EasyLine Continuous Gas Analyzers

EL3060 Series

Gas Analyzers in Category II 2G

Instructions for Installation, Start-up and Operation

41/24-406 EN Rev. 1



Contents

Preface 4

Guideline for Installation and Commissioning 6

Intended Application 7

Explosion Protection 8

Safety Information 9

Preparation for Installation 12

Requirements at the Installation Site, Power Supply 12
Gas Inlet and Outlet Conditions 14
Test Gases for the Calibration of the Analyzers 15
Case Purging 17
Pressure Sensor 18
Material Required for the Installation (not supplied) 19
Scope of Supply and Delivery 20
Analyzer Data Sheet 21
Type Plate 21
Dimension Drawing and Gas Connections of the Control Unit 22
Dimension Drawing and Gas Connections of the Analyzer Unit 24

Installing the Gas Analyzer 26

Unpacking the Gas Analyzer 26
Checking the Seal Integrity of the Gas Feed Paths 27
Installing the Gas Analyzer 28
Connecting the Gas Lines 29
Connecting the Electrical Leads - Safety Information 31
Electrical Connections 33
Connect the Electrical Leads 37

Start up the Gas Analyzer 38

Check the Installation 38
Initial Purging of Gas Feed Paths 40
Start up the Gas Analyzer 41

Operating the Gas Analyzer 42

Display - Measuring Mode 42
Operation - Menu Mode 44
Menu 47
Information on the Concept of Operation 48
Communication between the Gas Analyzer and the Computer 50

Maintenance 55

Inspection 55
Checking the Seal Integrity of the Gas Feed Paths 57

Shutting Down and Packing the Gas Analyzer 58

Shutting Down the Gas Analyzer 58
Packing the Gas Analyzer 59

Annex 60

Description of the gas analyzers 60
Information for the Installation, Maintenance and Repair of Electrical Installations in Hazardous Areas 62

Preface

Content of the Operator's Manual

These instructions in brief for installation, start-up and operation contain all the information necessary for the safe and compliant installation, start-up and operation of the gas analyzer.

Information on calibration, configuration and maintenance of the gas analyzer and the Modbus and Profibus is documented in the on-line help file of the operator's manual; the on-line help file can be found on the CD-ROM "Software Tools and Technical Documentation", which is supplied with the gas analyzer (see below).

Further Information

Analyzer Data Sheet

The version of the delivered gas analyzer is described in the analyzer data sheet.

CD-ROM "Software Tools and Technical Documentation"

The CD-ROM "Software Tools and Technical Documentation" with the following contents is supplied with the gas analyzer:

- Software Tools
- Operator's Manuals
- Data Sheets
- Technical Information
- Certificates.

CD-ROM "Spare Parts Analytical"

Information on spare parts can be found on the CD-ROM "Spare Parts Analytical", which is supplied with the gas analyzer.

Internet

Additional information on ABB Analytical products and services can be found on the Internet at "http://www.abb.com/analytical".

Further Information

If the information in this operator's manual does not cover a particular situation, ABB Service will be pleased to supply additional information as required.

Please contact your local service representative. For emergencies, please contact

ABB Service,
Telephone: +49-(0)180-5-222580, Telefax: +49-(0)621-38193129031,
E-mail: automation.service@de.abb.com

Symbols and Typefaces in the Operator's Manual

ATTENTION identifies safety information to be heeded during gas analyzer operation, in order to avoid risks to the user.

NOTE identifies specific information on the operation of the gas analyzer as well as on the use of this manual.

1, ***2***, ***3***, ...	Identifies reference numbers in figures.
`Display`	Identifies a display on the screen.
▲▶▼◀OK	Identifies function keys.

Guideline for Installation and Commissioning

Basic Steps

The following basic steps should be followed for the installation and commissioning of the gas analyzer:

1. Note the information on the intended application (see page 7).
2. Follow the safety information (see page 9).
3. Prepare for the installation, provide the requisite material (see page 12).
4. Unpack the gas analyzer (see page 26).
5. Check the seal integrity of the sample gas feed path (see page 27).
6. Install the gas analyzer (see page 28).
7. Connect the gas lines (see page 29).
8. Connect the electrical leads (see page 37).
9. Check the installation (see page 38).
10. Purge the sample gas feed path (see page 40).
11. Start up the gas analyzer (see page 41).
12. Configure the gas analyzer (see online help file).

Intended Application

Intended Application of the Gas Analyzer

The gas analyzers of the EL3060 series are intended for the continuous quantitative determination of individual gas components in gas mixtures.

The gas analyzer is suitable for measuring non-flammable and flammable gases under atmospheric conditions, which can occasionally form an potentially explosive atmosphere (Zone 1). The mixing ratio of these gases should be clearly below the lower explosive limit (LEL) and clearly above the upper explosive limit (UEL). Exceptions can be e.g. start up and shut-down conditions.

The gas analyzer may not be used for measuring gases, which attack the materials in contact with the sample medium (e.g. gases containing chlorine).

Any other use is not as specified.

Explosion Protection

Explosion Protection

The gas analyzers of the EL3060 series are designed for use in hazardous areas. They are certified in accordance with the European Directive 94/9/EC ("ATEX directive").

The housings are designed as field housings in the type of protection "Flameproof Enclosure 'd'". They comply with the requirements of the explosion group IIC. As a result, the gas analyzers can also be used in atmospheres containing hydrogen or acetylene.

EC Type Examination Certificates, Label

	EC Type Examination Certificate	**Label**
EL3060-CU control unit (with or without Magnos206, Caldos25, Caldos27 analyzers)	BVS 08 ATEX E 048 X	 II 2G Ex de IIC T4
Analyzer unit EL3060-Uras26	BVS 08 ATEX E 055 X	 II 2G Ex d IIC T4

Note: The measurement function according to Directive 94/9/EC, Annex II, Paragraph 1.5.5 is not an object of these EC type examination certificates.

NOTE
EC Type Examination Certificates and Conformity Certificates and can be found on the CD-ROM which is enclosed with the gas analyzer.
Please note the "Information for the installation, maintenance and repair of electrical installations in hazardous areas" (see page 62).

Safety Information

Requirements for Safe Operation

In order to operate in a safe and efficient manner the device should be properly handled and stored, correctly installed and set-up, properly operated and correctly maintained.

Qualifications of the Personnel

Only persons familiar with the installation, commissioning, operation and maintenance of comparable devices and certified as being capable of such work should work on the device.

Instructions and Regulations to be Observed

These include

- The contents of this operator's manual,
- The safety information affixed to the device,
- The applicable safety regulations for installing and operating electrical devices,
- The applicable safety regulations for working with gases, acids, condensates, etc.

National Regulations

The regulations and norms, standards and directives cited in this operator's manual are applicable in the Federal Republic of Germany. The applicable national regulations should be followed when the device is used in other countries.

Device Safety and Safe Operation

The instrument has been designed and tested in accordance with EN 61010 Part 1, "Safety Provisions for Electrical Measuring, Control, Regulation and Laboratory Instruments" and has been shipped ready for safe operation.

In order to maintain this condition and to assure safe operation, safety information in this manual must be observed. Failure to do so can put persons at risk and can lead to device damage as well as damage to other systems and devices.

Comply with the Safety Regulations

The safety regulations for explosion protection must be complied with without fail before carrying out any work on the instrument.

Carrying out Work with an Explosion Hazard is Prohibited

Carrying out work on live parts, with the exception of intrinsically safe circuits, and with auxiliary equipment which represents a danger of ignition is prohibited if there is an explosion hazard.

Equipotential Bonding Connection

The local potential equalization must be connected before any other connections are made.

Risks of a Disconnected Protective Lead

The device can be hazardous if the protective lead is interrupted inside or outside the device or if the protective lead is disconnected. Carrying out work on the potential equalization or the equipotential bonding connection is prohibited if there is an explosion hazard.

Risks Involved when Opening the Covers

Current-bearing components can be exposed when the covers or parts are removed, even if this can be done without tools. Current can be present at some connection points.

Risks Involved in Working with an Open Device

Before carrying out any work on an open instrument, all poles must be disconnected from all power sources. All work on a device that is open and connected to power should only be performed by trained personnel who are familiar with the risks involved.

The instrument case may only be opened under voltage if it has been ascertained in accordance with the applicable regulations that the surrounding atmosphere cannot become potentially explosive.

Danger from Charged Capacitors

The capacitors in the instrument require 10 minutes to discharge after all poles of the instrument have been disconnected from all power sources. The relevant caution statement on the case should be noted.

Exchange of the Battery

The battery may not be exchanged in an explosive atmosphere.

Stop the Supply of Sample Gas

In the case of flammable and toxic sample gases, the supply of sample gas must be stopped and the sample gas feed path purged with inert gas before the instrument case is opened.

When safe operation can no longer be assured …

If it is apparent that safe operation is no longer possible, the device should be taken out of operation and secured against unauthorized use.

The possibility of safe operation is excluded:

- If the device is visibly damaged,
- If the device no longer operates,
- After prolonged storage under adverse conditions,
- After severe transport stresses.

Preparation for Installation

Requirements at the Installation Site, Power Supply

Installation Site

The gas analyzer is only intended for installation indoors; it may not be installed outdoors.

The installation site must be stable enough to bear the weight of the gas analyzer!

Short Gas Paths

Install the gas analyzer as close as possible to the sampling location.

Install the gas conditioning and calibration modules as close as possible to the gas analyzer.

Adequate Air Circulation

Provide for adequate natural air circulation around the gas analyzer. Avoid heat build-up.

Protection from Adverse Conditions

Protect the gas analyzer from

- Cold
- Exposure to heat from e.g. the sun, furnaces, boilers
- Temperature variations
- Strong air currents
- Accumulation of dust and ingress of dust
- Corrosive atmosphere
- Vibration.

Climatic Conditions

Atmospheric pressure	Atmospheric conditions
Relative humidity	max. 75 %, slight condensation permissible
Ambient temperature	
for storage and transport	–25…+65 °C
EL3060-CU	+5…+50 °C
EL3060-Caldos25	+5…+50 °C / +5…+45 °C when used together with EL3060-Uras26
EL3060-Caldos27	+5…+50 °C / +5…+45 °C when used together with EL3060-Uras26
EL3060-Magnos206	+5…+50 °C / +5…+45 °C when used together with EL3060-Uras26
EL3060-Uras26	+5…+45 °C

Note: Explosion protection is not affected if the gas analyzer is operated at temperatures below +5 °C to –20 °C. However, compliance with the measurement data is not guaranteed in this temperature range.

Power Supply

Input voltage	100…240 V AC, 50…60 Hz ± 3 Hz
Power consumption	max. 187 VA
Battery	Lithium button-cell 3 V CR2032, for supply of the integrated clock during a power failure

Gas Inlet and Outlet Conditions

Sample Gas Inlet Conditions

The gas analyzer is suitable for measuring non-flammable and flammable gases under atmospheric conditions, which can occasionally form an potentially explosive atmosphere. The percentage of oxygen in the sample gas mixture may be a max. 21 % Vol. as per atmospheric conditions. If the sample gas only consists of a mixture of oxygen and flammable gases and vapors, it may be not potentially explosive under any circumstances. This can normally be provided if the percentage of oxygen is safely limited to a max. 2 % Vol. Flammable gases which are potentially explosive under the conditions applicable for the analysis, also with the exclusion of oxygen, may only be contained in the mixture to be analyzed in non-safety critical concentrations.

Corrosive Gases

The gas analyzer may not be used for measuring gases, which attack the materials in contact with the sample medium (e.g. gases containing chlorine).

Temperature

The dew point of the sample gas must be at least 5 °C lower than the lowest ambient temperature in the overall sample gas path. Otherwise, a sample gas cooler or condensate trap is required. Fluctuations in water vapor content cause volume errors.

Inlet Pressure

Absolute pressure max. 1,100 hPa and positive pressure max. 100 hPa

Flow

Uras26	20…100 l/h
Magnos206	30…90 l/h
Caldos25	max. 100 l/h
Caldos27	max. 100 l/h

Pressure Drop at the Flame Barriers

approx. 40 hPa with a flow of 50 l/h

Outlet Pressure

The outlet pressure must be the same as the atmospheric pressure.

Test Gases for the Calibration of the Analyzers

Analyzer(s)	Test gas for the zero-point calibration and the single-point calibration	Test gas for the end-point calibration
Uras26 with calibration cells (automatic calibration)	N_2 or air or IR sample component-free gas	– (calibration cells)
Uras26 without calibration cells (automatic calibration)	N_2 or air	Span gas*
Uras26 without calibration cells (manual calibration)	N_2 or air	Test gas for each sample component, respectively for each detector
Magnos206	Oxygen-free process gas	Process gas with known O_2 concentration
Magnos206 with a suppressed measuring range	Test gas with O_2 concentration near the starting point of the measuring range	Test gas with O_2 concentration near the end point of the measuring range
Magnos206 with single-point calibration	Test gas with O_2 concentration in an existing measuring range or ambient air. Same moisture content as process gas.	–
Magnos206 with substitute gas calibration	Oxygen-free process gas or substitute gas (O_2 in N_2)	Substitute gas, e.g. dried air
Caldos25	Sample component-free test gas or process gas	Test gas or process gas with a known sample component concentration near the end point of the measuring range
Caldos25 with substitute gas calibration	Sample component-free substitute gas	Substitute gas with a known sample component concentration near the end point of the measuring range
Caldos27	Sample component-free test gas or process gas	Test gas or process gas with a known sample gas concentration
Caldos27 with a suppressed measuring Range	Test gas with a sample component concentration near the starting point of the measuring range	Test gas with a sample component concentration near the end point of the measuring range
Caldos27 with single-point calibration	Test gas with a known and constant rTC value (standard gas; possibly also dried room air)	–

Analyzer(s)	Test gas for the zero-point calibration and the single-point calibration	Test gas for the end-point calibration
Uras26 + Magnos206 (automatic calibration, i.e. Magnos206 with single-point calibration)	IR sample component-free test gas with O_2 concentration in an existing measuring range or ambient air. Same moisture content as process gas.	Calibration cells or span gas*
Uras26 + Magnos206 (manual calibration)	Zero gas for Uras26, respectively Magnos206, or IR sample component-free test gas with O_2 concentration in an existing measuring range or ambient air. Same moisture content as process gas.	Span gas for all sample components in the Uras26 and Magnos206 (possibly only for the Uras26 if a single-point calibration is carried out for the Magnos206)
Uras26 + Caldos27 (automatic calibration, i.e. Caldos27 with single-point calibration)	IR sample component-free test gas with a known and constant rTC value (possibly also dried room air)	Calibration cells or span gas*
Uras26 + Caldos27 (manual calibration)	Zero reference gas for Uras26, respectively Caldos27, or IR sample component-free test gas with a known rTC value	Span gas for all sample components in the Uras26 and Caldos27 (possibly only for the Uras26 if a single-point calibration is carried out for the Caldos27)
Uras26 + Caldos25 (automatic calibration)	Sample component-free test gas or substitute gas for Uras26 and Caldos25	Test gas or substitute gas mixture for all sample components in the Uras26 and in the Caldos25*
Uras26 + Caldos25 (manual calibration)	IR sample component-free test gas for Uras26 and sample component-free test gas or substitute gas for Caldos25	Span gas for all sample components in the Uras26 and test gas or substitute gas with known sample component concentration for Caldos25

* Test gas mixture for multiple sample components possible if no or negligible cross-sensitivity is present

Case Purging

Use

The cases of the control unit and the analyzer unit Uras26 can be purged as an option for protection of the gas analyzers in a corrosive environment or with corrosive sample or associated gases.

Purge Gas

Clean instrument air from non-hazardous areas or inert gas is to be used as a purge gas. The purge gas for purging the EL3060-Uras26 analyzer unit may not contain any fractions of the sample components.

ATTENTION
Leaks may cause the purging gas to escape from the case. When applying nitrogen as purging gas, appropriate precautionary measures must be taken against asphyxiation!

Operating Statuses of the Case Purging

Two operating statuses of the purging are permissible to maintain the atmospheric conditions in the flameproof case:

- Restriction of the purge gas inlet pressure and outlet pressure to positive pressure $p_e \leq 80$ hPa (absolute pressure $p_{abs} \leq 1080$ hPa).
- The purge gas is provided at zero pressure at the inlet and extracted at the outlet ($p_e \geq -100$ hPa).

The purge gas flow in operation must be restricted to 10 l/h. The pressure drop at the flame barriers is approx. 20 hPa with a flow of 10 l/h.

The flameproof cases are specially sealed, so that the purge gas loss during case purging remains low. The purge gas loss in the EL3060-Uras26 analyzer unit can be further reduced by inserting the supplied O-ring (∅ 220 × 3 mm) in the groove provided between the bottom of the case and the case.

Pressure Sensor

Uras26

The pressure sensor is installed in the gas analyzer as standard. It is connected to a gas port (flame barrier) via an FPM tube as an option.

Magnos206

The pressure sensor is installed in the gas analyzer as an option. It is connected to a gas port (flame barrier) via an FPM tube as an option. With measurements in suppressed measuring ranges the connection of the pressure sensor and the sample gas outlet are to be connected to each other via a T-joint and short lines. Attention should be paid in particular that the gas discharge line is as short as possible or if it is longer, has a sufficiently wide internal diameter(≥ 10 mm).

Caldos27

The pressure sensor is installed in the gas analyzer as standard. It is connected to a gas port (flame barrier) via an FPM tube as an option.

Caldos25

No pressure sensor is installed in the gas analyzer.

Information for the Safe and Correct Operation of the Pressure Sensor

- If the pressure sensor (see page 18) is connected to the outside by hose, the yellow plastic screw cap must be screwed out of the connection fitting of the pressure sensor (flame barrier) before the gas analyzer is commissioned.
- For a precise pressure correction the connection of the pressure sensor and the sample gas outlet have to be connected to each other via a T-piece and short lines. The lines must be as short as possible or – in the case of a greater length – have an adequate internal diameter of (≥ 10 mm), so that the flow effect is minimized.
- If the pressure sensor connection is not connected to the sample gas outlet, it is required that the pressure sensor and the sample gas outlet are on the same pressure level for an exact pressure correction.

ATTENTION
The pressure sensor connection may not be connected to the sample gas feed path for the measurement of flammable gases.

Material Required for the Installation (not supplied)

Gas Connections

- Threaded connections with 1/8 NPT threads
- PTFE sealing tape

Flow Meter / Flow Monitor

- Flow meter or flow monitor with a needle valve for adjustment and monitoring of the sample gas flow rate and purge gas flow rate if required
- Recommendation: Flow meter 7…70 l/h, Order no. 23151-5-8018474

Shut-off Valve

- Install a shut-off valve in the sample gas supply line (definitely recommended with pressurized sample gas).

Purging of the Gas Line System

- Provide a means for purging the gas line system by feeding in an inert gas, e.g. nitrogen, from the gas sampling point.

Installation Material

- EL3060-CU control unit: 4 bolts M8 or M10
- EL3060-Uras26 analyzer unit: 4 bolts M8

Electrical Cables

- Design of the electrical connections: Terminal strips with screw connection
- Conductor size:
  - single-core: 0.5…4 mm^2
  - multi-core: 1.5…4 mm^2
  - stranded: 0.5…2.5 mm^2 (only with wire end ferrule)
- Select conductive material which is appropriate for the length of the lines and the predictable current load.
- Provide disconnecting devices in the power supply cable and the signal lines, in order to be able to disconnect all poles of the gas analyzer from all power sources if required.

Scope of Supply and Delivery

Scope of Supply and Delivery

- Gas Analyzer Model EL3060
- Accessories pack with:
  - CD-ROM "Software Tools and Technical Documentation"
  - CD-ROM "Spare Parts Analytical"
  - Instructions for Installation, Commissioning and Operation
  - Analyzer data sheet (see page 21)
  - 2 spacer bolts M5 x 100
    The spacer bolts are required, in order to install the display and operator control unit at a distance from the open case of the control unit during service work. They may **not be stored under any circumstances** in the case or in the terminal housing!
  - For EL3060-Uras26 in addition: O-ring ∅ 220 x 3 mm

Analyzer Data Sheet

Contents of the Analyzer Data Sheet

The analyzer data sheet is in the accessories pack. It contains the following information:

- Order number (A-No.)
- Part number (P-No.)
- Production number (F-No.)
- Date of manufacture
- Power supply (voltage, frequency, power consumption)
- Sample components and measuring ranges
- Serial numbers of the installed modules

NOTE
Store the analyzer data sheet in the vicinity of the gas analyzer, so that it is always available, especially in case of service.
Take note of the specifications in the analyzer data sheet when commissioning. They may deviate from the general specifications in the present Operator's Manual.

Type Plate

Contents of the Type Plate

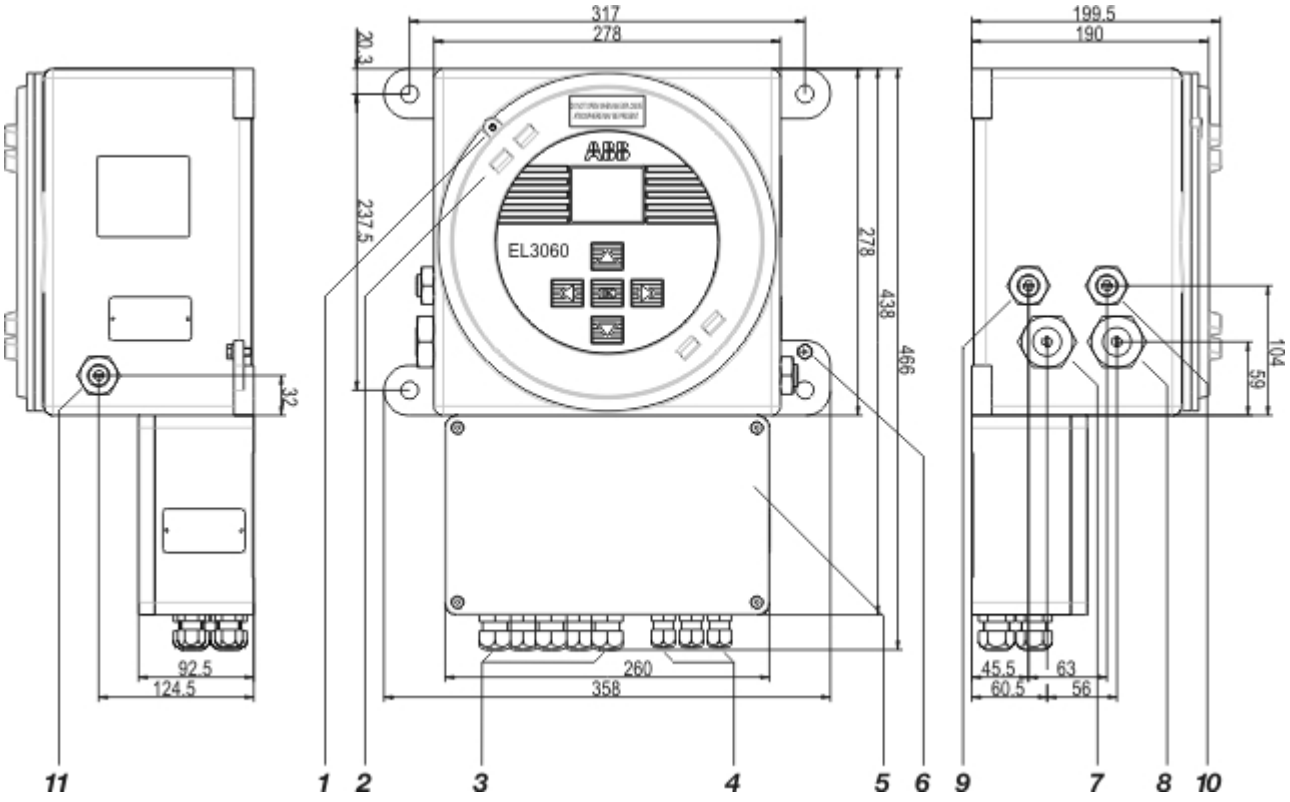
The type plate contains the following information:

- Production number (F-No.)
- Order number (A-No.)
- Power supply (voltage, frequency, max. power consumption)
- Installed analyzers with sample components and measuring ranges

Dimension Drawing and Gas Connections of the Control Unit

EL3060-CU Control Unit

(Dimensions in mm)



1 Socket-head hex screw for securing the case cover

2 Case cover

3 Screwed cable glands M20: 2 x metal, 3 x plastic

4 Screwed cable glands M16: 2 x metal, 1 x plastic

5 Terminal housing with terminal strip (see page 33)

6 Connection for equipotential bonding

7 Sample gas inlet [1)]

8 Sample gas outlet [1)]

9 Purge gas inlet [2)]

10 Purge gas outlet [2)]

11 Connection of the pressure sensor [3)]

1) if a Magnos206 or Caldos 27 or Caldos25 analyzer has been installed in the control unit

2) Option

3) Option. If flammable gases are to be measured, the pressure sensor (see page 18) may not be connected to the sample gas feed path.

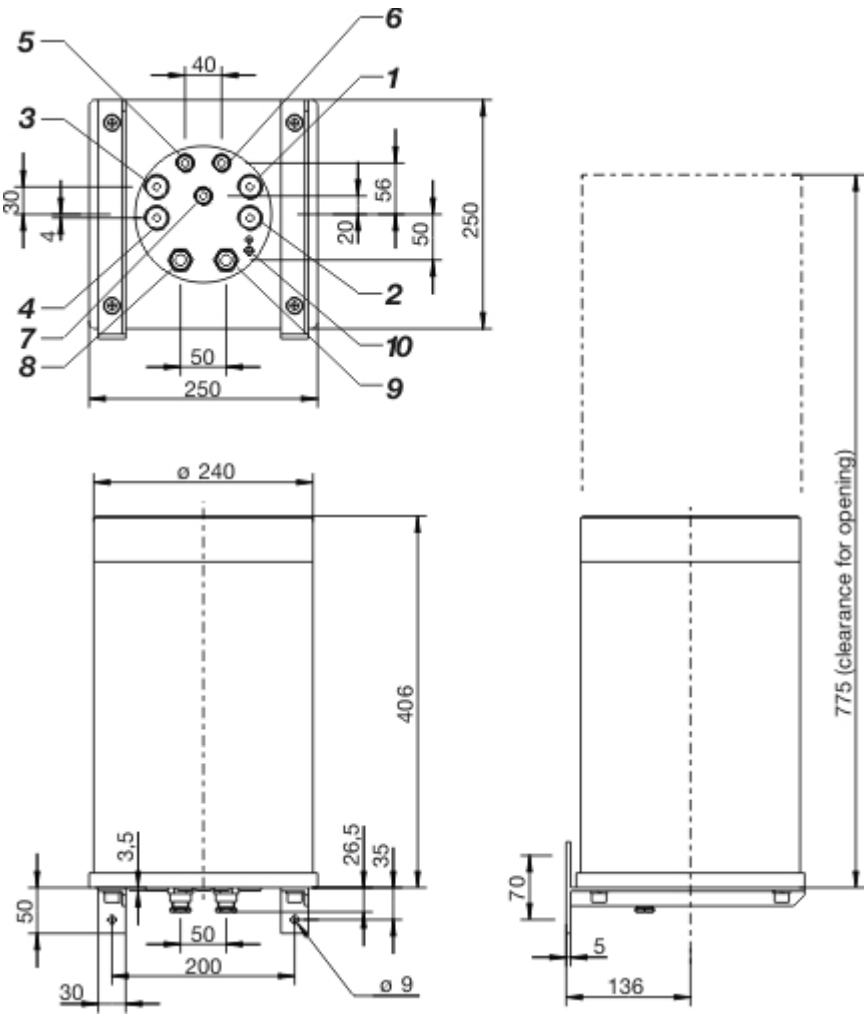
Design of the gas connections: Internal flame barriers of rust- and acid-resistant steel 1.4571 with 1/8 NPT female thread

NOTE
The extra space required on the left and right beside and under the control unit for the connecting cables must be considered (in each case approx. 10 cm).

Dimension Drawing and Gas Connections of the Analyzer Unit

EL3060-Uras26 Analyzer Unit

(Dimensions in mm)



1) Assignment of the

2) gas connections

3) see

4) analyzer data sheet (see page 21)

5 Purge gas inlet [1)]

6 Purge gas outlet [1)]

7 Connection of the pressure sensor [2)]

8 Conduit for data transmission cable

9 Conduit for 24 VDC connecting cable

10 Connection for equipotential bonding

1) Option

2) The connection of the pressure sensor (see page 18) must not be connected to the sample gas feed path when measuring flammable gases.

Design of the gas connections: Internal flame barriers of rust- and acid-resistant steel 1.4571 with 1/8 NPT female thread

Connecting cable: The non-detachable connecting cables for data transmission and the 24 V DC supply are an integral component of the flameproof case of the analyzer unit. In each case, they are 10 m long and may not be shortened to a length of less than 1 m.

NOTE
The extra space required below the analyzer unit for the connecting cables (approx. 10 cm) and above the analyzer unit for opening the case (approx. 40 cm) must be considered.

Installing the Gas Analyzer

Unpacking the Gas Analyzer

ATTENTION
The EL3060-CU control unit weighs approx. 20 kg. The EL3060-Uras26 analyzer unit weighs approx. 25 kg.
Unpacking and installing of the gas analyzer require two persons!

Unpacking the Gas Analyzer

1. Remove the accessories (see Scope of supply and delivery, page 20) from the shipping box.
   Ensure that the accessories do not get lost.
2. Remove the gas analyzer from the shipping box together with the respective protective packaging.
3. Remove the protective packaging and place the gas analyzer in a clean location.
4. Remove the adhesive packaging residues from the gas analyzer.

NOTE
Keep the shipping box and the protective packaging for future shipping needs.
If there is shipping damage which indicates improper handling, file a damage claim with the shipper (rail, mail or freight carrier) within seven days.

Checking the Seal Integrity of the Gas Feed Paths

Checking the Seal Integrity of the Gas Feed Paths

The seal integrity of the sample gas feed path and, if applicable, of the reference gas feed path is checked ex works with a helium leak test for a leakage rate of $< 2 \times 10^{-4}$ hPa l/s.

We recommend that the seal integrity of the gas feed path is checked before commissioning the instrument at the installation site, since it may have been affected during transport of the gas analyzer (e.g. through strong vibrations).

Requisite Material

- Pressure gauge
- Flexible tubing, length approx. 1 m
- T-piece with shut-off valve
- Air or nitrogen

ATTENTION
If the seal integrity test is to be carried out with air and if flammable gas could be present in the sample gas feed path or is to be subsequently introduced, the sample gas feed path must be purged with nitrogen beforehand! The seal integrity test can be carried out with nitrogen instead.

Checking the Seal Integrity of the Gas Feed Paths

1. Seal the outlet of the gas feed path to be tested so that it is gas-tight.
2. Connect the T-piece with the shut-off valve to the inlet of the gas feed path to be tested by means of the flexible tubing.
3. Connect the free end of the T-piece to the pressure gauge.
4. Blow air or nitrogen through the shut-off valve until the sample gas feed path is under a positive pressure of $p_e \approx 50$ hPa. Maximum positive pressure $p_e = 150$ hPa.
5. Close the shutoff valve. The pressure should not change measurably in 3 minutes. A sharp drop in pressure is an indication of a leak in the gas feed path being tested.
6. Repeat steps 1–5 for all gas feed paths in the gas analyzer.

Installing the Gas Analyzer

ATTENTION
The EL3060-CU control unit weighs approx. 20 kg. The EL3060-Uras26 analyzer unit weighs approx. 25 kg.
Unpacking and installing of the gas analyzer require two persons!

Mounting the EL3060-CU Control Unit

4 bolts M8 or M10 are required to mount the EL3060-CU control unit (not supplied).

The control unit must be fitted in such a way that the terminal housing points downwards (as shown in the dimension drawing (see page 22)).

Mounting the EL3060-Uras26 Analyzer Unit

4 bolts M8 are required to mount the EL3060-Uras26 analyzer unit (not supplied).

The analyzer unit can be mounted with a vertical or with horizontal alignment of the case.

- The gas connections must point downwards for vertical assembly (as shown in the dimension drawing (see page 24) on the bottom left).
- For horizontal assembly, the case must be mounted in such a way that the conduits for the connecting cable are at the bottom (as shown in the dimension drawing on the top left). In order to guarantee the degree of protection of case IP54, the supplied O-ring (∅ 220 × 3 mm) must be inserted in the groove provided between the bottom of the case and the case.

Connecting the Gas Lines

Position and Layout of the Gas Connections

The position and layout of the gas connections are shown in the dimension drawings of the control unit (see page 22) and the analyzer unit (see page 24).

Design of the Gas Connections

Design of the gas connections: Internal flame barriers of rust- and acid-resistant steel 1.4571 with 1/8 NPT female thread

- Sample gas inlets and outlets
- Flowing reference gas with EL3060-Uras26 (option)
- Case purging (option)
- Pressure sensor (option)

The assignment of the gas connections in a supplied EL3060-Uras26 analyzer unit is documented in the analyzer data sheet.

Connecting the Gas Lines

Connect the stainless steel pipes to the fittings (flame barriers) professionally and taking tightness requirements into consideration.

ATTENTION
The maximum permissible tightening torque is 50 Nm. If this value is exceeded, the internal gas connections could be damaged. The explosion protection could be impaired as a result.

Connecting the Pressure Sensor

- If the pressure sensor (see page 18) is connected to the outside by hose, the yellow plastic screw cap must be screwed out of the connection fitting of the pressure sensor (flame barrier) before the gas analyzer is commissioned.
- For a precise pressure correction the connection of the pressure sensor and the sample gas outlet have to be connected to each other via a T-piece and short lines. The lines must be as short as possible or – in the case of a greater length – have an adequate internal diameter of (≥ 10 mm), so that the flow effect is minimized.
- If the pressure sensor connection is not connected to the sample gas outlet, it is required that the pressure sensor and the sample gas outlet are on the same pressure level for an exact pressure correction.

ATTENTION
The pressure sensor connection may not be connected to the sample gas feed path for the measurement of flammable gases.

Installing the Flow Meter

Install a flow meter or flow monitor with a needle valve before the sample gas inlet and if required before the purge gas inlet in order to be able to adjust and monitor the gas flow rate.

Provide for Gas Line System Flushing

Install a shut-off valve in the sample gas line (definitely recommended with pressurized sample gas), in order to provide a means for purging the gas line system by feeding in an inert gas, e.g. nitrogen, from the gas sampling point.

Discharge Exhaust Gases

Conduct exhaust gases directly into the atmosphere or through a line with a large internal diameter which is as short as possible, or into a gas discharge line. Do not conduct exhaust gases via restrictions or shut-off valves!

NOTE
Dispose of corrosive and toxic exhaust gases according to the regulations!
Comply with the gas inlet and outlet conditions (see page 14)!
Purge the sample gas feed path before commissioning.
Do not feed in the sample gas until the gas analyzer has reached room temperature and the warm-up phase has ended! Otherwise, the sample gas could condense in the cold analyzer.

Connecting the Electrical Leads - Safety Information

ATTENTION
Follow all applicable national safety regulations for the installation and operation of the electrical apparatuses as well as the following safety instructions

Equipotential Bonding

The external equipotential bonding connections of the control unit and the analyzer unit must be connected to the local potential equalization. The local potential equalization must be connected before any other connections are made. The capacity of terminals is of max. 4 mm^2.

Risks of a Disconnected Equipotential Bonding

The gas analyzer can be hazardous if the equipotential bonding is interrupted inside or outside the device or if the equipotential bonding is disconnected. Carrying out work on the equipotential bonding or the equipotential bonding connection is prohibited if there is an explosion hazard.

Lay electrical lines in such a way that they are non-detachable

The electrical lines, including the connections between the analyzer unit and the control unit, must be non-detachable.

Connecting Cable of the EL3060-Uras26 Analyzer Unit

The non-detachable connecting cables for data transmission and the 24 V DC supply are an integral component of the flameproof case of the analyzer unit. In each case, they are 10 m long and may not be shortened to a length of less than 1 m.

Screened Leads

Screened leads must be led through the metal screwed cable glands. The braided shield must be placed on the screwed cable glands.

Separate Laying

Signal lines must be installed separately from the power supply lines. Analog and digital signal lines must be laid separately from each other.

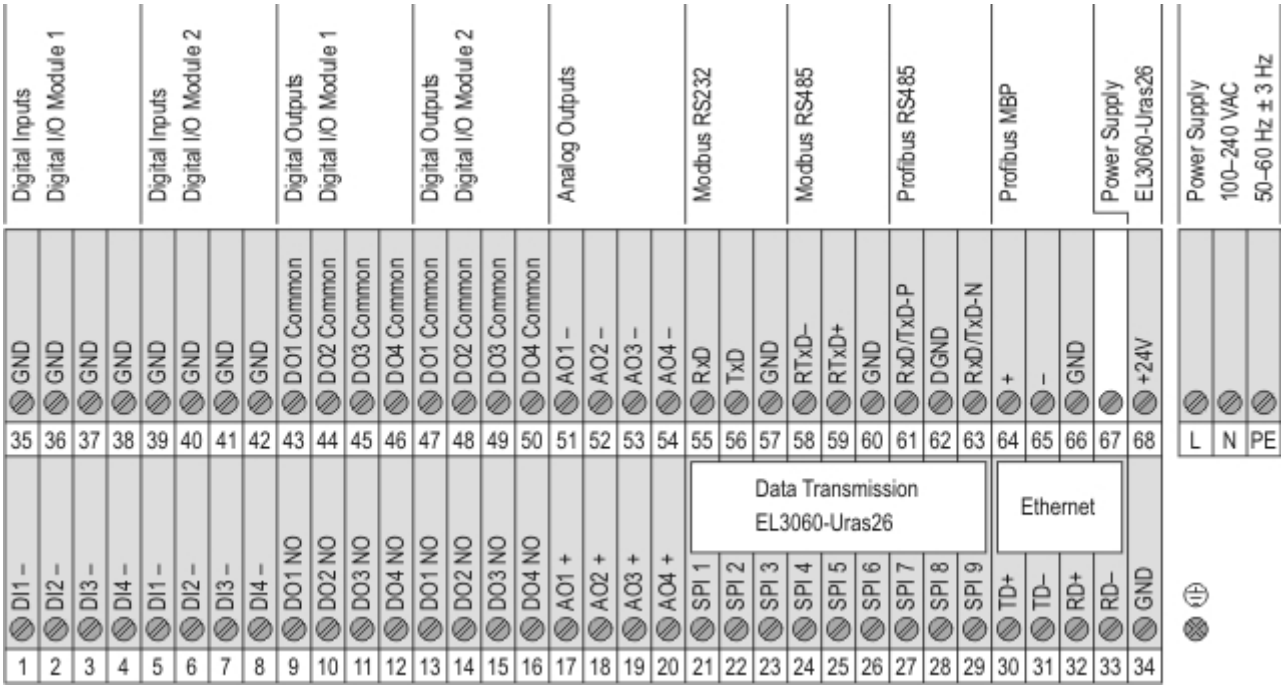
Unused Screwed Cable Glands

Unused screwed cable glands must be sealed with sealing plugs. The cap nuts on the unused screwed cable glands must be non-removable.

Before Connecting the Power Supply

Before connecting the power supply, it must be ensured that the mains voltage is in the permissible range 100…240 VAC for operation of the gas analyzer.

Electrical Connections



NOTE
Not all signal input and outputs are actually assigned, depending on the configuration of the gas analyzer.

Digital Inputs

Opto-electronic coupler with 24 V DC internal power supply. Activation with floating contacts or with Open-Collector drivers NPN.

Digital Outputs

Floating double-throw contacts, max. contact load rating 30 V/1 A. The relays must always be operated within the specified data. Inductive or capacitive loads are to be connected with appropriate protective measures (freewheeling diodes for inductive and series resistors with capacitive loads).

Standard Assignment of the Digital Inputs and Digital Outputs

Signal	Standard Assignment [1] Digital I/O Module 1	Standard Assignment [1] Digital I/O Module 2
Failure		
Maintenance request		
Maintenance mode		
Overall status	DO1	
Start automatic calibration	DI1	
Stop automatic calibration		
Disable automatic calibration	DI2	
Sample gas valve	DO4	
Zero-reference gas valve		
Span reference gas valve		
Alarm value 1	DO2	
Alarm value 2	DO3	
Alarm value 3		DO1
Alarm value 4		DO2
Alarm value 5		DO3
Alarm value 6		DO4
Alarm value 7		
Alarm value 8		
Alarm value 9		
Alarm value 10		
Measuring range switch-over		
Measuring range feedback signal		
Bus DI 1		
Bus DI 2		
Bus DI 3		
Bus DI 4		
Bus DI 5		
Bus DI 6		
Bus DI 7		
Bus DI 8		
External error [2]	DI3	
External maintenance request [2]	DI4	

1) Set ex works, can be reconfigured in operation.

2) Depending on the number of available digital inputs several external signals can be configured.

Analog Outputs

0/4...20 mA (pre-set ex works to 4...20 mA), common negative pole, electrically isolated to ground, can be connected to ground as required, in this regard, max. gain compared to local protective ground potential 50 V, working resistance max. 750 Ω. Resolution 16 bit. The output signal may not be less than 0 mA.

Modbus, Profibus

As an option, either the Modbus module or the Profibus module can be installed in the gas analyzer.

Ethernet Port

The Ethernet 10/100BASE-T interface of the gas analyzer is used

- for communication with the ECT configuration software (see page 48) for instrument configuration and software update and
- for transmission of the QAL3 data, if the option QAL3 monitoring has been integrated in the gas analyzer.

Analyzer Unit EL3060-Uras26

- Data transfer: terminals 21…29 (SPI1…SPI9) for lines 1…9 (inscription on the lines)
- Power supply: terminals 34 (GND) and 68 (+24V, line with red marking), separate PE connection

Power Supply

- Terminals L, N, PE

Design of the Electrical Connections

- Terminal blocks with screw connection
- Conductor size:
  - single-core: 0.5…4 mm^2
  - multi-core: 1.5…4 mm^2
  - stranded: 0.5…2.5 mm^2 (only with wire end ferrule)

Assignment of the Connecting Cables to the Cable Connectors

Connecting Cable	Screwed Cable Gland	Permissible External Diameter of Cable
Gas analyzer power supply	Plastic M16	4…8 mm
Power supply to EL3060-Uras26	Metal M20	7…12 mm
Data transfer for EL3060-Uras26	Metal M20	7…12 mm
Ethernet	Metal M16	3…7 mm
Profibus/Modbus	Metal M16	3…7 mm
Analog outputs	Plastic M20	6.5…12 mm
Digital inputs/outputs	Plastic M20	6.5…12 mm

Connect the Electrical Leads

Pass Cable through a Metal Screwed Cable Gland of the Control Unit

1. Bare the braided shield of the cable over a length of approx. 10 mm.
2. Undo the coupling nut on the metal screwed cable gland and remove the terminal insert.
3. Slide the coupling nut and the terminal insert over the cable.
4. Turn the braided shield back over the terminal insert. The braided shield must cover the sealing gasket approx. 2 mm.
5. Insert the terminal insert and the cable in the gland body and screw up the coupling nut.

Pass Cable through a Plastic Screwed Cable Gland of the Control Unit

1. Undo the coupling nut on the plastic screwed cable gland and remove the sealing gasket.
2. Slide the coupling nut and the sealing gasket over the cable.
3. Insert the cable and the sealing gasket in the gland body and screw up the coupling nut.

Connect Power Supply to the Control Unit

1. Check that the mains voltage is in the permissible range 100…240 V AC.
2. Ensure that the power supply feeder has an adequately dimensioned protective device (circuit-breaker max. 6 A).
3. Connect the power supply lead to the terminals L, N and PE.

NOTE
If required, install disconnecting devices in the power supply cable and in the signal lines, in order to be able to disconnect **all poles** of the control unit from all power sources. Mark the isolators in such a way that the assignment of the devices to be disconnected can be clearly recognized.

Start up the Gas Analyzer

Check the Installation

NOTE
The case of the gas analyzer can also be opened in the presence of an explosive atmosphere if all electrical lines have been disconnected from the supply and 10 minutes have passed since disconnection.

Check the Installation

Before you put the gas analyzer into operation, you should ensure that it has been correctly installed. Proceed in accordance with the following checklist:

Installation Site

- Do the conditions in the field (zone, group of enclosure, temperature class) comply with the specifications on the type plate?
- Have the control unit and the analyzer unit been installed indoors?
- Have the control unit and the analyzer unit been securely attached?

Connection of the Gas Lines

- Have all gas lines been correctly connected?
- If flammable gases are to be measured, is the pressure sensor not connected to the sample gas feed path?

Connection to the Potential Equalization

- Has the external equipotential bonding connection of the analyzer unit been connected to the local potential equalization?
- Has the external equipotential bonding connection of the control unit been connected to the local potential equalization?

Connection of the Electrical Lines

- Does the mains voltage correspond to the permissible operating voltage (100…240 V AC, see type plate)?
- Are all electrical lines non-detachable according to the specifications, and have they been correctly connected to the terminal block in the terminal housing?
- Are there any loose wire ends? Have all unused wires been insulated and mechanically secured?
- Have the correct cable types been used are for the lines led through the screwed cable glands of the control unit?

- Are the lines securely located in the screwed cable glands?
- Have the screened leads been led through the metal screwed cable glands? Has the braided shield been correctly placed on the screwed cable glands?
- Do the 24 VDC connecting cable and the data transmission cable which are securely connected to the EL3060-Uras26 analyzer unit have a length of more than 1 m and do they have any damage?

Integrity of the Case of the EL3060-Uras26 Analyzer Unit

- Is the case of the analyzer unit intact?
- Are all flame barriers and screw plugs present?
- In the case of horizontal assembly of the analyzer unit: Are the O-rings, which have been inserted in the grooves provided between the bottom of the case and the case and between the case and the case cover, clean and not pinched?
- Have all components of the case been completely bolted together and locked against rotation with the socket-head hex screws?

Integrity of the Case of the Control Unit

- Is the case of the control unit intact?
- Is the case of the control unit tightly closed?
- Is the case cover screwed in all the way and locked against rotation with the socket-head hex screw?
- Is the seal in the cover of the terminal housing intact? Is the cover of the terminal housing tightly closed?
- Are all screwed cable glands present and tightly screwed in?
- Are the openings of the unused screwed cable glands tightly closed with sealing plugs?

Connection of the Peripheral Units

- Are all devices needed for gas conditioning, calibration and waste gas disposal correctly connected and ready for use?

Initial Purging of Gas Feed Paths

Initial Purging of Gas Feed Paths

Initial Purging of Gas Feed Paths

Initial purging of the gas feed paths is required for the initial start-up and each time the gas feed paths inside the gas analyzer have been opened before the power supply is switched on. A potentially explosive mixture gas/air mixture in the gas feed paths is thereby removed.

Purge gas for non-flammable sample gas	Clean instrument air from non-hazardous areas
Purge gas for flammable sample gas	Inert gas
Purge gas volume	5x volume of the gas feed paths
Purge gas flow	approx. 30 l/h
Purging time	at least 3 min

The purge gas for purging the EL3060-Uras26 analyzer unit may not contain any fractions of the sample components.

NOTE
The purge gas flow in operation is a max. 10 l/h.

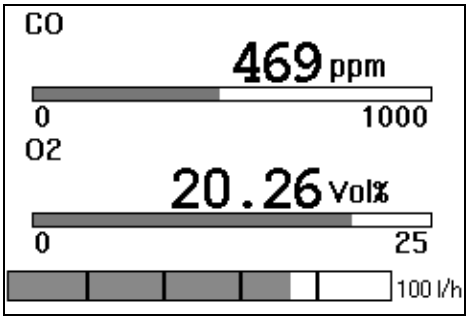
Start up the Gas Analyzer

Start up the Gas Analyzer

1 Switch on the power supply of the gas analyzer

2 The name of the gas analyzer and the number of the software version are shown in the display while booting.

3 After the start-up phase has ended, the display switches over to the measured value display.
Example:



4 Check the configuration of the gas analyzer and alter if necessary.

5 After the warm-up phase has ended, the gas analyzer is ready to carry out measurements.
Duration of the warm-up phase:
Uras26: approx. 1/2 hour without thermostat, approx. 2.5 hours with thermostat
Magnos206: approx. 2 hours
Caldos27: approx. 1/2 hour
Caldos25: 1…4 hours, depending on the measuring range

6 Check the calibration of the gas analyzer.
The gas analyzer is calibrated ex works. However, transport stresses and the pressure and temperature conditions at the installation site may influence the calibration.

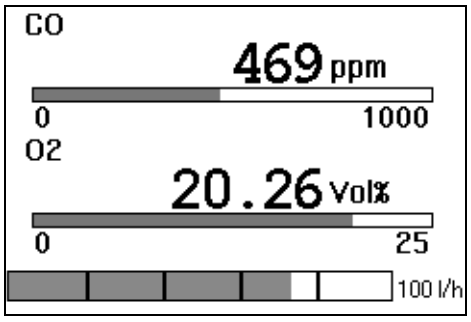
7 Feed in the sample gas.

Operating the Gas Analyzer

NOTE
All the illustrations of the displays in this operator's manual are examples. The displays on the instrument will normally differ from these.

Display - Measuring Mode

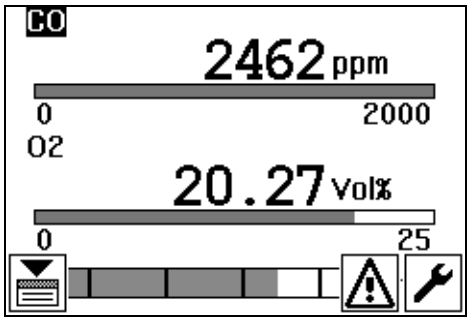
Display in Measuring Mode



In measuring mode, the screen displays the name, the measured value in numerals and the physical unit of the measured value for each sample component.

If the display of the name of the sample components flashes alternately with the inverted display, this signals that the measured value exceeds the measuring range limits.

Status Icons





An automatic calibration will be executed. The icon also appears in the menu title line in menu mode (see page 44).



A status message is active.



The status signal "Maintenance required" is active. The icon also appears in the menu title line in menu mode (see page 44).



The status signal "Error" is active or the maintenance switch has been set to "On". The icon is blinking. The icon also appears in the menu title line in menu mode (see page 44).



The configuration is being saved. The icon is blinking.
Do not switch off the power supply of the gas analyzer when the icon is displayed!

Key Functions in Measuring Mode

◀▶ Switch over the display of each individual measured value; in addition to the digital display, an analog bar with information on the range limits is shown in this display.

▼▲ Reduce or increase the contrast of the display.
When a status message is active, press key ▲ first.

OK Switch to menu mode (see page 44).

▼ If a status message is active : press the key to display the message list.

Number of Decimal Places

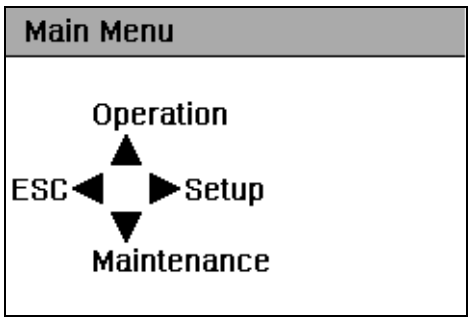
The number of decimal places in the display of the measured value in physical units (e.g. ppm) depends on the span of the measuring range:

Span (in physical units)	≤ 5	> 5…≤ 50	> 50…≤ 500	> 500
Number of decimal places	3	2	1	0

When setting the parameters, the number of decimal places is the same as in the display in measuring mode.

Operation - Menu Mode

Display in Menu Mode



Structure of the Menus

Starting from the main menu (see page 47), each menu contains a maximum of three menu items ("3-point menu"). Each menu item is assigned to one of the three buttons▲, ▶ and ▼ each menu item can therefore be selected directly. The button ◀ is used to return to the next higher menu.

The functions which are normally most frequently required are arranged in the menu in such a way that they can be called by repeatedly pressing the same button:

▲ Operation ▲ Calibration ▲ Manual Calibration
▲ Zero Point / Single Point

▶ Setup ▶ Calibration Data ▶ Test Gas Set Points

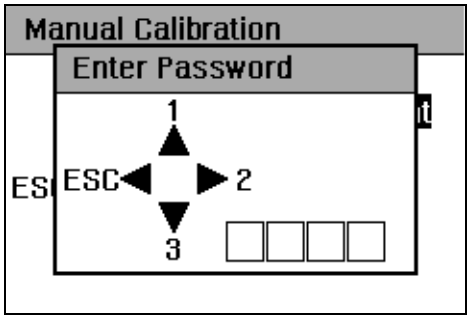
▼ Maintenance ▼ Diagnosis ▼ Device Status
▼ Status Messages

Key Functions in Menu Mode

	3-point menu
▲▶▼	Select menu item
◀	Return to the next higher menu
OK	Return to the measuring mode
	Component list
▲▼	Select component
▶ or **OK**	Call up selected component for processing
	Parameter list ("Selector")
▲▼	Select parameters
▶	Call up change in value
OK	Accept all displayed values and return to the next higher menu
◀	Discard all displayed values and return to the next higher menu
	Change in value
▲▼	Change selected position
▶	Select position to be changed
OK	Confirm altered value and return to the parameter list
◀	Discard altered value and return to the parameter list

Entering the Password

As soon as the user wishes to access a password-protected menu or a password-protected value change, he is requested to enter the password.



In this respect, the numbers 1, 2 and 3 are assigned to the three keys ▲, ▶ and ▼, as shown in the illustration.
Example: If the password "1213" has been configured, the user has to press the keys ▲, ▶, ▲ and ▼. Each key stroke is acknowledged by display of the character *.

The entered password remains active until the user returns to the measuring mode or the gas analyzer automatically switches over to the measuring mode through the time-out function.

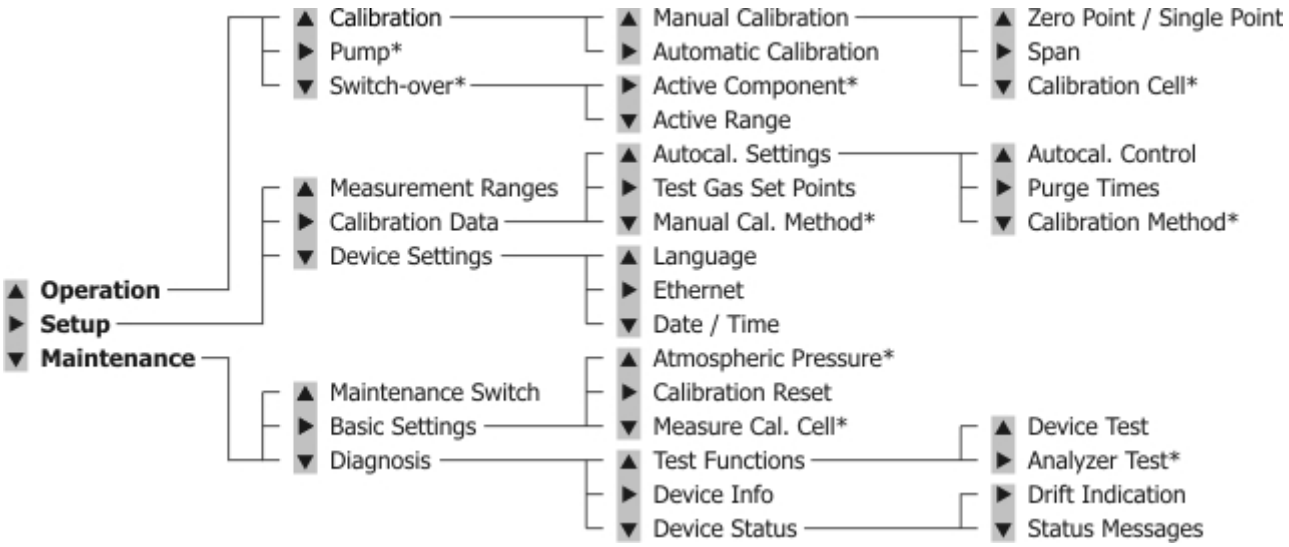
Time-out Function

If the user does not press a key for more than approx. 5 minutes during the selection of menu items, the gas analyzer will automatically return to the measuring mode (time-out function).

The time-out function is deactivated as soon as the user changes the value of a parameter or starts a calibration.

Menu

Overview of the Menu



* This menu depends on the configuration of the gas analyzer.

Information on the Concept of Operation

Concept of Operation

The concept of operation of the gas analyzer is designed in such a way that the functions required in normal operation are operated and configured directly on the instrument. On the other hand, the functions which are only seldom required, e.g. during the commissioning of the instrument, are configured offline using the software tool ECT ("EasyLine Configuration Tool" on the enclosed CD-ROM, also referred to as "configurator" in this manual) and then loaded into the gas analyzer.

Overview of the functions

Function	Instrument	Configurator	Modbus
Automatic calibration:			
Start/cancel automatic calibration (also possible via digital inputs)	X		X
Activate/deactivate cyclically time-controlled automatic calibration	X	X	X
Cycle time of the automatic calibration		X	
End-point calibration together with zero-point calibration		X	X
Date and time of the next automatic calibration (Start of the cycle)	X	X	
Test gas concentration	X	X	X
Purging times	X	X	
Output current response (for automatic and manual calibration)		X	
Calibration method (Magnos206)	X	X	
Manual calibration:			
Calibration method	X	X	
Test gas concentration	X	X	
Execute calibration	X		

Function	Instrument	Configurator	Modbus
Maintenance functions:			
Calibration reset	X		
Calibration of the pressure sensor / Set atmospheric pressure value	X		
Measuring calibration cell (Uras26)	X		
Drift, delta drift (display)	X		X
Software version	X	X	
Status information	X		X
Component parameters:			
Range limits	X	X	
Alarm value parameters		X	
Low pass time constant (T90 time, filter)		X	X
Active component	X	X	X
Modbus parameters		X	
Ethernet parameters	X	X	
Signal inputs and outputs (I/O connections)		X	

Communication between the Gas Analyzer and the Computer

Communication via Ethernet

Communication between the gas analyzer and the computer on which the Configurator is installed is executed via an Ethernet connection, either as a point-to-point connection or via a network.

Setting up the Communication between the Gas Analyzer and the Computer

Basically, the following steps are required to set up the communication between the gas analyzer and the computer:

1. Check and set the TCP/IP parameters in the gas analyzer and the computer.
2. Establish and test the Ethernet connection.
3. Start the communication between the gas analyzer and the computer.

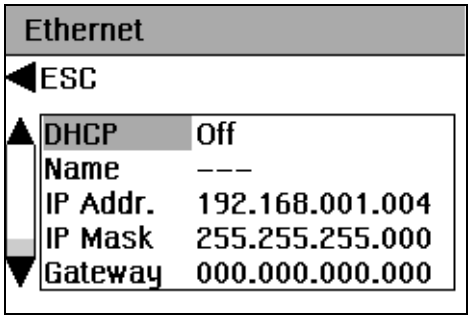
Check the TCP/IP Parameters in the Gas Analyzer and the Computer

The TCP/IP parameters in the gas analyzer and the computer must be checked and changed if necessary for operation of the configurator. In the case of a point-to-point connection, the IP addresses in the gas analyzer and the computer must be carefully matched.

Example: gas analyzer: 192.168.1.4, computer: 192.168.1.2

Set the IP Address in the Gas Analyzer

▶ Setup ▼ Device Settings ▶ Ethernet



Parameters

The parameters which have to be input depend on the DHCP setting:

DHCP on: DHCP on: Network name (max. 20 characters, no blanks and special characters),

DHCP off: IP address, IP address mask and IP gateway address.

The network name can only be altered in the Configurator. The default network name consists of "EL3K" and the last six positions of the MAC address (example: "EL3KFF579A").

Addresses

The IP address, IP address mask and IP gateway address must be obtained from the system administrator.

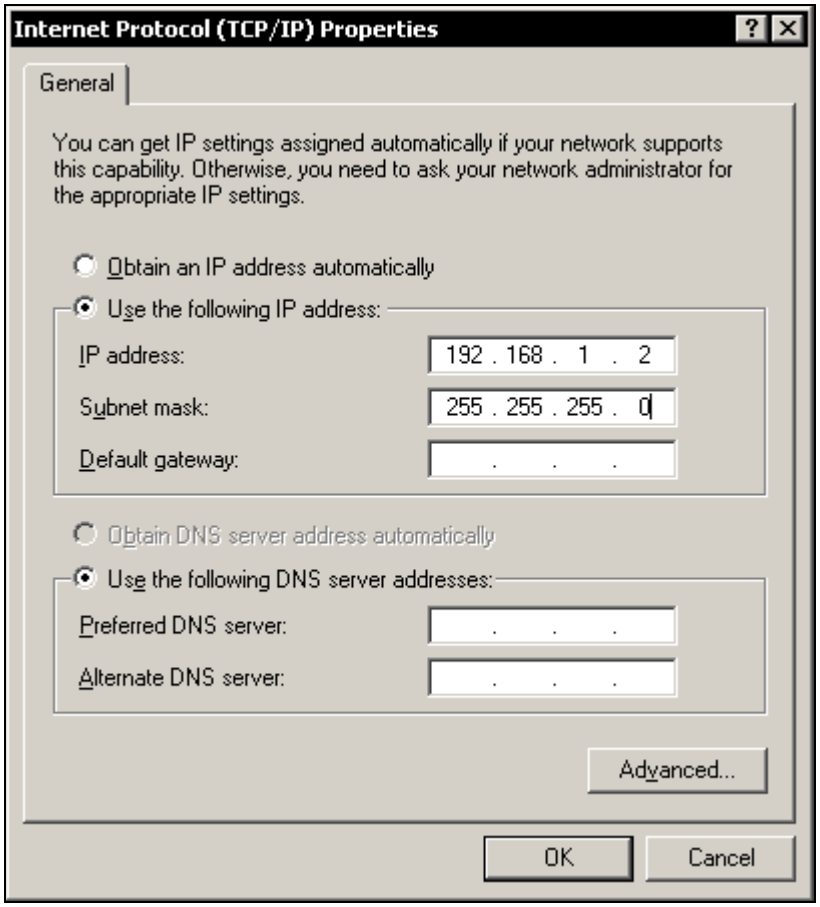
NOTE
The address bits that can be varied in the address mask may not all be set to 0 or 1 (broadcast addresses).

MAC Address

The 12-digit MAC address is unique and stored in each device during manufacture. It cannot be altered.

Set the IP Address in the Computer

Start → Settings → Network connections → Local Area Connection →
Tab "General": Properties → Tab "General": Select Internet Protocol (TCP/IP),
Properties → Tab "General": Use the following IP address: → Enter IP address
(see the following example).



Establish and Test the Ethernet Connection

Cables

Point-to-point connection: Twisted-pair cable with RJ45 connectors, terminal layout: 1–3, 3–1, 2–6, 6–2
Connection via an Ethernet network: twisted-pair cable with RJ45 connectors

The cables are standard Ethernet cables and are not part of the scope of supply and delivery of the gas analyzer.

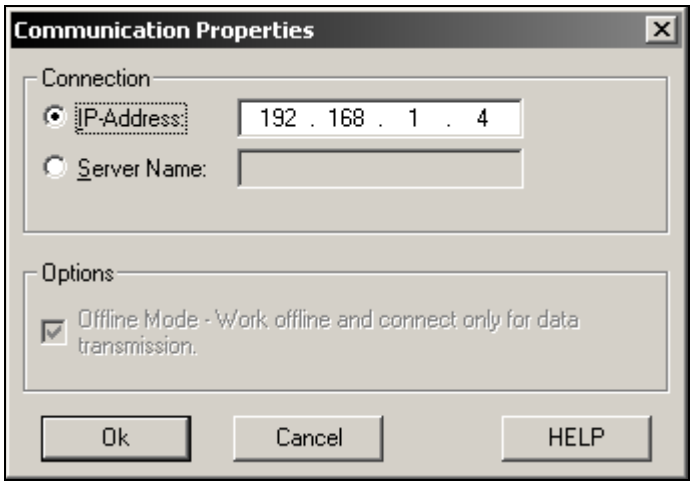
Test the Ethernet Connection

To test the Ethernet connection, enter the following in the computer in "Start..." → Execute..." input: "ping *IP address*" (with *IP address* = IP address of the gas analyzer). If the connection is OK, the gas analyzer reports "Answer from *IP address*: Bytes=32 time<10ms. TTL=255" (The numbers are instrument-specific). In the case of the message "Request timed-out", the connection is not OK.

The network name can also be entered instead of the IP address.

Start the Communication between the Gas Analyzer and the Computer

Communication between the configurator and the gas analyzer is started in the menu "Options..." → Communication Properties..." or by clicking the symbol . Input either the IP address or the network name (server name) of the gas analyzer (see example for a point-to-point connection below).



Receiving Configuration Data

After communication has been started, the configuration data can be received from the gas analyzer.

Menu "File → Receive Data" or .

Sending Configuration Data

After the configuration data been has edited, it can be sent to the gas analyzer. The configuration mode is active after an automatic cold restart of the gas analyzer.

Menu "File → Send Data" or .

Saving Configuration Data

The configuration data of the gas analyzer can be stored in the computer. The stored configuration file can be edited at a later date and sent to the gas analyzer.

Menu "File → Save As..." or .

Maintenance

Inspection

Regular Inspection

Proceed in accordance with the checklist "Checking the installation (see page 38)".

Checking the Seal Integrity of the Gas Feed Paths

The seal integrity of the sample gas feed path and, if applicable, the reference gas feed path should be checked during operation at least once a year. The seal integrity of the gas feed path must always be checked after the gas feed path inside the gas analyzer has been opened (see below).

If measured values are output slowly during operation (e.g. after feed in of the test gas) or implausible measured values are obtained, a leak in the sample gas feed path is a possible cause.

A simple procedure for testing the seal integrity of the gas feed paths is described in the section "Checking the seal integrity of the gas feed paths" (see page 57).

Measures Taken after Opening the Gas Paths inside the Gas Analyzer

All components of the case of the control unit and the analyzer unit EL3060-Uras26 must be completely bolted together and locked against rotation with the socket-head hex screws.

If the gas feed path or reference gas path inside the gas analyzer has been opened, the seal integrity should be tested with helium at a leak rate of $< 2 \times 10^{-4}$ hPa l/s. As an alternative to the helium leak test, the pressure drop method described in the section "Checking the seal integrity of the gas feed paths" (see page 57) can be used. In this respect, the test pressure is increased to $p_e \approx 400$ hPa (= 400 mbar) and the test duration to 15 minutes. The maximum excess pressure $p_e = 500$ hPa (= 500 mbar).

Initial purging of the gas feed paths is required for the initial start-up and each time the gas feed paths inside the gas analyzer have been opened before the power supply is switched on. A potentially explosive mixture gas/air mixture in the gas feed paths is thereby removed.

Purge gas for non-flammable sample gas	Clean instrument air from non-hazardous areas
Purge gas for flammable sample gas	Inert gas
Purge gas volume	5x volume of the gas feed paths
Purge gas flow	approx. 30 l/h
Purging time	at least 3 min

The purge gas for purging the EL3060-Uras26 analyzer unit may not contain any fractions of the sample components.

Reseal Cable Glands after Opening

If the pressure-proof cable glands, through which the data transmission cable and the 24 VDC connecting cable are routed to the flameproof cylinder of the EL3060-Uras26 analyzer unit, have been opened, the external nuts must be screwed tight with a torque wrench (size 20); tightening torque = 17 Nm.

Checking the Seal Integrity of the Gas Feed Paths

Requisite Material

- Pressure gauge
- Flexible tubing, length approx. 1 m
- T-piece with shut-off valve
- Air or nitrogen

ATTENTION
If the seal integrity test is to be carried out with air and if flammable gas could be present in the sample gas feed path or is to be subsequently introduced, the sample gas feed path must be purged with nitrogen beforehand! The seal integrity test can be carried out with nitrogen instead.

Checking the Seal Integrity of the Gas Feed Paths

1. Seal the outlet of the gas feed path to be tested so that it is gas-tight.
2. Connect the T-piece with the shut-off valve to the inlet of the gas feed path to be tested by means of the flexible tubing.
3. Connect the free end of the T-piece to the pressure gauge.
4. Blow air or nitrogen through the shut-off valve until the sample gas feed path is under a positive pressure of $p_e \approx 50$ hPa. Maximum positive pressure $p_e = 150$ hPa.
5. Close the shutoff valve. The pressure should not change measurably in 3 minutes. A sharp drop in pressure is an indication of a leak in the gas feed path being tested.
6. Repeat steps 1–5 for all gas feed paths in the gas analyzer.

ATTENTION
The following values apply for the test pressure and test duration after the gas feed paths inside the gas analyzer have been opened:
Test pressure $p_e \approx 400$ hPa, maximum positive pressure $p_e = 500$ hPa. Test duration 15 minutes.

Shutting Down and Packing the Gas Analyzer

Shutting Down the Gas Analyzer

Shutting Down the Gas Analyzer

In the case of a temporary shutdown:

1. Shut off the sample gas.
2. Purge the gas lines and gas feed paths in the analyzer module with dry fresh air or nitrogen for at least 5 minutes.
3. Switch off the power supply to the gas analyzer.

In the case of a long-term shutdown, carry out the following in addition:

1. Remove the gas lines from the gas analyzer ports. Tightly seal the gas ports.
2. Disconnect the electrical leads from the gas analyzer.

Ambient Temperature

Ambient temperature during storage and transport: –25 to +65 °C

Packing the Gas Analyzer

Packing

1. Tightly seal the gas ports.
2. If the original packaging is not available, wrap the gas analyzer in bubble wrap or corrugated cardboard. When shipping overseas, additionally shrink-wrap the gas analyzer air-tight in 0.2 mm thick polyethylene film adding a drying agent (such as silica gel). The amount of drying agent should be appropriate for the package volume and the expected shipping duration (at least 3 months).
3. Pack the gas analyzer in an adequately sized box lined with shock-absorbing material (foam or similar). The thickness of the shock-absorbing material should be adequate for the weight of the gas analyzer and the mode of dispatch. When shipping overseas, additionally line the box with a double layer of bitumen paper.
4. Mark the box as "Fragile Goods".

Ambient Temperature

Ambient temperature during storage and transport: –25 to +65° C

ATTENTION
When you return the gas analyzer to the service department, e.g. for repair, please state which gases have been supplied to the gas analyzer. This information is needed so that service personnel can take any requisite safety precautions for harmful gases.

Annex

Description of the gas analyzers

Versions of the Gas Analyzers

EL3060-CU	Control unit with no analyzer installed (with power supply for a separate analyzer unit)
EL3060-Caldos25	EL3060-CU with Caldos25 analyzer installed
EL3060-Caldos27	EL3060-CU with Caldos27 analyzer installed
EL3060-Magnos206	EL3060-CU with Magnos206 analyzer installed
EL3060-Uras26	Separate analyzer unit with Uras26 for connection to EL3060-CU, -Magnos206, -Caldos25 or -Caldos27

Control Unit

The case of the control unit EL3060-CU is designed as a field housing of die-cast aluminum in the type of protection "Flameproof Enclosure 'd'" to EN 60079-1. The display and operator control unit is mounted behind a glass window on the front of the case.

A terminal housing in the type of protection "Increased Safety 'e'" to EN 60079-7, in which the terminal block for the electrical connections is mounted, is flange-mounted on the underside of the flameproof case. Certified electrical conductor bushings are mounted between the inside of the flameproof case and the terminal housing in Increased Safety.

The degree of protection of case is IP65.

Magnos206, Caldos25 and Caldos27 Analyzers

The Magnos206, Caldos25 and Caldos27 analyzers are installed in the flameproof case of the control unit. Only one of the analyzers can be installed at the same time.

Uras26 Analyzer

The case of the analyzer Uras26 is designed as a cylindrical field housing of die-cast aluminum in the type of protection "Flameproof Enclosure 'd'" to EN 60079-1. The data transmission and the power supply cable for connection to the control unit have been securely connected ex works and led through pressure-proof cable glands on the underside of the case.

The degree of protection of case is IP54 (with horizontal assembly, only with inserted O-ring seals).

Gas Connections

The gas connections are led through flame barriers. The material of the flame barriers and the screwed pipe joints is rust- and acid-resistant steel 1.4571.

Case Purging

In order to protect the electronic assemblies from an ingressing aggressive atmosphere or corrosive sample gas components, the flameproof case can be purged with air or inert gas.

The purge gas is fed in and conducted away via two flame barriers, which are open on the inside of the flameproof case.

Note: The case purging has no meaning in the sense of a pressurized enclosure to EN 60079-2.

Electrical Safety

Test to	EN 61010-1:2001
Class of protection	I
Overvoltage category	Power supply, signal inputs and outputs: III
Degree of pollution	2
Safe isolation	Electrical isolation of the power supply from the other circuits through increased or double insulation. Functional extra-low voltage (PELV) on the low-voltage side.

Electromagnetic Compatibility

Interference immunity	Test to EN 61326-1:2006. Inspection severity: Industrial area, complies with at least the rating "continuously monitored operation" to Table 2 of EN 61326.
Emitted interference	Test to EN 61326-1:2006, EN 61000-3-2:2006, EN 61000-3-3:1995 + A1:2001 + A2:2005. Threshold class B for interference field strength and interference voltages is complied with.

Information for the Installation, Maintenance and Repair of Electrical Installations in Hazardous Areas

Installation to EN 60079-14 (VDE 0165 Part 1)

The electrical apparatus must be installed according to EN 60079-14 (VDE 0165 Part 1) "Electric Apparatuses for Potentially Explosive Gas Atmospheres" Part 14: Electrical equipment in hazardous areas".

Equipotential Bonding

With respect to the equipotential bonding, the requirements of EN 60079-14 and DIN VDE 0100 Part 410 "Protection against electric shock" and part 540 "Earthing, PE conductors, equipotential bonding conductors" must be complied with.

Electrostatic Charging

Electrostatic charging must be avoided. In this respect, the trade association regulations for the "Avoidance of ignition hazards due to electrostatic charges" (BGR 132) must be complied with.

Monitoring and Testing

Electrical equipment in hazardous areas must be monitored for its correct condition. It must be checked by a qualified electrician as required, or at least every three years, unless it is permanently monitored by a responsible engineer.

Carrying out Work on Electrical Installations

Electrical installations in hazardous areas must be disconnected from the power supply before any maintenance work is carried out on them. The isolation point must be provided with a suitable warning sign e.g. "Do not switch on - explosion hazard".

This does not apply to apparatus which may be opened under normal operating conditions, e.g. recording instruments, or for which it is expressly noted in the type examination certificate.

Carrying out Work on Intrinsically Safe Circuits

Work may also be carried out under voltage on intrinsically safe circuits in hazardous areas.

However, the electrical data of the relevant test equipment (inductance, capacitance, current value and voltage values) must be considered.

Particular attention is required when carrying out work on intrinsically safe circuits, which have been installed in conjunction with zone 0.

Explosion Hazard

The explosion hazard must be eliminated before carrying out any repair work.

Qualified Personnel

Repair work may only be carried out by qualified personnel.

Original Spare Parts

Only original spare parts may be used for the repair.

Purge before Commissioning

If repair work is carried out on components of an electrical equipment, on which the explosion protection depends, an expert must check and certify that the essential explosion protection characteristics of the apparatus correspond to the construction and design of the apparatus described in the certificate before it is returned to service.

Repair by the Manufacturer

The repair can also be carried out by the manufacturer, e.g. locally by an employee of the ABB after sales service or at the manufacturer's works.

In this respect, an indication of the repairs carried out with a subsequent individual test is affixed to the type plate. A test by an expert is not required in this case.

This document is protected by copyright. The translation, duplication and distribution in any form, even in a revised edition or in extracts, in particular as a reprint, by photomechanical or electronic reproduction or in the form of storage in data processing systems or data networks are prohibited without the consent of the copyright holder and will be prosecuted under civil and criminal law.

ABB has Sales & Customer Support expertise in over 100 countries worldwide.

www.abb.com

The Company's policy is one of continuous product improvement and the right is reserved to modify the information contained herein without notice.

Printed in the Fed. Rep. of Germany (10.08)

© ABB 2008

ABB Automation GmbH
Analytical
Stierstaedter Strasse 5
60488 Frankfurt am Main
Germany
Phone: +49 69 7930-40
Fax: +49 69 7930-4566
E-Mail: analytical-mkt.deapr@de.abb.com

41/24-406 EN Rev. 1