General information

Overview

The ULTRAMAT 6 single-channel or dual-channel gas analyzers operate according to the NDIR two-beam alternating light principle and measure gases highly selectively whose absorption bands lie in the infrared wavelength range from 2 to 9 µm, such as CO, CO_2, NO, SO_2, NH_3, H_2O as well as CH_4 and other hydrocarbons.

Single-channel analyzers can simultaneously measure up to 2 gas components, while dual-channel analyzers can simultaneously measure 3 (or 4 on request) gas components.

Benefits

- High selectivity with double-layer detector and optical coupler
  - Reliable measurements even in complex gas mixtures
- Low detection limits
  - Measurements with low concentrations
- Corrosion-resistant materials in gas path (option)
  - Measurement possible in highly corrosive sample gases
- Analyzer cells can be cleaned as required on site
  - Cost savings due to reuse after contamination
- Electronics and physics: gas-tight isolation, purging is possible, IP65
  - Long service life even in harsh environments
- Heated versions (option)
  - Use also in presence of gases condensing at low temperature
- Ex(p) for zones 1 and 2 (according to ATEX 2G and ATEX 3G)

Application

Areas of application

- Measurement for boiler control in incineration plants
- Emission measurements in incineration plants
- Measurement in the automotive industry (test benches)
- Warning equipment
- Process gas concentrations in chemical plants
- Trace measurements in pure gas processes
- Environmental protection
- TLV (Threshold Limit Value) monitoring at the workplace
- Quality monitoring
- Ex 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 material in the gas path, material in the sample cells (e.g. Titan, Hastelloy C22) and measured components are also available on request

TÜV version/QAL

TÜV-approved versions are available for measurement of CO, NO and SO_2 according to 13th and 17th BImSchV and TA Luft. Smallest TÜV-approved and permitted measuring ranges:

- 1-component analyzer
  CO: 0 to 50 mg/m^3
  NO: 0 to 100 mg/m^3
  SO_2: 0 to 75 mg/m^3
- 2-component analyzer (series connection)
  CO: 0 to 75 mg/m^3
  NO: 0 to 200 mg/m^3.
  Furthermore, the TÜV-approved versions of the ULTRAMAT 6 comply with the requirements of EN 14956 and QAL 1 in accordance with EN 14181. Conformity of the analyzers with both standards is TÜV-certified.
  The analyzer drift can be determined in accordance with EN 14181 (QAL 3) either manually or with a PC using the SIPROM GA maintenance and servicing software. In addition, selected manufacturers of emission evaluation computers offer the possibility for downloading the drift data via the analyzer's serial interface and to automatically record and process it in the evaluation computer.

Flow-type reference compartment

- The flow through the reference compartment should be adapted to the sample gas flow
- The gas supply of the reduced flow-type reference compartment should have an upstream pressure of 3 000 to 5 000 hPa (abs.). Then a restrictor will automatically adjust the flow to approximately 8 ml/min

Design

19" rack unit

- 19" rack unit with 4 HU for installation
  - in hinged frame
  - in cabinets with or without telescopic rails
- Front plate for service purposes can be pivoted down (laptop connection)
- Internal gas paths: hose made of FKM (Viton) or pipe made of titanium or stainless steel
- Gas connections for sample gas inlet and outlet: pipe diameter 6 mm or 1/4"
- 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 from gas path
- Individually purgeable enclosure halves
- Parts in contact with sample gas can be heated up to 65 °C (option)
- Gas path: hose made of FKM (Viton) or pipe made of titanium or stainless steel (further materials possible as special applications)
- Gas connections for sample gas inlet and outlet: pipe union for pipe diameter 6 mm or 1/4"
- Purging gas connections: pipe diameter 10 mm or 3/8"

Display and control panel

- Large LCD field for simultaneous display of:
  - Measured value (digital and analog displays)
  - Status bar
  - Measuring ranges
- Contrast of the LCD field adjustable via the menu
- Washable membrane keyboard with five softkeys
- Menu-driven operator control for parameterization, test functions, adjustment
- Operator support 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

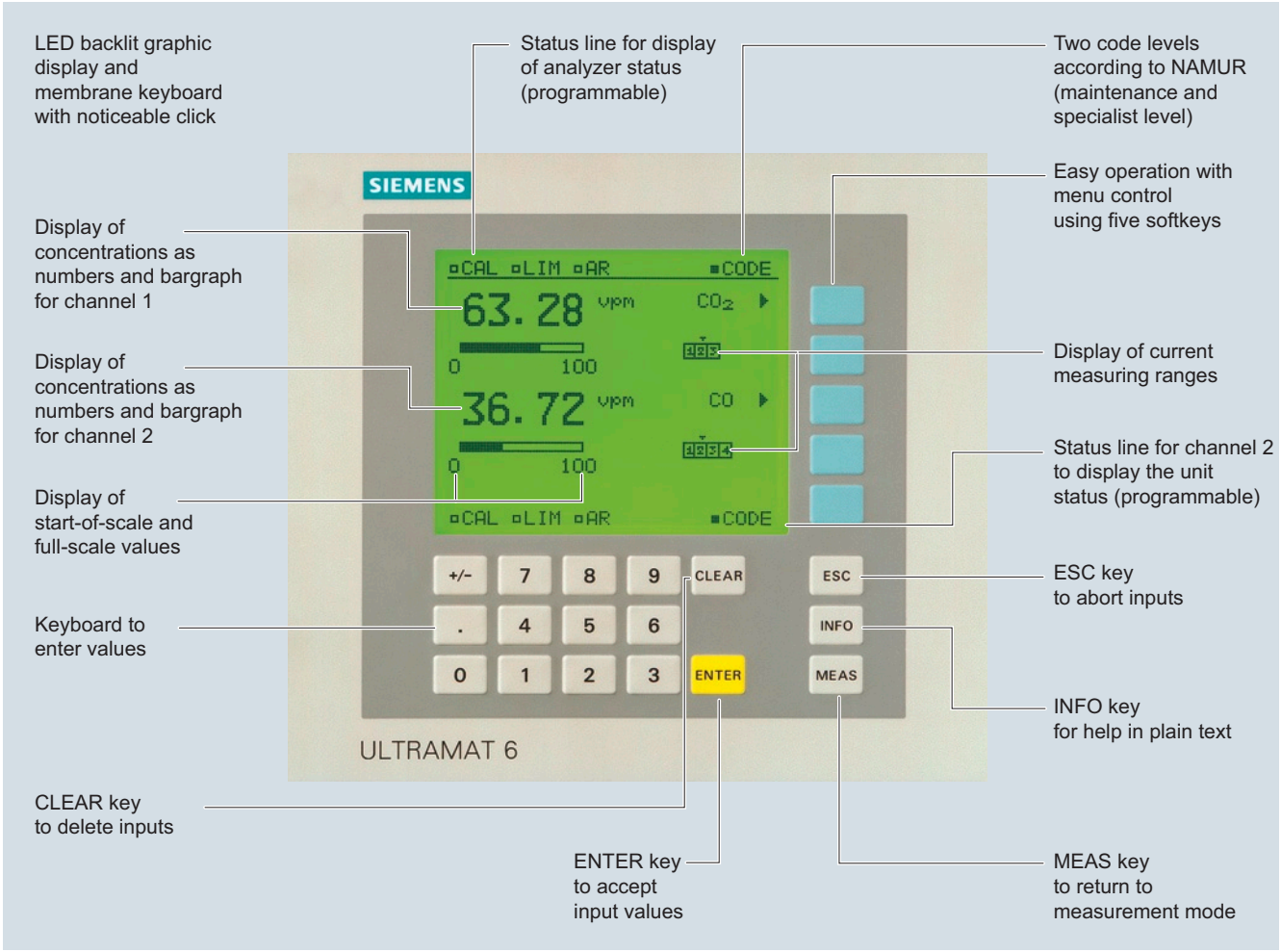
- One analog output per medium (from 0, 2, 4 to 20 mA; NAMUR parameterizable)
- Two analog inputs freely configurable (e.g. correction of cross-interferences or external pressure sensor)
- Six binary inputs freely configurable (e.g. measurement range changeover, processing of external signals from the sample preparation)
- Six relay outputs freely configurable e.g. for fault, maintenance request, limit alarm, external solenoid valves)
- Expansion by eight additional binary inputs and eight additional relay outputs e.g. for autocalibration with up to four test gases

Communication

RS 485 present in the basic unit (connection at the rear; for the rack unit 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



ULTRAMAT 6, membrane keyboard and graphic display

General information

Designs – Parts wetted by sample gas, standard

Gas path		19" rack unit	Field device	Field device Ex
With hoses	Bushing	Stainless steel, mat. no. 1.4571		-
	Hose	FKM (e.g. Viton)		
	Sample chamber:			
	• Body	Aluminum		
	• Lining	Aluminum		
	• Fitting	Stainless steel, mat. no. 1.4571, O-ring: FKM (e.g. Viton) or FFKM (Kalrez)		
	• Window	CaF_2, adhesive: E353, O-ring: FKM (e.g. Viton) or FFKM (Kalrez)		
With pipes	Bushing	Titanium		
	Pipe	Titanium, O-ring: FKM (e.g. Viton) or FFKM (Kalrez)		
	Sample chamber:			
	• Body	Aluminum		
	• Lining	Tantalum (only for cell length 20 mm to 180 mm)		
	• Window	CaF_2, adhesive: E353, O-ring: FKM (e.g. Viton) or FFKM (Kalrez)		
With pipes	Bushing	Stainless steel, mat. no. 1.4571		
	Pipe	Stainless steel, mat. no. 1.4571, O-ring: FKM (e.g. Viton) or FFKM (Kalrez)		
	Sample chamber:			
	• Body	Aluminum		
	• Lining	Aluminum or tantalum (tantalum only for cell length 20 mm to 180 mm)		
	• Window	CaF_2, adhesive: E353, O-ring: FKM (e.g. Viton) or FFKM (Kalrez)		

Options

Gas path		19" rack unit	Field device	Field device Ex
Flow indicator	Measurement pipe	Duran glass	-	-
	Variable area	Duran glass		
	Suspension boundary	PTFE (Teflon)		
	Angle pieces	FKM (e.g. Viton)		
Pressure switch	Membrane	FKM (e.g. Viton)	-	-
	Enclosure	PA 6.3T		

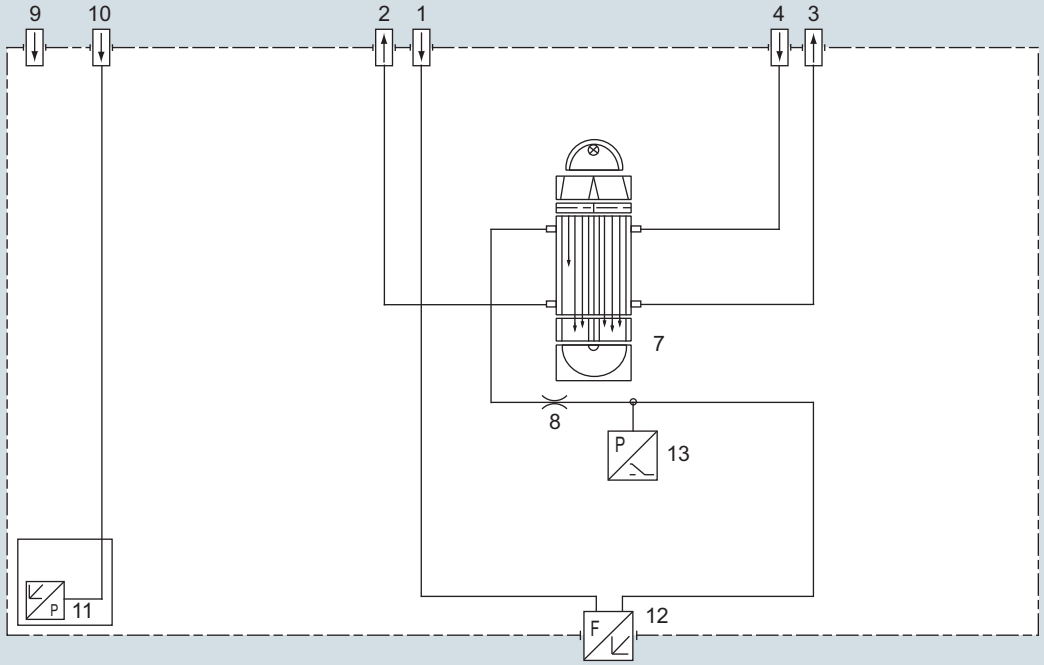
Versions – Parts wetted by sample gas, special applications (examples)

Gas path		19" rack unit	Field device	Field device Ex
With pipes	Bushing	e.g. Hastelloy C22		
	Pipe	e.g. Hastelloy C22, O-ring: FKM (e.g. Viton) or FFKM (Kalrez)		
	Sample chamber:			
	• Body	e.g. Hastelloy C22		
	• Window	CaF_2, without adhesive O-ring: FKM (e.g. Viton) or FFKM (Kalrez)		

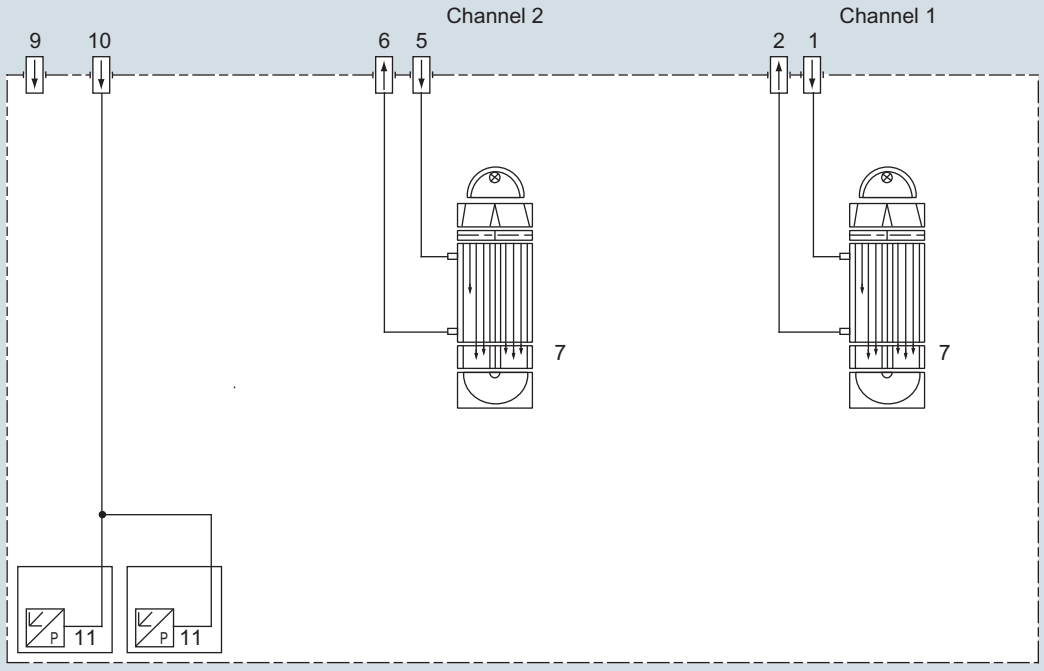
Gas path (19" rack unit)

Legend for the gas path figures

1	Sample gas inlet channel 1	8	Restrictor
2	Sample gas outlet channel 1	9	Purge gas inlet
3	Reference gas outlet (option)	10	Connection of atmospheric pressure sensor
4	Reference gas inlet (option)	11	Atmospheric pressure sensor
5	Sample gas inlet channel 2	12	Flow indicator in sample gas path (option)
6	Sample gas outlet channel 2	13	Pressure switch in sample gas path (option)
7	IR physical system		



Gas path ULTRAMAT 6, single-channel unit, 19" unit, with flow-type reference cell (option)



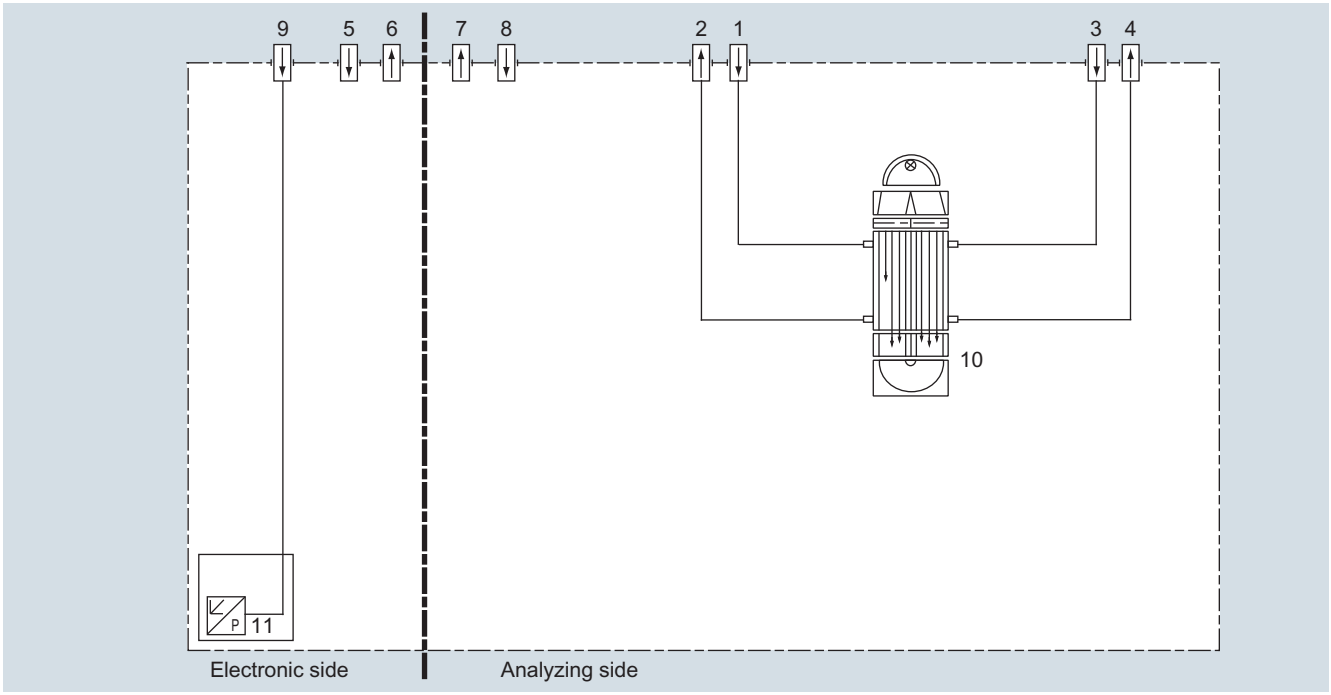
Gas path ULTRAMAT 6, dual-channel unit, 19" unit

General information

Gas path (field device)

Legend for the gas path figures

1	Sample gas inlet	7	Purging gas outlet (analyzer side)
2	Sample gas outlet	8	Purging gas inlet (analyzer side)
3	Reference gas inlet (option)	9	Connection of atmospheric pressure sensor
4	Reference gas outlet (option)	10	IR physical system
5	Purging gas inlet (electronics side)	11	Atmospheric pressure sensor
6	Purging gas outlet (electronics side)		



Gas path ULTRAMAT 6, field unit, with flow-type reference cell (option)

Function

Principle of operation

The ULTRAMAT 6 gas analyzer operates according to the infrared two-beam alternating light principle with double-layer detector and optical coupler.

The measuring principle is based on the molecule-specific absorption of bands of infrared radiation. The absorbed wavelengths are characteristic to the individual gases, but may partially overlap. This results in cross-sensitivities which are reduced to a minimum in the ULTRAMAT 6 gas analyzers by the following measures:

- Gas-filled filter cell (beam divider)
- Double-layer detector with optical coupler
- Optical filters if necessary

The figure shows the measuring principle. An IR source (1) which is heated to approx. 700 °C and which can be shifted to balance the system is divided by the beam divider (3) into two equal beams (sample and reference beams). The beam divider also acts as a filter cell.

The reference beam passes through a reference cell (8) filled with N_2 (a non-infrared-active gas) and reaches the right-hand side of the detector (11) practically unattenuated. The sample beam passes through the sample chamber (7) through which the sample gas flows and reaches the left-hand side of the detector (10) attenuated to a lesser or greater extent depending on the concentration of the sample gas. The detector is filled with a defined concentration of the gas component to be measured.

The detector is designed as a double-layer detector. The center of the absorption band is preferentially absorbed in the upper detector layer, the edges of the band are absorbed to approximately the same extent in the upper and lower layers. The upper and lower detector layers are connected together via the microflow sensor (12). This coupling means that the spectral sensitivity has a very narrow band.

The optical coupler (13) lengthens the lower receiver cell layer optically. The infrared absorption in the second detector layer is varied by changing the slider position (14). It is thus possible to individually minimize the influence of interfering components.

A chopper (5) rotates between the beam divider and the sample chamber and interrupts the two beams alternately and periodically. If absorption takes place in the sample chamber, a pulsating flow is generated between the two detector levels which is converted by the microflow sensor (12) into an electric signal.

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 together with the dense arrangement of the Ni grids causes a change in resistance. This leads to an offset in the bridge, which is dependent on the concentration of the sample gas.

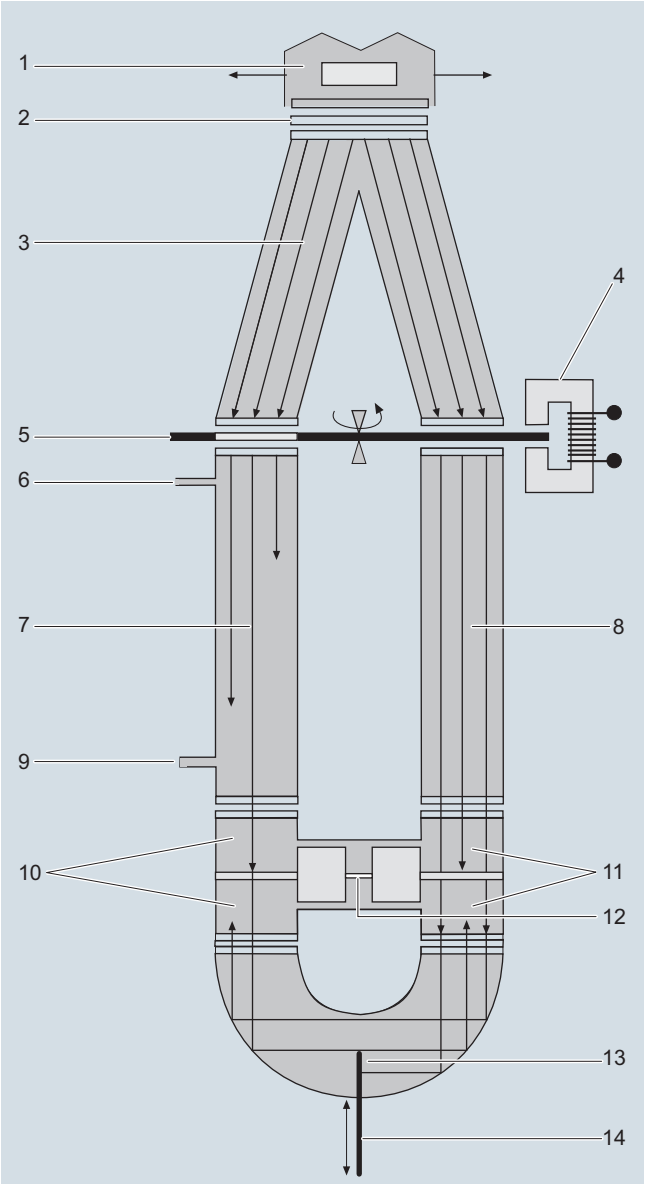
Notes

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

As far as possible, the ambient air of the analyzer should not have a large concentration of the gas components to be measured.

Flow-type reference sides with reduced flow must not be operated with flammable or toxic gases.

Flow-type reference sides with reduced flow and an O_2 content > 70 % may only be used together with Y02 (Clean for O_2).



1	IR source, adjustable	8	Reference cell
2	Optical filter	9	Sample gas outlet
3	Beam divider	10	Detector, meas. side
4	Eddy current drive	11	Detector, reference side
5	Chopper	12	Microflow sensor
6	Sample gas inlet	13	Optical coupler
7	Sample cell	14	Slider, adjustable

ULTRAMAT 6, principle of operation

Channels with electronically suppressed zero point only differ from the standard version in the measuring range parameterization.

Physically suppressed zeros can be provided as a special application.

General information

Essential characteristics

- Dimension of measured value freely selectable (e.g. vpm, mg/m^3)
- Four freely-parameterizable measuring ranges per component
- Measuring ranges with suppressed zero point possible
- Measuring range identification
- Galvanically isolated signal output 0/2/4 to 20 mA per component
- Automatic or manual measuring range switchover selectable; remote switching is also possible
- Differential measuring ranges with flow-type reference cell
- Storage of measured values possible during adjustments
- Time constants selectable within wide limits (static/dynamic noise suppression); i.e. the response time of the analyzer or component 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
- Monitoring of sample gas flow (option)
- Internal pressure sensor for correction of variations in atmospheric pressure in the range 700 to 1 200 hPa absolute
- External pressure sensor can be connected for correction of variations in the process gas pressure in the range 700 to 1 500 hPa absolute (option)
- Two control levels with separate authorization codes to prevent unintentional and unauthorized inputs
- Automatic, parameterizable measuring range calibration
- Simple handling using a numerical membrane keyboard and operator prompting
- Operation based on NAMUR recommendation
- Customer-specific analyzer options such as:
  - Customer acceptance
  - TAG labels
  - Drift recording
- Easy device replacement since electric connections can be simply disconnected from the device
- Sample chambers for use in presence of highly corrosive sample gases (e.g. tantalum layer or Hastelloy C22)

Additional features, dual-channel version

- Separate design of physical unit, electronics, inputs/outputs and power supply for each channel
- Display and operation via common LCD panel and keyboard
- Measurement channels 1 and 2 can be converted to series connection (linking of gas connections from channel 1 to channel 2 on rear)

Technical specifications

General information	
Measuring ranges	4, internally and externally switchable; autoranging is also possible
Smallest possible measuring range	Dependent on the application: e.g. CO: 0 … 10 vpm, CO_2: 0 … 5 vpm
Largest possible measuring span	Dependent on the application
Measuring range with suppressed zero point	Any zero point within 0 … 100 vol.% can be implemented; smallest possible span 20 %
Operating position	Front wall, vertical
Conformity	CE mark in accordance with EN 50081-1, EN 50082-2
Influence of interfering gases must be considered separately	
Design, enclosure	
Weight	Approx. 15 kg (with one IR channel) Approx. 21 kg (with two IR channels)
Degree of protection	IP20 according to EN 60529
Electrical characteristics	
EMC (**E**lectro**m**agnetic **C**ompatibility)	In accordance with standard requirements of NAMUR NE21 (08/98)
Electrical safety	According to EN 61010-1, overvoltage category III
Power supply	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
Power consumption	1-channel unit: Approx. 40 VA 2-channel unit: Approx. 70 VA
Fuse values	
• 100 ... 120 V	1 T/250 (7MB2121) 1.6 T/250 (7MB2123)
• 200 ... 240 V	0.63 T/250 (7MB2121) 1 T/250 (7MB2123)
Gas inlet conditions	
Permissible sample gas pressure	
• With hoses	
- Without pressure switch	600 … 1 500 hPa (absolute)
- With pressure switch	700 … 1 300 hPa (absolute)
• With pipes (without pressure switch)	600 … 1 500 hPa (absolute)
Sample gas flow	18 … 90 l/h (0.3 … 1.5 l/min)
Sample gas temperature	Min. 0 ... max. 50 °C, but above the dew point
Sample gas humidity	< 90 % RH (relative humidity), or dependent on measuring task, non-condensing
Dynamic response	
Warm-up period	At room temperature < 30 min (the technical specification will be met after 2 hours)
Delayed display (T_{90}-time)	Dependent on length of analyzer chamber, sample gas line and parameterizable damping
Damping (electrical time constant)	0 … 100 s, parameterizable
Dead time (purging time of the gas path in the unit at 1 l/min)	Approximately 0.5 ... 5 s, depending on version
Time for device-internal signal processing	< 1 s

Pressure correction range	
Pressure sensor	
• Internal	700 … 1 200 hPa absolute
• External	700 … 1 500 hPa absolute
Measuring response (relating to sample gas pressure 1 013 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature)	
Output signal fluctuation	< ± 1 % of the smallest possible measuring range according to rating plate
Zero point drift	< ± 1 % of the current measuring range/week
Measured-value drift	< ± 1 % of the current measuring range/week
Repeatability	≤ 1 % of the current measuring range
Detection limit	1 % of the smallest possible measuring range
Linearity error	< 0.5 % of the full-scale value
Influencing variables (relating to sample gas pressure 1 013 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature)	
Ambient temperature	< 1 % of current measuring range/10 K (with constant receiver cell temperature)
Sample gas pressure	• When pressure compensation has been switched on: < 0.15 % of the span/1 % change in atmospheric pressure • When pressure compensation has been switched off: < 1.5 % of the span/1 % change in atmospheric pressure
Sample gas flow	Negligible
Power supply	< 0.1 % of the current measuring range with rated voltage ± 10 %
Environmental conditions	Application-specific measuring influences possible if ambient air contains measured components or cross interference-sensitive gases
Electrical inputs and outputs	
Analog output	0/2/4 ... 20 mA, isolated; load ≤ 750 Ω
Relay outputs	6, with changeover contacts, freely parameterizable, e.g. for measuring range identification; load: 24 V AC/DC/1 A, isolated, non-sparking
Analog inputs	2, dimensioned for 0/2/4 ... 20 mA for external pressure sensor and accompanying gas influence correction (correction of cross-interference)
Binary inputs	6, designed for 24 V, isolated, freely parameterizable, e.g. for measuring range switchover
Serial interface	RS 485
Options	AUTOCAL function with 8 additional binary 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, during storage and transportation (dew point must not be undershot)

Selection and ordering data

Selection and ordering data			Article No.	Cannot be combined
ULTRAMAT 6 gas analyzer Single-channel 19" rack unit for installation in cabinets			↗ **7MB2121- ■■■■■ - ■AA■**	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				
Gas connections for sample gas and reference gas				
Pipe with 6 mm outer diameter			**0**	**0** → **A21**
Pipe with ¼" outer diameter			**1**	**1** → **A20**
Measured component		Possible with measuring range identification		
CO		11 ... 30	**A**	
CO highly selective (with optical filter)		12 ... 30	**B**	
CO (TÜV; see table "TÜV single component", page 1/88)			**X**	
CO_2		10 ... 30	**C**	
CH_4		13 ... 30	**D**	
C_2H_2		15 ... 30	**E**	
C_2H_4		15 ... 30	**F**	
C_2H_6		14 ... 30	**G**	
C_3H_6		14 ... 30	**H**	
C_3H_8		13 ... 30	**J**	
C_4H_6		15 ... 30	**K**	
C_4H_{10}		14 ... 30	**L**	
C_6H_{14}		14 ... 30	**M**	
SO_2 (TÜV; see table "TÜV single component", page 1/88)		13 ... 30	**N**	
NO (TÜV; see table "TÜV single component", page 1/88)		14 ... 20, 22	**P**	
NH_3 (dry)		14 ... 30	**Q**	**Q**
H_2O		17 ... 20, 22	**R**	**R**
N_2O		13 ... 30	**S**	
Smallest measuring range	Largest measuring range	Measuring range identification		
0 ... 5 vpm	0 ... 100 vpm	10	**A**	
0 ... 10 vpm	0 ... 200 vpm	11	**B**	
0 ... 20 vpm	0 ... 400 vpm	12	**C**	
0 ... 50 vpm	0 ... 1 000 vpm	13	**D**	
0 ... 100 vpm	0 ... 1 000 vpm	14	**E**	
0 ... 300 vpm	0 ... 3 000 vpm	15	**F**	
0 ... 500 vpm	0 ... 5 000 vpm	16	**G**	
0 ... 1 000 vpm	0 ... 10 000 vpm	17	**H**	
0 ... 3 000 vpm	0 ... 10 000 vpm	18	**J**	
0 ... 3 000 vpm	0 ... 30 000 vpm	19	**K**	
0 ... 5 000 vpm	0 ... 15 000 vpm	20	**L**	
0 ... 5 000 vpm	0 ... 50 000 vpm	21	**M**	
0 ... 1 %	0 ... 3 %	22	**N**	
0 ... 1 %	0 ... 10 %	23	**P**	
0 ... 3 %	0 ... 10 %	24	**Q**	
0 ... 3 %	0 ... 30 %	25	**R**	
0 ... 5 %	0 ... 15 %	26	**S**	
0 ... 5 %	0 ... 50 %	27	**T**	
0 ... 10 %	0 ... 30 %	28	**U**	
0 ... 10 %	0 ... 100 %	29	**V**	
0 ... 30 %	0 ... 100 %	30	**W**	
Internal gas paths	Sample chamber[1] (lining)	Reference chamber (flow-type)		
Hose made of FKM (Viton)	Aluminum	Non-flow-type	**0**	**0** **0** → **A20, A21**
	Aluminum	Flow-type	**1**	**1**
Pipe made of titanium	Tantalum	Non-flow-type	**4**	**4** → **A20, A21, Y02**
	Tantalum	Flow-type	**5**	**5** → **Y02**
Stainless steel pipe (mat. no. 1.4571)	Aluminum	Non-flow-type	**6**	**6** → **A20, A21**
	Tantalum	Non-flow-type	**8**	**8** → **A20, A21**
With sample gas monitoring				
Hose made of FKM (Viton)	Aluminum	Non-flow-type	**2**	**2** **2** → **A20, A21**
	Aluminum	Flow-type	**3**	**3**

Footnotes: see next page

Selection and ordering data	Article No.	
ULTRAMAT 6 gas analyzer Single-channel 19" rack unit for installation in cabinets	**7MB2121-** ■■■■■- ■AA■	Cannot be combined
Add-on electronics		
Without	0	
AUTOCAL function		
• With 8 additional digital inputs/outputs	1	
• With serial interface for the automotive industry (AK)	3	3 → E20
• With 8 digital inputs/outputs, PROFIBUS PA interface	6	
• With 8 digital inputs/outputs, PROFIBUS DP interface	7	
Power supply		
100 ... 120 V AC, 48 ... 63 Hz	0	
200 ... 240 V AC, 48 ... 63 Hz	1	
Operating software and documentation		
German	0	
English	1	
French	2	
Spanish	3	
Italian	4	

Additional versions	Order code
Add "-Z" to Article No. and specify Order code	
Flow-type reference cell with reduced flow, 6 mm	**A20**
Flow-type reference cell with reduced flow, ¼"	**A21**
Telescopic rails (2 units)	**A31**
TAG labels (specific lettering based on customer information)	**B03**
Kalrez gaskets in sample gas path	**B04**
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_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**
TÜV version acc. to 13th and 17th BImSchV	**Y17**

Accessories	Article No.
RS 485/Ethernet converter	**A5E00852383**
RS 485/RS 232 converter	**C79451-Z1589-U1**
RS 485/USB converter	**A5E00852382**
AUTOCAL function with serial interface for the automotive industry (AK)	**C79451-A3480-D512**
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**

[1] Only for cell length 20 to 180 mm

Selection and ordering data

Article No. ↗ **7MB2123-** ■■■■■ - ■■■■

ULTRAMAT 6 gas analyzer
Two-channel 19" rack unit for installation in cabinets for measuring 2 IR components

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

Cannot be combined

Gas connections for sample gas and reference gas				
Pipe with 6 mm outer diameter			0	0 → A21, A41
Pipe with ¼" outer diameter			1	1 → A20, A40
Channel 1 Measured component		Possible with measuring range identification		
CO		11 ... 30	A	
CO highly selective (with optical filter)		12 ... 30	B	
CO (TÜV; see table "TÜV single component", page 1/88)			X	
CO_2		10 ... 30	C	
CH_4		13 ... 30	D	
C_2H_2		15 ... 30	E	
C_2H_4		15 ... 30	F	
C_2H_6		14 ... 30	G	
C_3H_6		14 ... 30	H	
C_3H_8		13 ... 30	J	
C_4H_6		15 ... 30	K	
C_4H_{10}		14 ... 30	L	
C_6H_{14}		14 ... 30	M	
SO_2 (TÜV; see table "TÜV single component", page 1/88)		13 ... 30	N	
NO (TÜV; see table "TÜV single component", page 1/88)		14 ... 20, 22	P	
NH_3 (dry)		14 ... 30	Q	Q
H_2O		17 ... 20, 22	R	R
N_2O		13 ... 30	S	
Smallest measuring range	Largest measuring range	Measuring range identification		
0 ... 5 vpm	0 ... 100 vpm	10	A	
0 ... 10 vpm	0 ... 200 vpm	11	B	
0 ... 20 vpm	0 ... 400 vpm	12	C	
0 ... 50 vpm	0 ... 1 000 vpm	13	D	
0 ... 100 vpm	0 ... 1 000 vpm	14	E	
0 ... 300 vpm	0 ... 3 000 vpm	15	F	
0 ... 500 vpm	0 ... 5 000 vpm	16	G	
0 ... 1 000 vpm	0 ... 10 000 vpm	17	H	
0 ... 3 000 vpm	0 ... 10 000 vpm	18	J	
0 ... 3 000 vpm	0 ... 30 000 vpm	19	K	
0 ... 5 000 vpm	0 ... 15 000 vpm	20	L	
0 ... 5 000 vpm	0 ... 50 000 vpm	21	M	
0 ... 1 %	0 ... 3 %	22	N	
0 ... 1 %	0 ... 10 %	23	P	
0 ... 3 %	0 ... 10 %	24	Q	
0 ... 3 %	0 ... 30 %	25	R	
0 ... 5 %	0 ... 15 %	26	S	
0 ... 5 %	0 ... 50 %	27	T	
0 ... 10 %	0 ... 30 %	28	U	
0 ... 10 %	0 ... 100 %	29	V	
0 ... 30 %	0 ... 100 %	30	W	
Internal gas paths	Sample chamber[1] (lining)	Reference chamber (flow-type)		
Hose made of FKM (Viton)	Aluminum	Non-flow-type	0	0 0 → A20, A21, A40, A41
	Aluminum	Flow-type	1	1
Pipe made of titanium	Tantalum	Non-flow-type	4	4 → A20, A21, A40, A41, Y02
	Tantalum	Flow-type	5	5 → Y02
Stainless steel pipe (mat. no. 1.4571)	Aluminum	Non-flow-type	6	6 → A20, A21, A40, A41
	Tantalum	Non-flow-type	8	8 → A20, A21, A40, A41
With sample gas monitoring				
Hose made of FKM (Viton)	Aluminum	Non-flow-type	2	2 2 → A20, A21, A40, A41
	Aluminum	Flow-type	3	3

[1] Only for cell length 20 to 180 mm

Selection and ordering data			Article No.	
ULTRAMAT 6 gas analyzer Two-channel 19" rack unit for installation in cabinets for measuring 2 IR components			**7MB2123-** ■■■■■ - ■■■■	Cannot be combined
Add-on electronics				
Without			**0**	
AUTOCAL function				
• With 8 additional digital inputs/outputs each for channel 1			**1**	
• With 8 additional digital inputs/outputs each for channel 2			**2**	
• With 8 additional digital inputs/outputs each for channel 1 and channel 2			**3**	
• With serial interface for the automotive industry (AK)			**5**	5 → E20
• With 8 additional digital inputs/outputs each for channel 1 and channel 2 and PROFIBUS PA interface			**6**	
• With 8 additional digital inputs/outputs each for channel 1 and channel 2 and PROFIBUS DP interface			**7**	
Power supply				
100 ... 120 V AC, 48 ... 63 Hz			**0**	
200 ... 240 V AC, 48 ... 63 Hz			**1**	
Channel 2 Measured component		Possible with measuring range identification		
CO		11 ... 30	**A**	
CO highly selective (with optical filter)		12 ... 30	**B**	
CO (TÜV; see table "TÜV single component", page 1/88)			**X**	
CO_2		10 ... 30	**C**	
CH_4		13 ... 30	**D**	
C_2H_2		15 ... 30	**E**	
C_2H_4		15 ... 30	**F**	
C_2H_6		14 ... 30	**G**	
C_3H_6		14 ... 30	**H**	
C_3H_8		13 ... 30	**J**	
C_4H_6		15 ... 30	**K**	
C_4H_{10}		14 ... 30	**L**	
C_6H_{14}		14 ... 30	**M**	
SO_2 (TÜV; see table "TÜV single component", page 1/88)		13 ... 30	**N**	
NO (TÜV; see table "TÜV single component", page 1/88)		14 ... 20, 22	**P**	
NH_3 (dry)		14 ... 30	**Q**	Q
H_2O		17 ... 20, 22	**R**	R
N_2O		13 ... 30	**S**	
Smallest measuring range	Largest measuring range	Measuring range identification		
0 ... 5 vpm	0 ... 100 vpm	10	**A**	
0 ... 10 vpm	0 ... 200 vpm	11	**B**	
0 ... 20 vpm	0 ... 400 vpm	12	**C**	
0 ... 50 vpm	0 ... 1 000 vpm	13	**D**	
0 ... 100 vpm	0 ... 1 000 vpm	14	**E**	
0 ... 300 vpm	0 ... 3 000 vpm	15	**F**	
0 ... 500 vpm	0 ... 5 000 vpm	16	**G**	
0 ... 1 000 vpm	0 ... 10 000 vpm	17	**H**	
0 ... 3 000 vpm	0 ... 10 000 vpm	18	**J**	
0 ... 3 000 vpm	0 ... 30 000 vpm	19	**K**	
0 ... 5 000 vpm	0 ... 15 000 vpm	20	**L**	
0 ... 5 000 vpm	0 ... 50 000 vpm	21	**M**	
0 ... 1 %	0 ... 3 %	22	**N**	
0 ... 1 %	0 ... 10 %	23	**P**	
0 ... 3 %	0 ... 10 %	24	**Q**	
0 ... 3 %	0 ... 30 %	25	**R**	
0 ... 5 %	0 ... 15 %	26	**S**	
0 ... 5 %	0 ... 50 %	27	**T**	
0 ... 10 %	0 ... 30 %	28	**U**	
0 ... 10 %	0 ... 100 %	29	**V**	
0 ... 30 %	0 ... 100 %	30	**W**	
Operating software and documentation				
German				**0**
English				**1**
French				**2**
Spanish				**3**
Italian				**4**

Selection and ordering data

Additional versions	**Order code**	Cannot be combined
Add "-Z" to Article No. and specify Order codes.		
Flow-type reference cell with reduced flow, 6 mm (channel 1)	**A20**	
Flow-type reference cell with reduced flow, ¼" (channel 1)	**A21**	
Flow-type reference cell with reduced flow, 6 mm (channel 2)	**A40**	
Flow-type reference cell with reduced flow, ¼" (channel 2)	**A41**	
Connection pipe (can only be combined with the appropriate gas connection diameter and internal gas path materials)		
• Made of titanium, 6 mm, complete with screwed gland, for sample gas side	**A22**	
• Made of titanium, 6 mm, complete with screwed gland, for reference gas side	**A23**	
• Made of titanium, ¼", complete with screwed gland, for sample gas side	**A24**	
• Made of titanium, ¼", complete with screwed gland, for reference gas side	**A25**	
• Made of stainless steel (mat. no. 1.4571), 6 mm, complete with screwed gland, for sample gas side	**A27**	
• Made of stainless steel (mat. no. 1.4571), ¼", complete with screwed gland, for sample gas side	**A29**	
Telescopic rails (2 units)	**A31**	
TAG labels (specific lettering based on customer information)	**B03**	
Kalrez gaskets in sample gas path (channel 1)	**B04**	
Kalrez gaskets in sample gas path (channel 2)	**B05**	
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_2 service (specially cleaned gas path; channels 1 + 2)	**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**	
TÜV version acc. to 13th and 17th BImSchV (1st channel)	**Y17**	
TÜV version acc. to 13th and 17th BImSchV (2nd channel)	**Y18**	

Accessories	**Article No.**	
RS 485/Ethernet converter	**A5E00852383**	
RS 485/RS 232 converter	**C79451-Z1589-U1**	
RS 485/USB converter	**A5E00852382**	
AUTOCAL function with serial interface for the automotive industry (AK)	**C79451-A3480-D33**	
AUTOCAL function with 8 digital inputs/outputs for channel 1 or channel 2	**C79451-A3480-D511**	
AUTOCAL function with 8 digital inputs/outputs and PROFIBUS PA for channel 1 or channel 2	**A5E00057307**	
AUTOCAL function with 8 digital inputs/outputs and PROFIBUS DP for channel 1 or channel 2	**A5E00057312**	
Set of Torx screwdrivers	**A5E34821625**	

Selection and ordering data			Article No.		
ULTRAMAT 6 gas analyzer Single-channel or dual-channel 19" rack unit for installation in cabinets for measuring 2 or 3 IR components			↗ **7MB2124-** ■■■■■ - ■■■■		Cannot be combined
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Gas connections for sample gas and reference gas					
Pipe with 6 mm outer diameter			**0**		**0** → **A21, A41**
Pipe with ¼" outer diameter			**1**		**1** → **A20, A40**
Measured component	Smallest measuring range	Largest measuring range			
CO NO	0 ... 100 vpm 0 ... 100 vpm	0 ... 1 000 vpm 0 ... 1 000 vpm	**A A**		
CO NO	0 ... 300 vpm 0 ... 300 vpm	0 ... 3 000 vpm 0 ... 3 000 vpm	**A B**		
CO NO	0 ... 1 000 vpm 0 ... 1 000 vpm	0 ... 10 000 vpm 0 ... 10 000 vpm	**A C**		
For CO/NO (TÜV; table "TÜV, 2 components in series", page 1/88)					
CO_2 CO	0 ... 100 vpm 0 ... 100 vpm	0 ... 1 000 vpm 0 ... 1 000 vpm	**B A**		
CO_2 CO	0 ... 300 vpm 0 ... 300 vpm	0 ... 3 000 vpm 0 ... 3 000 vpm	**B B**		
CO_2 CO	0 ... 1 000 vpm 0 ... 1 000 vpm	0 ... 10 000 vpm 0 ... 10 000 vpm	**B C**		
CO_2 CO	0 ... 3 000 vpm 0 ... 3 000 vpm	0 ... 30 000 vpm 0 ... 30 000 vpm	**B D**		
CO_2 CO	0 ... 1 % 0 ... 1 %	0 ... 10 % 0 ... 10 %	**B E**		
CO_2 CO	0 ... 3 % 0 ... 3 %	0 ... 30 % 0 ... 30 %	**B F**		
CO_2 CO	0 ... 10 % 0 ... 10 %	0 ... 100 % 0 ... 100 %	**B G**		
CO_2 CH_4	0 ... 10 % 0 ... 10 %	0 ... 100 % 0 ... 100 %	**C G**		
CO_2 NO	0 ... 300 vpm 0 ... 300 vpm	0 ... 3 000 vpm 0 ... 3 000 vpm	**D B**		
Internal gas paths	Sample chamber[1] (lining)	Reference chamber (flow-type)			
Hose made of FKM (Viton)	Aluminum Aluminum	Non-flow-type Flow-type		**0** **1**	**0** **0** → **A20, A21, A40, A41** **1**
Pipe made of titanium	Tantalum Tantalum	Non-flow-type Flow-type		**4** **5**	**4** → **A20, A21, A40, A41, Y02** **5** → **Y02**
Stainless steel pipe (mat. no. 1.4571)	Aluminum Tantalum	Non-flow-type Non-flow-type		**6** **8**	**6** → **A20, A21, A40, A41** **8** → **A20, A21, A40, A41**
With sample gas monitoring					
Hose made of FKM (Viton)	Aluminum Aluminum	Non-flow-type Flow-type		**2** **3**	**2** **2** → **A20, A21, A40, A41** **3**
Add-on electronics					
Without				**0**	
AUTOCAL function					
• With 8 additional digital inputs/outputs each for channel 1				**1**	
• With 8 additional digital inputs/outputs each for channel 1 and channel 2				**2**	**2**
• With serial interface for the automotive industry (AK), channel 1				**3**	**3** → **E20**
• With serial interface for the automotive industry (AK), channel 1 and channel 2				**4**	**4** → **E20**
• With 8 additional digital inputs/outputs for channel 1 and PROFIBUS PA interface				**5**	
• With 8 additional digital inputs/outputs each for channel 1 and channel 2 and PROFIBUS PA interface				**6**	**6**
• With 8 additional digital inputs/outputs for channel 1 and PROFIBUS DP interface				**7**	
• With 8 additional digital inputs/outputs each for channel 1 and channel 2 and PROFIBUS DP interface				**8**	**8**

[1] Only for cell length 20 to 180 mm

Selection and ordering data			Article No.		
ULTRAMAT 6 gas analyzer Single-channel or dual-channel 19" rack unit for installation in cabinets for measuring 2 or 3 IR components			**7MB2124-** ■■■■■ - ■■■■		Cannot be combined
Power supply					
100 ... 120 V AC, 48 ... 63 Hz				0	
200 ... 240 V AC, 48 ... 63 Hz				1	
Channel 2 Measured component		Possible with measuring range identification			
Without channel 2				W	W
CO		11 ... 30		A	
CO highly selective (with optical filter)		12 ... 30		B	
CO (TÜV; see table "TÜV single component", page 1/88)				X	
CO_2		10 ... 30		C	
CH_4		13 ... 30		D	
C_2H_2		15 ... 30		E	
C_2H_4		15 ... 30		F	
C_2H_6		14 ... 30		G	
C_3H_6		14 ... 30		H	
C_3H_8		13 ... 30		J	
C_4H_6		15 ... 30		K	
C_4H_{10}		14 ... 30		L	
C_6H_{14}		14 ... 30		M	
SO_2 (TÜV; see table "TÜV single component", page 1/88)		13 ... 30		N	
NO (TÜV; see table "TÜV single component", page 1/88)		14 ... 20, 22		P	
NH_3 (dry)		14 ... 30		Q	Q
H_2O		17 ... 20, 22		R	R
N_2O		13 ... 30		S	
Smallest measuring range	Largest measuring range	Measuring range identification			
Without channel 2				X	X → A40, A41, B05
0 ... 5 vpm	0 ... 100 vpm	10		A	
0 ... 10 vpm	0 ... 200 vpm	11		B	
0 ... 20 vpm	0 ... 400 vpm	12		C	
0 ... 50 vpm	0 ... 1 000 vpm	13		D	
0 ... 100 vpm	0 ... 1 000 vpm	14		E	
0 ... 300 vpm	0 ... 3 000 vpm	15		F	
0 ... 500 vpm	0 ... 5 000 vpm	16		G	
0 ... 1 000 vpm	0 ... 10 000 vpm	17		H	
0 ... 3 000 vpm	0 ... 10 000 vpm	18		J	
0 ... 3 000 vpm	0 ... 30 000 vpm	19		K	
0 ... 5 000 vpm	0 ... 15 000 vpm	20		L	
0 ... 5 000 vpm	0 ... 50 000 vpm	21		M	
0 ... 1 %	0 ... 3 %	22		N	
0 ... 1 %	0 ... 10 %	23		P	
0 ... 3 %	0 ... 10 %	24		Q	
0 ... 3 %	0 ... 30 %	25		R	
0 ... 5 %	0 ... 15 %	26		S	
0 ... 5 %	0 ... 50 %	27		T	
0 ... 10 %	0 ... 30 %	28		U	
0 ... 10 %	0 ... 100 %	29		V	
0 ... 30 %	0 ... 100 %	30		W	
Operating software and documentation					
German					0
English					1
French					2
Spanish					3
Italian					4

Selection and ordering data

Additional versions	**Order code**	Cannot be combined
Add "-Z" to Article No. and specify Order codes.		
Flow-type reference cell with reduced flow, 6 mm (channel 1)	**A20**	
Flow-type reference cell with reduced flow, ¼" (channel 1)	**A21**	
Flow-type reference cell with reduced flow, 6 mm (channel 2)	**A40**	
Flow-type reference cell with reduced flow, ¼" (channel 2)	**A41**	
Connection pipe (can only be combined with the appropriate gas connection diameter and internal gas path materials)		
• Made of titanium, 6 mm, complete with screwed gland, for sample gas side	**A22**	
• Made of titanium, 6 mm, complete with screwed gland, for reference gas side	**A23**	
• Made of titanium, ¼", complete with screwed gland, for sample gas side	**A24**	
• Made of titanium, ¼", complete with screwed gland, for reference gas side	**A25**	
• Made of stainless steel (mat. no. 1.4571), 6 mm, complete with screwed gland, for sample gas side	**A27**	
• Made of stainless steel (mat. no. 1.4571), ¼", complete with screwed gland, for sample gas side	**A29**	
Telescopic rails (2 units)	**A31**	
TAG labels (specific lettering based on customer information)	**B03**	
Kalrez gaskets in sample gas path (channel 1)	**B04**	
Kalrez gaskets in sample gas path (channel 2)	**B05**	
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_2 service (specially cleaned gas path; channels 1 + 2)	**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**	
TÜV version acc. to 13th and 17th BImSchV (channel 1)	**Y17**	
TÜV version acc. to 13th and 17th BImSchV (channel 2)	**Y18**	

Accessories	**Article No.**
RS 485/Ethernet converter	**A5E00852383**
RS 485/RS 232 converter	**C79451-Z1589-U1**
RS 485/USB converter	**A5E00852382**
AUTOCAL function with serial interface for the automotive industry (AK)	**C79451-A3480-D33**
AUTOCAL function with 8 digital inputs/outputs for channel 1 or channel 2	**C79451-A3480-D511**
AUTOCAL function with 8 digital inputs/outputs and PROFIBUS PA for channel 1 or channel 2	**A5E00057307**
AUTOCAL function with 8 digital inputs/outputs and PROFIBUS DP for channel 1 or channel 2	**A5E00057312**
Set of Torx screwdrivers	**A5E34821625**

TÜV single component

Component	CO (TÜV)		SO_2 (TÜV)		NO (TÜV)	
Measuring range identification	**Smallest measuring range from 0 to ...**	**Largest measuring range from 0 to ...**	**Smallest measuring range from 0 to ...**	**Largest measuring range from 0 to ...**	**Smallest measuring range from 0 to ...**	**Largest measuring range from 0 to ...**
C			75 mg/m³	1 500 mg/m³		
D	50 mg/m³	1 000 mg/m³	300 mg/m³	3 000 mg/m³		
E			500 mg/m³	5 000 mg/m³	100 mg/m³	2 000 mg/m³
F	300 mg/m³	3 000 mg/m³	1 000 mg/m³	10 000 mg/m³	300 mg/m³	3 000 mg/m³
G	500 mg/m³	5 000 mg/m³			500 mg/m³	5 000 mg/m³
H	1 000 mg/m³	10 000 mg/m³	3 000 mg/m³	30 000 mg/m³	1 000 mg/m³	10 000 mg/m³
K	3 000 mg/m³	30 000 mg/m³	10 g/m³	100 g/m³	3 000 mg/m³	30 000 mg/m³
P	10 g/m³	100 g/m³	30 g/m³	300 g/m³	10 g/m³	100 g/m³
R	30 g/m³	300 g/m³	100 g/m³	1 000 g/m³	30 g/m³	300 g/m³
V	100 g/m³	1 160 g/m³	300 g/m³	2 630 g/m³	100 g/m³	1 250 g/m³

Example for ordering

ULTRAMAT 6, TÜV
Component: CO
Measuring range: 0 to 50 / 1 000 mg/m³
with hoses, non-flow-type reference compartment
without automatic adjustment (AUTOCAL)
230 V AC; German
7MB2121-0XD00-1AA0-Z +Y17

TÜV, 2 components in series

Component	CO (TÜV)		NO (TÜV)	
Measuring range identification	**Smallest measuring range from 0 to ...**	**Largest measuring range from 0 to ...**	**Smallest measuring range from 0 to ...**	**Largest measuring range from 0 to ...**
AA	75 mg/m³	1 000 mg/m³	200 mg/m³	2 000 mg/m³
AB	300 mg/m³	3 000 mg/m³	300 mg/m³	3 000 mg/m³
AC	1 000 mg/m³	10 000 mg/m³	1 000 mg/m³	10 000 mg/m³

Example for ordering

ULTRAMAT 6, TÜV, 2-component unit
Components: CO/NO + SO_2
Measuring range: CO: 0 to 75 / 1 000 mg/m³, NO: 0 to 200 / 2 000 mg/m³, SO_2: 0 to 75 / 1 500 mg/m³
with hoses, non-flow-type reference compartment
without automatic adjustment (AUTOCAL)
230 V AC; German
7MB2124-0AA00-1NC0-Z +Y17+Y18

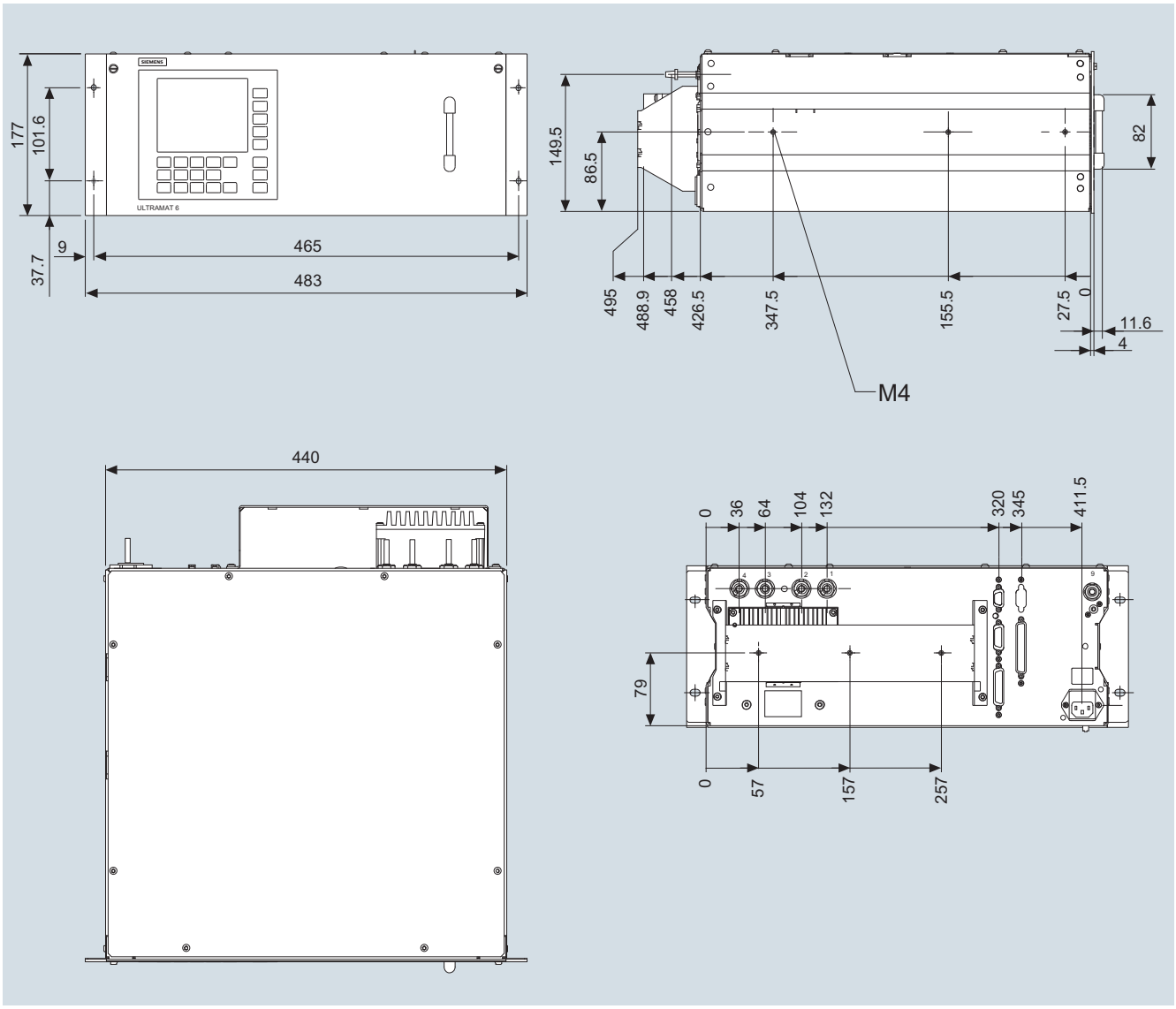
Note: for 3 components take both tables into consideration.

Ordering information measured component N_2O

Certification in accordance with AM0028 and AM0034 (Kyoto Protocol) for measuring N_2O, measuring range 0 ... 300 vpm / 3 000 vpm.

Version: Standard device

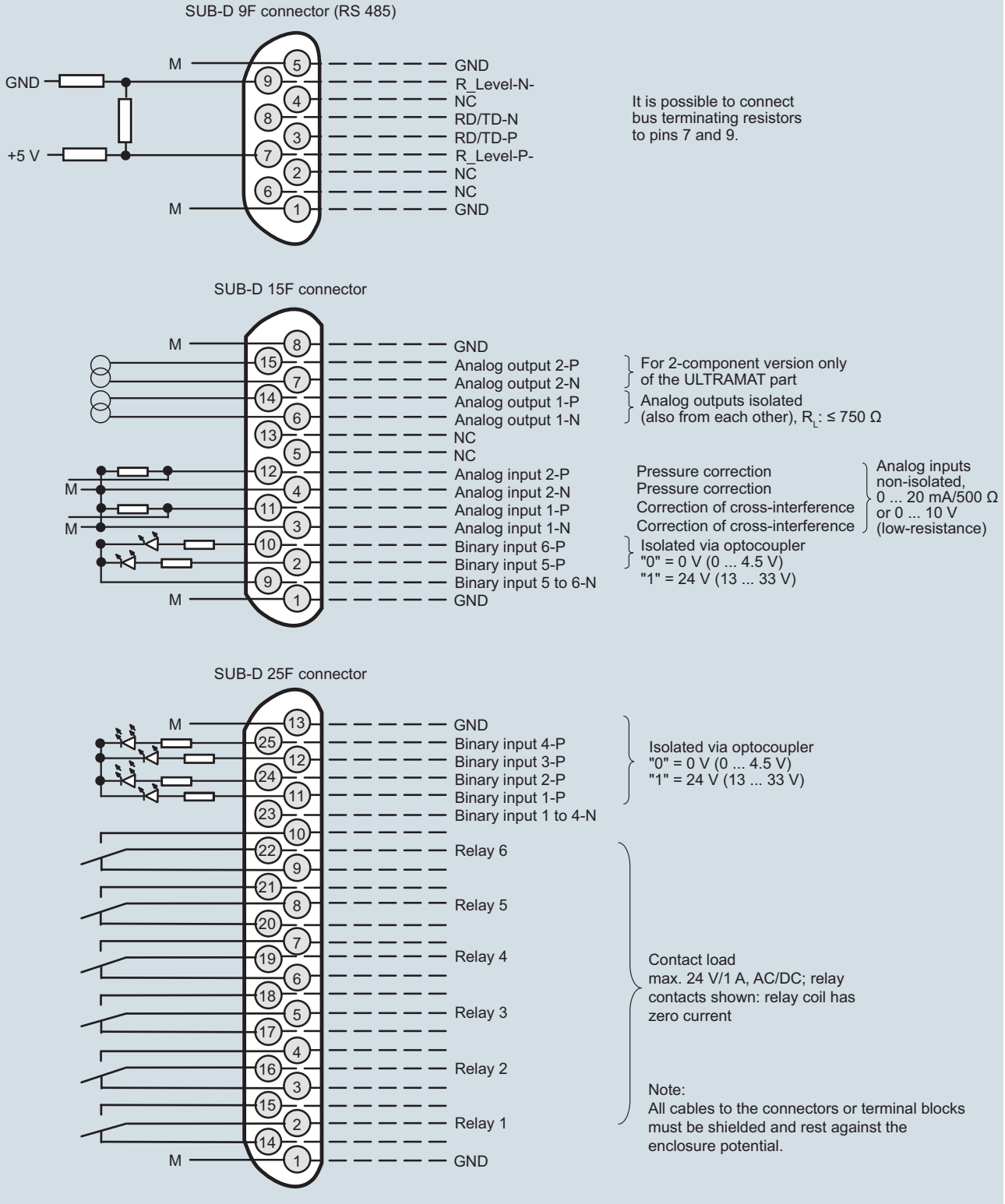
Dimensional drawings



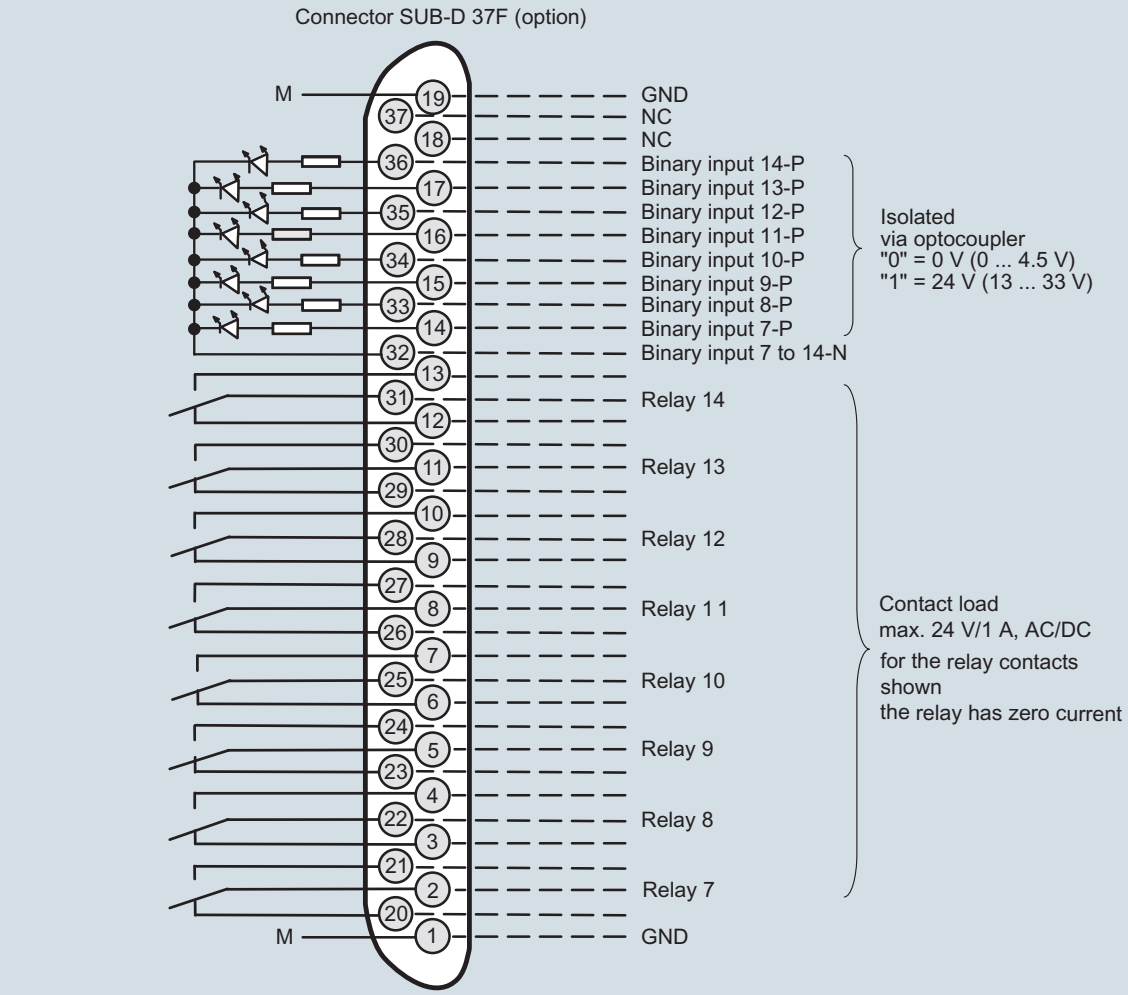
ULTRAMAT 6, 19“ unit, dimensions in mm (example: 1-channel version)

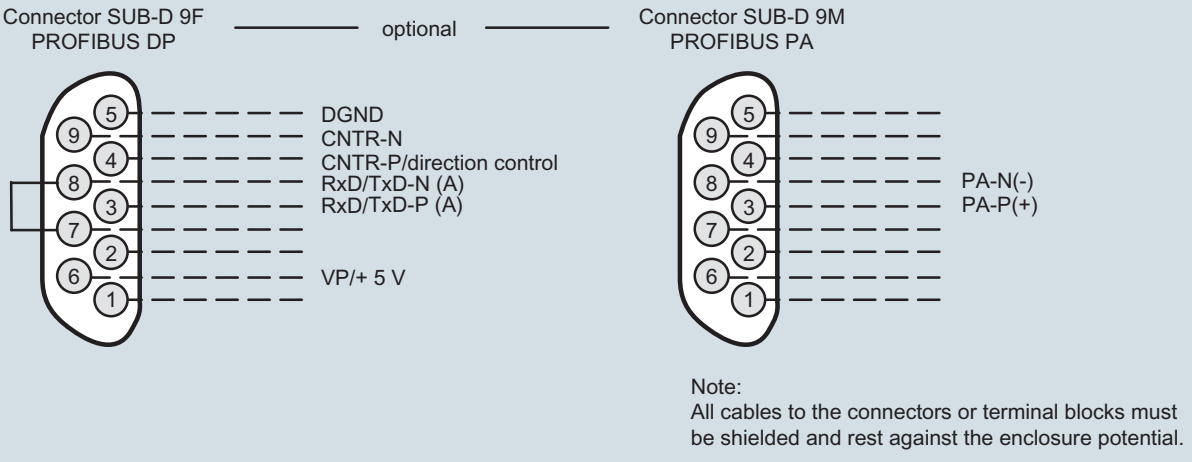
Schematics

Pin assignment (electrical and gas connections)



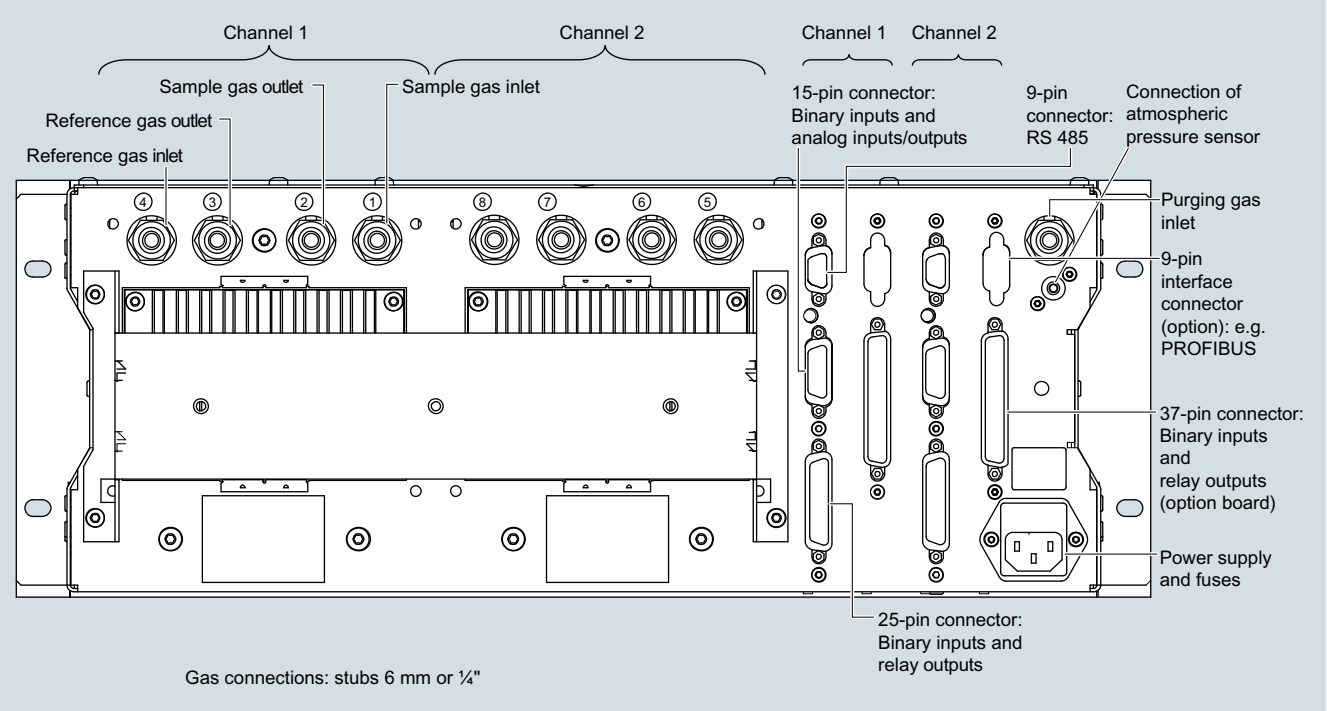
ULTRAMAT 6, 19“ unit, pin assignment





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

ULTRAMAT 6, 19“ unit, pin assignment of AUTOCAL board and PROFIBUS connectors



ULTRAMAT 6, 19“ unit, gas and electrical connections (example: 2-channel version)

Technical specifications

General information	
Measuring ranges	4, internally and externally switchable; autoranging is also possible
Smallest possible measuring range	Dependent on the application, e.g. CO: 0 … 10 vpm, CO_2 : 0 … 5 vpm
Largest possible measuring range	Dependent on the application
Measuring range with suppressed zero point	Any zero point within 0 … 100 vol.% can be implemented; smallest possible span 20 %
Heated version	65 °C
Operating position	Front wall, vertical
Conformity	CE mark in accordance with EN 50081-1, EN 50082-2
Influence of interfering gases must be considered separately	
Design, enclosure	
Weight	Approx. 32 kg
Degree of protection	IP65 in accordance with EN 60529, restricted breathing enclosure to EN 50021
Electrical characteristics	
Power supply	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
Power consumption	Approx. 35 VA; approx. 330 VA with heated version
EMC (**E**lectro**m**agnetic **C**ompatibility)	In accordance with standard requirements of NAMUR NE21 (08/98)
Electrical safety	In accordance with EN 61010-1
• Heated units	Overvoltage category II
• Unheated units	Overvoltage category III
Fuse values (unheated unit)	
• 100 ... 120 V	F3: 1 T/250; F4: 1 T/250
• 200 ... 240 V	F3: 0.63 T/250; F4: 0.63 T/250
Fuse values (heated unit)	
• 100 ... 120 V	F1: 1 T/250; F2: 4 T/250 F3: 4 T/250; F4: 4 T/250
• 200 ... 240 V	F1: 0.63 T/250; F2: 2.5 T/250 F3: 2.5 T/250; F4: 2.5 T/250

Gas inlet conditions	
Permissible sample gas pressure	
• With hoses (without pressure switch)	600 … 1 500 hPa (absolute)
• With pipes (without pressure switch)	600 … 1 500 hPa (absolute)
- Ex (leakage compensation)	600 … 1 160 hPa (absolute)
- Ex (continuous purging)	600 … 1 500 hPa (absolute)
Purging gas pressure	
• Permanent	< 165 hPa above ambient pressure
• For short periods	250 hPa above ambient pressure
Sample gas flow	18 … 90 l/h (0.3 … 1.5 l/min)
Sample gas temperature	Min. 0 ... max. 50 °C, but above the dew point, for heated version min. 0 … max. 80 °C
Sample gas humidity	< 90 % RH (RH: relative humidity) or dependent on measuring task
Dynamic response	
Warm-up period	At room temperature < 30 min (the technical specification will be met after 2 hours)
Delayed display (T_{90}-time)	Dependent on length of analyzer chamber, sample gas line and parameterizable damping
Damping (electrical time constant)	0 … 100 s, parameterizable
Dead time (purging time of the gas path in the unit at 1 l/min)	Approximately 0.5 ... 5 s, depending on version
Time for device-internal signal processing	< 1 s
Pressure correction range	
Pressure sensor	
• Internal	700 … 1 200 hPa absolute
• External	700 … 1 500 hPa absolute
Measuring response (relating to sample gas pressure 1 013 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature)	
Output signal fluctuation	< ± 1 % of the smallest possible measuring range according to rating plate
Zero point drift	< ± 1 % of the current measuring range/week
Measured-value drift	< ± 1 % of the current measuring range/week
Repeatability	≤ 1 % of the current measuring range
Detection limit	1 % of the smallest possible measuring range
Linearity error	< 0.5 % of the full-scale value

Influencing variables (relating to sample gas pressure 1 013 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature)	
Ambient temperature	< 1 % of current measuring range/10 K (with constant receiver cell temperature)
Sample gas pressure	When pressure compensation has been switched on: < 0.15 % of setpoint/1 % atmospheric pressure change
Sample gas flow	Negligible
Power supply	< 0.1 % of the current measuring range with rated voltage ± 10 %
Environmental conditions	Application-specific measuring influences possible if ambient air contains measured component or cross interference-sensitive gases
Electrical inputs and outputs	
Analog output	0/2/4 … 20 mA, isolated; load 750 Ω
Relay outputs	6, with changeover contacts, freely parameterizable, e.g. for measuring range identification; load: 24 V AC/DC/1 A, isolated, non-sparking
Analog inputs	2, dimensioned for 0/2/4 ... 20 mA for external pressure sensor and accompanying gas influence correction (correction of cross-interference)
Binary inputs	6, designed for 24 V, isolated, freely parameterizable, e.g. for measuring range switchover
Serial interface	RS 485
Options	AUTOCAL function with 8 additional binary 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 (RH: relative humidity) within average annual value, during storage and transportation (dew point must not be undershot)

Selection and ordering data			Article No.	
ULTRAMAT 6 gas analyzer For installation in the field, single-channel, 1 component			↗ **7MB2111-** ■■■■■ - ■■ **A** ■	Cannot be combined
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				
Gas connections				
Ferrule screw connection for pipe, outer diameter 6 mm			**0**	**0 → A29**
Ferrule screw connection for pipe, outer diameter ¼"			**1**	**1 → A28**
Measured component		Possible with measuring range identification		
CO		11 ... 30	**A**	
CO highly selective (with optical filter)		12 ... 30	**B**	
CO (TÜV; see table "TÜV single component", page 1/100)			**X**	
CO_2		10 ... 30	**C**	
CH_4		13 ... 30	**D**	
C_2H_2		15 ... 30	**E**	
C_2H_4		15 ... 30	**F**	
C_2H_6		14 ... 30	**G**	
C_3H_6		14 ... 30	**H**	
C_3H_8		13 ... 30	**J**	
C_4H_6		15 ... 30	**K**	
C_4H_{10}		14 ... 30	**L**	
C_6H_{14}		14 ... 30	**M**	
SO_2 (TÜV; see table "TÜV single component", page 1/100)		13 ... 30	**N**	
NO (TÜV; see table "TÜV single component", page 1/100)		14 ... 20, 22	**P**	
NH_3 (dry)		14 ... 30	**Q**	**Q**
H_2O		17 ... 20; 22 (17 to 24, 26; heated)	**R**	**R**
N_2O		13 ... 30	**S**	
Smallest measuring range	Largest measuring range	Measuring range identification		
0 ... 5 vpm	0 ... 100 vpm	10	**A**	
0 ... 10 vpm	0 ... 200 vpm	11	**B**	
0 ... 20 vpm	0 ... 400 vpm	12	**C**	
0 ... 50 vpm	0 ... 1 000 vpm	13	**D**	
0 ... 100 vpm	0 ... 1 000 vpm	14	**E**	
0 ... 300 vpm	0 ... 3 000 vpm	15	**F**	
0 ... 500 vpm	0 ... 5 000 vpm	16	**G**	
0 ... 1 000 vpm	0 ... 10 000 vpm	17	**H**	
0 ... 3 000 vpm	0 ... 10 000 vpm	19	**J**	
0 ... 3 000 vpm	0 ... 30 000 vpm	19	**K**	
0 ... 5 000 vpm	0 ... 15 000 vpm	20	**L**	
0 ... 5 000 vpm	0 ... 50 000 vpm	21	**M**	
0 ... 1 %	0 ... 3 %	22	**N**	
0 ... 1 %	0 ... 10 %	23	**P**	
0 ... 3 %	0 ... 10 %	24	**Q**	
0 ... 3 %	0 ... 30 %	25	**R**	
0 ... 5 %	0 ... 15 %	26	**S**	
0 ... 5 %	0 ... 50 %	27	**T**	
0 ... 10 %	0 ... 30 %	28	**U**	
0 ... 10 %	0 ... 100 %	29	**V**	
0 ... 30 %	0 ... 100 %	30	**W**	

1

Field device

Selection and ordering data — **Article No.**

ULTRAMAT 6 gas analyzer
For installation in the field, single-channel, 1 component

7MB2111- ■■■■■ - ■■A■ — Cannot be combined

Internal gas paths	Sample chamber (lining)	Reference chamber (flow-type)	
Hose made of FKM (Viton)	Aluminum	Non-flow-type	0
	Aluminum	Flow-type	1
Pipe made of titanium	Tantalum[1]	Non-flow-type	2
	Tantalum[1]	Flow-type	3
Stainless steel pipe (mat. no. 1.4571)	Aluminum	Non-flow-type	6
	Tantalum[1]	Non-flow-type	8

Add-on electronics	
Without	0
AUTOCAL function	
• With 8 additional digital inputs/outputs	1
• With 8 digital inputs/outputs and PROFIBUS PA interface	6
• With 8 digital inputs/outputs and PROFIBUS DP interface	7
• With 8 digital inputs/outputs and PROFIBUS PA Ex i	8
Power supply	
Standard unit and acc. to ATEX II 3G version (Zone 2)	
• 100 ... 120 V AC, 48 ... 63 Hz	0
• 200 ... 240 V AC, 48 ... 63 Hz	1
ATEX II 2G versions (Zone 1), incl. certificate	
• 100 ... 120 V AC, 48 ... 63 Hz, according to ATEX II 2G[2] (operating mode: leakage compensation)	2
• 200 ... 240 V AC, 48 ... 63 Hz, according to ATEX II 2G[2] (operating mode: leakage compensation)	3
• 100 ... 120 V AC, 48 ... 63 Hz, according to ATEX II 2G[2] (operating mode: continuous purging)	6
• 200 ... 240 V AC, 48 ... 63 Hz, according to ATEX II 2G[2] (operating mode: continuous purging)	7
Heating of internal gas paths and analyzer unit	
Without	A
With (max. 65 °C)	B
Language (supplied documentation, software)	
German	0
English	1
French	2
Spanish	3
Italian	4

0	0	0 → A28, A29
1	1	
		2 → A28, A29, Y02
		3 → Y02
		6 → A28, A29
		8 → A28, A29
		6 → E12
		7 → E12
		8
		0
		1
2		2
3		3
6		6
7		7

[1] Only for cell length 20 to 180 mm

[2] Only in connection with an approved purging unit

Selection and ordering data

Additional versions	**Order code**
Add "-Z" to Article No. and specify Order codes.	
Flow-type reference cell with reduced flow, 6 mm	**A28**
Flow-type reference cell with reduced flow, ¼"	**A29**
TAG labels (specific lettering based on customer information)	**B03**
Kalrez gaskets in sample gas path	**B04**
SIL conformity declaration (SIL 2) Functional Safety according to IEC 61508 and IEC 61511	**C20**
Ex versions Possible combinations: see: Table "Ex configurations – principle selection criteria", page 5/17	
ATEX II 3G certificate; restricted breathing enclosure, non-flammable gases	**E11**
ATEX II 3G certificate; flammable gases	**E12**
FM/CSA certificate – Class I Div 2	**E20**
ATEX II 3D certificate; potentially explosive dust atmospheres	
• In non-hazardous gas zone	**E40**
• In Ex zone acc. to ATEX II 3G, non-flammable gases	**E41**
• In Ex zone acc. to ATEX II 3G, flammable gases[1)]	**E42**
BARTEC Ex p control unit "Leakage compensation"	**E71**
BARTEC Ex p control 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**
TÜV version acc. to 13th and 17th BImSchV	**Y17**

Additional units for Ex versions	**Article No.**
Category ATEX II 2G (zone 1)	
BARTEC Ex p control unit, 230 V, "leakage compensation"	**7MB8000-2BA**
BARTEC Ex p control unit, 115 V, "leakage compensation"	**7MB8000-2BB**
BARTEC Ex p control unit, 230 V, "continuous purging"	**7MB8000-2CA**
BARTEC Ex p control 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**
Category ATEX II 3G (Zone 2)	
BARTEC Ex p control unit, 230 V, "continuous purging"	**7MB8000-2CA**
BARTEC Ex p control unit, 115 V, "continuous purging"	**7MB8000-2CB**
FM/CSA (Class I Div. 2)	
Ex purging unit MiniPurge FM	**7MB8000-1AA**

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	**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**

[1)] Only in connection with an approved purging unit

1

Field device

Selection and ordering data — Article No.

ULTRAMAT 6 gas analyzer — **7MB2112-** ■■■■■ - ■■ **A** ■
For installation in the field, single-channel, 2 components

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

Cannot be combined

Gas connections

Ferrule screw connection for pipe, outer diameter 6 mm			**0**	**0 → A29**
Ferrule screw connection for pipe, outer diameter ¼"			**1**	**1 → A28**
Measured component	Smallest measuring range	Largest measuring range		
CO	0 ... 100 vpm	0 ... 1 000 vpm	**A A**	
NO	0 ... 100 vpm	0 ... 1 000 vpm		
CO	0 ... 300 vpm	0 ... 3 000 vpm	**A B**	
NO	0 ... 300 vpm	0 ... 3 000 vpm		
CO	0 ... 1 000 vpm	0 ... 10 000 vpm	**A C**	
NO	0 ... 1 000 vpm	0 ... 10 000 vpm		
For CO/NO (TÜV; see table "TÜV, 2 components in series", page 1/100)				
CO_2	0 ... 100 vpm	0 ... 1 000 vpm	**B A**	
CO	0 ... 100 vpm	0 ... 1 000 vpm		
CO_2	0 ... 300 vpm	0 ... 3 000 vpm	**B B**	
CO	0 ... 300 vpm	0 ... 3 000 vpm		
CO_2	0 ... 1 000 vpm	0 ... 10 000 vpm	**B C**	
CO	0 ... 1 000 vpm	0 ... 10 000 vpm		
CO_2	0 ... 3 000 vpm	0 ... 30 000 vpm	**B D**	
CO	0 ... 3 000 vpm	0 ... 30 000 vpm		
CO_2	0 ... 1 %	0 ... 10 %	**B E**	
CO	0 ... 1 %	0 ... 10 %		
CO_2	0 ... 3 %	0 ... 30 %	**B F**	
CO	0 ... 3 %	0 ... 30 %		
CO_2	0 ... 10 %	0 ... 100 %	**B G**	
CO	0 ... 10 %	0 ... 100 %		
CO_2	0 ... 10 %	0 ... 100 %	**C G**	
CH_4	0 ... 10 %	0 ... 100 %		
CO_2	0 ... 100 vpm	0 ... 1 000 vpm	**D A**	
NO	0 ... 100 vpm	0 ... 1 000 vpm		
CO_2	0 ... 300 vpm	0 ... 3 000 vpm	**D B**	
NO	0 ... 300 vpm	0 ... 3 000 vpm		

Internal gas paths	Sample chamber (lining)	Reference chamber (flow-type)		
Hose made of FKM	Aluminum	Non-flow-type	**0**	**0 0 → A28, A29**
(Viton)	Aluminum	Flow-type	**1**	**1**
Pipe made of titanium	Tantalum[1)]	Non-flow-type	**2**	**2 → A28, A29, Y02**
	Tantalum[1)]	Flow-type	**3**	**3 → Y02**
Stainless steel pipe	Aluminum	Non-flow-type	**6**	**6 → A28, A29**
(mat. no. 1.4571)	Tantalum[1)]	Non-flow-type	**8**	**8 → A28, A29**

Add-on electronics		
Without	**0**	
AUTOCAL function		
• With 8 additional digital inputs/outputs	**1**	
• With 8 digital inputs/outputs and PROFIBUS PA interface	**6**	**6**
• With 8 digital inputs/outputs and PROFIBUS DP interface	**7**	**7**
• With 8 digital inputs/outputs and PROFIBUS PA Ex i	**8**	**8**

Power supply		
Standard unit and acc. to ATEX II 3G version (Zone 2)		
• 100 ... 120 V AC, 48 ... 63 Hz	**0**	**0**
• 200 ... 240 V AC, 48 ... 63 Hz	**1**	**1**
ATEX II 2G versions (Zone 1), incl. certificate		
• 100 ... 120 V AC, 48 ... 63 Hz, according to ATEX II 2G[2)] (operating mode: leakage compensation)	**2**	**2 2**
• 200 ... 240 V AC, 48 ... 63 Hz, according to ATEX II 2G[2)] (operating mode: leakage compensation)	**3**	**3 3**
• 100 ... 120 V AC, 48 ... 63 Hz, according to ATEX II 2G[2)] (operating mode: continuous purging)	**6**	**6 6**
• 200 ... 240 V AC, 48 ... 63 Hz, according to ATEX II 2G[2)] (operating mode: continuous purging)	**7**	**7 7**

Heating of internal gas paths and analyzer unit	
none	**A**
With (max. 65 °C)	**B**

Selection and ordering data	Article No.	
ULTRAMAT 6 gas analyzer For installation in the field, single-channel, 2 components	**7MB2112-** ■■■■■ - ■■ **A** ■	Cannot be combined
Language (supplied documentation, software)		
German	**0**	
English	**1**	
French	**2**	
Spanish	**3**	
Italian	**4**	

[1] Only for cell length 20 to 180 mm.

[2] See also "Additional units for Ex versions".

Additional versions	Order code
Add "-Z" to Article No. and specify Order codes.	
Flow-type reference cell with reduced flow, 6 mm	**A28**
Flow-type reference cell with reduced flow, ¼"	**A29**
TAG labels (specific lettering based on customer information)	**B03**
Kalrez gaskets in sample gas path	**B04**
SIL conformity declaration (SIL 2) Functional Safety according to IEC 61508 and IEC 61511	**C20**
Ex versions	
Possible combinations: see: Table "Ex configurations – principle selection criteria", page 5/17	
ATEX II 3G certificate; restricted breathing enclosure, non-flammable gases	**E11**
ATEX II 3G certificate; flammable gases	**E12**
CSA certificate – Class I Div 2	**E20**
ATEX II 3D certificate; potentially explosive dust atmospheres	
• In non-hazardous gas zone	**E40**
• In Ex zone acc. to ATEX II 3G, non-flammable gases	**E41**
• In Ex zone acc. to ATEX II 3G, flammable gases	**E42**
BARTEC Ex p control unit "Leakage compensation"	**E71**
BARTEC Ex p control 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**
TÜV version acc. to 13th and 17th BImSchV	**Y17**

Additional units for Ex versions	Article No.
Category ATEX II 2G (zone 1)	
BARTEC Ex p control unit, 230 V, "leakage compensation"	**7MB8000-2BA**
BARTEC Ex p control unit, 115 V, "leakage compensation"	**7MB8000-2BB**
BARTEC Ex p control unit, 230 V, "continuous purging"	**7MB8000-2CA**
BARTEC Ex p control 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**
Category ATEX II 3G (Zone 2)	
BARTEC Ex p control unit, 230 V, "continuous purging"	**7MB8000-2CA**
BARTEC Ex p control unit, 115 V, "continuous purging"	**7MB8000-2CB**
FM/CSA (Class I Div. 2)	
Ex purging unit MiniPurge FM	**7MB8000-1AA**

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	**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**

Field device

TÜV, single component
(only with additional suffix Z (Y17, Y18))

Component	CO (TÜV)		SO_2 (TÜV)		NO (TÜV)	
Measuring range identification	**Smallest measuring range from 0 to ...**	**Largest measuring range from 0 to ...**	**Smallest measuring range from 0 to ...**	**Largest measuring range from 0 to ...**	**Smallest measuring range from 0 to ...**	**Largest measuring range from 0 to ...**
C			75 mg/m³	1 500 mg/m³		
D	50 mg/m³	1 000 mg/m³	300 mg/m³	3 000 mg/m³		
E			500 mg/m³	5 000 mg/m³	100 mg/m³	2 000 mg/m³
F	300 mg/m³	3 000 mg/m³	1 000 mg/m³	10 000 mg/m³	300 mg/m³	3 000 mg/m³
G	500 mg/m³	5 000 mg/m³			500 mg/m³	5 000 mg/m³
H	1 000 mg/m³	10 000 mg/m³	3 000 mg/m³	30 000 mg/m³	1 000 mg/m³	10 000 mg/m³
K	3 000 mg/m³	30 000 mg/m³	10 g/m³	100 g/m³	3 000 mg/m³	30 000 mg/m³
P	10 g/m³	100 g/m³	30 g/m³	300 g/m³	10 g/m³	100 g/m³
R	30 g/m³	300 g/m³	100 g/m³	1 000 g/m³	30 g/m³	300 g/m³
V	100 g/m³	1 160 g/m³	300 g/m³	2 630 g/m³	100 g/m³	1 250 g/m³

Example for ordering

ULTRAMAT 6, TÜV (1-component unit)
Component: CO
Measuring range: 0 to 50 / 1 000 mg/m³
with hoses, non-flow-type reference compartment
without automatic adjustment (AUTOCAL)
230 V AC; without heating, German
7MB2111-0XD00-1AA0-Z +Y17

TÜV, 2 components in series

Component	CO (TÜV)		NO (TÜV)	
Measuring range identification	**Smallest measuring range from 0 to ...**	**Largest measuring range from 0 to ...**	**Smallest measuring range from 0 to ...**	**Largest measuring range from 0 to ...**
AA	75 mg/m³	1 000 mg/m³	200 mg/m³	2 000 mg/m³
AB	300 mg/m³	3 000 mg/m³	300 mg/m³	3 000 mg/m³
AC	1 000 mg/m³	10 000 mg/m³	1 000 mg/m³	10 000 mg/m³

Example for ordering

ULTRAMAT 6, TÜV (2 components in series)
Components: CO/NO
Measuring range CO: 0 to 75 / 1 000 mg/m³, NO: 0 to 200 / 2 000 mg/m³
with hoses, non-flow-type reference compartment
without automatic adjustment (AUTOCAL)
230 V AC; without heating, German
7MB2112-0AA00-1AA0-Z +Y17

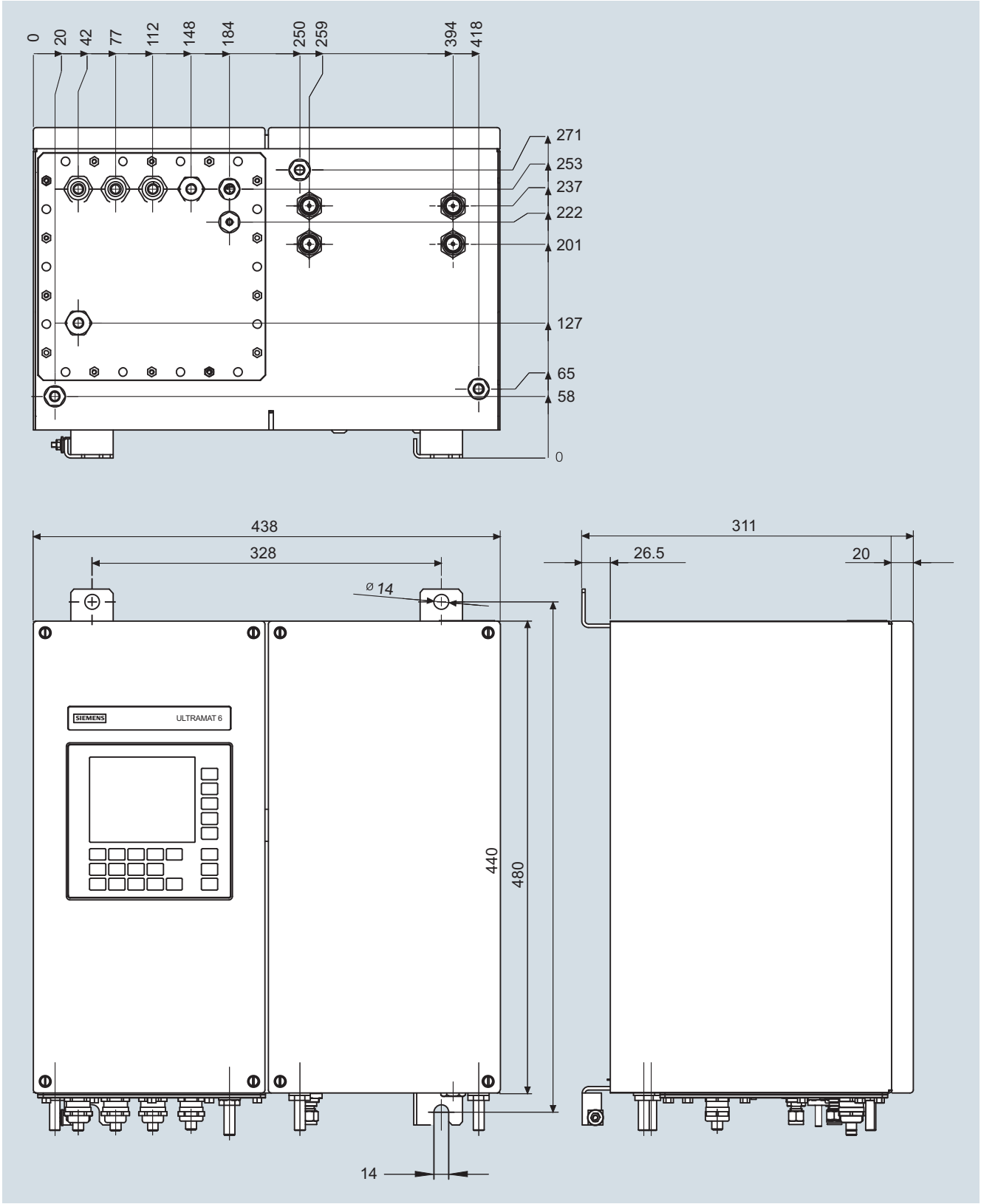
Note: for 3 components take both tables into consideration.

Ordering information measured component N_2O

Certification in accordance with AM0028 and AM0034 (Kyoto Protocol) for measuring N_2O, measuring range 0 to 300 vpm / 3 000 vpm.

Version: Standard device

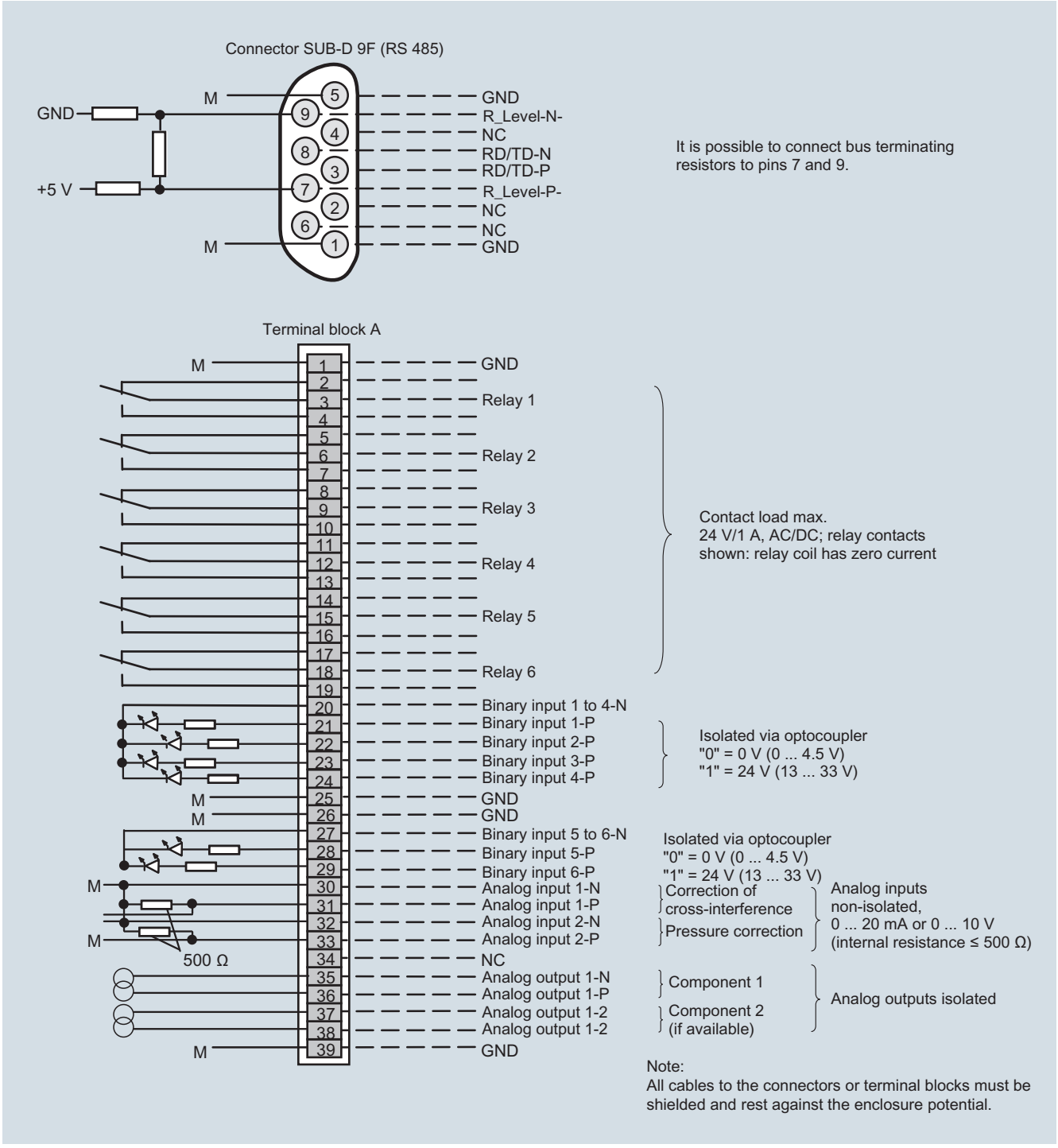
Dimensional drawings



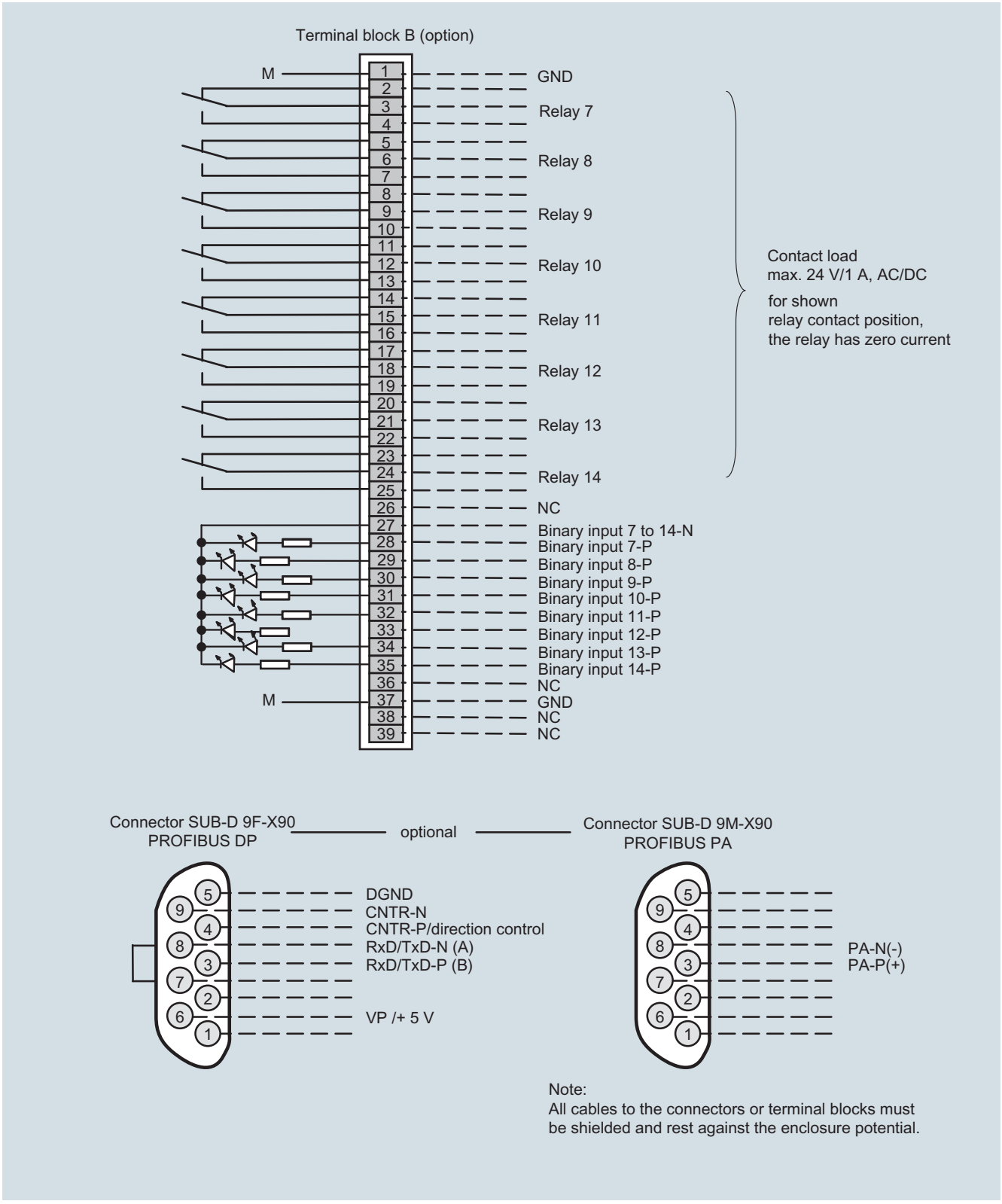
ULTRAMAT 6, field unit, dimensions in mm

Schematics

Pin assignment (electrical and gas connections)

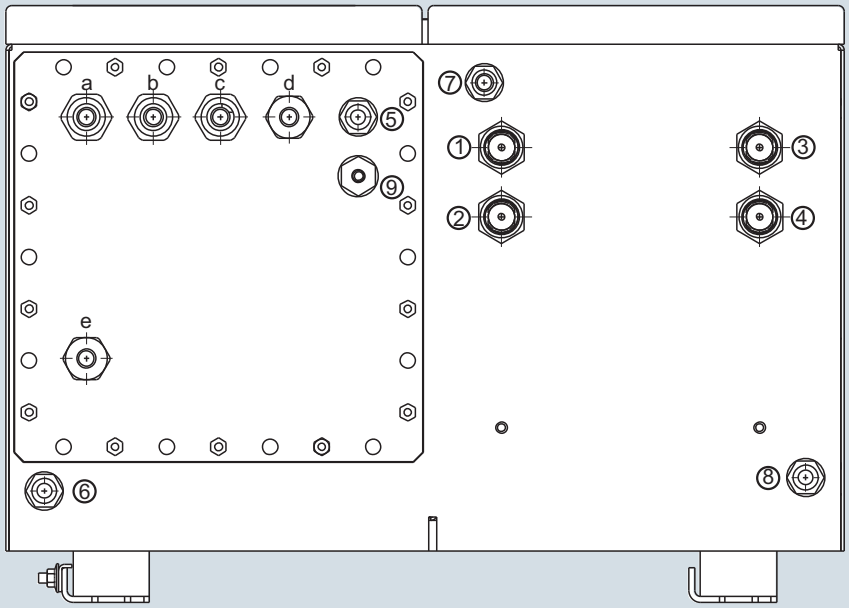


ULTRAMAT 6, field device, pin and terminal assignment



ULTRAMAT 6, field device, pin and terminal assignment of the AUTOCAL board and PROFIBUS connectors

Field device



Gas connections

① Sample gas inlet
② Sample gas outlet
③ Reference gas inlet (option)
④ Reference gas outlet (option)

Clamping gland for pipe Ø 6 mm or ¼"

⑤-⑧ Purging gas inlets/outlets, stubs Ø 10 mm or 3/8"
⑨ Connection atmospheric pressure sensor, stubs Ø ¼"

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

ULTRAMAT 6, field device, gas connections and electrical connections

Documentation

Selection and ordering data

Operating instructions	Article No.
ULTRAMAT 6 / OXYMAT 6	
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**

Selection and ordering data

Description	7MB-2121	7MB-2123	7MB-2124	7MB-2111	7MB-2112	7MB-2111/2 Ex	2 years (quantity)	5 years (quantity)	Article No.
Analyzer unit									
O-ring for cover (window)	x	x	x	x	x	x	2	4	**C79121-Z100-A24**
Cover (cell length 20 ... 180 mm)	x	x	x	x	x	x	2	2	**C79451-A3462-B151**
Cover (cell length 0.2 ... 6 mm)	x	x	x	x	x	x	2	2	**C79451-A3462-B152**
O-rings, set	x	x	x	x	x	x		1	**C79451-A3462-D501**
Sample gas path									
O-ring (hose clip)				x	x	x	2	4	**C71121-Z100-A159**
Pressure switch	x	x	x				1	2	**C79302-Z1210-A2**
Flow indicator	x	x	x				1	2	**C79402-Z560-T1**
Hose clip	x	x	x	x	x	x		1	**C79451-A3478-C9**
Heating cartridge (heated unit)				x	x	x		1	**W75083-A1004-F120**
Electronics									
Temperature fuse (heated unit)				x	x			1	**W75054-T1001-A150**
Fuse (device fuse)						x	1	2	**A5E00061505**
Temperature controller - electronics, 230 V AC				x	x	x		1	**A5E00118527**
Temperature controller - electronics, 115 V AC				x	x	x		1	**A5E00118530**
Fan, 24 V DC (heated unit)				x	x	x		1	**A5E00302916**
Front plate with keyboard	x	x	x				1	1	**C79165-A3042-B504**
Temperature sensor				x	x	x		1	**C79165-A3044-B176**
Adapter plate, LCD/keyboard	x	x	x	x	x		1	1	**C79451-A3474-B605**
Motherboard, with firmware: see spare parts list	x	x	x	x	x	x		1	
LC display	x	x	x	x	x		1	1	**W75025-B5001-B1**
Connector filter	x	x	x	x	x			1	**W75041-E5602-K2**
Fusible element, T 0.63 A/250 V	x		x	x	x	x	2	3	**W79054-L1010-T630**
Fusible element, T 1 A/250 V	x	x	x	x	x	x	2	3	**W79054-L1011-T100**
Fusible element, T 1.6 A/250 V		x	x				2	3	**W79054-L1011-T160**
Fusible element, T 2.5 A/250 V				x	x	x	2	3	**W79054-L1011-T250**

If the ULTRAMAT 6 is supplied with a specially cleaned gas path for high oxygen content ("Cleaned for O_2 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.