

**Overview**

The function of the OXYMAT 6 gas analyzers is based on the paramagnetic alternating pressure method and are used to measure oxygen in gases.

**Benefits**

- Paramagnetic alternating pressure principle
  - Small measuring ranges (0 to 0.5% or 99.5 to 100% O<sub>2</sub>)
  - Absolute linearity
- Detector element has no contact with the sample gas
  - Can be used under "harsh conditions"
  - Long service life
- Physically suppressed zero through suitable selection of reference gas (air or O<sub>2</sub>), e.g. 98 to 100% O<sub>2</sub> for purity monitoring/air separation
- Open interface architecture (RS 485, RS 232, PROFIBUS)
- SIPROM GA network for maintenance and service information (option)
- Electronics and physics: gas-tight isolation, purging is possible, IP65, long service life even in harsh environments (field device only)
- Heated versions (option), use also in presence of gases condensing at low temperature (field device only)
- Ex(p) for zones 1 and 2 according to ATEX 2G and ATEX 3G (field device only)

**Application****Fields of application**

- For boiler control in incineration plants
- For safety-relevant applications (SIL)
- In the automotive industry (testbed systems)
- In chemical plants
- For ultra-pure gas quality monitoring
- Environmental protection
- Quality monitoring
- Versions for analyzing flammable and non-flammable gases or vapors for use in hazardous areas

**Special versions****Special applications**

Besides the standard combinations, special applications concerning the material in the gas path and the material in the sample chambers are also available on request.

**Performance-tested version / QAL**

As a reference value for emission measurements according to TA-Luft, 13th and 27th BImSchV, federal emission law

**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: hose made of FKM (Viton) or pipe made of titanium or stainless steel (mat. no. 1.4571)
- Gas connections for sample gas inlet and outlet and for reference gas: fittings, pipe diameter of 6 mm or ¼"
- Flow indicator for sample gas on front plate (option)
- Pressure switch in sample gas path for flow monitoring (option)

**Field device**

- Two-door enclosure with gas-tight separation of analyzer and electronics sections
- Individually purgeable enclosure halves
- Analyzer unit and piping can be heated up to 130 °C (option)
- Gas path and stubs made of stainless steel (mat. no. 1.4571) or titanium, Hastelloy C22
- Purging gas connections: pipe diameter 10 mm or 3/8"
- Gas connections for sample gas inlet and outlet and for reference gas: 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

## Extractive continuous process gas analysis

Series 6

OXYMAT 6

1

### General information

#### Input and outputs

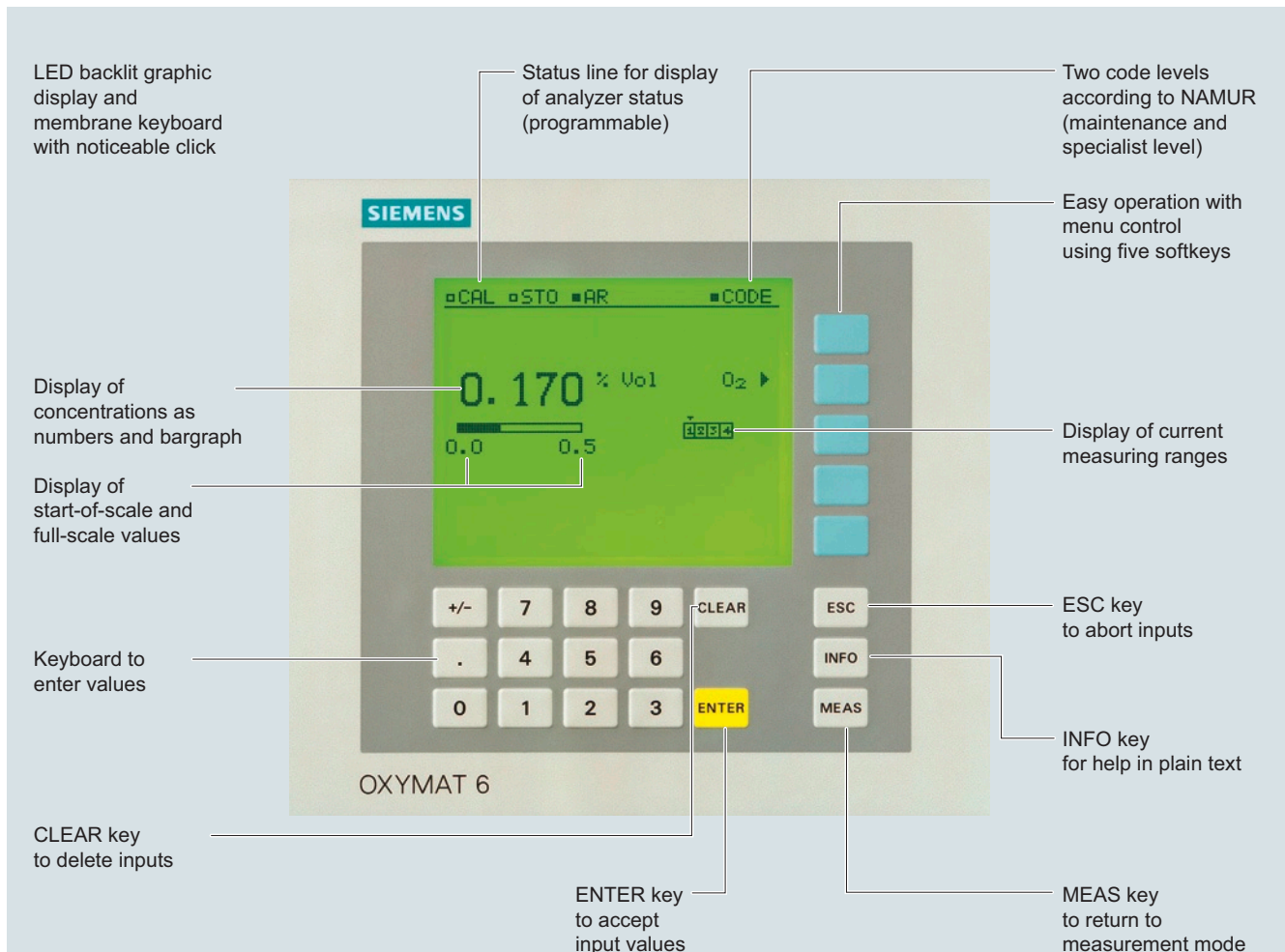
- One analog output per measured component (from 0, 2, 4 to 20 mA; NAMUR configurable)
- Two analog inputs configurable (e.g. correction of cross-interference, external pressure sensor)
- Six digital inputs freely configurable (e.g. for measurement range switchover, processing of external signals from sample preparation)
- Six relay outputs freely configurable (failure, maintenance demanded, maintenance switch, threshold alarm, external magnetic valves)
- Expansion: 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

- AK interface for the automotive industry with extended functions
- 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



OXYMAT 6, membrane keyboard and graphic display

**Designs – Parts wetted by sample gas, standard**

Gas path		19" rack unit	Field device	Field device Ex
<b>With hoses</b>	Bushing	Stainless steel, mat. no. 1.4571	-	-
	Hose	FKM (e.g. Viton)		
	Sample chamber	Stainless steel, mat. no. 1.4571 or Tantalum		
	Fittings for sample chamber	Stainless steel, mat. no. 1.4571		
	Restrictor	PTFE (e.g. Teflon)		
	O-rings	FKM (e.g. Viton)		
<b>With pipes</b>	Bushing	Titanium		
	Pipe	Titanium		
	Sample chamber	Stainless steel, mat. no. 1.4571 or Tantalum		
	Restrictor	Titanium		
	O-rings	FKM (Viton) or FFKM (Kalrez)		
<b>With pipes</b>	Bushing	Stainless steel, mat. no. 1.4571		
	Pipe	Stainless steel, mat. no. 1.4571		
	Sample chamber	Stainless steel, mat. no. 1.4571 or tantalum		
	Restrictor	Stainless steel, mat. no. 1.4571		
	O-rings	FKM (Viton) or FFKM (Kalrez)		
<b>With pipes</b>	Bushing		Hastelloy C 22	
	Pipe		Hastelloy C 22	
	Sample chamber		Stainless steel, mat. no. 1.4571 or tantalum	
	Restrictor		Hastelloy C 22	
	O-rings		FKM (e.g. Viton) or FFKM (e.g. Kalrez)	

**Options**

<b>Flow indicator</b>	Measurement pipe	Duran glass	-	-
	Variable area	Duran glass, black		
	Suspension boundary	PTFE (Teflon)		
	Angle pieces	FKM (Viton)		
<b>Pressure switch</b>	Membrane	FKM (Viton)	-	-
	Enclosure	PA 6.3 T		

# Extractive continuous process gas analysis

Series 6

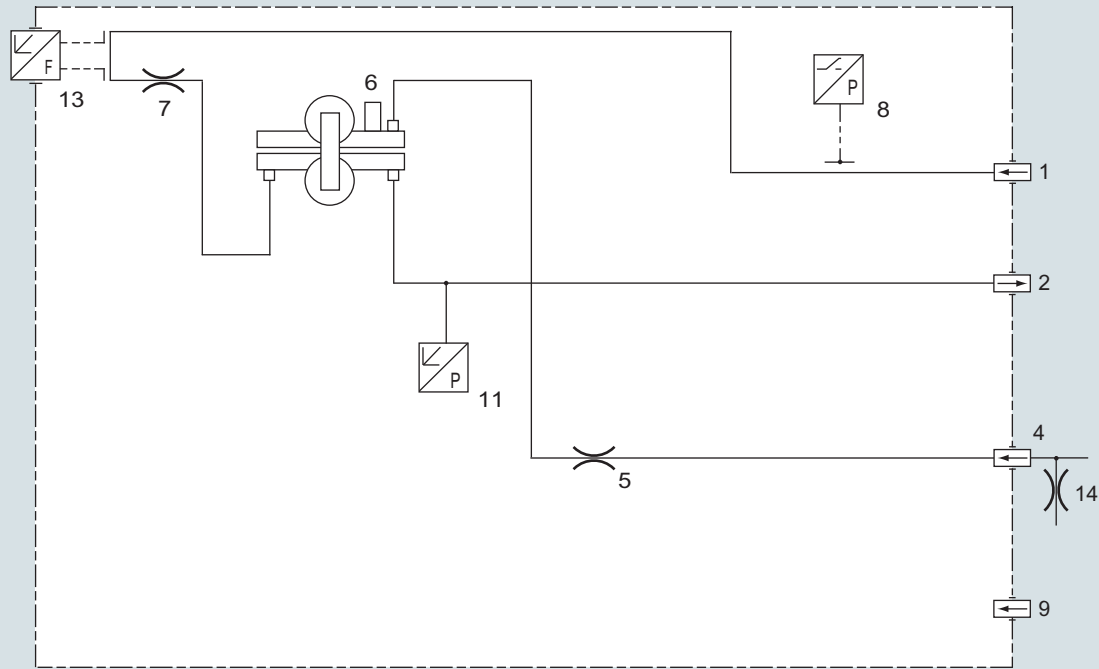
OXYMAT 6

## General information

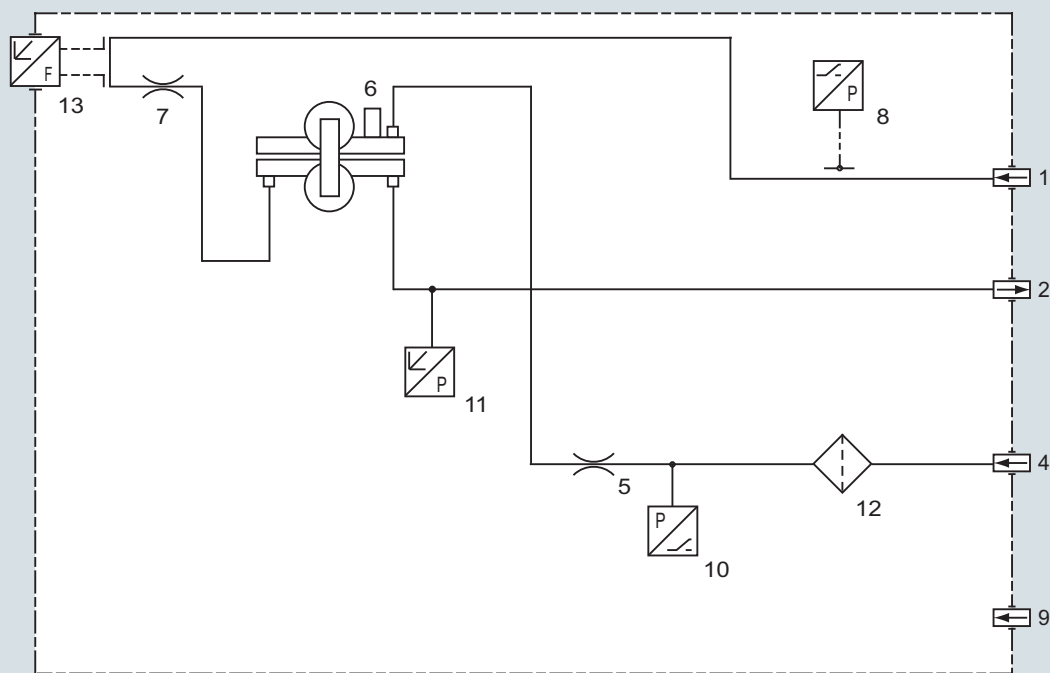
### Gas path (19" rack unit)

#### Legend for the gas path figures

1	Sample gas inlet	8	Pressure switch in sample gas path (option)
2	Sample gas outlet	9	Purging gas
3	Not used	10	Pressure switch in reference gas path (option)
4	Reference gas inlet	11	Pressure sensor
5	Restrictor in reference gas inlet	12	Filter
6	O <sub>2</sub> physical system	13	Flow indicator in sample gas path (option)
7	Restrictor in sample gas path	14	Outlet restrictor



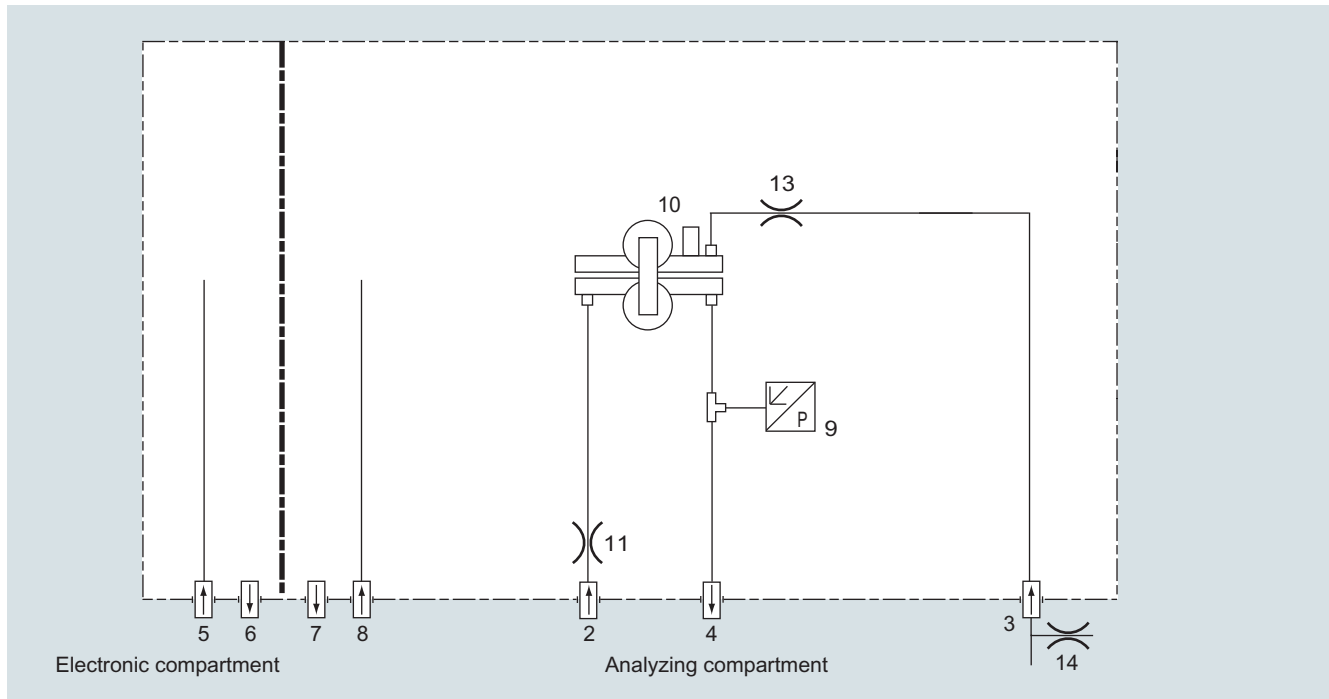
Gas path, reference gas connection 1 100 hPa, absolute



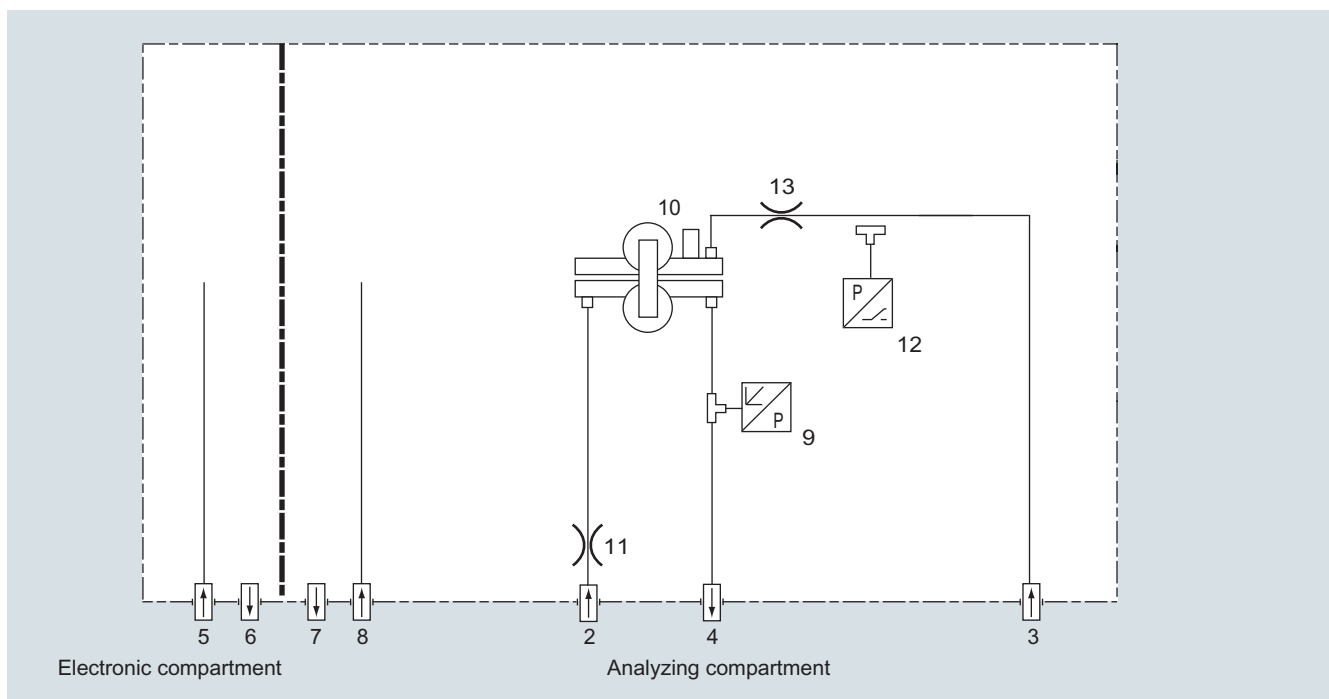
Gas path, reference gas connection 3 000 to 5 000 hPa, absolute

**Gas path (field device)****Legend for the gas path figures**

1	Not used	8	Purging gas inlet (analyzer side)
2	Sample gas inlet	9	Pressure sensor
3	Reference gas inlet	10	O <sub>2</sub> physical system
4	Sample gas outlet	11	Restrictor in sample gas path
5	Purging gas inlet (electronics side)	12	Pressure sensor in reference gas path (option)
6	Purging gas outlet (electronics side)	13	Restrictor
7	Purging gas outlet (analyzer side)	14	Outlet restrictor



Gas path, reference gas connection 1 100 hPa, absolute



Gas path, reference gas connection 3 000 to 5 000 hPa, absolute

# Extractive continuous process gas analysis

Series 6

OXYMAT 6

## General information

### Function

#### Principle of operation

In contrast to almost all other gases, oxygen is paramagnetic. This property is utilized as the measuring principle by the OXYMAT 6 gas analyzers.

Oxygen molecules in an inhomogeneous magnetic field are drawn in the direction of increased field strength due to their paramagnetism. When two gases with different oxygen contents meet in a magnetic field, a pressure difference is produced between them.

In the case of OXYMAT 6, one gas (1) is a reference gas ( $N_2$ ,  $O_2$  or air), the other is the sample gas (5). The reference gas is introduced into the sample chamber (6) through two channels (3). One of these reference gas streams meets the sample gas within the area of a magnetic field (7). Because the two channels are connected, the pressure, which is proportional to the oxygen content, causes a cross flow. This flow is converted into an electric signal by a microflow sensor (4).

The microflow sensor consists of two nickel-plated grids heated to approximately 120 °C, which, along with two supplementary resistors, form a Wheatstone bridge. The pulsating flow results in a change in the resistance of the Ni grids. This leads to an offset in the bridge which is dependent on the oxygen concentration of the sample gas.

Because the microflow sensor is located in the reference gas stream, the measurement is not influenced by the thermal conductivity, the specific heat or the internal friction of the sample gas. This also provides a high degree of corrosion resistance because the microflow sensor is not exposed to the direct influence of the sample gas.

By using a magnetic field with alternating strength (8), the effect of the background flow in the microflow sensor is not detected, and the measurement is thus independent of the instrument's operating position.

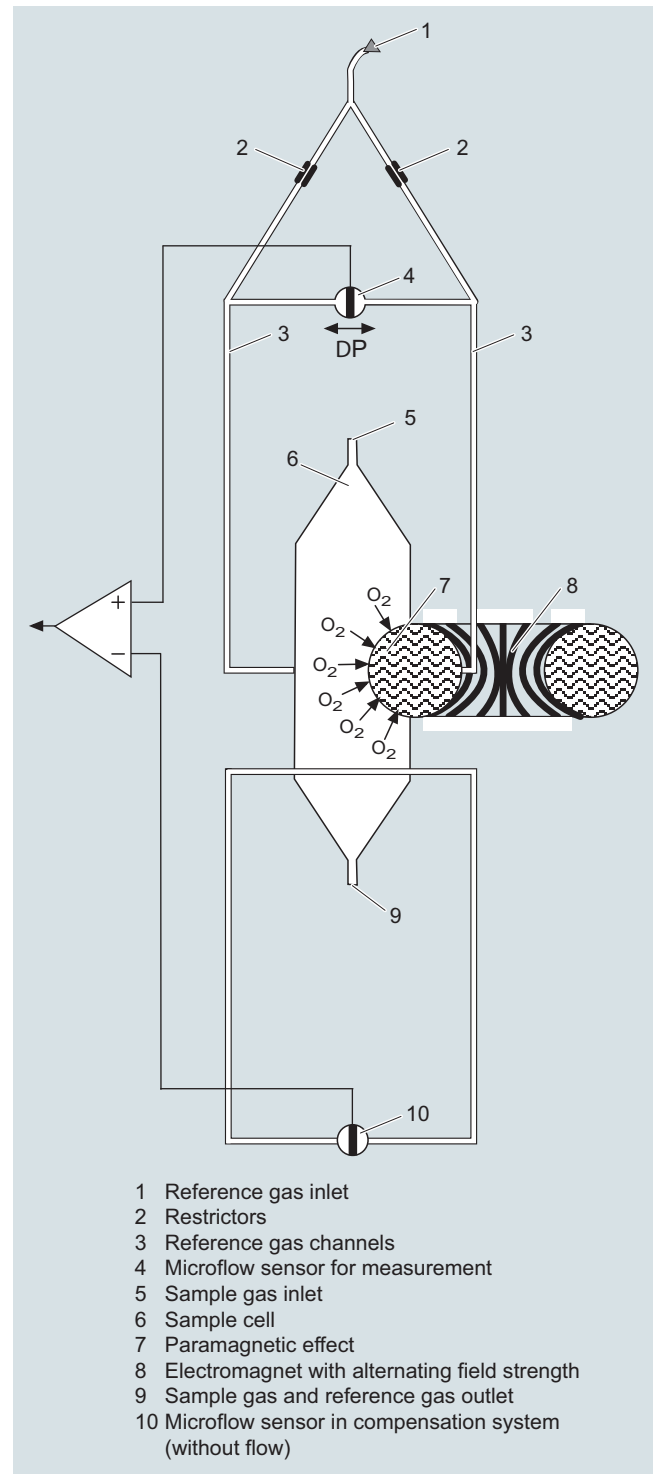
The sample chamber is directly in the sample path and has a small volume, and the microflow sensor is a low-lag sensor. This results in a very short response time for the OXYMAT 6.

Vibrations frequently occur at the place of installation and may falsify the measured signal (noise). A further microflow sensor (10) through which no gas passes acts as a vibration sensor. Its signal is applied to the measured signal as compensation.

If the density of the sample gas deviates by more than 50% from that of the reference gas, the compensation microflow sensor (10) is flushed with reference gas just like the measuring sensor (4).

#### Note

The sample gases must be fed into the analyzers free of dust. Condensation in the sample chambers must be prevented. Therefore, the use of gas modified for the measuring task is necessary in most application cases.



OXYMAT 6, principle of operation

**Advantages of the function-based application of reference gas**

- The zero point can be defined specific to the application. It is then also possible to set "physically" suppressed zero points. For example, it is possible when using pure oxygen as the zero gas to set a measuring range of 99.5 to 100% O<sub>2</sub> with a resolution of 50 vpm.
- The sensor (microflow sensor) is located outside the sample gas. Through use of an appropriate material in the gas path this also allows measurements in highly corrosive gases.
- Pressure variations in the sample gas can be compensated better since the reference gas is subjected to the same fluctuations.
- No influences on the thermal conductivity of the sample gas since the sensor is positioned on the reference gas side.
- The same gas is used for the serial gas calibration and as the reference gas. As a result of the low consumption of reference gas (3 to 10 ml/min), one calibration cylinder can be used for both gases.
- No measuring effect is generated in the absence of oxygen. The measured signal need not therefore be set electronically to zero, and is thus extremely stable with regard to temperature and electronic influences.

**Essential characteristics**

- Four measuring ranges which can be freely configured, even with suppressed zero point, all measuring ranges are linear
- Measuring ranges with physically suppressed zero point possible
- Measuring range identification
- Galvanically isolated measured-value output 0/2/4 to 20 mA (also inverted)
- Autoranging 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 point identification
- Internal pressure sensor for correction of pressure variations in sample gas range 500 to 2 000 hPa (abs.)
- External pressure sensor - only with piping as the gas path - can be connected for correction of variations in the sample gas pressure up to 3 000 hPa absolute (option)
- Monitoring of sample gas flow (option for version with hoses)
- Monitoring of sample gas and/or reference gas (option)
- Monitoring of reference gas with reference gas connection 3 000 to 5 000 hPa (abs.) (option)
- Automatic measuring range calibration can be configured
- 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 O<sub>2</sub> service
  - Kalrez gaskets
- Analyzer unit with flow-type compensation branch: a flow is passed through the compensation branch (option) to reduce the vibration dependency in the case of highly different densities of the sample and reference gases
- Sample chamber for use in presence of highly corrosive sample gases

# Extractive continuous process gas analysis

Series 6

OXYMAT 6

1

## General information

### Reference gases

Measuring range	Recommended reference gas	Reference gas connection pressure	Remarks
0 to ... vol.% O <sub>2</sub>	N <sub>2</sub>	2 000 ... 4 000 hPa above sample gas pressure (max. 5 000 hPa absolute)	The reference gas flow is set automatically to 5 ... 10 ml/min (up to 20 ml/min with flow-type compensation branch)
... to 100 vol.% O <sub>2</sub> (suppressed zero point with full-scale value 100 vol.% O <sub>2</sub> )	O <sub>2</sub>		
Around 21 vol.% O <sub>2</sub> (suppressed zero point with 21 vol.% O <sub>2</sub> within the measuring span)	Air	100 hPa with respect to sample gas pressure, which may vary by max. 50 hPa around the atmospheric pressure	

Table 1: Reference gases for OXYMAT 6

### Correction of zero point error / cross-sensitivities

Accompanying gas (concentration 100 vol.%)	Deviation from zero point in vol.% O <sub>2</sub> absolute	Accompanying gas (concentration 100 vol.%)	Deviation from zero point in vol.% O <sub>2</sub> absolute
<b>Organic gases</b>		<b>Inert gases</b>	
Ethane C <sub>2</sub> H <sub>6</sub>	-0.49	Helium He	+0.33
Ethene (ethylene) C <sub>2</sub> H <sub>4</sub>	-0.22	Neon Ne	+0.17
Ethine (acetylene) C <sub>2</sub> H <sub>2</sub>	-0.29	Argon Ar	-0.25
1.2 butadiene C <sub>4</sub> H <sub>6</sub>	-0.65	Krypton Kr	-0.55
1.3 butadiene C <sub>4</sub> H <sub>6</sub>	-0.49	Xenon Xe	-1.05
n-butane C <sub>4</sub> H <sub>10</sub>	-1.26	<b>Inorganic gases</b>	
iso-butane C <sub>4</sub> H <sub>10</sub>	-1.30	Ammonia NH <sub>3</sub>	-0.20
1-butene C <sub>4</sub> H <sub>8</sub>	-0.96	Hydrogen bromide HBr	-0.76
iso-butene C <sub>4</sub> H <sub>8</sub>	-1.06	Chlorine Cl <sub>2</sub>	-0.94
Dichlorodifluoromethane (R12) CCl <sub>2</sub> F <sub>2</sub>	-1.32	Hydrogen chloride HCl	-0.35
Acetic acid CH <sub>3</sub> COOH	-0.64	Dinitrogen monoxide N <sub>2</sub> O	-0.23
n-heptane C <sub>7</sub> H <sub>16</sub>	-2.40	Hydrogen fluoride HF	+0.10
n-hexane C <sub>6</sub> H <sub>14</sub>	-2.02	Hydrogen iodide HI	-1.19
Cyclo-hexane C <sub>6</sub> H <sub>12</sub>	-1.84	Carbon dioxide CO <sub>2</sub>	-0.30
Methane CH <sub>4</sub>	-0.18	Carbon monoxide CO	+0.07
Methanol CH <sub>3</sub> OH	-0.31	Nitrogen oxide NO	+42.94
n-octane C <sub>8</sub> H <sub>18</sub>	-2.78	Nitrogen N <sub>2</sub>	0.00
n-pentane C <sub>5</sub> H <sub>12</sub>	-1.68	Nitrogen dioxide NO <sub>2</sub>	+20.00
iso-pentane C <sub>5</sub> H <sub>12</sub>	-1.49	Sulfur dioxide SO <sub>2</sub>	-0.20
Propane C <sub>3</sub> H <sub>8</sub>	-0.87	Sulfur hexafluoride SF <sub>6</sub>	-1.05
Propylene C <sub>3</sub> H <sub>6</sub>	-0.64	Hydrogen sulfide H <sub>2</sub> S	-0.44
Trichlorofluoromethane (R11) CCl <sub>3</sub> F	-1.63	Water H <sub>2</sub> O	-0.03
Vinyl chloride C <sub>2</sub> H <sub>3</sub> Cl	-0.77	Hydrogen H <sub>2</sub>	+0.26
Vinyl fluoride C <sub>2</sub> H <sub>3</sub> F	-0.55		
1.1 vinylidene chloride C <sub>2</sub> H <sub>2</sub> Cl <sub>2</sub>	-1.22		

Table 2: Zero point error due to diamagnetism or paramagnetism of some accompanying gases with reference to nitrogen at 60 °C und 1 000 hPa absolute (according to IEC 1207/3)

### Conversion to other temperatures

The deviations from the zero point listed in Table 2 must be multiplied by a correction factor (k):

- with diamagnetic gases:  $k = 333 \text{ K} / (\varphi [^{\circ}\text{C}] + 273 \text{ K})$
- with paramagnetic gases:  $k = [333 \text{ K} / (\varphi [^{\circ}\text{C}] + 273 \text{ K})]^2$

All diamagnetic gases have a negative deviation from zero point.



## Technical specifications

<b>General information</b>		<b>Pressure correction range</b>	
Measuring ranges	4, internally and externally switchable; autoranging is also possible	Pressure sensor	
Smallest possible span (relating to sample gas pressure 1 000 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature)	0.5 vol.%, 2 vol.% or 5 vol.% O <sub>2</sub>	• Internal	500 ... 2 000 hPa absolute
Largest possible measuring span	100 vol.% O <sub>2</sub> (for a pressure above 2 000 hPa: 25 vol.% O <sub>2</sub> )	• External	500 ... 3 000 hPa absolute
Measuring ranges with suppressed zero point	Any zero point can be implemented within 0 ... 100 vol.%, provided that a suitable reference gas is used (see Table 1 in "Function")	<b>Measuring response</b>	
Operating position	Front wall, vertical	Output signal fluctuation	Based on sample gas pressure 1 013 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature
Conformity	CE mark in accordance with EN 50081-1, EN 50082-2	Zero point drift	< ± 0.75% of the smallest possible measuring range according to rating plate, with electronic damping constant of 1 s (corresponds to ±0.25% at 2 σ)
<b>Design, enclosure</b>		Measured-value drift	< ±0.5%/month of the current measuring range
Degree of protection	IP20 according to EN 60529	Repeatability	< 1% of the current measuring range
Weight	Approx. 13 kg	Detection limit	1% of the current measuring range
<b>Electrical characteristics</b>		Linearity error	< 0.1% of the current measuring range
Auxiliary power	100 ... 120 V AC (nominal range of use 90 ... 132 V), 48 ... 63 Hz or 200 ... 240 V AC (nominal range of use 180 ... 264 V), 48 ... 63 Hz	<b>Influencing variables</b>	
Power consumption	Approx. 35 VA	Ambient temperature	Based on sample gas pressure 1 013 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature
EMC (electromagnetic compatibility)	In accordance with standard requirements of NAMUR NE21 (08/98), EN 61326	Sample gas pressure (with air (100 hPa) as reference gas, correction of the atmospheric pressure fluctuations is only possible if the sample gas can vent to ambient air)	< 0.5%/10 K relating to the smallest possible measuring range according to rating plate, with measuring span 0.5%: 1%/10 K
Electrical safety	According to EN 61010-1, overvoltage category III	Accompanying gases	• With disabled pressure compensation: < 2% of the current measuring range /1% pressure change • With disabled pressure compensation: < 0.2% of the current measuring range /1% pressure change
Fuse values	100 ... 120 V: 1.0 T/250 200 ... 240 V: 0.63 T/250	Sample gas flow at zero point	< 1% of the current measuring range according to rating plate with a change in flow of 0.1 l/min within the permissible flow range
<b>Gas inlet conditions</b>		Auxiliary power	< 0.1% of the current measuring range with rated voltage ± 10%
Permissible sample gas pressure		<b>Electrical inputs and outputs</b>	
• With pipes	500 ... 3 000 hPa absolute	Analog output	0/2/4 ... 20 mA, isolated; max. load 750 Ω
• With hoses		Relay outputs	6, with changeover contacts, freely configurable, e.g. for measuring range identification; load: 24 V AC/DC/1 A, isolated
- Without pressure switch	500 ... 1 500 hPa absolute	Analog inputs	2, dimensioned for 0/2/4 ... 20 mA for external pressure sensor and residual gas influence correction (correction of cross-interference)
- With pressure switch	500 ... 1 300 hPa absolute	Digital inputs	6, designed for 24 V, isolated, freely configurable, e.g. for measuring range switchover
Sample gas flow	18 ... 60 l/h (0.3 ... 1 l/min)	Serial interface	RS 485
Sample gas temperature	Min. 0 ... 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
Sample gas humidity	< 90% RH (RH: relative humidity)	<b>Climatic conditions</b>	
Reference gas pressure (high-pressure version)	2 000 ... 4 000 hPa above sample gas pressure, but max. 5 000 hPa	Permissible ambient temperature	-30 ... +70 °C during storage and transportation, 5 ... 45 °C during operation
Reference gas pressure (low-pressure version)	Min. 100 hPa above sample gas pressure	Permissible humidity	< 90% RH (RH: relative humidity) within average annual value, during storage and transportation (dew point must not be undershot)
<b>Dynamic response</b>			
Warm-up period	At room temperature < 30 min (the technical specification will be met after 2 hours)		
Delayed display (T <sub>90</sub> -time)	Min. 1.5 ... 3.5 s, depending on version		
Damping (electrical time constant)	0 ... 100 s, configurable		
Dead time (purging time of the gas path in the unit at 1 l/min)	Approximately 0.5 ... 2.5 s, depending on version		
Time for device-internal signal processing	< 1 s		

# Extractive continuous process gas analysis

Series 6

OXYMAT 6

19" rack unit

1

**Selection and ordering data**
**OXYMAT 6 gas analyzer**

19" rack unit for installation in cabinets

**Article No.**

 7MB2021-
 

0
A
B
C
D
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F

 0 -
 

0
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2

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0
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2
3
4

Cannot be combined

[Click on the Article No. for the online configuration in the PIA Life Cycle Portal.](#)
**Gas connections**

Pipe with 6 mm outer diameter

Pipe with 1/4" outer diameter

**Smallest possible measuring span O<sub>2</sub>**

0.5 % reference gas pressure 3 000 hPa

0.5 % reference gas pressure 100 hPa (external pump)

2 % reference gas pressure 3 000 hPa

2 % reference gas pressure 100 hPa (external pump)

5 % reference gas pressure 3 000 hPa

5 % reference gas pressure 100 hPa (external pump)

**Sample chamber**

Non-flow-type compensation branch

- Made of stainless steel, mat. no. 1.4571

- Made of tantalum

Flow-type compensation branch

- Made of stainless steel, mat. no. 1.4571

- Made of tantalum

**Internal gas paths**

Hose made of FKM (Viton)

Pipe made of titanium

Pipe made of stainless steel, mat. no. 1.4571

**Power supply**

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

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

**Monitoring (reference gas, sample gas)**

Without

Reference gas only

Reference gas and sample gas (with flow indicator and pressure switch for sample gas)

Sample gas only

**Add-on electronics**

Without

AUTOCAL function

- With 8 additional digital inputs/outputs

- With serial interface for the automotive industry (AK)

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

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

**Language**

German

English

French

Spanish

Italian

**Additional versions**

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

**Order code**

Cannot be combined

Telescopic rails (2 units)

A31

Kalrez gaskets in sample gas path

B01

TAG labels (specific lettering based on customer information)

B03

SIL conformity declaration (SIL 2) Functional Safety according to IEC 61508 and IEC 61511

C20

FM/CSA certificate – Class I Div 2

E20

Clean for O<sub>2</sub> service (specially cleaned gas path)

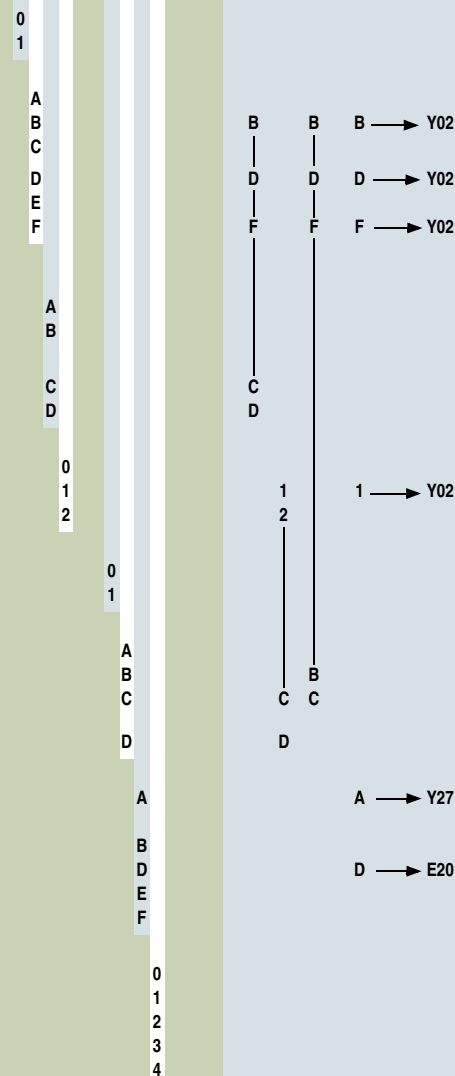
Y02

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

Y11

Performance-tested according to EN 15267

Y27



## Selection and ordering data

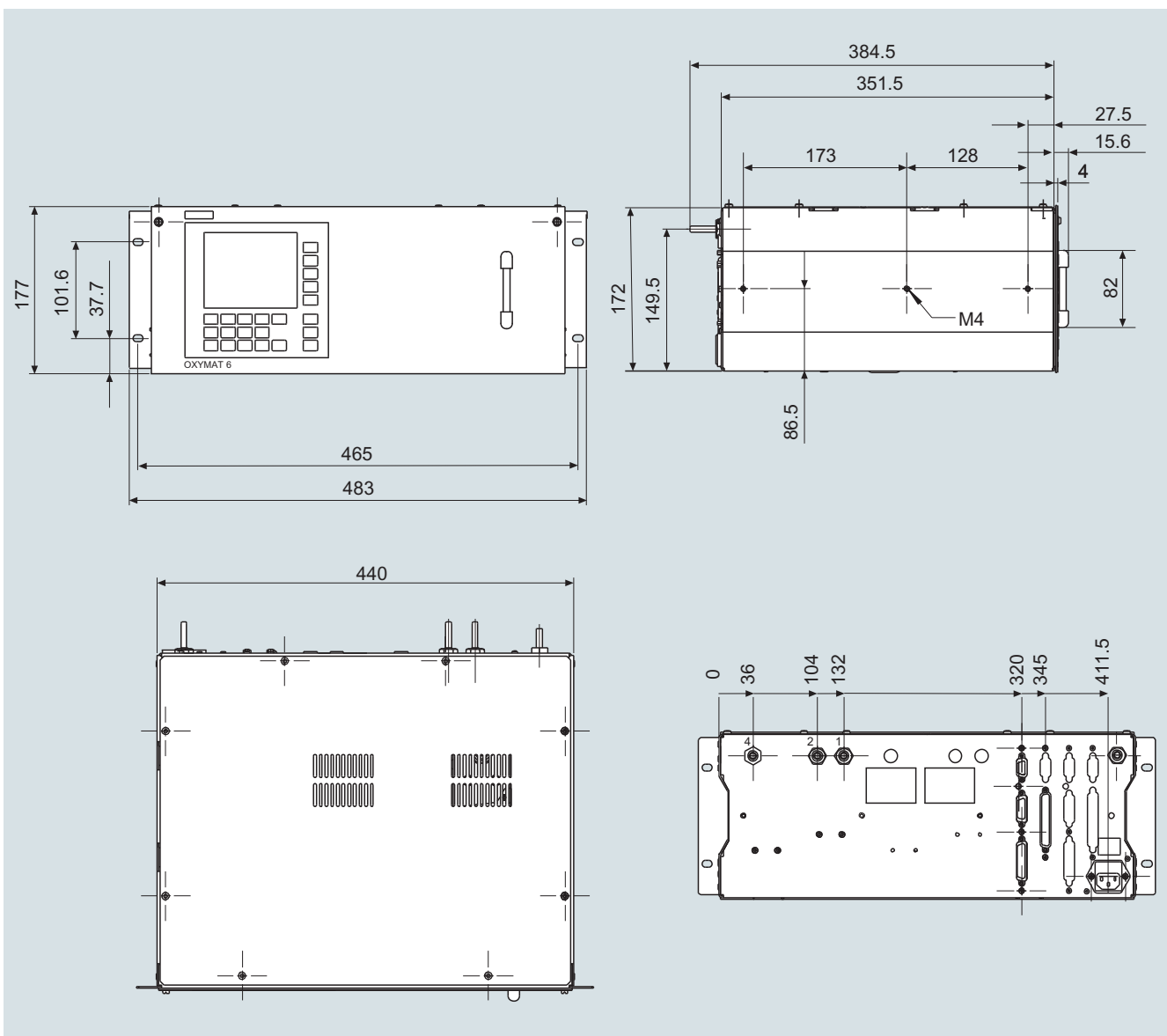
### Accessories

RS 485/Ethernet converter  
 RS 485/RS 232 converter  
 RS 485/USB converter  
 AUTOCAL function with serial interface for the automotive industry (AK)  
 AUTOCAL function with 8 digital inputs/outputs  
 AUTOCAL function with 8 digital inputs/outputs and PROFIBUS PA  
 AUTOCAL function with 8 digital inputs/outputs and PROFIBUS DP  
 Set of Torx screwdrivers

### Article No.

A5E00852383  
 C79451-Z1589-U1  
 A5E00852382  
 C79451-A3480-D512  
 C79451-A3480-D511  
 A5E00057307  
 A5E00057312  
 A5E34821625

## Dimensional drawings



OXYMAT 6, 19" unit, dimensions in mm

# Extractive continuous process gas analysis

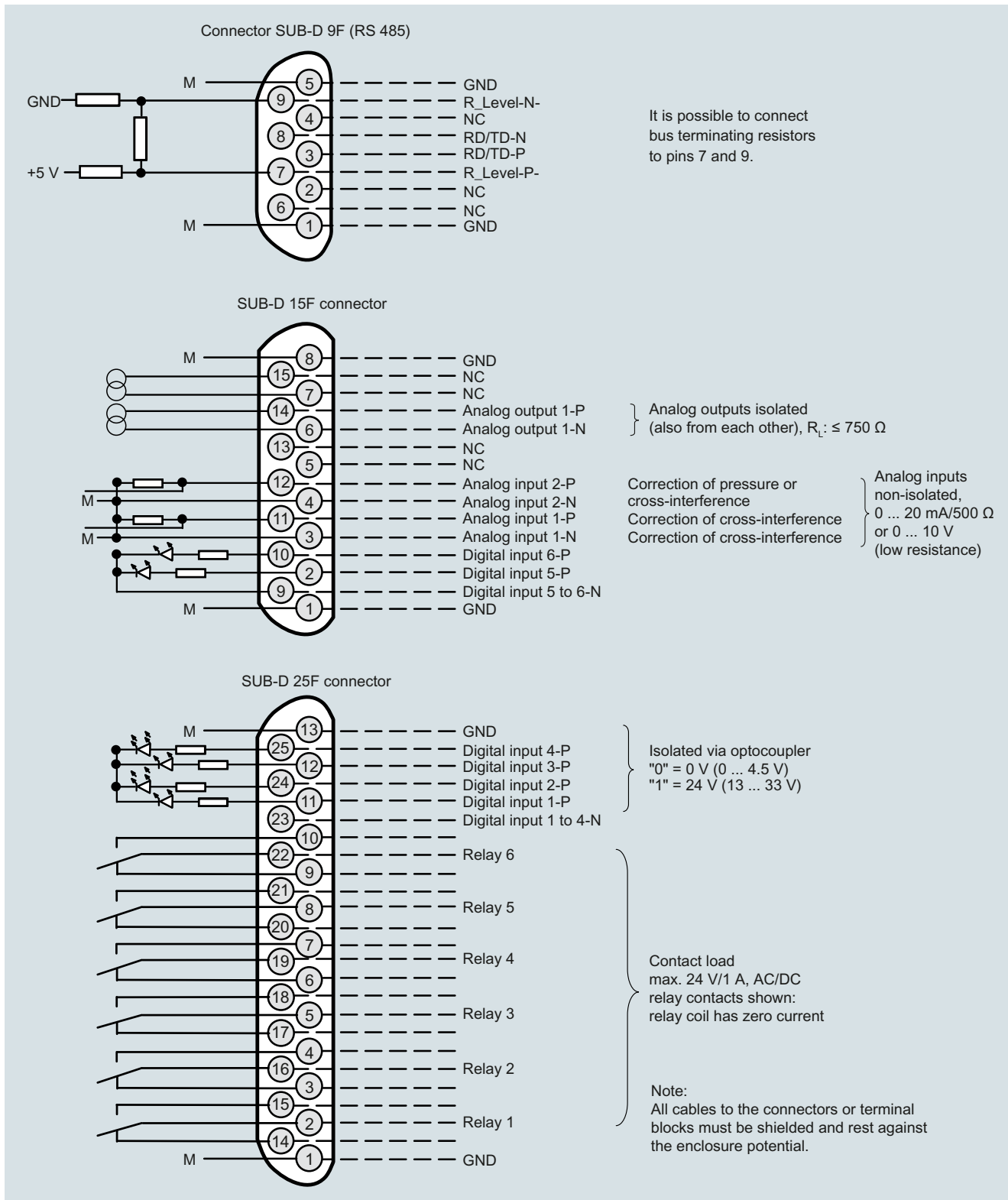
Series 6  
OXYMAT 6

19" rack unit

1

## Circuit diagrams

### Pin assignment (electrical and gas connections)



OXYMAT 6, 19" unit, pin assignment

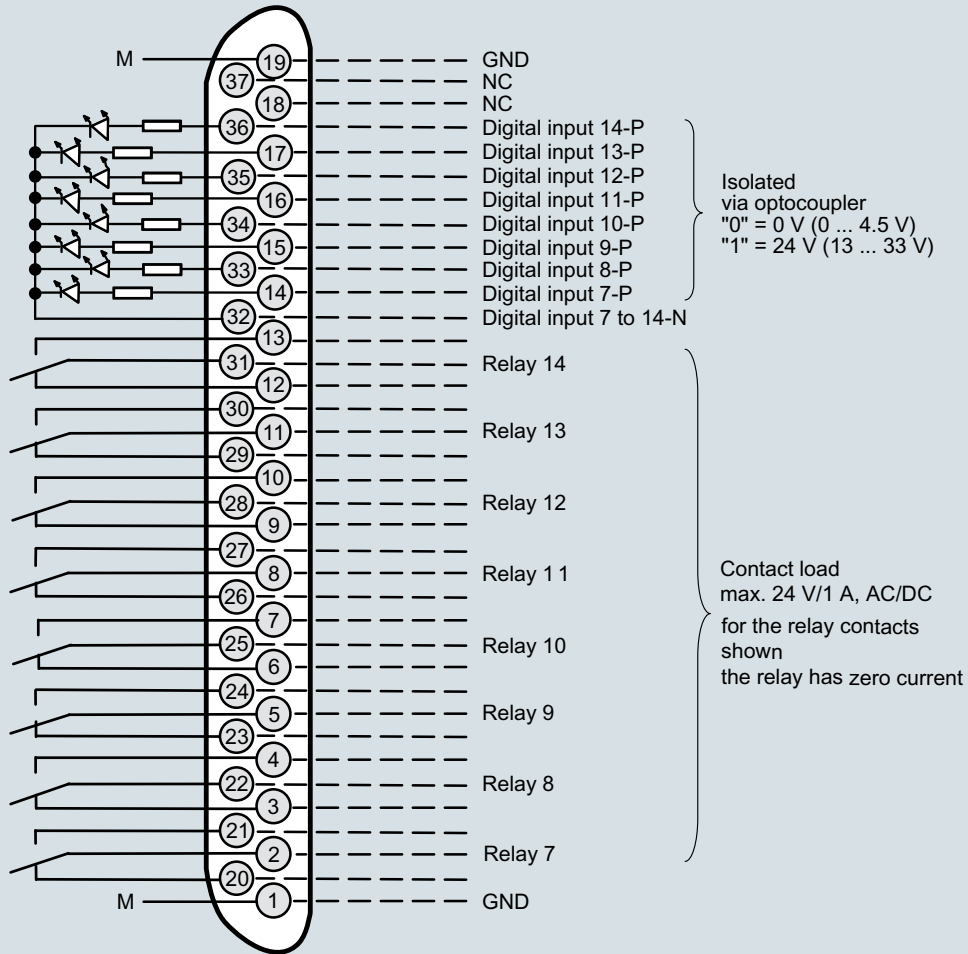
# Extractive continuous process gas analysis

Series 6  
OXYMAT 6

19" rack unit

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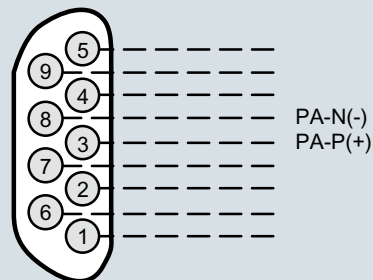
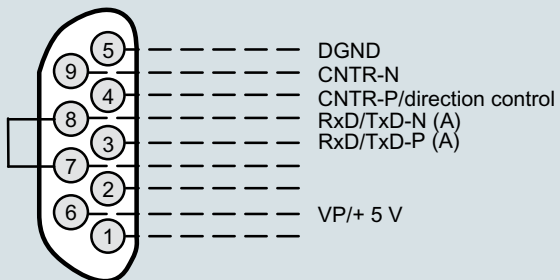
Connector SUB-D 37F (option)



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.

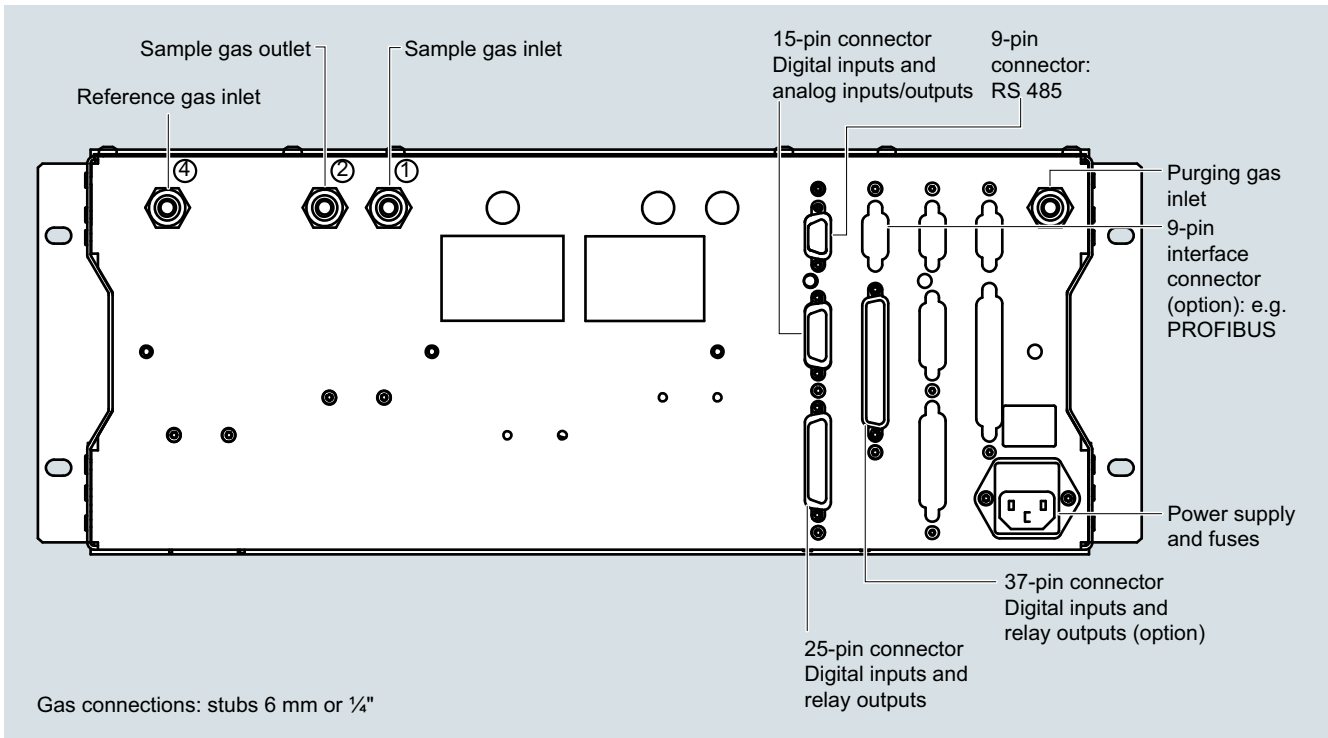
OXYMAT 6, 19" unit, pin assignment of AUTOCAL board and PROFIBUS connectors

# Extractive continuous process gas analysis

Series 6  
OXYMAT 6

19" rack unit

1



OXYMAT 6, 19" unit, gas and electrical connections

## Technical specifications

<b>General information</b>		<b>Dynamic response</b>	
Measuring ranges	4, internally and externally switchable; autoranging is also possible	Warm-up period	At room temperature < 30 min (the technical specification will be met after 2 hours)
Smallest possible span (relating to sample gas pressure 1 000 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature), smallest possible span with heated version: 0.5% (< 65 °C); 0.5 ... 1% (65 ... 90 °C); 1 ... 2% (90 ... 130 °C)	0.5 vol.%, 2 vol.% or 5 vol.% O <sub>2</sub>	Delayed display (t <sub>90</sub> -time)	< 1.5 s
Largest possible measuring span	100 vol.% O <sub>2</sub> (for a pressure above 2 000 hPa: 25 vol.% O <sub>2</sub> )	Damping (electrical time constant)	0 ... 100 s, configurable
Measuring ranges with suppressed zero point	Any zero point can be implemented within 0 ... 100 vol.%, provided that a suitable reference gas is used (see Table 1 in "Function")	Dead time (purging time of the gas path in the unit at 1 l/min)	Approx. 0.5 s
Operating position	Front wall, vertical	Time for device-internal signal processing	< 1 s
Conformity	CE mark in accordance with EN 50081-1, EN 50082-2	<b>Pressure correction range</b>	
<b>Design, enclosure</b>		Pressure sensor	
Degree of protection	IP65 in accordance with EN 60529, restricted breathing enclosure to EN 50021	• Internal	500 ... 2 000 hPa absolute
Weight	Approx. 28 kg	• External	500 ... 3 000 hPa absolute
<b>Electrical characteristics</b>		<b>Measuring response</b>	
Auxiliary power	100 ... 120 V AC (nominal range of use 90 ... 132 V), 48 ... 63 Hz or 200 ... 240 V AC (nominal range of use 180 ... 264 V), 48 ... 63 Hz	Output signal fluctuation	Based on sample gas pressure 1 013 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature
Power consumption	Approx. 35 VA, approx. 330 VA with heated version	Zero point drift	< ± 0.75% of the smallest possible measuring range according to rating plate, with electronic damping constant of 1 s (corresponds to ± 0.25% at 2 σ)
EMC (electromagnetic compatibility)	In accordance with standard requirements of NAMUR NE21 (08/98), EN 61326	Measured-value drift	< ± 0.5%/month of the smallest possible span according to rating plate
Electrical safety	In accordance with EN 61010-1	Repeatability	< 1% of the current measuring range
• Heated units	Overvoltage category II	Detection limit	1% of the current measuring range
• Unheated units	Overvoltage category III	Linearity error	< 0.1% of the current measuring range
Fuse values (unheated unit)		<b>Influencing variables</b>	
• 100 ... 120 V	F3: 1 T/250; F4: 1 T/250	Ambient temperature	Based on sample gas pressure 1 013 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature
• 200 ... 240 V	F3: 0.63 T/250; F4: 0.63 T/250	Sample gas pressure (with air (100 hPa) as reference gas, correction of the atmospheric pressure fluctuations is only possible if the sample gas can vent to ambient air)	< 0.5%/10 K relating to the smallest possible measuring range according to rating plate, with measuring span 0.5%: 1%/10 K
Fuse values (heated unit)		Accompanying gases	• With disabled pressure compensation: < 2% of the current measuring range /1% pressure change • With disabled pressure compensation: < 0.2% of the current measuring range /1% pressure change
• 100 ... 120 V	F1: 1 T/250; F2: 4 T/250	Sample gas flow at zero point	Deviation from zero point corresponding to paramagnetic or diamagnetic deviation of carrier gas
• 200 ... 240 V	F3: 4 T/250; F4: 4 T/250 F1: 0.63 T/250; F2: 2.5 T/250 F3: 2.5 T/250; F4: 2.5 T/250	Auxiliary power	< 1% of the current measuring range according to rating plate with a change in flow of 0.1 l/min within the permissible flow range; heated version up to double error
<b>Gas inlet conditions</b>			
Permissible sample gas pressure			
• With pipes	500 ... 3 000 hPa absolute		
• With pipes, Ex version			
- Leakage compensation	500 ... 1 160 hPa absolute		
- Continuous purging	500 ... 3 000 hPa absolute		
Reference gas pressure (high-pressure version)	2 000 ... 4 000 hPa above sample gas pressure, but max. 5 000 hPa		
Reference gas pressure (low-pressure version)	Min. 100 hPa above sample gas pressure		
Purging gas pressure			
• Permanent	< 165 hPa above ambient pressure		
• For short periods	Max. 250 hPa above ambient pressure		
Sample gas flow	18 ... 60 l/h (0.3 ... 1 l/min)		
Sample gas temperature	• Min. 0 to max. 50 °C, but above the dew point (unheated) • 15 °C above temperature analyzer unit (heated)		
Sample gas humidity	< 90% relative humidity		

**Extractive continuous process gas analysis**

Series 6

OXYMAT 6

**Field device**

1

**Electrical inputs and outputs**

Analog output	0/2/4 ... 20 mA, isolated; max. load 750 Ω
Relay outputs	6, with changeover contacts, freely configurable, e.g. for measuring range identification; load: 24 V AC/DC/1 A, isolated
Analog inputs	2, dimensioned for 0/2/4 ... 20 mA for external pressure sensor and residual gas influence correction (correction of cross-interference)
Digital inputs	6, designed for 24 V, isolated, freely configurable, e.g. for measuring range switchover
Serial interface	RS 485
Options	AUTOCAL function each with 8 additional digital inputs and relay outputs, also with PROFIBUS PA or PROFIBUS DP

**Climatic conditions**

Permissible ambient temperature	-30 ... +70 °C during storage and transportation, 5 ... 45 °C during operation
Permissible humidity	< 90% RH (relative humidity) as annual average (maximum accuracy achieved after 2 hours), during storage and transportation (dew point must not be undershot)



Selection and ordering data	Article No.	
<b>OXYMAT 6 gas analyzer</b> For field installation ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	↗ 7MB2011- 0 0 - - - - -	Cannot be combined
<u>Gas connections for sample gas and reference gas</u> Ferrule screw connection made of stainless steel (mat. no. 1.4571) • Pipe with 6 mm outer diameter • Pipe with ¼" outer diameter Ferrule screw connection made of titanium • Pipe with 6 mm outer diameter • Pipe with ¼" outer diameter Piping and gas connections made of Hastelloy C22: 7MB2011-0/1.... + order code D01 or D02	0 1  2 3	0 → D02 1 → D01  2 → D01, D02, Y02 3 → D01, D02, Y02
<u>Smallest possible measuring span O<sub>2</sub></u> 0.5 % reference gas pressure 3 000 hPa 0.5 % reference gas pressure 100 hPa (external pump) 2 % reference gas pressure 3 000 hPa 2 % reference gas pressure 100 hPa (external pump) 5 % reference gas pressure 3 000 hPa 5 % reference gas pressure 100 hPa (external pump)	A B C D E F	B B B B B → Y02 D D D D D → Y02 F F F F F → Y02
<u>Sample chamber</u> Non-flow-type compensation branch • Made of stainless steel, mat. no. 1.4571 • Made of tantalum Flow-type compensation branch • Made of stainless steel, mat. no. 1.4571 • Made of tantalum	A B  C D	C D
<u>Heating of internal gas paths and analyzer unit</u> None With (65 ... 130 °C)	0 1	1
<u>Power supply</u> Standard unit and acc. to ATEX II 3G version (Zone 2) • 100 ... 120 V AC, 48 ... 63 Hz • 200 ... 240 V AC, 48 ... 63 Hz ATEX II 2G versions (Zone 1), incl. certificate • 100 ... 120 V AC, 48 ... 63 Hz, according to ATEX II 2G <sup>1)</sup> (operating mode: leakage compensation) • 200 ... 240 V AC, 48 ... 63 Hz, according to ATEX II 2G <sup>1)</sup> (operating mode: leakage compensation) • 100 ... 120 V AC, 48 ... 63 Hz, according to ATEX II 2G <sup>1)</sup> (operating mode: continuous purging) • 200 ... 240 V AC, 48 ... 63 Hz, according to ATEX II 2G <sup>1)</sup> (operating mode: continuous purging)	0 1  2 3  6 7	2 2 2 → E11, E12 3 3 3 → E11, E12  6 6 6 → E11, E12 7 7 7 → E11, E12
<u>Reference gas monitoring</u> Without With	A B	B A
<u>Add-on electronics</u> Without AUTOCAL function • With 8 additional digital inputs and 8 additional relay 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	A  B E F G	E → E12 F → E12
<u>Language</u> German English French Spanish Italian	0 1 2 3 4	

<sup>1)</sup> See also next page, "Additional units for Ex versions".

# Extractive continuous process gas analysis

Series 6

OXYMAT 6

Field device

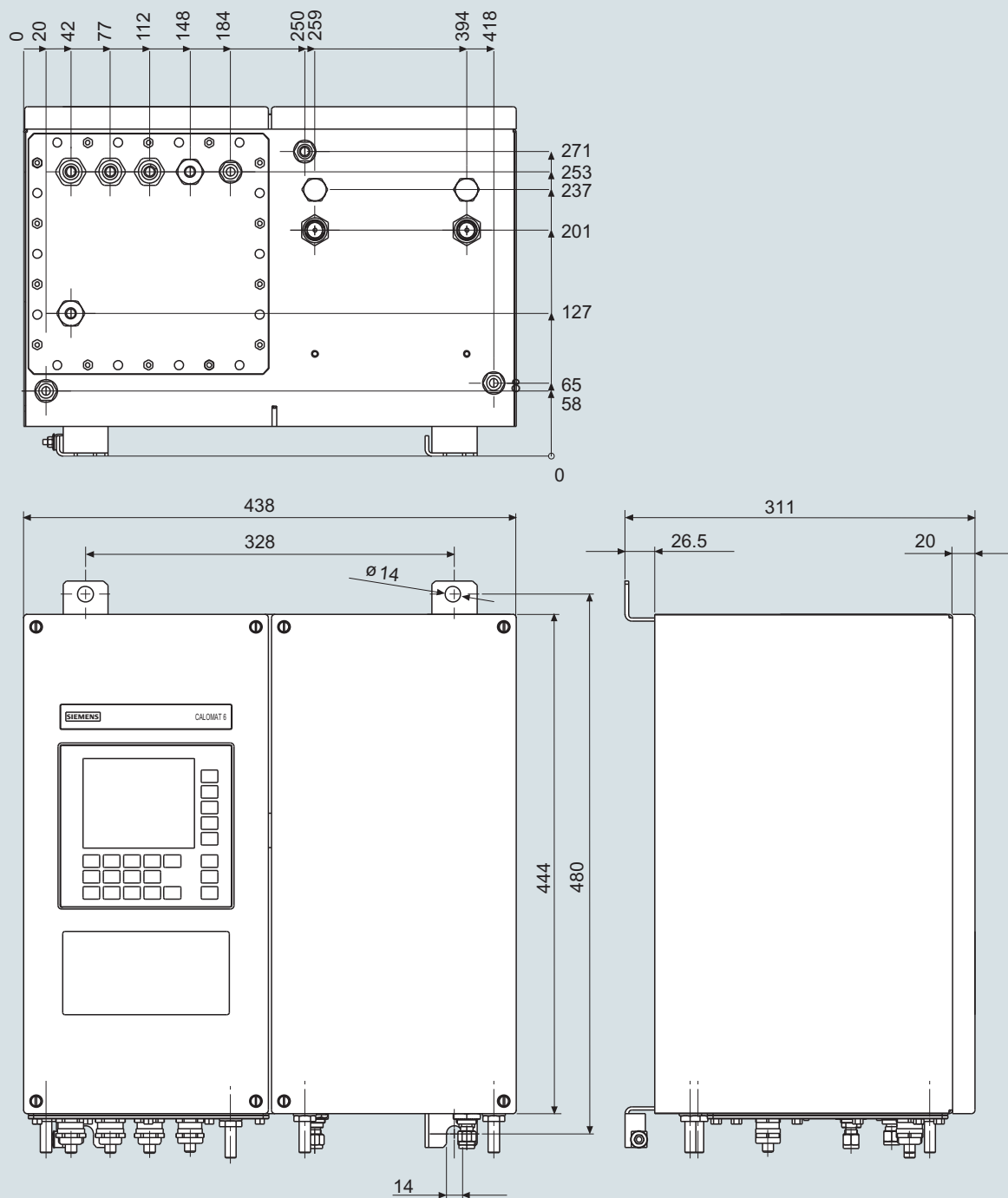
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## Selection and ordering data

<i>Additional versions</i>	<b>Order code</b>	Cannot be combined
Add "-Z" to Article No. and specify Order codes.		
Set of Torx screwdrivers	<b>A32</b>	
Kalrez gaskets in sample gas path	<b>B01</b>	
TAG labels (specific lettering based on customer information)	<b>B03</b>	
SIL conformity declaration (SIL 2) Functional Safety according to IEC 61508 and IEC 61511	<b>C20</b>	
Gas connections and piping made of Hastelloy C22		
• Outer diameter 6 mm	<b>D01</b>	→ <b>E20</b>
• Outer diameter ¼"	<b>D02</b>	→ <b>E20</b>
<u>Ex versions</u>		
Combination options see table "Ex configurations – principle selection criteria Series 6", chapter "General information"		
ATEX II 3G certificate; restricted breathing enclosure, non-flammable gases	<b>E11</b>	
ATEX II 3G certificate; flammable gases	<b>E12</b>	
FM/CSA certificate – Class I Div 2	<b>E20</b>	
ATEX II 3D certificate; potentially explosive dust atmospheres		
• In non-hazardous gas zone	<b>E40</b>	
• In Ex zone acc. to ATEX II 3G, non-flammable gases	<b>E41</b>	
• In Ex zone acc. to ATEX II 3G, flammable gases <sup>1)</sup>	<b>E42</b>	
BARTEC Ex p purging unit "Leakage compensation"	<b>E71</b>	
BARTEC Ex p purging unit "Continuous purging"	<b>E72</b>	
Clean for O <sub>2</sub> service (specially cleaned gas path)	<b>Y02</b>	
Measuring range indication in plain text, if different from the standard setting	<b>Y11</b>	
<u>Additional units for Ex versions</u>	<b>Article No.</b>	
<u>Category ATEX II 2G (zone 1)</u>		
BARTEC Ex p purging unit, 230 V, "leakage compensation"	<b>7MB8000-2BA</b>	
BARTEC Ex p purging unit, 115 V, "leakage compensation"	<b>7MB8000-2BB</b>	
BARTEC Ex p purging unit, 230 V, "continuous purging"	<b>7MB8000-2CA</b>	
BARTEC Ex p purging unit, 115 V, "continuous purging"	<b>7MB8000-2CB</b>	
Ex i isolating transformer	<b>7MB8000-3AB</b>	
Ex isolating relay, 230 V	<b>7MB8000-4AA</b>	
Ex isolating relay, 110 V	<b>7MB8000-4AB</b>	
Differential pressure switch for corrosive and non-corrosive gases	<b>7MB8000-5AA</b>	
Stainless steel flame arrester	<b>7MB8000-6BA</b>	
Hastelloy flame arrester	<b>7MB8000-6BB</b>	
<u>Category ATEX II 3G (Zone 2)</u>		
BARTEC Ex p purging unit, 230 V, "continuous purging"	<b>7MB8000-2CA</b>	
BARTEC Ex p purging unit, 115 V, "continuous purging"	<b>7MB8000-2CB</b>	
<u>FM/CSA (Class I Div. 2)</u>		
Ex purging unit MiniPurge FM	<b>7MB8000-1AA</b>	
<u>Accessories</u>		
RS 485/Ethernet converter	<b>A5E00852383</b>	
RS 485/RS 232 converter	<b>C79451-Z1589-U1</b>	
RS 485/USB converter	<b>A5E00852382</b>	
AUTOCAL function with 8 digital inputs/outputs	<b>A5E00064223</b>	
AUTOCAL function with 8 digital inputs/outputs and PROFIBUS PA	<b>A5E00057315</b>	
AUTOCAL function with 8 digital inputs/outputs and PROFIBUS DP	<b>A5E00057318</b>	
AUTOCAL function with 8 digital inputs/outputs and PROFIBUS PA Ex i (firmware 4.1.10 required)	<b>A5E00057317</b>	
Set of Torx screwdrivers	<b>A5E34821625</b>	

<sup>1)</sup> Only in connection with an approved purging unit

## Dimensional drawings



OXYMAT 6, field unit, dimensions in mm

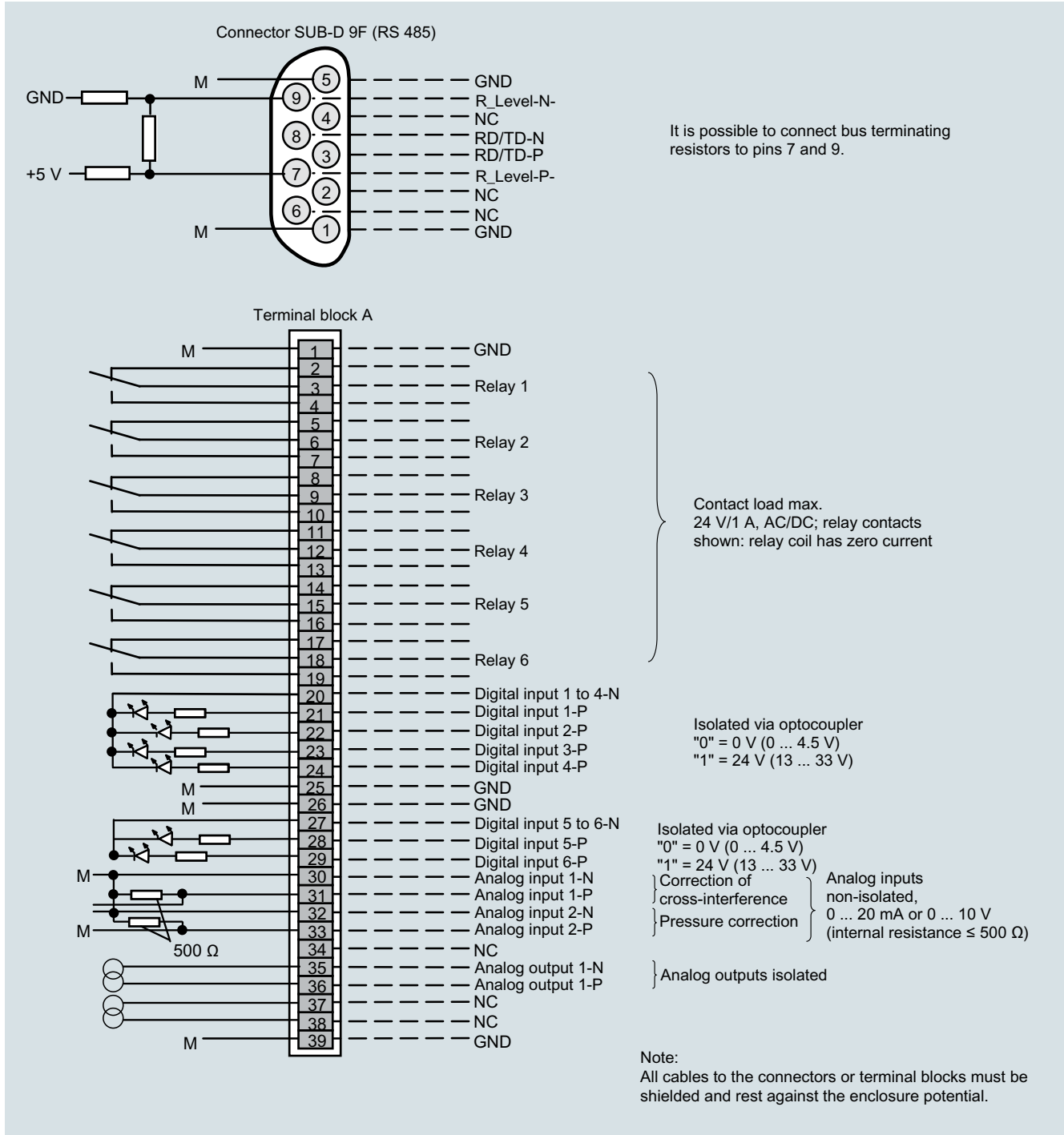
# Extractive continuous process gas analysis

Series 6  
OXYMAT 6

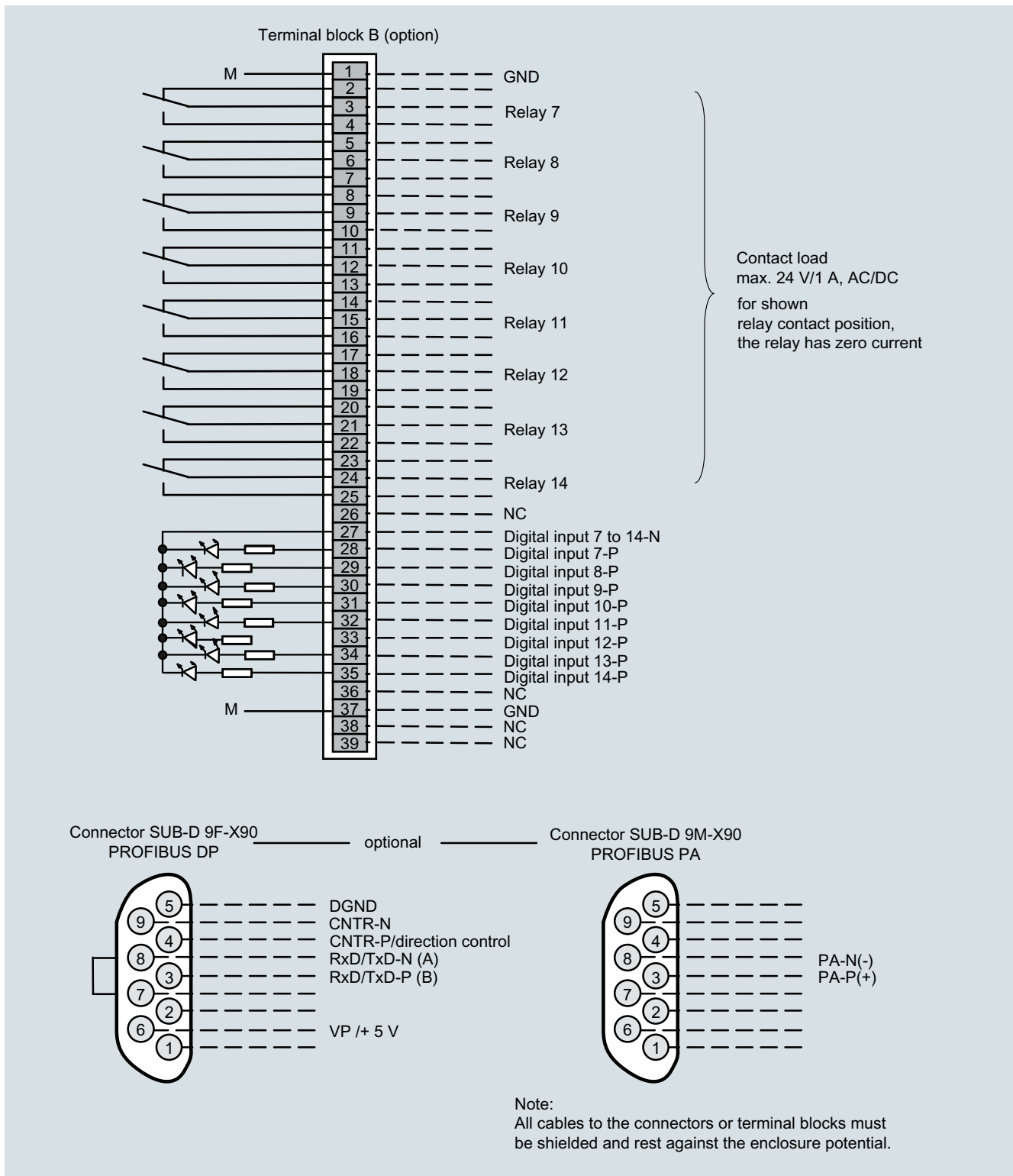
## Field device

### Circuit diagrams

#### Pin assignment (electrical and gas connections)



OXYMAT 6, field unit, connector and terminal assignment

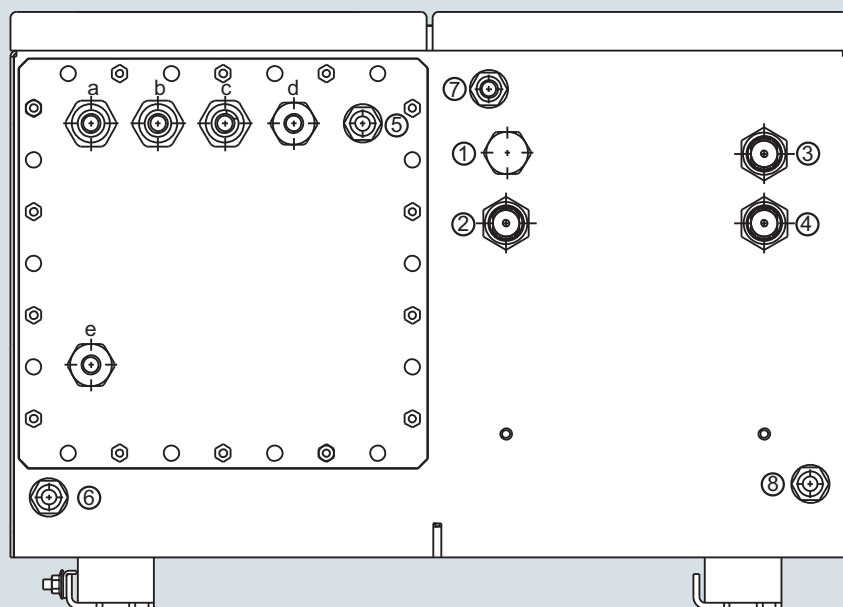


OXYMAT 6, field unit, connector and terminal assignment of the AUTOCAL board and PROFIBUS connectors

**Extractive continuous process gas analysis**

Series 6

OXYMAT 6

**Field device****Gas connections**

- |     |   |  |
|-----|---|--|
| ①   | not used  | } Clamping<br>gland for pipe<br>Ø 6 mm or 1/4" |
| ②   | Sample gas inlet                                  |  |
| ③   | Reference gas inlet                               |  |
| 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)<br>(analog + digital): cable gland M20x1.5 |
| d     | Interface connection: (Ø 7 ... 12 mm)<br>cable gland M20x1.5             |
| e     | Power supply: (Ø 7 ... 12 mm)<br>cable gland M20x1.5                     |

OXYMAT 6, field unit, gas and electrical connections

**Selection and ordering data**

Operating instructions	Article No.
<b>ULTRAMAT 6 / OXYMAT 6</b> Gas analyzer for IR-absorbing gases and oxygen	
• German	C79000-G5200-C143
• English	C79000-G5276-C143
• French	C79000-G5277-C143
• Spanish	C79000-G5278-C143
• Italian	C79000-G5272-C143

**More information**

The complete documentation is available in various languages for downloading free of charge:

<http://www.siemens.com/processanalytics/documentation>

**Extractive continuous process gas analysis**

Series 6

OXYMAT 6

**Suggestions for spare parts**

1

**Selection and ordering data**

Description	7MB2021	7MB2011	7MB2011 Ex	2 years (quantity)	5 years (quantity)	Article No.
<b>Analyzer unit</b>						
O ring (sample cell)	x	x	x	2	4	C71121-Z100-A159
O ring (fitting)	x	x	x	1	2	C74121-Z100-A6
O-ring (measuring head)	x	x	x	2	4	C79121-Z100-A32
Spacer		x	x	-	1	C79451-A3277-B22
Sample chamber, stainless steel, mat. no. 1.4571; non-flow-type compensation branch	x	x	x	-	1	C79451-A3277-B535
Sample chamber, tantalum, non-flow-type compensation branch	x	x	x	-	1	C79451-A3277-B536
Sample chamber, stainless steel, mat. no. 1.4571; flow-type compensation branch	x	x	x	-	1	C79451-A3277-B537
Sample chamber, tantalum, flow-type compensation branch	x	x	x	-	1	C79451-A3277-B538
Measuring head, non-flow-type compensation branch	x	x	x	1	1	C79451-A3460-B525
Measuring head, flow-type compensation branch	x	x	x	1	1	C79451-A3460-B526
Magnetic field connection plate	x	x	x	-	1	C79451-A3474-B606
Temperature sensor		x	x	-	1	C79451-A3480-B25
Heating cartridge		x	x	-	1	W75083-A1004-F120
<b>Sample gas path</b>						
Pressure switch (sample gas)	x			1	2	C79302-Z1210-A2
Flowmeter	x			1	2	C79402-Z560-T1
Restrictor, stainless steel, mat. no. 1.4571; hose gas path	x			2	2	C79451-A3480-C10
Restrictor, titanium, pipe gas path	x	x	x	2	2	C79451-A3480-C37
Reference gas path, 3000 hPa	x	x	x	1	1	C79451-A3480-D518
Capillary, 100 hPa, connection set	x	x	x	1	1	C79451-A3480-D519
Restrictor, stainless steel, mat. no. 1.4571; pipe gas path	x	x	x	1	1	C79451-A3520-C5
<b>Electronics</b>						
Temperature controller - electronics, 230 V AC		x	x	-	1	A5E00118527
Temperature controller - electronics, 115 V AC		x	x	-	1	A5E00118530
Fusible element (analyzer fuse) T 0.125 A/250 V			x	1	2	A5E00061505
Front plate with keyboard	x			1	1	C79165-A3042-B505
Motherboard, with firmware: see spare parts list	x	x	x	-	1	
Adapter plate, LCD/keyboard	x	x		1	1	C79451-A3474-B605
LC display	x	x		1	1	A5E31474846
Connector filter	x	x	x	-	1	W75041-E5602-K2
Temperature fuse (heated version only)		x		-	1	W75054-T1001-A150
Fusible element, T 0.63 A/250 V	x	x	x	2	3	W79054-L1010-T630
Fusible element, T 1 A/250 V	x	x	x	2	3	W79054-L1011-T100
Fusible element, T 2.5 A/250 V		x	x	2	3	W79054-L1011-T250

If the OXYMAT 6 was supplied with a specially cleaned gas path for high oxygen context ("Clean for O<sub>2</sub> 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.