

Overview

The CALOMAT 62 gas analyzer is primarily used for quantitative determination of one gas component (e.g. H_2 , N_2 , Cl_2 , HCl , NH_3) in binary or quasi-binary gas mixtures.

The CALOMAT 62 is specially designed for use in corrosive gas mixtures.

Benefits

- Universally applicable hardware basis
- Integrated correction of cross-interference, no external calculation required
- Open interface architecture (RS 485, RS 232, PROFIBUS)
- SIPROM GA network for maintenance and servicing information (option)
- Electronics and analyzer unit: gas-tight isolation, purging is possible, IP65, long service life even in harsh environments (field device)

Application**Fields of application**

- Chlorine-alkali electrolysis
- Metallurgy (steel production and processing)
- H_2 measurement in LNG (Liquefied Natural Gas) process
- Ammonia synthesis
- Fertilizer production
- Petrochemicals

Special versionsSpecial applications

In addition to the standard combinations, special applications are also available upon request (e.g. higher sample gas pressure up to 2 000 hPa absolute).

Design**19" rack unit**

- With 4 HU for installation
 - in hinged frame
 - In cabinets with or without telescope rails
 - With closed or flow-type reference chambers
- Front plate for service purposes can be pivoted down (laptop connection)
- IP20 degree of protection, with purging gas connection
- Internal gas routes: Pipe made of stainless steel (mat. no. 1.4571)
- Gas connections for sample gas inlet and outlet and for reference gas: Internal thread 1/8" – 27 NPT
- Purging gas connections: Pipe diameter 6 mm or 1/4"
- With closed or flow-type reference chambers

Field device

- Two-door enclosure (IP65) for wall mounting with gas-tight separation of analyzer and electronic parts, purgeable
- Individually purgeable enclosure halves
- Gas path with screw pipe connection made of stainless steel (mat. no. 1.4571), or Hastelloy C22
- Purging gas connections: Pipe diameter 10 mm or 3/8"
- Gas connections for sample gas inlet and outlet and for reference gas: Internal thread 1/8" – 27 NPT
- With closed or flow-type reference chambers

Display and control panel

- Large LCD panel for simultaneous display of:
 - Measured value (digital and analog displays)
 - Status bar
 - Measuring ranges
- Contrast of the LCD field adjustable via the menu
- Permanent LED backlighting
- Washable membrane keyboard with five softkeys
- Menu-driven operator control for parameterization, test functions, adjustment
- Operator support in plain text
- Graphical display of the concentration progression; time intervals parameterizable
- Bilingual operating software German/English, English/Spanish, French/English, Spanish/English, Italian/English

Input and outputs

- One analog output per medium (from 0, 2, 4 to 20 mA; NAMUR parameterizable)
- Two analog inputs configurable (e.g. correction of cross-interference or external pressure sensor)
- Six digital inputs freely configurable (e.g. for measurement range switchover, processing of external signals from sample preparation)
- Six relay outputs, freely configurable (e.g. failure, maintenance request, threshold alarm, external magnetic valves)
- Expansion by eight additional digital inputs and eight additional relay outputs each (e.g. for autocalibration with up to four calibration gases)

Communication

RS 485 present in basic unit (connection from the rear; for the rack unit also behind the front plate).

Options

- RS 485/RS 232 converter
- RS 485/Ethernet converter
- RS 485/USB converter
- Connection to networks via PROFIBUS DP/PA interface
- SIPROM GA software as the service and maintenance tool

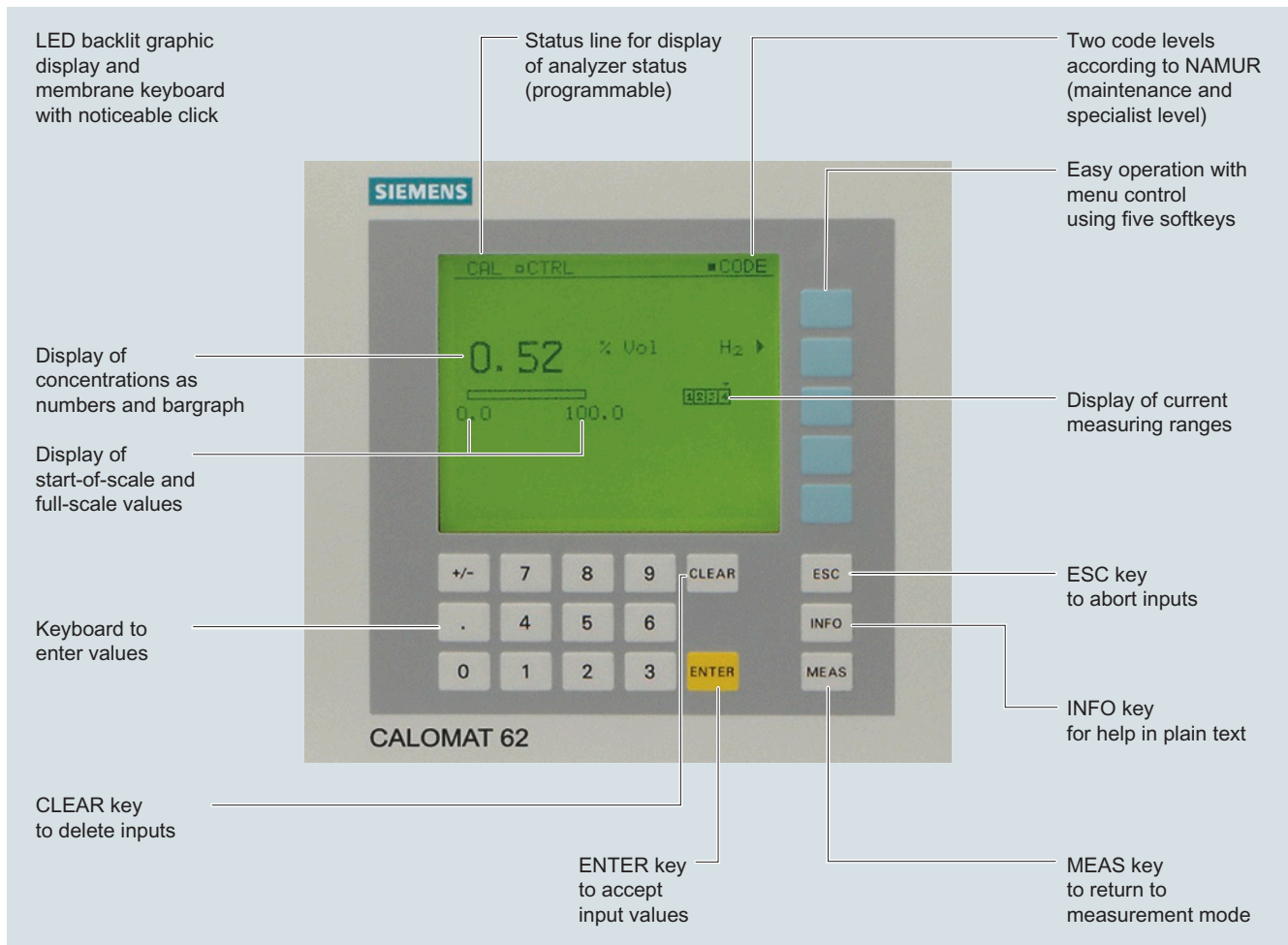
Extractive continuous process gas analysis

Series 6

CALOMAT 62

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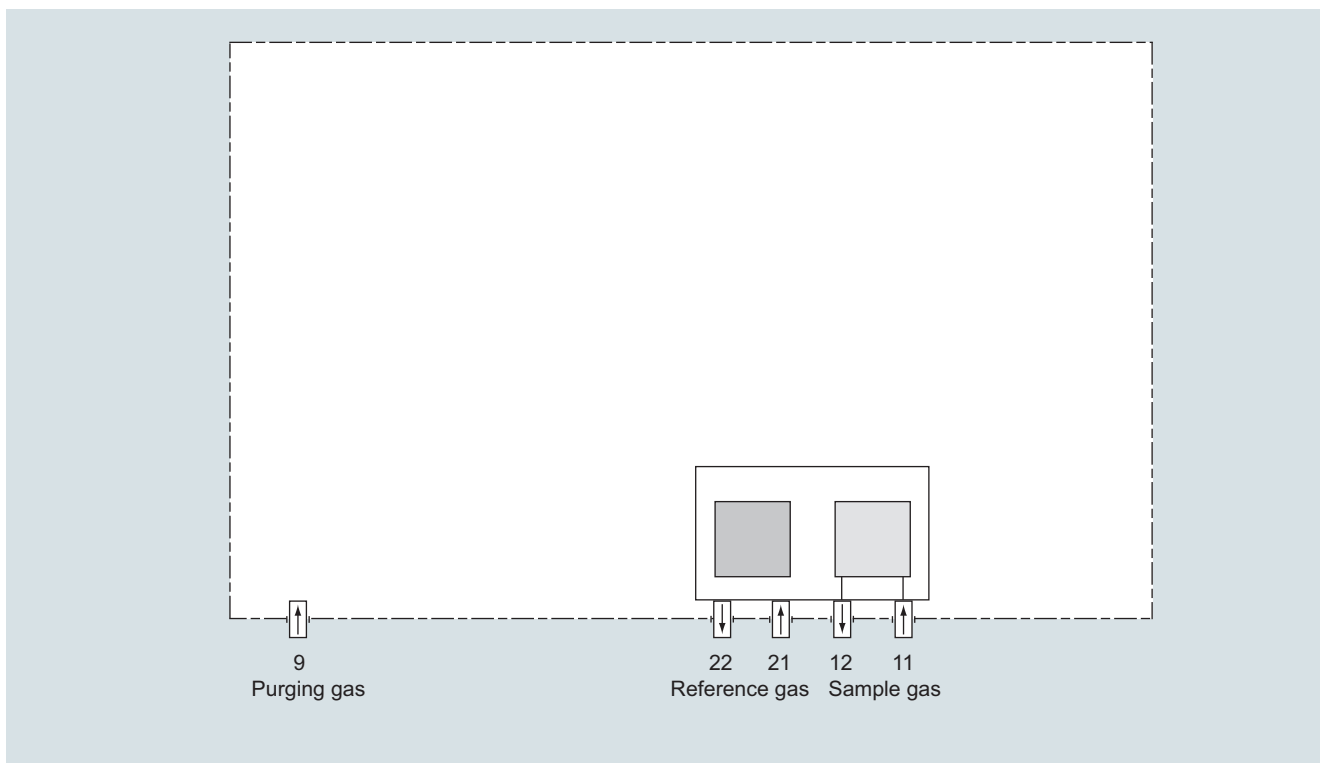
General information



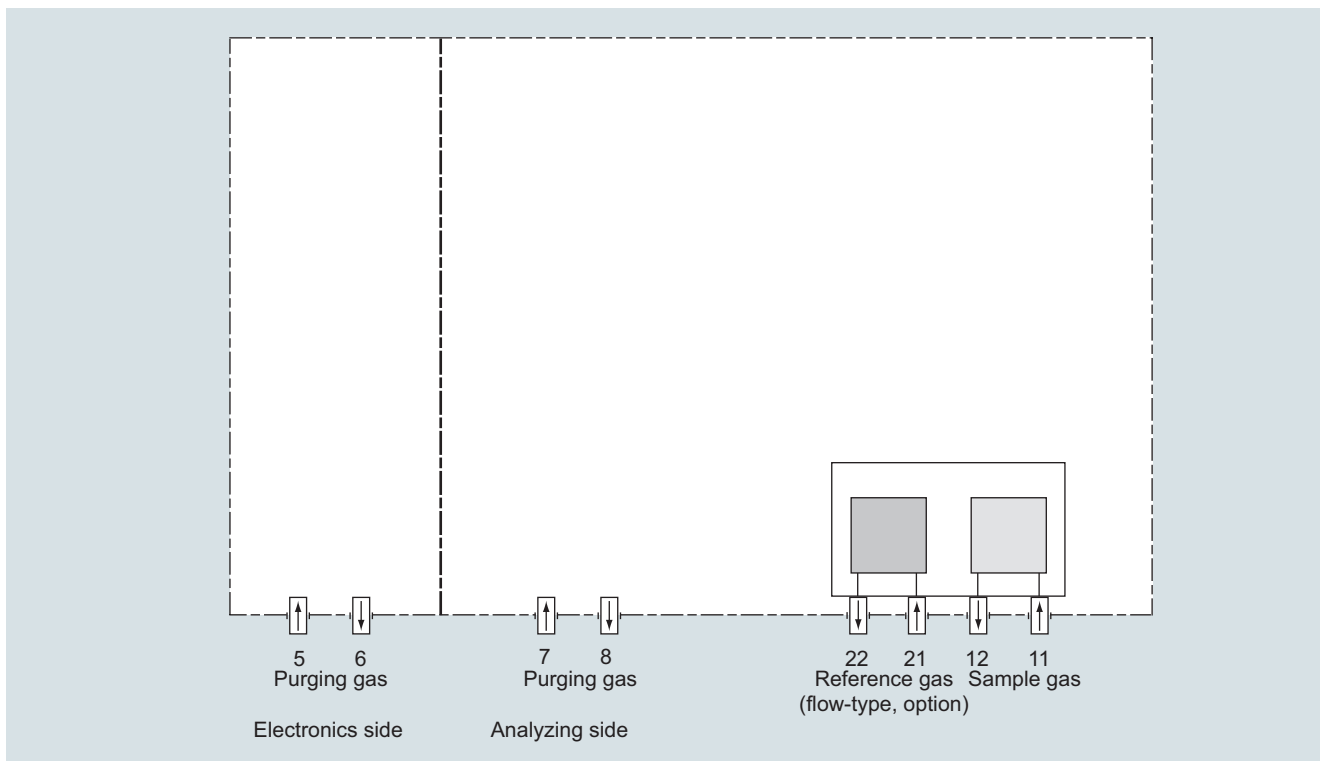
CALOMAT 62, membrane keyboard and graphic display

Designs – parts wetted by sample gas

Gas connection	19" rack unit	Field device
Input block with gas connection	Stainless steel, mat. no. 1.4571	Stainless steel, mat. no. 1.4571
Seal	FPM (e.g. Viton) or FFPM	FPM (e.g. Viton) or FFPM
Sensor	Glass	Glass
Input block with gas connection		Hastelloy C22
Seal		FFPM (e.g. Kalrez)
Sensor		Glass



CALOMAT 62, 19" rack unit, gas path



CALOMAT 62, field device, gas path

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General information

Function

Principle of operation

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

The temperature of a heated resistor surrounded by gas is determined by the thermal conductivity of the gas. Four such resistors are connected as a bridge.

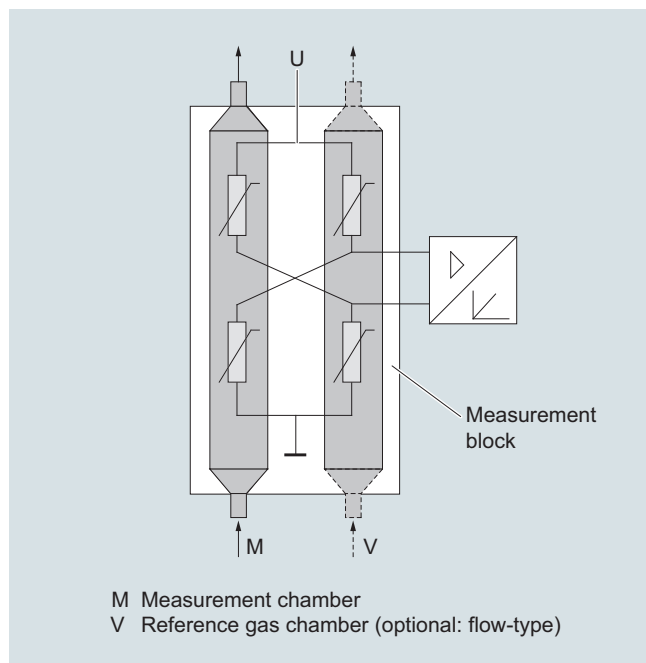
Sample gas flows around two of them, reference gas surrounds the other two. A constant DC voltage heats the resistors above the temperature of the measurement block.

The different thermal conductivities of the sample and reference gases result in different temperatures of the resistors. A change in the composition of the sample gas thus also causes a change in the resistance values.

The electrical equilibrium of the measuring bridge is disrupted, and a voltage is generated in the bridge diagonal. This is a measure of the concentration of the measured component.

Note

The sample gases must be fed into the analyzers free of oil, grease, and dust. The formation of condensation in the sample chambers (dew point of sample gas < ambient temperature) must be avoided. Therefore, gas prepared for the respective task must be provided in most applications.



CALOMAT 62, principle of operation, example of a non-flow-type reference chamber

Important features

- Four freely-programmable measuring ranges, also with suppressed zero, all ranges linear
- Smallest spans down to 1 % H₂ (with suppressed zero: 99 to 100 % H₂) possible
- Measuring range identification
- Electrically isolated measured-value output 0/2/4 to 20 mA (also inverted)
- Automatic or manual measuring range switchover selectable; remote switching is also possible
- Measured value can be saved during adjustment

- Time constants are selectable within wide ranges (static/dynamic noise suppression); i.e. the response time of the analyzer can be adapted to the respective task
- Short response time
- Low long-term drift
- Measuring point switchover for up to 6 measuring points (parameterizable)
- Measuring point identification
- External pressure sensor can be connected – for correction of variations in sample gas pressure
- Possibility for correcting the influence of residual gases (correction of cross-interference)
- Automatic measuring range calibration can be programmed
- Operation based on the NAMUR recommendation
- Two operator input levels with their own authorization codes to prevent unintentional and unauthorized interventions
- Simple handling using a numerical membrane keyboard and operator prompting
- Customer-specific device versions, such as:
 - Customer acceptance
 - TAG labels
 - Drift recording
 - Clean for O₂ service

Spans

The smallest and largest possible spans depend on both the measured component (gas type) and the respective application (see ordering data).

Cross-interferences

Information on the sample gas composition is required in order to determine the cross-interference of residual gases with several interfering components.

The zero offsets in % H₂ which result from 1 % residual gas (interfering gas) are listed in the following table; the specified values are approximate values.

It should be noted that the influence of interfering gas is not linear to its concentration. Information on the sample gas composition is required in order to determine the cross-interference of residual gases with several interfering components.

Ar	Approx. - 0.15 %
O ₂	Approx. + 0.02 %
CO ₂	Approx. - 0.13 %
CH ₄	Approx. + 0.17 %
SO ₂	Approx. - 0.31 %
Air (dry)	Approx. + 0.25 %

Effect of 1 % gas component with nitrogen as the residual gas, expressed in % H₂

Moreover, it must be noted that - in addition to a zero offset - the gradient of the characteristic can also be affected by the residual gas. However, this effect is negligible in the case of variations in the interfering gas concentration below 10 %.

Taking these facts into consideration and due to the fact that the cross-interference analyzers cause further measuring inaccuracies, a larger error in measurement occurs than with digital gas mixtures despite correction of cross-interference.

Specification for the interface cable

Surge impedance	100 ... 300 Ω , with a measuring frequency of > 100 kHz
Cable capacitance	Typ. < 60 pF/m
Core cross-section	> 0.22 mm ² , corresponds to AWG 23
Cable type	Twisted pair, 1 x 2 conductors of cable section
Signal attenuation	Max. 9 dB over the whole length
Shielding	Copper braided shield or braided shield and foil shield
Connection	Pin 3 and pin 8

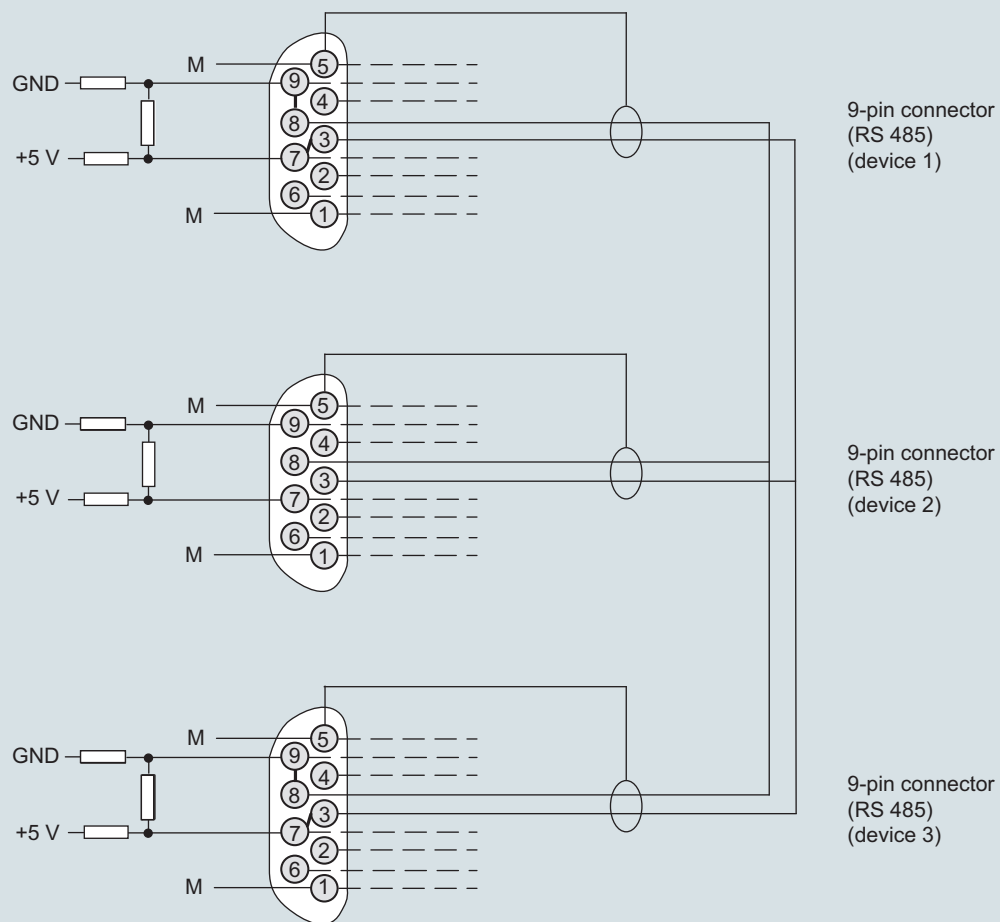
Bus terminating resistors

Pins 3-7 and 8-9 of the first and last connectors of a bus cable must be bridged (see graphic).

Note

It is advisable to install a repeater on the device side in the case of a cable length of more than 500 m or with high interferences.

Up to four components can be corrected via the ELAN bus, correction of cross-interference can be carried out for one or two components via the analog input.



Bus cable with plug connections, example

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19" rack unit

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Technical specifications

General information	Based on DIN EN 61207/IEC 1207. All data based on digital gas mixture H ₂ in N ₂	Measuring response	The time and measuring response refers to the measurement of H ₂ in N ₂ (based on the sample gas pressure 1 000 hPa absolute, sample gas flow 0.5 l/min, and ambient temperature 25 °C)
Measuring ranges	4, internally and externally switchable; automatic measuring range switchover also possible	Output signal fluctuation (3σ value)	< ± 1% of the smallest possible span according to rating plate with electronic damping constant of 1 s
Span	Application-dependent (see ordering data)	Zero point drift	< ± 1% of the current span/week
Measuring ranges with suppressed zero point	Application-dependent (see ordering data)	Measured-value drift	< ± 1% of the smallest possible span (according to rating plate)/week
Operating position	Front wall, vertical	Repeatability	< ± 1% of the current span
Conformity	CE marking in accordance with EN 50081-1/EN 50081-2 and RoHS	Detection limit	1% of the smallest possible span according to rating plate
Design, enclosure		Linearity error	< ± 1% of the current span
Degree of protection	IP20 according to EN 60529	Influencing variables	Based on sample gas pressure 1 000 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature
Weight	Approx. 13 kg	Ambient temperature	< 2%/10 K referred to smallest possible span according to label
Electrical characteristics		Accompanying gases	Deviation from zero point (for influence of interfering gas, see section "Cross-interference")
EMC interference immunity (electromagnetic compatibility)	In accordance with standard requirements of NAMUR NE21 (08/98) and EN 61326	Sample gas flow	0.2% of the current measuring span with a change in flow of 0.1 l/min within the permissible flow range
Electrical safety	In accordance with EN 61010-1; overvoltage category II	Sample gas pressure	< 1% of the current span with a change in pressure of 100 hPa
Auxiliary power (see nameplate)	100 V AC -10% ... 120 V AC +10%, 48 ... 63 Hz or 200 V AC -10% ... 240 V AC +10%, 48 ... 63 Hz	Auxiliary power	< 0.1% of the current span with rated voltage ± 10%
Power consumption	Approx. 30 VA	Electrical inputs and outputs	
Fuse values	100 to 120 V: 1.0 T/250 200 ... 240 V: 0.63 T/250	Analog output	0/2/4 ... 20 mA, floating; max. load 750 Ω
Gas inlet conditions		Relay outputs	6, with changeover contacts, freely configurable, e.g. for measuring range identification; load: 24 V AC/DC/1 A, isolated
Sample gas pressure	800 ... 1 100 hPa (absolute)	Analog inputs	2, dimensioned for 0/2/4 ... 20 mA for external pressure sensor and correction of cross-interference
Sample gas flow	30 ... 90 l/h	Digital inputs	6, designed for 24 V, isolated, freely configurable, e.g. for measuring range switchover
Sample gas temperature	Min. 0 to max. 50 °C, but above the dew point	Serial interface	RS 485
Temperature of the measuring cell	70 °C	Options	AUTOCAL function with 8 additional digital inputs and 8 additional relay outputs, also with PROFIBUS PA (on request) or PROFIBUS DP (on request)
Time response		Climatic conditions	
Warm-up period	The time and measuring response refers to the measurement of H ₂ in N ₂ < 30 min at room temperature (the technical specification will be met after 2 hours)	Permissible ambient temperature	-40 ... +70 °C during storage and transportation, 5 ... 45 °C in operation
Delayed display (T ₉₀)	Approx. 35 s (including dead time)	Permissible humidity (dew point must not be fallen below)	< 90% relative humidity as annual average, during storage and transportation
Damping (electrical time constant)	0 ... 100 s, configurable		
Dead time (the diffusion to the probes is the determining variable)	Approx. 34 s		

Selection and ordering data**CALOMAT 62 gas analyzer**

19" rack unit for installation in cabinets

Article No.

7MB2541- - A

Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Material of sample gas path

Stainless steel, mat. no. 1.4571; non-flow-type reference chamber, 1/8"-27 NPT	Purging gas stub 6 mm	0
Stainless steel, mat. no. 1.4571; non-flow-type reference chamber, 1/8"-27 NPT	Purging gas stub 1/4"	4

Application**Possible with measuring range identification**

H ₂ in N ₂	0, 5	A N
SO ₂ in air	1, 6	E L
CO ₂ in H ₂	0, 5	K A
CO ₂ in N ₂	1, 6	K N

Smallest measuring range**Largest measuring range****Reference gas or filling gas**

0 ... 1 %	0 ... 100 %	Accompanying gas component	0
0 ... 5 %	0 ... 100 %	Sample gas component	1
100 ... 99 %	100 ... 0 %		5
100 ... 95 %	100 ... 0 %		6

Add-on electronics

Without

AUTOCAL function

- With 8 additional digital inputs and outputs
- With 8 additional 8 digital inputs/outputs and PROFIBUS PA interface
- With 8 additional digital inputs/outputs and PROFIBUS DP interface

Power supply100 ... 120 V AC, 48 ... 63 Hz
200 ... 240 V AC, 48 ... 63 Hz**Explosion protection**

Without

Language (supplied documentation, software)German
English
French
Spanish
Italian**Additional versions****Order code**

Add "-Z" to Article No. and specify Order codes.

TAG labels (specific lettering based on customer information)

B03

Clean for O₂ service (specially cleaned gas path)

Y02

Measuring range indication in plain text, if different from the standard setting

Y11

Special setting (only in conjunction with an application no., e.g. extended measuring range)

Y12

Extended special setting (only in conjunction with an application no., e.g. determination of cross-interferences)

Y13

Accessories**Article No.**

RS 485/Ethernet converter

A5E00852383

RS 485/RS 232 converter

C79451-Z1589-U1

RS 485/USB converter

A5E00852382

AUTOCAL function with 8 digital inputs/outputs

C79451-A3480-D511

AUTOCAL function 8 digital inputs/outputs each and PROFIBUS PA

A5E00057307

AUTOCAL function 8 digital inputs/outputs each and PROFIBUS DP

A5E00057312

Set of Torx screwdrivers

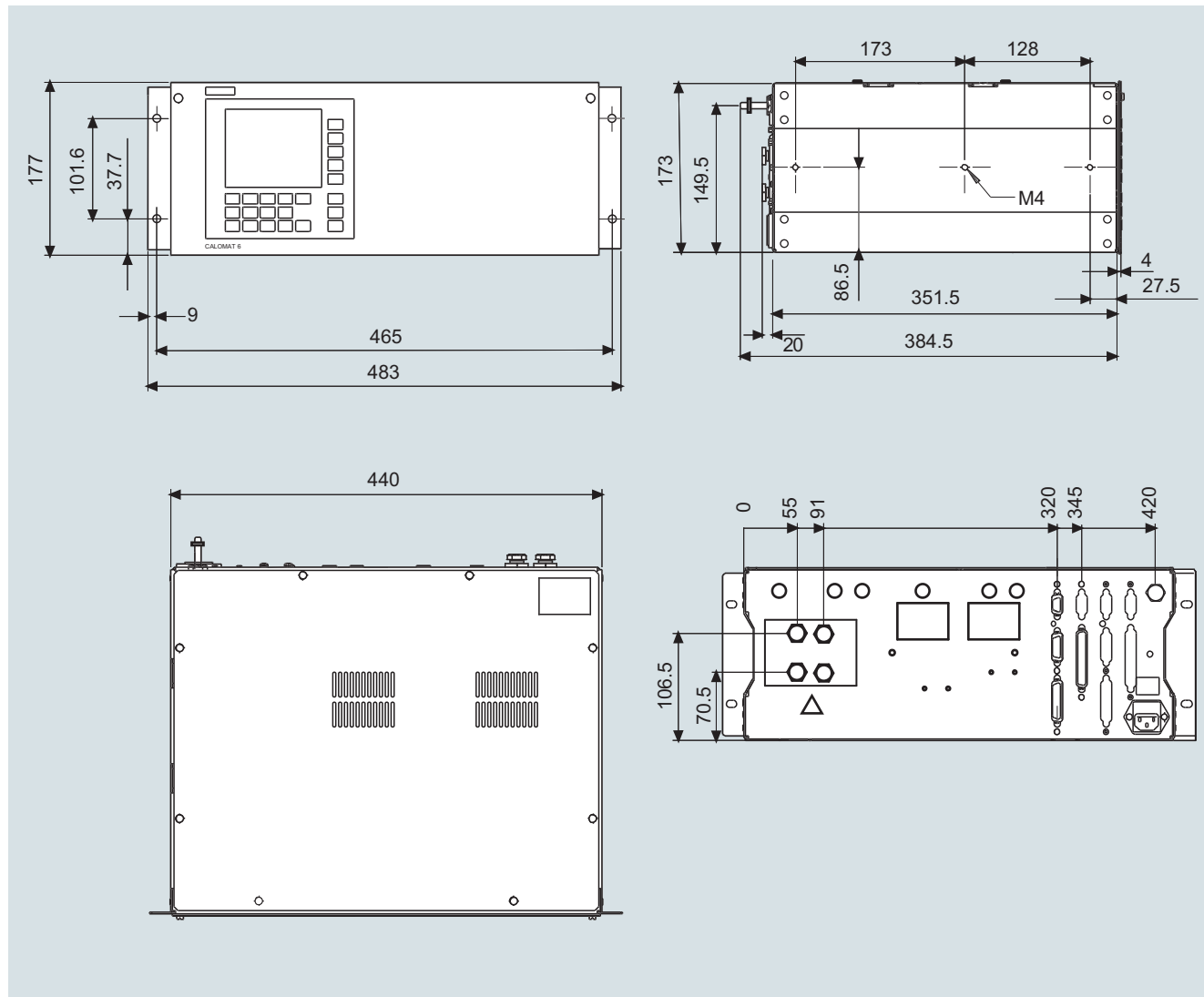
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Extractive continuous process gas analysis

Series 6

CALOMAT 62

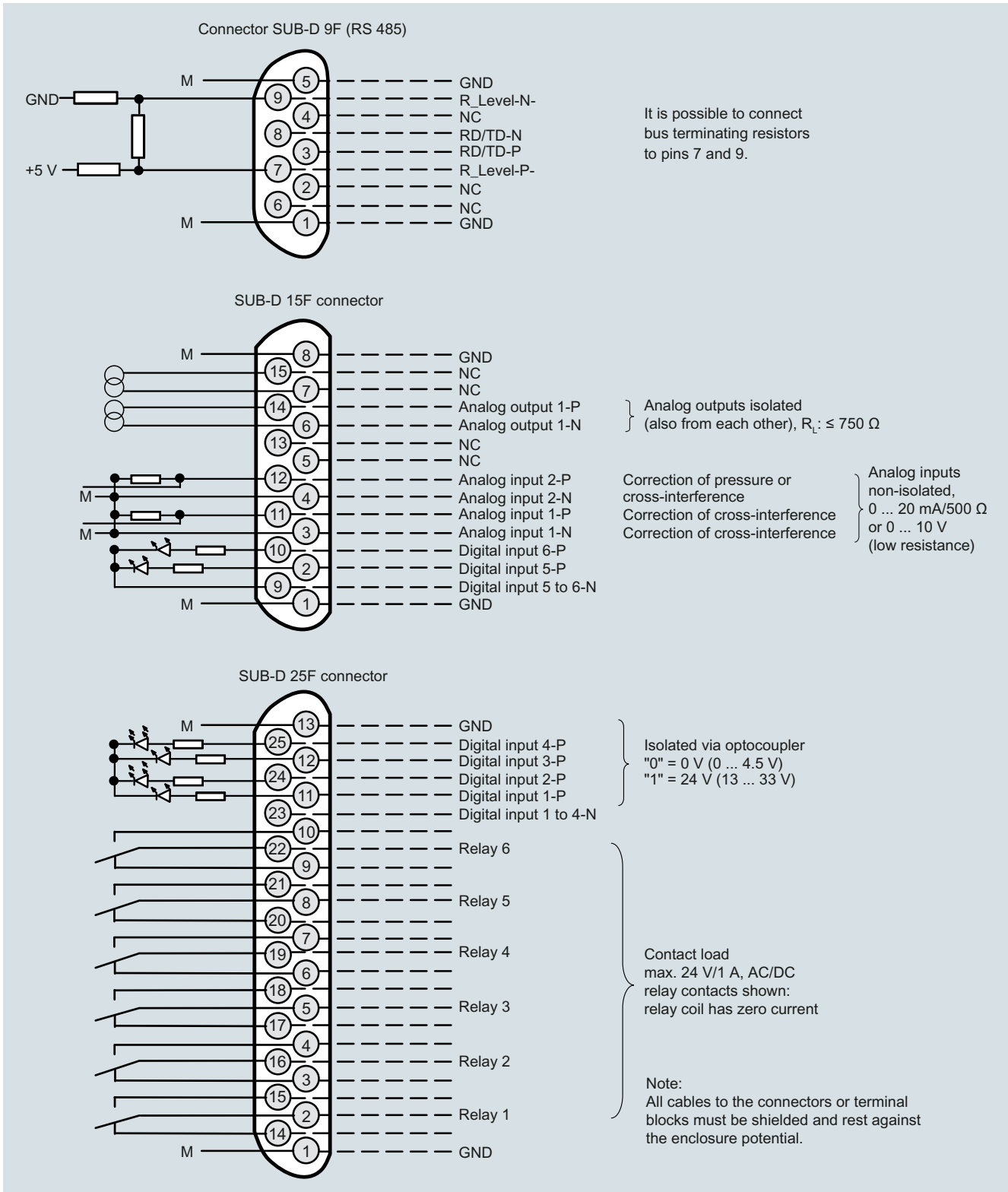
19" rack unit

Dimensional drawings

CALOMAT 62, 19" rack unit, dimensions in mm

Circuit diagrams

Pin assignment (electrical and gas connections)



CALOMAT 62, 19" rack unit, pin assignment

Extractive continuous process gas analysis

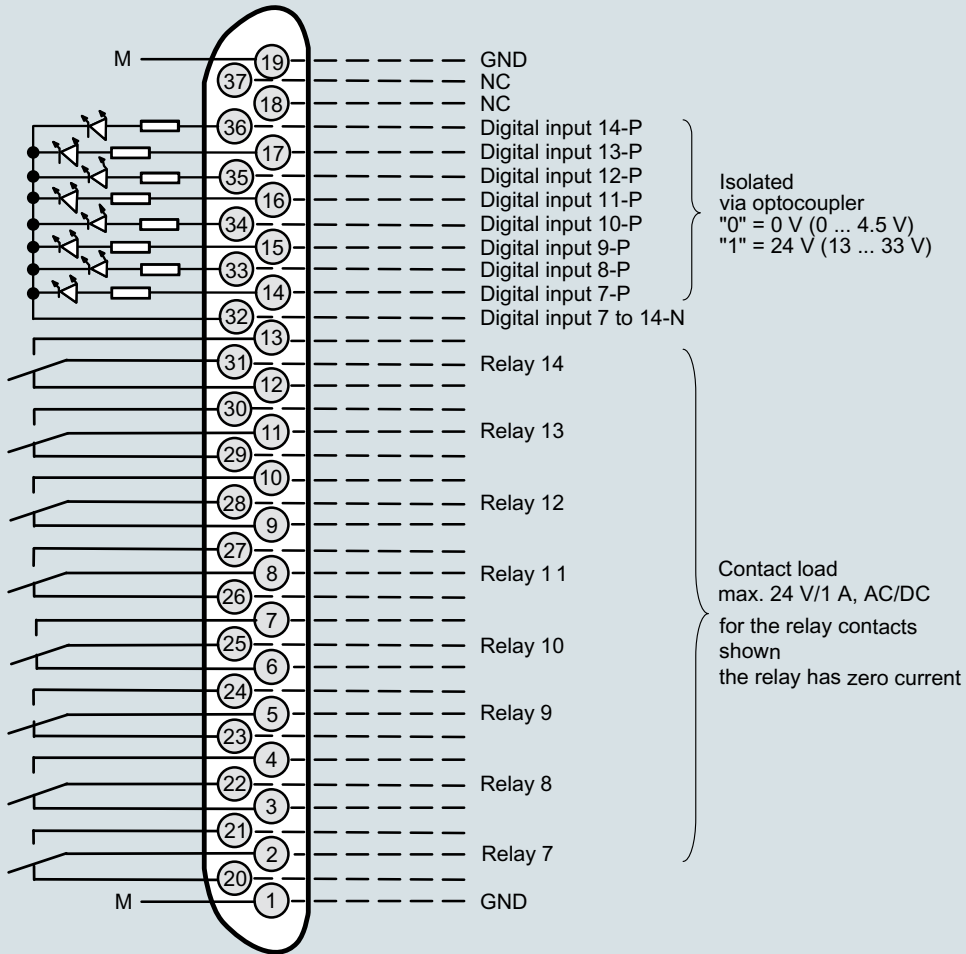
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19" rack unit

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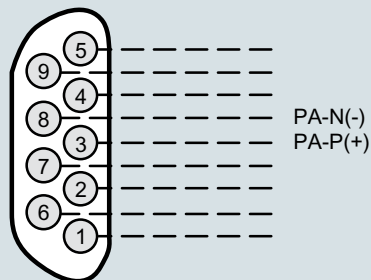
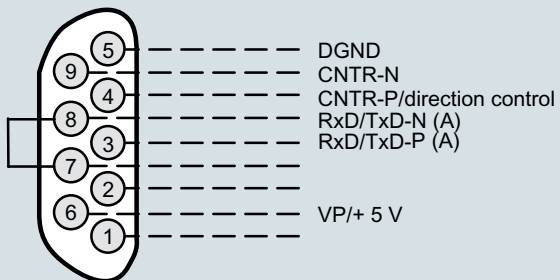
Connector SUB-D 37F (option)



Connector SUB-D 9F PROFIBUS DP

optional

Connector SUB-D 9M PROFIBUS PA



Note:
 All cables to the connectors or terminal blocks must be shielded and rest against the enclosure potential.

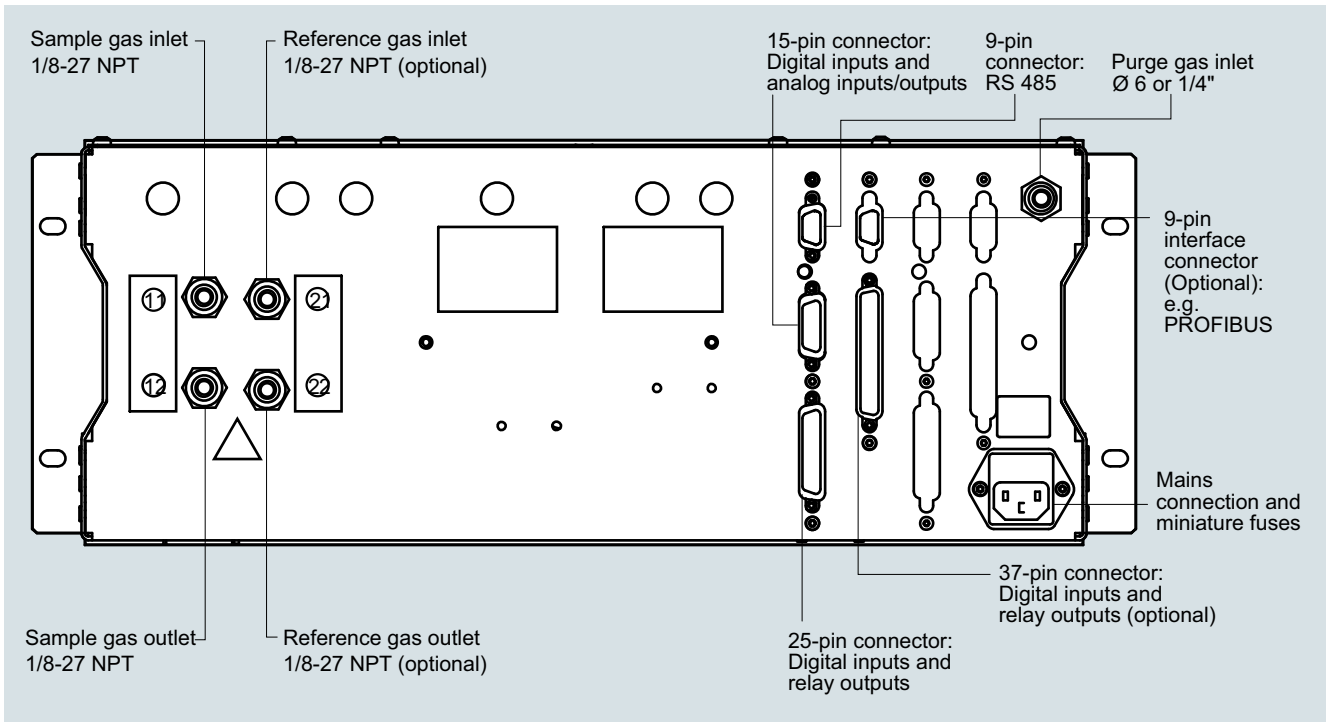
CALOMAT 62, 19" rack unit, pin assignment of the AUTOCAL board and PROFIBUS connectors

Extractive continuous process gas analysis

Series 6
CALOMAT 62

19" rack unit

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CALOMAT 62, 19" rack unit, gas connections and electrical connections

Extractive continuous process gas analysis

Series 6

CALOMAT 62

Field device

1

Technical specifications

General information	Based on DIN EN 61207/IEC 1207. All data based on digital gas mixture H ₂ in N ₂	Time response	The dynamic and measuring response refers to the measurement of H ₂ in N ₂ (based on the sample gas pressure 1 000 hPa absolute, sample gas flow 0.5 l/min, and ambient temperature 25 °C)
Measuring ranges	4, internally and externally switchable; automatic measuring range switchover also possible	Warm-up period	< 30 min at room temperature (the technical specification will be met after 2 hours)
Span	Application-dependent (see ordering data)	Delayed display (T ₉₀)	Approx. 35 s (including dead time)
Measuring ranges with suppressed zero point	Application-dependent (see ordering data)	Electrical damping	0 ... 100 s, configurable
Operating position	Front wall, vertical	Dead time (the diffusion to the probes is the determining variable)	Approx. 34 s
Conformity	CE marking in accordance with EN 50081-1/EN 50081-2 and RoHS	Measuring response	The dynamic and measuring response refers to the measurement of H ₂ in N ₂ (based on the sample gas pressure 1 000 hPa absolute, sample gas flow 0.5 l/min, and ambient temperature 25 °C)
Design, enclosure		Output signal fluctuation (3σ value)	< ± 1% of the smallest possible span according to rating plate with electronic damping constant of 1 s
Degree of protection	IP65 according to EN 60529	Zero point drift	< ± 1% of the current span/week
Weight	Approx. 25 kg	Measured-value drift	< ± 1% of the smallest possible span (according to rating plate)/week
Electrical characteristics		Repeatability	< ± 1% of the current span
EMC interference immunity (electromagnetic compatibility)	In accordance with standard requirements of NAMUR NE21 (08/98) and EN 61326	Detection limit	1% of the smallest possible span according to rating plate
Electrical safety	In accordance with EN 61010-1; overvoltage category II	Linearity error	< ± 1% of the current span
Auxiliary power (see nameplate)	100 V-10% ... 120 V +10% AC, 48 ... 63 Hz or 200 V-10% ... 240 V +10% AC, 48 ... 63 Hz	Influencing variables	Based on sample gas pressure 1 000 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature
Power consumption	<ul style="list-style-type: none"> Approx. 25 VA (gas connection block unheated) Approx. 330 VA (gas connection block heated) 	Ambient temperature	< 2%/10 K referred to smallest possible span according to rating plate
Fuse values (gas connection unheated)	100 ... 120 V F3 1T/250 F4 1T/250 200 ... 240 V F3 0.63T/250 F4 0.63T/250	Accompanying gases	Deviation from zero point (for influence of interfering gas, see section "Cross-interference")
Fuse values (gas connection heated)	100 ... 120 V F1 1T/250 F2 4T/250 F3 4T/250 F4 4T/250 200 ... 240 V F1 0.63T/250 F2 2.5T/250 F3 2.5T/250 F4 2.5T/250	Sample gas flow	0.2% of the current measuring span with a change in flow of 0.1 l/min within the permissible flow range
Gas inlet conditions		Sample gas pressure	< 1% of the span with a change in pressure of 100 hPa
Sample gas pressure	800 ... 1 100 hPa (absolute)	Auxiliary power	< 0.1% of the output signal span with rated voltage ± 10%
Sample gas flow	30 ... 90 l/h	Electrical inputs and outputs	
Sample gas temperature	Min. 0 to max. 50 °C, but above the dew point	Analog output	0/2/4 ... 20 mA, floating; load max. 750 Ω
Temperature		Relay outputs	6, with changeover contacts, freely configurable, e.g. for measuring range identification; load: 24 V AC/DC/1 A, floating
<ul style="list-style-type: none"> of the measuring cell (sensor) of the measurement cell block (base) 	70 °C 80 °C (heated)	Analog inputs	2, dimensioned for 0/2/4 ... 20 mA for external pressure sensor and correction of cross-interference
Sample gas humidity	< 90% relative humidity	Digital inputs	6, designed for 24 V, floating, freely configurable, e.g. for measuring range switchover
Purging gas pressure		Serial interface	RS 485
<ul style="list-style-type: none"> Permanent For short periods 	165 hPa above ambient pressure Max. 250 hPa above ambient pressure	Options	AUTOCAL function with 8 additional digital inputs and 8 additional relay outputs, also with PROFIBUS PA (on request) or PROFIBUS DP (on request)
		Climatic conditions	
		Permissible ambient temperature	-40 ... +70 °C during storage and transportation, 5 ... 45 °C in operation
		Permissible humidity (dew point must not be fallen below)	< 90% relative humidity as annual average, during storage and transportation

Extractive continuous process gas analysis

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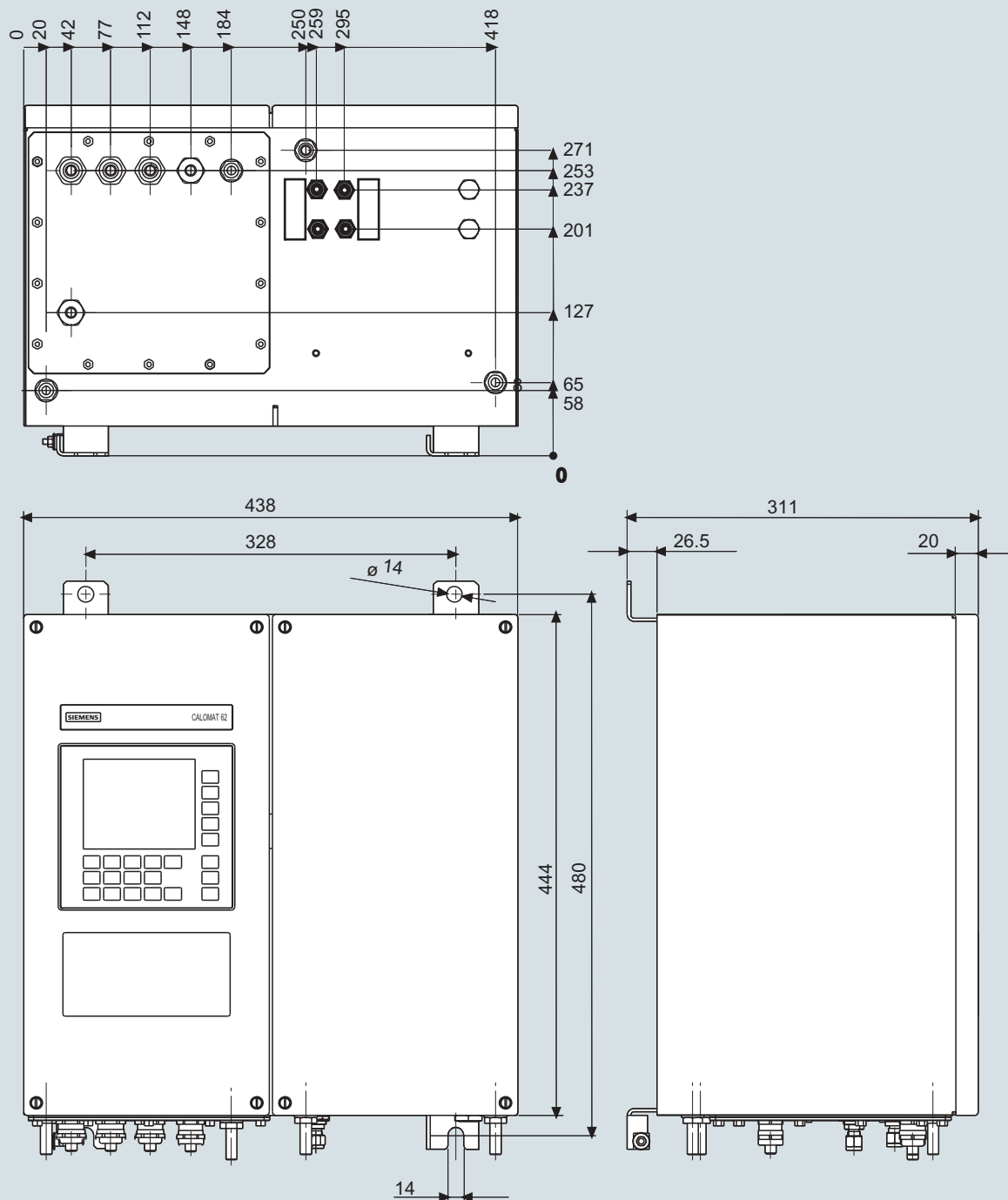
Field device

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Selection and ordering data

<i>Additional versions</i>	Order code
Add "-Z" to Article No. and specify Order codes.	
TAG labels (specific lettering based on customer information)	B03
BARTEC Ex p purging unit "Leakage compensation"	E71
BARTEC Ex p purging unit "Continuous purging"	E72
Clean for O ₂ service (specially cleaned gas path)	Y02
Measuring range indication in plain text, if different from the standard setting	Y11
Special setting (only in conjunction with an application no., e.g. extended measuring range)	Y12
Extended special setting (only in conjunction with an application no., e.g. determination of cross-interferences)	Y13
<i>Accessories</i>	Article No.
RS 485/Ethernet converter	A5E00852383
RS 485/RS 232 converter	C79451-Z1589-U1
RS 485/USB converter	A5E00852382
AUTOCAL function with 8 digital inputs/outputs	A5E00064223
AUTOCAL function 8 digital inputs/outputs each and PROFIBUS PA	A5E00057315
AUTOCAL function 8 digital inputs/outputs each and PROFIBUS DP	A5E00057318
Set of Torx screwdrivers	A5E34821625

Dimensional drawings



CALOMAT 62, field device, dimensions in mm

Extractive continuous process gas analysis

Series 6

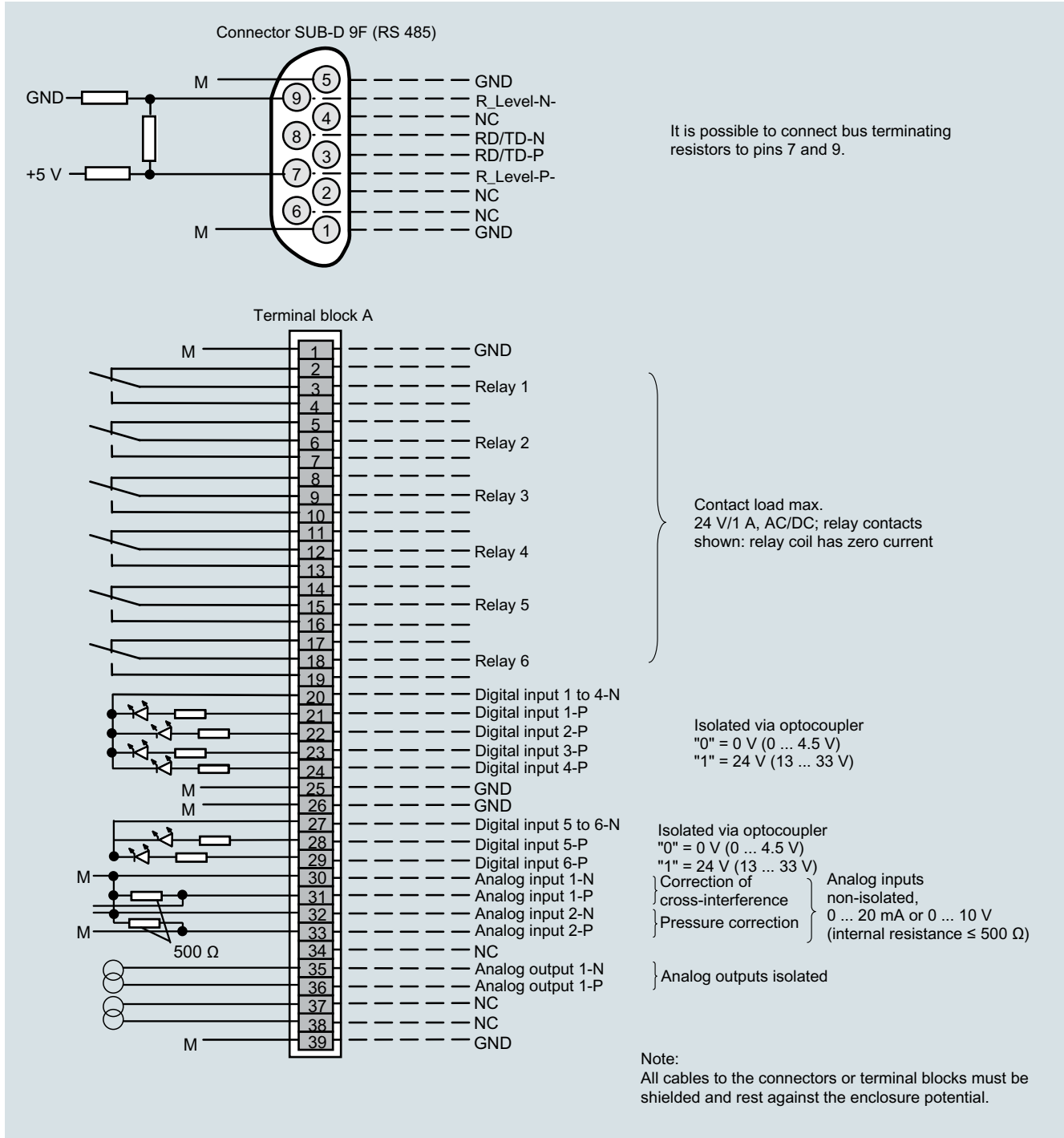
CALOMAT 62

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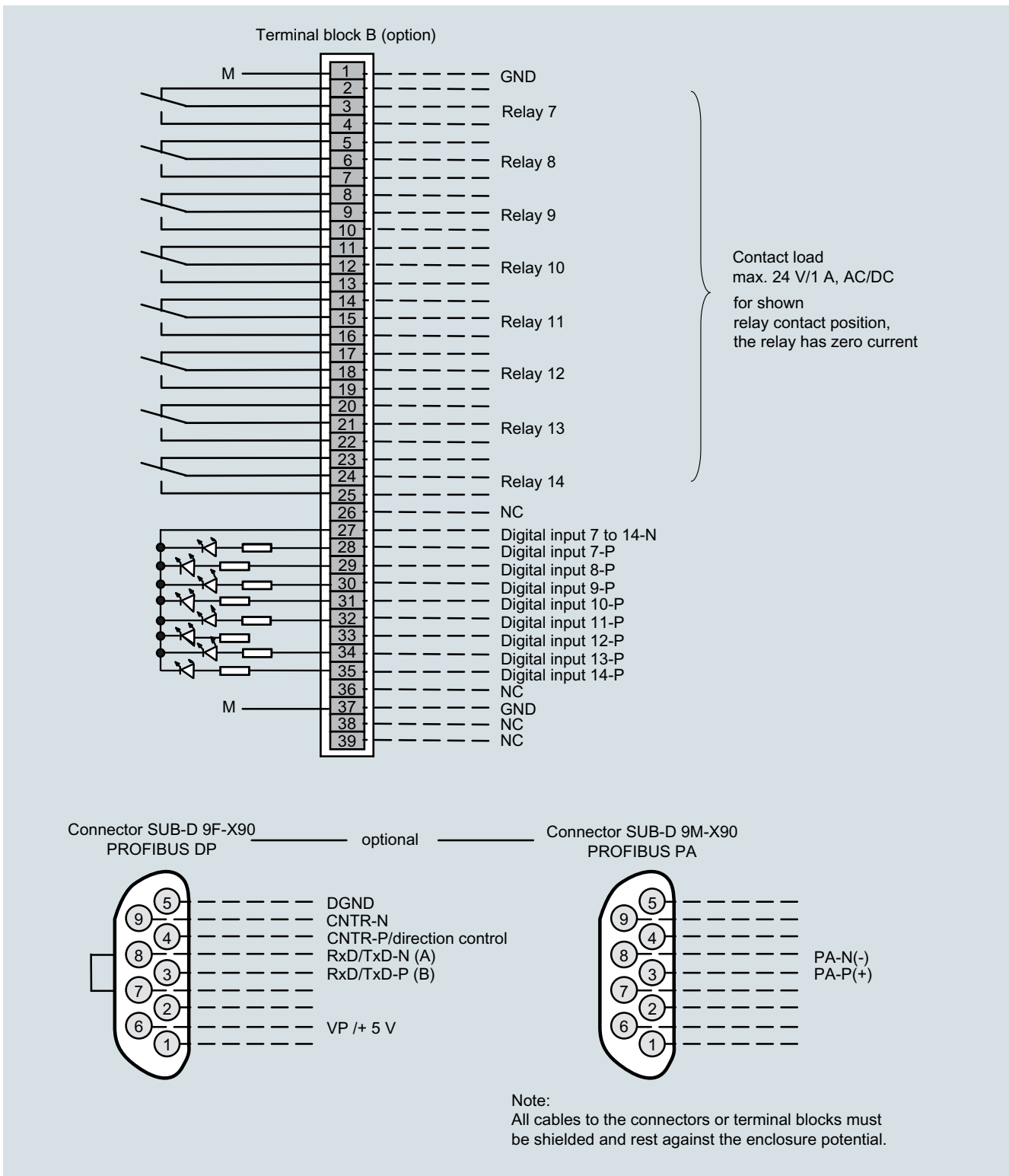
Field device

Circuit diagrams

Pin assignment (electrical and gas connections)



CALOMAT 62, field device, pin and terminal assignment



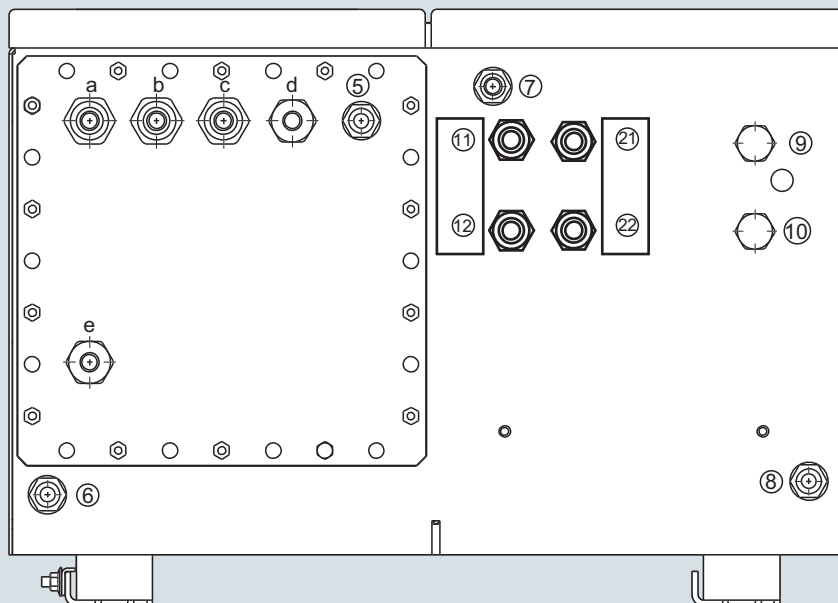
CALOMAT 62, field device, pin and terminal assignment of the AUTOCAL board and PROFIBUS connectors

Extractive continuous process gas analysis

Series 6

CALOMAT 62

Field device



Gas connections

- | | | |
|-------|--------------------------|------------------------------------|
| ⑪ | Sample gas inlet | } Internal thread
1/8" - 27 NPT |
| ⑫ | Sample gas outlet | |
| ⑰ | Reference gas inlet | |
| ⑱ | Reference gas outlet | |
| ⑤ - ⑧ | Purge gas inlets/outlets | Fittings Ø 10 mm or 3/8" |
| ⑨ | Unassigned | |
| ⑩ | Unassigned | |

Electrical connections

- | | |
|-------|--|
| a - c | Signal cable (Ø 10 ... 14 mm)
(analog + digital): cable gland M20x1.5 |
| d | Interface connection: (Ø 7 ... 12 mm)
cable gland M20x1.5 |
| e | Power supply: (Ø 7 ... 12 mm)
cable gland M20x1.5 |

CALOMAT 62, field device, gas connections and electrical connections

Selection and ordering data

Operating instructions	Article No.
Gas analyzers of Series 6 and ULTRAMAT 23 Schnittstelle/Interface PROFIBUS DP/PA • German and English	A5E00054148

More information

The complete documentation is available in various languages for downloading free of charge:
<http://www.siemens.com/processanalytics/documentation>

Selection and ordering data

Description	7MB2541	7MB2531	2 years (quantity)	5 years (quantity)	Article No.
Temperature limiter		x	–	1	A5E00891855
Adapter plate, LC display/keypad	x	x	1	1	C79451-A3474-B605
Temperature sensor		x	–	1	C79451-A3480-B25
LC display	x		–	1	A5E31474846
Line transformer, 115 V	x	x	–	1	W75040-B21-D80
Line transformer, 230 V	x	x	–	1	W75040-B31-D80
Fuse, T 0.63 A, line voltage 200 ... 240 V	x	x	2	3	W79054-L1010-T630
Fuse, T 1 A, supply voltage 100 ... 120 V	x	x	2	3	W79054-L1011-T100
Heating cartridge		x	–	1	W75083-A1004-F120