-STREAM XEGC: max. 7 in-puts)	electrical specification	max. 30 V, internally limited to 2.3 mA HIGH: min. 4 V; LOW: max. 3 V common GND
	function	Each input can be configured to one of the following functions: Open valve V1 ... V8 Open sample gas valve Activate sample gas pump Zero calibrate all channels Span calibrate all channels Zero and span calibrate all channels Abort calibration Zoom analog output 1 Zoom analog output 2 Zoom analog output 3 Zoom analog output 4
9 or 18 additional relay outputs (X-STREAM XEGC: max. 9 add. outputs)	electrical specification	Dry relay change-over contacts can be used as NO or NC max. load. 30 V; 1 A; 30 W resistive
	function	Each output can be configured to one of the following functions: NAMUR NE 107 status signal 'Failure', 'Maintenance request' 'Out of specification' or 'Function check' 1 of 2 concentration limits per channel, Control signals for external valve V1 ... V8, external sample gas valve, external pump, zoom status for analog outputs

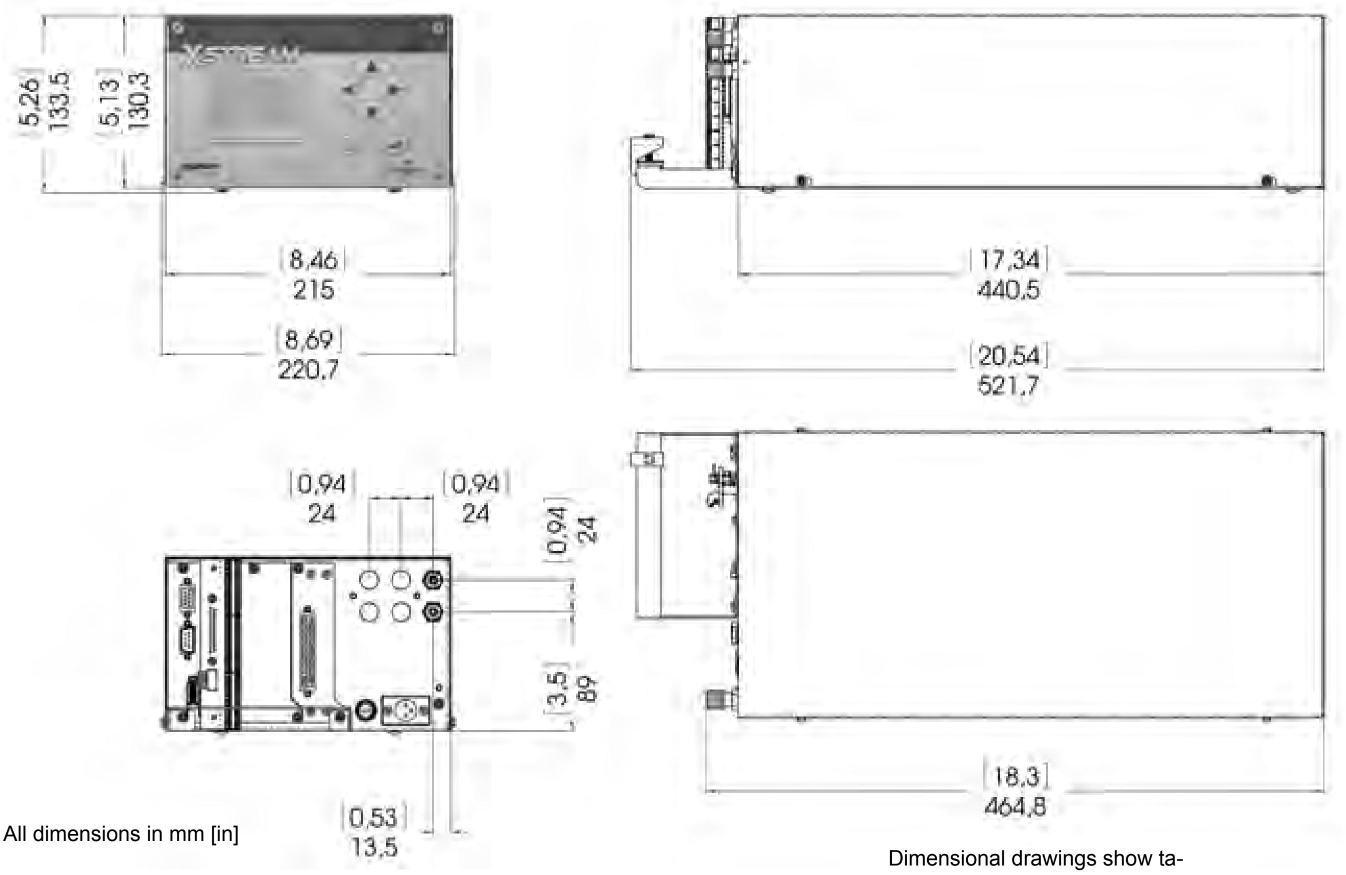
2.1 Common Technical Data

Optional interfaces for all models		
Analog I/O board		
2 analog inputs	electrical specification	0 - 1 V, 0 - 10 V (software selectable) R_{in} = 100 kΩ optional (requires to fit wire bridges, ☞ Chapter 4 'Installation'): 4 (0) - 20 mA ; R_{in} = 50 Ω optically isolated from analyzer GND protected against overload up to ± 15 V or ± 20 mA
	function	Input analog signals from external devices, such as e.g. pressure transmitters, flow sensors, analyzers, etc. for compensation or other purposes
Serial Interface		
1 Interface	electrical specification	9-pin,optically isolated from analyzer electronics
	function	RS232C, RS485 or Modbus

Special Interface		
Service Interface		
1 serial	electrical specification	RS232C, **NOT optically isolated from analyzer electronics**
	function	**Only for special trained service personnel!**

2.2 Model-Specific Technical Data

2.2.1 X-STREAM XEGC: ½ 19 Inch Tabletop Unit



All dimensions in mm [in]

Dimensional drawings show tabletop version with strain-reliefs and screw-type terminals.

Fig. 2-1: *X-STREAM XEGC - Dimensions*

1 Power connector
2 Fuse holder
3 Signal connectors
(some optional; CAN projected)

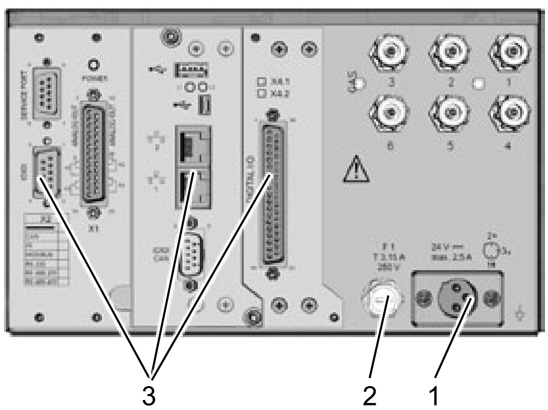


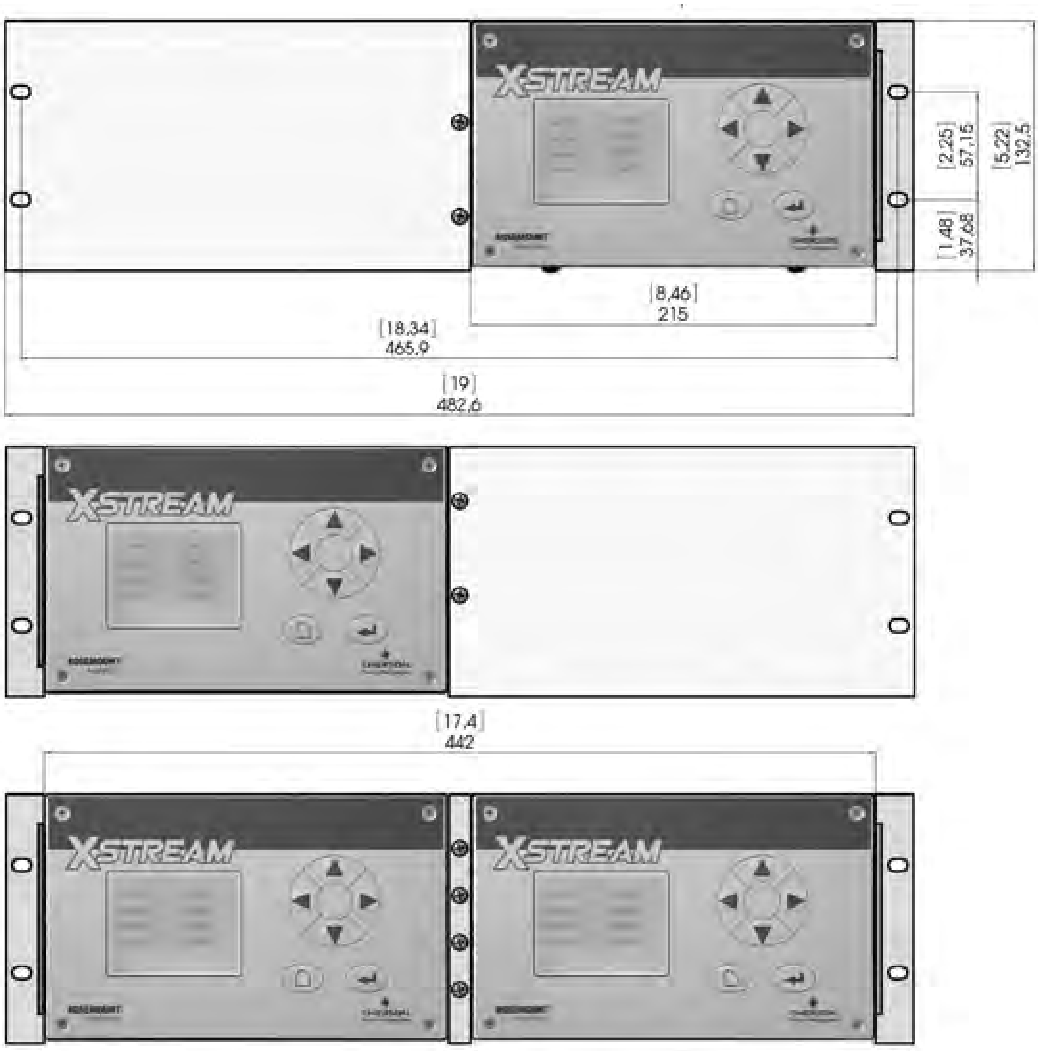
Fig. 2-2: *X-STREAM XEGC - Connectors and Fuse*

2.2.1 Model-Specific Technical Data: X-STREAM XEGC

Analyzer with blindplate to the left

Analyzer with blindplate to the right

Two analyzers in a rack



All dimensions in mm [in]

Fig. 2-3: *X-STREAM XEGC - Rack Mounting Options*

2.2.1 Model-Specific Technical Data: X-STREAM XEGC

Temperatures	
operational	0 ... +50 °C / 32 ... 122 °F
storage	-20 ... +70 °C / -4 ... -158 °F
Weight, max	8 ... 12 kg / 17.6 ... 26.5 lb
IP or Type rating	IP 20 for indoor use, protected against dripping water and direct sun light
Gas connections	
max number	6
max for purging (incl. / separate)	2 incl.
material	PVDF; stainless steel (opt.)
sizes	6/4 mm; ¼"
Power supply unit	wide range, external
Power supply	Mains supply voltage fluctuations are not to exceed +/- 10 percent of the nominal voltage
nominal voltage	DC 24 V
voltage range	DC 10 ... 30 V
nominal input current, max	2.5 A
Power input fuses	AC 230 V / T 3.15 A / 5x20 mm
Electrical in- and outputs	
power	3-pin XLR connector
signals	signal cables are connected using submin-D plugs or sockets on the unit’s rear panel
optional	terminals adaptors, to be installed onto the submin-D connec-tors
special	Ethernet: RJ45 socket; USB connectors

2.2.1 Model-Specific Technical Data: X-STREAM XEGC

2.2.1.1 Data for Optional External Power Supply Units

Model UPS 01 T

This PSU can be ordered as an option for supplying power to one tabletop unit.

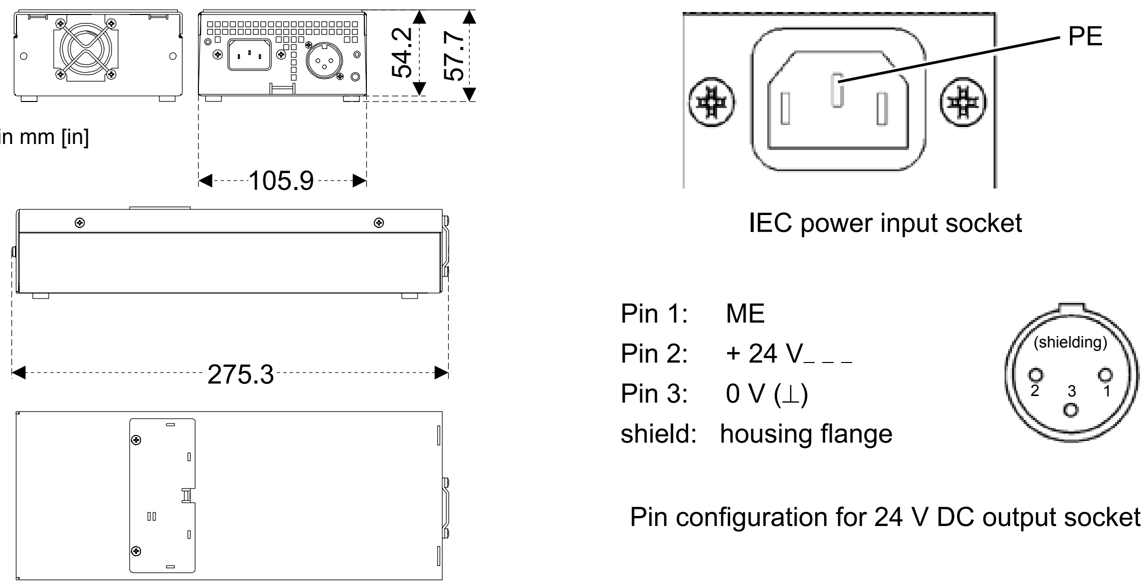


Fig. 2-4: *UPS 01 Tabletop Power Supply Unit*

Nominal input voltage	120 / 230 V~ 50/60 Hz
Input voltage range	95 - 138 V~ / 187 - 264 V~, 47 - 63 Hz
Power consumption	max. 240 VA
Input	via rubber connector (IEC plug; ☞ fig. 2-4).
Power input fuses	The PSU does not include user-replaceable fuses.
Nominal output voltage	24 V⎓ (+- 5 %)
Nominal output current	5 A
Surge protection	current limiting typ. 110% I_{nom}, straight response curve, short-circuit-proof
Excess temperature protection	reduction of output voltage to disconnection. Resets after cooling.
Output	3-pin XLR socket
Weight	approx. 2.5 kg (4.8 lb)
Certification	
Safety	EN 60950, UL1950, CSA22.2 NO 950-95
EMC	EN 50081-1 (emitted interference) EN 50082-2 (interference resistance), et al

2.2.1 Model-Specific Technical Data: X-STREAM XEGC

This PSU can optionally be ordered for rack installation.
Two variations are available:

- with blind front panel, connectors at the rear side
- with rear panel, connectors to the front.

Both variations are fixed to the rack by means of screws at the panels.

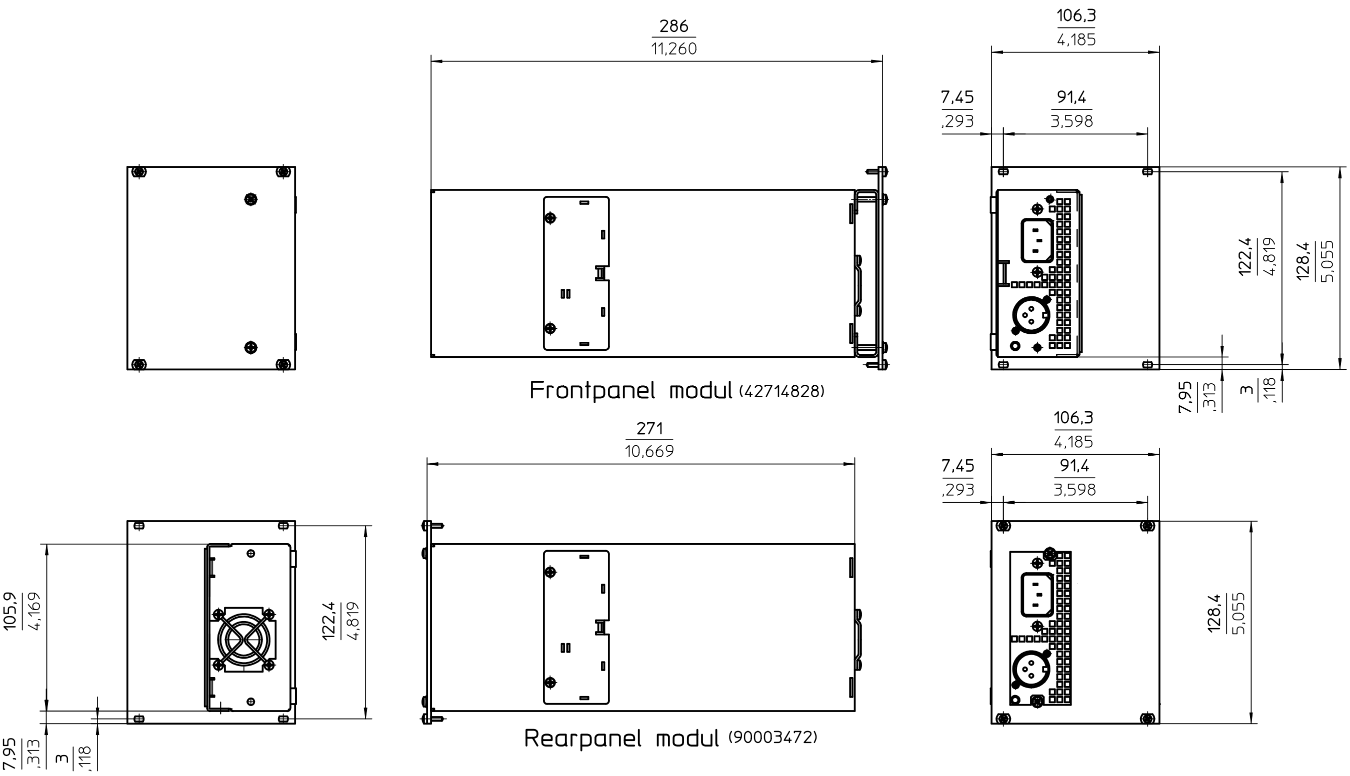
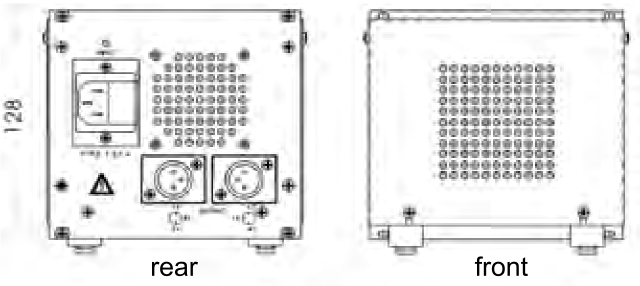


Fig. 2-5: *UPS 01 Power Supply Unit for Rack Installation*

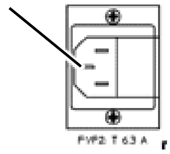
2.2.1 Model-Specific Technical Data: X-STREAM XEGC

Model 10 A tabletop PSU

This PSU can optionally be ordered for powering 2 tabletop units with a single common power supply.

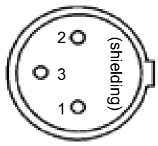


All dimensions in mm [in]



IEC power input connector with fuse-holder

Pin 1: ME
Pin 2: + 24 V⎓
Pin 3: 0 V (⊥)
shield: housing flange



Pin configuration for 24 V DC output socket

Fig. 2-6: *10 A Tabletop PSU*

Nominal input voltage	100-120 / 220-240 V∼ 50/60 Hz (Nominal voltage not to be changed by operator)
Input voltage range	85 - 132 / 176 - 264 V, 47 - 63 Hz
Input current	max. 240 VA
115 V setting	< 6 A
230 V setting	< 2.8 A
Input	via rubber connector (IEC plug; ☞ fig. 2-6).
Power input fuses	AC 230 V / T 6.3 A / 5x20 mm
Nominal output voltage	24 V⎓ (+ 5 / -1 %)
Nominal output current	max. 10 A, limited to 5 A per output
Surge protection	protection against short-circuits, power surges and no-load running
Excess temperature protection	derating from 60 °C /140 °F
Power loss	typ. 29 W (230 V∼; 24 V, 10 A)
Output	two 3-pin XLR socket
Weight	approx. 2 kg / 4.4 lb
Certification	*(for internal power supply module only)*
Safety	EN 60950, EN 50178, UL1950, UL/CSA-22.2 No 950-M90
EMC	EN 50081-1, class B (emitted interference), EN 50082-2, class A (interf. resistance), et al
Recommended clearance	15 mm / 0.6" in front and behind

2.2.2 X-STREAM XEGP: 19 Inch Tabletop and Rack-Mount Models

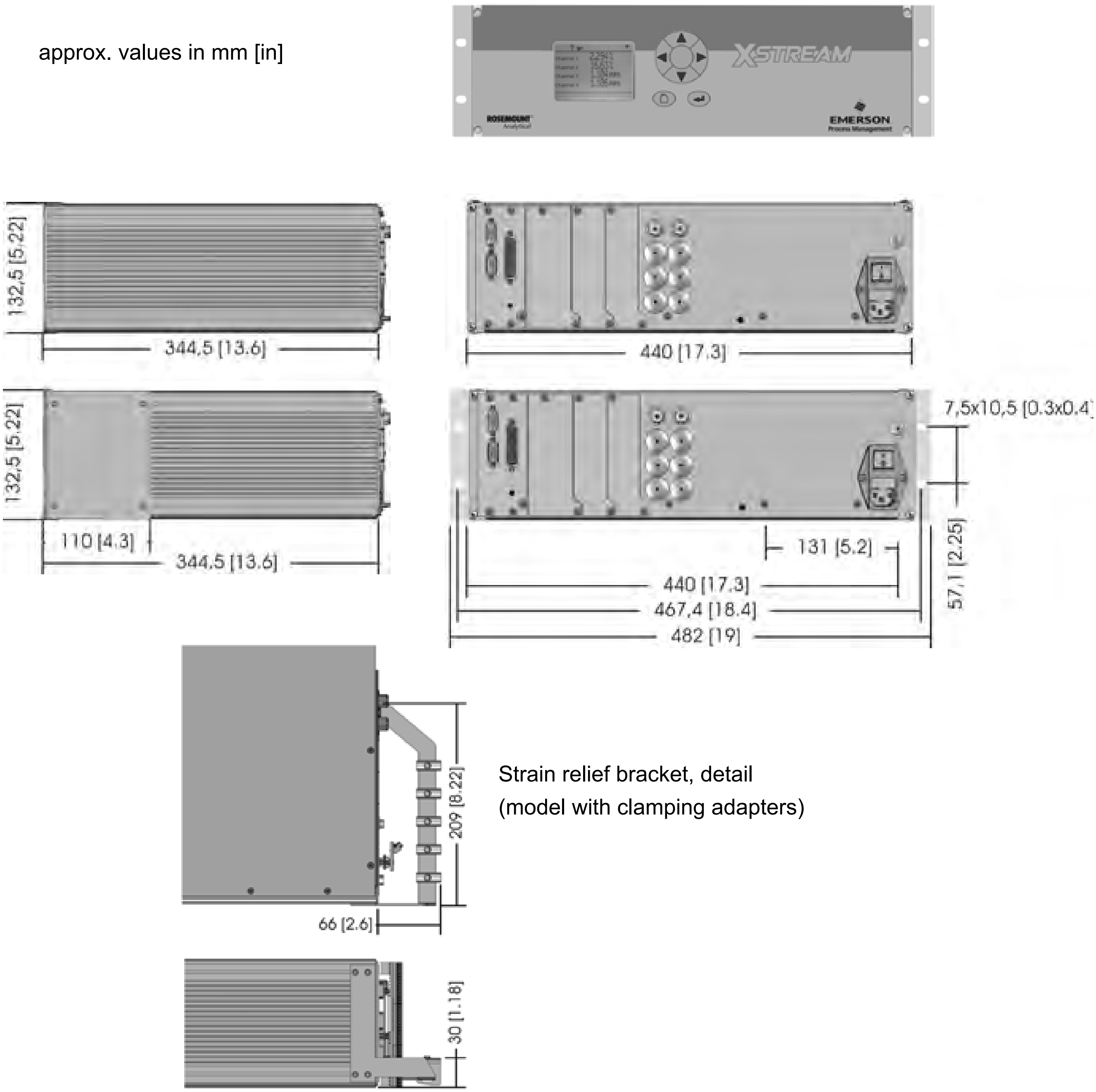
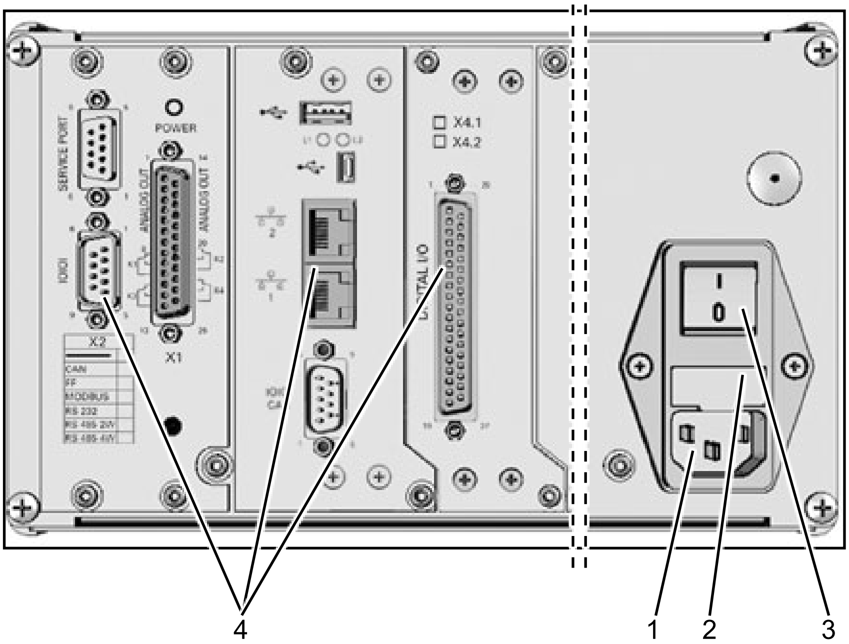


Fig. 2-7: *X-STREAM XEGP - Dimensions*

2.2.2 Model-Specific Technical Data: X-STREAM XEGP

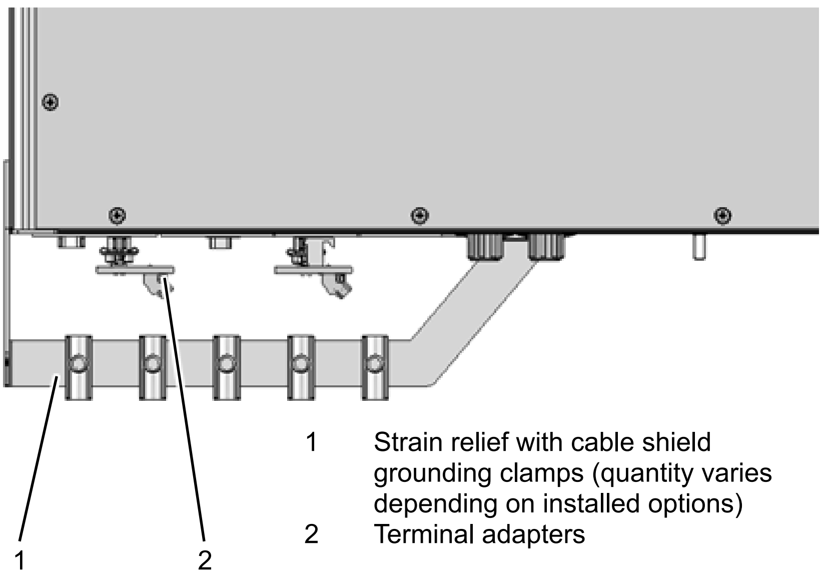
Temperatures	
operational	0 ... +50 °C / 32 ... 122 °F
storage	-20 ... +70 °C / -4 ... -158 °F
Weight, max	12 ... 16 kg / 26.5 ... 35.3 lb
IP or Type rating	IP 20 for indoor use, protected against dripping water and direct sun light
Gas connections	
max number	8
max for purging (incl. / separate)	1 separate.
material	PVDF; stainless steel (opt.)
sizes	6/4 mm; ¼"
Power supply unit	wide range, internal
Power supply	Mains supply voltage fluctuations are not to exceed +/- 10 percent of the nominal voltage
nominal voltage	100 - 240 V∿ 50 / 60 Hz
voltage range	85 - 264 V∿ 47 - 63 Hz
nominal input current, max	
standard, max	1.3 - 0.7 A
w/ temperature control, max	3 - 1.5 A
Power input fuses	AC 230 V / T 4 A / 5x20 mm
Electrical in- and outputs	
power	IEC connector with integrated power switch & fuse holders
signals	signal cables are connected using submin-D plugs or so-ckets on the unit's rear panel
optional	terminals adaptors, to be installed onto the submin-D con-nectors
special	Ethernet: RJ45 socket; USB connectors

2.2.2 Model-Specific Technical Data: X-STREAM XEGP

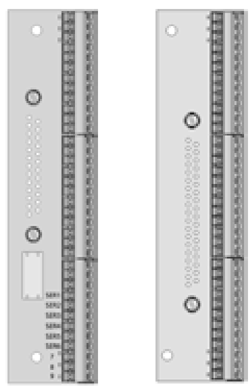


1	Power connector	3	Power switch
2	Fuse holder	4	Signal connectors (some optional; CAN projected)

Fig. 2-8: *X-STREAM XEGP - Power Supply and Signal Connections*



1 Strain relief with cable shield grounding clamps (quantity varies depending on installed options)
2 Terminal adapters

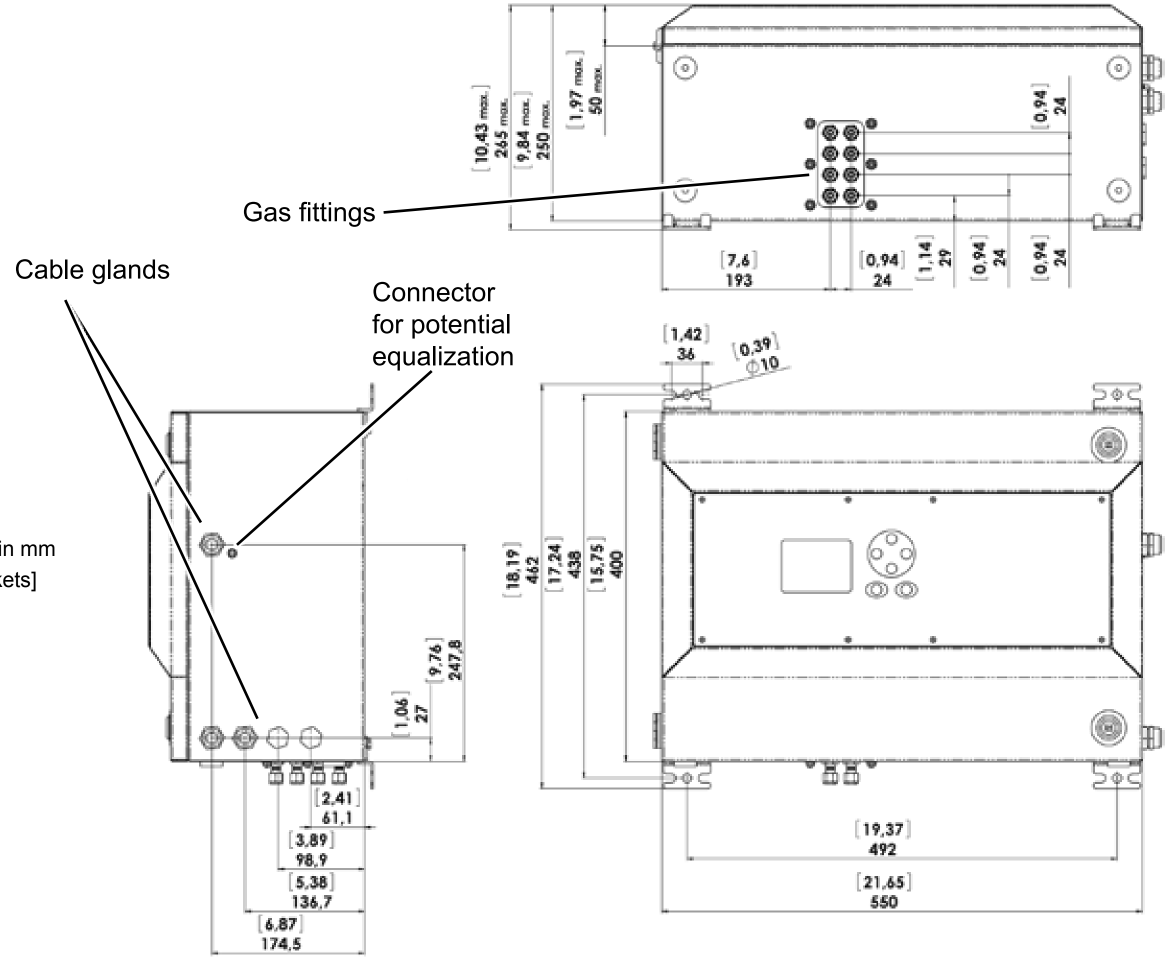


Terminal adapters (detail)

Fig. 2-9: *X-STREAM XEGP - Signal Connections With Screw-Type Terminal Adapters (top View)*

2.2.3 Model-Specific Technical Data: X-STREAM XE Field Housing

2.2.3 X-STREAM XEF/XDF: Single/Dual Compartment Field Housing



All dimensions in mm
[inches in brackets]

Fig. 2-10: *X-STREAM XEF - Dimensions*

2.2.3 Model-Specific Technical Data: X-STREAM XE Field Housing

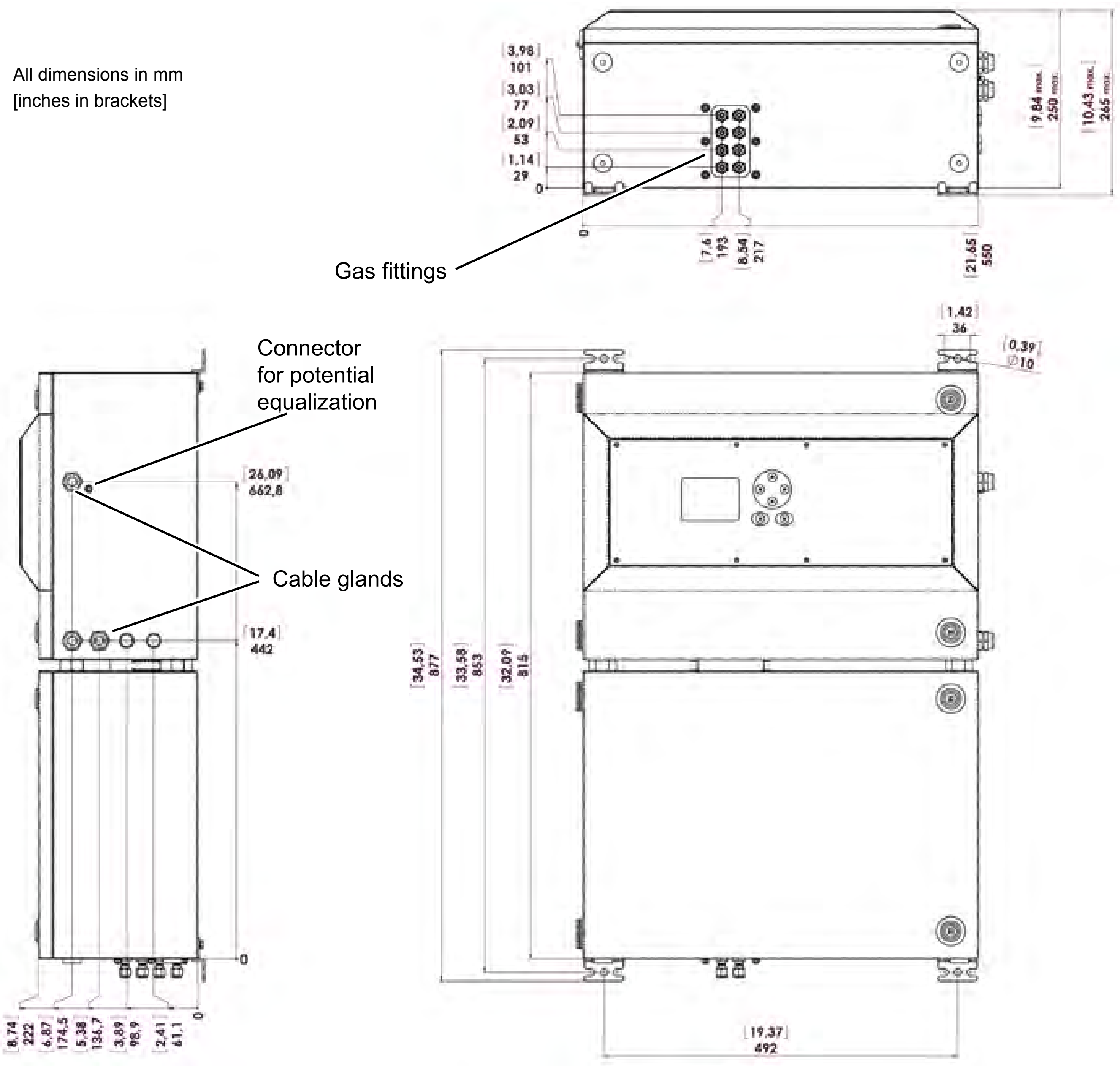
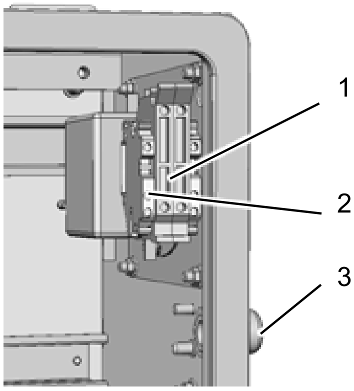


Fig. 2-11: *X-STREAM XDF - Dimensions*

2.2.3 Model-Specific Technical Data: X-STREAM XE Field Housing

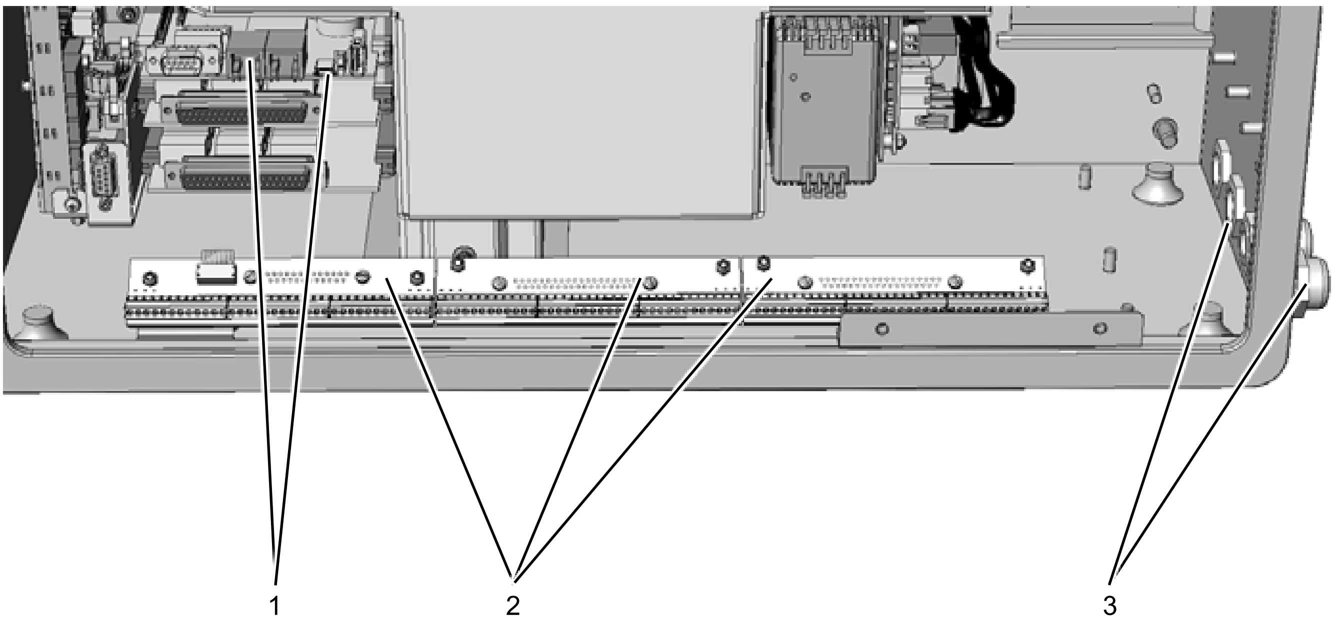
Temperatures	
operational	0 (-20) ... +50 °C / 32 (-4) ... 122 °F
storage	-20 ... +70 °C / -4 ... -158 °F
Weight, max	
XEF	up to approx. 25 kg / 55.1 lb
XDF	up to approx. 45 kg / 99.2 lb
IP or Type rating	IP 66, Type 4X for outdoor use, protected against direct sun light
Gas connections	
max number	8
max for purging (incl. / separate)	1 separate.
material	stainless steel
sizes	6/4 mm; ¼"
Power supply unit	wide range, internal
Power supply	Mains supply voltage fluctuations are not to exceed +/- 10 percent of the nominal voltage
nominal voltage	100 - 240 V∿ 50 / 60 Hz
voltage range	85 - 264 V∿ 47 - 63 Hz
nominal input current, max	
XEF	
standard, max	1.3 - 0.7 A
w/ temperature control, max	3 - 1.5 A
XDF	
standard, max	1.5 - 0.8 A
w/ temperature control, max	5.5 - 3 A
Power input fuses	AC 230 V / T 6.3 A / 5x20 mm
Electrical in- and outputs	
power	screw terminals with integrated fuse holders, max. 4 mm² / 11 AWG
signals	screw terminals, max. 1.5 mm² / 15 AWG
special	Ethernet: RJ45 socket; USB connectors
Cable entries	Cable glands, IP 68
permissible cable outer dia	7 ... 12 mm / 0.27" ... 0.47"

2.2.3 Model-Specific Technical Data: X-STREAM XE Field Housing



1 Power supply terminals with fuse holders
2 Grounded conductor clamp (PE)
3 Power supply cable entry

Fig. 2-12: *X-STREAM XE Field Housing - Power Supply Terminals / Fuse Holders*



1 Ethernet & USB (CAN projected)
2 Analog & digital I/O terminal strips
3 Max. 4 signal cables entries

Note!
Depending on the actual analyzer configuration not all shown terminal strips may be installed!

Fig. 2-13: *X-STREAM XE Field Housing - Signal Terminals*

2.2.4 X-STREAM XEFD: Flameproof Housing

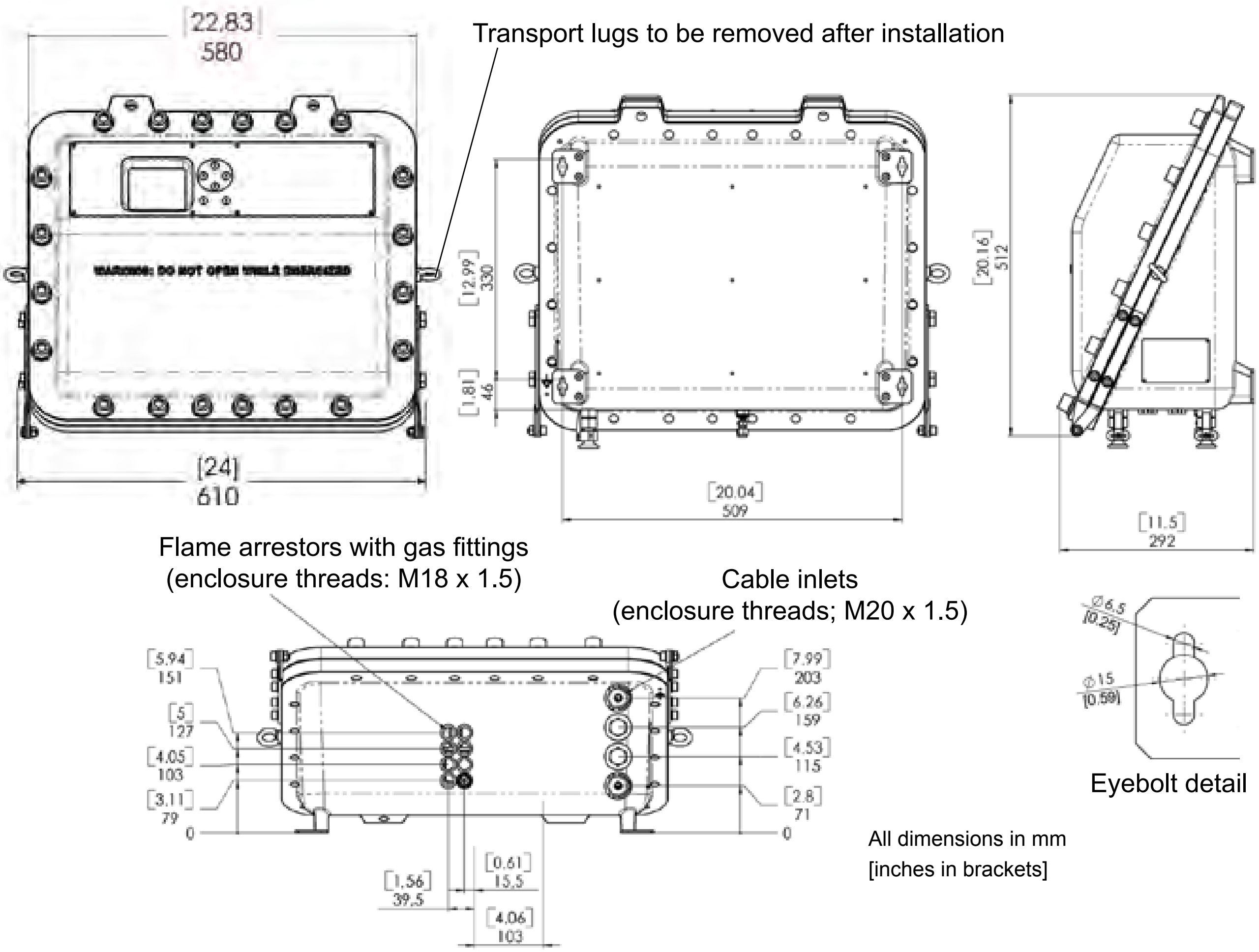


Fig. 2-14: X-STREAM XEFD - Dimensions

2.2.4 Model-Specific Technical Data: X-STREAM XEFD

Temperatures	
operational	0 (-20) ... +50 °C / 32 (-4) ... 122 °F
storage	-20 ... +70 °C / -4 ... -158 °F
Weight, max	up to approx. 63 kg / 138.6 lb
IP or Type rating	IP 66, Type 4X for outdoor use, protected against direct sun light
Gas connections	
max number	8
max for purging (incl. / sepa-rate)	2 incl..
material	stainless steel
sizes	6/4 mm; ¼"
Power supply unit	wide range, internal
Power supply	Mains supply voltage fluctuations are not to exceed +/- 10 percent of the nominal voltage
nominal voltage	100 - 240 V∿ 50 / 60 Hz
voltage range	85 - 264 V∿ 47 - 63 Hz
nominal input current, max	
standard, max	1.3 - 0.7 A
w/ temperature control, max	3 - 1.5 A
Power input fuses	AC 230 V / T 4 A / 5x20 mm
Electrical in- and outputs	
power	screw terminals with integrated fuse holders, max. 4 mm² / 11 AWG
signals	screw terminals, max. 1.5 mm² / 15 AWG
special	Ethernet: RJ45 socket; USB connectors
Cable entries	Cable glands, IP 68, or conduits with metric-to-NPT adaptors
cable glands: permissible cable outer dia	3 ... 13 mm / 0.11" ... 0.5" dependent on inset used in cable gland

2.2.4 Model-Specific Technical Data: X-STREAM XEFD

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

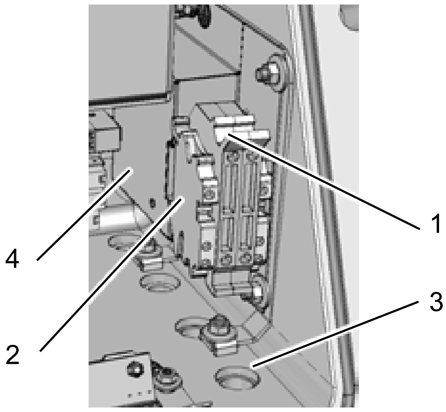
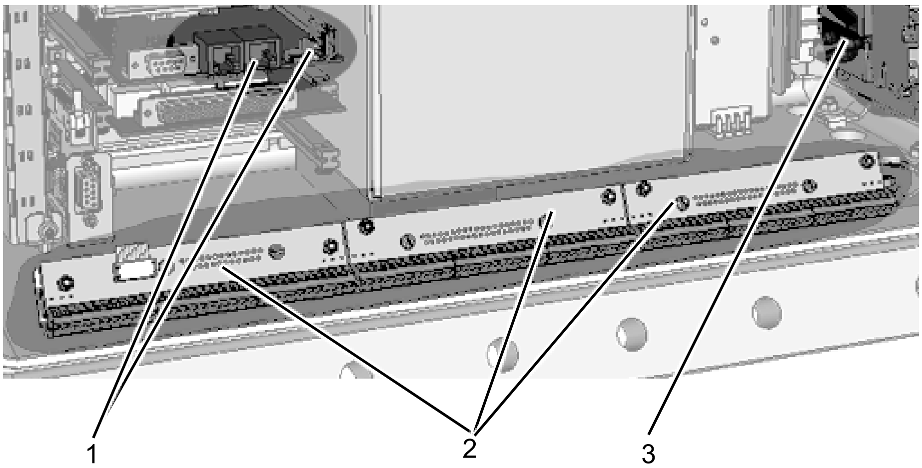


Fig. 2-15: X-STREAM XEFD - Power Supply Terminals / Fuse Holders



1 Ethernet & USB (CAN projected)
2 Analog & digital I/O terminal strips
3 Max. 3 signal cables entries

Note!
Depending on the actual analyzer configuration not all shown terminal strips may be installed!

Fig. 2-16: X-STREAM XEFD - Signal Terminals

2.3 Information on Name Plate

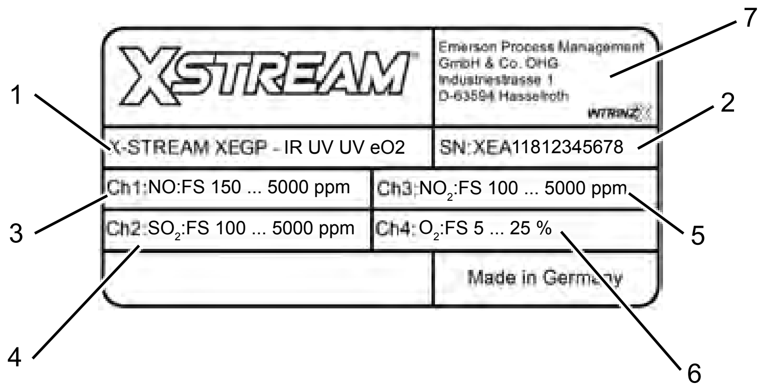
The name plate provides details on the configuration of the unit, installed measuring techniques, sample gases and measuring ranges. It also indicates the unit's serial number.

The plate is located on either the side or the rear of the unit.

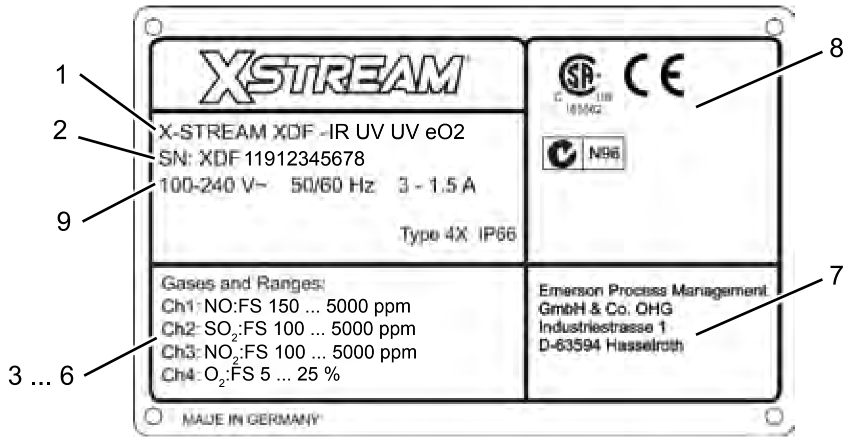
Note!

Analyzers configured to be installed in hazardous areas have special name plates, described in the associated manuals.

XEGC, XEGP



Field housings



1 Model and installed measuring techniques (here: IR & 2x UV & electrochemical O_2)
2 Serial number
3 Channel 1: Gas and full scale ranges (here: NO, 150 to 5000 ppm)
4 Channel 2: Gas and full scale ranges (here:SO2, 100 to 5000 ppm)
5 Channel 3: Gas and full scale ranges (here: NO2, 100 to 5000 ppm)
6 Channel 4: Gas and full scale ranges (here:O2, 5 to 25 %)
7 Manufacturer´s address
8 Certification marks (XEGC, XEGP: on a separate label)
9 Electrical data (XEGC, XEGP: on rear panel)

Fig. 2-17: *Analyzer Name Plate (examples)*

Chapter 3
Measuring Principles

X-STREAM series analyzers support several measuring principles depending on the gas component of interest. This provides best possible results, as the measurement can be chosen to optimally fit the characteristics of the gas to be measured with respect to the application. The following sections introduce the available measuring principles highlighting their specific characteristics.

3.1 Infrared Measurement (IR) Ultraviolet Measurement (UV)

The non-dispersive measurement methods described in this section utilize gas specific light absorption in order to discriminate between different gases. This is possible, as any gas possesses distinct absorption characteristics. Selective measurement of these so called absorption lines can be used to identify gas components: The amount of light absorpted by the absorption lines, is a direct measure of the gas concentration.

One can distinguish between two different types of non-dispersive measurements, differing in the way, wavelength selectivity is accomplished. It is essential for gas specific concentration measurements, to selectively detect only light of the absorption line wavelengths of the gas of interest. Typically a gas selective detector is used for NDIR measurements, ☞ 3-3. For NDUV the selectivity is achieved by an additional optical filter, as the detector itself is broadband sensitive. In some applications, a pyrodetector is used for NDIR measurements. This type of detectors is not wavelength selective, hence these setups also use an optical filter to narrow their wavelength response function.

The assembly of a NDIR and NDUV channel is shown in ☞ Fig. 3-3. For NDIR a broadband IR light source is used to generate the light, while NDUV measurements utilize a UV narrowband fluorescence source, already adopted for the absorption lines of the gas of interest. Part of this adoption is done by a specially selected optical filter in the adaptor cell.

The diameter of the light beam emitted from the sources is adjusted to completely fill the opening of the split analysis cell. After traversing the analysis cell, the light passes through a filter cell which adjusts the beam diameter to the chopper opening and the diameter of the active detector area. The chopper wheel used is designed to allow an intrinsically referenced measurement. The details of this new patent pending method are described in ☞ section 3.1.1.

The decision, which measurement (UV / IR) to use for a specific application depends on the gas component to be measured, and the required measurement performance.

3.1.1 IntrinzX Technology

The IntrinzX technology is an enhancement of the well established “proof peak” technology with automatic sensitivity control, known from the MLT gas analyzer series. While the “proof peak” provided only one reference measurement per chopper wheel revolution, the IntrinzX technology provides four reference measurements per revolution. The patent pending IntrinzX technology has been introduced into the market with the launch of the X-STREAM X2 gas analyzers.

Using the new IntrinzX chopper wheel, the reference and the measurement signal are modulated with 4 and 5 times the basic revolution frequency. As a result, the proof peak process is integrated into the measurement information, in contrast to being artificially inserted in the measurement signal.

Frequency filtering separates the sum signal into measurement and reference signal (☞ Fig. 3-1). This results in a permanently referenced signal by dividing the integrated reference level by the integrated measurement level for each revolution.

Therefore the IntrinzX technology provides many outstanding features:

- High dynamic measurement ranges (e.g. 0-200 to 50,000 ppm CO), which cannot be obtained with standard photometric technologies
- Reduced temperature dependency
- High sensitivity for lowest measuring ranges

This leads to cost saving effects for the customer:

- Fewer number of benches & cells
- Easier field repair and replacement of parts
- Easy adjustment of low measuring ranges in the field
- Reduced maintenance
- Extended span calibration intervals
- Minimized demand for test gases

Due to the inherent correlation between reference and measurement side, span calibration can often be achieved by zero calibration.

The above listed IntrinzX features offer a high degree of flexibility with regards to applications:

- One bench enables measurements of low & high ranges
- Low & high concentration in raw and clean gases
- Small and large ranges before and after scrubbers
- Measurement of carbon bed breakthrough / catalyst efficiency
- Mobile measurements at different sampling points / locations
- Easy adaption to different applications (universities, laboratories)
- Supports automotive engine testing
- Benches to be used in TOC applications for measurements of low and high carbon content

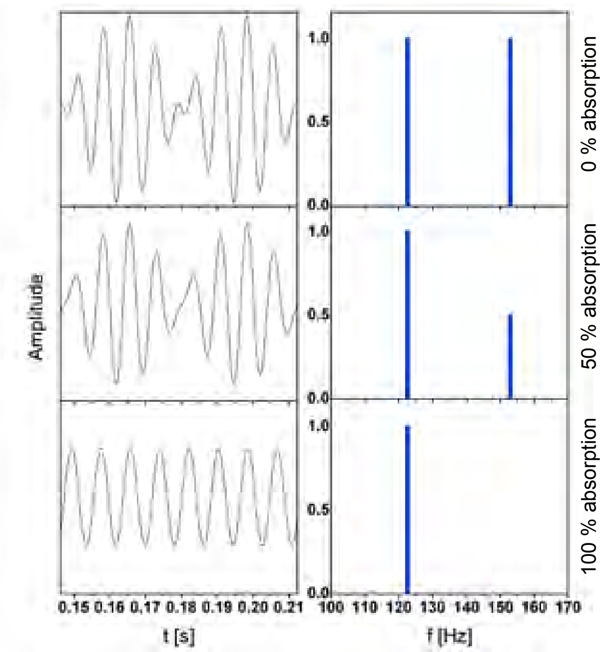


Fig. 3-1: *IntrinzX Signal Forms*

3.1.2 NDIR Detector

The standard detector used for NDIR measurements is an opto pneumatic detector. It consists of two chambers, filled with gas and connected via a small channel (☞ Fig. 3-2). The gas filling is chosen to provide maximum overlap with the gas to be measured. Usually the gas to be measured itself is used.

A micro flow sensor, placed in the connecting channel, measures the flow between both chambers. As light is absorbed by the gas in the absorption chamber, the gas temperature changes. This results in an increase of volume of the heated gas: The gas expands and flows towards the compensation chamber. When the chopper closes, no light is absorbed and thus temperature and volume of the gas in the absorption chamber decrease. Gas flows back from the (now) hotter compensation chamber into the absorption chamber. The absolute flow, detected by the micro flow sensor, in both cases is therefore a measure for the light absorbed while the chopper is open. This directly correlates to the amount of light not absorbed in the analysis cell and therefore to the concentration of the measurement gas inside the analysis cell.

Using the divided analysis cell and the IntrinzX chopper wheel, this enables simultaneous detection of measurement and reference signal.

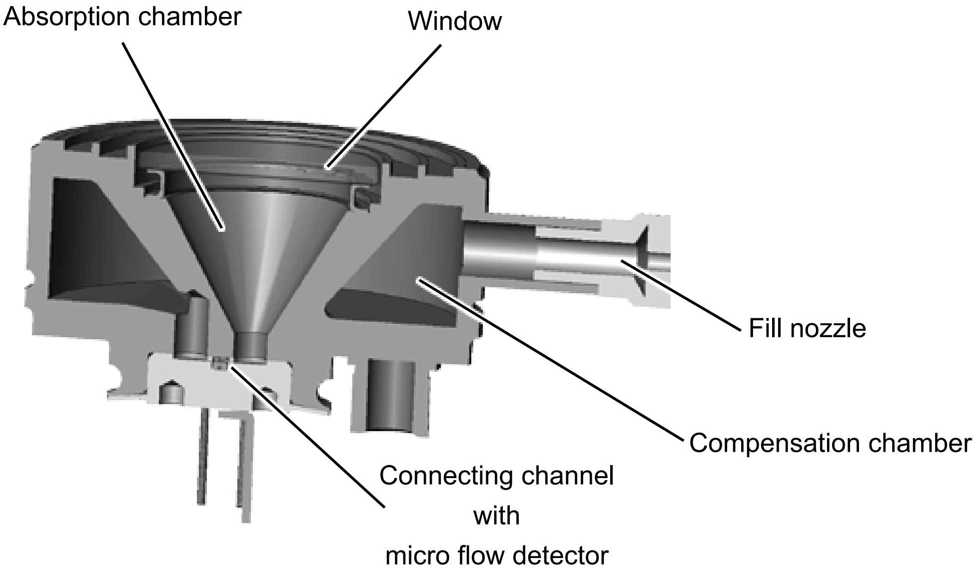
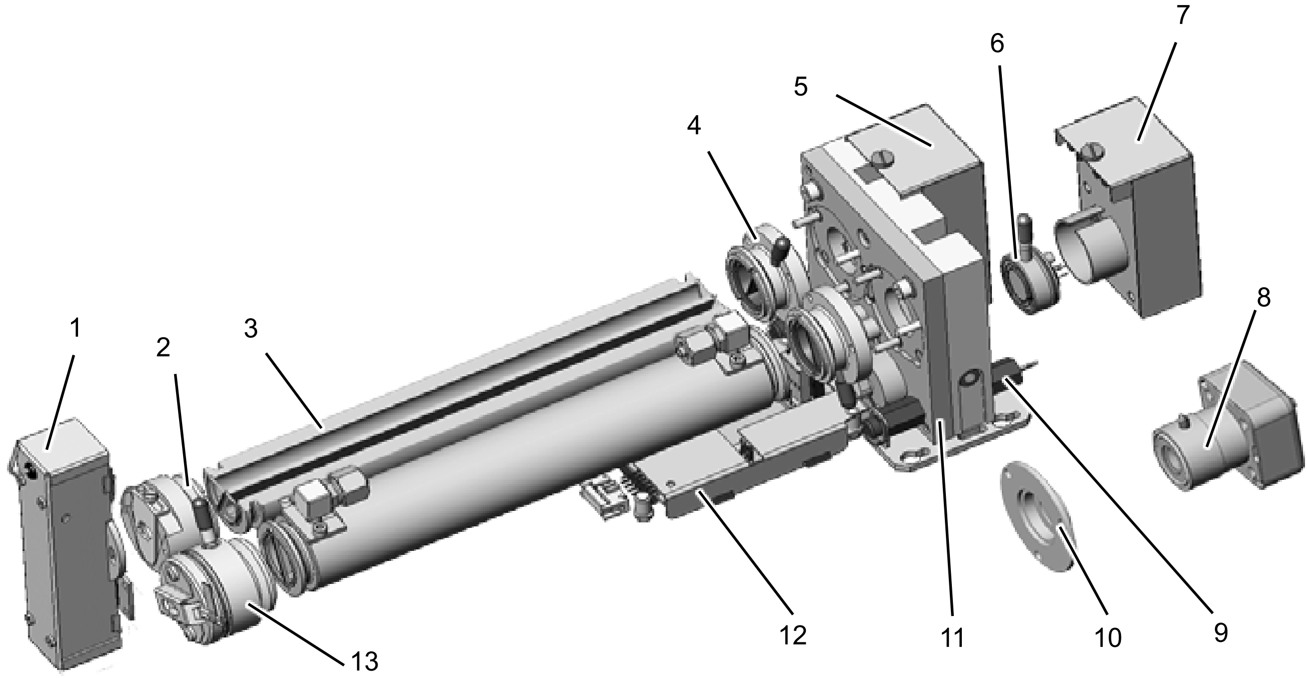


Fig. 3-2: *Gas Detector Design Principle*

3.1.3 Technical Implementation

The radiation emitted by an IR or UV source passes an adaptor cell, widening the beam to completely fill out the analysis cell´s diameter. At the opposite side of the cell, another adaptor cell is installed to reduce the beam to the diameter of the opening in the chopper.

The detectors are installed at the rear side of the chopper. As pyrodetectors are not as frequency selective as gas detectors, an additional filter has to be installed when using pyrodetectors, limiting the bandwidth of radiation passing the chopper.



1 UV source
2 Adaptor cell
3 Analysis cell (internal view)
4 Filter cell
5 UV detector
6 Gas detector
7 IR detector electronics
8 Pyro detector (alternatively)
9 Temperature sensor
10 Filter for pyro detector assembly
11 Chopper
12 Chopper electronics
13 IR source

Fig. 3-3: *Photometer Assembly Principle*

3.2 Oxygen Measurement

Two different principles are used for measuring oxygen concentrations. The principle used in your specific instrument is given by the channel code (sample gas designator) on the nameplate label (☞ figure on page 2-22):

pO2 = paramagnetical sensor

eO2 = electrochemical sensor

3.2.1 Paramagnetic Measurement

Oxygen measurement is based on the paramagnetical characteristics of oxygen molecules:

Two quartz spheres filled with nitrogen (N_2 is not paramagnetic) are arranged in a dumbbell configuration and, hinged to a platinum wire, placed inside a cell. Fixed to the wire a small mirror reflects a light beam to a photo detector (Fig. 3-4).

The measuring cell is placed inside an inhomogeneous magnetical field, generated by a strong permanent magnet of specific design.

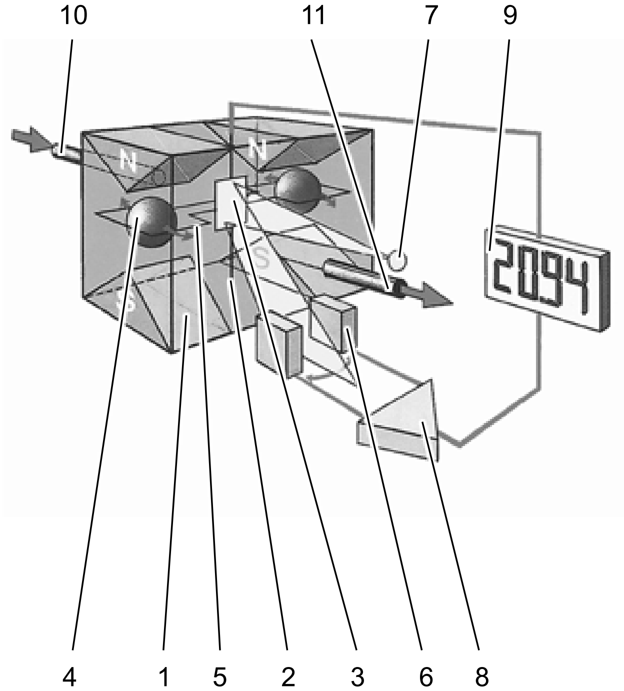
Oxygen molecules within the sample gas now due to their paramagnetical characteristics are deflected into the area of highest field strength. This generates different forces on both spheres and the resulting torque turns dumbbell and mirror out of the rest position. This generates a photodetector signal because the beam is deflected, too.

Initiated by the photodetector signal a preamplifier drives a compensation current through a loop surrounding the dumbbell to turn back the dumbbell into the rest position by effect of a magnetic field

So the current compensating the torque affecting the dumbbell is a direct measure for the oxygen concentration within the sample gas.

The paramagnetic oxygen detector also contains a temperature sensor and a heating element to hold the detector at approx. 55 °C.

Several variations are available including corrosion resistant, solvent resistant and/or intrinsically safe (for measuring flammable gases) versions.



1 Permanent magnet
2 Platinum wire
3 Mirror
4 Glass ball
5 Loop
6 Photodetector
7 Light source
8 Preamplifier
9 Display
10 Gas inlet
11 Gas outlet

Fig. 3-4: *Paramagnetic Oxygen Sensor - Assembly Principle*

3.2.1.1 Cross Interferences by Accompanying Gases

The table below shows, how accompanying gases interfere the paramagnetical oxygen measurement. If the concentration of such gases is already given at time of enquiry, this interference may be taken into account during factory startup and thus minimized (option).

100 % Gas		Zero-level effect % O_2
Acetylene	C_2H_2	-0.24
Allene	C_3H_4	-0.44
Ammonia	NH_3	-0.26
Argon	A	-0.22
Bromine	Br_2	-1.30
1.2-Butadiene	C_4H_6	-0.49
1.3-Butadiene	C_4H_6	-0.49
n-Butane	C_4H_{10}	-1.11
i-Butene	C_4H_8	-0.85
cis 2-Butene	C_4H_8	-0.89
trans 2-Butene	C_4H_8	-0.92
Carbon dioxide	CO_2	-0.27
Carbon monoxide	CO	+0.06
Chlorine	Cl_2	-0.77
Cyclohexane	C_6H_{12}	-1.56
Ethane	C_2H_6	-0.43
Ethylene	C_2H_4	-0.26
Helium	He	+0.30
n-Heptane	C_7H_{16}	-2.10
n-Hexane	C_6H_{14}	-1.70
Hydrogen	H_2	+0.24
Hydrogen bromide	HBr	-0.61

100 % Gas		Zero-level effect % O_2
Hydrogen chloride	HCl	-0.30
Hydrogen flouride	HF	+0.10
Hydrogen iodide	HI	-1.10
Hydrogen sulphide	H_2S	-0.39
Iodine	I	-2.40
Isobutane	C_4H_{10}	-1.11
Isobutane	C_5H_{12}	-1.49
Krypton	Kr	-0.51
Laughing gas	N_2O	-0.20
Methane	CH_4	-0.20
Neon	Ne	+0.13
Neoptane	C_5H_{12}	-1.49
Nitric acid	HNO_3	+0.43
Nitrogen dioxide	NO_2	+28.00
Nitrous oxide	NO	+40.00
n-Octane	C_8H_{18}	-2.50
n-Pentane	C_5H_{12}	-1.45
Propane	C_3H_8	-0.86
Propylene	C_3H_6	-0.55
Vinyl chloride	C_2H_3Cl	-0.63
Water	H_2O	-0.02
Xenon	Xe	-0.95

Tab. 3-1: *Standard Paramagnetic Sensor - Cross Interference by Accompanying Gases*

3.2.1.2 Applications With Corrosive Or Solvent Components

Special paramagnetic oxygen sensors are available to measure gases, containing corrosive or solvent components.

See below tables for further information on approved solvents, and medium affected materials.

Approved solvents (inclusive accompanying disturbing components)			
Component	**Concen-tration**	**Component**	**Concen-tration**
Acetic acid	0.1- 20 %	Heptane	0.1- 20 %
Acetone	0.1- 20 %	Hexane	0.1- 20 %
Acrolein	0.1- 20 %	Isopropanol	0.1- 20 %
Aromatics	0.1- 20 %	Methanol	0.1- 20 %
Butadiene	0.1- 20 %	Methyl acetate	0.1- 20 %
Butadiene-1	0.1- 20 %	Methylethylketone	0.1- 20 %
Butadiene-2	0.1- 20 %	Methylmercaptane	0.1- 20 %
C2H2	0.1- 20 %	Propadiene	0.1- 20 %
C4H8	0.1- 20 %	Propene	0.1- 20 %
C5	0.1- 20 %	Propylen oxide	0.1- 20 %
C6H12	0.1- 20 %	Propylene	0.1- 20 %
CH3COOH	0.1- 20 %	Toluene	0.1- 20 %
Cyclohexane	0.1- 20 %	Vinyl acetate	0.1- 20 %
Cyclohexanon	0.1- 20 %	Vinyl acetylene	0.1- 20 %
Dimethyl sulfide	0.1- 20 %	Xylene	0.1- 20 %
Ethanol	0.1- 20 %	i-Butyr acid	0.1- 20 %
Ethene	0.1- 20 %	i-Butyr aldehyd	0.1- 20 %
Ethylene	0.1- 20 %	i-Propylformiat	0.1- 20 %
Ethylene oxid	0.1- 20 %	n-Butane	0.1- 20 %
Conditions **· Single or summarized concentrations do not exceed 20 %** **· Gas passes gas cooler prior to entering the analyzer** **· Gas dew point at max. 5 °C** **Solvent resistant sensors are consumables!**			

Tab. 3-2: *Solvent Resistant Paramagnetic Sensor - Approved Solvents*

Component	**Measuring cell type**	
	Solvent resistant	**Corrosion resistant (Chlorine, dry)**
Case	SS 1.4572	SS 1.4573
Pole nucleus	Tantalum	
Mirror	Glass, Rhodium	
Tension band	Platinum alloy	
Loop wire	Platinum alloy	
Supporting wire	Platinum alloy	
Cylinder	Glass	
Cylinder bushing	Ceramics	
Dumbbell	Glass	
Taring	Epoxy	Epoxy
Compound material	Plumb bob, Epoxy	Epoxy
Seals	Kalrez	Kalrez

Tab. 3-3: *Solvent Resistant Paramagnetic Sensor - Medium Affected Materials*

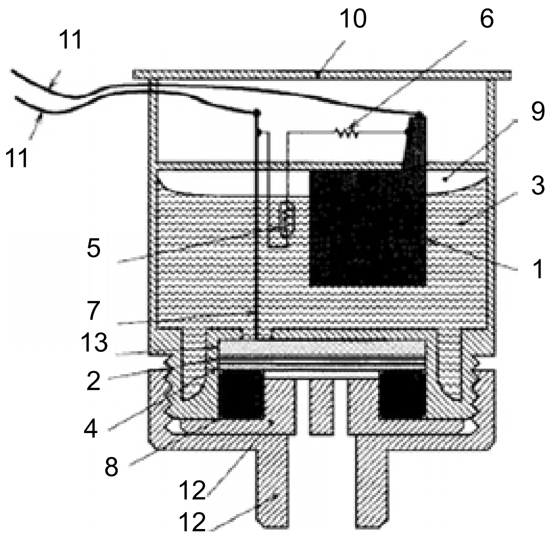
The table below shows, how accompanying gases interfere the paramagnetical oxygen measurement. If the concentration of such gases is already given at time of enquiry, this interference may be taken into account during factory startup and thus minimized (option).

100 % Gas		**Zero-level effect % O_2**
Argon	Ar	-0.22
Carbon Dioxide	CO_2	-0.27
Carbon Monoxide	CO	+0.01
Ethane	C_2H_6	-0.46
Ethene	C_2H_4	-0.26
Helium	He	+0.3
Hydrogen	H_2	+0.24
Methane	CH_4	-0.2
Neon	Ne	+0.13
Nitrogen	N_2	+0.00
Nitrogen Dioxide	NO_2	+28.0
Nitrogen Oxide	NO	+43.0
Nitrous Oxide	N_2O	-0.2
Propane	C_3H_8	-0.86
Propene	C_3H_6	-0.55

Tab. 3-4: *Solvent Resistant Paramagnetic Sensor - Cross Interference by Accompanying Gases*

3.2.2 Electrochemical Measurement (I)

This sensor utilizes the principle of galvanic cells, fig. 3-5 shows the design.



1 Anode (lead)
2 Cathode (Gold)
3 Electrolyte solution
4 Membrane
5 Thermistor
6 Resistance
7 Titanum wire
8 O-Ring
9 Pressure compensating volumes
10 Lid
11 Electrical connections
12 Lids
13 Current collector

Fig. 3-5: *Electrochemical Sensor - Design Principle*

The electrochemical oxygen sensor‘s key components are a lead anode (1) and a gold cathode (2) surrounded by a special acid electrolyte (3).

The gold electrode is integrated solid with the membrane,which is a non-porous fluororesin membrane. Oxygen which barely diffuses through the membrane is electrochemically reduced on the gold electrode.

The temperature compensating thermistor and adjusting resistance are connected between the cathode and anode. The current generated by oxygen reduction is converted into a voltage by these resistances.

The value of the current flowing to the thermistor and resistance varies in proportion to the oxygen concentration of the measuring gases which contact the membrane. Therefore, the voltage at the terminal of the resistances is used for the sensor output to measure the oxygen concentration.

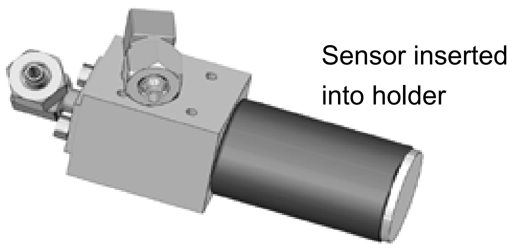


Fig. 3-6: *Electrochemical Sensor - Assembly*

3.2 Oxygen Measurement

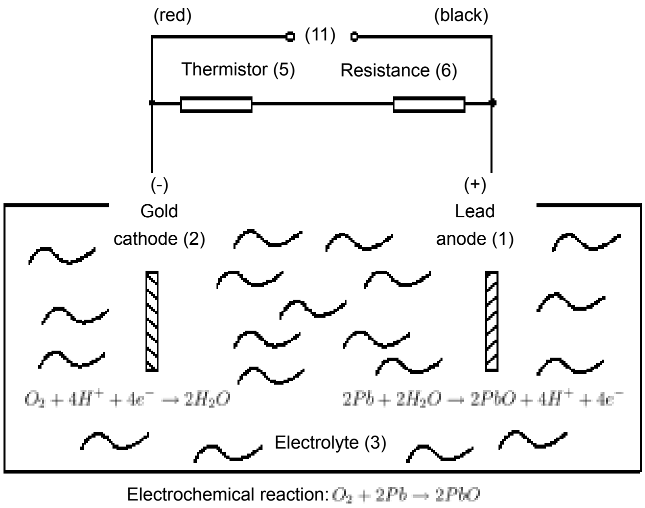


Fig. 3-7: *Electrochemical Reaction of Oxygen Sensor*

In consequence of its design the sensor‘s lifetime is limited and depends on theoretical designed life and oxygen concentration. The sensor output can be taken as a rough criterion for end of lifetime: The sensor is weared when the output in atmosphere is below 70 % of the initial output. The period till this can be calculated by

$$\text{Lifetime} = \frac{\text{designed life (\% hours)}}{O_2 \text{ concentration (\%)}}$$

The sensor‘s designed lifetime under constant conditions of ambient temperature 20 °C is approx. **900,000 % hrs.**

The lifetime at 21 % oxygen is then calculated to approx. **42,857 hrs, corresponding to approx. 5 years.**

An indicator for end of lifetime is a reduced output signal. In this case the sensor must be replaced to ensure accurate measurements (☞ Chapter 7 "Maintenance").

Note!

The given values are for reference only! The expected lifetime is greatly affected by the temperature of the environment in which the sensor is used or stored (operation at 40 °C halves lifetime).

Increases or decreases in atmospheric pressure have the same effect as increasing or decreasing oxygen concentrations.

3.2.3 Special Hints

Due to the measuring principle the electrochemical oxygen cell requires a minimum internal consumption of oxygen (residual humidity avoids drying of the cell). Supplying cells continuously with dry sample gas of low grade oxygen concentration or with sample gas free of oxygen could result in a reversible detuning of O_2 sensitivity. The output signal will become unstable, but response time remains constant.

For correct measurement the cell needs continuously to be supplied with concentrations of at least 0.1 Vol.-% O_2 . We recommend to use the cells if need be in alternating mode, means to purge cells with conditioned (not dried, but dust removed) ambient air when measurement pauses.

If it is necessary to interrupt oxygen supply for several hours or days, the cell has to regenerate (supply cell for about one day with ambient air). Temporary flushing with nitrogen (N_2) for less than 1 h (e.g. for analyzer zeroing purpose) has no influence on measuring characteristics.This sensor is not suitable for anorganic gases containing chlorene or flourene!

In addition it is not suitable for sample gases containing ozone, H_2S (> 100 ppm) or NH_3 (> 20 ppm).

For a number of other interfering gases ☞ Tab. 3-5.

Gas		Concen-tration	Interference Level
Carbon monoxide	CO	0-100 %	no effect
Carbon dioxide	CO_2	0-100 %	no effect
Nitric monoxide	NO	0-1 %	no effect
Nitrogen dioxide	NO_2	0-1 %	no effect
Sulfur dioxide	SO_2	0-3 %	3 %
Hydrogen sulfide	H_2S	0-3 %	no effect
Ammonia	NH_3	0-3 %	1 %
Hydrogen	H_2	0-100 %	no effect
Hydrogen chloride	HCl	0-3 %	1 %
Benzene	C_6H_6	0-100ppm	1 %
Methane	CH_4	0-100 %	no effect

Tab. 3-5: *Electrochemical Oxygen Measurement - Cross Interference by Accompanying Gases*

3.3 Thermal Conductivity Measurement

Thermal conductivity is the property of a material that indicates its ability to conduct heat.

Thermal conductivity measurement primarily is used for measuring concentrations of hydrogen (H_2) and helium (He). These gases are characterized by a specific thermal conducitivity, differing clearly from that of other gases (see table 3-5).

Gas		λ in mw / cm grd
		50 °C
Helium	He	1580
Neon	Ne	516
Argon	Ar	189
Krypton	Kr	102
Xenon	Xe	60
Radon	Rn	26
Hydrogen	H_2	1910
Oxygen	O_2	283
Chlorine	Cl_2	96,8
Sulfur Dioxide	SO_2	113
Nitrogen	N_2	277
Ammonia	NH_3	270
Carbon Dioxide	CO_2	184
Air	N_2/O_2	276
Hydrochloric Acid	HCl	151
Carbon Monoxide	CO	267
Methane	CH_4	371
Butane	C_4H_{10}	185

Tab. 3-6: *Examples of Specific Thermal Conductivities*

3.3.1 Principle of Operation

A Wheatstone bridge, made of 4 temperature sensitive resistors (PT 100 sensors), is surrounded by gas in a way, that each 2 sensors are located in the sample gas stream (R_S) and in a reference gas stream (R_R), ☞ Fig. 3-8.

The bridge output signal (U_{Br}) is adjusted to zero when in rest position (no gas flow). By default the reference gas path is closed (not flown through by gas). When sample gas is supplied, the sensors in the sample gas path are cooled due to the thermal conductivity effect: The gas absorbs heat and carries it away from the sensors. This tunes the Wheatstone bridge and generates a signal proportional to the thermal conductivity.

Additional electronics linearizes and conditions this signal to provide usefull measuring values.Depending on application, it is possible to supply a reference gas to the bridge's reference side. The output signal in this case is proportional to the difference of the thermal conductivities of sample and reference gas.

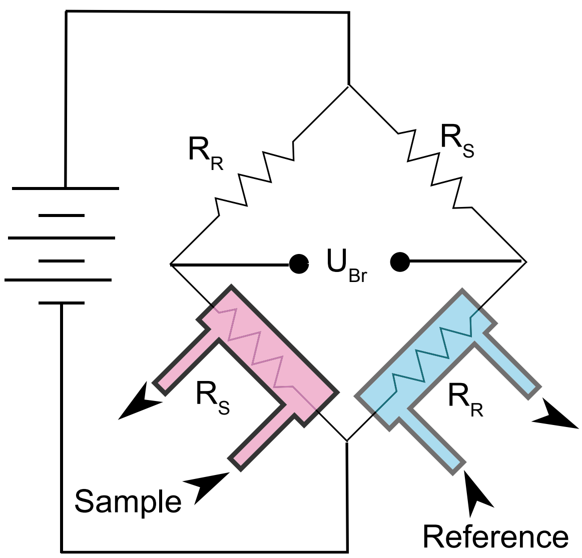


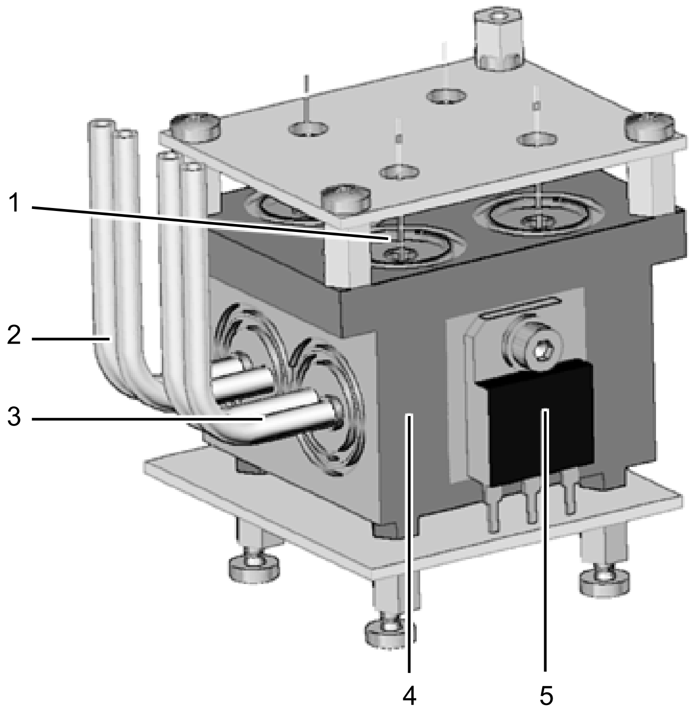
Fig. 3-8: *Wheatstone Bridge*

3.3 Thermal Conductivity Measurement

3.3.2 Technical Implementation

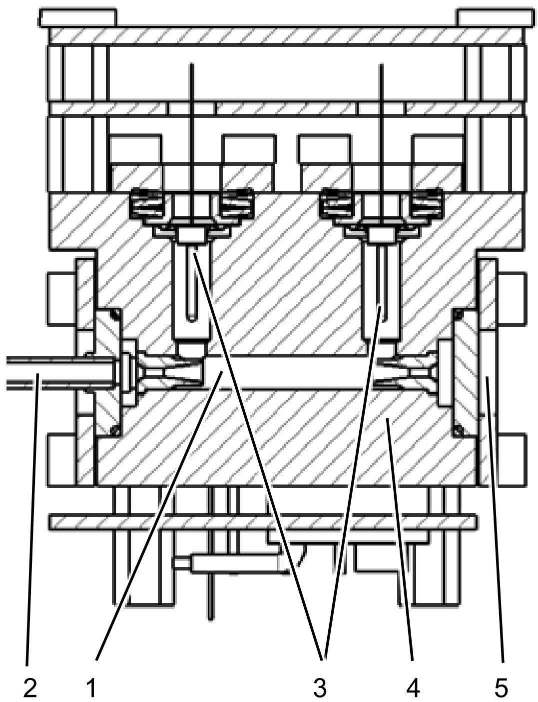
A block made of stainless steel contains two gas paths. Both, the volume of the block and the mass of the sensors have been minimized in order to obtain short response times. To suppress influences by changing ambient temperature the block is thermostatted and isolated against ambience.

The sensors are fully glass packaged to withstand aggressive gases.



1 Sensor
2 Sample gas inlet and outlet
3 Reference side inlet and outlet
4 Metal block
5 Heater for thermostatting

Fig. 3-9: *TC Cell, Exterior View , Thermal Isolation Removed*



1 Internal gas path
2 Sample gas inlet and outlet
3 PT 100 sensors
4 Metal block
5 Lid

Fig. 3-10: *TC Cell, Sectional View*

3.4 Measurement Specification

Sample gas components and measuring ranges (standard configurations)

Note!
The following table gives an overview only. Not all data is applicable to all analyzer variations. The sample gas(es) and measuring ranges for your specific analyzer are given by the order acknowledgement and on the analyzer's name plate label.

Gas component [1]		Lowest measuring range	Highest measuring range
Acetone	CH_3COCH_3	0 - 200 ppm [4]	0 - 3 %
Acetylene	C_2H_2	0 - 3 %	0 - 100 %
Ammonia	NH_3	0 - 100 ppm	0 - 100 %
Argon	Ar	0 - 50 %	0 - 100 %
Carbon dioxide	CO_2	0 - 5 ppm [4]	0 - 100 %
Carbon monoxide	CO	0 - 10 ppm [4]	0 - 100 %
Chlorine	Cl_2	0 - 300 ppm	0 - 100 %
Ethane	C_2H_6	0 - 1000 ppm	0 - 100 %
Ethanol	C_2H_5OH	0 - 1000 ppm	0 - 10 %
Ethylene	C_2H_4	0 - 400 ppm	0 - 100 %
Helium	He	0 - 10 %	0 - 100 %
Hexane	C_6H_{14}	0 - 300 ppm	0 - 10 %
Hydrogen	H_2	0 - 2 % [5]	0 - 100 %
Methane	CH_4	0 - 100 ppm	0 - 100 %
Methanol	CH_3OH	0 - 1000 ppm	0 - 10 %
n - Butane	C_4H_{10}	0 - 800 ppm	0 - 100 %
Nitrogen dioxide	NO_2	0 - 25 ppm	0 - 10 %
Nitrogen monoxide	NO	0 - 100 ppm	0 - 100 %
Nitrous oxide	N_2O	0 - 100 ppm	0 - 100 %
Oxygen (electrochemical)	O_2	0 - 5 %	0 - 25 % [3]
Oxygen (paramagnetic)	O_2	0 - 1 % [4]	0 - 100 %
Propane	C_3H_8	0 - 1,000 ppm	0 - 100 %
Propylene	C_2H_6	0 - 10 %	0 - 100 %
Sulfur dioxide	SO_2	0 - 25 ppm	0 - 100 %
Sulfur hexafluoride	SF_6	0 - 20 ppm	0 - 2 %
Toluene	C_7H_8	0 - 300 ppm	0 - 5 %
Vinyl chloride	C_2H_3Cl	0 - 2 %	0 - 2 %
Water vapor [2]	H_2O	0 - 1000 ppm	0 - 8 %

[1] More than 60 gases are detectable; other components and configurations on request
[2] Dew point below ambient temperature
[3] Higher concentrations decrease sensor lifetime
[4] Non-standard specifications for lowest range
[5] Special "refinery" application with 0 - 1% H_2 in N_2 available

Tab. 3-7: *Gas Components and Measuring Ranges, Examples*

3.6 Measurement Specification

General Performance Specifications

	NDIR/UV/VIS	Oxygen Sensor (PO_2 and EO_2)	Thermal Conductivity
Detection limit	≤ 1 % [1,4]	≤ 1 % [1,4]	≤ 2 % [1,4]
Linearity	≤ 1 % [1,4]	≤ 1 % [1,4]	≤ 1 % [1,4]
Zero-point drift	≤ 2 % per week [1,4]	≤ 2 % per week [1,4]	≤ 2 % per week [1,4]
Span (sensitivity) drift	≤ 0.5 % per week [1,4]	≤ 1 % per week [1]	≤ 1 % per week [1,4]
Repeatability	≤ 1 % [1,4]	≤ 1 % [1,4]	≤ 1 % [1,4]
Response time (t_{90})	4 s ≤ t_{90} ≤ 7 s [3,5]	< 5 s [3,6] / approx. 12 s [3,9]	5 s ≤ t_{90} ≤ 20 s [3,7]
Permissible gas flow	0.2 - 1.5 l/min.	0.2 - 1.0 l/min [6] / 0.2 - 1.5 l/min. [9]	0.2 - 1.5 l/min. (± 0.1 l/min)
Influence of gas flow	≤ 0.5 % [1,4]	≤ 2 % [1,4]	≤ 1 % [1,4,13]
Maximum gas pressure [18]	≤ 1,500 hPa abs. (≤ 7 psig) [17]	≤ 1,500 hPa abs. (≤ 7 psig) [16,17]	≤ 1,500 hPa abs. (≤ 7 psig) [17]
Influence of pressure			
– At constant temperature	≤ 0.10 % per hPa [2]	≤ 0.10 % per hPa [2]	≤ 0.10 % per hPa [2]
– With pressure compensation [8]	≤ 0.01 % per hPa [2]	≤ 0.01 % per hPa [2]	≤ 0.01 % per hPa [2]
Permissible ambient temperature	0 to +50 °C (32 to 122 °F)	0 to +50 °C (32 to 122 °F) [10]	0 to +50 °C (32 to 122 °F)
Influence of temperature (at constant pressure)			
– On zero point	≤ 1 % per 10 K [1]	≤ 1 % per 10 K [1]	≤ 1 % per 10 K [1,15]
– On span (sensitivity)	≤ 5 % (0 to +50 °C) [1,11,15]	≤ 1 % per 10 K [1,15]	≤ 1 % per 10 K [1,15]
Thermostat control [14]	Optionally 60 °C (140 °F) [5]	60 °C (140 °F) [6] / None [9]	75 °C (167 °F) [12]
Warm-up time	15 to 50 minutes [5,7]	Approx. 50 minutes [6]	15 to 50 minutes [7]

1 Related to full scale
2 Related to measuring value; 1 psi = 68.95 hPa
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 Paramagnetic oxygen measurement (PO_2)
7 Depending on measuring range
8 Pressure sensor is required
9 Electrochemical oxygen measurement (EO_2), not for use with sample gas containing FCHC´s
10 Electrochemical oxygen measurement (EO_2): +5 to +40 °C (41 to 104 °F)
11 Starting from +20 °C (68 °F) to 0 °C (32 °F) to +50 °C (122 °F) to +20 °C (68 °F)
12 Sensor / cell only
13 Flow variation within ± 0.1 l/min
14 Optional thermostatically controlled box with temperature 60 °C (140 °F)
15 Temperature variation: 10 K in 1 hour
16 No sudden pressure surge for PO_2 allowed
17 Special conditions apply to model X2FD
18 Limited to atmospheric if internal sample pump

Notes!
Not all data listed above are applicable to all analyzer versions (e.g. thermostatically controlled box is not available for ½ 19 in instruments).See also table 3-9 for special performance specifications!

Tab. 3-8: *General Measurement Performance Specifications*

3.6 Measurement Specification

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

	A61: 0 - 10 ... 100 ppm CO **A62: 0 - 20 ... 100 ppm CO** **B62: 0 - 10 ... 100 ppm CO$_2$**	**B61: 0 - 5 ... 100 ppm CO$_2$**
Noise	< 1 % [1 2]	< 1 % [1 2] *resp. < 0.1 ppm* [1 2 9]
Detection limit	< 2 % [1 2]	< 2 % [1 2] *resp. < 0.2 ppm* [1 2 9]
Linearity	< ±1 % [1 2]	< ±1 % [1 2]
Zero-point drift	< ±2 % [1 2 3]	< ±2 % [1 2 3] *resp. < 0.2 ppm* [1 2 3 9]
Span (sensitivity) drift	< ±2 % [1 2 4]	< ±2 % [1 2 4] *resp. < 0.2 ppm* [1 2 4 9]
Repeatability	< ±2 % [1 2]	< ±2 % [1 2] *resp. < 0.2 ppm* [1 2 9]
Response time (t_{90})	< 10 s [7]	< 10 s [7]
Permissible gas flow	0.2 - 1.5 l/min.	0.2 - 1.5 l/min.
Influence of gas flow	< ±2% [1 2]	< ±2% [1 2]
Maximum gas pressure [10]	≤ 1,500 hPa abs. (≤ 7 psig)	≤ 1,500 hPa abs. (≤ 7 psig)
Influence of pressure		
– At constant temperature	< 0.1 % per hPa [5]	≤ 0.1 % per hPa [5]
– With pressure compensation [8]	< 0.01 % per hPa [5]	≤ 0.01 % per hPa [5]
Permissible ambient temperature	5 to +40 °C (41 to 104 °F)	5 to +40 °C (41 to 104 °F)
Influence of temperature (at constant pressure)		
– On zero point	< ±2 % per 10 K [6]	< ±2 % per 10 K [6] *resp. < 0.2 ppm per 10 K* [6 9]
– On span (sensitivity)	< ±2 % per 10 K [6]	< ±2 % per 10 K [6] *resp. < 0.2 ppm per 10 K* [6 9]
Thermostat control	None	None

[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 must not change > 10 K within 1 h
[7] From gas analyzer inlet at gas flow of 1.0 l/min
[8] Barometric pressure sensor is required
[9] Applies to measuring range < 10 ppm
[10] Limited to atmospheric if internal sample pump

Tab. 3-9: *Special Performance Specifications for Gas Purity Measurements*

All these 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)

Chapter 4
Installation

This chapter describes the correct 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.

Keep the packaging in a safe place until unit is installed. We recommend to keep the packaging available for returning the instrument in case of failure, because only the original packaging ensures proper protection during transportation!

4.1 Scope of Supply

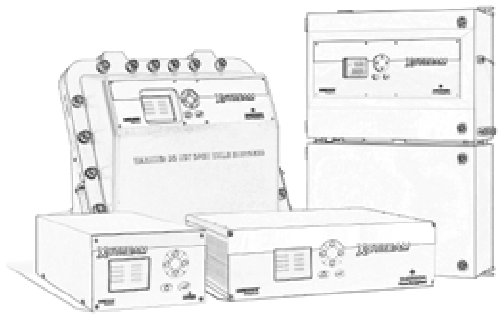
WARNING

HAZARDS FROM MISSING INFORMATION

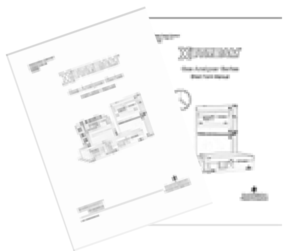
Compare the contents of your package with the pictures below.

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



Manuals:
- this X-STREAM XE series manual, either as paper or CD-ROM version
- a short form manual for general purpose instruments
- special addendum manuals for hazardous area installations

Fig. 4-1: *X-STREAM XE Analyzers - Scope of Supply*

4.2 Introduction

WARNING

ELECTRICAL SHOCK HAZARD

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).

4.3 Gas Conditioning

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

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

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

Flammable gases must not be supplied without additional protective measures.

Pressure and gas flow must remain within the values given in the ☞ „Measurement Specification“ 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.

The X-STREAM field housings can optionally be fitted with heated piping to enable the use of gases with a maximum dew point of 25 °C (77 °F).

Purging option

The purging 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.**

To minimize cross interferences the purge gas also has to be free of components to be measured.

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

For information about values for pressure and flow, please contact your nearest EMERSON Process Management sales office.

4.3 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, except in units with integrated valve blocks (500 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 configuration 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 XEGP, X-STREAM XEGC)
- underside of the analyzer (X-STREAM XEF, X-STREAM XEFD)

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. 4-2: *Labelling of Gas Connectors (example)*

4.3 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. 4-3).

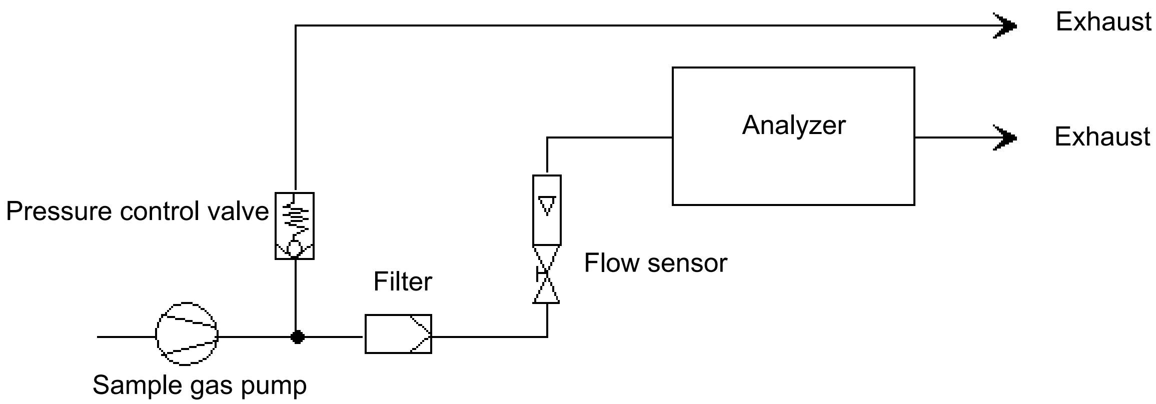


Fig. 4-3: *Installation in Bypass Mode*

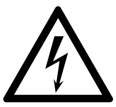
Internal solenoid valve block

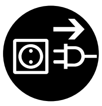
The max. permissable overpressure for all gases is restricted to 500 hPa if the analyzer is fitted with an internal solenoid valve block.

4.4 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-mountable 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 electrical shock, 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.

4.5 Analyzer Specific Instructions for Installation

Important note for X-STREAM XEFD!

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

Even if you do not install your X-STREAM XEFD in an EX zone, please install the unit according to the instructions in the separate manual.

Installation instructions:	X-STREAM XEGC & XEGP	☞ page 4-8
	X-STREAM XE field housings	☞ page 4-19
Notes for wiring signal inputs and outputs		☞ page 4-31

4.5.1 X-STREAM XEGC, X-STREAM XEGP

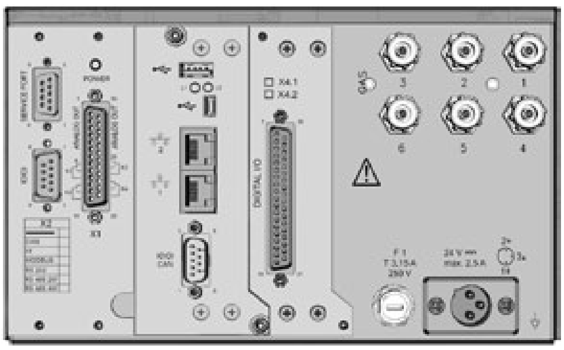
Plugs and sockets required for the electrical connections are on the rear panel of the units (fig. 4-4 & 4-5).

X-STREAM XEGP analyzers provide an internal widerange power supply for worldwide use.

X-STREAM XEGC analyzers are powered by an external DC 24 V power supply unit, optionally supplied with the unit. If a PSU is not included in delivery, another unit can be used instead, provided it conforms to the specifications on ☞ 2-9.

X-STREAM XEGC / XEGP analyzers should be operated in a horizontal position.

An optional kit with brackets and blindplate enables to install XEGC models into a rack; this is accomplished by means of four screws (☞ 2-7). The external PSU is optionally available for rack mounting, too.



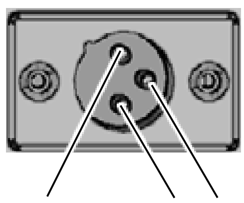
⚠ CAUTION

HAZARD BY RACK INSTALLATION

The optional brackets for rack mounting (☞ 2-7) are not designed to carry the weight of the instrument!

Support the instrument, when rack mounting!

Disregarding may cause personal injury and damaged equipment.



1: ME
2: + 24 V⎓
3: 0 V (⊥)

Fig. 4-4: *X-STREAM XEGC - Table Top Version Rear Panel*

4.5.1 Installation - X-STREAM XEGC, X-STREAM XEGP

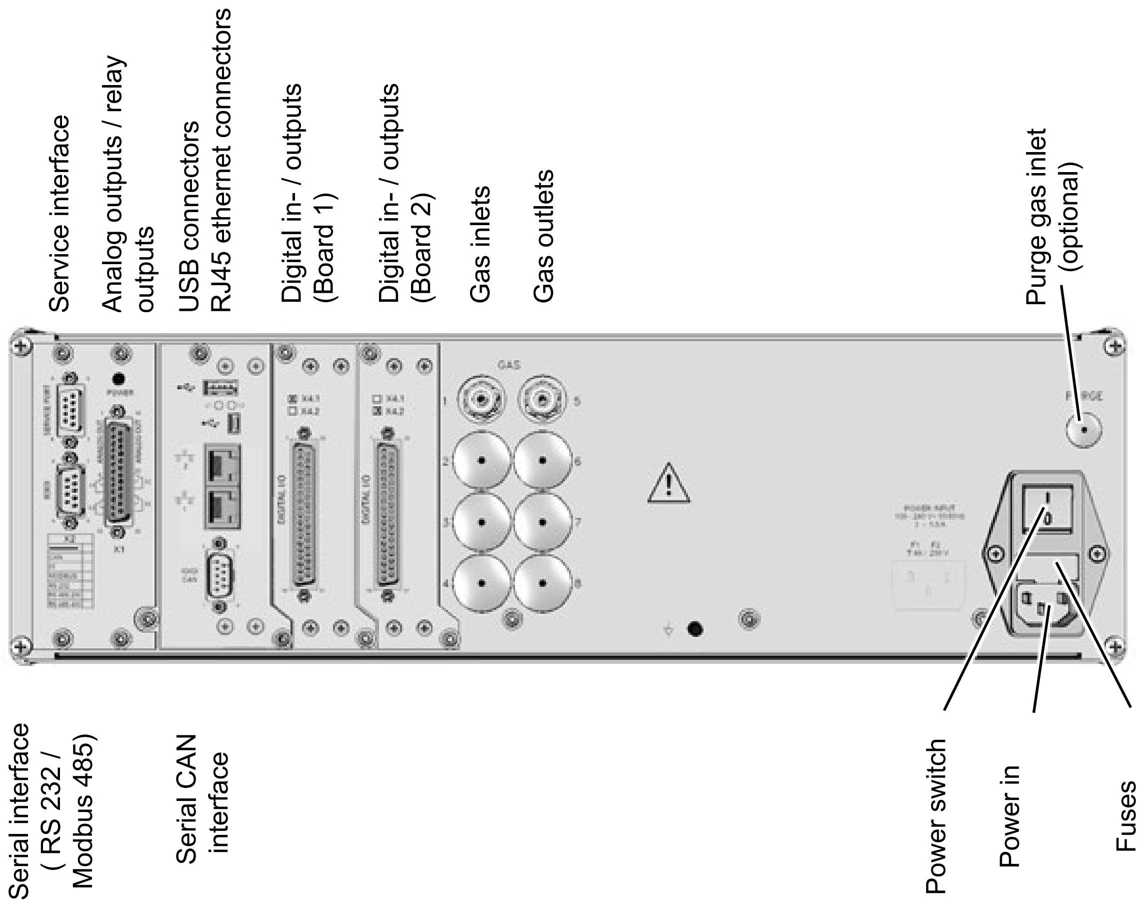


Fig. 4-5: *X-STREAM XEGP - Table Top Version Rear Panel*

The number and configuration 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 figures above (1, 2, 3, ...). This avoids confusion in case the analyzer ever has to be disconnected.

	X2GC	X2GP
Gas connections		
max number	6	8
max for purging (incl. / separate)	2 incl.	1 incl. & 1 separate
material	PVDF; stainless steel (opt.)	
sizes	6/4 mm; ¼"	

4.4.2 Installation - X-STREAM XEGP

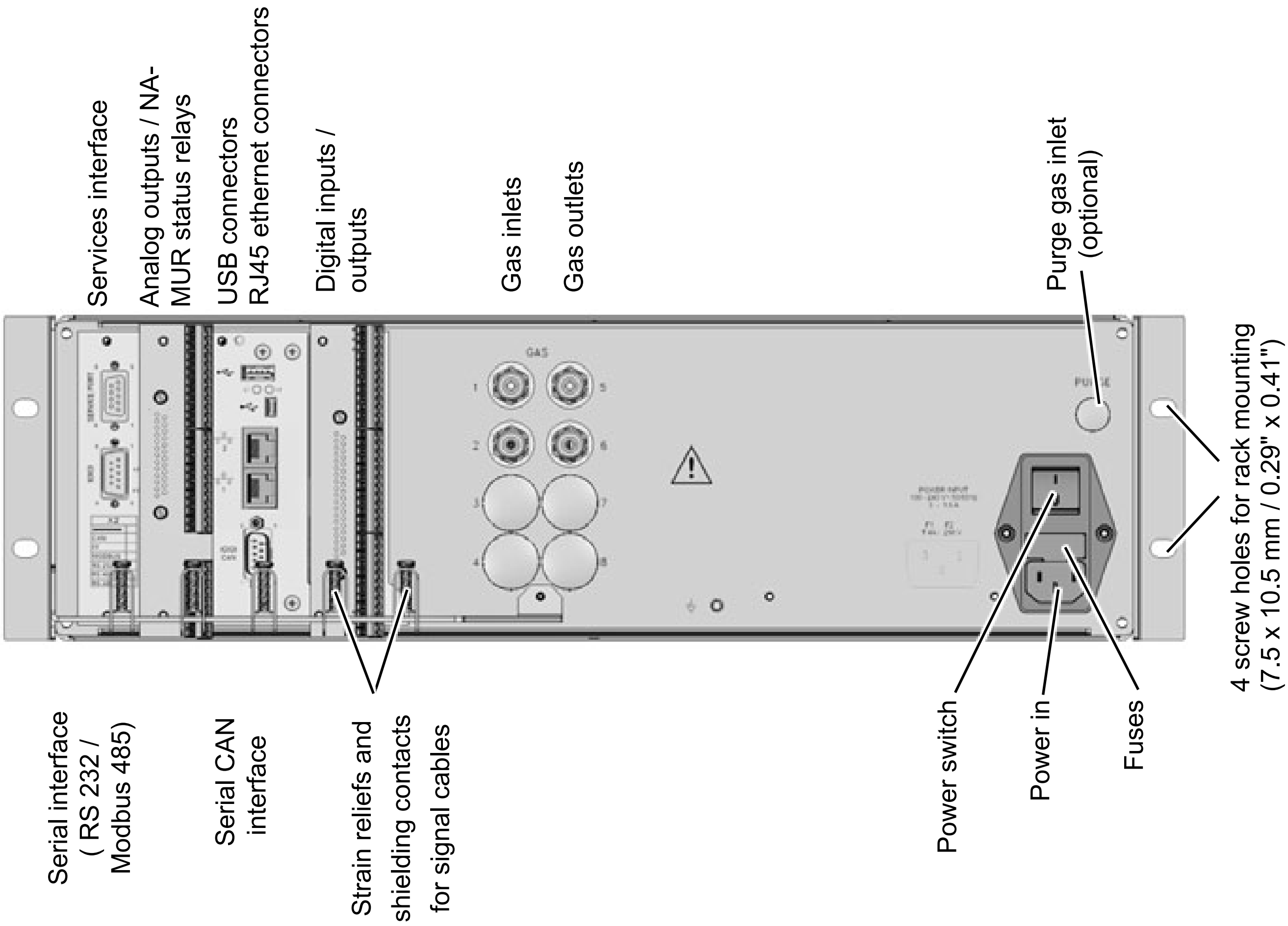


Fig. 4-6: *X-STREAM XEGP - Rear Panel, Model With Terminal Adapters and Front Side Brackets for Rack Mounting*

The brackets on either side of the front panel enable to install the unit into a rack; this is accomplished by means of four screws (fig. 4-6).

⚠ CAUTION

HAZARD BY INSTALLATION

The brackets are not designed to carry the weight of the instrument!

Support the instrument, when rack mounting!

Disregarding may cause personal injury and damaged equipment.

4.5.1 Installation - X-STREAM XEGC, X-STREAM XEGP

Signal inputs and outputs

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

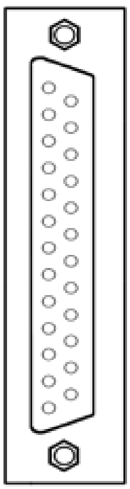
Analog signals
Relay outputs

Analog signals and relay outputs are located on a shared 25-pin submin socket (X1; Fig. 4-7), or on an optional terminals adaptor XSTA (☞ 4-13).

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 4.6.

	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
	Channel 5, (+) 4 (0) - 20 mA	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	Channel 5, GND	
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	

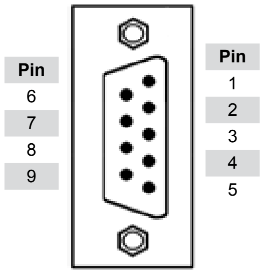
Note!
Configuration of relay contacts as per standard factory setting (NAMUR status signals)

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

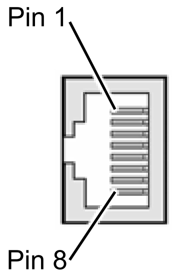
4.5.1 Installation - X-STREAM XEGC, X-STREAM XEGP

Serial interface

For specifications and notes on control, see chapter 7



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*



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

Ethernet connector

Fig. 4-8: *Plug X2 - Serial Interface*

Notes!

Consider the installation notes in section 4.6.

When terminal adapters are used, the Modbus interface terminals are located on the same adapter as those for the ***analog*** *signal outputs (Fig. 4-9, page 4-13).*

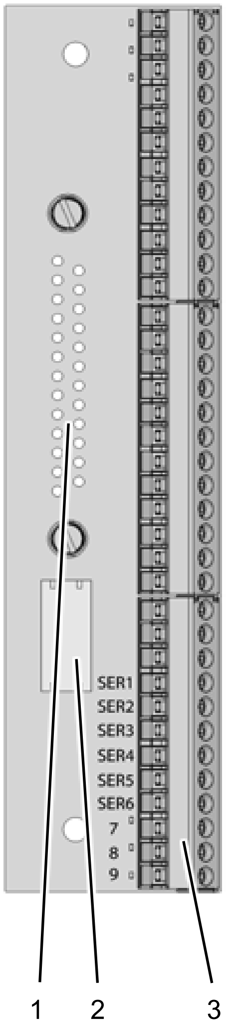
Then a flat flexible cable attached to the terminal adapter is used for connecting to the illustrated 9-pole plug.

X-STREAM analyzers are classified DTE (Data Terminal Equipment).

4.5.1 Installation - X-STREAM XEGC, X-STREAM XEGP

The XSTA adapter can optionally be used to connect signal cables to screw-type terminals instead of submin-D plugs and sockets: it is plugged onto the X1 Submin-D connector on the unit.

To connect any serial interface, the adapter is equipped with a flat flexible cable ending in a 9-pin submin-D plug, which should be plugged onto the unit's X2 connector.



Pin	Signal	
P2.1	Channel 1, (+) 4 (0) - 20 mA	Analog Outputs
P2.2	Channel 1, GND	Analog Outputs
P2.3	Channel 2, (+) 4 (0) - 20 mA	Analog Outputs
P2.4	Channel 2, GND	Analog Outputs
P2.5	Channel 3, (+) 4 (0) - 20 mA	Analog Outputs
P2.6	Channel 3, GND	Analog Outputs
P2.7	Channel 4, (+) 4 (0) - 20 mA	Analog Outputs
P2.8	Channel 4, GND	Analog Outputs
P2.9	*Channel 5, (+) 4 (0) - 20 mA (in preparation)*	Analog Outputs
P2.10	*Channel 5, GND (in preparation)*	Analog Outputs
P2.11	*not used*	
P2.12	*not used*	
P3.1	*not used*	
P3.2	*not used*	
P3.3	Output 1 (Failure), NC	Relay Outputs**)
P3.4	Output 1 (Failure), NO	Relay Outputs**)
P3.5	Output 1 (Failure), COM	Relay Outputs**)
P3.6	Output 2 (Maintenance Request), NC	Relay Outputs**)
P3.7	Output 2 (Maintenance Request), NO	Relay Outputs**)
P3.8	Output 2 (Maintenance Request), COM	Relay Outputs**)
P3.9	Output 3 (Out of Spec), NC	Relay Outputs**)
P3.10	Output 3 (Out of Spec), NO	Relay Outputs**)
P3.11	Output 3 (Out of Spec), COM	Relay Outputs**)
P3.12	Output 4 (Function check), NC	Relay Outputs**)
P4.1	Output 4 (Function check), NO	Relay Outputs**)
P4.2	Output 4 (Function check), COM	Relay Outputs**)
P4.3	*not used*	
P4.4		Serial Interface*)
P4.5		Serial Interface*)
P4.6		Serial Interface*)
P4.7		Serial Interface*)
P4.8		Serial Interface*)
P4.9		Serial Interface*)
P4.10		Serial Interface*)
P4.11		Serial Interface*)
P4.12		Serial Interface*)

1 Connector for plug X1 (on reverse side)
2 Connection for flat cable to plug X2 (cable not illustrated)
3 Screw-type terminals

Recommended 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)

*) See table below

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

Assignment of serial interface terminals

Terminal		MOD 485/ 2 wire	MOD 485/ 4 wire	RS 232
P4.4	*SER1*	Common	Common	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*

Note!
Consider the installation notes in section 4.6.

Fig. 4-9: *Configuration of XSTA Terminal Adapter*

4.5.1 Installation - X-STREAM XEGC, X-STREAM XEGP

Digital inputs & outputs

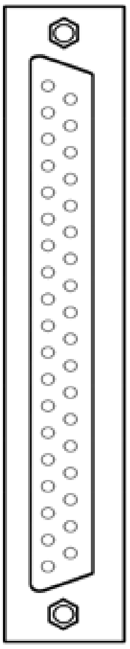
7 or 14 digital inputs (X-STREAM XEGC: max. 7 inputs)	electrical specification	max. 30 V, internally limited to 2.3 mA HIGH: min. 4 V; LOW: max. 3 V common GND
9 or 18 additional relay outputs (X-STREAM XEGC: max. 9 add. outputs)	electrical specification	Dry relay change-over contacts can be used as NO or NC max. load. 30 V; 1 A; 30 W resistive

Digital in- & outputs are located on shared 37-pin submin sockets (X4.1 or X4.2; Fig. 4-10), or on optional terminals adaptor XSTD (☞ next page)

Notes!
Depending on model and configuration, an analyzer may be fitted with up to 2 of these sockets (the unit is thus equipped with 14 digital inputs and 18 digital outputs).

To aid identification, the sockets are labelled X4.1 and X4.2.
Consider the installation notes in section 4.6.

	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



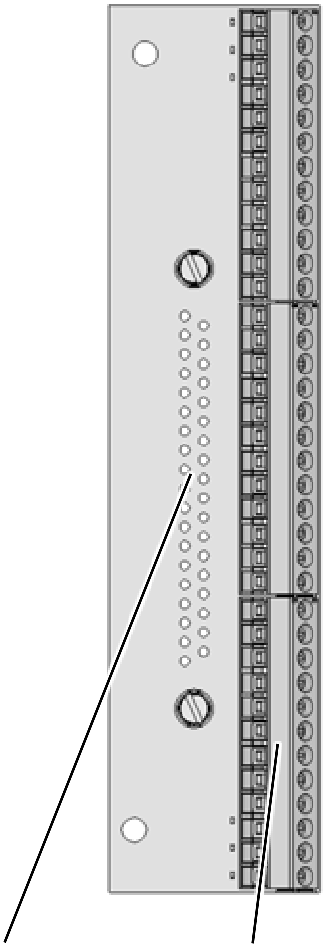
Pin	Signal	
20	Input 5	Digital inputs
21	Input 6	
22	Input 7	
23	Output 9, NC	Digital outputs
24	Output 9, NO	
25	Output 9, COM	
26	Output 10, NC	
27	Output 10, NO	
28	Output 10, COM	
29	Output 11, NC	
30	Output 11, NO	
31	Output 11, COM	
32	Output 12, NC	
33	Output 12, NO	
34	Output 12, COM	
35	Output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

Fig. 4-10: *Sockets X4.1 and X4.2 - Pin Configuration*

4.5.1 Installation - X-STREAM XEGC, X-STREAM XEGP

An XSTD adapter can optionally be used to connect digital I/O cables to screw-type terminals instead of Submin-D plugs and sockets: it is plugged onto the X4.1 and X4.2 (if fitted) Submin-D connectors on the unit.



1 2

Pin	Signal	
P3.1	Input 1	Digital inputs
P3.2	Input 2	
P3.3	Input 3	
P3.4	Input 4	
P3.5	Input 5	
P3.6	Input 6	
P3.7	Input 7	
P3.8	GND for inputs 1-7	
P3.9	*unused*	
P3.10	Output 5, NC	Digital outputs
P3.11	Output 5, NO	
P3.12	Output 5, COM	
P4.1	Output 6, NC	
P4.2	Output 6, NO	
P4.3	Output 6, COM	
P4.4	Output 7, NC	
P4.5	Output 7, NO	
P4.6	Output 7, COM	
P4.7	Output 8, NC	
P4.8	Output 8, NO	
P4.9	Output 8, COM	
P4.10	Output 9, NC	
P4.11	Output 9, NO	
P4.12	Output 9, COM	
P2.1	Output 10, NC	
P2.2	Output 10, NO	
P2.3	Output 10, COM	
P2.4	Output 11, NC	
P2.5	Output 11, NO	
P2.6	Output 11, COM	
P2.7	Output 12, NC	
P2.8	Output 12, NO	
P2.9	Output 12, COM	
P2.10	Output 13, NC	
P2.11	Output 13, NO	
P2.12	Output 13, COM	

Recommended 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)

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

1 Connector for socket X4.1 / X4.2 (on reverse side)
2 Screw-type terminals

Note!
Consider the installation notes in section 4.6.

Fig. 4-11: *Configuration of XSTD Terminal Adapter*

4.5.1 Installation - X-STREAM XEGC, X-STREAM XEGP

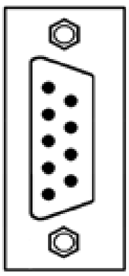
Analog inputs

Analog inputs are located on a 9-pole submin-D-connector (plug X5; Fig. 4-12) or on an optional terminals adaptor XSTI (Fig. 4-13).

2 analog inputs	electrical specification	0 - 1 (10) V, software selectable; R_{in} = 100 kΩ optional (requires to fit wire bridges, see figures): 4 (0) - 20 mA ; R_{in} = 50 Ω optically isolated from analyzer GND protected against overload up to ± 15 V or ± 20 mA

Note!
Consider the installation notes in section 4.6.

Signal		Pin
BR 2	fit a wire bridge here to apply analog	5
BR 2	signal in current mode to input 2 **)	4
	unused	3
BR 1	fit a wire bridge here to apply analog	2
BR 1	signal in current mode to input 1 *)	1



Pin	Signal
9	Input 2 high (+)
8	Input 2 low (-)
7	Input 1 low (-)
6	Input 1 high (+)

*) alternatively set jumper P2 on electronics board XASI

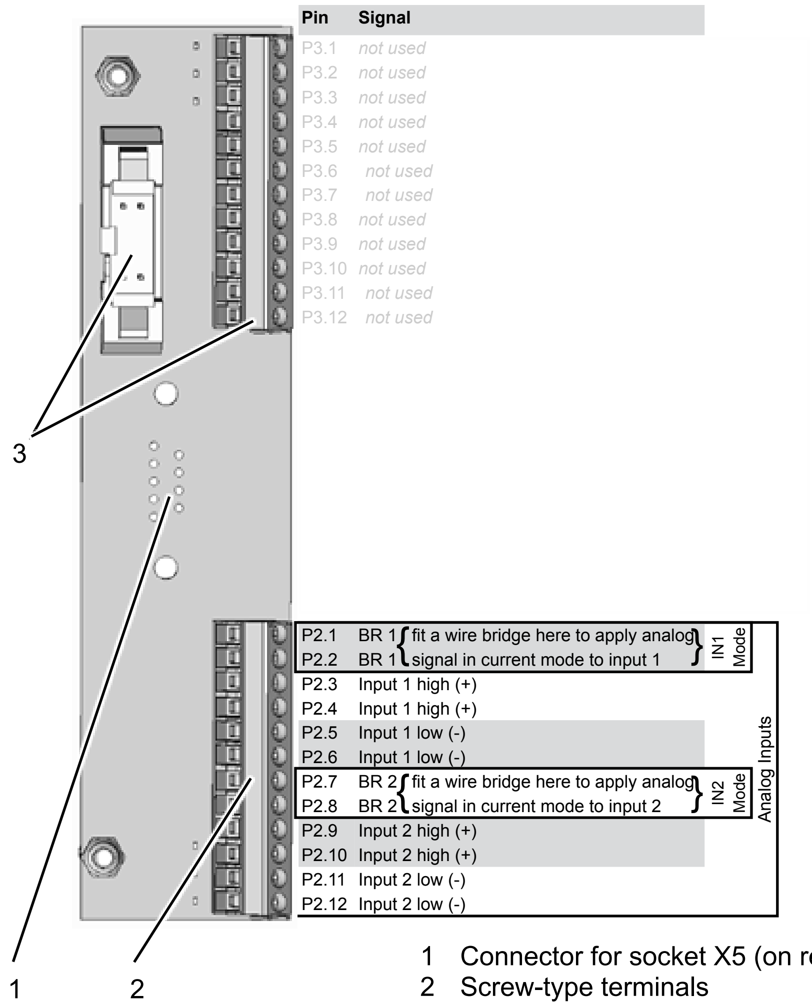
**) alternatively set jumper P1 on electronics board XASI

Fig. 4-12: *Plug X5 - Analog Inputs*

4.5.1 Installation - X-STREAM XEGC, X-STREAM XEGP

A XSTI adapter can optionally be used to connect analog IN cables to screw-type terminals instead of a submin-D plugs and sockets. The adapter is plugged onto the unit´s submin-D connector X5.

Recommended 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)



1 Connector for socket X5 (on reverse side)
2 Screw-type terminals
3 Reserved for future use

Fig. 4-13: *Configuration of XSTI Terminal Adapter*

4.5.1 Installation - X-STREAM XEGC, X-STREAM XEGP

Power supply

X-STREAM XEGC

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

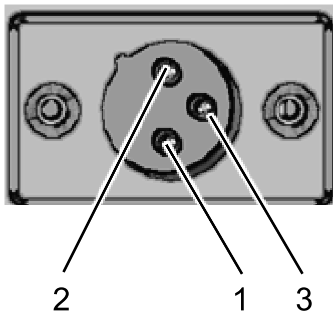
- an external power supply unit which can be connected directly to the analyzer using the supplied cable

or

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

Note the configuration of the pins on the connector (☞ Fig. 4-14).

Details of any PSUs supplied with the unit are given on ☞ 2-9.

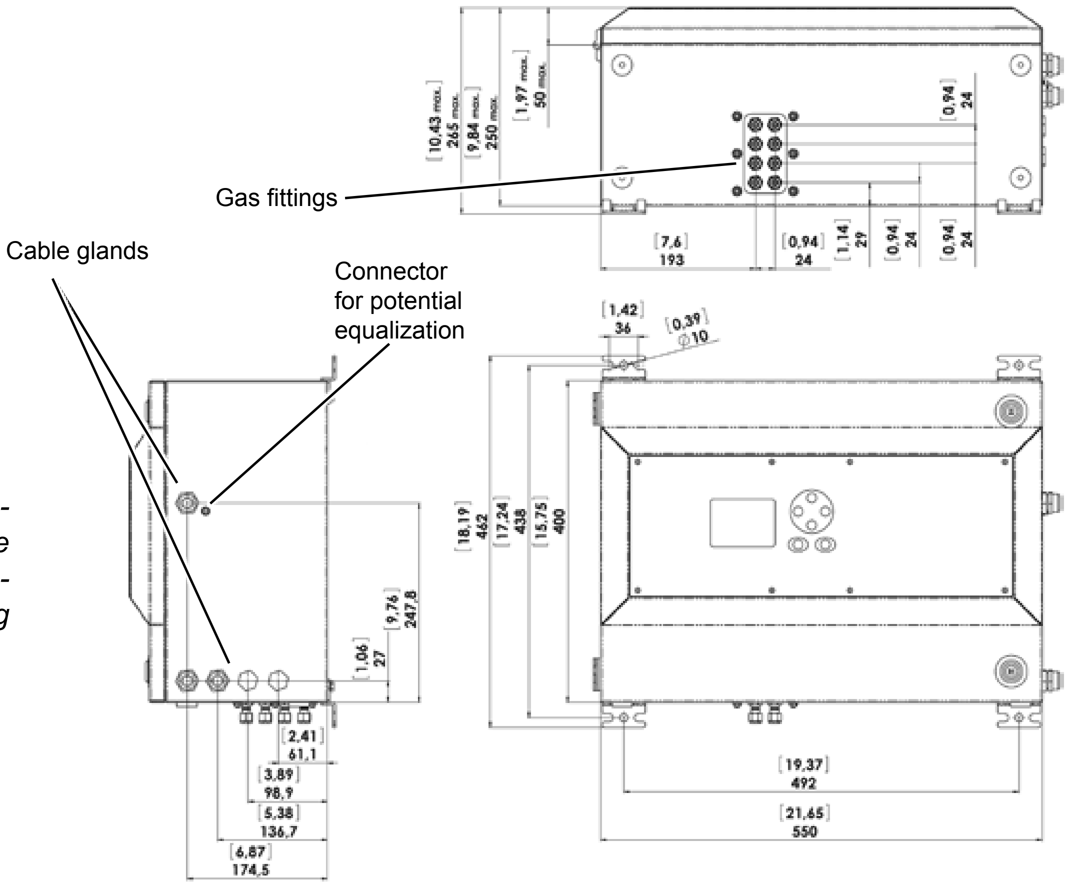


1: ME
2: + 24 V$_{---}$
3: 0 V (⊥)

Fig. 4-14: *24 V DC in Connector, Pin Configuration*

4.5.2 X-STREAM XEF, X-STREAM XDF

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. 4-15: *X-STREAM XEF - Dimensions for Installation*

⚠ CAUTION

HEAVY INSTRUMENT

X-STREAM XEF / XDF analyzers, intended to be wall mounted and/or outdoor installed, weigh up to 45 kg (99 lbs), depending on the chosen options!

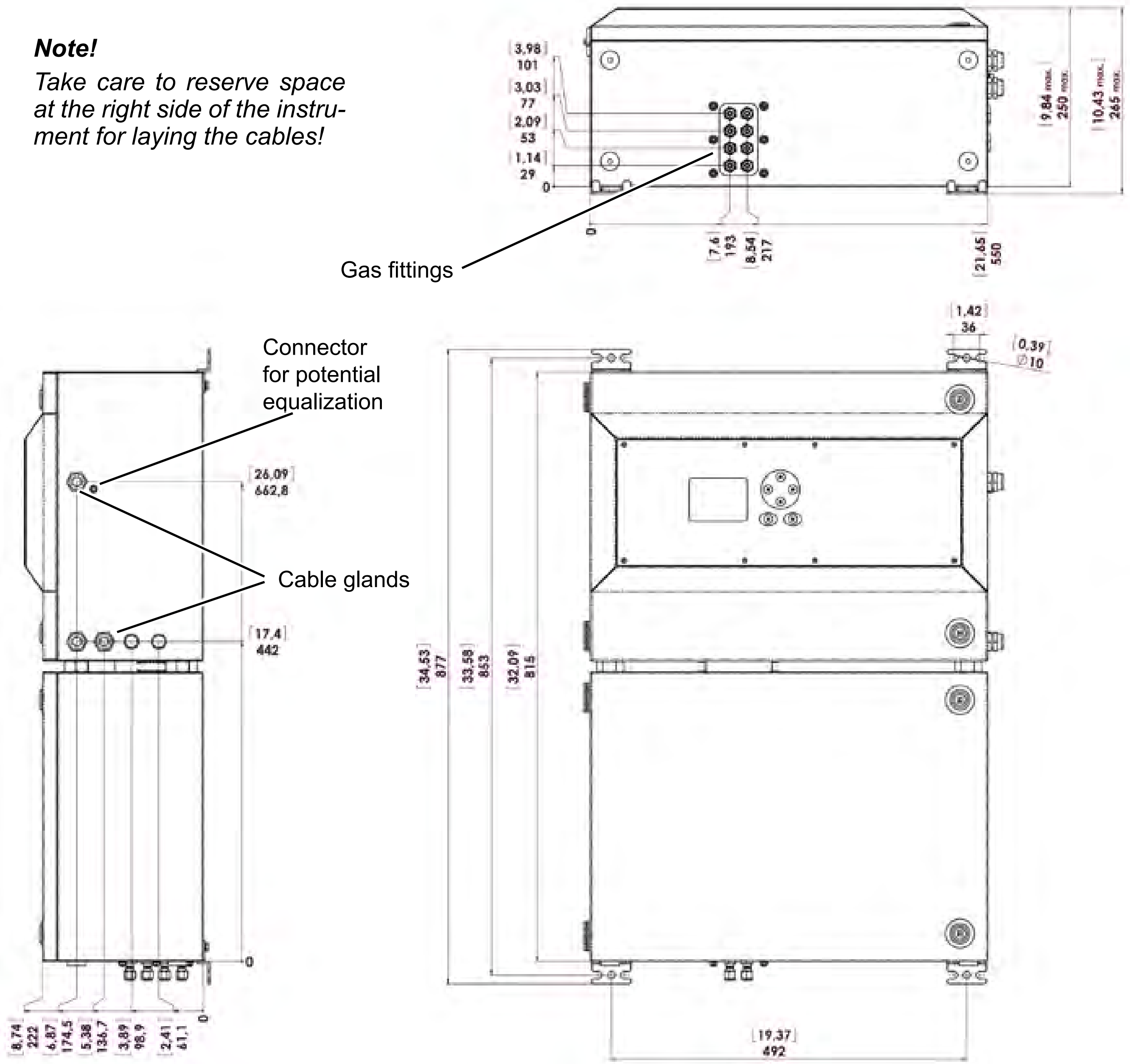
Use two persons and/or suitable tools for transportation and lifting these instruments!

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!

4.5.2 Installation - X-STREAM XE 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. 4-16: *X-STREAM XDF - Dimensions for Installation*

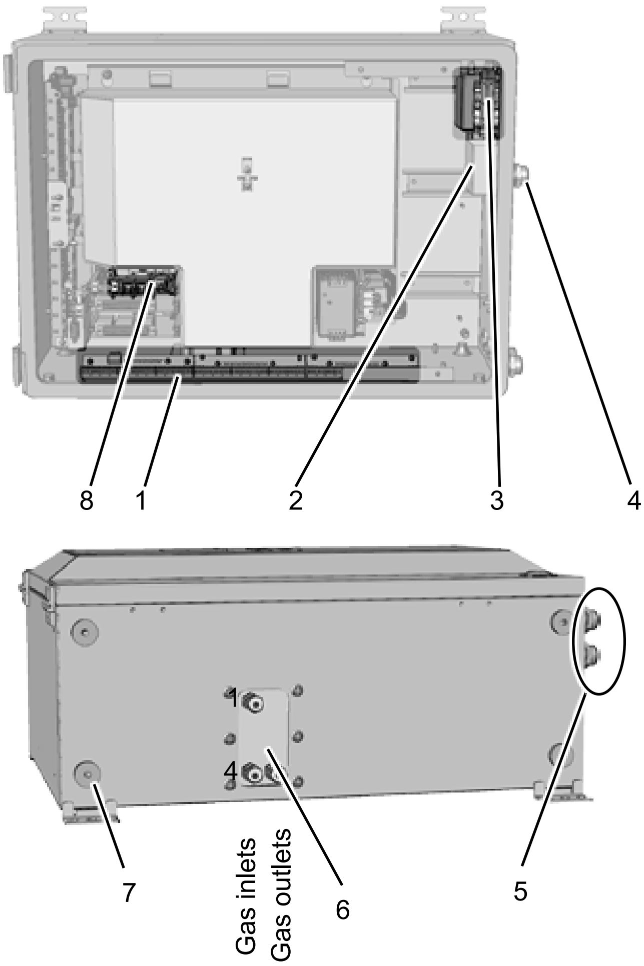
4.5.2 Installation - X-STREAM XE Field Housings

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 configuration 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.

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



Note on XDF!

In case of the dual compartment version XDF, the electrical connections are established in the upper compartment, and the gas connections to fittings at the lower compartment.

Besides this, the design and layout of terminals and fittings are the same as with the single compartment version XEF.

1 Terminals for signal cables
2 Mains filter
3 Power connections with integrated fuses
4 Gland 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. 4-17: *X-STREAM XE Field Housing - Arrangement of Terminals, Cable Glands and Gas Connectors*

4.5.2 Installation - X-STREAM XE 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 cabel
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 3⁄32“ (2 mm)

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

4.5.2 Installation - X-STREAM XE 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 configuration 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 mm² (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)

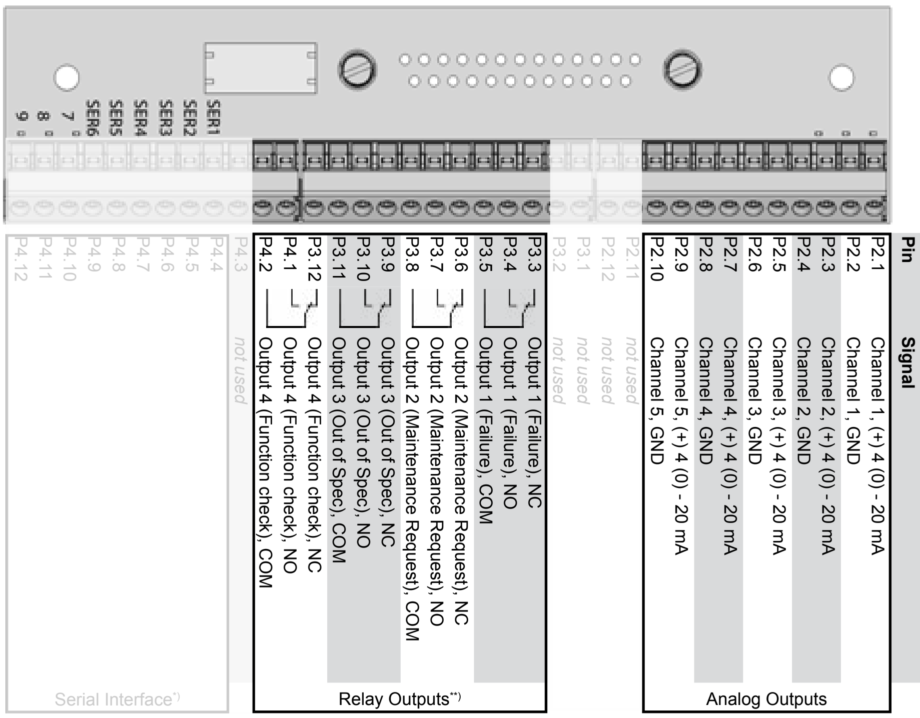
4.5.2 Installation - X-STREAM XE Field Housings

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; Fig. 4-18).

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 4.6.and the notes on installing cable glands on page 4-22.



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

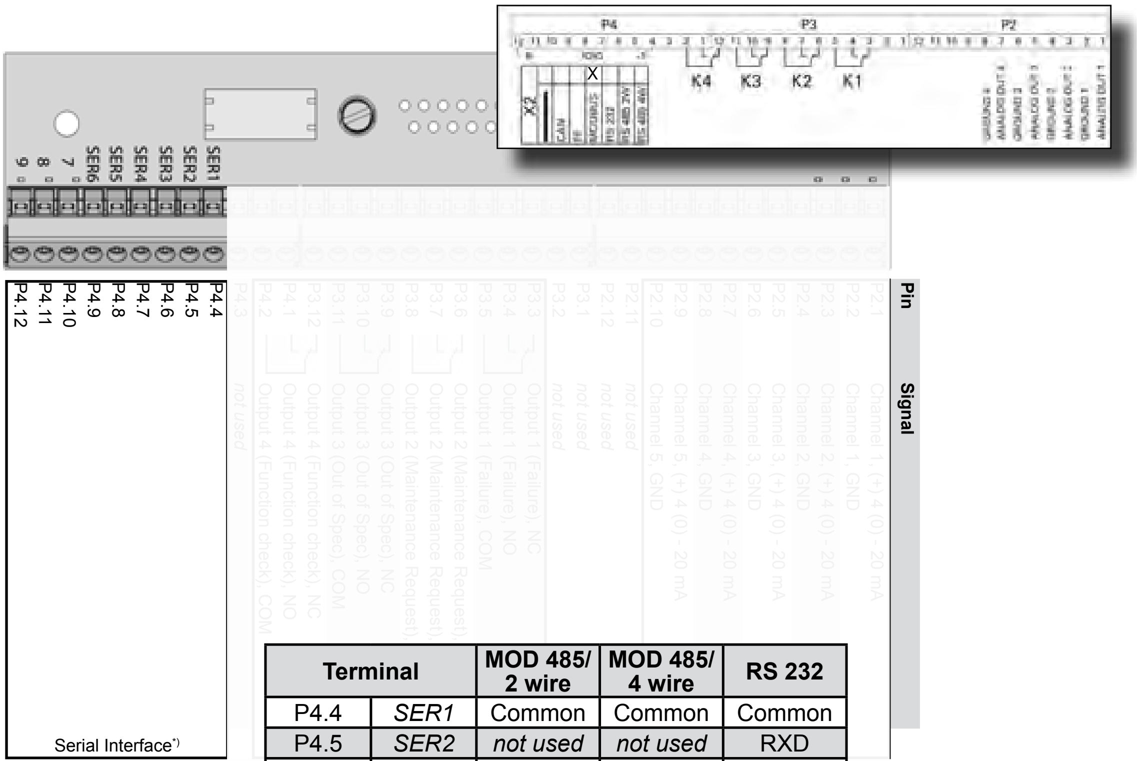
Fig. 4-18: *Terminal Block X1 - Analog Signals and Relay Outputs 1-4*

4.5.2 Installation - X-STREAM XE Field Housings

Serial interface

Specification and interface control:
☞ Chapter 9

The 9 terminals on the left (28 - 36) of the right most strip carry the serial interface signals.



*) See table

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*

Notes!
Consider the installation notes in section 4.6.and the notes on installing cable glands on page 4-22.

X-STREAM analyzers are classified DTE (Data Terminal Equipment).

Your analyzer´s type of serial interface is marked on a label nearby the terminals (see sample above)

Fig. 4-19: *Terminal Block X1 - Serial Interface*

4.5.2 Installation - X-STREAM XE Field Housings

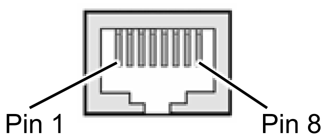
RJ45 Ethernet connection

The RJ45 connectors are located on an electronics board in the card cage section of the unit (Fig. 4-17, pg. 4-21). For connecting the analyzer into a network for analysis purposes, use the leftmost Ethernet connector.

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

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

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



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

FIG. 4-20: *X-STREAM XEF - Ethernet Connector*

4.5.2 Installation - X-STREAM XE Field Housings

Digital inputs and relay outputs (option)

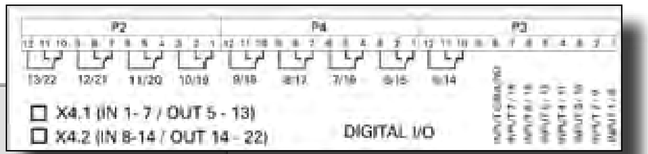
Terminals for these signals are located on the terminals board XSTD (terminal block X4; Fig. 4-21).

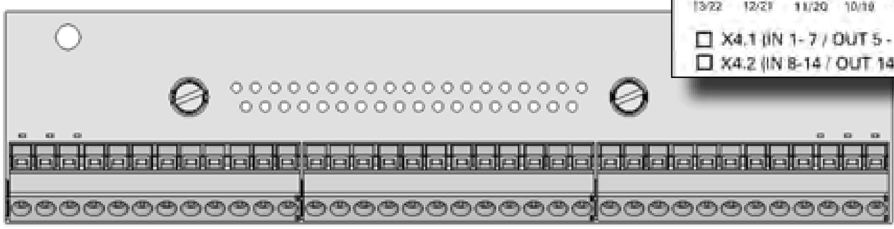
7 or 14 digital inputs	electrical specification	max. 30 V, internally limited to 2.3 mA HIGH: min. 4 V; LOW: max. 3 V common GND
9 or 18 additional relay outputs	electrical specification	Dry relay change-over contacts can be used as NO or NC max. load. 30 V; 1 A; 30 W resistive

Notes!

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

Consider the installation notes in section 4.6. and the notes on installing cable glands on page 4-22.





Pin	Signal
P3.1	Input 1
P3.2	Input 2
P3.3	Input 3
P3.4	Input 4
P3.5	Input 5
P3.6	Input 6
P3.7	Input 7
P3.8	GND for inputs 1-7
P3.9	*unused*
P3.10	Output 5, NC
P3.11	Output 5, NO
P3.12	Output 5, COM
P4.1	Output 6, NC
P4.2	Output 6, NO
P4.3	Output 6, COM
P4.4	Output 7, NC
P4.5	Output 7, NO
P4.6	Output 7, COM
P4.7	Output 8, NC
P4.8	Output 8, NO
P4.9	Output 8, COM
P4.10	Output 9, NC
P4.11	Output 9, NO
P4.12	Output 9, COM
P2.1	Output 10, NC
P2.2	Output 10, NO
P2.3	Output 10, COM
P2.4	Output 11, NC
P2.5	Output 11, NO
P2.6	Output 11, COM
P2.7	Output 12, NC
P2.8	Output 12, NO
P2.9	Output 12, COM
P2.10	Output 13, NC
P2.11	Output 13, NO
P2.12	Output 13, COM

Digital inputs

Digital outputs

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

Fig. 4-21:** X4: **Terminal Blocks for Digital Inputs and Outputs

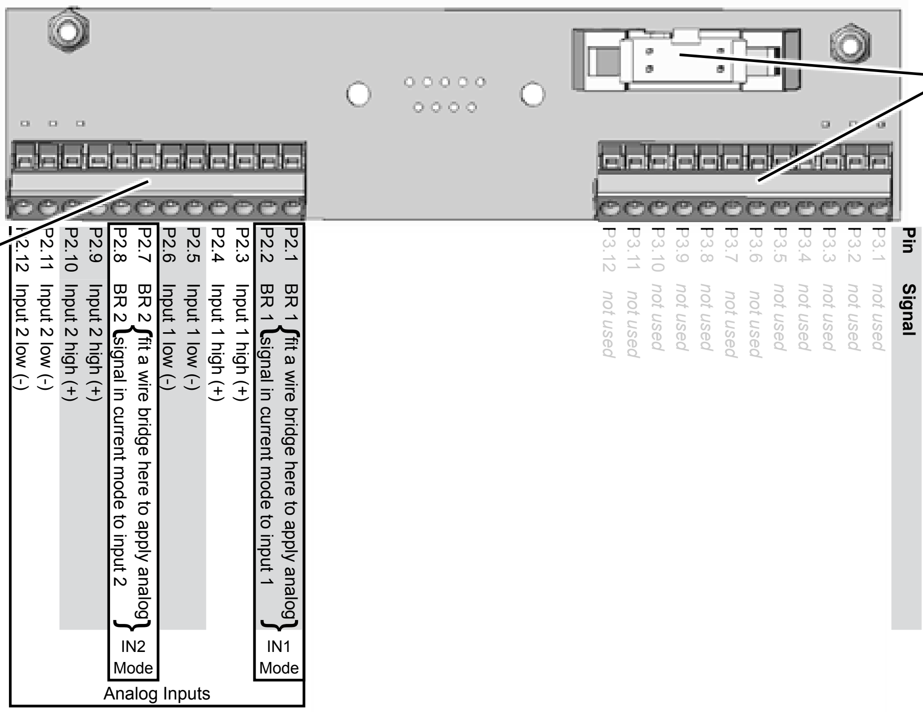
4.5.2 Installation - X-STREAM XE Field Housings

Analog inputs (option)

Terminals for analog input signals are located on the terminals board XSTI (terminal block X5; fig. 4-22).

2 analog inputs	0 - 1 V, 0 - 10 V (software selectable) R_{in} = 100 kΩ optional (requires to fit wire bridges, see figure): 4 (0) - 20 mA ; R_{in} = 50 Ω optically isolated from analyzer GND protected against overload up to ± 15 V or ± 20 mA

Note!
Consider the installation notes in section 4.6. and the notes on installing cable glands on page 4-22.



1 Screw-type terminals
2 Reserved for future use

Fig. 4-22: *Terminal Block X5 - Analog Input Signals*

4.5.2 Installation - X-STREAM XE 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.

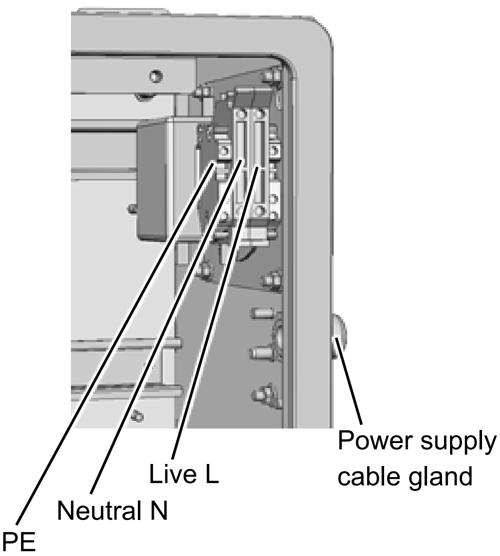


Fig. 4-23: *Power Supply Connections*

4.5.2 Installation - X-STREAM XE Field Housings

	WARNING
	ELECTRICAL SHOCK HAZARD BY MISSING EARTHING CONDUCTOR
	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.

4.6 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.

4.6.1 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. 4-24).

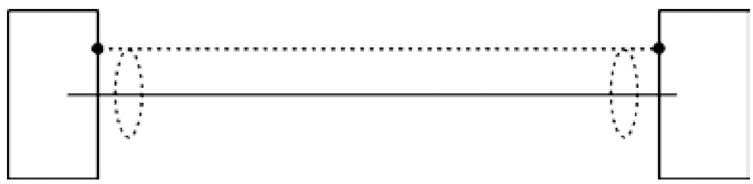


Fig. 4-24: *Shielded Signal Cable, Shielding Connected At Both Ends.*

4.6 Installation - Notes on Wiring

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.

This is the preferred method for connecting cable shields in hazardous area installations, to prevent interference currents between connected enclosures.

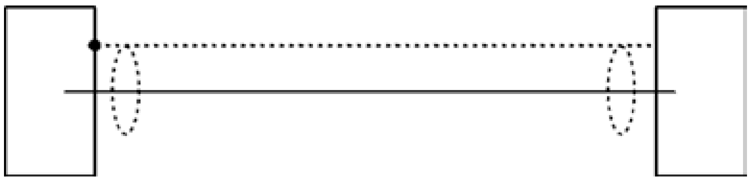


Fig. 4-25: *Shielded Signal Cable, Shielding Connected At One end.*

- Cables with double shielding: 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.

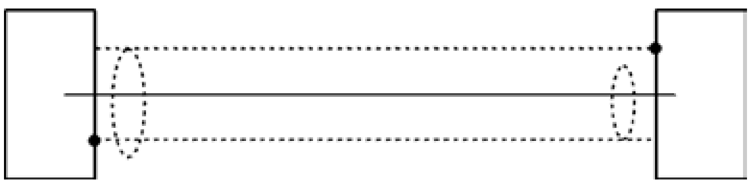


Fig. 4-26: *Signal Cable With Double Shielding, Shieldings Connected At Alternate Ends.*

4.6 Installation - Notes on Wiring

X-STREAM XEGP/XEGC with screw-type 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:

- Strip the signal cable to a length of 20 cm (8"). Take care to not damage the braided shield!
- Pull up the contact part of the shield connector terminal,
- feed through the cable as illustrated in Fig. 4-27, and
- release the contact part down onto the braided shield.

The result is a secure contact with the cable shield, improving the unit's immunity against interference from other electronic devices.

Finally connect the individual wires as described in section 4.5.1.

Fig. 4-27: *Shield Connector Terminal With Cable*

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

Ø 1.5 ... 6.5 mm (0.06" ... 0.25")	part # ETC02019
Ø 5 ... 11 mm (0.2" ... 0.43")	part # ETC02020
Ø 10 ... 17 mm (0.4" ... 0.66")	part # ETC02021
Ø 16 ... 24 mm (0.63" ... 0.94")	part # ETC02022

4.6.2 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. 4-28).

Compatible filter components for standard valves are available on request.

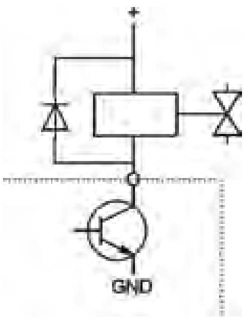


Fig. 4-28: *Suppressor Diode for Inductive Loads.*

4.6.3 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. 4-29).

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

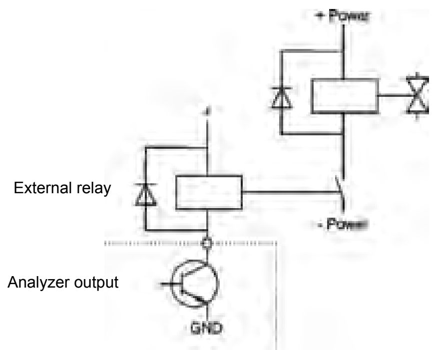


Fig. 4-29: *Driving High-Current Loads*

4.6.4 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 to their power supply by a common line:

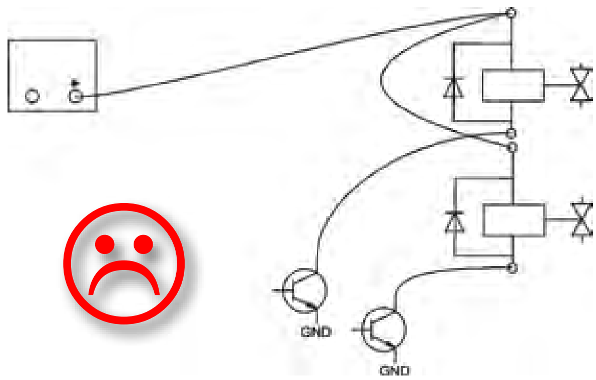


Fig. 4-30: *Common Line*

- **It is recommended** the loads to be wired separately, and each load connected separately to the power supply. Beginning at the distribution point, both the + and the - wires for each load are laid together to the load (Fig. 4-31). Interference is further reduced if a twisted multi-core cable is used.

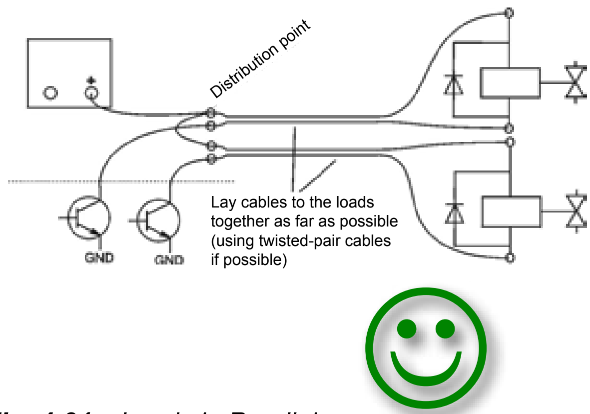


Fig. 4-31: *Loads in Parallel*

Chapter 5
Startup

5.1 Introduction

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

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

In order for the information in this chapter to be of any relevence, the unit must have been installed according to the instructions in chapter 4.

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

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!

5.2 Symbols and Typographical Conventions

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

Symbol	Description
Within Process Descriptions	
Setup..	Menu title
Setup.. Analog outputs..	Parent (SETUP) and current menu (ANALOG OUTPUTS)
Analog outputs.. Output*1...5*	As an example, the menu for Output1 is shown; the menus for outputs 2 to 5 look identical
Setup.. In-/Outputs.. Analog outputs.. 3 Output*1...5*	To access the current menu, access level code 3 has to be entered somewhere in the menu history
	Access levels: Access level 1 *(user)* Access level 2 *(expert)* Access level 3 *(administrator)* Access level 4 *(service level)*
Control.. Setup.. Status.. Info.. Service..	Screen shot (here: MAIN MENU)

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

5.3 Front Panel Elements

All X-STREAM XE gas analyzers have an graphic display to show 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, Polish, Portuguese and Spanish in various combinations).

Units are operated by six keys on the front panel.

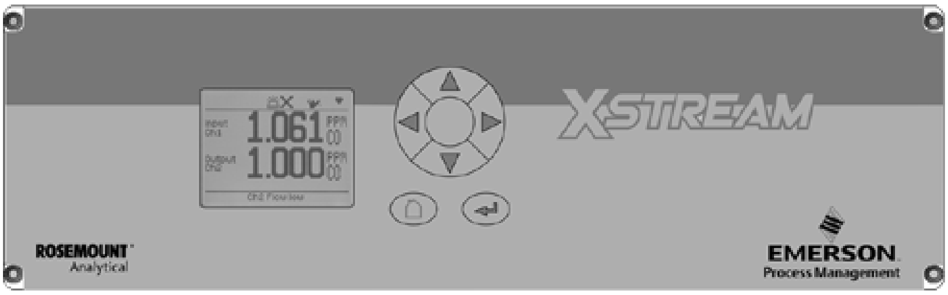
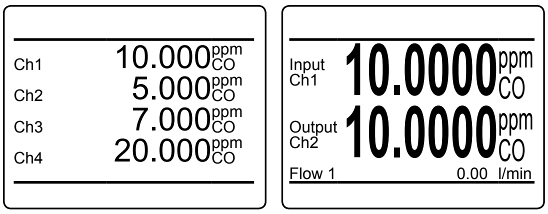


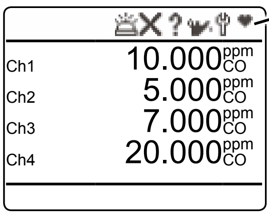
Fig. 5-1: *X-STREAM XE Front Panel*

5.3.1 Display



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

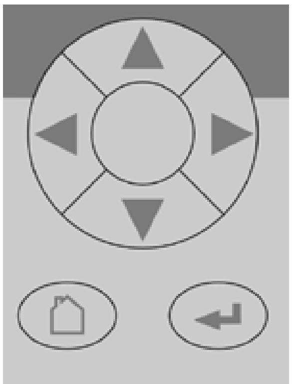
5.3.2 Status Line



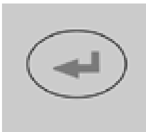
Status information is provided by different symbols in the display´s first line:

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

5.3.3 Keys

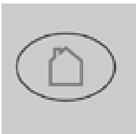


Six keys enable the use of the menu system. Depending on the operational mode (measuring, browsing menus, editing) they have the following functions:



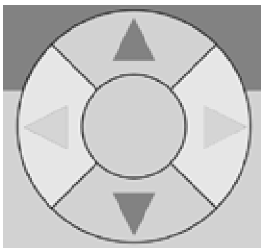
ENTER key:

Mode	*Function*
Measuring	Enter main menu
Browsing	Open submenu (..) or execute command (!)
Editing	Confirm new entry



HOME key:

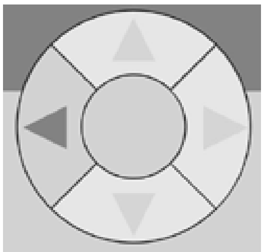
Mode	*Function*
Measuring	*(no function)*
Browsing	Return to measurement display
Editing	Abort entry



UP / DOWN keys:

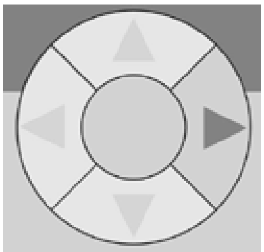
Mode	*Function*
Measuring	Enter main menu
Browsing	Highlight next menu line
	Open the previous/next page, when currently a line beginning with ▲/▼ is highlighted
Editing	Change current parameter

5.3 Front Panel Elements



LEFT key:

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



RIGHT key:

Mode	*Function*
Measuring	Enter main menu or open 2^{nd} measurement display page (if configured)
Browsing	Open submenu (..)
Editing	Go to next menu page, when ▼ shows in last menu line
	Move cursor 1 char to the right

5.4 Software

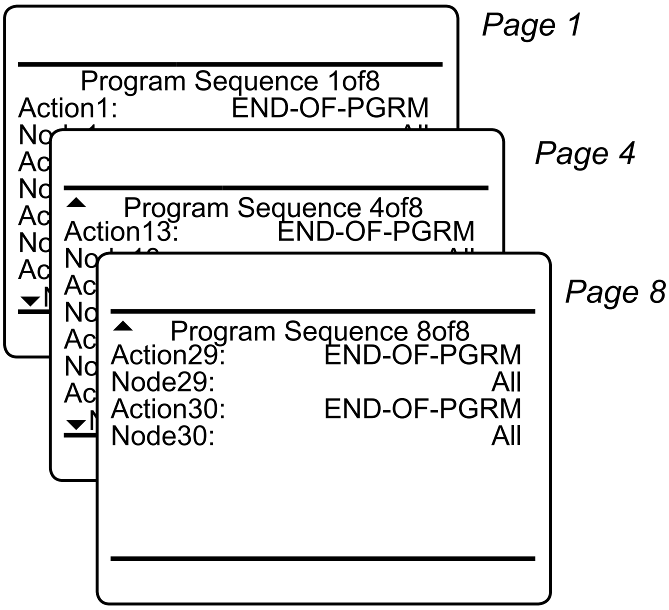
The analyzer software displays measurement results and status messages, allows parameters to be set and edited, and maintenance functions (e.g. calibration) to be carried out.

The software is organised hierarchically: The topmost level is called MEASUREMENT DISPLAY, followed by a MAIN MENU; all other menus and submenus are arranged below (☞ fig. 6-1, page 6-2).

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

Function	Description
Text	Simple text (not selectable with cursor)
Editable variables / parameters	A variable description shows a colon; 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 Pressing ENTER in an editable variable line highlights the value to be changed. The optional unit can only be changed utilizing a setup menu. Variables shown without a colon cannot be edited, they are for information only.
Executable command	A command line text ends in an exclamation mark; pressing ENTER with such a line highlighted, the command is executed, e.g. a calibration procedure. *Example:* Start calibration !
Selectable submenu	A menu line text ends in two dots. Press ENTER with a menu line highlighted to open the submenu. *Example:* Setup..

Browsing



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

In the example to the left

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

To show the next page (indicator ▼)

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

To show the previous page (indicator ▲)

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

Editing

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

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

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

Use LEFT and RIGHT to select another character.

The type of available characters depends on the position of the cursor:

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

There are two ways to exit the data entry mode:

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

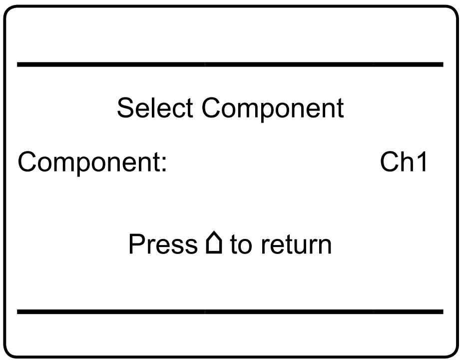
HOME: Cancel: all settings and changes are reset to their former values.

Component selection menu

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

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

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



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

This menu does not show on single-channel units.

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

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

5.4 Software

5.4.1 Access Levels & Codes

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

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

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

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

Level one is the user level and includes
- parameters which should be set by trained personnel only.
- functions, not to be started by any person (e.g. start calibrations).

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

Within this manual, the descriptions of the menus and procedures also indicate, which level the menus are assigned. These assignments cannot be changed.

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

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

We recommend to set new access codes, if you want to use this option (☞ 6-32)!

Notes!

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

*If a high level is **unlocked** (status **Off**, or code entered when requested), automatically all lower levels will also be **unlocked**.*

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

Entering access codes

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

```
            Access Code 1
Code                       00000000


          Press ⌂ to return
```

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

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

5.4.2 Special Messages

Depending on the last action performed by the user, one of the following messages may be displayed to assist or inform the user.

Information on incorrect entry:

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

Press ↵ to return to the previous screen to enter an acceptable value.

Wrong input

Range 0.1 ... 50

Press ↵ to return

Confirmation of execution of command:

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

Function executing

Press ↵ to return

5.5 Powering Up

5.5.1 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 remaining time counts down in the display.

5.5.2 Measurement Display

The measurement display is shown

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

The information, to be provided in each of the four lines of the measurement display, can be configured by an expert (access level 2):

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

The factory settings are as follows:

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

Note!

If less than four channels are installed in the unit, only the measureands for these channels are available for selection.

5.5 Powering Up

The setup menu enables several additional configurations, e.g.

- 2 pages measurement display
- different font sizes

☞ 6-29.

The very first display line shows

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

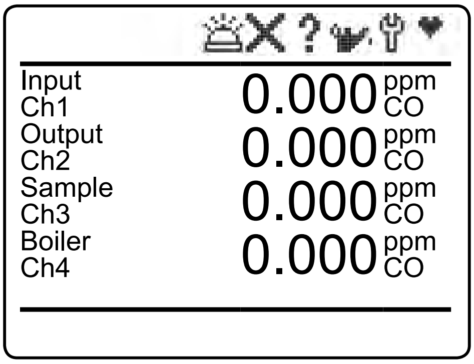
The display´s bottom line shows plain text status information (errors, maintenance requests, function checks or off-spec performance).

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

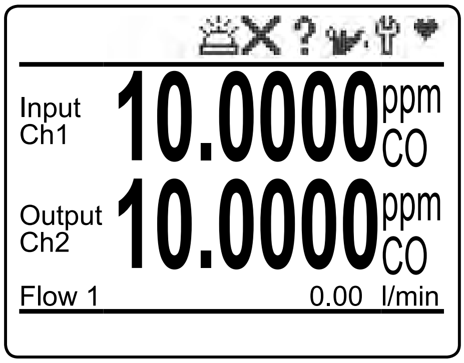
Most messages also activate a NAMUR relay (if a relay has been assigned to that NAMUR function; ☞ 6-68).

Note!

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



4 lines display



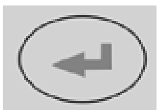
2 lines display with additional secondary parameter line

MEASUREMENT DISPLAY

5.6 Selecting the Language

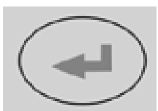
If the analyzer is operational and it becomes clear that the incorrect language has been set, which is unintelligible to the operator, the following sequence of keypresses (starting at the measurement display) can be used to set the language.

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.



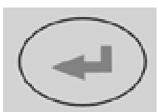
Note!

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.

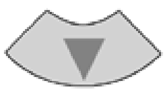


Note!

Pressing ENTER the 3rd time in this sequence highlights the "Language" line.

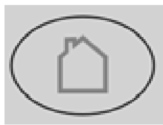


- DOWN changes the language.
- ENTER sets this language and the display is updated accordingly.
- If the selected language is not the intended, repeate the last three steps until the intended language is set.



5.7 Checking the Settings

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

()

Starting with the measurement display (☞ page 5-11), pressing any key except *HOME* will access the MAIN MENU; from here, follow these steps:

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

```
                 Setup
Display..
Alarm..
Measurements..
In-/Outputs..
Communication..
Alarms..
Installed Options..
▼Save-Load..
```

Note!

If you are unfamiliar with the language set: ☞ 5-12 shows the sequence of keys to set a different language.

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

Note!

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

```
                Display

Contrast..
Language:                  English
Phrase Version             EN1.04B
Measurements..
Measurement Display..
Menu Access..               10 Min
Auto Home:                  10 Min
```

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

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

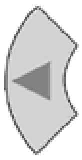
English, French, German, Italian, Spanish, Polish, Portuguese

Startup
5

5.7 Checking the Settings

5.7.1 Installed Options

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



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

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

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

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

Installed Options 1of2
Licenses..

Valves:	None
Pumps:	None
DIO#1 Installed:	No
DIO#2 Installed:	No
Anal. Outputs:	4
▼AIN Installed:	No

▲ Installed Options 2of2

Flow..
Pressure..

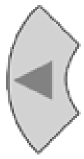
This 2 pages menu indicates, which of the possible optional components are installed in the unit. The values displayed on your unit may differ from those illustrated here.

Licenses

Key 1:	0
Key 2:	0
Key 3:	0
Package	None
Trial Days	

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

5.7.2 Configuring the Display



Press *LEFT* to return to SETUP.

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

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

```
        Display 1 assignments

Line 1:                     Comp1
Line 2:                     Comp2
Line 3:                     Comp3
Line 4:                     Comp4
Line 5:                     Blank

▼Labels..
```

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

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

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

```
          Display 1 labels

Line 1:
Line 2:
Line 3:
Line 4:
Line 5:
```

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

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

5.7.3 Calibration Setup

Setup..
Calibration..

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

Component ?

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

Note!
For more detailed information on calibration procedures, ☞ 7-5.

Ch1

Calibration

Gases..
Tolerances..
Procedure..
Valve Assignment..
Program Sequence..
Interval Time..
Deviations..

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

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

Gases

Zero Gas:	0.000 ppm
Span Gas:	50000.000 ppm
Range Gases..	
Current Range:	Range 1

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

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

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

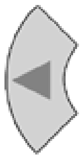
- during calibration the analyzer checks whether the values set for zero and span gas conform to the concentration of the gas currently being supplied.
- If the concentrations differ more than the percentage of range entered in the follo-wing lines, the calibration is aborted.This prevents calibration from being performed when the incorrect gas is supplied (e.g. span gas calibration using zero gas), which would result in an incorrectly configured unit.

Ch2

Tolerances

DeviatToler:	Off
Zero Limit:	20.0 %
Span Limit:	20.0 %

5.7 Checking the Settings



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

Setup..
Measurement..

Ch1
Measurement 1of2
Ranges..
Damping..
Linearization..
Cross Interference..
Average..
Delay..

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

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

Ch1
Measurement 2of2
Cut-off: None
Pressure Compensation ..

The second page´s last line
enables the user

- to enter the current ambient pressure manually, if no pressure sensor is installed,

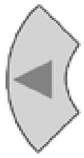
or

- to view the current pressure, if a sensor is installed (☞ INSTALLED OPTIONS, page 5-14).

Ch1
Pressure compensation
Manual Pressure: 1013 hPa
Pressure 1013 hPa
Pressure Status Good

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

5.7.4 Setting the Analog Outputs



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

Setup..
In/Outputs..
Analog Outputs..

Select the analog output you like to check.

Note!
The following section only in brief describes the entries currently of interest! ☞ Chapter 6 for a more detailed description.

Analog Outputs

Output1..
Output2..
Output3..
Output4..
Output5..

Select the signal assigned to this analog output.

Selectable options:

0 mA
20 mA
Comp1 ... 4
Temp1 ... 4
Press1 ... 4
Flow1 ... 4
Calc A ... D
RawVal1 ... 4
RangeID1 ... ID4

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

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

5.7 Checking the Settings

Signal*)	Description
None	The analog output is deactivated
0 mA	A 0 or 4 mA signal is generated, e.g. to check the signal processing in an external system. Whether a 0 or 4 mA signal is generated, is set by the "*Out range*" line (☞ next page).
20 mA	A 20 mA signal is generated, e.g. to check the signal processing in an external system.
Comp1 ... 5	Gas concentration
Temp1 ... 5	Temperature
Press1 ... 5	Pressure
Flow1 ... 5	Flow
Calc A ... D	Result of calculator
RawVal1 ... 5	Raw value
RangeID1 ... 5	ID of selected range

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

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

5.7 Checking the Settings

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

Next, select the output range:

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

Enter a concentration, to equal the low output limit (0 or 4 mA)

Enter a concentration, to equal the high output limit (20 mA)

Enable (**Yes**) or disable (**No**) output autoscaling.

"*FailMode*" selects the output´s behaviour under failure conditions, considering or not, the NAMUR recommendation NE 43. NE 43 defines output signals enabling to detect different types of failures/status (see table 6-1): The related information is transmitted as a current signal, but outside the (0)4-20 mA measurement signal range.

Available options:

Track: NE 43 not considered.

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

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

5.7 Checking the Settings

Operation Modes acc. NAMUR NE 43

If "*OutRange*" is set to **0-20 mA**, a 20 mA signal is generated, if the measured concentration is equal to "*Max Scale*". A 0 mA signal is generated if the sample gas concentration is 0 (dead zero).

However, a severed cable also results in a signal value of 0. An external data acquisition system thus cannot detect such an failure and accepts a gas concentration of 0.

The commonly used method of detecting a severed cable is to apply an offset: a concentration corresponding to the lower range value is assigned an analog signal of 4 mA, enabling to detect a severed or disconnected cable.

This live zero mode is activated by setting "*Out Range*" to **4-20 mA**.

Operation modes conforming to NAMUR 43 (NE 43) recommendations

The operation modes described above do not generate a signal which enables detection of a failure in the measurement system. In such cases the behaviour of the output signal is undefined: either the last value is held, or a random value is sent. System failures thus cannot be detected by an external data acquisition system.

NE 43 contains recommendations for setting analog outputs in order to avoid these situations. These are implemented by X-STREAM analyzers as follows:

Setting "*FailMode*" to **HIGH + 10%** or **LOW - 10%** defines specific analog output signals in case of a failure. Since these values do not occur under normal operation conditions, a data acquisition system is enabled to distinguish between the following situations (table 5-1):

- Valid signal (signal within valid range; column *C*)
- Signal out of range (signal rises or falls slowly to the limits given in columns *D* or *E* and holds this value until the concentration returns to a valid level).
- Failure (signal out of range; column *F*)
- Severed cable (no signal; column *G*)

			Output signal, if				
Column	*A*	*B*	*C*	*D*	*E*	*F*	*G*
"OutRange"	**"FailMode"**	**Failure signal level acc. NE 43**	**Measured value is valid**	**Measured value is below lower limit ("Low scale")**	**Measured value is above upper limit ("High scale")**	**An internal failure occured**	**Cable is severed**
0-20 mA	Track	-	0 ... 20 mA	< -19 mA	> 21 mA	undefined	0 mA
4-20 mA	Track	-	4 ... 20 mA	< -19 mA	> 21 mA	undefined	0 mA
0-20 mA	LOW - 10%	below	0 ... 20 mA	-0.2 mA	20.5 mA	-2 mA	0 mA
4-20 mA	LOW - 10%	below	4 ... 20 mA	3.8 mA	20.5 mA	2.4 mA	0 mA
0-20 mA	HIGH + 10%	above	0 ... 20 mA	-0.2 mA	20.5 mA	> 22 mA	0 mA
4-20 mA	HIGH + 10%	above	4 ... 20 mA	3.8 mA	20.5 mA	> 21.6 mA	0 mA

Tab. 5-1: *Analog Output Signals Settings and Operation Modes*

5.7 Checking the Settings

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

"*0/4 mA*" enables to finetune the analog output: Set "*Signal*" to **0 mA** and, while measuring the output current, adjust it to the expected value.

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

"*20 mA*" enables to finetune the analog output: Set "*Signal*" to **20 mA** and while measuring the output current, adjust it to the expected value.

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

"*Hold*" selects the output´s behaviour during calibrations.

If set to **Yes**,

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

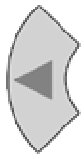
If set to **No**,

- the analog output signal always corresponds to the actual measured value during calibration; this may trigger alarms if limits are exceeded.
  Note!
  This behaviour may be undesireable if e.g. the unit is connected to a data acquisition system.

5.7 Checking the Settings

5.7.5 Setting Concentration Alarms

Note!
If concentration alarms are not being used, continue with *☞ 5-24.*



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

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

Ch1

Concentration

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

Four concentration limits can be set for each channel:

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

See the figure to the left for an explanation.

If you enter values for any threshold, the above given order has to be considered. A message is displayed, if an entered value does no comply with this condition.

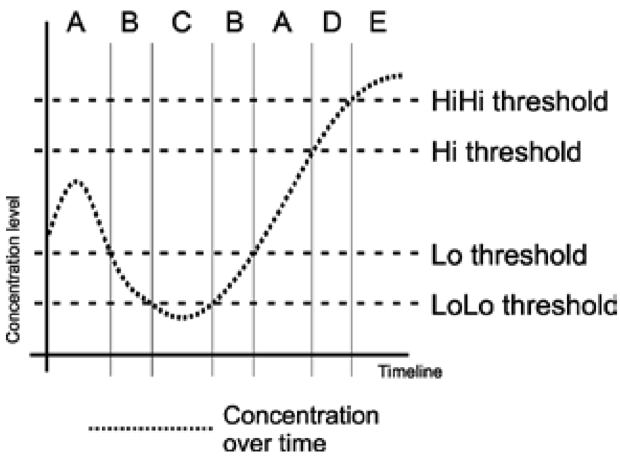


Fig. 5-2: *Arrangement of Concentration Thresholds*

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

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

Ch1

Concentration Alarms

LoLo Alarm:	Off
Lo Alarm	On
Hi Alarm	Off
HiHi Alarm	Off
Concentration	75.000 ppm

You may turn the alarm function **On** or **Off** separately for each channel ("*Alarm Monitor*").

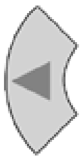
It´s also possible to use only some of the thresholds. In this case, set the not used to a level outside the range limits (for this, "*Lo"* and "*LoLo"* support entering negative values).

In case of an alarm, you may like to enter the STATES submenu, to check which one is triggered.

5.7.6 Backup the Settings

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

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



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

Save-Load

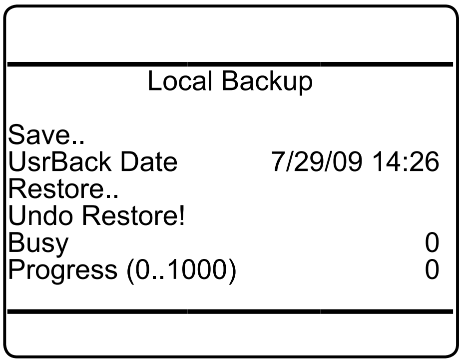
Local Backup..
Factory Defaults..
USB Backup..

USB Firmware Update..

This menu gives you the choice, to either

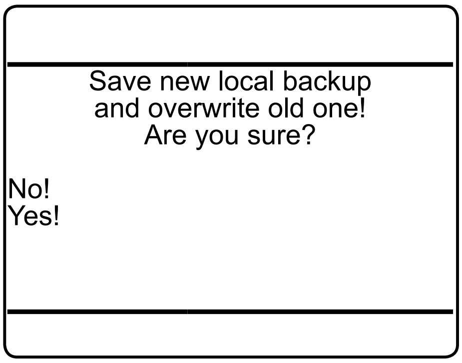
- make a local backup to a protected memory area
- restore the factory default settings, or
- make a backup to an external USB device.

5.7 Checking the Settings

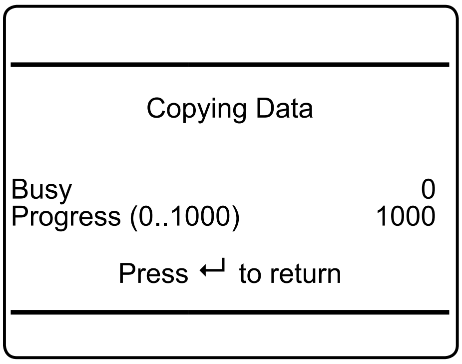


For now, make a local backup:

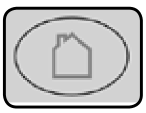
Enter LOCAL BACKUP and then select "*Save..*".



Confirm the operation (select "*Yes!*").



Wait until "*Progress (0..1000)*" shows **1000**, then press *ENTER* to return to LOCAL BACKUP.



You have now completed checking the unit's settings:

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

5.8 Perform a Calibration

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

Refer to chapter 7 for a comprehensive description of calibration procedures.

Chapter 6
User Interface and Software Menus

This chapter describes the structure and content of the X-STREAM gas analyzer software menus.

While this chapter describes all software menus in hierarchical order, chapters 5 & 7 explain by practical examples, how to navigate through the menus to perform certain basic setup operations, or maintenance functions.

6.1 Symbols and Typographical Conventions

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

Symbol	Description
Within Process Descriptions	
Setup..	Menu title
Setup.. Analog outputs..	Parent (SETUP) and current menu (ANALOG OUTPUTS)
Analog outputs.. Output*1...5*	As an example, the menu for Output1 is shown; the menus for outputs 2 to 5 look similiar
Setup.. In-/Outputs.. Analog outputs..  Output*1...5*	To access the current menu, access level code 3 has to be entered somewhere in the menu history
	Access levels:
	Access level 1 *(user)*
	Access level 2 *(expert)*
	Access level 3 *(administrator)*
	Access level 4 *(service level)*

Symbol	Description
Within Process Descriptions	
Control.. Setup.. Status.. Info.. Service..	Screen shot (here: MAIN MENU)

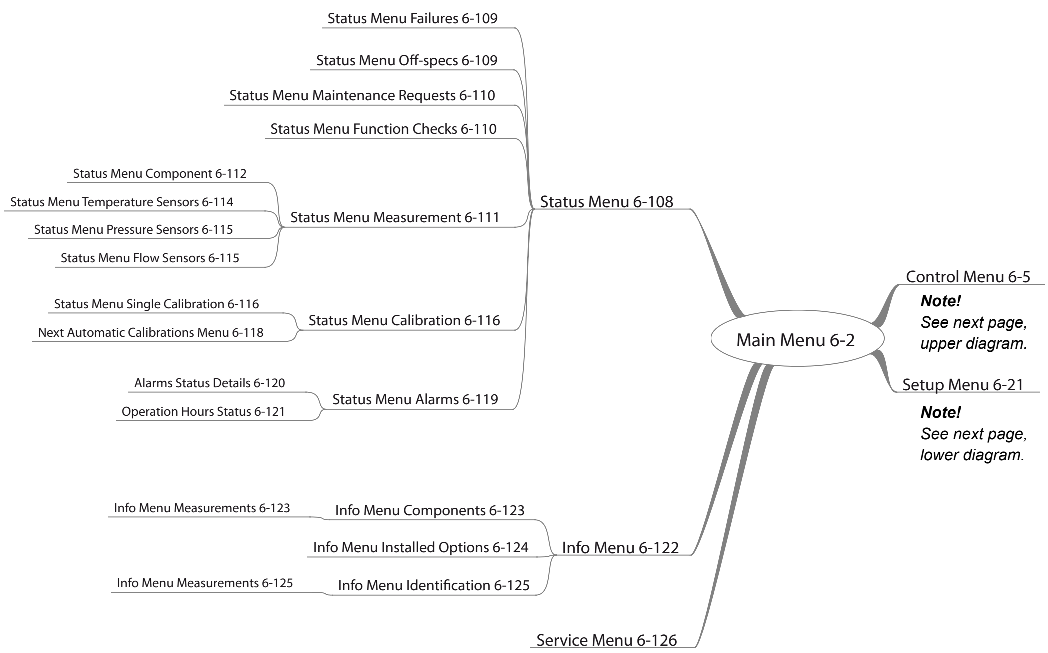
Convention	Description
Within Text	
(MENU TITLE) ☞ 6-12	For a detailed description of *MENU*, see page 6-12.
CONTROL	Identifies the CONTROL menu, e.g. "press ENTER to open CONTROL"
CONTROL - RANGES	From within the CONTROL menu, select the RANGES menu.
"*Valves*" "*Control..*"	Parameter or menu line name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

6.2 Menu System

Note!

This overview does only show menu branches up to the 3rd menu level, not functions nor parameter lines! E.g. the lines "Pump" or "Lock menus" of CONTROL are not shown.

The analyzer´s menu system has a dynamic behavior in that it does not show entries not supported by the current analyzer configuration. Therefore this overview might show entries hidden in your specific instrument!



Notes!
This figure applies to software revision 1.0.x
Numbers are page numbers of this manual, where the associated menu is explained.

Fig. 6-1: *X-STREAM XE Software Menu Structure*

6.2 Menu System

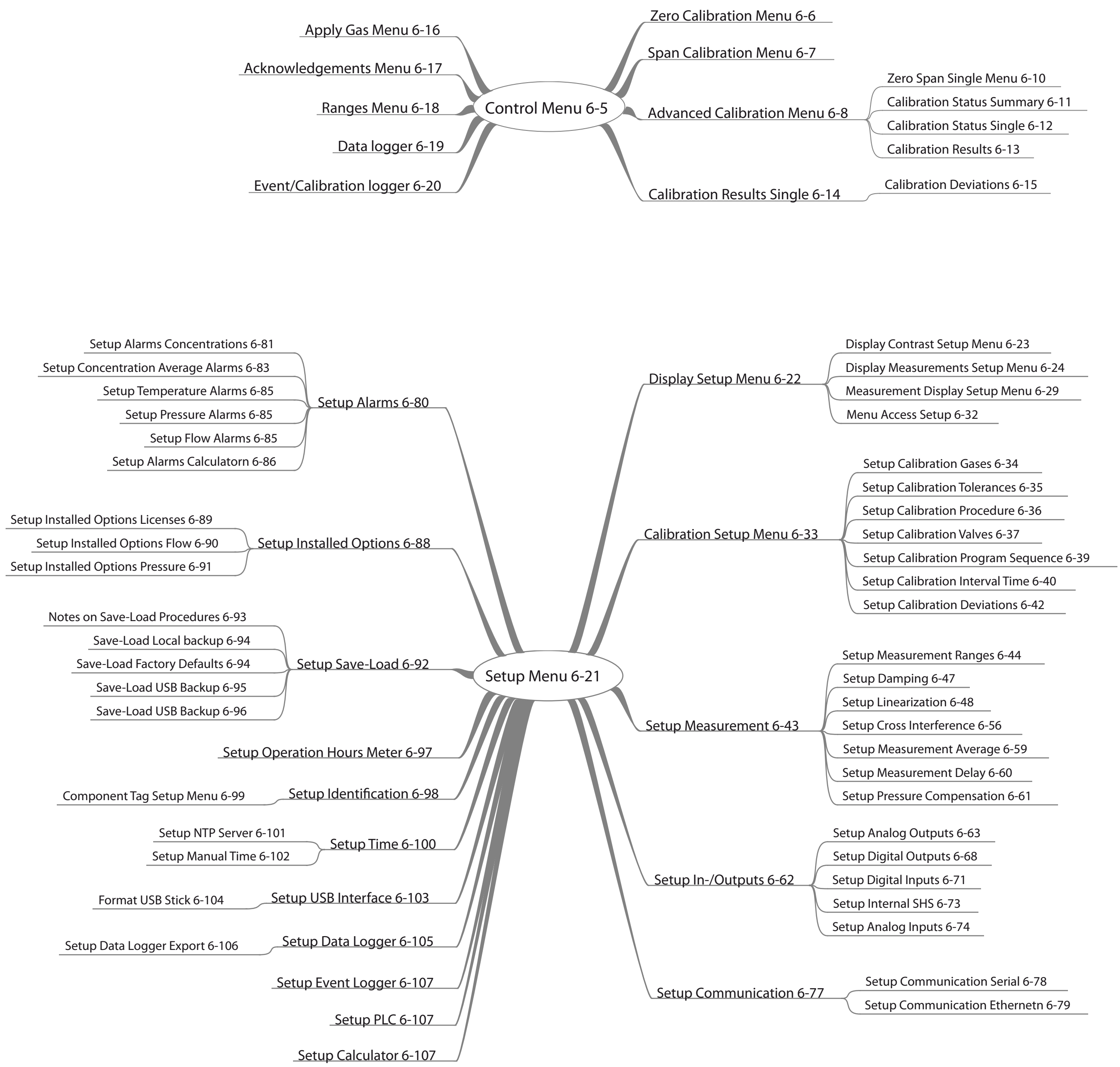
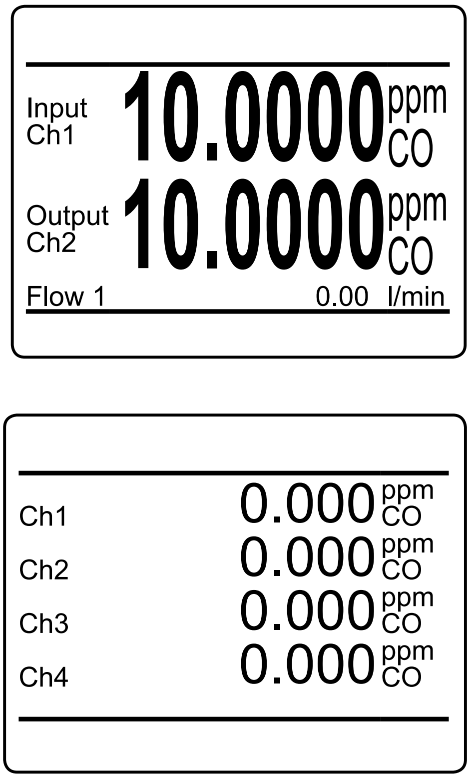


Fig. 6-1: *X-STREAM XE Software menu structure (continued)*

Software Menus
6

6.2 Menu System

6.2.1 Switching On



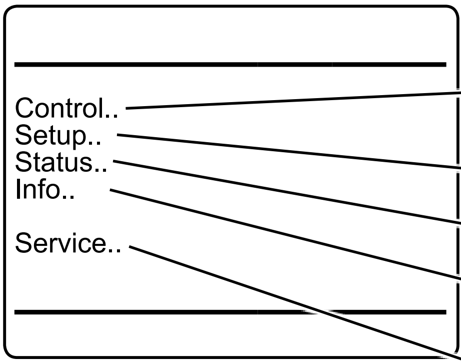
MEASUREMENT DISPLAY

When the unit is powered up, a self-test (POST) is initiated, after which the unit shows the **MEASUREMENT DISPLAY**.

Note!
Two different measurement display layouts are available and user selectable. ☞ DISPLAY SETUP, 6-29.

Depending on the setup, either a 2-channel layout or a 4-channel layout is used.

Press LEFT or RIGHT to switch to the MAIN MENU and select one of the main submenus:



MAIN MENU

Start functions or perform actions ☞ 6-5

Setup the instrument ☞ 6-21

Get status information ☞ 6-108

Some analyzer information ☞ 6-122

Get service information ☞ 6-126

6.2.2 Control Menu

Control..

Zero Calibration..
Span Calibration..
Advanced Calibration..
Apply Gas..
Lock Menus!
Acknowledgements
Pump 1: Off
Pump 2: Off
▼Ranges..

Perform zero calibrations ☞ 6-6

Perform span calibrations ☞ 6-7

Perform advanced calibrations ☞ 6-8

Apply gases ☞ 6-16

Press ENTER in this line to lock all menus, for which *"Code"* in MENU ACCESS has been set to **On** (☞ 6-32)

Acknowledge messages ☞ 6-17

Available if the related internal pump is installed:
Switch internal pump 1 / 2 **On** or **Off**.
Note!
These lines do not appear if digital inputs are used to control the pumps (☞ 6-71), or if no internal pump is available.

Set ranges ☞ 6-18

▲
Data Logger..
Event/Calibration Logger..

Handle data logger data ☞ 6-19

Handle event/calibration logger data ☞ 6-20

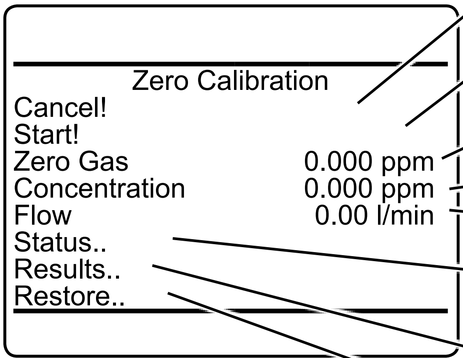
6.2.2 Control Menu

6.2.2.1 Zero Calibration Menu

Control..
Zero Calibration..

If the system is setup accordingly, the access code for level 1 must be entered to gain access to this menu.

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



Press ENTER in this line to cancel any ongoing calibration

Press ENTER in this line to start a zero calibration

Nominal zero gas concentration (can be set in SETUP ☞ 6-24)

Currently measured gas concentration, if a flowsensor is installed.

Currently measured gas flow

Open a submenu to see calibration status information ☞ 6-12

Open a submenu to see calibration results information ☞ 6-14

Press ENTER in this line to restore calibration data to the last known good data set.

A confirmation screen appears, before the function is executed.

Multi-channel unit:

Press LEFT to enter SELECT COMPONENT, to calibrate another channel.

6.2.2 Control Menu

6.2.2.2 Span Calibration Menu

Control..
Span Calibration..

If the system is setup accordingly, the access code for level 1 must be entered to gain access to this menu.

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

Span Calibration	
Cancel!	
Start!	
Span Gas	0.000 ppm
Concentration	0.000 ppm
Flow	0.00 l/min
Status..	
Results..	
Restore..	

Press ENTER in this line to cancel any ongoing calibration

Press ENTER in this line to start a span calibration

Nominal span gas concentration (can be set in SETUP ☞ 6-24)

Currently measured gas concentration.

Currently measured gas flow, if a flow sensor is installed.

Open a submenu to see calibration status information ☞ 6-12

Open a submenu to see calibration results information ☞ 6-14

Press ENTER in this line to restore calibration data to the last known good data set.

A confirmation screen appears, before the function is executed.

Multi-channel unit:

Press LEFT to enter SELECT COMPONENT, to calibrate another channel.

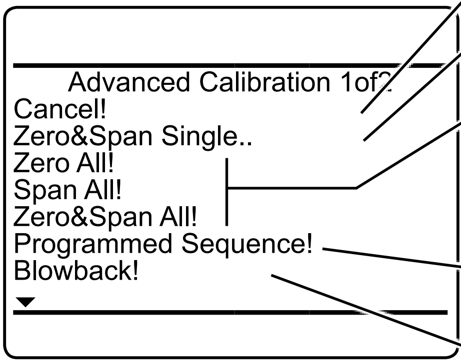
6.2.2.3 Advanced Calibration Menu

Control..
Advanced calibration..

Start and control valve supported calibration procedures

Note!
This menu is only available if "Valves" in INSTALLED OPTIONS is set to a value other than ***none****.*

If the system is setup accordingly, the access code for level 1 must be entered to gain access to this menu.



Press ENTER in this line to cancel any ongoing calibration

Zero & span a single channel ☞ 6-5

Highlight any of the next 3 lines and press ENTER to start the related calibration procedure:

- zero all channels
- span all channels
- zero and span all channels

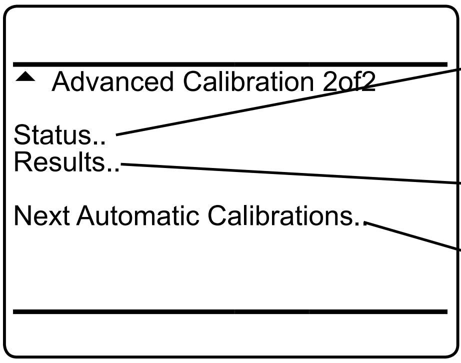
Press ENTER in this line to start a programmed calibration sequence; ☞ 6-39 for information on how to program a sequence.

Press ENTER in this line to start a blowback procedure for all channels

Note!
This menu is also available in single-channel units.

In this case, the 3rd and 4th lines will start a zero ***or*** *span calibration, while the 5th line starts the same procedure as the 2nd.*

6.2.2 Control Menu



Open a submenu to see calibration status summary for all channels ☞ 6-11

Open a submenu to see calibration results summary for all channels ☞ 6-13

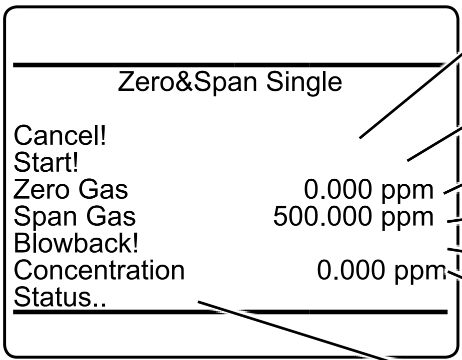
Open a submenu to view the scheduled dates for next automatically performed calibrations ☞ 6-118 .

6.2.2 Control Menu

6.2.2.3.1 Zero & Span Single Menu

Start and control a valve supported calibration procedure for zero **and** span for a single channel only.

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



Press ENTER in this line to cancel any ongoing calibration

Press ENTER in this line to start a zero & span calibration procedure

Nominal zero gas concentration (can be set in SETUP ☞ 6-24)

Nominal span gas concentration (can be set in the SETUP menu ☞ 6-24)

Immediately start a blowback procedure

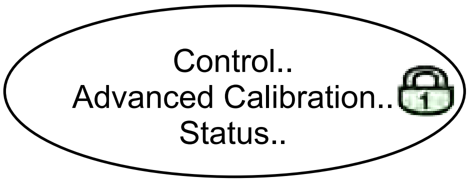
Currently measured gas concentration.

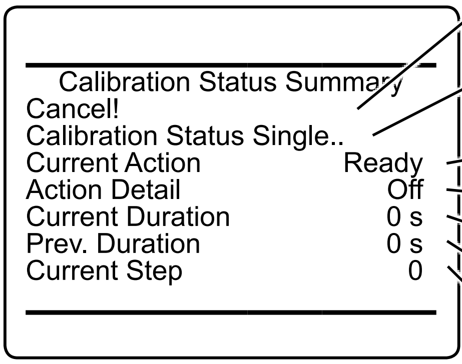
Open a submenu to see calibration status summary for all channels ☞ 6-11

Multi-channel unit:

Press LEFT to enter SELECT COMPONENT, to select another channel.

6.2.2.3.2 Calibration Status Summary





Press *ENTER* in this line to cancel any ongoing calibration

Open a submenu to see detailed calibration status information for a specific component (to be selected in a next step) ☞ 6-12.

Indicates the currently ongoing procedure (**Purging**, **Zeroing**, **Spaning**, **Ready)**

Shows the current procedure, or **Off**

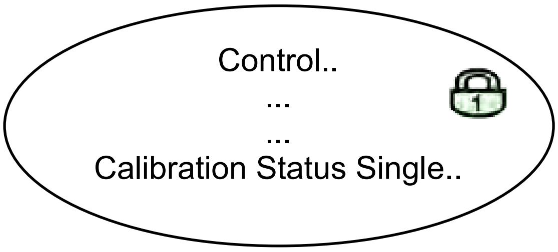
Shows the remaining time for the current procedure

Shows the time for the previous procedure

Information about the step currently carried out

6.2.2 Control Menu

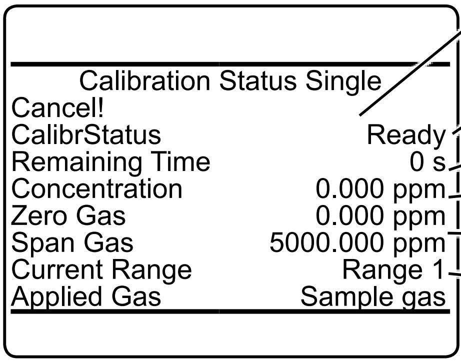
6.2.2.3.3 Calibration Status Single



This menu gives a channel specific status.

Note!
This menu can be opened from several higher-level menus, dependent on which it now may be necessary to select a component:

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



Press ENTER in the first line to cancel any ongoing calibration

Indicates the currently ongoing procedure (**Purging**, **Zeroing**, **Spaning**, **Ready)**

Shows the remaining time for the current procedure

Currently measured gas concentration.

Current channel´s calibration gases setup

Range under calibration.

Multi-channel unit:

Press LEFT to enter SELECT COMPONENT, to view the status for another channel.

6.2.2.3.4 Calibration Results

Control..
Advanced Calibration..
Results..

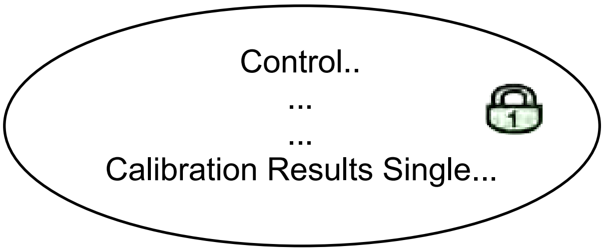
Open this menu, to see an overall calibration results summary.

Calibration Results Summary	
Result	OK
Any ZeroFail	No
Any SpanFail	No
Calibration Results Single..	

Open a submenu to see detailed, channel specific calibration results information ☞ 6-14

6.2.2 Control Menu

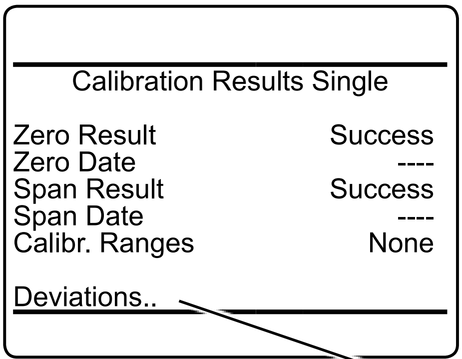
6.2.2.4 Calibration Results Single



This menu gives a channel specific summary of results.

Note!
This menu can be opened from several higher-level menus, dependent on which it now may be necessary to select a component:

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



Open a submenu to view calibration results deviations information ☞ next page.

Multi-channel unit:

Press LEFT *to enter SELECT COMPONENT, to view another channel´s results.*

6.2.2.4.1 Calibration Deviations

Control..
...
Calibration Results Single..
Deviations..

This menu gives a channel specific summary of deviations of calibration results.

Note!
This menu is a submenu of CALIBRATION RESULTS SINGLE, which can be opened from several higher-level menu.

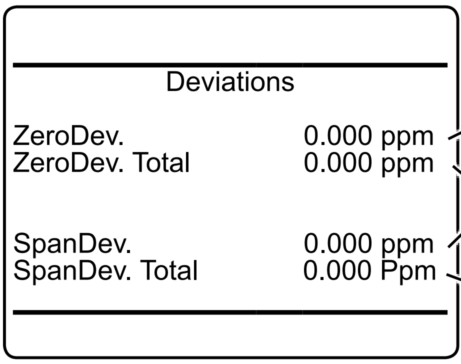
In the context of this menu, deviation means the value, a calibration corrected the zero or respectively the span calibration value.

Example:

A measuring channel shows zero drift of 10 ppm per week. It is calibrated once a week.

After the 3rd zero calibration, DEVIATIONS shows:

ZeroDev:	*10 ppm* (=last calibr.)
ZeroDev. total:	*30 ppm* (=summary of 3 calibrations carried out within 3 weeks)



ZeroDev. or SpanDev. in concentration units give the correction of the last corresponding calibration.

ZeroDev. total or SpanDev. total in concentration units give the total (sum of) corrections of the corresponding calibrations since the last time, deviations have been reset (SETUP - CALIBRATION - DEVIATIONS; ☞ 6-42)

6.2.2 Control Menu

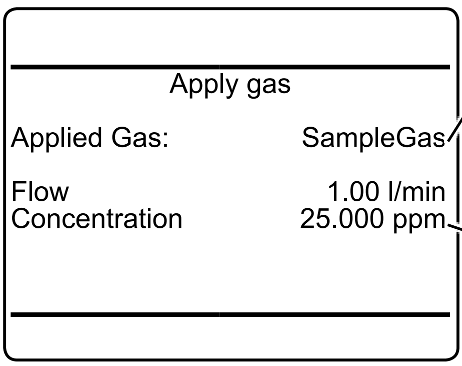
6.2.2.5 Apply Gas Menu

Control..
Apply gas..

If the instrument is equipped with internal, or connected to external valves, this menu enables to apply a specific gas to the analyzer, e.g. for maintenance purposes.

If the system is setup accordingly, the access code for level 1 must be entered to gain access to this menu.

Multi-channel unit:
In SELECT COMPONENT, select the channel for the gas to be applied.



Select the gas to be applied.
Available options:

SampleGas
ZeroGas
SpanGas1
SpanGas2
SpanGas3
SpanGas4
Blowback
All Closed

Currently measured gas concentration.

Multi-channel unit:

Press LEFT to enter SELECT COMPONENT, to change the settings for another channel.

6.2.2.6 Acknowledgements Menu

Control..
Acknowledgements..

If the system is setup accordingly, the access code for level 1 must be entered to gain access to this menu.

Acknowledgements

Failures!
Off-Specs!
Maintenance Requests!
Function Checks!
Alarms!
All States!

This submenu provides function lines to acknowledge status messages and alarms, separately (lines 1 to 5) or simultaneously (last line).

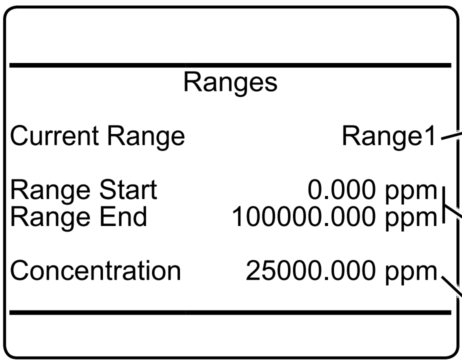
To do so, highlight the relevant line and press *ENTER*.

6.2.2.7 Ranges Menu

Control..
Ranges..

If the system is setup accordingly, the access code for level 1 must be entered to gain access to this menu.

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



Select the measuring range to be used.
Available options:

- **Range1**
- **Range2**
- **Range3**
- **Range4**

Lines 2 & 3 show the corresponding range limits.

Line 4 shows the currently measured value.

Note!
To change range limits *SETUP, page 6-44*

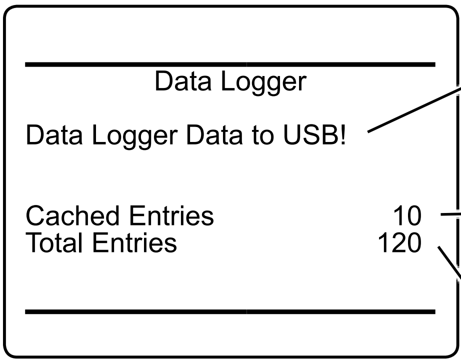
Multi-channel unit:
Press LEFT *to enter SELECT COMPONENT, to change the settings for another channel.*

6.2.2.8 Data Logger

Control..
Data logger..

Enter this menu to export data logger data to an external device for further processing.

If the system is setup accordingly, the access code for level 1 must be entered to gain access to this menu.



Export logged data (=total entries) to an USB device.

Notes!

Make sure, there´s a memory device connected!

*Before the data is exported, all "*Cached entries*" are copied to the "*Total entries*" file.*

Number of entries currently in RAM, not yet saved to the internal data logger (total entries) file.

Note!

*Data is written to the internal file every 30 min, or the moment, "*Logging*" is turned* ***Off*** *(SETUP - DATA LOGGER;* ☞ *6-105)*

Total number of entries in the internal data logger file.

6.2.2.9 Event/Calibration Logger

Control..
Event/Calibration Logger..

Enter this menu to export event or calibration logger data to an external device for further processing.

Note!
This menu is available only, if an optional software features license code has been purchased and installed; *☞ 6-89*

If the system is setup accordingly, the access code for level 1 must be entered to gain access to this menu.

Event/Calibration Logger

Event Logger Data to USB!
Total Entries 1

Calib Logger Data to USB!
Total Entries 5

Export logged event data to an USB device.

Note!
Make sure, there´s a memory device connected!

Total number of entries of the internal event logger file.

Export logged calibration data to an USB device.

Note!
Make sure, there´s a memory device connected!

Total number of entries of the internal calibrationein logger file.

6.2.3 Setup Menu

Setup..

Enter this menu to change basic analyzer settings.

Setup 1of2
Display..
Calibration..
Measurement..
In-/Outputs..
Communication..
Alarms..
Installed Options..
▼Save-Load..

- Display.. — Setup display layout, language and more ☞ 6-22
- Calibration.. — Setup calibration parameters ☞ 6-33
- Measurement.. — Setup channel specific parameters ☞ 6-43
- In-/Outputs.. — Configure In- and Outputs ☞ 6-62
- Communication.. — Setup communication parameters ☞ 6-77
- Alarms.. — Configure concentration alarms ☞ 6-80
- Installed Options.. — Configure installed options, enter licence codes for software options ☞ 6-88
- Save-Load.. — Backup and restore analyzer configurations ☞ 6-92

Setup 2of2
Operation Hours Meter..
Identification..
Time..
USB Interface..
Data Logger..
Event Logger..
PLC..
Calculator..

- Operation Hours Meter.. — Operation hours meter ☞ 6-97
- Identification.. — System identification ☞ 6-98
- Time.. — Setup date/time ☞ 6-100
- USB Interface.. — USB interface setup ☞ 6-103
- Data Logger.. — Data logger setup ☞ 6-105
- Event Logger.. — Event logger setup ☞ 6-107
- PLC.. — PLC setup ☞ 6-107
- Calculator.. — Calculator setup ☞ 6-107

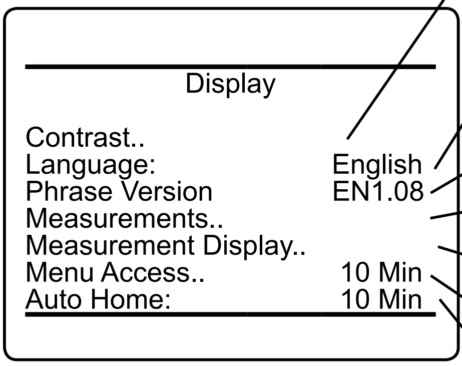
6.2.3 Setup Menu

6.2.3.1 Display Setup Menu

Setup..
Display..

From within this menu you can setup how measuring results show up, control menu access, and more.

If the system is setup accordingly, the access code for level 1 must be entered to gain access to this menu.



Adjust the display´s contrast ☞ 6-23

Selects the preferred language for the analyzer software. Available options may vary according to the software version.

Currently available:

English, French, German, Italian, Polish, Portuguese, Spanish

Phrases file version

Configure how measurement results are displayed ☞ 6-24 

Setup the measurement display ☞ 6-29 

Configure menu access authorizations ☞ 6-32 

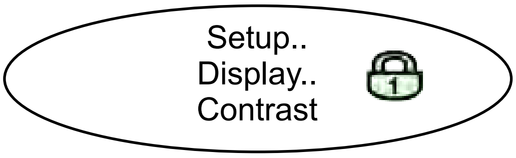
This parameter determines the time period without user activity, before returning to the measurement display from any submenu.

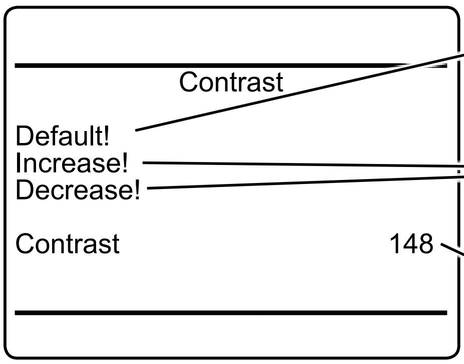
Available options:

Never, 1 min, 10 min

6.2.3 Setup Menu

6.2.3.1.1 Display Contrast Setup Menu





Press *ENTER* to reset to the default value (148).

Increase / decrease contrast by a value of **3**, each time *ENTER* is pressed in either of these lines.

Limits: **82 ... 208**

Shows the currently used contrast value and is updated each time, *ENTER* is pressed in one of the above menu lines.

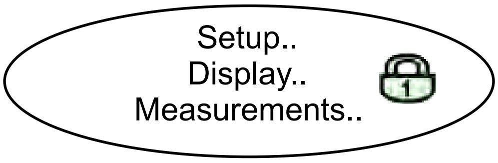
Notes!
If by mistake characters are not visible any longer, reset the contrast to the default value.

The display´s contrast is temperature dependent. If need be, re-adjust.

The default value gives an acceptable result for the analyzer´s permitted operating temperature range.

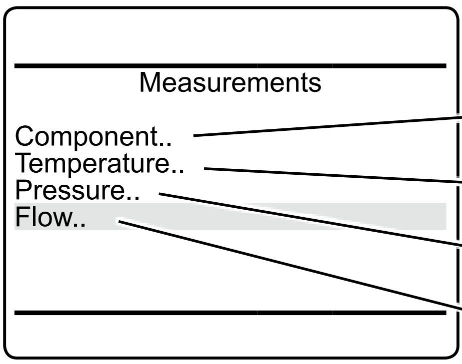
6.2.3 Setup Menu

6.2.3.1.2 Display Measurements Setup Menu



Enter this menu to setup measurement tags, units, precision and more for primary and secondary measurements. This specifies how the measured values are displayed.

If the system is setup accordingly, the access code for level 2 must be entered to gain access to this menu.



Configure the parameters for

Gas measurement ☞ 6-25

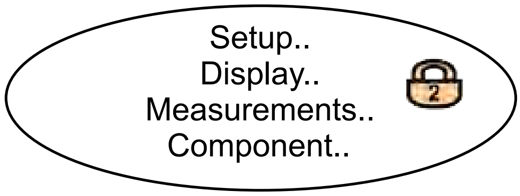
Temperature measurement ☞ 6-27

Pressure measurement ☞ 6-27

Flow measurement ☞ 6-28

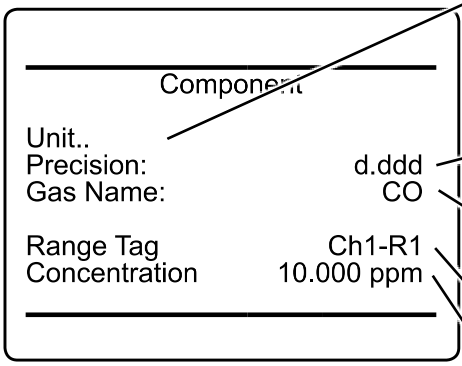
Note!
Temperature, pressure and flow are referred to as 'secondary measurements'.

6.2.3.1.2.1 Display Component Setup Menu



Specify how the measured gas concentration values are displayed.

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



Configure the component´s measuring unit 6-26

Configure the precision of the displayed measured value for this component.

Selectable options:

0. 0.1 0.12 0.123 0.1234

(means, the fraction part can be setup between none and four digits).

Enter this line to specify the gas name for this component. This name will show up on the measurement display.

Maximum length: **12 characters**

Shows the current range tag

The last line shows the current settings for the selected channel, depending on the settings above, and is updated if settings are changed.

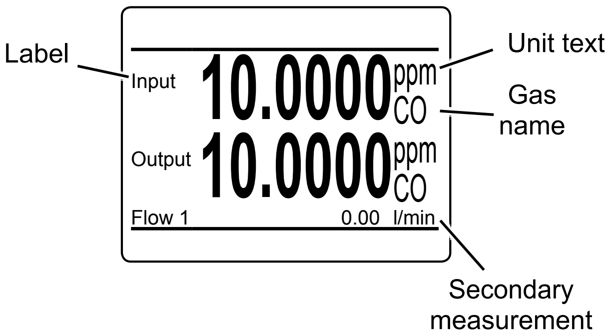


Fig. 6-2: *Measurement Display Elements*

Multi-channel unit:
Press LEFT to enter SELECT COMPONENT, to change the settings for another channel.

6.2.3.1.2.1.1 Component Unit Setup Menu

Setup..
Display..
Measurements..
Component..
Unit..

Within this menu, configure the component´s unit to be used for measurement results.

Ch1

Component Unit

Unit:	ppm
Unit Text:	ppm
Span Gas Unit:	ppm
Span Unit Text:	ppm
Custom Factor:	1.000000
Custom Offset:	0.000000
Span Gas	50000.000 ppm
Concentration	0.000 ppm

Select the measuring unit for the component.

Available options: **ppm, ppb, Vol%, Custom**

Set the text for the measuring unit of the component, to be shown in the measuring screen: each character must be set separately.[1)]

Select the measuring unit for the span gas.

Available options: **ppm, ppb, Vol%, Custom**

Note!

Zero gas unit and zero gas unit text are always as configured for the component (first 2 menu lines)!

Set the text for the measuring unit of the span gas: each character must be set separately.[1)]

Gas concentrations are internally calculated as ppm. To use other units, the corresponding factor must always be specified, e.g. 0.0001 to calculate from ppm to %.[2)]

If necessary, enter an offset here, to be added to the measured value.[2)]

The last 2 lines show how the settings affect the display of measurements.

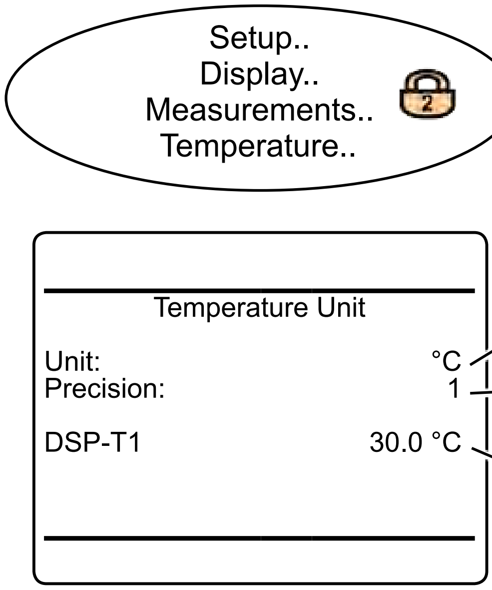
[1)] Configuring individual text strings is permitted only, if "*Unit*" or "*Span gas unit*" is set to **Custom**.

[2)] "*Custom factor*" and "*Custom offset*" are visible and editable only, if "*Unit*" or "*Span gas unit*" is set to **Custom**. For all other options, conversion factors and offsets are pre-defined.

Note!

Texts for units, and values for factor and offset are not checked for plausibility. Any arbitrary value can be set..

6.2.3.1.2.2 Display Temperature Setup Menu



Select the temperature unit to be used for all measurements.

Available options: **°C, °F, K**

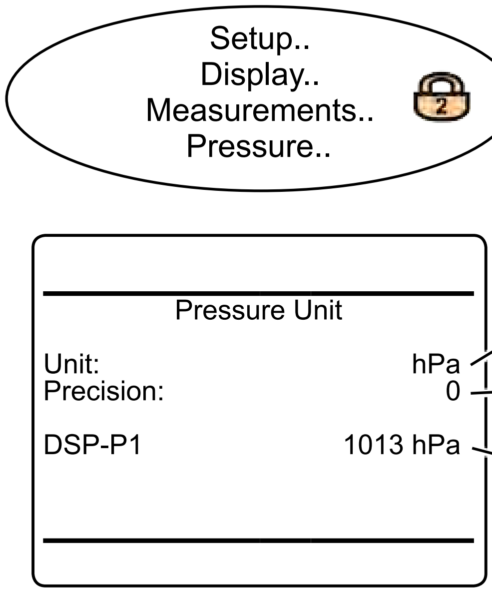
Configure the precision of temperature displays

Accepted values: **0 ... 2**

Example for the current settings.

Note!
Conversion factors for the different units are pre-defined.

6.2.3.1.2.3 Display Pressure Setup Menu



Select the pressure unit to be used for all measurements.

Available options: **hPa, mbar, bar, psig, Pa**

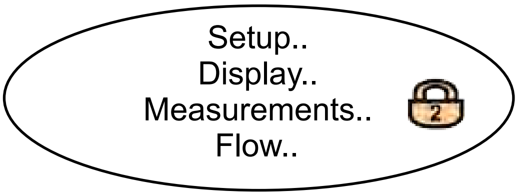
Configure the precision of pressure displays

Accepted values: **0 ... 2**

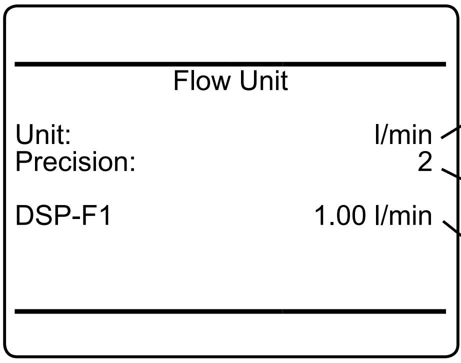
Example for the current settings.

Note!
Conversion factors for the different units are pre-defined.

6.2.3.1.2.4 Display Flow Setup Menu



Note!
This menu is available only if at least one flow sensor is installed (☞ 6-88).



Select the flow unit to be used for all measurements.
Available options:
l/min, l/h, ml/min, gal/min

Note!
1 gal = 1 US.liq.gal. = 3.7853 l

Configure the precision of flow displays
Accepted values: **0 ... 2**

Example for the current settings.

Note!
Conversion factors for the different units are pre-defined.

6.2.3.1.3 Measurement Display Setup Menu

Setup..
Display..
Measurement Display..

Enter this menu to configure the measurement display.

If the system is setup accordingly, the access code for level 2 must be entered to gain access to this menu.

```
Display 1 Assignments

Line 1:
Line 2:
Line 3:
Line 4:
Line 5:

▼Labels..
```

```
▲   Display 2 Assignments

Line 1:              Comp1
Line 2:              Comp2
Line 3:              Comp3
Line 4:              Comp4
Line 5:              Blank

Labels..
```

The MEASUREMENT DISPLAY may be configured as a single or dual page version, where the content of each page can be configured separately by a related page within this setup menu.

The first setup menu page ('Display 1 ...') configures the first MEASUREMENT DISPLAY page. You may specify up to 5 measurements to be shown on the page. If only up to two primary and one secondary measurements are configured, the display will use the 2 lines layout with bigger characters. Enter the second menu page ('Display 2 assignments') to setup a second MEASUREMENT DISPLAY page.

Note!
Primary measurements are gas measurements. Secondary measurements are pressure, flow, temperature; these are always displayed with the smaller font.

```
Display 1 Assignments

Line 1:              Comp1
Line 2:              Comp2
Line 3:              Comp3
Line 4:              Comp4
Line 5:              Flow1

▼Labels..
```

On either setup menu page, highlight the line to be configured, press *ENTER* and then select the parameter to be displayed in the related line by means of *UP* / *DOWN*.

Available options:

Comp1 ... Comp5
Temp1 ... Temp5
Flow1 ... Flow5
Press1 ... Press5
CalcA ... CalcD
Blank

Configure the labels ☞ 6-30.

6.2.3.1.3.1 Setup Measurement Display Labels

Setup..
Display..
Measurement Display..
Labels..

For each MEASUREMENT DISPLAY line you may enter an individual text, called "label".

Specifications:

- free alphanumeric text
- maximum length: 8 characters.

Display 1 Labels	
Line 1:	Input
Line 2:	Output
Line 3:	
Line 4:	
Line 5:	Flow1

Display 2 Labels	
Line 1:	Press1
Line 2:	Press2
Line 3:	Flow2
Line 4:	
Line 5:	

Labels

- show up on the MEASUREMENT DISPLAY only,
- may be setup for primary and secondary measurements, as they refer to the MEASUREMENT DISPLAY **line**, and not to the parameter.

Within this menu, to configure a label, enter the related menu line and enter the text.

Differing from labels, tags are used to identify a measurement (primary or secondary), and for this reason

- are transmitted via network
- show up on menu head lines with channel related data
- show up on the MEASUREMENT DISPLAY, too.

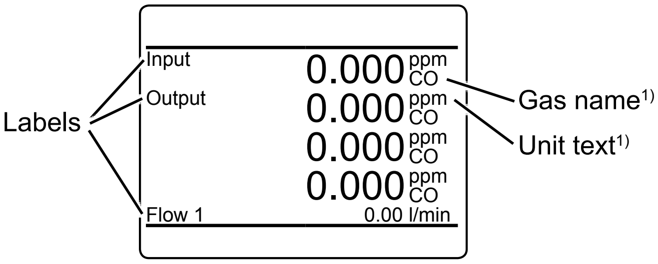
Due to their importance for measurement identification within a network, the menu to setup tags can be found at SETUP - IDENTIFICATION, page 6-9925.

Note!
There are separate DISPLAY LABELS menus for each MEASUREMENT DISPLAY.

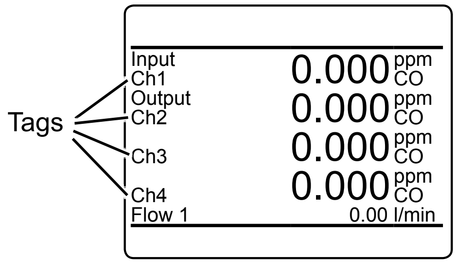
6.2.3 Setup Menu

Examples:

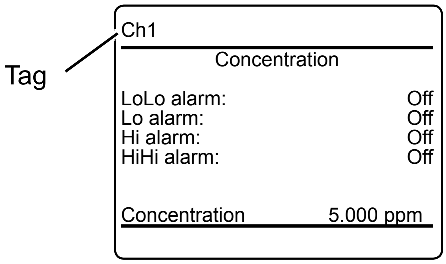
MEASUREMENT DISPLAY, if besides gas names and units, only labels are setup:



MEASUREMENT DISPLAY, if also tags are setup:

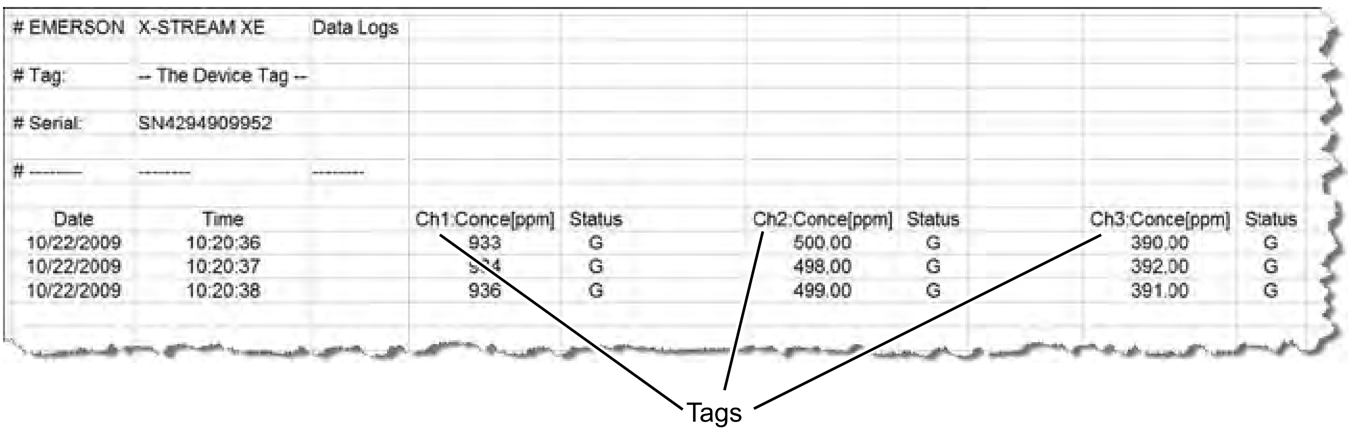


Identification of component specific menu pages:



[1] *To configure gas names and units:* *SETUP - DISPLAY - MEASUREMENTS, page 6-25.*

Identification of components in log files:



# EMERSON	X-STREAM XE	Data Logs						
# Tag:	-- The Device Tag --							
# Serial:	SN4294909952							
# --------	--------	--------						
Date	Time		Ch1:Conce[ppm]	Status	Ch2:Conce[ppm]	Status	Ch3:Conce[ppm]	Status
10/22/2009	10:20:36		933	G	500.00	G	390.00	G
10/22/2009	10:20:37		[illegible]	G	498.00	G	392.00	G
10/22/2009	10:20:38		936	G	499.00	G	391.00	G

Fig. 6-3: *Usage of Labels and Tags*

6.2.3 Setup Menu

6.2.3.1.4 Menu Access Setup

Setup..
Display..
Menu access..

If the system is setup accordingly, the access code for level 3 must be entered to gain access to this menu.

Menu access	
Restrict Level1:	Off
Code Level1:	00000001
Restrict Level2:	Off
Code Level2:	00000002
Restrict Level3:	Off
Code Level3:	00000003
Activate:	On Home

Enter these lines to activate or de-activate the access restrictions for the related menu level.

Avaliable options: **On**, **Off**

Setup the access codes:

Up to 8 alphanumeric characters may be entered for each code.

Determines how unlocked menus are re-locked to restore security settings.
Available options:

On Home: all levels with active acess code are locked on return to the MEASUREMENT DISPLAY

1 min: Levels are locked after 1 minute of inactivity.

Never: Menus remain unlocked

When using access codes, we recommend NOT using the factory-set codes.

Note!
Executing “Lock menus!” in CONTROL (☞ 6-5), immediately sets all activated locks.

6.2.3.2 Calibration Setup Menu

Setup..
Calibration..

If the system is setup accordingly, the access code for level 2 must be entered to gain access to this menu.

Component ?

Note!

Multi-channel unit:

Some of the following submenus require to select the component to be configured:

In SELECT COMPONENT, select which channel´s calibration to be configured.

Ch1

Calibration

Gases..
Tolerances..
Procedure..
Valve Assignment..
Program Sequence
Interval Time..
Deviations..

Submenu to specify the calibration gases for the selected channel; ☞ 6-34.

Setup calibration tolerances; ☞ 6-35.

Setup details for the channel´s calibration procedure; ☞ 6-36.

Assign calibration valves; ☞ 6-37.

Program a detailled calibration sequence; ☞ 6-39.

Specify interval times for automatic calibrations; ☞ 6-40.

See (and reset) calibrations deviations information ☞ 6-42.

6.2.3.2.1 Setup Calibration Gases

Setup..
Calibration..
Gases..

Ch1	
Gases	
Zero Gas:	0.000 ppm
Span Gas:	50000.000 ppm
Range Gases..	
Current Range:	Range 1

Zero Gas: Enter this line to setup the zero gas concentration.

Span Gas: Enter this line to setup the span gas concentration.

Range Gases..: Submenu to specify different calibration gases for several ranges (if instrument is setup to use different ranges); ☞ below.

Current Range: Information about currently used range.

Note!
The calibration gases units are as setup for the currently selected channel; ☞ 6-26.

6.2.3.2.1.1 Setup Range Gases

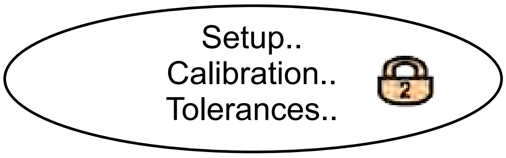
Setup..
Calibration..
Gases..
Range Gases..

Ch1	
Range Gases	
Zero Gas1:	0.000 ppm
Zero Gas2:	0.000 ppm
Zero Gas3:	0.000 ppm
Zero Gas4:	0.000 ppm
Span Gas1:	500.000 ppm
Span Gas2:	5000.000 ppm
Span Gas3:	25000.000 ppm
Span Gas4:	50000.000 ppm

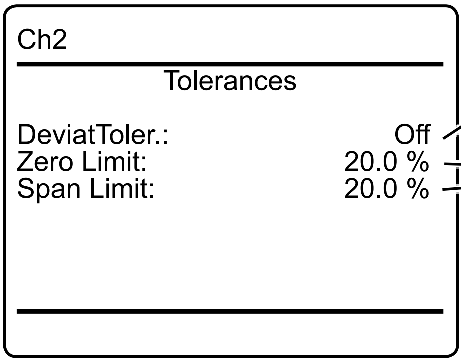
This menu enables to specify separate zero and span calibration gas concentrations for each range of the selected channel.

Note!
The calibration gases units are as setup for the currently selected channel; ☞ 6-26.

6.2.3.2.2 Setup Calibration Tolerances



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



This parameter determines whether the tolerance check is active during calibration (**On**), or not (**Off**).

If tolerance check is enabled (**On**), setup the limits for zero and span gas individually.

Accepted values: **0 ... 100 %**
(of the channel´s full range)

Multi-channel unit:

Press LEFT to enter SELECT COMPONENT, to change the settings for another channel.

6.2.3 Setup Menu

6.2.3.2.3 Setup Calibration Procedure

Setup..
Calibration..
Procedure..

If the system is setup accordingly, the access code for level 3 must be entered to gain access to this menu.

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

Ch2	
Procedure	
Purge Time:	10 s
Max. Time:	120 s
Zero Ranges:	Together
Span Ranges	Separately
Zero Method:	Stability
Span Method:	Instant
Test Mode:	No

Purge Time: The time required to completely fill the gas line with the related gas, when switching to zero or span gas [1]. Adjust according your system.
Accepted values:
0 ... [*max. time*, *see next menu line***]**

Max. Time: The maximum time to complete a calibration procedure, if calibrated with stability method. If not already regular finished, a calibration will be terminated after this time.
Accepted values: **0 ... 600 seconds**

Zero Ranges / Span Ranges: Specify how to calibrate multiple ranges of a channel.
Available options: **Together, separately**

Zero Method / Span Method: Specify the calibration methods for zero and span calibrations.
Available options: **Stability, Instant**

Test Mode: Set to **Yes**, to simply check, if the calibration is still valid**:** now the instrument performs calibration procedures, without correcting the calibration parameters (simulation of calibrations).

Note!
*Marked lines are available only if "Valves" in INSTALLED OPTIONS is set to a value other than **none**.*

Multi-channel unit:
Press LEFT to enter SELECT COMPONENT, to change the settings for another channel.

[1] see note on page 6-37

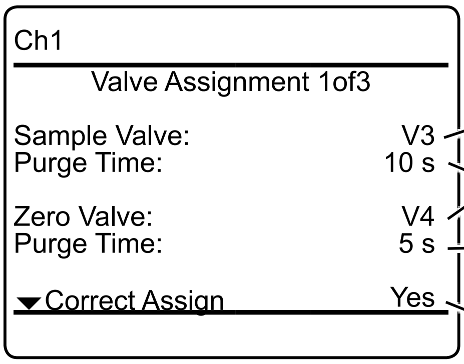
6.2.3.2.4 Setup Calibration Valves

Setup..
Calibration..
Valve Assignment..

Note!
This line is available only if “Valves” in INSTALLED OPTIONS is set to a value other than ***none****.* *(6-88).*

If the system is setup accordingly, the access code for level 3 must be entered to gain access to this menu.

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



For the selected channel:

- assign the valves to be used for the different functions, (available options: **None, V1 ... V20**)

and

- specify the purge time for each valve (accepted values: **0 ... 10,000** s)

If there is no conflict in valve assignment, this line shows **Yes**, otherwise check if, e.g. one valve has been assigned different functions for the same channel.

Note!
The purge time depends on the gas line design and length, and is the time it takes for the gas stream to completely fill the measuring cell, after the related valve has been opened.

Take care, that measured concentrations are faulty, because the cell is filled with improper gas, if purge times are too short.

Ch1	
▲ Valve Assignment 2of3	
Span1 Valve:	V1
Purge Time:	1 s
Span2 Valve:	None
Purge Time:	0 s
Span3 Valve:	None
Purge Time:	0 s
Span4 Valve:	None
▼ Purge Time:	0 s

On the 2nd menu page, assign the span valves, and specify their purge times for the different ranges of the selected channel.

Ch1	
▲ Valve Assignment 3of3	
Blowback Valve:	None
Purge Time:	0 s

The 3rd menu page enables to assign a blowback valve, and specify its purge time for the selected channel.

Multi-channel unit:

Press LEFT to enter SELECT COMPONENT, to change the settings for another channel.

6.2.3.2.5 Setup Calibration Program Sequence

Setup..
Calibration..
Program Sequence..

Note!
*This line is available only if "Valves" in INSTALLED OPTIONS is set to a value other than **none** (☞ 6-88).*

This menu with 8 pages allows to setup a sequences of up to 30 actions (steps), to carry out individual calibration procedures.

```
      Program Sequence 1of8
Action1:               Zero-Cal
Node1:                      All
Action2:              Span1-Cal
Node2:                      Ch1
Action3:              Span2-Cal
Node3:                      Ch3
Action4:            END-OF-PGRM
▼Node4:                     All
```

...

```
▲     Program Sequence 4of8
Action13:           END-OF-PGRM
Node13:                     All
Action14:           END-OF-PGRM
Node14:                     All
Action15:           END-OF-PGRM
Node15:                     All
Action16:           END-OF-PGRM
▼Node16:                    All
```

...

```
▲     Program Sequence 8of8
Action29:           END-OF-PGRM
Node29:                     All
Action30:           END-OF-PGRM
Node30:                     All
```

Each step consists of an action and a related node.

Available actions are:

Action name	*What happens*
Span1-Cal ... Span4-Cal	span calibrate range1 ... range4
ZSpan-Cal	zero & span calibrate
Span-Cal	span calibrate
Zero-Cal	zero calibrate
NoOp	no action
Blowback	start blowback
END-OF-PGRM	end of programmed sequence

Available nodes are (depending on number of channels installed within your analyzer):

Node name	*Selected action is carried out for*
All	all installed channels
Ch1 ... Ch5	the selected channel only

Example:
The sequence in the first figure to the left (page 1of8) starts with

- a zero calibration for all channels, followed by

- a span calibration of range 1 of channel 1

- a span calibration of range 2 of channel 3.

6.2.3.2.6 Setup Calibration Interval Time

Setup..
Calibration..
Interval Times..

Interval Times

Zero All..
Zero&Span All..
Programmed Sequence..
Blowback All..

Note!
This line is available only if “Valves” in INSTALLED OPTIONS is set to a value other than ***none*** *(☞ 6-88).*

Select the procedure(s) you want to configure to be carried out on a regular (interval time) basis.

Note!
All 4 lines in this menu link to submenus of a similiar design, exemplified in the following section.

6.2.3.2.6.1 Setup an Interval Time

Note!
For information about how to access menus exemplified in this section, ☞ above.

...

Enable:	Disabled
Interval:	24 h
Start Time..	
Next:	--
Time	6/22/09 15:33

Depending on the procedure selected on the previous menu page, the title shows '*Zero All*', '*Zero&Span All*', '*Programmed Sequence*' or '*Blowback All*'.

Enable or **Disable** interval times for the selected procedure

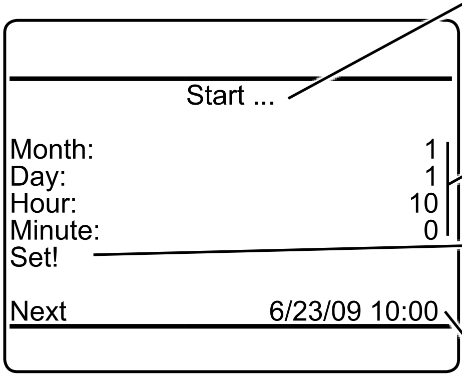
Specify the interval between two procedures.

Accepted values: **1 ... 10,000 h**

Shows the time for the next start of procedure, based on the current settings.

Current time.

6.2.3 Setup Menu



'...' in the title is replaced by *'Zero All', 'Zero&Span All', 'Programmed Sequence'* or *'Blowback All'*, depending on the selected procedure.

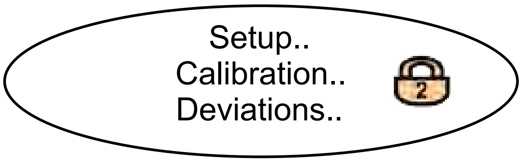
In lines 1 ... 4, specify date and time for the next countdown to start.

Set start date and time: The next calibration time is calculated, considering the entries in above lines and the interval time given on the previous page.

Note!
This procedure also updates the 4 lines above, to show the next calibration date as start time.

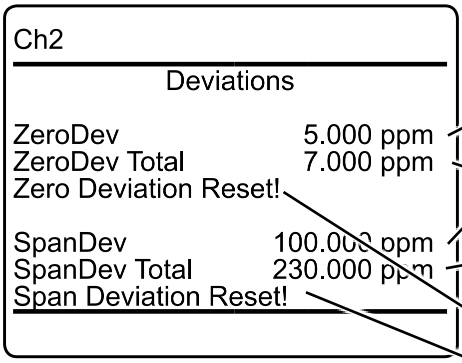
Shows the time for the next start of procedure, based on the current settings.

6.2.3.2.7 Setup Calibration Deviations



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

In the context of this menu, deviation means the value, the current zero or span calibration value is corrected by subsequent calibrations.



"*ZeroDev.*" or "*SpanDev.*" in concentration units give the correction by the last performed calibration.

"*ZeroDev. total*" or "*SpanDev. total*" in concentration units give the total (sum of) corrections of all the referred calibrations since the last time, deviations have been reset.

Reset all zero or span deviations.

Note!
These functions are carried out immediately, and there´s no undo!

Example:
A measuring channel shows zero drift of 10 ppm per week. It is calibrated once a week.
After 3 weeks, DEVIATIONS would show:

ZeroDev:	*10 ppm (= last calibr.)*
ZeroDev Total:	*30 ppm (= summary of 3 calibrations, carried out within 3 weeks)*

Multi-channel unit:
Press LEFT to enter SELECT COMPONENT, to change the settings for a different channel.

6.2.3.3 Setup Measurement

Setup..
Measurement..

If the system is setup accordingly, the access code for level 2 must be entered to gain access to this menu.

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

Ch1
Measurement 1of2

Ranges..
Damping..
Linearization..
Cross Interference..
Average..
Delay..

Submenu to configure up to 4 ranges per channel; ☞ 6-44.

Setup t_{90} times; ☞ 6-47.

Setup and activate linearization; ☞ 6-56.

Setup and activate cross interference compensation; ☞ 6-xx.

Setup and activate averaging; ☞ 6-59.

Setup delay time; ☞ 6-60.

Ch1
Measurement 2of2

Cut-off: None
Pressure Compensation ..

Cut-off mode: Output values are limited, in case they exceed the configured range limits, or are becoming negative.

Available options:

None: cut-off mode is disabled

RngLimits: values are limited to range limits

NonNegat.: negative values are output as '0'

Setup ambient pressure for compensation; ☞ 6-61

Note!
Cut-off always is disabled during calibrations!

Multi-channel unit:
Press LEFT to enter SELECT COMPONENT, to change the settings for another channel.

6.2.3.3.1 Setup Measurement Ranges

Setup..
Measurement..
Ranges..

Enter this menu to configure up to 4 ranges per channel.

```
Ch1
              Ranges

Current Range:            Range1
Range Start:           0.000 ppm
Range End:         50000.000 ppm
Starts & Ends..
Range Control:            Manual
Auto Ranging..
```

Select the range to be configured.
Available options: **Range1 ... Range4**

For the current range, specify start and end concentration limits.

Specify the limits for up to 4 ranges per channel in one single menu, making it easier to adjust several limits at a glance; 6-45.

For the current range, specify how range switching is done.
Available options:
Manual, Remote, Automatic

Note!
*Selecting **Remote** or **Automatic** range control is not possible, if identical ranges end values are specified (6-45)!*

Specify the switchover levels for up to 4 ranges per channel; 6-45.

6.2.3.3.1.1 Measurement Ranges Starts & Ends

Setup..
Measurement..
Ranges..
Starts & Ends..

Ch1

Starts & Ends

Range1 Start:	0.000 ppm
Range1 End:	500.000 ppm
Range2 Start:	0.000 ppm
Range2 End:	1000.000 ppm
Range3 Start:	0.000 ppm
Range3 End:	5000.000 ppm
Range4 Start:	0.000 ppm
Range4 End:	10000.000 ppm

Select the range to be configured, and set start and end concentrations.

Note!

For automatic or remote range control, all ranges end values need to be different!

6.2.3.3.1.2 Measurement Autoranging

Setup..
Measurement..
Ranges..
Autoranging..

Ch1

Auto Ranging

Range1:	Yes
Range2:	Yes
Range3:	Yes
Hysteresis:	10 %
Switchover Levels..	

For each range select separately, if autoranging is used (**Yes**) or not (**No**)

Specify the hysteresis for autoranging.
Accepted range: **1 ... 50 %**

Alternatively specify switchover limits for each range separately; ☞ 6-46.

6.2.3.3.1.2.1 Autoranging Switchover Levels

Setup..
Measurement..
Ranges..
Autoranging..
Switchover Levels..

Ch1

Switchover Levels

MinLevel1:	200.000 ppm
MaxLevel1:	500.000 ppm
MinLevel2:	400.000 ppm
MaxLevel2:	750.000 ppm
MinLevel3:	600.000 ppm
MaxLevel3:	2000.000 ppm
MinLevel4:	1800.000 ppm
MaxLevel4:	5000.000 ppm

Specify individual switchover levels, instead of using one single hysteresis value for all ranges.

Max. level gives the switchover limit for rising concentrations: If this level is exceeded, the analyzer activates the next higher range.

Min. level gives the switchover limit for decreasing concentrations: If this level is underrun, the analyzer activates the next lower range.

Note!
As given in the figures to the left, specifying the 'Min.level' of a level to be lower than the 'Max.level' of the level right below, defines a switching hysteresis.

6.2.3.3.2 Setup Damping

Setup..
Measurement..
Damping..

Any measuring system applies a damping on its output signal, compared to the change of the 'real' measurand, due to delays caused by

- electronic signal processing,
- sensors with finite response time,
- gas flow, and more.

This damping is called 'system damping'.

This software menu enables to setup an additional electronic damping (t90 time), that is added to the system damping. The reason to do so, is to e.g. have a smoother output signal.

```
Ch1
               Damping
t90 Range1:                 2.0 s
t90 Range2:                 2.0 s
t90 Range3:                 2.0 s
t90 Range4:                 2.0 s
t90 Current                 2.0 s
Current Range             Ch1-R1
t90 Time Max               76.9 s
```

Specify t_{90} times for each range of the selected channel.

Gives the current t_{90} time, specified for the currently selected range.

Shows the current measuring range.

Gives the maximum possible t_{90} time, which is limited by the size of the internal sampling buffer and the sampling rates of the installed measuring principles/sensors.

6.2.3.3.3 Setup Linearization

Setup..
Measurement..
Linearization..

If the system is set up accordingly, the access code for level 3 must be entered to gain access to this menu.

Ch1	
Linearization	
Linearizer:	Off
LinearMethod:	Splines
Calculate!	
Setpoints (X)..	
Actuals (Y)..	
Linearizer Min	20.000 ppm
Linearizer Max	110.000 ppm
▾Status	Normal

Switch **On** or **Off** the linearizer.

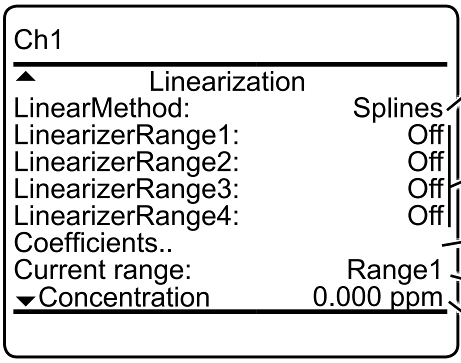
Specify the linearization methode to be used.
Available options: **Splines**, **Polynom**.

Select this line to let the analyzer calculate the new linearization curve.

First enter SETPOINTS (X) to enter the new setpoint values (☞ 6-50).
When done, enter ACTUALS (Y) to enter the corresponding actuals (☞ 6-51).

The linearization status.
Possible values: **Normal, Underflow, Overflow, Undefined**

6.2.3 Setup Menu



Specify the linearization methode to be used.

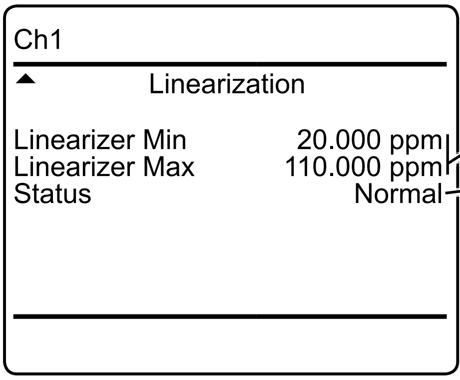
Available options: **Splines**, **Polynom**.

Separately switch **On** or **Off** the Linearization for each range of the selected channel.

Submenu to enter coefficients (☞).

Select the currently to be used range.

Currently measured gas concentration

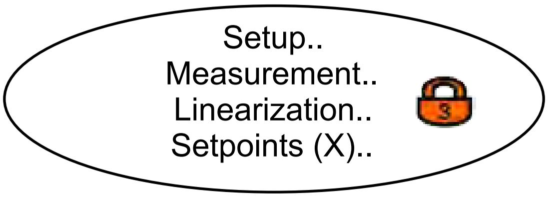


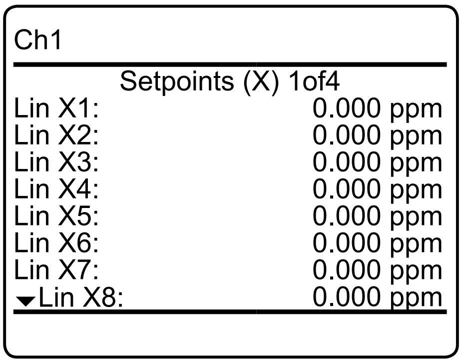
Measuring range, covered by the linearization settings.

Linearization status.

Possible values: **Normal, Underflow, Overflow, Undefined**

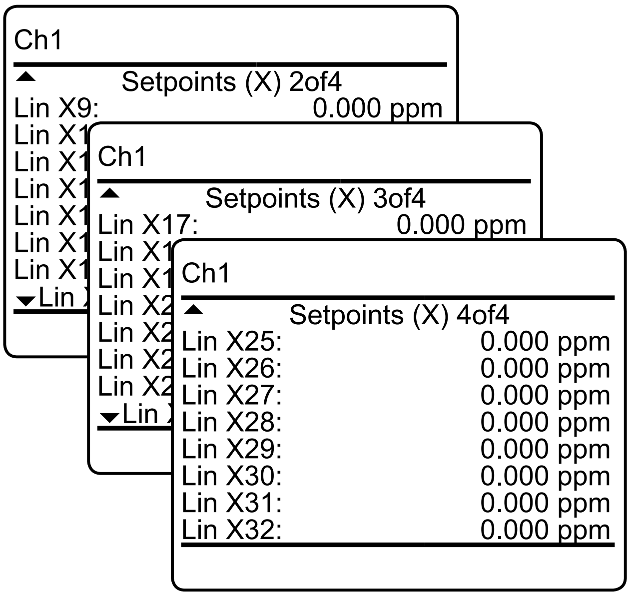
6.2.3.3.3.1 Setup Linearization Setpoints (X)



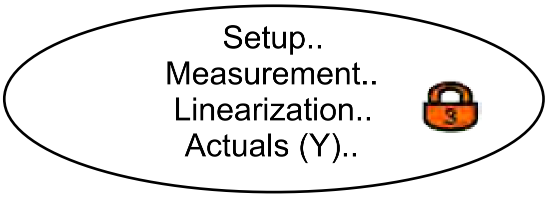


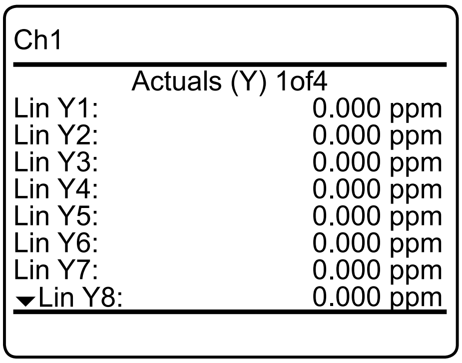
To modify a linearization curve, within this menu enter up to 32 setpoint values (x values) for the new parameter sets.

When done, return to the previous menu, enter ACTUALS (Y) and enter the correspon-ding (y) values.



6.2.3.3.3.2 Setup Linearization Actuals (Y)

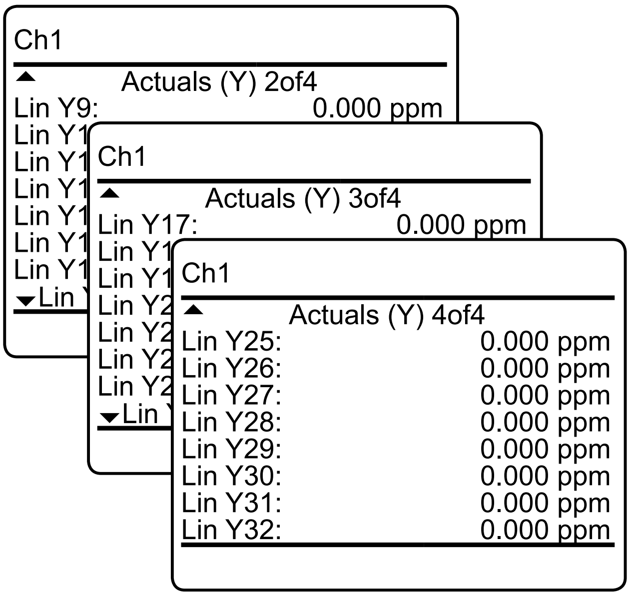




To modify a linearization curve, after having entered the setpoint values (x values) for the new parameter sets, within this menu enter the new actuals (y) values.

4 menu pages enable to enter up to 32 values.

Note!
Take care to enter the same number of actuals as setpoints!



6.2.3.3.3.3 Polynomials Coefficients

Setup..
Measurement..
Linearization..
Coefficients..

Range1 Uses:	Poly1
Range2 Uses:	Poly3
Range3 Uses:	Poly3
Range4 Uses:	Poly4
Coeffs Poly1..	
Coeffs Poly2..	
Coeffs Poly3..	
Coeffs Poly4..	
Calculation..	

Assign polynomials to each range of the current channel. Multiple assignments are supported.

Submenus to enter polynomials coefficients; ☞ .

Submenu to calculate the polynomials; ☞ .

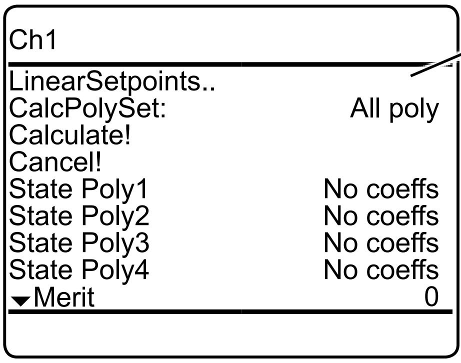
6.2.3.3.3.3.1 Enter Polynomials Coefficients

Overflow:	10.0 %
Underflow:	5.0 %
a0:	
a1:	
a2:	
a3:	
a4:	
RefValue	100000 ppm
State Poly1	No coeffs

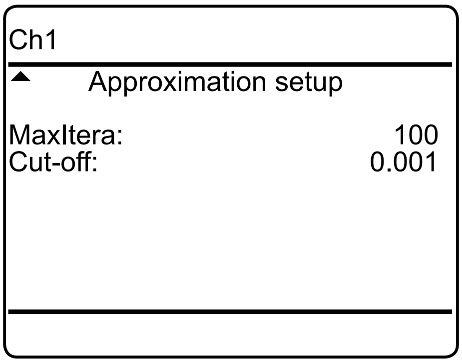
Enter the coefficients here for a 4th order polynomial:

$$a4\ x^4 + a3\ x^3 + a2\ x^2 + a1\ x + a0$$

6.2.3.3.3.3.2 Calculate Polynomials



Submenu for linearization setpoints (☞ 6-55)



6.2.3.3.3.3.2.1 Linearization Setpoints

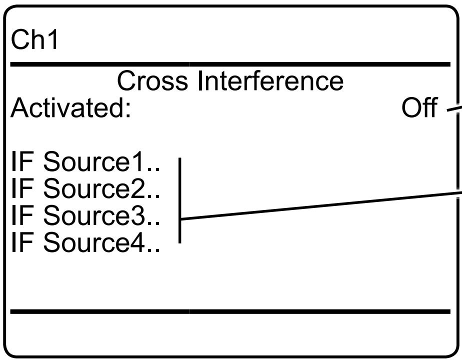
```
Ch1
        Linearization setpoints

Setpoints (X)..
Actuals (Y)..
RefPoly1:               10000 ppm
RefPoly2:               10000 ppm
RefPoly3:               10000 ppm
RefPoly4:               10000 ppm
Clear all points!
```

Submenu to enter setpoints (☞ 6-50).
Submenu to enter actuals (☞ 6-51).

6.2.3.3.4 Setup Cross Interference

Setup..
Measurement..
Cross Interference..

This menu enables to configure up to 4 sources (internal or external) for cross interference compensation.



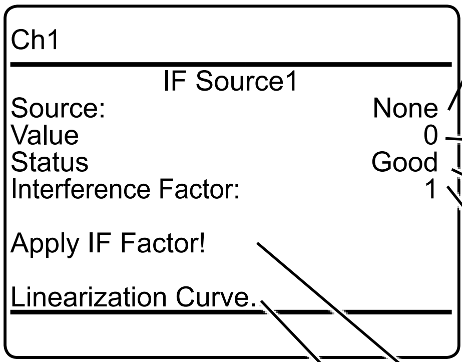
Enable (**On**) or disable (**Off**) cross interference compensation for the selected channel.

Up to 4 sources of concentration values can be configured for compensation. These submenus are exemplified on ☞ 6-57.

6.2.3.3.4.1 Setup Cross Interference Source*n*

Setup..
Measurement..
Cross Interference..
IF Source*1 ... 4*

Within this menu, configure the source and effect of interference of the component, interfering the currently selected channel.



Select the source of measuring values to be used for cross compensating the selected channel.

Available options:

None: source is disabled for cross compensation

Conc1 ... Conc5: Measurement values of internal channels 1 ... 5

AIN1, AIN2: Analog input 1 or 2

Calc A ... Calc D: Result of Calc A to Calc D

Shows the interfering components value, currently applied.

Shows the interfering components status.

Available options: **Absent, Good**.

Specify the influence of the selected source on the selected channel to be compensated.

Accepted range: **$-1x10^9$ ... $+1x10^9$**

Apply the configured settings.

If the source signal is not linear, enter this submenu .to configure a fourth-order polynomial, ☞ 6-578.

6.2.3.3.4.1.1 Setup Cross Interference Linearization Curve

Setup..
Measurement..
Cross Interference..
IF Source*1 ... 4*
Linearization Curve..

Note!
The menu figure to the left shows the default setup for the polynomials, which relates to a straight line.

So, if your IF source signal is linear, no further actions or changes in this menu are required.

Ch1

IF Source1

Reference Value:	1
IF Polynomial a1:	1.00000000
IF Polynomial a2:	0.00000000
IF Polynomial a3:	0.00000000
IF Polynomial a4:	0.00000000

Reference value to normalize the linearization curve.

Accepted range: **-1E+9 ... +1E+9**

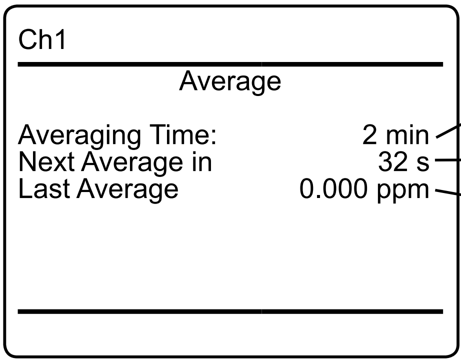
Enter up to 4 polynomial factors to linearize the interfering component´s input signal with a fourth-order polynomial of the form

$$a4\ x^4 + a3\ x^3 + a2\ x^2 + a1\ x$$

6.2.3.3.5 Setup Measurement Average

Setup..
Measurement..
Average..

Some applications, like e.g. CEMS, require to calculate and monitor concentration averages. Enter this menu to setup averaging.



In this line specify the averaging time.
Accepted values: **0 ... 120** min

Elapsed time for the next average.

Last average result.

6.2.3.3.6 Setup Measurement Delay

Setup..
Measurement..
Delay..

This menu option enables to delay a measurement output (on all display, analog outputs, network, etc.).

Use this option to compensate signal delays within multichannel instruments, if you need very synchronous results.

Reasons for unsynchronous behaviour may be e.g. serial tubing of multiple channels, where the first channel already gives a valid reading, while the last one is still waiting for the gas.

Ch1
Delay
Delay Time:: 2.0 s
Delay Time Max 98.0 s

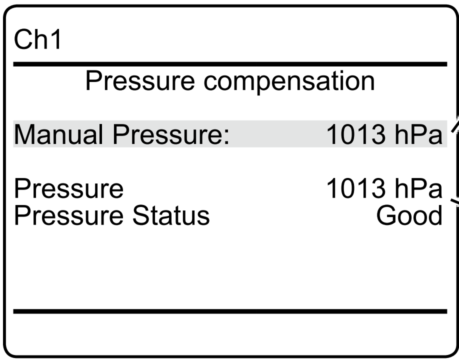
Setup the output delay time.

Accepted range: **0.0 s ... "*Max. Delay time*"**

The acceptable maximum delay time is internally calculated, depending on the installed measuring options, and cannot be changed.

6.2.3.3.7 Setup Pressure Compensation

Setup..
Measurement..
Pressure Compensation..



Manually enter the current ambient pressure for pressure compensation.

Note!

If a pressure sensor is installed, this line is hidden!

These lines show the pressure, currently used for pressure compensation and the status.

6.2.3.4 Setup In-/Outputs

Setup..
In-/Outputs..

If the system is setup accordingly, the access code for level 2 must be entered to gain access to this menu.

Enter the submenu for the in- or outputs you want to configure:

In-/Outputs

Analog Outputs..
Digital Outputs..
Digital Inputs..
Internal SHS..
Analog Inputs..

Analog outputs: ☞ 6-63

Digital outputs: ☞ 6-68

Digital inputs: ☞ 6-71

Internal sample handling system: ☞ 6-73

Analog inputs: ☞ 6-74

6.2.3.4.1 Setup Analog Outputs

Setup..
In-/Outputs..
Analog Outputs..

Configure your analyzer´s analog outputs.

If the system is setup accordingly, the access code for level 3 must be entered to gain access to this menu.

Analog Outputs

Output1..
Output2..
Output3..
Output4..
Output5..

Enter the submenu for the output you want to configure.

Note!
All submenus for the analog outputs settings are of an identical design.

6.2.3 Setup Menu

6.2.3.4.1.1 Setup Analog Output*n*

Setup..
In-/Outputs..
Analog outputs..
Output*1...5*..

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

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

Signal*)	Description
None	The analog output is deactivated
0 mA	A 0 or 4 mA signal is generated, e.g. to check the signal processing in an external system. Whether a 0 or 4 mA signal is generated, is set by the "*Out range*" line (☞ next page).
20 mA	A 20 mA signal is generated, e.g. to check the signal processing in an external system.
Comp1 ... 5	Gas concentration
Temp1 ... 5	Temperature
Press1 ... 5	Pressure
Flow1 ... 5	Flow
Calc A ... D	Result of calculator
RawVal1 ... 5	Raw value
RangeID1 ... 5	ID of selected range

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

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

6.2.3 Setup Menu

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

"*Out(put) rang*e":

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

Enter a concentration, to equal the low output limit (0 or 4 mA)

Enter a concentration, to equal the high output limit (20 mA)

Enable (**Yes**) or disable (**No**) output autoscaling.

"*Fail mode*" selects the output´s behaviour under failure conditions, considering or not, the NAMUR recommendation NE 43. NE 43 defines output signals enabling to detect different types of failures/status (see table 6-1): The related information is transmitted as a current signal, but outside the (0)4-20 mA measurement signal range.

Available options:

Track: NE 43 not considered.

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

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

Note!
*Factory settings are OutRange: **4-20 mA** and FailMode: **LOW - 10%**, if not changed at time of order.*

6.2.3.4.1.1.1 Operation Modes Acc. NAMUR NE 43

If "*OutRange*" is set to **0-20 mA**, a 20 mA signal is generated, if the measured concentration is equal to "*Max Scale*". A 0 mA signal is generated if the sample gas concentration is 0 (dead zero).

However, a severed cable also results in a signal value of 0. An external data acquisition system thus cannot detect such an failure and accepts a gas concentration of 0.

The commonly used method of detecting a severed cable is to apply an offset: a concentration corresponding to the lower range value is assigned an analog signal of 4 mA, enabling to detect a severed or disconnected cable.

This live zero mode is activated by setting "*Out Range*" to **4-20 mA**.

Operation Modes Conforming to NAMUR 43 (NE 43) Recommendations

The operation modes described above do not generate a signal which enables detection of a failure in the measurement system. In such cases the behaviour of the output signal is undefined: either the last value is held, or a random value is sent. System failures thus cannot be detected by an external data acquisition system.

NE 43 contains recommendations for setting analog outputs in order to avoid these situations. These are implemented by X-STREAM analyzers as follows:

Setting "*FailMode*" to **HIGH + 10%** or **LOW - 10%** defines specific analog output signals in case of a failure. Since these values do not occur under normal operation conditions, a data acquisition system is enabled to distinguish between the following situations (table 6-1):

- Valid signal (signal within valid range; column *C*)
- Signal out of range (signal rises or falls slowly to the limits given in columns *D* or *E* and holds this value until the concentration returns to a valid level).
- Failure (signal out of range; column *F*)
- Severed cable (no signal; column *G*)

			Output signal, if				
Column	*A*	*B*	*C*	*D*	*E*	*F*	*G*
"OutRange"	**"FailMode"**	**Failure signal level acc. NE 43**	**Measured value is valid**	**Measured value is below lower limit ("Low scale")**	**Measured value is above upper limit ("High scale")**	**An internal failure occured**	**Cable is severed**
0-20 mA	Track	-	0 ... 20 mA	< -19 mA	> 21 mA	undefined	0 mA
4-20 mA	Track	-	4 ... 20 mA	< -19 mA	> 21 mA	undefined	0 mA
0-20 mA	LOW - 10%	below	0 ... 20 mA	-0.2 mA	20.5 mA	-2 mA	0 mA
4-20 mA	LOW - 10%	below	4 ... 20 mA	3.8 mA	20.5 mA	2.4 mA	0 mA
0-20 mA	HIGH + 10%	above	0 ... 20 mA	-0.2 mA	20.5 mA	> 22 mA	0 mA
4-20 mA	HIGH + 10%	above	4 ... 20 mA	3.8 mA	20.5 mA	> 21.6 mA	0 mA

Tab. 6-1: *Analog Output Failure Modes*

6.2.3 Setup Menu

Signal:	Comp1
OutRange:	4-20 mA
Low Scale:	0.00
Max Scale:	100.00
AutoScale:	Yes
FailMode:	LOW - 10%
0/4 mA:	0.00
20 mA:	100.00
Hold:	No

"*0/4 mA*" enables to finetune the analog output: Set "*Signal*" to **0 mA** and, while measuring the output current, in this line adjust it to the expected value.

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

"*20 mA*" enables to finetune the analog output: Set "*Signal*" to **20 mA** and while measuring the output current, in this line adjust it to the expected value.

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

"*Hold*" selects the output´s behaviour during calibrations.

If set to **Yes**,

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

If set to **No**,

- the analog output signal always corresponds to the actual measured value during calibration; this may trigger alarms if limits are exceeded.
  Note!
  This behaviour may be undesireable if e.g. the unit is connected to a data acquisition system.

6.2.3.4.2 Setup Digital Outputs

Setup..
In-/Outputs..
Digital Outputs..

This first menu page enables to configure digital outputs 1 ... 4, which are the basic outputs, available with every X-STREAM XE analyzer ('X1' in the menu title refers to the instrument´s I/O connector X1).

Digital Outputs (X1)	
Output1 Node:	System
Output1 Signal:	Off
Output2 Node:	Ch1
Output2 Signal:	Off
Output3 Node:	Ch2
Output3 Signal:	Off
Output4 Node:	Ch3
▼Output4 Signal:	Off

For each output 1 .. 4 specify within the "*Node*" line the signal source.

Available options: **System**, **Ch1 ... Ch5** (depending on the number of channels installed).

If any one of **Ch1 ... Ch5** is selected, only signals, valid for the selected channel are considered.

If **System** is selected, analyzer specific signals are selectable.

Once the "*Node*" is specified, for each output 1 .. 4 select within the "*Signal*" line, what to output. Depending on the node, the list of available signals varies; ☞ next page.

6.2.3 Setup Menu

Node: **System** *(related to analyzer)*

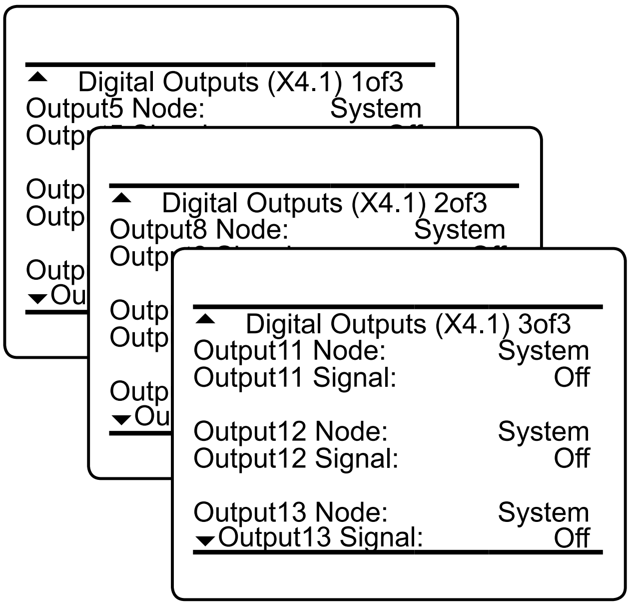
Option	Description
Off	Switched off
On	Switched on
Heartbeat	Status changes every second (test mode)
Any Failure Any Off-Spec Any MaintRequ Any FctCheck	Any failure, off-spec, maintenance request or function check status is set
Any calibrating Any zeroing Any spanning	Any calibration, zero or span calibration is on-going
Any zero failed Any span failed	A zero or span calibration failed
Any range low Any range high	Any measured value exceeds a current range
Any conc alm Any average alm Any temper alm Any press alm Any flow alm	Any channel triggered an alarm of the selected type
V1 ... V20	Drive an external valve
Pump1 ... 2	Drive an external pump
Ext Alarm1 ... 8	An alarm is triggered
PLC result1 ... 10	
CalcA rslt LoLo CalcA rslt Lo CalcA rslt Hi CalcA rslt HiHi	The result of calculatorA exceeds the selected limit
CalcB rslt LoLo .... CalcD rslt HiH	Similar to **CalcA**, but for calculators B ... D

Node: **Ch1 ... Ch5** *(related to channel)*

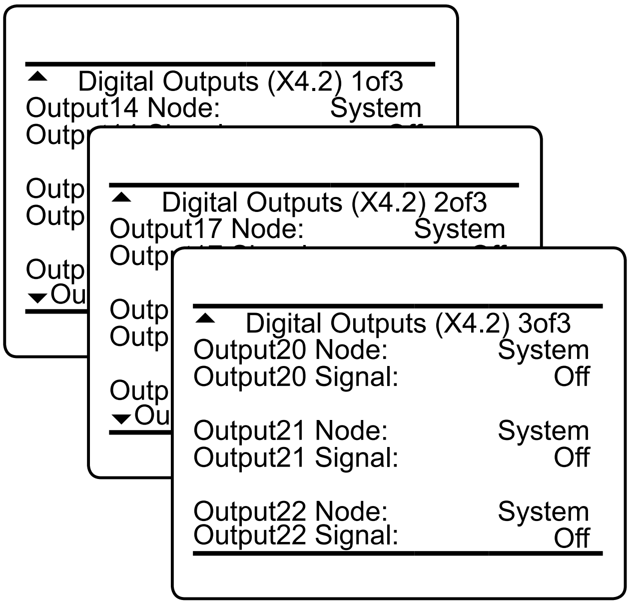
Option	Description
Off	Switched off
On	Switched on
Heartbeat	Status changes every second (test mode)
Failure Off-Spec MaintRequ FctCheck	A channel specific failure, off-spec, maintenance request or function check status is set
Calibrating Zeroing Spanning	The channel is calibrating, zeroing or spanning
Zero failed Span failed	The selected procedure failed
Range underflow Range overflow	Measured value exceeds current range
Range 1 ... 4	The selected range is active
Conc LoLo Conc Lo Conc Hi Conc HiHi	A concentration alarm of the selected type is triggered
Average .. ..LoLo, ..Lo, ..Hi, ..HiHi	A concentration average alarm of the selected type is triggered
Temperature .. ..LoLo, ..Lo, ..Hi, ..HiH	A temperature alarm of the selected type is triggered
Pressure .. ..LoLo, ..Lo, ..Hi, ..HiH	A pressure alarm of the selected type is triggered
Flow .. ..LoLo, ..Lo, ..Hi, ..HiH	A flow alarm of the selected type is triggered

6.2.3 Setup Menu

If your instrument features optional digital I/O boards, similiar menu pages for the additional digital outputs are unlocked. The options for each output are as described before.:



Menu pages 4 ... 6 (titled 'Digital outputs (X4.1)') enable to configure outputs 5 ... 13 on the first expansion board ('X4.1' in the menu title refers to the instrument´s I/O connector X4.1).



Menu pages 7 ... 9 (titled 'Digital outputs (X4.2)') enable to configure outputs 14 ... 22 on the second expansion board ('X4.2' in the menu title refers to the instrument´s I/O connector X4.2).

6.2.3.4.3 Setup Digital Inputs

Setup..
In-/Outputs..
Digital Inputs..

If your instrument features optional digital I/O boards, this menu appears, enabling to configure the digital inputs.

Menu pages 1...3 (titled "Digital inputs (X4.1)") enable to configure inputs 1...7 on the first expansion board ('X4.1' in the menu title refers to the instrument´s I/O connector X4.1).

```
Digital Inputs (X4.1) 1of3

Input1 Node:              System
Input1 Function:         ExtFail
Input1 Edge:                  Up
Input2 Node:                 Ch1
Input2 Function:          Range1
▼Input2 Edge:               Down
```

For each input 1...7 specify within the "*Node*" line the signal source.

Available options: **System**, **Ch1 ... Ch5** (depending on the number of channels installed).

If any one of **Ch1 ... Ch5** is selected, only signals, valid for the selected channel are selectable.

If **System** is selected, any system signal is selectable.

```
▲Input3 Node:             System
Input3 Function:         ExtFail
Input3
Input4
Input4
Input4
Input5
Input5
▼Inpu
```

```
▲   Digital inputs (X4.1) 3of3
Input6 Node:              System
Input6 Function:         ExtFail
Input6 Edge:                  Up
Input7 Node:                  Up
Input7 Function:             Ch3
Input7 Edge:              Range4
▼
```

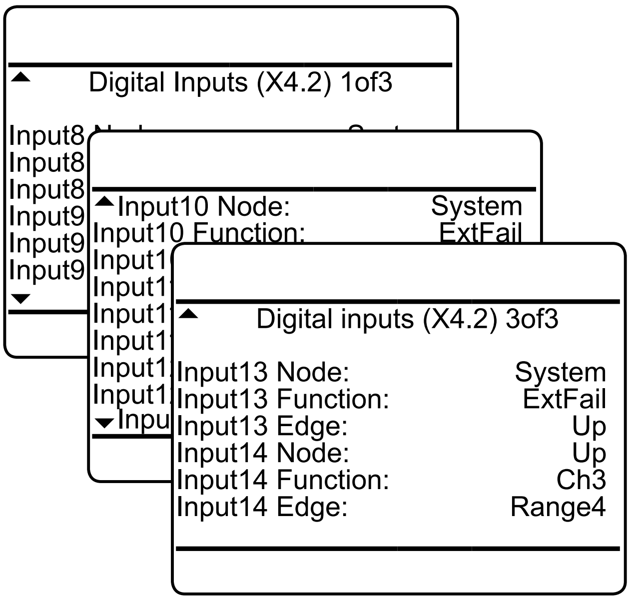
Once the "*Node*" is specified, for each input select the "*Function*" of that input (depending on the node, the list of available signals varies; ☞ next page) and select, how the input is to be triggered: by rising "*Edge*" (**Up**), or falling "*Edge*" (**Down**).

Node: **System**

Input*n* Function	
Option	**Description**
None	Not used
ZeroCalAll	Carry out the selected calibration procedure, or cancel any ongoing calibration
SpanCalAll	
ZeroSpanCalAll	
CancelAll	
ExtFail	The input is a NAMUR signal of the selected type
ExtMaint	
ExtFctCtrl	
ExtOffSpec	

Node: **Ch1 ... Ch5**

Input*n* Function	
Option	**Description**
None	Not used
ZeroCal	Carry out the selected calibration procedure, or cancel any ongoing calibration
SpanCal	
ZeroSpanCal	
Cancel	
Range 1 ... 4	Activate the selected range



Menu pages 4 ... 6 (titled 'Digital inputs (X4.2)') enable to configure outputs 8 ... 14 on a second expansion board ('X4.2' in the menu title refers to the instrument´s I/O connector X4.2).

6.2.3.4.4 Setup Internal SHS

Setup..
In-/Outputs..
Internal SHS..

If the system is setup accordingly, the access code for level 3 must be entered to gain access to this menu.

Internal SHS (1of2)	
Gas1 Signal:	Off
Gas2 Signal:	Off
Gas3 Signal:	Off
Gas4 Signal:	Off
Gas5 Signal:	Off
Gas6 Signal:	Off
Gas7 Signal:	Off
▼Gas8 Signal:	Off

▲ Internal SHS (2of2)	
Pump1 Signal:	Off
Pump2 Signal:	Off

Software Menus 6

6.2.3.4.5 Setup Analog Inputs

Setup..
In-/Outputs..
Analog Inputs..

Enter this menu to configure the optional analog inputs.

Note!
If your instrument does not feature analog inputs, this menu is not available.

If the system is setup accordingly, the access code for level 3 must be entered to gain access to this menu.

Analog Inputs

Analog Input1..
Analog Input2..

Select the analog input you want to configure (☞6-75).

6.2.3.4.5.1 Setup Analog Input *n*

Setup..
In-/Outputs..
Analog Inputs..
Analog Input*1 ... 2*

Analog Input1

Max. Good Value:	800
Min. Good Value:	1100
Adjust Conversion..	
Calc. Input Value	1013
Status	Good

With this two lines specify the range for the input value to be accepted as 'good'. The (not shown) unit for these entries is the measurement unit of the external source, such as e.g. pressure sensor: hPa, flow sensor: l/min, ...

Adjust analog-digital conversion ☞ 6-76

Shows the calculated input value, based on the conversion coefficients a0..a2, as specified in the submenu.

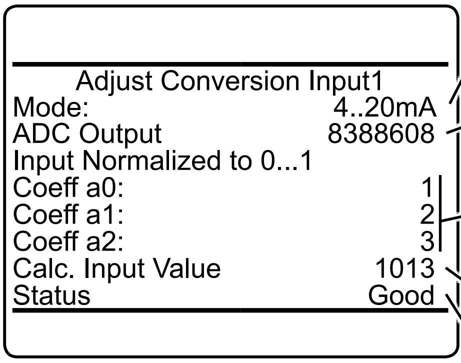
Input value status.

Possible entries:

Absent, Failure, Good, Simulated (e.g. when in test mode)

6.2.3.4.5.1.1 Adjust Conversion

Setup..
In-/Outputs..
Analog Inputs..
Analog Input*1 ... 2*
Adjust Conversion..



Select the type of signal, provided by the external source.

Available options:
0..10V, 0..1V, 4..20mA: voltage or current signal is applied

Off: Input is switched off

Test: the instrument internally generates a step-like signal for testing purposes.

Shows the internal ADC output (informative)

Enter the coefficients for your input signal here, considering

- it is for a cubic equation max.
- it is normalized to 0...1 (see note in menu)

Shows the calculated input value, based on the coefficients a0..a2, for comparison with the real input value. If both do not match, correct the coefficients.

Input signal status.

Possible values:

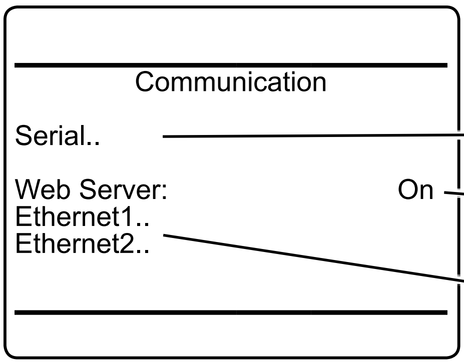
Absent, Failure, Good, Simulated (e.g. when in test mode)

6.2.3 Setup Menu

6.2.3.5 Setup Communication

Setup..
Communication..

If the system is setup accordingly, the access code for level 3 must be entered to gain access to this menu.



Setup the interface parameters to meet the configuration of your host system.

Configure the serial interface (☞ 6-78)

Specify, if (**On**) or not (**No**) a web server connection is used.

Configure "*Ethernet1*" or "*Ethernet2*" communication (☞ 6-79)

6.2.3.5.1 Setup Communication Serial

Setup..
Communication.. 
Serial..

Serial

Protocol:	Modbus-RTU
32Bit Mode:	16BitLow
Mbus ID:	1
Baud Rate:	19200
Parity:	Even

Select the Modbus protocol.
Available options:
MODB-RTU, None

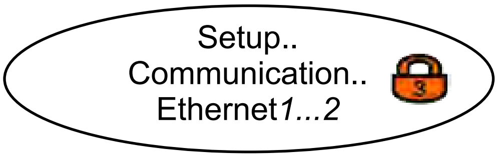
Modbus mode of operation.
Available options:
32Bit (=Daniel mode),
16BitLow (=Modicon mode, LOW word first)
16BitHigh (=Modicon mode, HIGH word first)

Enter instrument ID for network.
Accepted values: **1 .. 254**

Select baud rate for the serial interface.
Available options:
2400, **4800**, **9600**, **19200**

Set whether a parity bit is used.
Available options:
None, **Even**, **Odd**

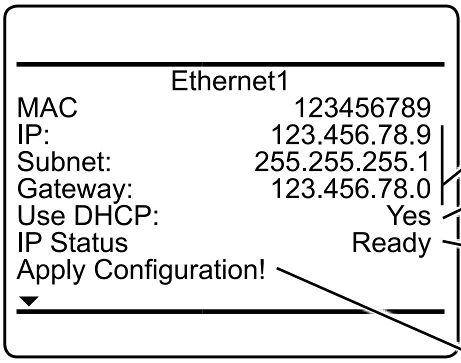
6.2.3.5.2 Setup Communication Ethernet*n*



Within these menus, configure the Ethernet communication for connector 1 or 2.

Most entries are standard, to be setup to meet your local network configuration.

Enter the second menu page to configure the Modbus parameters.

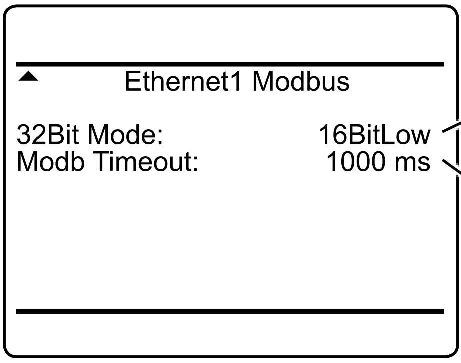


If your network does not feature a DHCP server, enter these lines to configure the network settings manually.

If your network does not feature a DHCP server, select **No** to enter the network settings manually.

If your network features a DHCP server, "*IP status*" turns to **Ready**, if a valid IP address has been assigned.

To apply any changes made on this first menu page, press enter in this line.



Modbus mode of operation.

Available options:

32Bit (=Daniel mode),

16BitLow (=Modicon mode, LOW word first)

16BitHigh (=Modicon mode, HIGH word first)

Modbus timeout.

Accepted values: **500 ... 10,000** ms

Note!

*At maximum 2 hosts at a time can connect to the analyzer. "*MBus timeout*" specifies the time interval to elapse, before a host without activity is disconnected.*

6.2.3.6 Setup Alarms

Setup..
Alarms..

This menu and its submenus enable to configure a couple of alarm conditions.

In case an alarm goes off, a status is set and the related pictogram shows in the display. Also digital outputs may be configured to be activated (6-68).

If the system is setup accordingly, the access code for level 3 must be entered to gain access to this menu.

Alarms

Alarms Output Failsafe: Yes
Concentration..
Conc Average..
Temperature..
Pressure..
Flow..

Select if the alarms outputs are failsafe (**Yes**) or not (**No**): Failsafe means, relay output coils are powered during normal operation.

Configure concentration alarms (6-81)

Configure alarms for concentration averages (6-83)

Configure temperature alarms (6-85)

Configure pressure alarms (6-85)

Configure flow alarms (6-85)

Alarms 2

Calculator A..
Calculator B..
Calculator C..
Calculator D..

X-STREAM XE analyzers can be upgraded with optional software packages, to provide 4 calculators (A ... D).

Their results can be monitored to activate alarms (6-86).

6.2.3.6.1 Setup Alarms Concentrations

Setup..
Alarms..
Concentration..

Note!
To configure concentration alarm levels for averaging measurements, ☞ 6-83!

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

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

Switch **On** or **Off** the alarm monitor for the current channel.

Specify up to 4 concentration (threshold) levels:

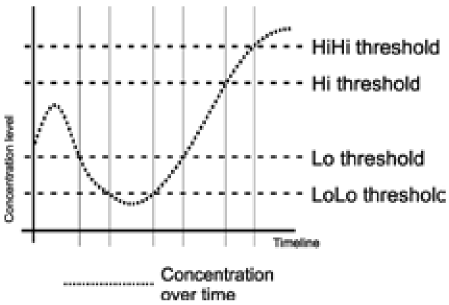
"*LoLo*" and "*Lo*" levels are to be setup below the expected concentration.

"*HiHi*"and "*Hi*" levels are to be setup above the expected concentration.

See the figure to the left for details.

Specify the hysteresis to be considered around the concentration levels, to avoid oscillating alarms.

To view the current alarm states; ☞ 6-82



Multi-channel unit:
Press LEFT *to enter SELECT COMPONENT, to change the settings for another channel.*

6.2.3.6.1.1 View Concentration Alarms States

Setup..
Alarms..
Concentration..
States..

Ch1

Concentration Alarms

LoLo Alarm:	Off
Lo Alarm	On
Hi Alarm	Off
HiHi Alarm	Off
Concentration	75.000 ppm

This menu gives an overview of activated alarms, based on the currently measured "*Concentration*".

6.2.3.6.2 Setup Concentration Average Alarms

Setup..
Alarms..
Conc Average..

Note!
To configure concentration alarm levels for non-averaging measurements, ☞ *6-81!*

If concentration averaging (☞ 6-59) is active, specify concentration alarms within this menu. In this case, an alarm goes off only, if an average value exceeds one of the given levels.

Component ?

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

Ch1

Concentration Average

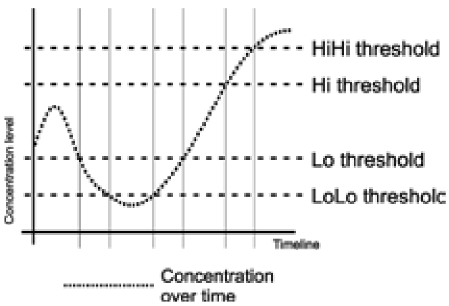
Alarm Monitor:	On
LoLo Level:	50.000 ppm
Lo Level:	100.000 ppm
Hi Level:	400.000 ppm
HiHi Level:	600.000 ppm
Hysteresis:	10.000 ppm
States..	

Switch **On** or **Off** the alarm monitor for the current channel.

Specify up to 4 concentration (threshold) levels:
"*LoLo*" and "*Lo*" levels are to be setup below the expected concentration.
"*HiHi*"and "*Hi*" levels are to be setup above the expected concentration.
See the figure to the left for details.

Specify the hysteresis to be considered around the concentration levels, to avoid oscillating alarms.

To view the current alarm states; ☞ 6-84



Multi-channel unit:
Press LEFT *to enter SELECT COMPONENT, to change the settings for another channel.*

6.2.3 Setup Menu

6.2.3.6.2.1 Setup Alarms Conc Average States

Setup..
Alarms..
Average..
States..

ConcAverage Alarms

LoLo Alarm	Off
Lo Alarm	Off
Hi Alarm	On
HiHi Alarm	Off
Average	468.000 ppm

This menu gives an overview of activated alarms, based on the currently measured "*Average*" of concentration.

6.2.3.6.3 Setup Temperature Alarms

Setup..
Alarms..
Temperature..

Configuring temperature alarms is similiar to the procedure for concentration alarms; ☞ 6-81 .

6.2.3.6.4 Setup Pressure Alarms

Setup..
Alarms..
Pressure..

Configuring pressure alarms is similiar to the procedure for concentration alarms; ☞ 6-81 .

6.2.3.6.5 Setup Flow Alarms

Setup..
Alarms..
Flow..

Configuring flow alarms is similiar to the procedure for concentration alarms; ☞ 6-81 .

6.2.3.6.6 Setup Alarms Calculator*n*

Setup..
Alarms..
Calculator *A*..*D*

Any X-STREAM XE analyzer can be upgraded with optional software packages to provide 4 calculators (A ... D). The results can be monitored to activate alarms.

Note!

This menu is available only, if a valid software upgrade code has been purchased and entered (☞ 6-89).

For more information on calculators, see the associated separate software features manual.

Calculator A	
Alarm Monitor:	On
LoLo Level:	50.000
Lo Level:	100.000
Hi Level:	400.000
HiHi Level:	600.000
Hysteresis:	1000
States..	

Switch **On** or **Off** the alarm monitor for the current calculator (here: exemplary Calculator A).

Specify up to 4 threshold levels:

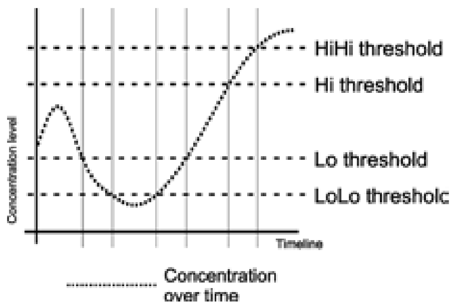
"*LoLo*" and "*Lo*" levels are to be setup below the expected calculator result range.

"*HiHi*"and "*Hi*" levels are to be setup above the calculator result range.

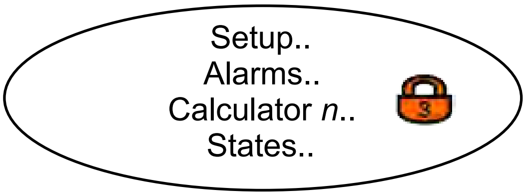
See the figure to the left for details.

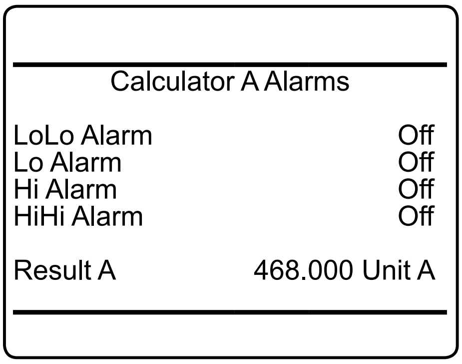
Specify the hysteresis to be considered around the threshold levels, to avoid oscillating alarms.

To view the current alarm states; ☞ 6-84



6.2.3.6.6.1 Setup Alarms Calculator *n* States





This menu gives an overview of activated alarms, based on the currently calculated "*Result* n" (here of Calculator A).

Note!
The calculator result unit is shown as configured in SETUP - CALCULATOR.

6.2.3.7 Setup Installed Options

Setup..
Installed Options..

Note!
Don´t change settings in this menu without experienced knowledge! Wrong settings may result in a defective instrument.

If the system is setup accordingly, the access code for level 3 must be entered to gain access to this menu.

```
Installed Options 1of2
Licenses..

Valves:                 None
Pumps:                  None
DIO#1 Installed:          No
DIO#2 Installed:          No
Anal. Outputs:             4
▼AIN Installed:           No
```

Some software features are optional and can be unlocked with a license code. To do so, ☞ 6-89

Lines 3 to 6 show if the related optional component is installed with the current instrument (**Yes**) or not (**None**), respectively shows, how they are installed ("*Valves*": **Internal**, **External** or **Int+Ext**), or which ("*Pumps*": **Pump 1, Pump 1&2**).

Indicates how many analog outputs are installed (**0** ... **9**).

Indicates if analog inputs are installed, or not.

Component ?

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

```
▲      Installed Options 2of2

Flow..
Pressure..
```

Setup flow sensor installation, ☞ 6-90

Setup pressure sensor installation, ☞ 6-91

Multi-channel unit:

Press LEFT *to enter SELECT COMPONENT to change the settings for a different channel.*

6.2.3.7.1 Setup Installed Options Licenses

Setup..
Installed Options..
Licenses..

This menu is used to unlock software features, to be purchased separately.

By default, X-STREAM XE analyzers provide a web browser interface and a basic data logger. 3 optional software packages are available, to upgrade the software:

Enhanced: add PLC and calculator.

Advanced: add advanced data logger, event/calibration logger and e-mail support.

Professional: add all enhanced and advanced packages options.

Note!
For more information on these options, see the associated separate software features manual.

Licenses	
Key 1:	88888
Key 2:	88888
Key 3:	88888
Package	Trial
Trial Days	21

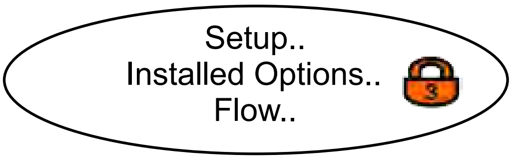
Trial version
Enter **88888** into each line "*Key 1*" to "*Key 3*" to unlock a **30 days full version (Professional) trial**. This trial is available only once for each analyzer, and only, if no other package has been activated before ("*Package*" shows **None**). Once entered, "*Trial Days*" shows the remaining time, until the package is disabled.

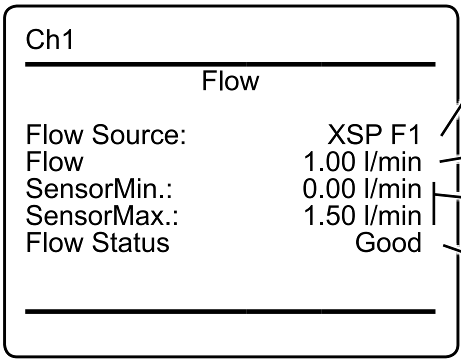
To unlock one of above packages for unlimited time, contact your EMERSON sales office. Have the analyzer serial number at hand, to purchase and receive an unlock code.

The code (3 5-digit numbers) has to be entered into lines "*Key 1*" to "*Key 3*". If the entered code is correct, "*Package*" shows the related name (see above).

Upgrades from one to another package are possible at any time, by purchasing and entering a valid unlock code.

6.2.3.7.2 Setup Installed Options Flow





Select the flow measurement data source for the currently selected channel.

Available options:

XSP F1 ...XSP F4: internal sensors, connected to the board XSP

AIN1, AIN2: analog inputs

Currently measured flow.

The sensor´s minimum and maximum limits.

The sensor´s status.

Possible entries: **Good, Absent, Failure**

6.2.3.7.3 Setup Installed Options Pressure

Setup..
Installed Options..
Pressure..

Ch1	
Pressure	
Pressure Source:	AIN1
Pressure	1013 hPa
SensorMin:	800 hPa
SensorMax	1100 hPa
Pressure Status	Good
Reference:	1013 hPa
Manual Pressure:	1014 hPa
Compensation:	Off

Select the pressure measurement data source for the currently selected channel.

Available options:

XSP P1, XSP P2: internal sensors, connected to the board XSP

AIN1, AIN2: analog inputs

Manual: enter the current pressure manually

Currently measured pressure, or currently entered manual pressure value.

The sensor´s minimum and maximum limits, or the limits for manual pressure entries.

The sensor´s status.

Possible entries: **Good, Absent, Failure**

Enter the reference pressure for pressure compensaion here.

Manually enter the current ambient pressure here.

Note!

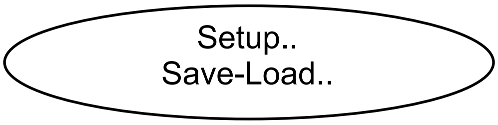
*If "Pressure source" is set to an option other than **Manual**, this line is hidden.*

Enable or disable pressure compensation for the selected channel.

Available options: **On, Off**

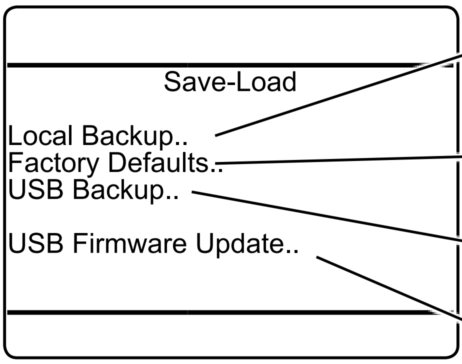
6.2.3 Setup Menu

6.2.3.8 Setup Save-Load



Enter this menu, if you want to save or restore configuration files from/to your analyzer.

If the system is setup accordingly, the access code for level 3 must be entered to gain access to this menu.



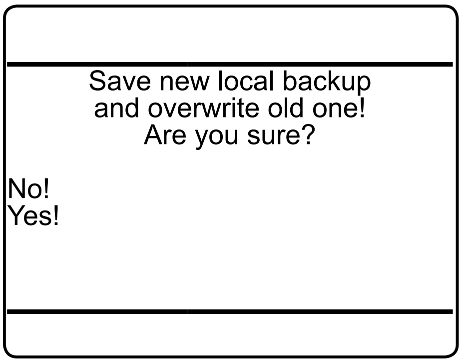
Enables to save/restore analyzer configuration data to/from a special internal memory area; ☞ 6-94

Restore the factory configuration; ☞ 6-94

Save/restore analyzer configuration data to/from external USB devices; ☞ 6-95

Update the analyzer firmware with a new version, available on the connected USB device; ☞ 6-

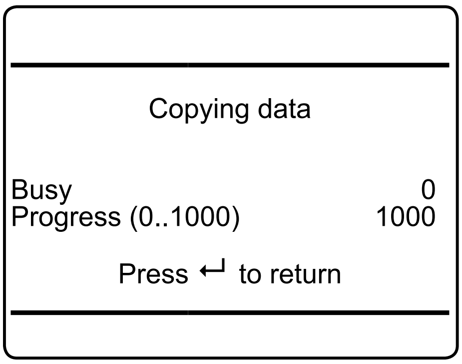
6.2.3.8.1 Notes on Save-Load Procedures



After selecting any 'backup' procedure, a safety prompt appears: select "*Yes!*" to start the backup; "*No!*" cancels.

Note!
There is no undo for this procedure, overwriting any older backup!

After selecting any 'restore' procedure, a safety prompt appears: select "*Yes!*" to start the backup; "*No!*" cancels.



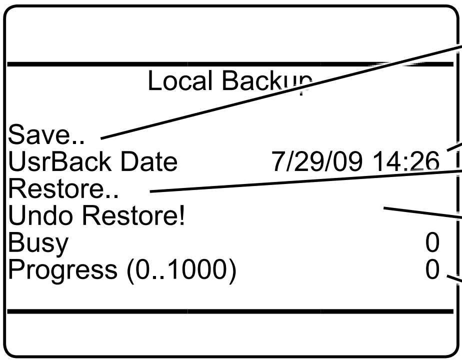
While a backup or restore procedure is ongoing, an information screen appears, as shown to the left:

Wait until "*Progress (0..1000)*" shows **1000**, then press *ENTER* to return to the previous menu.

6.2.3.8.2 Save-Load Local Backup

This menu enables to save or restore the current analyzer configuration to/from a special internal memory area.

Consider the notes on ☞ 6-93 !



Save the configuration data

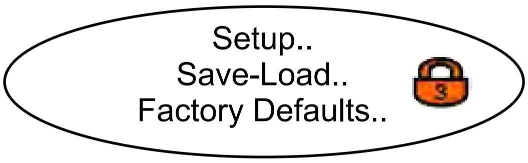
Date of last backup

Restore saved configuration data

Undo a restore

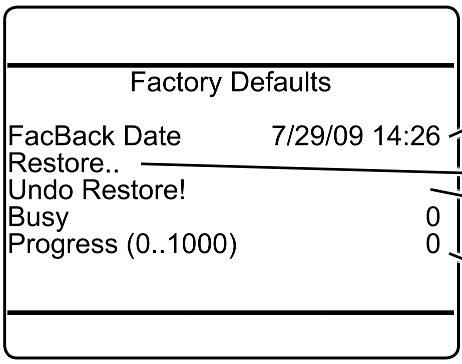
Wait until "*Progress (0..1000)*" shows **1000**, then press *ENTER* to return to LOCAL BACKUP.

6.2.3.8.3 Save-Load Factory Defaults



Note!
Factory defaults are saved once after factory startup and can only be restored!

Consider the notes on ☞ 6-93 !



Date of last backup

Restore saved factory configuration data

Undo a restore

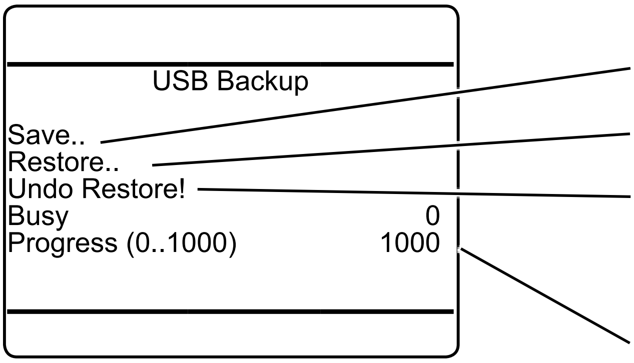
Wait until "*Progress (0..1000)*" shows **1000**, then press *ENTER* to return to LOCAL BACKUP.

6.2.3.8.4 Save-Load USB Backup

This menu enables to save or restore the current analyzer configuration to/from an external USB device.

Consider the notes on ☞ 6-93 !

Note!
Take care to consider the important information on ☞ 7-57, before starting any procedures with USB devices!



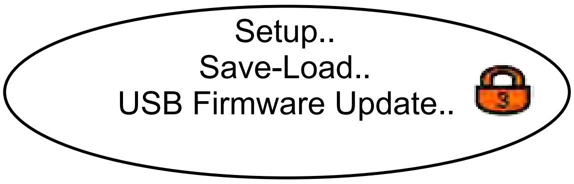
Save the configuration data

Restore saved configuration data

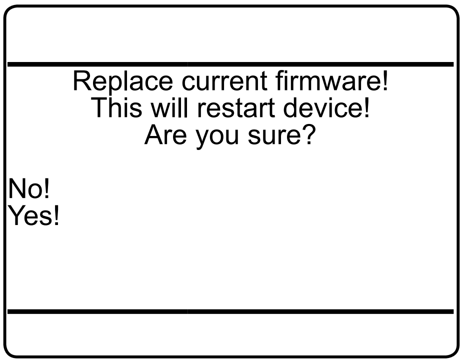
Undo a restore

Wait until "*Progress (0..1000)*" shows **1000**, then press *ENTER* to return to LOCAL BACKUP.

6.2.3.8.5 Save-Load USB Firmware Update



Firmware is the analyzer´s basic operation software. This menu enables to update your current analyzer firmware from an external USB device, e.g. to add new features, etc.

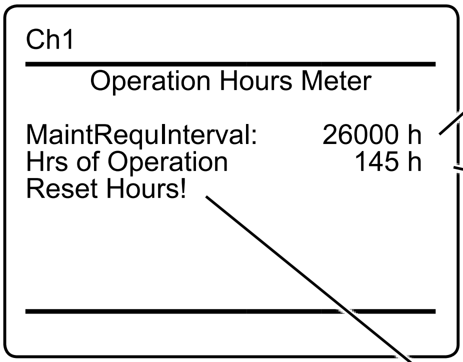


After selecting the firmware update procedure, a safety prompt appears: select "*Yes!*" to start the procedure; "*No!*" cancels.

6.2.3.9 Setup Operation Hours Meter

If the system is set up accordingly, the access code for level 2 must be entered to gain access to this menu.

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



Enter the operating hours for the selected channel´s maintenance requests interval.

Accepted range: **0** ... **26280** hrs.

Note!
*Enter **0** to disable operation hours monitoring for the selected channel.*

Operating hours since last reset.

Note!
*If this function is enabled, a maintenance request is triggered the moment, "*Hrs of Operation*" matches "*MaintRequInterval*". To reset this message, activate "*Reset Hours*".*

Press ENTER in this line to reset the operating hours meter for the selected channel.

Multi-channel unit:

Press LEFT to enter SELECT COMPONENT to change the settings for a different channel.

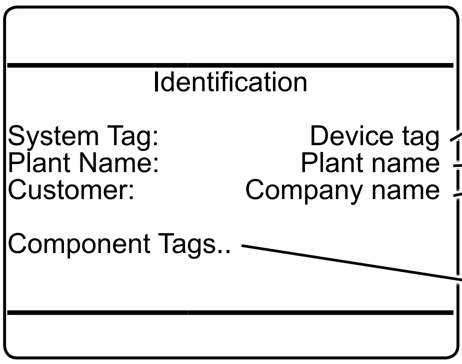
6.2.3 Setup Menu

6.2.3.10 Setup Identification

Setup..
Identification..

Enter analyzer identification data here.

If the system is set up accordingly, the access code for level 3 must be entered to gain access to this menu.

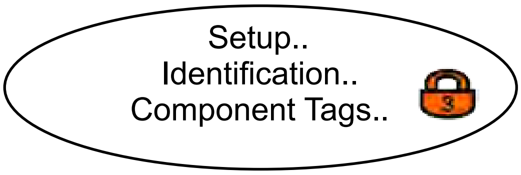


Enter a device tag here to identify the analyzer in e.g. a network

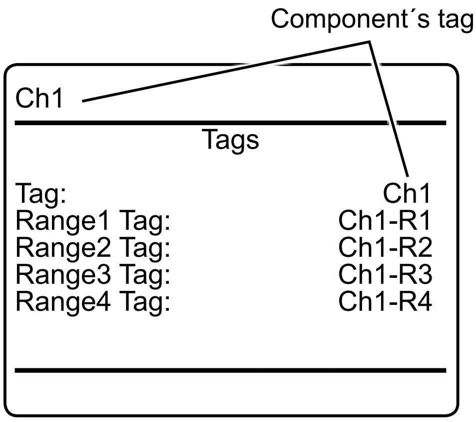
Enter a plant and customer name here.

Enter tags for components; ☞ 6-99

6.2.3.10.1 Component Tag Setup Menu



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



Within this menu, you may configure the component´s tag, and individual tags for each range.

Accepted entries: alphanumeric text, up to 8 characters long.

Note!
If set, the "Tag" always appears in the very top menu line, if the current menu refers to a specific component.

Multi-channel unit:

Press LEFT *to enter SELECT COMPONENT to change the settings for a different channel.*

☞ MEASUREMENT DISPLAY setup, page 6-30, to setup labels, and see examples of usage.

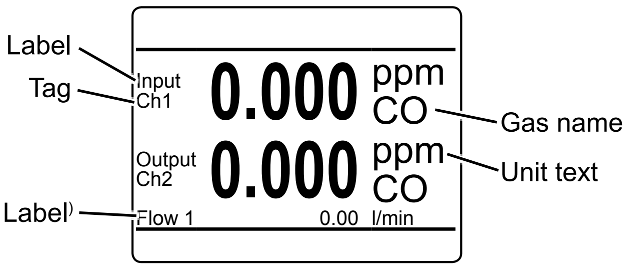


Fig. 6-4: *Measurement Display With Labels and Tags (example)*

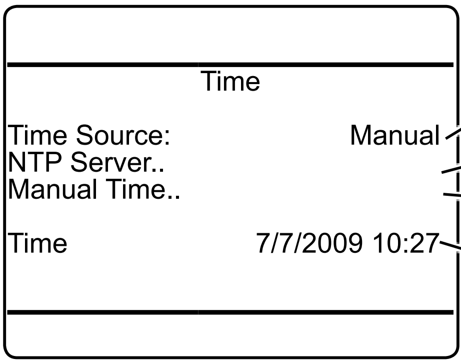
6.2.3.11 Setup Time

Setup..
Time..

Within this menu configure time settings.

Note!
Correct time settings are important for e.g. time interval based calibrations and log files entries.

If the system is setup accordingly, the access code for level 3 must be entered to gain access to this menu.



Select, how the analyzer time is set
Available options: **Manual, NTP**

Configure a NTP time server 6-101

Enter this menu to setup the analyzer time manually 6-102

The last line shows the current analyzer time.
Note!
Time format is 24h (13 = 1 pm)

6.2.3.11.1 Setup NTP Server

Setup..
Time..
NTP Server..

The Network Time Protocol (NTP) is a protocol for synchronizing the clocks of computer systems over internet.

NTP provides UTC time, and no information about time zones or daylight saving time is transmitted.

To sync the time with a NTP server,

- select **NTP** as "*Time Source*" in the previous menu
- ensure the analyzer has internet access (☞ SETUP - COMMUNICATION - ETHERNET1 or ETHERNET2; page 6-79).

Note!
A list of public NTP serves is available on the internet, e.g. at

http://support.ntp.org/bin/view/Servers/WebHome.

Next enter

- a valid NTP server IP address
- the difference (hrs) of your local time to the standard NTP time (UTC)
  Accepted values: **-12 ... 12** hrs
- the difference (min) of your local time to the standard NTP time (UTC)
  Accepted values: **0 ... 59** min

NTP Server	
NTP Server:	xx.xxx.xx.xxx
Time Zone:	1 h
Time Zone:	0 min
Sync Time:	No
Sync Interval:	1 h
Synchronize Now!	
Time	7/7/2009 13:27

Set "*Sync Time*" to **Yes**, if you want the analyzer to automatically sync the time.

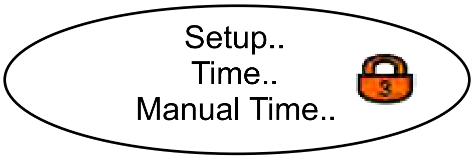
The interval, you want your analyzer to synchronize with the NTP server
Accepted values: **0 ... 23** h

To manually sync the time, start "*Synchronize Now!*"

The last line shows the current analyzer time.
Note!
Time format is 24h (13 = 1 pm)

6.2.3 Setup Menu

6.2.3.11.2 Setup Manual Time



Manual time

Year:	2009
Month:	7
Day:	7
Hour:	10
Minutes:	29
Set!	
Time	7/7/2009 13:29

Use this menu page to manually set analyzer date and time.

Note!
Time format is 24h (13 = 1 pm)

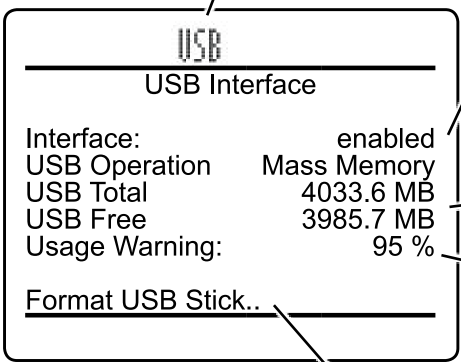
The last line shows the current analyzer time.

6.2.3.12 Setup USB Interface

Setup..
USB Interface..

If the system is set up accordingly, the access code for level 3 must be entered to gain access to this menu.

Indicator for an connected USB device.



If "*Interface*" is set to **Enabled**, this line shows status USB information:

MassMemory, if a memory stick is connected

Formatting, if formatting a device is on-going

NoDevice, if no device is connected

If "*Interface*" is set to **Disabled**, the line shows **Disabled**, too.

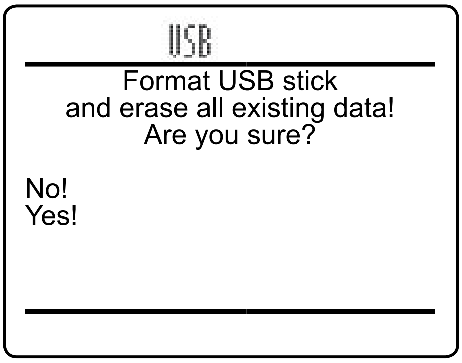
USB stick memory information (if a device is connected).

Specify the usage limit for the USB stick, to give a warning.

Format an USB memory stick before using it with this analyzer ☞ 6-104

6.2.3.12.1 Format USB Stick

Setup..
USB interface..
Format USB stick...



Select "Yes!" to start formatting.

A progress screen appears. Formating has ended when "*Busy*" in this screen shows **0.**

Note!
*While formatting is in progress, "*USB operation*" in the previous menu shows* ***formatting****.*
Do not remove a device while formatting!
This may cause loss of data or abnormal behaviour of the instrument!

Formatting creates a basic file system structure on the stick:

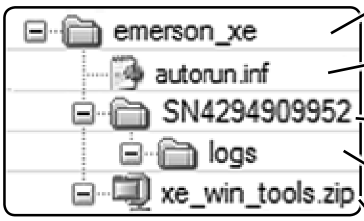


Fig. 6-5: *USB File System Structure*

'emerson_xe' directory within the root

File, to automatically run functions when connecting the stick to an analyzer, ☞ 7-66

'Serial number directory', beginning with 'SN', followed by the analyzer´s numeric serial number.

'logs' directory to hold the log files, copied to the stick by "*Export data to USB!*" actions within logger menus. Files within this directory are specific only for the analyzer with the serial number of the parent directory.

File with USB tools, ☞ 7-67

6.2.3.13 Setup Data Logger

Setup..
Data Logger..

If the system is setup accordingly, the access code for level 3 must be entered to gain access to this menu.

Data logger	
Logging:	Off
Sample Time:	1 s
Data Logger Data Delete!	
Cached Entries	14
Total Entries	0
Export..	
Export data to USB!	

Enable (**On**) or disable (**Off**) data logging.

Specify data logging interval time.
Accepted values: **0 ... 30,000** s

Delete current set of logged data.
Note!
There is no undo for this procedure!

Number of records currently in RAM, not yet saved to the internal data logger file.
Note!
*Data is written to the internal file every 30 min, or the moment, "Logging" is turned **Off***

Total number of records in the internal data logger file.

Setup data logger export options
(☞ 6-106).

Export logged data to an USB device.
Note!
See left hand notes.

Notes!
Make sure, there´s a memory device connected!

If not yet present, the structure as shown on ☞ 6-104 is created on the stick, without formatting.

The log files can be found within the 'logs' directory, ☞ 6-104.

☞ 7-65 for detailed information on the content of logfiles.

6.2.3.13.1 Setup Data Logger Export

Setup..
Data Logger..
Export..

Export

Concentration:	Yes
Temperature:	No
Flow:	No
Pressure:	Yes
FieldSep:	TAB

Menu lines 1 ... 4:
Specify which data to be exported.
Available options: **Yes, No**

Select the field separator, separating the different data columns in the exported text file.
Available options: **TAB, Semikol, Comma**

6.2.3.14 Setup Event Logger

Setup..
Event Logger..

Note!
This menu is available only, if a valid software upgrade code has been purchased and entered (6-89). See the separate software options manual for more information on this menu.

6.2.3.15 Setup PLC

Setup..
PLC..

Note!
This menu is available only, if a valid software upgrade code has been purchased and entered (6-89). See the separate software options manual for more information on this menu.

6.2.3.16 Setup Calculator

Setup..
Calculator..

Note!
This menu is available only, if a valid software upgrade code has been purchased and entered (6-89). See the separate software options manual for more information on this menu.

6.2.4 Status Menu

Status..

Within this menu, select any submenu to see detailed information about related status.

Note!
Lines 1 to 4 conform with NAMUR status. If no status of a specific type is active (no message to show), the related menu line is hidden.

```
Failures..
OffSpecs..
Maintenance Requests..
Function Checks..
Measurement..
Calibration..
Alarms..
Operation Hours Meter..
Time                1/02/10 13:18
```

Failure status information (☞ 6-109)

Off-specs status information (☞ 6-109)

Maintenance request status information (☞ 6-110)

Function checks status information (☞ 6-110)

Measurement status information (☞ 6-111)

Calibration status information (☞ 6-116)

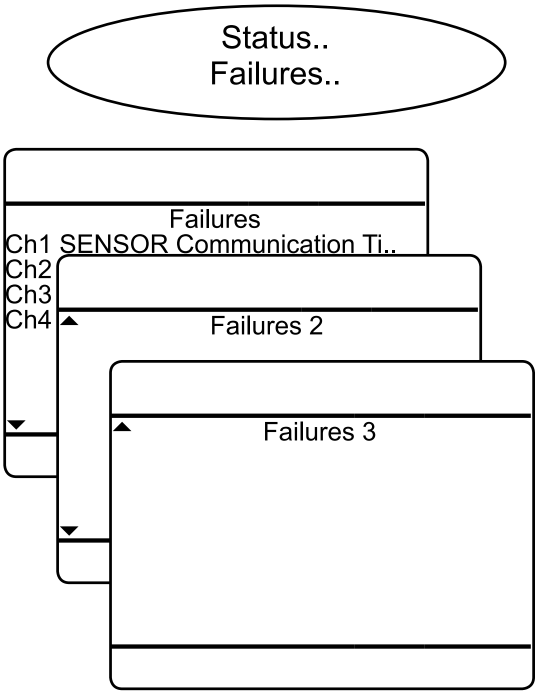
Alarms status information (☞ 6-119)

Operation hours information (☞ 6-121)

Current date & time

6.2.4 Status Menu

6.2.4.1 Status Menu Failures



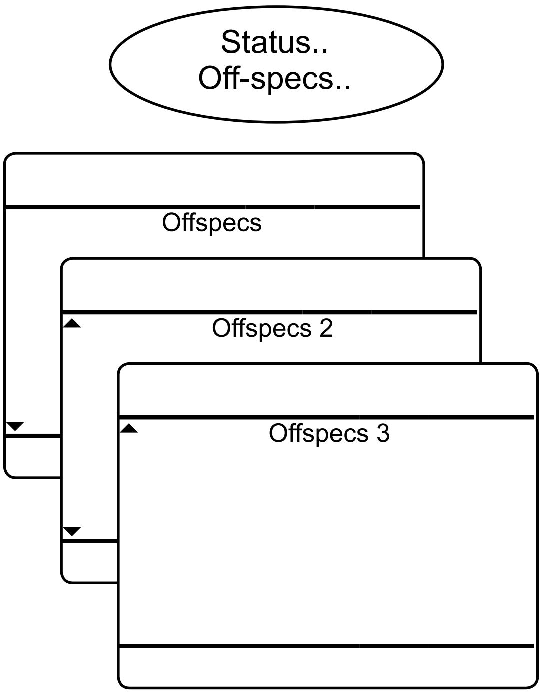
Up to 3 menu pages are prepared to show status messages of type 'Failure'.

Note!
If no failure is active (no message to show), this menu is hidden.

Messages starting with strings like 'Ch1' are channel related, while all others are analyzer related.

For a detailled description of messages, hints on causes of failures and recommended actions, chapter 8 'Troubleshooting'.

6.2.4.2 Status Menu Off-Specs



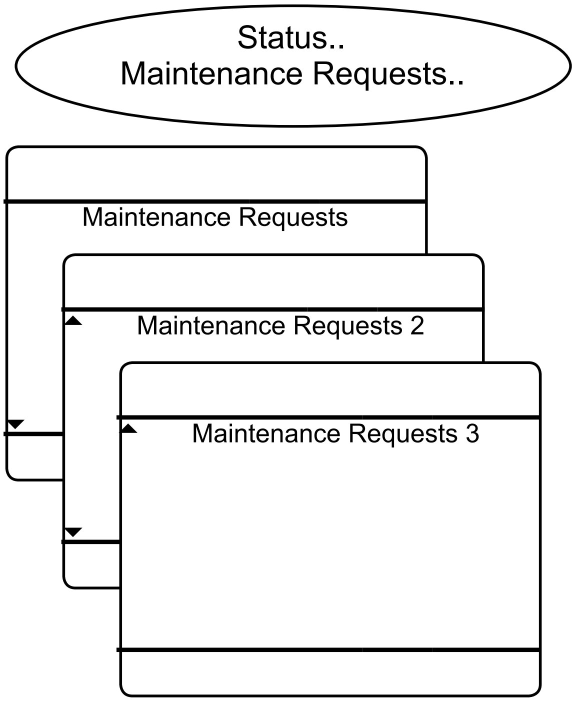
Up to 3 menu pages are prepared to show status messages of type 'Off-specs'.

Note!
If no off-spec is active (no message to show), this menu is hidden.

Messages starting with strings like 'Ch1' are channel related, while all others are analyzer related.

For a detailled description of messages, hints on causes of off-specs and recommended actions, chapter 8 'Troubleshooting'.

6.2.4.3 Status Menu Maintenance Requests



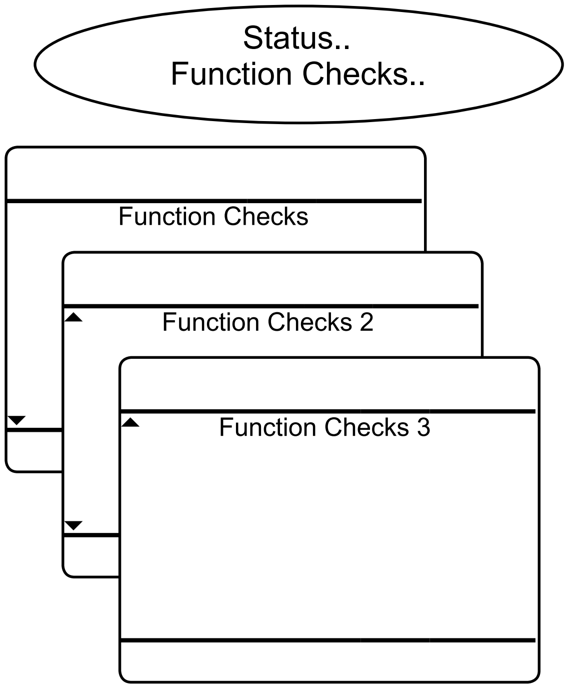
Up to 3 menu pages are prepared to show status messages of type 'Maintenance requests'.

Note!
If no maintenance request is active (no message to show), this menu is hidden.

Messages starting with strings like 'Ch1' are channel related, while all others are analyzer related.

For a detailled description of messages, hints on causes of maintenance requests and recommended actions, ☞ chapter 8 'Troubleshooting'.

6.2.4.4 Status Menu Function Checks



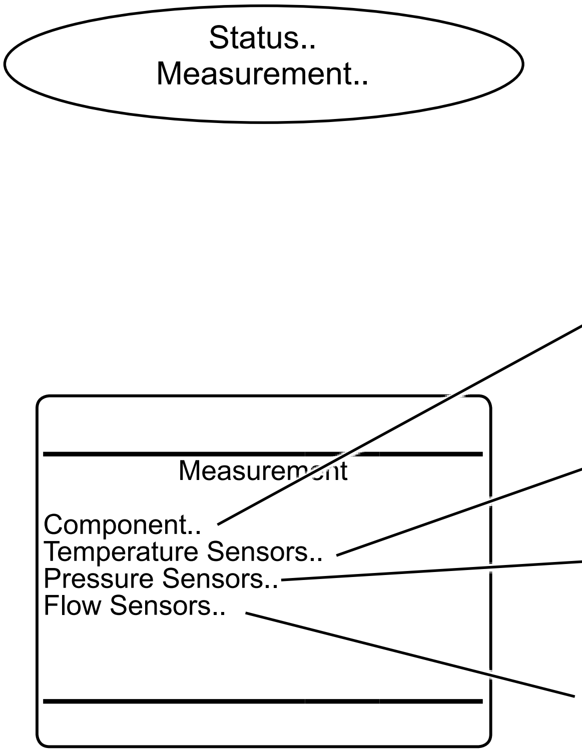
Up to 3 menu pages are prepared to show status messages of type 'Function check'.

Note!
If no function check is active (no message to show), this menu is hidden.

Messages starting with strings like 'Ch1' are channel related, while all others are analyzer related.

For a detailled description of messages, hints on causes of function check and recommended actions, ☞ chapter 8 'Troubleshooting'.

6.2.4.5 Status Menu Measurement



View status information on a specific component (☞ 6-112)

View status information on temperature sensors (☞ 6-114)

View status information on pressure sensors (☞ 6-115)

View status information on flow sensors (☞ 6-115)

6.2.4.5.1 Status Menu Component

Status..
Measurement..
Component..

Component ?

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

Ch1

Component

Raw Signal1	109518.000
Raw Signal2	54321.000
Raw Signal	2.016
Concentration	1,984 %
Current Range	Range 1
Statistics..	
Secondary Variables..	

Opens a submenu with measurement statistics for the selected channel; ☞ 6-113

Opens a submenu with information on secondary variables (pressure, flow, ...) of this channel; ☞ 6-114

Multi-channel unit:

Press LEFT *to enter SELECT COMPONENT, to view the status for another channel.*

6.2.4.5.1.1 Status Menu Component Statistics

Status..
Measurement..
Component..
Statistics..

```
Ch1
              Statistics
MinConc                   0.000 ppm
MinDate         7/7/2009 07:42:49
MaxConc                5000.000 ppm
MaxDate         8/7/2009 12:11:10

StdDev                      100 ppm
Start Date            1.1.10 10:00
Reset Statistics..
```

This menu page provides some statistical data for the selected component:

- Minimum and maximum measured concentrations, and the related date
- standard deviation of measured concentrations, and date when calculation started

To reset statistics below 

6.2.4.5.1.1.1 Status Menu Reset Statistics

Status..
Measurement..
Component..
Reset statistics..

If the system is setup accordingly, the access code for level 2 must be entered to gain access to this menu.

```
Ch1
          Reset Statistics

Reset Peak!

Reset StdDeviation!
```

Select, which statistic to reset.

Note!

There´s no undo for these functions!

6.2.4 Status Menu

6.2.4.5.1.2 Status Menu Secondary Variables

Status..
Measurement..
Component..
Secondary Variables..

Ch1	
Temperature	40.0 °C
Temp Status	Good
TempZComp	0.0 °C
TempSComp	0.0 °C
Pressure	1013 hPa
Pressure Status	Good
Flow	1.1 l/min
Flow Status	Good
Source Current	

This menu page provides some secondary measurement data for the selected component:

- Temperature, pressure and flow values
- Status of the related sensors
- Reference temperature for temperature compensation, separately for zero and span

Possible status values:
Good, Simulated, Failure, Absent

If the analyzer features an IR measurement, this line shows the IR source current.

6.2.4.5.2 Status Menu Temperature Sensors

Status..
Measurement..
Temperature Sensors..

Ch1	
Temperature Sensors 1of2	
DSP-T1	40.0 °C
Status	Installed
DSP-T2	0.0 °C
Status	Absent
DSP-T3	0.0 °C
Status	
DSP-T4	
▾Status	

Ch1	
▴Temperature Sensors 2of2	
AIN1	20.0 °C
Status	Installed
AIN2	0.0 °C
Status	Absent

View data for all possibly installed temperature sensors, provided in two lines each:

Each first line shows the temperature sensor and the currently measured value, followed by a related line showing the sensor status:

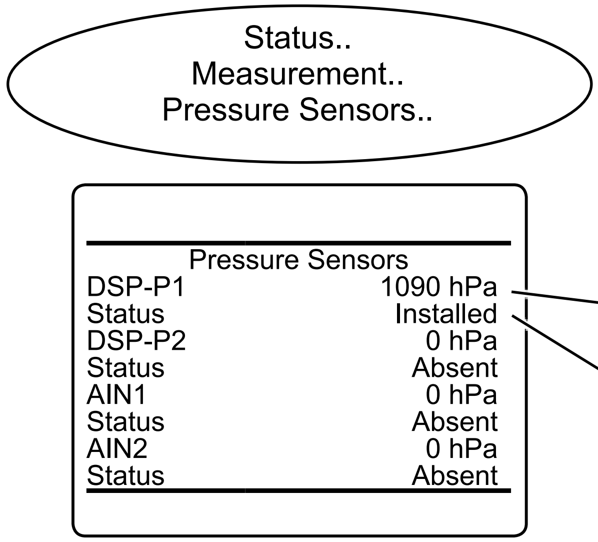
Sensor (possible values: **DSP-T1 ... -T4, AIN1, AIN2)** and current temperature.

Sensor status

Possible values: **Installed, Absent, Failure**.

6.2.4 Status Menu

6.2.4.5.3 Status Menu Pressure Sensors



View data for all possibly installed pressure sensors, provided in two lines each:

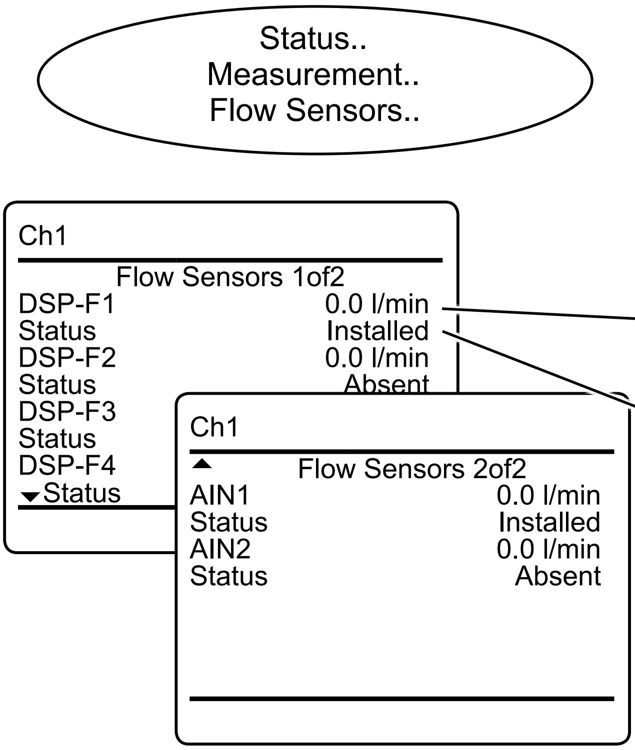
Each first line shows the pressure sensor and the currently measured value, followed by a related line showing the sensor status:

Sensor (possible values: **DSP-P1, DSP-P2, AIN1, AIN2)** and current pressure.

Sensor status

Possible values: **Installed, Absent, Failure**.

6.2.4.5.4 Status Menu Flow Sensors



View data for all possibly installed flow sensors, provided in two lines each:

Each first line shows the flow sensor and the currently measured value, followed by a related line showing the sensor status:

Sensor (possible values: **DSP-F1 ... -F4, AIN1, AIN2)** and current flow.

Sensor status

Possible values: **Installed, Absent, Failure**.

6.2.4 Status Menu

6.2.4.6 Status Menu Calibration

Status..
Calibration..

Enter this menu to view calibration status information.

Calibration

Component..

Next Automatic Calibrations..

View calibration data for a specific component 6-116.

Enter this menu to view scheduled dates for the next automatically performed calibrations; 6-118.

6.2.4.6.1 Status Menu Single Calibration

Status..
Calibration..
Component..

Component ?

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

Ch1

Single Calibration

Status..

Results..

View the calibration status for the current channel; 6-117.

View the calibration results for the current channel; 6-110.

Multi-channel unit:

Press LEFT to enter SELECT COMPONENT, to view the status for another channel.

6.2.4.6.1.1 Calibration Status Single Menu

Status..
Calibration..
Single Calibration..
Status..

This page provides calibration status information for the last calibration for the selected component.

Ch1

Calibration Status Single

CalibrStatus	Ready
Remaining Time	0 s
Concentration	0.000 ppm
Zero Gas	0.000 ppm
Span Gas	5000.000 ppm
Current Range	Range 1
Applied Gas	SampleGas

6.2.4.6.1.2 Calibration Results Single Menu

Status..
Calibration..
Single Calibration..
Results...

This page provides calibration results for the selected channel.

Ch1

Calibration Results Single

Zero Result	Success
Zero Date	7/7/2009
Span Result	Success
Span Date	7/7/2009
CalibrRanges	None

Deviations..

Calibration result deviations for the current channel; ☞ 6-118.

6.2.4 Status Menu

6.2.4.6.1.2.1 Calibration Results Single Deviations

Status..
Single Calibration..
Results..
Deviations..

This menu page provides calibration results for the selected channel.

Ch1

Deviations

ZeroDev	0.000 %
ZeroDev Total	0.000 %
SpanDev	0.000 %
SpanDev Total	0.000 %

6.2.4.6.2 Next Automatic Calibrations Menu

...
...
Next Automatic Calibrations..

Note!
This menu page is accessible from STATUS - CALIBRATION, and CONTROL - ADVANCED CALIBRATION.

This page provides information about scheduled automatic calibrations.

Next Automatic Calibrations

Zero All	4/15/10 14:30
Zero & Span All	--
Progr. Sequence	--
Blowback All	--

6.2.4.7 Status Menu Alarms

Status..
Alarms..

This menu lets you select from several alarm functions, to view detailed status information.

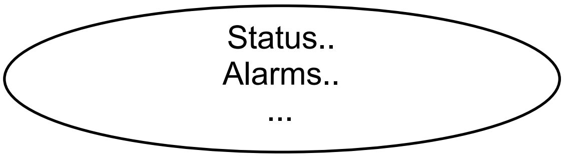
```
           Alarms

Concentration..
Conc Average..
Temperature..
Pressure..
Flow..
▼
```

The first menu page opens submenus for component (channel) related alarms, where you have so select the component of interest first, before gaining access to the detailed information.

```
▲         Alarms 2

Calculator A..
Calculator B..
Calculator C..
Calculator D..
```

The second menu page is available only, if the calculator option has been installed, and then enables to view related alarm status information.

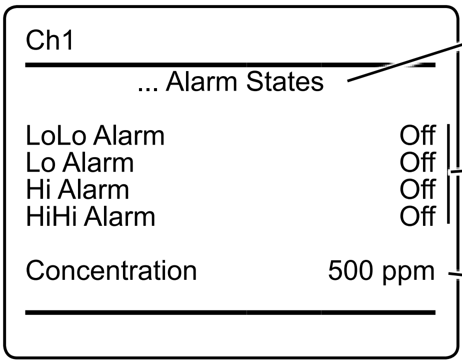
6.2.4.7.1 Alarms Status Details



All alarm status menus, accessible from STATUS - ALARMS (previous page), are designed in a similiar way to provide the information.

For submenus of the first STATUS - ALARMS menu page only:

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



'...' in the title is replaced by the text of the submenu line, selected in the previous menu, e.g. "*Concentration*"

These four menu lines show, if alarms are activated (**On**), or not (**Off**).

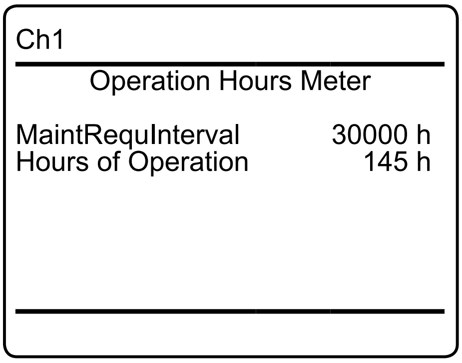
The last line shows the current value for the selected function, e.g. the currently measured concentration.

Multi-channel unit:

Press LEFT to enter SELECT COMPONENT, to view the status for another channel.

6.2.4.7.2 Operation Hours Status

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



Multi-channel unit:

Press LEFT *to enter SELECT COMPONENT, to view the status for another channel.*

6.2.5 Info Menu

Info..

Open this menu to view the most important information about your instrument at a glance.

Info	
Firmware	1.0
XSP Version	1.0
Serial no	123456789
Components..	
Installed Options..	
Ethernet1 IP	192.168.1.1
Ethernet2 IP	192.168.1.2
▼ Time	10/01/10 14:00

Enter this submenu to see how many measuring channels are installed; ☞ 6-123 .

Enter this submenu to see information about installed options; ☞ 6-124 .

▲ Data Logger	Off
Event Logger	Off
PLC Enabled	Yes
Calculator Enabled	No
Identification..	
LOI Firmware	V1.00 12.02.10
Phrase Version	EN 1.09
Time	10/01/10 10:00

Enter this submenu to see how the analyzer is identified, e.g. in a network; ☞ 6-125 .

6.2.5 Info Menu

6.2.5.1 Info Menu Components

Info..
Components..

Components

Channel1	Enabled
Channel2	Enabled
Channel3	Enabled
Channel4	Disabled
Channel5	Disabled
Measurement..	

Only measuring channels indicating **Enabled** are installed in the current analyzer.

See below for the measurement info menu

6.2.5.1.1 Info Menu Measurements

This menu shows the full scale limits.

Info..
Components..
Measurement..

Component ?

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

Measurement

RangeAbsMin	-10000 ppm
RangeAbsMax	10000000 ppm

Multi-channel unit:

Press LEFT to enter SELECT COMPONENT to change the settings for a different channel.

6.2.5 Info Menu

6.2.5.2 Info Menu Installed Options

Info..
Installed Options..

Installed Options	
Package	None
Valves	None
Pump	None
DIO#1 Installed	Yes
DIO#2 Installed	No
Anal. Outputs	4
AIN Installed	No

This menu indicates, if your analyzer features any of the listed options.

("*Package*" refers to the software upgrade options; ☞ 6-89).

6.2.5 Info Menu

6.2.5.3 Info Menu Identification

Info..
Identification..

Identification

System Tag	My Tag
Plant Name	My Plant
Customer	Me

Component Tags..

See how the instrument is identified.

6.2.5.3.1 Info Menu Component Tags

Info..
Identification..
Component Tags..

View channel and range tags for a selected component.

Component ?

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

Tags

Tag	Ch1
Range1 Tag	Ch1-R1
Range2 Tag	Ch1-R2
Range3 Tag	Ch1-R3
Range4 Tag	Ch1-R4

Multi-channel unit:

Press LEFT to enter SELECT COMPONENT to change the settings for a different channel.

6.2.6 Service Menu

Service..

Service

Europe..
North America..
Latin America..
Asia-Pacific..

Factory Setup..

This menu provides contact information about Emerson Process Management offices in several world regions (see below).

The factory setup menu is protected by access level 4 code, and intended to be used by special trained personnel (Emerson Process Management service) only!

Service information (exemplarly; see analyzer, or contact your sales office for latest data)

Europe

Emerson Process Management
GmbH & Co. OHG
Industriestr. 1
D-63594 Hasselroth
Germany
T +49(6055) 884-0
T +49(6055) 884-209

North America

Emerson Process Management
Rosemount Analytical Inc.
6565 P Davis Industrial Parkway
Solon, OH 44139
United States of America
T +1(440) 914-1261
F +1(440) 914-1262

Latin America

Emerson Process Management
Rosemount Analytical Inc.
11100 Brittmoore Park Road
Houston, TX 77041
United States of America
T +1(713) 467-6000
F +1(713) 827-3328

Asia-Pacific

Emerson Process Management
Asia Pacific Pte Ltd
1 Pandan Crescent
Singapore 128461
Singapore
T +65(6777) 8211
F +65(6777) 0947

Chapter 7
Maintenance and Other Procedures

7.1 Introduction

This chapter gives instructions not only for maintenance procedures, but also covers several procedures useful for properly operating the instruments.

Maintenance carried out on a regular basis ensures long-term efficiency of your EMERSON Process Management gas analyzer!

☞ page 7-2 for general information about maintenance procedures and intervals.

WARNING

ELECTRICAL SHOCK HAZARD

Live parts are accessible when working at open and powered instruments, and is subject to instructed and trained personnel only!

Take care to observe all applicable safety instructions!

For more detailled information about how to:

Perform a leak test	☞ page 7-4
Perform a calibration	☞ page 7-5
Replace an electrochemical oxygen sensor	☞ page 7-41
Clean the instrument´s outside	☞ page 7-51
Backup / restore configuration data sets	☞ page 7-52
Use log files	☞ page 7-62
Handle files on USB sticks	☞ page 7-66
Access the web browser interface	☞ page 7-68

7.2 General Maintenance Information

Intervals given in the following tables are based on standard operating conditions (ambient temperatures +10 ... +40 °C / +50 ... +104 °F; temperature changes < 10 K /hr).
Try cleaning contaminated components.
Replace components showing corrosion, or not passing inspections or tests!

Maintenance intervals must be shortened for differing operating conditions, and if aggressive gases are supplied.

Take care of special maintenance instructions in separate manuals for accessories or safety equipment, e.g. flame arrestors, infallible containments, etc.

If applicable, consider the manual addendums for instruments for hazardous areas!

Visual Inspections		
Component		**Interval**
Tubing, flexible	Leakage, embrittlement, contamination	Once a year
Tubing, stainless steel (SS)	Corrosion, contamination	
Pressure sensor, pressure switch, Flowmeter	Corrosion, leakage	
Pump	Fixed screws, swing free to move	
Valve block	Corrosion, leakage	
Flame arrestors	Corrosion, damages, firmly seated	
Field housings (IP 66 / NEMA 4X)	Corrosion, damages on enclosure and gaskets	
Field housings stopping plugs	Firmly seated	
Field housings cable glands	Firmly seated	

7.2 General Maintenance Information

Tests		
Component		**Interval**
Tubing, flexible	Leak Test	Once a year
Pressure sensor, pressure switch		
Valve block		
Pump diaphragm	Leak Test	After 5,000 hrs of operation (=208 days, if continuously operating)
Capillars	Pressure drop	Once a year
Flame arrestors	Pressure drop	See instructions in separate manual
Infallible containments	Several	See instructions in separate manual
RAW measuring values	Verify counts for zero gases *(decreasing counts may indicate contamination of optical components)*	Monthly, then quarterly *Acceptable values:* *photometer quotient: 1.0 ± 0.1* *NO, N_2O quotient: 1.0 ± 0.2* *pO_2, eO_2, TC: 0 ± 100,000 counts* *(for zero gas N_2)*

Replace Components Regularly	
Component	**Interval**
Filter, internal	Once a year, at least when contaminated
Filter, external	Several times a year, depending on process conditions

7.3 Performing a Leak Test

To achieve best and proper measuring results you must ensure the gas path system does not have leaks.
The following procedure describes how to perform a leak test with focus on the instrument.
The gas path system should be leak tested at least on a bimonthly basis and after maintenance, replacement or repair of gas path parts.
Note!
It is recommended to include external equipment (e.g. cooler, dust filters, etc.) into a leak test!

WARNING

HAZARD FROM GASES

Before opening gas paths they must be purged with ambient air or neutral gas (N2) to avoid hazards caused by toxic, flammable, explosive or harmful to health sample gas components!

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!

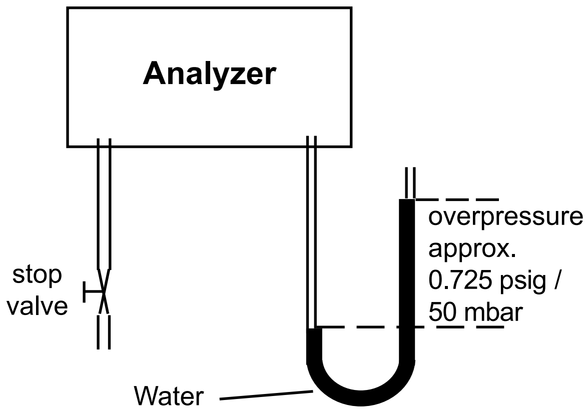


Fig. 7-1: *Leak Testing With U-Turn Manometer*

Max. pressure 7.25 psig (500 mbar)!
Multi channel instruments: Analyzers with parallel tubing require separate leak tests for each gas path !

7.4 Calibration Procedures

Note!
To achieve best and proper measuring results, it is recommended to perform zero and span calibrations on a regular weekly basis. Also a zero calibration must always precede a span calibration!

Zero calibration
To perform a zero calibration supply either nitrogen (N_2) or another suitable zero gas [conditioned ambient air or industrial air (NOT for oxygen measurement!)] to the gas path.

Span calibration
Supply span gases with concentrations of 80 % to 110 % of the upper measuring range limit to the gas path. Using lower concentrations may decrease accuracy when measuring above the span gas concentration!
If the oxygen concentration is known, ambient air may be used for an oxygen channel span calibration.

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.

Configuring and performing calibrations is important to ensure proper analyzer function. For this reason, several calibration related SETUP and CONTROL menus and their submenus can be protected by different access codes.

In the following sections this manual does not note when to enter access codes.

For information about which calibration related menus can be access code protected ☞ Chapter 6 - CONTROL menus, 6-5 and SETUP menus, 6-21.

7.4 Calibration Procedures

Before starting any calibration take care of the table below, and the following sections, describing general preparations for calibration procedures and how to perform such calibrations!

Furthermore you´ll find information about calibration gases setup: ☞ 7-7.

Type of Procedure	Menu Page (CONTROL -)	Valves	Simultaneously Calibrated Channels	More Information ☞
Manual calibration	ZERO CALIBRATION...	optional	single channel	page 7-17
	SPAN CALIBRATION...			
Advanced calibration	ADV.CALIBRATION - ZEROALL!	required	all channels	page 7-20
	ADV.CALIBRATION - SPANALL!			
	ADV.CALIBRATION - ZSCALALL!			
Remote calibration	n.a. (via Modbus or Dig IN)	recommended	all channels	page 7-32
Unattended calibration	n.a. (via interval time)	required	all channels	page 7-36

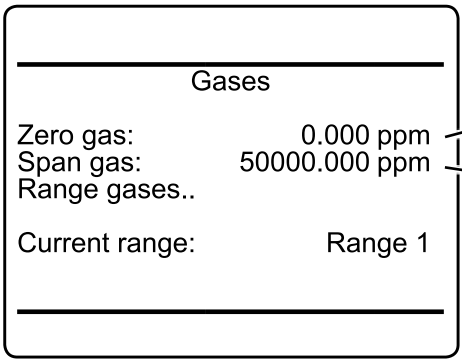
7.4.1 Preparing Calibrations

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

Starting from the MEASUREMENT SCREEN press DOWN to open the MAIN MENU, enter SETUP-CALIBRATION and directly enter GASES.

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

Note!
Within the following sections it is not always pointed out, where to enter access codes or select components!

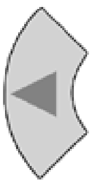


Enter the concentration value for the zero gas to be used during zero calibration.

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

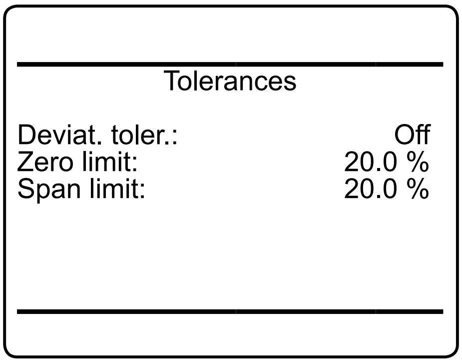
Note!
The units for the calibration gases are taken from the related entry in the display setup menu.

Multi-channel unit:
Press LEFT to enter SELECT COMPONENT to change the settings for a different channel.



When done, press LEFT to return to CALIBRATION.

7.4.1 Preparing Calibrations



Example:
Measuring range: 0 ... 50 %
Zero gas: 0 %
Span gas: 50 %
Tolerance limits: 20.0 % (see figure above)
Situation:
Due to a fault zero gas is supplied to carry out a span calibration, instead of span gas.
Deviat. toler. check disabled (Off):
The analyzer calibrates the span with the wrong gas resulting in an analyzer out of tune.
Deviat. toler. check enabled (On):
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 the value specified, from the upper measuring range limit.

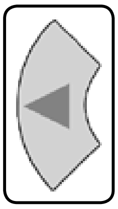
Next enter TOLERANCES:
By default the option '*Deviat.toler.*' (deviation tolerance check) is disabled (**Off**).

With deviation tolerance check enabled (**On**), during calibration the analyzer compares the currently measured concentration to the expected value, as setup in the GASES menu. If the measured concentration differs from the expected values by more than the percentage of measuring range, given in the menu lines 2&3, calibration is aborted and a maintenance request alarm is set (symbol, message and optional relay output).
Resetting the alarm requires to perform a valid calibration, or to confirm it within CONTROL - ACKNOWLEDGEMENTS.
So, tolerance check helps avoiding calibrating with a wrong gas (e.g. starting a span calibration while zero gas is flowing), resulting in an instrument out of tune (see example to the left side).

There are situations, when deviation tolerance check **must** be disabled, e.g. during first time calibration after changing the span gas concentration. In this cases select **Off**.

Note!
Unacknowledged maintenance requests are stored even if the instrument is switched off and on again!
In addition: If, for example, a calibration was aborted because of a tolerance check, the maintenance request is active. If the operator does not acknowledge the request and performs a new calibration, now with disabled tolerance check, the earlier maintenance request is stored and re-activated again, when the tolerance check is enabled somewhere in the future!

7.4.1 Preparing Calibrations



When done, press *LEFT* several times to return to SETUP:
If you use analog output signals, you may want to check or setup, how the analog signals proceeds during calibrations.

Analog outputs

Output1..
Output2..
Output3..
Output4..
Output5..

To do so, enter IN-/OUTPUTS - ANALOG OUTPUTS and enter the submenu of your analog output:

Signal:	0
Out range:	0-20 mA
LowScale:	0.00
MaxScale:	100.00
Auto scale:	Yes
Fail mode:	Live
0/4 mA:	0.00
20 mA:	100.00
Hold:	No

The menu to the left shows up, where the last line parameter specifies the behaviour during calibrations:
When "*Hold*" is set to **Yes**,

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

When set to **No**,

- the analog output signal always corresponds to the actual measured value during calibration; this may trigger alarms when limits are exceeded.
  Note!
  This behaviour may be undesireable if e.g. the unit is connected to a data acquisition system.

Setup this parameter in a way to serve your needs.

If you do not intend to carry out valve supported calibrations, continue with ☞ 7-17.

7.4.1 Preparing Calibrations

7.4.1.1 Valve Assignment for Valve Supported Calibrations

As described earlier, several calibration procedures require installed internal and/or external valves.
In addition this requires all requested calibration gases to be connected to the valves and the valves to be software assigned to the gases.

Why is assigning valves required?
For such calibrations the analyzer controls the gas flow and therefore needs to 'know' about the different valve functions - this is done by valve assignment.
In addition variable valve assignment allows to use one valve for different functions.

Example:

- *Dual channel analyzer for measuring CO and CO_2.*
- *Span gases are CO and CO_2 , zero gas for both channels is N_2.*

Without *variable assignment one would need to zero span channel 1 separately from channel 2. Taking into account the purge times before a calibration calculation starts, to ensure the measuring cells are filled with calibration gas, the whole procedure would take a quite long time.*

With *variable valve assignment the operator can specify e.g. the valve V1 to be the zero gas valve for channel 1 AND channel 2.*
Now, when starting a zero calibration, the analyzer calculates the zero values for both channels at a time!

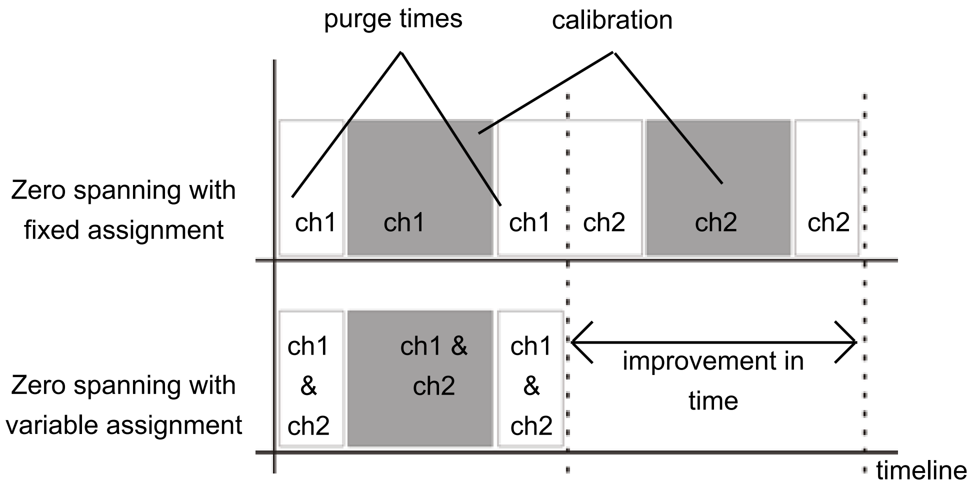
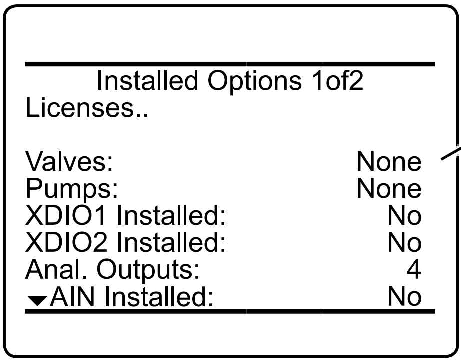


Fig. 7-2: *Calibration Improvement by Variable Valve Assignments*

7.4.1 Preparing a Calibration

Before starting to assign valves to gases and channels, you need to check if valves are supported:



Open SETUP - INSTALLED OPTIONS and check the *"Valves:"* line.
Available options:
None: Valves are not supported
Internal: Open INTSHS (☞ 7-12) to assign internal valves.
External: Open DIGITAL OUTPUTS (☞ 7-13) to assign external valves.
Int+Ext: Open both, INTSHS (☞ 7-120) and DIGITAL OUTPUTS (☞ 7-12) to assign internal and external valves.

7.4.1.1.1 Internal Valve Assignment

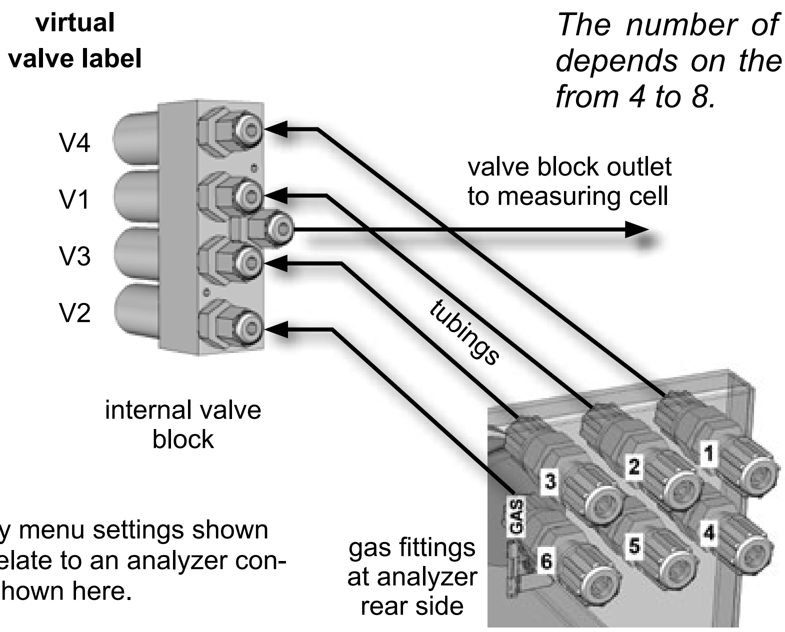
If your analyzer provides internal valves, at first open SETUP - IN-/OUTPUTS - INTERNAL SHS to assign the valves to the gas inlets:

Internal SHS (1of2)	
Gas1 Signal:	V4
Gas2 Signal:	V1
Gas3 Signal:	V3
Gas4 Signal:	Off
Gas5 Signal:	Off
Gas6 Signal:	V2
Gas7 Signal:	Off
▾Gas8 Signal:	Off

This menu allows to configure the optional internal valves for routing gas.

Each available analyzer gas inlet (*"Gas1 Signal ... Gas8 Signal"*) with a valve connected is assigned a virtual valve label (**V1...V8**). (If the components have been installed in the factory, the configuration is already setup).

Notes!
If already factory setup, changing the configuration could result in inproper operation!
Depending on the analyzer model, 1 or 2 valve blocks with up to 4 or 8 valves can be installed.
The number of available gas connections depends on the analyzer model and varies from 4 to 8.



The exemplary menu settings shown above could relate to an analyzer configuration as shown here.

Fig. 7-3: *Internal Valves Assignments*

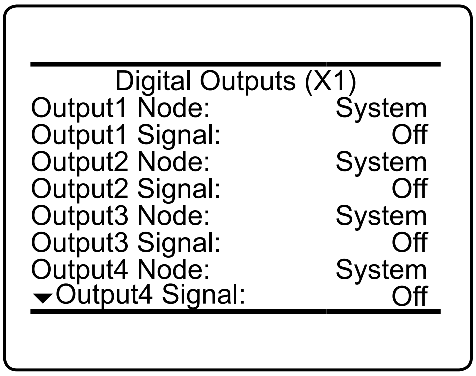
The next step is to assign the **internal valves** to the channels. If there are no **external** valves to be controlled by your analyzer, continue with ☞ 7-15.

7.4.1 Preparing a Calibration

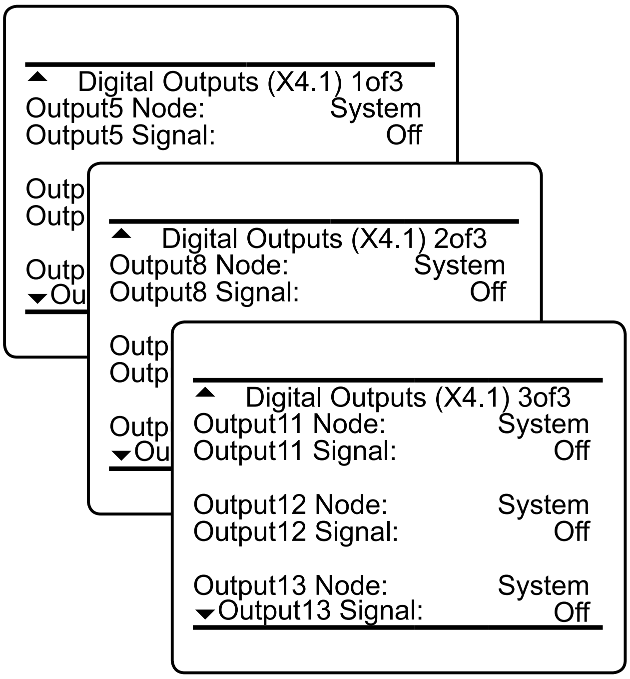
7.4.1.1.2 External Valve to Digital Output Assignment

Setup..
In-/Outputs..
Digital Outputs..

If your analyzer has to control external valves, at first check if all valves required for calibration are connected to digital outputs.
Then open SETUP - IN/OUTPUTS - DIGITAL OUTPUTS, to software assign the valves to the outputs:



This menu configures the digital outputs: All outputs (default and optional) support the same range of signals/functions. Outputs 1 to 4 are available in every unit, and by default setup to provide NAMUR signals (see figures to the left).



Further pages are indicated by a down arrow (▼), only when at least one extension card (outputs 5 - 13) is installed:

Outputs 5 - 13 are present on the first extension card,labelled X4.1 (outputs 9 to 13 setup on separate menu pages are not shown in this example).
Note!
Depending on the analyzer model, 1 or 2 Digital I/O extension cards can be installed.

Verify which digital outputs are connected to control your external valves, and how the valves are labelled.
Next enter the menu page, showing these outputs, and for each output select **System** in the line "*Output*n *Node*" (where "n" is replaced by the output number).
Finally for each output setup the valve's label.

```
▲  Digital Outputs (X4.1) 1of3
Output5 Node:            System
Output5 Signal:              V5

Output6 Node:            System
Output6 Signal:              V6

Output7 Node:            System
▼Output7 Signal:             V7
```

Example:
For our example we assume, that the analyzer controls 4 internal and 3 external valves:

- *Internal valves are connected as shown in fig. 7-3.*
- *3 external valves are labelled V5 ... V7, and connected to digital outputs 5 .. 7*

For this to be setup, enter the second page of the Digital Outputs menu, and for each output 5 ... 7

- *select* ***System*** *for the "...* Node*"*
- *select the label of the connected valve (**V5, V6** or **V7**) for the "...*Signal*", as shown in the lefthand figure.*

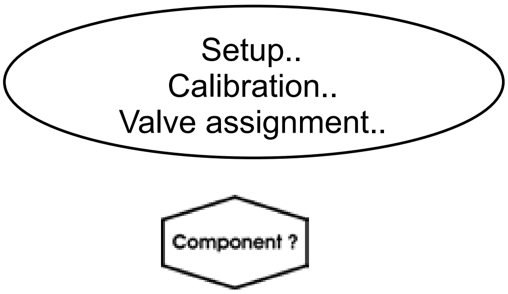
The next step is to assign the valves to the channels: Continue with ☞ 7-15.

7.4.1.1.3 Calibration Valve Assignment

For each channel a valve has to be assigned zero gas valve or span gas valve, whereat the valves can be freely assigned to any channel. This includes:

- selecting the same combination for all channels
- selecting combinations where one valve has the same function for several channels
- selecting combinations where one valve has different functions for several channels, e.g. the channel 1 zero valve is the channel 2 span valve.

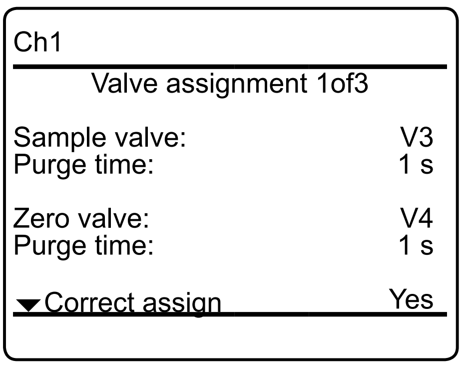
Depending on the gases used, this may allow higher calibration performance.



To do so, enter SETUP - CALIBRATION - VALVE ASSIGNMENT:

Multi-channel unit:
Select the component to be set in SELECT COMPONENT.

Note!
The selected channel is indicated in the uppermost display line!



On the first menu page, configure the sample and zero valves to be used for the selected channel with their individual purge times (this is the time needed to completely fill the cell with the gas, after the valve is activated. If the calibration is started earlier, the gas lines will still contain other components and the calibration will be inaccurate.).

"*Correct assign*" indicates, if the current assignment is correct (**Yes**), or not (**No**).

7.4.1 Preparing a Calibration

Ch1	
▲ Valve assignment 2of3	
Span1 valve:	V1
Purge time:	1 s
Span2 valve:	None
Purge time:	0 s
Span3 valve:	None
Purge time:	0 s
Span4 valve:	None
▼Purge time:	0 s

Now open the next menu to assign up to 4 span gas valves to the selected channel: one for each range.

Note!
Depending on the gas analyzer and SHS configuration, is may be possible to assign a specific valve to multiple ranges.

Again, don´t forget to specify the individual purge times.

Ch1	
▲ Valve assignment 3of3	
Blowback valve:	None
Purge time:	0 s

On the 3rd menu page, assign a blowback valve for the selected channel, if such is installed.

Note!
*To check, if entries, made on menu pages 2 & 3 are correct, go back to menu 1 and check "*Correct assign*".*

Multi-channel unit:
On menu 1, press LEFT to open SELECT COMPONENT to change the settings for a different channel.

7.4.2 Manual Calibration

Control..

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

```
Zero calibration..
Span calibration..
Advanced calibration..
Apply gas..
Lock menus!
Acknowledgements
Pump 1:                    Off
Pump 2:                    Off
▼Ranges..
```

To start a zero calibration select the first line:

7.4.2.1 Manual Zero Calibration

Component ?

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

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

Supply all calibration gases with the same flow as the sample gas (recommeded approx. 1 l/min), pressureless and utilizing the correct gas fitting (sect. 3.4).

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!

```
Ch1
        Zero calibration
Cancel!
Start!
Zero gas              0.000 ppm
Concentration         0.000 ppm
Flow                   0.00 l/min
Status..
Results..
Restore!
```

The first line gives you the choice to cancel the procedure now.
Select the second line to **start the calibration**.

7.4.2 Manual Calibration

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

Ch1	
Calibration status single	
Cancel!	
Calibr.status	Ready
Remaining time	0 s
Concentration	0.000 ppm
Zero gas	0.000 ppm
Span gas	5000.000 ppm
Current range	Range 1
Applied gas	Sample gas

"*Status..*" opens a new screen with enhanced calibration information about the current channel (indicated in the uppermost display line).

Ch1	
Calibration results single	
Zero result	Success
Zero date	31/01/2009
Soan result	Success
Span date	31/01/2009-
Calibr. ranges	None
Deviations..	

"*Results..*" opens a new screen with results of earlier calibrations (see left side).

Within this screen, *"Deviations.."* enables to open another screen, showing the last and and the summary of all deviations of earlier calibrations.

Deviations	
ZeroDev.	0.000 ppm
ZeroDev. total	0.000 ppm
SpanDev.	0.000 ppm
SpanDev. total	0.000 ppm

When finished press *LEFT* several times to return to **either**
SELECT COMPONENT (multi channel analyzer only), to perform a zero calibration for another channel,
or
to CONTROL, where you may start a span calibration. The procedure and screens look similiar to those of a zero calibration:

7.4.2 Manual Calibration

7.4.2.2 Manual Span Calibration

```
Zero calibration..
Span calibration..
Advanced calibration..
Apply gas..
Lock menus!
Acknowledgements
Pump 1:                    Off
Pump 2:                    Off
▼Ranges..
```

Select *"Span calibration.."*

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

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

```
       Span calibration
Cancel!
Start!
Span gas             0.000 ppm
Concentration        0.000 ppm
Flow                 0.00 l/min
Status..
Results..
Restore!
```

Span calibration offers the same options as Zero calibration, so for a detailled description ☞ 7-17.

When finished, press *LEFT* several times to return to SELECT COMPONENT (multi channel analyzer only), to perform a span calibration for another channel,
or
press *HOME* to return to the MEASUREMENT SCREEN, to finish with manual calibration procedures.

7.4.3 Advanced Calibration

Standard manual calibration procedures offer limited funtionality:
To zero and span calibrate a multi channel instrument the operator has to manually start 2 procedures per channel in proper sequence. In addition he has to stay at the instrument to see when the one sequence has finished and to start the following.
The same is applicable for a single channel instrument, when the operator wants to perform both zero and span calibrations.

To improve even manual calibration procedures, X-STREAM analyzers offer a new ADVANCED CALIBRATION menu: It allows single key activation for

- zero calibration of all channels of an analyzer
- span calibration of all channels of an analyzer
- zero **and** span calibration of all channels of an analyzer

(Although advanced calibration offers most advantages for multi channel instruments, it may be used for single channel analyzers as well, that is to activate zero **and** span calibration for the one channel by a single key press.)

The only precondition for making use of this new feature is to have internal and/or external valves installed and properly assigned (☞ 7-10).

For a description of how to perform

all channel zero calibrations	☞	page 7-21
all channel span calibrations	☞	page 7-24
all channel zero & span calibrations	☞	page 7-27

7.4.3 Advanced Calibration

7.4.3.1 Zero All Calibration

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

Supply all calibration gases with the same flow as the sample gas (recommeded approx. 1 l/min), pressureless and utilizing the correct gas fitting (☞ sect. 3.4).

Make sure the purge time is set to a value ensuring the measuring cell is filled properly with the related calibration gas after the valve has opened!

Ensure the warmup time after switching on has elapsed! Warmup time is 15 to 50 minutes depending on installed measuring system and configuration!

The procedure starts with the first channel´s zero valve, checks if other channel use the same zero valve, then in parallel zeroes all these channels and then selects the next zero valve. ☞ Fig. 7-4 on 7-23 for a procedure flow diagram.

Control..
Advanced Calibration..

Starting from the MEASUREMENT SCREEN press *ENTER* to open the MAIN MENU and enter CONTROL - ADVANCED CALIBRATION.

Advanced calibration 1of2
Cancel!
Zero&span single..
Zero all!
Span all!
Zero&span all!
Programmed sequence!
Blowback!

To start a zero calibration for ALL channels select the 3rd line.

Note!
Single channel analyzers show the same menu, with the restriction, that the term `all` relates to the single channel only!

7.4.3 Advanced Calibration

The analyzer immediately begins zero calibration(s), showing the CALIBRATION STATUS SUMMARY screen.

"*Current action"* indicates, what currently is carried out (**purging, zeroing, ready**)
"Action detail" shows the current procedure, or **Off**
"*Current duration"* gives the remaining time for the current procedure
"*Prev. duration"* shows the time elapsed since start of procedure
"*Current step"* gives information about the step currently carried out.

Calibration Status Summary	
Calibration Status Single..	
Current Action	Ready
Action Detail	Off
Current Duration	0 s
Prev. Duration	0 s
Current Step	0

To see a detailled calibration status for a single channel, enter CALIBRATION STATUS SINGLE,

Multi-channel unit:
Select the channel in SELECT COMPONENT.

Ch1	
Calibration status single	
Cancel!	
Calibr.status	Ready
Remaining time	0 s
Concentration	0.000 ppm
Zero gas	0.000 ppm
Span gas	5000.000 ppm
Current range	Range 1
Applied gas	Zero gas

to open the status screen with enhanced calibration information about the current channel (indicated in the uppermost display line), including
remaining calibration time, currently measured concentration, setup of zero & span gas concentrations and currently calibrated range (only valid for span calibrations).

The procedure has finished when *"Applied gas"* shows **Sample gas**, or *"Current action"* in the previous screen says **Ready**.

Press *HOME* to return to the MEASUREMENT SCREEN.

7.4.3 Advanced Calibration

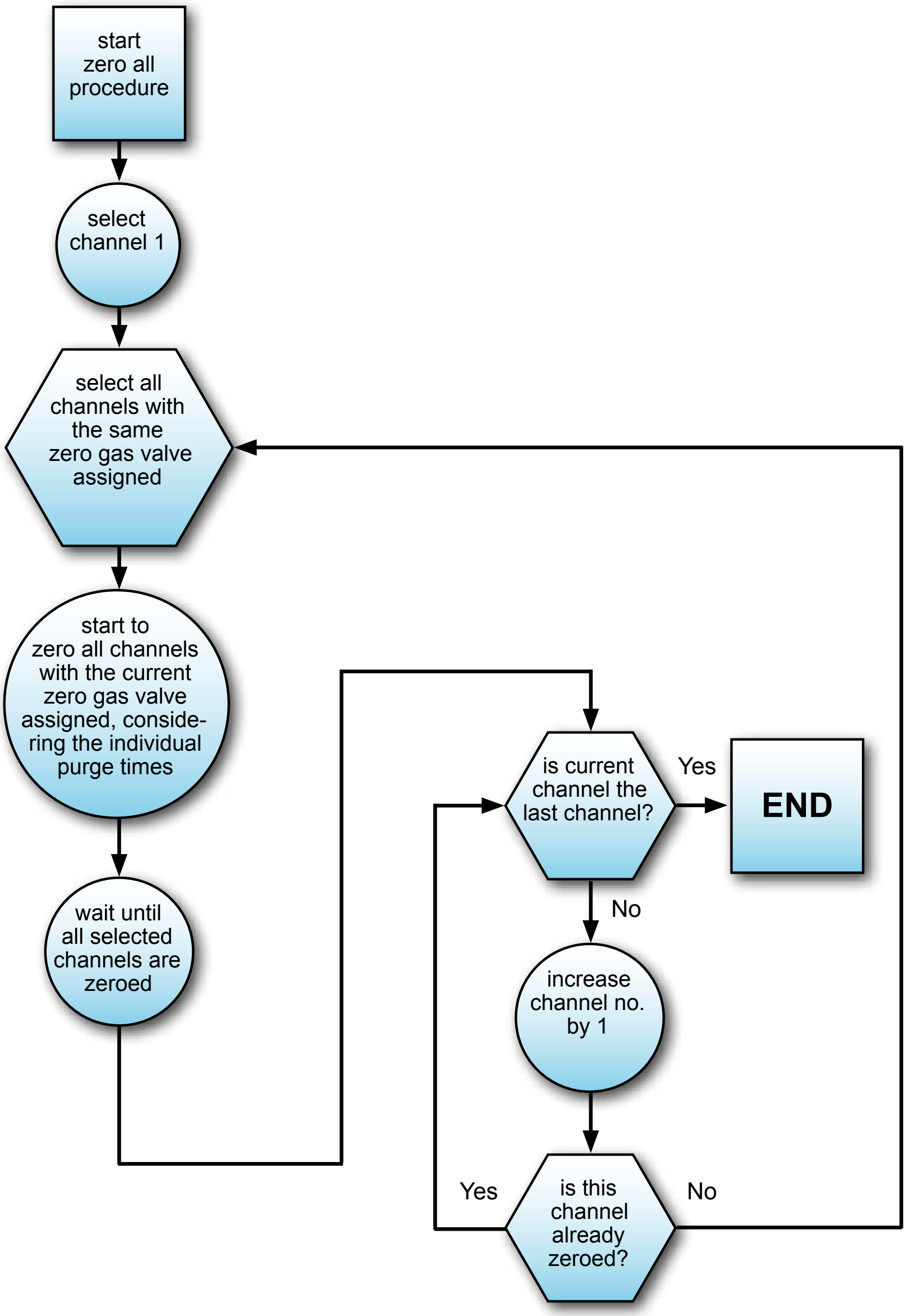


Fig. 7-4: *Zero All Calibration Procedure Flow Diagram*

7.4.3 Advanced Calibration

7.4.3.2 Span All Calibrations

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

Supply all calibration gases with the same flow as the sample gas (recommeded approx. 1 l/min), pressureless and utilizing the correct gas fitting (sect. 3.4).

Make sure the purge time is set to a value ensuring the measuring cell is filled properly with the related calibration gas after the valve has opened!

Ensure the warmup time after switching on has elapsed! Warmup time is 15 to 50 minutes depending on installed measuring system and configuration!

Control..
Advanced Calibration..

Starting from the MEASUREMENT SCREEN press *ENTER* to open the MAIN MENU and enter CONTROL - ADVANCED CALIBRATION.

```
     Advanced calibration 1of2
Cancel!
Zero&span single..
Zero all!
Span all!
Zero&span all!
Programmed sequence!
Blowback!
▼
```

To start a SPAN calibration for ALL channels select the 4th line.
7-30 for notes on span calibrating channels with multiple ranges!

Notes!
Perform zero calibrations before initiating span calibrations
Single channel analyzers show the same menu, with the restriction, that the term `all` relates to the single channel only!

The procedure starts with the first channel´s span valve, checks if other channel use the same span valve, then in parallel spans all these channels, and then selects the next span valve. Fig. 7-5 on 7-26 for a procedure flow diagram.

7.4.3 Advanced Calibration

Calibration status summary	
Cancel!	
Calibration status single..	
Current action	Ready
Action detail	Ch2
Current duration	0 s
Prev. duration	0 s
Current Step	0

The analyzer immediately begins span calibration(s), showing the CALIBRATION STATUS SUMMARY screen.

Press *ENTER* in the first line to cancel the current calibration

"*Current action*" indicates, what currently is carried out (**purging, zeroing, ready**)

"Action detail" shows the current procedure, or **Off**

"*Current duration*" gives the remaining time for the current procedure

"*Prev. duration*" shows the time elapsed since start of procedure

"*Current step*" gives information about the step currently carried out.

To see a detailled calibration status for a single channel, enter CALIBRATION STATUS SINGLE,

Multi-channel unit:
Select the channel in SELECT COMPONENT.

Ch1	
Calibration status single	
Cancel!	
Calibr.status	Ready
Remaining time	0 s
Concentration	0.000 ppm
Zero gas	0.000 ppm
Span gas	5000.000 ppm
Current range	Range 1
Applied gas	Zero gas

to open the status screen with enhanced calibration information about the current channel (indicated in the uppermost display line), including remaining calibration time, currently measured concentration, setup of zero & span gas concentrations and currently calibrated range.

The procedure has finished when '*Applied gas*' shows **Sample gas**, or "*Current action*" in the previous screen says **Ready**.

Press *HOME* to return to the MEASUREMENT SCREEN.

7.4.3 Advanced Calibration

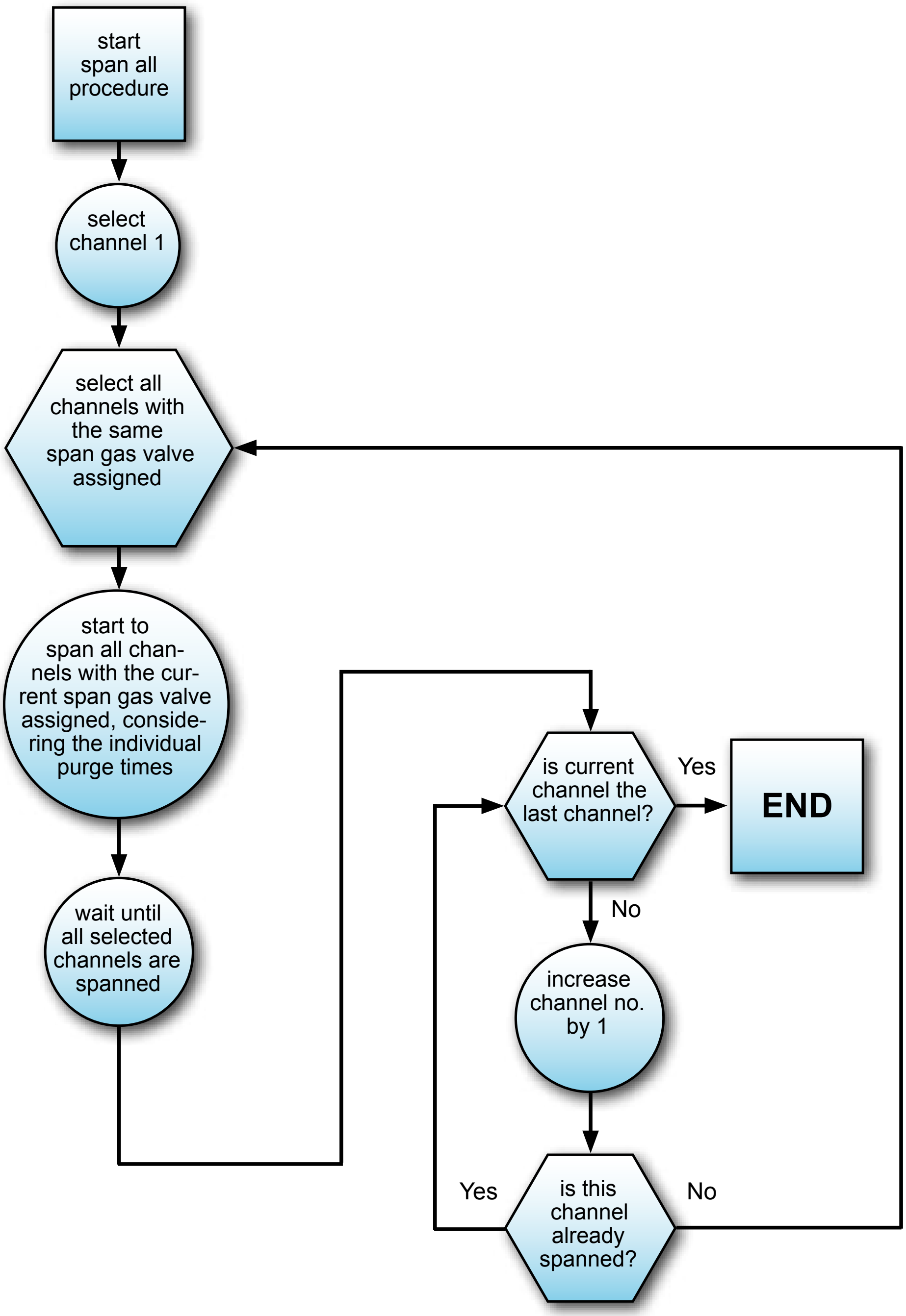


Fig. 7-5: *Span All Calibration Procedure Flow Diagram*

7.4.3.3 Zero&Span All Calibration

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

Supply all calibration gases with the same flow as the sample gas (recommeded approx. 1 l/min), pressureless and utilizing the correct gas fitting (sect. 3-4).

Make sure the calibration purge time is set to a value ensuring the measuring cell is filled properly with the related calibration gas after the valve has opened!

Ensure the warmup time after switching on has elapsed! Warmup time is 15 to 50 minutes depending on installed measuring system and configuration!

This procedure is a combination of the two described before, with an important deviation: If a selected zero gas valve is also assigned span gas valve for an already zeroed channel, this channel is spanned, while others are zeroed in parallel (Fig. 7-6 on 7-28 for a procedure flow diagram).

Control..
Advanced Calibration..

Starting from the MEASUREMENT SCREEN press *ENTER* to open the MAIN MENU and enter CONTROL - ADVANCED CALIBRATION.

Advanced calibration 1of2
Cancel!
Zero&span single..
Zero all!
Span all!
Zero&span all!
Programmed sequence!
Blowback!

To start a ZERO & SPAN calibration for ALL channels select the 5th line.
7-30 for notes on span calibrating channels with multiple ranges!

Notes!
Single channel analyzers show the same menu, with the restriction, that the term `all` relates to the single channel only!

7.4.3 Advanced Calibration

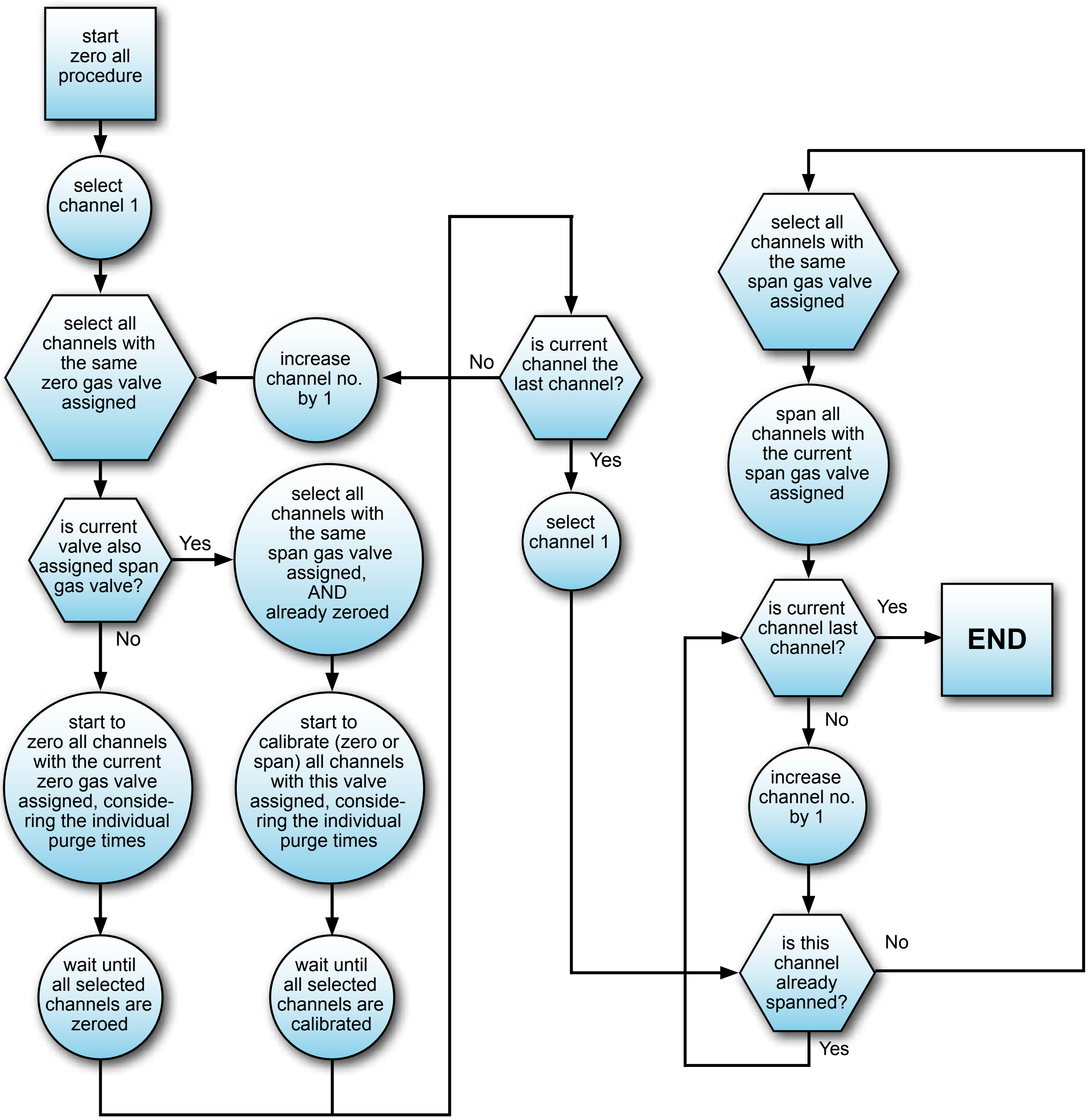


Fig. 7-6: Zero&Span All Calibration Procedure Flow Diagram

7.4.3 Advanced Calibration

The analyzer immediately begins to calibrate, showing the CALIBRATION STATUS SUMMARY screen.

Calibration status summary	
Calibration status single..	
Current action	Ready
Action detail	Ch2
Current duration	0 s
Prev. duration	0 s
Current Step	0

"*Current action"* indicates, what currently is carried out (**purging, zeroing, spanning, ready**)
"*Action detail"* shows the channel currently calibrated
"*Current duration*" gives the remaining time for the current procedure
"*Prev. duration*" shows the time elapsed since start of procedure

To see a detailled calibration status for a single channel, enter CALIBRATION STATUS SINGLE,

Component ?

Multi-channel unit:
Select the channel in SELECT COMPONENT.

Ch1	
Calibration status single	
Cancel!	
Calibr.status	Ready
Remaining time	0 s
Concentration	0.000 ppm
Zero gas	0.000 ppm
Span gas	5000.000 ppm
Current range	Range 1
Applied gas	Zero gas

to open the status screen with enhanced calibration information about the current channel (indicated in the uppermost display line), including
remaining calibration time, currently measured concentration, setup of zero & span gas concentrations and currently calibrated range.

The procedure has finished when "*Applied gas"* shows **Sample gas**, or "*Current action*" in the previous screen says **Ready**.

Press *HOME* to return to the MEASUREMENT SCREEN.

7.4.3.4 Notes on Span Calibrating Channels With Multiple Ranges

X-STREAM XE series gas analyzers support up to 4 ranges per measuring channel (☞ 6-44).
For valve supported calibrations, each range can be assigned an individual span gas valve (☞ 6-37 and figure to the left).

```
Ch1
▲        Valve assignment 2of3
Span1 valve:                 V1
Purge time:                 1 s
Span2 valve:                 V1
Purge time:                 5 s
Span3 valve:                 V4
Purge time:                 5 s
Span4 valve:                 V4
▼Purge time:                2 s
```

During calibrations, ranges are considered in a special way:

- Ranges not assigned a span gas valve are disregarded for span procedures.
- The main order of span calibrations is based on ascending order of channels: Firstly the channel 1 valves are selected in ascending order, then the (not yet used) valves of channel 2, etc., considering the next two conditions, saving time and gas consumption:
  - Ranges of the same channel with the same valve assigned: Only one range is span calibrated, and the resulting data is copied into the other range.
  - Ranges of different channels with the same valve assigned are calibrated in parallel, considering the individual purge times.

Note!
Except for copied data, all calibration steps can be reviewed in the event logger file.

Example:
Span gas valves configuration

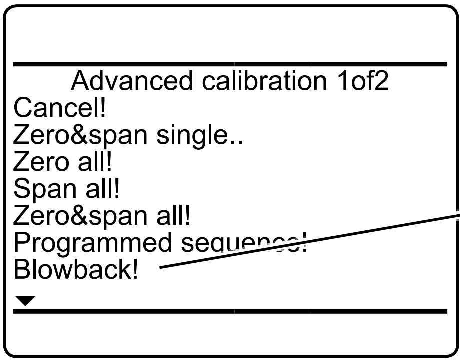
Channel	*Range 1*	*Range 2*	*Range 3*	*Range 4*
1	*V1*	*V1*	*V4*	*V4*
2	*V1*	*V2*	*V4*	*V4*
3	*V4*	*V2*	*V5*	*--*
4	*V5*	*V5*	*V5*	*V5*

Resulting span calibration procedure, focusing on handling of ranges

Step	***Valve***	***Calibrated channel / range (C**n **/ R**n**)***				
1	*V1*	*Ch1 / R1*	*Ch 1 / R2 (R1 data copied)*	*Ch2 / R1*		
2	*V4*	*Ch1 / R3*	*Ch1 / R4 (R3 data copied)*	*Ch2 / R3*	*Ch2 / R4 (R3 data copied)*	Ch3 / R2
3	*V2*	*Ch2 / R2*	*Ch3 / R2*			
4	*V5*	*Ch3 / R3*	*Ch4 / R1*	*(Ch4 / R1 data copied to all remaining Ch4 ranges)*		

7.4.3 Advanced Calibration

7.4.3.5 Blowback



From ADVANCED CALIBRATION you may also start a blowback procedure:
Press *ENTER* in this line to .
While the procedure is active, a "Function executing" message appears.

7.4.4 Remote Calibration

Remote calibrations may be initialized by digital inputs or Modbus commands, whereas both offer different functionalities:

Remote calibration via **digital inputs** (option) is feasible only in combination with internal or external valves and is limited to 3 procedures, to be assigned to any digital input:

- Zero calibrate all channels (Zero all),
- span calibrate all channels (SpanAll) and
- zero & span calibrate all channels (Zero & span all).

Note!
By activating span calibrations, it is the operators responsibility to not perform a span calibration without a preceding zero calibration!

The **Modbus interface** offers more variability in performing calibrations:

- *Calibration without valves*:
  The Modbus command initializes the procedure within the analyzer, but the operator has to take care that the gases are supplied in proper order, has to consider purge times as well as the condition to not perform a span calibration without a preceding zero calibration. So, in this configuration Modbus may be used e.g. together with an external sample handling system that controls the gas flow.
- *Calibration with valves*:
  Installed and assigned valves (☞ 7-10) support two different variations of how to perform calibrations:
  1. Perform single calibrations
     The Modbus command initializes single procedures (zero or span calibrations). The analyzers controls gas supply and purge times while it is the operators responsibility to not activate a span calibration without a preceding zero calibration!
  2. Special calibration procedures:
     - Zero calibrate all channels
     - Span calibrate all channels
     - Zero & span calibrate all channels.

     Initialized by the Modbus command the analyzer performs above mentioned procedures and controls gas supply, purge times and (for the last given procedure only) performs a zero calibration for all channels before activating span calibrations.

For detailled descriptions on how to perform

calibrations initialized via digital inputs ☞ 7-33
calibrations initialized via Modbus, without valves ☞ 7-35
calibrations initialized via Modbus, with valves ☞ 7-35

7.4.4 Remote Calibration

7.4.4.1 Calibrations Initialized by Digital Inputs

As already mentioned, the analyzer must either provide internal valves or external valves (connected to its digital outputs), to make use of this feature.

☞ Chapter 4 for information about electrical data and installation of digital inputs and outputs.

Digital inputs are edged triggered whereat the type of edge (rising or falling) can be setup via software menu (☞ 6-7171*).*

An edge is detected within a time slot of 300 to 500 ms after the edge is applied. To be accepted as an input signal,

- no change in signal is permitted for a minimum duration of 500 ms after the edge has been applied, otherwise it is rejected.

Furthermore take care

- calibrations can only be canceled by an approriate digital input signal or command, but not by another calibration trigger signal
- while a calibration is ongoing, any valve can only be activated if it is not used by this calibration procedure, and not assigned to a channel currently calibrated.
- input signals, intended to start another procedure, must be applied complying to the following condition:
  - if this next procedure affects components already in use for the ongoing procedure, the edge detection time slot must start after the ongoing procedure has ended

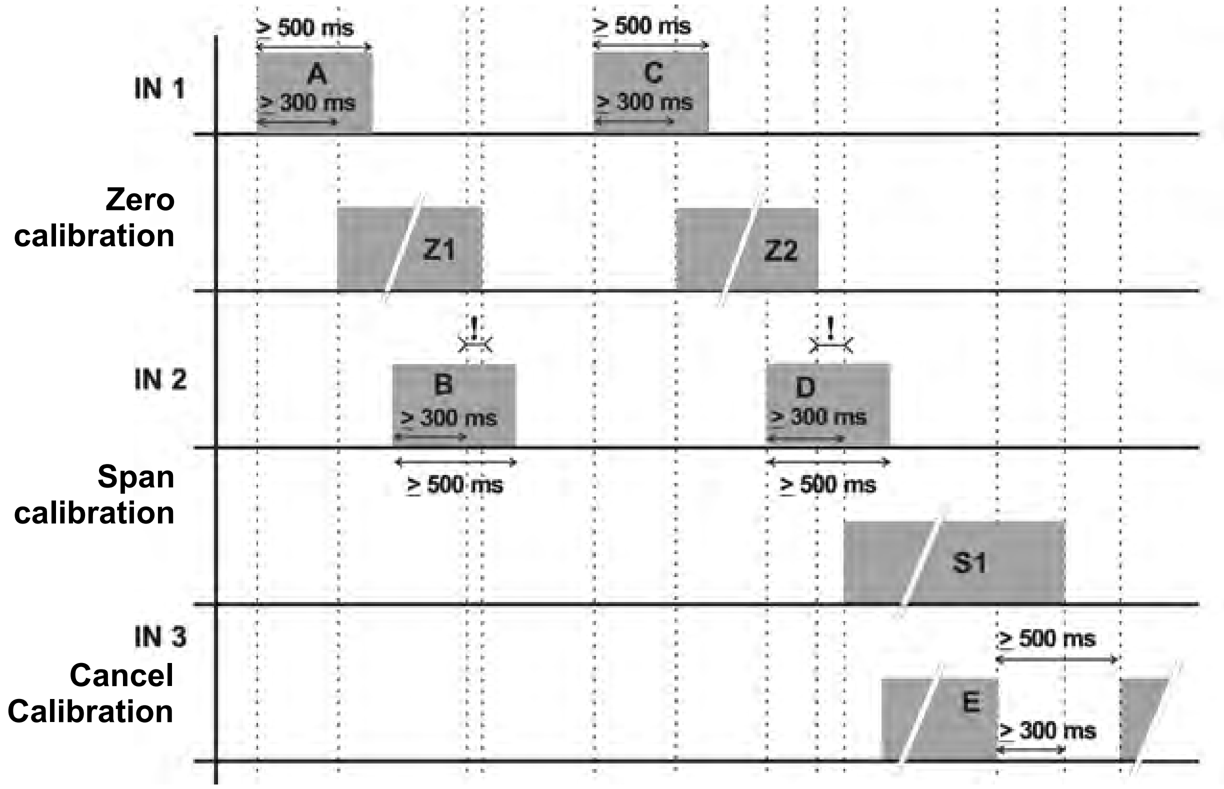
  For example, during an ongoing zero calibration, an input signal to start a span calibration for the same channel should be applied after the zero calibration has finished. At least it must be applied in a way, that the 300 to 500 ms edge detection time slot starts after the zero calibration has ended (see fig. 7-7, signal D), otherwise it is rejected (signal B)..

7.4.4 Remote Calibration

Examples

The sequences shown in Fig. 7-7 are based on the following setup for digital inputs IN1 to IN3:

- IN1 starts a zero calibration, initiated by a rising edge
- IN2 starts a span calibration, initiated by a rising edge
- IN3 cancels all calibrations with its falling edge



If signals are applied as shown, then

- IN1 (A) starts a zero calibration (Z1)
- the detection window (300 - 500 ms after edge) for IN2 (B) begins while the zero calibration (Z1) is ongoing: Signal (B) is ignored
- the edge of IN1 (C) is detected and the associated zero calibration (Z2) is started
- the detection window (300 - 500 ms after edge) for IN2 (D) begins after the zero calibration (Z2) has ended, so the span calibration (S1) is started
- the span calibration (S1) is canceled by the falling edge of IN3 (E)

Fig. 7-7: *Digital Inputs - Examples of Sequences*

7.4.4.2 Modbus Activated Calibrations Without Valves

Several Modbus commands allow to start calibrations (☞ Chapter 9, List of Modbus Commands).

If the analyzer does neither provide internal valves nor digital inputs and outputs (for controlling external valves), then the procedure corresponds to the manual calibration, with the Modbus commands replacing the manual front panel button keypresses.

This means, the Modbus command immediately starts the calculation. The operator has to ensure in this moment, the proper gas is applied and the measuring system is filled with calibration gas. If applicable, he also has to take care to not activate a span calibration without a preceding zero calibration.

For detailled instructions about manual calibration ☞ 7-17.

7.4.4.3 Modbus Activated Calibrations With Valves

Several Modbus commands allow to start calibrations (☞ Chapter 9, List of Modbus Commands).

If the analyzer provides either internal valves or digital inputs and outputs (for controlling external valves), then Modbus commands allow to make use of all the options described in Section 7.3.3 'Advanced Calibration' (page 7-20), with the Modbus commands replacing the manual front panel button keypresses.

This means, Modbus commands can initialize

- Zero calibrate all channels
- Span calibrate all channels
- Zero and span calibrate all channels.

The analyzer controls the gas flow, if applicable optimizes the sequence of multiple calibrations and takes care to not activate a span calibration without a preceding zero calibration.

7.4.5 Unattended Automatic Calibration

The unattended automatic calibration feature allows to program the analyzer to automatically perform valve supported calibration procedures without the need of digital inputs or Modbus interface connections.

Compared to the procedures described in the section before (advanced calibration), there are only very limited options, comparable to the manual calibration procedures: The operator has the simple choice of programming zero, or zero and span calibration intervals.

The main features compared to advanced calibrations as described from 7-18 are:

1) an interval time specifies the time between two calibrations
2) starting and processing calibrations does not need operator interaction
3) for span calibrations the analyzer considers the requirement, that always a zero calibration has to be carried out first,
4) (multi channel instruments only): Every time an unattended calibration is started, it is carried out for all channels!

Before selecting any further line make sure the required calibration gases are applied, and valves are assigned properly!

Supply all calibration gases with the same flow as the sample gas (recommended approx. 1 l/min), pressureless and utilizing the correct gas fittings (sect. 3.4).

Make sure the calibration purge time is set to a value ensuring the measuring cell is filled properly with the related calibration gas after the valve has opened!

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!

7.4.5 Unattended Automatic Calibration

Setup..
Calibration..
Interval times..

Interval times

Zero all..
Zero & span all..
Programmed sequence..
Blowback all..

Within SETUP - CALIBRATION, "*Interval time..*" opens the following screen:

Several time intervals may be specified:

"Zero all..": This entry specifies intervals for zero calibrations only! If there is an entry for *"Zero & span all.."*, too, the instrument will carry out **additional** zero calibrations based on the *"Zero & span all.."* interval.

"Zero & span all..": This is the interval to elapse before the analyzer automatically starts a **full** calibration procedure, consisting of a zero calibration followed by a span calibration.

"Programmed sequence..": This is the interval time for the sequence, setup in SETUP - CALIBRATION - PROGRAM SEQUENCE

"Blowback all..": To blowback all channels at regular intervals, enter this submenu.

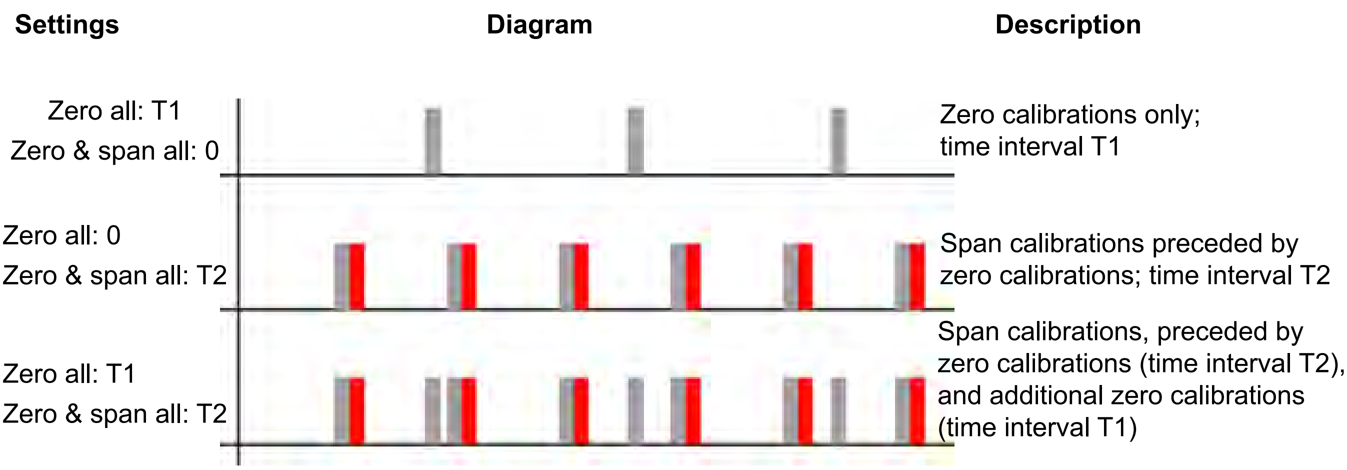


Fig. 7-8: *Graphical Explanation of Interval Time Settings*

7.4.5 Unattended Automatic Calibration

All submenus opened by above menu lines have the same content, exemplarily described below:

Zero all	
Enable:	Enabled
Interval:	15 h
Start time..	
Next:	--
Time	10/01/10 15:33

Set to **Enabled**, to use interval times for the selected calibration (here: Zero all)

Enter the interval time
Accepted range: **1 ... 10,000** h

In this submenu enter the start time for the first calibration (s. below)

Start time & date for the next calibration, based on the entered parameters (empty until date & time have been entered in the submenu)

Current date & time

Start zero all	
Month:	1
Day:	10
Hour:	16
Minute:	0
Set!	
Next	10/01/10 16:00

In this submenu enter the date and start time for the first calibration after finishing this setup.

Note!
Time format is 24h (1 pm = 13)

Start time & date for the next calibration, based on the entered parameters

Zero all	
Enable:	Enabled
Interval:	15 h
Start time..	
Next:	10/01/10 16:00
Time	10/01/10 15:33

Press *LEFT* to return to the previous menu, to see a summary.

Note!
If the displayed current time is not correct, update the system setup on ☞ 6-100.

7.4.6 Verifying a Calibration

For instruments **without** internal and/or external valves simply apply either span or zero calibration gas to the sample gas inlet. If the calibration still is proper, the reading on the MEASUREMENT SCREEN should show the related value.

For instruments **with** internal and/or external valves follow the procedure below:

```
Zero calibration..
Span calibration..
Advanced calibration..
Apply gas..
Lock menus!
Acknowledgements
Pump 1:                 Off
Pump 2:                 Off
▼Ranges..
```

Starting from the MEASUREMENT SCREEN press DOWN to open the MAIN MENU and enter CONTROL.
Enter APPLY GAS

Component ?

Multi-channel unit:
Select the component to be verified in SELECT COMPONENT.

```
Ch1
              Apply gas

Applied gas:           Span gas

Flow                 1.00 l/min
Concentration       25.000 ppm
```

Changing the "*Applied gas*" parameter opens the related valve.
Available options:
SpanGas-1 ... -4, ZeroGas, SampleGas, Blowback, All closed.

"*Flow"* shows the current gas flow, while "*Concentration"* should show the expected value, if the calibration is valid and correct.

7.4.8 Restoring a Calibration

```
Ch1
        Zero calibration
Cancel!
Start!
Zero gas                  0.000 ppm
Concentration             0.000 ppm
Flow                       0.00 l/min
Status..
Results..
Restore!
```

In case a wrong configuration was detected after a calibration was carried out (e.g. wrong gas connected), there is an option to restore the last calibration data:
Any menu, from where a channel specific calibration can be started, shows a line "*Restore!*" (see example to the left).
Press ENTER in such a line to restore the last calibration data for the selected channel and type of calibration (zero/span). While restore is processing, a 'Function executing' message appears.

7.4.7 Cancelling an Ongoing Calibration

```
Ch1
        Zero calibration
Cancel!
Start!
Zero gas                  0.000 ppm
Concentration             0.000 ppm
Flow                       0.00 l/min
Status..
Results..
Restore!
```

Any menu, from where a calibration can be started, shows a line *"Cancel!"* (see example to the left).
Press ENTER in such a line to cancel any ongoing calibration. While canceling, a 'Function executing' message appears.

7.5 Replacing the Electrochemical Sensor

In consequence of its design the sensor‘s lifetime is limited and depends on theoretical designed life and Oxygen concentration. The sensor output can be taken as a rough criterion for end of lifetime: The sensor is worn-out when the output in atmosphere is below 70 % of the initial output. The period till then can be calculated by

$$\textit{Lifetime} = \frac{\textit{designed life (\% hours)}}{O_2 \textit{ concentration (\%)}}$$

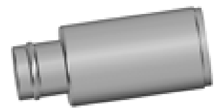
The sensor‘s designed life under constant conditions of 20 °C is approx. **900,000 hrs.**

The lifetime at 21 % oxygen is therefore calculated to approx. **42,857 hrs, corresponding to approx. 5 years.**

Irrespective of all calculations above:
A sensor is worn-out when, connected to ambient air, the output voltage is less than 2.8 V: Replace the sensor!

For replacing the electrochemical sensor the following tools are required:

- Philips screw drivers # 0 & 2
- Square key for the field housing's squash fasteners
- allen key for the flameproof analyzer to remove/open the cover/front door.
- 1 digital volt meter (measuring range 0 ... 2 V dc minimum) with suitable cables and probes.



Note 1!
The given lifetime values are for reference only! The expected lifetime is greatly affected by the temperature of the environment in which the sensor is used or stored. Increases or decreases in atmospheric pressure have the same effect as that by increases or decreases in oxygen concentration. (Operation at 40 °C halves lifetime).

Note 2!
Due to the measuring principle the electrochemical oxygen cell requires a minimum internal consumption of oxygen (residual humidity avoids drying up the cell). Supplying cells continuously with dry sample gas of low grade oxygen concentration or with sample gas free of oxygen could result in a reversible detuning of O_2 sensitivity. The output signal will become unstable, but response time remains constant.
For proper measurement results the cell needs to be supplied continuously with concentrations of at least 0.1 Vol.-% O_2.
We recommend using the cell if need be in alternating mode, means to purge the cell with conditioned ambient air (not dried, but dust removed) when measurement pauses.
If it is necessary to interrupt the oxygen supply for several hours or days, the cell has to regenerate (supply cell for about one day with ambient air). Temporary flushing with nitrogen (N_2) for less than 1 h (e.g. for analyzer zeroing purpose) has no influence on measuring characteristics.

7.5 Replacing the Electrochemical Sensor

WARNING

ELECTRICAL SHOCK HAZARD

Working at opened and powered instruments means working near live parts and is subject to instructed and trained personnel only!

WARNING

HAZARD FROM EXPLOSIVE, FLAMMABLE AND HARMFUL GASES

Before opening gas paths they must be purged with ambient air or neutral gas (N2) to avoid hazards caused by toxic, flammable, explosive or harmful to health sample gas components!

CAUTION

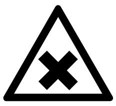
ELECTROSTATIC DISCHARGE HAZARD

Working at internal components of electronical and electrical instruments may cause electrostatic discharge (ESD), destroying components!

Working at open instruments is recommended at special workplaces only! If no such workplace is available, at minimum perform the following procedures to not destroy electronic components:

Discharge the electric charge from your body. Do this by touching a device that is grounded electrically (e.g. instruments with earth connectors, heating installations). This should be done periodically when working at open instruments (especially after leaving the service site, because e.g. walking on low conducting floors might cause additional ESD).

7.5 Replacing the Electrochemical Sensor



⚠ WARNING

HAZARD FROM WEAK ACID AQUEOUS SOLUTION

If the electrolyte leaks due to sensor damage, put the sensor in a plastic bag so that the solution will not be smeared on other places and return the sensor to Emerson Process Management or an industrial waste management contractor.

The electrolyte is a weak acid aqueous solution of 5 to 6 in pH with an irritating odor. It will not ignite spontaneously even if it is left. Nevertheless, lead acetate, which is a component of the solution, is harmful to human bodies and should be handled with care as follows:

If the electrolyte leaked due to sensor damage is smeared on the skin or clothing, immediately wash the contacted part with soapy water and wash off the solution with a large amount of tap water.

If the electrolyte leaked due to sensor damage gets into an eye, immediately wash the eye with a large amount of tap water for 15 minutes and consult a doctor promptly.

If the electrolytic solution or atomized electrolytic solution leaked due to sensor damage is inhaled, immediately wash the nostrils and gargle with tap water and consult a doctor promptly.

Do not disassemble or repair the sensor. Removing a sensor part or remodeling the sensor will damage the sensor or leak the electrolyte and restoration to the original condition may not be possible.

If the electrolyte leaked due to sensor damage is swallowed, immediately wash the mouth with tap water. Swallow a large amount of tap water or 600 cm^3 (20.29 fl.oz) of milk and vomit it. Consult a doctor promptly.

Discarded sensors cause environmental contamination. Return a worn-out sensor to Emerson Process Management or an industrial waste management contractor when discarding a worn-out sensor.

7.5 Replacing the Electrochemical Sensor

7.5.1 General Hints on Handling the Sensor

GENERAL HINTS ON HANDLING THE SENSOR

Do not expose the sensor to a temperature other than the temperature range of -20 to +60‘C (-4 to +140 F). Exposing to a temperature outside the temperature range may cause abnormal output or leak of the electrolyte due to parts degradation or damage.

Make sure to prevent condensation of the oxygen concentration detecting part. If condensed, the output will lower and response speed will slow down, disabling accurate concentration measurement. The sensor characteristics will return to the original characteristics if condensation moisture evaporates after putting the sensor in dry air several hours to several days.

Do not drop or apply a violent shock or vibration to the sensor. If shocked or vibrated, the sensor output may temporarily vary or become unstable. The original sensor condition will usually reset by putting the sensor in a stationary condition in the atmosphere at a ordinary temperature several hours to several days. Depending on the degree of a shock or vibration, the internal sensor structure may break and the sensor may not return to original condition.

7.5.2 Opening X-STREAM Analyzers

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Live parts are accessible when working at open instruments!

Take care to observe all applicable safety instructions!

7.5.2.1 How to Open X-STREAM XEGP

Remove the top cover after loosening the 12 screws.
If your instrument features an internal heated box, ☞ fig. 7-11 on next for information on how to open.

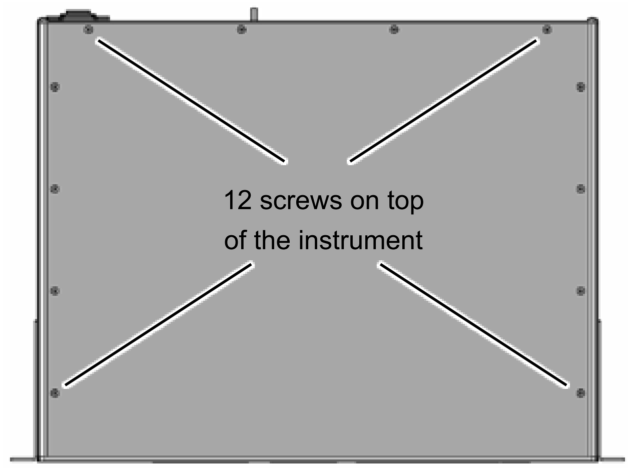


Fig. 7-9: *X-STREAM XEGP*

7.5.2.2 How to Open X-STREAM XEGC

Loosen the 4 screws for the cover, push the cover towards the rear and remove it.

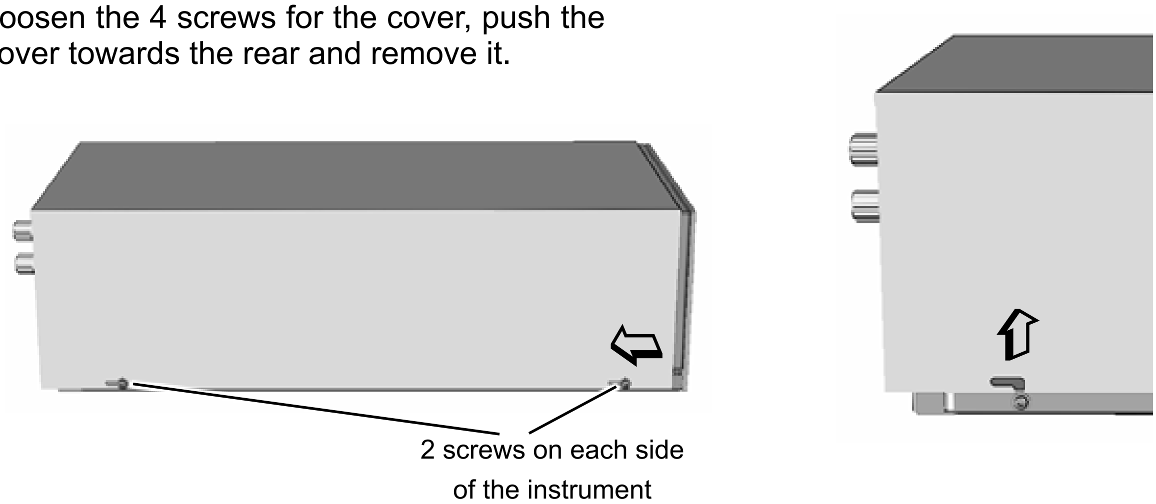


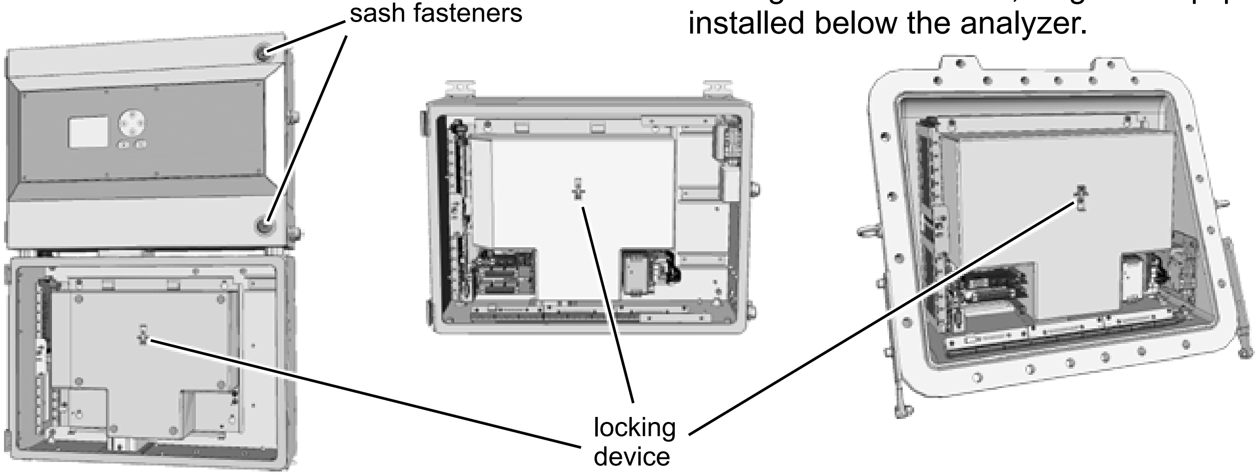
Fig. 7-10: *X-STREAM XEGC*

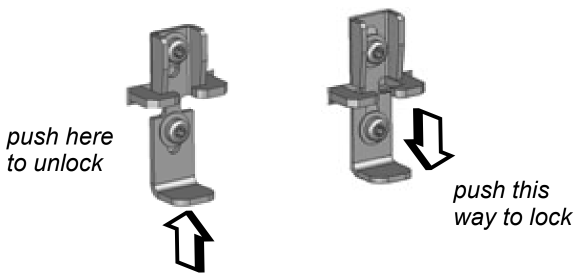
7.5.2.3 How to Open X-STREAM XEF / XDF

Depending on the individual analyzer configuration, either open the upper or lower front door to the left, utilizing the two sash fasteners.

7.5.2.4 How to Open X-STREAM XEFD

To open a X-STREAM XEFD loosen the 20 screws located at the instrument´s flange. Then carfeully flip down the front door to not damage the instrument, hinges or equipment installed below the analyzer.





Locking device details

Note 1!
The internal box covering the physical components, as shown in this figure, is optional and may not be installed in your specific instrument!

Note 2!
To remove the box loosen the 2 screws of the locking device, push it´s slider upwards as shown to the right, and take out the box to the frontside of the instrument!

Fig. 7-11: *X-STREAM Field Housings - Interior Views (shown Without Front Doors)*

WARNING

EXPLOSION HAZARD

Special variations of X-STREAM XEF and XDF. as well as X-STREAM XEFD may be installed in hazardous areas.

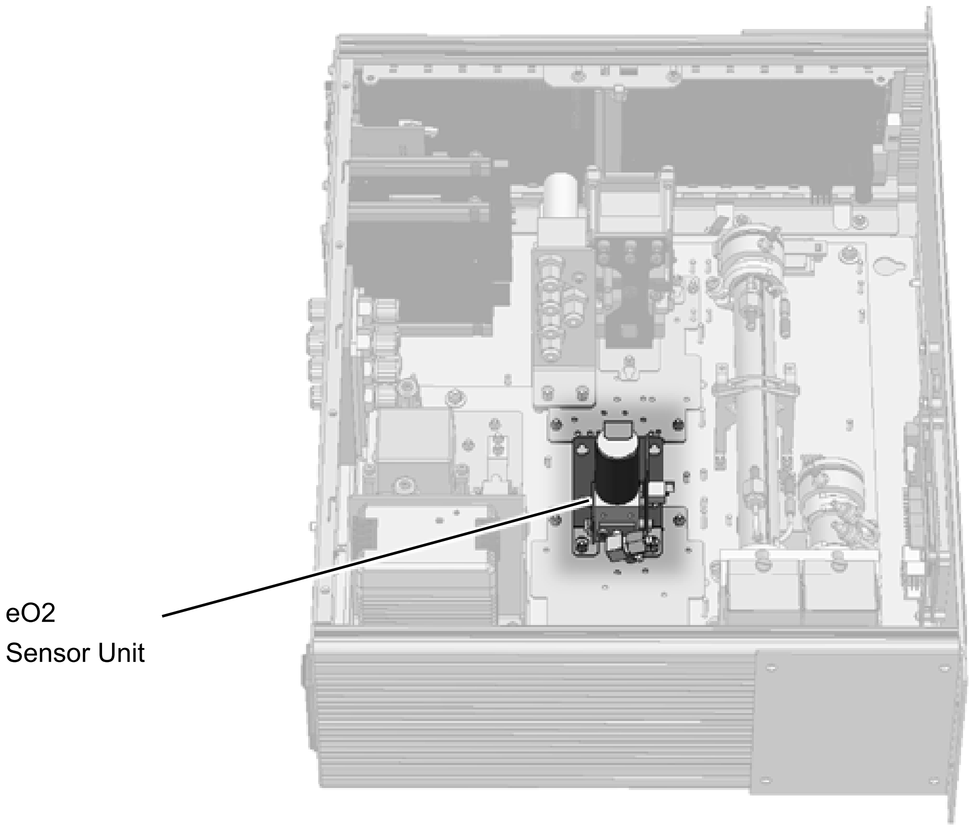
Maintaining such instruments is permitted only considering special conditions, given in the related separate manuals.

Do not open nor maintain instruments in hazardous areas without having read and understood all associated instruction manuals!

7.5.3 Locating the Sensor

The instruments provide two different variations of internal designs (except ½ 19' instruments):

- Instruments with internal heated box covering the physical components cannot provide an electrochemical sensor due to the limited temperature range of the sensor itself
- Instruments without internal heated box have the sensor installed onto the basic mounting plate.



Note!
Exemplary this figure shows the internal design of a X-STREAM XEGP analyzer. The other analyzer variations are designed in a comparable way.

Fig. 7-12: *Location of the EO2 Sensor Unit*

7.5.4 Disassembling the Sensor Unit

The sensor unit consists of a holder, an electronics board and the sensor itself, all together installed on a base plate (Fig. 7-13).
After loosening the nut (5), push the holder (3) with sensor (1) until the nut is above the hole (see details), then lift the holder from the base plate (4). The sensor is still fixed in the holder by means of a clip (8).
Now loosen the screws (7), fixing the sensor block (6) to the holder, push the holder downwards until the screws heads slip through the holes.

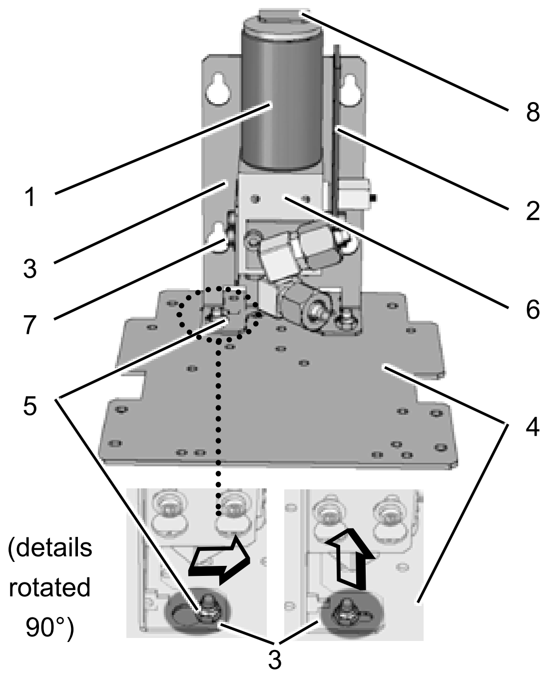
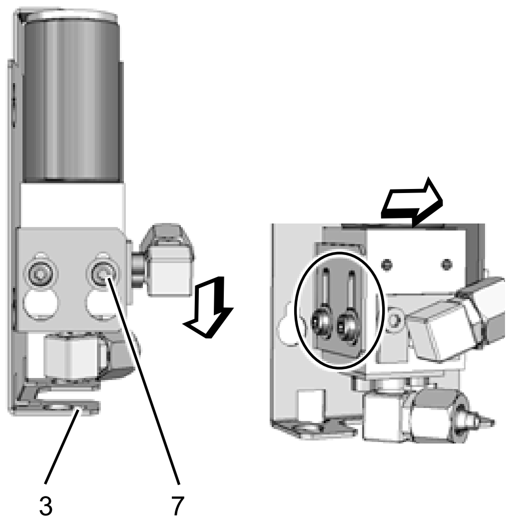
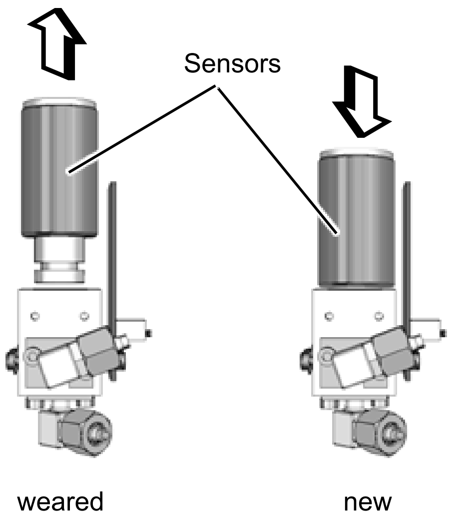


Fig. 7-13: *Sensor Unit Design*

1	Sensor	5	Nuts
2	Electronics Board	6	Sensor block
3	Holder	7	Screws
4	Base Plate	8	Clip



Pull off the signal connector from the electronics board (2) and take off the sensor.
Take a new sensor, remove its plug, insert the sensor into the block and connect the signal connector to P3 on the electronics board (Fig. 7-14).



Now re-assemble the sensor unit in reverse order, but do not yet install it into the analyzer as it requires a signal adjustment.

7.5.5 Adjusting the Output Signal

Having replaced the worn sensor, the board´s output signal requires some adjustment.

WARNING

ELECTRICAL SHOCK HAZARD

Working at open and powered instruments means working near live parts and is subject to instructed and trained personnel only!

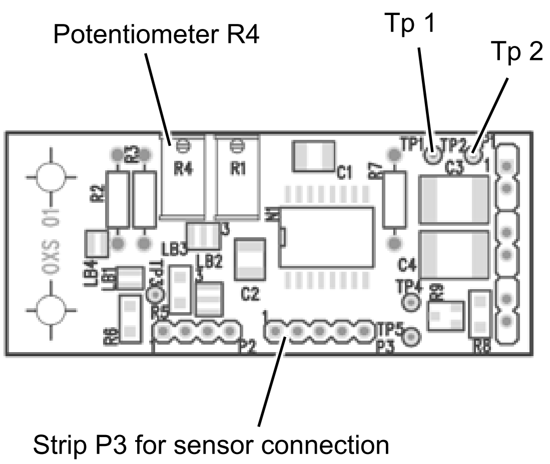


Fig. 7-14: *OXS Board, Top View*

Procedure:

- power on the open instrument.
- Supply ambient air (approx. 21 % O_2)
- Connect a digital voltmeter (DVM) to Tp 1 (signal) and Tp 2 (GND) on the electronics board OXS (fig. 7-14).
- Adjust the measured signal to 3360 mV DC (± 5 mV) utilizing the potentiometer R4 on OXS board.

Note!
Once the output signal has been adjusted for a specific sensor, changing the potentiometer settings will cause incorrect measuring results!

7.5.6 Finalizing the Sensor Replacement

- Disconnect the analyzer from power
- Re-install the sensor unit into the analyzer
- Close the housing. Take care to use all screws, especially if the instrument is to be used in hazardous areas!

In a next step for proper measuring results, perform a zero and a span calibration at least for the channel with the replaced sensor.

WARNING

EXPLOSION HAZARD

Special conditions and instructions for start-up after maintenance apply to instruments to be operated in hazardous areas!

Not observing these conditions and instructions may cause explosions!

See the associated manuals, provided with instruments for use in hazardous areas, for more information.

To ensure proper disposal, send back the old sensor to the EMERSON Process Management factory (or to your local sales office) or to an industrial waste management contractor for waste disposal.

7.6 Cleaning the Instrument´s Outside

Use a liquid general purpose detergent and a lint-free cloth for cleaning the analyzer´s outside.

> ⚠ **WARNING**
>
> **HAZARD FROM UNHEALTHY SUBSTANCES**
>
> **Take care to follow the safety instructions and instructions for use given by the manufacturer of the chosen general purpose detergent!**

Procedure

- Disconnect the instrument from power!
- If disconnecting from gas lines is required, take care of the following:

> ⚠ **WARNING**
>
> **EXPLOSIVE, FLAMMABLE AND HARMFUL GASES HAZARD**
>
> **Before opening gas paths they must be purged with ambient air or neutral gas (N2) to avoid hazards caused by toxic, flammable, explosive or harmful to health sample gas components!**

Seal the open analyzer´s gas fittings utilizing PVC caps to avoid contamination of inner gas path.

- Moisten the lint-free cloth with a mixture of 3 parts of water and 1 part of the general purpose detergent.

Do NOT drench the cloth, just moisten it to prevent liquid entering the housing!

- Clean the analyzer housing outside with the moistened cloth.
- If need be dry the housing after cleaning.

7.7 Save / Restore Configuration Data Sets

After some time of operating the instrument, one can assume all the parameters (calibration gases setup, measuring ranges, inputs and outputs, etc) are setup to meet the application´s and operator´s needs. To save these settings for means of restoring them in case of failures, data loss or even overwriting, use the options of the SETUP - SAVE-LOAD menus.
X-STREAM analyzers support saving analyzer data by providing different options:

Local backup

Use this option to save the current data in a special analyzer memory section.

Factory defaults..

This is the data, stored in a special memory section after the instrument has been configured in the factory. The user cannot change, but only restore this data.

USB backup

This option enables to save or restore an analyzer configuration to/from an external USB device. This way e.g. administrators can save analyzer configurations separately from the analyzer at a safe location.

Note!
During backup or restore processes, a progress indicator menu is shown: "Busy" turns from **0** *to* **1**. *"Progress (0..1000)" shows* **1000** *when copying data has finished.*

Copying data

Busy	0
Progress (0..1000)	1000

7.7 Save / Restore Configuration Data Sets

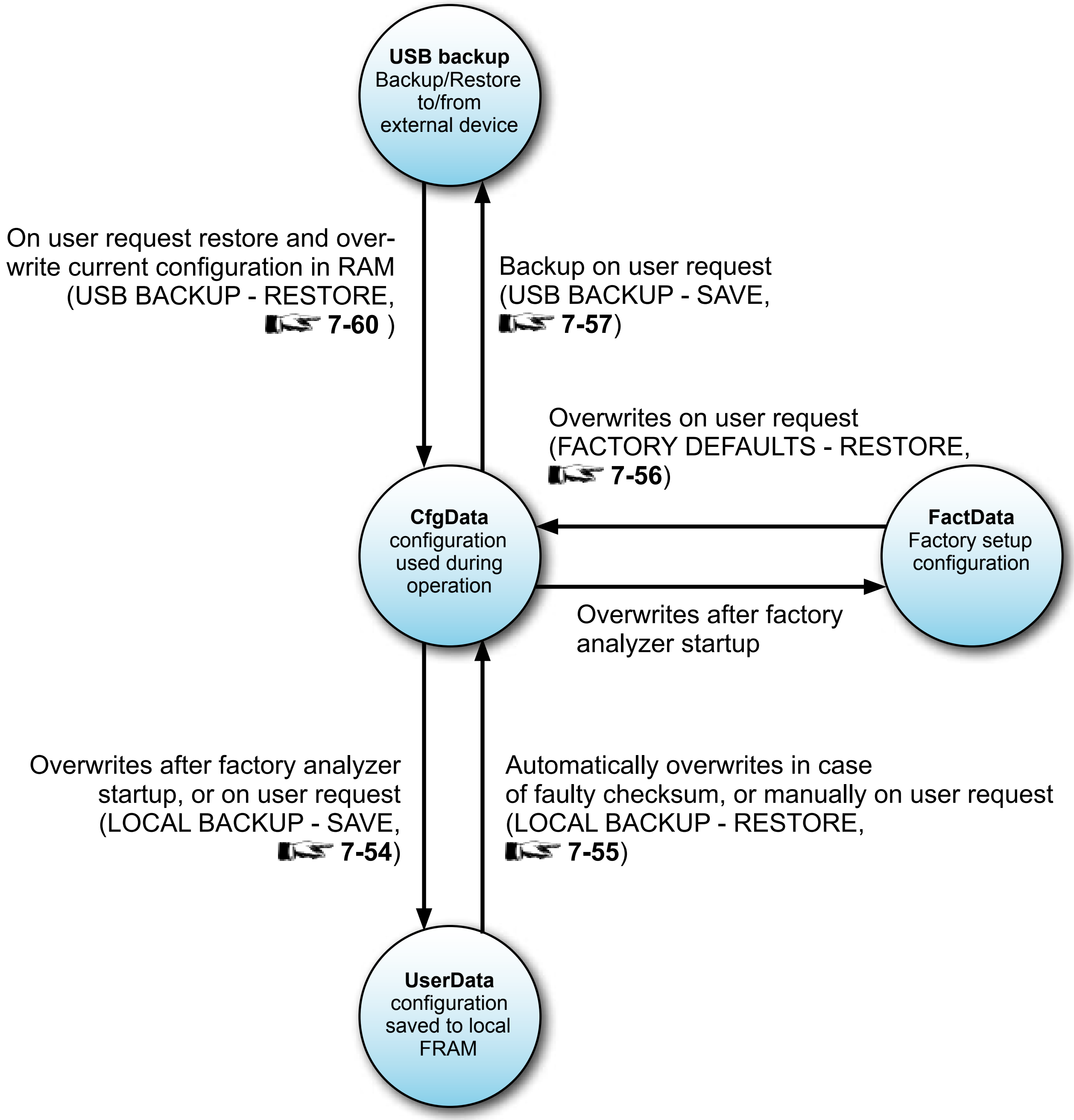


Fig. 7-15: *Relations of Supported Data Sets, and Where to Find Further Information*

7.7 Save / Restore Configuration Data Sets

7.7.1 Local Backup - Save

Setup..
Save-Load..

Starting at the MEASUREMENT SCREEN press *DOWN* to open the MAIN MENU, enter SETUP and next SAVE-LOAD.. .

If system is setup accordingly, access level 3 code must be entered to gain access to this menu.

Save-Load

Local backup..
Factory defaults..
USB backup..

Highlight *"Local backup.."* and press *ENTER*.

Local backup

Save..
UsrBack date 7/29/09 14:26
Restore..
Undo restore!
Busy 0
Progress 0

Highlight 'Save..' and enter the submenu.

Store new local backup
and overwrite old one!
Are you sure?

No!
Yes!

A screen appears to confirm the operation: Select **Yes!** and press *ENTER* to see a new screen, showing the current status.

7.7.2 Local Backup - Restore

Setup..
Save-Load..

Starting at the MEASUREMENT SCREEN press *DOWN* to open the MAIN MENU, enter SETUP and next SAVE-LOAD.. .

If system is setup accordingly, access level 3 code must be entered to gain access to this menu.

Save-Load

Local backup..
Factory defaults..
USB backup..

Highlight "*Local backup..*" and press *ENTER*.

Local backup

Save..	
UsrBack date	7/29/09 14:26
Restore..	
Undo restore!	
Busy	0
Progress	0

Information about the last backup

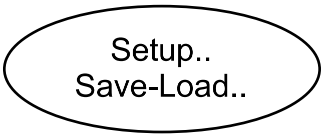
Highlight "*Restore*.." and enter the submenu.

Restore from local backup!
This will restart device!
Are you sure?

No!
Yes!

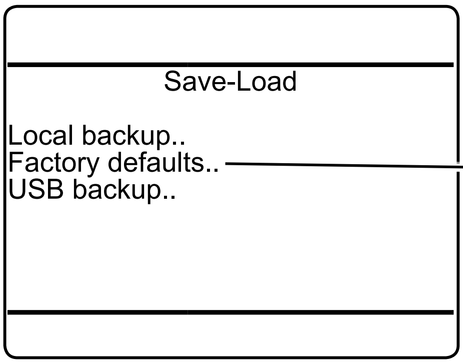
A screen appears to confirm the operation: Select **Yes!** and press *ENTER* to see a new screen, showing the current status.

7.7.3 Factory Defaults - Restore

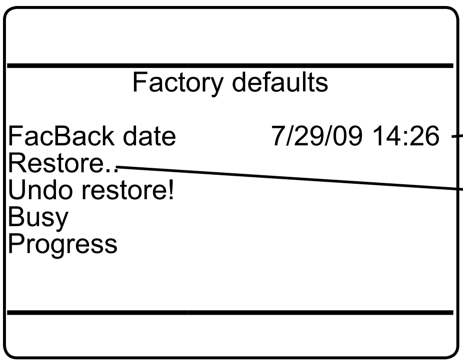


Starting at the MEASUREMENT SCREEN press *DOWN* to open the MAIN MENU, enter SETUP and next SAVE-LOAD.. .

If system is setup accordingly, access level 3 code must be entered to gain access to this menu.

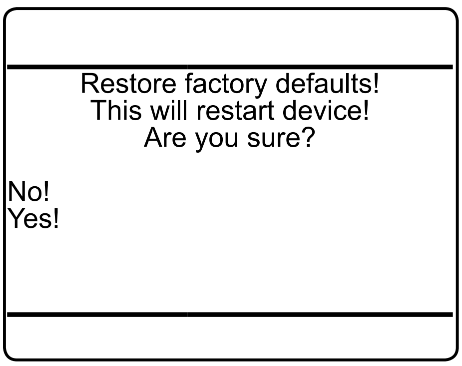


Highlight "*Factory defaults..*" and press *ENTER*.



Information about the last backup

Highlight "*Restore..*" and enter the submenu.



A screen appears to confirm the operation: Select **Yes!** and press *ENTER* to see a new screen, showing the current status.

Note!

All changes regarding the analyzer setup, applied after instrument was shipped, will be overwritten!

7.7.4 USB Backup - Save

IMPORTANT INFORMATION!
Read carefully before activating USB procedures!

The analyzer provides a dual-mode USB 1.0 interface, which comes with two connectors. The primary purpose of the bigger connector is to attach mass storage devices such as sticks or disk drives, while the smaller mini USB connector is preserved to connect a PC/ computer.

Note!
Using both connectors in parallel is not supported. Connecting a PC will disable mass storage functionality.

Supported Mass Storage Device Types
Unfortunately not all USB mass storage devices are completely compatible with the interface.
It is recommended to use brands like SANDISK, KINGSTON, TOSHIBA etc.
Before finally storing data, check for proper operation!

Installation
Mass storage devices can be hot-plugged. After attaching a device, the analyzer will automatically recognize it, if the USB interface is enabled; 6-103. However, do not remove a memory device, while data transmission is ongoing, this can cause loss of data!

Formatting
Prior to first usage, it is recommended to format the mass storage device by the analyzer:

- Attach an USB device
- Enter SETUP - USB INTERFACE (may require to enter access level 3 code)
- Select "*Format USB stick..*" and press *ENTER*.

File System
The analyzer requires a special file system on the memory device:
After installation (and formatting), the analyzer checks the file system on the mass storage device, and automatically creates whatever is required.

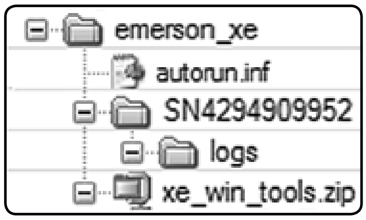


Fig. 7-16: *USB File System Structure*

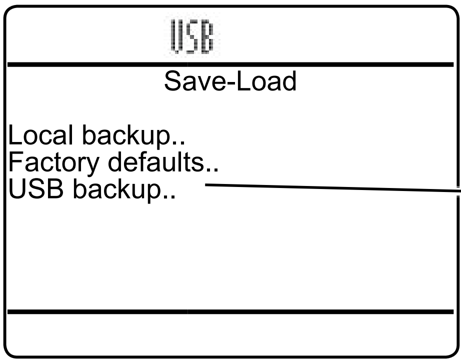
Auto-Run Feature
It is possible to initiate special procedures upon connecting a mass storage device, e.g. updating the firmware, firmware backup, configuration backup, etc., 7-66 for more information.

7.7 Save / Restore Configuration Data Sets

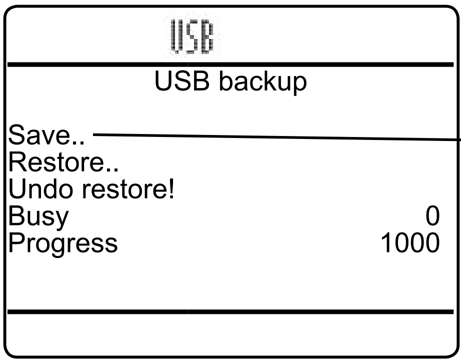
Setup..
Save-Load..

Starting at the MEASUREMENT SCREEN press *DOWN* to open the MAIN MENU, enter SETUP and next SAVE-LOAD.

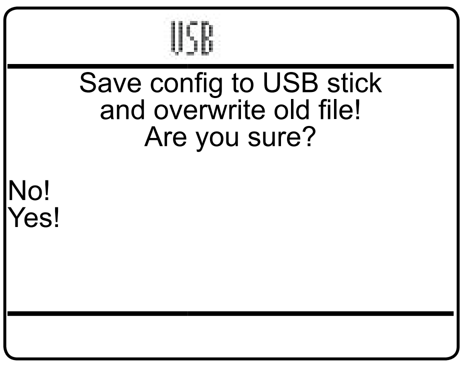
If system is setup accordingly, access level 3 code must be entered to gain access to this menu.



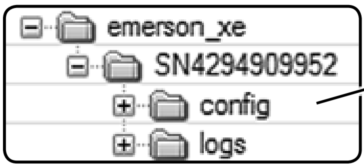
Highlight *"USB backup.."* and press *ENTER*.



Highlight *"Save.."* and enter the submenu.



Note!
Take care to have an USB device connected to the analyzer´s USB port!
A screen appears to confirm the operation: Select **Yes!** and press *ENTER* to see a new screen, showing the current status.



The backup files are stored within the USB device' file structure, in a subdirectory 'config'.
For more information on the USB device file system structure, ☞ 6-104

7.7.5 USB Backup - Restore

Setup..
Save-Load..

Starting from the MEASUREMENT SCREEN, press DOWN to open the MAIN MENU, enter SETUP and next SAVE-LOAD.. .

If system is setup accordingly, access level 3 code must be entered to gain access to this menu.

USB
Save-Load

Local backup..
Factory defaults..
USB backup..

In this line press ENTER.

USB
USB backup

Save..
Restore..
Undo restore!
Busy 0
Progress 1000

Enter this submenu.

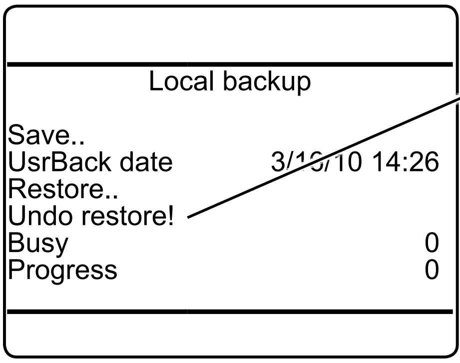
USB
Restore config from USB stick!
This will restart device!
Are you sure?

No!
Yes!

Note!
Take care to have an USB device connected to the analyzer´s USB port (icon to be visible in the first menu line)!

A screen appears to confirm the operation: Select **Yes!** and press ENTER to start the process.

7.7.6 Undo Restore



Each backup menu has a function line called *"Undo restore!"* to undo the last restore backup operation, as shown exemplarily shown by the figures to the left (local backup menu). This works from any backup/restore menu, and undoes any last restore, regardless if this was started from the current or from another. During the undo process, a 'Function executing' message appears.

7.8 Handling Log Files

Log files are created by the internal data logger, event logger and calibration logger, whereat the latter are part of optional software upgrade packages.

Working with log files is in the following exemplarily explained on the basis of the data logger:

7.8.1 Configuring Log Files

```
          Data logger
Logging:                    Off
Sample time:                1 s
Data logger data delete!
Cached entries               14
Total entries                 0

Data Selection
Export data to USB!
```

Open SETUP - DATA LOGGER (this may require to enter the access code for level 3), to see the following menu:

Highlight the 7th line and open the associated submenu to see a list of data available for logging.

```
        Data Selection

Concentration:              Yes
Temperature:                 No
Flow:                        No
Pressure:                    No

FieldSep:                   TAB
```

Each entry in the log file contains the following fields

- date
- time, followed by
- the fields as selected in the menu:

For each parameter select, if it is to be included (**Yes**) or not (**No**) in the log file:
"*Concentration*" includes the measured concentration (ppm) and current status of all installed channels.
"*Temperature*", "*Flow*" and "*Pressure*" include the associated measured values.

```
        Data Selection

Concentration:              Yes
Temperature:                 No
Flow:                        No
Pressure:                    No

FieldSep:                   TAB
```

The separator for the fields within an entry is specified with the last menu line: Available options are **TAB**(ulator), **Comma** and **SemiKol**(on). Entries are separated by a carrige return and line feed.

7.8 Logfiles

Data logger	
Logging:	On
Sample time:	1 s
Data logger data delete!	
Cached entries	14
Total entries	0
Data Selection..	
Export data to USB!	

Press left to return to the previous menu, and

- enter a sample time to specify the time interval between entries
- turn "*Logging*" **On**, to start logging.

All the log file data is kept in an internal memory, and written into a file on the internal memory card every 30 minutes (or when "*Logging*" is turned **Off**.

So,

- "*Cached entries*" shows the number of entries in memory
- "*Total entries*" gives the number of entries, already saved to the internal memory card.

7.8.2 Exporting Log Files

There are two options to export log files to an USB device:

1st option:
From within SETUP - DATA LOGGER (this may require to enter the access code for level 3)

Data logger	
Logging:	On
Sample time:	1 s
Data logger data delete!	
Cached entries	14
Total entries	0
Data Selection..	
Export data to USB!	

The last line "*Export data to USB!*" enables to export the total entries to a connected USB device.

7.8 Logfiles

2nd option:
From within CONTROL - DATA LOGGER (this may require to enter the access code for level 1)

Data logger

Export data to USB!

Cached entries	0
Total entries	0

The line "*Export data to USB!*" enables to export the total entries to a connected USB device.

Before starting to export, the analyzer automatically adds the cached entries to the total entries file, so all available data is exported to the log file.

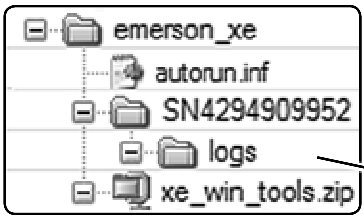


Fig. 7-17: *Subdirectory for Log Files*

Take care to have a proper USB memory device connected (☞ 7-57), before starting to export a log file, otherwise an error message shows up.

Log files are exported to the subdirectory named 'logs' beneath a directory, named with the serial number of the current analyzer.

Notes!
If not already present, the file system structure is created automatically.

One memory device may have multiple 'serial number' directories, each created automatically, when for the first time connected to a new analyzer, and containing only the files for that specific analyzer.

Note!
Data logger exports into data.log, event logger into events.log, and calibration logger into calibration.log.
Several files of the same type are added by extending the file names with increasing numbers, e.g. data001.log, data002.log, ...

7.8.3 Log Files Content

The exported log file does not only show the discussed entries data, but also separate lines with

- the type of log file
- the analyzer tag, if such has been setup (☞ 6-98)
- the analyzer serial number
- column headings for the entries fields

For further processing, import that file e.g. into a spreadsheet.

Example
Imported into a text file, for a 3 channel instrument the above settings would give the following log file layout:

```
# EMERSON    X-STREAM XE Data LogsCR
CRLF
# Tag:       -- The Device Tag --CR
CRLF
# Serial:    SN4294909952CR
CRLF
# --------   --------    --------CR
CRLF
Date       Time          Ch1:Conce[ppm]  Status    Ch2:Conce[ppm]  Status    Ch3:Conce[ppm]  Status  CRLF
10/22/2009 10:20:36      933.00          G         500.00          G         390.00          G       CRLF
10/22/2009 10:20:37      934.00          G         498.00          G         392.00          G       CRLF
10/22/2009 10:20:38      936.00          G         499.00          G         391.00          G       CRLF
```

Imported into a spreadsheet software, it looks like this:

# EMERSON	X-STREAM XE	Data Logs						
# Tag:	-- The Device Tag --							
# Serial:	SN4294909952							
# --------	--------	--------						
Date	Time		Ch1:Conce[ppm]	Status	Ch2:Conce[ppm]	Status	Ch3:Conce[ppm]	Status
10/22/2009	10:20:36		933	G	500.00	G	390.00	G
10/22/2009	10:20:37		934	G	498.00	G	392.00	G
10/22/2009	10:20:38		936	G	499.00	G	391.00	G

Note!
Date format is dd/mm/yyyy
Time format is hh:mm:ss (with 24 h format)
Status codes are: G = Good, F = Failure, A = Alarm, M = Maintenance, C = Check function, O = Out of specification, S = Simulate, X = Absent

Fig. 7-18: *Example of Log File*

7.9 Files on USB Memory Device

After connecting or formatting an USB device, or after a first log file export, a special file structure is present on the stick, ☞ figure below.

Furthermore, two files are created within this structure:

- autorun.inf
- xe_win_tools.zip

7.9.1 autorun.inf

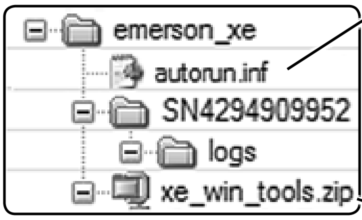


Fig. 7-19: *USB File System Structure*

'Autorun.inf' can be used to automatically start actions, when the USB device, it is saved on, is connected to the analyzer.
Each time, an USB mass memory device is connected, the analyzer checks for the precense of a plain text file, called 'autorun.inf'. If such a file does not exist, a template file is automatically created, as well as, if need be, the file structure.

Another file, automatically created, is called 'xe_win_tools.zip'; ☞ 7-67 .

```
# Emerson X-STREAM XE | USB-AUTORUN File
#
# -- Functions ---------------------------------------
#
# Remove # from a line below to activate a function
#
# SAVE_CONFIG Save current configuration to USB
# SAVE_FIRMWARE Save firmware (incl. config) to USB
# SAVE_DATALOGS Save data logger files to USB
# SAVE_EVENTLOGS Save event logger files to USB
# SET_PASSWORDS Set all passwords to factory
#                    defaults (LOI and webbrowser)
#
# .---------------------------------------------------
```

Fig. 7-20: *Autorun.inf Template*

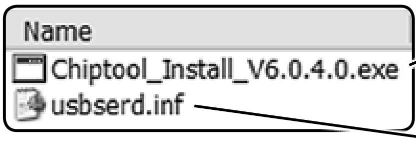
The automatically created autorun.inf acts as a template, containing

- help text, and
- instruction lines: To enable, just remove the leading '#' and save the file as text file to the device again.

The file is scanned line by line. Any line not starting with '#' is checked for a valid key word (CAPITAL terms in the template´s functions section), which is passed to a batch loop processor, to be executed as soon as possible.

7.9.2 xe_win_tools.zip

This ZIP contains some files to be used with a Microsoft Windows based computer only.



Chiptool for Ethernet connections, enables to remotely identify an analyzer by its IP address, without requiring front panel access.

USB driver for MS Windows PC

7.10 Web Browser

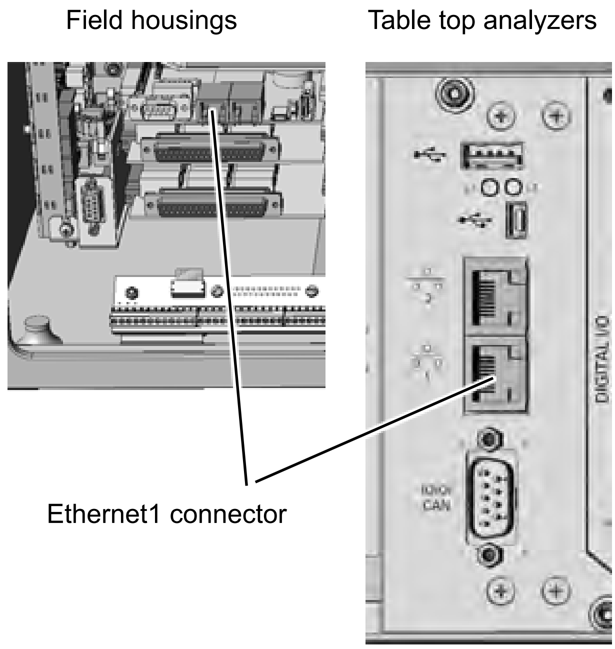


Fig. 7-21: *Ethernet Connectors*

To gain access to the instrument´s web browser interface, first ensure the instrument is powered and connected to your network via Ethernet1 connector (see figure on the left)

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

Info	
Firmware	1.0
DSP version	1.0
Serial no	123456789
Components..	
Installed options..	
Ethernet1 IP	192.168.1.1
Ethernet2 IP	192.168.1.2
▼ Time	10/01/10 14:00

IP address for Ethernet1 connector

If no network IP address has been assigned, check the network settings (☞ 6-79)

7.10 Web Browser

Connect your computer to the network, open a web browser and enter the instrument´s network IP address, and if all is configured properly, a screen like the following appears:

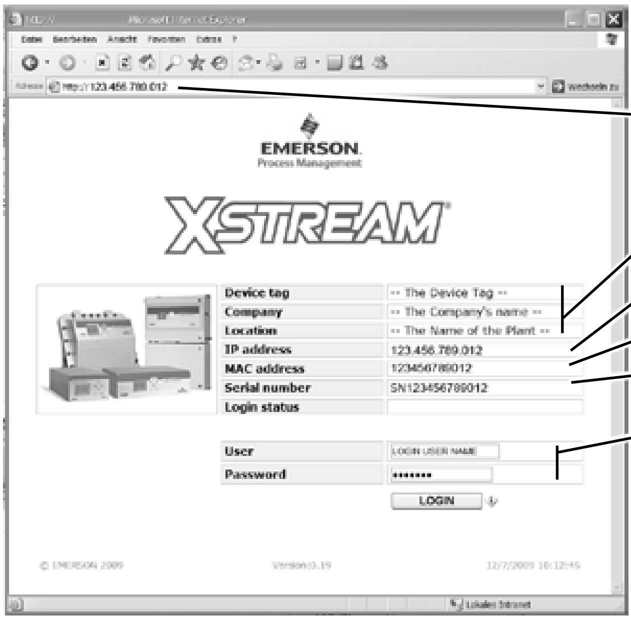


Fig. 7-22: Web Browser Logon Screen

Usernames for login are: **Operator, Expert, Administrator.**
Default password (for all) is: **password**

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

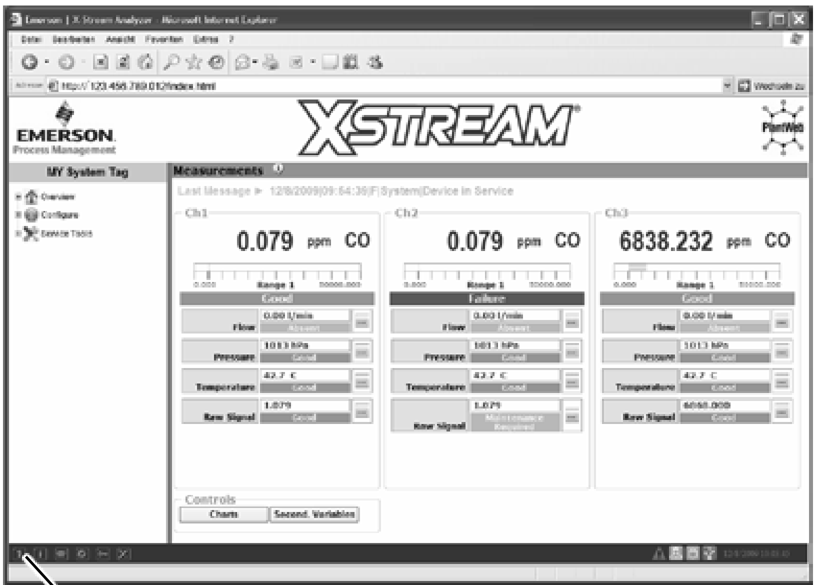
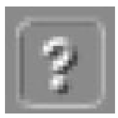


Fig. 7-23: Web Browser Measurements Screen

After logon, the measurements screen appears.
Click on the left most icon in the status bar,



to receive comprehensive online help on the X-STREAM XE web browser interface.

Chapter 8
Troubleshooting

8.1 Abstract

This chapter covers troubleshooting the analyzer:

Section 8.2 describes messages possibly appearing in the measuring screen‘s status line gives hints on the potential causes and on how to solve the problem(s).

Two tables differentiate between analyzer related messages and channel related messages.

As the analyzer software is not capable to detect all problems and faults, section 8.3 describes such faults, their consequences, gives hints on potential causes and on how to solve the problem(s).

Section 8.4 gives detailled instructions on how to replace or adjust components, addressed to personnel familiar with the aspects of working on such components.

8.2 Solving Problems Indicated by NAMUR Status Messages

As mentioned before, status messages show up in the measuring display´s last line. Multiple status messages, active at a time, show up sequentially in this status line. To see all status messages at a glance, enter STATUS: If any status is set, the corresponding menu line appears, whereat only the first 4 lines are of interest here (NAMUR status).

```
Failures..
Off-Specs..
Maintenance requests..
Function checks..
Measurement..
Calibration..
Alarms..
```

Enter any status line to see detailled status messages.

In the following table, all possible NAMUR status messages are listed in alphabetical order, together with hints on the possible causes, and tips on how to solve the problems.

Depending on the NAMUR status level assigned, the instrument can also activate status relay outputs, according the NAMUR NE 107 specifications.

Notes!

Recommended actions preceded by a bullet are alternatives.

If recommended actions do not solve a problem, call Emerson Service!

Supported NAMUR status levels:

Failures: Require immediate actions. The analyzer is not any longer working properly, and the output signal is invalid due to malfunction.

Off-spec: The analyzer is working outside its specification (e.g. measuring range), or internal diagnostics indicate deviations due to internal problems. To achieve proper outputs, corrective action is required.

If solving a reported problem requires working inside an open instrument, take care of the safety instructions, given at the beginning of this manual!

Check request (*or maintenance requests***)**: The instrument is still working properly, within its specifications and the output signal is valid, but maintenance is required in for-seeable future, because a function will soon be restricted or a wear reserve is nearly exhausted.

Function check: The analyzer is still working properly, but currently is in a status where the output signal is temporarily invalid (e.g. frozen) due to some ongoing procedures (e.g. during calibration).

8.2.1 Analyzer Related NAMUR Messages

Message *Status level*	Explanation	Recommended Actions
Calculator program error *Maintenance*	While running the calculator, an inconsistency was detected Division by 0 detected	• Check the calculator program for syntax errors, impossible commands or signal references • Check for divisions by 0
Can´t open Data Logger file *Maintenance*	Accessing the data logger file is not possible	• Check if internal disk is present / installed • Call Emerson Service
Can´t write to Data Logger file *Maintenance*	Accessing the data logger file is not possible	
Checksum error *Maintenance*	Creating the factory configuration file caused a checksum error.	Store a new factory configuration file.
Cfg checksum error *Maintenance*	Creating the user configuration file caused a checksum error.	Create a new user configuration file.
Cfg file open error *Maintenance*	Opening the user configuration file is not possible.	Call Emerson service
Cfg file read error *Maintenance*	Writing to the user configuration file is not possible.	
Cfg file write error *Maintenance*	Writing to the user configuration file is not possible	
Device not in Service *Function check*	Operator has set the analyzer to function check mode	Set analyzer into service
DISK Free space warning *Maintenance*	Internal disk usage exceeded specified limit (default: 80 %)	Free space by deleting files
DISK full *Maintenance*	Internal disk usage exceeded 95 % limit	

8.2.1 Analyzer Related Messages

Message *Status level*	**Explanation**	**Recommended Actions**
E-Mail: Not sent *Maintenance*	Failed to send e-mail	• Check Ethernet connection • Check SMTP configuration
E-Mail: Could not open LOG file *Maintenance*	Accessing log file not possib-le No NAMUR!	• Check if internal disk is pre-sent / installed • Call Emerson service
External Failure *Failure*	An external source (e.g. digital input or PLC program) meets a failure condition that is for-warded to the self-diagnostics system.	• Check the assigned digital input for the condition. • Check PLC program for the condition. • Reassign digital inputs to not being forwarded to the dia-gnostic system.
External FctCheck *Function check*	An external source (e.g. digital input or PLC program) meets a function check con-dition that is forwarded to the self-diagnostics system.	
External MaintRequ *Maintenance*	An external source (e.g. digital input or PLC program) meets a maintenance request con-dition that is forwarded to the self-diagnostics system.	
External OffSpec *Off-spec*	An external source (e.g. digital input or PLC program) meets a out-of-specification condition that is forwarded to the self-diagnostics system.	
Factory file open error *Maintenance*	Opening the factory configura-tion file is not possible.	• Create a new factory confi-guration file • Check the file system for consistency using CHKDISK tool

8.2.1 Analyzer Related Messages

Message *Status level*	**Explanation**	**Recommended Actions**
Factory file read error *Maintenance*	Reading the factory configuration file is not possible	• Check if internal disk is present / installed • Call Emerson service
Factory file write error *Maintenance*	Writing the factory configuration file is not possible. This message does not appear during normal operation!	
FATAL!! Configuration data destroyed *Failure*	The instrument is now unconfigured, because retrieving the configuration data from several sources failed.	
FATAL: FRAM read/write error *Maintenance*	The instrument is now unconfigured, because retrieving the configuration data from several sources failed.	Call Emerson service
Flash write count over limit *Maintenance*	Write cycles to internal CPU Flash Memory exceeded number of 90,000	
Limitation analog output 1 *Off-spec*	Concentration assigned to the indicated analog output is outside configured ranges: Analog output is limited to configured ranges	• Use another measurement range. • Extend analog output range configuration if possible. • Run measurement inside its given ranges.
Limitation analog output 2 *Off-spec*		
Limitation analog output 3 *Off-spec*		
Limitation analog output 4 *Off-spec*		
Limitation analog output 5 *Off-spec*		
PLC program error *Maintenance*	While installing the PLC program, a program error was discovered	Check the PLC program for syntax errors, wrong commands or references

Troubleshooting

8

8.2.1 Analyzer Related Messages

Message *Status level*	**Explanation**	**Recommended Actions**
SCAL blowback *Function check*	Device runs system calibration's blowback mode	• Wait until system calibration procedure is finished • Cancel system calibration procedure
SCAL program sequence *Function check*	Device runs system calibration's program sequence	
SCAL spanning *Function check*	Currently a system calibration's spanning is ongoing	
SCAL zeroing *Function check*	Currently a system calibration's zeroing is ongoing	• Wait until system calibration procedure is finished • Cancel system calibration procedure
SCAL zeroing & spanning *Function check*	Currently a system calibration (zeroing and spanning) is ongoing	
Sensor CRC-check *Failure*	XPSV - CPU communication failure	Call Emerson service, if message shows up repeatedly
Sensor command buffer overflow *Failure*		
Sensor failure *Failure*		
Sensor invalid message length *Failure*		
SENSOR RESET *Maintenance*		

8.2.1 Analyzer Related Messages

Message *Status level*	**Explanation**	**Recommended Actions**
USB free space warning *Maintenance*	The attached USB storage devices´s free memory exceeded the setup limit (☞ 6-103)	• Replace USB device by another one with sufficient free memory • On the USB device, delete files not required. To do so, attach it to a computer. • Format USB device (☞ 6-104)
USB stick full *Maintenance*	The attached USB storage device has not sufficient free memory to store data	

8.2.2 Channel Related Messages (preceded by Channel Tag, e.g. CO2.1)

Message *Status level*	**Description**	**Recommended Actions**
Concentration Is Higher Than Limit *Off-spec*	Currently the actual concentration is outside the analyzer's range limits. The shown measuring value does not comply to the actual concenctration.	Reduce concentration
Concentration Is Lower Than Limit *Off-spec*		Increase concentration
Device Not in Service *Function check*	Operator has set the analyzer to function check mode	Set analyzer into service
External Failure *Failure*	An external source (e.g. digital input or PLC program) meets a failure condition that is forwarded to the self-diagnostics system.	• Check the assigned digital input for the condition. • Check PLC program for the condition. • Reassign digital inputs to not being forwarded to the diagnostic system.
External FctCheck *Function check*		
External MaintRequ *Maintenance*		
External OffSpec *Off-spec*		
Flow High *Maintenance*	The activated flow monitor detected a too high flow according its configured high level.	• Ensure proper flow • Increase limit if appropriate
Flow High-High *Failure*	The detected flow is too high	• Check flow adjusting equipment, reduce flow to accepted value • If applicable check internal or external pump function, reduce flow to accepted value
Flow Low *Maintenance*	The activated flow monitor detected a too low flow according its configured low level.	• Ensure proper flow • Decrease limit if appropriate

8.2.2 Channel Related Messages

Message *Status level*	**Description**	**Recommended Actions**
Flow Low-Low *Failure*	The detected flow is too low or missing due to a leak, not limited to the instrument's internal gas path	• Check the external and internal gas path for leakage and plugging • If applicable check internal pump function
Invalid Interference Value *Off-spec*	A measuring value used for cross interference compensation is found to be erroneous.	Check status of interfering components
Linearizer Overflow *Off-spec*	The current concentration value is above the upper linearization range limit, so measuring results are not reliable.	Adjust gas concentration to be within range
Linearizer Underflow *Off-spec*	The current concentration value is below the lower linearization range limit, so measuring results are not reliable.	Adjust gas concentration to be within range
Operation Hours Exceeded *Maintenance*	The operation hours exceeded the service interval time.	• The instrument, or selected components require maintenance • After maintenance, enter SETUP - OPERATION HOURS METER (☞ 6-97), to reset the counter.
No Sample Gas *Function check*	The concentration measurement does not represent the normal value. Possible reasons: Calibration procedure is busy.	• Check, if a calibration is ongoing • If no calibration is ongoing, check if sample gas is applied (if need be, check for open sample gas valves)
Range Overflow *Off-spec*	Gas concentration is out of measurement range and therefore linearization curve does not apply (measuring results are not reliable).	• Select higher range (*polynomial linearization mode only*) • Adjust gas concentration to be within range

8.2.2 Channel Related Messages

Message *Status level*	**Description**	**Recommended Actions**
Range Underflow *Off-spec*	Gas concentration is out of measurement range and therefore linearization curve does not apply (measuring results are not reliable).	• Select lower range (*polynomial linearization mode only*) • Adjust gas concentration to be within range
Secondary Sensor Signal Simulation *Function check*	Any secondary sensor's signal is simulated for service purposes	• Restart device. • Ask service personnel to deactivate simulation.
Sensor ADC *Failure*	Input voltage applied to an internal DC signal input (DC 1...5) too high	• Adjust sensors output voltage to be within 0 .. 5 V limit • Replace sensor
	Input voltage applied to an internal AC signal input (WS 1...4)too high	• Adjust sensors output voltage to be within ± 6 V limit • Replace sensor
Sensor Chopper *Failure*	Internal failure bit of electronics board XSP is set	• Switch analyzer off and on again • Check red LED on chopper board UCC • Replace chopper
Sensor Communication Timeout *Failure*	The serial communication between the main controller and the sensor interface has timed out. The reason is unknown.	Check both boards, and proper connections
Sensor Detector *Failure*	XSP's failure bit was set	• Switch off / on the analyzer • Check if VVS signal is proper • Replace detector
Sensor Flow *Failure*	The flow sensor is not working properly	Check the sensors function, and if need be, replace the sensor.
Sensor Pressure *Off-spec*	The pressure measurement is not working properly for compensation purposes	Configure pressure to be within limits
Sensor Signal Simulation *Function check*	The primary sensor signal is simulated for service purposes	• Restart device. • Ask service personnel to deactivate simulation.

8.2.2 Channel Related Messages

Message *Status level*	**Description**	**Recommended Actions**
Sensor Source + *Failure*	The current through the IR or UV source is too high	• Check for IR source internal resistance is > 6 Ohms • Replace source
Sensor Source - *Failure*	The current through the IR or UV source is too low	• Check for IR source internal resistance is < 8 Ohms • Check for broken cables • Replace source
Sensor Temperature *Off-spec*	The temperature measurement is not working properly	• Check the temperature sensor • Check function of heaters
Spanning Started *Function check*	Span calibration is ongoing	• Wait for the procedure to finish. • Cancel the procedure
STANDBY Status *Function check*	All valves are closed	-
Startup Phase *Function check*	Physical components starting up	Wait until all components are working properly
Tolerance Check Failed *Maintenance*	Difference between setpoint and actuals is too high	• Disable check or change tolerance • Check components for proper function
Unstable Measurement *Maintenance*	Measurement too noisy while calibrating	• Check for constant gas flow • Increase t_{90} time
Warming Up *Function check*	Some components need to be at a specific temperature to work properly. This message shows, until all components reached their temperatures.	• Wait until warmup time has elapsed • Check function of heaters and temperature control
Zeroing Started *Function check*	Zero calibration ongoing	• Wait for the procedure to finish. • Cancel the procedure

8.3 Solving Problems Not Indicated by Status Messages

The following table lists possible faults not detectable by the instrument‘s software, gives hints on the potential causes, and tips on how to solve the problems.

If solving a problem requires working inside the instrument take care of the safety instructions given at the beginning of this manual!

Note on X-STREAM field housings!

To see the current analyzer status, or operate the instrument even if the front door is open, just loosen the screw, fixing the front panel, and swivel the front panel to the side or to the top (flameproof XEFD), as shown in figure 8-1.

Notes!

Recommended actions preceded by a bullet are alternatives.

If recommended actions do not solve a problem, call Emerson Service!

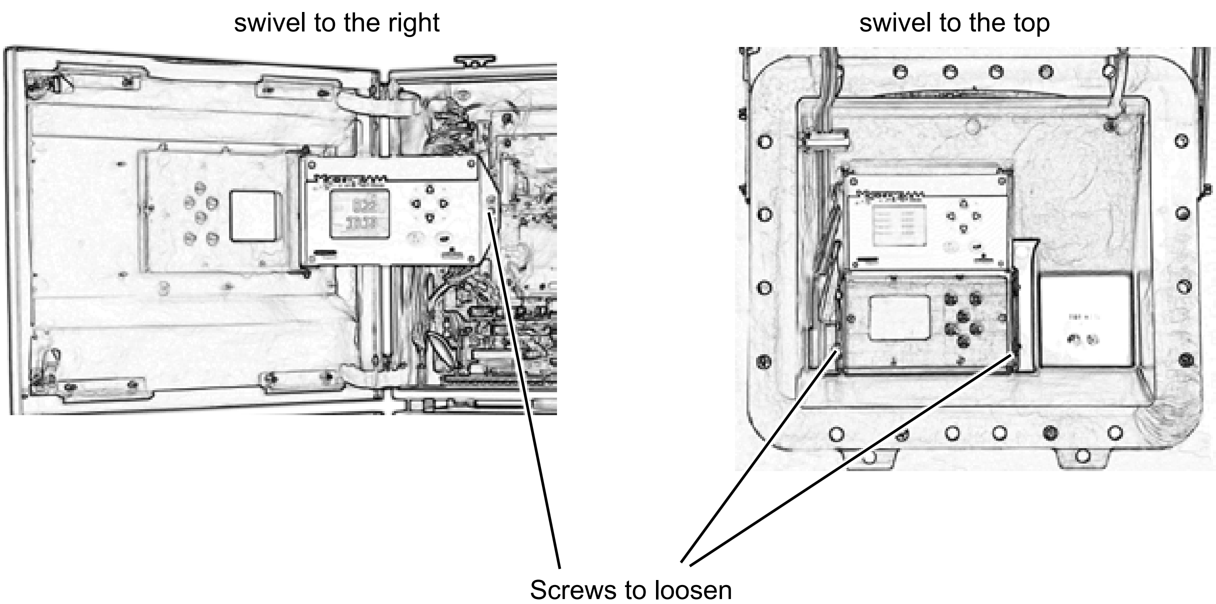


Fig. 8-1: *X-STREAM XEF, XDF and XEFD, Opened With Visible Front Panel*

8.3 Solving Problems Not Indicated by Status Messages

Situation	Description	Recommended Actions
Display Dark	Power supply missing	• Check power connection • Check power supply • Check instrument‘s power fuses • Check power supply unit: green LED (OK)
	Front panel connection faulty	Check front panel connections
Instrument Does Not Work nor Respond on Inputs	CPU hang up	Disconnect power to reset CPU
No Analog Output Signal	External failure	Check external circuitry for failures
	Internal connection failure	• Check signal connection at P22 of board XPSA • XPSA: If red LED "No PWM" glows - check connection to P19 • XPSA: LED "No PWM" dark - check power connection to XPSA (2-pole cable br/wht)
	Analog outputs 2 - 4 affected	Check installation of module XSIA on XPSA board
Digital Outputs Not Working Properly	External failure	Check external circuitry for failures
	Configuration failure	Check digital outputs menu settings
	Outputs 1 - 4 affected	• XPSA: If red LED "TI-MEOUT" glows - check con-nection to P33 • XPSA: LED "TIMEOUT" dark - check power connection to XPSA (2-pole cable br/wht)

8.3 Solving Problems Not Indicated by Status Messages

<table>
<tr><th>Situation</th><th>Description</th><th>Recommended Actions</th></tr>
<tr><td>Digital Outputs Not Working Properly (cont.)</td><td>Outputs on extension board(s) (XDIO) affected</td><td>• XDIO: If LED "TIMEOUT" glows - check jumpers on XDIO.
XDIO #1: jumper on ADR2
XDIO #2: jumpers on ADR2 & ADR0
• XDIO: If LED "TIMEOUT" glows - check connection to P33
• XDIO: If LED "NO SPI" glows - check internal SPI communication cable (10 pole cable)</td></tr>
<tr><td rowspan="3">Digital Inputs Not Working Properly</td><td>External failure</td><td>Check external circuitry for failures</td></tr>
<tr><td>Configuration failure</td><td>Check digital inputs menu settings</td></tr>
<tr><td>Outputs on extension board(s) (XDIO) affected</td><td>• XDIO: If LED "TIMEOUT" glows - check jumpers on XDIO.
XDIO #1: jumper on ADR2
XDIO #2: jumpers on ADR2 & ADR0
• XDIO: If LED "TIMEOUT" glows - check connection to P33
• XDIO: If LED "NO SPI" glows - check internal SPI communication cable (10 pole cable)</td></tr>
<tr><td>Internal Valves Not Working Properly</td><td>Connection failure</td><td>• Check electrical connection of valves
• XPSA: If red LED "TIMEOUT" glows - check connection to P33
• XPSA: LED "TIMEOUT" dark - check power connection to XPSA (2-pole cable br/wht)</td></tr>
</table>

8.3 Solving Problems Not Indicated by Status Messages

Situation	Description	Recommended Actions
External Valves Not Working Properly	Valves connected to digital outputs	See "Digital outputs not working properly"
	Valves not connected to digital outputs	Check external valve controller
Serial Communication Not Working Properly	External failure	Check external circuitry for failures
	Connection failure	• XPSA: If red LED "TIMEOUT" glows - check connection to P33 • Check installation of interface module (SIF 232 or 485)
Fluctuating or Invalid Readout	Leak in gas path	Perform a leak test
	Ambient air contains high concentration of measured gas component	• Check absorber (at chopper/ measuring cell) and replace if need be. • Purge instrument with inert (neither absorbing, nor interfering) gas
	Fluctuating gas pressure	• Check gas path before and behind cell and sensor • Remove restriction behind gas outlet • Reduce gas flow or pump rate
	Sensor or detector not connected	Check detectors connections
	Electrochemical Oxygen sensor worn-out	Check sensor and replace if need be
	IR channel: Source not connected or defective	• Check connections: X3 (1/2) / source channel 1 X3 (4/5) / source channel 2 • If source housing is cold: Exchange all sources in case of multi-channel analyzer / replace source if need be (see service manual)

8.3 Solving Problems Not Indicated by Status Messages

Situation	Description	Recommended Actions
Fluctuating or Invalid Readout (continued)	Analog preamplifier of affected channel defective	Check measuring point (☞ page 8-19)
	Gas path(s) polluted	• Check analysis cells and windows for pollution • Clean polluted parts (see service manual) • Check gas paths for pollution and clean gas paths if need be
	Wrong pressure value used for compensation	• Set ambient pressure to proper value (☞ page 6-61) • Sensor failure (☞ status message "PressSensor“, page 8-10)
	Condensation inside gas path	• Check temperature of gas path(s) • Remove all sources of condensation • Keep all temperatures at least 10 °C above dew point
Readout Damping Time Too Long	Wrong signal damping settings	Check signal damping (☞ page 6-47)
	Pump rate too low	• Distance between sampling point and analyzer too long • Replace pump by external model with higher pump rate (operate in bypass mode, ☞ page 4-5)
	Gas path(s) polluted	• Check gas path and sample handling system for pollution • Clean gas path

8.3 Solving Problems Not Indicated by Status Messages

Situation	Description	Recommended Actions
No Gas Flow	Sample gas pump (option) switched off	Switch on sample gas pump (☞ page 6-5)
	Membrane of sample gas pump defective	Replace sample pump membrane
	Sample gas pump defective	Replace sample gas pump
	Solenoid valves (option) not opened / defective	External valves: • Check connection between valves and digital outputs All valves: • Check valve seat and replace if need be • Replace solenoid valves • For valve control via serial interface or digital inputs: • Any valve activated?
	Gas path(s) polluted	• Check gas path and sample handling system for pollution • Clean gas path

8.4 Troubleshooting on Components

This section gives information on how to check and replace internal components.

Some work described on the next pages need to be carried out by qualified personnel only, and may require special tools, to ensure the instrument or component is not damaged or disadjusted!

WARNING

ELECTRICAL SHOCK HAZARD

Working at opened and powered instruments means working near live parts and is subject to instructed and trained personnel only!

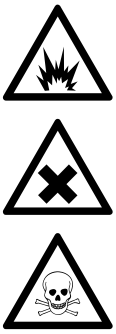
WARNING

ELECTRICAL SHOCK HAZARD

Live parts are accessible when working at open instruments!

Take care to observe all applicable safety instructions!

8.4 Troubleshooting on Components



⚠ WARNING

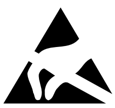
HAZARD FROM EXPLOSIVE, FLAMMABLE AND HARMFUL GASES

Before opening gas paths they must be purged with ambient air or neutral gas (N2) to avoid hazards caused by toxic, flammable, explosive or harmful to health sample gas components!

⚠ CAUTION

HIGH TEMPERATURES

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



⚠ CAUTION

ELECTROSTATIC DISCHARGE HAZARD

Working at internal components of electronical and electrical instruments may cause electrostatic discharge (ESD), destroying components!

We recommend special antistatic workplaces for working at open instruments! If no such workplace is available, at minimum perform the following procedures to not destroy electronic components:

Discharge the electric charge from your body. Do this by touching a device that is grounded electrically (e.g. instruments with earth connectors, heating installations). This should be done periodically when working at open instruments (especially after leaving the service site, because e.g. walking on low conducting floors might cause additional ESD).

8.4 Troubleshooting on Components

8.4.1 Opening X-STREAM Analyzers

WARNING

ELECTRICAL SHOCK HAZARD

Live parts are accessible when working at open instruments!

Take care to observe all applicable safety instructions!

8.4.1.1 How to Open X-STREAM XEGP

Remove the top cover after loosening the 12 screws.
If your instrument features an internal heated box, ☞ fig. 8-4 on next page for information on how to open.

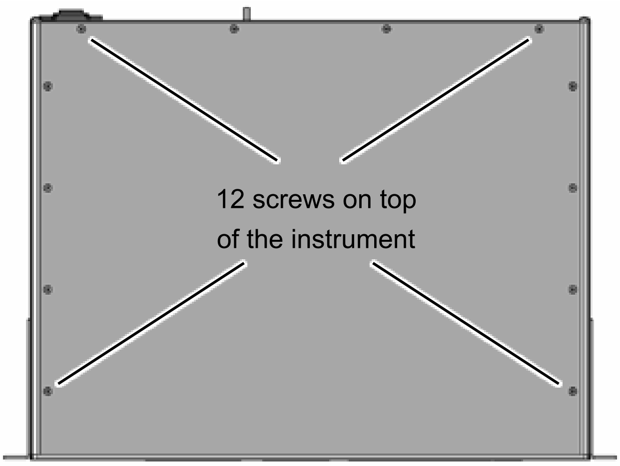


Fig. 8-2: *X-STREAM XEGP*

8.4.1.2 How to Open X-STREAM XEGC

Loosen the 4 screws for the cover, push the cover towards the rear and remove it.

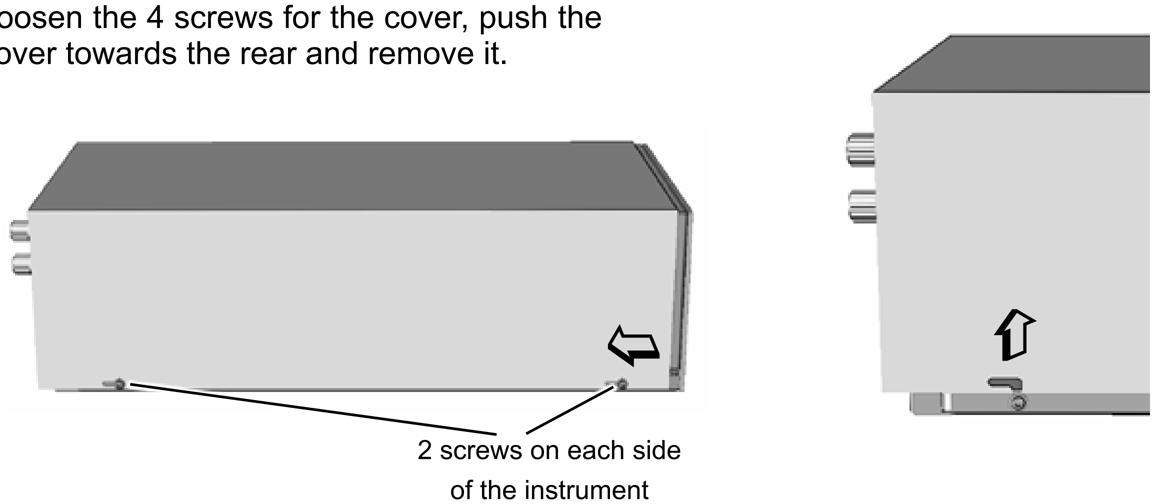


Fig. 8-3: *X-STREAM XEGC*

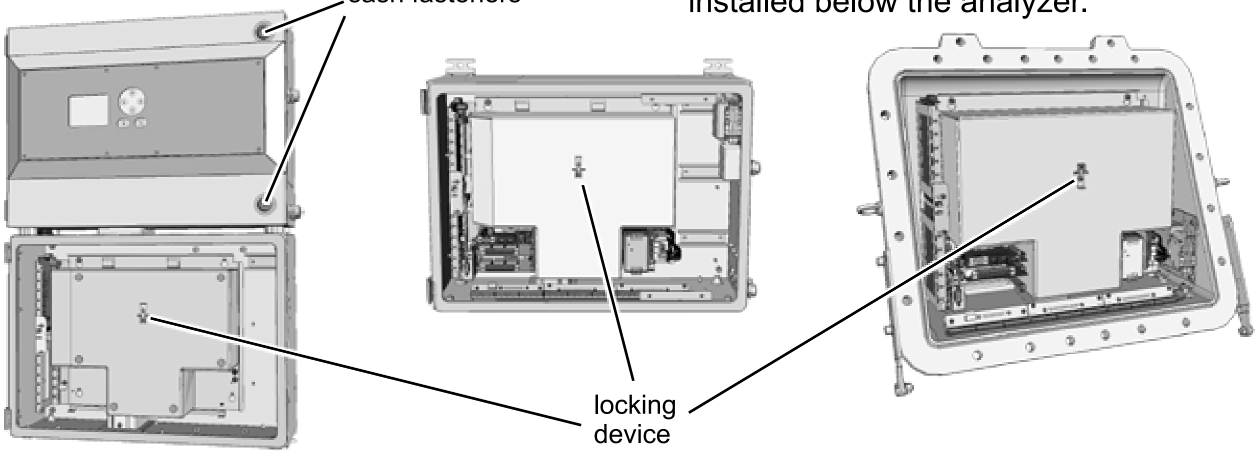
8.4 Troubleshooting on Components

8.4.1.3 How to Open X-STREAM XEF / XDF

Depending on the individual analyzer configuration, either open the upper or lower front door to the left, utilizing the two sash fasteners.

8.4.1.4 How to Open X-STREAM XEFD

To open a X-STREAM XEFD loosen the 20 screws located at the instrument´s flange. Then carfeully flip down the front door to not damage the instrument, hinges or equipment installed below the analyzer.

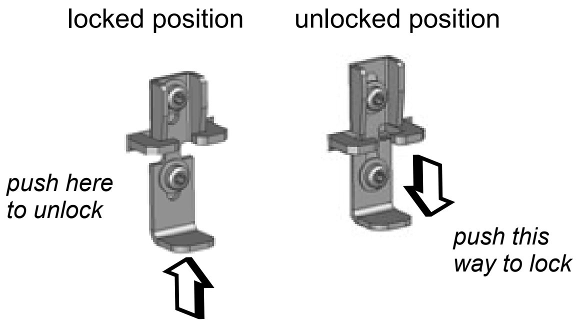


Note 1!

The internal box covering the physical components, as shown in this figure, is optional and may not be installed in your specific instrument!

Note 2!

To remove the box loosen the 2 screws of the locking device, push it´s slider upwards as shown to the right, and take out the box to the frontside of the instrument!



Locking device details

Fig. 8-4: *X-STREAM Field Housings - Interior Views (shown Without Front Doors)*

⚠ WARNING

EXPLOSION HAZARD

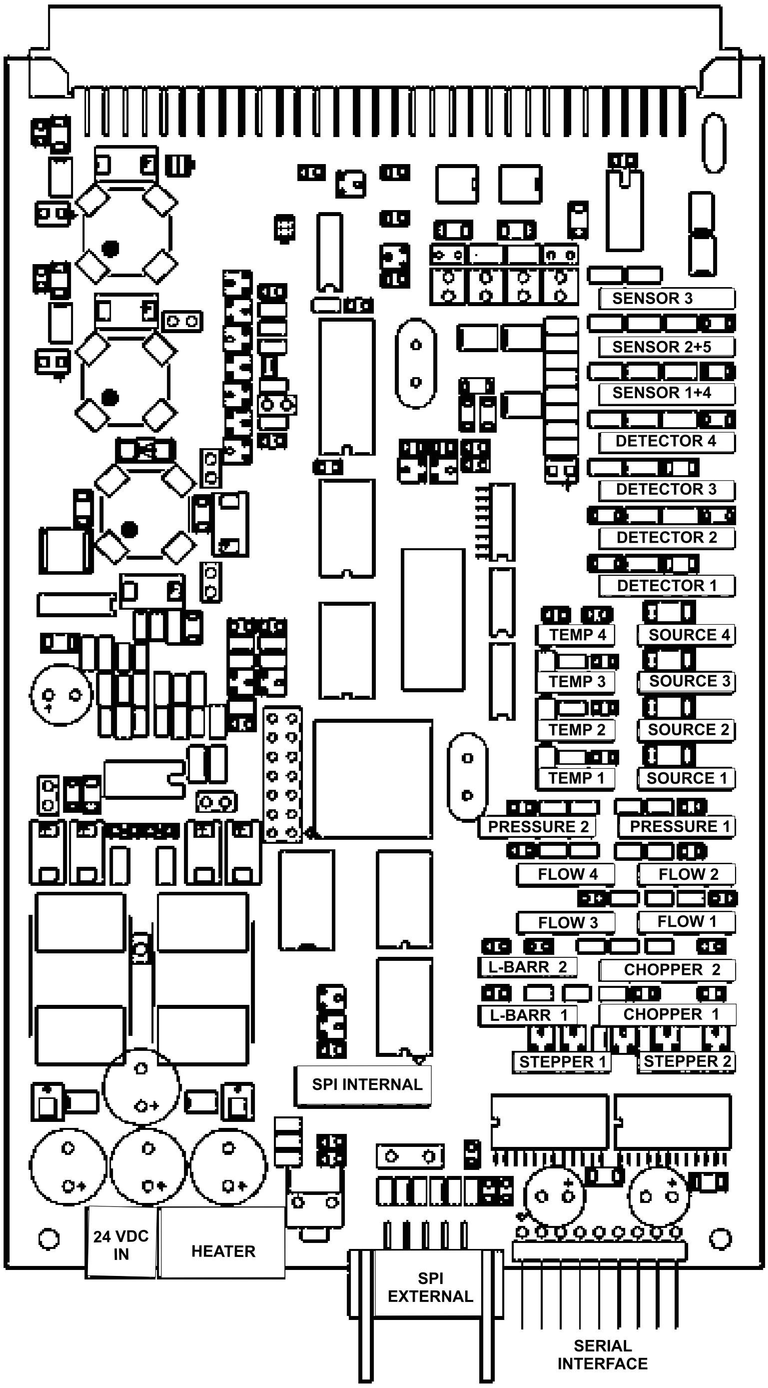
Special variations of X-STREAM XEF and XDF. as well as X-STREAM XEFD may be installed in hazardous areas.

Maintaining such instruments is permitted only considering special conditions, given in the related separate manuals.

Do not open nor maintain instruments in hazardous areas without having read and understood all associated instruction manuals!

8.4 Troubleshooting on Components

8.4.2 Signal Connectors on XSP Board



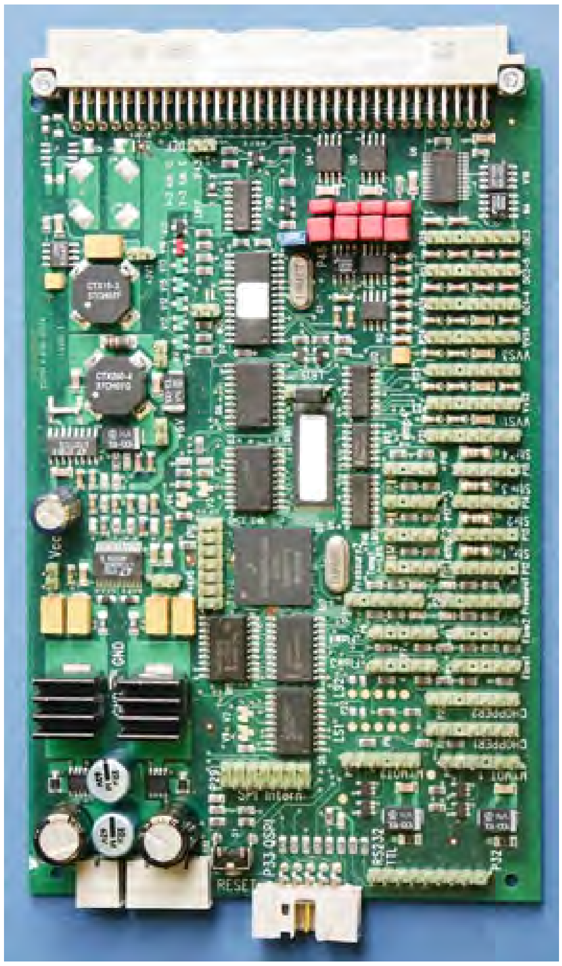
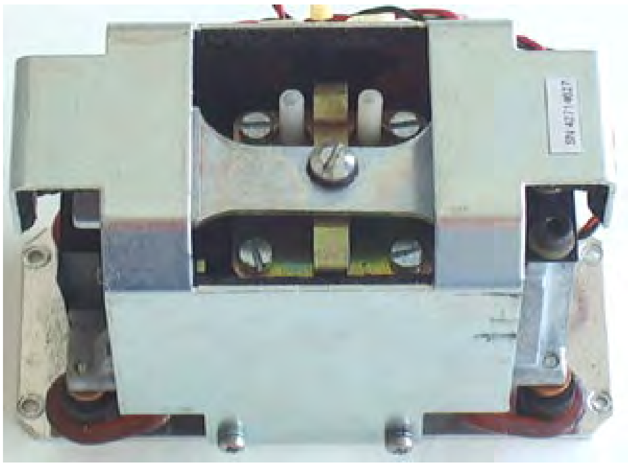


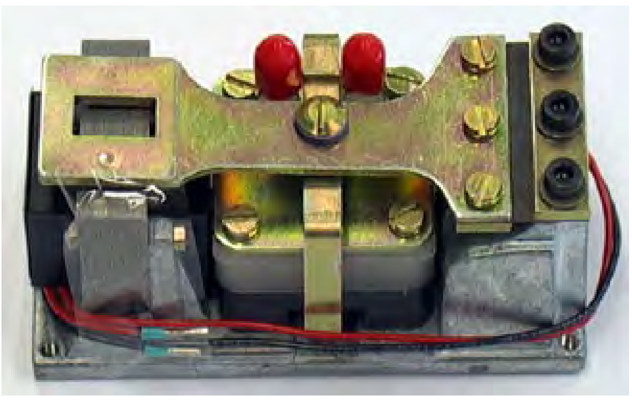
Fig. 8-5: *XSP - Allocation of Signal Connectors*

8.4.3 Sample Pump: Replacement of Diaphragm

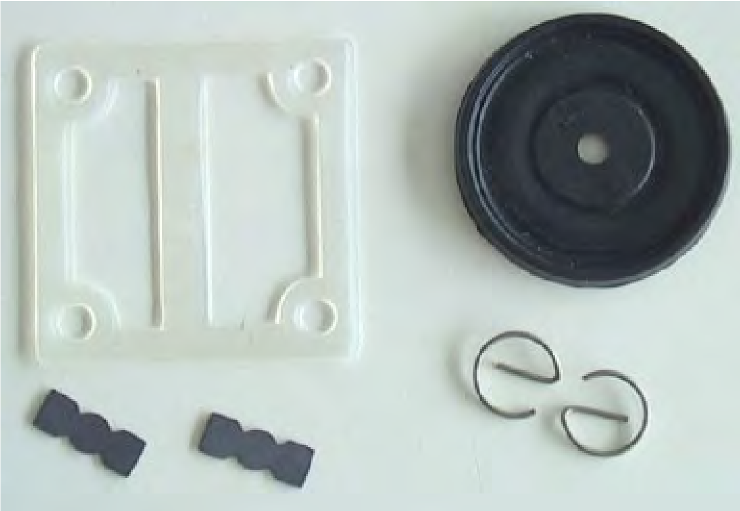


This instruction explains the procedure to replace the diaphragms of sample gas pumps (PN 42716569) used in the X-STREAM series gas analyzers.

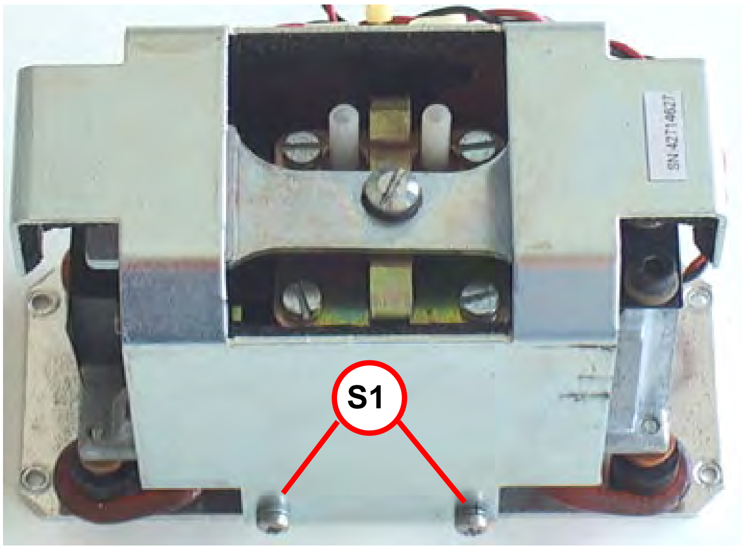
To do so you need to dismantle the pump from your analyzer.



8.4 Troubleshooting on Components



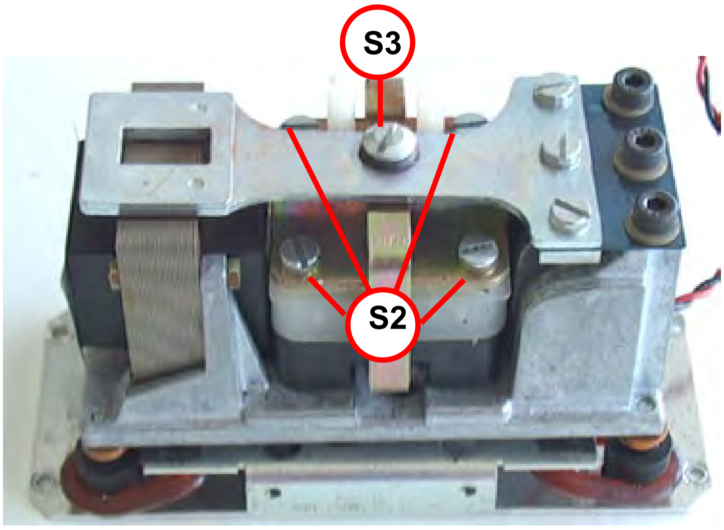
Required parts for the spare parts kit for the pump (PN 0375946).



Step 1:

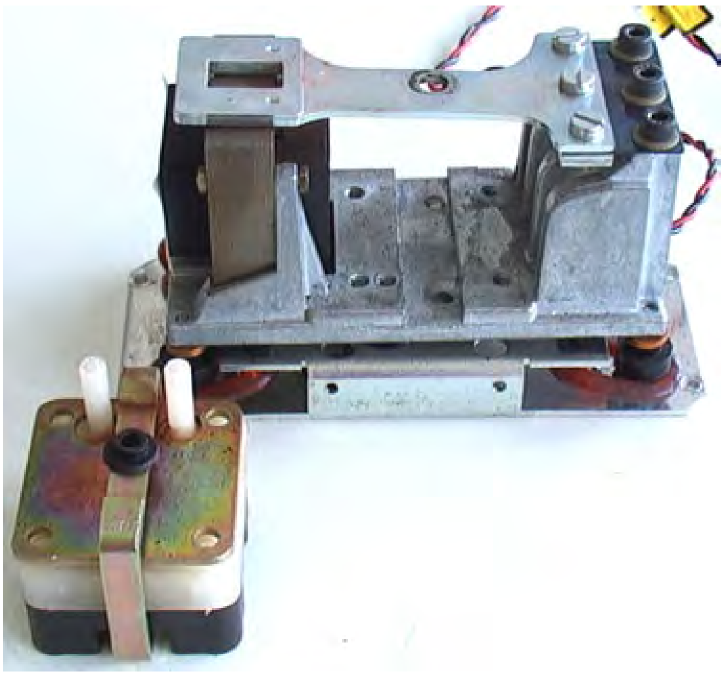
If applicable:

Remove the screws **S1** on both sides of the pump. Take off the cover.



Step 2:

Remove the screws **S2** and screw **S3**.



Step 3:

Take out the pump assembly.

Step 4:

Mark the pump assy. before disassembly.

Step 5:

Remove the white block.

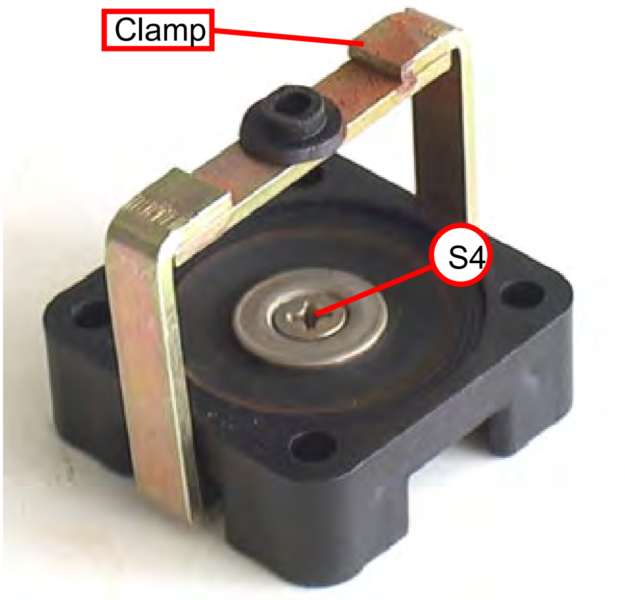
Step 6:

Remove the teflon gasket.

Step 7:

Remove the remaining two pump parts.

Clean the white plate for the gas in- and outlet.

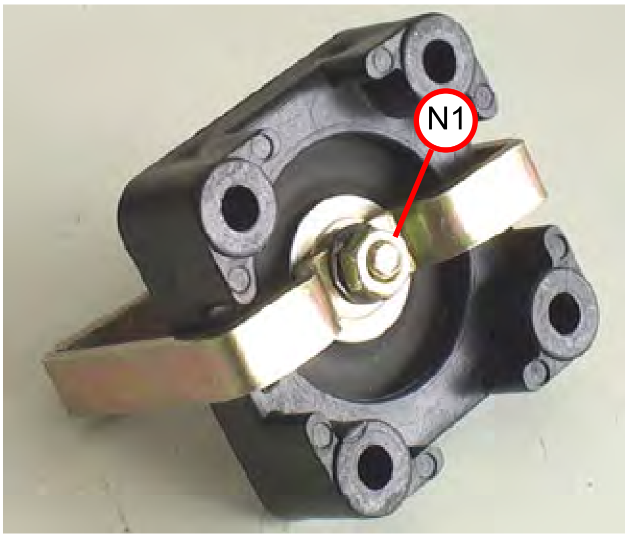


Step 8:

Disassemble the lower block and the clamp.

Loosen the screw **S4** and

the nut **N1**.



Step 9:

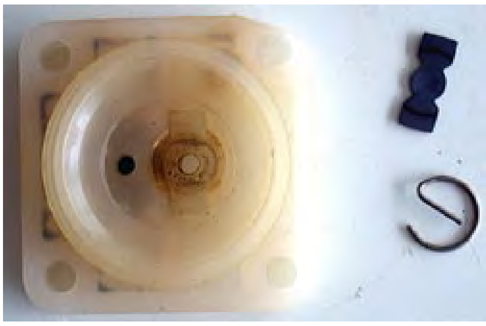
Remove the two washers on the dia-phragm.

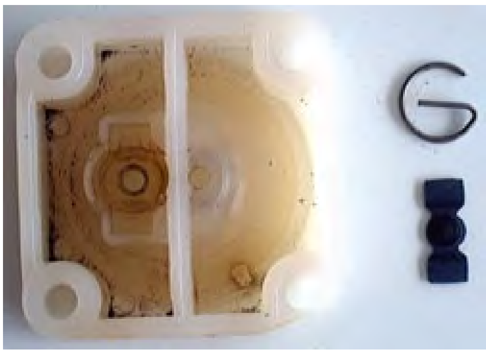
Step 10:

Replace the old with the new dia-phragm and assemble the washers and the clamp in reverse order (step 9 and 8).

Step 11:

Remove the locking springs on both sides of the white block and take out the old diaphragms on both sides.



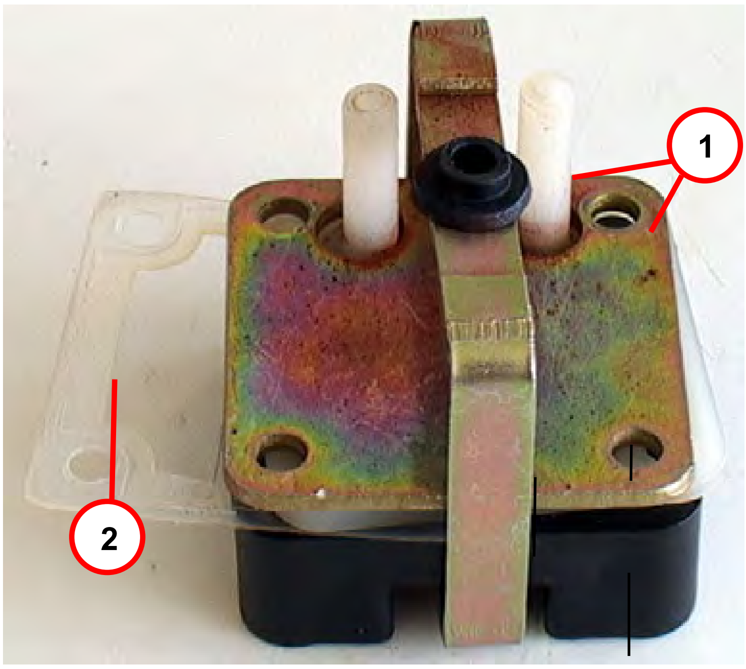


8.4 Troubleshooting on Components

Step 12:

Clean the white block.

Afterwards put in the new dia-phragms and fix them with the new locking springs.

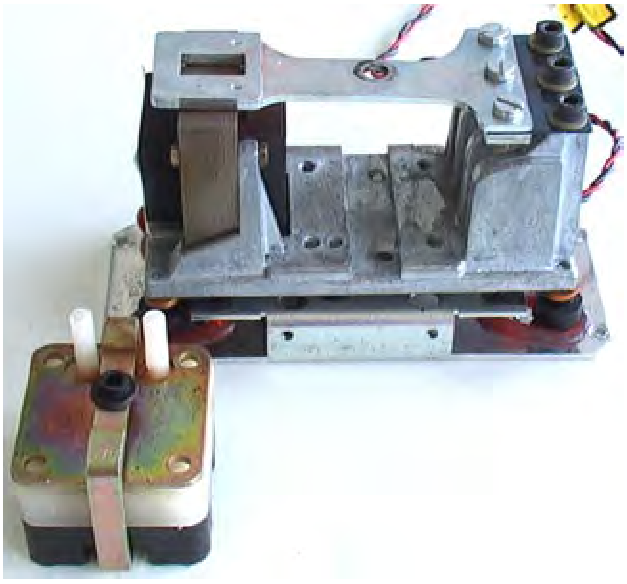


Step 13:

Assemble the pump assy. Take care of your marker (☞ step 4)

1. Put the two upper plates under the clamp (☞ steps 6 & 7 for reference).

2. Put the white block and the **new** teflon gasket between the lower block and the in-outlet plate.

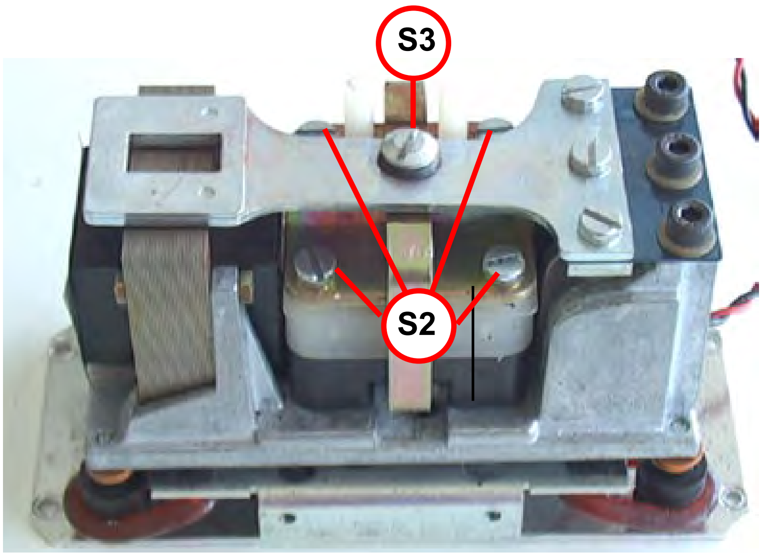


Step 14:

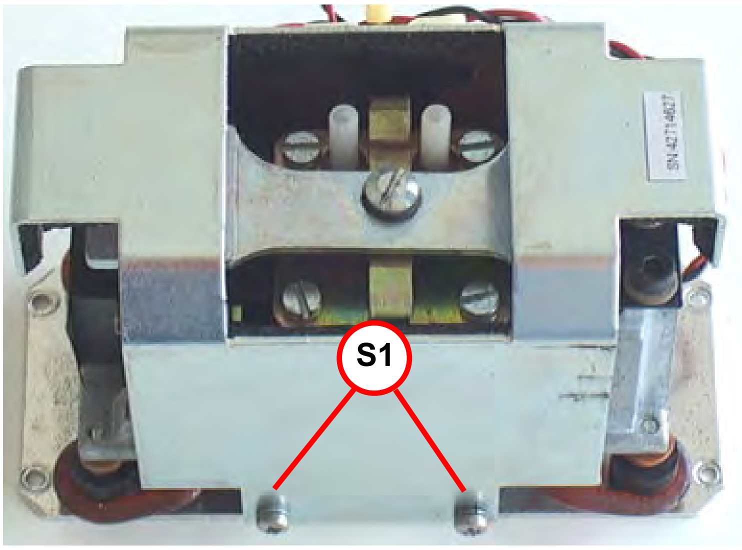
Assemble the pump assy in reverse order.

Put it in the pump housing and fix it with the screws **S2**.

Fix the clamp with screw **S3** and the black buffer.



8.4 Troubleshooting on Components



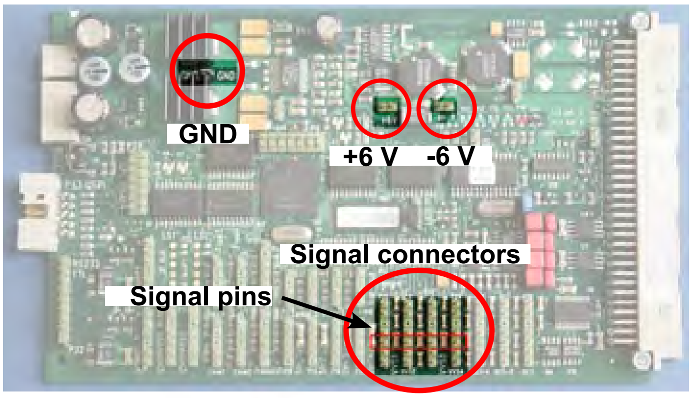
Step 15:

If applicable:

Install the cover and fix it with screws **S1** at both sides.

Finally re-install the pump into your analyzer, to complete the replacement of pump diaphragm.

8.4.4 Paramagnetic Oxygen Cell for Standard Applications: Adjustment of Physical Zero



To adjust the physical zero you need to measure some voltages on the XSP board:

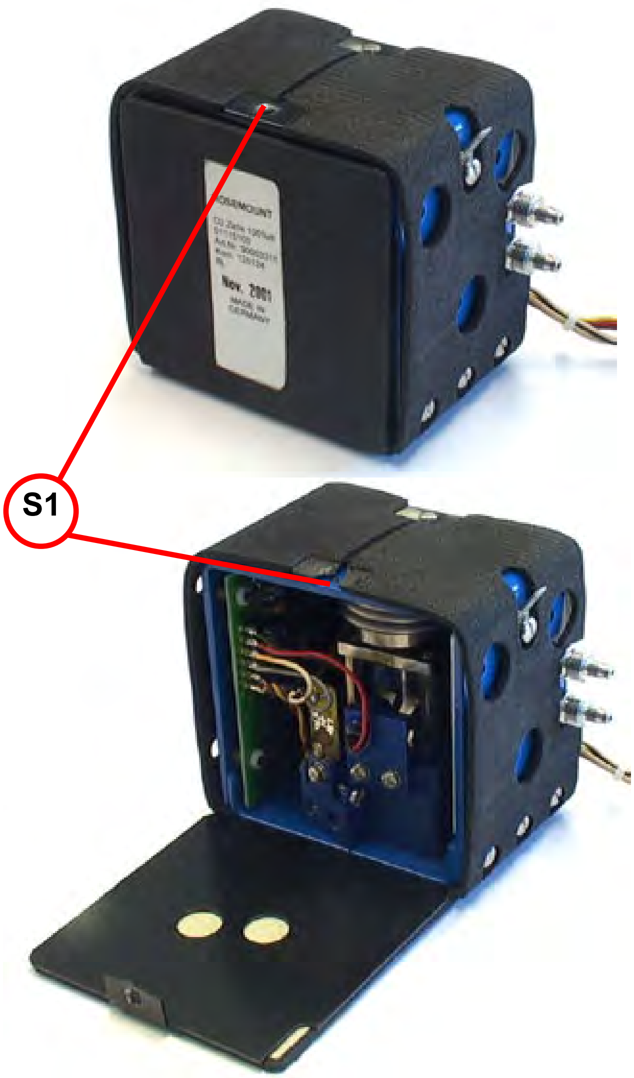
Depending on which channel the cell is assigned to, the measuring signal (+) can be measured at pin 3 of the related connector. GND (-) is available at a separate pin (see figure).

The measured voltage should be

0 V ± 50 mV.

The cell contains strong magnets!

Use only non-magnetic tools to adjust the zero point!



Step 1:

The figure to the left shows a heated paramagnetic oxygen cell.

Note!

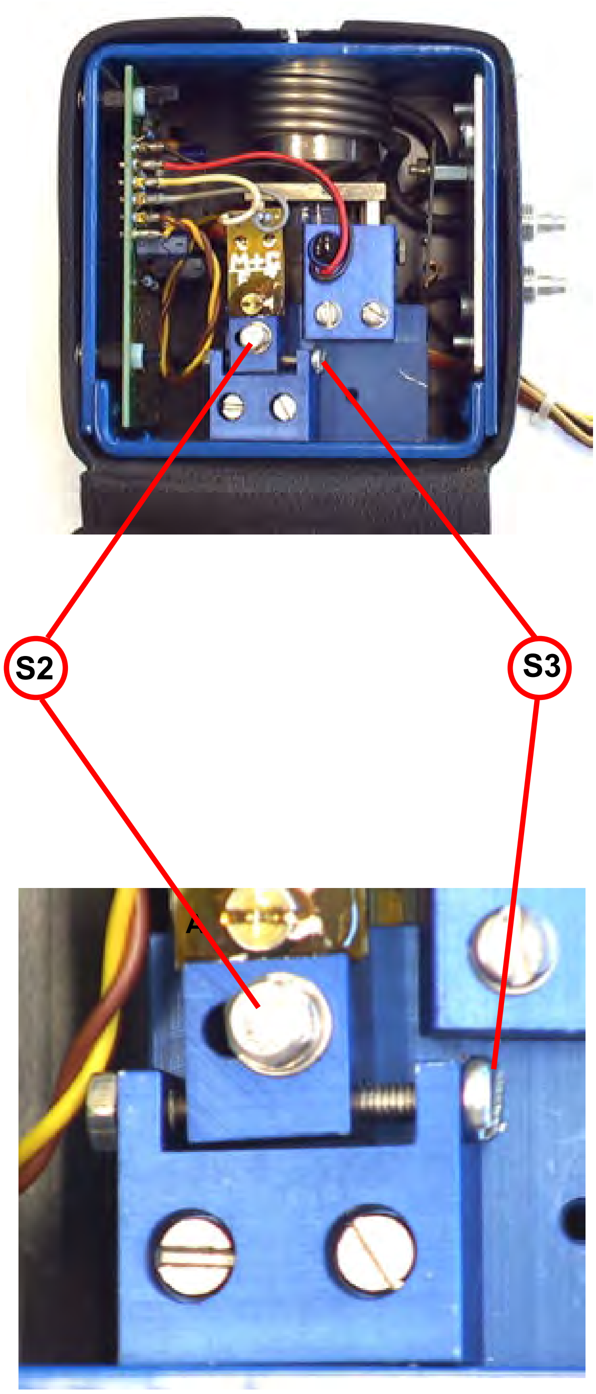
Depending on your specific instrument alternatively an unheated cell may be installed.

In this case skip step 2 and continue with step 3.

Step 2:

Open the cell cover by loosening the screw **S1** at the top.

8.4 Troubleshooting on Components



Step 3:

Apply N2 to the analyzer.

Step 4:

Carefully loosen the screw **S2**.
Now you can adjust the physical zero point with screw **S3**.
Turn the screw carefully.

The cell´s electronic is light sensitive: When exposed to light while adjusting the zero point utilizing screw S3, a zero point shift may arise after the cover is closed.

Tip:
Shade the cell with a cloth when adjusting screw S3.

Step 5:

Tighten the screw **S2** with care, close the cover and check the zero point again.
Note!
If the cell itself does not provide a cover, close the instrument while checking the cell!

You might have to re-adjust the zero point several times until it remains at the expected value.

8.4 Troubleshooting on Components

Step 6:

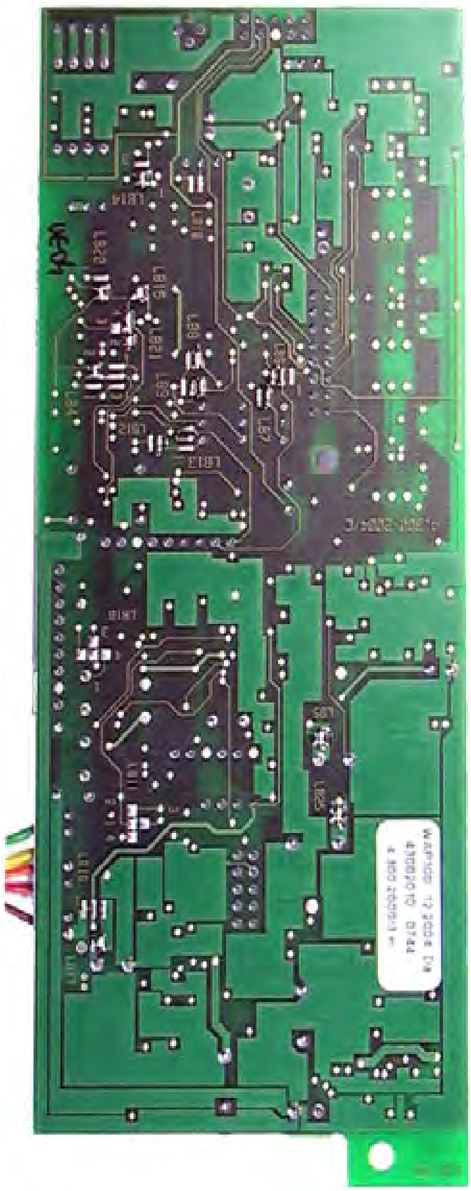
Fix the closed cell´s cover with screw **S1**.

This completes the zero point adjustment procedure.

8.4.5 Thermal Conductivity Cell: Adjustment of Output Signal

To adjust the zero signal of this measuring cell you need to have access to both sides of the related electronics board WAP 100.

A digital voltmeter (DVM) is required to measure and adjust several voltages!

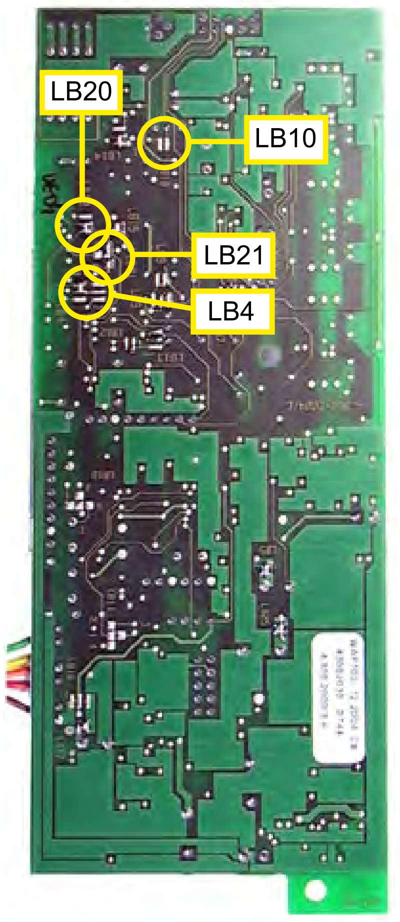


8.4 Troubleshooting on Components

Step 1:

Check the solder bridges, located at the solder side of the board, for proper configuration:

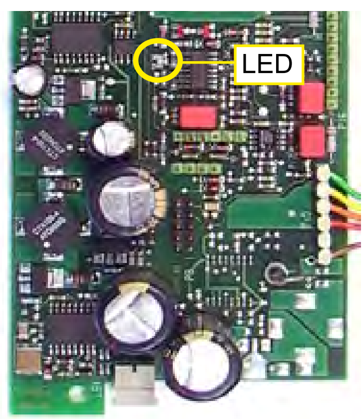
LB10	open
LB4 2-5	closed
LB21 1-4	closed
LB20	open

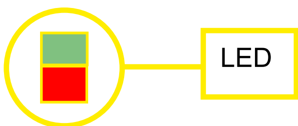


Step 2:

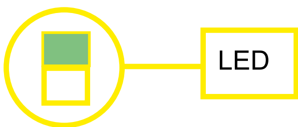
Switch on the analyzer.

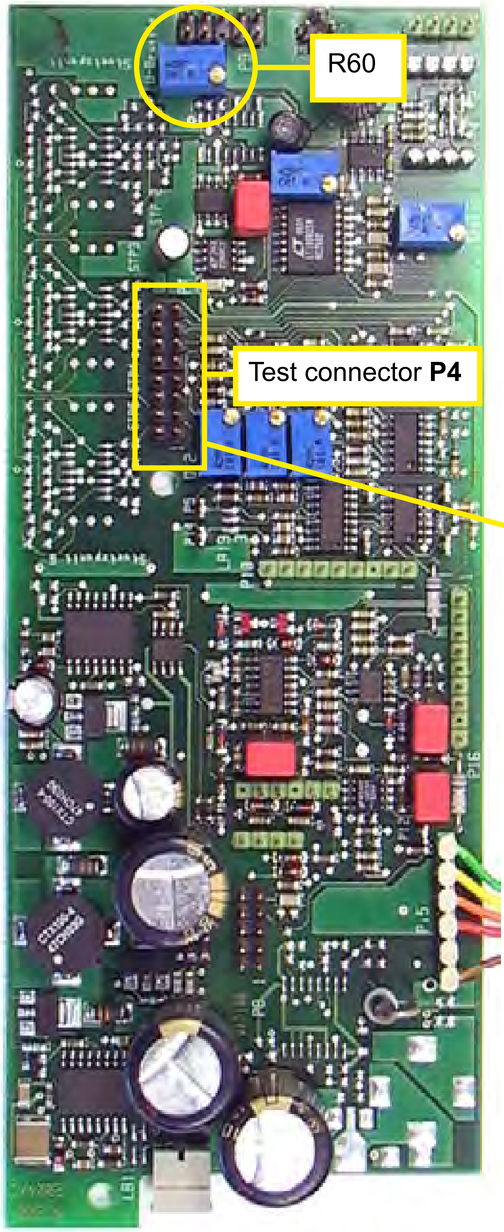
The onboard LED will light up red and green.





When the warmup time has elapsed, the LED flashes green.



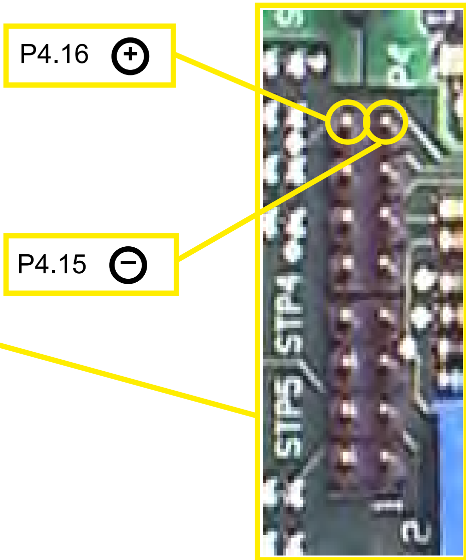


Step 3:

Locate test connector P4 to **measure the bridge voltage**:

P4.16	Bridge voltage (+)
P4.15	Bridge voltage (-); GND

CAUTION!
Do not short-circuit pins!

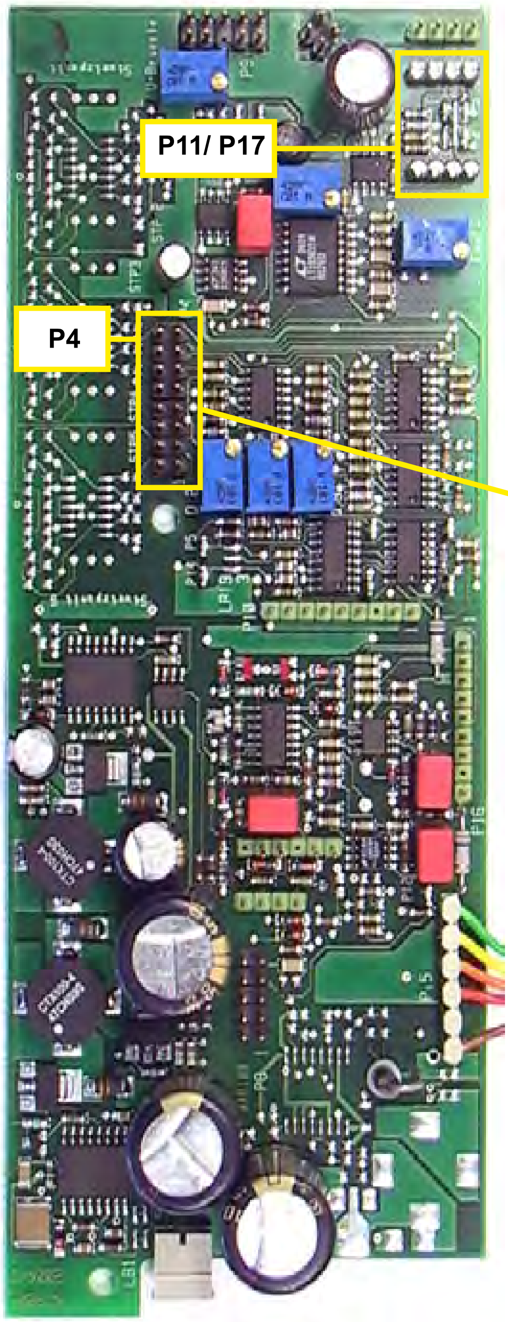


Alternatively the GND signal (-) is accessible on the main board BKS, too: Locate X11 (☞ fig. 8-3, page 8-16) .

The bridge voltage depends on range and sample gas and should be between 3V and 5V.

Only if the WAP 100 board has been replaced, it is necessary to adjust the voltage with potentio-meter R60.

8.4 Troubleshooting on Components



Step 4:

To **adjust the physical zero point**:

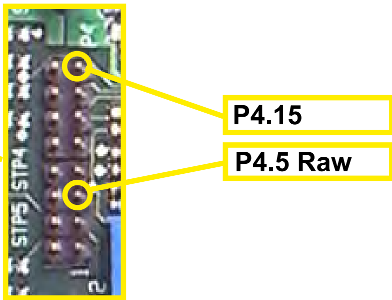
Apply zero gas to the analyzer.

Connect the DVM to the following pins:

P4.5 Raw signal (+)

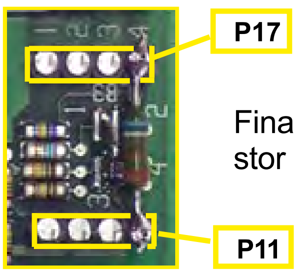
P4.15 Bridge voltage (-); GND

CAUTION!
Do not short-circuit pins!



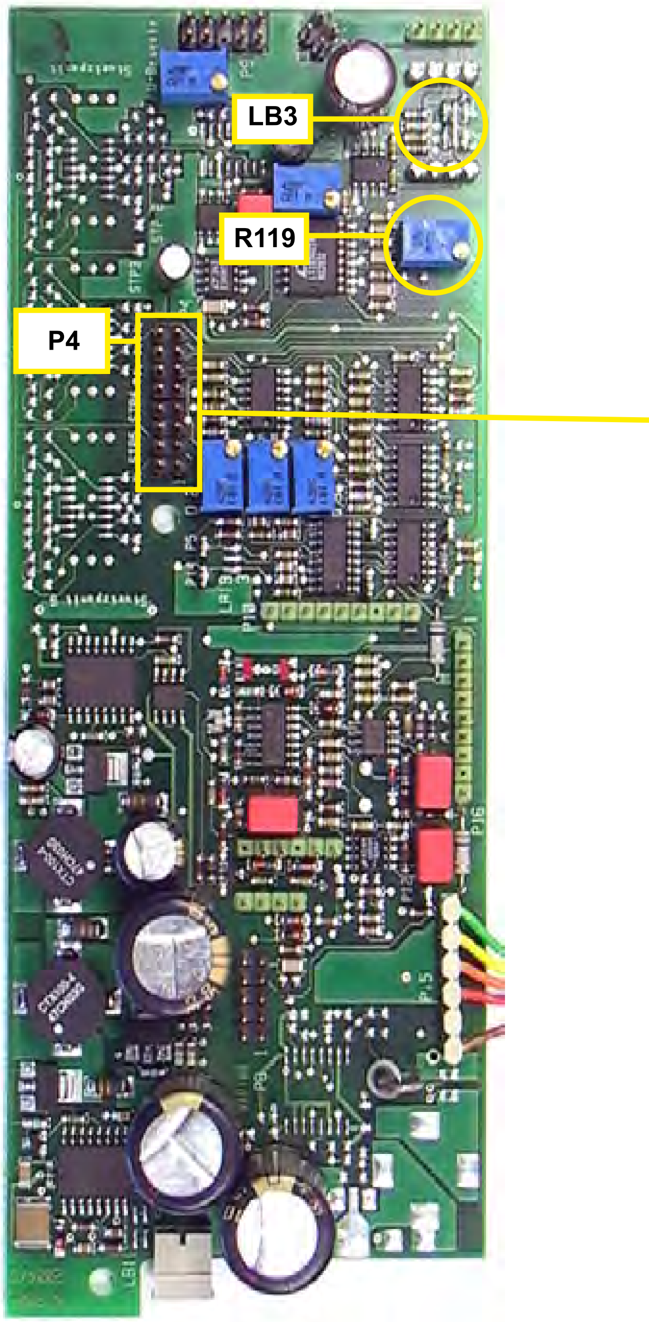
To adjust the physical zero point, it is necessary to install a resistor between **P11/ P17** at position 1, 2, 3 or 4 (the following figure shows it at position 4). The position and value depends on the individual cell parameters. Proper configuration is a result of "try and error"!

Change resistor and/or position until the voltage is **0 V ± 500 mV**.



Finally solder in the resistor between P11/ P17.

8.4 Troubleshooting on Components



Step 5:

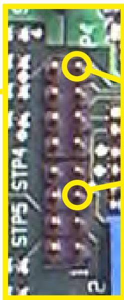
To **adjust the physical span**:

Apply span gas to the analyzer.

Do not disconnect the DVM:

P4.5 Raw signal (+)
P4.15 Bridge voltage (-); GND

CAUTION!
Do not short-circuit pins!



Adjust the voltage to **10V** utilizing **R119**.

If 10V is not within the adjustable range, it is necessary to change the signal amplification with **solder bridge LB3**:

For an amplification factor of	close
20	1-5
150	3-5
300	4-5
500	2-3-4-5

Step 6:

Now once more check the zero point:

Apply zero gas to the analyzer.

Do not disconnect the DVM:

The voltage should be **0 V ± 500 mV.**

If it does not, repeat from step 3!

8.4 Troubleshooting on Components

Step 7:

To **finetune the physical zero point**:

Close solder bridge LB10.

Apply zero gas to the analyzer.

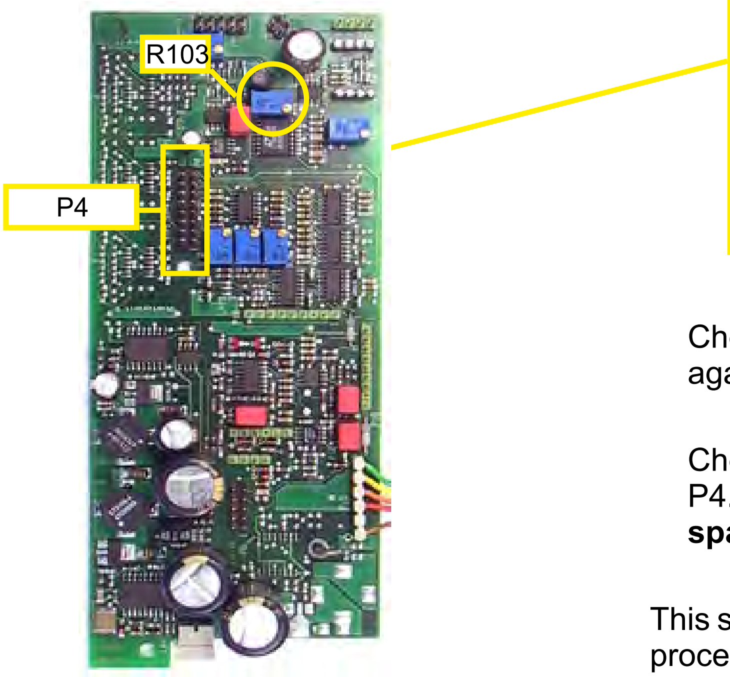
Do not disconnect the DVM:

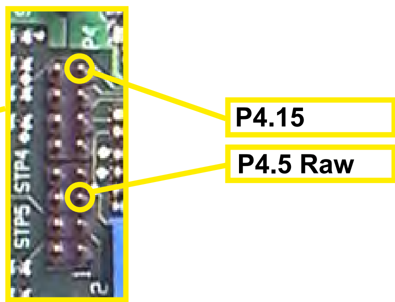
P4.5	Raw signal (+)
P4.15	Bridge voltage (-); GND

CAUTION!

Do not short-circuit pins!

Now you can finetune the zero point to a minimum value, using R103.





Check the zero point with **zero gas** again and perform a **zero calibration**.

Check the full scale signal (10V at P4.5) with **span gas** and perform a **span calibration**.

This step completes the adjustment of output procedure.

Chapter 9
Modbus Functions

9.1 Abstract

This chapter lists all Modbus functions and registers supported by X-STREAM gas analyzers.

Refer to the *www.Modbus-IDA.org* website for detailled documentation about programming the interface. At date of creation of this instruc-tion manual the following documents were used:

- MODBUS Protocol Specification: Modbus_Application_Protocol_V1_1a.pdf
- MODBUS Serial Line Implementation Guide: Modbus_over_serial_line_V1.pdf.

For a list of

supported functions ☞ page 9-2

supported parameters and registers,

ordered by parameter tag name ☞ page 9-22
ordered by register number ☞ page 9-20

9.1.1 Modbus TCP/IP

Before using Modbus TCP/IP take care to configure the communication properly: ☞ 6-79.

For Modbus TCP/IP the analyzer is factory configured to support DHCP servers: The moment, the powered instrument is connected to a DHCP server via ethernet, it will receive a valid IP address and become visible in the network.

If no DHCP server is available, configure the IP address manually ☞ 6-79.

9.2 Supported Functions

Modbus Function	Function Code		Note [1)]
	decimal	(hex)	
ReadCoils	01	(0x01)	for registers of 2000
ReadDiscreteInputs	02	(0x02)	for registers of 1000
ReadHoldingRegisters	03	(0x03)	for registers of 3000, 8000, 9000
ReadInputRegisters	04	(0x04)	for registers of 4000, 8000, 9000
WriteSingleCoil	05	(0x05)	for registers of 2000
WriteSingleRegister	06	(0x06)	for registers of 3000
Diagnostic	08	(0x08)	sub function "00 = Return Query Data" only
WriteMultipleCoils	15	(0x0F)	for registers of 2000
WriteMultipleRegisters	16	(0x10)	for registers of 3000, 8000, 9000

[1)] Registers ranges 8000 and 9000 are **Daniel** long word or floating point registers.
To calculate the related **Modicon** registers use the following table:

Daniel		Modicon	Data type
8001 - 8499	equals	5001 - 5999	long word
9001 - 9999	equals	6001 - 7999	floating point

or ☞ the following pages for comparisons of all Daniel and Modicon registers.

9.3 List of Parameters and Registers - Sorted by Tag Name

Note!

The client access column in the following list provides information about the read only (RO) or read/write (R/W) access restrictions for each parameter.
All parameters with read/write access, as well as tag names beginning with "Service." require entering the service level access code into register 3008 (parameter "Service.RemoteSecurity"), to enable write access.

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Control.Acknowledge.AllStates	2091	2091	Boolean	R/W	0=no effect, 1=Acknowledge device's states
Control.Acknowledge.Failure	2092	2092	Boolean	R/W	0=no effect, 1=Acknowledge device's Namur Failure alarms
Control.Acknowledge.FctChecks	2095	2095	Boolean	R/W	0=no effect, 1=Acknowledge device's Namur FctCheck alarms
Control.Acknowledge.LevelAlarms	2096	2096	Boolean	R/W	0=no effect, 1=Acknowledge device's level alarms
Control.Acknowledge.MaintRequests	2094	2094	Boolean	R/W	0=no effect, 1=Acknowledge device's Namur MaintRequ alarms
Control.Acknowledge.OffSpecs	2093	2093	Boolean	R/W	0=no effect, 1=Acknowledge device's Namur Off-spec alarms
Control.ApplyGas.PumpState1	2081	2081	Boolean	R/W	Pump1 state (0=Off, 1=On)
Control.ApplyGas.PumpState2	2082	2082	Boolean	R/W	Pump1 state (0=Off, 1=On)
Control.ApplyGas.SampleValve1	2051	2051	Boolean	R/W	0=close all valves, 1=open sample valve comp1
Control.ApplyGas.SampleValve2	2052	2052	Boolean	R/W	0=close all valves, 1=open sample valve comp2
Control.ApplyGas.SampleValve3	2053	2053	Boolean	R/W	0=close all valves, 1=open sample valve comp3
Control.ApplyGas.SampleValve4	2054	2054	Boolean	R/W	0=close all valves, 1=open sample valve comp4
Control.ApplyGas.SampleValve5	2055	2055	Boolean	R/W	0=close all valves, 1=open sample valve comp5
Control.ApplyGas.Span1Valve1	2061	2061	Boolean	R/W	0=open sample valve, 1=open span1 valve comp1
Control.ApplyGas.Span1Valve2	2065	2065	Boolean	R/W	0=open sample valve, 1=open span1 valve comp2
Control.ApplyGas.Span1Valve3	2069	2069	Boolean	R/W	0=open sample valve, 1=open span1 valve comp3
Control.ApplyGas.Span1Valve4	2073	2073	Boolean	R/W	0=open sample valve, 1=open span1 valve comp4
Control.ApplyGas.Span1Valve5	2077	2077	Boolean	R/W	0=open sample valve, 1=open span1 valve comp5
Control.ApplyGas.Span2Valve1	2062	2062	Boolean	R/W	0=open sample valve, 1=open span2 valve comp1
Control.ApplyGas.Span2Valve2	2066	2066	Boolean	R/W	0=open sample valve, 1=open span2 valve comp2
Control.ApplyGas.Span2Valve3	2070	2070	Boolean	R/W	0=open sample valve, 1=open span2 valve comp3
Control.ApplyGas.Span2Valve4	2074	2074	Boolean	R/W	0=open sample valve, 1=open span2 valve comp4
Control.ApplyGas.Span2Valve5	2078	2078	Boolean	R/W	0=open sample valve, 1=open span2 valve comp5
Control.ApplyGas.Span3Valve1	2063	2063	Boolean	R/W	0=open sample valve, 1=open span3 valve comp1

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Control.ApplyGas.Span3Valve2	2067	2067	Boolean	R/W	0=open sample valve, 1=open span3 valve comp2
Control.ApplyGas.Span3Valve3	2071	2071	Boolean	R/W	0=open sample valve, 1=open span3 valve comp3
Control.ApplyGas.Span3Valve4	2075	2075	Boolean	R/W	0=open sample valve, 1=open span3 valve comp4
Control.ApplyGas.Span3Valve5	2079	2079	Boolean	R/W	0=open sample valve, 1=open span3 valve comp5
Control.ApplyGas.Span4Valve1	2064	2064	Boolean	R/W	0=open sample valve, 1=open span4 valve comp1
Control.ApplyGas.Span4Valve2	2068	2068	Boolean	R/W	0=open sample valve, 1=open span4 valve comp2
Control.ApplyGas.Span4Valve3	2072	2072	Boolean	R/W	0=open sample valve, 1=open span4 valve comp3
Control.ApplyGas.Span4Valve4	2076	2076	Boolean	R/W	0=open sample valve, 1=open span4 valve comp4
Control.ApplyGas.Span4Valve5	2080	2080	Boolean	R/W	0=open sample valve, 1=open span4 valve comp5
Control.ApplyGas.ZeroValve1	2056	2056	Boolean	R/W	0=open sample valve, 1=open zero valve comp1
Control.ApplyGas.ZeroValve2	2057	2057	Boolean	R/W	0=open sample valve, 1=open zero valve comp2
Control.ApplyGas.ZeroValve3	2058	2058	Boolean	R/W	0=open sample valve, 1=open zero valve comp3
Control.ApplyGas.ZeroValve4	2059	2059	Boolean	R/W	0=open sample valve, 1=open zero valve comp4
Control.ApplyGas.ZeroValve5	2060	2060	Boolean	R/W	0=open sample valve, 1=open zero valve comp4
Control.Calibration.Blowback_1	2016	2016	Boolean	R/W	Blowback procedure comp1 (1=start)
Control.Calibration.Blowback_2	2017	2017	Boolean	R/W	Blowback procedure comp2 (1=start)
Control.Calibration.Blowback_3	2018	2018	Boolean	R/W	Blowback procedure comp3 (1=start)
Control.Calibration.Blowback_4	2019	2019	Boolean	R/W	Blowback procedure comp4 (1=start)
Control.Calibration.Blowback_5	2020	2020	Boolean	R/W	Blowback procedure comp5 (1=start)
Control.Calibration.Blowback_All	2025	2025	Boolean	R/W	Blowback procedure all (1=start)
Control.Calibration.Calib_Cancel	2026	2026	Boolean	R/W	Cancel any calibration (1=cancel)
Control.Calibration.ProgSequence	2024	2024	Boolean	R/W	Zero+span calibration all (1=start)
Control.Calibration.Span_1	2006	2006	Boolean	R/W	Span calibration comp1 (1=start)
Control.Calibration.Span_2	2007	2007	Boolean	R/W	Span calibration comp2 (1=start)
Control.Calibration.Span_3	2008	2008	Boolean	R/W	Span calibration comp3 (1=start)
Control.Calibration.Span_4	2009	2009	Boolean	R/W	Span calibration comp4 (1=start)
Control.Calibration.Span_5	2010	2010	Boolean	R/W	Span calibration comp5 (1=start)
Control.Calibration.Span_All	2022	2022	Boolean	R/W	Span calibration all (1=start)
Control.Calibration.Zero_1	2001	2001	Boolean	R/W	Zero calibration comp1 (1=start)
Control.Calibration.Zero_2	2002	2002	Boolean	R/W	Zero calibration comp2 (1=start)
Control.Calibration.Zero_3	2003	2003	Boolean	R/W	Zero calibration comp3 (1=start)
Control.Calibration.Zero_4	2004	2004	Boolean	R/W	Zero calibration comp4 (1=start)

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Control.Calibration.Zero_5	2005	2005	Boolean	R/W	Zero calibration comp5 (1=start)
Control.Calibration.Zero_All	2021	2021	Boolean	R/W	Zero calibration all (1=start)
Control.Calibration.ZeroSpan_1	2011	2011	Boolean	R/W	Zero+span calibration comp1 (1=start)
Control.Calibration.ZeroSpan_2	2012	2012	Boolean	R/W	Zero+span calibration comp1 (1=start)
Control.Calibration.ZeroSpan_3	2013	2013	Boolean	R/W	Zero+span calibration comp1 (1=start)
Control.Calibration.ZeroSpan_4	2014	2014	Boolean	R/W	Zero+span calibration comp1 (1=start)
Control.Calibration.ZeroSpan_5	2015	2015	Boolean	R/W	Zero+span calibration comp1 (1=start)
Control.Calibration.ZeroSpan_All	2023	2023	Boolean	R/W	Zero+span calibration all (1=start)
Info.ProgramVersion	4011… 4016	4011… 4016	String	RO	software release version
Info.SensorVersion	4026	4026	Word	RO	Version number of sensor firmware
Info.SerialNumber	3141… 3147	3141… 3147	String	RO	serial number of the device
PV1	6001… 6002	9001	Float	RO	Primary Variable 1
PV2	6003… 6004	9002	Float	RO	Primary Variable 2
PV3	6005… 6006	9003	Float	RO	Primary Variable 3
PV4	6007… 6008	9004	Float	RO	Primary Variable 4
PV5	6009… 6010	9005	Float	RO	Primary Variable 5
Service.General.ChannelActive1	3001	3001	Word	R/W	built-in component1
Service.General.ChannelActive2	3002	3002	Word	R/W	built-in component2
Service.General.ChannelActive3	3003	3003	Word	R/W	built-in component3
Service.General.ChannelActive4	3004	3004	Word	R/W	built-in component4
Service.General.ChannelActive5	3005	3005	Word	R/W	built-in component5
Service.General.Identification.CPLDVersion	4028	4028	Word	RO	Version number of CPLD firmware
Service.General.Identification.Manufacturin-gInfo	3251… 3266	3251… 3266	String	RO	Infos stored for manufacturing purpo-ses
Service.General.Identification.ProgramVer-sionDate	4017… 4022	4017… 4022	String	RO	software release date
Service.General.Identification.SensorBuild	4027	4027	Word	RO	Build number of sensor firmware
Service.Measurement.AbsMaxRange1	6323… 6324	9162	Float	R/W	absolute maximum range of comp1
Service.Measurement.AbsMaxRange2	6327… 6328	9164	Float	R/W	absolute maximum range of comp2
Service.Measurement.AbsMaxRange3	6331… 6332	9166	Float	R/W	absolute maximum range of comp3
Service.Measurement.AbsMaxRange4	6335… 6336	9168	Float	R/W	absolute maximum range of comp4
Service.Measurement.AbsMaxRange5	6339… 6340	9170	Float	R/W	absolute maximum range of comp5
Service.Measurement.AbsMinRange1	6321… 6322	9161	Float	R/W	absolute minimum range of comp1

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Service.Measurement.AbsMinRange2	6325… 6326	9163	Float	R/W	absolute minimum range of comp2
Service.Measurement.AbsMinRange3	6329… 6330	9165	Float	R/W	absolute minimum range of comp3
Service.Measurement.AbsMinRange4	6333… 6334	9167	Float	R/W	absolute minimum range of comp4
Service.Measurement.AbsMinRange5	6337… 6338	9169	Float	R/W	absolute minimum range of comp5
Service.Measurement.Compensation.Pfact-Coeffs1	6541… 6548	9271… 9274	Float	R/W	polynom coeffs for pressure factor of comp1
Service.Measurement.Compensation.Pfact-Coeffs2	6549… 6556	9275… 9278	Float	R/W	polynom coeffs for pressure factor of comp2
Service.Measurement.Compensation.Pfact-Coeffs3	6557… 6564	9279… 9282	Float	R/W	polynom coeffs for pressure factor of comp3
Service.Measurement.Compensation.Pfact-Coeffs4	6565… 6572	9283… 9286	Float	R/W	polynom coeffs for pressure factor of comp4
Service.Measurement.Compensation.Pfact-Coeffs5	6573… 6580	9287… 9290	Float	R/W	polynom coeffs for pressure factor of comp5
Service.Measurement.Compensation.PfactE-nable1	3421	3421	Word	R/W	enable pressure span compensation of comp1
Service.Measurement.Compensation.PfactE-nable2	3422	3422	Word	R/W	enable pressure span compensation of comp2
Service.Measurement.Compensation.PfactE-nable3	3423	3423	Word	R/W	enable pressure span compensation of comp3
Service.Measurement.Compensation.PfactE-nable4	3424	3424	Word	R/W	enable pressure span compensation of comp4
Service.Measurement.Compensation.PfactE-nable5	3425	3425	Word	R/W	enable pressure span compensation of comp5
Service.Measurement.Compensation.Pfact-SensorAssign1	3426	3426	Word	R/W	assign press-sensor of span comp1 (0=Man, 1=DSP_P1, 2=DSP_P2 etc.)
Service.Measurement.Compensation.Pfact-SensorAssign2	3427	3427	Word	R/W	assign press-sensor of span comp2 (0=Man, 1=DSP_P1, 2=DSP_P2 etc.)
Service.Measurement.Compensation.Pfact-SensorAssign3	3428	3428	Word	R/W	assign press-sensor of span comp3 (0=Man, 1=DSP_P1, 2=DSP_P2 etc.)
Service.Measurement.Compensation.Pfact-SensorAssign4	3429	3429	Word	R/W	assign press-sensor of span comp4 (0=Man, 1=DSP_P1, 2=DSP_P2 etc.)
Service.Measurement.Compensation.Pfact-SensorAssign5	3430	3430	Word	R/W	assign press-sensor of span comp5 (0=Man, 1=DSP_P1, 2=DSP_P2 etc.)
Service.Measurement.Compensation.Tfact-Coeffs1	6441… 6448	9221… 9224	Float	R/W	polynom coeffs for temperature factor of comp1
Service.Measurement.Compensation.Tfact-Coeffs2	6449… 6456	9225… 9228	Float	R/W	polynom coeffs for temperature factor of comp2
Service.Measurement.Compensation.Tfact-Coeffs3	6457… 6464	9229… 9232	Float	R/W	polynom coeffs for temperature factor of comp3
Service.Measurement.Compensation.Tfact-Coeffs4	6465… 6472	9233… 9236	Float	R/W	polynom coeffs for temperature factor of comp4

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Service.Measurement.Compensation.Tfact-Coeffs5	6473… 6480	9237… 9240	Float	R/W	polynom coeffs for temperature factor of comp5
Service.Measurement.Compensation.Tfact-ConcCoeffs1	6481… 6488	9241… 9244	Float	R/W	polynom coeffs for conc correction of temp factor comp1
Service.Measurement.Compensation.Tfact-ConcCoeffs2	6489… 6496	9245… 9248	Float	R/W	polynom coeffs for conc correction of temp factor comp2
Service.Measurement.Compensation.Tfact-ConcCoeffs3	6497… 6504	9249… 9252	Float	R/W	polynom coeffs for conc correction of temp factor comp3
Service.Measurement.Compensation.Tfact-ConcCoeffs4	6505… 6512	9253… 9256	Float	R/W	polynom coeffs for conc correction of temp factor comp4
Service.Measurement.Compensation.Tfact-ConcCoeffs5	6513… 6520	9257… 9260	Float	R/W	polynom coeffs for conc correction of temp factor comp5
Service.Measurement.Compensation.TfactE-nable1	3411	3411	Word	R/W	enable temperature span compensati-on of comp1
Service.Measurement.Compensation.TfactE-nable2	3412	3412	Word	R/W	enable temperature span compensati-on of comp2
Service.Measurement.Compensation.TfactE-nable3	3413	3413	Word	R/W	enable temperature span compensati-on of comp3
Service.Measurement.Compensation.TfactE-nable4	3414	3414	Word	R/W	enable temperature span compensati-on of comp4
Service.Measurement.Compensation.TfactE-nable5	3415	3415	Word	R/W	enable temperature span compensati-on of comp5
Service.Measurement.Compensation.Tfact-SensorAssign1	3416	3416	Word	R/W	assign temp-sensor of span comp1 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
Service.Measurement.Compensation.Tfact-SensorAssign2	3417	3417	Word	R/W	assign temp-sensor of span comp2 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
Service.Measurement.Compensation.Tfact-SensorAssign3	3418	3418	Word	R/W	assign temp-sensor of span comp3 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
Service.Measurement.Compensation.Tfact-SensorAssign4	3419	3419	Word	R/W	assign temp-sensor of span comp4 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
Service.Measurement.Compensation.Tfact-SensorAssign5	3420	3420	Word	R/W	assign temp-sensor of span comp5 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
Service.Measurement.Compensation.Tfact-Temperature1	6531… 6532	9266	Float	RO	temperature for span compensation of comp1
Service.Measurement.Compensation.Tfact-Temperature2	6533… 6534	9267	Float	RO	temperature for span compensation of comp2
Service.Measurement.Compensation.Tfact-Temperature3	6535… 6536	9268	Float	RO	temperature for span compensation of comp3
Service.Measurement.Compensation.Tfact-Temperature4	6537… 6538	9269	Float	RO	temperature for span compensation of comp4
Service.Measurement.Compensation.Tfact-Temperature5	6539… 6540	9270	Float	RO	temperature for span compensation of comp5
Service.Measurement.Compensation.Toff-Coeffs1	6401… 6408	9201… 9204	Float	R/W	polynom coeffs for temperature offset of comp1
Service.Measurement.Compensation.Toff-Coeffs2	6409… 6416	9205… 9208	Float	R/W	polynom coeffs for temperature offset of comp2

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Service.Measurement.Compensation.Toff-Coeffs3	6417… 6424	9209… 9212	Float	R/W	polynom coeffs for temperature offset of comp3
Service.Measurement.Compensation.Toff-Coeffs4	6425… 6432	9213… 9216	Float	R/W	polynom coeffs for temperature offset of comp4
Service.Measurement.Compensation.Toff-Coeffs5	6433… 6440	9217… 9220	Float	R/W	polynom coeffs for temperature offset of comp5
Service.Measurement.Compensation.ToffE-nable1	3401	3401	Word	R/W	enable temperature zero compensation of comp1
Service.Measurement.Compensation.ToffE-nable2	3402	3402	Word	R/W	enable temperature zero compensation of comp2
Service.Measurement.Compensation.ToffE-nable3	3403	3403	Word	R/W	enable temperature zero compensation of comp3
Service.Measurement.Compensation.ToffE-nable4	3404	3404	Word	R/W	enable temperature zero compensation of comp4
Service.Measurement.Compensation.ToffE-nable5	3405	3405	Word	R/W	enable temperature zero compensation of comp5
Service.Measurement.Compensation.Toff-SensorAssign1	3406	3406	Word	R/W	assign temp-sensor of zero comp1 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
Service.Measurement.Compensation.Toff-SensorAssign2	3407	3407	Word	R/W	assign temp-sensor of zero comp2 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
Service.Measurement.Compensation.Toff-SensorAssign3	3408	3408	Word	R/W	assign temp-sensor of zero comp3 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
Service.Measurement.Compensation.Toff-SensorAssign4	3409	3409	Word	R/W	assign temp-sensor of zero comp4 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
Service.Measurement.Compensation.Toff-SensorAssign5	3410	3410	Word	R/W	assign temp-sensor of zero comp5 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
Service.Measurement.Compensation.Toff-Temperature1	6521… 6522	9261	Float	RO	temperature for zero compensation of comp1
Service.Measurement.Compensation.Toff-Temperature2	6523… 6524	9262	Float	RO	temperature for zero compensation of comp2
Service.Measurement.Compensation.Toff-Temperature3	6525… 6526	9263	Float	RO	temperature for zero compensation of comp3
Service.Measurement.Compensation.Toff-Temperature4	6527… 6528	9264	Float	RO	temperature for zero compensation of comp4
Service.Measurement.Compensation.Toff-Temperature5	6529… 6530	9265	Float	RO	temperature for zero compensation of comp5
Service.Measurement.Lin.CutOff1	7185… 7186	9593	Float	R/W	Linearizer Cut-off value of comp1
Service.Measurement.Lin.CutOff2	7385… 7386	9693	Float	R/W	Linearizer Cut-off value of comp1
Service.Measurement.Lin.CutOff3	7585… 7586	9793	Float	R/W	Linearizer Cut-off value of comp1
Service.Measurement.Lin.CutOff4	7785… 7786	9893	Float	R/W	Linearizer Cut-off value of comp1
Service.Measurement.Lin.CutOff5	7985… 7986	9993	Float	R/W	Linearizer Cut-off value of comp1
Service.Measurement.Lin.Enable1	3501	3501	Word	R/W	Enable Linearizer of comp1

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Service.Measurement.Lin.Enable2	3502	3502	Word	R/W	Enable Linearizer of comp1
Service.Measurement.Lin.Enable3	3503	3503	Word	R/W	Enable Linearizer of comp1
Service.Measurement.Lin.Enable4	3504	3504	Word	R/W	Enable Linearizer of comp1
Service.Measurement.Lin.Enable5	3505	3505	Word	R/W	Enable Linearizer of comp1
Service.Measurement.Lin.Iterations1	3521	3521	Word	RO	Lin-computing iteration steps of comp1
Service.Measurement.Lin.Iterations2	3522	3522	Word	RO	Lin-computing iteration steps of comp1
Service.Measurement.Lin.Iterations3	3523	3523	Word	RO	Lin-computing iteration steps of comp1
Service.Measurement.Lin.Iterations4	3524	3524	Word	RO	Lin-computing iteration steps of comp1
Service.Measurement.Lin.Iterations5	3525	3525	Word	RO	Lin-computing iteration steps of comp1
Service.Measurement.Lin.LinearizerStatus1	3516	3516	Word	RO	Lin, status comp1 (0=Normal, 1=Underflow, 2=Overflow, 3=Undefined)
Service.Measurement.Lin.LinearizerStatus2	3517	3517	Word	RO	Lin, status comp2 (0=Normal, 1=Underflow, 2=Overflow, 3=Undefined)
Service.Measurement.Lin.LinearizerStatus3	3518	3518	Word	RO	Lin, status comp3 (0=Normal, 1=Underflow, 2=Overflow, 3=Undefined)
Service.Measurement.Lin.LinearizerStatus4	3519	3519	Word	RO	Lin, status comp4 (0=Normal, 1=Underflow, 2=Overflow, 3=Undefined)
Service.Measurement.Lin.LinearizerStatus5	3520	3520	Word	RO	Lin, status comp5 (0=Normal, 1=Underflow, 2=Overflow, 3=Undefined)
Service.Measurement.Lin.MaxValue1	7183… 7184	9592	Float	RO	Linearizer Maximum Value of comp1
Service.Measurement.Lin.MaxValue2	7383… 7384	9692	Float	RO	Linearizer Maximum Value of comp2
Service.Measurement.Lin.MaxValue3	7583… 7584	9792	Float	RO	Linearizer Maximum Value of comp3
Service.Measurement.Lin.MaxValue4	7783… 7784	9892	Float	RO	Linearizer Maximum Value of comp4
Service.Measurement.Lin.MaxValue5	7983… 7984	9992	Float	RO	Linearizer Maximum Value of comp5
Service.Measurement.Lin.Method1	3506	3506	Word	R/W	Linearization method of comp1 (0=Splines, 1=Polynom)
Service.Measurement.Lin.Method2	3507	3507	Word	R/W	Linearization method of comp2 (0=Splines, 1=Polynom)
Service.Measurement.Lin.Method3	3508	3508	Word	R/W	Linearization method of comp3 (0=Splines, 1=Polynom)
Service.Measurement.Lin.Method4	3509	3509	Word	R/W	Linearization method of comp4 (0=Splines, 1=Polynom)
Service.Measurement.Lin.Method5	3510	3510	Word	R/W	Linearization method of comp5 (0=Splines, 1=Polynom)
Service.Measurement.Lin.MinValue1	7181… 7182	9591	Float	RO	Linearizer Minimum Value of comp1
Service.Measurement.Lin.MinValue2	7381… 7382	9691	Float	RO	Linearizer Minimum Value of comp2
Service.Measurement.Lin.MinValue3	7581… 7582	9791	Float	RO	Linearizer Minimum Value of comp3

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Service.Measurement.Lin.MinValue4	7781… 7782	9891	Float	RO	Linearizer Minimum Value of comp4
Service.Measurement.Lin.MinValue5	7981… 7982	9991	Float	RO	Linearizer Minimum Value of comp5
Service.Measurement.Lin.OverflowPerc1	7161… 7168	9581… 9584	Float	R/W	Lin-Overflow [%] for Range1..4 of comp1
Service.Measurement.Lin.OverflowPerc2	7361… 7368	9681… 9684	Float	R/W	Lin-Overflow [%] for Range1..4 of comp2
Service.Measurement.Lin.OverflowPerc3	7561… 7568	9781… 9784	Float	R/W	Lin-Overflow [%] for Range1..4 of comp3
Service.Measurement.Lin.OverflowPerc4	7761… 7768	9881… 9884	Float	R/W	Lin-Overflow [%] for Range1..4 of comp4
Service.Measurement.Lin.OverflowPerc5	7961… 7968	9981… 9984	Float	R/W	Lin-Overflow [%] for Range1..4 of comp5
Service.Measurement.Lin.RangePolySet1	3531… 3534	3531… 3534	Word	R/W	polyn, set of range1..4 comp1 (0=Poly1, 1=Poly2, 2=Poly3, 3=Poly4)
Service.Measurement.Lin.RangePolySet2	3535… 3538	3535… 3538	Word	R/W	polyn, set of range1..4 comp2 (0=Poly1, 1=Poly2, 2=Poly3, 3=Poly4)
Service.Measurement.Lin.RangePolySet3	3539… 3542	3539… 3542	Word	R/W	polyn, set of range1..4 comp3 (0=Poly1, 1=Poly2, 2=Poly3, 3=Poly4)
Service.Measurement.Lin.RangePolySet4	3543… 3546	3543… 3546	Word	R/W	polyn, set of range1..4 comp4 (0=Poly1, 1=Poly2, 2=Poly3, 3=Poly4)
Service.Measurement.Lin.RangePolySet5	3547… 3550	3547… 3550	Word	R/W	polyn, set of range1..4 comp5 (0=Poly1, 1=Poly2, 2=Poly3, 3=Poly4),
Service.Measurement.Lin.Set1Coeffs1	7121… 7130	9561… 9565	Float	R/W	Lin-Polynom. Set1-Coeffs (A0..4) for comp1
Service.Measurement.Lin.Set1Coeffs2	7321… 7330	9661… 9665	Float	R/W	Lin-Polynom. Set1-Coeffs (A0..4) for comp2
Service.Measurement.Lin.Set1Coeffs3	7521… 7530	9761… 9765	Float	R/W	Lin-Polynom. Set1-Coeffs (A0..4) for comp3
Service.Measurement.Lin.Set1Coeffs4	7721… 7730	9861… 9865	Float	R/W	Lin-Polynom. Set1-Coeffs (A0..4) for comp4
Service.Measurement.Lin.Set1Coeffs5	7921… 7930	9961… 9965	Float	R/W	Lin-Polynom. Set1-Coeffs (A0..4) for comp5
Service.Measurement.Lin.Set2Coeffs1	7131… 7140	9566… 9570	Float	R/W	Lin-Polynom. Set2-Coeffs (A0..4) for comp1
Service.Measurement.Lin.Set2Coeffs2	7331… 7340	9666… 9670	Float	R/W	Lin-Polynom. Set2-Coeffs (A0..4) for comp2
Service.Measurement.Lin.Set2Coeffs3	7531… 7540	9766… 9770	Float	R/W	Lin-Polynom. Set2-Coeffs (A0..4) for comp3
Service.Measurement.Lin.Set2Coeffs4	7731… 7740	9866… 9870	Float	R/W	Lin-Polynom. Set2-Coeffs (A0..4) for comp4
Service.Measurement.Lin.Set2Coeffs5	7931… 7940	9966… 9970	Float	R/W	Lin-Polynom. Set2-Coeffs (A0..4) for comp5
Service.Measurement.Lin.Set3Coeffs1	7141… 7150	9571… 9575	Float	R/W	Lin-Polynom. Set3-Coeffs (A0..4) for comp1

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Service.Measurement.Lin.Set3Coeffs2	7341… 7350	9671… 9675	Float	R/W	Lin-Polynom. Set3-Coeffs (A0..4) for comp2
Service.Measurement.Lin.Set3Coeffs3	7541… 7550	9771… 9775	Float	R/W	Lin-Polynom. Set3-Coeffs (A0..4) for comp3
Service.Measurement.Lin.Set3Coeffs4	7741… 7750	9871… 9875	Float	R/W	Lin-Polynom. Set3-Coeffs (A0..4) for comp4
Service.Measurement.Lin.Set3Coeffs5	7941… 7950	9971… 9975	Float	R/W	Lin-Polynom. Set3-Coeffs (A0..4) for comp5
Service.Measurement.Lin.Set4Coeffs1	7151… 7160	9576… 9580	Float	R/W	Lin-Polynom. Set4-Coeffs (A0..4) for comp1
Service.Measurement.Lin.Set4Coeffs2	7351… 7360	9676… 9680	Float	R/W	Lin-Polynom. Set4-Coeffs (A0..4) for comp2
Service.Measurement.Lin.Set4Coeffs3	7551… 7560	9776… 9780	Float	R/W	Lin-Polynom. Set4-Coeffs (A0..4) for comp3
Service.Measurement.Lin.Set4Coeffs4	7751… 7760	9876… 9880	Float	R/W	Lin-Polynom. Set4-Coeffs (A0..4) for comp4
Service.Measurement.Lin.Set4Coeffs5	7951… 7960	9976… 9980	Float	R/W	Lin-Polynom. Set4-Coeffs (A0..4) for comp5
Service.Measurement.Lin.StartFunction1	3511	3511	Word	R/W	LinFct c1: 1=On/Off, 2=Calc, 3=ToUSB, 4=FromUSB, 5=Install, 6=ToFile
Service.Measurement.Lin.StartFunction2	3512	3512	Word	R/W	LinFct c2: 1=On/Off, 2=Calc, 3=ToUSB, 4=FromUSB, 5=Install, 6=ToFile
Service.Measurement.Lin.StartFunction3	3513	3513	Word	R/W	LinFct c3: 1=On/Off, 2=Calc, 3=ToUSB, 4=FromUSB, 5=Install, 6=ToFile
Service.Measurement.Lin.StartFunction4	3514	3514	Word	R/W	LinFct c4: 1=On/Off, 2=Calc, 3=ToUSB, 4=FromUSB, 5=Install, 6=ToFile
Service.Measurement.Lin.StartFunction5	3515	3515	Word	R/W	LinFct c5: 1=On/Off, 2=Calc, 3=ToUSB, 4=FromUSB, 5=Install, 6=ToFile
Service.Measurement.Lin.TableXValues1	7001… 7006	9501… 9503	Float	R/W	Linearization table X-Values of comp1
Service.Measurement.Lin.TableXValues2	7201… 7206	9601… 9603	Float	R/W	Linearization table X-Values of comp2
Service.Measurement.Lin.TableXValues3	7401… 7406	9701… 9703	Float	R/W	Linearization table X-Values of comp3
Service.Measurement.Lin.TableXValues4	7601… 7606	9801… 9803	Float	R/W	Linearization table X-Values of comp4
Service.Measurement.Lin.TableXValues5	7801… 7806	9901… 9903	Float	R/W	Linearization table X-Values of comp5
Service.Measurement.Lin.TableYValues1	7061… 7066	9531… 9533	Float	R/W	Linearization table Y-Values of comp1
Service.Measurement.Lin.TableYValues2	7261… 7266	9631… 9633	Float	R/W	Linearization table Y-Values of comp2
Service.Measurement.Lin.TableYValues3	7461… 7466	9731… 9733	Float	R/W	Linearization table Y-Values of comp3
Service.Measurement.Lin.TableYValues4	7661… 7666	9831… 9833	Float	R/W	Linearization table Y-Values of comp4

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Service.Measurement.Lin.TableYValues5	7861… 7866	9931… 9933	Float	R/W	Linearization table Y-Values of comp5
Service.Measurement.Lin.UnderflowPerc1	7169… 7176	9585… 9588	Float	R/W	Lin-Underflow [%] for Range1..4 of comp1
Service.Measurement.Lin.UnderflowPerc2	7369… 7376	9685… 9688	Float	R/W	Lin-Underflow [%] for Range1..4 of comp2
Service.Measurement.Lin.UnderflowPerc3	7569… 7576	9785… 9788	Float	R/W	Lin-Underflow [%] for Range1..4 of comp3
Service.Measurement.Lin.UnderflowPerc4	7769… 7776	9885… 9888	Float	R/W	Lin-Underflow [%] for Range1..4 of comp4
Service.Measurement.Lin.UnderflowPerc5	7969… 7976	9985… 9988	Float	R/W	Lin-Underflow [%] for Range1..4 of comp5
Service.Measurement.Simulation.PVARaw-Value1	6011… 6012	9006	Float	RO	value for rawPVA of comp1
Service.Measurement.Simulation.PVARaw-Value2	6013… 6014	9007	Float	RO	value for rawPVA of comp2
Service.Measurement.Simulation.PVARaw-Value3	6015… 6016	9008	Float	RO	value for rawPVA of comp3
Service.Measurement.Simulation.PVARaw-Value4	6017… 6018	9009	Float	RO	value for rawPVA of comp4
Service.Measurement.Simulation.PVARaw-Value5	6019… 6020	9010	Float	RO	value for rawPVA of comp5
Service.Measurement.Simulation.SimPVA-RawEnable1	3456	3456	Word	R/W	enable simulation for rawPVA of comp1
Service.Measurement.Simulation.SimPVA-RawEnable2	3457	3457	Word	R/W	enable simulation for rawPVA of comp2
Service.Measurement.Simulation.SimPVA-RawEnable3	3458	3458	Word	R/W	enable simulation for rawPVA of comp3
Service.Measurement.Simulation.SimPVA-RawEnable4	3459	3459	Word	R/W	enable simulation for rawPVA of comp4
Service.Measurement.Simulation.SimPVA-RawEnable5	3460	3460	Word	R/W	enable simulation for rawPVA of comp5
Service.Measurement.Simulation.SimPVA-RawValue1	6971… 6972	9486	Float	R/W	simulation value for rawPVA of comp1
Service.Measurement.Simulation.SimPVA-RawValue2	6973… 6974	9487	Float	R/W	simulation value for rawPVA of comp2
Service.Measurement.Simulation.SimPVA-RawValue3	6975… 6976	9488	Float	R/W	simulation value for rawPVA of comp3
Service.Measurement.Simulation.SimPVA-RawValue4	6977… 6978	9489	Float	R/W	simulation value for rawPVA of comp4
Service.Measurement.Simulation.SimPVA-RawValue5	6979… 6980	9490	Float	R/W	simulation value for rawPVA of comp5
Service.Measurement.Simulation.SimX-SPMuxEnable1	3461… 3468	3461… 3468	Word	R/W	enable simulation for XSP‘s multiplexer value1..8
Service.Measurement.Simulation.SimX-SPMuxValue1	6981… 6996	9491… 9498	Float	R/W	simulation value for XSP‘s multiplexer value1..8

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Service.Measurement.Simulation.XSPMux-Value1	6341… 6356	9171… 9178	Float	RO	values for XSP's multiplexer value1..8
Service.Status.DeviceStates.ChStateForce1	5311… 5318	8156… 8159	DWord	R/W	Forcing for comp1's state bitfield (b0:......)
Service.Status.DeviceStates.ChStateForce2	5321… 5328	8161… 8164	DWord	R/W	Forcing for comp2's state bitfield (b0:......)
Service.Status.DeviceStates.ChStateForce3	5331… 5338	8166… 8169	DWord	R/W	Forcing for comp3's state bitfield (b0:......)
Service.Status.DeviceStates.ChStateForce4	5341… 5348	8171… 8174	DWord	R/W	Forcing for comp4's state bitfield (b0:......)
Service.Status.DeviceStates.ChStateForce5	5351… 5358	8176… 8179	DWord	R/W	Forcing for comp5's state bitfield (b0:......)
Service.Status.DeviceStates.ChStateInhibit1	5251… 5258	8126… 8129	DWord	R/W	Inhibit for comp1's state bitfield (b0:......)
Service.Status.DeviceStates.ChStateInhibit2	5261… 5268	8131… 8134	DWord	R/W	Inhibit for comp2's state bitfield (b0:......)
Service.Status.DeviceStates.ChStateInhibit3	5271… 5278	8136… 8139	DWord	R/W	Inhibit for comp3's state bitfield (b0:......)
Service.Status.DeviceStates.ChStateInhibit4	5281… 5288	8141… 8144	DWord	R/W	Inhibit for comp4's state bitfield (b0:......)
Service.Status.DeviceStates.ChStateInhibit5	5291… 5298	8146… 8149	DWord	R/W	Inhibit for comp5's state bitfield (b0:......)
Service.Status.DeviceStates.DvcStateForce	5301… 5308	8151… 8154	DWord	R/W	Forcing for device (N0) state bitfield (b0:......)
Service.Status.DeviceStates.DvcStateInhibit	5241… 5248	8121… 8124	DWord	R/W	Inhibit for device (N0) state bitfield (b0:......)
Service.Status.NAMUR.FailureMap	5029… 5030	8015	DWord	R/W	Bitmask that maps cond. for failure source
Service.Status.NAMUR.FailureMask	5021… 5022	8011	DWord	R/W	Bitmask that disables failure sources
Service.Status.NAMUR.FctCheckMap	5035… 5036	8018	DWord	R/W	Bitmask that maps cond. for FctCheck source
Service.Status.NAMUR.FctCheckMask	5027… 5028	8014	DWord	R/W	Bitmask that disables NAMUR Fct-Check sources
Service.Status.NAMUR.MaintMap	5033… 5034	8017	DWord	R/W	Bitmask that maps cond. for mainte-nance request source
Service.Status.NAMUR.MaintMask	5025… 5026	8013	DWord	R/W	Bitmask that disables NAMUR mainte-nance request sources
Service.Status.NAMUR.OffSpecMap	5031… 5032	8016	DWord	R/W	Bitmask that maps cond. to OffSpec source
Service.Status.NAMUR.OffSpecMask	5023… 5024	8012	DWord	R/W	Bitmask that disables NAMUR OffSpec sources
Setup.Calibration.CurrentSpangas1	6111… 6112	9056	Float	R/W	current zero gas of comp1
Setup.Calibration.CurrentSpangas2	6113… 6114	9057	Float	R/W	current zero gas of comp2

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Setup.Calibration.CurrentSpangas3	6115… 6116	9058	Float	R/W	current zero gas of comp3
Setup.Calibration.CurrentSpangas4	6117… 6118	9059	Float	R/W	current zero gas of comp4
Setup.Calibration.CurrentSpangas5	6119… 6120	9060	Float	R/W	current zero gas of comp5
Setup.Calibration.CurrentZerogas1	6101… 6102	9051	Float	R/W	current zero gas of comp1
Setup.Calibration.CurrentZerogas2	6103… 6104	9052	Float	R/W	current zero gas of comp2
Setup.Calibration.CurrentZerogas3	6105… 6106	9053	Float	R/W	current zero gas of comp3
Setup.Calibration.CurrentZerogas4	6107… 6108	9054	Float	R/W	current zero gas of comp4
Setup.Calibration.CurrentZerogas5	6109… 6110	9055	Float	R/W	current zero gas of comp5
Setup.Calibration.Range1Spangas1	6261… 6262	9131	Float	R/W	span gas of range1 of comp1
Setup.Calibration.Range1Spangas2	6269… 6270	9135	Float	R/W	span gas of range1 of comp2
Setup.Calibration.Range1Spangas3	6277… 6278	9139	Float	R/W	span gas of range1 of comp3
Setup.Calibration.Range1Spangas4	6285… 6286	9143	Float	R/W	span gas of range1 of comp4
Setup.Calibration.Range1Spangas5	6293… 6294	9147	Float	R/W	span gas of range1 of comp5
Setup.Calibration.Range1Zerogas1	6221… 6222	9111	Float	R/W	zero gas of range1 of comp1
Setup.Calibration.Range1Zerogas2	6229… 6230	9115	Float	R/W	zero gas of range1 of comp2
Setup.Calibration.Range1Zerogas3	6237… 6238	9119	Float	R/W	zero gas of range1 of comp3
Setup.Calibration.Range1Zerogas4	6245… 6246	9123	Float	R/W	zero gas of range1 of comp4
Setup.Calibration.Range1Zerogas5	6253… 6254	9127	Float	R/W	zero gas of range1 of comp5
Setup.Calibration.Range2Spangas1	6263… 6264	9132	Float	R/W	span gas of range2 of comp1
Setup.Calibration.Range2Spangas2	6271… 6272	9136	Float	R/W	span gas of range2 of comp2
Setup.Calibration.Range2Spangas3	6279… 6280	9140	Float	R/W	span gas of range2 of comp3
Setup.Calibration.Range2Spangas4	6287… 6288	9144	Float	R/W	span gas of range2 of comp4
Setup.Calibration.Range2Spangas5	6295… 6296	9148	Float	R/W	span gas of range2 of comp5

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Setup.Calibration.Range2Zerogas1	6223… 6224	9112	Float	R/W	zero gas of range2 of comp1
Setup.Calibration.Range2Zerogas2	6231… 6232	9116	Float	R/W	zero gas of range2 of comp2
Setup.Calibration.Range2Zerogas3	6239… 6240	9120	Float	R/W	zero gas of range2 of comp3
Setup.Calibration.Range2Zerogas4	6247… 6248	9124	Float	R/W	zero gas of range2 of comp4
Setup.Calibration.Range2Zerogas5	6255… 6256	9128	Float	R/W	zero gas of range2 of comp5
Setup.Calibration.Range3Spangas1	6265… 6266	9133	Float	R/W	span gas of range3 of comp1
Setup.Calibration.Range3Spangas2	6273… 6274	9137	Float	R/W	span gas of range3 of comp2
Setup.Calibration.Range3Spangas3	6281… 6282	9141	Float	R/W	span gas of range3 of comp3
Setup.Calibration.Range3Spangas4	6289… 6290	9145	Float	R/W	span gas of range3 of comp4
Setup.Calibration.Range3Spangas5	6297… 6298	9149	Float	R/W	span gas of range3 of comp5
Setup.Calibration.Range3Zerogas1	6225… 6226	9113	Float	R/W	zero gas of range3 of comp1
Setup.Calibration.Range3Zerogas2	6233… 6234	9117	Float	R/W	zero gas of range3 of comp2
Setup.Calibration.Range3Zerogas3	6241… 6242	9121	Float	R/W	zero gas of range3 of comp3
Setup.Calibration.Range3Zerogas4	6249… 6250	9125	Float	R/W	zero gas of range3 of comp4
Setup.Calibration.Range3Zerogas5	6257… 6258	9129	Float	R/W	zero gas of range3 of comp5
Setup.Calibration.Range4Spangas1	6267… 6268	9134	Float	R/W	span gas of range4 of comp1
Setup.Calibration.Range4Spangas2	6275… 6276	9138	Float	R/W	span gas of range4 of comp2
Setup.Calibration.Range4Spangas3	6283… 6284	9142	Float	R/W	span gas of range4 of comp3
Setup.Calibration.Range4Spangas4	6291… 6292	9146	Float	R/W	span gas of range4 of comp4
Setup.Calibration.Range4Spangas5	6299… 6300	9150	Float	R/W	span gas of range4 of comp5
Setup.Calibration.Range4Zerogas1	6227… 6228	9114	Float	R/W	zero gas of range4 of comp1
Setup.Calibration.Range4Zerogas2	6235… 6236	9118	Float	R/W	zero gas of range4 of comp2
Setup.Calibration.Range4Zerogas3	6243… 6244	9122	Float	R/W	zero gas of range4 of comp3

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Setup.Calibration.Range4Zerogas4	6251… 6252	9126	Float	R/W	zero gas of range4 of comp4
Setup.Calibration.Range4Zerogas5	6259… 6260	9130	Float	R/W	zero gas of range4 of comp5
Setup.Calibration.SpanMethod1	3306	3306	Word	R/W	span cal method comp1 (0=Instant, 1=Stability)
Setup.Calibration.SpanMethod2	3307	3307	Word	R/W	span cal method comp2 (0=Instant, 1=Stability)
Setup.Calibration.SpanMethod3	3308	3308	Word	R/W	span cal method comp2 (0=Instant, 1=Stability)
Setup.Calibration.SpanMethod4	3309	3309	Word	R/W	span cal method comp4 (0=Instant, 1=Stability)
Setup.Calibration.SpanMethod5	3310	3310	Word	R/W	span cal method comp5 (0=Instant, 1=Stability)
Setup.Calibration.ZeroMethod1	3301	3301	Word	R/W	zero cal method comp1 (0=Instant, 1=Stability)
Setup.Calibration.ZeroMethod2	3302	3302	Word	R/W	zero cal method comp2 (0=Instant, 1=Stability)
Setup.Calibration.ZeroMethod3	3303	3303	Word	R/W	zero cal method comp3 (0=Instant, 1=Stability)
Setup.Calibration.ZeroMethod4	3304	3304	Word	R/W	zero cal method comp4 (0=Instant, 1=Stability)
Setup.Calibration.ZeroMethod5	3305	3305	Word	R/W	zero cal method comp5 (0=Instant, 1=Stability)
Setup.Communication.Eth1ModbusFt32	3400	3400	Word	R/W	Modbus 32Bit mode of Ethernet1
Setup.Communication.Eth2ModbusFt32	3399	3399	Word	R/W	Modbus 32Bit mode of Ethernet2
Setup.Communication.SIntModbusFt32	3397	3397	Word	R/W	Modbus 32Bit mode of serial COM
Setup.Communication.SSvcModbusFt32	3398	3398	Word	R/W	Modbus 32Bit mode of serial service COM
Setup.Display.Component.Gasname1	3071… 3074	3071… 3074	String	R/W	gas name of component1
Setup.Display.Component.Gasname2	3075… 3078	3075… 3078	String	R/W	gas name of component2
Setup.Display.Component.Gasname3	3079… 3082	3079… 3082	String	R/W	gas name of component3
Setup.Display.Component.Gasname4	3083… 3086	3083… 3086	String	R/W	gas name of component4
Setup.Display.Component.Gasname5	3087… 3090	3087… 3090	String	R/W	gas name of component5
Setup.Display.Component.Precision1	3036	3036	Word	R/W	decimal points displayed for component1
Setup.Display.Component.Precision2	3037	3037	Word	R/W	decimal points displayed for component2
Setup.Display.Component.Precision3	3038	3038	Word	R/W	decimal points displayed for component3
Setup.Display.Component.Precision4	3039	3039	Word	R/W	decimal points displayed for component4

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Setup.Display.Component.Precision5	3040	3040	Word	R/W	decimal points displayed for compo-nent4
Setup.Display.Component.PV_Unit1	3011	3011	Word	R/W	PV1 unit: 0 = Custom, ppm, ppb, Vol%
Setup.Display.Component.PV_Unit2	3016	3016	Word	R/W	PV2 unit: 0 = Custom, ppm, ppb, Vol%
Setup.Display.Component.PV_Unit3	3021	3021	Word	R/W	PV3 unit: 0 = Custom, ppm, ppb, Vol%
Setup.Display.Component.PV_Unit4	3026	3026	Word	R/W	PV4 unit: 0 = Custom, ppm, ppb, Vol%
Setup.Display.Component.PV_Unit5	3031	3031	Word	R/W	PV5 unit: 0 = Custom, ppm, ppb, Vol%
Setup.Display.Component.PV_UnitFactor1	6301… 6302	9151	Float	R/W	factor to convert ppm into displayed custom unit1
Setup.Display.Component.PV_UnitFactor2	6305… 6306	9153	Float	R/W	factor to convert ppm into displayed custom unit2
Setup.Display.Component.PV_UnitFactor3	6309… 6310	9155	Float	R/W	factor to convert ppm into displayed custom unit3
Setup.Display.Component.PV_UnitFactor4	6313… 6314	9157	Float	R/W	factor to convert ppm into displayed custom unit4
Setup.Display.Component.PV_UnitFactor5	6317… 6318	9159	Float	R/W	factor to convert ppm into displayed custom unit5
Setup.Display.Component.PV_UnitOffset1	6303… 6304	9152	Float	R/W	offset to convert ppm into displayed custom unit1
Setup.Display.Component.PV_UnitOffset2	6307… 6308	9154	Float	R/W	offset to convert ppm into displayed custom unit2
Setup.Display.Component.PV_UnitOffset3	6311… 6312	9156	Float	R/W	offset to convert ppm into displayed custom unit3
Setup.Display.Component.PV_UnitOffset4	6315… 6316	9158	Float	R/W	offset to convert ppm into displayed custom unit4
Setup.Display.Component.PV_UnitOffset5	6319… 6320	9160	Float	R/W	offset to convert ppm into displayed custom unit5
Setup.Display.Component.PV_UnitString1	3012… 3015	3012… 3015	String	R/W	unit displayed for comp1
Setup.Display.Component.PV_UnitString2	3017… 3020	3017… 3020	String	R/W	unit displayed for comp2
Setup.Display.Component.PV_UnitString3	3022… 3025	3022… 3025	String	R/W	unit displayed for comp3
Setup.Display.Component.PV_UnitString4	3027… 3030	3027… 3030	String	R/W	unit displayed for comp4
Setup.Display.Component.PV_UnitString5	3032… 3035	3032… 3035	String	R/W	unit displayed for comp5
Setup.Display.Component.Tag1	3041… 3045	3041… 3045	String	R/W	displayed tag for component1
Setup.Display.Component.Tag2	3046… 3050	3046… 3050	String	R/W	displayed tag for component2
Setup.Display.Component.Tag3	3051… 3055	3051… 3055	String	R/W	displayed tag for component3
Setup.Display.Component.Tag4	3056… 3060	3056… 3060	String	R/W	displayed tag for component4
Setup.Display.Component.Tag5	3061… 3065	3061… 3065	String	R/W	displayed tag for component5

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Setup.Display.MeasDisplay.Dis1Label1	3101… 3104	3101… 3104	String	R/W	displayed label of measure display 1, Line 1
Setup.Display.MeasDisplay.Dis1Label2	3105… 3108	3105… 3108	String	R/W	displayed label of measure display 1, Line 2
Setup.Display.MeasDisplay.Dis1Label3	3109… 3112	3109… 3112	String	R/W	displayed label of measure display 1, Line 3
Setup.Display.MeasDisplay.Dis1Label4	3113… 3116	3113… 3116	String	R/W	displayed label of measure display 1, Line 4
Setup.Display.MeasDisplay.Dis1Label5	3117… 3120	3117… 3120	String	R/W	displayed label of measure display 1, Line 5
Setup.Display.MeasDisplay.Dis1Line1	3091	3091	Word	R/W	assigned signal of measure display 1, Line 1
Setup.Display.MeasDisplay.Dis1Line2	3092	3092	Word	R/W	assigned signal of measure display 1, Line 2
Setup.Display.MeasDisplay.Dis1Line3	3093	3093	Word	R/W	assigned signal of measure display 1, Line 3
Setup.Display.MeasDisplay.Dis1Line4	3094	3094	Word	R/W	assigned signal of measure display 1, Line 4
Setup.Display.MeasDisplay.Dis1Line5	3095	3095	Word	R/W	assigned signal of measure display 1, Line 5
Setup.Display.MeasDisplay.Dis2Label1	3121… 3124	3121… 3124	String	R/W	displayed label of measure display 2, Line 1
Setup.Display.MeasDisplay.Dis2Label2	3125… 3128	3125… 3128	String	R/W	displayed label of measure display 2, Line 2
Setup.Display.MeasDisplay.Dis2Label3	3129… 3132	3129… 3132	String	R/W	displayed label of measure display 2, Line 3
Setup.Display.MeasDisplay.Dis2Label4	3133… 3136	3133… 3136	String	R/W	displayed label of measure display 2, Line 4
Setup.Display.MeasDisplay.Dis2Label5	3137… 3140	3137… 3140	String	R/W	displayed label of measure display 2, Line 5
Setup.Display.MeasDisplay.Dis2Line1	3096	3096	Word	R/W	assigned signal of measure display 2, Line 1
Setup.Display.MeasDisplay.Dis2Line2	3097	3097	Word	R/W	assigned signal of measure display 2, Line 2
Setup.Display.MeasDisplay.Dis2Line3	3098	3098	Word	R/W	assigned signal of measure display 2, Line 3
Setup.Display.MeasDisplay.Dis2Line4	3099	3099	Word	R/W	assigned signal of measure display 2, Line 4
Setup.Display.MeasDisplay.Dis2Line5	3100	3100	Word	R/W	assigned signal of measure display 2, Line 5
Setup.In/Outputs.AO.AdjustEnd1	6367… 6368	9184	Float	R/W	fine adjustment for end range of out-put1
Setup.In/Outputs.AO.AdjustEnd2	6375… 6376	9188	Float	R/W	fine adjustment for end range of out-put2
Setup.In/Outputs.AO.AdjustEnd3	6383… 6384	9192	Float	R/W	fine adjustment for end range of out-put3

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Setup.In/Outputs.AO.AdjustEnd4	6391…6392	9196	Float	R/W	fine adjustment for end range of output4
Setup.In/Outputs.AO.AdjustEnd5	6399…6400	9200	Float	R/W	fine adjustment for end range of output5
Setup.In/Outputs.AO.AdjustStart1	6365…6366	9183	Float	R/W	fine adjustment for start range of output1
Setup.In/Outputs.AO.AdjustStart2	6373…6374	9187	Float	R/W	fine adjustment for start range of output2
Setup.In/Outputs.AO.AdjustStart3	6381…6382	9191	Float	R/W	fine adjustment for start range of output3
Setup.In/Outputs.AO.AdjustStart4	6389…6390	9195	Float	R/W	fine adjustment for start range of output4
Setup.In/Outputs.AO.AdjustStart5	6397…6398	9199	Float	R/W	fine adjustment for start range of output5
Setup.In/Outputs.AO.AutoScale1	3273	3273	Word	R/W	Auto scale for ranged signals on output1 (0=NO, 1=Yes)
Setup.In/Outputs.AO.AutoScale2	3278	3278	Word	R/W	Auto scale for ranged signals on output2 (0=NO, 1=Yes)
Setup.In/Outputs.AO.AutoScale3	3283	3283	Word	R/W	Auto scale for ranged signals on output3 (0=NO, 1=Yes)
Setup.In/Outputs.AO.AutoScale4	3288	3288	Word	R/W	Auto scale for ranged signals on output4 (0=NO, 1=Yes)
Setup.In/Outputs.AO.AutoScale5	3293	3293	Word	R/W	Auto scale for ranged signals on output5 (0=NO, 1=Yes)
Setup.In/Outputs.AO.EndRange1	6363…6364	9182	Float	R/W	level where analoge output scaling ends on output1
Setup.In/Outputs.AO.EndRange2	6371…6372	9186	Float	R/W	level where analoge output scaling ends on output2
Setup.In/Outputs.AO.EndRange3	6379…6380	9190	Float	R/W	level where analoge output scaling ends on output3
Setup.In/Outputs.AO.EndRange4	6387…6388	9194	Float	R/W	level where analoge output scaling ends on output4
Setup.In/Outputs.AO.EndRange5	6395…6396	9198	Float	R/W	level where analoge output scaling ends on output5
Setup.In/Outputs.AO.FailMode1	3274	3274	Word	R/W	Behavior on errors output1 (0=Track, 1=-10%Start, 2=+10%End)
Setup.In/Outputs.AO.FailMode2	3279	3279	Word	R/W	Behavior on errors output2 (0=Track, 1=-10%Start, 2=+10%End)
Setup.In/Outputs.AO.FailMode3	3284	3284	Word	R/W	Behavior on errors output3 (0=Track, 1=-10%Start, 2=+10%End)
Setup.In/Outputs.AO.FailMode4	3289	3289	Word	R/W	Behavior on errors output4 (0=Track, 1=-10%Start, 2=+10%End)
Setup.In/Outputs.AO.FailMode5	3294	3294	Word	R/W	Behavior on errors output5 (0=Track, 1=-10%Start, 2=+10%End)
Setup.In/Outputs.AO.Hold1	3275	3275	Word	R/W	Hold output1 on calibrations (0=Track, 1=Hold)

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Setup.In/Outputs.AO.Hold2	3280	3280	Word	R/W	Hold output2 on calibrations (0=Track, 1=Hold)
Setup.In/Outputs.AO.Hold3	3285	3285	Word	R/W	Hold output3 on calibrations (0=Track, 1=Hold)
Setup.In/Outputs.AO.Hold4	3290	3290	Word	R/W	Hold output4 on calibrations (0=Track, 1=Hold)
Setup.In/Outputs.AO.Hold5	3295	3295	Word	R/W	Hold output5 on calibrations (0=Track, 1=Hold)
Setup.In/Outputs.AO.NumberOuts	3270	3270	Word	R/W	number of analog outputs
Setup.In/Outputs.AO.OutRange1	3272	3272	Word	R/W	range of output1 (0=0..20mA, 1=4-20mA)
Setup.In/Outputs.AO.OutRange2	3277	3277	Word	R/W	range of output2 (0=0..20mA, 1=4-20mA)
Setup.In/Outputs.AO.OutRange3	3282	3282	Word	R/W	range of output3 (0=0..20mA, 1=4-20mA)
Setup.In/Outputs.AO.OutRange4	3287	3287	Word	R/W	range of output4 (0=0..20mA, 1=4-20mA)
Setup.In/Outputs.AO.OutRange5	3292	3292	Word	R/W	range of output5 (0=0..20mA, 1=4-20mA)
Setup.In/Outputs.AO.SignalAsgn1	3271	3271	Word	R/W	assigned signal output1
Setup.In/Outputs.AO.SignalAsgn2	3276	3276	Word	R/W	assigned signal output2
Setup.In/Outputs.AO.SignalAsgn3	3281	3281	Word	R/W	assigned signal output3
Setup.In/Outputs.AO.SignalAsgn4	3286	3286	Word	R/W	assigned signal output4
Setup.In/Outputs.AO.SignalAsgn5	3291	3291	Word	R/W	assigned signal output5
Setup.In/Outputs.AO.StartRange1	6361… 6362	9181	Float	R/W	level where analoge output scaling starts on output1
Setup.In/Outputs.AO.StartRange2	6369… 6370	9185	Float	R/W	level where analoge output scaling starts on output2
Setup.In/Outputs.AO.StartRange3	6377… 6378	9189	Float	R/W	level where analoge output scaling starts on output3
Setup.In/Outputs.AO.StartRange4	6385… 6386	9193	Float	R/W	level where analoge output scaling starts on output4
Setup.In/Outputs.AO.StartRange5	6393… 6394	9197	Float	R/W	level where analoge output scaling starts on output5
Setup.In/Outputs.DI.Node_DI1	3221	3221	Word	R/W	node of DigInp1 / XDIO1 Inp1
Setup.In/Outputs.DI.Node_DI10	3238	3238	Word	R/W	node of DigInp10 / XDIO2 Inp3
Setup.In/Outputs.DI.Node_DI11	3239	3239	Word	R/W	node of DigInp11 / XDIO2 Inp4
Setup.In/Outputs.DI.Node_DI12	3240	3240	Word	R/W	node of DigInp12 / XDIO2 Inp5
Setup.In/Outputs.DI.Node_DI13	3241	3241	Word	R/W	node of DigInp13 / XDIO2 Inp6
Setup.In/Outputs.DI.Node_DI14	3242	3242	Word	R/W	node of DigInp14 / XDIO2 Inp7
Setup.In/Outputs.DI.Node_DI2	3222	3222	Word	R/W	node of DigInp2 / XDIO1 Inp2
Setup.In/Outputs.DI.Node_DI3	3223	3223	Word	R/W	node of DigInp3 / XDIO1 Inp3
Setup.In/Outputs.DI.Node_DI4	3224	3224	Word	R/W	node of DigInp4 / XDIO1 Inp4
Setup.In/Outputs.DI.Node_DI5	3225	3225	Word	R/W	node of DigInp5 / XDIO1 Inp5
Setup.In/Outputs.DI.Node_DI6	3226	3226	Word	R/W	node of DigInp6 / XDIO1 Inp6
Setup.In/Outputs.DI.Node_DI7	3227	3227	Word	R/W	node of DigInp7 / XDIO1 Inp7

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Setup.In/Outputs.DI.Node_DI8	3236	3236	Word	R/W	node of DigInp8 / XDIO2 Inp1
Setup.In/Outputs.DI.Node_DI9	3237	3237	Word	R/W	node of DigInp9 / XDIO2 Inp2
Setup.In/Outputs.DI.Signal_DI1	3228	3228	Word	R/W	signal of DigInp1 / XDIO1 Inp1
Setup.In/Outputs.DI.Signal_DI10	3245	3245	Word	R/W	signal of DigInp10 / XDIO2 Inp3
Setup.In/Outputs.DI.Signal_DI11	3246	3246	Word	R/W	signal of DigInp11 / XDIO2 Inp4
Setup.In/Outputs.DI.Signal_DI12	3247	3247	Word	R/W	signal of DigInp12 / XDIO2 Inp5
Setup.In/Outputs.DI.Signal_DI13	3248	3248	Word	R/W	signal of DigInp13 / XDIO2 Inp6
Setup.In/Outputs.DI.Signal_DI14	3249	3249	Word	R/W	signal of DigInp14 / XDIO2 Inp7
Setup.In/Outputs.DI.Signal_DI2	3229	3229	Word	R/W	signal of DigInp2 / XDIO1 Inp2
Setup.In/Outputs.DI.Signal_DI3	3230	3230	Word	R/W	signal of DigInp3 / XDIO1 Inp3
Setup.In/Outputs.DI.Signal_DI4	3231	3231	Word	R/W	signal of DigInp4 / XDIO1 Inp4
Setup.In/Outputs.DI.Signal_DI5	3232	3232	Word	R/W	signal of DigInp5 / XDIO1 Inp5
Setup.In/Outputs.DI.Signal_DI6	3233	3233	Word	R/W	signal of DigInp6 / XDIO1 Inp6
Setup.In/Outputs.DI.Signal_DI7	3234	3234	Word	R/W	signal of DigInp7 / XDIO1 Inp7
Setup.In/Outputs.DI.Signal_DI8	3243	3243	Word	R/W	signal of DigInp8 / XDIO2 Inp1
Setup.In/Outputs.DI.Signal_DI9	3244	3244	Word	R/W	signal of DigInp9 / XDIO2 Inp2
Setup.In/Outputs.DO.Node_DO1	3151	3151	Word	R/W	node of DigOut1 / XPSA
Setup.In/Outputs.DO.Node_DO10	3166	3166	Word	R/W	node of DigOut10 / XDIO1 Out6
Setup.In/Outputs.DO.Node_DO11	3167	3167	Word	R/W	node of DigOut11 / XDIO1 Out7
Setup.In/Outputs.DO.Node_DO12	3168	3168	Word	R/W	node of DigOut12 / XDIO1 Out8
Setup.In/Outputs.DO.Node_DO13	3169	3169	Word	R/W	node of DigOut13 / XDIO1 Out9
Setup.In/Outputs.DO.Node_DO14	3181	3181	Word	R/W	node of DigOut14 / XDIO2 Out1
Setup.In/Outputs.DO.Node_DO15	3182	3182	Word	R/W	node of DigOut15 / XDIO2 Out2
Setup.In/Outputs.DO.Node_DO16	3183	3183	Word	R/W	node of DigOut16 / XDIO2 Out3
Setup.In/Outputs.DO.Node_DO17	3184	3184	Word	R/W	node of DigOut17 / XDIO2 Out4
Setup.In/Outputs.DO.Node_DO18	3185	3185	Word	R/W	node of DigOut18 / XDIO2 Out5
Setup.In/Outputs.DO.Node_DO19	3186	3186	Word	R/W	node of DigOut19 / XDIO2 Out6
Setup.In/Outputs.DO.Node_DO2	3152	3152	Word	R/W	node of DigOut2 / XPSA
Setup.In/Outputs.DO.Node_DO20	3187	3187	Word	R/W	node of DigOut20 / XDIO2 Out7
Setup.In/Outputs.DO.Node_DO21	3188	3188	Word	R/W	node of DigOut21 / XDIO2 Out8
Setup.In/Outputs.DO.Node_DO22	3189	3189	Word	R/W	node of DigOut22 / XDIO2 Out9
Setup.In/Outputs.DO.Node_DO3	3153	3153	Word	R/W	node of DigOut3 / XPSA
Setup.In/Outputs.DO.Node_DO4	3154	3154	Word	R/W	node of DigOut4 / XPSA
Setup.In/Outputs.DO.Node_DO5	3161	3161	Word	R/W	node of DigOut5 / XDIO1 Out1
Setup.In/Outputs.DO.Node_DO6	3162	3162	Word	R/W	node of DigOut6 / XDIO1 Out2
Setup.In/Outputs.DO.Node_DO7	3163	3163	Word	R/W	node of DigOut7 / XDIO1 Out3
Setup.In/Outputs.DO.Node_DO8	3164	3164	Word	R/W	node of DigOut8 / XDIO1 Out4
Setup.In/Outputs.DO.Node_DO9	3165	3165	Word	R/W	node of DigOut9 / XDIO1 Out5
Setup.In/Outputs.DO.Signal_DO1	3156	3156	Word	R/W	signal of DigOut1 / XPSA
Setup.In/Outputs.DO.Signal_DO10	3176	3176	Word	R/W	signal of DigOut10 / XDIO1 Out6
Setup.In/Outputs.DO.Signal_DO11	3177	3177	Word	R/W	signal of DigOut11 / XDIO1 Out7
Setup.In/Outputs.DO.Signal_DO12	3178	3178	Word	R/W	signal of DigOut12 / XDIO1 Out8
Setup.In/Outputs.DO.Signal_DO13	3179	3179	Word	R/W	signal of DigOut13 / XDIO1 Out9

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Setup.In/Outputs.DO.Signal_DO14	3191	3191	Word	R/W	signal of DigOut14 / XDIO2 Out1
Setup.In/Outputs.DO.Signal_DO15	3192	3192	Word	R/W	signal of DigOut15 / XDIO2 Out2
Setup.In/Outputs.DO.Signal_DO16	3193	3193	Word	R/W	signal of DigOut16 / XDIO2 Out3
Setup.In/Outputs.DO.Signal_DO17	3194	3194	Word	R/W	signal of DigOut17 / XDIO2 Out4
Setup.In/Outputs.DO.Signal_DO18	3195	3195	Word	R/W	signal of DigOut18 / XDIO2 Out5
Setup.In/Outputs.DO.Signal_DO19	3196	3196	Word	R/W	signal of DigOut19 / XDIO2 Out6
Setup.In/Outputs.DO.Signal_DO2	3157	3157	Word	R/W	signal of DigOut2 / XPSA
Setup.In/Outputs.DO.Signal_DO20	3197	3197	Word	R/W	signal of DigOut20 / XDIO2 Out7
Setup.In/Outputs.DO.Signal_DO21	3198	3198	Word	R/W	signal of DigOut21 / XDIO2 Out8
Setup.In/Outputs.DO.Signal_DO22	3199	3199	Word	R/W	signal of DigOut22 / XDIO2 Out9
Setup.In/Outputs.DO.Signal_DO3	3158	3158	Word	R/W	signal of DigOut3 / XPSA
Setup.In/Outputs.DO.Signal_DO4	3159	3159	Word	R/W	signal of DigOut4 / XPSA
Setup.In/Outputs.DO.Signal_DO5	3171	3171	Word	R/W	signal of DigOut5 / XDIO1 Out1
Setup.In/Outputs.DO.Signal_DO6	3172	3172	Word	R/W	signal of DigOut6 / XDIO1 Out2
Setup.In/Outputs.DO.Signal_DO7	3173	3173	Word	R/W	signal of DigOut7 / XDIO1 Out3
Setup.In/Outputs.DO.Signal_DO8	3174	3174	Word	R/W	signal of DigOut8 / XDIO1 Out4
Setup.In/Outputs.DO.Signal_DO9	3175	3175	Word	R/W	signal of DigOut9 / XDIO1 Out5
Setup.In/Outputs.SHS.Node_Gas1	3201	3201	Word	R/W	node of SHS GasOut1
Setup.In/Outputs.SHS.Node_Gas2	3202	3202	Word	R/W	node of SHS GasOut2
Setup.In/Outputs.SHS.Node_Gas3	3203	3203	Word	R/W	node of SHS GasOut3
Setup.In/Outputs.SHS.Node_Gas4	3204	3204	Word	R/W	node of SHS GasOut4
Setup.In/Outputs.SHS.Node_Gas5	3205	3205	Word	R/W	node of SHS GasOut5
Setup.In/Outputs.SHS.Node_Gas6	3206	3206	Word	R/W	node of SHS GasOut6
Setup.In/Outputs.SHS.Node_Gas7	3207	3207	Word	R/W	node of SHS GasOut7
Setup.In/Outputs.SHS.Node_Gas8	3208	3208	Word	R/W	node of SHS GasOut8
Setup.In/Outputs.SHS.Node_Pump1	3209	3209	Word	R/W	node of SHS Pump1
Setup.In/Outputs.SHS.Node_Pump2	3210	3210	Word	R/W	node of SHS Pump1
Setup.In/Outputs.SHS.Signal_Gas1	3211	3211	Word	R/W	signal of SHS GasOut1
Setup.In/Outputs.SHS.Signal_Gas2	3212	3212	Word	R/W	signal of SHS GasOut2
Setup.In/Outputs.SHS.Signal_Gas3	3213	3213	Word	R/W	signal of SHS GasOut3
Setup.In/Outputs.SHS.Signal_Gas4	3214	3214	Word	R/W	signal of SHS GasOut4
Setup.In/Outputs.SHS.Signal_Gas5	3215	3215	Word	R/W	signal of SHS GasOut5
Setup.In/Outputs.SHS.Signal_Gas6	3216	3216	Word	R/W	signal of SHS GasOut6
Setup.In/Outputs.SHS.Signal_Gas7	3217	3217	Word	R/W	signal of SHS GasOut7
Setup.In/Outputs.SHS.Signal_Gas8	3218	3218	Word	R/W	signal of SHS GasOut8
Setup.In/Outputs.SHS.Signal_Pump1	3219	3219	Word	R/W	signal of SHS Pump1
Setup.In/Outputs.SHS.Signal_Pump2	3220	3220	Word	R/W	signal of SHS Pump1
Setup.Measurement.EndOfCurrentRange_1	6043… 6044	9022	Float	R/W	end of current range of comp1
Setup.Measurement.EndOfCurrentRange_2	6047… 6048	9024	Float	R/W	end of current range of comp2
Setup.Measurement.EndOfCurrentRange_3	6051… 6052	9026	Float	R/W	end of current range of comp3

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Setup.Measurement.EndOfCurrentRange_4	6055… 6056	9028	Float	R/W	end of current range of comp4
Setup.Measurement.EndOfCurrentRange_5	6059… 6060	9030	Float	R/W	end of current range of comp5
Setup.Measurement.EndOfRange1_1	6143… 6144	9072	Float	R/W	end of range1 of comp1
Setup.Measurement.EndOfRange1_2	6159… 6160	9080	Float	R/W	end of range1 of comp2
Setup.Measurement.EndOfRange1_3	6175… 6176	9088	Float	R/W	end of range1 of comp3
Setup.Measurement.EndOfRange1_4	6191… 6192	9096	Float	R/W	end of range1 of comp4
Setup.Measurement.EndOfRange1_5	6207… 6208	9104	Float	R/W	end of range1 of comp5
Setup.Measurement.EndOfRange2_1	6147… 6148	9074	Float	R/W	end of range2 of comp1
Setup.Measurement.EndOfRange2_2	6163… 6164	9082	Float	R/W	end of range2 of comp2
Setup.Measurement.EndOfRange2_3	6179… 6180	9090	Float	R/W	end of range2 of comp3
Setup.Measurement.EndOfRange2_4	6195… 6196	9098	Float	R/W	end of range2 of comp4
Setup.Measurement.EndOfRange2_5	6211… 6212	9106	Float	R/W	end of range2 of comp5
Setup.Measurement.EndOfRange3_1	6151… 6152	9076	Float	R/W	end of range3 of comp1
Setup.Measurement.EndOfRange3_2	6167… 6168	9084	Float	R/W	end of range3 of comp2
Setup.Measurement.EndOfRange3_3	6183… 6184	9092	Float	R/W	end of range3 of comp3
Setup.Measurement.EndOfRange3_4	6199… 6200	9100	Float	R/W	end of range3 of comp4
Setup.Measurement.EndOfRange3_5	6215… 6216	9108	Float	R/W	end of range3 of comp5
Setup.Measurement.EndOfRange4_1	6155… 6156	9078	Float	R/W	end of range4 of comp1
Setup.Measurement.EndOfRange4_2	6171… 6172	9086	Float	R/W	end of range4 of comp2
Setup.Measurement.EndOfRange4_3	6187… 6188	9094	Float	R/W	end of range4 of comp3
Setup.Measurement.EndOfRange4_4	6203… 6204	9102	Float	R/W	end of range4 of comp4
Setup.Measurement.EndOfRange4_5	6219… 6220	9110	Float	R/W	end of range4 of comp5
Setup.Measurement.StartOfCurrentRange_1	6041… 6042	9021	Float	R/W	start of current range of comp1

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Setup.Measurement.StartOfCurrentRange_2	6045… 6046	9023	Float	R/W	start of current range of comp2
Setup.Measurement.StartOfCurrentRange_3	6049… 6050	9025	Float	R/W	start of current range of comp3
Setup.Measurement.StartOfCurrentRange_4	6053… 6054	9027	Float	R/W	start of current range of comp4
Setup.Measurement.StartOfCurrentRange_5	6057… 6058	9029	Float	R/W	start of current range of comp5
Setup.Measurement.StartOfRange1_1	6141… 6142	9071	Float	R/W	start of range1 of comp1
Setup.Measurement.StartOfRange1_2	6157… 6158	9079	Float	R/W	start of range1 of comp2
Setup.Measurement.StartOfRange1_3	6173… 6174	9087	Float	R/W	start of range1 of comp3
Setup.Measurement.StartOfRange1_4	6189… 6190	9095	Float	R/W	start of range1 of comp4
Setup.Measurement.StartOfRange1_5	6205… 6206	9103	Float	R/W	start of range1 of comp5
Setup.Measurement.StartOfRange2_1	6145… 6146	9073	Float	R/W	start of range2 of comp1
Setup.Measurement.StartOfRange2_2	6161… 6162	9081	Float	R/W	start of range2 of comp2
Setup.Measurement.StartOfRange2_3	6177… 6178	9089	Float	R/W	start of range2 of comp3
Setup.Measurement.StartOfRange2_4	6193… 6194	9097	Float	R/W	start of range2 of comp4
Setup.Measurement.StartOfRange2_5	6209… 6210	9105	Float	R/W	start of range2 of comp5
Setup.Measurement.StartOfRange3_1	6149… 6150	9075	Float	R/W	start of range3 of comp1
Setup.Measurement.StartOfRange3_2	6165… 6166	9083	Float	R/W	start of range3 of comp2
Setup.Measurement.StartOfRange3_3	6181… 6182	9091	Float	R/W	start of range3 of comp3
Setup.Measurement.StartOfRange3_4	6197… 6198	9099	Float	R/W	start of range3 of comp4
Setup.Measurement.StartOfRange3_5	6213… 6214	9107	Float	R/W	start of range3 of comp5
Setup.Measurement.StartOfRange4_1	6153… 6154	9077	Float	R/W	start of range4 of comp1
Setup.Measurement.StartOfRange4_2	6169… 6170	9085	Float	R/W	start of range4 of comp2
Setup.Measurement.StartOfRange4_3	6185… 6186	9093	Float	R/W	start of range4 of comp3
Setup.Measurement.StartOfRange4_4	6201… 6202	9101	Float	R/W	start of range4 of comp4

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Setup.Measurement.StartOfRange4_5	6217… 6218	9109	Float	R/W	start of range4 of comp5
Setup.Measurement.XIntf.ComputeFactor1	3476	3476	Word	R/W	Compute cross interference factor comp1 (0=Src1, 1=Src2 etc.)
Setup.Measurement.XIntf.ComputeFactor2	3477	3477	Word	R/W	Compute cross interference factor comp2 (0=Src1, 1=Src2 etc.)
Setup.Measurement.XIntf.ComputeFactor3	3478	3478	Word	R/W	Compute cross interference factor comp3 (0=Src1, 1=Src2 etc.)
Setup.Measurement.XIntf.ComputeFactor4	3479	3479	Word	R/W	Compute cross interference factor comp4 (0=Src1, 1=Src2 etc.)
Setup.Measurement.XIntf.ComputeFactor5	3480	3480	Word	R/W	Compute cross interference factor comp5 (0=Src1, 1=Src2 etc.)
Setup.Measurement.XIntf.Enable1	3471	3471	Word	R/W	Enable cross interference compensati-on for comp1
Setup.Measurement.XIntf.Enable2	3472	3472	Word	R/W	Enable cross interference compensati-on for comp2
Setup.Measurement.XIntf.Enable3	3473	3473	Word	R/W	Enable cross interference compensati-on for comp3
Setup.Measurement.XIntf.Enable4	3474	3474	Word	R/W	Enable cross interference compensati-on for comp4
Setup.Measurement.XIntf.Enable5	3475	3475	Word	R/W	Enable cross interference compensati-on for comp5
Setup.Measurement.XIntf.InterfereFactors1	6609… 6616	9305… 9308	Float	R/W	Cross interfere factors1..4 for comp1
Setup.Measurement.XIntf.InterfereFactors2	6669… 6676	9335… 9338	Float	R/W	Cross interfere factors1..4 for comp2
Setup.Measurement.XIntf.InterfereFactors3	6729… 6736	9365… 9368	Float	R/W	Cross interfere factors1..4 for comp3
Setup.Measurement.XIntf.InterfereFactors4	6789… 6796	9395… 9398	Float	R/W	Cross interfere factors1..4 for comp4
Setup.Measurement.XIntf.InterfereFactors5	6849… 6856	9425… 9428	Float	R/W	Cross interfere factors1..4 for comp5
Setup.Measurement.XIntf.LinearPolyCoeffs1	6625… 6632	9313… 9316	Float	R/W	Cross interfere linearization refe-rences1..4 for comp1
Setup.Measurement.XIntf.LinearPolyCoeffs2	6685… 6692	9343… 9346	Float	R/W	Cross interfere linearization refe-rences1..4 for comp2
Setup.Measurement.XIntf.LinearPolyCoeffs3	6745… 6752	9373… 9376	Float	R/W	Cross interfere linearization refe-rences1..4 for comp3
Setup.Measurement.XIntf.LinearPolyCoeffs4	6805… 6812	9403… 9406	Float	R/W	Cross interfere linearization refe-rences1..4 for comp4
Setup.Measurement.XIntf.LinearPolyCoeffs5	6865… 6872	9433… 9436	Float	R/W	Cross interfere linearization refe-rences1..4 for comp5
Setup.Measurement.XIntf.LinearReferences1	6617… 6624	9309… 9312	Float	R/W	Cross interfere linearization refe-rences1..4 for comp1
Setup.Measurement.XIntf.LinearReferences2	6677… 6684	9339… 9342	Float	R/W	Cross interfere linearization refe-rences1..4 for comp2

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	**Daniel**			
Setup.Measurement.XIntf.LinearReferences3	6737… 6744	9369… 9372	Float	R/W	Cross interfere linearization references1..4 for comp3
Setup.Measurement.XIntf.LinearReferences4	6797… 6804	9399… 9402	Float	R/W	Cross interfere linearization references1..4 for comp4
Setup.Measurement.XIntf.LinearReferences5	6857… 6864	9429… 9432	Float	R/W	Cross interfere linearization references1..4 for comp5
Setup.Measurement.XIntf.SignalStates1	4051… 4054	4051… 4054	Word	RO	Cross interfere signal value states1..4 for comp1
Setup.Measurement.XIntf.SignalStates2	4055… 4058	4055… 4058	Word	RO	Cross interfere signal value states1..4 for comp2
Setup.Measurement.XIntf.SignalStates3	4059… 4062	4059… 4062	Word	RO	Cross interfere signal value states1..4 for comp3
Setup.Measurement.XIntf.SignalStates4	4063… 4066	4063… 4066	Word	RO	Cross interfere signal value states1..4 for comp4
Setup.Measurement.XIntf.SignalStates5	4067… 4070	4067… 4070	Word	RO	Cross interfere signal value states1..4 for comp5
Setup.Measurement.XIntf.SignalValues1	6601… 6608	9301… 9304	Float	RO	Cross interfere signal values1..4 for comp1
Setup.Measurement.XIntf.SignalValues2	6661… 6668	9331… 9334	Float	RO	Cross interfere signal values1..4 for comp2
Setup.Measurement.XIntf.SignalValues3	6721… 6728	9361… 9364	Float	RO	Cross interfere signal values1..4 for comp3
Setup.Measurement.XIntf.SignalValues4	6781… 6788	9391… 9394	Float	RO	Cross interfere signal values1..4 for comp4
Setup.Measurement.XIntf.SignalValues5	6841… 6848	9421… 9424	Float	RO	Cross interfere signal values1..4 for comp5
Setup.Measurement.XIntf.Sources1	3481… 3484	3481… 3484	Word	R/W	Interf. sources 1..4 comp1 (0=None, 1=Conc1, 2=Conc2, 6=AIN1 etc.)
Setup.Measurement.XIntf.Sources2	3485… 3488	3485… 3488	Word	R/W	Interf. sources 1..4 comp2 (0=None, 1=Conc1, 2=Conc2, 6=AIN1 etc.)
Setup.Measurement.XIntf.Sources3	3489… 3492	3489… 3492	Word	R/W	Interf. sources 1..4 comp3 (0=None, 1=Conc1, 2=Conc2, 6=AIN1 etc.)
Setup.Measurement.XIntf.Sources4	3493… 3496	3493… 3496	Word	R/W	Interf. sources 1..4 comp4 (0=None, 1=Conc1, 2=Conc2, 6=AIN1 etc.)
Setup.Measurement.XIntf.Sources5	3497… 3500	3497… 3500	Word	R/W	Interf. sources 1..4 comp5 (0=None, 1=Conc1, 2=Conc2, 6=AIN1 etc.)
Status.DeviceStates.ChannelState1	5191… 5198	8096… 8099	DWord	RO	component1‘s state bitfield (b0:......)
Status.DeviceStates.ChannelState2	5201… 5208	8101… 8104	DWord	RO	component2‘s state bitfield (b0:......)
Status.DeviceStates.ChannelState3	5211… 5218	8106… 8109	DWord	RO	component3‘s state bitfield (b0:......)
Status.DeviceStates.ChannelState4	5221… 5228	8111… 8114	DWord	RO	component4‘s state bitfield (b0:......)
Status.DeviceStates.ChannelState5	5231… 5238	8116… 8119	DWord	RO	component5‘s state bitfield (b0:......)

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Status.DeviceStates.DeviceState	5181… 5188	8091… 8094	DWord	RO	device (N0) state bitfield (b0:......)
Status.Diagnostics.DSPMuxValue1	6341… 6342	9171	Float	RO	DSP multiplexer value 1
Status.Diagnostics.DSPMuxValue2	6343… 6344	9172	Float	RO	DSP multiplexer value 2
Status.Diagnostics.DSPMuxValue3	6345… 6346	9173	Float	RO	DSP multiplexer value 3
Status.Diagnostics.DSPMuxValue4	6347… 6348	9174	Float	RO	DSP multiplexer value 4
Status.Diagnostics.DSPMuxValue5	6349… 6350	9175	Float	RO	DSP multiplexer value 5
Status.Diagnostics.DSPMuxValue6	6351… 6352	9176	Float	RO	DSP multiplexer value 6
Status.Diagnostics.DSPMuxValue7	6353… 6354	9177	Float	RO	DSP multiplexer value 7
Status.Diagnostics.DSPMuxValue8	6355… 6356	9178	Float	RO	DSP multiplexer value 8
Status.Diagnostics.RawMeasConce1	6021… 6022	9011	Float	RO	raw ADC of measure-side component1
Status.Diagnostics.RawMeasConce2	6025… 6026	9013	Float	RO	raw ADC of measure-side component2
Status.Diagnostics.RawMeasConce3	6029… 6030	9015	Float	RO	raw ADC of measure-side component3
Status.Diagnostics.RawMeasConce4	6033… 6034	9017	Float	RO	raw ADC of measure-side component4
Status.Diagnostics.RawMeasConce5	6037… 6038	9019	Float	RO	raw ADC of measure-side component5
Status.Diagnostics.RawQuotConce1	6011… 6012	9006	Float	RO	raw ADC quotient of component1
Status.Diagnostics.RawQuotConce2	6013… 6014	9007	Float	RO	raw ADC quotient of component2
Status.Diagnostics.RawQuotConce3	6015… 6016	9008	Float	RO	raw ADC quotient of component3
Status.Diagnostics.RawQuotConce4	6017… 6018	9009	Float	RO	raw ADC quotient of component4
Status.Diagnostics.RawQuotConce5	6019… 6020	9010	Float	RO	raw ADC quotient of component4
Status.Diagnostics.RawRefConce1	6023… 6024	9012	Float	RO	raw ADC of reference side component1
Status.Diagnostics.RawRefConce2	6027… 6028	9014	Float	RO	raw ADC of reference side component2
Status.Diagnostics.RawRefConce3	6031… 6032	9016	Float	RO	raw ADC of reference side component3
Status.Diagnostics.RawRefConce4	6035… 6036	9018	Float	RO	raw ADC of reference side component4

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Status.Diagnostics.RawRefConce5	6039… 6040	9020	Float	RO	raw ADC of reference side component5
Status.Flow1	6071… 6072	9036	Float	RO	flow of comp1
Status.Flow2	6073… 6074	9037	Float	RO	flow of comp2
Status.Flow3	6075… 6076	9038	Float	RO	flow of comp3
Status.Flow4	6077… 6078	9039	Float	RO	flow of comp4
Status.Flow5	6079… 6080	9040	Float	RO	flow of comp5
Status.NamurStates.FailAlarmComp1	5049… 5050	8025	DWord	RO	NamurFailure alarms that are compo-nent1 related
Status.NamurStates.FailAlarmComp2	5057… 5058	8029	DWord	RO	NamurFailure alarms that are compo-nent2 related
Status.NamurStates.FailAlarmComp3	5065… 5066	8033	DWord	RO	NamurFailure alarms that are compo-nent3 related
Status.NamurStates.FailAlarmComp4	5073… 5074	8037	DWord	RO	NamurFailure alarms that are compo-nent4 related
Status.NamurStates.FailAlarmComp5	5081… 5082	8041	DWord	RO	NamurFailure alarms that are compo-nent5 related
Status.NamurStates.FailAlarmDev	5041… 5042	8021	DWord	RO	NamurFailure alarms that are device related
Status.NamurStates.FailureActive	5009… 5010	8005	DWord	RO	Namur Failure active bitfield
Status.NamurStates.FailureAlarm	5001… 5002	8001	DWord	RO	Namur Failure alarm bitfield
Status.NamurStates.FctCheckActive	5015… 5016	8008	DWord	RO	Namur Function Check active bitfield
Status.NamurStates.FctCheckAlarm	5007… 5008	8004	DWord	RO	Namur Function Check alarm bitfield
Status.NamurStates.FctCheckAlarmComp1	5055… 5056	8028	DWord	RO	Namur FctCheck alarms that are com-ponent1 related
Status.NamurStates.FctCheckAlarmComp2	5063… 5064	8032	DWord	RO	Namur FctCheck alarms that are com-ponent1 related
Status.NamurStates.FctCheckAlarmComp3	5071… 5072	8036	DWord	RO	Namur FctCheck alarms that are com-ponent1 related
Status.NamurStates.FctCheckAlarmComp4	5079… 5080	8040	DWord	RO	Namur FctCheck alarms that are com-ponent1 related
Status.NamurStates.FctCheckAlarmComp5	5087… 5088	8044	DWord	RO	Namur FctCheck alarms that are com-ponent1 related
Status.NamurStates.FctCheckAlarmDev	5047… 5048	8024	DWord	RO	Namur FctCheck alarms that are de-vice related
Status.NamurStates.MaintRequActive	5013… 5014	8007	DWord	RO	Namur Maintenance Request active bitfield

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Status.NamurStates.MaintRequAlarm	5005… 5006	8003	DWord	RO	Namur Maintenance Request alarm bitfield
Status.NamurStates.MaintRequAlarmComp1	5053… 5054	8027	DWord	RO	Namur MaintRequ alarms that are com-ponent1 related
Status.NamurStates.MaintRequAlarmComp2	5061… 5062	8031	DWord	RO	Namur MaintRequ alarms that are com-ponent2 related
Status.NamurStates.MaintRequAlarmComp3	5069… 5070	8035	DWord	RO	Namur MaintRequ alarms that are com-ponent3 related
Status.NamurStates.MaintRequAlarmComp4	5077… 5078	8039	DWord	RO	Namur MaintRequ alarms that are com-ponent4 related
Status.NamurStates.MaintRequAlarmComp5	5085… 5086	8043	DWord	RO	Namur MaintRequ alarms that are com-ponent5 related
Status.NamurStates.MaintRequAlarmDev	5045… 5046	8023	DWord	RO	NamurMaintRequ alarms that are device related
Status.NamurStates.NamurAlarm	4001	4001	Word	RO	NAMUR sum state bit-field (b0:F b1:M b2:S b3:C)
Status.NamurStates.NamurAlarmCh1	4003	4003	Word	RO	comp1‘s NAMUR state bit-field (b0:F b1:M b2:S b3:C)
Status.NamurStates.NamurAlarmCh2	4004	4004	Word	RO	comp2‘s NAMUR state bit-field (b0:F b1:M b2:S b3:C)
Status.NamurStates.NamurAlarmCh3	4005	4005	Word	RO	comp3‘s NAMUR state bit-field (b0:F b1:M b2:S b3:C)
Status.NamurStates.NamurAlarmCh4	4006	4006	Word	RO	comp4‘s NAMUR state bit-field (b0:F b1:M b2:S b3:C)
Status.NamurStates.NamurAlarmCh5	4007	4007	Word	RO	comp4‘s NAMUR state bit-field (b0:F b1:M b2:S b3:C)
Status.NamurStates.NamurAlarmDevice	4002	4002	Word	RO	device‘s NAMUR state bit-field (b0:F b1:M b2:S b3:C)
Status.NamurStates.OffSpecActive	5011… 5012	8006	DWord	RO	Namur Off-spec active bitfield
Status.NamurStates.OffSpecAlarm	5003… 5004	8002	DWord	RO	Namur Off-spec alarm bitfield
Status.NamurStates.OffSpecAlarmComp1	5051… 5052	8026	DWord	RO	Namur Off-spec alarms that are com-ponent1 related
Status.NamurStates.OffSpecAlarmComp2	5059… 5060	8030	DWord	RO	Namur Off-spec alarms that are com-ponent2 related
Status.NamurStates.OffSpecAlarmComp3	5067… 5068	8034	DWord	RO	Namur Off-spec alarms that are com-ponent3 related
Status.NamurStates.OffSpecAlarmComp4	5075… 5076	8038	DWord	RO	Namur Off-spec alarms that are com-ponent4 related
Status.NamurStates.OffSpecAlarmComp5	5083… 5084	8042	DWord	RO	Namur Off-spec alarms that are com-ponent5 related
Status.NamurStates.OffSpecAlarmDev	5043… 5044	8022	DWord	RO	NamurOff-spec alarms that are device related
Status.Pressure1	6061… 6062	9031	Float	RO	pressure of comp1

9.3 List of Parameters and Registers - Sorted by Tag Name

Tag Name	Address		Data Type	Client Access	Description
	Modicon	Daniel			
Status.Pressure2	6063… 6064	9032	Float	RO	pressure of comp2
Status.Pressure3	6065… 6066	9033	Float	RO	pressure of comp3
Status.Pressure4	6067… 6068	9034	Float	RO	pressure of comp4

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
2001	2001	Control.Calibration.Zero_1	Boolean	R/W	Zero calibration comp1 (1=start)
2002	2002	Control.Calibration.Zero_2	Boolean	R/W	Zero calibration comp2 (1=start)
2003	2003	Control.Calibration.Zero_3	Boolean	R/W	Zero calibration comp3 (1=start)
2004	2004	Control.Calibration.Zero_4	Boolean	R/W	Zero calibration comp4 (1=start)
2005	2005	Control.Calibration.Zero_5	Boolean	R/W	Zero calibration comp5 (1=start)
2006	2006	Control.Calibration.Span_1	Boolean	R/W	Span calibration comp1 (1=start)
2007	2007	Control.Calibration.Span_2	Boolean	R/W	Span calibration comp2 (1=start)
2008	2008	Control.Calibration.Span_3	Boolean	R/W	Span calibration comp3 (1=start)
2009	2009	Control.Calibration.Span_4	Boolean	R/W	Span calibration comp4 (1=start)
2010	2010	Control.Calibration.Span_5	Boolean	R/W	Span calibration comp5 (1=start)
2011	2011	Control.Calibration.ZeroSpan_1	Boolean	R/W	Zero+span calibration comp1 (1=start)
2012	2012	Control.Calibration.ZeroSpan_2	Boolean	R/W	Zero+span calibration comp1 (1=start)
2013	2013	Control.Calibration.ZeroSpan_3	Boolean	R/W	Zero+span calibration comp1 (1=start)
2014	2014	Control.Calibration.ZeroSpan_4	Boolean	R/W	Zero+span calibration comp1 (1=start)
2015	2015	Control.Calibration.ZeroSpan_5	Boolean	R/W	Zero+span calibration comp1 (1=start)
2016	2016	Control.Calibration.Blowback_1	Boolean	R/W	Blowback procedure comp1 (1=start)
2017	2017	Control.Calibration.Blowback_2	Boolean	R/W	Blowback procedure comp2 (1=start)
2018	2018	Control.Calibration.Blowback_3	Boolean	R/W	Blowback procedure comp3 (1=start)
2019	2019	Control.Calibration.Blowback_4	Boolean	R/W	Blowback procedure comp4 (1=start)
2020	2020	Control.Calibration.Blowback_5	Boolean	R/W	Blowback procedure comp5 (1=start)
2021	2021	Control.Calibration.Zero_All	Boolean	R/W	Zero calibration all (1=start)
2022	2022	Control.Calibration.Span_All	Boolean	R/W	Span calibration all (1=start)
2023	2023	Control.Calibration.ZeroSpan_All	Boolean	R/W	Zero+span calibration all (1=start)
2024	2024	Control.Calibration.ProgSequence	Boolean	R/W	Zero+span calibration all (1=start)
2025	2025	Control.Calibration.Blowback_All	Boolean	R/W	Blowback procedure all (1=start)
2026	2026	Control.Calibration.Calib_Cancel	Boolean	R/W	Cancel any calibration (1=cancel)
2051	2051	Control.ApplyGas.SampleValve1	Boolean	R/W	0=close all valves, 1=open sample valve comp1
2052	2052	Control.ApplyGas.SampleValve2	Boolean	R/W	0=close all valves, 1=open sample valve comp2
2053	2053	Control.ApplyGas.SampleValve3	Boolean	R/W	0=close all valves, 1=open sample valve comp3
2054	2054	Control.ApplyGas.SampleValve4	Boolean	R/W	0=close all valves, 1=open sample valve comp4
2055	2055	Control.ApplyGas.SampleValve5	Boolean	R/W	0=close all valves, 1=open sample valve comp5
2056	2056	Control.ApplyGas.ZeroValve1	Boolean	R/W	0=open sample valve, 1=open zero valve comp1
2057	2057	Control.ApplyGas.ZeroValve2	Boolean	R/W	0=open sample valve, 1=open zero valve comp2
2058	2058	Control.ApplyGas.ZeroValve3	Boolean	R/W	0=open sample valve, 1=open zero valve comp3
2059	2059	Control.ApplyGas.ZeroValve4	Boolean	R/W	0=open sample valve, 1=open zero valve comp4
2060	2060	Control.ApplyGas.ZeroValve5	Boolean	R/W	0=open sample valve, 1=open zero valve comp4
2061	2061	Control.ApplyGas.Span1Valve1	Boolean	R/W	0=open sample valve, 1=open span1 valve comp1
2062	2062	Control.ApplyGas.Span2Valve1	Boolean	R/W	0=open sample valve, 1=open span2 valve comp1
2063	2063	Control.ApplyGas.Span3Valve1	Boolean	R/W	0=open sample valve, 1=open span3 valve comp1
2064	2064	Control.ApplyGas.Span4Valve1	Boolean	R/W	0=open sample valve, 1=open span4 valve comp1
2065	2065	Control.ApplyGas.Span1Valve2	Boolean	R/W	0=open sample valve, 1=open span1 valve comp2
2066	2066	Control.ApplyGas.Span2Valve2	Boolean	R/W	0=open sample valve, 1=open span2 valve comp2
2067	2067	Control.ApplyGas.Span3Valve2	Boolean	R/W	0=open sample valve, 1=open span3 valve comp2

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
2068	2068	Control.ApplyGas.Span4Valve2	Boolean	R/W	0=open sample valve, 1=open span4 valve comp2
2069	2069	Control.ApplyGas.Span1Valve3	Boolean	R/W	0=open sample valve, 1=open span1 valve comp3
2070	2070	Control.ApplyGas.Span2Valve3	Boolean	R/W	0=open sample valve, 1=open span2 valve comp3
2071	2071	Control.ApplyGas.Span3Valve3	Boolean	R/W	0=open sample valve, 1=open span3 valve comp3
2072	2072	Control.ApplyGas.Span4Valve3	Boolean	R/W	0=open sample valve, 1=open span4 valve comp3
2073	2073	Control.ApplyGas.Span1Valve4	Boolean	R/W	0=open sample valve, 1=open span1 valve comp4
2074	2074	Control.ApplyGas.Span2Valve4	Boolean	R/W	0=open sample valve, 1=open span2 valve comp4
2075	2075	Control.ApplyGas.Span3Valve4	Boolean	R/W	0=open sample valve, 1=open span3 valve comp4
2076	2076	Control.ApplyGas.Span4Valve4	Boolean	R/W	0=open sample valve, 1=open span4 valve comp4
2077	2077	Control.ApplyGas.Span1Valve5	Boolean	R/W	0=open sample valve, 1=open span1 valve comp5
2078	2078	Control.ApplyGas.Span2Valve5	Boolean	R/W	0=open sample valve, 1=open span2 valve comp5
2079	2079	Control.ApplyGas.Span3Valve5	Boolean	R/W	0=open sample valve, 1=open span3 valve comp5
2080	2080	Control.ApplyGas.Span4Valve5	Boolean	R/W	0=open sample valve, 1=open span4 valve comp5
2081	2081	Control.ApplyGas.PumpState1	Boolean	R/W	Pump1 state (0=Off, 1=On)
2082	2082	Control.ApplyGas.PumpState2	Boolean	R/W	Pump1 state (0=Off, 1=On)
2091	2091	Control.Acknowledge.AllStates	Boolean	R/W	0=no effect, 1=Acknowledge device‘s states
2092	2092	Control.Acknowledge.Failure	Boolean	R/W	0=no effect, 1=Acknowledge device‘s Namur Failure alarms
2093	2093	Control.Acknowledge.OffSpecs	Boolean	R/W	0=no effect, 1=Acknowledge device‘s Namur Off-spec alarms
2094	2094	Control.Acknowledge.MaintReque-sts	Boolean	R/W	0=no effect, 1=Acknowledge device‘s Namur MaintRequ alarms
2095	2095	Control.Acknowledge.FctChecks	Boolean	R/W	0=no effect, 1=Acknowledge device‘s Namur FctCheck alarms
2096	2096	Control.Acknowledge.LevelAlarms	Boolean	R/W	0=no effect, 1=Acknowledge device‘s level alarms
3001	3001	Service.General.ChannelActive1	Word	R/W	built-in component1
3002	3002	Service.General.ChannelActive2	Word	R/W	built-in component2
3003	3003	Service.General.ChannelActive3	Word	R/W	built-in component3
3004	3004	Service.General.ChannelActive4	Word	R/W	built-in component4
3005	3005	Service.General.ChannelActive5	Word	R/W	built-in component5
3011	3011	Setup.Display.Component.PV_Unit1	Word	R/W	PV1 unit: 0 = Custom, ppm, ppb, Vol%
3016	3016	Setup.Display.Component.PV_Unit2	Word	R/W	PV2 unit: 0 = Custom, ppm, ppb, Vol%
3021	3021	Setup.Display.Component.PV_Unit3	Word	R/W	PV3 unit: 0 = Custom, ppm, ppb, Vol%
3026	3026	Setup.Display.Component.PV_Unit4	Word	R/W	PV4 unit: 0 = Custom, ppm, ppb, Vol%
3031	3031	Setup.Display.Component.PV_Unit5	Word	R/W	PV5 unit: 0 = Custom, ppm, ppb, Vol%
3036	3036	Setup.Display.Component.Preci-sion1	Word	R/W	decimal points displayed for component1
3037	3037	Setup.Display.Component.Preci-sion2	Word	R/W	decimal points displayed for component2
3038	3038	Setup.Display.Component.Preci-sion3	Word	R/W	decimal points displayed for component3

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
3039	3039	Setup.Display.Component.Precision4	Word	R/W	decimal points displayed for component4
3040	3040	Setup.Display.Component.Precision5	Word	R/W	decimal points displayed for component4
3091	3091	Setup.Display.MeasDisplay.Dis-1Line1	Word	R/W	assigned signal of measure display 1, Line 1
3092	3092	Setup.Display.MeasDisplay.Dis-1Line2	Word	R/W	assigned signal of measure display 1, Line 2
3093	3093	Setup.Display.MeasDisplay.Dis-1Line3	Word	R/W	assigned signal of measure display 1, Line 3
3094	3094	Setup.Display.MeasDisplay.Dis-1Line4	Word	R/W	assigned signal of measure display 1, Line 4
3095	3095	Setup.Display.MeasDisplay.Dis-1Line5	Word	R/W	assigned signal of measure display 1, Line 5
3096	3096	Setup.Display.MeasDisplay.Dis-2Line1	Word	R/W	assigned signal of measure display 2, Line 1
3097	3097	Setup.Display.MeasDisplay.Dis-2Line2	Word	R/W	assigned signal of measure display 2, Line 2
3098	3098	Setup.Display.MeasDisplay.Dis-2Line3	Word	R/W	assigned signal of measure display 2, Line 3
3099	3099	Setup.Display.MeasDisplay.Dis-2Line4	Word	R/W	assigned signal of measure display 2, Line 4
3100	3100	Setup.Display.MeasDisplay.Dis-2Line5	Word	R/W	assigned signal of measure display 2, Line 5
3151	3151	Setup.In/Outputs.DO.Node_DO1	Word	R/W	node of DigOut1 / XPSA
3152	3152	Setup.In/Outputs.DO.Node_DO2	Word	R/W	node of DigOut2 / XPSA
3153	3153	Setup.In/Outputs.DO.Node_DO3	Word	R/W	node of DigOut3 / XPSA
3154	3154	Setup.In/Outputs.DO.Node_DO4	Word	R/W	node of DigOut4 / XPSA
3156	3156	Setup.In/Outputs.DO.Signal_DO1	Word	R/W	signal of DigOut1 / XPSA
3157	3157	Setup.In/Outputs.DO.Signal_DO2	Word	R/W	signal of DigOut2 / XPSA
3158	3158	Setup.In/Outputs.DO.Signal_DO3	Word	R/W	signal of DigOut3 / XPSA
3159	3159	Setup.In/Outputs.DO.Signal_DO4	Word	R/W	signal of DigOut4 / XPSA
3161	3161	Setup.In/Outputs.DO.Node_DO5	Word	R/W	node of DigOut5 / XDIO1 Out1
3162	3162	Setup.In/Outputs.DO.Node_DO6	Word	R/W	node of DigOut6 / XDIO1 Out2
3163	3163	Setup.In/Outputs.DO.Node_DO7	Word	R/W	node of DigOut7 / XDIO1 Out3
3164	3164	Setup.In/Outputs.DO.Node_DO8	Word	R/W	node of DigOut8 / XDIO1 Out4
3165	3165	Setup.In/Outputs.DO.Node_DO9	Word	R/W	node of DigOut9 / XDIO1 Out5
3166	3166	Setup.In/Outputs.DO.Node_DO10	Word	R/W	node of DigOut10 / XDIO1 Out6
3167	3167	Setup.In/Outputs.DO.Node_DO11	Word	R/W	node of DigOut11 / XDIO1 Out7
3168	3168	Setup.In/Outputs.DO.Node_DO12	Word	R/W	node of DigOut12 / XDIO1 Out8
3169	3169	Setup.In/Outputs.DO.Node_DO13	Word	R/W	node of DigOut13 / XDIO1 Out9
3171	3171	Setup.In/Outputs.DO.Signal_DO5	Word	R/W	signal of DigOut5 / XDIO1 Out1
3172	3172	Setup.In/Outputs.DO.Signal_DO6	Word	R/W	signal of DigOut6 / XDIO1 Out2
3173	3173	Setup.In/Outputs.DO.Signal_DO7	Word	R/W	signal of DigOut7 / XDIO1 Out3
3174	3174	Setup.In/Outputs.DO.Signal_DO8	Word	R/W	signal of DigOut8 / XDIO1 Out4
3175	3175	Setup.In/Outputs.DO.Signal_DO9	Word	R/W	signal of DigOut9 / XDIO1 Out5

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
3176	3176	Setup.In/Outputs.DO.Signal_DO10	Word	R/W	signal of DigOut10 / XDIO1 Out6
3177	3177	Setup.In/Outputs.DO.Signal_DO11	Word	R/W	signal of DigOut11 / XDIO1 Out7
3178	3178	Setup.In/Outputs.DO.Signal_DO12	Word	R/W	signal of DigOut12 / XDIO1 Out8
3179	3179	Setup.In/Outputs.DO.Signal_DO13	Word	R/W	signal of DigOut13 / XDIO1 Out9
3181	3181	Setup.In/Outputs.DO.Node_DO14	Word	R/W	node of DigOut14 / XDIO2 Out1
3182	3182	Setup.In/Outputs.DO.Node_DO15	Word	R/W	node of DigOut15 / XDIO2 Out2
3183	3183	Setup.In/Outputs.DO.Node_DO16	Word	R/W	node of DigOut16 / XDIO2 Out3
3184	3184	Setup.In/Outputs.DO.Node_DO17	Word	R/W	node of DigOut17 / XDIO2 Out4
3185	3185	Setup.In/Outputs.DO.Node_DO18	Word	R/W	node of DigOut18 / XDIO2 Out5
3186	3186	Setup.In/Outputs.DO.Node_DO19	Word	R/W	node of DigOut19 / XDIO2 Out6
3187	3187	Setup.In/Outputs.DO.Node_DO20	Word	R/W	node of DigOut20 / XDIO2 Out7
3188	3188	Setup.In/Outputs.DO.Node_DO21	Word	R/W	node of DigOut21 / XDIO2 Out8
3189	3189	Setup.In/Outputs.DO.Node_DO22	Word	R/W	node of DigOut22 / XDIO2 Out9
3191	3191	Setup.In/Outputs.DO.Signal_DO14	Word	R/W	signal of DigOut14 / XDIO2 Out1
3192	3192	Setup.In/Outputs.DO.Signal_DO15	Word	R/W	signal of DigOut15 / XDIO2 Out2
3193	3193	Setup.In/Outputs.DO.Signal_DO16	Word	R/W	signal of DigOut16 / XDIO2 Out3
3194	3194	Setup.In/Outputs.DO.Signal_DO17	Word	R/W	signal of DigOut17 / XDIO2 Out4
3195	3195	Setup.In/Outputs.DO.Signal_DO18	Word	R/W	signal of DigOut18 / XDIO2 Out5
3196	3196	Setup.In/Outputs.DO.Signal_DO19	Word	R/W	signal of DigOut19 / XDIO2 Out6
3197	3197	Setup.In/Outputs.DO.Signal_DO20	Word	R/W	signal of DigOut20 / XDIO2 Out7
3198	3198	Setup.In/Outputs.DO.Signal_DO21	Word	R/W	signal of DigOut21 / XDIO2 Out8
3199	3199	Setup.In/Outputs.DO.Signal_DO22	Word	R/W	signal of DigOut22 / XDIO2 Out9
3201	3201	Setup.In/Outputs.SHS.Node_Gas1	Word	R/W	node of SHS GasOut1
3202	3202	Setup.In/Outputs.SHS.Node_Gas2	Word	R/W	node of SHS GasOut2
3203	3203	Setup.In/Outputs.SHS.Node_Gas3	Word	R/W	node of SHS GasOut3
3204	3204	Setup.In/Outputs.SHS.Node_Gas4	Word	R/W	node of SHS GasOut4
3205	3205	Setup.In/Outputs.SHS.Node_Gas5	Word	R/W	node of SHS GasOut5
3206	3206	Setup.In/Outputs.SHS.Node_Gas6	Word	R/W	node of SHS GasOut6
3207	3207	Setup.In/Outputs.SHS.Node_Gas7	Word	R/W	node of SHS GasOut7
3208	3208	Setup.In/Outputs.SHS.Node_Gas8	Word	R/W	node of SHS GasOut8
3209	3209	Setup.In/Outputs.SHS.Node_ Pump1	Word	R/W	node of SHS Pump1
3210	3210	Setup.In/Outputs.SHS.Node_ Pump2	Word	R/W	node of SHS Pump1
3211	3211	Setup.In/Outputs.SHS.Signal_Gas1	Word	R/W	signal of SHS GasOut1
3212	3212	Setup.In/Outputs.SHS.Signal_Gas2	Word	R/W	signal of SHS GasOut2
3213	3213	Setup.In/Outputs.SHS.Signal_Gas3	Word	R/W	signal of SHS GasOut3
3214	3214	Setup.In/Outputs.SHS.Signal_Gas4	Word	R/W	signal of SHS GasOut4
3215	3215	Setup.In/Outputs.SHS.Signal_Gas5	Word	R/W	signal of SHS GasOut5
3216	3216	Setup.In/Outputs.SHS.Signal_Gas6	Word	R/W	signal of SHS GasOut6
3217	3217	Setup.In/Outputs.SHS.Signal_Gas7	Word	R/W	signal of SHS GasOut7
3218	3218	Setup.In/Outputs.SHS.Signal_Gas8	Word	R/W	signal of SHS GasOut8
3219	3219	Setup.In/Outputs.SHS.Signal_ Pump1	Word	R/W	signal of SHS Pump1

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
3220	3220	Setup.In/Outputs.SHS.Signal_Pump2	Word	R/W	signal of SHS Pump1
3221	3221	Setup.In/Outputs.DI.Node_DI1	Word	R/W	node of DigInp1 / XDIO1 Inp1
3222	3222	Setup.In/Outputs.DI.Node_DI2	Word	R/W	node of DigInp2 / XDIO1 Inp2
3223	3223	Setup.In/Outputs.DI.Node_DI3	Word	R/W	node of DigInp3 / XDIO1 Inp3
3224	3224	Setup.In/Outputs.DI.Node_DI4	Word	R/W	node of DigInp4 / XDIO1 Inp4
3225	3225	Setup.In/Outputs.DI.Node_DI5	Word	R/W	node of DigInp5 / XDIO1 Inp5
3226	3226	Setup.In/Outputs.DI.Node_DI6	Word	R/W	node of DigInp6 / XDIO1 Inp6
3227	3227	Setup.In/Outputs.DI.Node_DI7	Word	R/W	node of DigInp7 / XDIO1 Inp7
3228	3228	Setup.In/Outputs.DI.Signal_DI1	Word	R/W	signal of DigInp1 / XDIO1 Inp1
3229	3229	Setup.In/Outputs.DI.Signal_DI2	Word	R/W	signal of DigInp2 / XDIO1 Inp2
3230	3230	Setup.In/Outputs.DI.Signal_DI3	Word	R/W	signal of DigInp3 / XDIO1 Inp3
3231	3231	Setup.In/Outputs.DI.Signal_DI4	Word	R/W	signal of DigInp4 / XDIO1 Inp4
3232	3232	Setup.In/Outputs.DI.Signal_DI5	Word	R/W	signal of DigInp5 / XDIO1 Inp5
3233	3233	Setup.In/Outputs.DI.Signal_DI6	Word	R/W	signal of DigInp6 / XDIO1 Inp6
3234	3234	Setup.In/Outputs.DI.Signal_DI7	Word	R/W	signal of DigInp7 / XDIO1 Inp7
3236	3236	Setup.In/Outputs.DI.Node_DI8	Word	R/W	node of DigInp8 / XDIO2 Inp1
3237	3237	Setup.In/Outputs.DI.Node_DI9	Word	R/W	node of DigInp9 / XDIO2 Inp2
3238	3238	Setup.In/Outputs.DI.Node_DI10	Word	R/W	node of DigInp10 / XDIO2 Inp3
3239	3239	Setup.In/Outputs.DI.Node_DI11	Word	R/W	node of DigInp11 / XDIO2 Inp4
3240	3240	Setup.In/Outputs.DI.Node_DI12	Word	R/W	node of DigInp12 / XDIO2 Inp5
3241	3241	Setup.In/Outputs.DI.Node_DI13	Word	R/W	node of DigInp13 / XDIO2 Inp6
3242	3242	Setup.In/Outputs.DI.Node_DI14	Word	R/W	node of DigInp14 / XDIO2 Inp7
3243	3243	Setup.In/Outputs.DI.Signal_DI8	Word	R/W	signal of DigInp8 / XDIO2 Inp1
3244	3244	Setup.In/Outputs.DI.Signal_DI9	Word	R/W	signal of DigInp9 / XDIO2 Inp2
3245	3245	Setup.In/Outputs.DI.Signal_DI10	Word	R/W	signal of DigInp10 / XDIO2 Inp3
3246	3246	Setup.In/Outputs.DI.Signal_DI11	Word	R/W	signal of DigInp11 / XDIO2 Inp4
3247	3247	Setup.In/Outputs.DI.Signal_DI12	Word	R/W	signal of DigInp12 / XDIO2 Inp5
3248	3248	Setup.In/Outputs.DI.Signal_DI13	Word	R/W	signal of DigInp13 / XDIO2 Inp6
3249	3249	Setup.In/Outputs.DI.Signal_DI14	Word	R/W	signal of DigInp14 / XDIO2 Inp7
3270	3270	Setup.In/Outputs.AO.NumberOuts	Word	R/W	number of analog outputs
3271	3271	Setup.In/Outputs.AO.SignalAsgn1	Word	R/W	assigned signal output1
3272	3272	Setup.In/Outputs.AO.OutRange1	Word	R/W	range of output1 (0=0..20mA, 1=4-20mA)
3273	3273	Setup.In/Outputs.AO.AutoScale1	Word	R/W	Auto scale for ranged signals on output1 (0=NO, 1=Yes)
3274	3274	Setup.In/Outputs.AO.FailMode1	Word	R/W	Behavior on errors output1 (0=Track, 1=-10%Start, 2=+10%End)
3275	3275	Setup.In/Outputs.AO.Hold1	Word	R/W	Hold output1 on calibrations (0=Track, 1=Hold)
3276	3276	Setup.In/Outputs.AO.SignalAsgn2	Word	R/W	assigned signal output2
3277	3277	Setup.In/Outputs.AO.OutRange2	Word	R/W	range of output2 (0=0..20mA, 1=4-20mA)
3278	3278	Setup.In/Outputs.AO.AutoScale2	Word	R/W	Auto scale for ranged signals on output2 (0=NO, 1=Yes)
3279	3279	Setup.In/Outputs.AO.FailMode2	Word	R/W	Behavior on errors output2 (0=Track, 1=-10%Start, 2=+10%End)
3280	3280	Setup.In/Outputs.AO.Hold2	Word	R/W	Hold output2 on calibrations (0=Track, 1=Hold)

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
3281	3281	Setup.In/Outputs.AO.SignalAsgn3	Word	R/W	assigned signal output3
3282	3282	Setup.In/Outputs.AO.OutRange3	Word	R/W	range of output3 (0=0..20mA, 1=4-20mA)
3283	3283	Setup.In/Outputs.AO.AutoScale3	Word	R/W	Auto scale for ranged signals on output3 (0=NO, 1=Yes)
3284	3284	Setup.In/Outputs.AO.FailMode3	Word	R/W	Behavior on errors output3 (0=Track, 1=-10%Start, 2=+10%End)
3285	3285	Setup.In/Outputs.AO.Hold3	Word	R/W	Hold output3 on calibrations (0=Track, 1=Hold)
3286	3286	Setup.In/Outputs.AO.SignalAsgn4	Word	R/W	assigned signal output4
3287	3287	Setup.In/Outputs.AO.OutRange4	Word	R/W	range of output4 (0=0..20mA, 1=4-20mA)
3288	3288	Setup.In/Outputs.AO.AutoScale4	Word	R/W	Auto scale for ranged signals on output4 (0=NO, 1=Yes)
3289	3289	Setup.In/Outputs.AO.FailMode4	Word	R/W	Behavior on errors output4 (0=Track, 1=-10%Start, 2=+10%End)
3290	3290	Setup.In/Outputs.AO.Hold4	Word	R/W	Hold output4 on calibrations (0=Track, 1=Hold)
3291	3291	Setup.In/Outputs.AO.SignalAsgn5	Word	R/W	assigned signal output5
3292	3292	Setup.In/Outputs.AO.OutRange5	Word	R/W	range of output5 (0=0..20mA, 1=4-20mA)
3293	3293	Setup.In/Outputs.AO.AutoScale5	Word	R/W	Auto scale for ranged signals on output5 (0=NO, 1=Yes)
3294	3294	Setup.In/Outputs.AO.FailMode5	Word	R/W	Behavior on errors output5 (0=Track, 1=-10%Start, 2=+10%End)
3295	3295	Setup.In/Outputs.AO.Hold5	Word	R/W	Hold output5 on calibrations (0=Track, 1=Hold)
3301	3301	Setup.Calibration.ZeroMethod1	Word	R/W	zero cal method comp1 (0=Instant, 1=Stability)
3302	3302	Setup.Calibration.ZeroMethod2	Word	R/W	zero cal method comp2 (0=Instant, 1=Stability)
3303	3303	Setup.Calibration.ZeroMethod3	Word	R/W	zero cal method comp3 (0=Instant, 1=Stability)
3304	3304	Setup.Calibration.ZeroMethod4	Word	R/W	zero cal method comp4 (0=Instant, 1=Stability)
3305	3305	Setup.Calibration.ZeroMethod5	Word	R/W	zero cal method comp5 (0=Instant, 1=Stability)
3306	3306	Setup.Calibration.SpanMethod1	Word	R/W	span cal method comp1 (0=Instant, 1=Stability)
3307	3307	Setup.Calibration.SpanMethod2	Word	R/W	span cal method comp2 (0=Instant, 1=Stability)
3308	3308	Setup.Calibration.SpanMethod3	Word	R/W	span cal method comp2 (0=Instant, 1=Stability)
3309	3309	Setup.Calibration.SpanMethod4	Word	R/W	span cal method comp4 (0=Instant, 1=Stability)
3310	3310	Setup.Calibration.SpanMethod5	Word	R/W	span cal method comp5 (0=Instant, 1=Stability)
3397	3397	Setup.Communication.SIntMod-busFt32	Word	R/W	Modbus 32Bit mode of serial COM
3398	3398	Setup.Communication.SSvcMod-busFt32	Word	R/W	Modbus 32Bit mode of serial service COM
3399	3399	Setup.Communication.Eth2Mod-busFt32	Word	R/W	Modbus 32Bit mode of Ethernet2
3400	3400	Setup.Communication.Eth1Mod-busFt32	Word	R/W	Modbus 32Bit mode of Ethernet1
3401	3401	Service.Measurement.Compensati-on.ToffEnable1	Word	R/W	enable temperature zero compensation of comp1
3402	3402	Service.Measurement.Compensati-on.ToffEnable2	Word	R/W	enable temperature zero compensation of comp2
3403	3403	Service.Measurement.Compensati-on.ToffEnable3	Word	R/W	enable temperature zero compensation of comp3

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
3404	3404	Service.Measurement.Compensation.ToffEnable4	Word	R/W	enable temperature zero compensation of comp4
3405	3405	Service.Measurement.Compensation.ToffEnable5	Word	R/W	enable temperature zero compensation of comp5
3406	3406	Service.Measurement.Compensation.ToffSensorAssign1	Word	R/W	assign temp-sensor of zero comp1 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
3407	3407	Service.Measurement.Compensation.ToffSensorAssign2	Word	R/W	assign temp-sensor of zero comp2 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
3408	3408	Service.Measurement.Compensation.ToffSensorAssign3	Word	R/W	assign temp-sensor of zero comp3 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
3409	3409	Service.Measurement.Compensation.ToffSensorAssign4	Word	R/W	assign temp-sensor of zero comp4 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
3410	3410	Service.Measurement.Compensation.ToffSensorAssign5	Word	R/W	assign temp-sensor of zero comp5 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
3411	3411	Service.Measurement.Compensation.TfactEnable1	Word	R/W	enable temperature span compensation of comp1
3412	3412	Service.Measurement.Compensation.TfactEnable2	Word	R/W	enable temperature span compensation of comp2
3413	3413	Service.Measurement.Compensation.TfactEnable3	Word	R/W	enable temperature span compensation of comp3
3414	3414	Service.Measurement.Compensation.TfactEnable4	Word	R/W	enable temperature span compensation of comp4
3415	3415	Service.Measurement.Compensation.TfactEnable5	Word	R/W	enable temperature span compensation of comp5
3416	3416	Service.Measurement.Compensation.TfactSensorAssign1	Word	R/W	assign temp-sensor of span comp1 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
3417	3417	Service.Measurement.Compensation.TfactSensorAssign2	Word	R/W	assign temp-sensor of span comp2 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
3418	3418	Service.Measurement.Compensation.TfactSensorAssign3	Word	R/W	assign temp-sensor of span comp3 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
3419	3419	Service.Measurement.Compensation.TfactSensorAssign4	Word	R/W	assign temp-sensor of span comp4 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
3420	3420	Service.Measurement.Compensation.TfactSensorAssign5	Word	R/W	assign temp-sensor of span comp5 (0=None, 1=DSP_T1, 2=DSP_T2 etc.)
3421	3421	Service.Measurement.Compensation.PfactEnable1	Word	R/W	enable pressure span compensation of comp1
3422	3422	Service.Measurement.Compensation.PfactEnable2	Word	R/W	enable pressure span compensation of comp2
3423	3423	Service.Measurement.Compensation.PfactEnable3	Word	R/W	enable pressure span compensation of comp3
3424	3424	Service.Measurement.Compensation.PfactEnable4	Word	R/W	enable pressure span compensation of comp4
3425	3425	Service.Measurement.Compensation.PfactEnable5	Word	R/W	enable pressure span compensation of comp5
3426	3426	Service.Measurement.Compensation.PfactSensorAssign1	Word	R/W	assign press-sensor of span comp1 (0=Man, 1=DSP_P1, 2=DSP_P2 etc.)
3427	3427	Service.Measurement.Compensation.PfactSensorAssign2	Word	R/W	assign press-sensor of span comp2 (0=Man, 1=DSP_P1, 2=DSP_P2 etc.)

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
3428	3428	Service.Measurement.Compensation.PfactSensorAssign3	Word	R/W	assign press-sensor of span comp3 (0=Man, 1=DSP_P1, 2=DSP_P2 etc.)
3429	3429	Service.Measurement.Compensation.PfactSensorAssign4	Word	R/W	assign press-sensor of span comp4 (0=Man, 1=DSP_P1, 2=DSP_P2 etc.)
3430	3430	Service.Measurement.Compensation.PfactSensorAssign5	Word	R/W	assign press-sensor of span comp5 (0=Man, 1=DSP_P1, 2=DSP_P2 etc.)
3456	3456	Service.Measurement.Simulation.SimPVARawEnable1	Word	R/W	enable simulation for rawPVA of comp1
3457	3457	Service.Measurement.Simulation.SimPVARawEnable2	Word	R/W	enable simulation for rawPVA of comp2
3458	3458	Service.Measurement.Simulation.SimPVARawEnable3	Word	R/W	enable simulation for rawPVA of comp3
3459	3459	Service.Measurement.Simulation.SimPVARawEnable4	Word	R/W	enable simulation for rawPVA of comp4
3460	3460	Service.Measurement.Simulation.SimPVARawEnable5	Word	R/W	enable simulation for rawPVA of comp5
3471	3471	Setup.Measurement.XIntf.Enable1	Word	R/W	Enable cross interference compensation for comp1
3472	3472	Setup.Measurement.XIntf.Enable2	Word	R/W	Enable cross interference compensation for comp2
3473	3473	Setup.Measurement.XIntf.Enable3	Word	R/W	Enable cross interference compensation for comp3
3474	3474	Setup.Measurement.XIntf.Enable4	Word	R/W	Enable cross interference compensation for comp4
3475	3475	Setup.Measurement.XIntf.Enable5	Word	R/W	Enable cross interference compensation for comp5
3476	3476	Setup.Measurement.XIntf.ComputeFactor1	Word	R/W	Compute cross interference factor comp1 (0=Src1, 1=Src2 etc.)
3477	3477	Setup.Measurement.XIntf.ComputeFactor2	Word	R/W	Compute cross interference factor comp2 (0=Src1, 1=Src2 etc.)
3478	3478	Setup.Measurement.XIntf.ComputeFactor3	Word	R/W	Compute cross interference factor comp3 (0=Src1, 1=Src2 etc.)
3479	3479	Setup.Measurement.XIntf.ComputeFactor4	Word	R/W	Compute cross interference factor comp4 (0=Src1, 1=Src2 etc.)
3480	3480	Setup.Measurement.XIntf.ComputeFactor5	Word	R/W	Compute cross interference factor comp5 (0=Src1, 1=Src2 etc.)
3501	3501	Service.Measurement.Lin.Enable1	Word	R/W	Enable Linearizer of comp1
3502	3502	Service.Measurement.Lin.Enable2	Word	R/W	Enable Linearizer of comp1
3503	3503	Service.Measurement.Lin.Enable3	Word	R/W	Enable Linearizer of comp1
3504	3504	Service.Measurement.Lin.Enable4	Word	R/W	Enable Linearizer of comp1
3505	3505	Service.Measurement.Lin.Enable5	Word	R/W	Enable Linearizer of comp1
3506	3506	Service.Measurement.Lin.Method1	Word	R/W	Linearization method of comp1 (0=Splines, 1=Polynom)
3507	3507	Service.Measurement.Lin.Method2	Word	R/W	Linearization method of comp2 (0=Splines, 1=Polynom)
3508	3508	Service.Measurement.Lin.Method3	Word	R/W	Linearization method of comp3 (0=Splines, 1=Polynom)

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
3509	3509	Service.Measurement.Lin.Method4	Word	R/W	Linearization method of comp4 (0=Splines, 1=Polynom)
3510	3510	Service.Measurement.Lin.Method5	Word	R/W	Linearization method of comp5 (0=Splines, 1=Polynom)
3511	3511	Service.Measurement.Lin.StartFunction1	Word	R/W	LinFct c1: 1=On/Off, 2=Calc, 3=ToUSB, 4=FromUSB, 5=Install, 6=ToFile
3512	3512	Service.Measurement.Lin.StartFunction2	Word	R/W	LinFct c2: 1=On/Off, 2=Calc, 3=ToUSB, 4=FromUSB, 5=Install, 6=ToFile
3513	3513	Service.Measurement.Lin.StartFunction3	Word	R/W	LinFct c3: 1=On/Off, 2=Calc, 3=ToUSB, 4=FromUSB, 5=Install, 6=ToFile
3514	3514	Service.Measurement.Lin.StartFunction4	Word	R/W	LinFct c4: 1=On/Off, 2=Calc, 3=ToUSB, 4=FromUSB, 5=Install, 6=ToFile
3515	3515	Service.Measurement.Lin.StartFunction5	Word	R/W	LinFct c5: 1=On/Off, 2=Calc, 3=ToUSB, 4=FromUSB, 5=Install, 6=ToFile
3516	3516	Service.Measurement.Lin.LinearizerStatus1	Word	RO	Lin, status comp1 (0=Normal, 1=Underflow, 2=Overflow, 3=Undefined)
3517	3517	Service.Measurement.Lin.LinearizerStatus2	Word	RO	Lin, status comp2 (0=Normal, 1=Underflow, 2=Overflow, 3=Undefined)
3518	3518	Service.Measurement.Lin.LinearizerStatus3	Word	RO	Lin, status comp3 (0=Normal, 1=Underflow, 2=Overflow, 3=Undefined)
3519	3519	Service.Measurement.Lin.LinearizerStatus4	Word	RO	Lin, status comp4 (0=Normal, 1=Underflow, 2=Overflow, 3=Undefined)
3520	3520	Service.Measurement.Lin.LinearizerStatus5	Word	RO	Lin, status comp5 (0=Normal, 1=Underflow, 2=Overflow, 3=Undefined)
3521	3521	Service.Measurement.Lin.Iterations1	Word	RO	Lin-computing iteration steps of comp1
3522	3522	Service.Measurement.Lin.Iterations2	Word	RO	Lin-computing iteration steps of comp1
3523	3523	Service.Measurement.Lin.Iterations3	Word	RO	Lin-computing iteration steps of comp1
3524	3524	Service.Measurement.Lin.Iterations4	Word	RO	Lin-computing iteration steps of comp1
3525	3525	Service.Measurement.Lin.Iterations5	Word	RO	Lin-computing iteration steps of comp1
4001	4001	Status.NamurStates.NamurAlarm	Word	RO	NAMUR sum state bit-field (b0:F b1:M b2:S b3:C)
4002	4002	Status.NamurStates.NamurAlarmDevice	Word	RO	device‘s NAMUR state bit-field (b0:F b1:M b2:S b3:C)
4003	4003	Status.NamurStates.NamurAlarmCh1	Word	RO	comp1‘s NAMUR state bit-field (b0:F b1:M b2:S b3:C)
4004	4004	Status.NamurStates.NamurAlarmCh2	Word	RO	comp2‘s NAMUR state bit-field (b0:F b1:M b2:S b3:C)
4005	4005	Status.NamurStates.NamurAlarmCh3	Word	RO	comp3‘s NAMUR state bit-field (b0:F b1:M b2:S b3:C)
4006	4006	Status.NamurStates.NamurAlarmCh4	Word	RO	comp4‘s NAMUR state bit-field (b0:F b1:M b2:S b3:C)
4007	4007	Status.NamurStates.NamurAlarmCh5	Word	RO	comp4‘s NAMUR state bit-field (b0:F b1:M b2:S b3:C)
4026	4026	Info.SensorVersion	Word	RO	Version number of sensor firmware

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
4027	4027	Service.General.Identification.SensorBuild	Word	RO	Build number of sensor firmware
4028	4028	Service.General.Identification.CPLDVersion	Word	RO	Version number of CPLD firmware
8001	5001…5002	Status.NamurStates.FailureAlarm	DWord	RO	Namur Failure alarm bitfield
8002	5003…5004	Status.NamurStates.OffSpecAlarm	DWord	RO	Namur Off-spec alarm bitfield
8003	5005…5006	Status.NamurStates.MaintRequAlarm	DWord	RO	Namur Maintenance Request alarm bitfield
8004	5007…5008	Status.NamurStates.FctCheckAlarm	DWord	RO	Namur Function Check alarm bitfield
8005	5009…5010	Status.NamurStates.FailureActive	DWord	RO	Namur Failure active bitfield
8006	5011…5012	Status.NamurStates.OffSpecActive	DWord	RO	Namur Off-spec active bitfield
8007	5013…5014	Status.NamurStates.MaintRequActive	DWord	RO	Namur Maintenance Request active bitfield
8008	5015…5016	Status.NamurStates.FctCheckActive	DWord	RO	Namur Function Check active bitfield
8011	5021…5022	Service.Status.NAMUR.FailureMask	DWord	R/W	Bitmask that disables failure sources
8012	5023…5024	Service.Status.NAMUR.OffSpecMask	DWord	R/W	Bitmask that disables NAMUR OffSpec sources
8013	5025…5026	Service.Status.NAMUR.MaintMask	DWord	R/W	Bitmask that disables NAMUR maintenance request sources
8014	5027…5028	Service.Status.NAMUR.FctCheckMask	DWord	R/W	Bitmask that disables NAMUR FctCheck sources
8015	5029…5030	Service.Status.NAMUR.FailureMap	DWord	R/W	Bitmask that maps cond. for failure source
8016	5031…5032	Service.Status.NAMUR.OffSpecMap	DWord	R/W	Bitmask that maps cond. to OffSpec source
8017	5033…5034	Service.Status.NAMUR.MaintMap	DWord	R/W	Bitmask that maps cond. for maintenance request source
8018	5035…5036	Service.Status.NAMUR.FctCheckMap	DWord	R/W	Bitmask that maps cond. for FctCheck source
8021	5041…5042	Status.NamurStates.FailAlarmDev	DWord	RO	NamurFailure alarms that are device related
8022	5043…5044	Status.NamurStates.OffSpecAlarmDev	DWord	RO	NamurOff-spec alarms that are device related
8023	5045…5046	Status.NamurStates.MaintRequAlarmDev	DWord	RO	NamurMaintRequ alarms that are device related
8024	5047…5048	Status.NamurStates.FctCheckAlarmDev	DWord	RO	Namur FctCheck alarms that are device related
8025	5049…5050	Status.NamurStates.FailAlarmComp1	DWord	RO	NamurFailure alarms that are component1 related
8026	5051…5052	Status.NamurStates.OffSpecAlarmComp1	DWord	RO	Namur Off-spec alarms that are component1 related

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
8027	5053… 5054	Status.NamurStates.MaintRequAlarmComp1	DWord	RO	Namur MaintRequ alarms that are component1 related
8028	5055… 5056	Status.NamurStates.FctCheckAlarmComp1	DWord	RO	Namur FctCheck alarms that are component1 related
8029	5057… 5058	Status.NamurStates.FailAlarmComp2	DWord	RO	NamurFailure alarms that are component2 related
8030	5059… 5060	Status.NamurStates.OffSpecAlarmComp2	DWord	RO	Namur Off-spec alarms that are component2 related
8031	5061… 5062	Status.NamurStates.MaintRequAlarmComp2	DWord	RO	Namur MaintRequ alarms that are component2 related
8032	5063… 5064	Status.NamurStates.FctCheckAlarmComp2	DWord	RO	Namur FctCheck alarms that are component1 related
8033	5065… 5066	Status.NamurStates.FailAlarmComp3	DWord	RO	NamurFailure alarms that are component3 related
8034	5067… 5068	Status.NamurStates.OffSpecAlarmComp3	DWord	RO	Namur Off-spec alarms that are component3 related
8035	5069… 5070	Status.NamurStates.MaintRequAlarmComp3	DWord	RO	Namur MaintRequ alarms that are component3 related
8036	5071… 5072	Status.NamurStates.FctCheckAlarmComp3	DWord	RO	Namur FctCheck alarms that are component1 related
8037	5073… 5074	Status.NamurStates.FailAlarmComp4	DWord	RO	NamurFailure alarms that are component4 related
8038	5075… 5076	Status.NamurStates.OffSpecAlarmComp4	DWord	RO	Namur Off-spec alarms that are component4 related
8039	5077… 5078	Status.NamurStates.MaintRequAlarmComp4	DWord	RO	Namur MaintRequ alarms that are component4 related
8040	5079… 5080	Status.NamurStates.FctCheckAlarmComp4	DWord	RO	Namur FctCheck alarms that are component1 related
8041	5081… 5082	Status.NamurStates.FailAlarmComp5	DWord	RO	NamurFailure alarms that are component5 related
8042	5083… 5084	Status.NamurStates.OffSpecAlarmComp5	DWord	RO	Namur Off-spec alarms that are component5 related
8043	5085… 5086	Status.NamurStates.MaintRequAlarmComp5	DWord	RO	Namur MaintRequ alarms that are component5 related
8044	5087… 5088	Status.NamurStates.FctCheckAlarmComp5	DWord	RO	Namur FctCheck alarms that are component1 related
9001	6001… 6002	PV1	Float	RO	Primary Variable 1
9002	6003… 6004	PV2	Float	RO	Primary Variable 2
9003	6005… 6006	PV3	Float	RO	Primary Variable 3
9004	6007… 6008	PV4	Float	RO	Primary Variable 4
9005	6009… 6010	PV5	Float	RO	Primary Variable 5
9006	6011… 6012	Service.Measurement.Simulation.PVARawValue1	Float	RO	value for rawPVA of comp1

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
9006	6011… 6012	Status.Diagnostics.RawQuotConce1	Float	RO	raw ADC quotient of component1
9007	6013… 6014	Service.Measurement.Simulation.PVARawValue2	Float	RO	value for rawPVA of comp2
9007	6013… 6014	Status.Diagnostics.RawQuotConce2	Float	RO	raw ADC quotient of component2
9008	6015… 6016	Service.Measurement.Simulation.PVARawValue3	Float	RO	value for rawPVA of comp3
9008	6015… 6016	Status.Diagnostics.RawQuotConce3	Float	RO	raw ADC quotient of component3
9009	6017… 6018	Service.Measurement.Simulation.PVARawValue4	Float	RO	value for rawPVA of comp4
9009	6017… 6018	Status.Diagnostics.RawQuotConce4	Float	RO	raw ADC quotient of component4
9010	6019… 6020	Service.Measurement.Simulation.PVARawValue5	Float	RO	value for rawPVA of comp5
9010	6019… 6020	Status.Diagnostics.RawQuotConce5	Float	RO	raw ADC quotient of component4
9011	6021… 6022	Status.Diagnostics.RawMeasConce1	Float	RO	raw ADC of measure-side component1
9012	6023… 6024	Status.Diagnostics.RawRefConce1	Float	RO	raw ADC of reference side component1
9013	6025… 6026	Status.Diagnostics.RawMeasConce2	Float	RO	raw ADC of measure-side component2
9014	6027… 6028	Status.Diagnostics.RawRefConce2	Float	RO	raw ADC of reference side component2
9015	6029… 6030	Status.Diagnostics.RawMeasConce3	Float	RO	raw ADC of measure-side component3
9016	6031… 6032	Status.Diagnostics.RawRefConce3	Float	RO	raw ADC of reference side component3
9017	6033… 6034	Status.Diagnostics.RawMeasConce4	Float	RO	raw ADC of measure-side component4
9018	6035… 6036	Status.Diagnostics.RawRefConce4	Float	RO	raw ADC of reference side component4
9019	6037… 6038	Status.Diagnostics.RawMeasConce5	Float	RO	raw ADC of measure-side component5
9020	6039… 6040	Status.Diagnostics.RawRefConce5	Float	RO	raw ADC of reference side component5
9021	6041… 6042	Setup.Measurement.StartOfCurrentRange_1	Float	R/W	start of current range of comp1
9022	6043… 6044	Setup.Measurement.EndOfCurrentRange_1	Float	R/W	end of current range of comp1
9023	6045… 6046	Setup.Measurement.StartOfCurrentRange_2	Float	R/W	start of current range of comp2
9024	6047… 6048	Setup.Measurement.EndOfCurrentRange_2	Float	R/W	end of current range of comp2
9025	6049… 6050	Setup.Measurement.StartOfCurrentRange_3	Float	R/W	start of current range of comp3

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
9026	6051…6052	Setup.Measurement.EndOfCurren-tRange_3	Float	R/W	end of current range of comp3
9027	6053…6054	Setup.Measurement.StartOfCurren-tRange_4	Float	R/W	start of current range of comp4
9028	6055…6056	Setup.Measurement.EndOfCurren-tRange_4	Float	R/W	end of current range of comp4
9029	6057…6058	Setup.Measurement.StartOfCurren-tRange_5	Float	R/W	start of current range of comp5
9030	6059…6060	Setup.Measurement.EndOfCurren-tRange_5	Float	R/W	end of current range of comp5
9031	6061…6062	Status.Pressure1	Float	RO	pressure of comp1
9032	6063…6064	Status.Pressure2	Float	RO	pressure of comp2
9033	6065…6066	Status.Pressure3	Float	RO	pressure of comp3
9034	6067…6068	Status.Pressure4	Float	RO	pressure of comp4
9035	6069…6070	Status.Pressure5	Float	RO	pressure of comp5
9036	6071…6072	Status.Flow1	Float	RO	flow of comp1
9037	6073…6074	Status.Flow2	Float	RO	flow of comp2
9038	6075…6076	Status.Flow3	Float	RO	flow of comp3
9039	6077…6078	Status.Flow4	Float	RO	flow of comp4
9040	6079…6080	Status.Flow5	Float	RO	flow of comp5
9041	6081…6082	Status.Temperature1	Float	RO	temperature of comp1
9042	6083…6084	Status.Temperature2	Float	RO	temperature of comp2
9043	6085…6086	Status.Temperature3	Float	RO	temperature of comp3
9044	6087…6088	Status.Temperature4	Float	RO	temperature of comp4
9045	6089…6090	Status.Temperature5	Float	RO	temperature of comp5
9051	6101…6102	Setup.Calibration.CurrentZerogas1	Float	R/W	current zero gas of comp1
9052	6103…6104	Setup.Calibration.CurrentZerogas2	Float	R/W	current zero gas of comp2
9053	6105…6106	Setup.Calibration.CurrentZerogas3	Float	R/W	current zero gas of comp3
9054	6107…6108	Setup.Calibration.CurrentZerogas4	Float	R/W	current zero gas of comp4

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
9055	6109… 6110	Setup.Calibration.CurrentZerogas5	Float	R/W	current zero gas of comp5
9056	6111… 6112	Setup.Calibration.CurrentSpangas1	Float	R/W	current zero gas of comp1
9057	6113… 6114	Setup.Calibration.CurrentSpangas2	Float	R/W	current zero gas of comp2
9058	6115… 6116	Setup.Calibration.CurrentSpangas3	Float	R/W	current zero gas of comp3
9059	6117… 6118	Setup.Calibration.CurrentSpangas4	Float	R/W	current zero gas of comp4
9060	6119… 6120	Setup.Calibration.CurrentSpangas5	Float	R/W	current zero gas of comp5
9071	6141… 6142	Setup.Measurement.StartO-fRange1_1	Float	R/W	start of range1 of comp1
9072	6143… 6144	Setup.Measurement.En-dOfRange1_1	Float	R/W	end of range1 of comp1
9073	6145… 6146	Setup.Measurement.StartO-fRange2_1	Float	R/W	start of range2 of comp1
9074	6147… 6148	Setup.Measurement.En-dOfRange2_1	Float	R/W	end of range2 of comp1
9075	6149… 6150	Setup.Measurement.StartO-fRange3_1	Float	R/W	start of range3 of comp1
9076	6151… 6152	Setup.Measurement.En-dOfRange3_1	Float	R/W	end of range3 of comp1
9077	6153… 6154	Setup.Measurement.StartO-fRange4_1	Float	R/W	start of range4 of comp1
9078	6155… 6156	Setup.Measurement.En-dOfRange4_1	Float	R/W	end of range4 of comp1
9079	6157… 6158	Setup.Measurement.StartO-fRange1_2	Float	R/W	start of range1 of comp2
9080	6159… 6160	Setup.Measurement.En-dOfRange1_2	Float	R/W	end of range1 of comp2
9081	6161… 6162	Setup.Measurement.StartO-fRange2_2	Float	R/W	start of range2 of comp2
9082	6163… 6164	Setup.Measurement.En-dOfRange2_2	Float	R/W	end of range2 of comp2
9083	6165… 6166	Setup.Measurement.StartO-fRange3_2	Float	R/W	start of range3 of comp2
9084	6167… 6168	Setup.Measurement.En-dOfRange3_2	Float	R/W	end of range3 of comp2
9085	6169… 6170	Setup.Measurement.StartO-fRange4_2	Float	R/W	start of range4 of comp2
9086	6171… 6172	Setup.Measurement.En-dOfRange4_2	Float	R/W	end of range4 of comp2
9087	6173… 6174	Setup.Measurement.StartO-fRange1_3	Float	R/W	start of range1 of comp3
9088	6175… 6176	Setup.Measurement.En-dOfRange1_3	Float	R/W	end of range1 of comp3

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
9089	6177… 6178	Setup.Measurement.StartOfRange2_3	Float	R/W	start of range2 of comp3
9090	6179… 6180	Setup.Measurement.EndOfRange2_3	Float	R/W	end of range2 of comp3
9091	6181… 6182	Setup.Measurement.StartOfRange3_3	Float	R/W	start of range3 of comp3
9092	6183… 6184	Setup.Measurement.EndOfRange3_3	Float	R/W	end of range3 of comp3
9093	6185… 6186	Setup.Measurement.StartOfRange4_3	Float	R/W	start of range4 of comp3
9094	6187… 6188	Setup.Measurement.EndOfRange4_3	Float	R/W	end of range4 of comp3
9095	6189… 6190	Setup.Measurement.StartOfRange1_4	Float	R/W	start of range1 of comp4
9096	6191… 6192	Setup.Measurement.EndOfRange1_4	Float	R/W	end of range1 of comp4
9097	6193… 6194	Setup.Measurement.StartOfRange2_4	Float	R/W	start of range2 of comp4
9098	6195… 6196	Setup.Measurement.EndOfRange2_4	Float	R/W	end of range2 of comp4
9099	6197… 6198	Setup.Measurement.StartOfRange3_4	Float	R/W	start of range3 of comp4
9100	6199… 6200	Setup.Measurement.EndOfRange3_4	Float	R/W	end of range3 of comp4
9101	6201… 6202	Setup.Measurement.StartOfRange4_4	Float	R/W	start of range4 of comp4
9102	6203… 6204	Setup.Measurement.EndOfRange4_4	Float	R/W	end of range4 of comp4
9103	6205… 6206	Setup.Measurement.StartOfRange1_5	Float	R/W	start of range1 of comp5
9104	6207… 6208	Setup.Measurement.EndOfRange1_5	Float	R/W	end of range1 of comp5
9105	6209… 6210	Setup.Measurement.StartOfRange2_5	Float	R/W	start of range2 of comp5
9106	6211… 6212	Setup.Measurement.EndOfRange2_5	Float	R/W	end of range2 of comp5
9107	6213… 6214	Setup.Measurement.StartOfRange3_5	Float	R/W	start of range3 of comp5
9108	6215… 6216	Setup.Measurement.EndOfRange3_5	Float	R/W	end of range3 of comp5
9109	6217… 6218	Setup.Measurement.StartOfRange4_5	Float	R/W	start of range4 of comp5
9110	6219… 6220	Setup.Measurement.EndOfRange4_5	Float	R/W	end of range4 of comp5
9111	6221… 6222	Setup.Calibration.Range1Zerogas1	Float	R/W	zero gas of range1 of comp1
9112	6223… 6224	Setup.Calibration.Range2Zerogas1	Float	R/W	zero gas of range2 of comp1

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
9113	6225…6226	Setup.Calibration.Range3Zerogas1	Float	R/W	zero gas of range3 of comp1
9114	6227…6228	Setup.Calibration.Range4Zerogas1	Float	R/W	zero gas of range4 of comp1
9115	6229…6230	Setup.Calibration.Range1Zerogas2	Float	R/W	zero gas of range1 of comp2
9116	6231…6232	Setup.Calibration.Range2Zerogas2	Float	R/W	zero gas of range2 of comp2
9117	6233…6234	Setup.Calibration.Range3Zerogas2	Float	R/W	zero gas of range3 of comp2
9118	6235…6236	Setup.Calibration.Range4Zerogas2	Float	R/W	zero gas of range4 of comp2
9119	6237…6238	Setup.Calibration.Range1Zerogas3	Float	R/W	zero gas of range1 of comp3
9120	6239…6240	Setup.Calibration.Range2Zerogas3	Float	R/W	zero gas of range2 of comp3
9121	6241…6242	Setup.Calibration.Range3Zerogas3	Float	R/W	zero gas of range3 of comp3
9122	6243…6244	Setup.Calibration.Range4Zerogas3	Float	R/W	zero gas of range4 of comp3
9123	6245…6246	Setup.Calibration.Range1Zerogas4	Float	R/W	zero gas of range1 of comp4
9124	6247…6248	Setup.Calibration.Range2Zerogas4	Float	R/W	zero gas of range2 of comp4
9125	6249…6250	Setup.Calibration.Range3Zerogas4	Float	R/W	zero gas of range3 of comp4
9126	6251…6252	Setup.Calibration.Range4Zerogas4	Float	R/W	zero gas of range4 of comp4
9127	6253…6254	Setup.Calibration.Range1Zerogas5	Float	R/W	zero gas of range1 of comp5
9128	6255…6256	Setup.Calibration.Range2Zerogas5	Float	R/W	zero gas of range2 of comp5
9129	6257…6258	Setup.Calibration.Range3Zerogas5	Float	R/W	zero gas of range3 of comp5
9130	6259…6260	Setup.Calibration.Range4Zerogas5	Float	R/W	zero gas of range4 of comp5
9131	6261…6262	Setup.Calibration.Range1Span-gas1	Float	R/W	span gas of range1 of comp1
9132	6263…6264	Setup.Calibration.Range2Span-gas1	Float	R/W	span gas of range2 of comp1
9133	6265…6266	Setup.Calibration.Range3Span-gas1	Float	R/W	span gas of range3 of comp1
9134	6267…6268	Setup.Calibration.Range4Span-gas1	Float	R/W	span gas of range4 of comp1
9135	6269…6270	Setup.Calibration.Range1Span-gas2	Float	R/W	span gas of range1 of comp2
9136	6271…6272	Setup.Calibration.Range2Span-gas2	Float	R/W	span gas of range2 of comp2

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
9137	6273… 6274	Setup.Calibration.Range3Span-gas2	Float	R/W	span gas of range3 of comp2
9138	6275… 6276	Setup.Calibration.Range4Span-gas2	Float	R/W	span gas of range4 of comp2
9139	6277… 6278	Setup.Calibration.Range1Span-gas3	Float	R/W	span gas of range1 of comp3
9140	6279… 6280	Setup.Calibration.Range2Span-gas3	Float	R/W	span gas of range2 of comp3
9141	6281… 6282	Setup.Calibration.Range3Span-gas3	Float	R/W	span gas of range3 of comp3
9142	6283… 6284	Setup.Calibration.Range4Span-gas3	Float	R/W	span gas of range4 of comp3
9143	6285… 6286	Setup.Calibration.Range1Span-gas4	Float	R/W	span gas of range1 of comp4
9144	6287… 6288	Setup.Calibration.Range2Span-gas4	Float	R/W	span gas of range2 of comp4
9145	6289… 6290	Setup.Calibration.Range3Span-gas4	Float	R/W	span gas of range3 of comp4
9146	6291… 6292	Setup.Calibration.Range4Span-gas4	Float	R/W	span gas of range4 of comp4
9147	6293… 6294	Setup.Calibration.Range1Span-gas5	Float	R/W	span gas of range1 of comp5
9148	6295… 6296	Setup.Calibration.Range2Span-gas5	Float	R/W	span gas of range2 of comp5
9149	6297… 6298	Setup.Calibration.Range3Span-gas5	Float	R/W	span gas of range3 of comp5
9150	6299… 6300	Setup.Calibration.Range4Span-gas5	Float	R/W	span gas of range4 of comp5
9151	6301… 6302	Setup.Display.Component.PV_UnitFactor1	Float	R/W	factor to convert ppm into displayed custom unit1
9152	6303… 6304	Setup.Display.Component.PV_Uni-tOffset1	Float	R/W	offset to convert ppm into displayed custom unit1
9153	6305… 6306	Setup.Display.Component.PV_UnitFactor2	Float	R/W	factor to convert ppm into displayed custom unit2
9154	6307… 6308	Setup.Display.Component.PV_Uni-tOffset2	Float	R/W	offset to convert ppm into displayed custom unit2
9155	6309… 6310	Setup.Display.Component.PV_UnitFactor3	Float	R/W	factor to convert ppm into displayed custom unit3
9156	6311… 6312	Setup.Display.Component.PV_Uni-tOffset3	Float	R/W	offset to convert ppm into displayed custom unit3
9157	6313… 6314	Setup.Display.Component.PV_UnitFactor4	Float	R/W	factor to convert ppm into displayed custom unit4
9158	6315… 6316	Setup.Display.Component.PV_Uni-tOffset4	Float	R/W	offset to convert ppm into displayed custom unit4
9159	6317… 6318	Setup.Display.Component.PV_UnitFactor5	Float	R/W	factor to convert ppm into displayed custom unit5
9160	6319… 6320	Setup.Display.Component.PV_Uni-tOffset5	Float	R/W	offset to convert ppm into displayed custom unit5

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
9161	6321… 6322	Service.Measurement.AbsMin-Range1	Float	R/W	absolute minimum range of comp1
9162	6323… 6324	Service.Measurement.AbsMax-Range1	Float	R/W	absolute maximum range of comp1
9163	6325… 6326	Service.Measurement.AbsMin-Range2	Float	R/W	absolute minimum range of comp2
9164	6327… 6328	Service.Measurement.AbsMax-Range2	Float	R/W	absolute maximum range of comp2
9165	6329… 6330	Service.Measurement.AbsMin-Range3	Float	R/W	absolute minimum range of comp3
9166	6331… 6332	Service.Measurement.AbsMax-Range3	Float	R/W	absolute maximum range of comp3
9167	6333… 6334	Service.Measurement.AbsMin-Range4	Float	R/W	absolute minimum range of comp4
9168	6335… 6336	Service.Measurement.AbsMax-Range4	Float	R/W	absolute maximum range of comp4
9169	6337… 6338	Service.Measurement.AbsMin-Range5	Float	R/W	absolute minimum range of comp5
9170	6339… 6340	Service.Measurement.AbsMax-Range5	Float	R/W	absolute maximum range of comp5
9171	6341… 6342	Status.Diagnostics.DSPMuxValue1	Float	RO	DSP multiplexer value 1
9172	6343… 6344	Status.Diagnostics.DSPMuxValue2	Float	RO	DSP multiplexer value 2
9173	6345… 6346	Status.Diagnostics.DSPMuxValue3	Float	RO	DSP multiplexer value 3
9174	6347… 6348	Status.Diagnostics.DSPMuxValue4	Float	RO	DSP multiplexer value 4
9175	6349… 6350	Status.Diagnostics.DSPMuxValue5	Float	RO	DSP multiplexer value 5
9176	6351… 6352	Status.Diagnostics.DSPMuxValue6	Float	RO	DSP multiplexer value 6
9177	6353… 6354	Status.Diagnostics.DSPMuxValue7	Float	RO	DSP multiplexer value 7
9178	6355… 6356	Status.Diagnostics.DSPMuxValue8	Float	RO	DSP multiplexer value 8
9181	6361… 6362	Setup.In/Outputs.AO.StartRange1	Float	R/W	level where analoge output scaling starts on output1
9182	6363… 6364	Setup.In/Outputs.AO.EndRange1	Float	R/W	level where analoge output scaling ends on output1
9183	6365… 6366	Setup.In/Outputs.AO.AdjustStart1	Float	R/W	fine adjustment for start range of output1
9184	6367… 6368	Setup.In/Outputs.AO.AdjustEnd1	Float	R/W	fine adjustment for end range of output1
9185	6369… 6370	Setup.In/Outputs.AO.StartRange2	Float	R/W	level where analoge output scaling starts on output2
9186	6371… 6372	Setup.In/Outputs.AO.EndRange2	Float	R/W	level where analoge output scaling ends on output2

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
9187	6373… 6374	Setup.In/Outputs.AO.AdjustStart2	Float	R/W	fine adjustment for start range of output2
9188	6375… 6376	Setup.In/Outputs.AO.AdjustEnd2	Float	R/W	fine adjustment for end range of output2
9189	6377… 6378	Setup.In/Outputs.AO.StartRange3	Float	R/W	level where analoge output scaling starts on output3
9190	6379… 6380	Setup.In/Outputs.AO.EndRange3	Float	R/W	level where analoge output scaling ends on output3
9191	6381… 6382	Setup.In/Outputs.AO.AdjustStart3	Float	R/W	fine adjustment for start range of output3
9192	6383… 6384	Setup.In/Outputs.AO.AdjustEnd3	Float	R/W	fine adjustment for end range of output3
9193	6385… 6386	Setup.In/Outputs.AO.StartRange4	Float	R/W	level where analoge output scaling starts on output4
9194	6387… 6388	Setup.In/Outputs.AO.EndRange4	Float	R/W	level where analoge output scaling ends on output4
9195	6389… 6390	Setup.In/Outputs.AO.AdjustStart4	Float	R/W	fine adjustment for start range of output4
9196	6391… 6392	Setup.In/Outputs.AO.AdjustEnd4	Float	R/W	fine adjustment for end range of output4
9197	6393… 6394	Setup.In/Outputs.AO.StartRange5	Float	R/W	level where analoge output scaling starts on output5
9198	6395… 6396	Setup.In/Outputs.AO.EndRange5	Float	R/W	level where analoge output scaling ends on output5
9199	6397… 6398	Setup.In/Outputs.AO.AdjustStart5	Float	R/W	fine adjustment for start range of output5
9200	6399… 6400	Setup.In/Outputs.AO.AdjustEnd5	Float	R/W	fine adjustment for end range of output5
9261	6521… 6522	Service.Measurement.Compensati-on.ToffTemperature1	Float	RO	temperature for zero compensation of comp1
9262	6523… 6524	Service.Measurement.Compensati-on.ToffTemperature2	Float	RO	temperature for zero compensation of comp2
9263	6525… 6526	Service.Measurement.Compensati-on.ToffTemperature3	Float	RO	temperature for zero compensation of comp3
9264	6527… 6528	Service.Measurement.Compensati-on.ToffTemperature4	Float	RO	temperature for zero compensation of comp4
9265	6529… 6530	Service.Measurement.Compensati-on.ToffTemperature5	Float	RO	temperature for zero compensation of comp5
9266	6531… 6532	Service.Measurement.Compensati-on.TfactTemperature1	Float	RO	temperature for span compensation of comp1
9267	6533… 6534	Service.Measurement.Compensati-on.TfactTemperature2	Float	RO	temperature for span compensation of comp2
9268	6535… 6536	Service.Measurement.Compensati-on.TfactTemperature3	Float	RO	temperature for span compensation of comp3
9269	6537… 6538	Service.Measurement.Compensati-on.TfactTemperature4	Float	RO	temperature for span compensation of comp4
9270	6539… 6540	Service.Measurement.Compensati-on.TfactTemperature5	Float	RO	temperature for span compensation of comp5

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
9486	6971… 6972	Service.Measurement.Simulation. SimPVARawValue1	Float	R/W	simulation value for rawPVA of comp1
9487	6973… 6974	Service.Measurement.Simulation. SimPVARawValue2	Float	R/W	simulation value for rawPVA of comp2
9488	6975… 6976	Service.Measurement.Simulation. SimPVARawValue3	Float	R/W	simulation value for rawPVA of comp3
9489	6977… 6978	Service.Measurement.Simulation. SimPVARawValue4	Float	R/W	simulation value for rawPVA of comp4
9490	6979… 6980	Service.Measurement.Simulation. SimPVARawValue5	Float	R/W	simulation value for rawPVA of comp5
9591	7181… 7182	Service.Measurement.Lin.MinVa-lue1	Float	RO	Linearizer Minimum Value of comp1
9592	7183… 7184	Service.Measurement.Lin.MaxVa-lue1	Float	RO	Linearizer Maximum Value of comp1
9593	7185… 7186	Service.Measurement.Lin.CutOff1	Float	R/W	Linearizer Cut-off value of comp1
9691	7381… 7382	Service.Measurement.Lin.MinVa-lue2	Float	RO	Linearizer Minimum Value of comp2
9692	7383… 7384	Service.Measurement.Lin.MaxVa-lue2	Float	RO	Linearizer Maximum Value of comp2
9693	7385… 7386	Service.Measurement.Lin.CutOff2	Float	R/W	Linearizer Cut-off value of comp1
9791	7581… 7582	Service.Measurement.Lin.MinVa-lue3	Float	RO	Linearizer Minimum Value of comp3
9792	7583… 7584	Service.Measurement.Lin.MaxVa-lue3	Float	RO	Linearizer Maximum Value of comp3
9793	7585… 7586	Service.Measurement.Lin.CutOff3	Float	R/W	Linearizer Cut-off value of comp1
9891	7781… 7782	Service.Measurement.Lin.MinVa-lue4	Float	RO	Linearizer Minimum Value of comp4
9892	7783… 7784	Service.Measurement.Lin.MaxVa-lue4	Float	RO	Linearizer Maximum Value of comp4
9893	7785… 7786	Service.Measurement.Lin.CutOff4	Float	R/W	Linearizer Cut-off value of comp1
9991	7981… 7982	Service.Measurement.Lin.MinVa-lue5	Float	RO	Linearizer Minimum Value of comp5
9992	7983… 7984	Service.Measurement.Lin.MaxVa-lue5	Float	RO	Linearizer Maximum Value of comp5
9993	7985… 7986	Service.Measurement.Lin.CutOff5	Float	R/W	Linearizer Cut-off value of comp1
3012… 3015	3012… 3015	Setup.Display.Component.PV_Unit-String1	String	R/W	unit displayed for comp1
3017… 3020	3017… 3020	Setup.Display.Component.PV_Unit-String2	String	R/W	unit displayed for comp2
3022… 3025	3022… 3025	Setup.Display.Component.PV_Unit-String3	String	R/W	unit displayed for comp3
3027… 3030	3027… 3030	Setup.Display.Component.PV_Unit-String4	String	R/W	unit displayed for comp4

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
3032…3035	3032…3035	Setup.Display.Component.PV_Unit-String5	String	R/W	unit displayed for comp5
3041…3045	3041…3045	Setup.Display.Component.Tag1	String	R/W	displayed tag for component1
3046…3050	3046…3050	Setup.Display.Component.Tag2	String	R/W	displayed tag for component2
3051…3055	3051…3055	Setup.Display.Component.Tag3	String	R/W	displayed tag for component3
3056…3060	3056…3060	Setup.Display.Component.Tag4	String	R/W	displayed tag for component4
3061…3065	3061…3065	Setup.Display.Component.Tag5	String	R/W	displayed tag for component5
3071…3074	3071…3074	Setup.Display.Component.Gasna-me1	String	R/W	gas name of component1
3075…3078	3075…3078	Setup.Display.Component.Gasna-me2	String	R/W	gas name of component2
3079…3082	3079…3082	Setup.Display.Component.Gasna-me3	String	R/W	gas name of component3
3083…3086	3083…3086	Setup.Display.Component.Gasna-me4	String	R/W	gas name of component4
3087…3090	3087…3090	Setup.Display.Component.Gasna-me5	String	R/W	gas name of component5
3101…3104	3101…3104	Setup.Display.MeasDisplay.Dis1La-bel1	String	R/W	displayed label of measure display 1, Line 1
3105…3108	3105…3108	Setup.Display.MeasDisplay.Dis1La-bel2	String	R/W	displayed label of measure display 1, Line 2
3109…3112	3109…3112	Setup.Display.MeasDisplay.Dis1La-bel3	String	R/W	displayed label of measure display 1, Line 3
3113…3116	3113…3116	Setup.Display.MeasDisplay.Dis1La-bel4	String	R/W	displayed label of measure display 1, Line 4
3117…3120	3117…3120	Setup.Display.MeasDisplay.Dis1La-bel5	String	R/W	displayed label of measure display 1, Line 5
3121…3124	3121…3124	Setup.Display.MeasDisplay.Dis2La-bel1	String	R/W	displayed label of measure display 2, Line 1
3125…3128	3125…3128	Setup.Display.MeasDisplay.Dis2La-bel2	String	R/W	displayed label of measure display 2, Line 2
3129…3132	3129…3132	Setup.Display.MeasDisplay.Dis2La-bel3	String	R/W	displayed label of measure display 2, Line 3
3133…3136	3133…3136	Setup.Display.MeasDisplay.Dis2La-bel4	String	R/W	displayed label of measure display 2, Line 4
3137…3140	3137…3140	Setup.Display.MeasDisplay.Dis2La-bel5	String	R/W	displayed label of measure display 2, Line 5
3141…3147	3141…3147	Info.SerialNumber	String	RO	serial number of the device
3251…3266	3251…3266	Service.General.Identification.ManufacturingInfo	String	RO	Infos stored for manufacturing purposes
3461…3468	3461…3468	Service.Measurement.Simulation.SimXSPMuxEnable1	Word	R/W	enable simulation for XSP‘s multiplexer value1..8

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
3481…3484	3481…3484	Setup.Measurement.XIntf.Sources1	Word	R/W	Interf. sources 1..4 comp1 (0=None, 1=Conc1, 2=Conc2, 6=AIN1 etc.)
3485…3488	3485…3488	Setup.Measurement.XIntf.Sources2	Word	R/W	Interf. sources 1..4 comp2 (0=None, 1=Conc1, 2=Conc2, 6=AIN1 etc.)
3489…3492	3489…3492	Setup.Measurement.XIntf.Sources3	Word	R/W	Interf. sources 1..4 comp3 (0=None, 1=Conc1, 2=Conc2, 6=AIN1 etc.)
3493…3496	3493…3496	Setup.Measurement.XIntf.Sources4	Word	R/W	Interf. sources 1..4 comp4 (0=None, 1=Conc1, 2=Conc2, 6=AIN1 etc.)
3497…3500	3497…3500	Setup.Measurement.XIntf.Sources5	Word	R/W	Interf. sources 1..4 comp5 (0=None, 1=Conc1, 2=Conc2, 6=AIN1 etc.)
3531…3534	3531…3534	Service.Measurement.Lin.Range-PolySet1	Word	R/W	polyn, set of range1..4 comp1 (0=Poly1, 1=Poly2, 2=Poly3, 3=Poly4)
3535…3538	3535…3538	Service.Measurement.Lin.Range-PolySet2	Word	R/W	polyn, set of range1..4 comp2 (0=Poly1, 1=Poly2, 2=Poly3, 3=Poly4)
3539…3542	3539…3542	Service.Measurement.Lin.Range-PolySet3	Word	R/W	polyn, set of range1..4 comp3 (0=Poly1, 1=Poly2, 2=Poly3, 3=Poly4)
3543…3546	3543…3546	Service.Measurement.Lin.Range-PolySet4	Word	R/W	polyn, set of range1..4 comp4 (0=Poly1, 1=Poly2, 2=Poly3, 3=Poly4)
3547…3550	3547…3550	Service.Measurement.Lin.Range-PolySet5	Word	R/W	polyn, set of range1..4 comp5 (0=Poly1, 1=Poly2, 2=Poly3, 3=Poly4),
4011…4016	4011…4016	Info.ProgramVersion	String	RO	software release version
4017…4022	4017…4022	Service.General.Identification.ProgramVersionDate	String	RO	software release date
4051…4054	4051…4054	Setup.Measurement.XIntf.Signal-States1	Word	RO	Cross interfere signal value states1..4 for comp1
4055…4058	4055…4058	Setup.Measurement.XIntf.Signal-States2	Word	RO	Cross interfere signal value states1..4 for comp2
4059…4062	4059…4062	Setup.Measurement.XIntf.Signal-States3	Word	RO	Cross interfere signal value states1..4 for comp3
4063…4066	4063…4066	Setup.Measurement.XIntf.Signal-States4	Word	RO	Cross interfere signal value states1..4 for comp4
4067…4070	4067…4070	Setup.Measurement.XIntf.Signal-States5	Word	RO	Cross interfere signal value states1..4 for comp5
8091…8094	5181…5188	Status.DeviceStates.DeviceState	DWord	RO	device (N0) state bitfield (b0:......)
8096…8099	5191…5198	Status.DeviceStates.Channel-State1	DWord	RO	component1's state bitfield (b0:......)
8101…8104	5201…5208	Status.DeviceStates.Channel-State2	DWord	RO	component2's state bitfield (b0:......)
8106…8109	5211…5218	Status.DeviceStates.Channel-State3	DWord	RO	component3's state bitfield (b0:......)
8111…8114	5221…5228	Status.DeviceStates.Channel-State4	DWord	RO	component4's state bitfield (b0:......)
8116…8119	5231…5238	Status.DeviceStates.Channel-State5	DWord	RO	component5's state bitfield (b0:......)
8121…8124	5241…5248	Service.Status.DeviceStates.Dvc-StateInhibit	DWord	R/W	Inhibit for device (N0) state bitfield (b0:......)

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
8126… 8129	5251… 5258	Service.Status.DeviceStates.Ch-StateInhibit1	DWord	R/W	Inhibit for comp1‘s state bitfield (b0:......)
8131… 8134	5261… 5268	Service.Status.DeviceStates.Ch-StateInhibit2	DWord	R/W	Inhibit for comp2‘s state bitfield (b0:......)
8136… 8139	5271… 5278	Service.Status.DeviceStates.Ch-StateInhibit3	DWord	R/W	Inhibit for comp3‘s state bitfield (b0:......)
8141… 8144	5281… 5288	Service.Status.DeviceStates.Ch-StateInhibit4	DWord	R/W	Inhibit for comp4‘s state bitfield (b0:......)
8146… 8149	5291… 5298	Service.Status.DeviceStates.Ch-StateInhibit5	DWord	R/W	Inhibit for comp5‘s state bitfield (b0:......)
8151… 8154	5301… 5308	Service.Status.DeviceStates.Dvc-StateForce	DWord	R/W	Forcing for device (N0) state bitfield (b0:......)
8156… 8159	5311… 5318	Service.Status.DeviceStates.Ch-StateForce1	DWord	R/W	Forcing for comp1‘s state bitfield (b0:......)
8161… 8164	5321… 5328	Service.Status.DeviceStates.Ch-StateForce2	DWord	R/W	Forcing for comp2‘s state bitfield (b0:......)
8166… 8169	5331… 5338	Service.Status.DeviceStates.Ch-StateForce3	DWord	R/W	Forcing for comp3‘s state bitfield (b0:......)
8171… 8174	5341… 5348	Service.Status.DeviceStates.Ch-StateForce4	DWord	R/W	Forcing for comp4‘s state bitfield (b0:......)
8176… 8179	5351… 5358	Service.Status.DeviceStates.Ch-StateForce5	DWord	R/W	Forcing for comp5‘s state bitfield (b0:......)
9171… 9178	6341… 6356	Service.Measurement.Simulation. XSPMuxValue1	Float	RO	values for XSP‘s multiplexer value1..8
9201… 9204	6401… 6408	Service.Measurement.Compensati-on.ToffCoeffs1	Float	R/W	polynom coeffs for temperature offset of comp1
9205… 9208	6409… 6416	Service.Measurement.Compensati-on.ToffCoeffs2	Float	R/W	polynom coeffs for temperature offset of comp2
9209… 9212	6417… 6424	Service.Measurement.Compensati-on.ToffCoeffs3	Float	R/W	polynom coeffs for temperature offset of comp3
9213… 9216	6425… 6432	Service.Measurement.Compensati-on.ToffCoeffs4	Float	R/W	polynom coeffs for temperature offset of comp4
9217… 9220	6433… 6440	Service.Measurement.Compensati-on.ToffCoeffs5	Float	R/W	polynom coeffs for temperature offset of comp5
9221… 9224	6441… 6448	Service.Measurement.Compensati-on.TfactCoeffs1	Float	R/W	polynom coeffs for temperature factor of comp1
9225… 9228	6449… 6456	Service.Measurement.Compensati-on.TfactCoeffs2	Float	R/W	polynom coeffs for temperature factor of comp2
9229… 9232	6457… 6464	Service.Measurement.Compensati-on.TfactCoeffs3	Float	R/W	polynom coeffs for temperature factor of comp3
9233… 9236	6465… 6472	Service.Measurement.Compensati-on.TfactCoeffs4	Float	R/W	polynom coeffs for temperature factor of comp4
9237… 9240	6473… 6480	Service.Measurement.Compensati-on.TfactCoeffs5	Float	R/W	polynom coeffs for temperature factor of comp5
9241… 9244	6481… 6488	Service.Measurement.Compensati-on.TfactConcCoeffs1	Float	R/W	polynom coeffs for conc correction of temp factor comp1
9245… 9248	6489… 6496	Service.Measurement.Compensati-on.TfactConcCoeffs2	Float	R/W	polynom coeffs for conc correction of temp factor comp2

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
9249… 9252	6497… 6504	Service.Measurement.Compensation.TfactConcCoeffs3	Float	R/W	polynom coeffs for conc correction of temp factor comp3
9253… 9256	6505… 6512	Service.Measurement.Compensation.TfactConcCoeffs4	Float	R/W	polynom coeffs for conc correction of temp factor comp4
9257… 9260	6513… 6520	Service.Measurement.Compensation.TfactConcCoeffs5	Float	R/W	polynom coeffs for conc correction of temp factor comp5
9271… 9274	6541… 6548	Service.Measurement.Compensation.PfactCoeffs1	Float	R/W	polynom coeffs for pressure factor of comp1
9275… 9278	6549… 6556	Service.Measurement.Compensation.PfactCoeffs2	Float	R/W	polynom coeffs for pressure factor of comp2
9279… 9282	6557… 6564	Service.Measurement.Compensation.PfactCoeffs3	Float	R/W	polynom coeffs for pressure factor of comp3
9283… 9286	6565… 6572	Service.Measurement.Compensation.PfactCoeffs4	Float	R/W	polynom coeffs for pressure factor of comp4
9287… 9290	6573… 6580	Service.Measurement.Compensation.PfactCoeffs5	Float	R/W	polynom coeffs for pressure factor of comp5
9301… 9304	6601… 6608	Setup.Measurement.XIntf.SignalValues1	Float	RO	Cross interfere signal values1..4 for comp1
9305… 9308	6609… 6616	Setup.Measurement.XIntf.InterfereFactors1	Float	R/W	Cross interfere factors1..4 for comp1
9309… 9312	6617… 6624	Setup.Measurement.XIntf.LinearReferences1	Float	R/W	Cross interfere linearization references1..4 for comp1
9313… 9316	6625… 6632	Setup.Measurement.XIntf.LinearPolyCoeffs1	Float	R/W	Cross interfere linearization references1..4 for comp1
9331… 9334	6661… 6668	Setup.Measurement.XIntf.SignalValues2	Float	RO	Cross interfere signal values1..4 for comp2
9335… 9338	6669… 6676	Setup.Measurement.XIntf.InterfereFactors2	Float	R/W	Cross interfere factors1..4 for comp2
9339… 9342	6677… 6684	Setup.Measurement.XIntf.LinearReferences2	Float	R/W	Cross interfere linearization references1..4 for comp2
9343… 9346	6685… 6692	Setup.Measurement.XIntf.LinearPolyCoeffs2	Float	R/W	Cross interfere linearization references1..4 for comp2
9361… 9364	6721… 6728	Setup.Measurement.XIntf.SignalValues3	Float	RO	Cross interfere signal values1..4 for comp3
9365… 9368	6729… 6736	Setup.Measurement.XIntf.InterfereFactors3	Float	R/W	Cross interfere factors1..4 for comp3
9369… 9372	6737… 6744	Setup.Measurement.XIntf.LinearReferences3	Float	R/W	Cross interfere linearization references1..4 for comp3
9373… 9376	6745… 6752	Setup.Measurement.XIntf.LinearPolyCoeffs3	Float	R/W	Cross interfere linearization references1..4 for comp3
9391… 9394	6781… 6788	Setup.Measurement.XIntf.SignalValues4	Float	RO	Cross interfere signal values1..4 for comp4
9395… 9398	6789… 6796	Setup.Measurement.XIntf.InterfereFactors4	Float	R/W	Cross interfere factors1..4 for comp4
9399… 9402	6797… 6804	Setup.Measurement.XIntf.LinearReferences4	Float	R/W	Cross interfere linearization references1..4 for comp4
9403… 9406	6805… 6812	Setup.Measurement.XIntf.LinearPolyCoeffs4	Float	R/W	Cross interfere linearization references1..4 for comp4

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
9421… 9424	6841… 6848	Setup.Measurement.XIntf.Signal-Values5	Float	RO	Cross interfere signal values1..4 for comp5
9425… 9428	6849… 6856	Setup.Measurement.XIntf.Inter-fereFactors5	Float	R/W	Cross interfere factors1..4 for comp5
9429… 9432	6857… 6864	Setup.Measurement.XIntf.Linear-References5	Float	R/W	Cross interfere linearization references1..4 for comp5
9433… 9436	6865… 6872	Setup.Measurement.XIntf.Linear-PolyCoeffs5	Float	R/W	Cross interfere linearization references1..4 for comp5
9491… 9498	6981… 6996	Service.Measurement.Simulation. SimXSPMuxValue1	Float	R/W	simulation value for XSP‘s multiplexer value1..8
9501… 9503	7001… 7006	Service.Measurement.Lin.TableX-Values1	Float	R/W	Linearization table X-Values of comp1
9531… 9533	7061… 7066	Service.Measurement.Lin.TableY-Values1	Float	R/W	Linearization table Y-Values of comp1
9561… 9565	7121… 7130	Service.Measurement.Lin.Set-1Coeffs1	Float	R/W	Lin-Polynom. Set1-Coeffs (A0..4) for comp1
9566… 9570	7131… 7140	Service.Measurement.Lin.Set-2Coeffs1	Float	R/W	Lin-Polynom. Set2-Coeffs (A0..4) for comp1
9571… 9575	7141… 7150	Service.Measurement.Lin.Set-3Coeffs1	Float	R/W	Lin-Polynom. Set3-Coeffs (A0..4) for comp1
9576… 9580	7151… 7160	Service.Measurement.Lin.Set-4Coeffs1	Float	R/W	Lin-Polynom. Set4-Coeffs (A0..4) for comp1
9581… 9584	7161… 7168	Service.Measurement.Lin.Over-flowPerc1	Float	R/W	Lin-Overflow [%] for Range1..4 of comp1
9585… 9588	7169… 7176	Service.Measurement.Lin.Under-flowPerc1	Float	R/W	Lin-Underflow [%] for Range1..4 of comp1
9601… 9603	7201… 7206	Service.Measurement.Lin.TableX-Values2	Float	R/W	Linearization table X-Values of comp2
9631… 9633	7261… 7266	Service.Measurement.Lin.TableY-Values2	Float	R/W	Linearization table Y-Values of comp2
9661… 9665	7321… 7330	Service.Measurement.Lin.Set-1Coeffs2	Float	R/W	Lin-Polynom. Set1-Coeffs (A0..4) for comp2
9666… 9670	7331… 7340	Service.Measurement.Lin.Set-2Coeffs2	Float	R/W	Lin-Polynom. Set2-Coeffs (A0..4) for comp2
9671… 9675	7341… 7350	Service.Measurement.Lin.Set-3Coeffs2	Float	R/W	Lin-Polynom. Set3-Coeffs (A0..4) for comp2
9676… 9680	7351… 7360	Service.Measurement.Lin.Set-4Coeffs2	Float	R/W	Lin-Polynom. Set4-Coeffs (A0..4) for comp2
9681… 9684	7361… 7368	Service.Measurement.Lin.Over-flowPerc2	Float	R/W	Lin-Overflow [%] for Range1..4 of comp2
9685… 9688	7369… 7376	Service.Measurement.Lin.Under-flowPerc2	Float	R/W	Lin-Underflow [%] for Range1..4 of comp2
9701… 9703	7401… 7406	Service.Measurement.Lin.TableX-Values3	Float	R/W	Linearization table X-Values of comp3
9731… 9733	7461… 7466	Service.Measurement.Lin.TableY-Values3	Float	R/W	Linearization table Y-Values of comp3
9761… 9765	7521… 7530	Service.Measurement.Lin.Set-1Coeffs3	Float	R/W	Lin-Polynom. Set1-Coeffs (A0..4) for comp3

9.4 List of Parameters and Registers - Sorted by Daniel Registers

Address		Tag Name	Data Type	Client Access	Description
Daniel	Modicon				
9766… 9770	7531… 7540	Service.Measurement.Lin.Set-2Coeffs3	Float	R/W	Lin-Polynom. Set2-Coeffs (A0..4) for comp3
9771… 9775	7541… 7550	Service.Measurement.Lin.Set-3Coeffs3	Float	R/W	Lin-Polynom. Set3-Coeffs (A0..4) for comp3
9776… 9780	7551… 7560	Service.Measurement.Lin.Set-4Coeffs3	Float	R/W	Lin-Polynom. Set4-Coeffs (A0..4) for comp3
9781… 9784	7561… 7568	Service.Measurement.Lin.Over-flowPerc3	Float	R/W	Lin-Overflow [%] for Range1..4 of comp3
9785… 9788	7569… 7576	Service.Measurement.Lin.Under-flowPerc3	Float	R/W	Lin-Underflow [%] for Range1..4 of comp3
9801… 9803	7601… 7606	Service.Measurement.Lin.TableX-Values4	Float	R/W	Linearization table X-Values of comp4
9831… 9833	7661… 7666	Service.Measurement.Lin.TableY-Values4	Float	R/W	Linearization table Y-Values of comp4
9861… 9865	7721… 7730	Service.Measurement.Lin.Set-1Coeffs4	Float	R/W	Lin-Polynom. Set1-Coeffs (A0..4) for comp4
9866… 9870	7731… 7740	Service.Measurement.Lin.Set-2Coeffs4	Float	R/W	Lin-Polynom. Set2-Coeffs (A0..4) for comp4
9871… 9875	7741… 7750	Service.Measurement.Lin.Set-3Coeffs4	Float	R/W	Lin-Polynom. Set3-Coeffs (A0..4) for comp4
9876… 9880	7751… 7760	Service.Measurement.Lin.Set-4Coeffs4	Float	R/W	Lin-Polynom. Set4-Coeffs (A0..4) for comp4
9881… 9884	7761… 7768	Service.Measurement.Lin.Over-flowPerc4	Float	R/W	Lin-Overflow [%] for Range1..4 of comp4
9885… 9888	7769… 7776	Service.Measurement.Lin.Under-flowPerc4	Float	R/W	Lin-Underflow [%] for Range1..4 of comp4
9901… 9903	7801… 7806	Service.Measurement.Lin.TableX-Values5	Float	R/W	Linearization table X-Values of comp5
9931… 9933	7861… 7866	Service.Measurement.Lin.TableY-Values5	Float	R/W	Linearization table Y-Values of comp5

Chapter 10
Service Information

10.1 Return of Material

If factory repair of defective equipment is required, proceed as follows:

1. Secure a return authorization from a Rosemount Analytical Sales Office or Representative before returning the equipment. Equipment must be returned with complete identification in accordance with Rosemount instructions or it will not be accepted.
2. In no event will Rosemount be responsible for equipment without proper authorization and identification.
3. Carefully pack defective unit in a sturdy box with sufficient shock absorbing material to ensure no additional damage will occur during shipping.

The completed and signed Declaration of Decontamination (☞ page A-35) must be included with the instrument (we recommend to attach it to the packaging outside)!

4. In a cover letter, describe completely:
   a. The symptoms that determined the equipment is faulty.
   b. The environment in which the equipment was operating (housing, weather, vibration, dust, etc.).
   c. Site from which equipment was removed.
   d. Whether warranty service or non-warranty service is requested.
   e. Complete shipping instructions for the return of the equipment.
5. Enclose a cover letter and purchase order and ship the defective equipment according to instructions provided in a Rosemount Return Authorization, prepaid, to:

In Europe:

Emerson Process Management GmbH & Co. OHG
Service Department
Deutschland
+49 6055 884-470/-472

In US:

Emerson Process Management
Rosemount Analytical Inc.
Customer Service Center
1-800-433-6076
1-440-914-1261

In Asia Pacific:

Emerson Process Management Asia Pacific Pte Limited
Singapore
+65-6-777-8211

If warranty service is expected, the defective unit will be carefully inspected and tested at the factory. If failure was due to conditions listed in the standard Rosemount warranty, the defective unit will be repaired or replaced at Rosemount's option, and an operating unit will be returned to the customer in accordance with shipping instructions furnished in the cover letter.

For equipment no longer under warranty, the equipment will be repaired at the factory and returned as directed by the purchase order and shipping instructions.

10 Service Information

10.2 Customer Service

For order administration, replacement parts, applicaton assistance, on-site or factory repair, service or maintenance contract information, contact:

In Europe:

Emerson Process Management
GmbH & Co. OHG

Service Department

Germany

T +49 6055 884-470/-472

In US:

Emerson Process Management

Rosemount Analytical Inc.

Customer Service Center

T 1-800-433-6076
T 1-440-914-1261

In Asia Pacific:

Emerson Process Management
Asia Pacific Pte Limited

1 Pandan Crescent

Singapore 128461

T +65-6-777-8211

10.3 Training

A comprehensive Factory Training Program of operator and service classes is available. For a copy of the training schedule contact:

In Europe:

Emerson Process Management
GmbH & Co. OHG

Service Department

Germany

T +49 6055 884-470/-472

In US:

Emerson Process Management

Rosemount Analytical Inc.

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T 1-800-433-6076
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In Asia Pacific:

Emerson Process Management
Asia Pacific Pte Limited

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Singapore 128461

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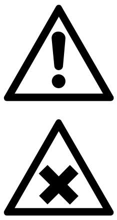
Chapter 11
Dismounting and Disposal

11.1 Dismounting and Diposal of the Analyzer



WARNING

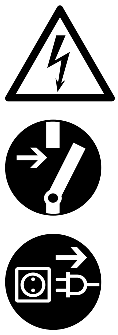
HAZARDS FROM DISMOUNTING

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!



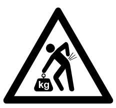
WARNING

ELECTRICAL SHOCK HAZARD WHEN DISMOUNTING

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

Failure to follow may cause exposure to risk of damage, injury or death.

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.



CAUTION

HEAVY INSTRUMENT

The models intended for outside and wall mounted use (X-STREAM XEF, XDF and XEFD) 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.

11 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 recyclers specialised in this field. Let the instrument and the packing material duly and environmently friendly be disposed of. 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 batteries

- This instrument contains a CR primary lithium button cell battery of size CR 2032.
- The battery is soldered to an electronics board and usually does not need to be replaced during the instrument´s lifetime.
- At the end of lifetime, the instrument must be disposed in compliance with the 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 (A-35)
- hand over the dismounted instrument together with the Declaration of Decontamination to a disposal specialist. The disposal specialist then has to disassemble the instrument, and recycle and dispose it and the contained battery in compliance with all applicable waste treatment regulations.

Appendix

This chapter contains

A.1 Modbus Specification

MODBUS over serial line specification and implementation guide V1.02 | Modbus-IDA.ORG

MODBUS over Serial Line

Specification and Implementation Guide

V1.02

Modbus.org | http://www.modbus.org/ | 1/44
Dec 20, 2006

A.1 Modbus Specification

3 Physical Layer

3.1 Preamble

A new MODBUS solution over serial line should implement an electrical interface in accordance with EIA/TIA-485 standard (also known as RS485 standard). This standard allows point to point and multipoint systems, in a "two-wire configuration". In addition, some devices may implement a "Four-Wire" RS485-Interface.

A device may also implement an RS232-Interface.

In such a MODBUS system, a Master Device and one or several Slave Devices communicate on a passive serial line.

On standard MODBUS system, all the devices are connected (in parallel) on a trunk cable constituted by 3 conductors. Two of those conductors (the "Two-Wire" configuration) form a balanced twisted pair, on which bi-directional data are transmitted, typically at the bit rate of 9600 bits per second.

Each device may be connected (see figure 19):

- either directly on the trunk cable, forming a daisy-chain,
- either on a passive Tap with a derivation cable,
- either on an active Tap with a specific cable.

Screw Terminals, RJ45, or D-shell 9 connectors may be used on devices to connect cables (see the chapter "Mechanical Interfaces").

3.2 Data Signaling Rates

9600 bps and 19.2 Kbps are required and 19.2 is the required default

Other baud rates may optionally be implemented : 1200, 2400, 4800, … 38400 bps, 56 Kbps, 115 Kbps, …

Every implemented baud rate must be respected better than 1% in transmission situation, and must accept an error of 2% in reception situation.

A.1 Modbus Specification

3.3 Electrical Interfaces

3.3.1 Multipoint Serial Bus Infrastructure

Figure 19 gives a general overview of the serial bus infrastructure in a MODBUS multipoint Serial Line system.

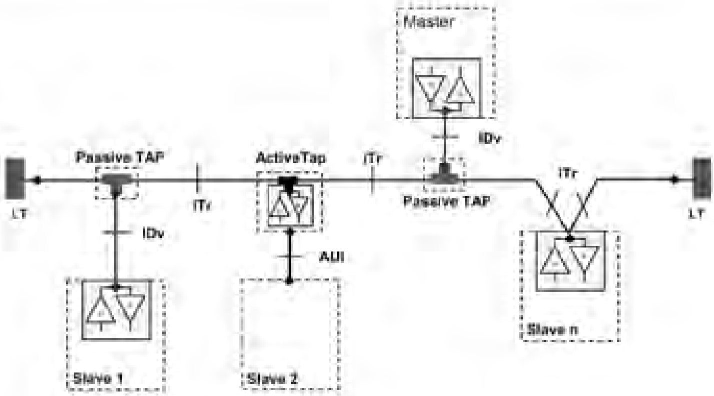


Figure 19 : Serial bus infrastructure

A multipoint MODBUS Serial Line bus is made of a principal cable **(the Trunk)**, and possibly some **derivation** cables.
Line terminations are necessary at each extremity of the trunk cable for impedance adaptation (see § "Two-Wire MODBUS Definition" & "Optional Four-Wire MODBUS Definition" for details).

As shown in figure 19, different implementations may operate in the same MODBUS Serial Line system :

- the device integrates the communication transceiver and is connected to the trunk using a **Passive Tap** and a derivation cable (case of Slave 1 and Master) ;
- the device doesn't integrate the communication transceiver and is connected to the trunk using an **Active Tap** and a derivation cable (the active TAP integrates the transceiver)
(case of Slave 2) ;
- the device is connected directly to the trunk cable, in a **Daisy-Chain** (case of Slave n)

The following conventions are adopted :

- The interface with the **trunk** is named **ITr** (Trunk Interface)
- The interface between the device and the **Passive Tap** is named **IDv** (Derivation Interface)
- The interface between the device and the **Active Tap** is named **AUI** (Attachment Unit Interface)

Remarks :

1. In some cases, the Tap may be connected directly to the IDv-socket or the AUI-socket of the device, without using a derivation cable.
2. A Tap may have several IDv sockets to connect several devices. Such a Tap is named **Distributor** when it is a passive one.
3. When using an active Tap, power supply of the Tap may be provided either via its AUI or ITr interface.

ITr and **IDv** interfaces are described in the following chapters (see § "Two-Wire MODBUS DEFINITION" & "Four-Wire MODBUS DEFINITION").

A.1 Modbus Specification

3.3.2 Two-Wire MODBUS Definition

A MODBUS solution over serial line should implement a "Two-Wire" electrical interface in accordance with EIA/TIA-485 standard.

On such a 2W-bus, at any time one driver only has the right for transmitting.

In fact a third conductor must also interconnect all the devices of the bus : the common.

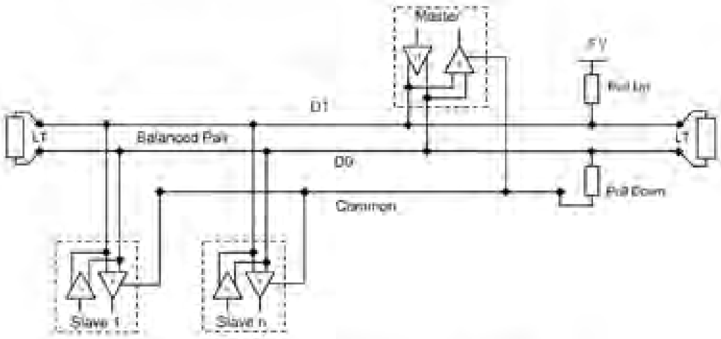


Figure 20: **General 2-Wire Topology**

2W-MODBUS Circuits Definition

Required Circuits		For device	Required on device	EIA/TIA-485 name	Description
on ITr	on IDv				
D1	D1	I/O	**X**	B/B'	**Transceiver terminal 1, V1 Voltage** (V1 > V0 for binary 1 [OFF] state)
D0	D0	I/O	**X**	A/A'	**Transceiver terminal 0, V0 Voltage** (V0 > V1 for binary 0 [ON] state)
Common	Common	--	**X**	C/C'	Signal and optional Power Supply Common

Notes :

- For Line Termination (LT), Pull Up and Pull Down resistors, please refer to section "Multipoint System requirements".
- D0, D1, and Common circuit names must be used in the documentation related to the device and the Tap (User Guide, Cabling Guide, ...) to facilitate interoperability.
- Optional electrical interfaces may be added, for example :
  - **Power Supply :** 5..24 V D.C.
  - **Port mode control :** PMC circuit (TTL compatible). When needed, port mode may be controlled either by this external circuit and/or by another way (a switch on the device for example). In the first case while an open circuit PMC will ask for the 2W-MODBUS mode, a Low level on PMC will switch the port into 4W-MODBUS or RS232-MODBUS Mode, depending on the implementation.

A.1 Modbus Specification

3.3.3 Optional Four-Wire MODBUS Definition

Optionally, such MODBUS devices also permit to implement a **2-pair** bus (4 wires) of mono directional data. The data on the **master pair** (RXD1-RXD0) are only received by the slaves , the data on the **slave pair** (TXD1-TXD0) are only received by the only master.

In fact a fifth conductor must also interconnect all the devices of the 4W-bus : the common.

In the same way as on a 2W-MODBUS, at any time one driver only has the right for emitting.

Such a device must implement, for each balanced pair, a driver and a transceiver **in accordance with EIA/ TIA-485**. (Sometimes this solution has been named "RS422", which is not correct : the RS422 standard does not support several drivers on one balanced pair.)

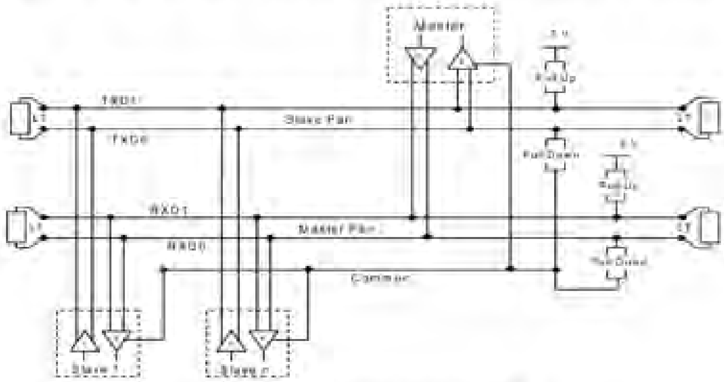


Figure 21: General 4-wire topology

Optional 4W-MODBUS Circuits Definition

Required Circuits on ITr	on IDv	**For device**	**Required on device**	**EIA/TIA-485 name**	**Description for IDv**
TXD1	TXD1	Out	**X**	B	**Generator terminal 1**, Vb Voltage (Vb > Va for binary 1 [OFF] state)
TXD0	TXD0	Out	**X**	A	**Generator terminal 0**, Va Voltage (Va > Vb for binary 0 [ON] state)
RXD1	RXD1	In	**(1)**	B'	**Receiver terminal 1**, Vb' Voltage (Vb' > Va' for binary 1 [OFF] state)
RXD0	RXD0	In	**(1)**	A'	**Receiver terminal 0**, Va' Voltage (Va' > Vb' for binary 0 [ON] state)
Common	Common	--	**X**	C/C'	Signal and optional Power Supply **Common**

Notes :

- For Line Termination (LT), Pull Up and Pull Down resistors, please refer to section "Multipoint System requirements".
- Those circuits **(1)** are required only if an 4W-MODBUS option is implemented.
- The name of the 5 required circuits must be used in the documentation related to the device and the Tap (User Guide, Cabling Guide, ...) to facilitate interoperability.
- Optional electrical interfaces may be added, for example :
  - **Power Supply :** 5..24 V D.C.
  - **PMC circuit :** See above (in 2W-MODBUS Circuits Definition) the note about this optional circuit.

A.1 Modbus Specification

3.3.3.1 4W-Cabling System Important Topic

In such a 4W-MODBUS, Master Device and Slave Devices have IDv interfaces with the same 5 required circuits
As the master has to :

- receive from the slave the data on the slave pair (TXD1-TXD0),
- and transmit on the master pair (RXD1-RXD0 , received by the slaves) ,

the 4W-cabling system must cross the two pairs of the bus between ITr and the IDv of the master :

	Signal on Master IDv		EIA/TIA-485 Name	Circuit on ITr
	Name	Type		
Slave Pair	RXD1	In	B'	TXD1
	RXD0	In	A'	TXD0
Master Pair	TXD1	Out	B	RXD1
	TXD0	Out	A	RXD0
	Common	--	C/C'	Common

This crossing may be implemented by crossed cables, but the connection of such crossed cables in a 2-wire system may cause damages. To connect a 4W master device (which have a MODBUS connector) a better solution is to use a Tap which includes the crossing function.

3.3.3.2 Compatibility between 4-Wire and 2-Wire cabling

In order to connect devices implementing a 2-Wire physical interface to an already existing 4-Wire system, the 4-Wire cabling system can be modified as described below :

- TxD0 signal shall be wired with the RxD0 signal, turning them to the D0 signal
- TxD1 signal shall be wired with the RxD1 signal, turning them to the D1 signal.
- Pull-up, Pull-down and line terminations resistors shall be re-arranged to correctly adapt the D0, D1 signals.

A.1 Modbus Specification

The figure hereafter gives an example where slaves 2 and 3 which use a 2-Wire interface can operate with the Master and the slave 1 which use a 4-Wire interface

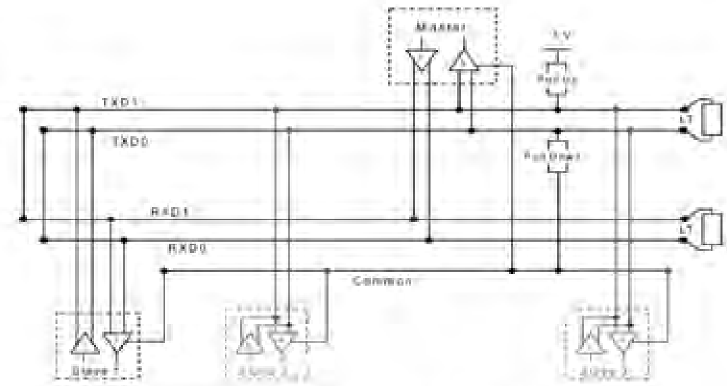


Figure 22 : Changing a 4-Wire cabling system into a 2-Wire cabling system

In order to connect devices implementing a 4-Wire physical interface to an already existing 2-Wire system, the 4-Wire interface of the new coming devices can be arranged as describe below :

On each 4-Wire device interface :

- TxD0 signal shall be wired with the RxD0 signal and then connected to the D0 signal of the trunk ;
- TxD1 signal shall be wired with the RxD1 signal and then connected to the D1 signal of the trunk.

The figure hereafter gives an example where slaves 2 and 3 which use a 4-Wire interface can operate with the Master and the slave 1 which use a 2-Wire interface.

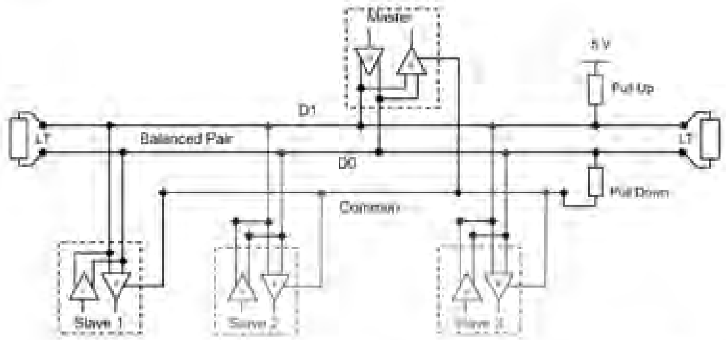


Figure 23 : Connecting devices with 4-Wire interface to a 2-Wire cabling system

A.1 Modbus Specification

3.3.4 RS232-MODBUS Definition

Some devices may implement an RS232-Interface between a DCE and a DTE.

Optional RS232-MODBUS Circuits Definition

Signal	For DCE	Required on DCE (1)	Required on DTE (1)	Description
Common	–	X	X	**Signal Common**
CTS	In			Clear to Send
DCD	–			Data Carrier Detected (from DCE to DTE)
DSR	In			Data Set Ready
DTR	Out			Data Terminal Ready
RTS	Out			Request to Send
RXD	In	X	X	**Received Data**
TXD	Out	X	X	**Transmitted Data**

Notes :

- "X" marked signals are required only if an RS232-MODBUS option is implemented.
- Signals are in accordance with EIA/ TIA-232
- Each TXD must be wired with RXD of the other device ;
- RTS may be wired with CTS of the other device,
- DTR may be wired with DSR of the other device.
- Optional electrical interfaces may be added, for example :
  - **Power Supply :** 5..24 V D.C.
  - **PMC circuit :** See above (In 2W-MODBUS Circuits Definition) the note about this optional circuit.

3.3.5 RS232-MODBUS requirements

This optional MODBUS on Serial Line system should only be used for short length (typically less than 20m) point to point interconnection.

Then, the EIA/TIA-232 standard must be respected :

⇒ circuits definition,

⇒ maximum wire capacitance to ground (2500 pF, then 25 m for a 100 pF/m cable).

Please refer to chapter "Cables" for the shield, and for the possibility to use Category 5 Cables.

Documentation of the device must indicate :

⇒ if the device must be considered as a DCE either as a DTE,

⇒ how optional circuits must work if such is the case.

A.1 Modbus Specification

3.4 Multipoint System requirements

For any EIA/ TIA-485 multipoint system, in either 2-wire or 4-wire configuration, the following requirements all apply.

3.4.1 Maximum number of devices without repeater

A figure of **32 devices** is always authorized on any RS485-MODBUS system without repeater.

Depending of :

- all the possible addresses,
- the figure of RS485 Unit Load used by the devices,
- and the line polarization in need be,

A RS485 system may implement a larger number of devices. Some devices allow the implementation of a RS485-MODBUS serial line with more than 32 devices, without repeater.

In this case these MODBUS devices must be documented to say how many of such devices are authorized without repeater.

The use of a **repeater** between two heavy loaded RS485-MODBUS is also possible.

3.4.2 Topology

An RS485-MODBUS configuration without repeater has one trunk cable, along which devices are connected, directly (daisy chaining) or by short derivation cables.

The trunk cable, also named "Bus", can be long (see hereafter). Its two ends must be connected on Line Terminations.

The use of repeaters between several RS485-MODBUS is also possible.

3.4.3 Length

The end to end length of the **trunk cable** must be limited. The maximum length depends on the baud rate, the cable (Gauge, Capacitance or Characteristic Impedance), the number of loads on the daisy chain, and the network configuration (2-wire or 4-wire).

For a maximum 9600 Baud Rate and AWG26 (or wider) gauge, the maximum length is 1000m. In the specific case shown in the figure 22 (4 Wire cabling used as a 2 Wire cabling system) the maximum length must be divided by two.

The **derivations** must be short, never more than 20m. If a multi-port tap is used with n derivations, each one must respect a maximum length of 40m divided by n.

3.4.4 Grounding Arrangements

The « Common » circuit (Signal and optional Power Supply Common) must be connected directly to protective ground, preferably at **one point only** for the entire bus. Generally this point is to choose on the master device or on its Tap.

3.4.5 Line Termination

A reflection in a transmission line is the result of an impedance discontinuity that a travelling wave sees as it propagates down the line. To minimize the reflections from the end of the RS485-cable it is required to place a Line Termination **near each of the 2 Ends** of the Bus.

It is important that the line be terminated at **both** ends since the propagation is bi-directional, but it is not allowed to place more than 2 LT on one passive D0-D1 balanced pair . Never place any LT on a derivation cable.

A.1 Modbus Specification

Each line termination must be connected between the two conductors of the balanced line : D0 and D1.

Line termination may be a 150 ohms value (0.5 W) resistor.

A serial capacitor (1 nF, 10 V minimum) with a 120 Ohms (0.25 W) resistor is a better choice when a polarization of the pair must be implemented (see here after).

In a 4W-system, each pair must be terminated at each end of the bus.

In an RS232 interconnections, no termination should be wired.

3.4.6 Line Polarization

When there is no data activity on an RS-485 balanced pair, the lines are not driven and, thus susceptible to external noise or interference. To insure that its receiver stays in a constant state, when no data signal is present, some devices need to bias the network.

Each MODBUS device must be documented to say :

- if the device needs a line polarization,
- if the device implements, or can implement, such a line polarization.

If one or several devices need polarization, **one** pair of resistors must be connected on the RS-485 balanced pair :

- a Pull-Up Resistor to a 5V Voltage on D1 circuit,
- a Pull-Down Resistor to the common circuit on D0 circuit.

The value of those resistors must be between 450 Ohms and 650 Ohms. 650 Ohms resistors value may allow a higher number of devices on the serial line bus.

In this case, a polarization of the pair must be implemented **at one location for the whole Serial Bus**. Generally this point is to choose on the master device or on its Tap. Other devices must not implement any polarization.

The maximum number of devices authorized on such a MODBUS Serial Line is reduced by 4 from a MODBUS without polarization.

A.2 EC Declaration of Conformity

EC DECLARATION OF CONFORMITY

Document number: RAE/X-STREAM XE AC-E1
Date: August 2009

We,

Emerson Process Management GmbH & Co. OHG

located at

Industriestrasse 1, D-63594 Hasselroth, Germany

declare under our sole responsibility that our gas analyzer, type

X-STREAM XE

to which this declaration relates is in conformity with the provisions of:

2004/108/EC **EMC Directive**
with the application of the harmonized standards including the latest amendments:

EN 61326-1:2006 Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements

---

2006/95/EC **Low Voltage Directive**
with the application of the harmonized standards:

EN 61010-1:2001 Safety requirements for electrical equipment for measurement, control and laboratory use
Part 1: General requirements

Last two digits of the year in which the CE marking was affixed: 09

97/23/EC **Pressure Equipment Directive**
This analyzer has been designed and manufactured considering article 3, paragraph 3 of the above mentioned directive and therefore CE marking does not refer to this directive.

This document covers all 19" and fieldhousing X-STREAM XE gas analyzer variations with AC power supply.

Hasselroth, August 2009

(Signature)

Andy Kemish
(Name)

VP Rosemount Analytical Europe
(Function name)

ROSEMOUNT Analytical

EMERSON Process Management

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

A.2 EC Declaration of Conformity

EC DECLARATION OF CONFORMITY

Document number: RAE/X-STREAM XE DC-E1
Date: August 2009

We,

Emerson Process Management GmbH & Co. OHG

located at

Industriestrasse 1, D-63594 Hasselroth, Germany

declare under our sole responsibility that our gas analyzer, type

X-STREAM XE

to which this declaration relates is in conformity with the provisions of:

2004/108/EC	**EMC Directive** with the application of the harmonized standard: **EN 61326-1:2006** Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements
97/23/EC	**Pressure Equipment Directive** This analyzer has been designed and manufactured considering article 3, paragraph 3 of the above mentioned directive and therefore CE marking does not refer to this directive.

This document covers all ½ 19" X-STREAM XE gas analyzer variations with DC power supply.

Hasselroth, August 2009

(Signature)

Andy Kemish
(Name)

VP Rosemount Analytical Europe
(Function name)

ROSEMOUNT Analytical

EMERSON Process Management

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

A.3 CSA Certificate of Compliance

CSA INTERNATIONAL

Certificate of Compliance

Certificate: 1714037 (LR 105173) **Master Contract:** 185562

Project: 2247530 **Date Issued:** 2010/01/21

Issued to: **Emerson Process Management**
GmbH & Co. OHG
Industriestrasse 1
Hasselroth, 63594
Germany
Attention: Uwe Schmidt

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.

C US

Rob Kohuch, P. Eng.

Issued by: Rob Kohuch, P. Eng.

PRODUCTS

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

CLASS 8721 05 - LABORATORY ELECTRICAL EQUIPMENT

CLASS 8721 85 - ELECTRICAL EQUIPMENT FOR LABORATORY USE (Certified to U.S. Standards)

Gas analyzer, Model: X-STREAM, rated 100-240Vac, 50/60 Hz, 3 - 1.5A, Class I, Pollution Degree II.
- **X-STREAM F (XF) or X-STREAM (X2F, XLF) or X-STREAM Enhanced Field Housing Gas Analyzer (XEF)**: Wall mounting with field wiring terminals, for outdoor use NEMA 4X and display;
- **X-STREAM GP (XGP)**: Table Top or Rack Mount with field wiring terminals for indoor use;
- **X-STREAM GPS (XGPS):** Table Top or Rack Mount with appliance inlet for indoor use with or without display;
- **X-STREAM (X2GP) or X-STREAM Enhanced (XEGP) General Purpose Gas Analyzer:** Table Top or Rack Mount with appliance inlet for indoor use and display (optional with field wiring terminals for indoor use);

DQD 507 Rev. 2009-09-01

A.3 CSA Certificate of Compliance

CSA INTERNATIONAL

Certificate: 1714037 (LR 105173) **Master Contract:** 185562

Project: 2247530 **Date Issued:** 2010/01/21

- **X-STREAM Gas Analyzer Core (X2CA)** Table Top or Rack Mount with appliance inlet for indoor use and no display (optional with field wiring terminals for indoor use);

Gas analyzer, Model: X-STREAM, rated 100-240Vac, 50/60 Hz, 5.5 - 3A, Class I, Pollution Degree II.

- **X-STREAM (XXF) or X-STREAM Enhanced Field Housing Gas Analyzer (XDF)**: Wall mounting with field wiring terminals, for outdoor use NEMA 4X and display;

Gas analyzer, Model: X-STREAM, rated 24Vdc, 2.5A, Class I, Pollution Degree II.

- **X-STREAM (X2GC)or X-STREAM Enhanced (XEGC)General Purpose Compact Gas Analyzer** Table Top or Rack Mount with 24Vdc in connector and display;
- **X-STREAM Compact Gas Analyzer Core (X2CC):** Table Top or Rack Mount with 24Vdc in

Conditions of Acceptability

- For the X-STREAM Models XGP, XGPS, X2GP, X2CA and XEGP the equipment is supplied with an approved power supply cord set or power supply cord with plug that is acceptable to the authorities in the country where the equipment is to be used. Units supplied without a power cord and that are not permanently connected are considered as component. Component-type units must be provided with a Fire, Mechanical and Electrical enclosure and must be re-evaluated by CSA.

- The plug/connector is used as the disconnected device. The switch for X2GP/X2CA/XEGP is not considered the disconnect device. All units must be provided with a disconnect device.

CLASS 2258-02 PROCESS CONTROL EQUIPMENT – For Hazardous Locations

CLASS 2258-82 PROCESS CONTROL EQUIPMENT – For Hazardous Locations – Certified to U.S. Standards.

X-Stream FD (XFD): Flameproof for Hazardous Locations

Class I, Zone 1, Ex d IIB+H2, T3

Class I, Zone 1, AEx d IIB+H2, T3

Gas analyzer, Model: X-Stream, rated 100-240Vac, 50/60 Hz, 2–1 A. Class I, Pollution Degree II; Type 4 & IP66

Ambient Temperature Range: -30°C to +50°C Maximum internal case pressure = 110kpa

XFD-abcdefghijklmnop

a = Language: A, B, C, D or E

b = Ambient Conditions: 1, 2, 3, 4, 5 or 6

c = Instrument: 1, 2, 3, 4, 5, 6 or 7

d = Bench 1: any combination of 2 or 3 alpha-numeric characters

DQD 507 Rev. 2009-09-01

A.3 CSA Certificate of Compliance

CSA INTERNATIONAL

Certificate:	1714037 (LR 105173)	**Master Contract:**	185562
Project:	2247530	**Date Issued:**	2010/01/21

e = Bench 1 – Special Linearization or Calibration: 0, 1, 2, 3, 4 or 5

f = Bench 2: any combination of 2 or 3 alpha-numeric characters

g = Bench 2 – Special Linearization or Calibration: 0, 1, 2, 3, 4 or 5

h = Enclosure: 1, 2, 3, 4, 5 or 6

i = Hazardous Area Options and Special Approvals: B or D

B = CSA Certification

D = CSA Certification with a Breathing Device for Venting (Same Device as option "p")

j = Input/Output Options: 1, 2, 5 or 6

k = Communication Interface: A, B, C or D

l = Sample Handling: 0, 1, 3, 5 or 7

m = Gas Path Sensors: 0, 1, 2, 3, 4 or 5

n = Gas Path Tubing: A, B, C, D or E

o = Gas Path Fittings: 3, 4, 5 or 6

p = Flame Arrestors: 2, 3, 4, 5, 6, 7 or 8

X-Stream FD (X2FD): Flameproof for Hazardous Locations

Class I, Zone 1, Ex d IIB+H2, T3

Class I, Zone 1, AEx d IIB+H2, T3

Gas analyzer , Model: X-Stream, rated 100-240Vac, 50/60 Hz, 3 - 1.5A, Class I, Pollution Degree II; Ambient Temperature Range: -30°C to +50°C

X-Stream FD (X2FD) has same electronics as the X-STREAM General Purpose Gas Analyzer (X2GP) with new Hazardous Locations Enclosure.

X2FD-abcdefghijklmnopqrstuv

a = Language: A, B, C, D, E or F

b = Ambient Conditions: 1, 2, 3, 4, 5 or 6

DQD 507 Rev. 2009-09-01

A.3 CSA Certificate of Compliance

CSA INTERNATIONAL

Certificate: 1714037 (LR 105173) **Master Contract:** 185562

Project: 2247530 **Date Issued:** 2010/01/21

c = Instrument: 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14 or 15

d = Bench 1: any combination of 2 or 3 alpha-numeric characters

e = Bench 1 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

f = Bench 2: any combination of 2 or 3 alpha-numeric characters

g = Bench 2 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

h = Bench 3: any combination of 2 or 3 alpha-numeric characters

i = Bench 3 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

j = Bench 4: any combination of 2 or 3 alpha-numeric characters

k = Bench 4 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

l = Enclosure: 1, 2, 3, 4, 5 or 6

m = Hazardous Area Options and Special Approvals: B or D

B = CSA Certification

D = CSA Certification with a Breathing Device for Venting (Same Device as option “v”)

n = Analog Outputs: 1, 2, 3 or 4

o = Digital Inputs/Relay Outputs: 0, 1 or 2

p = Communication Interface: 0, A, B, C or D

q = Spare: 0

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

s = Gas Path Sensors: 0, 1, 2, 3, 4, 5, 6, 7 or 8

t = Gas Path Tubing: A, B, C, D, E, F, G, H or I

u = Gas Path Fittings: E, F, G, H, I, J, K or L

v = Flame Arrestors: 2, 3, 4, 5, 6, 7 or 8

X-STREAM FD (XEFD): Flameproof for Hazardous Locations

Class I, Zone 1, Ex d IIB+H2, T3

DQD 507 Rev. 2009-09-01

A.3 CSA Certificate of Compliance

CSA INTERNATIONAL

Certificate: 1714037 (LR 105173) **Master Contract:** 185562

Project: 2247530 **Date Issued:** 2010/01/21

Class I, Zone 1, AEx d IIB+H2, T3

Gas analyzer , Model: X-STREAM, rated 100-240Vac, 50/60 Hz, 3 - 1.5A, Class I, Pollution Degree II; Ambient Temperature Range: -30°C to +50°C

X-STREAM FD Enhanced (XEFD) has same electronics as the X-STREAM Enhanced General Purpose Gas Analyzer **(XEF)** with same Hazardous Locations Enclosure as X-STREAM X2FD.

XEFD-abcdefghijklmnopqrstuv

a = Language: A, B, C, D, E, F or G

b = Ambient Conditions: 1 or 4

c = Instrument: 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14 or 15

d = Bench 1: any combination of 2 or 3 alpha-numeric characters

e = Bench 1 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

f = Bench 2: any combination of 2 or 3 alpha-numeric characters

g = Bench 2 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

h = Bench 3: any combination of 2 or 3 alpha-numeric characters

i = Bench 3 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

j = Bench 4: any combination of 2 or 3 alpha-numeric characters

k = Bench 4 – Special Linearization or Calibration: 0, 1, 2, 3, 4, 5, A, B, C or D

l = Enclosure: 1, 2, 3 or 4

m = Hazardous Area Options and Special Approvals: B or D

B = CSA Certification

D = CSA Certification with a Breathing Device for Venting (Same Device as option “v”)

n = Analog Outputs: 1, 2, 3 or 4

o = Digital Inputs/Relay Outputs/Analog Inputs: 0, 1, 2, 5 or A

p = Communication Interface: 0, A or B

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

DQD 507 Rev. 2009-09-01

A.3 CSA Certificate of Compliance

CSA INTERNATIONAL

Certificate: 1714037 (LR 105173) **Master Contract:** 185562

Project: 2247530 **Date Issued:** 2010/01/21

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

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

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

u = Gas Path Fittings: E, F, G, H, I, J, K or L

v = Flame Arrestors: 2, 3, 4, 5, 6, 7 or 8

X-STREAM FN (X2FN, XLFN, XXFN, XEFN, XDFN): Non-Incendive for Hazardous Locations

Class 1 Zone 2 Ex nAC IIC T4

Class 1 Zone 2 AEx nAC IIC T4

Class I Div 2 Groups ABCD

-20 °C to +50 °C IP66 Enclosure Type 4X

Gas analyzer, Model: X-STREAM, rated 100-240Vac, 50/60 Hz, 3 - 1.5A, Class I, Pollution Degree II.
- **X-STREAM Field Housing Gas Analyzer (X2FN)**:
- **X-STREAM (XLFN) or X-STREAM Enhanced (XEFN)Field Housing Gas Analyzer:**

Gas analyzer, Model: X-STREAM, rated 100-240Vac, 50/60 Hz, 5.5 - 3A, Class I, Pollution Degree II

X-STREAM (XXFN) or X-STREAM Enhanced Dual (XDFN) Field Housing Gas Analyzer:

APPLICABLE REQUIREMENTS

CAN/CSA-C22.2 No. 61010-1-04 - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements

UL Std No. 61010-1, 2nd Edition. - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements

CAN/CSA-E60079-0:02 (R2006) - Electric Apparatus for Explosive Gas Atmospheres, Part 0: General Requirements

CAN/CSA-E60079-1:02 (R2006) - Electric Apparatus for Explosive Gas Atmospheres, Part 1: Construction and Verification Test of Flameproof Enclosures of Electrical Apparatus “d”

CAN/CSA-E60079-15:02 (R2006) - Electric Apparatus for Explosive Gas Atmospheres, Part 15: Type of protection "n"

CSA C22.2 No 213-M1987 - Non-Incendive Electrical Equipment for Use in Class I,Division 2 Hazardous Locations

DQD 507 Rev. 2009-09-01

A.3 CSA Certificate of Compliance

CSA INTERNATIONAL

Certificate: 1714037 (LR 105173) **Master Contract:** 185562

Project: 2247530 **Date Issued:** 2010/01/21

CAN/CSA-C22.2 No. 94-M91 (R2001) - Special Purpose Enclosures

CAN/CSA C22.2 No. 60529:05 - Degrees of protection provided by enclosure (IP Code)

ANSI/ISA-12.00.01-2002 (IEC 60079-0 Mod) - Electric Apparatus for Use in Class I, Zones 0, 1 & 2 Hazardous (Classified) Locations: General Requirements

ANSI/ISA-12.22.01-2002 (IEC 60079-1 Mod) - Electric Apparatus for Use in Class I, Zones 1 Hazardous (Classified) Locations Type of Protection – Flameproof “d”

UL 60079-15:2009 - Electric Apparatus for Explosive Gas Atmospheres, Part 15: Construction, Test and Marking of Type of Protection ’n’ Electrical Apparatus

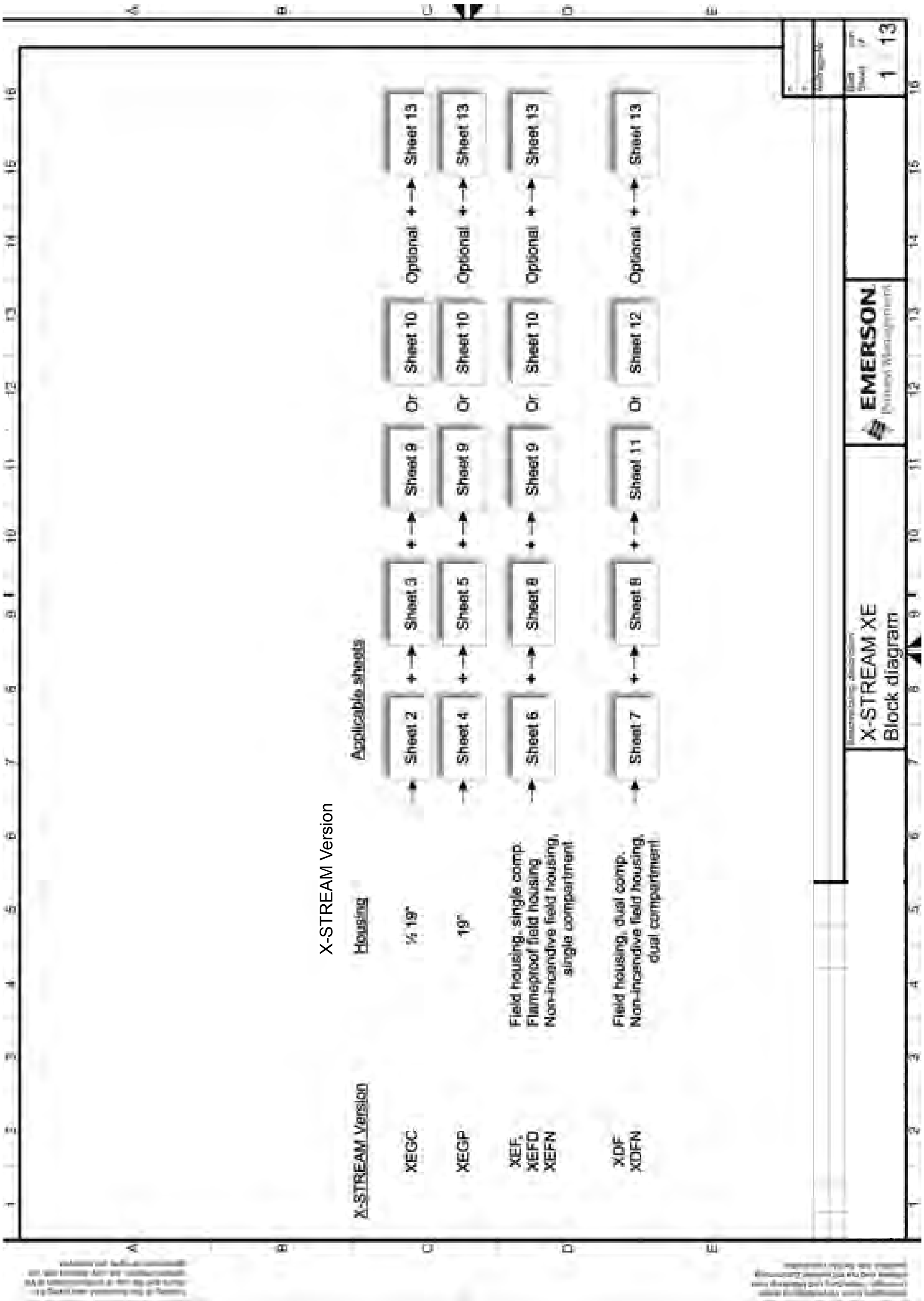
IEC 60529 Edition 2.1-2001-02 - Degrees of protection provided by enclosure (IP Code)

UL 50 11th ed - Enclosures for Electrical Equipment

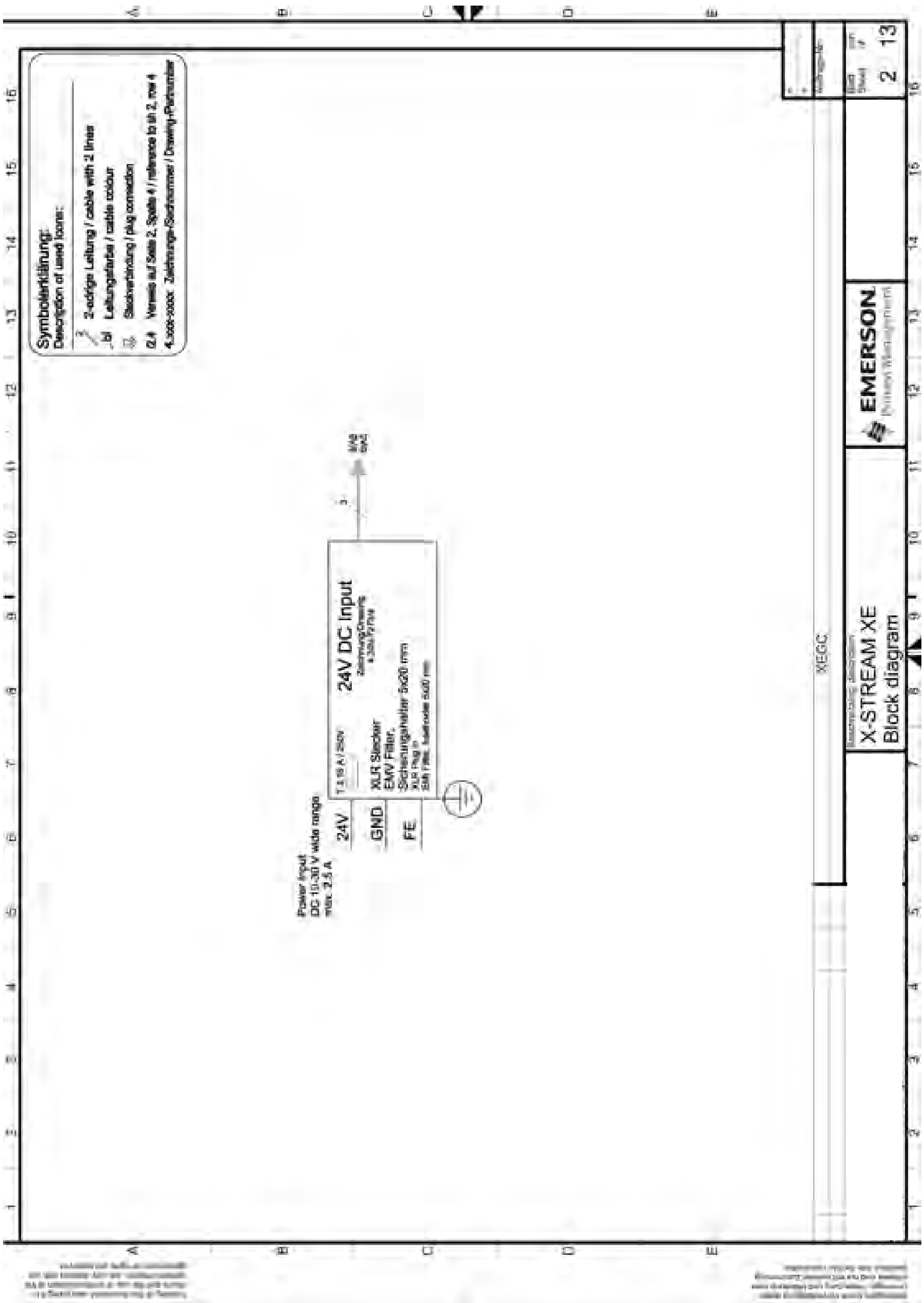
ISA 12.12.01-2007 - Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations

DQD 507 Rev. 2009-09-01

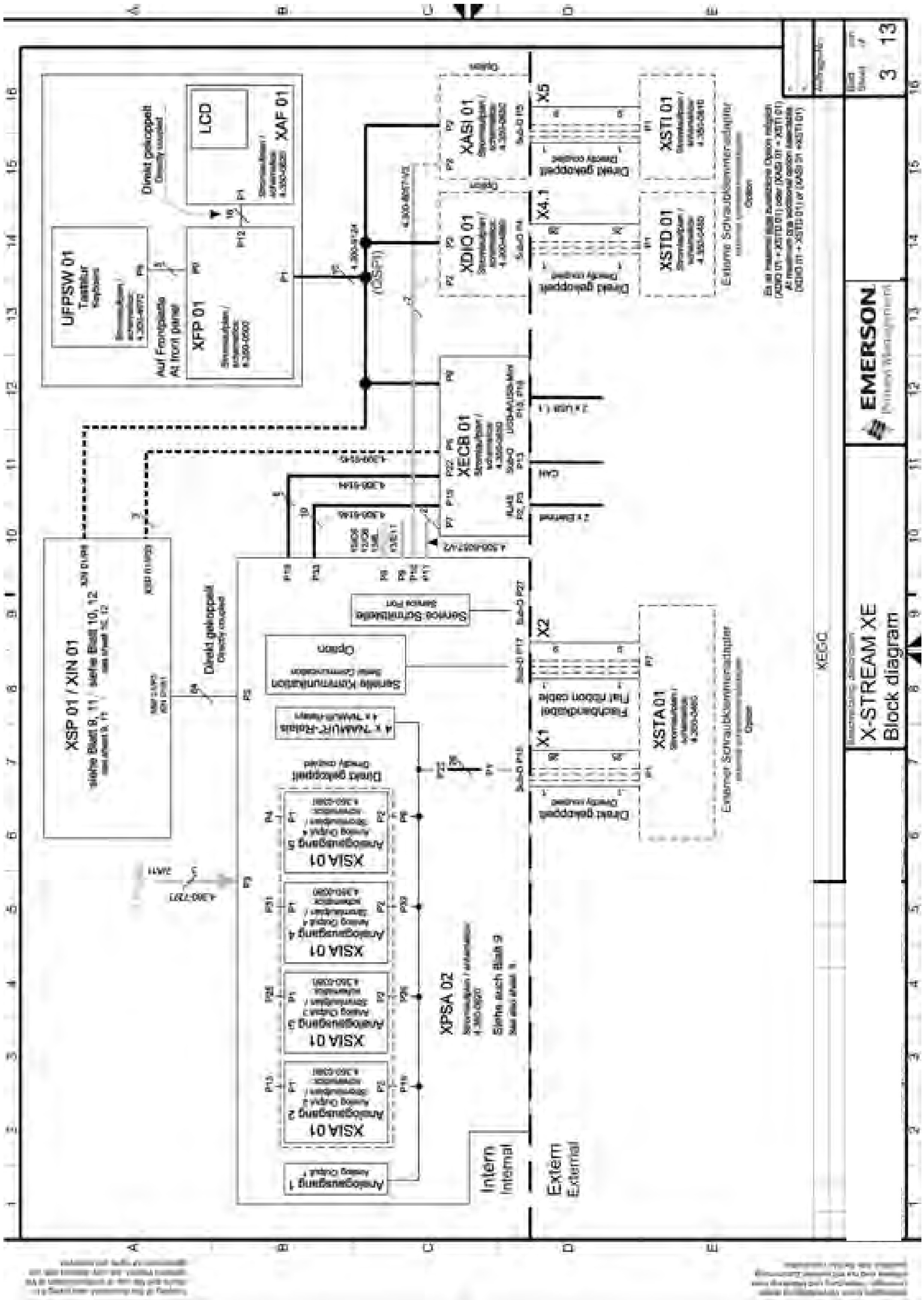
A.4 Block Diagram



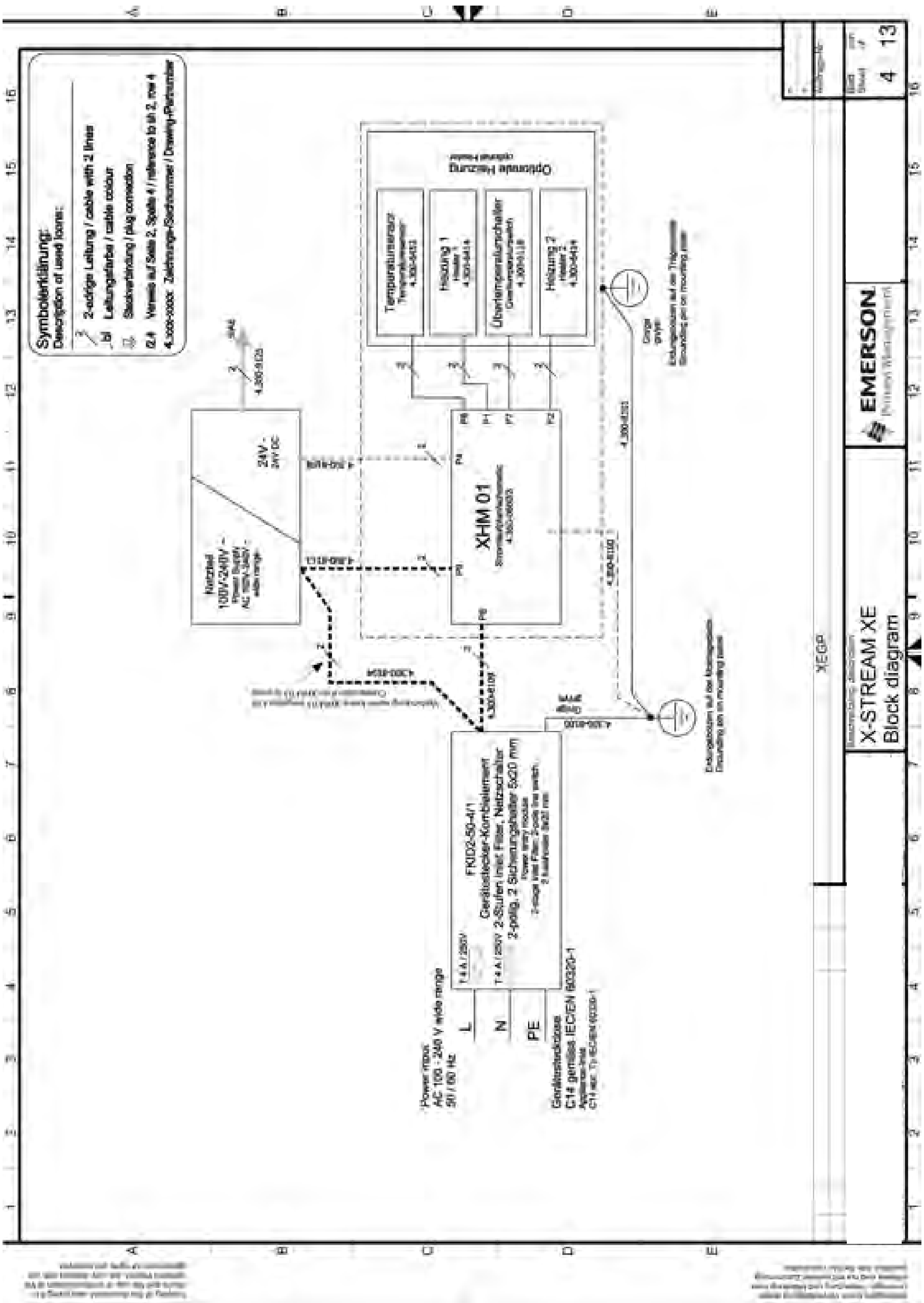
A.4 Block Diagram



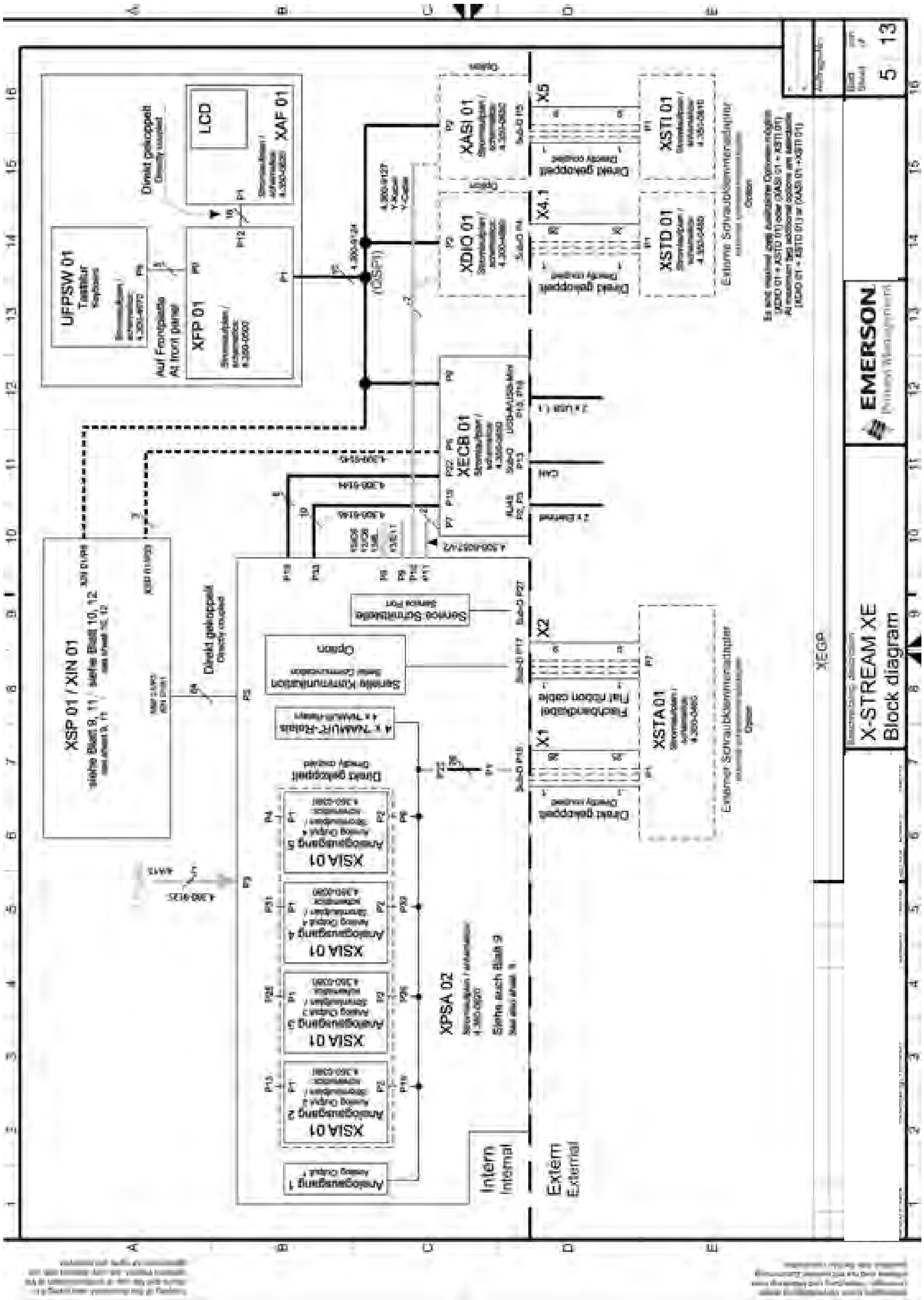
A.4 Block Diagram



A.4 Block Diagram



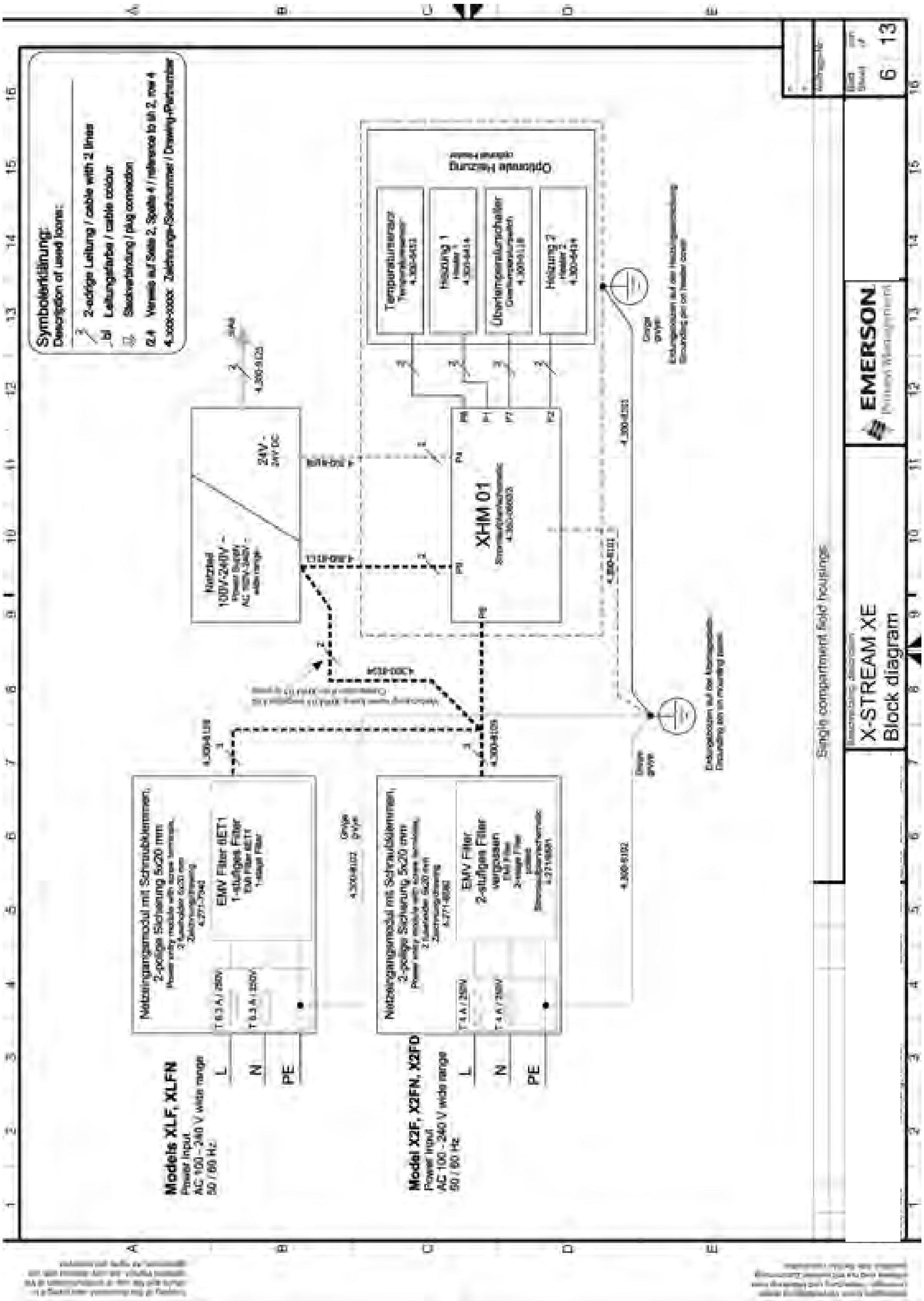
A.4 Block Diagram



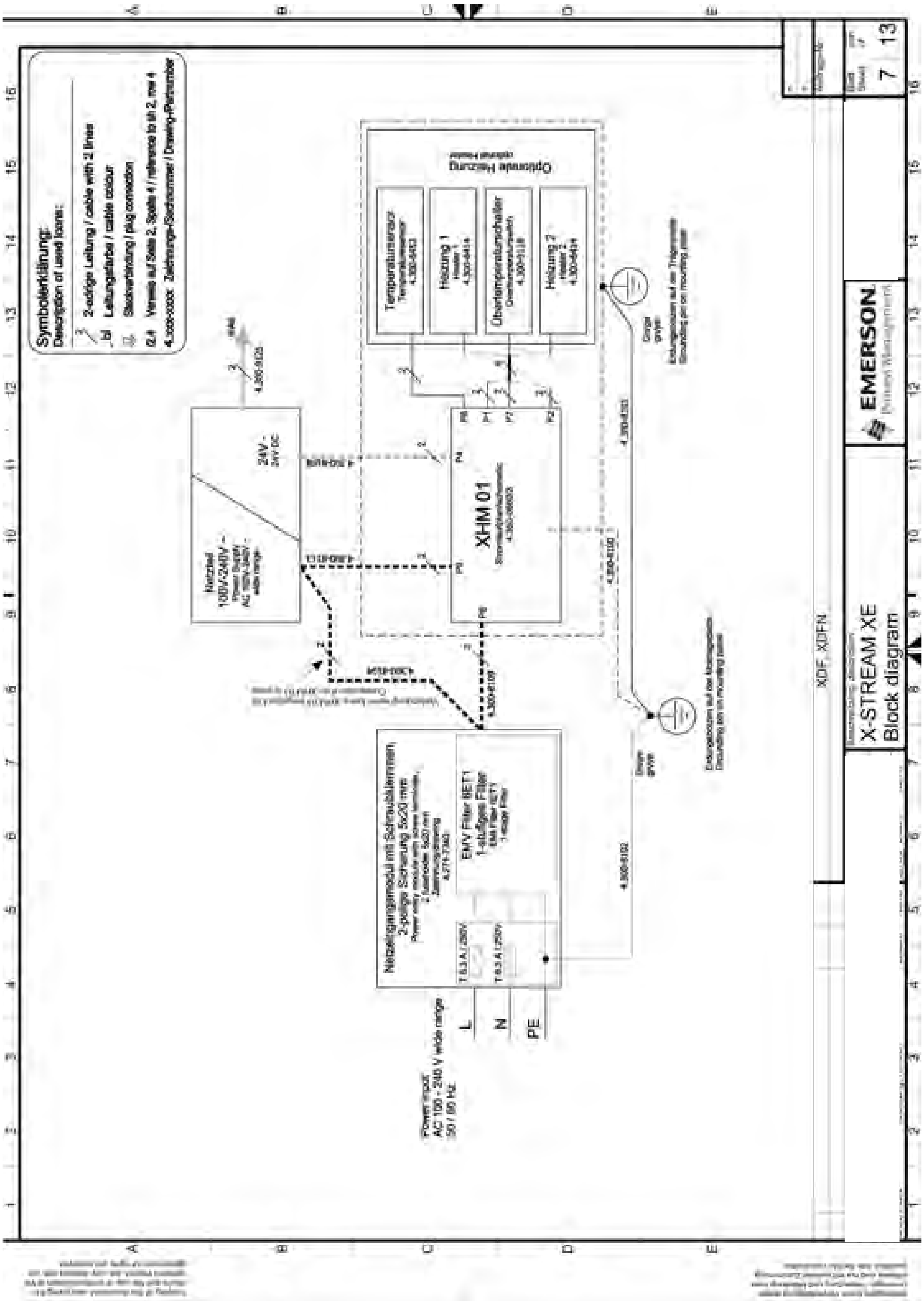
Appendix

A

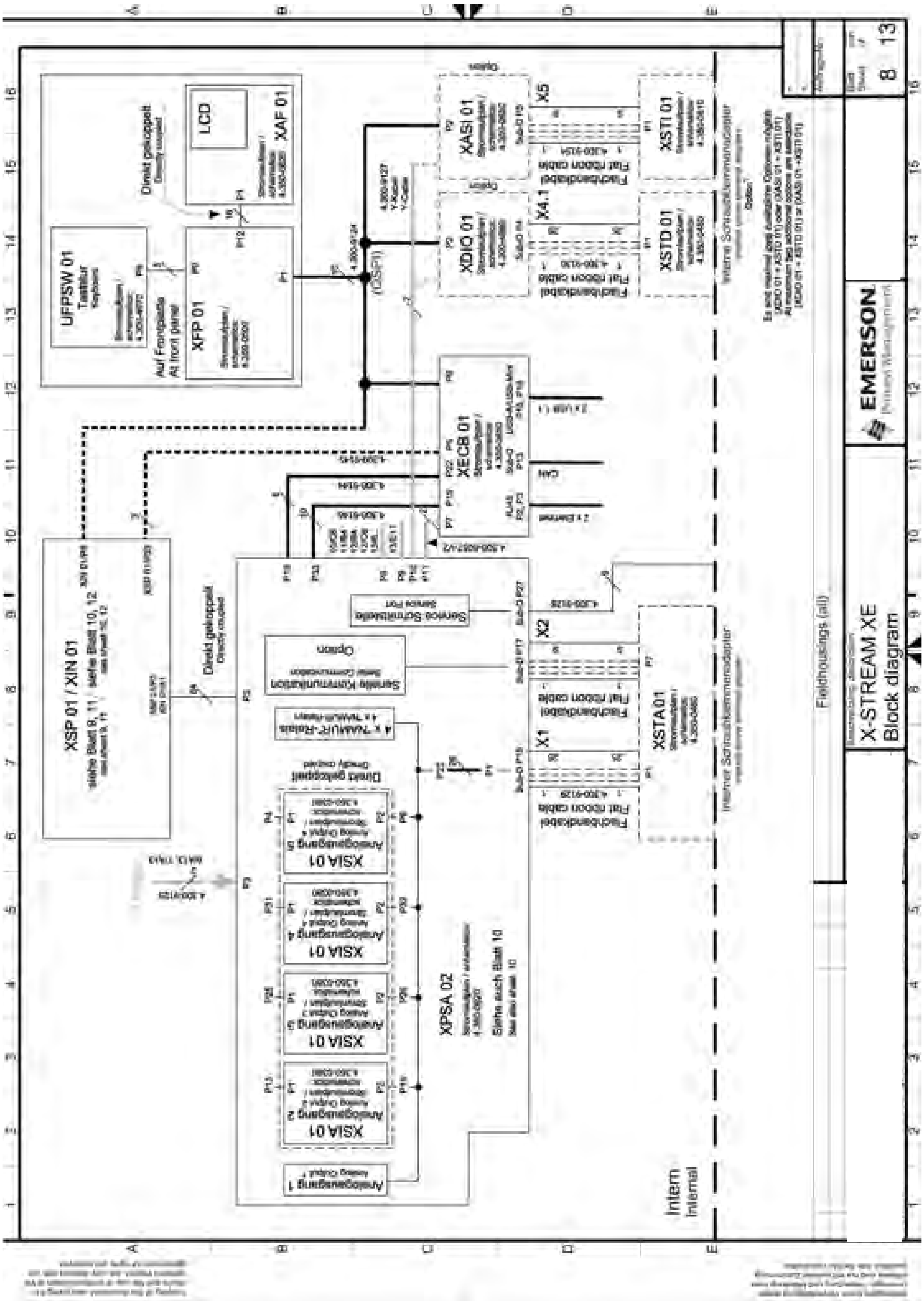
A.4 Block Diagram



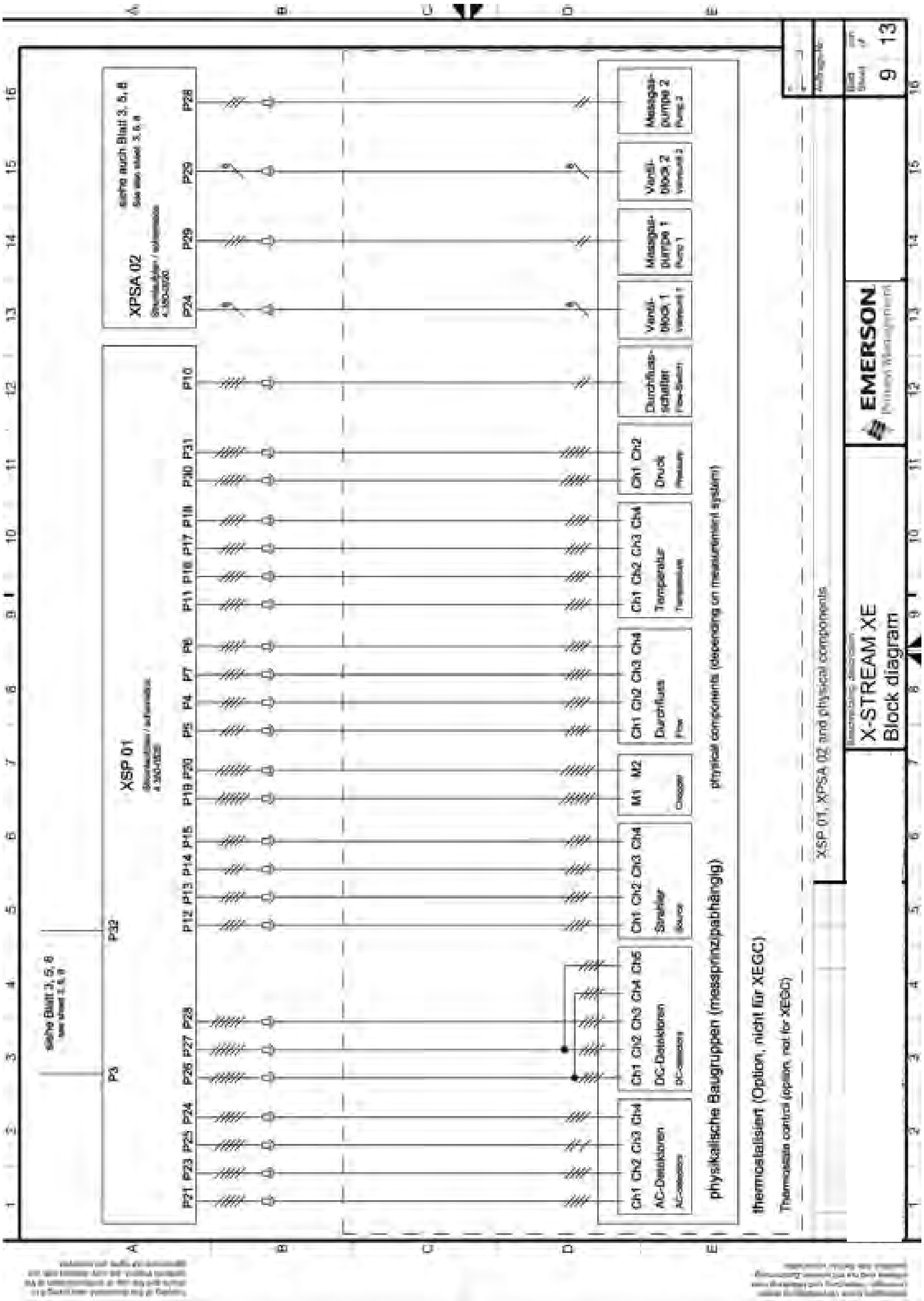
A.4 Block Diagram



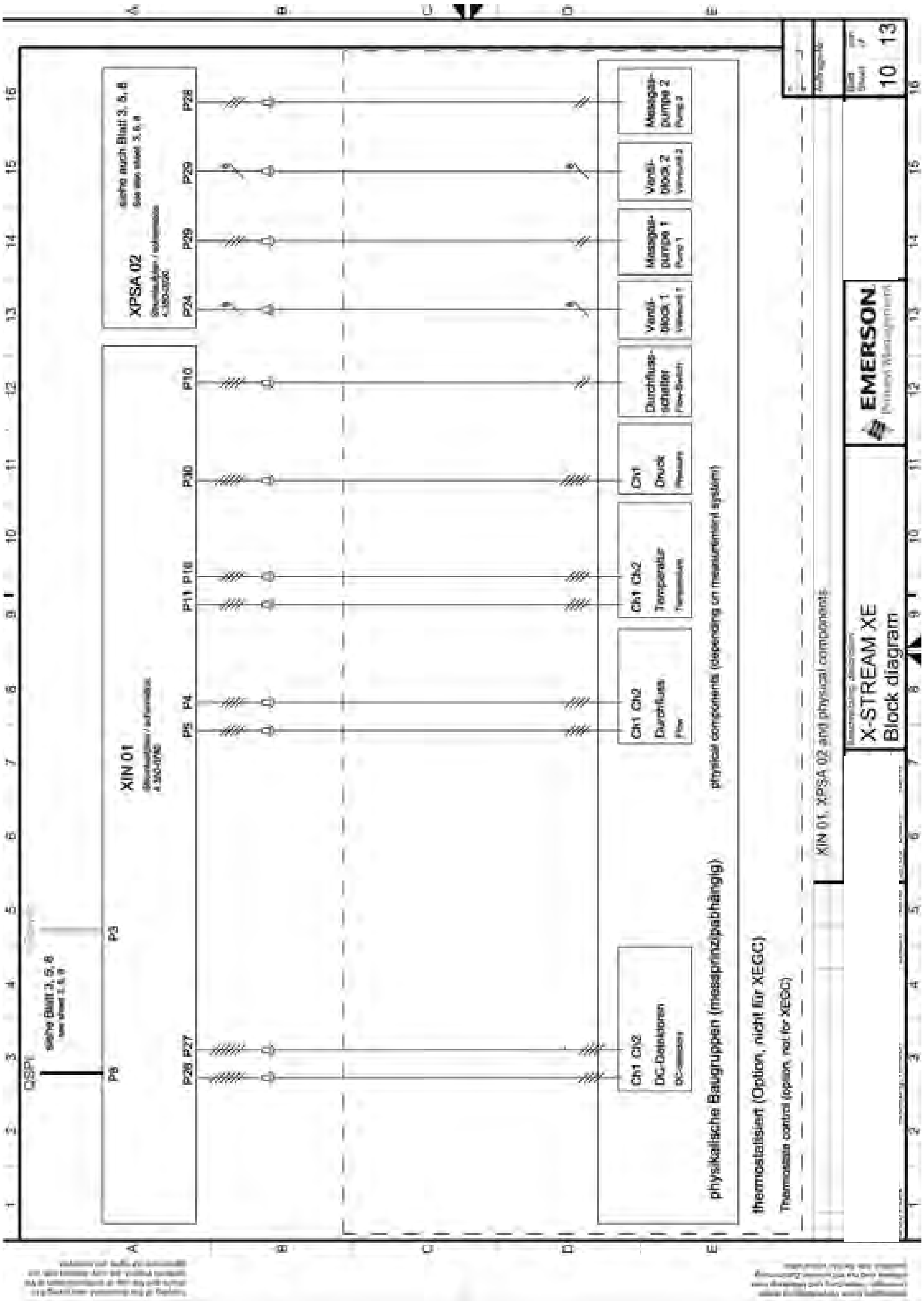
A.4 Block Diagram



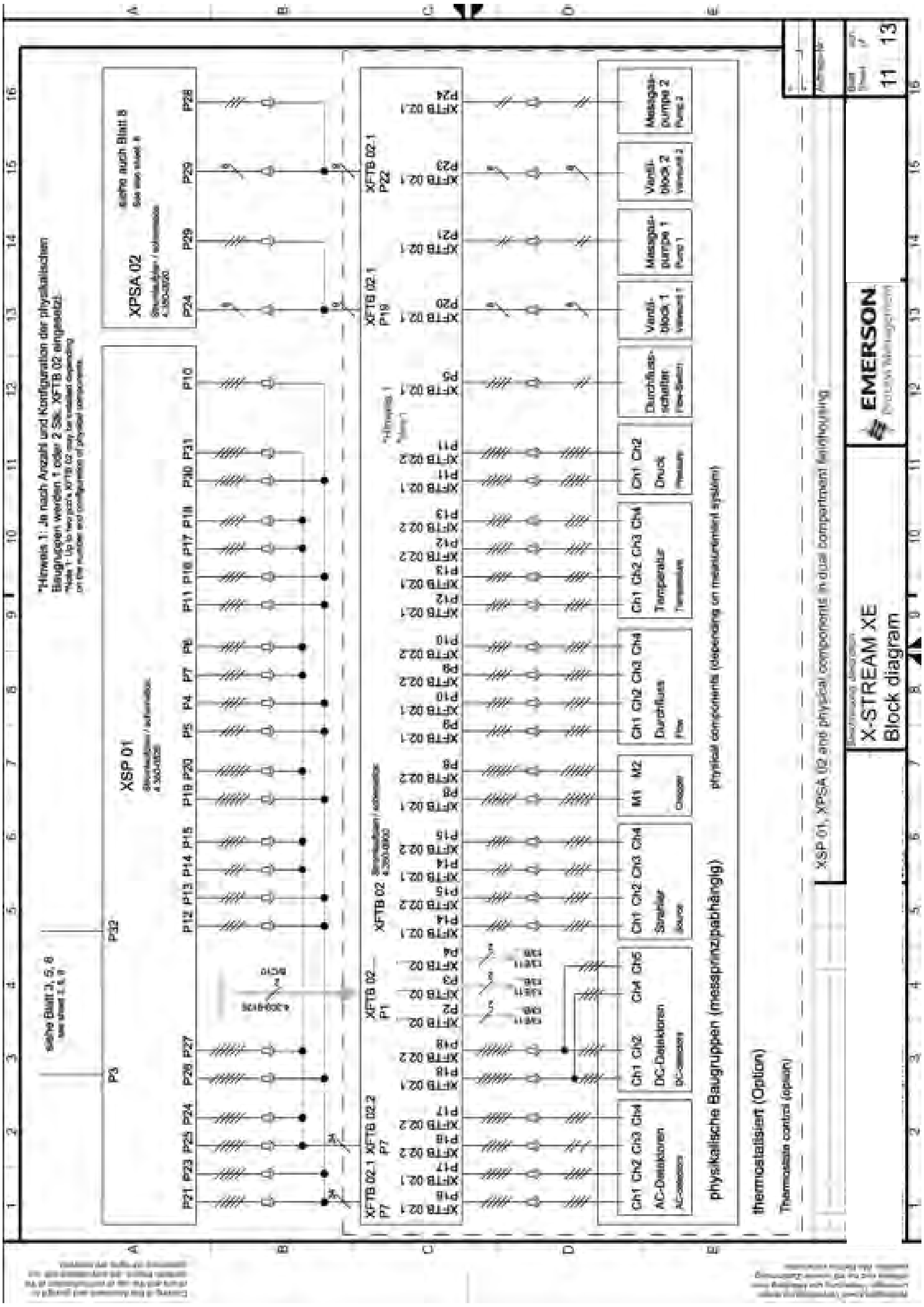
A.4 Block Diagram



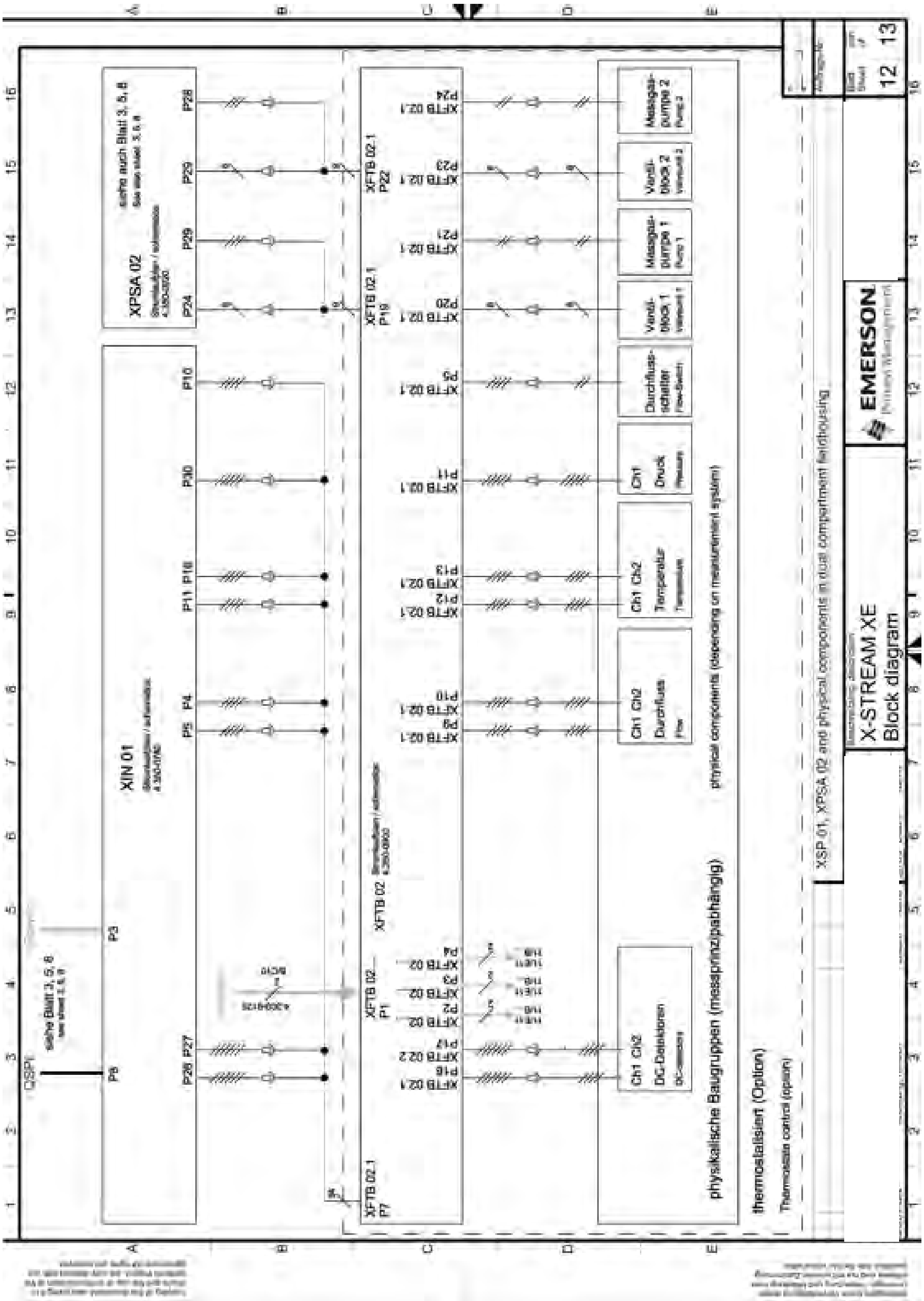
A.4 Block Diagram



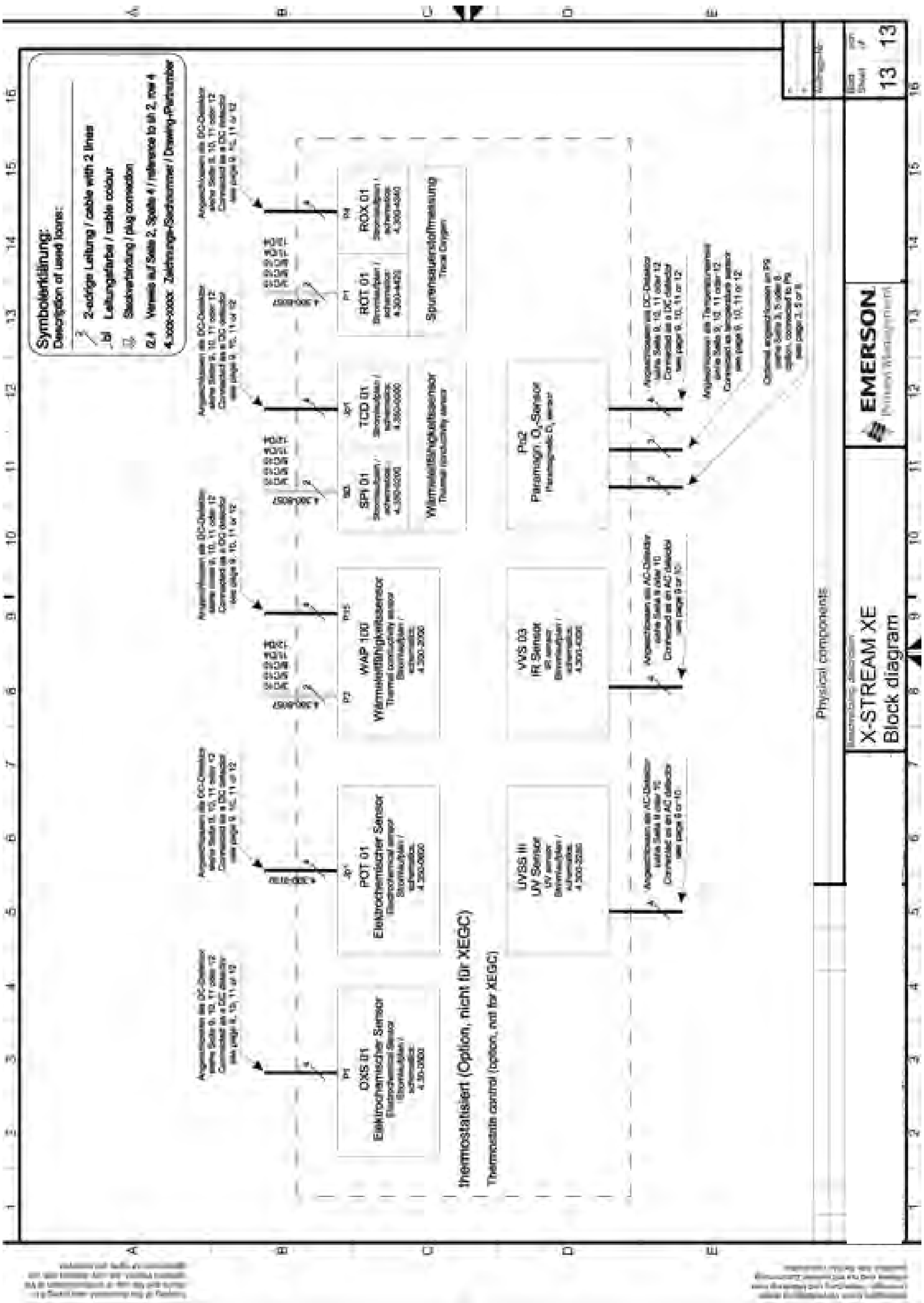
A.4 Block Diagram



A.4 Block Diagram



A.4 Block Diagram



A.5 Water Vapor: Relationship of Dewpoint, Vol.-% and g/Nm³

Dewpoint		Content of Water	Water Concentration
° C	° F	Vol. -%	g/Nm³
0	32,0	0,60	4,88
1	33,8	0,65	5,24
2	36,8	0,68	5,64
3	37,4	0,75	6,06
4	39,2	0,80	6,50
5	41,0	0,86	6,98
6	42,8	0,92	7,49
7	44,6	0,99	8,03
8	46,4	1,06	8,60
9	48,2	1,13	9,21
10	50,0	1,21	9,86
11	51,8	1,29	10,55
12	53,6	1,38	11,29
13	55,4	1,48	12,07
14	57,2	1,58	12,88
15	59,0	1,68	14,53
16	60,8	1,79	14,69
17	62,6	1,90	16,08
18	64,4	2,04	16,72
19	66,2	2,16	17,72
20	68,0	2,30	19,01
21	69,8	2,45	20,25
22	71,6	2,61	21,55
23	73,4	2,77	22,95
24	75,2	2,95	24,41
25	77,0	3,12	25,97
26	78,8	3,32	27,62
27	80,6	3,52	29,37
28	82,4	3,73	32,28
29	84,2	3,96	33,15
30	86,0	4,18	35,20
31	87,6	4,43	37,37
32	89,6	4,69	39,67
33	91,4	4,97	42,09
34	93,2	5,25	44,64
35	95,0	5,55	47,35
36	96,8	5,86	50,22
37	98,6	6,20	53,23
38	100,4	6,55	56,87
39	102,2	6,90	59,76
40	104,0	7,18	62,67
42	107,6	8,10	70,95
44	111,2	8,99	79,50
45	113,0	9,45	84,02
46	114,8	9,96	89,20
48	118,4	11,07	99,80
50	122,0	12,04	110,81
52	125,6	13,43	124,61
54	129,2	14,80	139,55
55	131,0	15,55	147,97
56	132,8	16,29	156,26
58	136,4	17,91	175,15
60	140,0	19,65	196,45
62	143,6	21,55	220,60
64	147,2	23,59	247,90
66	150,8	25,80	279,20
68	154,4	28,18	315,10
70	158,0	30,75	356,70
72	161,6	33,50	404,50
74	165,2	36,47	461,05
76	168,8	39,66	527,60
78	172,4	43,06	607,50
80	176,0	46,72	704,20
82	179,6	50,65	824,00
84	183,2	54,84	975,40
86	186,8	59,33	1171,50
88	190,4	64,09	1433,30
90	194,0	69,18	1805,00

Note!

Standard conditions: 273 K (0 °C) and 1013 hPa.
Water concentration calculated at dry standard conditions.

A.6 Declaration of Decontamination

Because of legal regulations and for the safety of Emerson Process Management employees and operating equipment, we need this "**Declaration of Decontamination**", signed by an authorized person, prior to processing your order. Ensure to include it with the shipping documents, or (recommended) attach it to the outside of the packaging.

Instrument details	Analyzer model	
	Serial no.	
Process details	Temperature	
	Pressure	

Please check where applicable, include safety data sheet and, if necessary, special handling instructions!

The medium was used for	Medium and concentration	CAS No.	toxic	harmful	corrosive	flamma-ble	other[1)]	harmless
Process								
Process cleaning								
Cleaning of returned parts								

1) e.g. explosive, radioactive, environmentally hazardous, of biological risk, etc.

Declaration and Sender Data

We hereby declare that the retumed parts have been carefully cleaned. To the best of our knowledge they are free from any residues in dangerous quantities.

Company	Contact Person / Function
Address	
	Phone
Location, Date	Signature

A.7 PLC Quick Reference

PLC Quick Reference Card

Rev. 2010-04

PLC Quick Reference Card

If timers need to be used, they have to be setup at the beginning of the program (see Example Program)
For USB transfer save PLC.TXT on the USB stick in the directory
emerson_xe\<Analyzer Serial Number>\config

PLC Timer Setup

Syntax: <COMMAND> <ID> <VALUE>; [Comment]
For details see *Timer Modes* below

COMMAND	ID	VALUE
TMR_MODE	1…8	OFFDELAY, ONDELAY, REPPULSE, SINGLEPULSE, RETRIGSPULSE, INHIBSPULSE, CLKTRGPULSE , COUNTER
TMR_DURATION	1…8	1…3600
TMR_PERIOD_CNT	1…8	1…3600 (REPPULSE: sec CLKTRGPULSE: min COUNTER: counts)
TMR_TRIG_TIME	1…8	YYYY,MM,DD,hh,mm

Programming Quick Reference

Syntax: <OPERATOR> [<OPERAND>,<OPERAND>,…]; [Comment]
Maximum amount of operators & operands: approx. 400

SPECIAL CHARACTER	Function
,	Separation of Operands
;	Command Termination
#	Start of Comment Line

OPERATOR	OPERANDS	Description
CLR	-	Set register to FALSE
SET	-	Set register to TRUE
AND	O1, [O2, O3, …]	Logical AND of register and <read operands>
OR	O1, [O2, O3, …]	Logical OR of register and <read operands>
NEG	-	Negate register
LOAD	O1	load register with state of <read operands>
STO	O1, [O2, O3, …]	Store register to <write operands>
IF	O1, O2	if register = TRUE then load register with state of first <read operand> else load register with state of second <read operand>
CALL	O1, [O2, O3, …]	if register = TRUE then call <call operand>
END	-	End of program

READ & WRITE OPERANDS	Description
R1 … R10	Result 1 … 10
M1 … M15	Memory 1 … 15

A.7 PLC Quick Reference

PLC Quick Reference Card

Rev. 2010-04

WRITE ONLY OPERANDS	Description
T1I1, T1I2	Timer 1 / Input 1, 2
T2I1, T2I2	Timer 2 / Input 1, 2
T3I1, T3I2	Timer 3 / Input 1, 2
T4I1, T4I2	Timer 4 / Input 1, 2
T5I1, T5I2	Timer 5 / Input 1, 2
T6I1, T6I2	Timer 6 / Input 1, 2
T7I1, T7I2	Timer 7 / Input 1, 2
T8I1, T8I2	Timer 8 / Input 1, 2

Syntax of channel related operands indices: `<CHANNELNUMBER><SIGNALNUMBER>`

READ ONLY OPERANDS	Description
S01 … S76	System Digital Output Pool (see below)
S101 … S540	Channel Digital Output Pool (see below)
T1 … T8	Timer Output 1 … 8
DI1 … DI14	Digital Input 1 … 14
PU1, PU2	Pump State 1, 2
TRUE	Logical TRUE operand
FALSE	Logical FALSE operand

CALL ONLY OPERANDS	Description
A01 … A15	System Actions (see below)
A101 … A521	Channel Actions (see below)

System Actions Pool Index

Usage example: `CALL A06; # Start programmed sequence if register changed to TRUE`

ANR	Description
01	None
02	Zero All
03	Span All
04	Zero&Span All
05	Cancel All
06	ProgSequ
07	Blowback
08	CalCheckMod
09	*Reserved*
10	Failure
11	OffSpec
12	MaintRequ

ANR	Description
13	FctCheck
14	Pump1
15	Pump2
16	Ext Alarm1
17	Ext Alarm2
18	Ext Alarm3
19	Ext Alarm4
20	Ext Alarm5
21	Ext Alarm6
22	Ext Alarm7
23	Ext Alarm8

A.7 PLC Quick Reference

PLC Quick Reference Card

Rev. 2010-04

System Digital Output Pool Index

Usage example: `LOAD S41; Load the state of pump1 into register`

SNR	Signal	SNR	Signal
01	Off	**39**	V19
02	On	**40**	V20
03	Heartbeat	**41**	Pump1
04	Any Failure	**42**	Pump2
05	Any OffSpec	**43**	Ext Alarm1
06	Any MaintRequ	**44**	Ext Alarm2
07	Any FctCheck	**45**	Ext Alarm3
08	Any Calibrating	**46**	Ext Alarm4
09	Any Zeroing	**47**	Ext Alarm5
10	Any Spanning	**48**	Ext Alarm6
11	Any Zero Failed	**49**	Ext Alarm7
12	Any Span Failed	**50**	Ext Alarm8
13	Any Range Low	**51**	PLC Result1
14	Any Range High	**52**	PLC Result2
15	Any ConcAlarm	**53**	PLC Result3
16	Any AvgAlarm	**54**	PLC Result4
17	Any TempAlarm	**55**	PLC Result5
18	Any PressAlarm	**56**	PLC Result6
19	Any FlowAlarm	**57**	PLC Result7
20	*reserved*	**58**	PLC Result8
21	V1	**59**	PLC Result9
22	V2	**60**	PLC Result10
23	V3	**61**	CalcA Rslt LoLo
24	V4	**62**	CalcA Rslt Lo
25	V5	**63**	CalcA Rslt Hi
26	V6	**64**	CalcA Rslt HiHi
27	V7	**65**	CalcB Rslt LoLo
28	V8	**66**	CalcB Rslt Lo
29	V9	**67**	CalcB Rslt Hi
30	V10	**68**	CalcB Rslt HiHi
31	V11	**69**	CalcC Rslt LoLo
32	V12	**70**	CalcC Rslt Lo
33	V13	**71**	CalcC Rslt Hi
34	V14	**72**	CalcC Rslt HiHi
35	V15	**73**	CalcD Rslt LoLo
36	V16	**74**	CalcD Rslt Lo
37	V17	**75**	CalcD Rslt Hi
38	V18	**76**	CalcD Rslt HiHi

A.7 PLC Quick Reference

EMERSON Process Management

PLC Quick Reference Card

Rev. 2010-04

Channel Actions Pool Index

Usage example: `CALL A103; Start span cal for channel 1, if register changed to TRUE`
`# Replace 'x' in table by channel # (1 … 5)`

ANR	Description
x01	None
x02	ZeroCal
x03	SpanCal
x04	ZeroSpanCal
x05	Cancel
x06	Range1
x07	Range2
x08	Range3
x09	Range4
x10	Failure
x11	OffSpec

ANR	Description
x12	MaintRequ
x13	FctCheck
x14	SampleGas
x15	ZeroGas
x16	SpanGas1
x17	SpanGas2
x18	SpanGas3
x19	SpanGas4
x20	All Closed
x21	Blowback

Channel Digital Output Pool Index

Usage example: `LOAD S332; Load press low alarm state of channel 3 into register`
`# Replace 'x' in table by channel # (1 … 5)`

SNr	Description
x01	Off
x02	On
x03	Heartbeat
x04	Failure
x05	OffSpec
x06	MaintRequ
x07	FctCheck
x08	Calibrating
x09	Zeroing
x10	Spanning
x11	Zero Failed
x12	Span Failed
x13	Range Underflow
x14	Range Overflow
x15	Range1
x16	Range2
x17	Range3
x18	Range4
x19	Conc. LoLo
x20	Conc. Lo

SNR	Description
x21	Conc. Hi
x22	Conc. HiHi
x23	Average LoLo
x24	Average Lo
x25	Average Hi
x26	Average HiHi
x27	Temperature LoLo
x28	Temperature Lo
x29	Temperature Hi
x30	Temperature HiHi
x31	Pressure LoLo
x32	Pressure Lo
x33	Pressure Hi
x34	Pressure HiHi
x35	Flow LoLo
x36	Flow Lo
x37	Flow Hi
x38	Flow HiHi
x39	Off
x40	Off

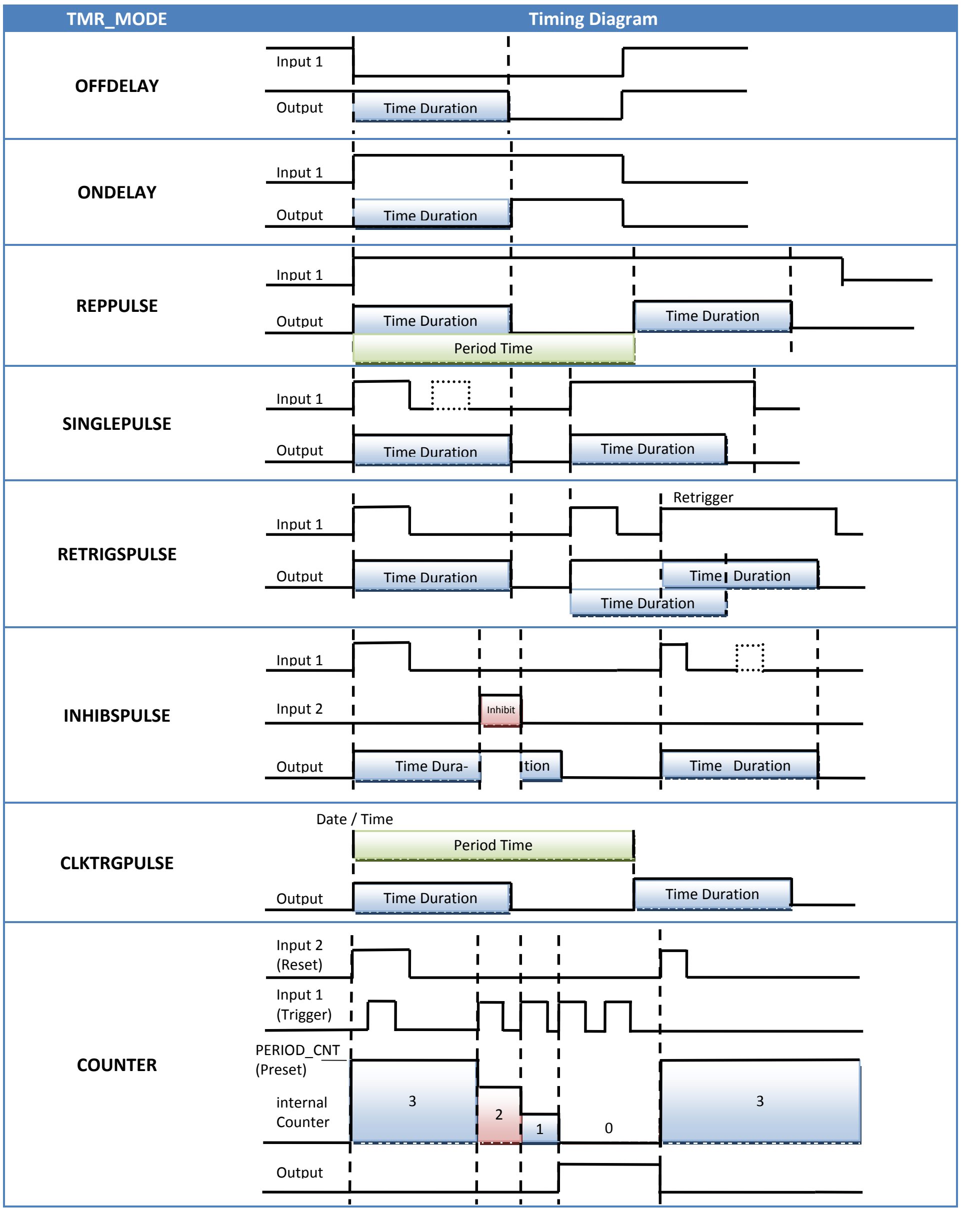
A.7 PLC Quick Reference

EMERSON
Process Management

PLC Quick Reference Card

Rev. 2010-04

Timer Modes



A.7 PLC Quick Reference

PLC Quick Reference Card

Rev. 2010-04

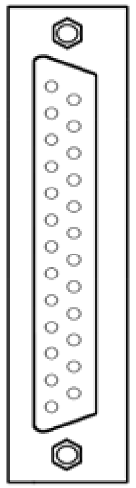
Example Program

```
#-Example for Timer 1---------------------
TMR_MODE      1 OFFDELAY;
TMR_DURATION  1 5; delay 5 sec

#-Example for Timer 2---------------------
TMR_MODE      2 ONDELAY;
TMR_DURATION  2 5; delay 5 sec

#-Example for Timer 3---------------------
TMR_MODE      3 REPPULSE;
TMR_DURATION  3 5; pulse width 5 sec
TMR_PERIOD_CNT 3 20;   periode 20 sec

#-Example for Timer 4---------------------
TMR_MODE      4 SINGLEPULSE;
TMR_DURATION  4 5; pulse width 5 sec

#-Example for Timer 5---------------------
TMR_MODE      5 RETRIGSPULSE;
TMR_DURATION  5 5; pulse width 5 sec

#-Example for Timer 6---------------------
TMR_MODE      6 INHIBSPULSE;
TMR_DURATION  6 10; pulse width 10 sec

#-Example for Timer 7---------------------
TMR_MODE      7 CLKTRGPULSE;
TMR_DURATION  7 5; pulse width 5 sec
TMR_PERIOD_CNT 7 10; pulse trigger is repeated each 10 minutes
TMR_TRIG_TIME 7 2009,10,26,17,00; start triggering Oct26 2009, 05:00 pm

#-Example for Timer 8---------------------
TMR_MODE      8 COUNTER;
TMR_PERIOD_CNT 8 10; preset count value = 10

#--------------------------------
LOAD  DI1;  Digital Input#1
STO   T1I1,T2I1,T3I1; feed Input1 of Timers1..3 with this state
STO   R9;   assign Digital Input#1 also to Result#9
LOAD  DI5;  load Digital Input#2
STO   T1I2,T2I2,T3I2; feed Input2 of Timers1..3 with this state
#--------------------------------
LOAD  T1;   read Timer 1 output
STO   R1;   store as Result#1
#--------------------------------
LOAD  DI5;  read Digital Input #5
IF    R10,R2;  if DI5 then load Result#10 else load Result#2
CALL  A110; simulate an 'External Failure" of Ch1 if loaded with '1' state
LOAD  T3;   read Timer 3 output
CALL  A311; simulate an "MaintRequ" of Ch3 if loaded with '1' state
#--------------------------------
LOAD  S62;  CalcA rslt Lo
STO   R3;   store as Result#3
LOAD  S208;   Ch2 calibrating
STO   R4;   store as Result#4

END;           Program end
```

A.8 Assignment of Terminals and Sockets

A.8.1 Tabletop & Rack Mount Analyzers

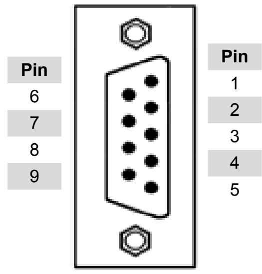
	Signal	Pin
Analog outputs	Channel 1, (+) 4 (0) - 20 mA	1
	Channel 2, (+) 4 (0) - 20 mA	2
	Channel 3, (+) 4 (0) - 20 mA	3
	Channel 4, (+) 4 (0) - 20 mA	4
	Channel 5, (+) 4 (0) - 20 mA	5
	unused	6
	unused	7
Relay contacts (Status signals)	Output1 (Failure) NC	8
	Output1 (Failure) NO	9
	Output1 (Failure) 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	Channel 5, GND	
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	

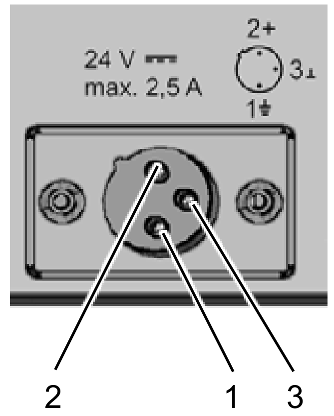
Note!
Configuration of relay contacts as per standard factory setting (NAMUR status signals)

Socket X1 - Analog Outputs, Relay Outputs 1...4
(Assignment of Screw Terminals Adaptor: See XSTA on Next Page)



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*

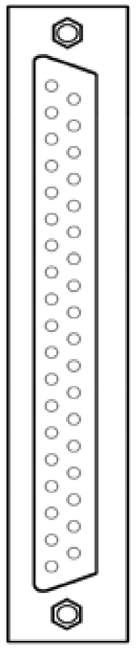
Connector X2 - IOIOI - Serial Interface
(Assignment of Screw Terminals Adaptor: See XSTA on Next Page)



1: ME
2: + 24 V
3: 0 V (⊥)

DC 24 V Input (½ 19" Analyzer)

	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

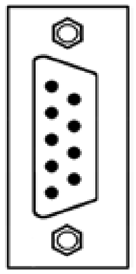


Pin	Signal	
20	Input 5	Digital inputs
21	Input 6	
22	Input 7	
23	Output 9, NC	Digital outputs
24	Output 9, NO	
25	Output 9, COM	
26	Output 10, NC	
27	Output 10, NO	
28	Output 10, COM	
29	Output 11, NC	
30	Output 11, NO	
31	Output 11, COM	
32	Output 12, NC	
33	Output 12, NO	
34	Output 12, COM	
35	Output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

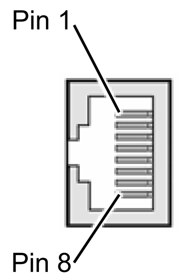
Signal	Pin
BR 2 / BR 2: fit a wire bridge here to apply analog signal in current mode to input 2*)	5, 4
unused	3
BR 1 / BR 1: fit a wire bridge here to apply analog signal in current mode to input 1**)	2, 1



Pin	Signal
9	Input 2 high (+)
8	Input 2 low (-)
7	Input 1 low (-)
6	Input 1 high (+)

*) alternatively set jumper P1 on electronics board XASI
**) alternatively set jumper P2 on electronics board XASI

Connector X5 - Analog Inputs
(Assignment of Screw Terminals Adaptor: See XSTI on Next Page)



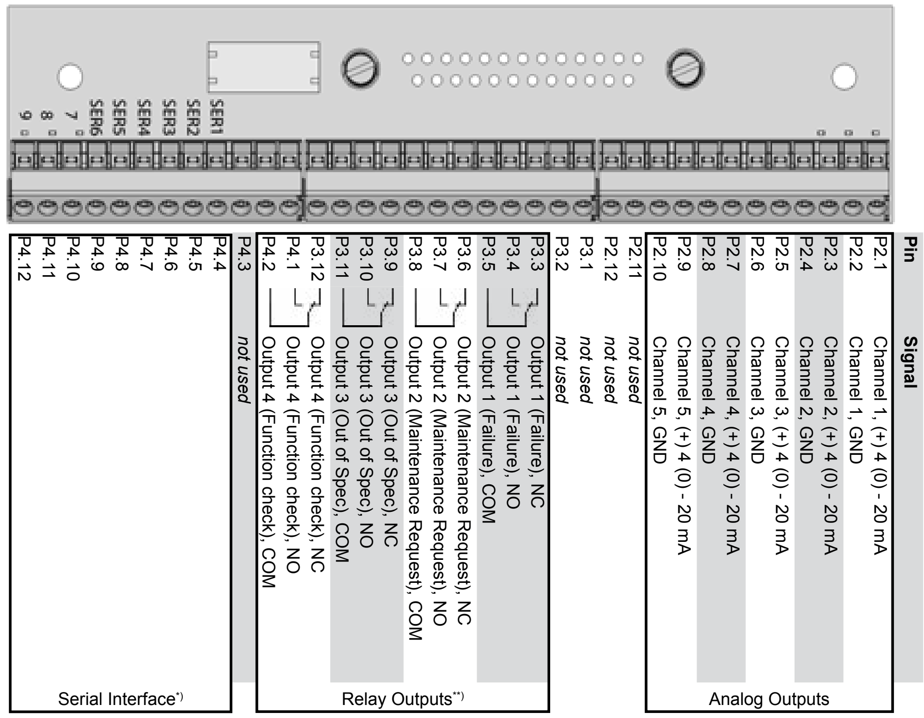
Pin no.	Signal
1	TX+
2	TX-
3	RX+
6	RX-
other	*not used*

Ethernet Connector for Modbus

Appendix
A

A.8.2 Field Housings

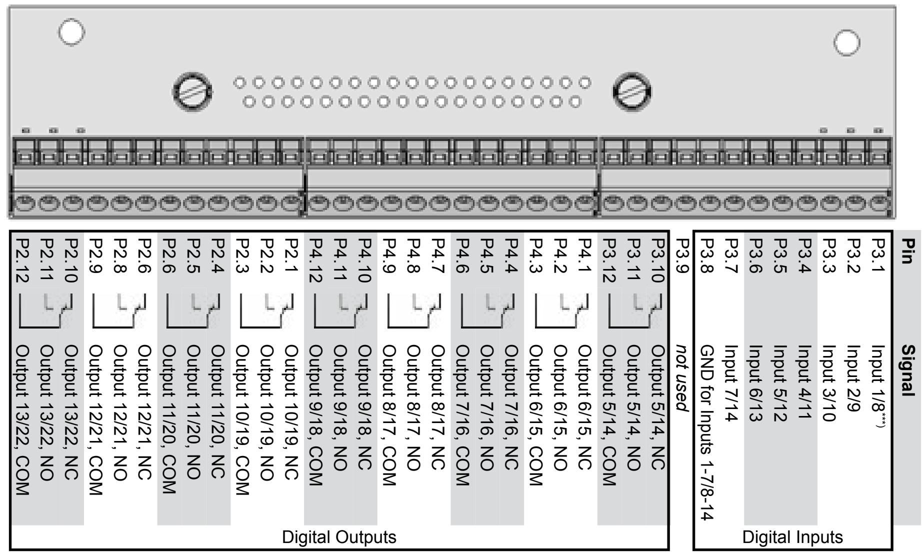
XSTA: Standard Strip With Standard and Optional Signals



*) See table below

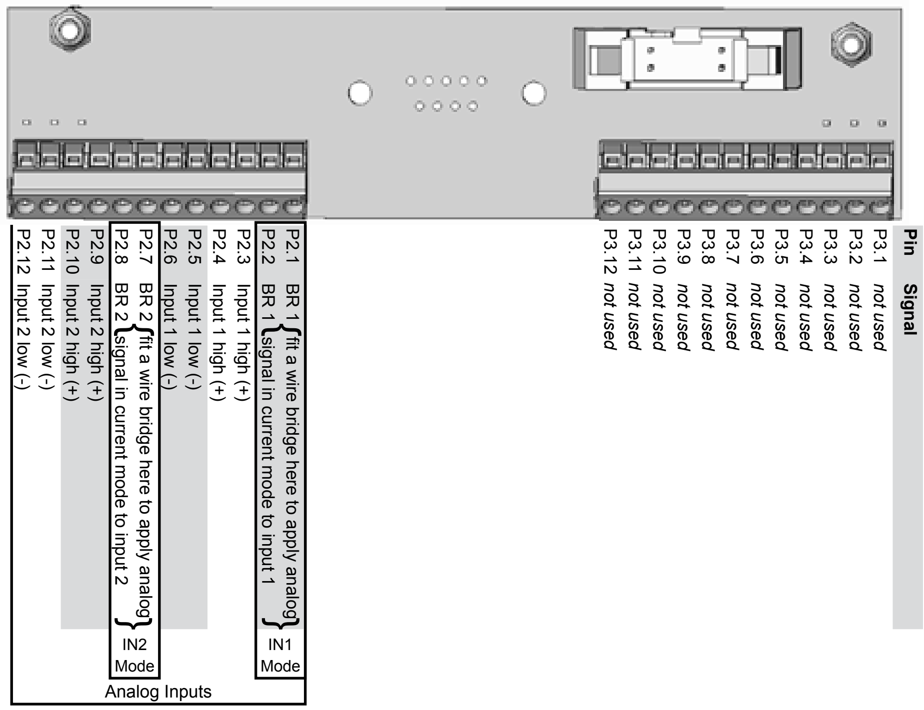
**) Configuration of relay output terminals as per standard factory setting (NAMUR status signals)

XSTD: Optional Strips With
7 Dig Inputs and 9 Dig Outputs Each



***) 1st/2nd no. identifies inputs/outputs on the 1st/2nd expansion board

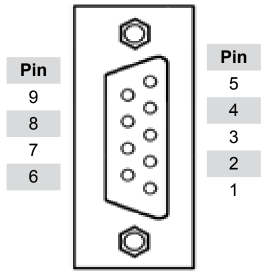
XSTI: Analog Inputs



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

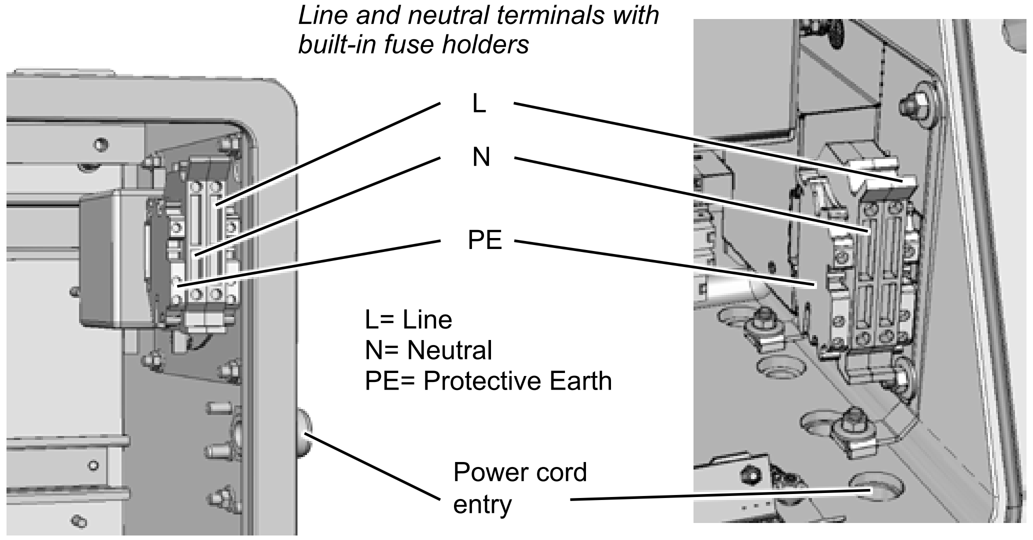


Pin no.	RS 232
1	Common
2	RXD
3	TXD
4	*not used*
5	Common
6	*not used*
7	*not used*
8	*not used*
9	*not used*

Service Port Connector - Serial RS 232 Interface

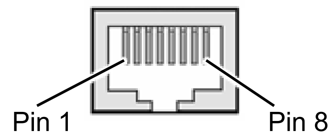
Note!

Line and neutral terminals with built-in fuse holders



Field housing ***Flameproof (cast) housing***

Power Terminals



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

Ethernet Connector for Modbus

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