ULTRAMAT 6

General

Overview

ULTRAMAT 6, 19“ unit and field unit

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 measure up to 2 gas components, dual-channel analyzers up to 4 gas components simultaneously.

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
- Cleanable sample cells
  - Cost saving in further use in case of pollution
- Electronics and physics: gas-tight isolation, purging is possible, IP65
  - High service life even in harsh environments
- Heated versions (option)
  - Use also in presence of gases condensing at low temperature
- EEx(p) for zones 1 and 2 (according to ATEX 2G and ATEX 3G)

Application

Application

- Measurements for boiler control in combustion plants
- Emission measurements in incineration plants
- Measurements in the automotive industry (test benches)
- Warning equipment
- Process gas concentrations in chemical plants
- Trace measurements in pure gas processes
- Environment protection
- MAC-value monitoring at place of work
- Quality monitoring
- Ex versions to analyze flammable and non-flammable gases or vapors for use in hazardous areas

Special versions

- Special applications
  Besides the standard combinations special applications concerning material of the gas path, material of the sample cells (e.g. titanium, Hastelloy C22) and sample components are also available on request.
- TÜV version / QAL
  TÜV-approved versions are available for measurement of CO, NO and SO_2 according to 13. and 17. BImSchV and TA Luft. Smallest TÜV-approved and permitted measuring ranges:
  - 1-component analyzer
    CO: 0 ... 50 mg/m^3
    NO: 0 ... 100 mg/m^3
    SO_2: 0 ... 75 mg/m^3
  - 2-component analyzer (series connection)
    CO: 0 ... 75 mg/m^3
    NO: 0 ... 200 mg/m^3

Furthermore, the TÜV-approved versions of the ULTRAMAT 6 comply with the requirements of EN 14956 and of QAL 1 according to EN 14181. Conformity of the analyzers with both standards is TÜV-certified.

Determination of the analyzer drift according to EN 14181 (QAL 3) can be carried out manually or also 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 them in the evaluation computer.

- Flow-type reference compartment
  - The flow of 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 2000 to 4000 hPa. Than a restriction will automatically adjust the flow to about 8 hPa

Design

19“ unit

- With 4 HU for installation
  - in hinged frames
  - in cabinets, with or without slide rails
- Front panel for service can be hinged down (laptop connection)
- Internal gas paths: flexible tube made of FKM (Viton) or pipe made of titanium or stainless steel
- Gas connections for sample gas input and output: pipe diameter 6 mm or 1/4"
- Flowmeter for sample gas on the front panel (option)
- Pressure switch in sample gas path for flow monitoring (option)

Field unit

- Two-door housing with gas-tight separation of analyzer and electronics sections from gas path
- Each half of the enclosure can be purged separately
- Analyzer section and piping 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 panel for simultaneous display of:
  - Measured value (digital and analog displays)
  - Status line
  - Measuring ranges
- Contrast of LCD panel adjustable using menu
- Washable membrane keyboard with five softkeys
- Menu-based operation for parametrization, test functions, calibration
- User help in plain text
- Graphic display of concentration trend; programmable time intervals
- Operation software in two languages: German/English, English/Spanish, French/English, Italian/English, Spanish/English

Inputs and outputs

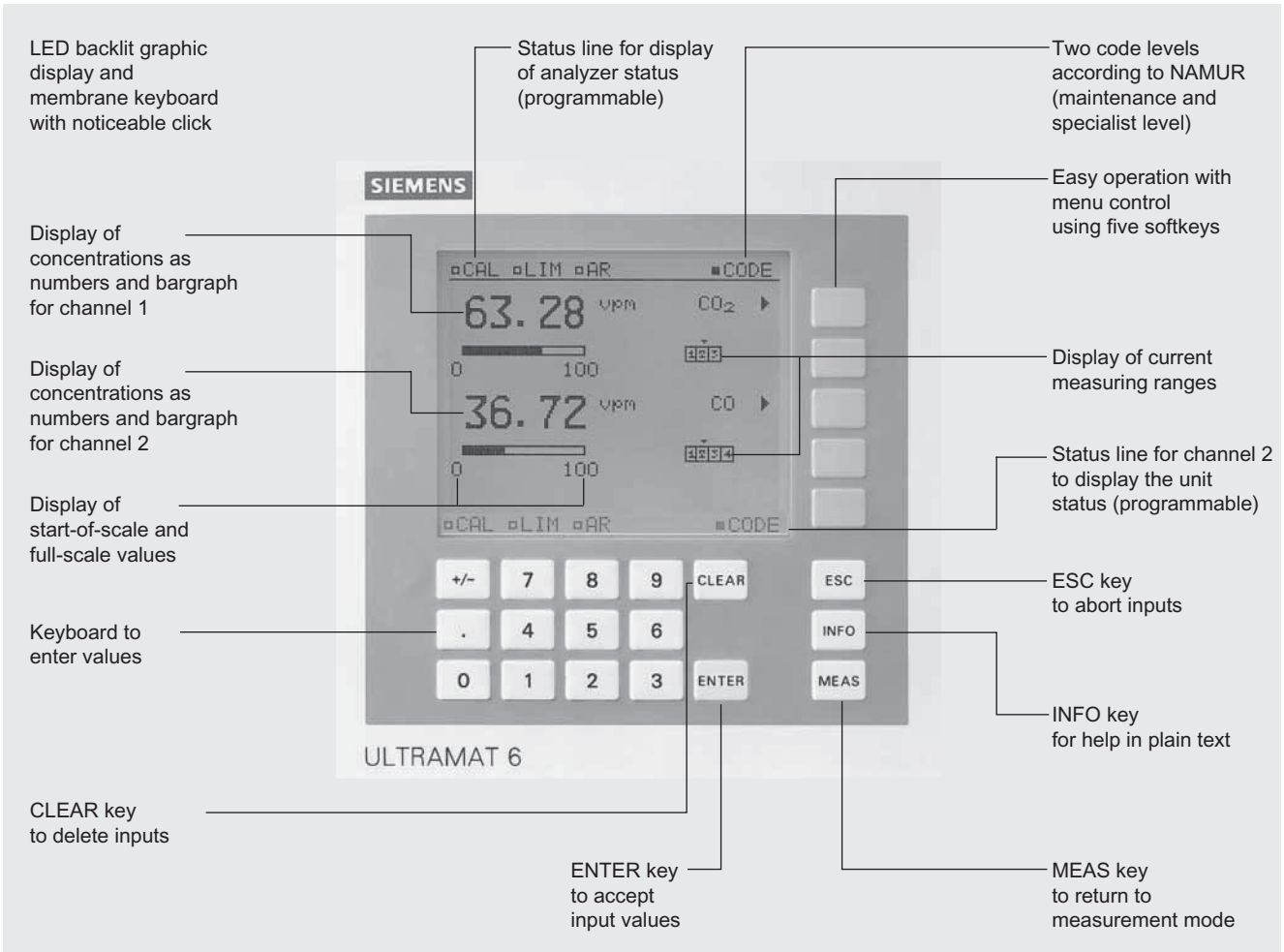
- One analog output per sample component (from 0, 2, 4 to 20 mA; parameterizing according to NAMUR)
- Two analog inputs freely configurable (e.g. correction of cross interferences or external pressure sensor)
- Six binary inputs freely configurable (e.g. for range switching, processing external signals from sample conditioning)
- Six relay outputs freely configurable (e.g. failure, maintenance request, limit alarm, external solenoid valves)
- Extension with eight additional binary inputs and eight additional relay outputs, e.g. for automatic calibration with up to four calibration gases

Communication

- RS 485 present in basic unit (connection at the rear; with 19“ unit also possibility of connection 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
- Linking to networks via PROFIBUS DP/PA interface
- SIPROM GA software as service and maintenance tool



ULTRAMAT 6, membrane keyboard and graphic display

General

Versions – Wetted parts, standard

Gas path		19“ unit	Field unit	Ex field unit
With hoses	Bushing	SS, type No. 1.4571		—
	Hose	FKM (z. B. Viton)		
	Sample cell:			
	• Body	Aluminum		
	• Cell lining	Aluminum		
	• Stub	SS, type 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 cell:			
	• Body	Aluminum		
	• Cell lining	Tantalum (only for sample cell length 20 ... 180 mm)		
	• Window	CaF_2, adhesive: E353, O-ring: FKM (e.g. Viton) or FFKM (Kalrez)		
With pipes	Bushing	SS, type No. 1.4571		
	Pipe	SS, type No. 1.4571, O-ring: FKM (e.g. Viton) or FFKM (Kalrez)		
	Sample cell:			
	• Body	Aluminum		
	• Cell lining	Aluminum or tantalum (Ta: only for sample cell length 20 ... 180 mm)		
	• Window	CaF_2, adhesive: E353, O-ring: FKM (e.g. Viton) or FFKM (Kalrez)		

Options

Gas path		19“ unit	Field unit	Ex field unit
Flowmeter	Metering pipe	Duran glass	—	—
	Float	Duran glass		
	Float limit	PTFE (e.g. Teflon)		
	Elbows	FKM (e.g. Viton)		
Pressure switch	Membrane	FKM (e.g. Viton)	—	—
	Enclosure	PA 6.3 T		

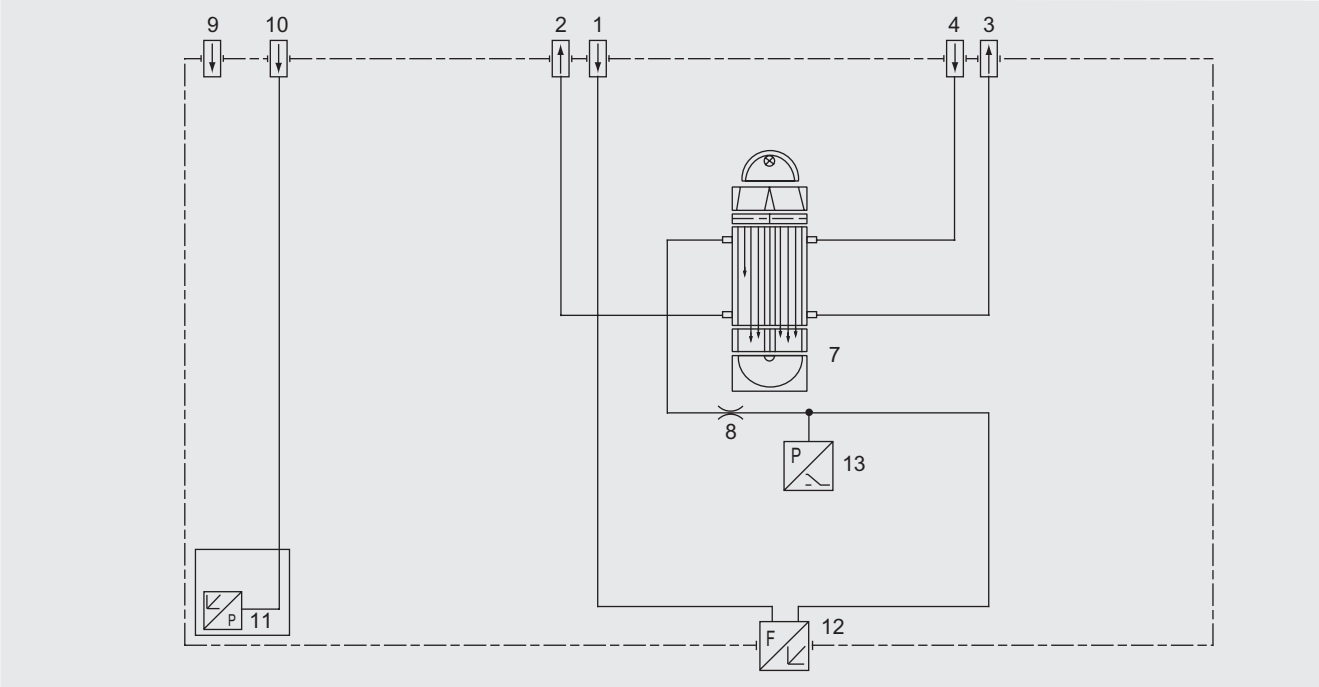
Versions – Wetted parts, special applications (examples)

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

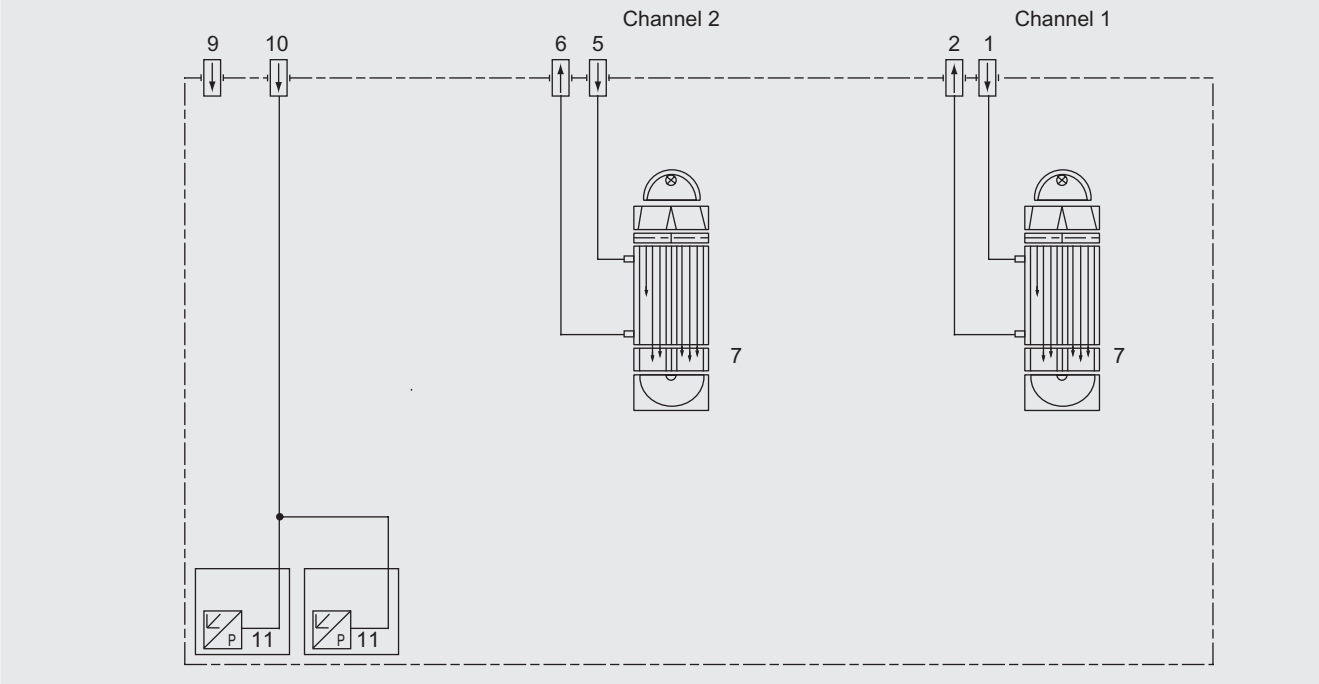
Gas path (19“ unit)

Key to gas path figures

1 Sample gas inlet channel 1
2 Sample gas outlet channel 1
3 Reference gas outlet (option)
4 Reference gas inlet (option)
5 Sample gas inlet channel 2
6 Sample gas outlet channel 2
7 IR bench
8 Restriction
9 Purging gas inlet
10 Gas inlet atmospheric pressure sensor
11 Atmospheric pressure sensor
12 Flowmeter in sample gas path (option)
13 Pressure switch in sample gas path (option)



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



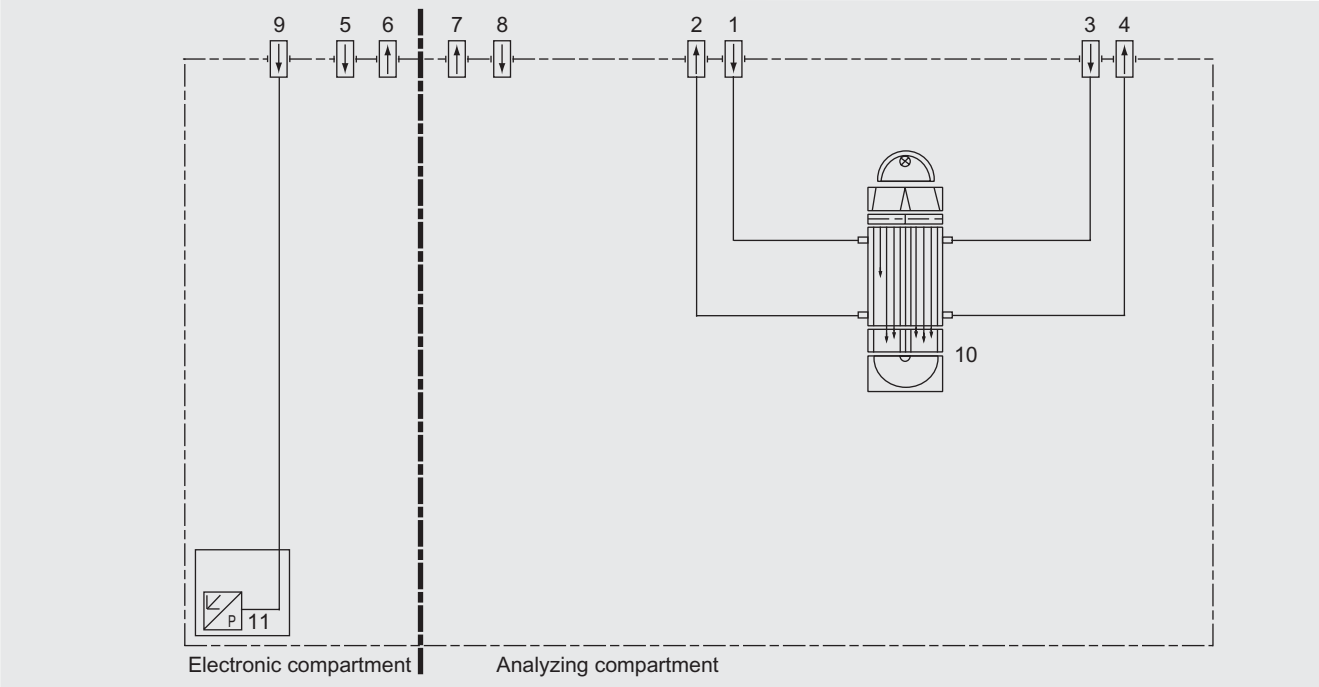
Gas path ULTRAMAT 6, dual-channel unit, 19“ unit

General

Gas path (field unit)

Key to gas path figures

1 Sample gas inlet
2 Sample gas outlet
3 Reference gas inlet (option)
4 Reference gas outlet (option)
5 Purging gas inlet (electronic compartment)
6 Purging gas outlet (electronic compartment)
7 Purging gas outlet (anlyzing compartment)
8 Purging gas inlet (anlyzing compartment)
9 Gas inlet atmospheric pressure sensor
10 IR bench
11 Atmospheric pressure sensor



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

Function

Mode 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 cell (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 cell and interrupts the two beams alternately and periodically. If absorption takes place in the sample cell, 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 grids heated to approx. 120 °C which, together with two further resistors, form a Wheatstone bridge. The pulsating flow together with the very close arrangement of the Ni grids leads to 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 have to enter the analyzer dustfree. Avoid condensate in the sample cells. Therefore an appropriate gas preparation is required in most applications.

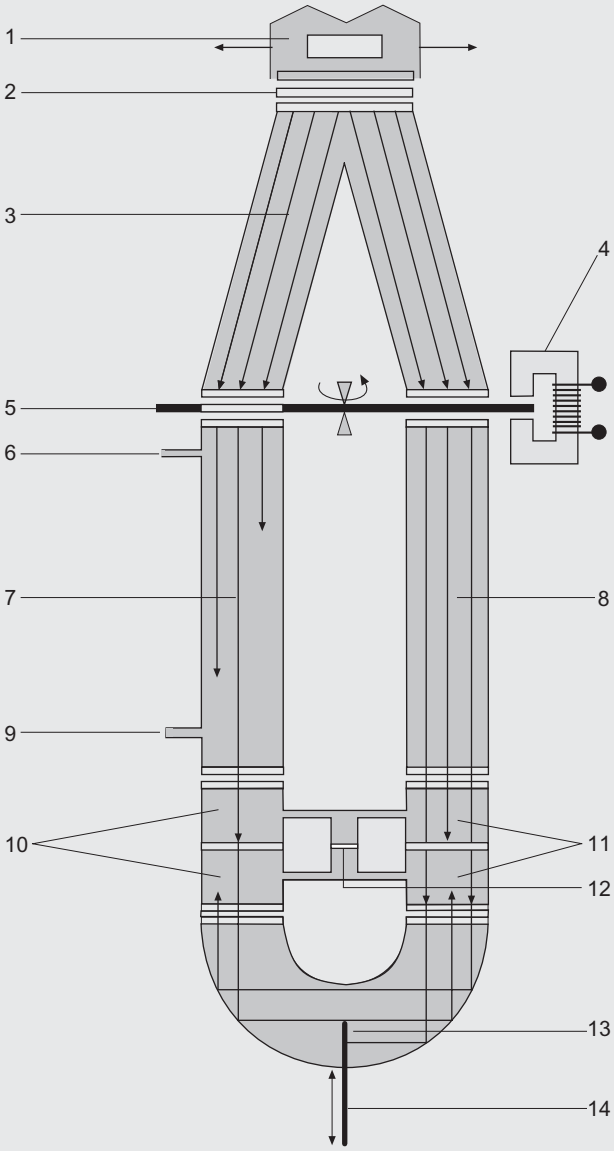
The ambient air of the analyzer should be, in a large extent, free of high concentration of the component to be measured.

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

Reference side with reduced flow must not exceed 70% of O_2 content.

Channels with electronically suppressed zero only differ from the standard version by the measuring ranges parameterization.

Physically suppressed zeros are implemented as special applications.



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, mode of operation

General

Essential characteristics

- Dimension of measured value freely selectable (e.g. vpm, mg/m^3)
- Four freely-programmable measuring ranges per component
- Measuring ranges with suppressed zero possible
- Measuring range identification
- One electrically isolated signal output 0/2/4 to 20 mA per component
- Autoranging or manual range switching possible; remote switching is also possible
- Differential measuring ranges with flow-type reference cell
- Storage of measured values possible during calibration
- Time constants selectable within wide limits (static/dynamic noise suppression); i.e. the response time of the analyzer or the component can be matched to the respective application
- Fast response time
- Low long-term drift
- Measuring-point selection 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 600 to 1200 hPa absolute
- External pressure sensor can be connected for correction of variations in the process gas pressure in the range 600 to 1500 hPa absolute (option)
- Two-stage access code to prevent unintentional and unauthorized inputs
- Automatic range calibration can be parameterized
- Simple handling using menu-based operation with numerical membrane keyboard
- Operation based on NAMUR Recommendation
- Customer-specific analyzer versions such as e.g.:
  - Customer acceptance
  - Tag labels
  - Drift recording
- Simple analyzer exchange since electric connections are easy to remove
- Sample cell for use in presence of highly corrosive sample gases (e.g. tantalum layer or Hastelloy C22)

Additional characteristics, 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
- Channels 1 and 2 can be converted to connection in series (linking of gas connections from channel 1 to channel 2 on rear)

Technical specifications

General

Measuring ranges	4, internally and externally switchable; automatic measuring range changeover also possible
Smallest possible measuring range	Dependent on the application: e.g. CO: 0 to 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 measuring span 20%
Operating position	Front wall, vertical
Conformity	CE mark in accordance with EN 50081-1, EN 50082-2

Design, enclosure

Weight	Approximately 15 kg (with one IR channel)
	Approximately 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
Auxiliary power	100 ... 120 V AC (rated range 90 to 132 V), 48 ... 63 Hz or 200 ... 240 V AC (rated range 180 to 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 ... 1500 hPa (absolute)
- With pressure switch	600 ... 1300 hPa (absolute)
• With pipes (without pressure switch)	600 ... 1500 hPa (absolute)
Sample gas flow	18 ... 90 l/h (0.3 ... 1.5 l/min)
Sample gas temperature	0 ... 50 °C
Sample gas humidity	< 90% RH (relative humidity), or dependent on application, non-condensing

Dynamic response

Warm-up period	At room temperature < 30 min (the technical specification will be met after 2 hours)
Display delay (T_{90}-time)	Dependent on length of analysis cell, 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	600 ... 1200 hPa absolute
• External	600 ... 1500 hPa absolute

Measuring response (relating ... sample gas pressure 1013 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
Repeat precision	≤ 1% of the current measuring range
Minimum detectable quantity	1% of the smallest possible measuring range
Linearity error	< 0.5% of the full-scale value

Influencing variable (relating to sample gas pressure 1013 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 reception cell temperature)
Sample gas pressure	When pressure compensation has been switched on: < 0.15% of the measuring span/1% atmospheric pressure change
	When pressure compensation has been switched off: < 1.5% of the measuring span/1% atmospheric pressure change
Sample gas flow	Negligible
Auxiliary power	< 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, potential-free; load ≤ 750 Ω
Relay outputs	6, with changeover contacts, freely parameterizable, e.g. for measuring range identification; loading capacity: 24 V AC/DC/1 A, potential-free, non-sparking
Analog inputs	2, dimensioned for 0/2/4 ... 20 mA for external pressure sensor and residual gas influence correction (correction of diagonal gas)
Binary inputs	6, designed for 24 V, potential-free, freely parameterizable, e.g. for measurement range changeover
Serial interface	RS 485
Options	AUTOCAL function each 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) within average annual value, during storage and transportation (dew point must not be undershot)

ULTRAMAT 6

19" unit

2

Selection and Ordering Data

Order No.

ULTRAMAT 6 gas analyzer D) **7MB2121-** ■■■■■ - ■AA■
Single-channel 19" unit for installation in cabinets

Cannot be combined

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 codes**		
CO		11 ... 30	A	
CO highly selective (with optical filter)		12 ... 30	B	
CO (TÜV; see table TÜV, single component)			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 tableTÜV, single component)		13 ... 30	N	
NO (TÜV; see table TÜV, single component)		14 ... 20, 22	P	
NH_3 (dry)		14 ... 30	Q	Q
H_2O		17 ... 20, 22	R	R
N_2O		13 ... 30	S	
Smallest meas. range	**Largest meas. range**	**Measuring range code**		
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 ... 1000 vpm	13	D	
0 ... 100 vpm	0 ... 1000 vpm	14	E	
0 ... 300 vpm	0 ... 3000 vpm	15	F	
0 ... 500 vpm	0 ... 5000 vpm	16	G	
0 ... 1000 vpm	0 ... 10000 vpm	17	H	
0 ... 3000 vpm	0 ... 10000 vpm	18	J	
0 ... 3000 vpm	0 ... 30000 vpm	19	K	
0 ... 5000 vpm	0 ... 15000 vpm	20	L	
0 ... 5000 vpm	0 ... 50000 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 cell[1] (lining)**	**Reference cell (flow-type)**		
Hose made from FKM (Viton)	Aluminum	Non-flow-type	0	0 0 → A20, A21
	Aluminum	Flow-type	1	1
Pipe made from titanium	Tantalum	Non-flow-type	4	4 → A20, A21, Y02
	Tantalum	Flow-type	5	5 → Y02
Pipe made of stainless steel (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 from FKM (Viton)	Aluminum	Non-flow-type	2	2 2 → A20, A21
	Aluminum	Flow-type	3	3

[1] Only for cell lengths between 20 and 180 mm

D) Subject to AL export regulations: 9I999, ECCN: N

Selection and Ordering Data

		Order No.	
ULTRAMAT 6 gas analyzer Single-channel 19" unit for installation in cabinets	D)	**7MB2121-** ■■■■■ - ■ **A A** ■	Cannot be combined
Supplementary electronics			
Without		**0**	
AUTOCAL function			
• With 8 additional binary inputs/outputs		**1**	
• With serial interface for the automotive industry (AK)		**3**	**3 → E20**
• With 8 binary inputs/outputs, PROFIBUS PA interface		**6**	
• With 8 binary inputs/outputs, PROFIBUS DP interface		**7**	
Auxiliary power			
100 ... 120 V AC, 48 ... 63 Hz		**0**	
200 ... 240 V AC, 48 ... 63 Hz		**1**	
Operator software and documentation			
German		**0**	
English		**1**	
French		**2**	
Spanish		**3**	
Italian		**4**	

Further versions	Order code
Add "-Z" to Order No. and specify order code	
Flow-type reference compartment with reduced flow, 6 mm	**A20**
Flow-type reference compartment with reduced flow, ¼"	**A21**
Telescopic rails (2 units)	**A31**
Set of Torx screwdrivers, Allen screwdrivers	**A32**
TAG labels (specific inscription based on customer information)	**B03**
Kalrez gaskets in sample gas path	**B04**
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 interference influences)	**Y13**
TÜV version acc. to 17. BImSch	**Y17**

Retrofitting sets		Order No.
RS 485/Ethernet converter		**A5E00852383**
RS 485/RS 232 converter	D)	**C79451-Z1589-U1**
RS 485/USB converter		**A5E00852382**
AUTOCAL function with serial interface for the automotive industry (AK)	E)	**C79451-A3480-D512**
AUTOCAL function with 8 binary inputs/outputs	D)	**C79451-A3480-D511**
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS PA	D)	**A5E00057307**
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS DP	D)	**A5E00057312**

D) Subject to AL export regulations: 9I999, ECCN: N
E) Subject to AL export regulations: 9I999, ECCN: EAR99

ULTRAMAT 6

19" unit

2

Selection and Ordering Data

Order No.

ULTRAMAT 6 gas analyzer D) **7MB2123-** ■■■■■ - ■■■■

Two-channel 19" unit for installation in cabinets for measuring 2 IR components

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 codes		
CO		11 ... 30	A	
CO highly selective (with optical filter)		12 ... 30	B	
CO (TÜV; see table TÜV, 2 components)			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, 2 components)		13 ... 30	N	
NO (TÜV; see table TÜV, 2 components)		14 ... 20, 22	P	
NH_3 (dry)		14 ... 30	Q	Q
H_2O		17 ... 20, 22	R	R
N_2O		13 ... 30	S	
Smallest meas. range	Largest meas. range	Meas. range code		
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 ... 1000 vpm	13	D	
0 ... 100 vpm	0 ... 1000 vpm	14	E	
0 ... 300 vpm	0 ... 3000 vpm	15	F	
0 ... 500 vpm	0 ... 5000 vpm	16	G	
0 ... 1000 vpm	0 ... 10000 vpm	17	H	
0 ... 3000 vpm	0 ... 10000 vpm	19	J	
0 ... 3000 vpm	0 ... 30000 vpm	19	K	
0 ... 5000 vpm	0 ... 15000 vpm	20	L	
0 ... 5000 vpm	0 ... 50000 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 cell[1)] (lining)	Reference cell (flow-type)		
Hose made from FKM (Viton)	Aluminum	Non-flow-type	0	0 → A20, A21, A40, A41
	Aluminum	Flow-type	1	1
Pipe made from titanium	Tantalum	Non-flow-type	4	4 → A20, A21, A40, A41, Y02
	Tantalum	Flow-type	5	5 → Y02
Pipe made of stainless steel (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 from FKM (Viton)	Aluminum	Non-flow-type	2	2 → A20, A21, A40, A41
	Aluminum	Flow-type	3	3

[1)] Only for cell lengths between 20 and 180 mm

D) Subject to AL export regulations: 9I999, ECCN: N

Selection and Ordering Data

Order No.

ULTRAMAT 6 gas analyzer D) **7MB2123-** ■■■■■ - ■■■
Two-channel 19" unit for installation in cabinets for measuring 2 IR components

Cannot be combined

Supplementary electronics		
Without	0	
AUTOCAL function		
• With 8 additional binary inputs/outputs for channel 1	1	
• With 8 additional binary inputs/outputs for channel 2	2	
• With 8 additional binary inputs/outputs for channel 1 and channel 2	3	
• With serial interface for the automotive industry (AK)	5	5 → E20
• With an additional 8 binary inputs/outputs for channel 1 and channel 2 and PROFIBUS PA interface	6	
• With an additional 8 binary inputs/outputs for channel 1 and channel 2 and PROFIBUS DP interface	7	
Auxiliary power		
100 ... 120 V AC, 48 ... 63 Hz	0	
200 ... 240 V AC, 48 ... 63 Hz	1	

Channel 2 Measured component	Possible with Measuring range codes		
CO	11 ... 30	A	
CO highly selective (with optical filter)	12 ... 30	B	
CO (TÜV; see table TÜV, 2 components)		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, 2 components)	13 ... 30	N	
NO (TÜV; see table TÜV, 2 components)	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 code	
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 ... 1000 vpm	13	D
0 ... 100 vpm	0 ... 1000 vpm	14	E
0 ... 300 vpm	0 ... 3000 vpm	15	F
0 ... 500 vpm	0 ... 5000 vpm	16	G
0 ... 1000 vpm	0 ... 10000 vpm	17	H
0 ... 3000 vpm	0 ... 10000 vpm	19	J
0 ... 3000 vpm	0 ... 30000 vpm	19	K
0 ... 5000 vpm	0 ... 15000 vpm	20	L
0 ... 5000 vpm	0 ... 50000 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

Operator software and documentation	
German	0
English	1
French	2
Spanish	3
Italian	4

D) Subject to AL export regulations: 9I999, ECCN: N

19" unit

2

Selection and Ordering Data

Further versions		Order code	Cannot be combined
Add "-Z" to Order No. and specify order codes.			
Flow-type reference compartment with reduced flow, 6 mm (channel 1)		**A20**	
Flow-type reference compartment with reduced flow, ¼" (channel 1)		**A21**	
Flow-type reference compartment with reduced flow, 6 mm (channel 2)		**A40**	
Flow-type reference compartment with reduced flow, ¼" (channel 2)		**A41**	
Connection pipes (can only be combined with the appropriate gas connection diameter and internal gas path materials)			
- Titanium connection pipe, 6 mm, complete with screwed gland, for sample gas compartment		**A22**	
- Titanium connection pipe, 6 mm, complete with screwed gland, for reference gas compartment		**A23**	
- Titanium connection pipe, ¼", complete with screwed gland, for sample gas compartment		**A24**	
- Titanium connection pipe, ¼", complete with screwed gland, for reference gas compartment		**A25**	
- Stainless steel (Mat. No. 1.4571) connection pipe, 6 mm, complete with screwed gland, for sample gas compartment		**A27**	
- Stainless steel (Mat. No. 1.4571) connection pipe, ¼", complete with screwed gland, for sample gas compartment		**A29**	
Telescopic rails (2 units)		**A31**	
Set of Torx screwdrivers, Allen screwdrivers		**A32**	
TAG labels (specific inscription based on customer information)		**B03**	
Kalrez gaskets in sample gas path (channel 1)		**B04**	
Kalrez gaskets in sample gas path (channel 2)		**B05**	
CSA certificate – Class I Div 2		**E20**	
Clean for O_2 service (specially cleaned gas path; channels 1 + 2)		**Y02**	→ **A22 - A25**
Measurement 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 interference influences)		**Y13**	
TÜV version acc. to 17. BImSch		**Y17**	
Retrofitting sets		Order No.	
RS 485/Ethernet converter		**A5E00852382**	
RS 485/RS 232 converter	D)	**C79451-Z1589-U1**	
RS 485/USB converter		**A5E00852383**	
AUTOCAL function with serial interface for the automotive industry (AK)	D)	**C79451-A3480-D33**	
AUTOCAL function with 8 binary inputs/outputs for channel 1 or channel 2	D)	**C79451-A3480-D511**	
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS PA for channel 1 or channel 2	D)	**A5E00057307**	
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS DP for channel 1 or channel 2	D)	**A5E00057312**	

D) Subject to AL export regulations: 9I999, ECCN: N

Selection and Ordering Data

Order No.

ULTRAMAT 6 gas analyzer D) **7MB2124-** ■■■■■ - ■■■■

One- or two-channel 19" unit for installation in cabinets for measuring 2 to 3 IR components

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
Measured component	Smallest meas. range	Largest meas. range		
CO NO	0 ... 100 vpm 0 ... 100 vpm	0 ... 1000 vpm 0 ... 1000 vpm	AA	
CO NO	0 ... 300 vpm 0 ... 300 vpm	0 ... 3000 vpm 0 ... 3000 vpm	AB	
CO NO	0 ... 1000 vpm 0 ... 1000 vpm	0 ... 10000 vpm 0 ... 10000 vpm	AC	
For CO/NO (TÜV; see table TÜV 2 components)				
CO_2 CO	0 ... 100 vpm 0 ... 100 vpm	0 ... 1000 vpm 0 ... 1000 vpm	BA	
CO_2 CO	0 ... 300 vpm 0 ... 300 vpm	0 ... 3000 vpm 0 ... 3000 vpm	BB	
CO_2 CO	0 ... 1000 vpm 0 ... 1000 vpm	0 ... 10000 vpm 0 ... 10000 vpm	BC	
CO_2 CO	0 ... 3000 vpm 0 ... 3000 vpm	0 ... 30000 vpm 0 ... 30000 vpm	BD	
CO_2 CO	0 ... 1% 0 ... 1%	0 ... 10% 0 ... 10%	BE	
CO_2 CO	0 ... 3% 0 ... 3%	0 ... 30% 0 ... 30%	BF	
CO_2 CO	0 ... 10% 0 ... 10%	0 ... 100% 0 ... 100%	BG	
CO_2 CH_4	0 ... 10% 0 ... 10%	0 ... 100% 0 ... 100%	CG	
CO_2 NO	0 ... 100 vpm 0 ... 100 vpm	0 ... 1000 vpm 0 ... 1000 vpm	DA	
CO_2 NO	0 ... 300 vpm 0 ... 300 vpm	0 ... 3000 vpm 0 ... 3000 vpm	DB	
Internal gas paths	Sample cell[1] (lining)	Reference cell (flow-type)		
Hose made from FKM (Viton)	Aluminum	Non-flow-type		0 0 → A20, A21, A40, A41
	Aluminum	Flow-type	1	1
Pipe made from titanium	Tantalum	Non-flow-type	4	4 → A20, A21, A40, A41, Y02
	Tantalum	Flow-type	5	5 → Y02
Pipe made of stainless steel (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 from FKM (Viton)	Aluminum	Non-flow-type	2	2 2 → A20, A21, A40, A41
	Aluminum	Flow-type	3	3
Supplementary electronics				
Without			0	
AUTOCAL function				
• With 8 additional binary inputs/outputs for channel 1			1	
• With 8 additional binary inputs/outputs 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 an additional 8 binary inputs/outputs for channel 1 and PROFIBUS PA interface			5	
• With an additional 8 binary inputs/outputs for channel 1 and channel 2 and PROFIBUS PA interface			6	6
• With an additional 8 binary inputs/outputs for channel 1 and PROFIBUS DP interface			7	
• With an additional 8 binary inputs/outputs for channel 1 and channel 2 and PROFIBUS DP interface			8	8

[1] Only for cell lengths between 20 and 180 mm

D) Subject to AL export regulations: 9I999, ECCN: N

19" unit

2

Selection and Ordering Data

Order No.

ULTRAMAT 6 gas analyzer D) **7MB2124-** ■■■■■ - ■■■■

One- or two-channel 19" unit for installation in cabinets for measuring 2 to 3 IR components

Cannot be combined

Auxiliary power				
100 ... 120 V AC, 48 ... 63 Hz			0	
200 ... 240 V AC, 48 ... 63 Hz			1	
Channel 2 Measured component		Possible with Measuring range codes		
Without channel 2			W	W
CO		11 ... 30	A	
CO highly selective (with optical filter)		12 ... 30	B	
CO (TÜV; see table TÜV, 2 components)			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, 2 components)		13 ... 30	N	
NO (TÜV; see table TÜV, 2 components)		14 ... 20, 22	P	
NH_3 (dry)		14 ... 30	Q	Q
H_2O		17 ... 20, 22	R	R
N_2O		13 ... 30	S	
Smallest meas. range	Largest meas. range	Meas. range code		
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 ... 1000 vpm	13	D	
0 ... 100 vpm	0 ... 1000 vpm	14	E	
0 ... 300 vpm	0 ... 3000 vpm	15	F	
0 ... 500 vpm	0 ... 5000 vpm	16	G	
0 ... 1000 vpm	0 ... 10000 vpm	17	H	
0 ... 3000 vpm	0 ... 10000 vpm	19	J	
0 ... 3000 vpm	0 ... 30000 vpm	19	K	
0 ... 5000 vpm	0 ... 15000 vpm	20	L	
0 ... 5000 vpm	0 ... 50000 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	
Operator software and documentation				
German				0
English				1
French				2
Spanish				3
Italian				4

D) Subject to AL export regulations: 9I999, ECCN: N

Selection and Ordering Data

Further versions		Order code	Cannot be combined
Add "-Z" to Order No. and specify order codes.			
Flow-type reference compartment with reduced flow, 6 mm (channel 1)		**A20**	
Flow-type reference compartment with reduced flow, ¼" (channel 1)		**A21**	
Flow-type reference compartment with reduced flow, 6 mm (channel 2)		**A40**	
Flow-type reference compartment with reduced flow, ¼" (channel 2)		**A41**	
Connection pipes (can only be combined with the appropriate gas connection diameter and internal gas path materials)			
- Titanium connection pipe, 6 mm, complete with screwed gland, for sample gas compartment		**A22**	
- Titanium connection pipe, 6 mm, complete with screwed gland, for reference gas compartment		**A23**	
- Titanium connection pipe, ¼", complete with screwed gland, for sample gas compartment		**A24**	
- Titanium connection pipe, ¼", complete with screwed gland, for reference gas compartment		**A25**	
- Stainless steel (Mat. No. 1.4571) connection pipe, 6 mm, complete with screwed gland, for sample gas compartment		**A27**	
- Stainless steel (Mat. No. 1.4571) connection pipe, ¼", complete with screwed gland, for sample gas compartment		**A29**	
Telescopic rails (2 units)		**A31**	
Set of Torx screwdrivers, Allen screwdrivers		**A32**	
TAG labels (specific inscription based on customer information)		**B03**	
Kalrez gaskets in sample gas path (channel 1)		**B04**	
Kalrez gaskets in sample gas path (channel 2)		**B05**	
CSA certificate – Class I Div 2		**E20**	
Clean for O_2 service (specially cleaned gas path; channels 1 + 2)		**Y02**	→ **A22 - A25**
Measurement 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 interference influences)		**Y13**	
TÜV version acc. to 17. BImSch		**Y17**	
TÜV version acc. to 17. BImSch (channel 2)		**Y18**	
Retrofitting sets		Order No.	
RS 485/Ethernet converter		**A5E00852383**	
RS 485/RS 232 converter	D)	**C79451-Z1589-U1**	
RS 485/USB converter		**A5E00852382**	
AUTOCAL function with serial interface for the automotive industry (AK)	D)	**C79451-A3480-D33**	
AUTOCAL function with 8 binary inputs/outputs for channel 1 or channel 2	D)	**C79451-A3480-D511**	
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS PA for channel 1 or channel 2	D)	**A5E00057307**	
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS DP for channel 1 or channel 2	D)	**A5E00057312**	

D) Subject to AL export regulations: 9I999, ECCN: N

ULTRAMAT 6

19" unit

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	1500 mg/m³		
D	50 mg/m³	1000 mg/m³	300 mg/m³	3000 mg/m³		
E			500 mg/m³	5000 mg/m³	100 mg/m³	2000 mg/m³
F	300 mg/m³	3000 mg/m³	1000 mg/m³	10000 mg/m³	300 mg/m³	3000 mg/m³
G	500 mg/m³	5000 mg/m³			500 mg/m³	5000 mg/m³
H	1000 mg/m³	10000 mg/m³	3000 mg/m³	30000 mg/m³	1000 mg/m³	10000 mg/m³
K	3000 mg/m³	30000 mg/m³	10 g/m³	100 g/m³	3000 mg/m³	30000 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	1000 g/m³	30 g/m³	300 g/m³
V	100 g/m³	1160 g/m³	300 g/m³	2630 g/m³	100 g/m³	1250 g/m³

Example for ordering

ULTRAMAT 6, TÜV
Component CO
Measuring range 0 … 50/1000 mg/m³
with hoses, non-flow-type reference compartment
without automatic adjustment (AUTOCAL)
230 V AC; English
7MB2121-0XD00-1AA1-Z +Y17

TÜV, 2 components in series

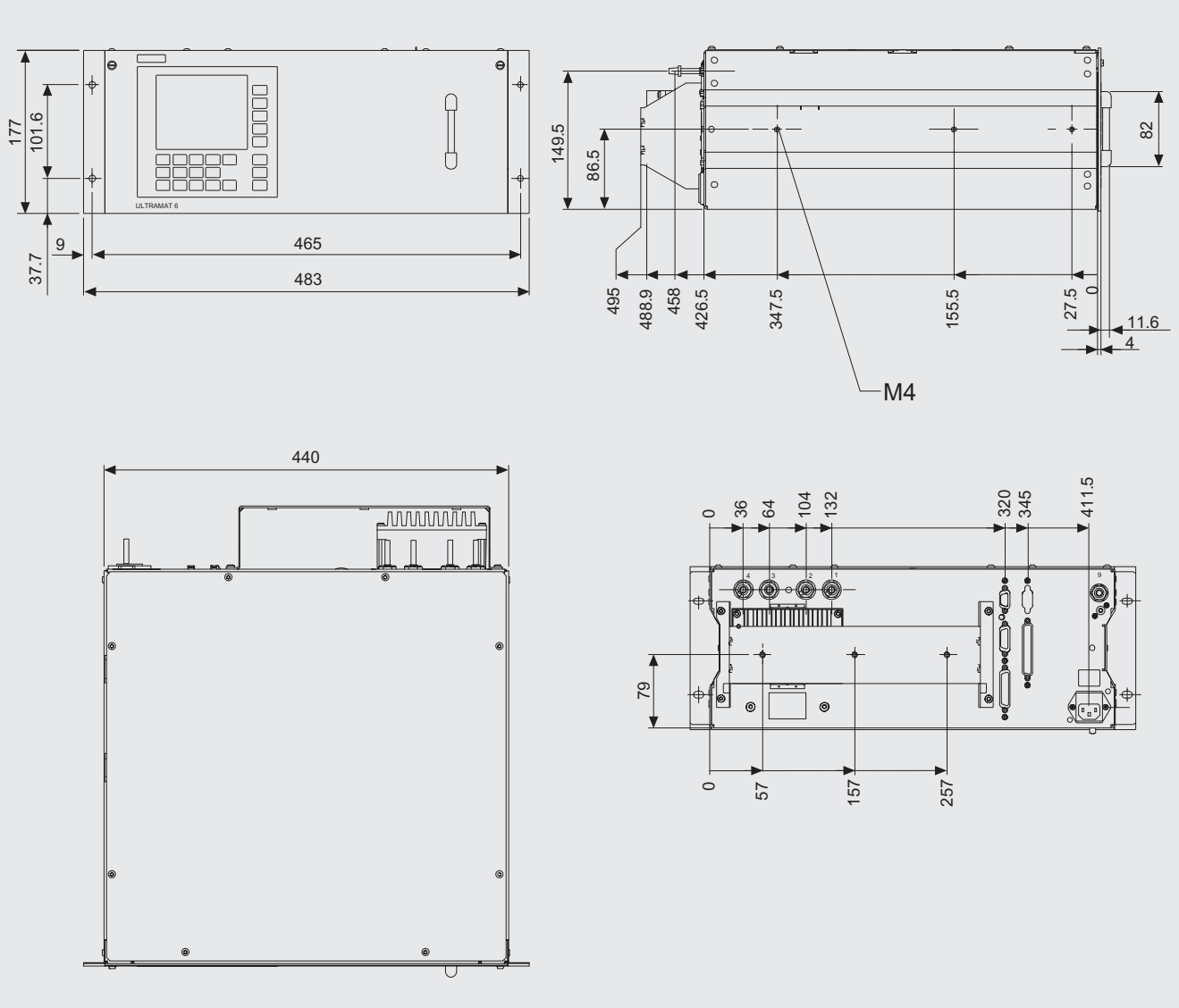
Component	CO (TÜV)		NO (TÜV)	
Measuring range identification	Smallest measuring range from 0 to ...	Largest measuring range from 0 to ...	Smallest measuring range from 0 to ...	Largest measuring range from 0 to ...
AA	75 mg/m³	1000 mg/m³	200 mg/m³	2000 mg/m³
AB	300 mg/m³	3000 mg/m³	300 mg/m³	3000 mg/m³
AC	1000 mg/m³	10000 mg/m³	1000 mg/m³	10000 mg/m³

Example for ordering

ULTRAMAT 6, TÜV (2- component unit)
Components CO/NO + SO_2
Measuring range CO: 0 … 75/1000 mg/m³,
NO: 0 … 200/2000 mg/m³,
SO_2 : 0 … 75/1500 mg/m³,
with hoses, non-flow-type reference compartment
without automatic adjustment (AUTOCAL)
230 V AC; English
7MB2124-0AA00-1NC1-Z +Y17 +Y18

Note: for 3 components take both tables into consideration.

Dimensional drawings

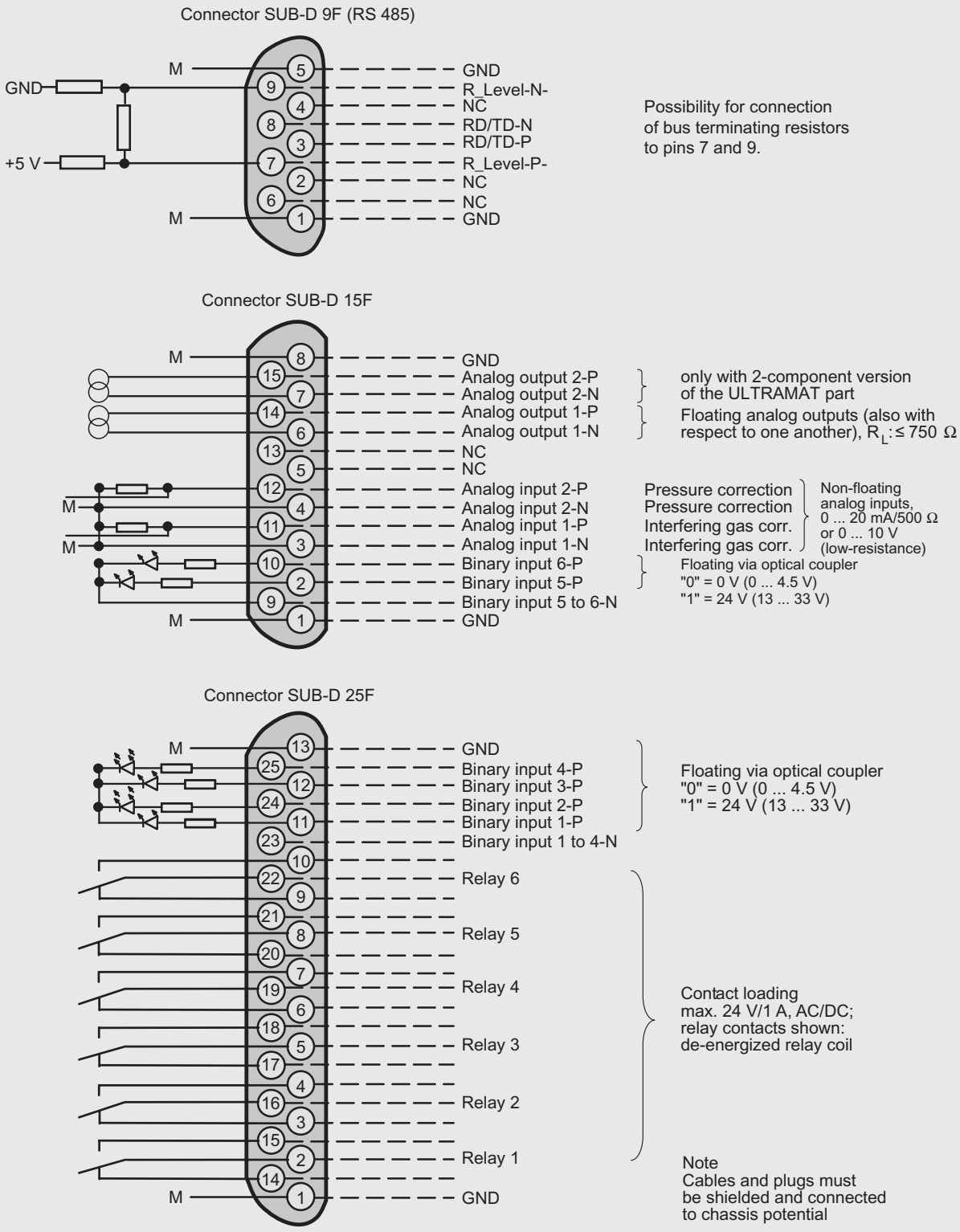


ULTRAMAT 6, 19“ unit, dimensions in mm (example: 1-channel version)

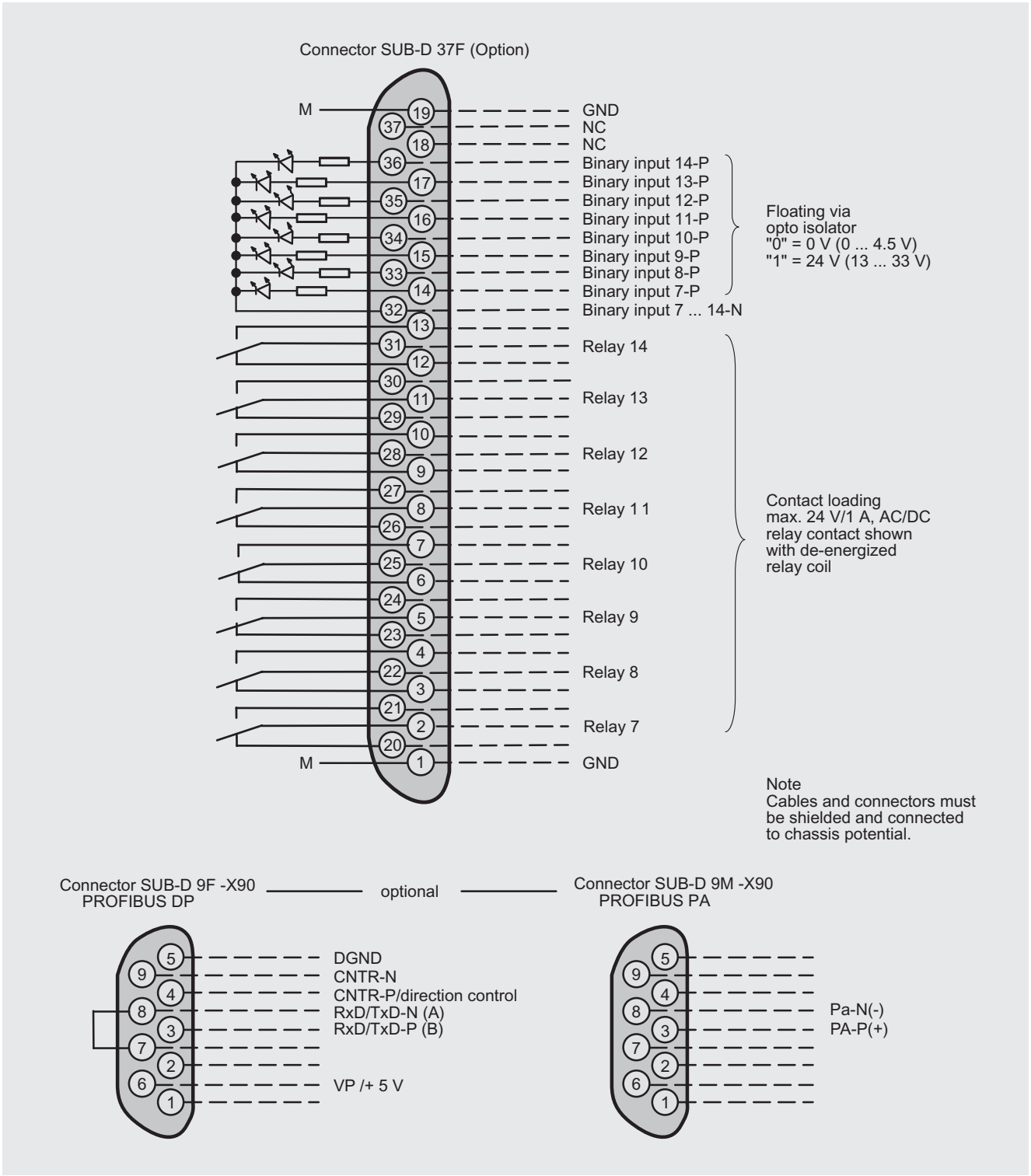
2

Schematics

Pin assignment (electrical and gas connections)

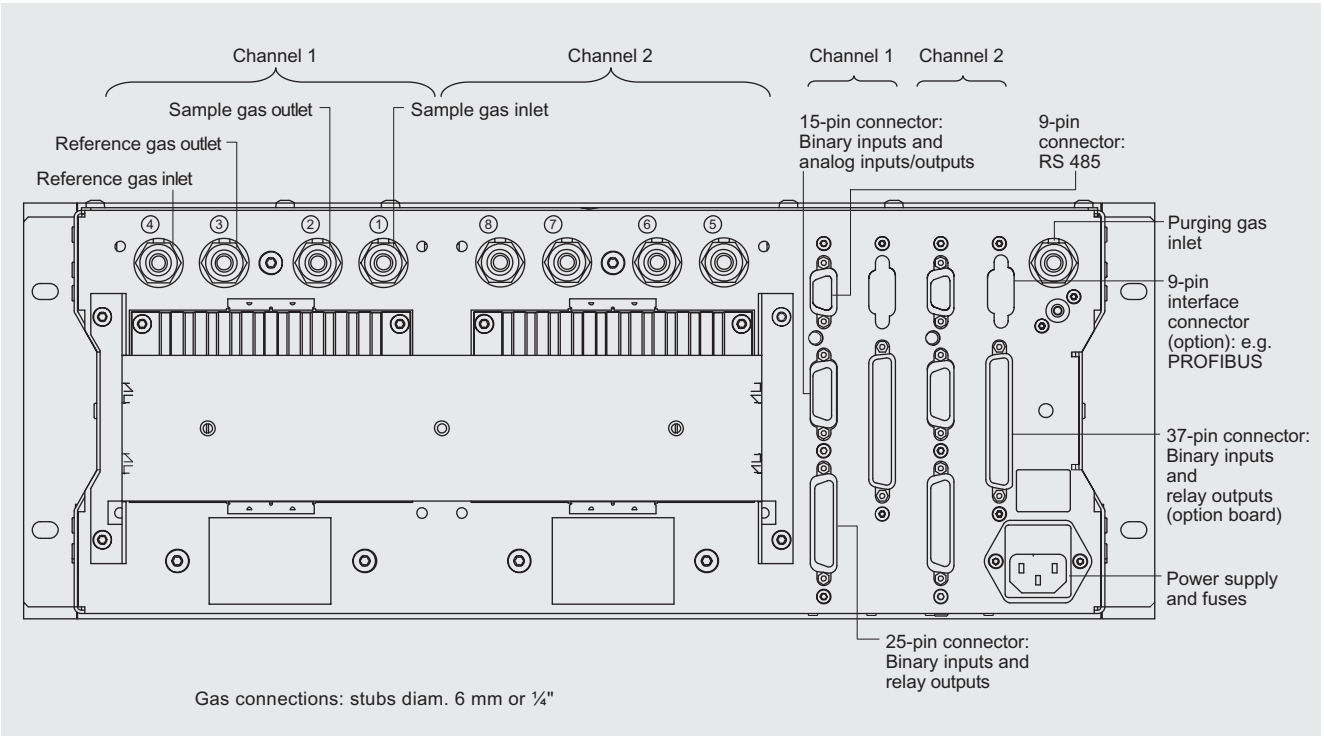


ULTRAMAT 6, 19“ unit, pin assignment



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

19" unit



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

Technical specifications

General	
Measuring ranges	4, internally and externally switchable; automatic measuring range changeover 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 measuring span 20%
Heated version	65 °C
Operating position	Front wall, vertical
Conformity	CE mark in accordance with EN 50081-1, EN 50082-2
Design, enclosure	
Weight	Approximately 32 kg
Degree of protection	IP65 in accordance with EN 60529, restricted breathing enclosure to EN 50021
Electrical characteristics	
Auxiliary power	100 ... 120 V AC (rated range 90 to 132 V), 48 ... 63 Hz or 200 ... 240 V AC (rated range 180 to 264 V), 48 ... 63 Hz
Power consumption	Approximately 35 VA; approximately 330 VA for 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 ... 1500 hPa (absolute)
• With pipes (without pressure switch)	600 ... 1500 hPa (absolute)
- Ex (leakage compensation)	600 ... 1160 hPa (absolute)
- Ex (continuous purging)	600 ... 1500 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	0 ... 50 °C, for heated version 0 ... 80 °C
Sample gas humidity	< 90% RH (RH: relative humidity) or dependent on application
Dynamic response	
Warm-up period	At room temperature < 30 min (the technical specification will be met after 2 hours)
Display delay (T_{90}-time)	Dependent on length of analysis cell, 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	600 ... 1200 hPa absolute
• External	600 ... 1500 hPa absolute
Measuring response (relating to sample gas pressure 1013 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
Repeat precision	≤ 1% of the current measuring range
Minimum detectable quantity	1% of the smallest possible measuring range
Linearity error	< 0.5% of the full-scale value
Influencing variable (relating to sample gas pressure 1013 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 reception cell temperature)
Sample gas pressure	When pressure compensation has been switched on: < 0.15% of setpoint/1% atmospheric pressure change
Sample gas flow	Negligible
Auxiliary power	< 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, potential-free; load 750 Ω
Relay outputs	6, with changeover contacts, freely parameterizable, e.g. for measuring range identification; loading capacity: 24 V AC/DC/1 A, potential-free, non-sparking
Analog inputs	2, dimensioned for 0/2/4 ... 20 mA for external pressure sensor and residual gas influence correction (correction of diagonal gas)
Binary inputs	6, designed for 24 V, potential-free, freely parameterizable, e.g. for measurement range changeover
Serial interface	RS 485
Options	AUTOCAL function each 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)

Field unit

2

Selection and Ordering Data

Order No.

ULTRAMAT 6 gas analyzer D) **7MB2111-** ■■■■■ - ■■A■ Cannot be combined
For installation in the field, single-channel, 1 component

Gas connections		Cannot be combined
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 codes	
CO	11 ... 30	A
CO highly selective (with optical filter)	12 ... 30	B
CO (TÜV; see table TÜV, single component)		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)	13 ... 30	N
NO (TÜV; see table TÜV, single component)	14 ... 20, 22	P
NH_3 (dry)	14 ... 30	Q
H_2O	17 ... 20; 22 (17 ... 24, 26; heated)	R
N_2O	13 ... 30	S

Smallest meas. range	Largest meas. range	Measuring range code	
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 ... 1000 vpm	13	D
0 ... 100 vpm	0 ... 1000 vpm	14	E
0 ... 300 vpm	0 ... 3000 vpm	15	F
0 ... 500 vpm	0 ... 5000 vpm	16	G
0 ... 1000 vpm	0 ... 10000 vpm	17	H
0 ... 3000 vpm	0 ... 10000 vpm	19	J
0 ... 3000 vpm	0 ... 30000 vpm	19	K
0 ... 5000 vpm	0 ... 15000 vpm	20	L
0 ... 5000 vpm	0 ... 50000 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

Selection and Ordering Data

Order No.

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

D) **7MB2111 - ■■■■■ - ■■ A ■**

Cannot be combined

Internal gas paths	Sample cell[1] (lining)	Reference cell (flow-type)		
Hose made from FKM (Viton)	Aluminum	Non-flow-type	0	0 0 0 → A28, A29
	Aluminum	Flow-type	1	1 1
Pipe made from titanium	Tantalum	Non-flow-type	2	2 → A28, A29, Y02
	Tantalum	Flow-type	3	3 → Y02
Pipe made of stainless steel (Mat. No. 1.4571)	Aluminum	Non-flow-type	6	6 → A28, A29
	Tantalum	Non-flow-type	8	8 → A28, A29

Supplementary electronics	
Without	0
AUTOCAL function	
• With 8 additional binary inputs/outputs	1
• With 8 binary inputs/outputs and PROFIBUS PA interface	6
• With 8 binary inputs/outputs and PROFIBUS DP interface	7
• With 8 binary inputs/outputs and PROFIBUS PA Ex-i	8

Auxiliary power	
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)	
• 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 for internal gas paths and analyzer section	
Without	A
With (max. 65 °C)	B

Language (supplied documentation, software)	
German	0
English	1
French	2
Spanish	3
Italian	4

[1] Only for cell lengths between 20 and 180 mm

[2] Only in connection with an approved purging unit.

D) Subject to AL export regulations: 9I999, ECCN: N

Field unit

2

Selection and Ordering Data

Further versions		Order code	Cannot be combined
Add "-Z" to Order No. and specify order codes.			
Flow-type reference compartment with reduced flow, 6 mm		**A28**	
Flow-type reference compartment with reduced flow, ¼"		**A29**	
Set of Torx screwdrivers, Allen screwdrivers		**A32**	
TAG labels (specific lettering based on customer information)		**B03**	
Kalrez gaskets in sample gas path		**B04**	
Ex versions			
For combination options, see Ex configurations table in "Ex versions"			
ATEX II 3G certificate; restricted breathing enclosure, non-flammable gases		**E11**	
ATEX II 3G certificate; flammable gases[1)]		**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[1)]		**E42**	
Clean for O_2 service (specially cleaned gas path)		**Y02**	
Measurement 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 interference influences)		**Y13**	
TÜV version acc. to 17. BImSch		**Y17**	
Additional units for Ex versions		Order No.	
Category ATEX II 2G (Zone 1)			
BARTEC EEx p control unit, 230 V, "leakage compensation"	D)	**7MB8000-2BA**	
BARTEC EEx p control unit, 115 V, "leakage compensation"	D)	**7MB8000-2BB**	
BARTEC EEx p control unit, 230 V, "continuous purging"	D)	**7MB8000-2CA**	
BARTEC EEx p control unit, 115 V, "continuous purging"	D)	**7MB8000-2CB**	
Ex isolation amplifier	D)	**7MB8000-3AA**	
Ex isolating relay, 230 V	D)	**7MB8000-4AA**	
Ex isolating relay, 110 V	D)	**7MB8000-4AB**	
Differential pressure switch for corrosive gases	E)	**7MB8000-5AA**	
Differential pressure switch for non-corrosive gases		**7MB8000-5AB**	
Stainless steel flame arrestor	D)	**7MB8000-6BA**	
Hastelloy flame arrestor	D)	**7MB8000-6BB**	
Category ATEX II 3G (Zone 2)			
BARTEC EEx p control unit (flammable gases)	D)	**7MB8000-1BA**	
FM/CSA (Class I Div. 2)			
Ex purging unit MiniPurge FM	D)	**7MB8000-1AA**	
Retrofitting sets		Order No.	
RS 485/Ethernet converter		**A5E00852383**	
RS 485/RS 232 converter	D)	**C79451-Z1589-U1**	
RS 485/USB converter		**A5E00852382**	
AUTOCAL function with 8 binary inputs/outputs	D)	**C79451-A3480-D33**	
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS PA	D)	**C79451-A3480-D511**	
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS DP	D)	**A5E00057307**	
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS PA Ex i (firmware 4.1.10 required)	D)	**A5E00057312**	

[1)] Only in connection with an approved purging unit.
D) Subject to AL export regulations: 9I999, ECCN: N
E) Subject to AL export regulations: 9I999, ECCN: EAR99H

Selection and Ordering Data

ULTRAMAT 6 gas analyzer
For installation in the field, single-channel, 2 components

Order No. D) **7MB2112-** ■■■■■ - ■■A■

				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 meas. range.**	**Largest meas. range**		
CO	0 ... 100 vpm	0 ... 1000 vpm	A A	
NO	0 ... 100 vpm	0 ... 1000 vpm		
CO	0 ... 300 vpm	0 ... 3000 vpm	A B	
NO	0 ... 300 vpm	0 ... 3000 vpm		
CO	0 ... 1000 vpm	0 ... 10000 vpm	A C	
NO	0 ... 1000 vpm	0 ... 10000 vpm		
For CO/NO (TÜV; see table TÜV, 2 components)				
CO_2	0 ... 100 vpm	0 ... 1000 vpm	B A	
CO	0 ... 100 vpm	0 ... 1000 vpm		
CO_2	0 ... 300 vpm	0 ... 3000 vpm	B B	
CO	0 ... 300 vpm	0 ... 3000 vpm		
CO_2	0 ... 1000 vpm	0 ... 10000 vpm	B C	
CO	0 ... 1000 vpm	0 ... 10000 vpm		
CO_2	0 ... 3000 vpm	0 ... 30000 vpm	B D	
CO	0 ... 3000 vpm	0 ... 30000 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 ... 1000 vpm	D A	
NO	0 ... 100 vpm	0 ... 1000 vpm		
CO_2	0 ... 300 vpm	0 ... 3000 vpm	D B	
NO	0 ... 300 vpm	0 ... 3000 vpm		
Internal gas paths	**Sample cell[1] (lining)**	**Reference cell (flow-type)**		
Hose made from FKM (Viton)	Aluminum	Non-flow-type	0	0 0 → A28, A29
	Aluminum	Flow-type	1	1
Pipe made from titanium	Tantalum	Non-flow-type	2	2 → A28, A29, Y02
	Tantalum	Flow-type	3	3 → Y02
Pipe made of stainless steel (Mat. No. 1.4571)	Aluminum	Non-flow-type	6	6 → A28, A29
	Tantalum	Non-flow-type	8	8 → A28, A29
Supplementary electronics				
Without			0	
AUTOCAL function				
• With 8 additional binary inputs/outputs			1	
• With 8 binary inputs/outputs and PROFIBUS PA interface			6	6
• With 8 binary inputs/outputs and PROFIBUS DP interface			7	7
• With 8 binary inputs/outputs and PROFIBUS PA Ex-i			8	8
Auxiliary power				
Standard unit and acc. to ATEX II 3G version				
• 100 ... 120 V AC, 48 ... 63 Hz			0	0
• 200 ... 240 V AC, 48 ... 63 Hz			1	1
ATEX II 2G versions				
• 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 for internal gas paths and analyzer section				
Without			A	
With (max. 65 °C)			B	
Language (supplied documentation, software)				
German			0	
English			1	
French			2	
Spanish			3	
Italian			4	

[1] Only for cell lengths between 20 and 180 mm

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

D) Subject to AL export regulations: 9I999, ECCN: N

Field unit

2

Selection and Ordering Data

Further versions		Order code
Add "-Z" to Order No. and specify order codes.		
Flow-type reference compartment with reduced flow, 6 mm		**A28**
Flow-type reference compartment with reduced flow, ¼"		**A29**
Set of Torx screwdrivers, Allen screwdrivers		**A32**
TAG labels (specific lettering based on customer information)		**B03**
Kalrez gaskets in sample gas path		**B04**
Ex versions		
For combination options, see Ex configurations table in "Ex versions"		
ATEX II 3G certificate; restricted breathing enclosure, non-flammable gases		**E11**
ATEX II 3G certificate; flammable gases[1)]		**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[1)]		**E42**
Clean for O_2 service (specially cleaned gas path)		**Y02**
Measurement 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 interference influences)		**Y13**
TÜV version acc. to 17. BImSch		**Y17**
Additional units for Ex versions		Order No.
Category ATEX II 2G (Zone 1)		
BARTEC EEx p control unit, 230 V, "leakage compensation"	D)	**7MB8000-2BA**
BARTEC EEx p control unit, 115 V, "leakage compensation"	D)	**7MB8000-2BB**
BARTEC EEx p control unit, 230 V, "continuous purging"	D)	**7MB8000-2CA**
BARTEC EEx p control unit, 115 V, "continuous purging"	D)	**7MB8000-2CB**
Ex isolation amplifier	D)	**7MB8000-3AA**
Ex isolating relay, 230 V	D)	**7MB8000-4AA**
Ex isolating relay, 110 V	D)	**7MB8000-4AB**
Differential pressure switch for corrosive gases	E)	**7MB8000-5AA**
Differential pressure switch for non-corrosive gases		**7MB8000-5AB**
Stainless steel flame arrestor	D)	**7MB8000-6BA**
Hastelloy flame arrestor	D)	**7MB8000-6BB**
Category ATEX II 3G (Zone 2)		
BARTEC EEx p control unit (flammable gases)	D)	**7MB8000-1BA**
FM/CSA (Class I Div. 2)		
Ex purging unit MiniPurge FM	D)	**7MB8000-1AA**
Retrofitting sets		Order No.
RS 485/Ethernet converter		**A5E00852383**
RS 485/RS 232 converter	D)	**C79451-Z1589-U1**
RS 485/USB converter		**A5E00852382**
AUTOCAL function with 8 binary inputs/outputs	D)	**A5E00064223**
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS PA	D)	**A5E00057315**
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS DP	D)	**A5E00057318**
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS PA Ex i (firmware 4.1.10 required)	D)	**A5E00057317**

[1)] Only in connection with an approved purging unit.
D) Subject to AL export regulations: 9I999, ECCN: N
E) Subject to AL export regulations: 9I999, ECCN: EAR99H

TÜV, single component (only with additional code 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	1500 mg/m³		
D	50 mg/m³	1000 mg/m³	300 mg/m³	3000 mg/m³		
E			500 mg/m³	5000 mg/m³	100 mg/m³	2000 mg/m³
F	300 mg/m³	3000 mg/m³	1000 mg/m³	10000 mg/m³	300 mg/m³	3000 mg/m³
G	500 mg/m³	5000 mg/m³			500 mg/m³	5000 mg/m³
H	1000 mg/m³	10000 mg/m³	3000 mg/m³	30000 mg/m³	1000 mg/m³	10000 mg/m³
K	3000 mg/m³	30000 mg/m³	10 g/m³	100 g/m³	3000 mg/m³	30000 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	1000 g/m³	30 g/m³	300 g/m³
V	100 g/m³	1160 g/m³	300 g/m³	2630 g/m³	100 g/m³	1250 g/m³

Example for ordering

ULTRAMAT 6, TÜV (1-component unit)
Component CO
Measuring range 0 … 50/1000 mg/m³
with hoses, non-flow-type reference compartment
without automatic adjustment (AUTOCAL)
230 V AC; without heating, English
7MB2111-0XD00-1AA1-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	1000 mg/m³	200 mg/m³	2000 mg/m³
AB	300 mg/m³	3000 mg/m³	300 mg/m³	3000 mg/m³
AC	1000 mg/m³	10000 mg/m³	1000 mg/m³	10000 mg/m³

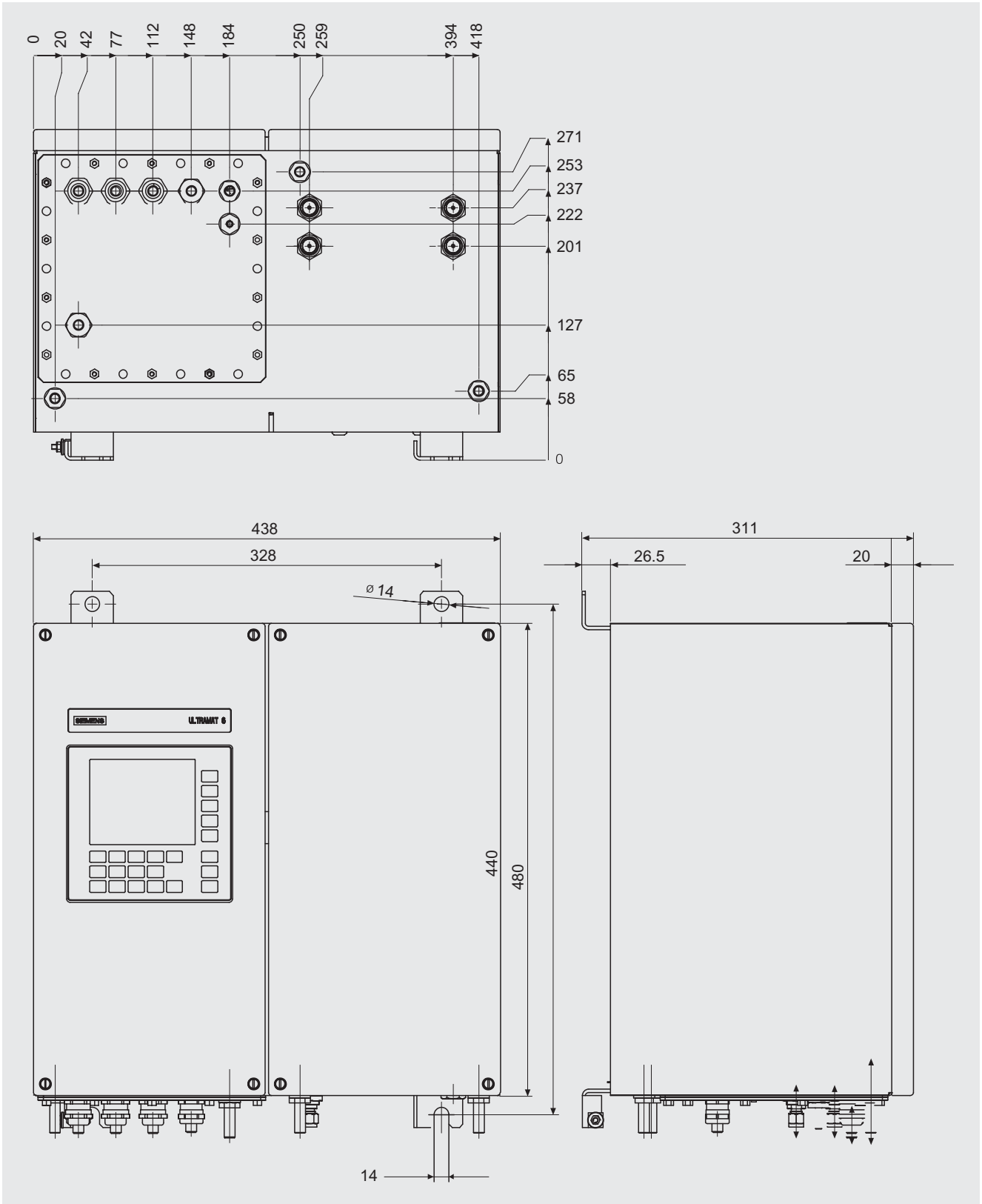
Example for ordering

ULTRAMAT 6, TÜV (2- channel unit)
Components CO/NO
Measuring range CO: 0 … 75/1000 mg/m³, NO: 0 … 200/2000 mg/m³
with hoses, non-flow-type reference compartment
without automatic adjustment (AUTOCAL)
230 V AC; without heating, English
7MB2112-0AA00-1AA1-Z +Y17

Note: for 3 components take both tables into consideration.

Field unit

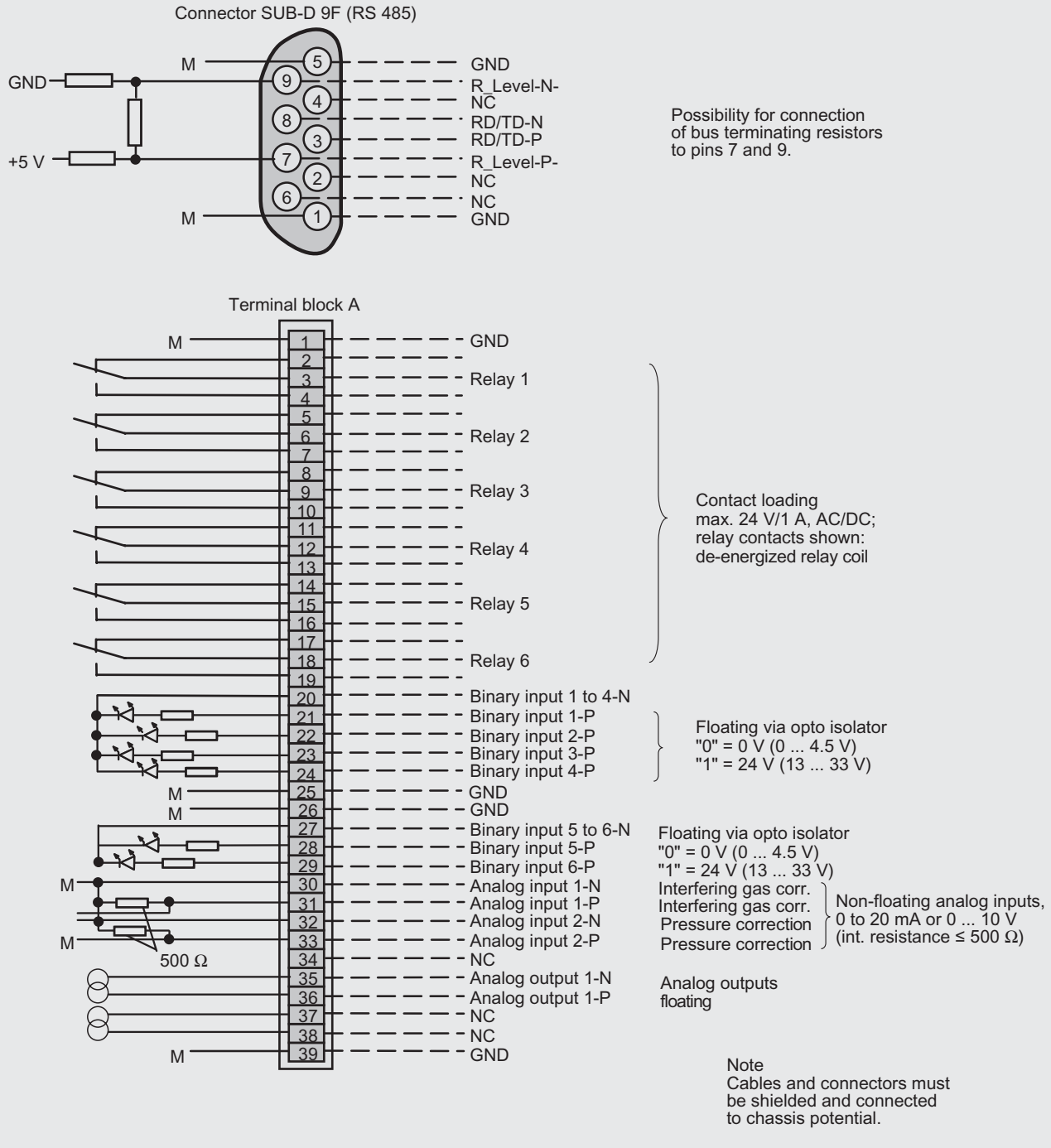
Dimensional drawings



ULTRAMAT 6, field unit, dimensions in mm

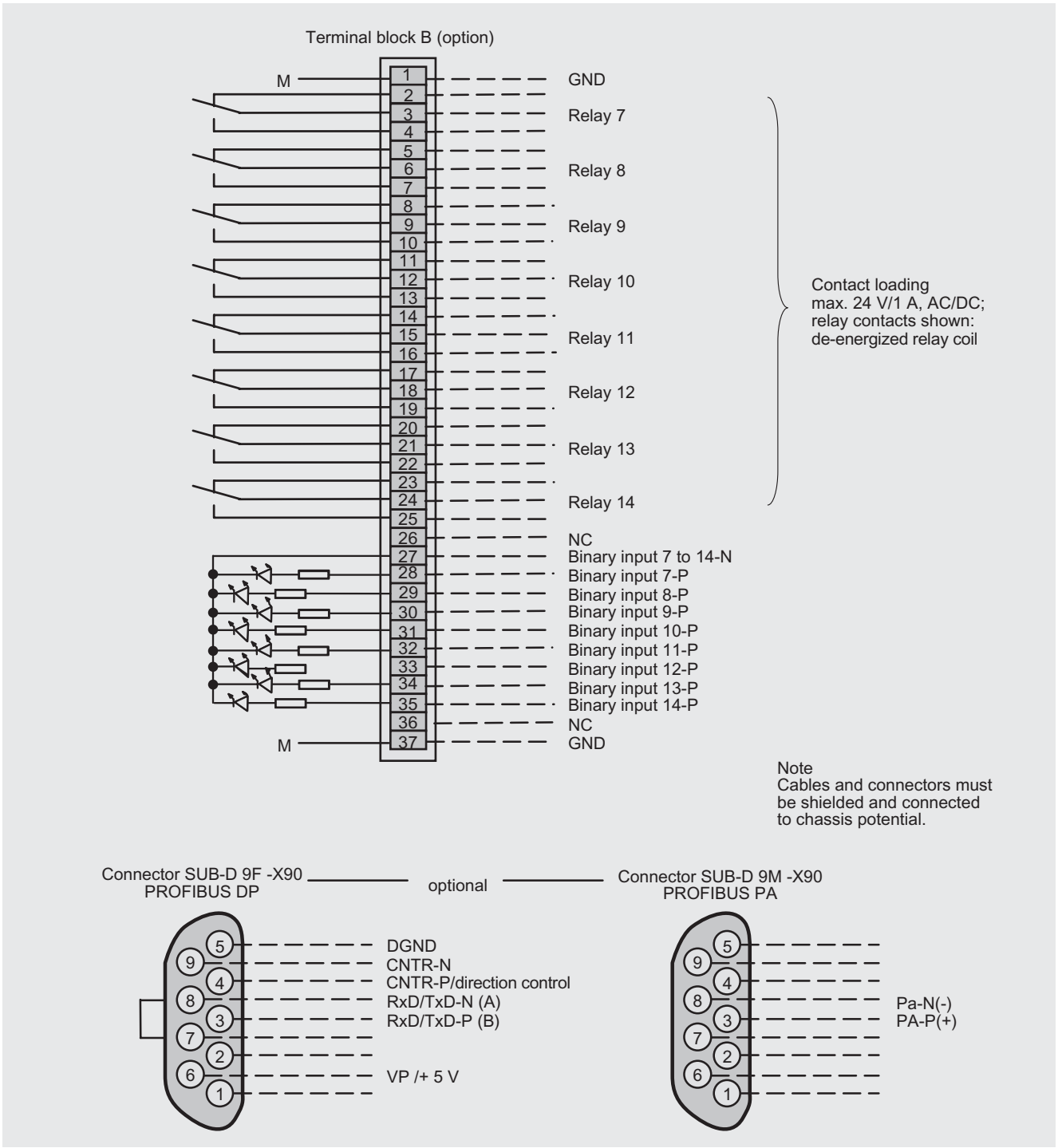
Schematics

Pin assignment (electrical and gas connections)

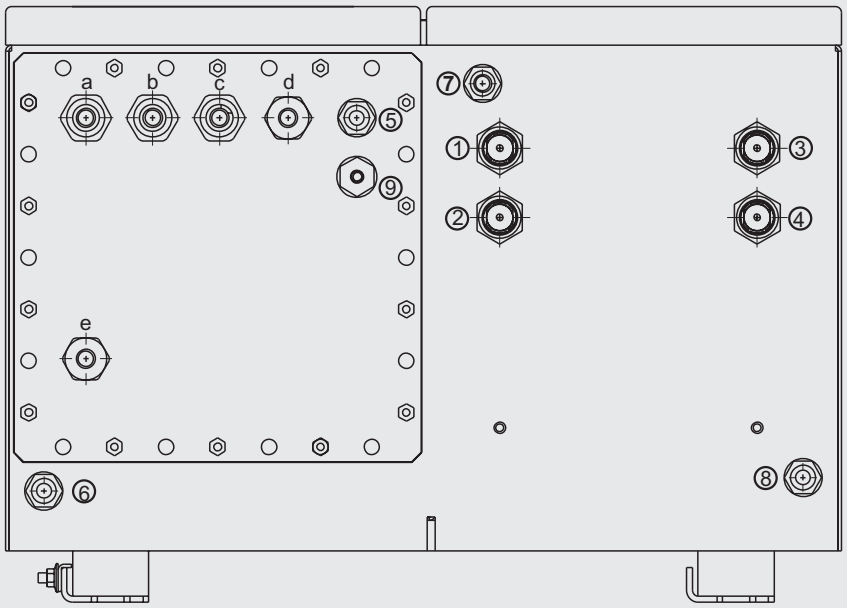


ULTRAMAT 6, field unit, connector and terminal assignment

Field unit



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



Gas connections

①	Sample gas inlet	Clamping gland for pipe Ø 6 mm or ¼"
②	Sample gas outlet	
③	Reference gas inlet (option)	
④	Reference gas outlet (option)	
⑤-⑧	Purging gas inlets/outlets stubs Ø 10 mm or 3/8 "	
⑨	Connection atmospheric pressure sensor	

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 unit, gas and electrical connections

Documentation

Selection and Ordering Data

Manual		Order No.
ULTRAMAT 6 / OXYMAT 6 Gasanalysengerät für IR-absorbierende Gase und Sauerstoff (German)	D)	**C79000-G5200-C143**
ULTRAMAT 6 / OXYMAT 6 Gas Analyzers for IR-absorbing Gases and Oxygen (English)	D)	**C79000-G5276-C143**
ULTRAMAT 6 / OXYMAT 6 Analyseurs de gaz pour la mesure de composants infrarouges et d'oxygène (French)	D)	**C79000-G5277-C143**
ULTRAMAT 6 / OXYMAT 6 Analizadores para gases absorbentes de infrarrojo y oxígeno (Spanish)	D)	**C79000-G5278-C143**
ULTRAMAT 6 / OXYMAT 6 Analizzatori per i gas assorbenti raggi infrarossi ed ossigeno (Italian)	D)	**C79000-G5272-C143**

D) Subject to AL export regulations: 9I999, ECCN: N

Selection and Ordering Data

Description	7MB2121	7MB2123	7MB2124	7MB2111	7MB2112	7MB2111/2 Ex	2 years (qty)	5 years (qty)		Order No.
Analyzer part										
O-ring for Y cell	x	x	x	x	x	x	1	2	D)	**C75121-Z101-C1**
O-ring behind Y cell	x	x	x	x	x	x	1	2	D)	**C75121-Z101-C2**
O-ring for reflector	x	x	x	x	x	x	1	2	D)	**C75121-Z101-C3**
O-ring for cover (window, front side)	x	x	x	x	x	x	2	2	D)	**C75121-Z101-C4**
O-ring for cooling element	x	x	x	x			1	1	D)	**C75121-Z101-C5**
O-ring for cover (window, rear side)	x	x	x	x	x	x	2	4	D)	**C79121-Z100-A24**
Radiator	x	x	x	x	x	x	1	1	D)	**C79451-A3462-B12**
Cover (cell length 20 ... 180 mm)	x	x	x	x	x	x	2	2	D)	**C79451-A3462-B151**
Cover (cell length 0.2 ... 6 mm)	x	x	x	x	x	x	2	2	D)	**C79451-A3462-B152**
O-rings, set	x	x	x	x	x	x		1	D)	**C79451-A3462-D501**
Sample gas path										
O-ring (hose clip)				x	x	x	2	4	D)	**C71121-Z100-A159**
O-ring (chopper)	x	x	x	x	x	x	1	2	D)	**C75121-Z100-C3**
Pressure switch	x	x	x						D)	**C79302-Z1210-A2**
Flow indicator	x	x	x						D)	**C79402-Z560-T1**
Hose clip	x	x	x	x	x	x		1	D)	**C79451-A3478-C9**
Heating cartridge (heated unit)				x	x	x		1	D)	**W75083-A1004-F120**
Electronics										
Temperature fuse (heated unit)				x	x			1	D)	**A5E00023094**
Fusible plug (device fuse)						x	1	2	D)	**A5E00061501**
Temperature controller - electronic, 230 V AC				x	x			1	D)	**A5E00118527**
Temperature controller - electronic, 115 V AC				x	x			1	D)	**A5E00118530**
Fan, 24 V DC (heated unit)				x	x	x		1	D)	**A5E00302916**
Front plate with keyboard	x	x	x				1	1	D)	**C79165-A3042-B504**
Temperature sensor				x	x	x		1	D)	**C79165-A3044-B176**
Adapter board, LCD/keyboard	x	x	x	x	x		1	1	D)	**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	D)	**W75025-B5001-B1**
Connector filter	x	x	x	x	x			1	D)	**W75041-E5602-K2**
Fusible plug, T 0.63/250 V	x		x	x	x	x	2	3	D)	**W75054-L1010-T630**
Fusible plug, 1 A, 110/220 V	x	x	x				2	3	D)	**W75054-L1011-T100**
Fusible plug, 1.6 A, 250 V		x	x	x	x	x	2	3	D)	**W75054-L1011-T160**
Fusible plug, 2.5 A, 250 V				x	x	x	2	3	D)	**W75054-L1011-T250**

D) Subject to AL export regulations: 9I999, ECCN: N

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