## 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, $SO_2$, $NH_3$, $H_2O$, $CH_4$ and other hydrocarbons.

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

ULTRAMAT 6, 19“ unit and field unit

## 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

  TÜV-approved versions are available for measurement of CO, NO and $SO_2$ according to 13. 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 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.

## 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).

### *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: ferrule screw for pipe diameter 6 mm or 1/4"
- Purging gas connections: pipe diameter 10 mm or 3/8".

## General

### *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 configuration, test functions, calibration
- User help in plain text
- Graphic display of concentration trend; programmable time intervals
- Operating software in two languages: German/English, English/Spanish, French/English, Italian/English.

### *Inputs and outputs*

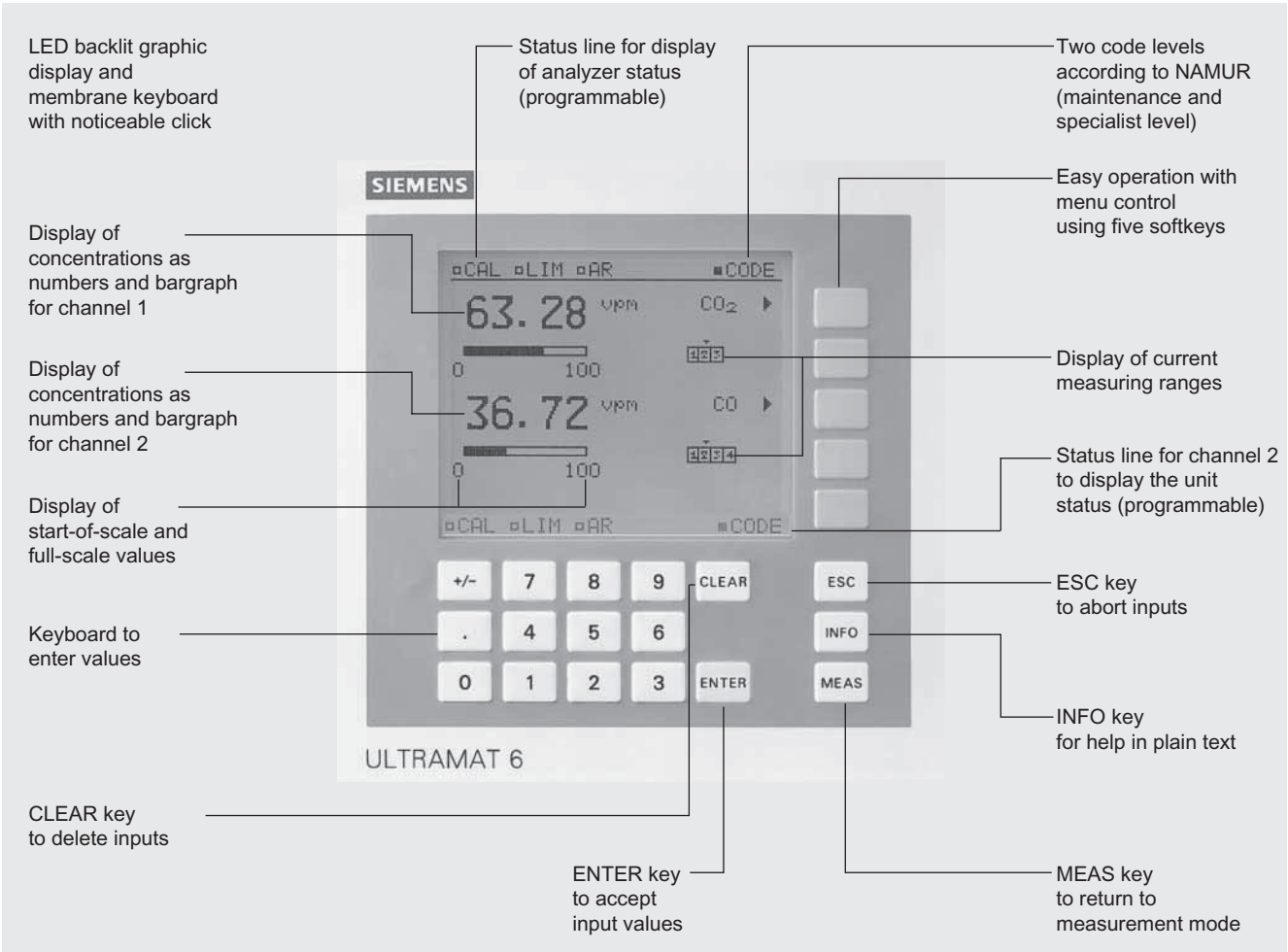
- One analog output per sample component
- Two analog inputs freely configurable (e.g. correction of cross interferences or external pressure sensor)
- Six binary inputs freely configurable (e.g. for range switching, processing external signals from sample conditioning)
- Six relay outputs freely configurable (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
- Linking to networks via PROFIBUS DP/PA interface
- SIPROM GA software as service and maintenance tool.




ULTRAMAT 6, membrane keyboard and graphic display

### *Versions – Wetted parts, standard*

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

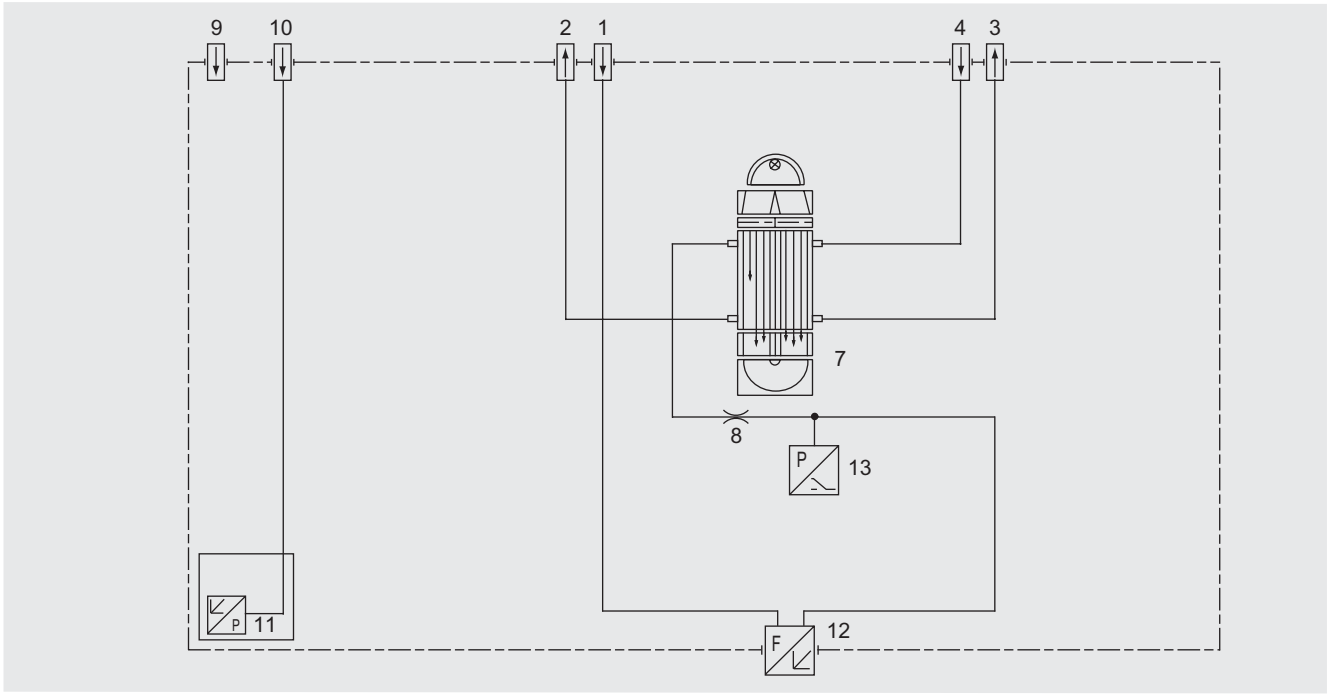
| Gas path | | 19“ unit | Field unit | Ex field unit |
|---|---|---|---|---|
| With pipes | Bushing | e.g. Hastelloy C22 | | |
| | Pipe | e.g. Hastelloy C22,<br>O-ring: FKM (e.g. Viton) or FFKM (Kalrez) | | |
| | Sample cell: | | | |
| | • Body | e.g. Hastelloy C22 | | |
| | • Window | $CaF_2$, without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

## General

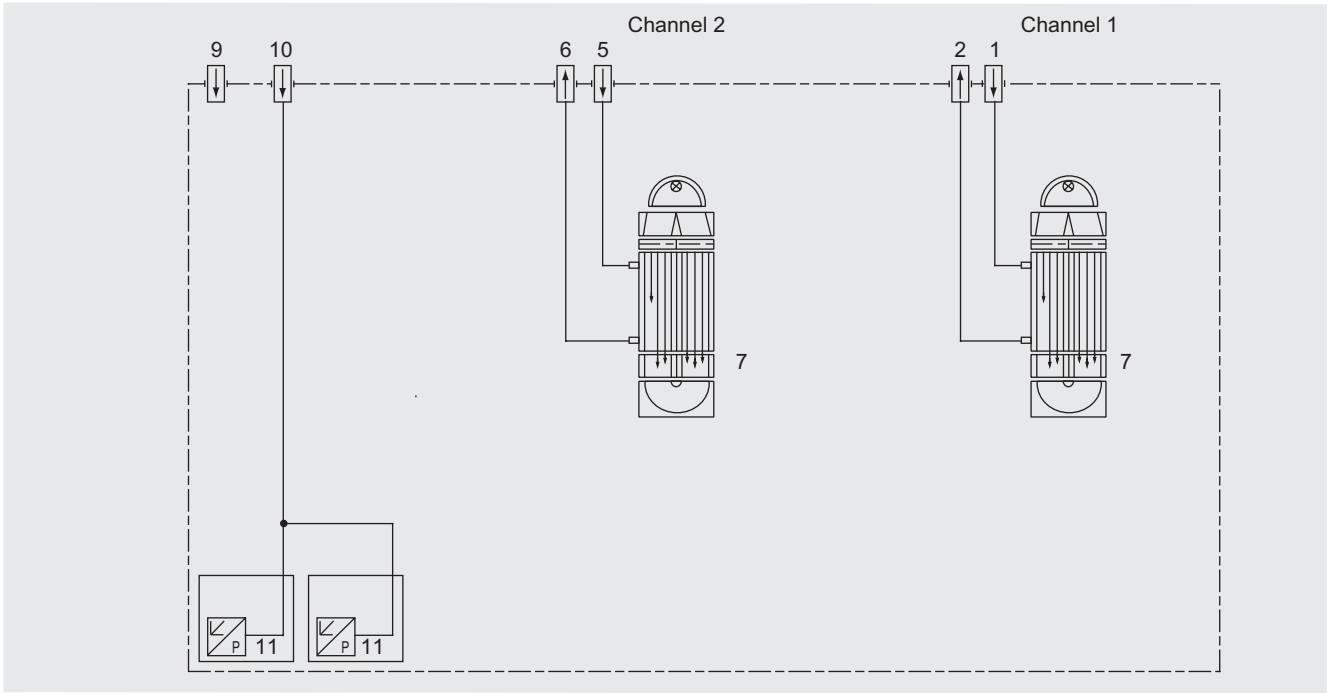
### *Gas path (19“ unit)*

**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)

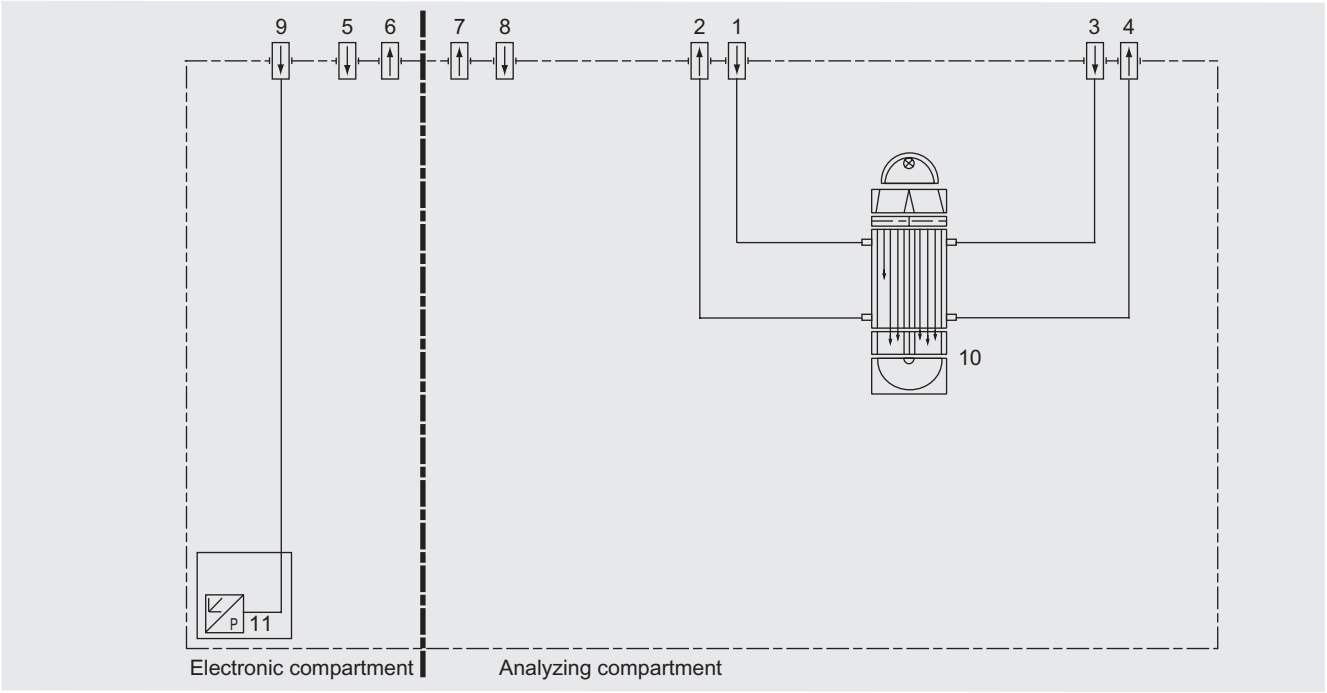



Gas path ULTRAMAT 6, dual-channel unit, 19“ unit

### *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)

## General



### 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

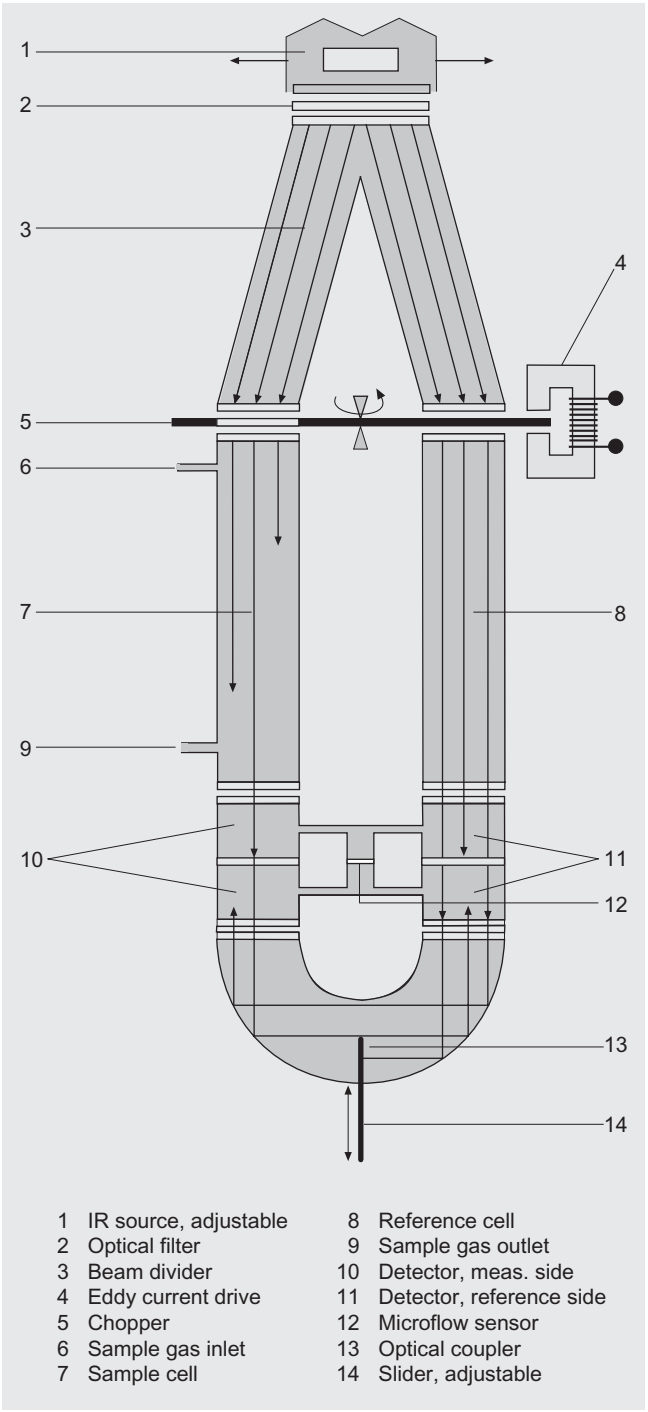
The sample gases have to enter the analyzer dust-free. Avoid condensate in the sample cells. Therefore an appropriate gas preparation is required in most applications.

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 compartments with reduced flow must not be used with flammable or toxic gases.

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

Physically suppressed zeros are implemented as special applications.




ULTRAMAT 6, mode of operation

***Essential characteristics***

- 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).

## 19" unit



### Technical specifications

**General**

| | |
|---|---|
| Measuring ranges | 4, switchable internally and externally; autoranging is also possible |
| Smallest possible measuring range | Depending on application, e.g. CO: 0 ... 10 vpm, $CO_2$: 0 ... 5 vpm |
| Largest possible measuring span | Depending on application |
| Measuring range with suppressed zero | Every zero possible within 0 ... 100 Vol.%, smallest possible measuring span 20% |
| Characteristic | Linearized |
| Position of use | Front panel vertical |
| Conformity | CE identification EN 50081-1, EN 50082-2 |

**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 interference immunity (**E**lectro**M**agnetic **C**ompatibility) | According to standard requirements of NAMUR NE21 (08/98) |
| Electrical safety | According to EN 61010-1, overvoltage category III |
| Power supply | 100 ... 120 V AC (rated range 90 ... 132 V), 48 ... 63 Hz or<br>200 ... 240 V AC (rated range 180 ... 264 V), 48 ... 63 Hz |
| Power consumption | 1-channel unit: approx. 40 VA<br>2-channel unit: approx. 70 VA |
| Fuse links | |
| • 100... 120 V | 1T/250 (7MB2121), 1.6T/250 (7MB2123) |
| • 200... 240 V | 0.63T/250 (7MB2121), 1T/250 (7MB2123) |

**Gas inlet conditions**

| | |
|---|---|
| Perm. sample gas pressure | |
| • for analyzers with hoses | |
| - without pressure switch | 600 ... 1500 hPa (absolute) |
| - with pressure switch | 600 ... 1300 hPa (absolute) |
| • for analyzers 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 depending on application, non condensing |

**Time response**

| | |
|---|---|
| Warm-up period | With amb. temperature < 30 min (maximum accuracy achieved after 2 hours) |
| Response time ($T_{90}$ time) | Dependent on length of analyzer cell, sample gas line and damping |
| Damping (electric time constant) | 0 ... 100 s, programmable |
| Dead time (purging time of gas path in analyzer at 1 l/min) | Approx. 0.5 ... 5 s, depending on version |
| Time for internal signal processing | < 1 s |

**Pressure correction range**

| | |
|---|---|
| Pressure sensor | |
| • internal | 600 ... 1200 hPa absolute |
| • external | 600 ... 1500 hPa absolute |

**Measuring response** (maximum accuracy achieved after 2 hours)

| | |
|---|---|
| Output signal fluctuation | ± 0.1 % ... ± 1 % of smallest possible measuring range specified on rating plate depending on application with the unit specific electronic time constant (corresponds to ± 0.33% at 2σ) |
| Zero drift | < 1% of measuring range/week |
| Measured-value drift | < 1% of measuring range/week |
| Repeatability | ≤ 1% of respective measuring range |
| Minimum detection limit | 1% of smallest measuring range |
| Linearity error | < 0.5% of full-scale value |

**Influencing variables** (referred to 1000 hPa sample gas pressure, 0.5 l/min sample gas flow and 25 °C ambient temperature)

| | |
|---|---|
| Ambient temperature | < 1% of measuring range/10 K (for a constant temperature of the reception cell) |
| Sample gas pressure | With pressure compensation: < 0.15% of span/1% change in atmospheric pressure<br>without pressure compensation: < 1.5% of span/1% change in atmospheric pressure |
| Sample gas flow | Negligible |
| Power supply | < 0.1% of output signal span with rated voltage ± 10% |
| Ambient conditions | Application-dependent influencing of measurement if ambient air contains measured component or cross-sensitive gases |

**Electric inputs and outputs**

| | |
|---|---|
| Analog output | 0/2/4 ... 20 mA, floating; load ≤ 750 Ω |
| Relay outputs | 6, with changeover contacts, freely parameterizable, e.g. for range identification; loading capacity: 24 V AC/DC / 1 A floating, non sparking |
| Analog inputs | 2, designed for 0/2/4 ... 20 mA, for external pressure sensor and correction of influence of residual gas (correction of cross interference) |
| Binary inputs | 6, designed for 24 V, floating, freely parameterizable, e.g. for range switching |
| Serial interface | RS 485 |
| Options | Autocal function with 8 additional binary inputs and 8 relay outputs, also with PROFIBUS PA and PROFIBUS DP |

**Ambient conditions**

| | |
|---|---|
| Permissible ambient temperature | -30 ... +70 °C during storage and transport, +5 ... +45 °C during operation |
| Permissible humidity | < 90 % RH (relative humidity) as annual average, during storage and transport (dew point must not be fallen below) |

## Selection and Ordering Data

Order No. 7MB2121-■■■■■-■AA■

**ULTRAMAT 6 gas analyzer**
Single-channel 19“ unit for installation in cabinets

| | | | | cannot be combined |
|---|---|---|---|---|
| Gas connections for sample gas and reference gas | | | | |
| Piping with outer diameter 6 mm | | | 0 | 0 → A21 |
| Piping with outer diameter ¼“ | | | 1 | 1 → A20 |
| Measured component | | possible with range code | | |
| 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 | 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 of FKM (Viton) | Aluminum | Non-flow-type | 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 |
| Pipe made of SS (type 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 → A20, A21 |
| | Aluminum | Flow-type | 3 | 3 |

1) Only for sample cell length 20 mm ... 180 mm

# ULTRAMAT 6

## 19" unit

2

| Selection and Ordering Data | Order No. | |
|---|---|---|
| **ULTRAMAT 6 gas analyzer**<br>Single-channel 19" unit for installation in cabinets | 7MB2121-■■■■■-■AA■ | cannot be combined |
| Additional electronics | | |
| Without | 0 | |
| Autocal board | | |
| • With 8 additional binary inputs/outputs | 1 | |
| • With serial interface for the automotive industry (AK) | 3 | 3 → E20 |
| • With 8 binary inputs/outputs and PROFIBUS PA interface | 6 | |
| • With 8 binary inputs/outputs and 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 | |

| Further versions | Order code | cannot be combined |
|---|---|---|
| Please add „-Z" to Order No. and specify Order code. | | |
| Interface converter from RS 485 to RS 232 | **A11** | → E20 |
| Flow-type reference compartment with reduced flow, 6 mm | **A20** | |
| Flow-type reference compartment with reduced flow, ¼" | **A21** | |
| Slide rails (2 rails) | **A31** | |
| Set of Torx tools, socket spanner | **A32** | |
| TAG labels (customer-defined inscriptions) | **B03** | |
| Kalrez gaskets in sample gas path | **B04** | |
| Certificate CSA – Class I Div 2 | **E20** | |
| Clean for $O_2$-Service (specially cleaned gas path) | **Y02** | |
| Measuring range in plain text, if different from 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 according to 17. BImSch | **Y17** | |

| Retrofitting sets | Order No. |
|---|---|
| RS 485/Ethernet converter | **C79451-A3364-D61** |
| RS 485/RS 232 converter | **C79451-Z1589-U1** |
| Autocal function with serial interface for the automotive industry (AK) | **C79451-A3480-D12** |
| Autocal function with 8 binary inputs/outputs | **C79451-A3480-D511** |
| Autocal function with 8 binary inputs/outputs and PROFIBUS PA | **A5E00057307** |
| Autocal function with 8 binary inputs/outputs and PROFIBUS DP | **A5E00057312** |

## Selection and Ordering Data

Order No. 7MB2123-

**ULTRAMAT 6 gas analyzer**
Dual-channel 19" unit for installation in cabinets to measure 2 IR-components

| | | | Order No. | cannot be combined |
|---|---|---|---|---|
| Gas connections for sample gas and reference gas | | | | |
| Piping with outer diameter 6 mm | | | 0 | 0 → A21, A41 |
| Piping with outer diameter ¼" | | | 1 | 1 → A20, A40 |
| Measured component | | possible with 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 of FKM (Viton) | Aluminum | Non-flow-type | 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 |
| Pipe made of SS (type 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 → A20, A21, A40, A41 |
| | Aluminum | Flow-type | 3 | 3 |

1) Only for sample cell length 20 mm ... 180 mm

## 19" unit

2

### Selection and Ordering Data

Order No. 7MB2123-

**ULTRAMAT 6 gas analyzer**
Dual-channel 19" unit for installation in cabinets to measure 2 IR-components

| | | | | cannot be combined |
|---|---|---|---|---|
| **Additional electronics** | | | | |
| Without | | 0 | | |
| Autocal board | | | | |
| • 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 8 additional binary inputs/outputs for channel 1 and channel 2 and PROFIBUS PA interface | | 6 | | |
| • With 8 additional binary inputs/outputs 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 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 | |
| **Operating software and documentation** | | | | |
| German | | | | 0 |
| English | | | | 1 |
| French | | | | 2 |
| Spanish | | | | 3 |
| Italian | | | | 4 |

## Selection and Ordering Data

| **Further versions**<br>Please add „-Z“ to Order No. and specify Order code. | Order code | cannot be combined |
|---|---|---|
| Interface converter from RS 485 to RS 232 | **A11** | → **E20** |
| 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**<br>(can only be combined with the according gas connection diameter and materials of the internal gas path) | | |
| - Connection pipe made of titanium 6 mm, complete with screwed gland, for sample gas compartment | **A22** | |
| - Connection pipe made of titanium 6 mm, complete with screwed gland, for reference gas compartment | **A23** | |
| - Connection pipe made of titanium ¼“, complete with screwed gland, for sample gas compartment | **A24** | |
| - Connection pipe made of titanium ¼“, complete with screwed gland, for reference gas compartment | **A25** | |
| - Connection pipe made of SS (type no. 1.4571) 6 mm, compl. with screwed gland for sample gas compartment | **A27** | |
| - Connection pipe made of SS (type no. 1.4571) ¼“, complete with screwed gland, for sample gas compartment | **A29** | |
| Slide rails (2 rails) | **A31** | |
| Set of Torx tools, socket spanner | **A32** | |
| TAG labels (customer-defined inscriptions) | **B03** | |
| Kalrez gaskets in sample gas path (channel 1) | **B04** | |
| Kalrez gaskets in sample gas path (channel 2) | **B05** | |
| Certificate CSA – Class I Div 2 | **E20** | |
| Clean for $O_2$-Service (specially cleaned gas path) (channel 1 + 2) | **Y02** | → **A22 - A25** |
| Measuring range in plain text, if different from 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 according to 17. BImSch | **Y17** | |
| TÜV version according to 17. BImSch (channel 2) | **Y18** | |

| **Retrofitting sets** | Order No. |
|---|---|
| RS 485/Ethernet converter | **C79451-A3364-D61** |
| RS 485/RS 232 converter | **C79451-Z1589-U1** |
| Autocal function with serial interface for the automotive industry (AK) | **C79451-A3480-D12** |
| Autocal function with 8 binary inputs/outputs for channel 1 or channel 2 | **C79451-A3480-D511** |
| Autocal function with 8 binary inputs/outputs and PROFIBUS PA for channel 1 or channel 2 | **A5E00057307** |
| Autocal function with 8 binary inputs/outputs and PROFIBUS DP for channel 1 or channel 2 | **A5E00057312** |

## 19" unit

2

### Selection and Ordering Data

Order No. 7MB2124-

**ULTRAMAT 6 gas analyzer**
Single or dual-channel 19" unit for installation in cabinets to measure 2-3 IR-components

cannot be combined

| | | | | |
|---|---|---|---|---|
| Gas connections for sample gas and reference gas | | | | |
| Piping with outer diameter 6 mm | | | 0 | 0 → A21, A41 |
| Piping with outer diameter ¼" | | | 1 | 1 → A20, A40 |
| Meas. component | Smallest meas. range | Largest meas. range | | |
| CO | 0 ... 100 vpm | 0 ... 1000 vpm | AA | |
| NO | 0 ... 100 vpm | 0 ... 1000 vpm | | |
| CO | 0 ... 300 vpm | 0 ... 3000 vpm | AB | |
| NO | 0 ... 300 vpm | 0 ... 3000 vpm | | |
| CO | 0 ... 1000 vpm | 0 ... 10000 vpm | AC | |
| NO | 0 ... 1000 vpm | 0 ... 10000 vpm | | |
| for CO/NO (TÜV; see Table TÜV, 2 components) | | | | |
| $CO_2$ | 0 ... 100 vpm | 0 ... 1000 vpm | BA | |
| CO | 0 ... 100 vpm | 0 ... 1000 vpm | | |
| $CO_2$ | 0 ... 300 vpm | 0 ... 3000 vpm | BB | |
| CO | 0 ... 300 vpm | 0 ... 3000 vpm | | |
| $CO_2$ | 0 ... 1000 vpm | 0 ... 10000 vpm | BC | |
| CO | 0 ... 1000 vpm | 0 ... 10000 vpm | | |
| $CO_2$ | 0 ... 3000 vpm | 0 ... 30000 vpm | BD | |
| CO | 0 ... 3000 vpm | 0 ... 30000 vpm | | |
| $CO_2$ | 0 ... 1% | 0 ... 10% | BE | |
| CO | 0 ... 1% | 0 ... 10% | | |
| $CO_2$ | 0 ... 3% | 0 ... 30% | BF | |
| CO | 0 ... 3% | 0 ... 30% | | |
| $CO_2$ | 0 ... 10% | 0 ... 100% | BG | |
| CO | 0 ... 10% | 0 ... 100% | | |
| $CO_2$ | 0 ... 10% | 0 ... 100% | CG | |
| $CH_4$ | 0 ... 10% | 0 ... 100% | | |
| $CO_2$ | 0 ... 100 vpm | 0 ... 1000 vpm | DA | |
| NO | 0 ... 100 vpm | 0 ... 1000 vpm | | |
| $CO_2$ | 0 ... 300 vpm | 0 ... 3000 vpm | DB | |
| NO | 0 ... 300 vpm | 0 ... 3000 vpm | | |
| Internal gas paths | Sample cell[1] (lining) | Reference cell (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 |
| Pipe made of SS (type 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 |
| Additional electronics | | | | |
| Without | | | 0 | |
| Autocal board | | | | |
| • 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 8 additional binary inputs/outputs for channel 1 and PROFIBUS PA interface | | | 5 | |
| • With 8 additional binary inputs/outputs for channel 1 and channel 2 and PROFIBUS PA interface | | | 6 | 6 |
| • With 8 additional binary inputs/outputs for channel 1 and PROFIBUS DP interface | | | 7 | |
| • With 8 additional binary inputs/outputs for channel 1 and channel 2 and PROFIBUS DP interface | | | 8 | 8 |

1) Only for sample cell length 20 mm ... 180 mm

2

## Selection and Ordering Data

Order No.

**ULTRAMAT 6 gas analyzer**
Single or dual-channel 19" unit for installation in cabinets to measure 2-3 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 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 | | | W | W → 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 | C | |
| 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 | |

### Operating software and documentation

| | |
|---|---|
| German | 0 |
| English | 1 |
| French | 2 |
| Spanish | 3 |
| Italian | 4 |

## 19" unit



### Selection and Ordering Data

| Further versions<br>Please add „-Z“ to Order No. and specify Order code. | Order code | cannot be combined |
|---|---|---|
| Interface converter from RS 485 to RS 232 | **A11** | **E20** |
| 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**<br>(can only be combined with the according gas connection diameter and materials of the internal gas path) | | |
| - Connection pipe made of titanium 6 mm, complete with screwed gland, for sample gas compartment | **A22** | |
| - Connection pipe made of titanium 6 mm, complete with screwed gland, for reference gas compartment | **A23** | |
| - Connection pipe made of titanium ¼“, complete with screwed gland, for sample gas compartment | **A24** | |
| - Connection pipe made of titanium ¼“, complete with screwed gland, for reference gas compartment | **A25** | |
| - Connection pipe made of SS (type no. 1.4571) 6 mm, compl. with screwed gland for sample gas compartment | **A27** | |
| - Connection pipe made of SS (type no. 1.4571) ¼“, complete with screwed gland, for sample gas compartment | **A29** | |
| Slide rails (2 rails) | **A31** | |
| Set of Torx tools, socket spanner | **A32** | |
| TAG labels (customer-defined inscriptions) | **B03** | |
| Kalrez gaskets in sample gas path (channel 1) | **B04** | |
| Kalrez gaskets in sample gas path (channel 2) | **B05** | |
| Certificate CSA – Class I Div 2 | **E20** | |
| Clean for $O_2$-Service (specially cleaned gas path) (channel 1 + 2) | **Y02** | **A22 - A25** |
| Measuring range in plain text, if different from 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 according to 17. BImSch | **Y17** | |
| TÜV version according to 17. BImSch (channel 2) | **Y18** | |

| Retrofitting sets | Order No. |
|---|---|
| RS 485/Ethernet converter | **C79451-A3364-D61** |
| RS 485/RS 232 converter | **C79451-Z1589-U1** |
| Autocal function with serial interface for the automotive industry (AK) | **C79451-A3480-D12** |
| Autocal function with serial interface for the automotive industry (AK) (channel 1 + 2) | **C79451-A3480-D33** |
| Autocal function with 8 binary inputs/outputs for channel 1 or channel 2 | **C79451-A3480-D511** |
| Autocal function with 8 binary inputs/outputs and PROFIBUS PA for channel 1 or channel 2 | **A5E00057307** |
| Autocal function with 8 binary inputs/outputs and PROFIBUS DP for channel 1 or channel 2 | **A5E00057312** |

### *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 $mg/m^3$ | 1500 $mg/m^3$ | | |
| D | 50 $mg/m^3$ | 1000 $mg/m^3$ | 300 $mg/m^3$ | 3000 $mg/m^3$ | | |
| E | | | 500 $mg/m^3$ | 5000 $mg/m^3$ | 100 $mg/m^3$ | 2000 $mg/m^3$ |
| F | 300 $mg/m^3$ | 3000 $mg/m^3$ | 1000 $mg/m^3$ | 10000 $mg/m^3$ | 300 $mg/m^3$ | 3000 $mg/m^3$ |
| G | 500 $mg/m^3$ | 5000 $mg/m^3$ | | | 500 $mg/m^3$ | 5000 $mg/m^3$ |
| H | 1000 $mg/m^3$ | 10000 $mg/m^3$ | 3000 $mg/m^3$ | 30000 $mg/m^3$ | 1000 $mg/m^3$ | 10000 $mg/m^3$ |
| K | 3000 $mg/m^3$ | 30000 $mg/m^3$ | 10 $g/m^3$ | 100 $g/m^3$ | 3000 $mg/m^3$ | 30000 $mg/m^3$ |
| P | 10 $g/m^3$ | 100 $g/m^3$ | 30 $g/m^3$ | 300 $g/m^3$ | 10 $g/m^3$ | 100 $g/m^3$ |
| R | 30 $g/m^3$ | 300 $g/m^3$ | 100 $g/m^3$ | 1000 $g/m^3$ | 30 $g/m^3$ | 300 $g/m^3$ |
| V | 100 $g/m^3$ | 1160 $g/m^3$ | 300 $g/m^3$ | 2630 $g/m^3$ | 100 $g/m^3$ | 1250 $g/m^3$ |

**Example for ordering**

ULTRAMAT 6, TÜV
Component CO
Measuring range 0 ... 50/1000 $mg/m^3$
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 $mg/m^3$ | 1000 $mg/m^3$ | 200 $mg/m^3$ | 2000 $mg/m^3$ |
| AB | 300 $mg/m^3$ | 3000 $mg/m^3$ | 300 $mg/m^3$ | 3000 $mg/m^3$ |
| AC | 1000 $mg/m^3$ | 10000 $mg/m^3$ | 1000 $mg/m^3$ | 10000 $mg/m^3$ |

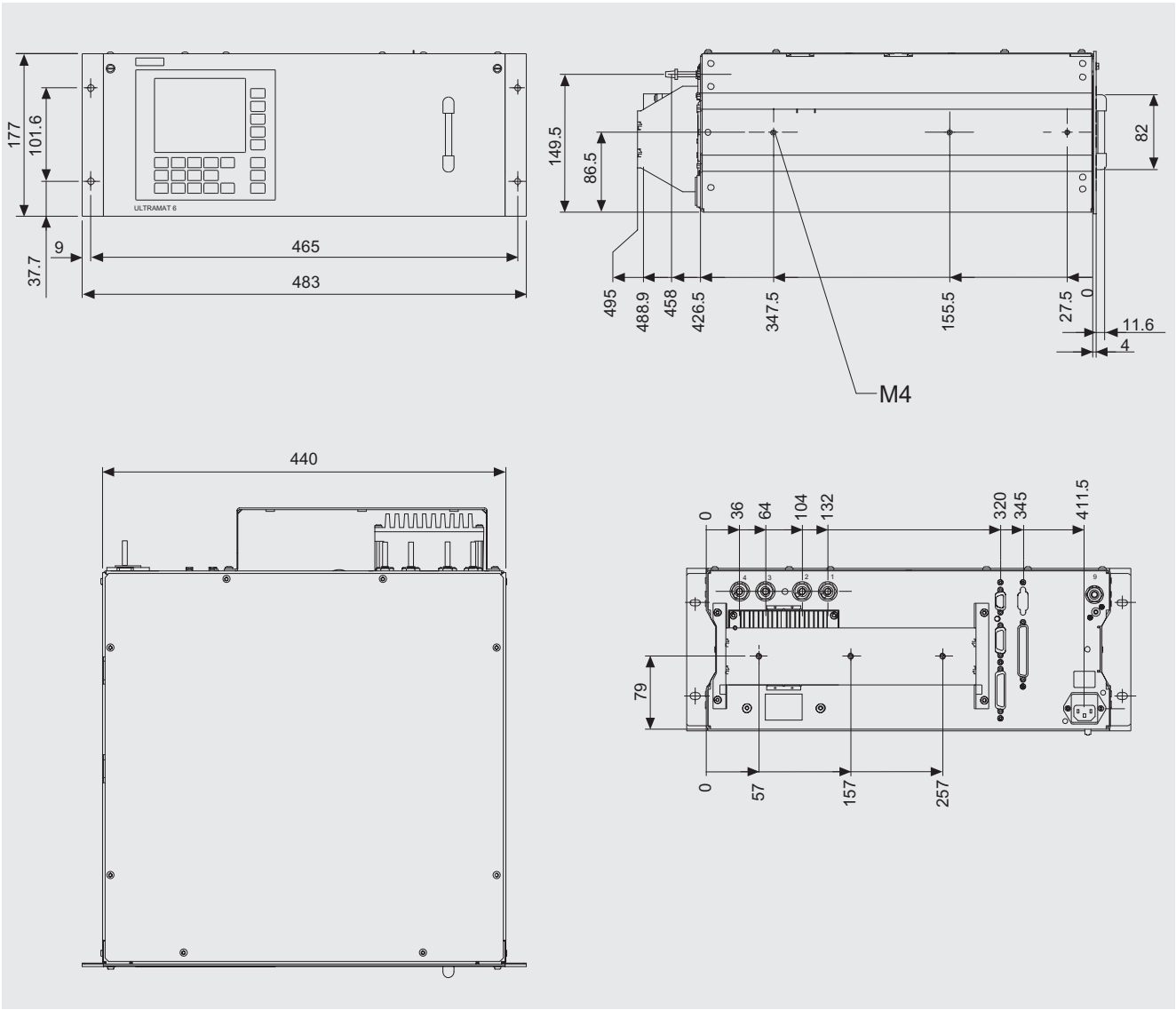
**Example for ordering**

ULTRAMAT 6, 2-channel, TÜV
Component CO/NO + $SO_2$
Measuring range CO: 0 ... 75/1000 $mg/m^3$
NO: 0 ... 200/2000 $mg/m^3$
$SO_2$: 0 ... 75/1500 $mg/m^3$
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.

## 19" unit

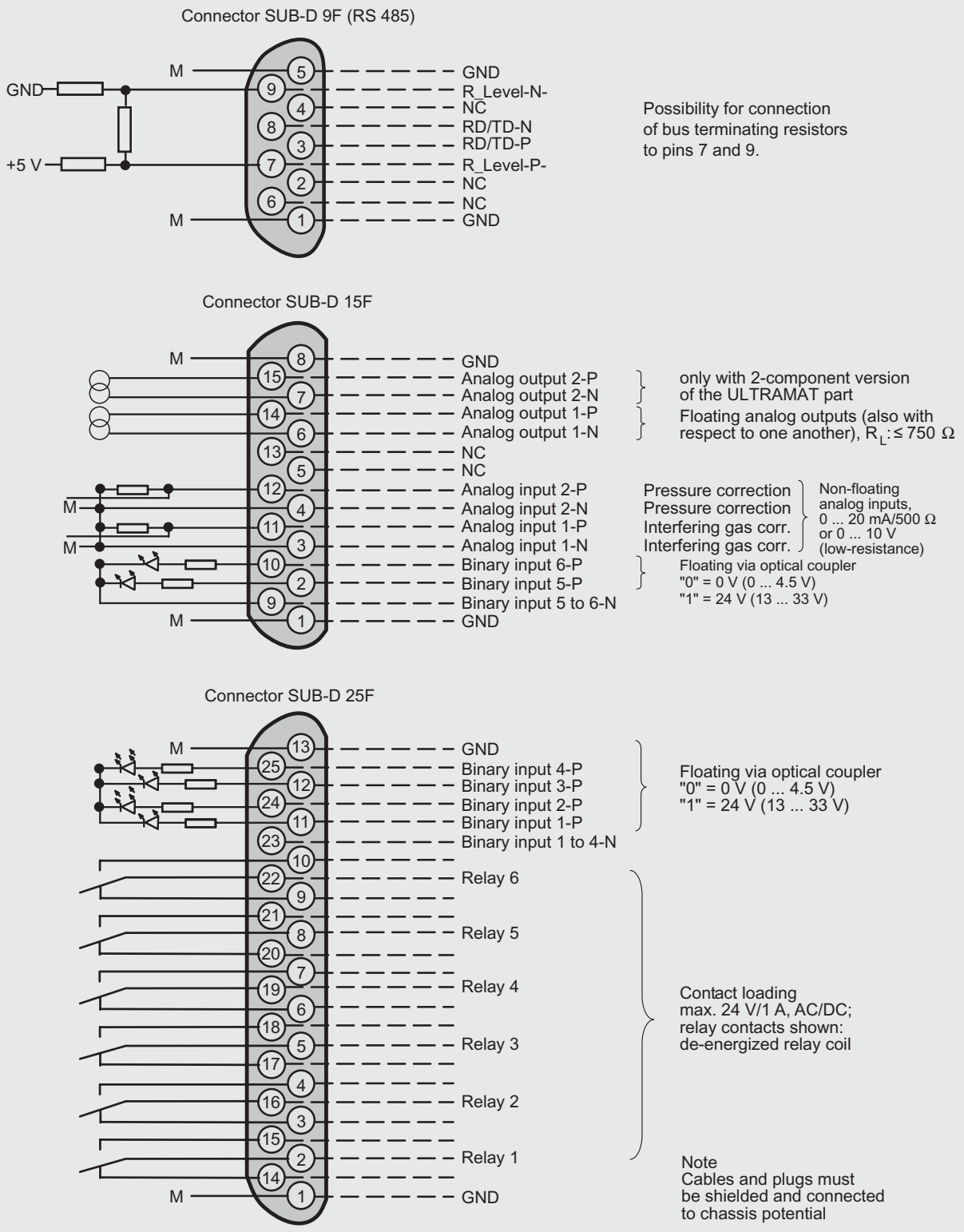
### Dimensional drawings




ULTRAMAT 6, 19“ unit, dimensions in mm

## Schematics

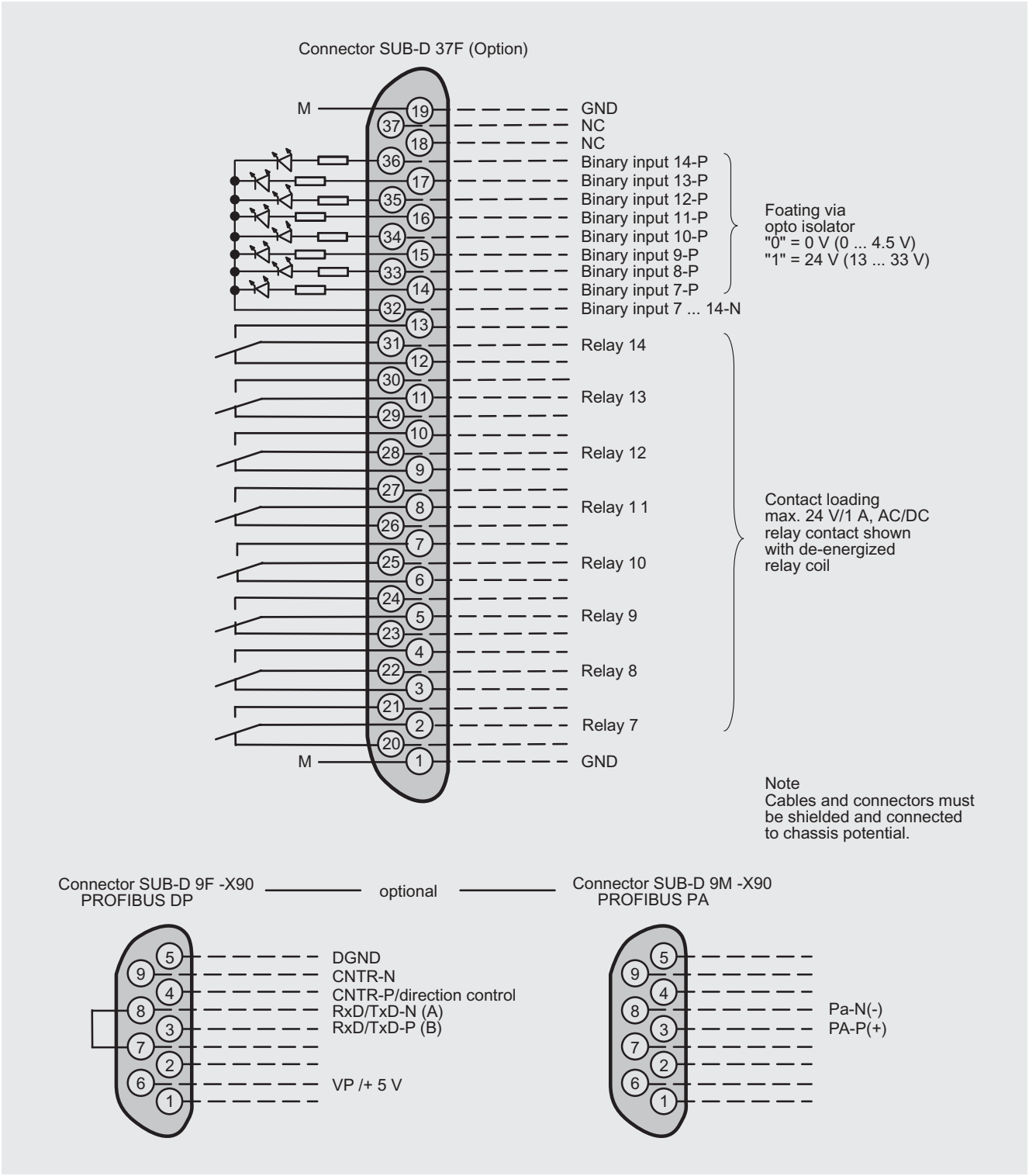
### *Pin assignment (electrical and gas connections)*



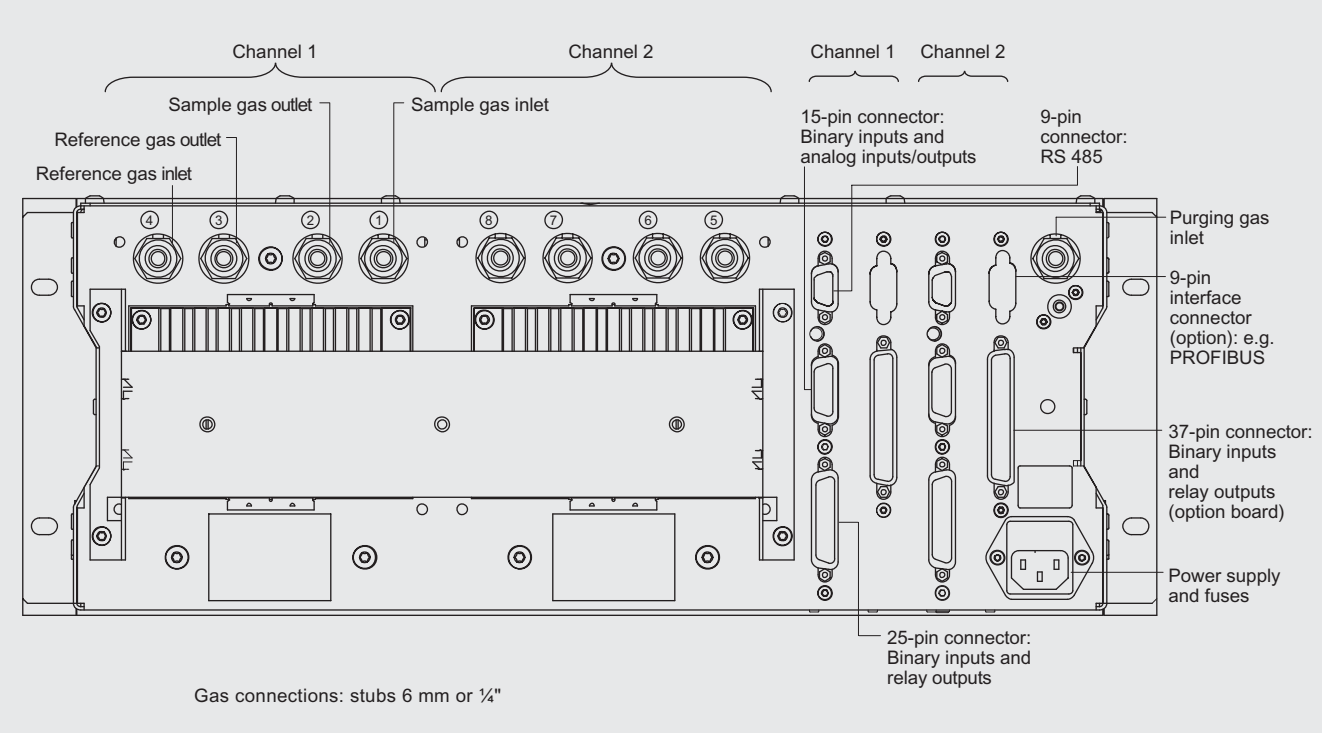

ULTRAMAT 6, 19“ unit, pin assignment

## 19" unit






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




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

## Field unit

2

### Technical specifications

| | |
|---|---|
| **General** | |
| Measuring ranges | 4, switchable internally and externally; autoranging is also possible |
| Smallest possible measuring range | Depending on application, e.g. CO: 0 ... 10 vpm, $CO_2$: 0 ... 5 vpm |
| Largest possible measuring range | Depending on application |
| Measuring range with suppressed zero | Any zero point within 0 ... 100 % can be achieved; smallest possible span 20 % |
| Heated version | max. 65 °C |
| Characteristic | Linearized |
| Position of use | Front panel vertical |
| Conformity | CE identification EN 50081-1, EN 50082-2 |
| **Design, enclosure** | |
| Weight | Approx. 32 kg |
| Degree of protection | IP65 according to EN 60529, restricted breathing to EN 50021 |
| **Electrical characteristics** | |
| Power supply | 100 ... 120 V AC (rated range 90 ... 132 V), 48 ... 63 Hz or 200 ... 240 V AC (rated range 180 ... 264 V), 48 ... 63 Hz |
| Power consumption | Approx. 35 VA; approx. 330 VA with heated version |
| **E**EMC interference immunity (**E**lectro**M**agnetic **C**ompatibility) | According to standard requirements of NAMUR NE21 (08/98) |
| Electrical safety | According to EN 61010-1 |
| • heated units | overvoltage category II |
| • unheated units | overvoltage category III |
| Fuse links (unit without heater) | |
| • 100... 120 V | F3: 1T/250; F4: 1T/250 |
| • 200... 240 V | F3: 0.63T/250; F4: 0.63T/250 |
| Fuse links (unit with heater) | |
| • 100... 120 V | F1: 1T/250; F2: 4T/250<br>F3: 4T/250; F4: 4T/250 |
| • 200... 240 V | F1: 0.63T/250; F2: 2.5T/250<br>F3: 2.5T/250; F4: 2.5T/250 |
| **Gas inlet conditions** | |
| Perm. sample gas pressure | |
| • for analyzers with hoses (without pressure switch) | 600 ... 1500 hPa (absolute) |
| • for analyzers 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 |
| • For short periods | 250 hPa above ambient |
| Sample gas flow | 18 ... 90 l/h (0.3 ... 1.5 l/min) |
| Sample gas temperature | 0 ... 50 °C; with heated version: 0 ... 80 °C |
| Sample gas humidity | < 90% RH (relative humidity) or depending on application |
| **Time response** | |
| Warm-up period | With amb. temperature < 30 min (maximum accuracy achieved after 2 hours); heated version: approx. 90 min |
| Response time ($T_{90}$ time) | Dependent on length of analyzer cell, sample gas line and damping |
| Damping (electric time constant) | 0 ... 100 s, programmable |
| Dead time (purging time of gas path in analyzer at 1 l/min) | Approx. 0.5 ... 5 s, depending on version |
| Time for internal signal processing | < 1 s |
| **Pressure correction range** | |
| Pressure sensor | |
| • internal | 600 ... 1200 hPa absolute |
| • external | 600 ... 1500 hPa absolute |
| **Measuring response** (maximum accuracy achieved after 2 hours) | |
| Output signal fluctuation | ± 0.1% ... ± 1% of smallest possible measuring range specified on rating plate, depending on application with the unit specific electronic time constant (corresponds to ± 0.33% at 2σ) |
| Zero drift | < 1% of measuring range/week |
| Measured-value drift | < 1% of measuring range/week |
| Repeatability | Between 0.1% and 1% of respective measuring range |
| Minimum detection limit | 1% of smallest measuring range |
| Linearity error | < 0.5% of full-scale value |
| **Influencing variables** (referred to 1000 hPa absolute sample gas pressure, 0.5 l/min sample gas flow and 25 °C ambient temperature) | |
| Ambient temperature | < 1% of measuring range/10 K (for a constant temperature of the reception cell) |
| Sample gas pressure | With pressure compensation: < 0.15% of setpoint/1% change in atmospheric pressure |
| Sample gas flow | Negligible |
| Power supply | < 0.1% of output signal span at rated voltage ± 10% |
| Ambient conditions | Application-dependent influencing of measurement if ambient air contains measured component or cross-sensitive gases |
| **Electric inputs and outputs** | |
| Analog output | 0/2/4 ... 20 mA. floating; max. load 750 Ω |
| Relay outputs | 6, with changeover contacts, freely selectable, e.g. for range identification; loading capacity: 24 V AC/DC / 1 A floating, non sparking |
| Analog inputs | 2, designed for 0/2/4 ... 20 mA, for ext. pressure sensor and correction of influence of residual gas (correction of cross-interference) |
| Binary inputs | 6, designed for 24 V, floating, freely selectable, e.g. for range switching |
| Serial interface | RS 485 |
| Options | Autocal function with 8 additional binary inputs and 8 relay outputs, also with PROFIBUS PA and PROFIBUS DP |
| **Ambient conditions** | |
| Permissible ambient temperature | -30 ... +70 °C during storage and transport, +5 ... +45 °C during operation |
| Permissible humidity | < 90 % RH (relative humidity) as annual average, during storage and transport )dew point must not be fallen below) |

## Selection and Ordering Data

Order No.

**ULTRAMAT 6 gas analyzer**
for field mounting, single-channel, 1 component

7MB2111 - ■■■■■■ - ■■ 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 | possible with 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 | 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 |

## Field unit

### Selection and Ordering Data

Order No.

**ULTRAMAT 6 gas analyzer**
for field mounting, single-channel, 1 component

**7 M B 2 1 1 1 - ■ ■ ■ ■ ■ - ■ ■ A ■**

| Internal gas paths | Sample cell[1]) (lining) | Reference cell (flow-type) | |
|---|---|---|---|
| Hose made of FKM (Viton) | Aluminum | Non-flow-type | 0 |
| | Aluminum | Flow-type | 1 |
| Pipe made of titanium | Tantalum | Non-flow-type | 2 |
| | Tantalum | Flow-type | 3 |
| Pipe made of SS (type No. 1.4571) | Aluminum | Non-flow-type | 6 |
| | Tantalum | Non-flow-type | 8 |

| Additional electronics | |
|---|---|
| Without | 0 |
| Autocal board | |
| • 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 |

| Power supply | |
|---|---|
| 100 ... 120 V AC, 48 ... 63 Hz | 0 |
| 200 ... 240 V AC, 48 ... 63 Hz | 1 |
| 100 ... 120 V AC, 48 ... 63 Hz, acc. to ATEX II 2G[2]) (operating mode: leakage compensation) | 2 |
| 200 ... 240 V AC, 48 ... 63 Hz, acc. to ATEX II 2G[2]) (operating mode: leakage compensation) | 3 |
| 100 ... 120 V AC, 48 ... 63 Hz, acc. to ATEX II 2G[2]) (operating mode: continuous purging) | 6 |
| 200 ... 240 V AC, 48 ... 63 Hz, acc. to ATEX II 2G[2]) (operating mode: continuous purging) | 7 |

| Heating of the internal gas paths and analyzer section | |
|---|---|
| Without | A |
| With (max. 65 °C) | B |

| Operating software and documentation | |
|---|---|
| German | 0 |
| English | 1 |
| French | 2 |
| Spanish | 3 |
| Italian | 4 |
| | 4 |

cannot be combined

| | | | | |
|---|---|---|---|---|
| 0 | 0 | 0 | → | A28, A29 |
| 1 | 1 | | | |
| | | 2 | → | A28, A29, Y02 |
| | | 3 | → | Y02 |
| | | 6 | → | A28, A29 |
| | | 8 | → | A28, A29 |

| | | | | |
|---|---|---|---|---|
| | | 6 | | |
| | | 7 | | |
| | 8 | | | |
| | 0 | | | |
| | 1 | | | |
| 2 | | 2 | → | A11 |
| 3 | | 3 | → | A11 |
| 6 | | 6 | → | A11 |
| 7 | | 7 | → | A11 |

1) Only for sample cell length 20 ... 180 mm.
2) Only in relation with an approved purging unit.

## Selection and Ordering Data

| Further versions<br>Please add „-Z“ to Order No. and specify Order code. | Order code | cannot be combined |
|---|---|---|
| Interface converter from RS 485 to RS 232 | **A11** | → **E20** |
| Flow-type reference compartment with reduced flow, 6 mm | **A28** | |
| Flow-type reference compartment with reduced flow, ¼“ | **A29** | |
| Set of Torx tools, socket spanner | **A32** | |
| TAG labels (customer-defined inscriptions) | **B03** | |
| Kalrez gaskets in sample gas path | **B04** | |
| **Ex versions** | | |
| Combination possibilities s. Table Ex configurations in „Ex versions“ | | |
| ATEX II 3G certificate; restricted breathing, non-flammable gases | **E11** | |
| ATEX II 3G certificate; flammable gases [1]) | **E12** | |
| CSA certificate – Class I Div. 2 | **E20** | |
| ATEX II 3D certificate; dust Ex areas and additionnally: | | |
| • in non-hazardous gas zone | **E40** | |
| • in Ex zone acc. ATEX II 3G, and non-flammable gases | **E41** | |
| • in Ex zone acc. ATEX II 3G, and flammable gases [1]) | **E42** | |
| Clean for $O_2$-Service (specially cleaned gas path) | **Y02** | |
| Measuring range in plain text, if different from 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 according to 17. BImSch | **Y17** | |

| **Additional units for explosion-proof versions Category ATEX II 2G (Zone 1)** | Order No. |
|---|---|
| BARTEC EEx p control unit, 230 V, „leakage compensation“ | **7MB8000-2BA** |
| BARTEC EEx p control unit, 115 V, „leakage compensation“ | **7MB8000-2BB** |
| BARTEC EEx p control unit, 230 V, „continuous purging“ | **7MB8000-2CA** |
| BARTEC EEx p control unit, 115 V, „continuous purging“ | **7MB8000-2CB** |
| Explosion-protected isolation amplifier | **7MB8000-3AA** |
| Explosion-protected isolating relay, 230 V | **7MB8000-4AA** |
| Explosion-protected isolating relay, 110 V | **7MB8000-4AB** |
| Differential pressure switch for corrosive gases | **7MB8000-5AA** |
| Differential pressure switch for non-corrosive gases | **7MB8000-5AB** |
| Flame arrester made of stainless steel | **7MB8000-6BA** |
| Flame arrestor made of Hastelloy | **7MB8000-6BB** |
| **Category ATEX II 3G (Zone 2)** | |
| BARTEC EEx p control unit (flammable gases) | **7MB8000-1BA** |
| **FM/CSA (Class I Div. 2)** | |
| Ex purging unit MiniPurge FM | **7MB8000-1AA** |
| **Retrofitting sets** | |
| RS 485/Ethernet converter | **C79451-A3364-D61** |
| RS 485/RS 232 converter | **C79451-Z1589-U1** |
| Autocal function with 8 binary inputs/outputs | **A5E00064223** |
| Autocal function with 8 binary inputs/outputs and PROFIBUS PA | **A5E00057315** |
| Autocal function with 8 binary inputs/outputs and PROFIBUS DP | **A5E00057318** |
| Autocal function with 8 binary inputs/outputs and PROFIBUS PA Ex i (requires Firmware 4.1.10) | **A5E00057317** |

1) Only in relation with an approved purging unit.

## Field unit

2

### Selection and Ordering Data

Order No. 7MB2112-■■■■■-■■A■

**ULTRAMAT 6 gas analyzer**
for field mounting, single-channel, 2 components

| | | | Order No. | 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 | AA | |
| NO | 0 ... 100 vpm | 0 ... 1000 vpm | | |
| CO | 0 ... 300 vpm | 0 ... 3000 vpm | AB | |
| NO | 0 ... 300 vpm | 0 ... 3000 vpm | | |
| CO | 0 ... 1000 vpm | 0 ... 10000 vpm | AC | |
| NO | 0 ... 1000 vpm | 0 ... 10000 vpm | | |
| for CO/NO (TÜV; see Table TÜV, 2 components) | | | | |
| $CO_2$ | 0 ... 100 vpm | 0 ... 1000 vpm | BA | |
| CO | 0 ... 100 vpm | 0 ... 1000 vpm | | |
| $CO_2$ | 0 ... 300 vpm | 0 ... 3000 vpm | BB | |
| CO | 0 ... 300 vpm | 0 ... 3000 vpm | | |
| $CO_2$ | 0 ... 1000 vpm | 0 ... 10000 vpm | BC | |
| CO | 0 ... 1000 vpm | 0 ... 10000 vpm | | |
| $CO_2$ | 0 ... 3000 vpm | 0 ... 30000 vpm | BD | |
| CO | 0 ... 3000 vpm | 0 ... 30000 vpm | | |
| $CO_2$ | 0 ... 1% | 0 ... 10% | BE | |
| CO | 0 ... 1% | 0 ... 10% | | |
| $CO_2$ | 0 ... 3% | 0 ... 30% | BF | |
| CO | 0 ... 3% | 0 ... 30% | | |
| $CO_2$ | 0 ... 10% | 0 ... 100% | BG | |
| CO | 0 ... 10% | 0 ... 100% | | |
| $CO_2$ | 0 ... 10% | 0 ... 100% | CG | |
| $CH_4$ | 0 ... 10% | 0 ... 100% | | |
| $CO_2$ | 0 ... 100 vpm | 0 ... 1000 vpm | DA | |
| NO | 0 ... 100 vpm | 0 ... 1000 vpm | | |
| $CO_2$ | 0 ... 300 vpm | 0 ... 3000 vpm | DB | |
| NO | 0 ... 300 vpm | 0 ... 3000 vpm | | |
| Internal gas paths | Sample cell[1] (lining) | Reference cell (flow-type) | | |
| Hose made of FKM (Viton) | Aluminum | Non-flow-type | 0 | 0 0 → A28, A29 |
| | Aluminum | Flow-type | 1 | 1 |
| Pipe made of titanium | Tantalum | Non-flow-type | 2 | 2 → A28, A29, Y02 |
| | Tantalum | Flow-type | 3 | 3 → Y02 |
| Pipe made of SS (type No. 1.4571) | Aluminum | Non-flow-type | 6 | 6 → A28, A29 |
| | Tantalum | Non-flow-type | 8 | 8 → A28, A29 |
| Additional electronics | | | | |
| Without | | | 0 | |
| Autocal board | | | | |
| • 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 ↓ 0 |
| Power supply | | | | |
| 100 ... 120 V AC, 48 ... 63 Hz | | | 0 | 0 |
| 200 ... 240 V AC, 48 ... 63 Hz | | | 1 | 1 |
| 100 ... 120 V AC, 48 ... 63 Hz, acc. to ATEX II 2G[2]) (operating mode: leakage compensation) | | | 2 | 2 2 → A11 |
| 200 ... 240 V AC, 48 ... 63 Hz, acc. to ATEX II 2G[2]) (operating mode: leakage compensation) | | | 3 | 3 3 → A11 |
| 100 ... 120 V AC, 48 ... 63 Hz, acc. to ATEX II 2G[2]) (operating mode: continuous purging) | | | 6 | 6 6 → A11 |
| 200 ... 240 V AC, 48 ... 63 Hz, acc. to ATEX II 2G[2]) (operating mode: continuous purging) | | | 7 | 7 7 → A11 |
| Heating of the internal gas paths and analyzer section | | | | |
| Without | | | A | |
| With (max. 65 °C) | | | B | |
| Operating software and documentation | | | | |
| German | | | 0 | |
| English | | | 1 | |
| French | | | 2 | |
| Spanish | | | 3 | |
| Italian | | | 4 | |

1) Only for measuring cell length 20 ... 180 mm.
2) Only in relation with an approved purging unit.

## Selection and Ordering Data

| Further versions<br>Please add „-Z“ to Order No. and specify Order code. | Order code | cannot be combined |
|---|---|---|
| Interface converter from RS 485 to RS 232 | **A11** | → **E20** |
| Flow-type reference compartment with reduced flow, 6 mm | **A28** | |
| Flow-type reference compartment with reduced flow, ¼“ | **A29** | |
| Set of Torx tools, socket spanner | **A32** | |
| TAG labels (customer-definde inscriptions) | **B03** | |
| Kalrez gaskets in sample gas path | **B04** | |
| **Ex versions** | | |
| Combination possibilities s. Table Ex configurations in „Ex versions“ | | |
| ATEX II 3G certificate; restricted breathing, non-flammable gases | **E11** | |
| ATEX II 3G certificate; flammable gases [1]) | **E12** | |
| CSA certificate – Class I Div. 2 | **E20** | |
| ATEX II 3D certificate; dust Ex areas and additionnally: | | |
| • in non-hazardous gas zone | **E40** | |
| • in Ex zone acc. ATEX II 3G, and non-flammable gases | **E41** | |
| • in Ex zone acc. ATEX II 3G, and flammable gases [1]) | **E42** | |
| Clean for $O_2$-Service (specially cleaned gas path) | **Y02** | |
| Measuring range in plain text, if different from 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 according to 17. BImSch | **Y17** | |

| **Additional units for explosion-proof versions Category ATEX II 2G (Zone 1)** | Order No. |
|---|---|
| BARTEC EEx p control unit, 230 V, „leakage compensation“ | **7MB8000-2BA** |
| BARTEC EEx p control unit, 115 V, „leakage compensation“ | **7MB8000-2BB** |
| BARTEC EEx p control unit, 230 V, „continuous purging“ | **7MB8000-2CA** |
| BARTEC EEx p control unit, 115 V, „continuous purging“ | **7MB8000-2CB** |
| Explosion-protected isolation amplifier | **7MB8000-3AA** |
| Explosion-protected isolating relay, 230 V | **7MB8000-4AA** |
| Explosion-protected isolating relay, 110 V | **7MB8000-4AB** |
| Differential pressure switch for corrosive gases | **7MB8000-5AA** |
| Differential pressure switch for non-corrosive gases | **7MB8000-5AB** |
| Flame arrester made of stainless steel | **7MB8000-6BA** |
| Flame arrester made of Hastelloy | **7MB8000-6BB** |
| **Category ATEX II 3G (Zone 2)** | |
| BARTEC EEx p control unit (flammable gases) | **7MB8000-1BA** |
| **FM /CSA (Class I Div. 2)** | |
| Ex purging unit MiniPurge FM | **7MB8000-1AA** |

| **Retrofitting sets** | Order No. |
|---|---|
| RS 485/Ethernet converter | **C79451-A3364-D61** |
| RS 485/RS 232 converter | **C79451-Z1589-U1** |
| Autocal function with 8 binary inputs/outputs | **A5E00064223** |
| Autocal function with 8 binary inputs/outputs and PROFIBUS PA | **A5E00057315** |
| Autocal function with 8 binary inputs/outputs and PROFIBUS DP | **A5E00057318** |
| Autocal function with 8 binary inputs/outputs and PROFIBUS PA Ex i (requires Firmware 4.1.10) | **A5E00057317** |

1) Only in relation with an approved purging unit.

## Field unit



### *TÜV, single component (only with supplement Y (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**

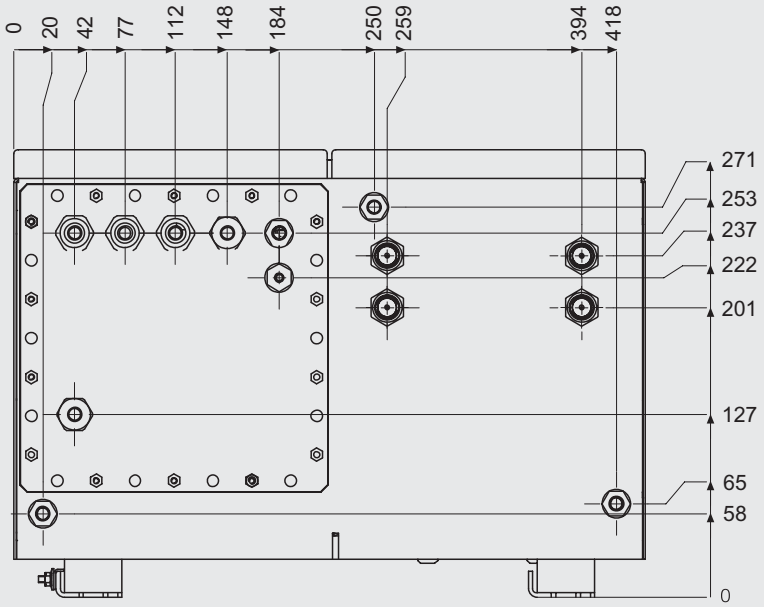
### *TÜV, 2 components in series*

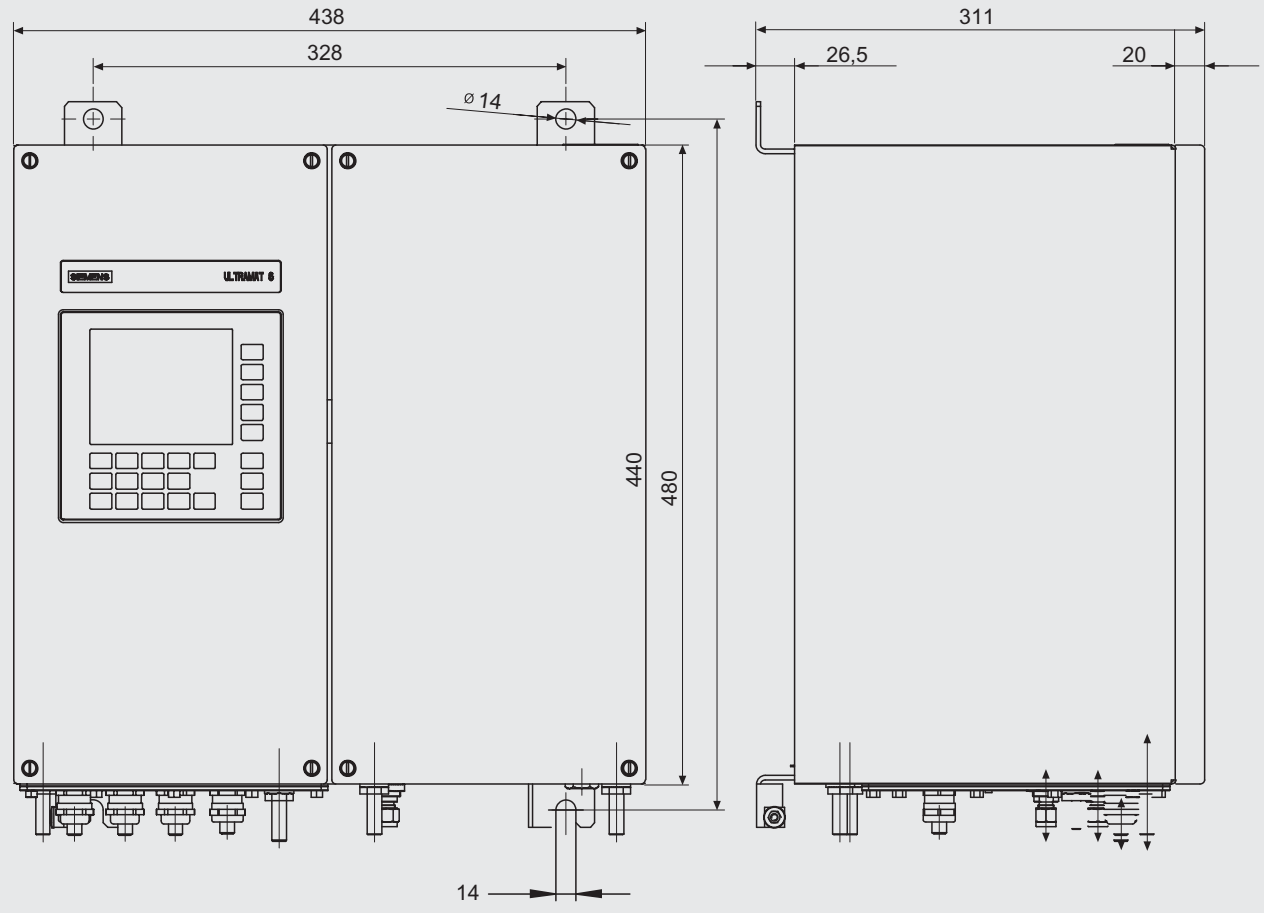
| Component | CO (TÜV) | | NO (TÜV) | |
|---|---|---|---|---|
| Measuring range identification | Smallest measuring range from 0 to ... | Largest measuring range from 0 to ... | Smallest measuring range from 0 to ... | Largest measuring range from 0 to ... |
| AA | 75 mg/m³ | 1000 mg/m³ | 200 mg/m³ | 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 components in series)
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**

## Dimensional drawings



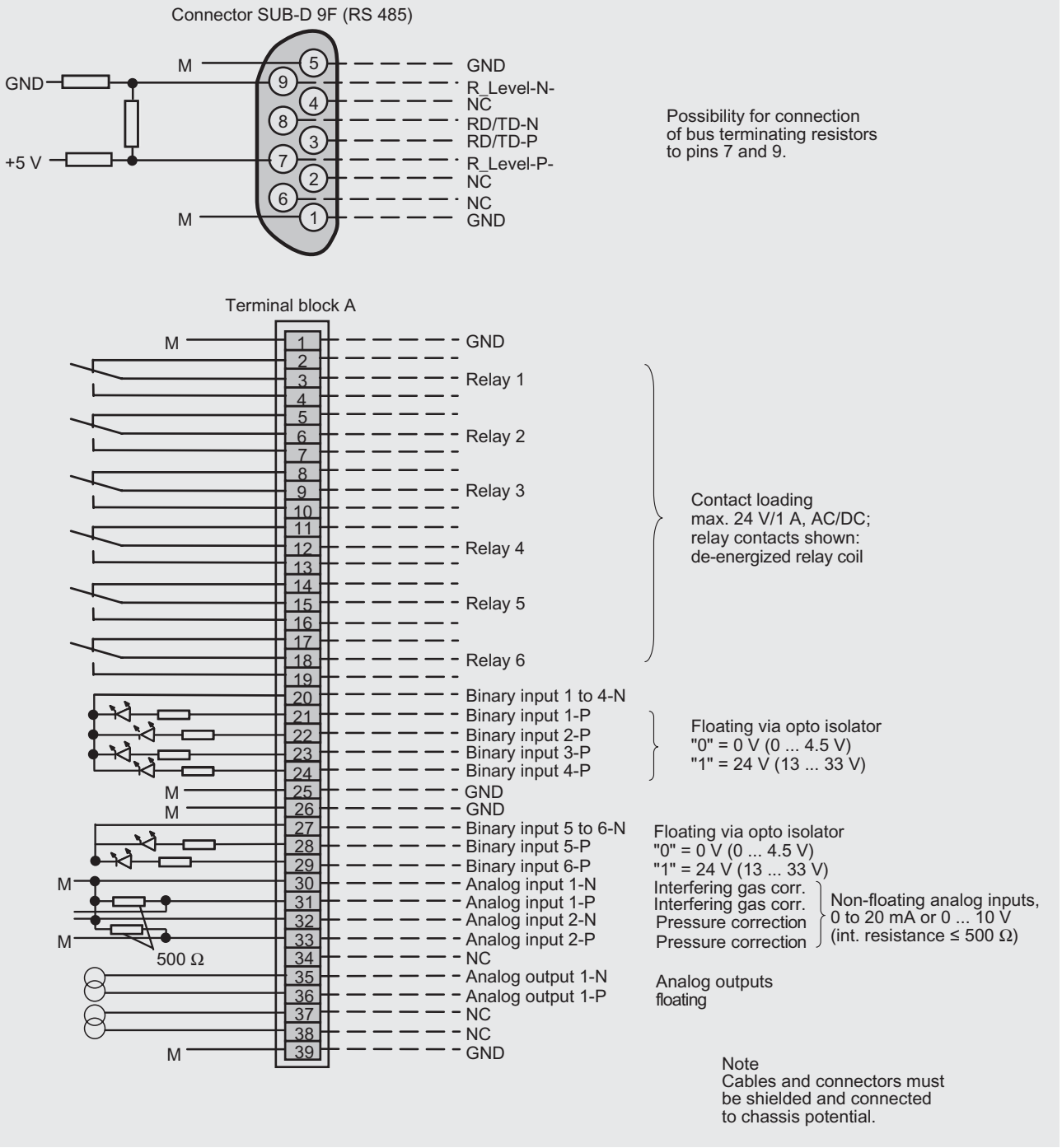

ULTRAMAT 6, field unit, dimensions in mm

## Field unit

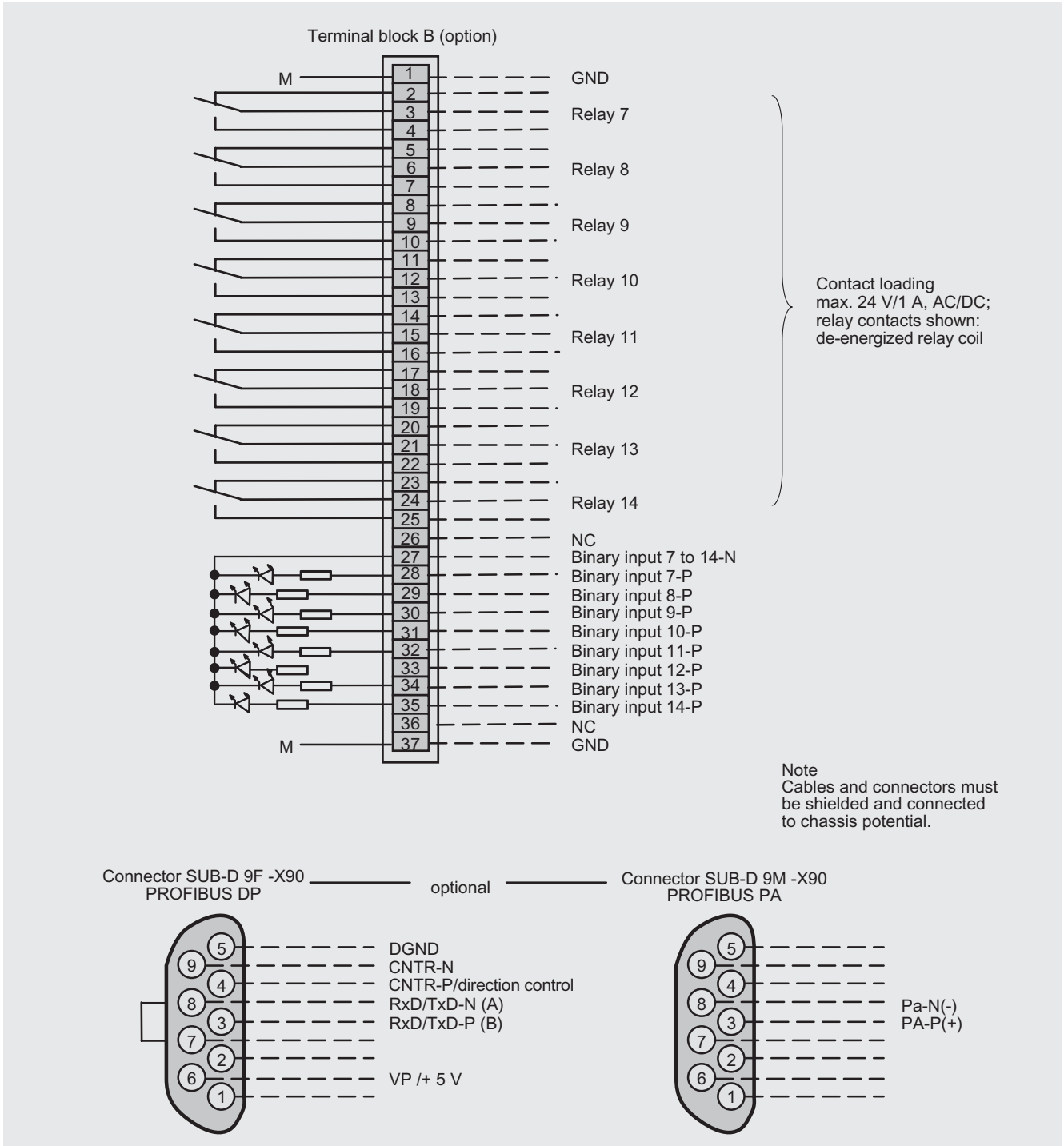
2

### Schematics

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



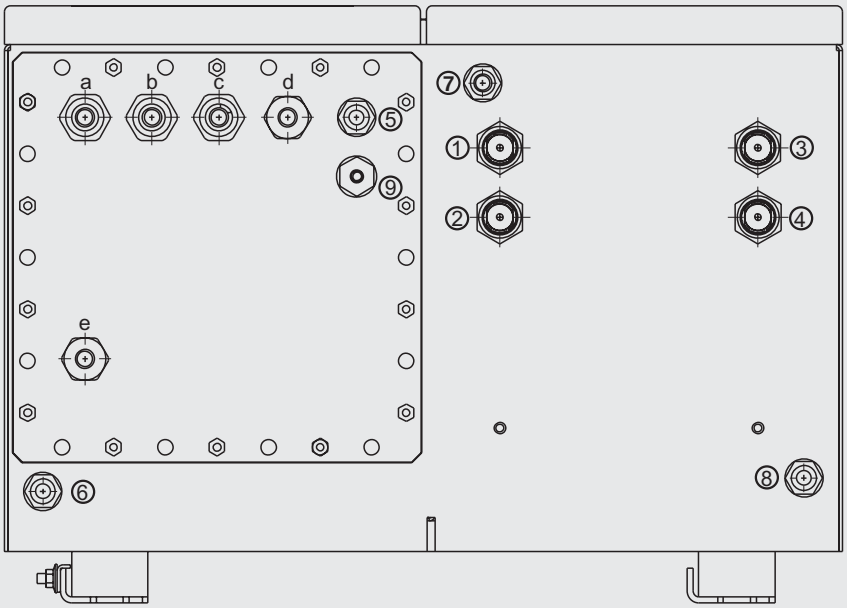

ULTRAMAT 6, field unit, connector and terminal assignment




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

## Field unit






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 ¼ " |
| 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

## Selection and Ordering Data

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

## Proposition of spare parts

### Selection and Ordering Data

| Description | 7MB-2121 | 7MB-2123 | 7MB-2124 | 7MB-2111 | 7MB-2112 | 7MB-2111/2 Ex | 2 years (qty) | 5 years (qty) | Order No. |
|---|---|---|---|---|---|---|---|---|---|
| **Analyzer section** | | | | | | | | | |
| O-ring for hose cell | x | x | x | x | x | x | 1 | 2 | **C75121-Z101-C1** |
| O-ring behind hose cell | x | x | x | x | x | x | 1 | 2 | **C75121-Z101-C2** |
| O-ring for reflector | x | x | x | x | x | x | 1 | 2 | **C75121-Z101-C3** |
| O-ring for cover (window, front side) | x | x | x | x | x | x | 2 | 2 | **C75121-Z101-C4** |
| O-Ring for cooler element | x | x | x | x | x | x | 1 | 1 | **C75121-Z101-C5** |
| O-ring for cover (window, rear side) | x | x | x | x | x | x | 2 | 4 | **C79121-Z100-A24** |
| IR source | x | x | x | x | x | x | 1 | 1 | **C79451-A3462-B12** |
| Window (cell length 20 mm … 180 mm) | x | x | x | x | x | x | 2 | 2 | **C79451-A3462-B151** |
| Window (cell length 0.2 mm … 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 circuit** | | | | | | | | | |
| O-ring (stubs) | | | | x | x | x | 2 | 4 | **C71121-Z100-A159** |
| O-ring (chopper) | x | x | x | x | x | x | 1 | 2 | **C75121-Z100-C3** |
| Pressure switch | x | x | x | | | | | | **C79302-Z1210-A2** |
| Flowmeter | x | x | x | | | | | | **C79402-Z560-T1** |
| Stub | 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 | **A5E00023094** |
| Fuse link (heated unit) | | | | | | x | 1 | 2 | **A5E00061501** |
| Temperature controller - electronic, 230 V AC | | | | x | x | | | 1 | **A5E00118527** |
| Temperature controller - electronic, 115 V AC | | | | 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 board, LCD/ keyboard | x | x | x | x | x | | 1 | 1 | **C79451-A3474-B605** |
| Motherboard, without firmware | x | x | x | x | x | x | | 1 | **C79451-A3474-B620** |
| LC display | x | x | x | x | x | | 1 | 1 | **W75025-B5001-B1** |
| Connector filter | x | x | x | x | x | | | 1 | **W75041-E5602-K2** |
| Fuse link, T 0.63/250 V | x | | x | x | x | x | 2 | 3 | **W75054-L1010-T630** |
| Fuse link, 1 A, 110/220 V | x | x | x | | | | 2 | 3 | **W75054-L1011-T100** |
| Fuse link, 1,6 A, 250 V | | x | x | x | x | x | 2 | 3 | **W75054-L1011-T160** |
| Fuse link, 2,5 A, 250 V | | | | x | x | x | 2 | 3 | **W75054-L1011-T250** |

If the ULTRAMAT 6 was delivered with specially cleaned gas path for high oxygen content (so-called "Cleaned for $O_2$ service"), please absolutely specify it for a spare part order. This is the only way to guarantee that the gas path furthermore corresponds to the special requirements for this variant.