

Overview

The CALOMAT 6 gas analyzer is primarily used for quantitative determination of H₂ or He in digital or quasi-digital non-corrosive gas mixtures.

Concentrations of other gases can also be measured if their thermal conductivities differ significantly from the residual gases like Ar, CO₂, CH₄, NH₃.

Benefits

- Small T₉₀ time due to micromechanical-produced Si sensor
- Universally applicable hardware basis, high measuring range dynamics (e.g. 0 to 1 %, 0 to 100 %, 95 to 100 % H₂)
- Integrated correction of cross-interference, no external calculation required
- Open interface architecture (RS 485, RS 232, PROFIBUS)
- SIPROM GA network for maintenance and service information (option)
- Electronics and physics: gas-tight separation, purgeable, IP65, long service life even in harsh environments
- Ex(p) for Zones 1 and 2 (in accordance with 94/9/EC (ATEX 2G and ATEX 3G), and Class I Div 2 (CSA) Ex(n))

Application**Fields of application**

- Pure gas monitoring (0 to 1 % H₂ in Ar)
- Protective gas monitoring (0 to 2 % He in N₂)
- Hydroargon gas monitoring (0 to 25 % H₂ in Ar)
- Forming gas monitoring (0 to 25 % H₂ in N₂)
- Gas production:
 - 0 to 2 % He in N₂
 - 0 to 10 % Ar in O₂
- Chemical applications:
 - 0 to 2 % H₂ in NH₃
 - 50 to 70 % H₂ in N₂
- Wood gasification (0 to 30 % H₂ in CO/CO₂/CH₄)
- Blast furnace gas (0 to 5 % H₂ in CO/CO₂/CH₄/N₂)
- Bessemer converter gas (0 to 20 % H₂ in CO/CO₂)
- Monitoring equipment for hydrogen-cooled turbo-alternators:
 - 0 to 100 % CO₂/Ar in air
 - 0 to 100 % H₂ in CO₂/Ar
 - 80 to 100 % H₂ in air
- Versions for the analysis of flammable and non-flammable gases or vapors for use in hazardous areas (Zone 1 and Zone 2)

Special versions**Special 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
- Front plate can be swung down for servicing purposes (laptop connection)
- Internal gas paths: stainless steel pipe (mat. no. 1.4571)
- Gas connections for sample gas inlet and outlet and for purging gas: fittings, pipe diameter of 6 mm or ¼"

Field device

- Two-door enclosure (IP65) with gas-tight separation of analyzer and electronics sections
- Individually purgeable enclosure halves
- Stainless steel gas path and stubs (mat. no. 1.4571)
- Purging gas connections: pipe diameter 10 mm or 3/8"
- Gas connections for sample gas inlet and outlet: clamping ring connection for a pipe diameter of 6 mm or ¼"

Display and control panel

- Large LCD panel for simultaneous display of:
 - Measured value (digital and analog displays)
 - Status bar
 - Measuring ranges
- Contrast of LCD panel adjustable using menu
- Permanent LED backlighting
- Washable membrane keyboard with five softkeys
- Menu-driven operation for parameterization, test functions, adjustment
- User help in plain text
- Graphic display of concentration trend; programmable time intervals
- 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 demanded, 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 slide-in module also behind the front plate).

Options

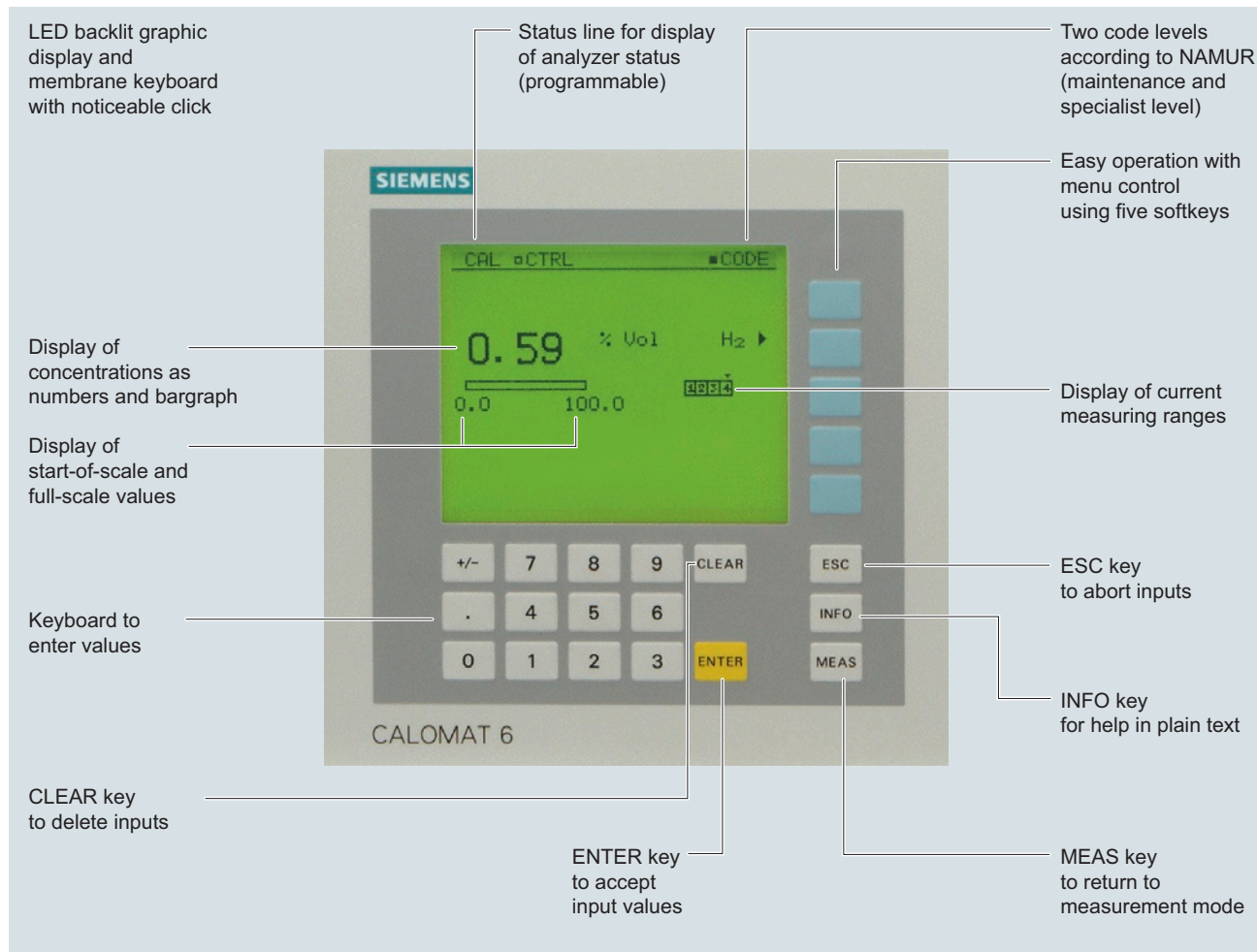
- RS 485/RS 232 converter
- RS 485/Ethernet converter
- RS 485/USB converter
- Connection to networks via PROFIBUS DP/PA interface
- SIPROM GA software as the service and maintenance tool

Extractive continuous process gas analysis

Series 6

CALOMAT 6

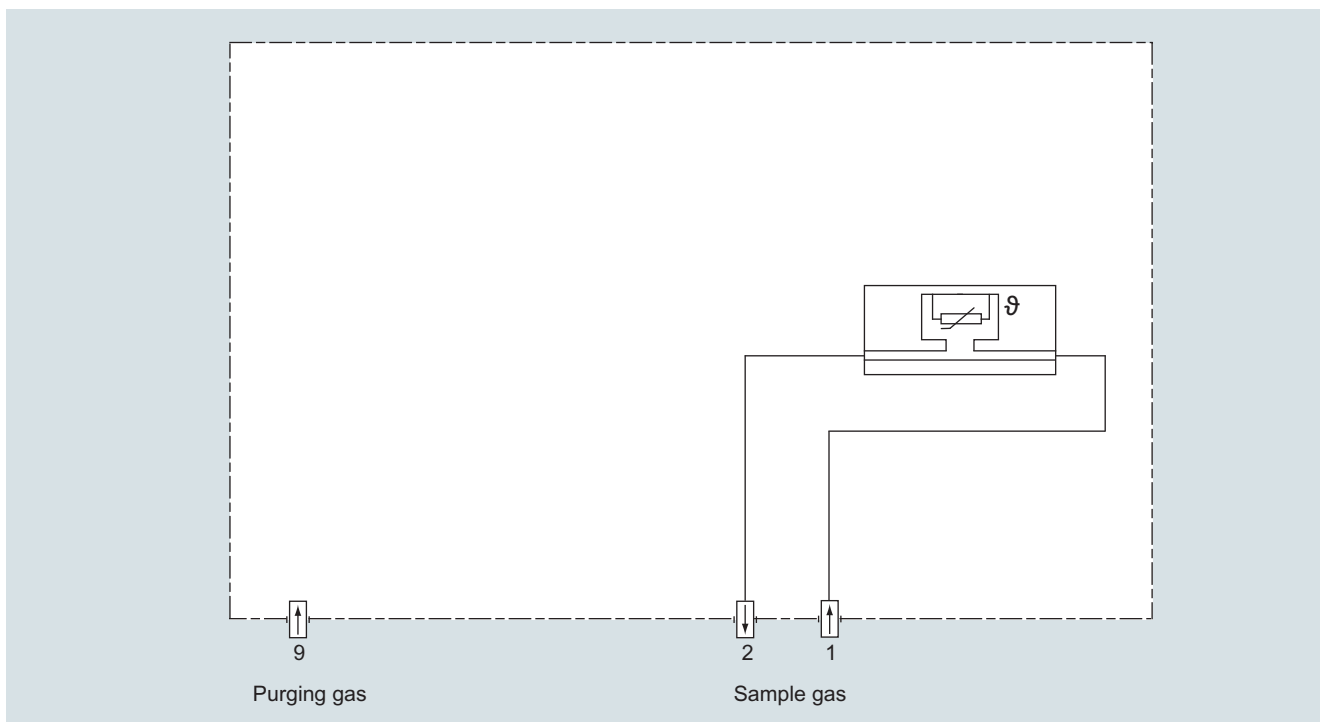
General information



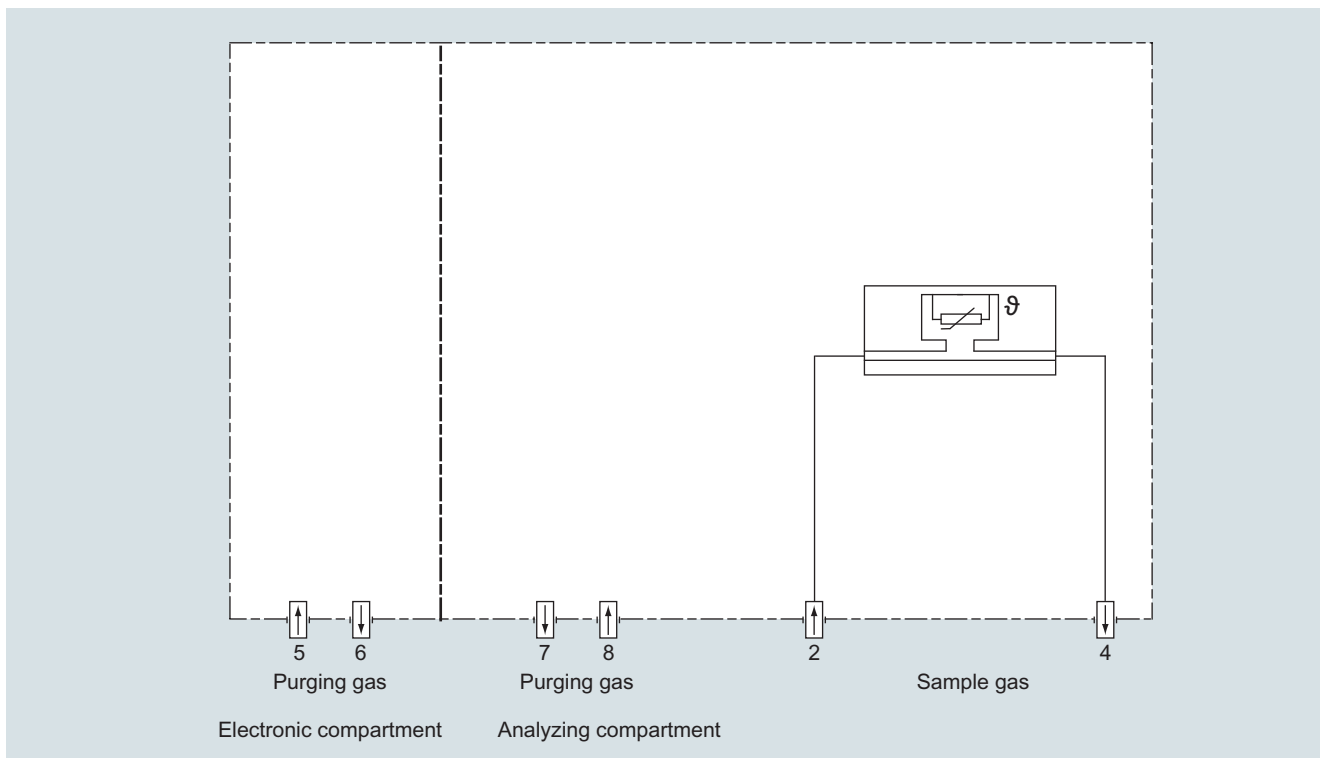
CALOMAT 6, membrane keyboard and graphic display

Designs – parts wetted by sample gas

Gas path		19" rack unit	Field device	Field device Ex
With pipes	Bushing	Stainless steel, mat. no. 1.4571		
	Pipe	Stainless steel, mat. no. 1.4571		
	Sample cell body	Stainless steel, mat. no. 1.4571		
	O-rings	FFKM-Chemraz		
	Sensor	Si, SiO _x N _y , AU, epoxy resin, glass		
	Tightness	Leakage < 1 µl/s		



CALOMAT 6, 19" rack unit, gas path



CALOMAT 6, field device, gas path

Extractive continuous process gas analysis

Series 6

CALOMAT 6

General information

Function

Principle of operation

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

The CALOMAT 6 works with a micromechanically produced Si chip whose measuring membrane is equipped with thin-film resistors.

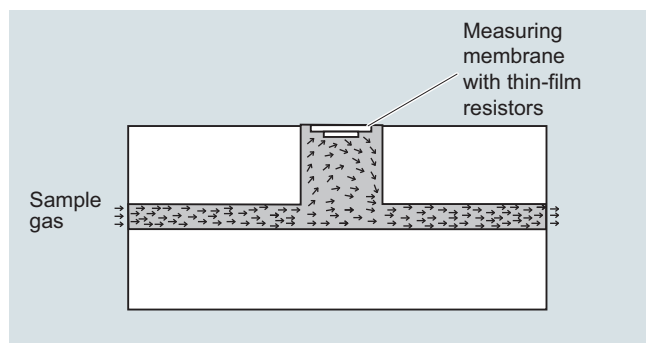
The resistors are kept at a constant temperature. This requires an current intensity depending on the thermal conductivity of the sample gas. This "raw value" is processed further electronically to calculate the gas concentration.

The sensor is located in a thermostatically-controlled stainless steel enclosure in order to prevent the influence of changes in ambient temperature.

To prevent the influence of changes in flow, the sensor is positioned in a bore located to the side of the main flow.

Note

The sample gases must be fed into the analyzers free of dust. Condensation (dew point sample gas < ambient temperature) is to be avoided in the measurement chambers. Therefore, the use of gas modified for the measuring tasks is necessary in most application cases.



CALOMAT, principle of operation

Essential characteristics

- Four freely parameterizable measuring ranges, also with suppressed zero point, all measuring ranges linear
- Smallest measuring spans up to 1 % H₂ (with disabled zero point: 95 to 100 % H₂) possible
- Measuring range identification
- Galvanically isolated measured-value output 0/2/4 to 20 mA (also inverted)
- Autoranging or manual measurement range switchover possible; remote switching is also possible
- Storage of measured values possible during adjustments
- Wide range of selectable time constants (static/dynamic noise suppression); i.e. the response time of the analyzer can be matched to the respective measuring task
- Short response time
- Low long-term drift
- Measuring point switchover for up to 6 measuring points (programmable)
- Measuring range identification
- Measuring point identification
- External pressure sensor can be connected – for the correction of sample gas fluctuations
- Automatic range calibration can be parameterized

- Operation based on the NAMUR recommendation
- Two control levels with their own authorization codes for the prevention of accidental and unauthorized operator interventions
- Simple handling using a numerical membrane keyboard and operator prompting
- Customer-specific analyzer options such as:
 - Customer acceptance
 - TAG labels
 - Drift recording
 - Clean for O₂ service

Measuring spans

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

The smallest possible spans listed below refer to N₂ as the residual gas. With other gases which have a larger/smaller thermal conductivity than N₂, the smallest possible span is also larger/smaller.

Component	Smallest possible span
H ₂	0 ... 1 % (95 ... 100 %)
He	0 ... 2 %
Ar	0 ... 10 %
CO ₂	0 ... 20 %
CH ₄	0 ... 15 %
H ₂ in blast furnace gas	0 ... 10 %
H ₂ in converter gas	0 ... 20 %
H ₂ with wood gasification	0 ... 30 %

Influence of interfering gases

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

The following table lists the zero offsets expressed in % H₂ resulting from 10 % residual gas (interfering gas) in each case.

Component	Zero offset
Ar	-1.28 %
CH ₄	+1.59 %
C ₂ H ₆ (non-linear response)	+0.04 %
C ₃ H ₈	-0.80 %
CO	-0.11 %
CO ₂	-1.07 %
He	+6.51 %
H ₂ O (non-linear response)	+1.58 %
NH ₃ (non-linear response)	+1.3 %
O ₂	+0.18 %
SF ₆	-2.47 %
SO ₂	-1.34 %
100 % air (dry)	+0.27 %

For residual gas concentrations differing from 10 %, the corresponding multiple of the associated value in the table provides an acceptable approximation. This is valid for residual gas concentrations up to 25 % (dependent on type of gas).

The thermal conductivity of most gas mixtures has a non-linear response. Even ambiguous results, such as e.g. with NH₃/N₂ mixtures, can occur within a specific concentration range.

In addition to a zero offset, it should also be noted that the gradient of the characteristic is influenced by the residual gas. However, this effect is negligible for most gases.

In case of correction of the influence of interfering gases with additional analyzers (ULTRAMAT 6/ULTRAMAT 23), the resulting measuring error can – depending on the application – amount up to 5 % of the smallest measuring range of the respective application.

Example of 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

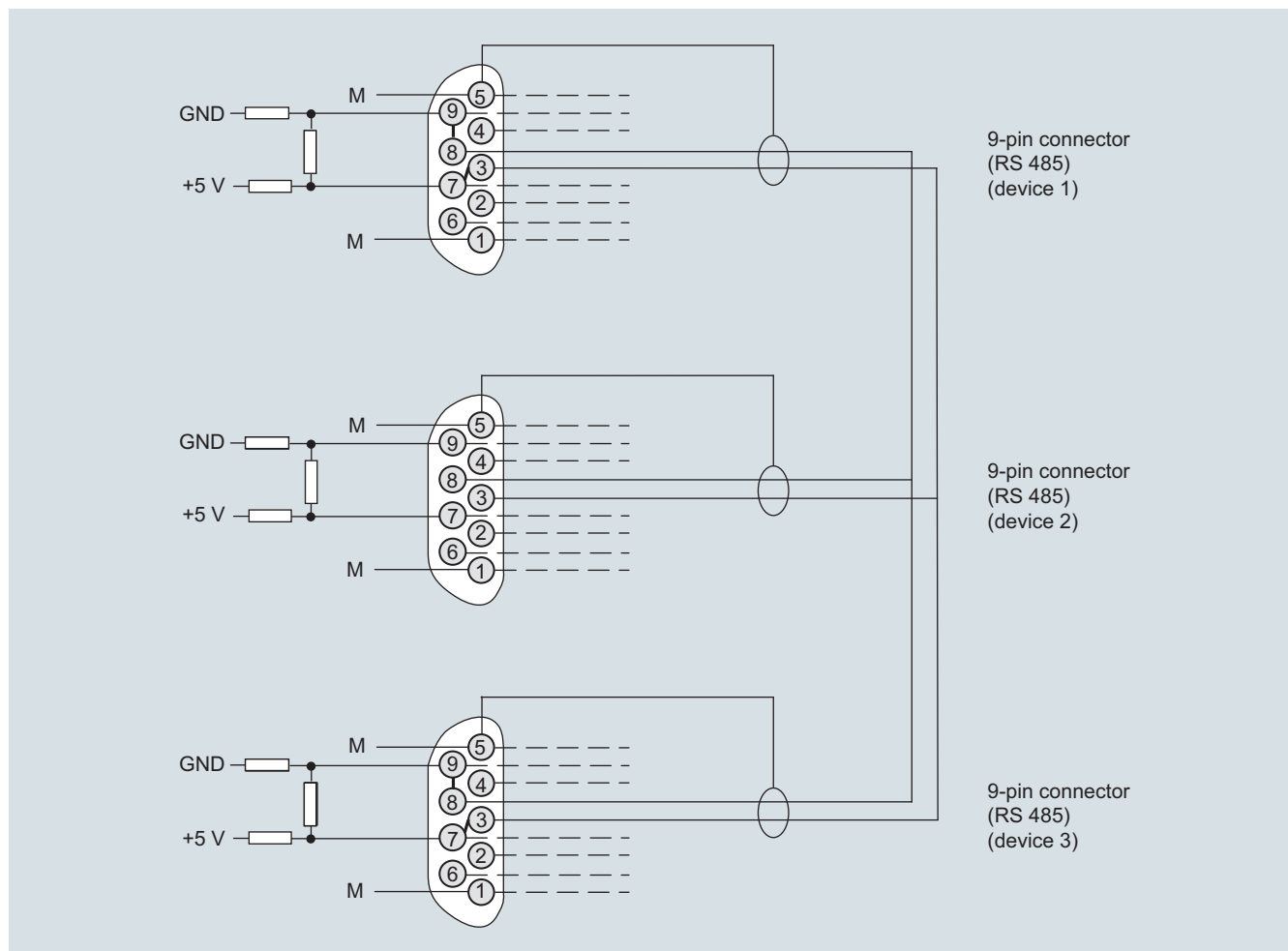
Bus terminating resistors

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

Extractive continuous process gas analysis

Series 6

CALOMAT 6

19" rack unit

1

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	Based on sample gas pressure 1 013 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature
Measuring ranges	4, internally and externally switchable; automatic measuring range switchover also possible	Output signal fluctuation	< ± 0.75% of the smallest possible measuring range according to rating plate, with electronic damping constant of 1 s ($\sigma = 0.25\%$)
Largest possible measuring span	100 vol.% H ₂ (for smallest measuring span, see "Function")	Zero point drift	< ± 1%/week of the smallest possible measuring span according to rating plate
Measuring ranges with suppressed zero point	Any zero point within 0 ... 100 vol.% can be implemented, smallest possible measuring span: 5% H ₂	Measured-value drift	< ± 1%/week of the smallest possible measuring span according to rating plate
Operating position	Front wall, vertical	Repeatability	< 1% of the current measuring range
Conformity	CE mark in accordance with EN 61326/A1 and EN 61010/1	Detection limit	1% of the current measuring range
Design, enclosure		Linearity error	< ± 1% of the current measuring range
Degree of protection	IP20 according to EN 60529	Influencing variables	Based on sample gas pressure 1 013 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature
Weight	Approx. 10 kg	Ambient temperature	< 1%/10 K referred to smallest possible measuring span according to rating plate
Electrical characteristics		Accompanying gases	Deviation from zero point (for influence of interfering gas see paragraph titled "Interference influences")
EMC interference immunity (electromagnetic compatibility)	In accordance with standard requirements of NAMUR NE21 (08/98)	Sample gas flow	< 0.2% of the smallest possible span according to rating plate with a change in flow of 0.1 l/min within the permissible flow range
All signal lines must be shielded. Measured value deviations of up to 4% of the smallest measuring range may occur in ranges with strong electromagnetic interference.		Sample gas pressure	< 1% of the current measuring range with a pressure change of 100 hPa
Electrical safety	In accordance with EN 61010-1; over-voltage category II	Auxiliary power	< 0.1% of the current measuring range with rated voltage ± 10%
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	Electrical inputs and outputs	
Power consumption	Approx. 20 VA	Analog output	0/2/4 ... 20 mA, floating; load max. 750 Ω
Fuse values	100 to 120 V: 1.0T/250 200 ... 240 V: 0.63 T/250	Relay outputs	6, with changeover contacts, freely parameterizable, e.g. for measuring range identification; load: 24 V AC/DC/1 A, isolated
Gas inlet conditions		Analog inputs	2, dimensioned for 0/2/4 ... 20 mA for external pressure sensor and correction of cross-interference
Sample gas pressure	800 ... 1 100 hPa (absolute)	Digital inputs	6, designed for 24 V, isolated, freely parameterizable, e.g. for measurement range switchover
Sample gas flow	30 ... 90 l/h (0.5 ... 1.5 l/min)	Serial interface	RS 485
Sample gas temperature	Min. 0 to max. 50 °C, but above the dew point	Options	AUTOCAL function each with 8 additional digital inputs and relay outputs, also with PROFIBUS PA or PROFIBUS DP
Temperature of the measuring cell	Approx. 60 °C	Climatic conditions	
Sample gas humidity	< 90% relative humidity	Permissible ambient temperature	-30 ... +70 °C during storage and transportation, 5 ... 45 °C during operation
Dynamic response		Permissible humidity (dew point must not be fallen below)	< 90% relative humidity as annual average, during storage and transportation
Warm-up period	< 30 min (the technical specification will be met after 2 hours)		
Delayed display (T ₉₀)	< 5 s		
Damping (electrical time constant)	0 ... 100 s, configurable		
Dead time (purging time of the gas path in the unit at 1 l/min)	Approx. 0.5 s		

Selection and ordering data

Article No.

CALOMAT 6 gas analyzer

7MB2521-

0 - A

Cannot be combined

19" rack unit for installation in cabinets

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

Connections for sample gas

Pipe with 6 mm outer diameter

Pipe with 1/4" outer diameter

Measured component	Smallest/largest measuring range
H ₂ in N ₂	0 ... 1/100 %
H ₂ in N ₂ (blast furnace gas measurement) ¹⁾	0 ... 5/100 %
H ₂ in N ₂ (converter measurement) ¹⁾	0 ... 5/100 %
H ₂ in N ₂ (wood gasification) ¹⁾	0 ... 5/100 %
H ₂ in Ar	0 ... 1/100 %
H ₂ in NH ₃	0 ... 1/100 %
He in N ₂	0 ... 2/100 %
He in Ar	0 ... 2/100 %
He in H ₂	0 ... 10/80 %
Ar in N ₂	0 ... 10/100 %
Ar in O ₂	0 ... 10/100 %
CO ₂ in N ₂	0 ... 20/100 %
CH ₄ in Ar	0 ... 15/100 %
NH ₃ in N ₂	0 ... 10/30 %
H ₂ monitoring (turbo generators)	
• CO ₂ in air	0 ... 100 %
• H ₂ in CO ₂	0 ... 100 %
• H ₂ in air	80 ... 100 %

Add-on electronics

Without

AUTOCAL function

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

Power supply

100 ... 120 V AC, 48 ... 63 Hz

200 ... 240 V AC, 48 ... 63 Hz

Explosion protection

Without

Certificate: ATEX II 3G, flammable and non-flammable gases

FM/CSA certificate – Class I Div 2

Language (supplied documentation, software)

German

English

French

Spanish

Italian

0
1

AA

AW

AX

AY

AB

AC

BA

BB

BC

CA

CB

DA

EA

FA

GA

GA

0

1

6

7

6

7

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1

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D

0

1

2

3

4

¹⁾ Ready to enter external correction of cross-interferences for CO, CO₂ and CH₄ (CH₄ only for blast furnace gas and wood gasification).

Extractive continuous process gas analysis

Series 6

CALOMAT 6

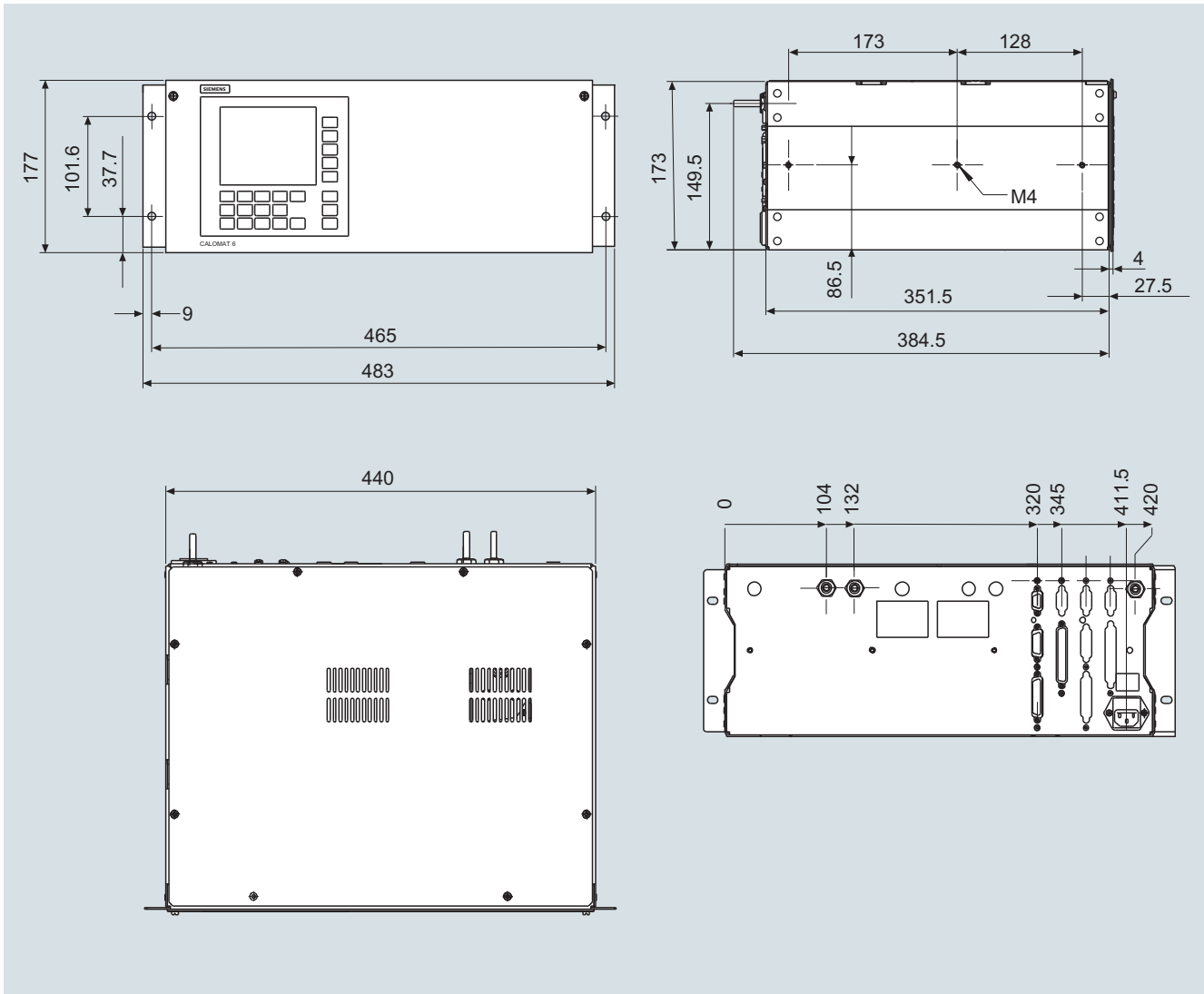
19" rack unit

1

Selection and ordering data

<i>Additional versions</i>	Order code
Add "-Z" to Article No. and specify Order codes.	
Telescopic rails (2 units)	A31
TAG labels (specific lettering based on customer information)	B03
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.)	Y12
<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	C79451-A3480-D511
AUTOCAL function with 8 digital inputs/outputs and PROFIBUS PA	A5E00057307
AUTOCAL function with 8 digital inputs/outputs and PROFIBUS DP	A5E00057312
Set of Torx screwdrivers	A5E34821625

Dimensional drawings



CALOMAT 6, 19" unit, dimensions in mm

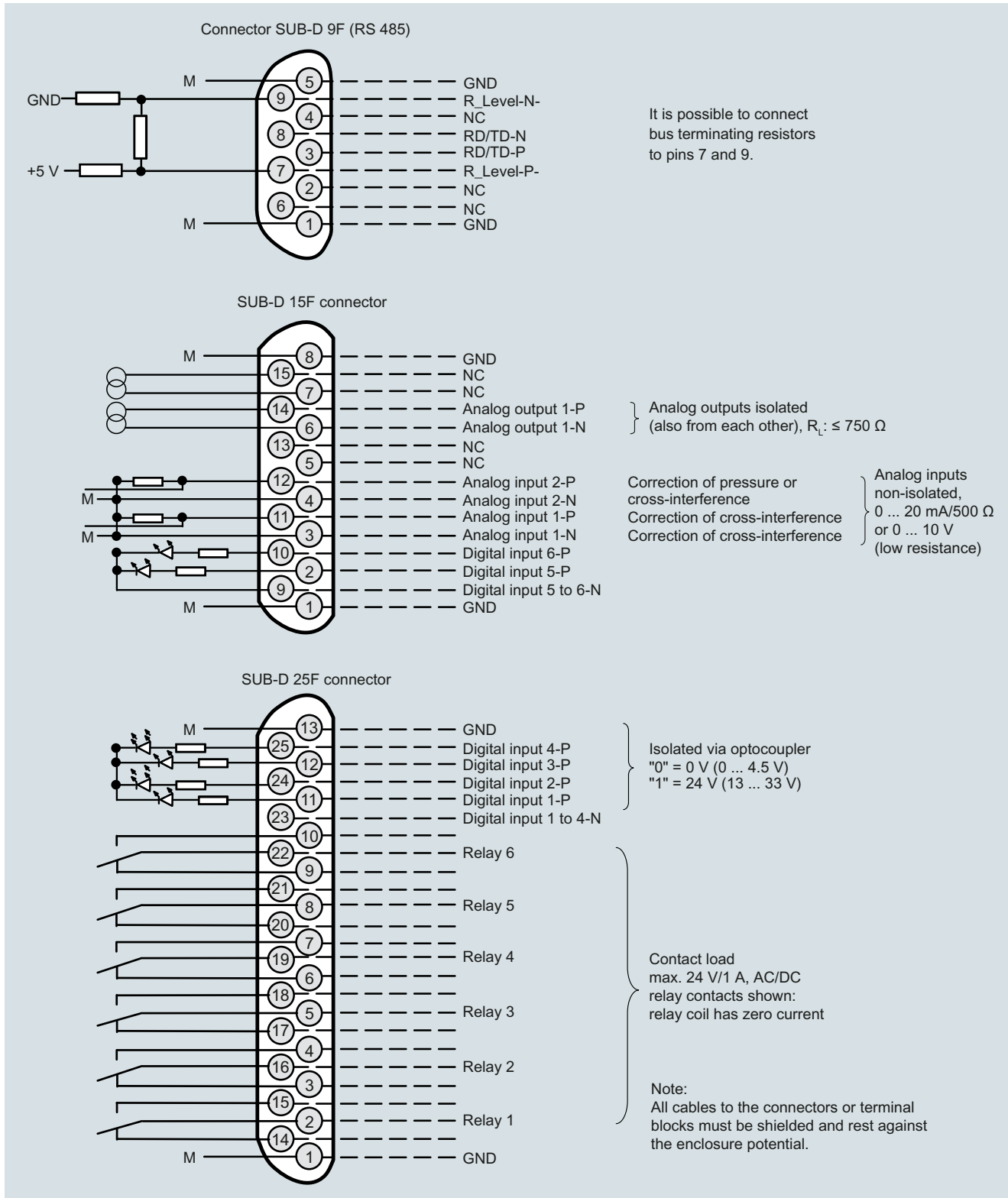
Extractive continuous process gas analysis

Series 6
CALOMAT 6

19" rack unit

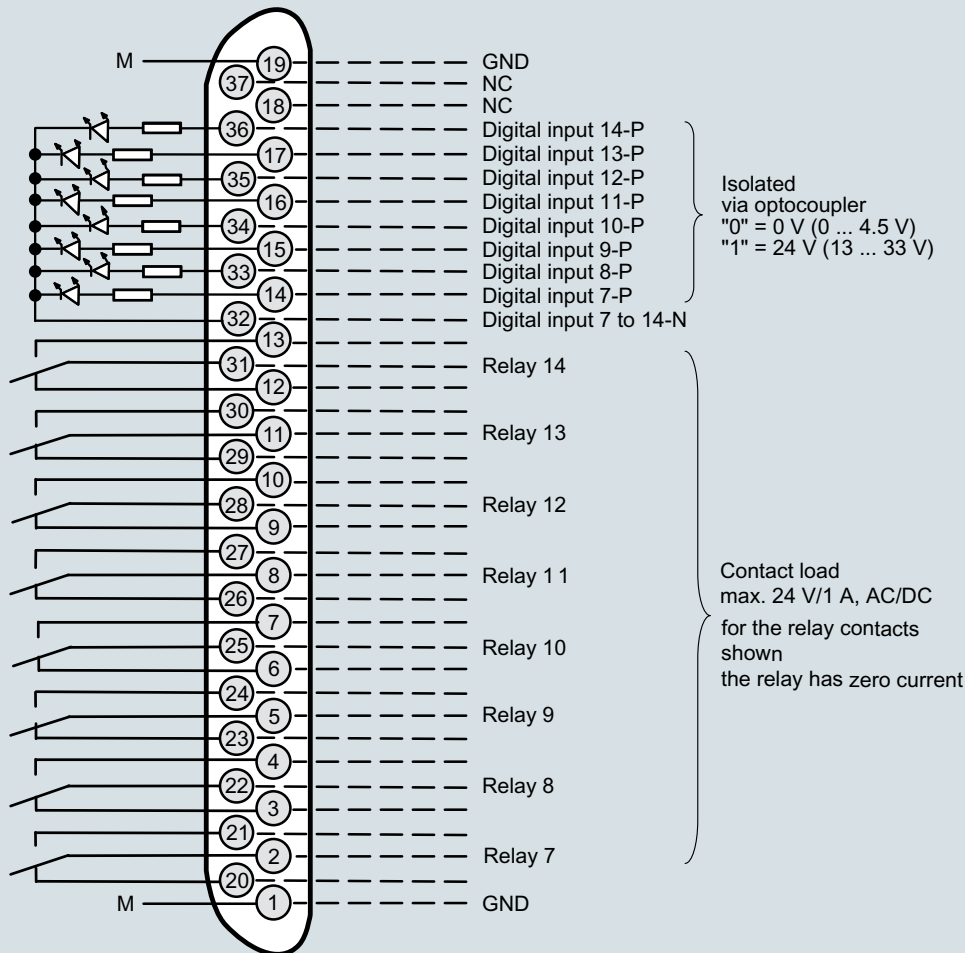
Circuit diagrams

Pin assignment (electrical and gas connections)



CALOMAT 6, 19" unit, pin assignment

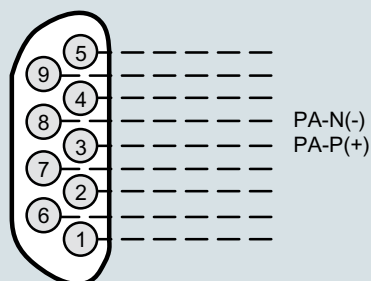
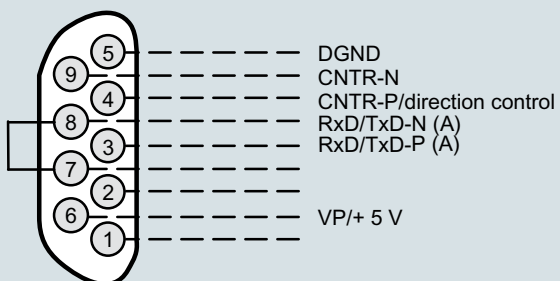
Connector SUB-D 37F (option)



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.

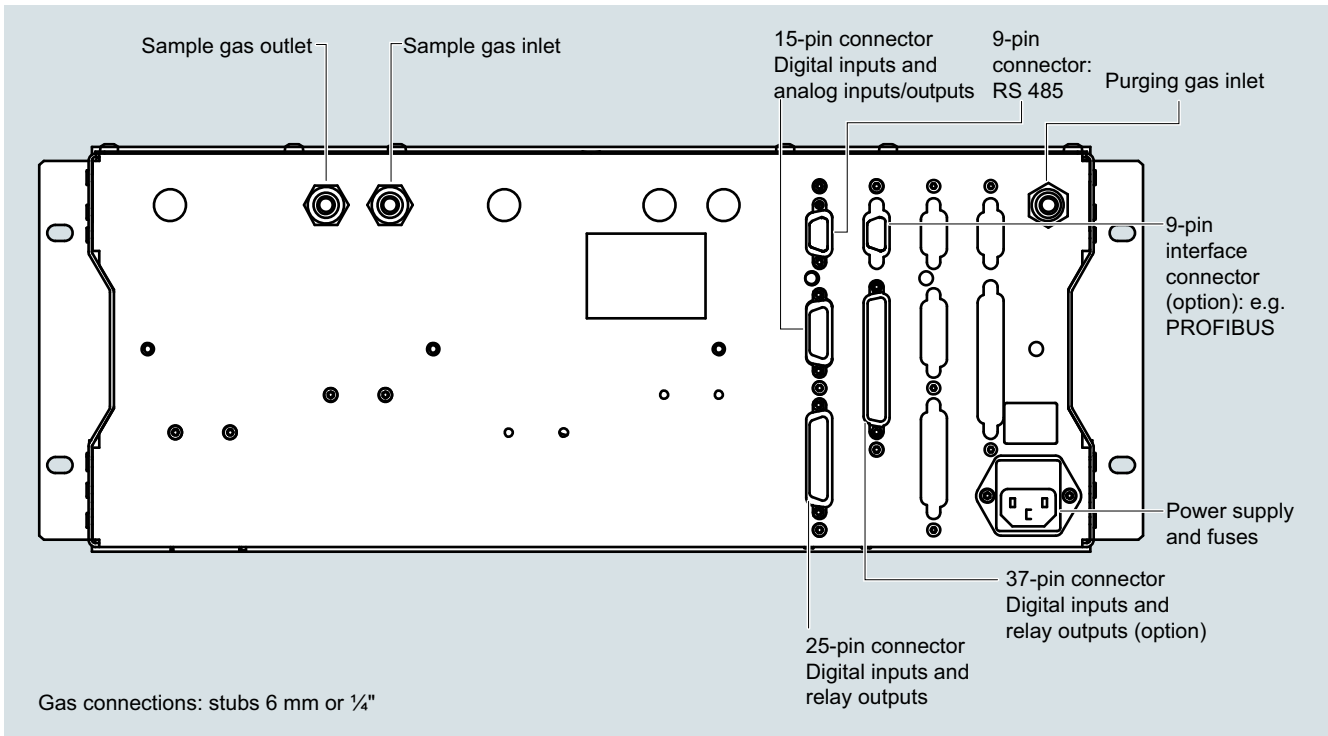
CALOMAT 6, 19" unit, pin assignment of AUTOCAL board and PROFIBUS connectors

Extractive continuous process gas analysis

Series 6
CALOMAT 6

1

19" rack unit



CALOMAT 6, 19" unit, gas and electrical connections

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	Based on sample gas pressure 1 013 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature
Measuring ranges	4, internally and externally switchable; automatic measuring range change-over also possible	Output signal fluctuation (maximum accuracy achieved after 2 hours)	< ± 0.75% of the smallest possible measuring range according to rating plate, with electronic damping constant of 1 s ($\sigma = 0.25\%$)
Largest possible measuring span	100 vol.% H ₂ (for smallest measuring span, see "Function")	Zero point drift	< ± 1%/week of the smallest possible measuring span according to rating plate
Measuring ranges with suppressed zero point	Any zero point within 0 ... 100 vol.% can be implemented; smallest possible measuring span: 5% H ₂	Measured-value drift	< ± 1%/week of the smallest possible measuring span according to rating plate
Operating position	Front wall, vertical	Repeatability	< 1% of the current measuring range
Conformity	CE mark in accordance with EN 61326/A1 and EN 61010/1	Detection limit	1% of the current measuring range
Design, enclosure		Linearity error	< ± 1% of the current measuring range
Degree of protection	IP65 according to EN 60529	Influencing variables	Based on sample gas pressure 1013 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature
Weight	Approx. 25 kg	Ambient temperature	< 1%/10 K referred to smallest possible measuring span according to rating plate
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)	Sample gas flow	< 0.2% of the smallest possible span according to rating plate with a change in flow of 0.1 l/min within the permissible flow range
All signal lines must be shielded. Measured value deviations of up to 4% of the smallest measuring range may occur in ranges with strong electromagnetic interference.		Sample gas pressure	< 1% of the current measuring range with a pressure change of 100 hPa
Electrical safety	In accordance with EN 61010-1; over-voltage category II	Electrical inputs and outputs	
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	Analog output	0/2/4 ... 20 mA, floating; load max. 750 Ω
Power consumption (unit)	Approx. 20 VA	Relay outputs	6, with changeover contacts, freely configurable, e.g. for measuring range identification; load: 24 V AC/DC/1 A, floating
Fuse values	100 to 120 V: 1.0T/250 200 ... 240 V: 0.63 T/250	Analog inputs	2, dimensioned for 0/2/4 ... 20 mA for external pressure sensor and correction of cross-interference
Gas inlet conditions		Digital inputs	6, designed for 24 V, floating, freely configurable, e.g. for measuring range switchover
Sample gas pressure	800 to 1 100 hPa (absolute)	Serial interface	RS 485
Sample gas flow	30 to 90 l/h (0.5 to 1.5 l/min)	Options	AUTOCAL function each with 8 additional digital inputs and relay outputs, also with PROFIBUS PA or PROFIBUS DP
Sample gas temperature	Min. 0 to max. 50 °C, but above the dew point	Climatic conditions	
Temperature of the measuring cell	Approx. 60 °C	Permissible ambient temperature	-30 ... +70 °C during storage and transportation, 5 ... 45 °C in operation
Sample gas humidity	< 90% relative humidity	Permissible humidity (dew point must not be fallen below)	< 90% relative humidity as annual average, during storage and transportation
Purging gas pressure			
• Permanent	165 hPa above ambient pressure		
• For short periods	Max. 250 hPa above ambient pressure		
Time response	Based on sample gas pressure 1 000 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature		
Warm-up period	< 30 min (the technical specification will be met after 2 hours)		
Delayed display (T ₉₀)	< 5 s		
Electrical damping	0 ... 100 s, configurable		
Dead time (at 1 l/min)	Approx. 0.5 s		

Extractive continuous process gas analysis

Series 6

CALOMAT 6

Field device

1

Selection and ordering data**Article No.****CALOMAT 6 gas analyzer**

For field installation

➤ **7MB2511-0-0-A** Cannot be combined

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

Connections for sample gas

Ferrule screw connection for pipe, outer diameter 6 mm

Ferrule screw connection for pipe, outer diameter 1/4"

Measured component	Smallest/largest measuring range
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H ₂ in N ₂	0 ... 1/100 %	AA	AA
H ₂ in N ₂ (blast furnace gas measurement) ¹⁾	0 ... 5/100 %	AW	AW
H ₂ in N ₂ (converter measurement) ¹⁾	0 ... 5/100 %	AX	AX
H ₂ in N ₂ (wood gasification) ¹⁾	0 ... 5/100 %	AY	AY
H ₂ in Ar	0 ... 1/100 %	AB	AB
H ₂ in NH ₃	0 ... 1/100 %	AC	AC
He in N ₂	0 ... 2/100 %	BA	BC
He in Ar	0 ... 2/100 %	BB	BC
He in H ₂	0 ... 10/80 %	BC	BC
Ar in N ₂	0 ... 10/100 %	CA	CA
Ar in O ₂	0 ... 10/100 %	CB	CB
CO ₂ in N ₂	0 ... 20/100 %	DA	DA
CH ₄ in Ar	0 ... 15/100 %	EA	EA
NH ₃ in N ₂	0 ... 10/30 %	FA	FA
H ₂ monitoring (turbo generators)		GA	GA
• CO ₂ in air	0 ... 100 %		
• H ₂ in CO ₂	0 ... 100 %		
• H ₂ in air	80 ... 100 %		

Add-on electronics

Without

AUTOCAL function

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

Power supply

100 ... 120 V AC, 48 ... 63 Hz

200 ... 240 V AC, 48 ... 63 Hz

Explosion protection, incl. certificate

Without

Acc. to ATEX II 3G, non-flammable gases

Acc. to ATEX II 3G; flammable gases²⁾

FM/CSA certificate – Class I Div 2

According to ATEX II 2G, leakage compensation²⁾According to ATEX II 2G, continuous purging²⁾

ATEX II 3D certificate; potentially explosive dust atmospheres

- In non-hazardous gas zone
- In Ex zone acc. to ATEX II 3G, non-flammable gases
- In Ex zone acc. to ATEX II 3G, flammable gases²⁾

Language (supplied documentation, software)

German

English

French

Spanish

Italian

¹⁾ Ready to enter external correction of cross-interferences for CO, CO₂ and CH₄ (CH₄ only for blast furnace gas and wood gasification).²⁾ Only in connection with an approved purging unit.

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
<i>Additional units for Ex versions</i>	Article No.
<u>ATEX Category II 2G (zone 1)</u>	
BARTEC Ex p purging unit, 230 V, "leakage compensation"	7MB8000-2BA
BARTEC Ex p purging unit, 115 V, "leakage compensation"	7MB8000-2BB
BARTEC Ex p purging unit, 230 V, "continuous purging"	7MB8000-2CA
BARTEC Ex p purging unit, 115 V, "continuous purging"	7MB8000-2CB
Ex i isolating transformer	7MB8000-3AB
Ex isolating relay, 230 V	7MB8000-4AA
Ex isolating relay, 110 V	7MB8000-4AB
Differential pressure switch for corrosive and non-corrosive gases	7MB8000-5AA
Stainless steel flame arrestor	7MB8000-6BA
Hastelloy flame arrestor	7MB8000-6BB
<u>ATEX Category II 3G (zone 2)</u>	
BARTEC Ex p purging unit, 230 V, "continuous purging"	7MB8000-2CA
BARTEC Ex p purging unit, 115 V, "continuous purging"	7MB8000-2CB
<u>FM/CSA (Class I Div. 2)</u>	
Ex purging unit Minipurge FM	7MB8000-1AA
<i>Accessories</i>	
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 with 8 digital inputs/outputs and PROFIBUS PA	A5E00057315
AUTOCAL function with 8 digital inputs/outputs and PROFIBUS DP	A5E00057318
AUTOCAL function with 8 digital inputs/outputs and PROFIBUS PA Ex i (firmware 4.1.10 required)	A5E00057317
Set of Torx screwdrivers	A5E34821625

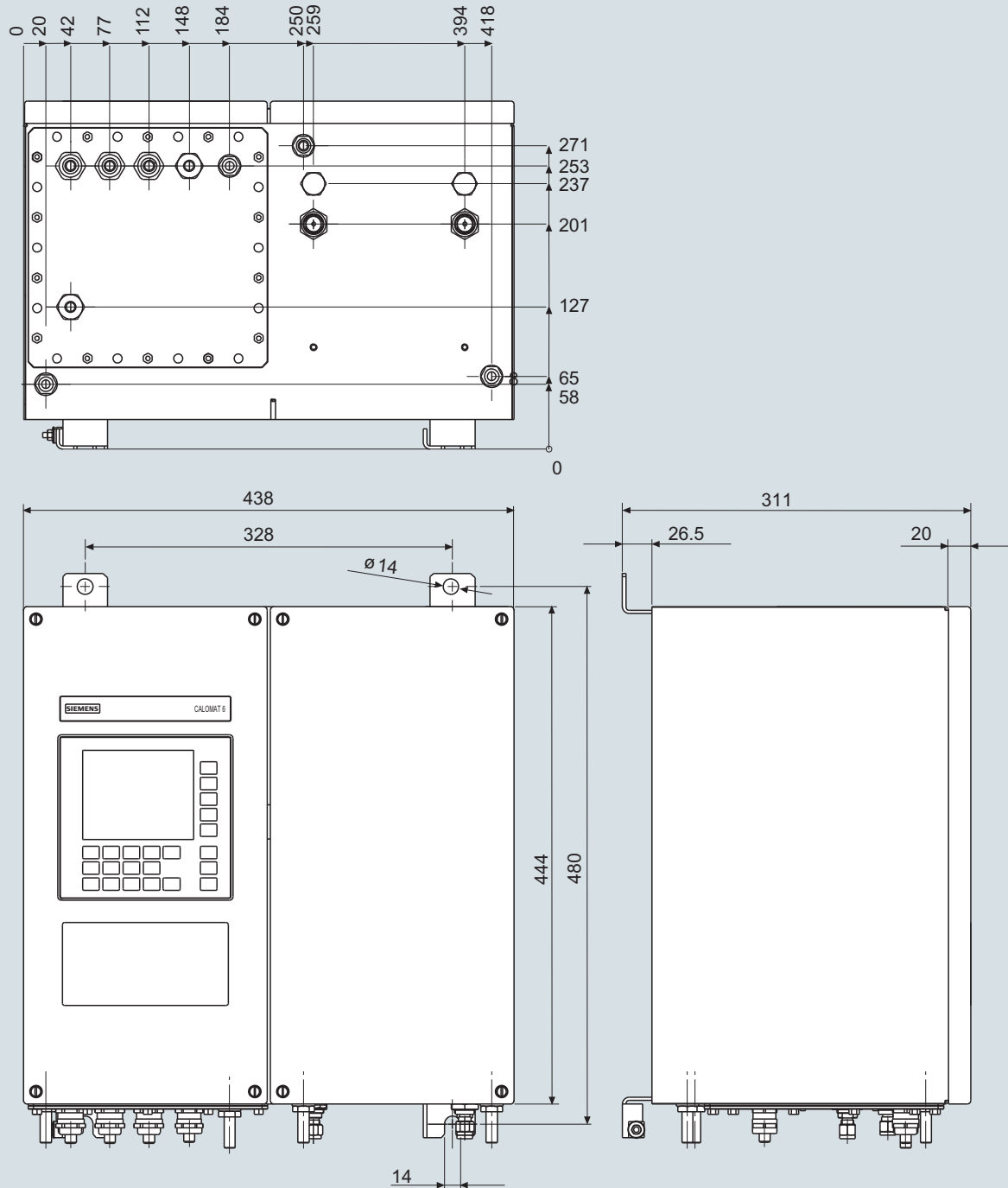
Extractive continuous process gas analysis

Series 6

CALOMAT 6

Field device

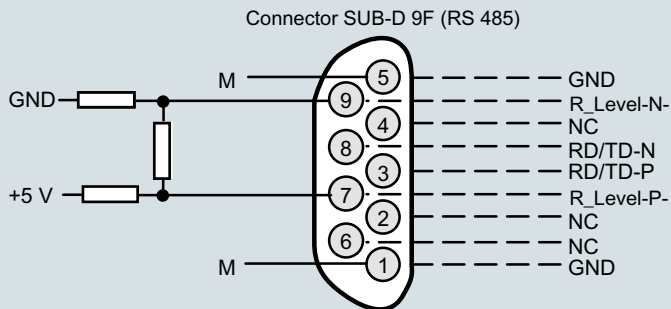
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Dimensional drawings

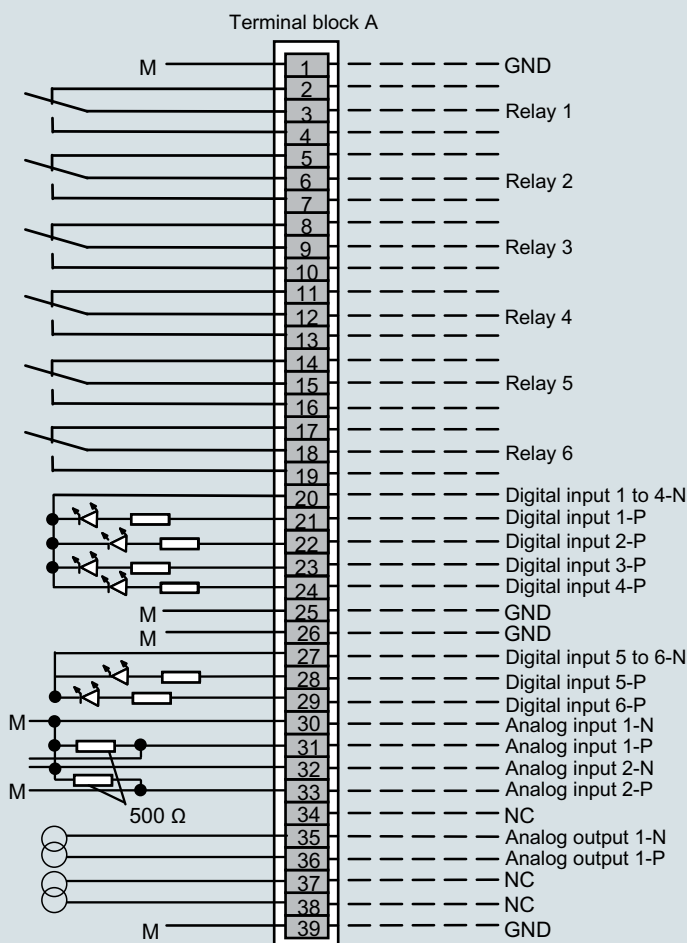
CALOMAT 6, field unit, dimensions in mm

Circuit diagrams

Pin assignment (electrical and gas connections)



It is possible to connect bus terminating resistors to pins 7 and 9.



Contact load max.
24 V/1 A, AC/DC; relay contacts shown: relay coil has zero current

Isolated via optocoupler
"0" = 0 V (0 ... 4.5 V)
"1" = 24 V (13 ... 33 V)

Isolated via optocoupler
"0" = 0 V (0 ... 4.5 V)
"1" = 24 V (13 ... 33 V)
} Correction of cross-interference } Analog inputs non-isolated,
} Pressure correction } 0 ... 20 mA or 0 ... 10 V (internal resistance ≤ 500 Ω)

} Analog outputs isolated

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

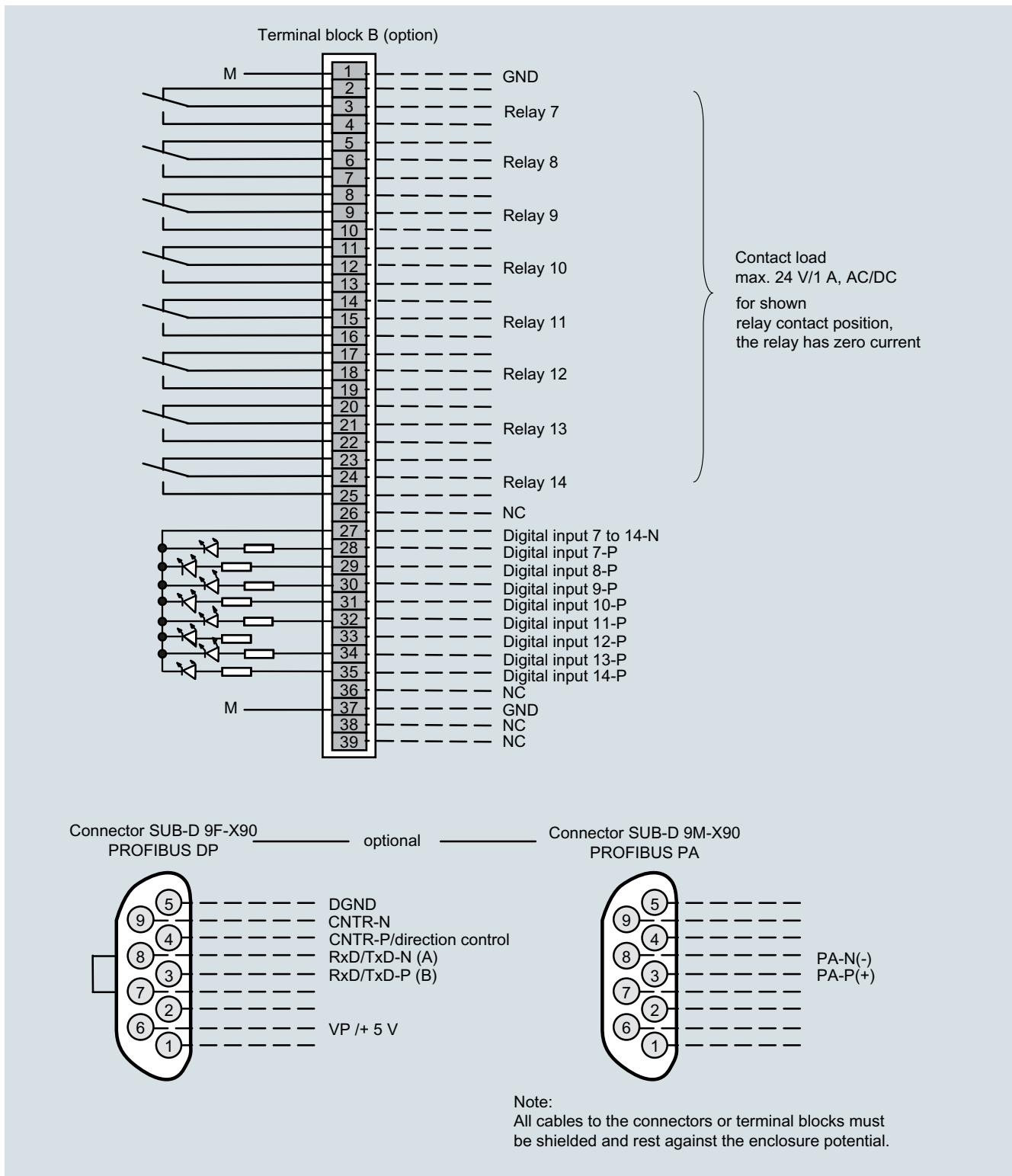
CALOMAT 6, field unit, connector and terminal assignment

Extractive continuous process gas analysis

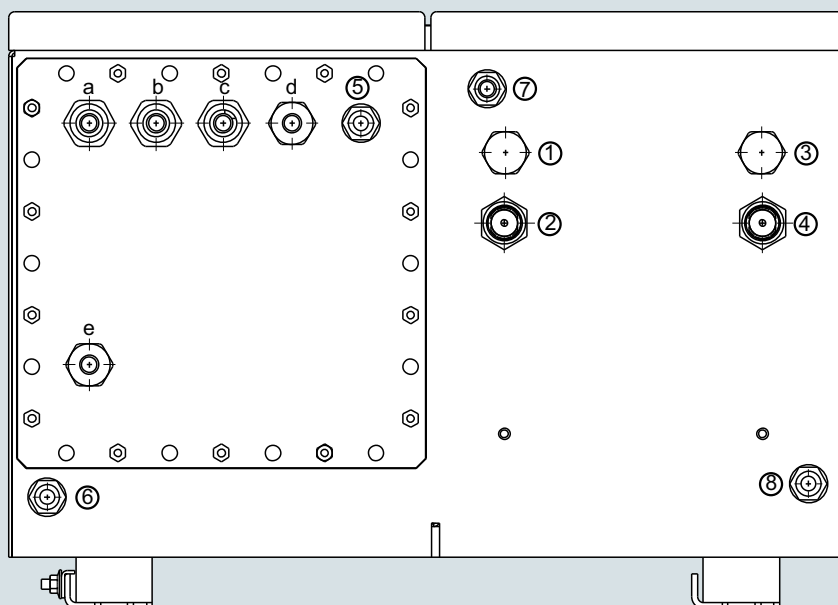
Series 6
CALOMAT 6

Field device

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CALOMAT 6, field unit, connector and terminal assignment of the AUTOCAL board and PROFIBUS connectors



Gas connections

- | | | |
|-----|--|--|
| ① | not used | } Clamping
gland for pipe
Ø 6 mm or ¼" |
| ② | Sample gas inlet | |
| ③ | not used | |
| ④ | Sample gas outlet | |
| ⑤-⑧ | Purging gas inlets/outlets stubs Ø 10 mm or 3/8" | |

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 6, field unit, gas and electrical connections

Extractive continuous process gas analysis

Series 6

CALOMAT 6

Documentation, suggestions for spare parts

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Selection and ordering data

Operating instructions	Article No.
CALOMAT 6 Thermal conductivity gas analyzer	
• German	A5E00116454
• English	A5E00116455
• French	A5E00116456
• Italian	A5E00116457
• Spanish	A5E00116458
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

	7MB2521	7MB2511	7MB2511 Ex	2 years (quantity)	5 years (quantity)	Article No.
Analyzer unit						
Measuring cell	x	x	x	1	1	A5E00095332
O ring (set of 4)	x	x	x	1	2	A5E00124182
Electronics						
Fuse (device fuse)			x	1	2	A5E00061505
Front plate without LC display	x			1	1	C79165-A3042-B508
Motherboard, with firmware: see spare parts list	x	x	x	-	1	
Adapter plate, LCD/keyboard	x	x		1	1	C79451-A3474-B605
LC display (non-Ex version)	x			1	1	A5E31474846
Line transformer, 115 V	x	x	x	-	1	W75040-B21-D80
Line transformer, 230 V	x	x	x	-	1	W75040-B31-D80
Connector filter	x	x	x	-	1	W75041-E5602-K2
Fusible element, T 0.63/250 V	x	x		2	3	W79054-L1010-T630
Fusible element, 1 A, 110/120 V	x	x	x	2	3	W79054-L1011-T100

If the CALOMAT 6 is supplied with a specially cleaned gas path for high oxygen context ("Cleaned for O₂ service"), please ensure that you specify this when ordering spare parts. This is the only way to guarantee that the gas path will continue to comply with the special requirements for this version.