SIEMENS

Continuous gas analysis

Thermal conductivity gas analyzer for measuring corrosive and non-corrosive gases

CALOMAT 62

Operating Instructions

Edition 12/2015

Answers for industry.

SIEMENS

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06/2015

A5E00881393-02

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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General Information 1

1.1 Information for our customers

Before beginning work with this device, please read this manual! It contains important information and data whose observation ensures proper device function and saves you servicing costs. The manual will help you to operate the device more easily and efficiently, allowing you to achieve reliable results.

1.2 General information

The product described in this manual has left the factory in a perfectly safe and tested condition. In order to preserve this condition and to operate this product correctly and safely, it may only be used in the manner described by the manufacturer. Furthermore, proper transportation, storage, installation, operation and maintenance of the device are vital for ensuring correct and safe operation.

This manual contains the information required for the intended use of the described product.

It is addressed to technically qualified personnel who are specially trained or who have the relevant knowledge of automation technology (measuring and control systems).

Knowledge and technically correct implementation of the safety notes and warnings contained in this manual are required for safe installation and commissioning, as well as for safety during the operation and maintenance of the described product. Only qualified personnel have the required professional knowledge for correctly interpreting the generally valid safety notes and warnings in this manual in each specific case and to act accordingly.

This manual is an inherent part of the scope of delivery, despite the fact that it can be ordered separately for logistic reasons.

Due to the variety of technical details, it is not possible to consider every single detail for all versions of the described product and for every conceivable case in the set-up, operation, maintenance and use in systems. For further information, or in the case of problems which are not covered in enough detail in this document, please request the required information from your local or responsible Siemens regional office.

Note

In particular, before using the device for new research and development applications, we recommend that you first contact us to discuss the application in question.

1.3 How to use this manual

1.3.1 Device version and validity

With the CALOMAT 62, you have acquired a device that is available in various designs (field device, rack-mounted device).

This manual considers both designs. Differences between rack-mounted and field devices are indicated in that the former have an **E** at the end of their name, and the latter have an **F**. In contexts applicable to both designs, the general name CALOMAT 62 is used.

1.3.2 Special information and warnings

This manual provides you with information on using, installing, operating, and maintaining the device.

Pay particular attention to all special information and warnings. Information of this type is set apart from the rest of the text and is marked with the corresponding pictograms. This information provides you with useful tips and helps avoid maloperations.

1.3.3 Hot surfaces

⚠ WARNING

Hot surfaces

Danger of burns resulting from hot surfaces. This is indicated by the corresponding warning symbol on the device.

- Take appropriate protective measures, for example, wear protective gloves.

1.4 Warranty conditions

We expressly point out that the product quality is exclusively and conclusively described in the sales contract. The content of this product documentation is neither a part of a previous or existing agreement, promise or legal relationship, nor is it intended to modify these. All obligations on the part of Siemens AG are contained in the respective sales contract, which also contains the complete and solely applicable liability provisions. The provisions defined in the sales contract for the responsibility for defects are neither extended nor limited by the remarks in this document.

1.5 Delivery information

The respective scope of delivery is listed on the shipping documents – enclosed with the delivery – in accordance with the valid sales contract.

When opening the packaging, please observe the corresponding information on the packaging material. Check the delivery for completeness and undamaged condition. In particular, you should compare the Order No. on the rating plates with the ordering data, if available.
If possible, please retain the packaging material, since you can use it again in case of return deliveries.

1.6 Standards and regulations

As far as possible, the harmonized European standards were the basis for the specification and production of this device. If no harmonized European standards have been applied, the standards and regulations for the Federal Republic of Germany are valid.

When this product is used beyond the scope of these standards and regulations, the valid standards and regulations of the country of the operating company apply.

Description

2

2.1 Field of application

Application

The CALOMAT 62 gas analyzer is primarily used for quantitative determination of hydrogen or helium in binary or quasi-binary gas mixtures.
Concentrations of other gases can also be measured if their thermal conductivities significantly differ from those of the accompanying gases.

Benefits

- Universally applicable hardware platform
- Open interface architecture (RS 485, RS 232, PROFIBUS)
- Glass-enclosed sensor, thus applications possible with highly corrosive gases
- Field device: gas-tight separation of electronics and analyzer unit, IP65, long service life even in harsh environments
- Field device: Approved for operation in potentially explosive atmospheres of Zone 2 and Zone 1.
  For details, refer to the ATEX manual A5E03312404.

Application examples:

- Chlorine-alkali electrolysis (0 ...10 % H_2 in Cl_2)
- Metallurgy (steel manufacture and processing)
- H_2 measurement in LNG (*Liquefied Natural Gas*) process
- Ammonia synthesis
- Manufacture of synthetic fertilizers

Main features

- Four measuring ranges which can be freely configured, even with suppressed zero, all measuring ranges are linear
- Very small spans possible (down to 1% H_2)
- Electrically-isolated analog output 0/2/4 to 20 mA (also configurable according to NAMUR)
- Selectable automatic or manual measuring range switching; remote switching is also possible
- Measured values can be stored during calibration
- Time constants can be selected within wide ranges (static/dynamic noise suppression), i.e. the response time of the device can be adapted to the respective measuring task
- Simple handling through menu-prompted operation (dialog) according to NAMUR recommendation
- Low long-term drift
- Two operation levels with separate authorization codes to prevent unintentional and unauthorized operator interventions
- External pressure sensor can be connected to correct fluctuations in the process gas pressure
- Possibility for correction of cross-influence of accompanying gases
- Automatic measuring range calibration can be configured
- PROFIBUS DP/PA
- Customized analyzer versions such as:
  - Customer acceptance
  - TAG labels
  - Drift recording

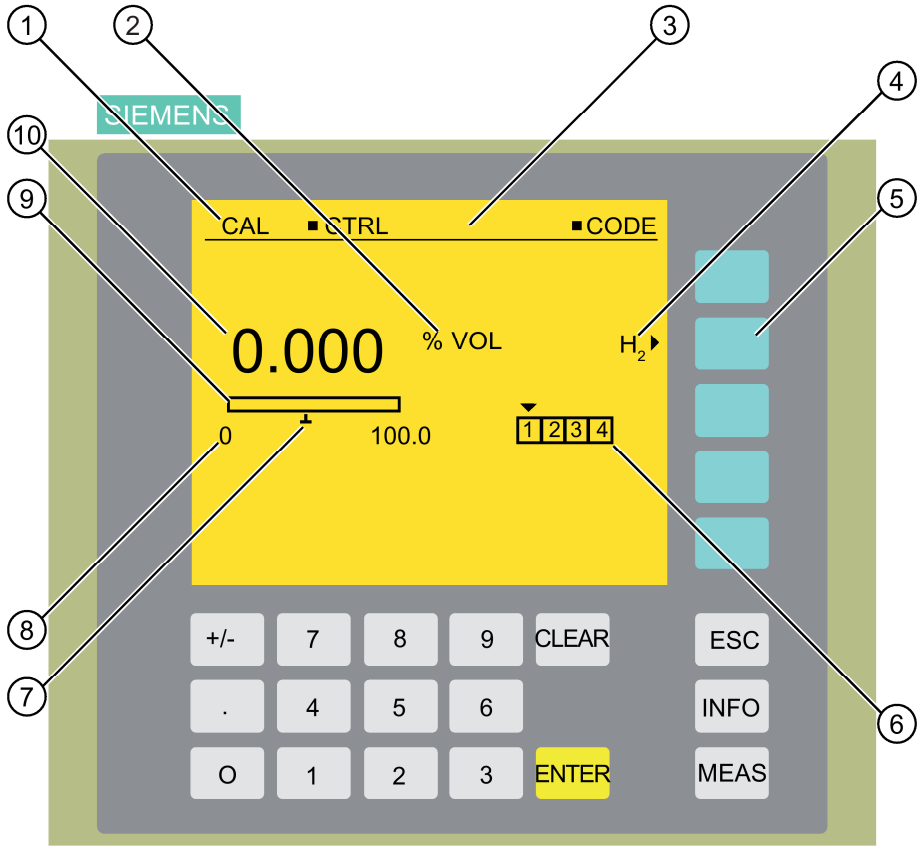
2.2 Design

Enclosure

- 19" rack-mounted device:
  - With 4 HU for installation in hinged bays or cabinets, with or without telescopic rails
  - Front panel can be swung down for servicing purposes (e.g. for RS 485 notebook connection)
  - Purging gas connections: pipe diameter 6 mm or 1/4"
- Filled housing for wall mounting:
  - Gas-tight separation between electronics and analyzer unit
  - Purging gas connections: pipe diameter 10 mm or 3/8"

Display and control panel

- Large LCD field for simultaneous display of measured value (digital and analog), analyzer state and measuring range
- Contrast of the LCD field is adjustable via menu
- Constant LED backlighting
- 5-digit measured value display (decimal point counts as digit)
- Washable membrane keyboard with five softkeys
- Menu-prompted operation for parameterization, configuration, test functions, calibration
- Operating help in plain text
- Graphical display of the concentration curve; time intervals can be configured
- Two-language operating software:
  German/English, English/Spanish, French/English, Spanish/English, Italian/English



CALOMAT 62

1 Status line for display of analyzer state (configurable)
2 Display of dimension
3 Status line
4 Display of measured component
5 Five softkeys for menu control
6 Display of active measuring range(s)
7 Limit marker on bargraph
8 Start-of-scale and full-scale values
9 Measured value display as bargraph
10 Measured value

Image 2-1 Display and control panel

Inputs and outputs

- Six freely-configurable binary inputs (e.g. for range switching, processing of external signals from sample preparation)
- Six freely-configurable relay outputs (e.g. for failure, maintenance request, maintenance switch, limit alarm, external solenoid valves)
- Two configurable analog inputs (e.g. for external pressure sensor and correction of cross-interference)
- Can be extended by eight additional binary inputs and eight additional relay outputs for automatic calibration with max. four calibration gases

Communication

- RS 485 included in the standard analyzer (connection at rear)

Options

- Converter to RS 232
- Linked in networks via PROFIBUS DP/PA interface
- SIPROM GA software as servicing and maintenance tool

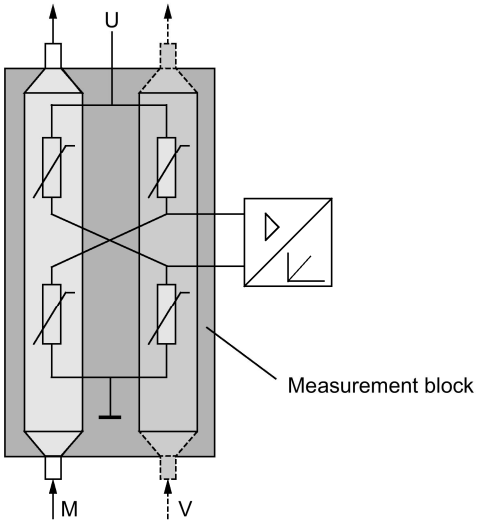
2.3 Mode of operation

Mode of operation

The measuring principle is based on the different thermal conductivities of gases.

The warming-up of a heated measuring resistor surrounded by gas depends on the thermal conductivity of the gas. Four such measuring resistors are connected into a Wheatstone bridge. The sample gas flows around two of the resistors, and reference gas around the other two. A constant DC voltage warms up the resistors above the temperature of the measuring block.

If the sample gas and reference gas have different thermal conductivities, the resistors are warmed up to different extents by the converted heating capacity. A change in the composition of the sample gas therefore results in a change in the resistance values. The electrical equivalence of the Wheatstone bridge is disturbed, and a voltage results in the bridge diagonal. This is a measure of the concentration of the measured components.



M Sample chamber
V Reference gas chamber (option: flow-type)

Image 2-2 Design of a thermal conductivity sensor

Wetted parts materials

- Sample gas and reference gas paths: stainless steel 1.4571 or Hastelloy C22
- Sensor: Glass
- Gaskets: FPM (FKM) or FFPM (FFKM)

2.4 Technical specifications

2.4.1 CALOMAT 62 in general

General technical data of CALOMAT 6	
Measuring ranges	4, internally and externally switchable; manual and automatic range switching is also possible
Largest possible span	Depends on application (see Section 3.4)
Conformity	CE marking according to EN 61326/A1

Electrical characteristics	
EMC – interference immunity 6) (electromagnetic compatibility)	According to standard requirements of NAMUR NE21 (08/98);
Electrical safety	According to EN 61010-1, overvoltage category II
Auxiliary power (see rating plate)	100 V AC -10 % to 120 V AC +10 %, 48 to 63 Hz or 200 V AC -10 % to 240 V AC +10 %, 48 to 63 Hz

Gas path	
Gas connections	Female thread 1/8"-27 NPT (according to ANSI B 1.20.1)
Gaskets (O–rings)	FPM (e.g. Viton) or FFPM (e.g. Kalrez)
Sensor	Glass
Leak-tightness	Loss through leaks < 0.5 µl/s

Gas inlet conditions	
Sample gas pressure	800...1100 hPa (absolute)
Sample gas flow	30...90 l/h (0.5...1.5 l/min)
Sample gas temperature	0 to 50 °C
Sensor temperature	Approx. 70 °C
Sample gas moisture content	< 90% RH [2)]

Measuring and time responses [5)]	
Warm-up time	< 30 min [3)]
Display delay T90 (including dead time)	Approx. 35 s
Damping (electronic time constant)	0 to 100 s, adjustable
Dead time (at 1 l/min)	Approx. 34 s (because of diffusion to sensor)
Output signal variation [7)]	<0.75 % of smallest possible measuring range according to rating plate with an electronic damping constant of 1 s (σ = 0.25 %)
Zero drift	< 1% / week of smallest possible span according to rating plate

Measuring and time responses [5]	
Repeatability	< 2% of respective span
Linearity deviation	< 2% of respective span
Accuracy [4]	The accuracy is the geometric total of the repeatability, output signal variation, drift and linearity deviation with constant influencing variables

Influencing variables [5]	
Ambient temperature	< 2%/ 10 K based on the smallest span according to rating plate
Accompanying gases	For zero deviation (influence of interfering gas), see Section 3.5
Sample gas flow	< 0.2 % of smallest possible span according to rating plate with a change in flow of 0.1 l/min within the permissible flow range
Sample gas pressure	< 1% of the respective span with a change in pressure of 100 hPa
Auxiliary power	< 0.1% of the output span with rated voltage ±10 %

Electric inputs and outputs	
Analog output	0 / 2 / 4 to 20 mA according to NAMUR, floating, max. load 750 Ω
Relay outputs	6, with changeover contacts, can be freely configured, e.g. for measuring range identification; max. load: 24 V AC/DC / 1 A, floating
Analog inputs	2, designed for 0 / 2 / 4 to 20 mA for external pressure sensor and correction of cross-interference
Binary inputs	6, designed for 24 V, floating, can be freely configured, e.g. for measuring range switching
Serial interface	RS 485
Options	Autocal function with eight additional binary inputs and eight additional relay outputs, also with PROFIBUS-PA or PROFIBUS-DP

Climatic conditions	
Permissible ambient temperature	-30 to +70 °C during storage and transport, +5 to +45 °C during operation
Permissible humidity [5]	< 90% RH [2] as annual mean, during storage and transport

1) Based on DIN EN 61207/IEC 120, i.e. the above technical specifications are based on the binary gas mixture H2 in N2! The measuring and time responses may deviate greatly with other gas mixtures
2) RH: relative humidity
3) Maximum accuracy is achieved after 2 hours
4) The error of the calibration gas must be considered in addition
5) Based on a sample gas pressure of 1000 hPa absolute, sample gas flow 0.5 l/min, and ambient temperature 25 °C
6) The dew point must not be fallen below!
7) All signal lines must be shielded

2.4.2 CALOMAT 62E rack-mounted device

Design, enclosure	
Degree of protection	IP 20 according to EN 60529
Position of use (analyzer)	Front panel vertical
Dimensions (analyzer)	383 x 177 x 390 mm
Weight (analyzer)	Approx. 10 kg

Electrical characteristics	
EMC – interference immunity 6) (electromagnetic compatibility)	According to standard requirements of NAMUR NE21 (08/98);
Electrical safety	According to EN 61010-1, overvoltage category II
Auxiliary power (see rating plate)	100 V AC -10 % to 120 V AC +10 %, 48 to 63 Hz or 200 V AC -10 % to 240 V AC +10 %, 48 to 63 Hz
Power consumption	Approx. 30 VA
Fuse ratings	100 ... 120 V T1L250V 200 ... 240 V T630L250V

Gas path	
Gas connections	Female thread 1/8"-27 NPT (according to ANSI B 1.20.1)
Gaskets (O–rings)	FPM (e.g. Viton) or FFPM (e.g. Kalrez)
Sensor	Glass
Leak-tightness	Loss through leaks < 0.5 µl/s
Internal gas path (gas lines)	Stainless steel 1.4571

2.4.3 CALOMAT 62F field device

Design, enclosure	
Degree of protection	IP 65 according to EN 60529
Position of use (analyzer)	Front panel vertical
Dimensions (analyzer)	438 x 503 x 311 mm
Weight (analyzer)	Approx. 25 kg

Electrical characteristics	
EMC – interference immunity 6) (electromagnetic compatibility)	According to standard requirements of NAMUR NE21 (08/98);
Electrical safety	According to EN 61010-1, overvoltage category II
Auxiliary power (see rating plate)	100 V AC -10 % to 120 V AC +10 %, 48 to 63 Hz or 200 V AC -10 % to 240 V AC +10 %, 48 to 63 Hz
Power consumption	Approx. 30 VA with non-heated gas connection block, approx. 330 VA with heated gas connection block
Fuse ratings (gas connection not heated)	100 ... 120 V F3/F4 T1L250V 200 ... 240 V F3/F4 T630L250V
Fuse ratings (gas connection block heated)	100 ... 120 V F1 T1L250V F2/F3/F4 T4L250V 200 ... 240 V F1 T630L250V F2/F3/F4 T250L250V

Gas path	
Gas connections	Female thread 1/8"-27 NPT (according to ANSI B 1.20.1)
Gaskets (O–rings)	FPM (e.g. Viton) or FFPM (e.g. Kalrez)
Sensor	Glass
Leak-tightness	Loss through leaks < 0.5 µl/s
Internal gas path (gas lines)	Stainless steel 1.4571 or Hastelloy C22

Gas inlet conditions	
Sample gas temperature with heated gas inlet	0 to 80 °C
Temperature of gas connection with heated gas inlet	Approx. 70 °C
Purging gas pressure	165 hPa, briefly 250 hPa

2.4.4 Spans

The smallest and largest spans depend on both the measured component (type of gas) and on the respective application.

The following tables list a selection of applications and the relevant smallest possible spans. The smallest possible spans listed below always refer to N_2 as the accompanying gas. With other gases with a larger/smaller thermal conductivity compared to N_2, the smallest possible span is correspondingly larger/smaller.

Table 2- 1 Overview of standard applications

Application	Range code number
H_2 in N_2; HCl; Cl_2	0; 5
Cl_2 in air	1; 6
Cl_2 in HCl	3; 7
HCl in air	1; 6
NH_3 in N_2	4; 8
SO_2 in air	1; 6
CO_2 in H_2	0; 5
CO_2 in N_2	1; 6

Table 2- 2 Assignment of possible spans

Range code number	Possible span
0	0 ... 1 % / 100 %
1	0 ... 5 % / 100 %
2	0 ... 5 % / 60 %
3	0 ... 10 % / 100 %
4	0 ... 20 % / 40 %
5	100 ... 99 % / 0 %
6	100 ... 95 % / 0 %
7	100 ... 90 % / 0 %
8	100 ... 80 % / 60 %

2.4.5 Influence of interfering gases

Knowledge of the sample gas composition is required to determine the influence of accompanying gases with several interfering components.

The following table lists the zero offsets in % H_2 caused by 1 % accompanying gas (interfering gas) in each case; the values indicated are approximate.
It should be noted that the influence of the interfering gas is not linearly follow its concentration. Knowledge of the sample gas composition is required to determine the influence of accompanying gases with several interfering components.

Table 2- 3 Effect of gas component with nitrogen as a accompanying gas, expressed in % H_2

Gas	Zero offset
Ar	-0.15 %
O_2	+0.02 %
CH_4	+0.17 %
CO_2	-0.13 %
SO_2	-0.31 %
As comparison:	
Air (dry)	+0.25 %

Moreover, it must be noted that, in addition to a zero offset, the gradient of the characteristic can also be affected by the accompanying gas.
However, this effect is negligible for fluctuations below 10 % in the concentration of the interfering gas.
Taking these facts into consideration and due to the fact that the cross-interference analyzers cause further measuring inaccuracies, a larger measurement error occurs than with binary gas mixtures despite correction of cross-interference.

2.4.6 Gas flow charts

2.4.6.1 CALOMAT 62-E

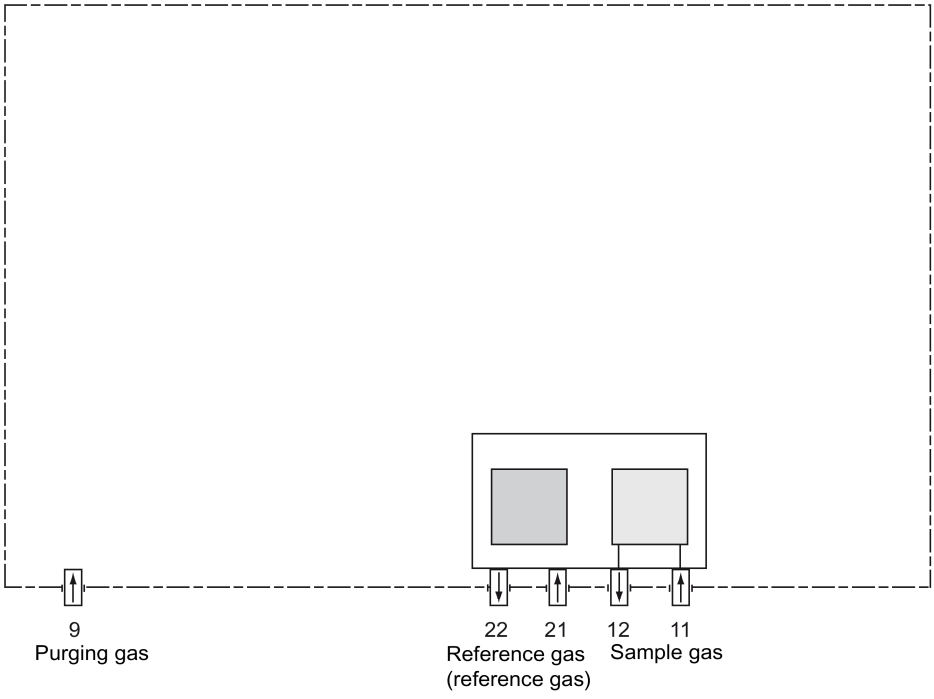


Image 2-3 CALOMAT 62-E gas flow chart

2.4.6.2 CALOMAT 62-F

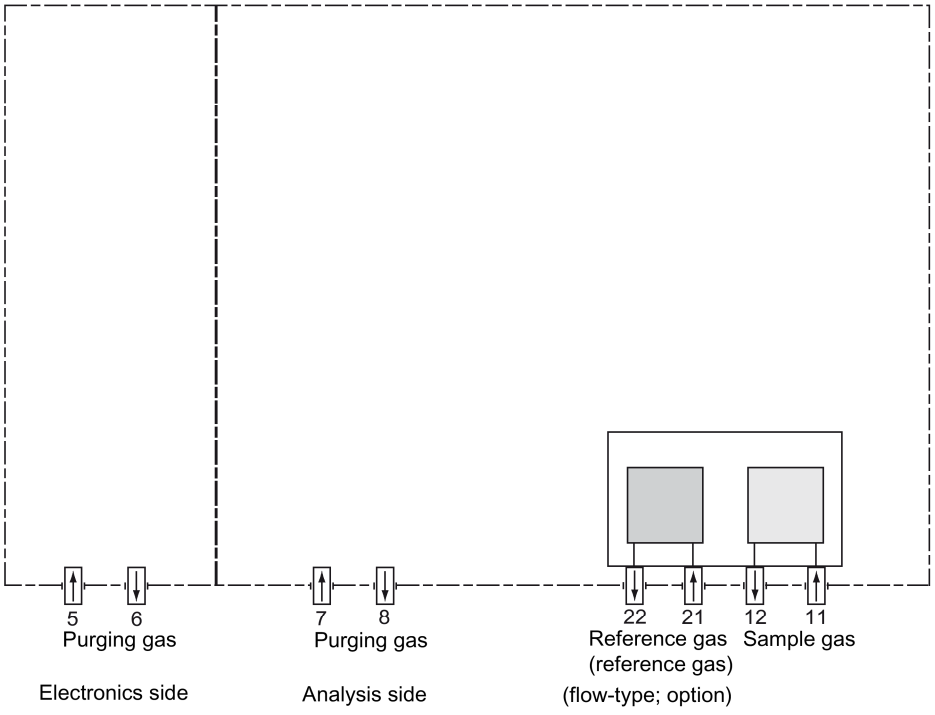


Image 2-4 CALOMAT 62-F gas flow chart

2.4.7 Dimensional drawings

CALOMAT 62F field device

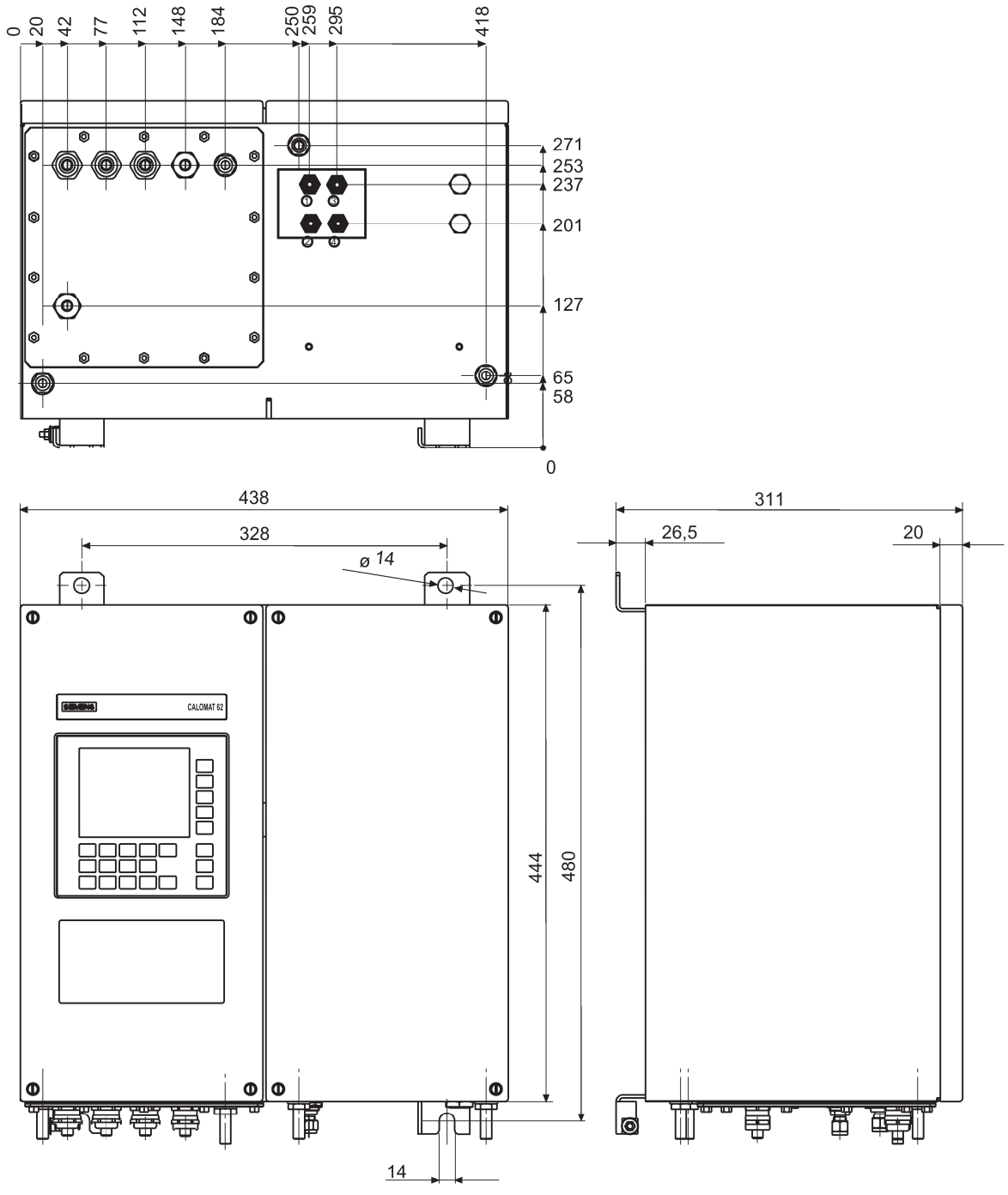


Image 2-5 Dimensional drawing of CALOMAT 62F field device

CALOMAT 62E rack-mounted device

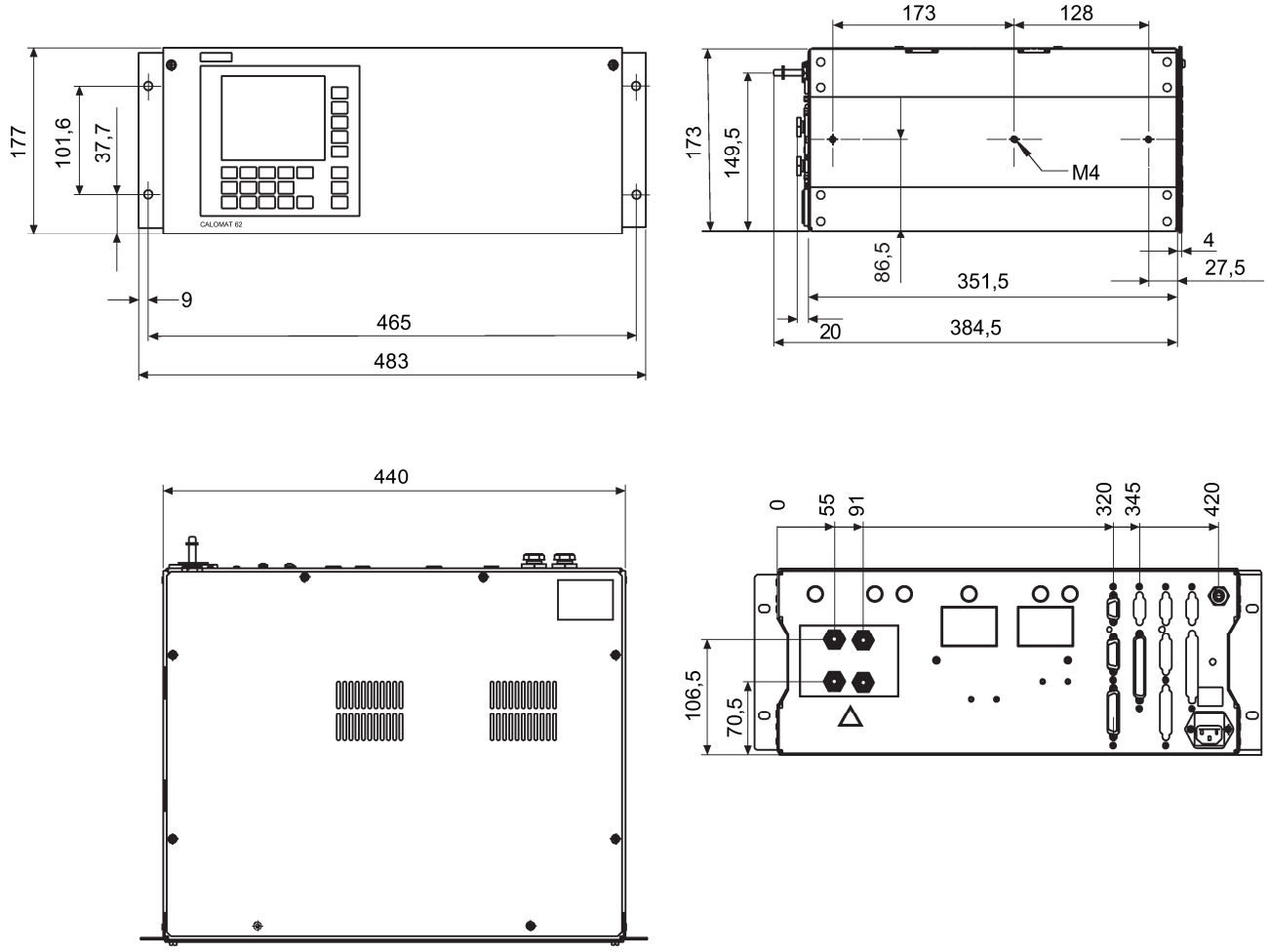


Image 2-6 Dimensional drawing of CALOMAT 62E rack-mounted device

2.5 Communication

2.5.1 General information

All gas analyzers of series 6 as well as the ULTRAMAT 23 offer the following communication facilities:

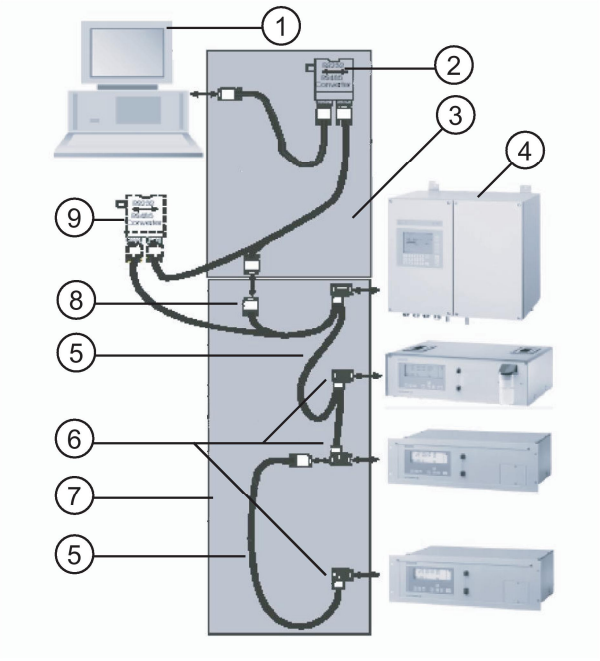
- ELAN interface (RS485)
- SIPROM GA
- PROFIBUS DP/PA
- Generic communications interface (only ULTRAMAT 6E, OXYMAT/ULTRAMAT 6E, OXYMAT 61, OXYMAT 6).

2.5.2 ELAN interface

ELAN interface

ELAN is a standard integrated serial interface (RS 485) which allows communication with several analyzers. You can network up to 12 analyzers.

The functional principle of the ELAN interface is shown in the following figure:



1 Computer
2 RS485/RS232 converter with RS 485 and RS 232 cable
3 RS485 bus connector with jumper
4 Analyzer
5 RS485 cable
6 RS485 bus connector
7 RS485 network
8 9-pin Sub-D plug
9 Optional: RS485 repeater

Image 2-7 Typical structure of an ELAN network (RS485)

Interface parameters

Parameter	Value
Level	RS485
Baud rate	9600
Data bit	8
Stop bit	1
Start bit	1
Parity	None
No information feedback	

Ordering information	Article No.
Interface description	C79000-B5200-C176
Converter RS485-RS232 including SIPROM GA	C79451-Z1589-U1
RS485/Ethernet converter	A5E00852383
RS485/USB converter	A5E00852382
SIMATIC cable / bus line	6XV1 830-0EH10
SIMATIC bus connector	6ES7 972-0BB11-0XA0
9-pin Sub-D plug	6ES7 972-0BB11-0XA0
Repeater	6ES7 972-0AA01-0XA0

Further information can be found in the ELAN interface description:

Article numbers:

- C79000-B5200-C176 German
- C79000-B5274-C176 English

2.5.3 SIPROM GA functions

SIPROM GA is a software tool especially for service and maintenance tasks. All analyzer functions, whether as a single device or several linked together, can be remotely operated and monitored this way.

Functions:

- Display and storage of device data
- Remote operation of device functions
- Parameter and configuration settings
- Comprehensive diagnostics information
- Remote calibration
- Online help
- Cyclic storage of measured values
- Status on hard disk and export to commercially available user programs
- Download of new software
- Drift values according to QAL 3, DIN EN 14181

Hardware requirements:

- PC/laptop Pentium 133 MHz, RAM 32 MB, CD-ROM drive
- At least 35 MB free disk space
- VGA graphics card supported by Windows
- Printer supported by Windows
- Vacant COM port for direct coupling to ELAN RS485 network
- For connection of the Ethernet/485 interface converter, a standard network of 10 Mbit or 100 Mbit (RJ 45 connection) with TCP/IP is necessary.
- In the case of an RS485 network, the distance should not exceed 500 m. If this distance is exceeded, a repeater must be used.

Software requirements:

- Windows 98
- Windows 2000
- Windows XP
- Windows Vista
- Windows 7

The SIPROM GA software is available on the Internet and can downloaded from the following address: http://support.automation.siemens.com/WW/llisapi.dll?aktprim=0&lang=en&referer=%2fWW%2f&func=cslib.csinfo&siteid=csius&groupid=4000002&extranet=standard&viewreg=WW&nodeid0=10806991&objaction=csopen

2.5.4 PROFIBUS DP/PA

PROFIBUS DP/PA is the leading fieldbus on the market. All Siemens gas analyzers with an optional – also retrofittable – plug-in card are Profibus-compatible and comply with the binding "Device profile for analyzers" defined by the PNO (PROFIBUS International). Central access to the system analyzers is possible with the SIMATIC PDM software tool.

"Fieldbus" is the name of a digital communication system with which distributed field devices of a system are linked to each other over a single cable and are simultaneously connected to programmable controllers or a process control system.

The PROFIBUS-DP version is widespread in factory automation due to its high transmission speed per device, while PROFIBUS-PA takes the required properties of process engineering into account, such as use in hazardous areas.

The benefit is the considerable savings potential in all areas of the system, covering project planning and commissioning, operation and maintenance, up to subsequent system extensions.

Operation of the gas analyzers from a control system or a separate PC is possible with the SIMATIC PDM software tool (Process Device Manager). This software executes under Windows XP/Windows 2000 and can also be integrated in the SIMATIC PCS 7 process control system. With this, the integration of the devices in the system as well as the complex parameter structure of the analyzers can be clearly illustrated. Operating becomes simply a matter of "clicking".

PROFIBUS International (PNO) is an independent institution and represents the interests of many manufacturers and users. This organization offers services such as consulting, training and device certification, and understands its primary job as the further development, standardization and promotion of PROFIBUS technology. The binding functionality definition for a device class in the form of a profile is the condition for standardized device behavior from various manufacturers, the so-called interoperability. The binding profile for analyzers was defined at the end of 1999. With this, the interaction of all PROFIBUS-compatible devices of a system is guaranteed.

In this profile, the functionalities of the analyzers are defined in a block model: for example, the physical block describes the measuring procedure, analyzer and manufacturer name, serial number and the operating state (operation, maintenance). Different functional blocks contain the execution of certain functions, such as measured value and alarm processing. The transducer blocks describe the function of the actual measuring process, as well as its control, e.g. the pre-processing of a measured value, correction of cross-interferences, characteristics, measuring ranges, as well as switching and control processes. The data transmission between the bus participants is defined in protocols.

A distinction is made between cyclic and acyclic services. Time-critical data, such as measured values and status, are transmitted with cyclic services. The acyclic services allow device parameters to be queried or changed during operation.

All gas analyzers of Series 6 (ULTRAMAT 6, OXYMAT 6/61/64, CALOMAT 6/62 and FIDAMAT 6 as well as ULTRAMAT 23) are PROFIBUS-compatible with an optional plug-in card, which can also be retrofitted.

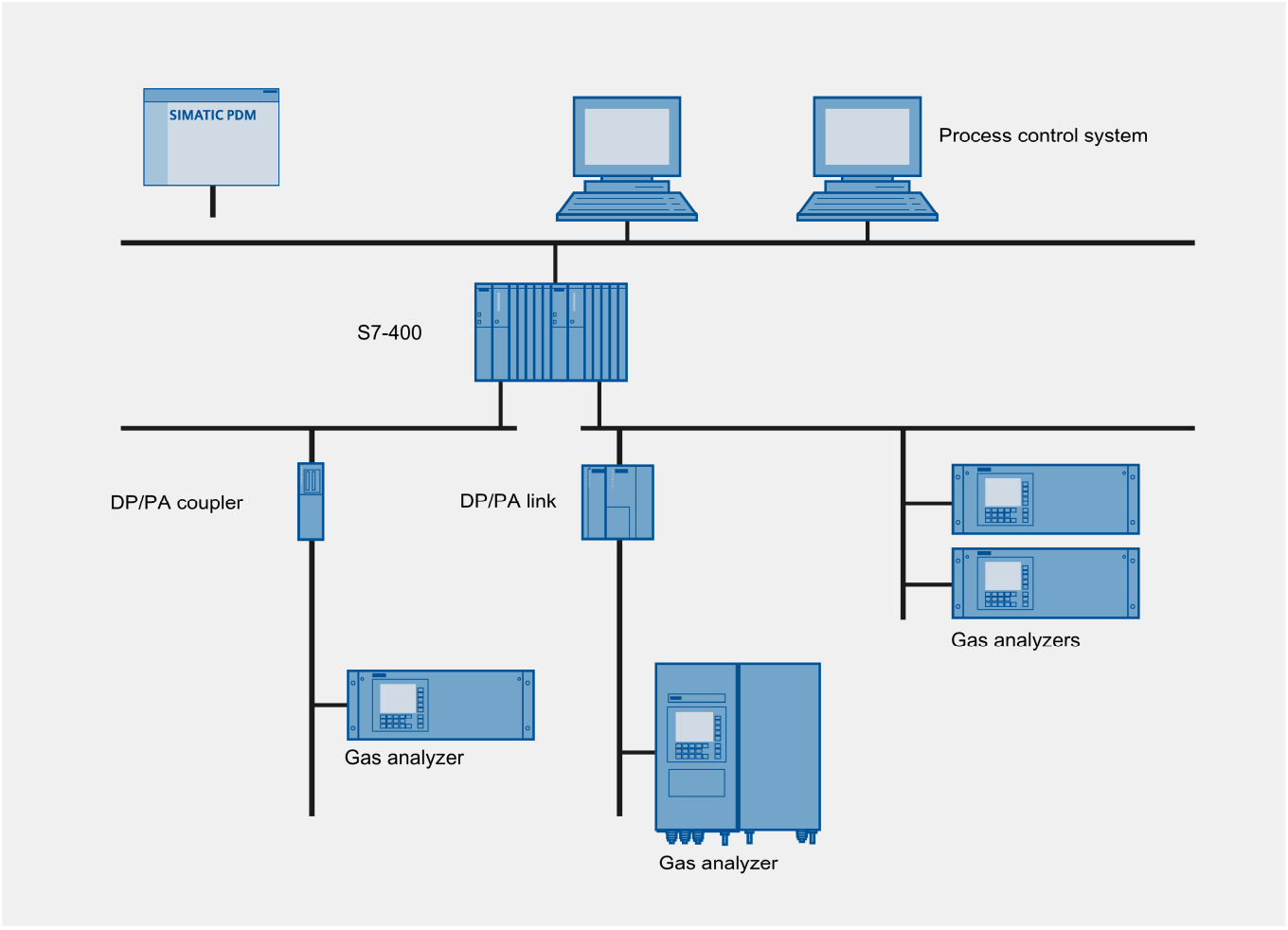


Image 2-8 Typical structure of a PROFIBUS system

Installing and connecting 3

3.1 Safety information

It is essential to observe the following statements and information!

⚠ WARNING

Electrical safety

Certain parts of this device are under dangerous voltage. The enclosure must be closed and grounded before switching on the device. Failure to comply with this can result in death, personal injury and/or damage to property. Also read section Electrical connection (Page 39) for more on this.

⚠ WARNING

Flammable sample gases

Explosive gases or gas mixtures must not be introduced into the device!

Toxic and/or corrosive sample gases

If toxic or corrosive sample gases are introduced into the device, the exhaust gases must be discharged such that there is no danger to persons, plants or the environment.

Ex protection

The CALOMAT 62E may not be operated in potentially explosive atmospheres.

⚠ CAUTION

Gas path materials

Only gases or gas mixtures may be introduced into the device to which the materials in the gas path are corrosion-resistant.

Danger of burns

Heated devices always have an outside temperature of 70 °C! Furthermore, the temperature only drops slowly because of the high thermal capacity of the materials. Therefore, temperatures up to 70 °C can still be present long after devices are switched off.

Touching can therefore result in skin burns.

You should therefore always use protective gloves when working on this device!

Purging the enclosure

With the CALOMAT 62E rack-mounted device there is no need to purge the enclosure if it can be guaranteed that there is a natural exchange of air from the environment. However, this consideration only applies to a limited extent when introducing toxic or corrosive sample gases. In this case, the threshold limit value (TLV according to TGRS 900) must also be considered (see also dangerous materials directive 2005 or equivalent international directives).

With the CALOMAT 62F field device, the enclosure must always be purged with at least 1 l/min. This consumption of purging gas can be reduced if it is guaranteed that the purging gas pressure is always at least 50 Pa above the sample gas pressure, ensuring that no sample gas can escape from leaks. The purging gas must be collected using a suitable setup, and discharged environmentally-friendly via an exhaust line.

Purging of the enclosure can only be omitted if non-toxic gases or flammable gases/gas mixtures below the lower explosion limit (LEL) are introduced into the device.

Liability

Following commissioning, the plant owner is fully responsible for the device.

NOTICE

Incorrect mounting

The device can be damaged, destroyed, or its functionality impaired through improper mounting.

- Before installing ensure there is no visible damage to the device.
- Make sure that process connectors are clean, and suitable gaskets and glands are used.
- Mount the device using suitable tools. Refer to the information in Auto-Hotspot for installation torque requirements.

3.2 Installation requirements

Installation conditions

Select an installation location which is as vibration-free as possible.

During operation, make sure that the permissible ambient temperature of 5 °C to 45 °C is observed. If the device is not installed in a closed room, make sure that it is not exposed to direct sunlight.

Rack-mounted device

The CALOMAT 62E must only be operated in closed rooms. If you install it in a cabinet or a desktop housing, place it on supporting or telescopic rails. You can also install it in a swivel frame. It is not sufficient to only secure the front side, since the weight of the device loads the chassis too greatly.

When installing in control cabinets, provide ventilation such that the exchange of air is above 1/h.

Field device

To install field devices of type CALOMAT 62F, use a support dimensioned according to IEC/EN 61010-1 which must be able to bear up to four times the weight of the device.

The enclosure must be securely anchored at all four mounting points.

Due to the heavy weight, the brackets must be correctly dimensioned.

Sample gas line

Use a material resistant to the sample gas for the gas inlet and outlet lines.

Gas preparation

To prevent contamination of parts wetted by the sample gas, and thus influencing of the quality of the measurement, the sample gases must be introduced to the analyzer free of oil, grease and dust. It is also necessary to prevent the generation of dusts ≥ 2 µm and condensation. It must be guaranteed that the dew point of the sample gas is always significantly lower than the lowest temperature of the components wetted by the sample gas.

It is therefore necessary in most applications to use a gas preparation system adapted to the measuring task.

Gas connections

Refer to the dimensional drawings for the assignments of the gas connections.

All sample gas inlets and outlets have a female thread 1/8"-27 NPT according to ANSI B 1.20.1.

Before fitting the NPT threaded joint, it must be provided with appropriate sealing mass or tape. Use a fork wrench with appropriate jaw size to tighten the threaded joint. Otherwise there is a danger that the gas path will leak.

The device must be subject to an annual leak test to ensure the functionality of the sample and comparison gas paths. The plant owner can extend this test interval in individual cases if negative influences resulting from chemical corrosion upon the gas path components wetted by the sample gas are not to be expected.

A leak test must always be carried out following servicing work on the sample gas path.

3.3 Electrical connection

3.3.1 General Information

⚠ WARNING

For the electrical installation, observe VDE 0100 or an equivalent international standard for setting up high-voltage systems having nominal voltages under 1000 V.

Failure to comply with these regulations can result in death, personal injury and/or damage to property.

Notes on installation

If signals (e.g. analog output 4...20 mA) are to be introduced into a hazardous area of zone 1, these must be intrinsically-safe. This requires additional upgrading of the device with energy-limiting modules. The Ex identification of these modules must be attached clearly visibly on the enclosure.

To avoid electrostatic charges and scratches, the control panel (window and keyboard) must only be cleaned with a damp cloth.

Use of the keyboard is only permissible for servicing purposes (diagnostics, calibration/adjustment).

Cable feed-throughs

Special care must be taken with the cable feed-throughs, since carelessness can endanger safety. Required torque and permissible cable diameter range of screwed glands:

M20 x 1.5: 3.8 ± 0.2 Nm; cable diam.: 7...12 mm
M20 x 1.5: 5,0 ± 0.2 Nm; cable diam.: 10...14 mm

All connected cables must be secured.

3.3.2 Mains connection

- The device comes with an appliance plug which may only be connected to the mains supply line by qualified personnel. The mains supply line must comply with the valid regulations and conditions for the place of installation and be provided with a protective conductor which lies at the potential of the enclosure. The cross-section of each wire must be ≥ 1 mm². Connect the phase conductor to the marked position in the plug.
- Install the mains line separately from the signal lines.
- Provide a mains disconnection device in the direct vicinity of the device (for load rating, see rating plate). It must be readily accessible and marked.
- Check whether the existing mains voltage agrees with the mains voltage specified on the rating plate.

3.3.3 Safety bracket on rack devices

The enclosed safety bracket protects the power plug in rack devices from being disconnected unintentionally. It must be particularly fitted for installations in hazardous areas of FM/CSA Class I, Div. 2.

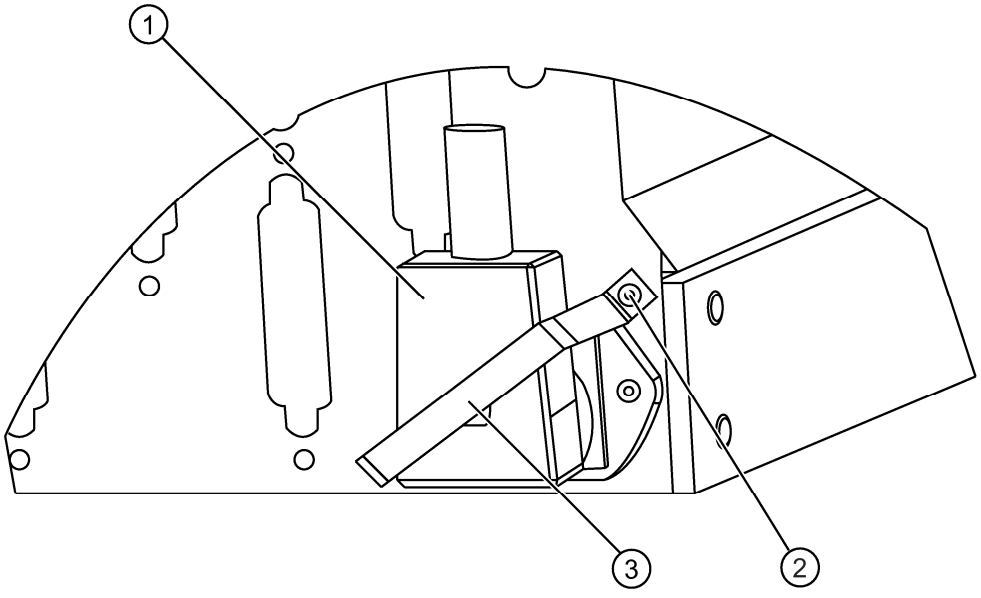


Image 3-1 Safety bracket for power plug in rack devices

1 Power plug
2 Screw
3 Safety bracket

3.3.4 Connection of the signal lines

WARNING

Only connect the signal lines to devices which have reliable electric isolation from their power supply.

- The connection lines to the relay outputs, the binary inputs, the analog inputs and the analog output must be shielded.
- The reference ground of the analog inputs is the potential of the housing.
- The analog output is floating.
- As a measure to suppress sparking across the relay contacts (e.g. limit relays), RC elements must be connected as shown in the following figure. Note that the RC element results in a drop-out delay for an inductive component (e.g. solenoid valve). It must also be ensured that a non-polarized capacitor is used.

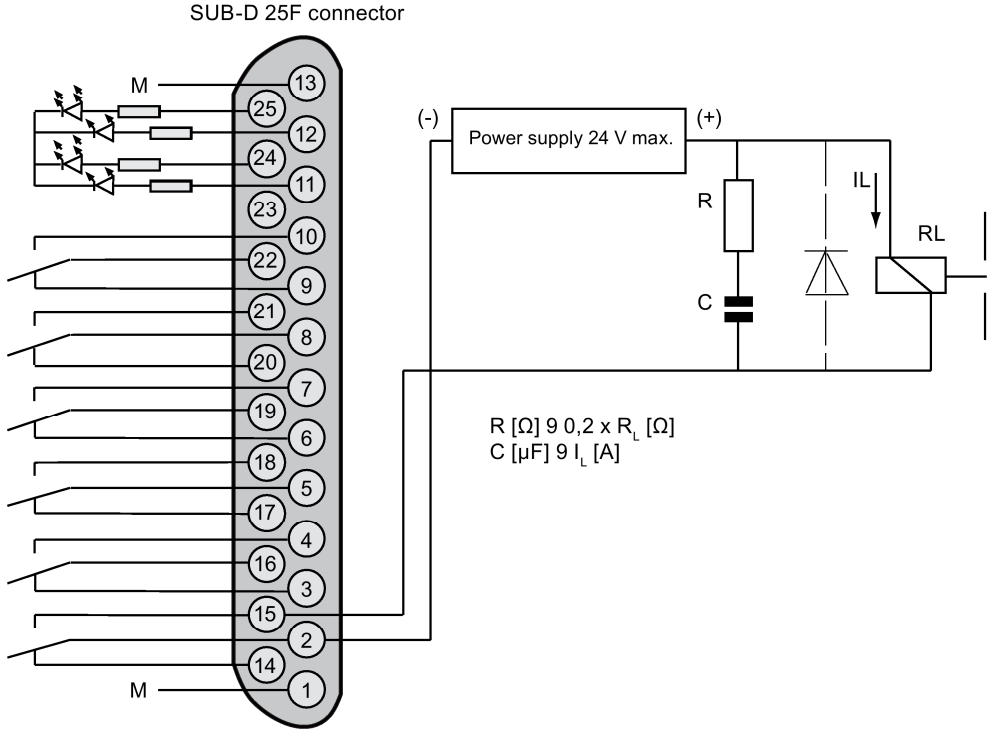


Image 3-2 Example of spark suppression on a relay contact

- **CALOMAT 62E rack-mounted device:**
  Connect the signal lines to the SUB-D connectors on the rear of the device.
- **CALOMAT 62F field device:**
  Connect the signal lines to terminal blocks A and B (optional). These are located on the flange board on the base of the left side of the enclosure.
- Refer to the ELAN interface description (Order No. C79000-B5274-C176) for details on the interface cable.

Note

All connection lines (except for the mains connection line) must be shielded. The shielding of the connected lines must have a large-area and continuous contact at the respective screw couplings. The core cross-section must be ≥ 0.5 mm². We recommend cables of type JE-LiYCY...BD. The cable length of the analog output depends on the load.

3.3.5 Pin assignments

3.3.5.1 CALOMAT 62E motherboard

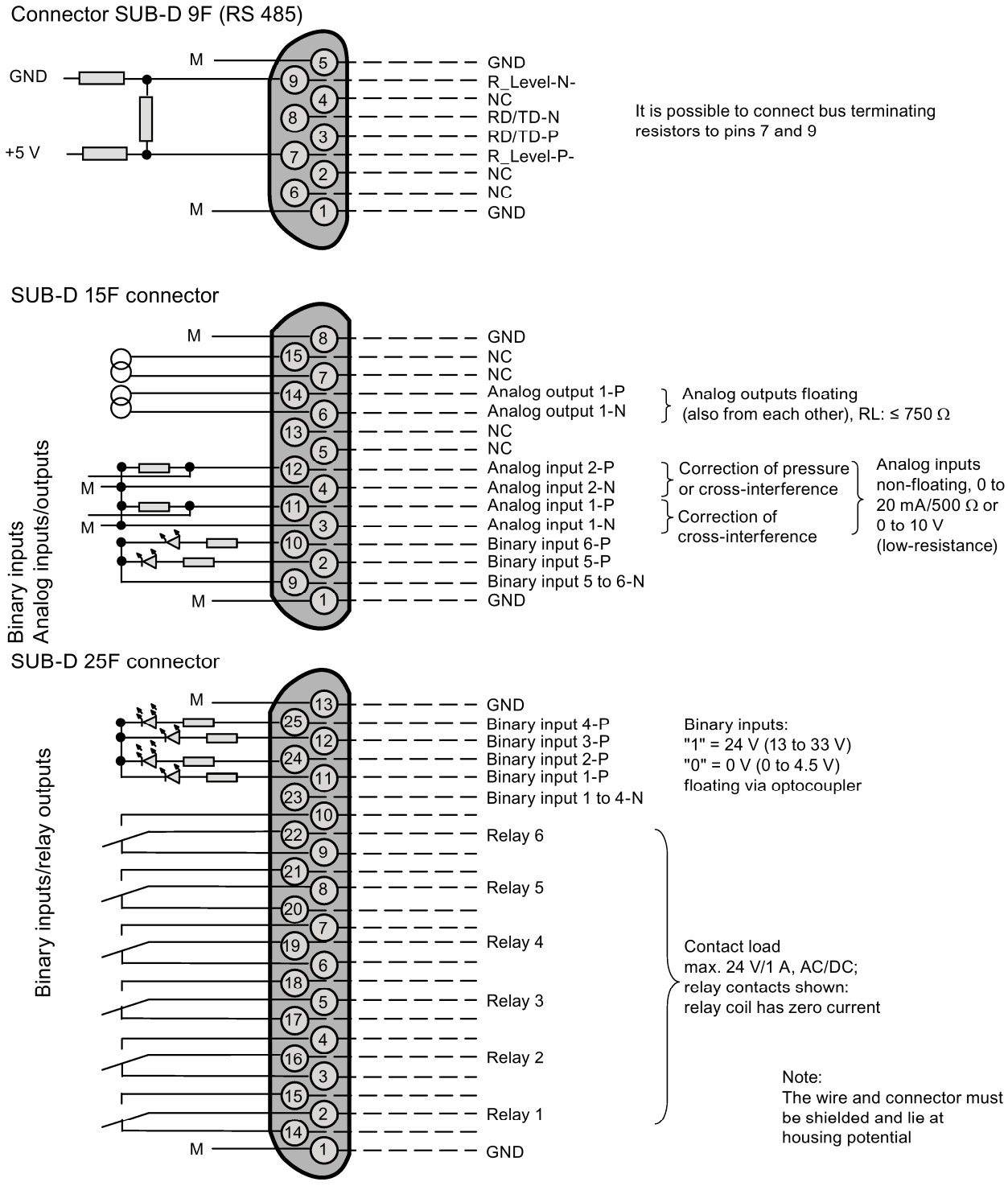


Image 3-3 CALOMAT 62, 19" rack unit, motherboard pin assignments

3.3.5.2 AUTOCAL board of CALOMAT 62E

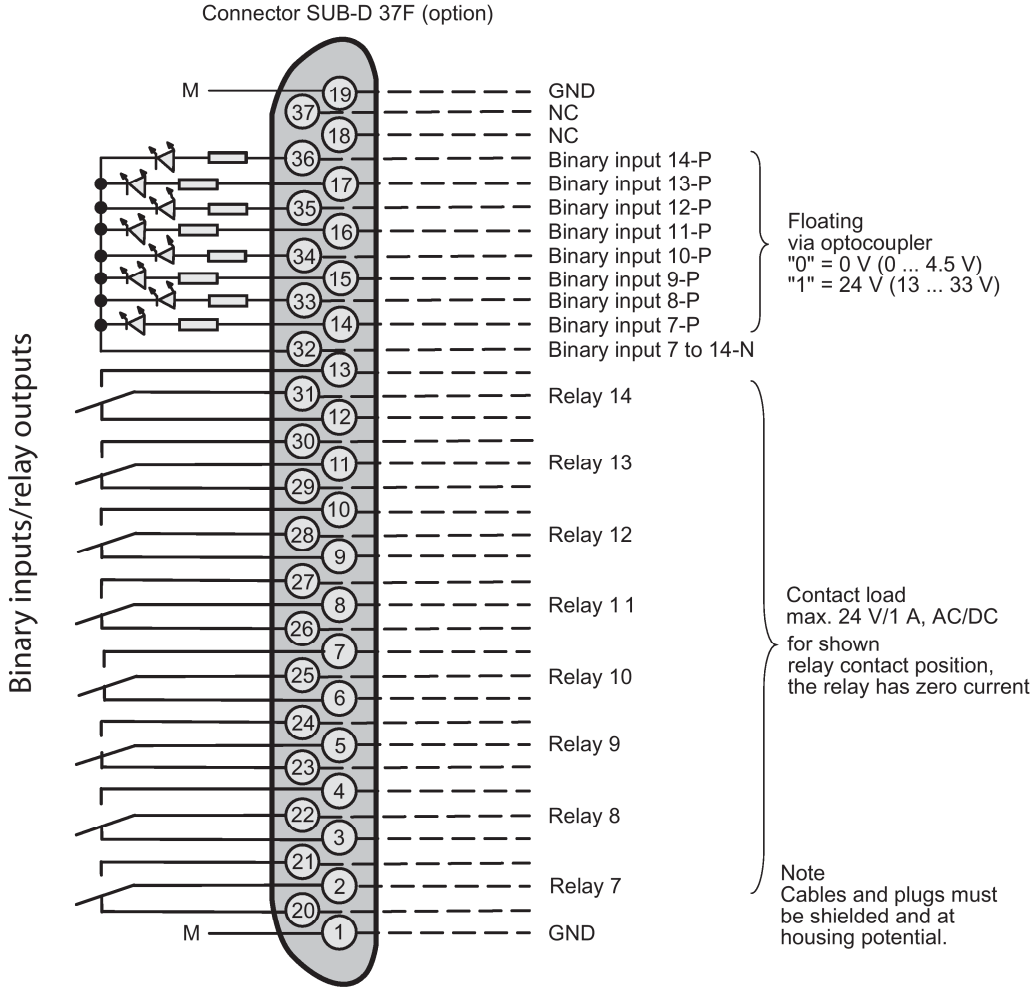


Image 3-4 Pin assignments of AUTOCAL module of CALOMAT 62E

Other supplementary electronics (e.g. PROFIBUS) are described in the supplied documents.

3.3.5.3 CALOMAT 62F motherboard

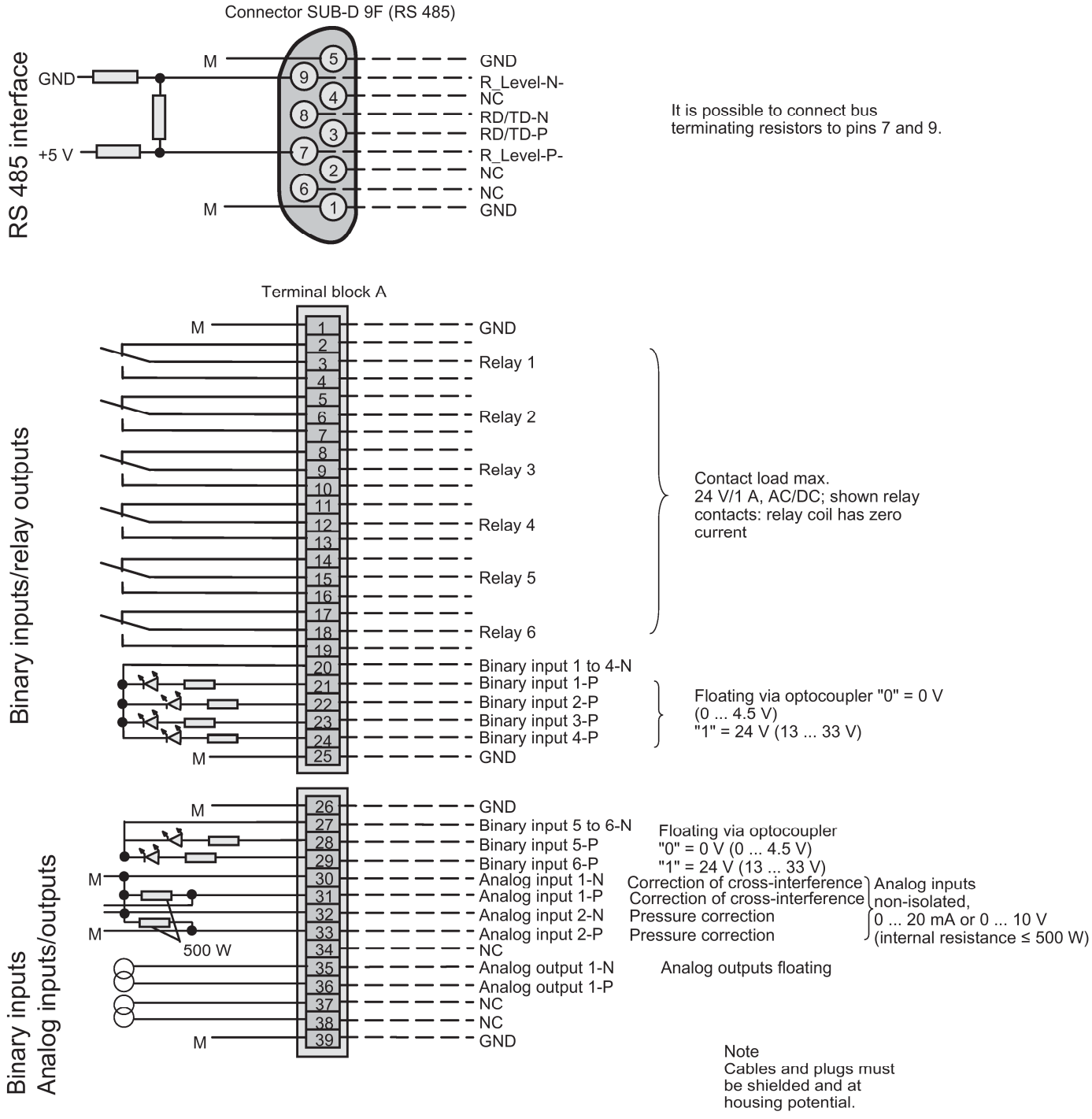


Image 3-5 Pin assignments of motherboard of CALOMAT 62 field device

3.3.5.4 AUTOCAL board of CALOMAT 62F

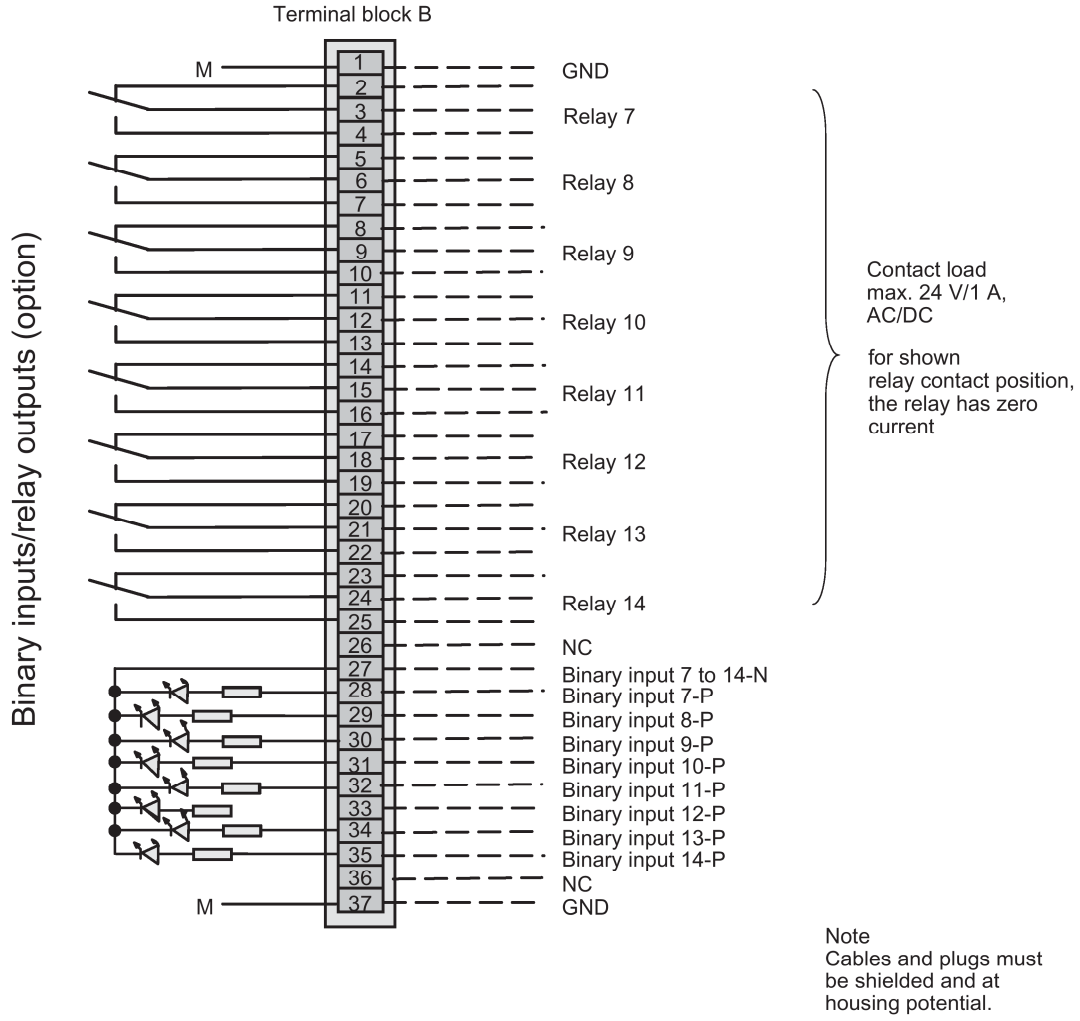


Image 3-6 Pin assignments of AUTOCAL module of CALOMAT 62F

Other supplementary electronics (e.g. PROFIBUS) are described in the supplied documents.

3.3.5.5 ELAN interface cable

Interface cable specification

Parameter	Value
Characteristic impedance	100 to 300 Ω for a measuring frequency of > 100 kHz
Cable capacitance	Typ. < 60 pF per meter
Core cross-section	> 0.22 mm2 , equivalent to AWG 23
Cable type	Twisted pair, 1x2 conductors
Signal attenuation	Max. 9 dB along the entire length of the conductor segment
Shielding	Copper braiding shield or braided shield and foil shield

Bus terminating resistors

For connection of bus terminating resistors, place a jumper from pin 3 to pin 7 and from pin 8 to pin 9 in the first and last connectors of a bus line (see figure "Pin assignments").

Note

For a conductor length longer than 500 m or with high interferences, we recommend that a repeater be installed. For additional information, please refer to the ELAN interface description.

Order Nos.:

- C79000-B5200-C176 German
- C79000-B5276-C176 English

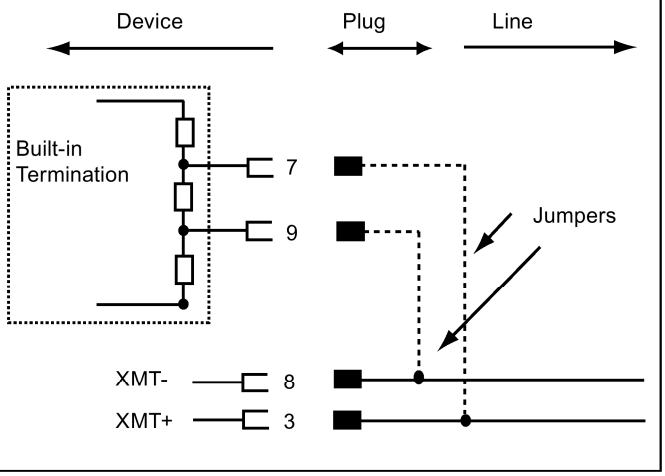
<table>
<tr><td rowspan="3">ULTRAMAT 6
OXYMAT 6
CALOMAT 6
FIDAMAT 6
CALOMAT 62
OXYMAT 61
OXYMAT 64
ULTRAMAT 23</td><td>XMT+</td><td>3</td></tr>
<tr><td>XMT-</td><td>8</td></tr>
<tr><td>Selectable termination using jumpers</td><td> 
</td></tr>
</table>

Image 3-7 Pin assignments

3.4 Dimensions for preparing installation

3.4.1 Dimensions of CALOMAT 62E rack-mounted device

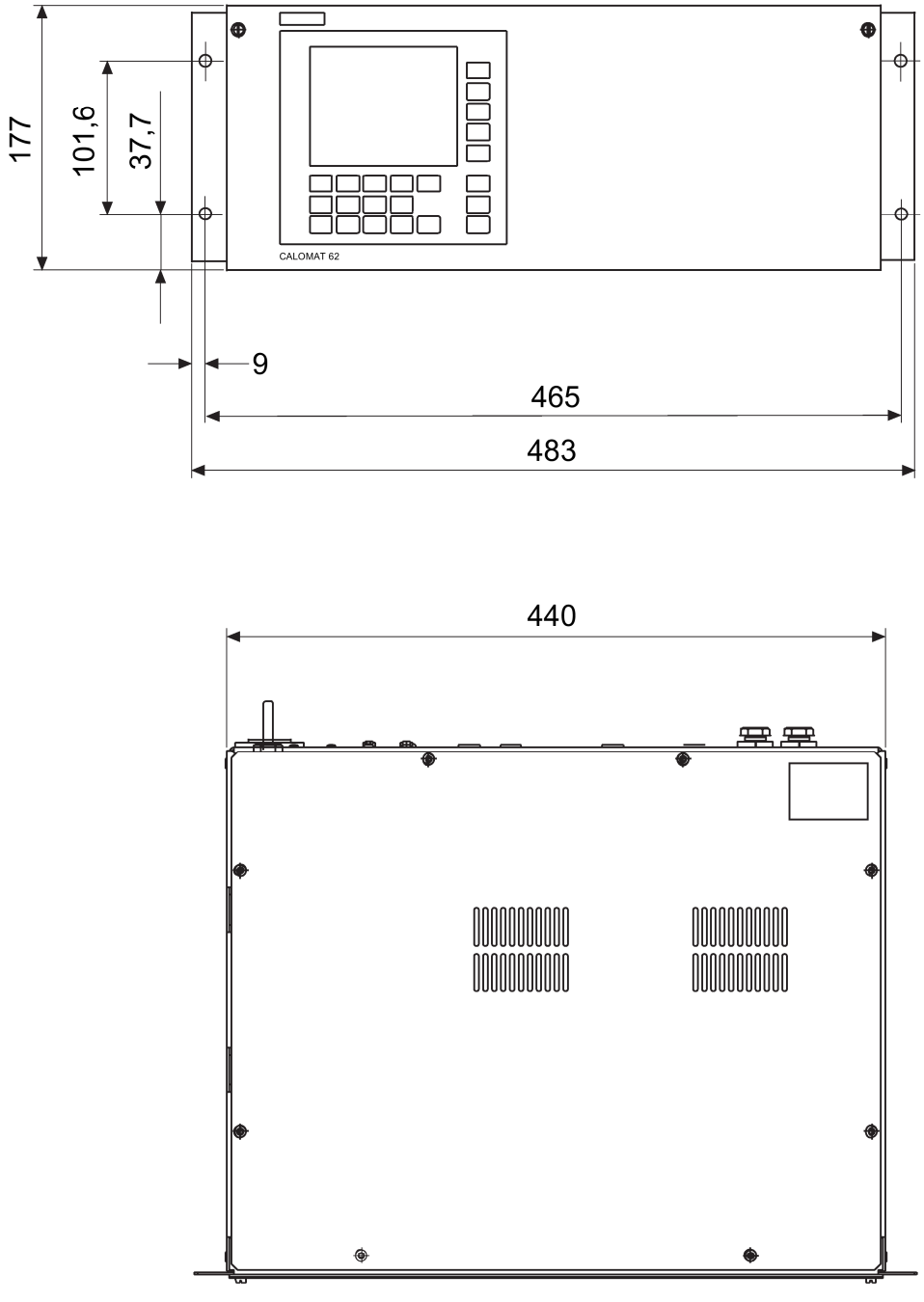


Image 3-8 Dimensions for preparing installation of CALOMAT 62E (front view and plan view)

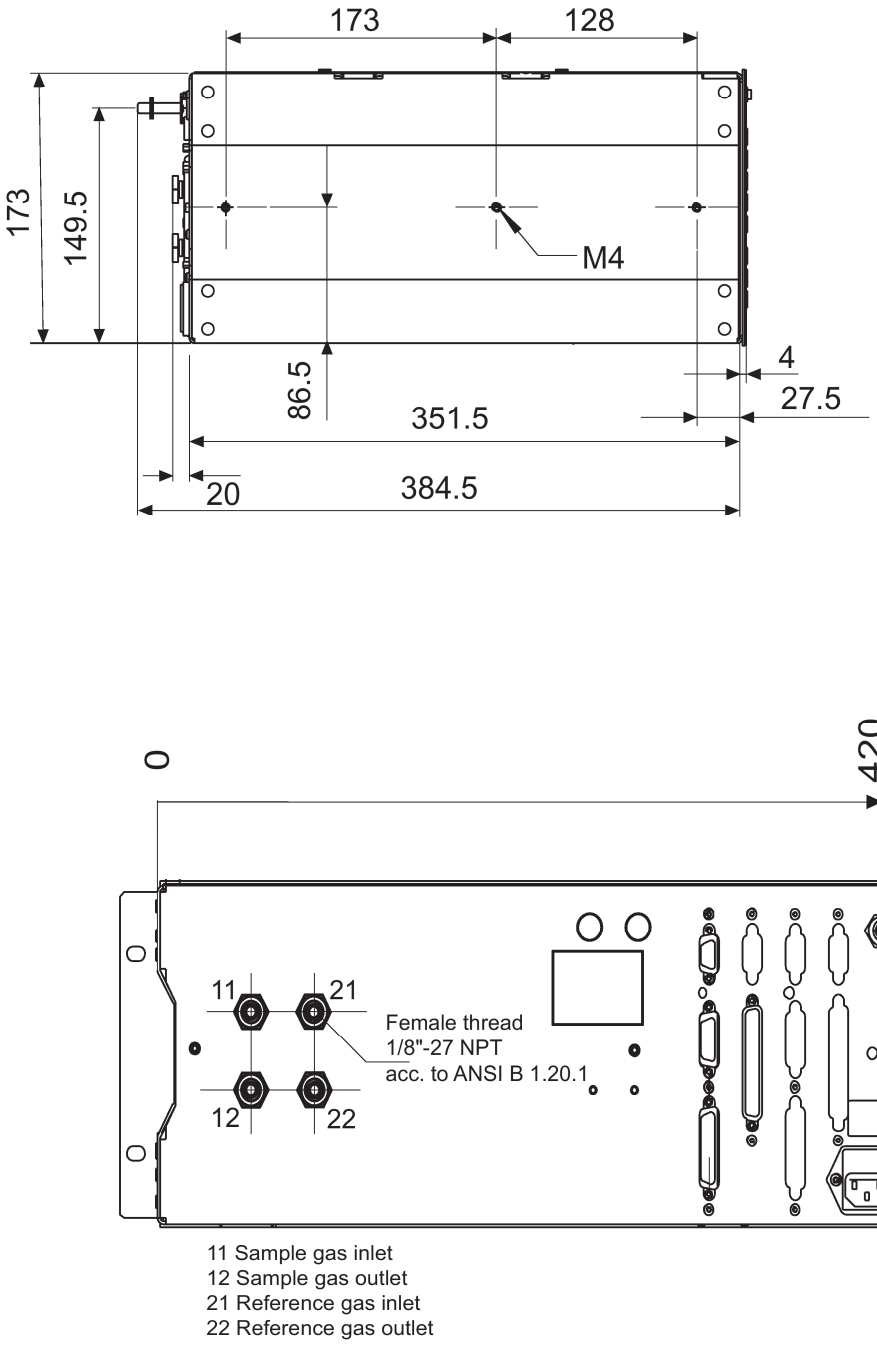
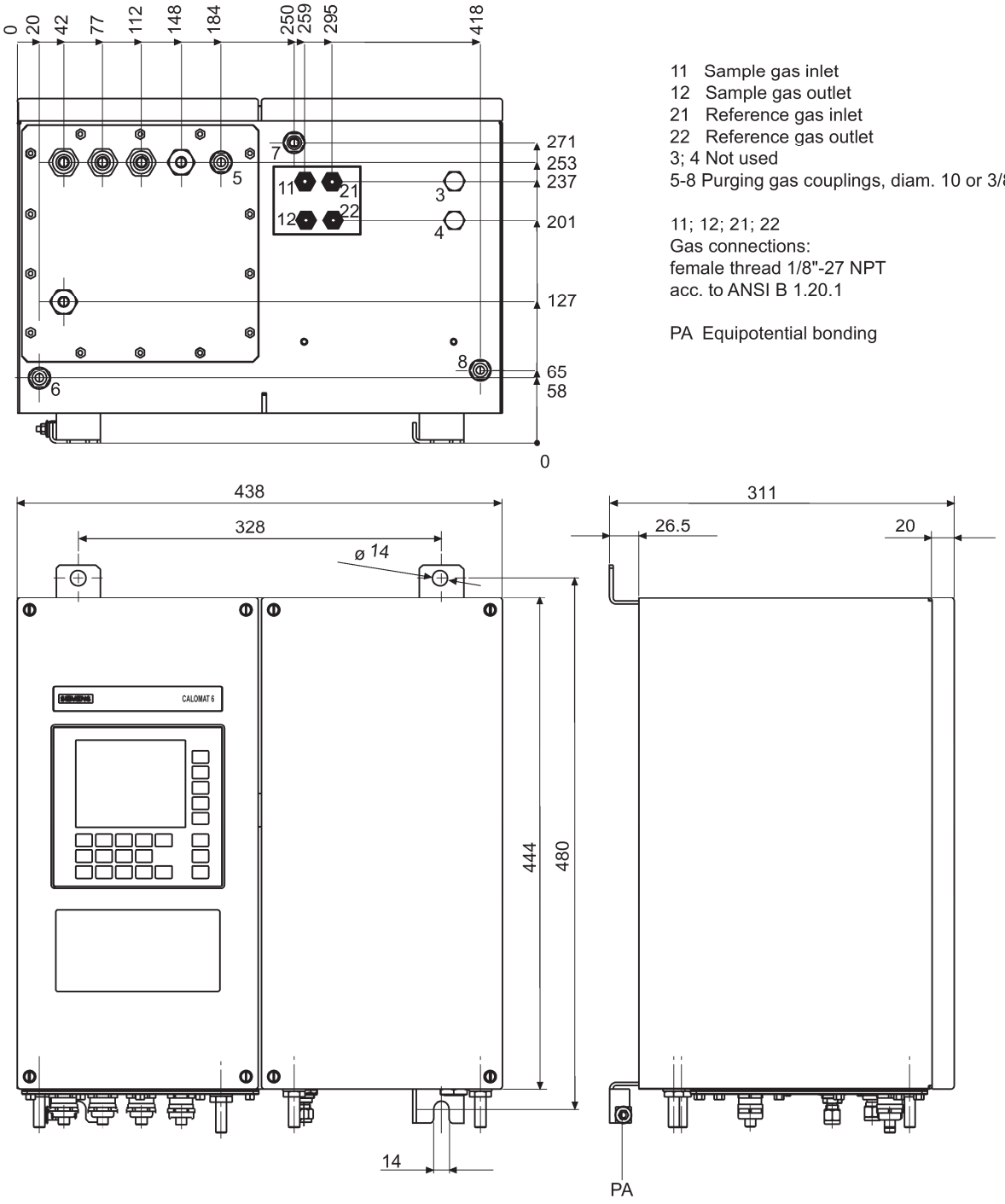


Image 3-9 Dimensions for preparing installation of CALOMAT 62E (side view and rear view)

3.4.2 Dimensions of CALOMAT 62F field device



11 Sample gas inlet
12 Sample gas outlet
21 Reference gas inlet
22 Reference gas outlet
3; 4 Not used
5-8 Purging gas couplings, diam. 10 or 3/8"

11; 12; 21; 22
Gas connections:
female thread 1/8"-27 NPT
acc. to ANSI B 1.20.1

PA Equipotential bonding

Image 3-10 Dimensions for preparing installation (bottom view, front view and side view) of CALOMAT 62F

Commissioning

4

4.1 Safety information

It is essential to observe the following statements and information!

⚠ WARNING

Electrical safety

Certain parts of this device are under dangerous voltage. The enclosure must be closed and grounded before switching on the device. Failure to comply with this can result in death, personal injury and/or damage to property. Also read section Electrical connection (Page 39) for more on this.

⚠ WARNING

Flammable sample gases

Explosive gases or gas mixtures must not be introduced into the device!

Toxic and/or corrosive sample gases

If toxic or corrosive sample gases are introduced into the device, the exhaust gases must be discharged such that there is no danger to persons, plants or the environment.

Ex protection

The CALOMAT 62E may not be operated in potentially explosive atmospheres.

⚠ CAUTION

Gas path materials

Only gases or gas mixtures may be introduced into the device to which the materials in the gas path are corrosion-resistant.

Danger of burns

Heated devices always have an outside temperature of 70 °C! Furthermore, the temperature only drops slowly because of the high thermal capacity of the materials. Therefore, temperatures up to 70 °C can still be present long after devices are switched off.

Touching can therefore result in skin burns.

You should therefore always use protective gloves when working on this device!

Purging the enclosure

With the CALOMAT 62E rack-mounted device there is no need to purge the enclosure if it can be guaranteed that there is a natural exchange of air from the environment. However, this consideration only applies to a limited extent when introducing toxic or corrosive sample gases. In this case, the threshold limit value (TLV according to TGRS 900) must also be considered (see also dangerous materials directive 2005 or equivalent international directives).

With the CALOMAT 62F field device, the enclosure must always be purged with at least 1 l/min. This consumption of purging gas can be reduced if it is guaranteed that the purging gas pressure is always at least 50 Pa above the sample gas pressure, ensuring that no sample gas can escape from leaks. The purging gas must be collected using a suitable setup, and discharged environmentally-friendly via an exhaust line.

Purging of the enclosure can only be omitted if non-toxic gases or flammable gases/gas mixtures below the lower explosion limit (LEL) are introduced into the device.

Liability

Following commissioning, the plant owner is fully responsible for the device.

4.2 General information for commissioning

Operation

Before connecting and switching on the device, the operator must have made himself familiar with the device operation.

Interfaces

Before use, the interfaces must be correctly allocated and configured.

Noise damping

The output signal fluctuations caused by noise in the measured signal can be reduced using function 50. This function offers you the option of parameterizing a low-pass filter which can be assigned a time constant up to 100 s.

Temperature influence

Compensation of the temperature influence depends on the application, and is only necessary in exceptional cases. This particularly applies to measuring ranges outside the standard applications (consultation with the responsible technical department is strongly recommended).

The compensation parameters required are stored in the software. During operation, make sure that the permissible ambient temperature of 5 °C to 45 °C is observed.

Pressure influence

The thermal conductivity is a variable which is independent of pressure within a wide range. Pressure compensation is nevertheless possible if required, where an external pressure transmitter is then connected.

4.3 Gas preparation

Make all gas preparation elements upstream of the analyzer (gas sampling devices, gas cooling devices, condensation vessels, filters, and any connected controllers, recorders or indicators) ready for operation. Refer to the associated operating instructions.

4.4 Checking for leaks

Checking for leaks

Carry out a leak test prior to commissioning or following each maintenance measure which affects the sensor or the gas path. This is carried out as follows:

1. Connect the sample gas outlet to a relative pressure manometer (e.g. U-tube manometer with measuring range 0 to 150 hPa, resolution 0.1 hPa).
2. Apply air to the sample gas inlet.
   As soon as an overpressure of approx. 100 hPa has been reached (measure using manometer at sample gas outlet), block the sample gas inlet.
3. Wait approx. one minute until the enclosed air has become adapted to its environmental conditions. Then record the pressure.
4. Wait a further 5 minutes, and then read the pressure.
   The gas path is sufficiently leakproof if the pressure drop is below 1 hPa/min.

For device versions with a flow-type reference gas chamber, proceed in the same manner as in 1 to 4.

If the leak test is unsuccessful, replace the gaskets of all threaded joints.

Note

It must be guaranteed during the measurement that the temperature of the gas path and sensor remains constant.

Before switching on the device and introducing sample gas, the operator must be acquainted with device operation.

4.5 Commissioning and operation

4.5.1 General information

Check

Before switching the device on, check that all gas connections have been made and are leakproof, and that the required pressures are present at the inlets.

Switch on the power supply

The sensor is in the warm-up phase for the first 30 minutes. The **CTRL** message (function check) appears in the status bar during this time. The full accuracy of the device is achieved after approx. 2 hours.

Note

Please note the information given in Section 3.4 "Electrical connection".

4.5.2 Measuring ranges

Measuring ranges / spans

The desired spans (start-of-scale and full-scale values of measuring range) can be defined using function 41. The start-of-scale / full-scale values are allocated to the values 0/2/4 mA to 20 mA of the analog output current.

If you enter the same values for the start-of-scale and full-scale of a measuring range, this range is considered as non-existent.

We recommend that you allocate the smallest span (MS) to measuring range 1 and the respectively larger ones to ranges 2 – 4. In general, the following is true for the allocation: MS1 < MS2 < MS3 < MS4.

Change measuring ranges

The linearized characteristic for the largest measuring range (according to the rating plate) is stored in memory. If the largest measuring range (function 41) is changed, this full-scale value must not be exceeded.

The smallest measuring range (according to the rating plate) must not be fallen short of, since in this case the noise and temperature influences on the measured value will increase relative to the measuring range, which would impair repeatability and worsen the drift behavior.

Setpoint point 1 (zero point)

Enter setpoint 1 using function 22. This applies to all measuring ranges. Note that point 1 usually corresponds to the physical zero, i.e. the difference between reference gas and zero gas is 'zero'.

Physically suppressed zero

If the start-of-scale value is not at a concentration of zero, reference is made to measuring ranges with suppressed zero. In this case a reference gas is selected which allows the physical zero to be set to the desired start-of-scale value (not customary) or full-scale value (usually).

Example:
Measuring range with suppressed zero: 95 - 100 % H_2 in N_2. H_2 is usually selected as the reference gas for this application, so that the physical zero is then at 100 % H_2. The setpoint 100 % must then be entered in function 22.
The situation is different for the assignment of the analog current output: in this case the start-of-scale value (usually 4 mA) can be assigned to the 'full-scale value' 95 % H_2, and the full-scale value (20 mA) can be assigned to the 'start-of-scale value' 100 % H_2.

If a zero gas is selected whose concentration does not correspond to the physical zero, it can be expected that noise and temperature errors will increase as the interval from the physical zero increases. This applies likewise to non-suppressed zeros.

Setpoint point 2 (span)

The setpoint of point 2 (span) must be as far from the point 1 as possible (at least 60% of the respective full-scale value). Provide the corresponding calibration gas for the span calibration. Enter the setpoint using function 21.

The displayed setpoint must agree with the calibration gas value. If this is not the case, make them agree using function 22.

Select the leading measuring range using "Total calibration".

4.5.3 General information on calibration

Note

Calibration is only possible when the device is in the "Measure" operating state.

Zero and span calibrations

Introduce zero gas or calibration gas at a rate of 0.5 ... 1.5 l/min (30 ... 90 l/h) to the device. Calibrate the zero using function 20, and the span using function 21.

Note

With the correction of cross-interference activated during a calibration procedure, the influence of interfering gas is not considered. Therefore a calibration gas without interfering gas components must always be used when calibrating the CALOMAT 62.

Single/total calibration

Single calibration means that each measuring range is calibrated using its own calibration gas. This is recommendable if the ratio of the spans is greater than 1:10.

Only the leading measuring range (selectable using function 23) is calibrated in the case of a total calibration, the other ranges are derived using the switching ratio.

4.5.4 Calibration examples

a)

Measuring range: 0 – 5 % H_2 in N_2

Zero gas: 100 % N_2

Calibration gas: 4.68 % H_2 in N_2

Step	Procedure	Fct. No.	Input	Remark
1	Select start-of-scale and full-scale values of measuring range	41	0 - 5	Assignment 0 % ⇒ 0(2/4) mA Assignment 5 % ⇒ 20 mA
2	Enter setpoints for zero and span	22	0	Zero setpoint
			4,68	Span setpoint
3	Calibrate zero	20		Introduce nitrogen
4	Calibrate span	21		Introduce calibration gas

b)

Measuring range: 95 - 100 % H_2 in N_2 (suppressed zero)

Zero gas: 100 % H_2

Calibration gas: 95,3 % H_2 in N_2

Step	Procedure	Fct. No.	Input	Remark
1	Select start-of-scale and full-scale values of measuring range	41	95 - 100	Assignment 0 % ⇒ 0(2/4) mA Assignment 5 % ⇒ 20 mA
2	Enter setpoints for zero and span	22	100	Zero setpoint
			95,3	Span setpoint
3	Calibrate zero	20		Introduce zero gas
4	Calibrate span	21		Introduce calibration gas

Note

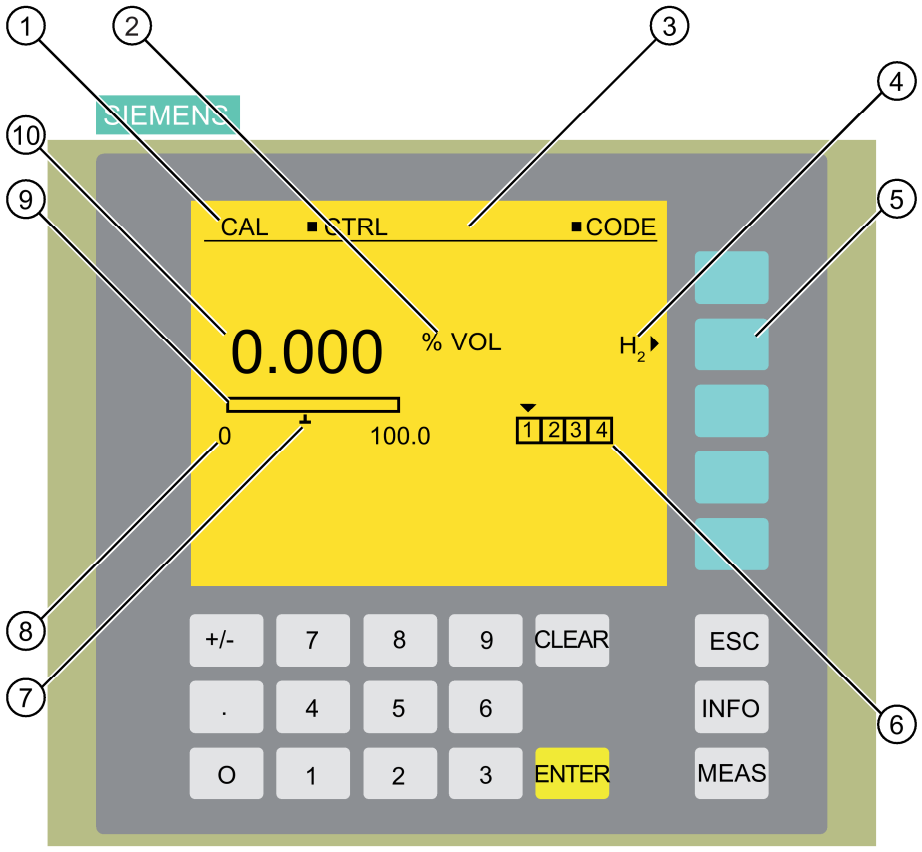
The operation and input options of the named functions are described in detail in "Operation".

Operation

5

5.1 General information about operation

5.1.1 Measured value display and control panel



CALOMAT 62

1 Status display
2 Display of dimension
3 Status line
4 Display of measured component
5 Buttons with varying function (softkeys)
6 Display of activated measuring ranges with the current range marked
7 Limit marker on bargraph
8 Start-of-scale and full-scale values
9 Analog display of measured value
10 Measured value

Image 5-1 Measured value display and control panel

Table 5- 1 Button meanings

Button	Meaning/function
CLEAR	Clears the commenced number input
ENTER	Every number entered (except fast activation of a function) must be confirmed with [ENTER].
ESC	Jumps back one step in the operating structure. Changes are accepted without need for confirmation.
INFO	Information about current menu / current function
MEAS	Jump back from every position in the operating structure to the "Decoded display mode" (you may be asked to confirm the entered data). Pressing the [MEAS] button again changes to "Coded display mode", i.e. another change in the "Operator control mode" requires the entry of the corresponding code.
Softkey	Varying function; possible here are: • Submenu selection / function selection • Selection of a subfunction

Note

Representation

The representation of the screen menu is based on the example of an H_2 application. As a result, either H_2 or MK (= measured component) appear as measured component.

5.1.2 Editing inputs

The values in the menus shown in this chapter are meant as examples.

An active input field is shown with colons (e.g.: 10:) as a limiter. The cursor blinks under the number to be entered.

By pressing the [ENTER] button, you finish your input and the value is stored. If there are several input fields on one function screen, the cursor positions itself at the next input field at the same time.

Note

Confirm every entered value, even the last of several values in a function, before exiting the function with [ENTER]!

With the [CLEAR] button, you can clear a number which you have begun to enter. The cursor then jumps back to the first position of the input field.

Graphic symbols

■ = activated (ON state; also in status message in the status line)

□ = deactivated (OFF state; also in status message in the status line)

► = access a submenu/subfunction

● = trigger a function/subfunction (e.g. Start calibration...)

5.1.3 Device operating modes

Table 5- 2 Device operating modes

Mode	Properties	Remarks
Coded display mode	• Measured value display is shown • Protected submenus can only be reached by entering a code • The current operating state of the device (except for "Measure") is displayed in the bottom line • Functional check not active	The device only supplies reliable measured values in this mode, as far as it's in the "Measure" operating state. From the operator control mode, you can reach this mode by pressing the [MEAS] button twice.
Decoded display mode	• Measured value display is shown • The submenus protected by the entered code are accessible • The current operating state of the device (except for "Measure") is displayed in the bottom line • Functional check active • Measured value can be influenced	From the operator control mode, you can reach this mode by pressing the [MEAS] button once and confirming or discarding the made entries.
Operator control mode	• Menu or function is displayed • Settings and inputs can be made • Functional check active • Measured value can be influenced	From "Coded display mode" you can reach this mode by entering the code of the corresponding operation level. In this mode, you can parameterize/calibrate the device.

Schematic diagram of the operating sequence with operating modes

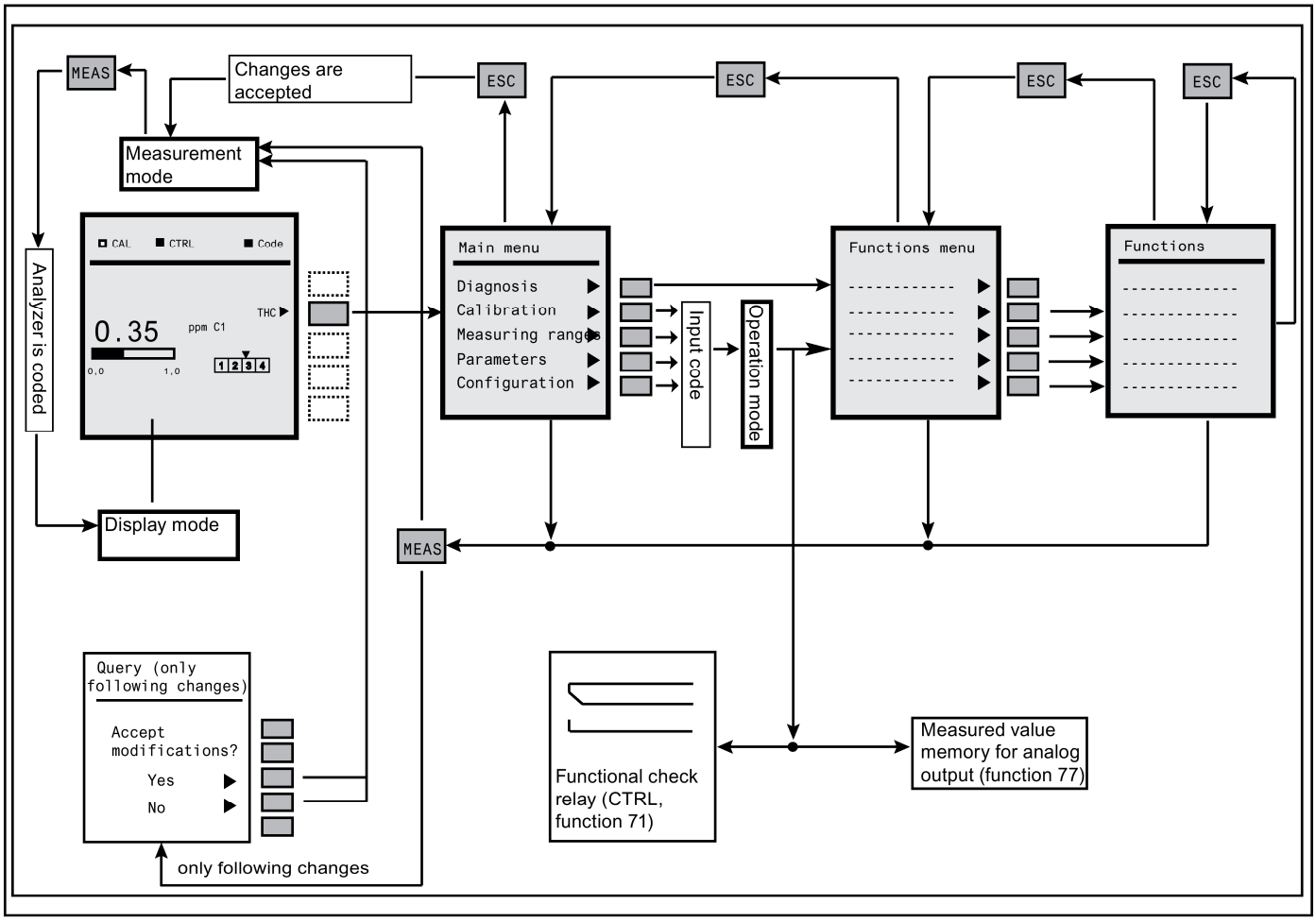


Image 5-2 Operating sequence with operating modes

5.2 Measured value display

In the following, the displays below are referred to as the "Measured value display" which appear in the display in the two operating states "Coded display mode" and "Decoded display mode".

Note

Device operating state

In the "Measured value display", the current operating state of the device can be read in the bottom line. The "Measured value display" is not an operating state and not an operating mode, but is simply displayed. It must not be confused with the "Measure" operating state (also "Measuring state") of the device!

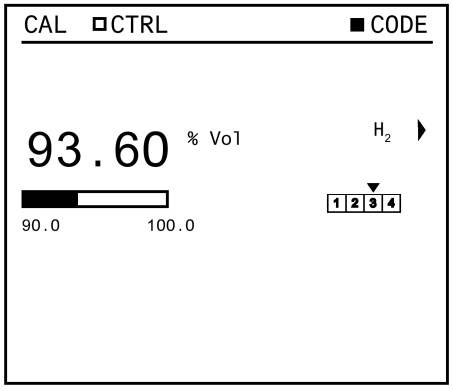


Image 5-3 Measured value display

5.3 Menu control

5.3.1 Entering the main menu

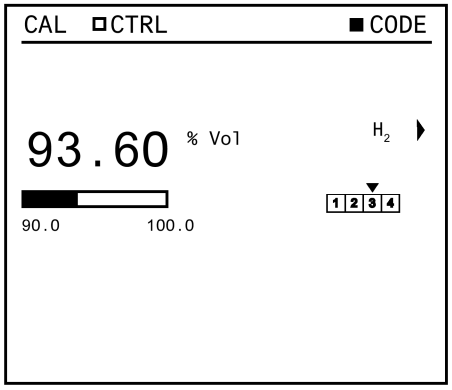


Image 5-4 Measured value display

On the right side of the measured value display is the measured component with an arrow pointing to the right (►). A softkey is assigned to this component.

Press this softkey to call the main menu.

5.3.2 Entering a submenu

The main menu consists of five submenus.

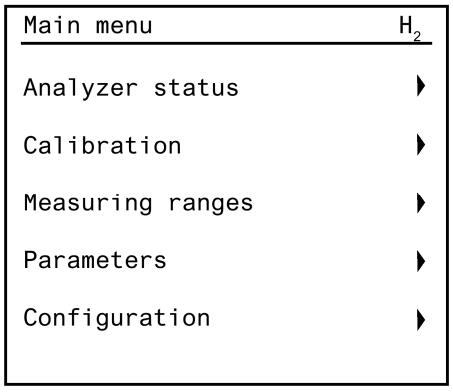


Image 5-5 Main menu

Some of these are protected against unauthorized access by various level codes.

Menu	Code level
Analyzer status	Not coded
Calibration	Code level 1
Measuring ranges	Code level 1
Parameter	Code level 1
Configuration	Code level 2

The code of level 1 is preset to "111" in the factory, and the code of level 2 is preset to "222".

Entering a submenu

If you select a submenu by pressing the associated softkey, the code of the corresponding operation level is queried once (exception: the submenu "Analyzer status" is freely accessible; selecting this does not change the operating mode).

Decoding level 2 also decodes level 1.

By entering a corresponding code, the device switches to the operator control mode, whereby the functional check is activated.

The functional check "CTRL" (shown in the status line of the measured value display) is always activated by the device when an intervention endangers correct measurement, e.g. when the code is entered. If you have configured a corresponding relay using function 71 with "Functional check", an extra signal is sent out via the relay contact together with the decoding. This relay contact then signals every functional check activation, e.g. even the warm-up phases and calibration states of the device.

Decoding also activates the measured value memory, providing you have parameterized it using function 77. The coding status of the device can be read in the status line of the measured value display as a symbol "■ CODE" for "coded" or "□ CODE" for "decoded".

5.3.3 Jump back to coded/decoded display mode

With the [MEAS] key, you can jump from "Operator control mode" back to "Decoded display mode". Any input started is aborted.

Before jumping back, the following query appears:

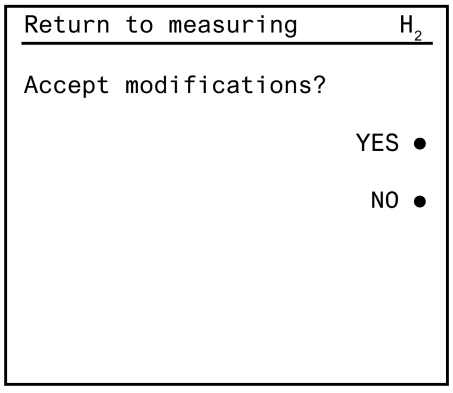


Image 5-6 Query before jumping back

- Press "YES" to accept changes permanently into the working memory of the parameter memory or "NO" to discard the changes. The device then changes to "Decoded display mode".
- Press [ESC] to return to the last function screen. Changes are accepted here without a further query.

Coding the device

After jumping back to "Decoded display mode" with [ESC] or [MEAS], if you press [MEAS] again you put the device back into "Coded display mode". Only now is the functional check deactivated again.

5.3.4 Fast function selection

In order to directly access the desired function when operating frequently from the "Coded display mode", a "Power user operation" was created. This allows you to directly access the desired function by entering the function number. This allows you to skip menu levels. However, the functions can only be directly called from the measured value display. For fast function selection, proceed as follows:

1. Enter the number of the desired function using the number keys.
2. Press the softkey of the component with the arrow ►. If the desired function is protected by a code, you will be asked to enter the code.

Functions

6

6.1 Overview of operating functions

The following overview is a list of the device functions.

Main menu item	Function number	Name of function
Analyzer status	1	Factory data
	2	Diagnostics values
	3	Logbook
	4	Display measuring ranges
Calibration (code 1)	20	Calibration point 1
	21	Calibration point 2
	22	Setpoint point 1/point 2
	23	Calibration settings
	24	Autocal
	25	Drift values
Measuring ranges (code 1)	40	Select measuring ranges
	41	Define measuring ranges
Parameters (code 2)	50	Electric time constant
	51	Limits
	52	On/off functions
	53	Status signals
	54	Graphic measured value display
	55	Measured value display/suppression of negative measured values
	56	LCD contrast
	58	Date/time
	59	Measuring-point switchover
	60	Logbook settings
Configuration (code 2)	70	Analog output
	71	Relay assignment
	72	Binary inputs
	73	ELAN configuration
	74	Reset
	75	Save, load data
	76	Suppress short noise signals
	77	Save analog output (measured value)
	78	Calibration tolerance
	79	Change codes
	80	Analyzer test
	81	Select language
	82	Pressure correction
	83	Correction of cross-interference
	85	Switch valves
	86	Linear temperature compensation*
	87	Faults on/off
	90	PROFIBUS configuration
	99	Factory settings

* Function not implemented at the moment

6.2 Analyzer status

6.2.1 Analyzer status submenu

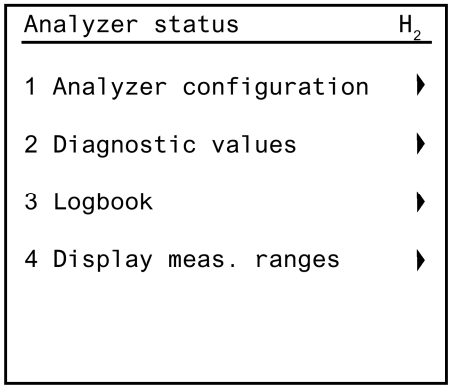


Image 6-1 Analyzer status submenu

The analyzer status functions are freely accessible. For this reason, there is no code query and no change in the operating mode.

The analyzer status submenu offers you various functions for displaying device parameters and stored data.

6.2.2 Analyzer configuration (function 1)

When this function is selected, important device manufacturing data can be viewed:

- Firmware No.

  Order No. of the software in the EPROM
- Order No.

  Information on device ordering data
- Production No.

  Indication of date of manufacture and device serial number
- Object version

  Indication of the hardware design of the device
- Software version and date

  Indication of the functional scope of the device

6.2.3 Diagnostic values (function 2)

The most important diagnostic values may be called using function 2. They may allow conclusions to be drawn for evaluation of errors or setting work.

6.2.4 Logbook (function 3)

In the logbook, all errors which led to a maintenance request (W) or fault message (S) are listed. Section Removing faults (Page 135) contains a list of fault messages and maintenance requests.

The limit alarm (LIM) and functional check (CTRL) are also registered. However, these do not trigger a maintenance request or fault message.

The logbook contains a max. of eight pages, with four messages per page. It works according to the cyclic buffer principle, i.e. when all eight pages (all 32 locations) are occupied, the oldest message is overwritten.

You can delete or block logbook entries (function 60), but you can also switch them off individually (function 87).

Note

If an error occurs whose error message is switched off with function 87, there is no reaction at any configured interface. This applies to the ELAN interface, the analog output and the relay output.

6.2.5 Display measuring ranges (function 4)

The measuring ranges defined using function 41 are listed here. However, you cannot carry out any changes in this function.

6.3 Calibration

6.3.1 Calibration submenu

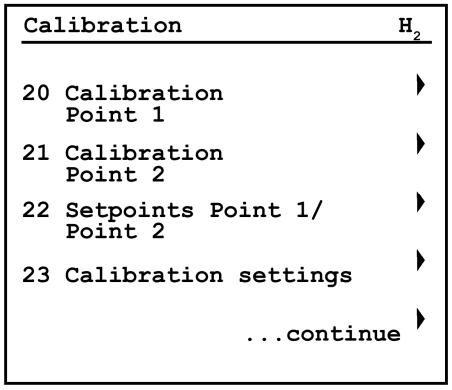


Image 6-2 Calibration submenu

You can calibrate the device using the functions available in this menu. Press the fifth softkey "...continue" to access further functions.

This menu is protected by the code of code level 1.

The CALOMAT 62 offers the option of a manual or automatic calibration (function 24). The latter is only possible with an optional board which contains an additional eight binary outputs and eight relay outputs.

Unlike other devices from the 6 Series, no independent calibration of the zero point is carried out with the CALOMAT 62. The factors of the zero point and the span are determined by a combined 2-point calibration in which point 1 does not have to correspond to the zero point. Point 1 must be calibrated first, and then point 2. The two factors can only be calculated and stored after both calibrations have been completed. The setpoints for the calibration between point 1 and point 2 are entered using function 22.

Following selection of functions 20 and 21, the corresponding gases must be introduced manually.

6.3.2 Calibration point 1 (function 20)

If the device is equipped with an optional board, automatic calibration is always activated when the device is switched on. In order to perform manual adjustment or via binary inputs, the automatic calibration must first be switched off (function 24).

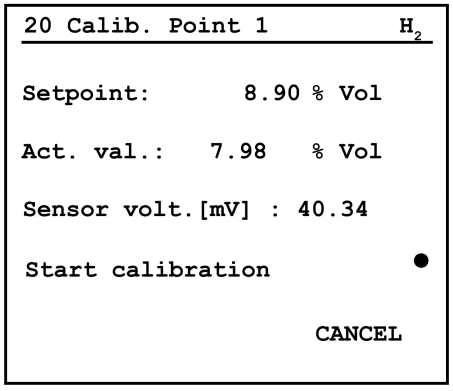


Image 6-3 Calibration point 1

In order to calibrate the point 1, the device must be in the "Measure" operating state. If this is not the case, calibration is not possible. The display will show the message *"Analyzer is not measuring"*.

Only initiate calibration when the measured value (actual value) has stabilized after applying the calibration gas. Otherwise, the calibration may be imprecise.

If there is a high level of noise, you need to increase the time constant before calibrating (function 50).

6.3.3 Calibration point 2 (function 21)

Calibration of point 1 must be completed before you can perform the calibration of point 2. If this is not the case, a message appears indicating that the triggering of the calibration was prevented.

A single or total calibration is carried out depending on the setting of function 23.

Single calibration ("Measure" operating state required)

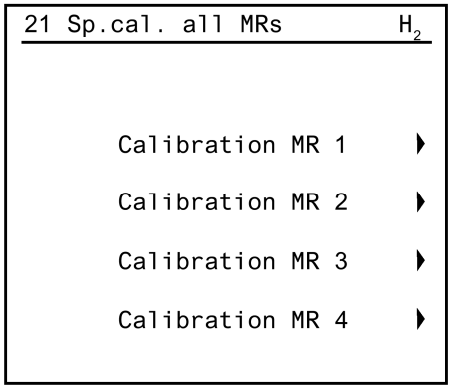


Image 6-4 Carry out single calibration

Single calibration is only possible if the *"Total calibration"* subfunction has been deactivated in function 23.

In the display, so many measuring ranges appear as were previously defined using function 41. The above function display is an example of the single calibration of four measuring ranges.

If you would like to calibrate range 3, press the corresponding softkey.

The setpoint, current actual value and the sensor voltage of the selected range then appear in the display:

Note

If automatic measuring range switching (function 40) is active, the actual value of the range determined by the switchover is displayed. This measuring range does not necessarily correspond to the selected range. However, this does not have any effect on the calibration of the selected measuring range.

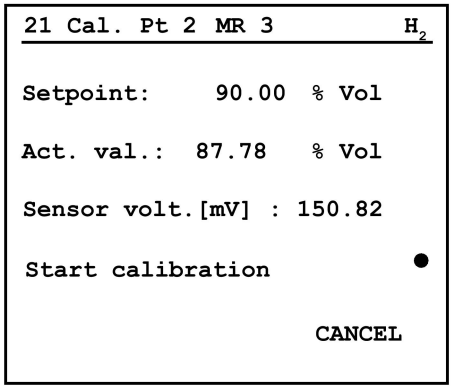


Image 6-5 Calibration point 2

When the actual value has stabilized, you can initiate the calibration process by pressing the fourth softkey. The actual value is now made to agree with the setpoint.

Total calibration ("Measure" operating state required)

Total calibration is only possible if the *"Total calibration"* subfunction has been activated using function 23.

With a total calibration, you calibrate all measuring ranges together. Define the "leading" measuring range in function 22. We recommend that you use the largest measuring range for this.

The setpoint, current actual value and sensor voltage of the "leading" measuring range appear in the display.

When the actual value has stabilized, you can initiate the calibration process by pressing the fourth softkey. The actual value is now made to agree with the setpoint.

Note

Measuring accuracy

With a switching ratio of the spans of more than 1:10, an individual calibration should be carried out for each range to achieve a higher measuring accuracy.

6.3.4 Setpoints point 1 / point 2 (function 22)

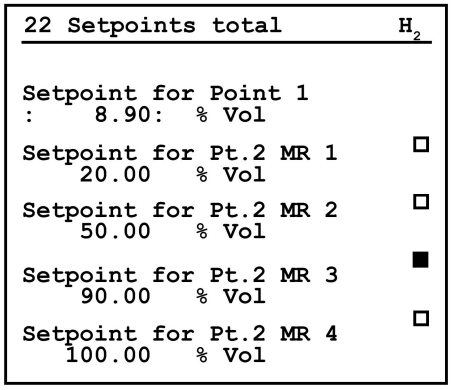


Image 6-6 Setting the setpoints

The function display shows the setpoint input with total calibration. The third measuring range is chosen here as the leading measuring range.

With single calibration, there is no choice for the leading measuring range.

6.3.5 Calibration settings (function 23)

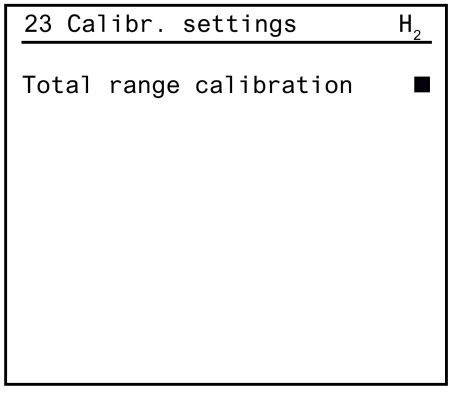


Image 6-7 Select calibration method

With this function, select between total and single calibration of the measuring ranges.

Total calibration means that you adjust one "leading measuring range" and all other measuring ranges are calibrated using the switching ratio.

If the total calibration, as shown on the function display, is not activated, you must calibrate every range individually.

6.3.6 Autocal (function 24)

Note

You can only make use of automatic calibration (Autocal) if your device contains additional electronics (optional board). If this isn't the case, a corresponding message will appear on the display when the Autocal function is called.

Automatic calibration can only be started if the device is in the "Measure" operating state!

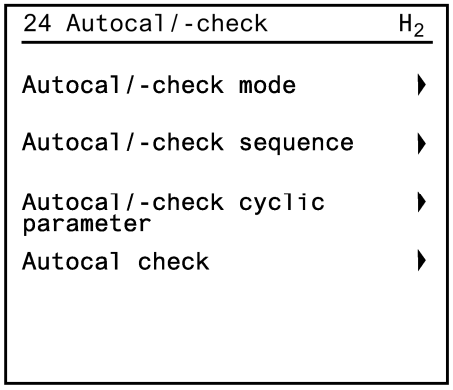


Image 6-8 Autocal function

Note

The settings for "Autocal/Check..." (subfunctions 1 to 3) are valid both for Autocal (automatic calibration) and for Autocal Check (automatic check that the set calibration tolerances are complied with, without calibration).

The settings for "Autocal Check" (4th subfunction) only refer to the check of the calibration tolerances without calibration.

AUTOCAL/Check operating mode

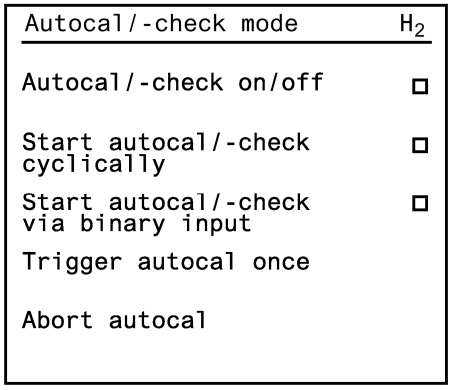


Image 6-9 AUTOCAL/Check operating mode

With this subfunction, you parameterize various Autocal operating modes.

"Autocal/Check on/off":

During the *" Autocal off"* state (display:"□"), the settings of the switch *"Start autocal cyclically (parameter)"* and *"Start autocal via binary input"* do not have an effect on the device. *" "Trigger Autocal once"* cannot be selected. The cycle time continues to run. No automatic calibration is initiated, however.

"Autocal/Check start cyclically":

You can activate Autocal to be a regularly repeated cycle if you first set *"Time from Autocal to Autocal (cycle time)"* using subfunction *"Autocal/Check cycle parameter"*.

The Autocal Check is only for checking the calibrations. As with Autocal, the device executes the sequence configured in subfunction *"Autocal/Check sequence"*. As opposed to Autocal, no new calibrations are carried out, but only the deviations are checked with respect to selectable calibration tolerances.

Exceeding these tolerances leads to the maintenance request W10 "**Autocal-Check-Error**" In the event of a fault, Autocal/Check is aborted. At the same time, the fault message S15 "**Calibration aborted**" appears in the logbook.

"Autocal/Check start via binary input":

If you previously configured a binary input using function 72, you can initiate Autocal via a binary input.

"Trigger Autocal once":

In the state *"Autocal on"*, you can start an Autocal sequence at any time using the softkey *"Trigger Autocal once"* providing the device is in the "Measure" operating state. A sequence initiated this way has no influence on the time cycle of an Autocal, i.e. the cycle time continues to run independently of this.

After initiating, the dot disappears until the process is finished.

"Abort Autocal":

A running automatic calibration process can be exited at any time using the softkey *"Abort Autocal"*. With this, all calibration data determined up to that point are discarded and the calibration data used before Autocal was started are used further (zero and span).

Canceling has no influence on the time cycle. All valid calibration processes are retained.

AUTOCAL/Check sequence

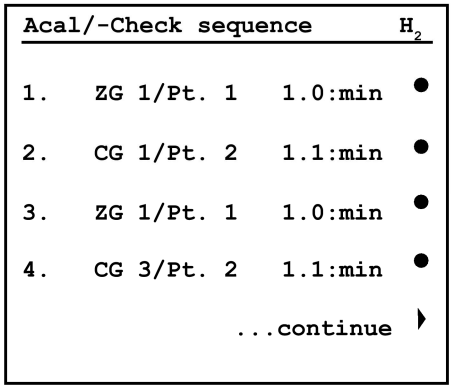


Image 6-10 AUTOCAL/Check sequence

With this subfunction, you can combine several calibration phases to form one Autocal sequence.

You can arrange the automatic calibration as you wish. It is possible to "compose" a sequence of up to twelve different phases.

In addition to the supply of one calibration gas for point 1 and up to four calibration gases for point 2, you can also program purging with sample gas, sample gas intermediate operation, as well as a signaling contact. The signaling contact is available if you previously allocated it to a relay output using function 71.

Sample gas intermediate operation

Sample gas intermediate operation can be necessary if the system may only leave measuring mode for a certain time. If the required purge times are greater in total than the permissible downtime, measuring mode must be returned to between calibrations.

Signaling contact

Use the signaling contact to initiate an automatic calibration process of a second device, for example, or to signal the beginning or end of an Autocal.

Relay outputs

If you have defined relay outputs for the sample gas and/or calibration gas for point 1 and point 2 (function 71), these are used to activate the corresponding external solenoid valves. The same applies to the signaling contact "Autocal". This is closed for 1 s when the command is executed.

Example:

You want to program the following sequence:

1. Calibration point 1 with zero gas 1, after 15 minutes purging with calibration gas
2. Calibration point 2 with calibration gas 1, after 10 minutes purging with calibration gas
3. Purging with sample gas: 8 minutes
4. Sample gas intermediate operation: 30 minutes
5. Calibration point 1 with zero gas 1, after 15 minutes purging with calibration gas
6. Calibration with point 2 with calibration gas 3, after 5 minutes of purging

The specified Autocal sequence is shown in the following function displays.

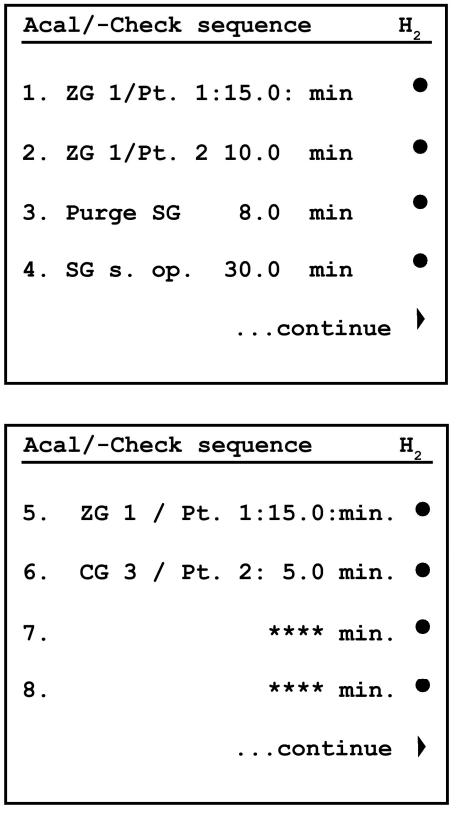


Image 6-11 Example of Autocal sequence

List of Autocal sequence points that can be selected:

1. Zero gas 1 / point 1
2. Zero gas 2 / point 1 (not relevant for CALOMAT 62).
3. Calibration gas 1 / point 2
4. Calibration gas 2 / point 2
5. Calibration gas 3 / point 2
6. Calibration gas 4 / point 2
7. Purge sample gas
8. Sample gas intermediate operation
9. Signaling contact

AUTOCAL/Check cycle parameters

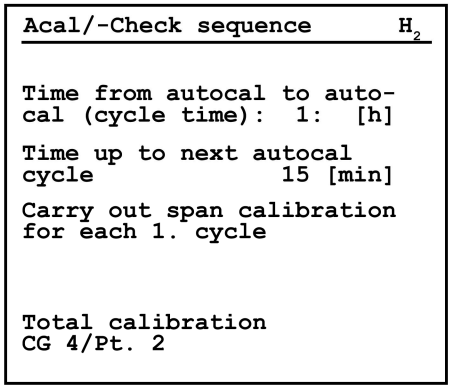


Image 6-12 Autocal/Check cycle parameters

With this subfunction, you can parameterize various time constants for activating a cyclically repeated Autocal sequence.

"Time from Autocal to Autocal (cycle time)":

Any setting between 1 and 720 (hours) is accepted by the device.

"Time to first Autocal" (after the time of setting):

If you enter "0" here and Autocal is activated with *"Autocal on/off"*, the device begins immediately with the Autocal sequence.

Note

The clock inside the device also runs when Autocal is deactivated! It starts the first time the device is switched on and must be set to the current time using function 58.

"Carry out span calibration for each xth cycle":

This is where you set the number of cycles after which a calibration of point 2 is to be performed.

Note

As long as Autocal is activated (Autocal ■), access to functions 20 and 21 is blocked. If you activate these functions anyway, a corresponding message appears on the display.

Settings for AUTOCAL Check

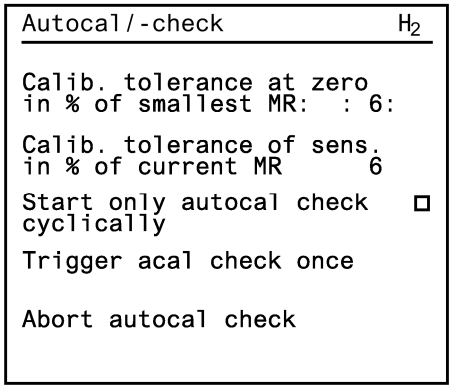


Image 6-13 Autocal Check

In the subfunction *"Autocal Check"*, enter the desired calibration tolerances which should be checked by Autocal Check. Using function 72, you can also select the binary input for "Autocal Check".

When a calibration limit is exceeded, the maintenance request W10 is set, and also, if configured, the relay "Acal Chk Dif".

Both will be reset again after an error-free Autocal Check. W10 is retained in the logbook.

"When starting via cycle, initiate Autocal Check":

If this function is activated, the device executes an Autocal Check when Autocal is started via a cycle. In other words, it only checks that the calibration tolerances are observed, but does not carry out a calibration.

Sequence:

1. Start the Autocal Check:
   - By means of the softkey *"Trigger Autocal Check once"* in the subfunction *"Acal/Check sequence"*
   - Via binary input
   - Via cycle
2. The device executes the sequence as configured in the subfunction *"Autocal/Check sequence"*.

6.3.7 Drift values (function 25)

This function shows deviations occurring for the calibrations (and AUTOCAL as well) (actual value - setpoint) as a sum parameter. All rated zero point and sensitivity calibrations of each range are calculated here for the selected measured component. Every new deviation is added to the existing drift value.

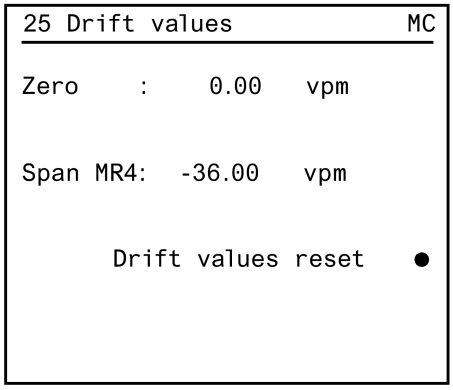


Image 6-14 Drift values

The display of the drift values for the sensitivity calibration depends on the setting of the calibration method. If total calibration is selected here, only the selected measuring range for the sensitivity calibration is displayed. For single calibration, all measuring ranges can be individually adjusted and can therefore have different drift values, which are shown separately.

The drift values can reset to 0.0 with the 'Reset drift values' instruction. When you reboot the device all measuring ranges have 0.0 as the drift value.

6.4 Measuring ranges

6.4.1 Measuring ranges submenu

After selecting the measuring range functions in the main menu, the following screen appears when the third softkey ("Measuring ranges") is pressed.

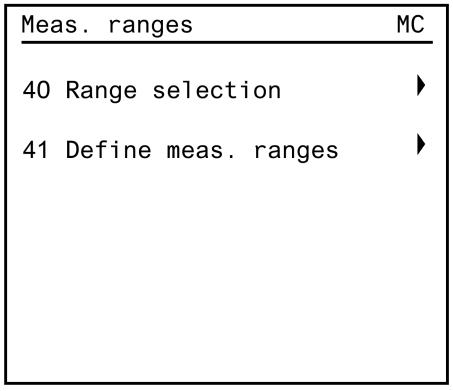


Image 6-15 Measuring ranges submenu

The measuring ranges menu contains all functions you need for selecting and setting the measuring ranges.

This menu is protected by the code of code level 1.

6.4.2 Select measuring ranges (function 40)

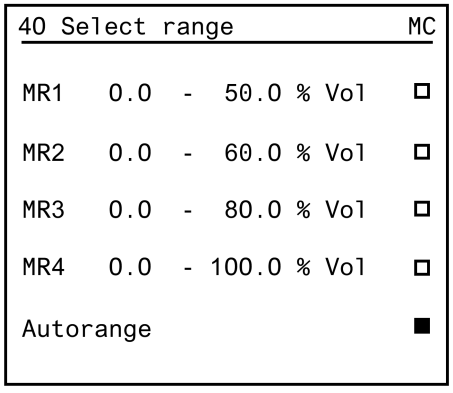


Image 6-16 Select measuring ranges

You can select a fixed measuring range or switch to automatic measuring range switching. All selection options are subject to mutual interlocking.

Automatic measuring range switching is only possible under the following conditions:

- At least two measuring ranges must be available. A measuring range is assumed when the following condition is satisfied: Start-of-scale value ≠ full-scale value
- The spans must become greater
- The measuring ranges must "border on" each other or overlap

Measuring range types

The permissible measuring range constellations result which are shown in the figure below:

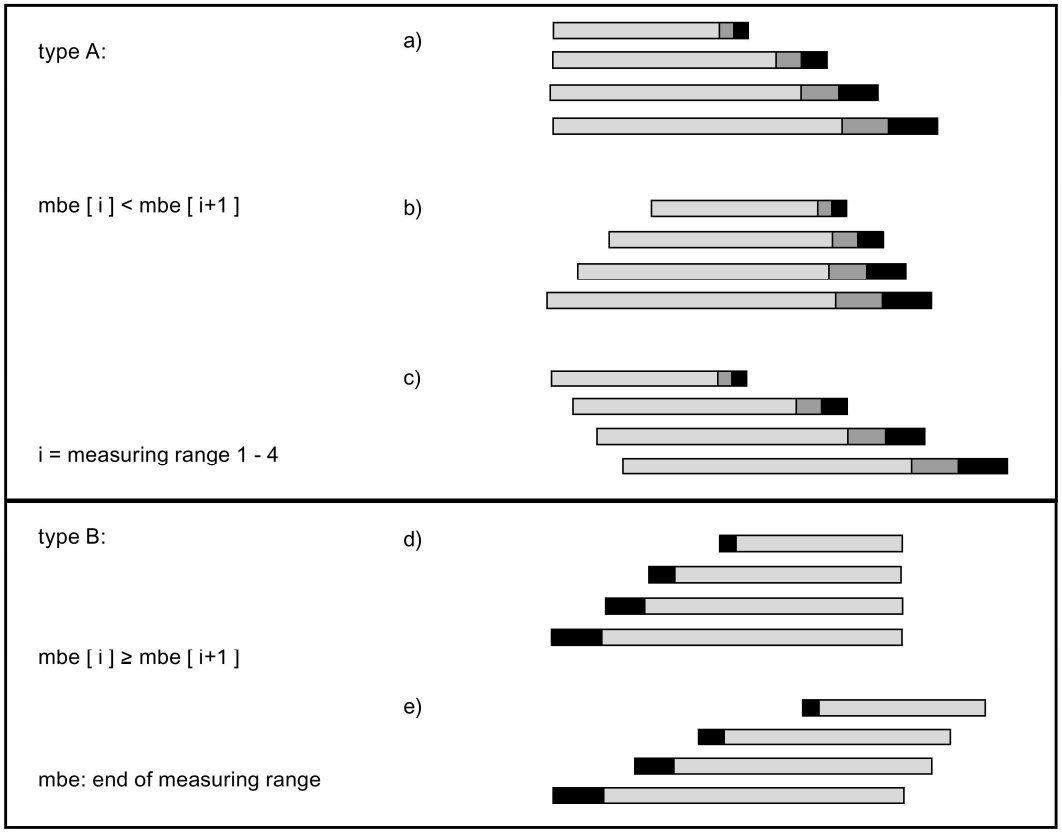
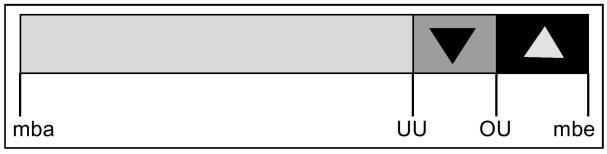


Image 6-17 Measuring range types

Two measuring range types are distinguished:

Type A:

The full-scale value must be smaller than the full-scale value which follows it. The top measuring range limit therefore becomes larger with every measuring range.



SSV Start-of-scale value
FSV Full-of-scale value
LS Low switchover point: select smaller measuring range
HS High switchover point: select larger measuring range

Image 6-18 Measuring range type A

The following applies to measuring range switching:

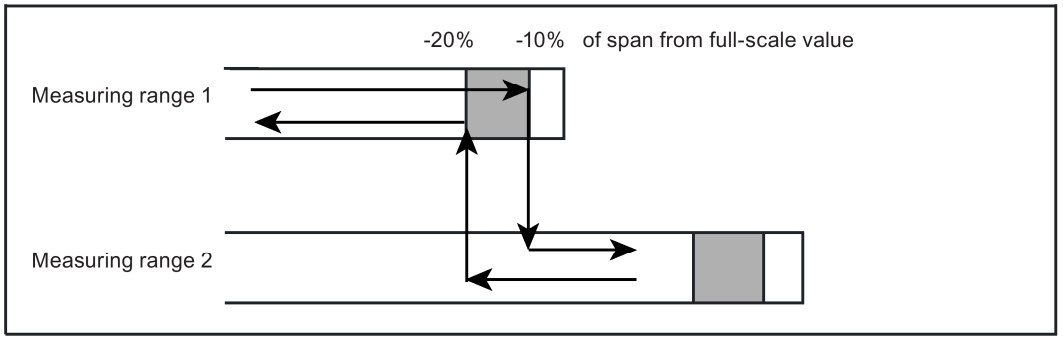
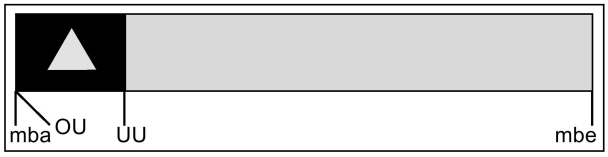


Image 6-19 Measuring range switching, type A

When the upper switchover point (OU) is exceeded, the next larger measuring range available is selected. If the lower switchover point (UU) of the next smaller measuring range available is fallen below, this is selected. The UU lies at 80 % (HystS) of the measuring range. The OU lies at 90 % (HystE) of the measuring range.

Type B:

The full-scale value must be greater than or equal to the full-scale value following it. Since the measuring spans must simultaneously become larger, the start-of-scale values of the following measuring ranges become continuously smaller.



SSV Start-of-scale value
FSV Full-of-scale value
LS Low switchover point: select smaller measuring range
HS High switchover point: select larger measuring range

Image 6-20 Measuring range type B

The following applies to measuring range switching:

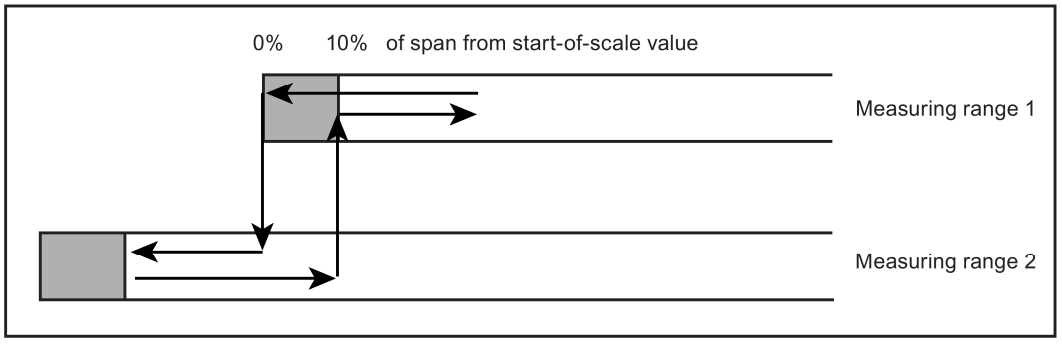


Image 6-21 Measuring range switching, type B

When the upper switchover point (OU) is fallen below, the next larger measuring range available is selected. If the lower switchover point (UU) of the next smaller measuring range available is exceeded, this is selected.

The UU lies at 10 % (100 % - HystE) of the measuring range. The OU lies at the start of the measuring range (mba).

6.4.3 Define measuring ranges (function 41)

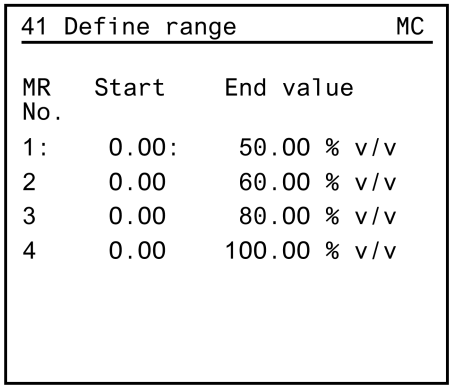


Image 6-22 Define measuring ranges

You can define a maximum of four measuring ranges whose start-of-scale values are allocated to the bottom value (0/ 2/ 4 mA) and whose full-scale values are allocated to the top value (20 mA) of the analog output.

If the message "Measuring ranges not plausible!" appears, this means that autoranging is not possible.

If the start-of-scale and full-scale values are "0", the measuring range is deactivated.

Note

If a start-of-scale value other than "0" is defined, you need to read the section "Preparations for startup - measuring ranges with suppressed zero point".

6.5 Parameter

6.5.1 Parameters submenu

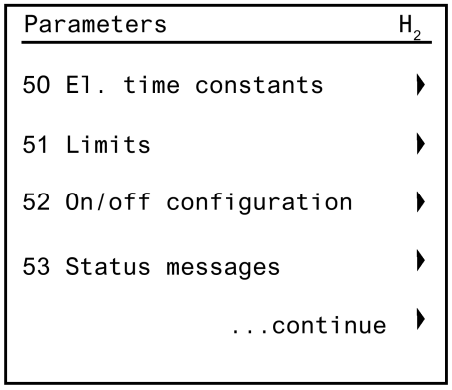


Image 6-23 Parameters submenu

The parameters menu contains all functions which are required for parameterizing the device.

You can branch to further parameter functions by pressing the fifth softkey, "...continue".

This menu is protected by the code of code level 1.

6.5.2 Electric time constants (function 50)

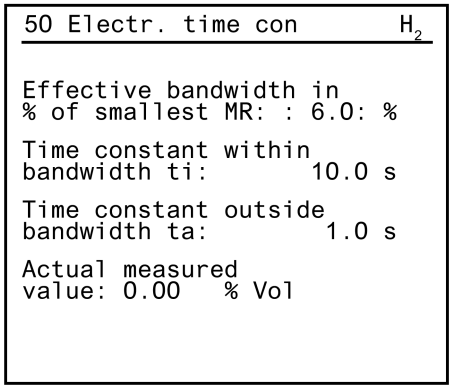


Image 6-24 Electric time constants

With this function, you set various time constants in order to reduce noise. The noise reduction is approximately equivalent to a low-pass filter with the corresponding time constant. The display delay is given as the 90% time.

The time constant "ti" acts within an parameterizable effective interval which is defined in % of the smallest span. It attenuates small changes in the measurement (e.g. noise) on the one hand, but becomes ineffective immediately when the measured value exceeds the effective interval. In this case, the outer time constant "ta" attenuates the measured value.

You can parameterize values up to 100% for the effective interval, and values up to 100 s for the time constants "ti" and "ta". By cleverly combining these three parameters, you can achieve a low display delay (90% time) despite high noise suppression.

The effect on the set attenuation parameters can be observed in the bottom line. The "live" measured value is displayed here.

6.5.3 Limits (function 51)

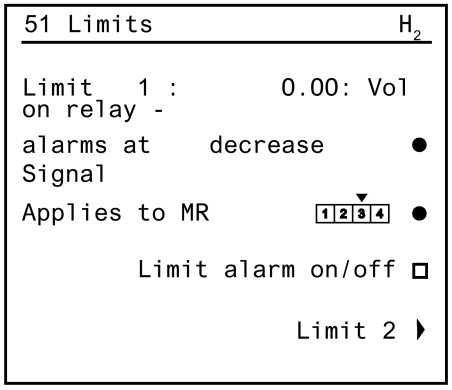


Image 6-25 Limits

The device monitors up to four limits for every component, and these limits can be allocated to any measuring range. Each limit can be allocated to any relay using function 71.

You can only parameterize positive limits up to 100%.

"Alarms at decrease signal":

Here you select whether a limit alarm is to be switched if the entered limit is exceeded or fallen short of.

"Applies to measuring range...":

Here, you allocate the limit to the desired measuring range(s) by pressing the third softkey several times. When you do so, the pointers move over the measuring range numbers and indicate the ranges in which the limit monitor is to be active. In the above example, this is measuring range 3.

"Limit alarm":

The limit monitoring of each limit can be switched off here or using function 52.

The response of a limit relay is registered in the logbook (function 3). As soon as the cause of the limit alarm has been eliminated, the limit relay is reset automatically.

You can change to the next limit using the fifth softkey (*"Limit…"*).

6.5.4 On/off functions (function 52)

With this function, you can easily switch other functions on/off, for example, the ones listed in this function screen.

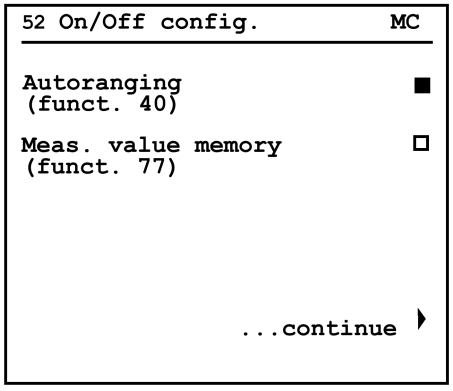


Image 6-26 On/off functions

Thanks to this simplified operation, these functions do not have the longer paths through various menus. For better orientation, the function numbers have also been specified.

Activated functions are marked by "■", deactivated ones by "□". Using the fifth softkey ("...continue"), jump to the next function screen with further functions.

Function 52 is used to switch the following functions on and off:

Table 6- 1 Functions switched on/off by function 52

Description	Fct. No.	Remarks
Total calibration	23	
Automatic calibration	24	Only with supplementary electronics
Automatic measuring range switching	40	
Limit monitoring 1	51	
Limit monitoring 2	51	
Limit monitoring 3	51	
Limit monitoring 4	51	
Blocking of the logbook	60	
Suppression of negative measured values	70	
Fault / WA / FCTRL acc. to NAMUR	72	
Measured value memory	77	
Signal tolerance violation	78	
Temperature recompensation of zero point	86	
Temperature recompensation of span	86	

Besides the functions listed in the table "Functions switched on/off by function 52", function 52 can also be used to address other service functions. These are restricted to service engineers and are only visible when the service code is entered (code level 3).

6.5.5 Status messages (function 53)

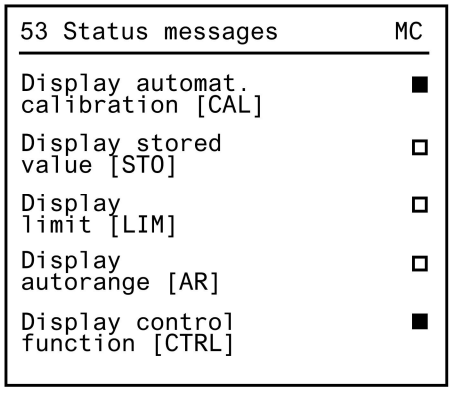


Image 6-27 Status messages

With this function, you can configure the status message display in the status line of the measured value display. You can display a maximum of four different status messages. The message CODE ■/□ provides information on the current operating mode ("Coded display mode"/"Decoded display mode") and is therefore always displayed.

The device activates the functional check (softkey 5 in the function display) when it determines that the measured value was influenced.

This is the case:

- If the device is not in the measuring state (for example, during the warm-up phase, calibration)
- After entry of a code (i.e. switch to "Operator control mode")
- During the operation via an interface (REMOTE mode)

Table 6- 2 Status messages

Status	**What appears in the display depends on functions 52 and 53**			
	Fct. 53 "□"	**Fct. 52 "□" Fct. 53 "■"**	**Fct. 52 "■" Fct. 53 "■"**	
Calibration: CAL	None	CAL	□ CAL	■ CAL; calibration running (also in Autocal)
Measured value memory: STO	None	STO	□ STO	■ STO; analog output applied to memory (see function 77)
Limit: LIM	None	LIM	□ LIM	■ LIM; limit has been violated (see function 51)
Automatic measuring range switching: AR	None	AR	□ AR	■ AR; measuring range switching (actively possible), see function 40
Functional check: CTRL	None	□ CTRL or ■ CTRL (functional check cannot be switched off using function 52)	□ CTRL	■ CTRL; device is not in "Measure" state or in "Operator control mode" or "Remote" mode

Alternately to the specified status messages, the following messages can be displayed in the status bar:

- A fault currently pending in the device: "Maintenance request" and/or "Fault"
- An activated measuring protection: "Measuring protection switched on" (see also function 72)
- During operation via the ELAN interface: "Remote" with display of the device state.

6.5.6 Graphical representation of measured values (function 54)

With this function, you can follow the trend of the measured values for the last ten minutes or 24 hours on the display.

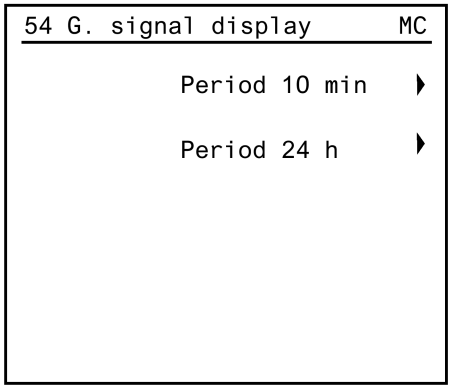


Image 6-28 Graphical measured value representation

Select the desired time period with softkey 1 or 2.

The device now graphs the measured value vs. time:

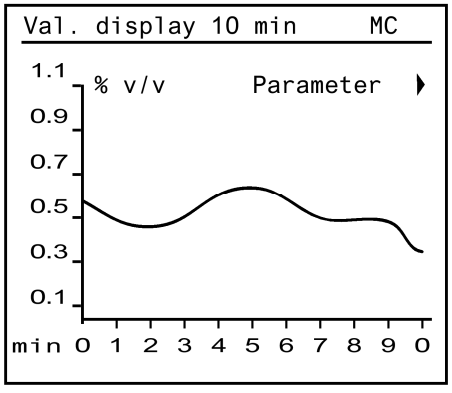


Image 6-29 Measured value trend

The most recent measured value is on the time axis at the left at t = 0.

Select softkey 1 "Parameters".

Here, assign a certain measuring range to the measured value axis:

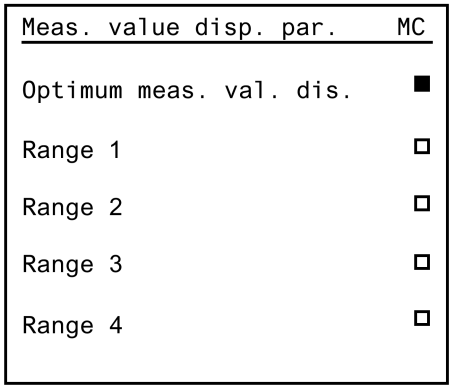


Image 6-30 Parameters for measured value representation

If you select *"Optimum measured-value display"*, the software automatically scales the measured value axis. The device adapts the scale to the measured value scatter.

6.5.7 Measured value display (function 55)

With this function, you can configure the display of measured values.

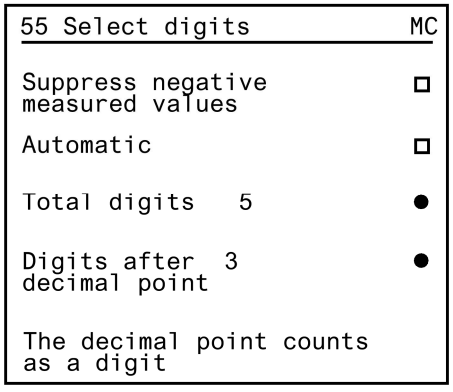


Image 6-31 Configuring the measured value display

You have the following options for this:

- With softkey 1, you suppress the display of negative measured values.
- With softkey 2 "Automatic", you can activate the automatic display of the measured value with 5 digits. The number of decimal places depends on the size of the measured value.
- With the softkeys 3 and 4, you can choose the total number of digits and the maximum number of decimal places.

Note that a maximum of five digits can be displayed (decimal point also counts as one digit).

6.5.8 LCD contrast (function 56)

With this function, you can make the display contrast brighter or darker.

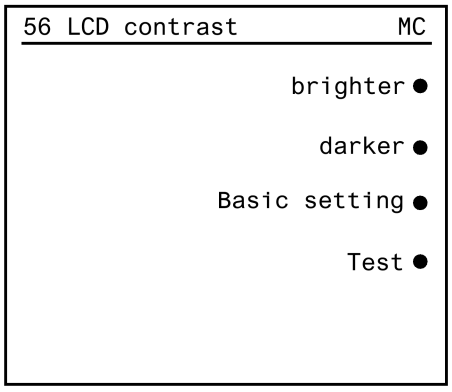


Image 6-32 Setting the LCD contrast

If the contrast is misadjusted, you can restore the factory settings using the third softkey *"Basic settings"*.

With the fourth softkey *"Test"*, you can carry out an LCD test. Various test screens are then displayed in succession.

From "Coded/decoded display mode", you can restore the basic setting by entering [8] [8] [8] [8] [ENTER].

6.5.9 Date/time (function 58)

With this function, you can set the date and time.

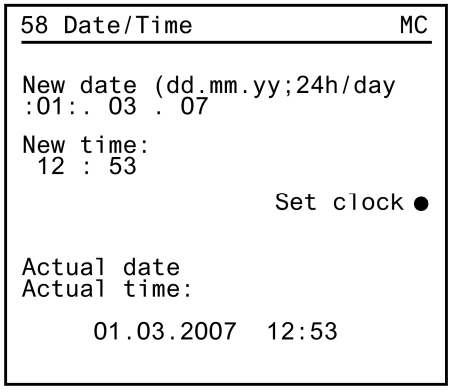


Image 6-33 Setting the date/time

The device features a system clock that is not buffered against mains failure (no a real-time clock). When starting the device, the clock starts with the date 1.1.1995.

When the function is called, the cursor is placed at the first place of the date display. Enter the new settings in the order: day, month, year. By pressing [ENTER], jump to the next input field. With a 24-hour based system (hours, minutes), set the time in the same way.

Note

When the device is switched off, the clock stops and is not updated.

The settings are especially important for troubleshooting. Errors which are always stored in the logbook (function 60) can be allocated more easily with the help of the date and time.

Press the third softkey *"Set clock"* in order to accept the set data. These then appear at the bottom edge of the display.

6.5.10 Measuring point switching (function 59)

With this function, you can assign the device up to six measuring points, which are switched automatically at the expiration of a configured period.

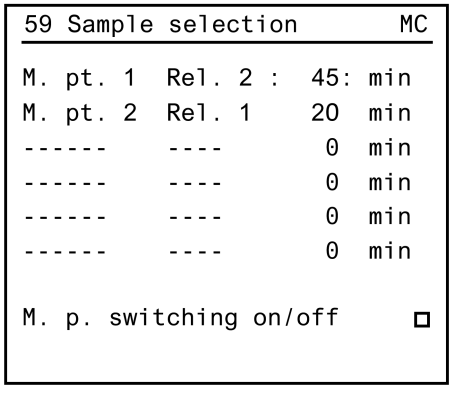


Image 6-34 Measuring point switching

The condition is that you configured the measuring point relay beforehand using function 71 "Relay outputs", which then actuates the corresponding solenoid valves.

Every measuring point relay is also allocated a time period, which you can enter in the respective input field. Values between 0 and 60 (minutes) are possible for this input.

Press the fifth softkey to activate/deactivate the measuring point switching.

You can allocate a signal relay to each measuring point relay. This allows measuring point identification separate from the measuring point relay. You also use function 71 to configure the signal relay.

6.5.11 Logbook settings (function 60)

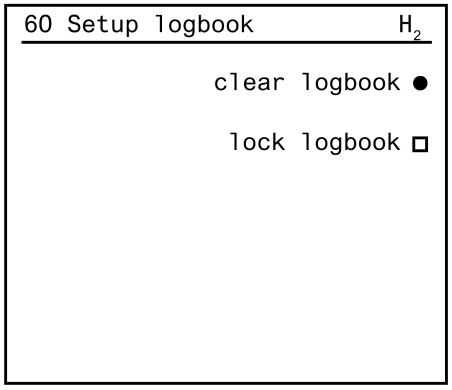


Image 6-35 Parameterizing the logbook

With this function, you delete or block logbook entries.

From the "Coded/decoded display mode", you can also delete logbook entries with the button sequence [5][5][5][5] [ENTER].

Status messages such as maintenance requests or faults cannot be suppressed by "blocking". They still appear, despite the blocked logbook.

6.6 Configuration

6.6.1 Configuration submenu

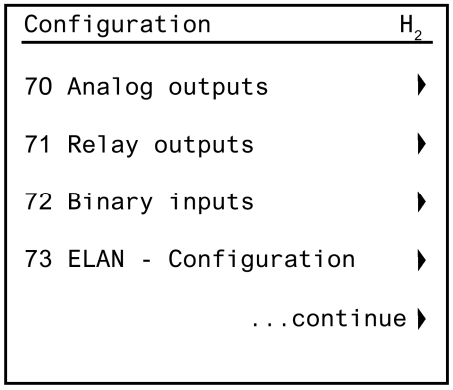


Image 6-36 Configuration submenu

All functions of this menu are only accessible via the code of level 2.

This menu contains all functions required for configuring the device.

Press the fifth softkey ("...continue") to branch to further configuration functions.

6.6.2 Analog output (function 70)

With this function, you can configure the analog output.

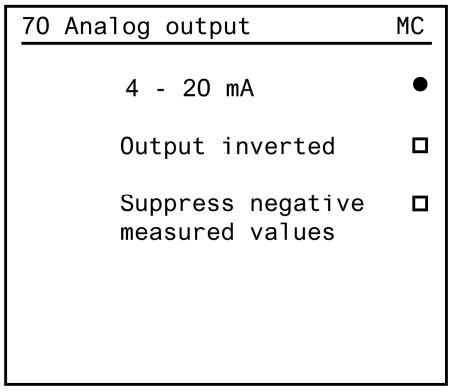


Image 6-37 Configuring the analog output

With softkey 1, define the start-of-scale value of the measuring range. The following settings (see also table "Configurations of the analog output") are possible:

- 0 – 20 mA
- 2 – 20 mA
- 4 – 20 mA
- NAMUR/4 – 20 mA (with limit at 3.8 mA).

You can invert the analog output with softkey 2: e.g. 0 ... 20 % O_2 ≡ 0 ... 20 mA → 0 ... 20 % O_2 ≡ 20 ... 0 mA

With softkey 3, you can suppress the negative measured values. If a negative value has an unfavorable effect on further processing, the negative measured values at the analog output can be limited to 0 (or 2/4/4 (NAMUR) mA) when this function is activated. The display continues to show the actual measured value.

Table 6- 3 Configurations of the analog output

Defined analog output / mA	Measuring range limit in normal operation		Measuring range limit in case of fault / CTRL	
	Start-of-scale value / mA	Full-scale value / mA	Start-of-scale value / mA	Full-scale value / mA
0 – 20	-1	21	0	21
2 – 20	1	21	2	21
4 – 20	2	21	4	21
4 – 20 (NAMUR)	3.8	20.5	3	21.5

Note

If the electronics is defective, it is possible that the analog output may get stuck at approx. -1 mA or approx. +24 mA.

6.6.3 Relay outputs (function 71)

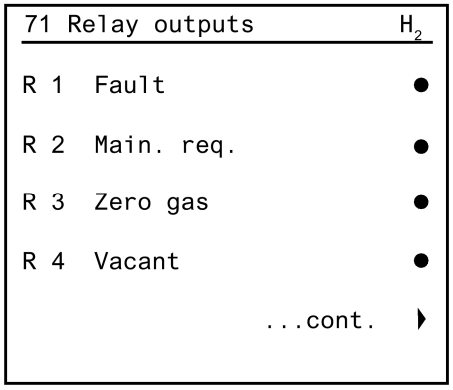


Image 6-38 Assigning the relays

There are six freely configurable relays included in the standard equipment whose switchable output contacts (max. 24 V/1 A) can be used for signaling, actuating valves, etc.

If these six relays are insufficient, you can retrofit additional electronics with eight further relays (optional board).

With this function, you can assign each relay functions listed in the table "Relay outputs (possible functions)", whereby you may only assign each function once. In other words, for example, "Fault" may not be assigned to two relays at the same time.

The connection assignments for the individual relays in the zero-current state can be found in the routing assignments "Motherboard pin assignments".

Press the fifth softkey ("...continue"), to access the next function screen, thus branching to further relays.

Note

Changing the configuration

Every change to the configuration of the relay assignments should always be saved in the user data memory by means of function 75.

If you neglect to do this, there is a danger that a previous (unwanted) configuration will be loaded by "Load user data" (function 75).

Table 6- 4 Relay outputs (possible functions)

Function	Relay is passive when	Relay conducts current	Remark
Not assigned			Relay is permanently passive (zero current)
Fault	Fault		Also shown in the status line of the measured value display
Maintenance request	Maintenance request		Also shown in the status line of the measured value display
Calibration		Calibration running	For identification purposes
Measuring range 1 to 4		Measuring range 1 to 4 on	Measuring range identification
Limit 1 to 4	Limit 1 (to 4) triggered		Limit monitoring
Functional check (CTRL)	Functional check active		Signal when: Device is decoded, warm-up phase (approx. 30 min), calibration running (Autocal), Remote (operation via interface)
Sample gas		Supply of sample gas	Valve actuation for Autocal
Zero gas/point 1		Supply of calibration gas for point 1	
Calibration gas 1 to 4 / point 2		Supply of calibration gas for point 2	
Measuring point 1 to 6		Measuring point 1 to 6 selected	For taking a gas sample via solenoid valves at various measuring points
Measuring point signal 1 to 6		Measuring point 1 to 6 selected	For identifying the measuring point (runs parallel to measuring point)
Signaling contact		When there's a signal, the relay conducts current for a short time	e.g. in the case of AUTOCAL: actuation of a second device
Autocal check		Autocal difference too large (function 24)	

Note

If the clocking of the process electronics is faulty, the relay outputs may adopt an undefined state.

6.6.4 Binary inputs (function 72)

Binary input functions

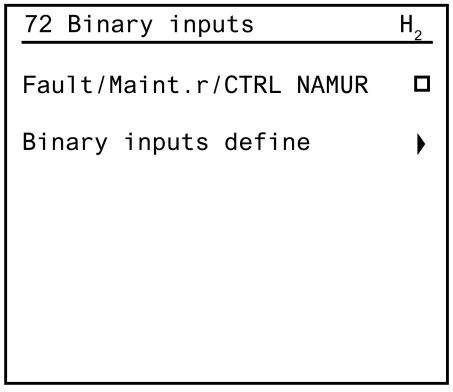


Image 6-39 Binary input function

Six floating binary inputs are included in the standard equipment ("0" = 0 V [0 to 4.5 V]; "1" = 24 V [13 to 33 V]).

If these six inputs are insufficient, you can retrofit additional electronics with eight further binary inputs (optional board).

If you activate the "NAMUR" ("■") operating mode with softkey 1, the binary inputs behave as in table "Binary input activation functions" marked with "N".

If you deactivate the "NAMUR" ("□") operating mode, the binary inputs behave compatibly with the software outputs of the older version V 4.3.0 (in the table "Binary input activation functions" marked with "X").

Press softkey 2. The following function screen appears on the display.

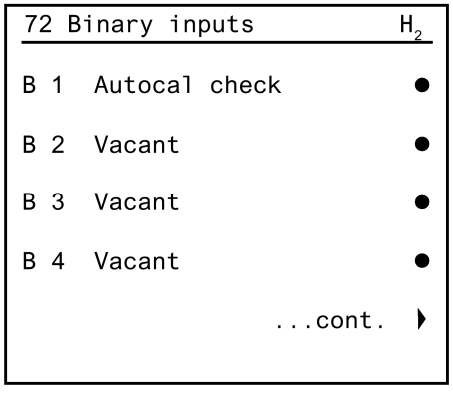


Image 6-40 Define binary inputs

Assign one of the activation functions listed below to each input as you like, whereby every function may only be assigned once.

The connection assignments for the individual inputs can be found in the section "Electrical connection".

Press the fifth softkey ("...continue"), to access the next function screen, thus branching to further binary inputs.

Note

Save changes

Make sure you save every change in the configuration of the binary inputs in the user data memory using function 75! If you neglect to do this, there is a danger that a previous (unwanted) configuration will be loaded by "Load user data" (function 75).

Table 6- 5 Binary input activation functions

Function	Necessary activation voltage			Remark / effect
	0 V	24 V	24 V (min. 1 s)	
Not assigned				No effect when activated
Fault 1 to 7	N	X		e.g. due to: • Signal from a gas preparation system: – Condensate overflow – Gas cooler defective • Fault message from cross-interference analyzer
Maintenance request 1 to 7	N	X		
Acknowledge			N, X	Activation deletes all logbook entries. However, if the cause of a fault or maintenance request has not been eliminated, the corresponding message reappears in the logbook.
Functional check 1 to 4	N	X		Relay must be configured for functional check using function 71 if, for example, the function also has to be checked by a second device as a consequence of the functional check.
Autocal			N, X	Note: Effective activation only possible in "Measure" operating state! Autocal must be configured (function 24)
Measuring range 1 to 4			N, X	Activation switches to the corresponding measuring range.

Function	Necessary activation voltage			Remark / effect
	0 V	24 V	24 V (min. 1 s)	
Zero gas/Pt. 1			N, X	"Zero gas/Pt. 1 on" starts the calibration of point 1 Note: Effective activation only possible in "Measure" operating state! Relay must be configured for zero gas / point 1. After activation, the device changes from "Measure" to "Calibration" operating state. See also "Example - binary inputs"
Calibration gas/Pt. 2			N, X	"Calibration gas/Pt. 2 on" starts the calibration of point 2 Note: Effective activation only possible in "Measure" operating state! Relay must be configured for calibration gas 1-4 / point 2. After activation, the device changes from "Measure" to "Calibration" operating state. See also "Example - binary inputs"
Sample gas			N, X	"Sample gas on" stops a running zero point calibration or calibration gas calibration from point 1 or point 2. Note: Effective activation only possible in "Measure" and "Calibration" operating states! Relay must be configured for sample gas. Before the sample gas valve opens, the other valves are closed. The device then switches to the "Measure" operating state, and all other states (e.g. "Calibration") are left.
Pt. 1 Calibration			N, X	During activation, the new calibration factors are determined and the calibration completed. Note: Both points must always be calibrated (see section)!
Pt. 2 Calibration				
Autorange			N, X	Activate "Automatic measuring range switching"
Autocal Check			N, X	Note: Effective activation only possible in "Measure" operating state! Start Autocal check (function 24)
Measuring protection		N, X		It is possible to define a binary input "Measuring protection" which has the following effect: If the device is in the "Measure" operating state (functional check deactivated), it remains in this state, i.e.: • The device can no longer be decoded. • The device can no longer be set to "Remote". The message "Measuring protection activated" appears in the status line of the measured value display.

6.6.5 ELAN configuration (function 73)

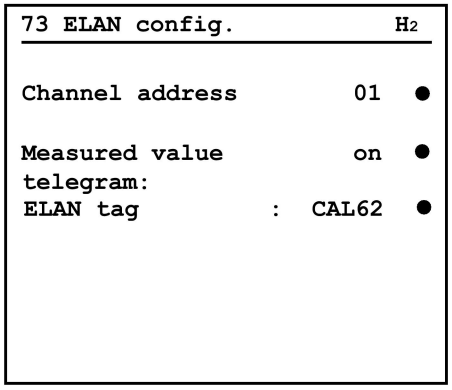


Image 6-41 Configuring ELAN

With this function, you set the parameters for an ELAN network.

Channel address:

Set the channel address here. Addresses from one to twelve can be set. In an ELAN network, each address may only be used once.

Measured value telegrams on/off:

Here you can switch the cyclic, independent sending of measured values on or off every 500 ms.

Note

Independent sending of measured values

If you have set up your own communication control system, this option offers a simple way of checking an ELAN telegram. In order to avoid unnecessarily loading the device and the ELAN network, however, the function should only be switched on as needed!

ELAN tag:

Display of the tag assigned to this device in the ELAN network.

Further ELAN details can be found in the ELAN interface description:

- (C79000-B5200-C176 German)
- (C79000-B5276-C176 English).

6.6.6 Reset (function 74)

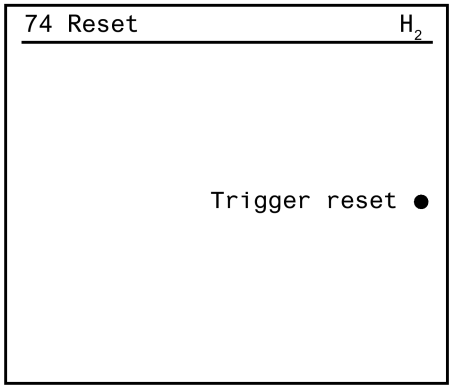


Image 6-42 Carrying out a reset

When this function is called, the device runs the "Warm-up phase" and then changes to "Warm-up phase" operating state, which activates the functional check at the same time. The device is only completely ready for operation again after successfully running through this phase.

6.6.7 Save, load data (function 75)

This function is used to exchange the data records of your working area.

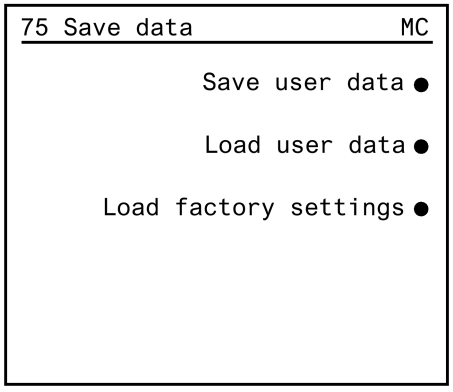


Image 6-43 User data memory

Press the softkey 1 *"Save user data"* e.g. after the system has been successfully commissioned. All individual settings are then saved.

Press the softkey 2 *"Load user data"*, to load the last user data saved.

These functions are important when the device is undergoing repairs or maintenance work, or, for example, if new parameter settings are to be tested.

Press softkey 3 to restore the factory settings.

A confirmation query is set up in this function. In order to actually load the respective data in the memory, you must confirm with "yes". If you select "no", this is canceled.

Note

Note that all previous settings are lost with "Load user data" and "Load factory data"!

The following figure shows an overview of the interaction between the various memory modules.

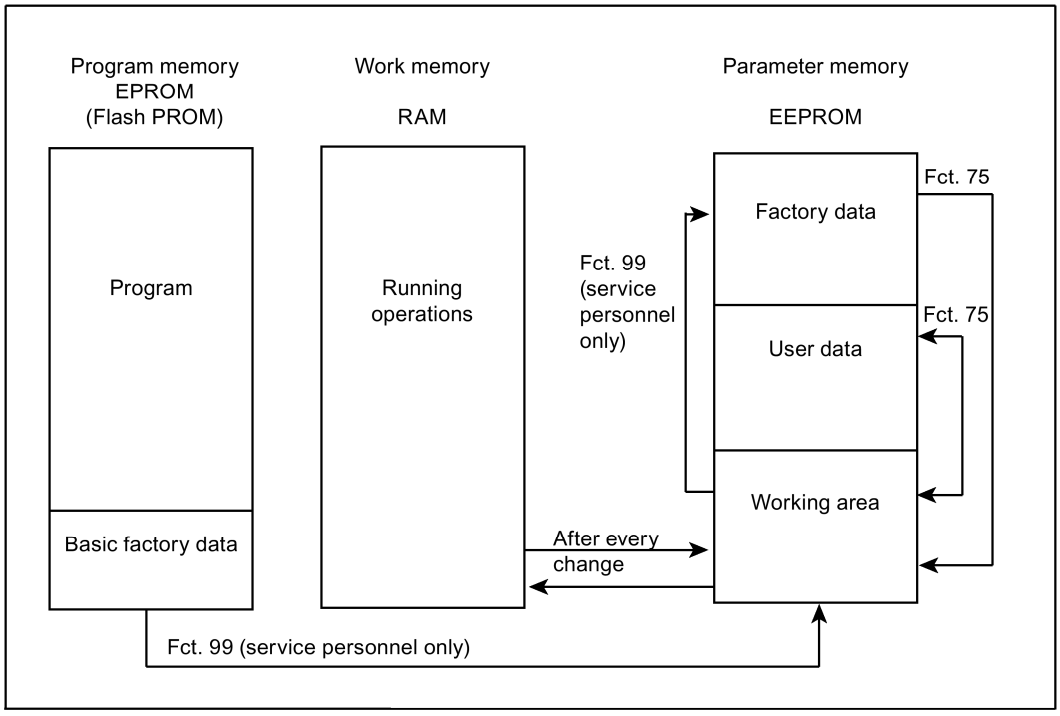


Image 6-44 Memory modules

6.6.8 Suppression of short noise signals (function 76)

With function 76, you can eliminate undesired spikes which exceed a configurable threshold.

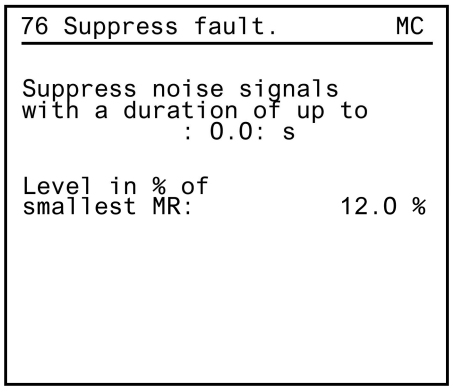


Image 6-45 Suppressing noise

Spikes are created by electromagnetic interferences or sometimes by mechanical shocks. These noise signals can be suppressed by entering a "blanking time" of 0 to 5 s. The entered time has the effect that the last measured value before the spike occurred is displayed so that the measured result is not influenced.

Times can be entered in steps of 0.1 s.

Under *"Level in % of smallest MR"* , enter the threshold value in % of the smallest measuring range above which the noise signals are to be suppressed.

Note

If a change in concentration directly follows a noise signal, this may be displayed after a delay.

When this function is activated, the settings of function 50 ("Electric time constants") must also be taken into account. Here you need to ensure that the "Threshold in % of smallest range" is greater than the effect interval set using function 50.

6.6.9 Measured value memory (function 77)

This function is used to define the response of the analog output when the device assumes a specific state.

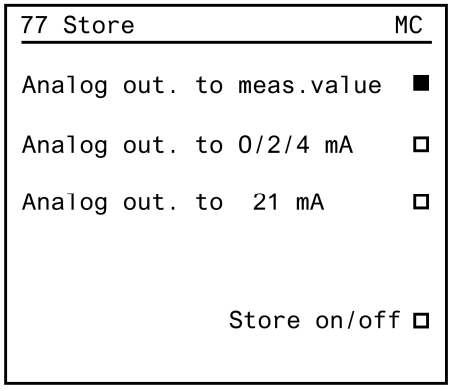


Image 6-46 Setting the analog output

For following states:

- Fault (F)
- Function check based on
  - Decoding
  - Calibration
  - Warm-up phase
  - Device not in Measure
  - Remote access

One of these values is sent permanently to the analog output:

- The last registered measured value
  or
- The start-of-scale value of the selected analog current range (0, 2, 4 A)
  or
- Te full-scale value of the selected analog current range (21 A)

'Memory on' (■) activates the respective setting.

6.6.10 Calibration tolerances (function 78)

Setting the calibration tolerances

With this function, you define the calibration tolerances. If these tolerances are exceed during a calibration, the maintenance request W1 (calibration difference to large) is triggered.

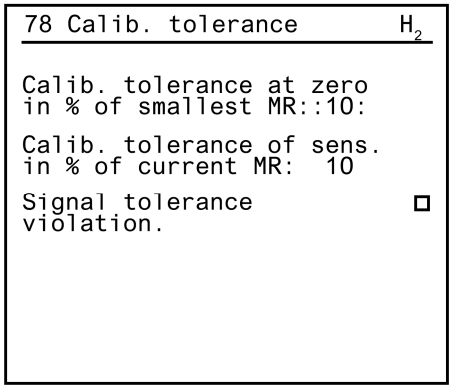


Image 6-47 Setting the calibration tolerances

With softkey 3 *"Signal tolerance violation"*, you activate or deactivate the tolerance monitoring.

If you previously configured a relay output to "Maintenance request" using function 71, the device outputs large changes in the zero point (point 1) or the span (point 2) compared to the last calibration as "Maintenance request".

With *"Calibration tolerance at zero point ..."*, you define the max. deviation proportional to the smallest span in %.

With *"Calibration tolerance at span ..."*, you define in % the max. deviation proportional to the current span of the measuring range in which the calibration takes place.

The calibration tolerance, which can be set from 0 to 99 %, refers with zero point (point 1) to the measuring range with the smallest measuring span and with the span (point 2) to the measuring range in which the total adjustment is carried out (marked with "■" in function 22).

Example

Measuring range 1	0 to 50 % H_2
Measuring range 2	0 to 100 % H_2
Leading measuring range in which calibration takes place	Measuring range 2
Selected calibration tolerances	6 % (for both)
Response threshold for zero point	50 % H_2 x 0.06 = 3 % H_2
Response threshold for span	100 % H_2 x 0.06=6 % H_2

If the measured value deviation of the most recently set zero point (point 1) calibration or scan (point 2) calibration is greater than the configured value and if "Signal tolerance violation" is activated, the corresponding relay signals a maintenance request.

6.6.11 Change codes (function 79)

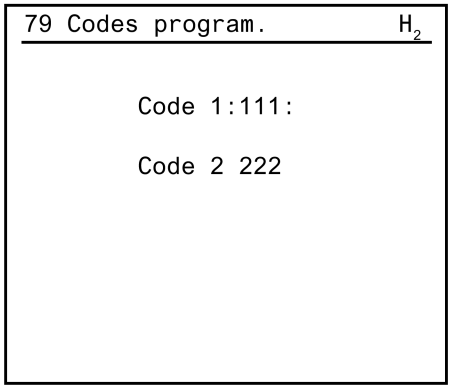


Image 6-48 Change codes

With this function, you replace the factory-set codes ("111" for level 1, "222" for level 2) by your own.

If you enter the value "000" for a code, code blocking is canceled and you have immediate access to the corresponding operation level.

6.6.12 Device test (function 80)

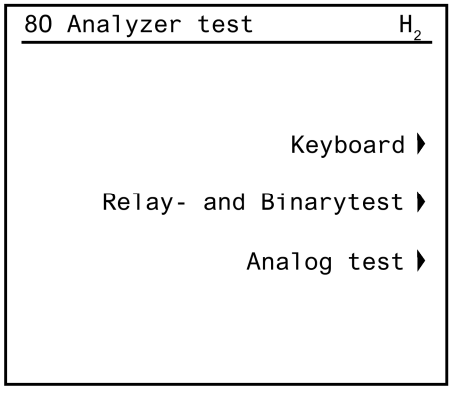


Image 6-49 Testing the device

With this function, you can test the functional ability of the device.

Keyboard test

You can test all keys on the control panel by means of the keyboard test. The five softkeys on the right edge can be used to make the associated item appear/disappear. If a number key or the sign key is pressed, this is displayed in the bottom line of the display.

After pressing the [INFO] key, a message is displayed in plain text. The [MEAS] and [ESC] keys retain their "jump back" function.

Relay and binary test

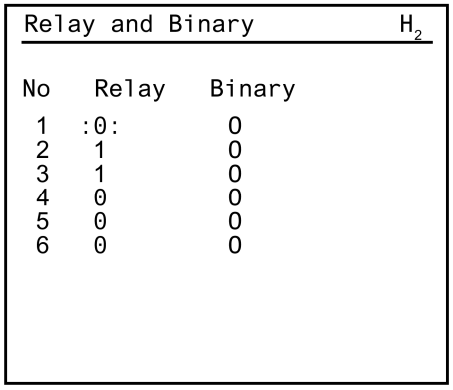


Image 6-50 Test relay outputs and binary inputs

The first function screen shows the state of the six relay and binary inputs of the standard device. With an optional board, there are another eight relay/binary inputs on a second page.

With the relay test, individual relays can be activated. This is done via the input field. With "1", the relay is on, with "0", it returns to its release condition. Numbers other than "0" and "1" are not accepted by the input field.

After leaving function 80, the relays are back in the state they had before calling the relay and binary test.

The current state of the binary inputs is displayed in the "Binary" column.

Analog test

With the analog test, the analog output is set to a constant current of 0 to 24000 µA for testing purposes.

The analog input displays the input currents in µA.

6.6.13 Language selection (function 81)

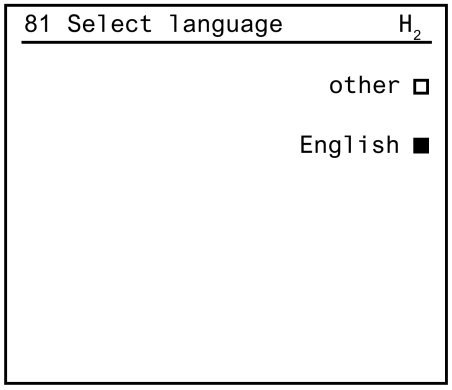


Image 6-51 Selecting a language

With this function, you set the device to a second dialog language.

The device is always delivered in the ordered language. Usually, English is included as a second language (if English is the first language, Spanish is set as the second language).

6.6.14 Pressure correction (function 82)

Note

Please note

The measuring principle of the CALOMAT 62 is based on the thermal conductivity of gases. This physical effect is almost pressure-independent at atmospheric conditions (800 ... 1100 hPa). A pressure correction is therefore usually unnecessary, and should only be carried out by Siemens servicing engineers.

Before you perform a pressure correction yourself, we recommend that you discuss your problem with our technical support department CGA Help Desk (https://support.industry.siemens.com/My/ww/en/requests#createRequest).

This function offers the possibility for

- A pressure correction using an external pressure sensor via analog input 2 and
- A pressure correction using an external pressure sensor via ELAN (RS 485).

The pressure correction can also be switched off using function 52 ("On/off functions").

The external pressure sensor must be equipped with a diaphragm suitable for the application. Its analog output range must be 0(2/4) - 20 mA (this corresponds to around 0(1/2) - 10 V).

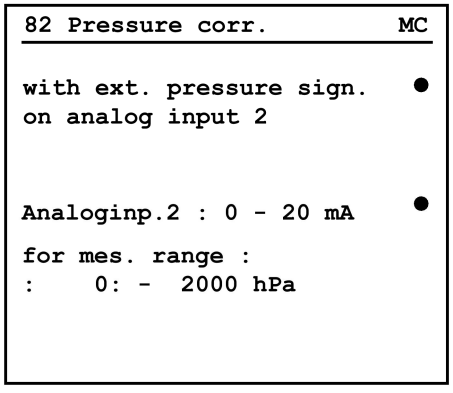


Image 6-52 Pressure correction via analog input 2

The characteristic data of the external pressure sensor can be entered using function 82. The pressure measuring range is entered in hPa (1 hPa = 1 mbar).

Pressure correction using an external pressure sensor via ELAN

A pressure correction can also be carried out via ELAN if e.g. a further gas analyzer has already been provided with an external pressure sensor and if this is connected via a serial interface to the device.

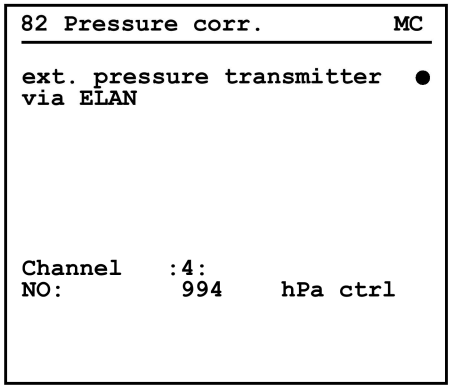


Image 6-53 Pressure correction via ELAN

The following line shows the component, the pressure and the status of the device connected via ELAN.

Note

Measured value "Pressure"

The measured value "Pressure" is an internal value which can be supplied to a further gas analyzer via ELAN.

On the device supplying the pressure data, the parameter "Measured value telegrams" must be set to "On" using the function 73.

Note

Changing the gradient

In addition to the influence of the accompanying gases on the zero point of the measuring range, changes in the gradient of the characteristic of the measured component also occur in certain applications. This change in gradient can also be corrected as a function of the interfering gas. The configuration of the gradient correction is performed by the manufacturer.

6.6.15 Correction of cross-interference (function 83)

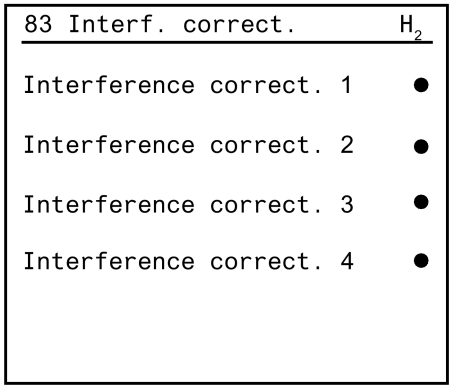


Image 6-54 Carrying out correction of cross-interference

Accompanying gases (interfering gases) present in the sample gas influence the measurement (see also Table 2-3). The relationship between interfering gas concentration and offset is usually non-linear.

Note

A differentiation must always be made with the correction of cross-interference as to whether the interfering gas has a constant or variable concentration.

Correction of cross-interference is only meaningful if the effect of the interfering gas is lower than the expected concentration of the measured component.

Press the first softkey. The following function screen appears on the display.

By pressing the first softkey, now select the type of influence of an interfering gas. The following distinctions are possible:

- No correction of cross-interference
- Correction of cross-interference with constant influence of interfering gas
- Correction of cross-interference with variable influence of interfering gas via analog input 1
- Correction of cross-interference with variable influence of interfering gas via ELAN

Note

The correction of cross-interference is deactivated for the duration of a calibration process (zero point (point 1) or span (point 2)). It is active again when calibration has been completed and the device has returned to the "Measure" operating state.

Correction of cross-interference with constant influence of interfering gas

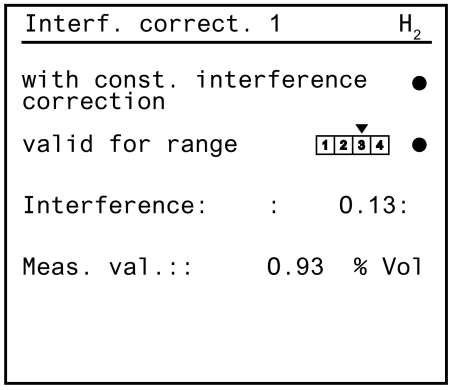


Image 6-55 Constant influence of interfering gas

In this example, an interfering gas results in an H_2 offset of +0.93 %.

With softkey 2, you can set whether the correction of cross-interference should only apply to certain measuring ranges.

Under *"Interference"*, enter the value of the zero offset.

Correction of cross-interference with variable influence of interfering gas via analog input 1

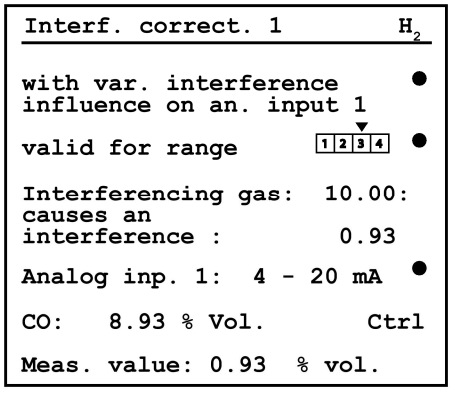


Image 6-56 Variable influence of interfering gas

In this example, 10 % of an interfering gas result in an H_2 offset of 0.93 %.

Here, a variable influence of interfering gas is active which must be measured using a suitable separate gas analyzer and then applied to the device for correction of cross-interference as an analog current.

Correction of cross-interference with variable influence of interfering gas via ELAN

Press softkey 1 again to carry out the correction of cross-interference via the RS485 serial interface (ELAN).

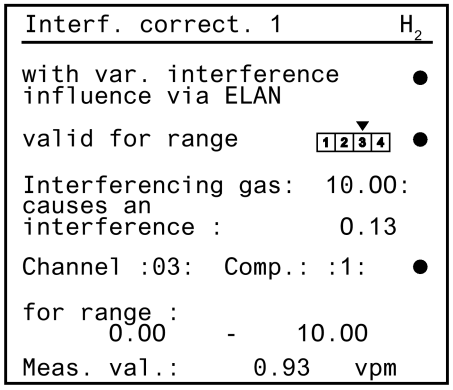


Image 6-57 Correction of cross-interference with variable influence via ELAN

The procedure for the configuration is the same as that for the correction of cross-interference via analog input 1.

Enter the channel number and component number of the cross-interference analyzer. The gas type, measured value and the status of the selected device appear in the display.

With softkey 2, you can set whether this correction of cross-interference should only apply to certain measuring ranges.

Note

On the device supplying the correction data, the parameter *"Measured value telegrams"* (function 73) must be set to *"On"*.

6.6.16 Switch valves (function 85)

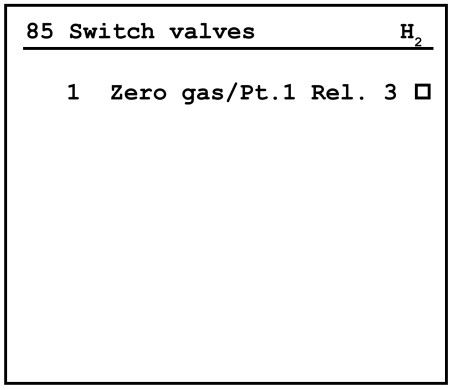


Image 6-58 Switching valves

With this function, you can manually switch up to six valves. This is done via the relays which are allocated to the individual valves and are available on the motherboard and optional board. The precondition is that the corresponding relays have been previously configured with function 71 ("Relay outputs")

The "Switch valves" function only applies to the relay functions "Zero gas/Pt. 1", "Calibration gas 1 to 4/Pt. 2" and "Sample gas".

Only one valve can be switched at a time, since the valves are mutually interlocked.

6.6.17 Linear temperature compensation (function 86)

The sensor is thermostatically-controlled, and therefore operates practically independent of the ambient temperature. It is therefore not possible to improve the temperature response even when using the additional measure of linear temperature compensation.

This function is only provided for servicing purposes, and must only be used by servicing personnel.

6.6.18 Error on/off (function 87)

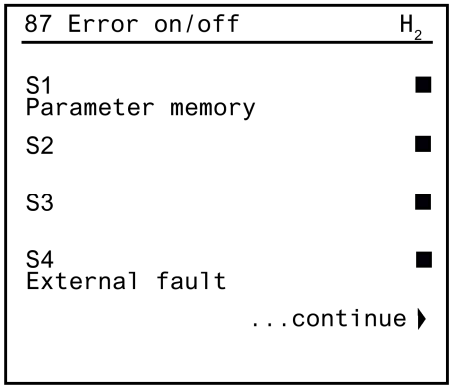


Image 6-59 Switching errors on and off

With this function, you switch the message for maintenance requests and faults (see Tables "Causes of maintenance requests" and "Causes of error messages") off individually so that there is no entry in the logbook, no message in the status line of the measured value display, and no external signal sent.

Error messages which do not apply to this analyzer are identified by the absence of text following the fault number.

6.6.19 PROFIBUS configuration (function 90)

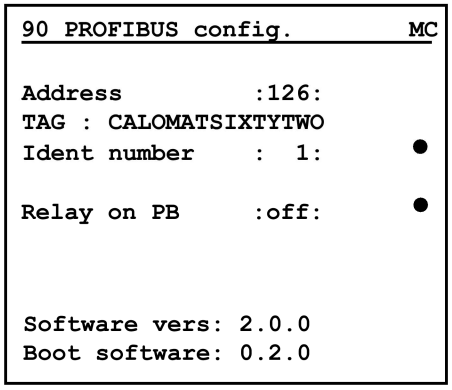


Image 6-60 Configuring PROFIBUS

This function can only be called if the device contains additional PROFIBUS electronics (optional board).

The parameters have the following meanings:

- Address: With this function, you can set the PROFIBUS station address. The address can be set from 0 to 126.
- TAG: A tag assigned to the device in the PROFIBUS network
- Ident number: The configuration behavior of the device is configured with the *"Ident number"* (softkey 2). Parameters 0, 1 and 3 can be selected and have the following meaning:

Parameter	Meaning
0	Only the PROFILE ID number is positively acknowledged
1	Only the device-specific ID number is positively acknowledged
3	Only the PROFILE ID number for multivariable devices (complex analyzers) is positively acknowledged.

- Relay by PB. The 8 relays of the additional electronics (optional board) can be enabled using this in order that they can be remotely controlled via PROFIBUS. To allow activation, none of these relays may be used by an internal function of the device.

Note

To be able to address the relays of the additional electronics via PROFIBUS, these relays must be set to "Vacant" in the relay configuration. Otherwise, it will not be possible to activate this function.

6.6.20 Factory settings (function 99)

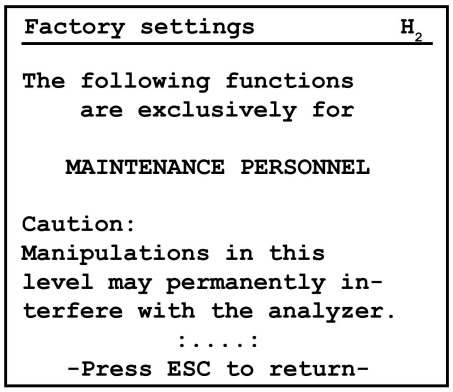


Image 6-61 Factory settings

With this function, the operator can access the factory functions level. These settings are intended only for maintenance personnel and are therefore protected by an additional code.

After activating this function, a message appears which prompts you to enter the corresponding code.

Maintenance and service 7

7.1 Maintenance and service

7.1.1 Important maintenance information

⚠ WARNING

Maintaining/servicing the device

Disconnect the gas and power supply before opening the device.

Only carry out setting work with appropriate tools in order to prevent short circuits on the electronic boards.

Incorrect installation or adjustment could result in the release of gas, which in turn could result in damage to the analyzer (e.g. danger of explosion) or to the health of persons (e.g. poisoning).

⚠ CAUTION

Danger of burns

With heated devices, the temperature only drops slowly because of the high thermal capacity of the materials. Therefore temperatures up to 80 °C can still be present a long time after switching off the devices.

Maintenance

The analyzer must be subject to annual maintenance in order to check the electrical safety and correct working. It is up to the owner to decide on extension of the maintenance interval in individual cases.

The maintenance interval must be defined by the owner. The influence of the introduced gases on the components wetted by them must be considered. If standards or directives apply to the gases/components used, these must also be observed.

To allow maintenance work, the top cover of the CALOMAT 62E can be removed and the front panel swung forwards. With the CALOMAT 62F, the front doors must be opened.

If maintenance work is interrupted for more than two hours, the analyzer must be closed again.

Service

All modules within the housing can be replaced in the event of a defect. Repairs to these modules are not envisaged.

The following modules can be replaced:

- Complete analyzer section (metal bracket with sensor and sensor electronics)
- Mains transformer
- Fuses
- Complete motherboard
- Optional board
- Complete front panel of enclosure (CALOMAT 62E)
- Front panel of enclosure without display (CALOMAT 62E)
- Complete enclosure door (CALOMAT 62F)

Removal of these modules - with the exception of the sensor - is self-explanatory.

7.1.2 Analyzer section

The analyzer section comprises the sensor, sensor electronics and mounting bracket. These components form one unit which is referred to as the analyzer section.

In the event of a defect on the sensor or electronics, the complete analyzer section must be replaced. This must be carefully removed and returned to the manufacturer.

Analyzer sections which have been exposed to radioactive or highly toxic gases cannot be returned. In such cases, the owner of the CALOMAT 62 must ensure that the sensor is disposed of correctly in accordance with the local directives at the location of use.

7.1.3 Installation and removal of the sensor

Open the enclosure and disconnect the 10-core sensor ribbon cable from the plug of the sensor electronics.

Then remove all NPT screwed glands from the gas couplings, and unscrew the four hexagon nuts (width across flats 27 mm).

Only with CALOMAT 62E: When unscrewing, hold the sensor in one hand so that it does not fall onto the floor of the enclosure.

Proceed in reverse order to install the sensor.

Note

Sensor installation

A leak test must be carried out following every maintenance measure affecting the sensor and gas path.

7.1.4 Installing and removing the sensor electronics

Before removing, disconnect the 10-core sensor cable from the motherboard (CALOMAT 62E) or from the enclosure feed-through board (CALOMAT 62F). Subsequently disconnect the 3-core interface cable from the sensor electronics.

Remove the mounting bracket with the sensor electronics from the enclosure. To do this, first loosen four base screws in the CALOMAT 62E or three nuts of the mounting bracket in the CALOMAT 62F; the mounting bracket can then be easily removed from the enclosure.

Proceed in reverse order to install the sensor electronics.

7.2 Replacement of motherboard and optional board

7.2.1 CALOMAT 62E motherboard

The motherboard and optional board can be easily replaced/retrofitted.

To remove, proceed as follows:

1. Disconnect the device from the mains.
2. Loosen the screws on the enclosure cover and remove it.
3. Remove the locking bracket above the motherboard.
4. Remove the SUB-D connector from the rear of the enclosure.
5. Loosen the three screws (M3) which are next to the SUB-D plug connectors on the rear of the device.
6. Disconnect the plug connectors of the ribbon cables from the motherboard.
7. Carefully remove the motherboard.

Proceed in reverse order to install the motherboard.

7.2.2 CALOMAT 62F motherboard

To remove, proceed as follows:

1. Disconnect the device from the mains.
2. Open the left door of the enclosure.
3. Remove the plug connectors of the interface cables from terminal blocks A and B.
4. Remove the sheet-metal covers.
5. Disconnect all cables leading to the motherboard.
6. Remove the sheet-metal cassette in which the motherboard is located out of the enclosure.
7. Disconnect the interface cable (ribbon cables) from the motherboard.
8. To remove the motherboard, remove the three screws (M 3) between the connectors and one locking screw (M 4) at the opposite end of the motherboard.

To install the board, carry out the same steps in the opposite order.

7.2.3 Optional board

The procedure is the same as for the motherboard. In contrast to this, the optional board is only secured with two screws on the rear of the enclosure (CALOMAT 6E) or on the sheet-metal cassette (CALOMAT 6F).

To install the board, carry out the same steps in the opposite order.

7.3 Replacement of fuses

⚠ WARNING

Make sure you disconnect the device from the mains before exchanging fuses!

It is only permissible to replace a blown fuse by one of the same type.

Apart from this, the previously described requirements applicable to operator and maintenance personnel apply.

The device is protected by several fuses depending on the mains voltage and the device version.

CALOMAT 62E and CALOMAT 62F (without heating of gas connection block)

Fuses F3, F4: the fuses are located in the mains connection socket in a drawer. To replace the fuses, they can be levered up using a screwdriver and removed.

The appropriate Order Nos. can be obtained from the spare parts list.

Table 7- 1 Fuse ratings F3, F4 in Ampere

Voltage	Fuse rating
200 - 240 V	0.63 A (T630L250V)
100 - 120 V	1.0 A (T1L250V)

CALOMAT 62F (with heating of gas connection block)

Fuses F1, F2: these fuses are located on the heater control board behind the left cover plate (see Fig. 6-1). The cover plate must be fitted again following replacement of the fuses.

Table 7- 2 Fuse rating F1 in Ampere

Voltage	Fuse rating
200 - 240 V	0.63 A (T630L250V)
100 - 120 V	1.0 A (T1L250V)

Table 7- 3 Fuse rating F2 in Ampere

Voltage	Fuse rating
200 - 240 V	2.5 A (T2.5L250V)
100 - 120 V	4.0 A (T4L250V)

Fuses F3, F4: the fuses are located in the mains connection socket in a drawer. To replace the fuses, they can be levered up using a screwdriver and removed.

The appropriate Order Nos. can be obtained from the spare parts list.

Table 7- 4 Fuse ratings F3, F4 in Ampere

Voltage	Fuse rating
200 - 240 V	2.5 A (T2.5L250V)
100 - 120 V	4.0 A (T4L250V)

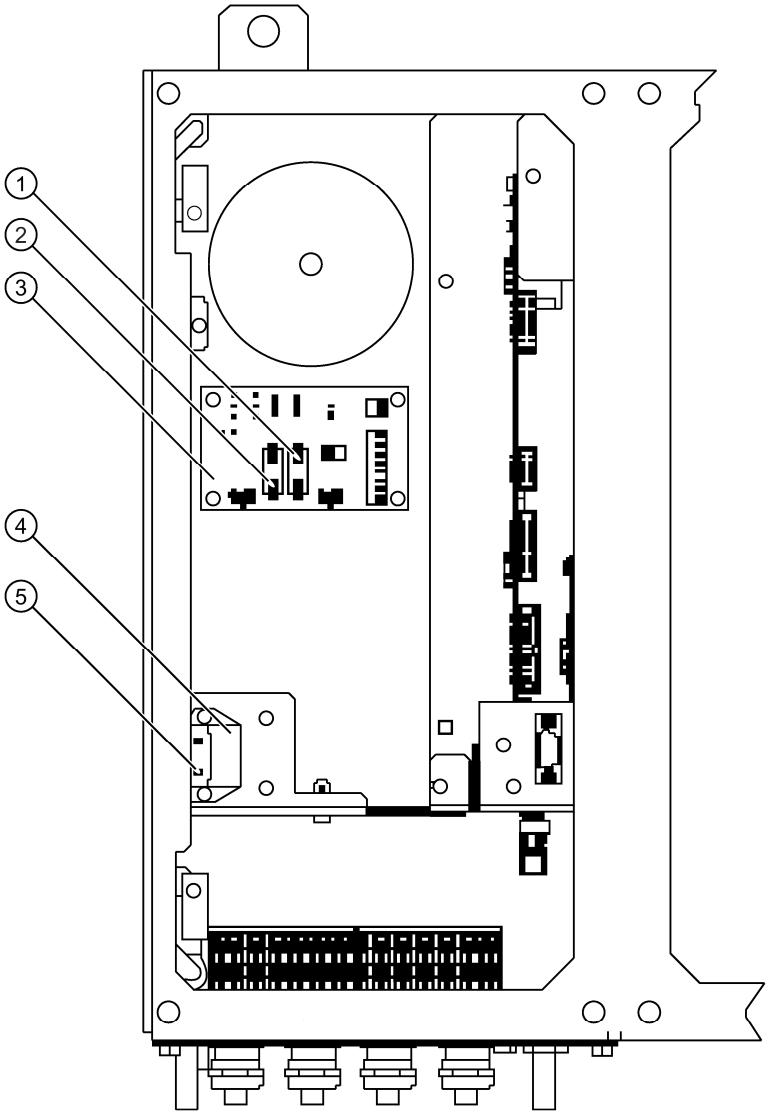


Image 7-1 CALOMAT 62F, heated version

1 F1: fuse for basic electronics
2 F2: fuse for heater
3 Heater board
4 Fuse drawer for fuses F3, F4
5 Mains connection socket

7.4 Cleaning the device

Cleaning the surface

NOTICE
Make absolutely sure that no water penetrates the device during cleaning.

The front panels and doors and the control panel are washable. Use a sponge or cloth dampened by water containing washing-up liquid. In particular, the surface in the display area must only be cleaned with a gentle pressure to prevent damage to the thin foil.

Cleaning the interior

After opening the device, you can blow out the interior carefully with a compressed air gun, if necessary.

Removing faults

8

8.1 Alarms and messages

The device is able to detect functional irregularities. These appear as "Maintenance request" or "Fault" in the status line of the measured value display. At the same time, they are recorded in the logbook (function 3) and can be called up there. Logbook entries which have to be acknowledged are identified by a dot. You acknowledge a message by pressing the softkey next to the corresponding logbook entry. If you do not eliminate the cause, the message will appear again.

Latching

Certain logbook messages are latching (e.g. "Sensor temperature outside tolerance limits"). They must be acknowledged manually or via binary input in order to reset them, but they appear again immediately if the cause of the message has not been eliminated.

Note: acknowledgment via a binary input should be carried out only with brief setting (approx. 1 s) since latching of the associated fault message otherwise remains ineffective.

If a new message appears, the record stored in the logbook is shifted back one place in the memory. There are a total of 32 memory locations available. If all 32 memory locations are already occupied when another record arrives (no. 33), the oldest one (no. 1) is overwritten. A power failure deletes all records.

It cannot be excluded that all pages of the logbook are rapidly used up in the case of a high message rate (logbook "overflows"). It can occur that unacknowledged messages are no longer visible in the logbook, but are nevertheless still saved. These entries will continue to result in fault messages. Deletion is only possible if the logbook is deleted completely using function 60.

Logbook entries which have to be acknowledged are identified in the following tables by "Q" in the column "No.".

You can block the logbook or even delete the messages in it with function 60. This might be especially helpful during test operation.

All messages can be shut off individually with function 87. In normal operation, we recommend that this option is not used.

8.2 Maintenance requests

If there are indications of changes in internal device parameters, "Maintenance request" appears in the status line. Such changes do not significantly affect the measuring quality at the time they occur. In order to still guarantee the measuring quality, it may be necessary to carry out remedial measures.

The following fault messages entail a maintenance request (output in the display) and are signaled externally if a corresponding relay has been configured using function 71.

Table 8- 1 Causes of maintenance requests

No.	Message	Possible cause	Remedy	
W1 Q	Calibration tolerance exceeded	Calibration gas was changed	Repeat calibration	
		Condensation or contamination in the gas path and/or thermal conductivity sensor	Sample gas must be cleaned before it is introduced into the device; use appropriate measures to guarantee that the parts wetted by the sample gas are always above the dew point; replace the analyzer section if necessary	
W4 Q	Set clock	The device was switched off	New input of date and time	
W6 Q	Temperature of LC display too high or too low	Ambient temperature above 45 °C or below 5 °C	Make sure that the ambient temperature is in the range from 5 °C to 45 °C.	
W7 Q	Temperature of gas connection block (only with heated version)	Temperature of gas connection block > 5 °C above setpoint	1. Check whether T-sensor is connected to the feed-through board. If yes: 2. Check resistance of T-sensor (<< 3 kΩ); If unsuccessful: 3. Inform service department	
W9	External maintenance request	External signal	Check (function 72 must be configured accordingly)	
W10	AUTOCAL/Check error	Tolerances that are exceeded in AUTOCAL/Check or false sample gas (assignment to the measuring range is wrong)	Perform AUTOCAL again	This message disappears only when the AUTOCAL has been successfully completed.

8.3 Fault messages

Defects in the hardware or changes in the device parameters which would result in the device being unable to make reliable measurements lead to a fault message. "Fault" then appears in the status line if the device is in measuring mode.

The faults listed below result in a fault message (output in the display) and are signaled externally if a corresponding relay has been configured using function 71. Immediate remedial measures should always be carried out here by qualified maintenance personnel.

Function 87 can be used to switch off (deactivate) each fault individually.

Table 8- 2 Possible fault messages

No.	Fault message	Possible cause	Remedy
S1 Q	Parameter memory test failed	EPROM contains incorrect or incomplete data in the working area	Carry out RESET; if the fault message S1 is still displayed: 1. Load user data (function 75) If the fault message S1 is still displayed: 2. Inform service department Important: leave analyzer in operation in order to facilitate fault diagnostics by the servicing personnel!
S4	External fault message	External signal	Check; function 72 must be configured accordingly
S5 Q	Temperature of sensor outside tolerance	Temperature control of sensor faulty	
S6 Q	Temperature of gas connection block (only with heated version)	1. Temperature fuse blown	Inform service department
		2. Temperature control board faulty	
		3. Fuse in the appliance plug or on the temperature control board blown	
		4. Temperature sensor or heating cartridge faulty	
S10 Q	24 h RAM/Flash check	RAM or Flash-PROM	Replace motherboard; inform service department
S12 Q	Mains power supply	Line voltage outside tolerance	Line voltage must be within the specified tolerance limits according to the rating plate
S14	Measured value greater than full-scale value (+ 5%)	Incorrect sample gas, incorrect entry in function 22	Check, and correct if necessary
S15 Q	Calibration aborted	Fault during calibration via binary input	Eliminate the cause of the fault message
		Fault if the analyzer is in Autocal mode	

8.4 Other faults

Besides the maintenance request and fault messages, other important messages are listed in the logbook:

LIM 1 (... 4) (limits were violated) and
CTRL (function check).

Within a period appropriate to the drift, calibrate the zero (function 20) and span (function 21) of the analyzer using corresponding zero and calibration gases. Ensure that the gas is suitably prepared. A larger drift is usually a sign that deposits (e.g. through condensation) have been produced in the measuring cell, or that dust particles have accumulated.

In addition to the fault messages which can be shown in the logbook, the following influences could lead to an unsteady display:

Table 8- 3 Additional fault causes

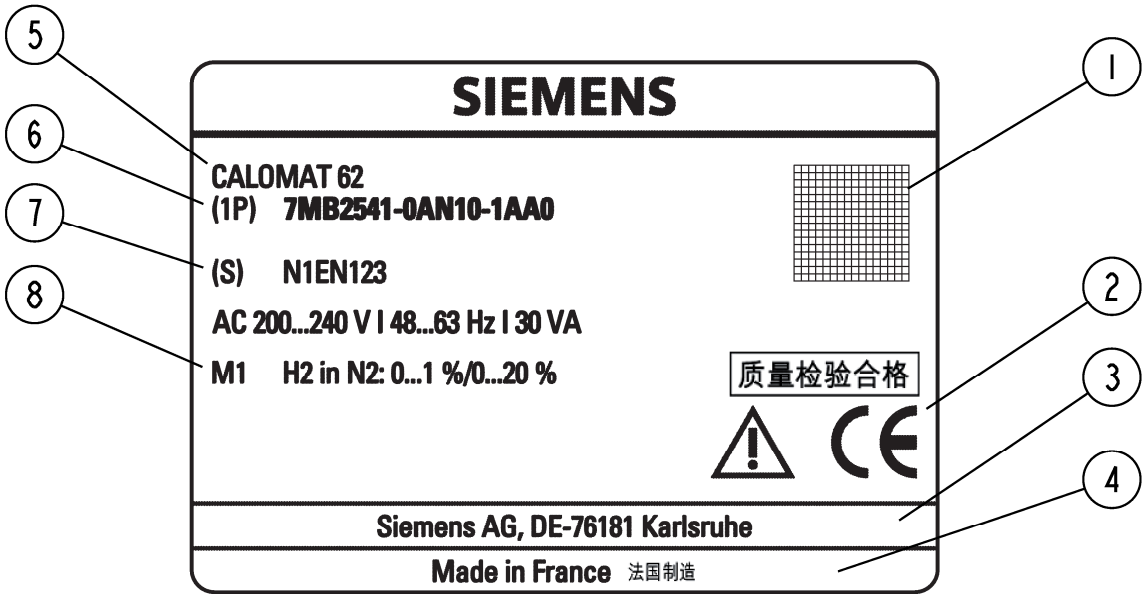
Fault	Possible cause and its elimination
Large drift	Check gas preparation (especially the filter); if the sensor leaks, the analyzer section must be replaced
Measured value depends on the flow	Check the flow; when using a rotameter, remember that this is calibrated for air; therefore take the gas density into account
Irregular flashing of the green LED on the rear of the device	Replace motherboard and/or inform service department
Occurrence of sporadic spikes	See also function 76; inform service department if necessary

Spare parts/accessories

9

9.1 Ordering information

The rating plate contains important data such as Article no. of the device, product version, serial number, electrical connection data, and measuring range. The spare parts list corresponds to the technical status of April 2014.



1	Data matrix code	5	Device name
2	CE conformity marking	6	Complete article no. of the device (MLFB number)
3	Name and address of manufacturer	7	Serial number
4	Designation of origin	8	Measuring range(s)

Image 9-1 Example of rating plate for CALOMAT 62

Ordering example

The order for spare parts must contain:

Table 9- 1 Information for ordering of spare part

Device name	CALOMAT 62
Order no. of the device	7MB2541-0AN10-1AA0
Serial number	N1S100001
Quantity	1
Designation of the spare part	Front panel
Article no. of the spare part	A5E01061562

9.2 Spare parts

Table 9- 2 Spare parts list - analyzer sections

Item	Article no. Analyzer section	Article no.= spare part number	Material	Application	Measuring range
1	A5E00756681001	A5E00123379001	Stainless steel 1.4571 n. b.	H_2/N_2	0-1% / 0-5%
2	A5E00756681002	A5E00123379002			0-1% / 0-20%
3	A5E00756681003	A5E00123379003			100-99% / 100-90%
4	A5E00756681004	A5E00123379004			100-95% / 100-50%
5	A5E00756681005	A5E00123379005		NH_3/N_2	0-20% / 0-40%
6	A5E00756681006	A5E00123379006			100-80% / 100-60%
7	A5E00756681007	A5E00123379007		NH_3/CO_2	0-20% / 0-40%
8	A5E00756681008	A5E00123379008			100-80% / 100-60%
9	A5E00756681009	A5E00123379009		SO_2/air	0-5% / 0-60%
10	A5E00756681010	A5E00123379010			100-95% / 100-50%
11	A5E00756681011	A5E00123379011		CO_2/H_2	0-1% / 0-5%
12	A5E00756681012	A5E00123379012			0-1% / 0-20%
13	A5E00756681013	A5E00123379013			100-99% / 100-90%
14	A5E00756681014	A5E00123379014			100-95% / 100-50%
15	A5E00756681015	A5E00123379015		CO_2/N_2	0-5% / 0-60%
16	A5E00756681016	A5E00123379016			100-95% / 100-50%
17	A5E00756681017	A5E00123379017	Stainless steel 1.4571 b.	H_2/N_2	0-1% / 0-5%
18	A5E00756681018	A5E00123379018			0-1% / 0-20%
19	A5E00756681019	A5E00123379019			100-99% / 100-90%
20	A5E00756681020	A5E00123379020			100-95% / 100-50%
21	A5E00756681021	A5E00123379021		NH_3/N_2	0-20% / 0-40%
22	A5E00756681022	A5E00123379022			100-80% / 100-60%
23	A5E00756681023	A5E00123379023		NH_3/CO_2	0-20% / 0-40%
24	A5E00756681024	A5E00123379024			100-80% / 100-60%
25	A5E00756681025	A5E00123379025		SO_2/air	0-5% / 0-60%
26	A5E00756681026	A5E00123379026			100-95% / 100-50%
27	A5E00756681027	A5E00123379027		CO_2/H_2	0-1% / 0-5%
28	A5E00756681028	A5E00123379028			0-1% / 0-20%
29	A5E00756681029	A5E00123379029			100-99% / 100-90%
30	A5E00756681030	A5E00123379030			100-95% / 100-50%
31	A5E00756681031	A5E00123379031		CO_2/N_2	0-5% / 0-60%
32	A5E00756681032	A5E00123379032			100-95% / 100-50%

Item	Article no. Analyzer section	Article no.= spare part number	Material	Application	Measuring range
33	A5E00756681033	A5E00123379033	Hastelloy C22 n. b.	H_2/N_2	0-1% / 0-5%
34	A5E00756681034	A5E00123379034			0-1% / 0-20%
35	A5E00756681035	A5E00123379035			100-99% / 100-90%
36	A5E00756681036	A5E00123379036			100-95% / 100-50%
37	A5E00756681037	A5E00123379037		H_2/Cl_2	0-1% / 0-5%
38	A5E00756681038	A5E00123379038			0-1% / 0-20%
39	A5E00756681039	A5E00123379039			100-99% / 100-90%
40	A5E00756681040	A5E00123379040			100-95% / 100-50%
41	A5E00756681041	A5E00123379041		Cl_2/air	0-5% / 0-60%
42	A5E00756681042	A5E00123379042			100-95% / 100-50%
43	A5E00756681043	A5E00123379043		Cl_2/HCl	0-10% / 0-100%
44	A5E00756681044	A5E00123379044			100-90% / 100-20%
45	A5E00756681045	A5E00123379045		HCl/air	0-5% / 0-60%
46	A5E00756681046	A5E00123379046			100-95% / 100-50%
47	A5E00756681047	A5E00123379047		NH_3/N_2	0-20% / 0-40%
48	A5E00756681048	A5E00123379048			100-80% / 100-60%
49	A5E00756681049	A5E00123379049		NH_3/CO_2	0-20% / 0-40%
50	A5E00756681050	A5E00123379050			100-80% / 100-60%
51	A5E00756681051	A5E00123379051		SO_2/air	0-5% / 0-60%
52	A5E00756681052	A5E00123379052			100-95% / 100-50%
53	A5E00756681053	A5E00123379053		CO_2/H_2	0-1% / 0-5%
54	A5E00756681054	A5E00123379054			0-1% / 0-20%
55	A5E00756681055	A5E00123379055			100-99% / 100-90%
56	A5E00756681056	A5E00123379056			100-95% / 100-50%
57	A5E00756681057	A5E00123379057		CO_2/N_2	0-5% / 0-60%
58	A5E00756681058	A5E00123379058			100-95% / 100-50%

Item	Article no. Analyzer section	Article no.= spare part number	Material	Application	Measuring range
59	A5E00756681059	A5E00123379059	Hastelloy C22 b.	H_2/N_2	0-1% / 0-5%
60	A5E00756681060	A5E00123379060			0-1% / 0-20%
61	A5E00756681061	A5E00123379061			100-99% / 100-90%
62	A5E00756681062	A5E00123379062			100-95% / 100-50%
63	A5E00756681063	A5E00123379063		H_2/Cl_2	0-1% / 0-5%
64	A5E00756681064	A5E00123379064			0-1% / 0-20%
65	A5E00756681065	A5E00123379065			100-99% / 100-90%
66	A5E00756681066	A5E00123379066			100-95% / 100-50%
67	A5E00756681067	A5E00123379067		Cl_2/air	0-5% / 0-60%
68	A5E00756681068	A5E00123379068			100-95% / 100-50%
69	A5E00756681069	A5E00123379069		Cl_2/HCl	0-10% / 0-100%
70	A5E00756681070	A5E00123379070			100-90% / 100-20%
71	A5E00756681071	A5E00123379071		HCl/air	0-5% / 0-60%
72	A5E00756681072	A5E00123379072			100-95% / 100-50%
73	A5E00756681073	A5E00123379073		NH_3/N_2	0-20% / 0-40%
74	A5E00756681074	A5E00123379074			100-80% / 100-60%
75	A5E00756681075	A5E00123379075		NH_3/CO_2	0-20% / 0-40%
76	A5E00756681076	A5E00123379076			100-80% / 100-60%
77	A5E00756681077	A5E00123379077		SO_2/air	0-5% / 0-60%
78	A5E00756681078	A5E00123379078			100-95% / 100-50%
79	A5E00756681079	A5E00123379079		CO_2/H_2	0-1% / 0-5%
80	A5E00756681080	A5E00123379080			0-1% / 0-20%
81	A5E00756681081	A5E00123379081			100-99% / 100-90%
82	A5E00756681082	A5E00123379082			100-95% / 100-50%
83	A5E00756681083	A5E00123379083		CO_2/N_2	0-5% / 0-60%
84	A5E00756681084	A5E00123379084			100-95% / 100-50%
85	A5E00756681085	A5E00123379085	Hastelloy C22 n. b.	H_2/HCl	0-1% / 0-5%
86	A5E00756681086	A5E00123379086			0-1% / 0-20%
87	A5E00756681087	A5E00123379087			100-99% / 100-90%
88	A5E00756681088	A5E00123379088			100-95% / 100-50%
89	A5E00756681089	A5E00123379089	Hastelloy C22 b.	H_2/HCl	0-1% / 0-5%
90	A5E00756681090	A5E00123379090			0-1% / 0-20%
91	A5E00756681091	A5E00123379091			100-99% / 100-90%
92	A5E00756681092	A5E00123379092			100-95% / 100-50%
b. = flow-type reference gas side; n. b. = with enclosed reference gas					

Table 9- 3 Spare parts list - miscellaneous spare parts

Description	Article no.	Remarks
Mains transformer 230 V	W75040-B31-D80	For rack-mounted and field devices
Mains transformer 115 V	W75040-B21-D80	For rack-mounted and field devices
Fuse T630L250V, 0.63 A	W79054-L1010-T630	With mains voltage 200 - 240 V
Fuse T1L250V, 1.0 A	W79054-L1011-T100	With mains voltage 100 - 120 V
Fuse T2.5L250V, 2.5 A	W79054-L1011-T250	With mains voltage 200 - 240 V
Fuse T4L250V, 4 A	W79054-L1011-T400	With mains voltage 100 - 120 V
Line filter	W75041-E5602-K2	
Motherboard with firmware, German	A5E01035603	When ordering, always specify the Serial No. of the device!
Motherboard with firmware, English	A5E01035605	
Motherboard with firmware, French	A5E01035606	
Motherboard with firmware, Spanish	A5E01035607	
Motherboard with firmware, Italian	A5E01035608	
Option board: relay	C79451-A3480-D511	Retrofitting set for rack-mounted device
Option board: PROFIBUS PA	A5E00057307	Retrofitting set for rack-mounted device
Option board: PROFIBUS DP	A5E00057312	Retrofitting set for rack-mounted device
Option board: relay	A5E00064223	Retrofitting set for field device
Option board: PROFIBUS PA	A5E00057315	Retrofitting set for field device
Option board: PROFIBUS DP	A5E00057318	Retrofitting set for field device
Firmware update for PROFIBUS	A5E00057164	For PROFIBUS PA and PROFIBUS DP
Adapter board, LC display/keyboard	C79451-A3474-B605	For rack-mounted and field devices
LC display	W75025-B5001-B1	For rack-mounted and field devices
Complete analyzer front panel	A5E01244894	Only for rack-mounted enclosure
Analyzer front panel **without** LC display	C79165-A3042-B508	Only for rack-mounted enclosure
Temperature controller electronics	A5E00118530	115 V AC, without fuses F1, F2*
	A5E00118527	230 V AC, without fuses F1, F2*
Temperature sensor	C79451-A3480-B25	Only field device; can be screwed-in
Heating cartridge	W75083-A1004-F120	Only field device; 1 unit; 115 W
Temperature limiter 100°C	A5E00891855	Only field device; can be reset

* See also Section 6.3

Appendix A

A.1 Service and support

Technical support is available on the Internet at: CGA Help Desk (https://support.industry.siemens.com/My/ww/en/requests#createRequest)

Your regional Siemens representative can be found here: Contact partner (http://www.automation.siemens.com/mcms/aspa-db/en/automation-technology/Pages/default.aspx // XmlEditor.InternalXmlClipboard:2b8c9950-1d49-ffc1-5ad9-f7f0b769b59f)

A.2 Returned delivery

Note

Return delivery of contaminated device components

Device components which have come into contact with radioactive gases or substances, or have been exposed to radioactive or high-energy radiation, may no longer be returned.

The owner of the device must ensure in such cases that the contaminated device components are disposed of correctly in accordance with the local directives at the location of use.

The gas analyzer or replacement parts should be returned in their original packaging. If the original packaging is no longer available, we recommend that you wrap the device in plastic foil and pack it with shock-absorbing material (wood shavings, cellular rubber, or similar material) in a sufficiently large box. If you use wood shavings, the stuffed layer on each side should be at least 15 cm thick.

For overseas shipping, shrink-wrap the devices in an additional PE foil which is at least 0.2 mm thick, with a desiccant (e.g. silica gel) enclosed. For this type of shipping, you must also line the inside of the transport container with a double layer of tar paper.

If you return your device for repair, enclose the filled-in decontamination declaration as well as the filled-in fault description. In the case of guarantee claim, please enclose your guarantee card.

Decontamination declaration

With this declaration you confirm "that the device/spare part has been thoroughly cleaned, is free of residues, and that the device/spare part represents no danger for mankind and environment."

If the returned device/spare part has come into contact with poisonous, corrosive, flammable or polluting substances, you must thoroughly rinse, clean and neutralize the device/spare part before returning it, in order to ensure that all hollow areas are free of hazardous substances. Check the item after it has been cleaned.

SIEMENS will return devices or spare parts to you at your expense if a decontamination declaration is not included.

SIEMENS will only service returned products or spare parts if this decontamination declaration is enclosed which confirms that the products or spare parts have been correctly decontaminated and are therefore safe to handle. The decontamination declaration must be visibly attached to the outside of the packaging in a firmly secured transparent document bag.

You can find an empty decontamination declaration form in section Auto-Hotspot.

A.2.1 Return address

For quick identification and elimination of causes of error, we ask you to return the devices. The return address responsible for your location can be found here:
Return address (http://www.automation.siemens.com/mcms/aspa-db/en/automation-technology/Pages/default.aspx)

A.2.2 Error Description

Customer name	
Administrator	
Delivery address	
Phone/ Fax/ E-mail:	
Return delivery address (if not the same address as above)	
Device name	
MLFB No.	
Serial number	
Description of returned part	
Fault indication	
Process data at measuring point	
Operating temperature	
Operating pressure	
Composition of sample gas	
Operating duration/ operating date	
Confirmation	It is confirmed that the returned part has **not** come into contact with highly toxic or radioactive gases or substances, or been exposed to radioactive or high-energy radiation.
Company, department	
Last name, first name	
Location:	
Date:	Signature:

Software update ( ) yes ( ) no

A.2.3 Decontamination declaration

To protect our employers, equipment and the environment it must be guaranteed that the returned device is completely free of residues of the measured medium.

Therefore we check that a decontamination declaration has been provided before we unpack the device.

Please attach a transparent plastic envelope to the outside of the packaging with the completely filled-in and signed decontamination declaration as well as the shipping documents.

SIEMENS **PD PA AP**

Declaration of Decontamination

SIEMENS will only service returned products or spare parts if they are accompanied by this Declaration of Decontamination confirming that the products or spare parts have been properly decontaminated and are safe to handle.

The Declaration of Decontamination must be displayed **outside of the packing** in a well fastened clear document pouch.

Customs:
please do not remove!

The enclosed product/spare part:

Product/spare part name: _____

Product/spare part Nr. or MLFB: _____

Serial Nr.: _____

Product/spare part used as a SIL (Safety Integrity Level) in a Safety Instrument System
yes ☐ no ☐

Product/spare part operated with liquid/medium:

_____

medium/liquid is:

☐ harmless ☐ toxic ☐ flammable ☐ corrosive ☐ harmful

☐ other _____ (please specify)

We have:
☐ checked that all cavities in the product/spare are free from such substances

☐ **flushed out and neutralized all cavities in the device**

We hereby certify that the returned products/spare parts have been carefully cleaned and are free from any residues.
They are therefore not harmful to health and environment.

Company: _____ Address: _____

Department: _____ Name: _____

Tel. No.: _____ Fax No.: _____

Name: _____

Date: _____ Signature: _____

company stamp

Please attach outside the packaging

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Dekontaminations-Erklärung

SIEMENS wird nur solche Produkte oder Ersatzteile reparieren oder an diesen Service durchführen, deren Verpackung mit einer vollständig ausgefüllten und unterzeichneten Dekontaminierungserklärung versehen ist, die bestätigt, dass durch den Umgang mit den Produkten oder Ersatzteilen keine Gefahr für die Mitarbeiter oder die Umwelt verbunden ist.

Bitte die Dekontaminations-Erklärung inklusive Versandpapieren in einer Klarsichthülle **außen an die Verpackung** gut befestigt anbringen.

Zollabfertigung:
bitte nicht entfernen!

Das beiliegende Gerät/Ersatzteil:

Produkt/Ersatzteil Name: ☐

Produkt/Ersatzteil Nr. oder MLFB: ☐

Serial Nr.: ☐

Produkt wurde als SIL (Safety Integrity Level) in einem Safety Instrument System benutzt
ja ☐ nein ☐

Produkt/Ersatzteil wurde in/mit dem folgendem Medium betrieben:

☐

Dieser Messtoff ist:
☐ harmlos ☐ giftig ☐ brennbar ☐ ätzend ☐ wassergefährdent

☐ sonstiges ☐ (bitte spezifizieren)

Wir haben:
☐ alle Hohlräume des Gerätes auf Freiheit von diesen Stoffen geprüft/

☐ alle Hohlräume des Gerätes gespült und neutralisiert

Wir bestätigen, dass das Gerät/Ersatzteil sorgfältig gereinigt wurde und frei von Rückständen ist.
Von dem Gerät/Ersatzteil geht keine Gefahr für Mensch und Umwelt aus.

Firma: ☐ Adresse: ☐

Abteilung: ☐ Name: ☐

Tel.-Nr.: ☐ Fax Nr.: ☐

Name: ☐

Datum: ☐ Unterschrift: ☐

Firmenstempel

Bitte außen an der Verpackung anbringen

A.3 Declaration of conformity

CE

The manufacturer of the gas analyzers

CALOMAT 62E CALOMAT 62F

7MB2541-xxxxx-xxxx 7MB2531-xxxxx-xxxx

7MB2547-xxxxx-xxxx 7MB2537-xxxxx-xxxx

is authorized to attach a CE marking to the rating plate, since the device complies with the following applicable directives:

- **Requirements of the low-voltage directives (73/23/EEC and 93/68/EEC)**
- **Requirements of the guidelines for electromagnetic compatibility (2004/108/EU, 91/263/EEC, 92/31/EEC, 93/68/EEC and 93/97/EEC)**

Applied harmonized standards for all devices:

- **EN 61326**
- **EN 61010**

The EU declarations of conformity are kept available for the responsible authorities in accordance with the above-named EC directives at:

SIEMENS

Siemens AG

Process Industries and Drives

Process Automation

Analytical Products

D-76181 Karlsruhe

If this product is used outside the European Union, the standards and regulations valid in the country of the company using the product must be observed!

List of abbreviations/acronyms

B

B.1 List of abbreviations

Abbreviation/symbol	Explanation
″	Inch 1″ ≙ 25.4 mm
<	Less than
>	Greater than
≤	Less than or equal to
≥	Greater than or equal to
°	Degrees
Ar	Argon
°C	Degrees Celsius
CH_4	Methane
Cl_2	Chlorine
cm	Centimeter
cm²	Square centimeter
CO_2	Carbon dioxide
EEPROM	Electrically-erasable programmable read-only memory
e.g.	For example
ELAN	Economic local area network
EPROM	Erasable programmable read-only memory
FFKM, FFPM	Perfluoroelastomer
FKM	Fluorinated elastomer
FPM	Fluorinated elastomer
H_2	Hydrogen
HCl	Hydrogen chloride, hydrochloric acid
He	Helium
hPa	Hectopascal
HS	Upper switchover point
HU	Height unit for computer housings, 1 HU ≙ 1¾" ≙ 44.45 mm
Hyst	Hysteresis
kg	Kilogram
kHz	Kilohertz
kΩ	Kiloohm
kPa	Kilopascal
l	Liter
LCD	Liquid crystal display
LED	Light emitting diode
LEL	Lower explosion limit

Abbreviation/symbol	Explanation
LS	Lower switchover point
mA	Milliampere
max.	Maximum
MB	Megabyte
mba, MBA	Start-of-scale value
mbar	Millibar
mbe, MBE	Full-of-scale value
Mbit	Mbit
mg	Milligram
MHz	Megahertz
min	Minute
MK	Measured component
ml	Milliliter
MLFB	Machine-readable product code
mm	Millimeter
mm²	Square millimeter
MPa	Megapascal
MS	Span
ms	Millisecond
mΩ	Milliohm
MΩ	Megaohm
H_2	Hydrogen
N_2	Nitrogen
n. B.	As required
NH_3	Ammonia
No.	Number
O_2	Oxygen
o. Ä.	Or similar
pF	Picofarad (10^{-12} Farad)
RAM	Random access memory
s	Second
SO_2	Sulphur dioxide
TRGS	Technical rule for hazardous materials
TLV	Threshold limit value (maximum workplace concentration)
UEL	Upper explosion limit
V	Volt
Δ	Difference (delta)
µA	Microampere
µl	Microliter
Ω	Ohm

Glossary

Adapter board

Board contained in the standard configuration of the CALOMAT 62. It is used to preprocess sensor signals and the measured signal.

Additional electronics

Generic term for all optional boards.

Back wall of housing

Part for sealing the rear housing opening of the device.

Calibration

Elimination of deviations between the setpoint and actual value of certain measured variables.

Calibration gas

Gas used to carry out a calibration.

Code

A selectable sequence of characters for enabling a protected submenu.

Code level

Area of protected functions or states which are enabled after entering a certain code.

Coded display mode

Operating mode in which the measured value is displayed and the device is protected against unauthorized access by codes.

Commissioning

Totality of measures and actions required to make a machine or system capable of running.

Control panel

Panel with operating elements used to make inputs on the device.

Correction of cross-interference

Computed correction of the measured value falsification caused by the interfering gas.

Cross-interference deflection

The falsification of a measurement caused by an interfering gas.

Cursor

Tool (insertion mark, writing mark, input mark) for identifying the current processing position of a program.

Decoded display mode

Operating mode in which the measured value is displayed, the device is partially or completely decoded, and the functional check is active.

Dialog language

Language in which communication between the user and device takes place.

Display

Visible information on states and values.

Display unit

Device component which outputs/shows device information and visualizes the communication via the control panel.

Factory functions

Function for device maintenance. This function is protected by the highest code level and is only accessible to maintenance personnel.

Factory setting

Standard settings of the device at the time of delivery.

Front panel

Front part of a device, usually with clear identification features (e.g. device name, manufacturer logo, etc.).

Function

Numbered software function of a device. Functions are listed in submenus.

Function display

Screen display depending on the called function.

Functional check

Identification activated by the device if it determines that the measured value was influenced (e.g. when changing to operator control mode by decoding the device).

Gas analyzer

Device for quantitative analysis of gases and gas mixtures.

Gas inlet

Defined point for connecting a gas to the analyzer.

Gas outlet

Defined point for directing a gas out of the gas analyzer.

Input field

Single or multi-line area for entering data.

Interfering gas

A gas which interferes with the measurement, and which may be contained in the sample gas.

Leak-tightness

Containment system reliability against escaping gases.

Limit alarm

Signaling of upward/downward violation of a limit.

Limit monitoring

Function which monitors the observation of adjustable limits, and signals if these are violated.

Limit relay

Relay to which a certain limit is assigned and which is switched when there is a limit alarm.

Main menu

Menu of the highest hierarchical level. It contains the submenus.

Measured signal

Representation of measured variables in the signal path by an allocated physical quantity of the same or different type. Depending on the position of the measured signal at the input or output of the considered element, one distinguishes between an input signal and an output signal.

Measured value

The measured value is an output value which reflects a determined variable.

Measured value display

Totality of the displayed information in "Coded display mode" and "Decoded display mode". The following are displayed, for example: measured value, status line with status messages, footer, measuring ranges, components, etc.

Measuring point

Location where a measured value is recorded.

Measuring point relay

Relay to which a measuring point is allocated.

Measuring range

The measuring range has a reference number, e.g. 1. It is characterized by a start-of-scale value and a full-scale value.

Measuring range switching

Automatic switching over of measuring ranges. Also referred to as "autorange" in the software.

Membrane keyboard

Keyboard whose keys are protected against atmospheric influences by a membrane.

Motherboard

Board which contains the basic data and firmware for the device.

Noise

Totality of all phenomena which could disturb the transmission and/or recording of information.

Operating mode

Various modes into which the device can be put by intervening from the outside. Three modes are distinguished:

- Coded display mode
- Decoded display mode
- Operator control mode

Operating state

Generic term for a number of independent states which the device can assume during operation (e.g. measure, standby, pause, etc.).

Operation level

Certain operating area (menus and functions) which is either freely accessible or protected by a code.

Operator control mode

Operating mode in which the device is partially or entirely decoded and the functional check is activated. The device is parameterized in this mode.

PROFIBUS

PROFIBUS stands for Process Field Bus. PROFIBUS is a multi-vendor standard for the networking of field devices (e.g., PLC, drives, actuators, or sensors). PROFIBUS is available with the following protocols: DP (= Dezentrale Peripherie, distributed I/O devices), FMS (= fieldbus message specification) and PA (= process automation).

Sample gas

A gas which has been extracted from a process and is to be analyzed.

Sensitivity

Sensitivity is understood as the lowest level which a sensor, detector, actuator or other material requires for signal detection and storage.

Signaling contact

Usually a floating contact contained in electronic components (e.g. relay) which signals the occurrence of an event defined as a fault to a control unit.

Span

Difference between defined start-of-scale value and defined full-scale value.

Span calibration

Adjustment of the span using a suitable calibration gas.

Spike

Engl.: Spike: Undesired, briefly occurring peaked interference of a measured signal.

Standard configuration

Totality of standard features contained in the device at the time of delivery without optional extensions.

Status message

Selectable output of various messages in the status line of the measured value display.

Subfunction

Independent functional unit within a function.

Submenu

Menu which is listed under a higher-order menu item.

Supply gas

Generic term for combustion gas and combustion air.

Time constant

System parameter which determines the way a system-relevant variable changes with time.

Warm restart

Restarting the device from its "warm" state with the last set parameters.

Warm-up phase

Time which the analyzer needs to reach operating temperature. It counts as one of the operating states.

Zero calibration

Calibration of the zero point with a suitable zero gas.

Zero gas

Gas used to calibrate the zero point.

Zero point

Smallest possible point of a measuring range (usually the start-of-scale value).

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