

Continuous Gas Analyzers, extractive

ULTRAMAT/OXYMAT 6

General

Overview

2



ULTRAMAT/OXYMAT 6, 19" unit

The ULTRAMAT/OXYMAT 6 gas analyzer is a practical combination of the ULTRAMAT 6 and OXYMAT 6 analyzers in a single enclosure.

The ULTRAMAT 6 channel operates according to the NDIR two-beam alternating light principle and measures one or two gases highly selectively whose absorption bands lie in the infrared wavelength range from 2 to 9 μm , such as CO, CO₂, NO, SO₂, NH₃, H₂O as well as CH₄ and other hydrocarbons.

The OXYMAT 6 channel is based on the paramagnetic alternating pressure method and is used to measure oxygen in gases.

Benefits

- 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
- Open interface architecture (RS 485, RS 232, PROFIBUS)
- SIPROM GA network for maintenance and servicing information (option)

ULTRAMAT channel

- High selectivity with double-layer detector and optical coupler
 - Reliable measurements even in complex gas mixtures
- Low detection limits
 - Measurements with low concentrations

OXYMAT channel

- Paramagnetic alternating pressure principle
 - Small measuring ranges (0 - 0.5% or 99.5 - 100% O₂)
 - Absolute linearity
- Detector element has no contact with the samples gas
 - Can be used to measure corrosive gases
 - Long lifetime
- Physically suppressed zero through suitable selection of reference gas (air or O₂), e.g. 98 - 100% O₂ for purity monitoring/air separation

Application

Applications

- Measurements for boiler control in combustion plants
- Emission measurements in incineration plants
- Measurements in the automotive industry (test benches)
- Process gas concentrations in chemical plants

- Trace measurements in pure gas processes
- Environment protection
- TLV value monitoring at place of work
- Quality monitoring

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, SO₂ and O₂ according to 13. and 17. BImSchV and TA Luft.
Smallest TÜV-approved and permitted measuring ranges:
 - 1-component analyzer
 - CO: 0 ... 50 mg/m³
 - NO: 0 ... 100 mg/m³
 - SO₂: 0 ... 75 mg/m³
 - 2-component analyzer (series connection)
 - CO: 0 ... 75 mg/m³
 - NO: 0 ... 200 mg/m³

All larger measuring ranges are also permitted.

Furthermore, the TÜV-approved versions of the ULTRAMAT/OXYMAT 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).
- Sample cell (OXYMAT channel) – with or without flow-type compensation branch – made of stainless steel (SS, type No. 1.4571) or of tantalum for highly corrosive sample gases (e.g. HCl, Cl₂, SO₂, SO₃ etc.)
- Monitoring (option) sample and/or reference gas (both channels)

Continuous Gas Analyzers, extractive ULTRAMAT/OXYMAT 6

General

2

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
- Permanent LED backlighting
- 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
- Operation software in two languages: German/English, English/Spanish, French/English, Italian/English, Spanish/English.

Inputs and outputs (per channel)

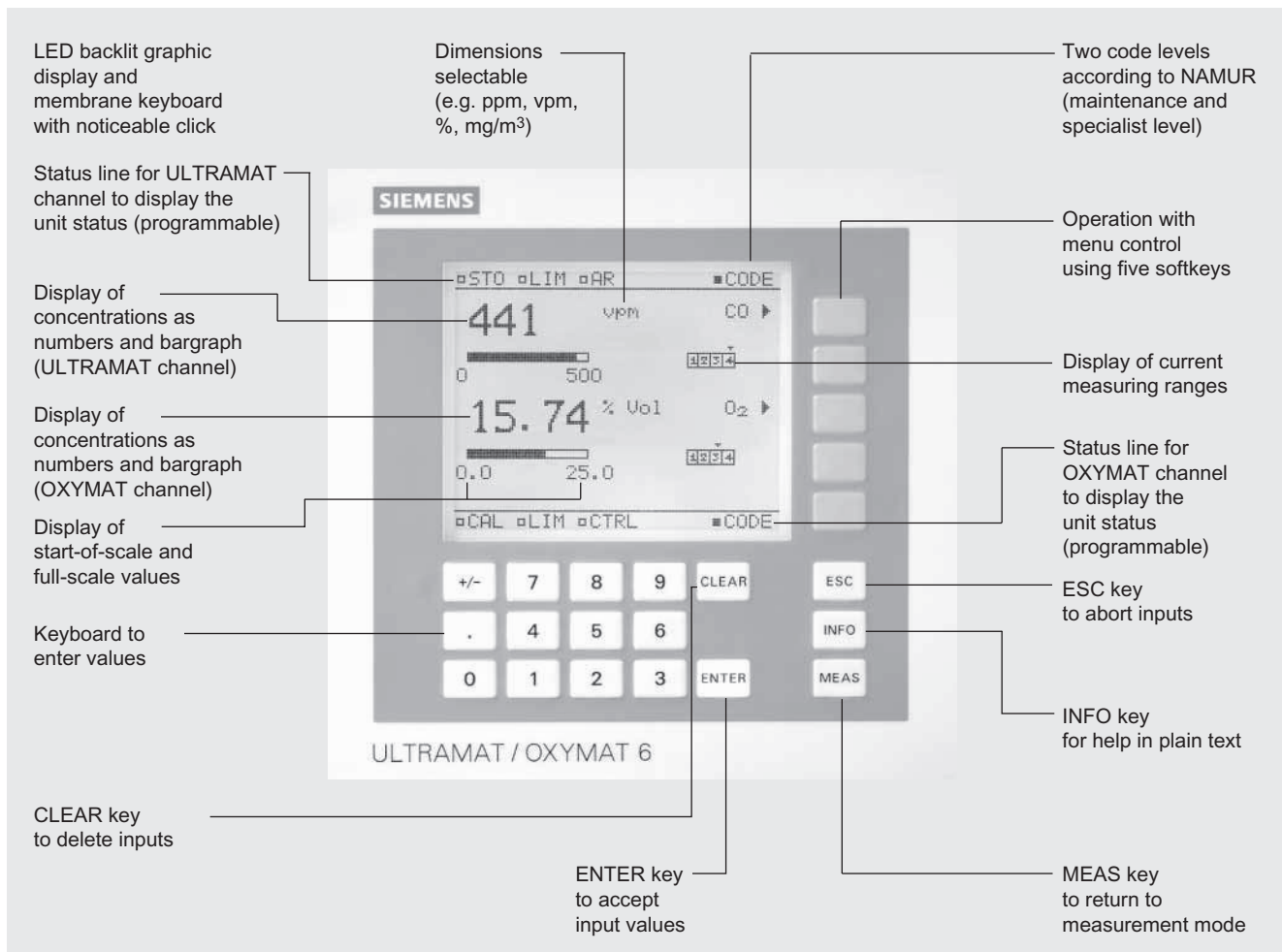
- One analog output for each measured component
- Two analog inputs freely configurable (e.g. correction of cross interferences or external pressure sensor)
- Six binary inputs freely configurable (e.g. for range switching, external signal processing from sample preparation)
- Six relay outputs freely configurable e.g. for 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 the basic unit (connection at the rear and for the 19" unit also behind the front plate).

Options

- AK interface for the automotive industry with extended functions
- RS 485/RS 232 converter
- RS 485/Ethernet converter
- RS 485/USB converter
- Linking to networks via PROFIBUS DP/PA interface
- SIPROM GA software as service and maintenance tool.



ULTRAMAT/OXYMAT 6, membrane keyboard and graphic display

Continuous Gas Analyzers, extractive

ULTRAMAT/OXYMAT 6

General

Versions – Wetted parts, standard

Gas path ULTRAMAT channel		19" unit
With hoses	Bushing Hose Sample cell: • Body • Cell lining • Stub • Window	SS, type No. 1.4571 FKM (e.g. Viton) Aluminum Aluminum SS, type No. 1.4571, O-ring: FKM (e.g. Viton) or FFKM (Kalrez) CaF ₂ , adhesive: E353, O-ring: FKM (e.g. Viton) or FFKM (Kalrez)
With pipes	Bushing Pipe Sample cell: • Body • Cell lining • Window	Titanium Titanium, O-ring: FKM (e.g. Viton) or FFKM (Kalrez) Aluminum Tantalum (only for cell length 20 ... 180 mm) CaF ₂ , adhesive: E353, O-ring: FKM (e.g. Viton) or FFKM (Kalrez)
With pipes	Bushing Pipe Sample cell: • Body • Cell lining • Window	SS, type No. 1.4571 SS, type No. 1.4571, O-ring: FKM (e.g. Viton) or FFKM (Kalrez) Aluminum Aluminum or tantalum (Ta: only for cell length 20 ... 180 mm) CaF ₂ , adhesive: E353, O-ring: FKM (e.g. Viton) or FFKM (Kalrez)
Flowmeter	Metering pipe Float Float limit Elbows	Duran glass Duran glass PTFE (Teflon) FKM (e.g. Viton)
Pressure switch	Membrane Enclosure	FKM (e.g. Viton) PA 6.3 T

Options

Gas path, ULTRAMAT channel		19" unit
Flowmeter	Metering pipe Float Float limit Elbows	Duran glass Duran glass PTFE (Teflon) FKM (e.g. Viton)
Pressure switch	Membrane Enclosure	FKM (e.g. Viton) PA 6.3 T

Versions – Wetted parts, special applications (examples)

Gas path, ULTRAMAT channel		19" unit
With pipes	Bushing Pipe Sample cell: • Body • Window	e.g. Hastelloy C22 e.g. Hastelloy C22, O-ring: FKM (e.g. Viton) or FFKM (Kalrez) e.g. Hastelloy C22 CaF ₂ , without adhesive, O-ring: FKM (e.g. Viton) or FFKM (Kalrez)

Continuous Gas Analyzers, extractive ULTRAMAT/OXYMAT 6

General

2

Versions – Wetted parts, standard

Gas path, OXYMAT channel		19" unit
With hoses	Connection	SS, type No. 1.4571
	Hose	FKM (e.g. Viton)
	Sample cell	SS, type No. 1.4571 or Ta
	Stubs sample cell	SS, type No. 1.4571
	Restrictor	PTFE (e.g. Teflon)
	O-rings	FKM (e.g. Viton)
With pipes	Connection	Titanium
	Pipe	Titanium
	Sample cell	SS, type No. 1.4571 or tantalum
	Restrictor	Titanium
	O-rings	FKM (Viton) or FFKM (e.g. Kalrez)
With pipes	Connection	SS, type No. 1.4571
	Pipe	SS, type No. 1.4571
	Sample cell	SS, type No. 1.4571 or tantalum
	Restrictor	SS, type No. 1.4571
	O-rings	FKM (Viton) or FFKM (Kalrez)
With pipes	Connection	Hastelloy C 22
	Pipe	Hastelloy C 22
	Sample cell	SS, type No. 1.4571 or tantalum
	Restrictor	Hastelloy C 22
	O-rings	FKM (e.g. Viton) or FFKM (e.g. Kalrez)

Options

Gas path, OXYMAT channel		19" unit
Flowmeter	Metering pipe	Duran glass
	Float	Duran glass
	Float limit	PTFE (Teflon)
	Elbows	FKM (e.g. Viton)
Pressure switch	Membrane	FKM (e.g. Viton)
	Enclosure	PA 6.3 T

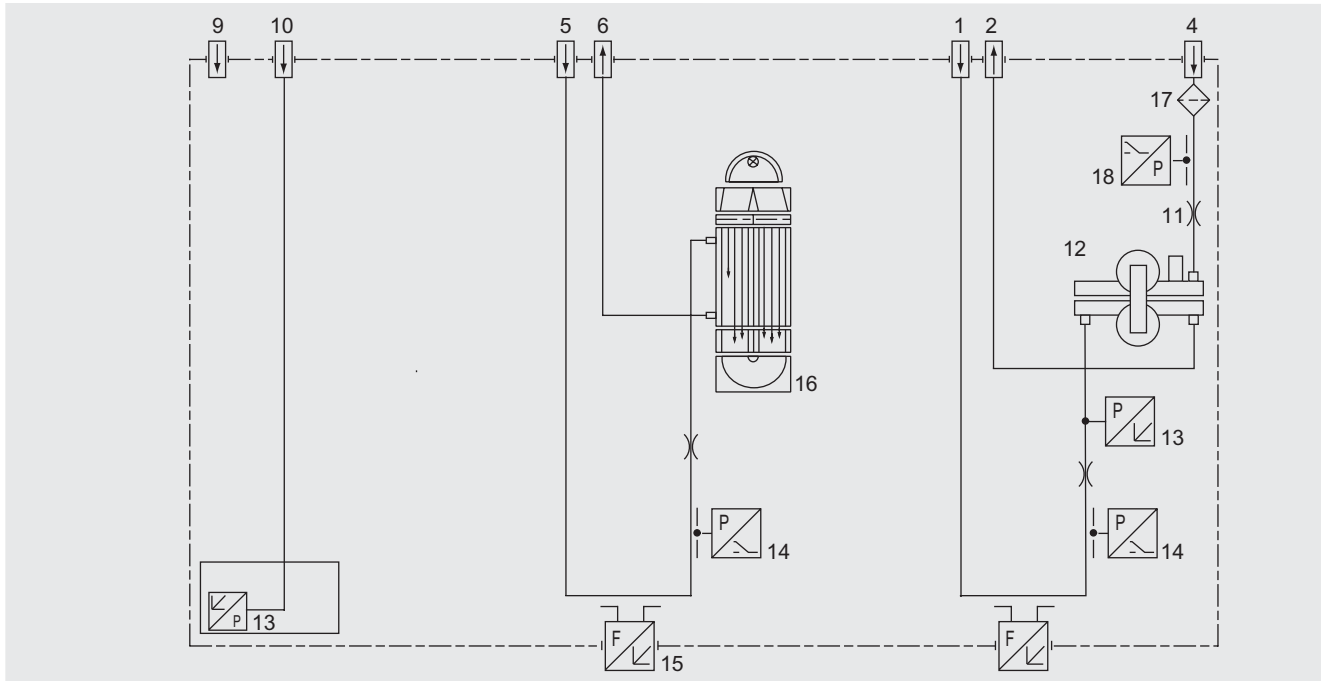
Continuous Gas Analyzers, extractive ULTRAMAT/OXYMAT 6

General

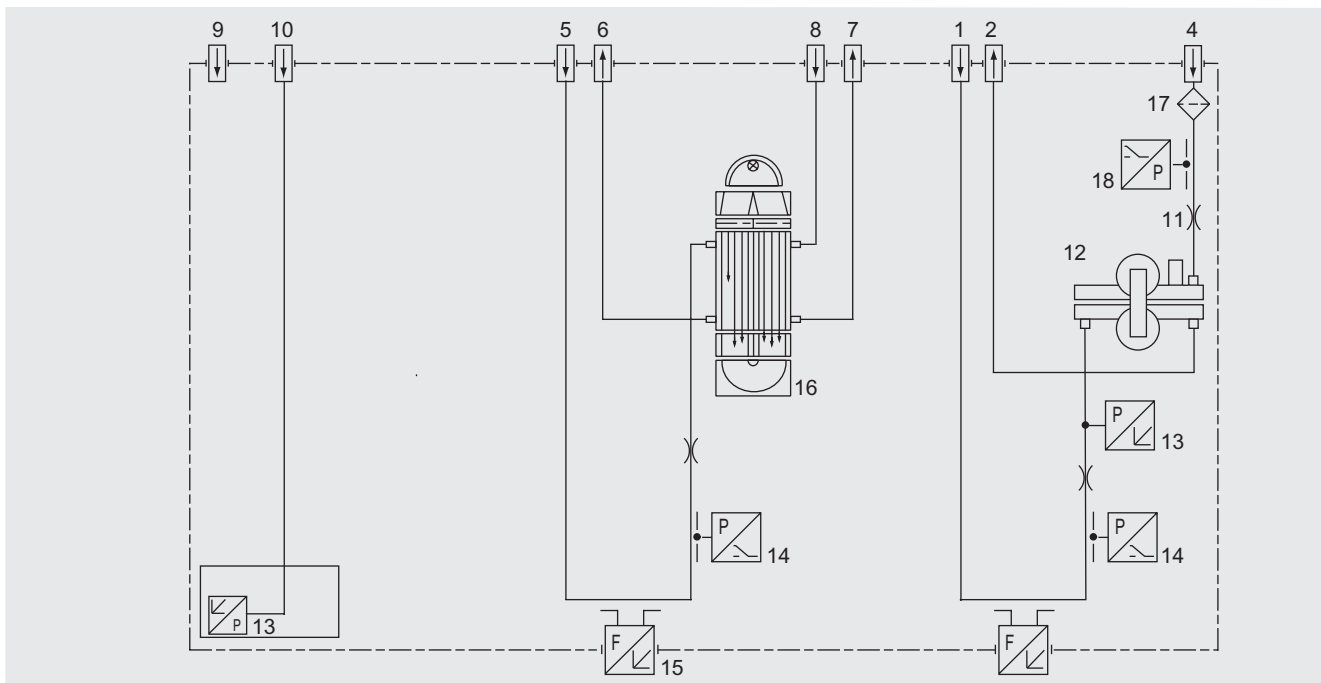
Gas path

Key to gas path figures

- | | |
|---|--|
| 1 Sample gas inlet (OXYMAT channel) | 10 Connection pressure sensor (ULTRAMAT channel) |
| 2 Sample gas outlet (OXYMAT channel) | 11 Restrictor (in reference gas inlet) |
| 3 Not used | 12 O ₂ bench |
| 4 Reference gas inlet | 13 Pressure sensor |
| 5 Sample gas inlet (ULTRAMAT channel) | 14 Pressure switch in sample gas path (option) |
| 6 Sample gas outlet (ULTRAMAT channel) | 15 Flowmeter in sample gas path (option) |
| 7 Reference gas outlet (ULTRAMAT channel, option) | 16 IR bench |
| 8 Reference gas inlet (ULTRAMAT channel, option) | 17 Filter |
| 9 Purging gas | 18 Pressure switch |



ULTRAMAT/OXYMAT 6, gas path (example) IR channel without flow-type reference side



ULTRAMAT/OXYMAT 6, gas path (example) IR channel with flow-type reference side

Function

Mode of operation, ULTRAMAT channel

The ULTRAMAT channel 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 N₂ (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 for most applications.

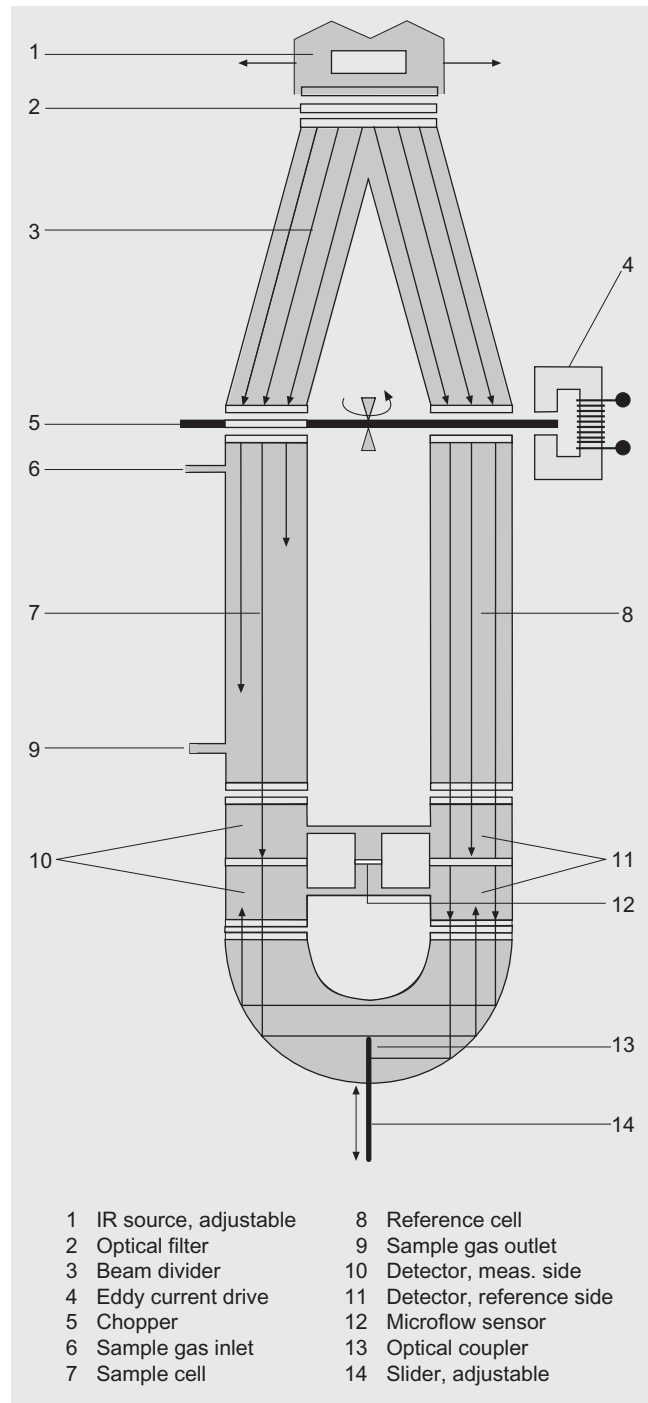
The ambient air of the analyzer should be, in a large extent, free of high concentration of the component to be measured.

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

Reference side with reduced flow must not exceed 70% of O₂ content.

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

Physically suppressed zeros are carried out as special application.



ULTRAMAT 6, mode of operation

Continuous Gas Analyzers, extractive

ULTRAMAT/OXYMAT 6

General

Mode of operation, OXYMAT channel

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

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

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

The microflow sensor consists of two nickel grids heated to approx. 120 °C which form a Wheatstone bridge together with two supplementary resistors. The pulsating flow results in a change in the resistance of the Ni grids. This results in a bridge offset which depends on the oxygen concentration in the sample gas.

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

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

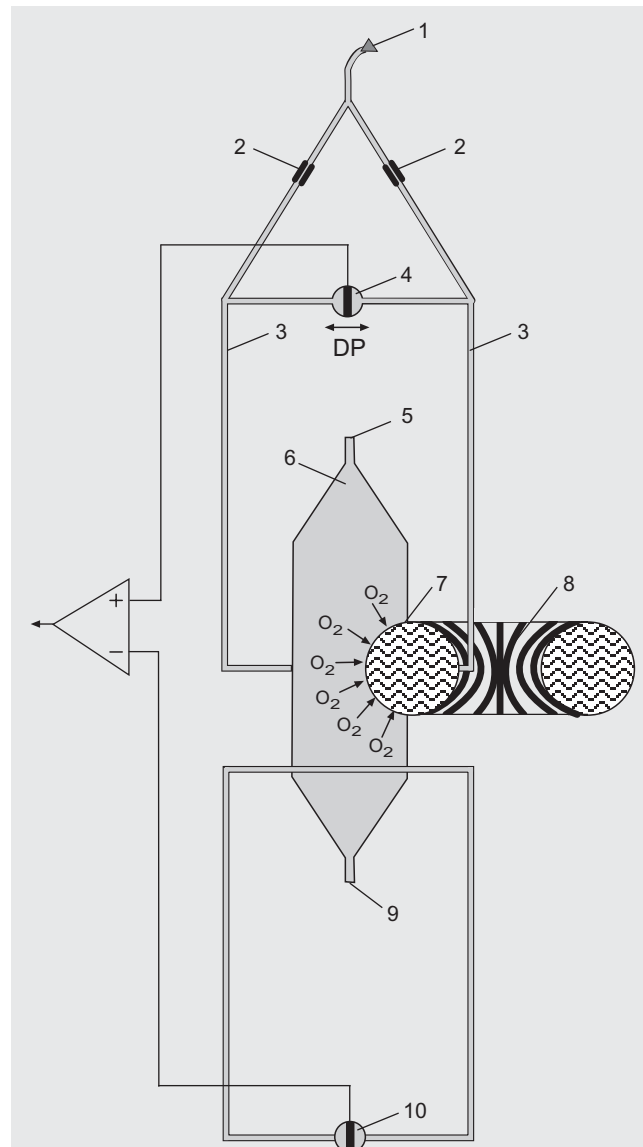
The sample cell is directly in the sample path and has a small volume. The microflow sensor thus responds quickly, resulting in a very short response time.

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

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

Note

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



- 1 Reference gas inlet
- 2 Restrictors
- 3 Reference gas channels
- 4 Microflow sensor for measurement
- 5 Sample gas inlet
- 6 Sample cell
- 7 Paramagnetic effect
- 8 Electromagnet with alternating field strength
- 9 Sample gas and reference gas outlet
- 10 Microflow sensor in compensation system (without flow)

OXYMAT 6, mode of operation

Continuous Gas Analyzers, extractive ULTRAMAT/OXYMAT 6

General

2

Essential characteristics

- Dimension of measured value freely selectable (e.g. vpm, mg/m³)
- Four freely-parameterizable measuring ranges per component
- Measuring ranges with elevated physical zero possible
- Measuring range identification
- Electrically isolated signal output selectable as 0/2/4 ... 20 mA per component
- Autoranging or manual range switching possible; remote switching is also possible
- Storage of measured values possible during adjustments
- Time constants selectable within wide limits (static/dynamic noise suppression); i.e. the response time of the analyzer can be matched to the respective application
- Short 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)
- Two-stage access code with authorization 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 options such as e.g.:
 - Customer acceptance
 - Tag labels
 - Drift recording

ULTRAMAT channel

- Differential measuring ranges with flow-type reference cell
- Internal pressure sensor for correction of variations in atmospheric pressure in the range 600 to 1200 hPa absolute
- External pressure sensor - only with piping gas path - can be connected for correction of variations in the process gas pressure in the range 600 to 1500 hPa absolute (option)
- Sample cells for use in presence of highly corrosive sample gases (e.g. tantalum layer or Hastelloy C22)

OXYMAT channel

- Monitoring of sample gas and/or reference gas (option)
- Different smallest spans (0.5%, 2.0% or 5.0% O₂)
- Analyzer section with flow-type compensation circuit (option): a flow is passed through the compensation branch to reduce the vibration dependency in the case of highly different densities of the sample and reference gases
- Internal pressure sensor for correction of pressure variations in sample gas (range 500 to 2000 hPa absolute)
- External pressure sensor can be connected for correction of variations in sample gas pressure up to 3000 hPa absolute (option), only with piping as the gas path
- Monitoring of reference gas with reference gas connection 3000 to 4000 hPa (option)
- Sample cell for use in presence of highly corrosive sample gases

Continuous Gas Analyzers, extractive

ULTRAMAT/OXYMAT 6

General

Reference gases

Measuring range	Recommended reference gas	Reference gas connection pressure	Remarks
0 to ... % v/v O ₂	N ₂	2000 ... 4000 hPa above sample gas pressure (max. 5000 hPa absolute)	The reference gas flow is set automatically to 5 ... 10 ml/min (up to 20 ml/min when also flowing through compensation branch)
... to 100% v/v O ₂ (suppressed zero with full-scale value 100% v/v O ₂)	O ₂		
Around 21% v/v O ₂ (suppressed zero with 21% v/v O ₂ within the span)	Air	100 hPa with respect to sample gas pressure which may vary by max. 50 hPa around the atmospheric pressure	

Table 1: Reference gases for OXYMAT 6 channel

Correction of zero error / Cross interferences (OXYMAT channel)

Residual gas (concentration 100% v/v)	Zero deviation in % v/v O ₂ absolute	Residual gas (concentration 100% v/v)	Zero deviation in % v/v O ₂ absolute
Organic gases		Inert gases	
Acetic acid CH ₃ COOH	-0.64	Argon Ar	-0.25
Acetylene C ₂ H ₂	-0.29	Helium He	+0.33
1,2 butadiene C ₄ H ₆	-0.65	Krypton Kr	-0.55
1,3 butadiene C ₄ H ₆	-0.49	Neon Ne	+0.17
iso-butane C ₄ H ₁₀	-1.30	Xenon Xe	-1.05
n-butane C ₄ H ₁₀	-1.26		
1-butene C ₄ H ₆	-0.96	Anorganic gases	
iso-butene C ₄ H ₈	-1.06	Ammonia NH ₃	-0.20
Cyclo-hexane C ₆ H ₁₂	-1.84	Carbon dioxide CO ₂	-0.30
Dichlorodifluoromethane (R12) CCl ₂ F ₂	-1.32	Carbon monoxide CO	+0.07
Ethane C ₂ H ₆	-0.49	Chlorine Cl ₂	-0.94
Ethylene C ₂ H ₄	-0.22	Dinitrogen monoxide N ₂ O	-0.23
n-heptane C ₇ H ₁₆	-2.4	Hydrogen H ₂	+0.26
n-hexane C ₆ H ₁₄	-2.02	Hydrogen bromide HBr	-0.76
Methane CH ₄	-0.18	Hydrogen chloride HCl	-0.35
Methanol CH ₃ OH	-0.31	Hydrogen fluoride HF	-0.10
n-octane C ₈ H ₁₈	-2.78	Hydrogen iodide HI	-1.19
n-pentane C ₅ H ₁₂	-1.68	Hydrogen sulphide H ₂ S	-0.44
iso-pentane C ₅ H ₁₂	-1.49	Oxygen O ₂	+100
Propane C ₃ H ₈	-0.87	Nitrogen N ₂	0.00
Propylene C ₃ H ₆	-0.64	Nitrogen dioxide NO ₂	+20.00
Trichlorofluoromethane (R11) CCl ₃ F	-1.63	Nitrogen oxide NO	+42.94
Vinyl chloride C ₂ H ₃ Cl	-0.77	Sulphur dioxide SO ₂	-0.20
Vinyl fluoride C ₂ H ₃ F	-0.55	Sulphur hexafluoride SF ₆	-1.05
1,1 vinylidene chloride C ₂ H ₂ Cl ₂	-1.22	Water H ₂ O	-0.03

Table 2: Zero error due to diamagnetism or paramagnetism of residual gases with nitrogen as the reference gas at 60 °C and 1000 hPa absolute (according to IEC 1207/3)

Conversion to other temperatures:

The zero errors mentioned in Table 2 must be multiplied with a correction factor (k):

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

(all diamagnetic gases have a negative zero error).

Continuous Gas Analyzers, extractive ULTRAMAT/OXYMAT 6

19" unit

2

Technical specifications

General

Operating position	Front wall, vertical
Conformity	CE mark in accordance with EN 50081-1, EN 50082-2

Design, enclosure

Weight	Approximately 21 kg
Degree of protection	IP20 according to EN 60529

Electrical characteristics

EMC (Electromagnetic Compatibility)	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 ... 264 V), 48 ... 63 Hz
Power consumption	Approx. 70 VA
Fuse values	120 ... 120 V: F1/F2 = T 1.6 A 200 ... 240 V: F1/F2 = T 1 A

Electrical inputs and outputs (per channel)

Analog output	0/2/4 ... 20 mA, potential-free; load max. 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, designed for 0/2/4 ... 20 mA for pressure sensor external and carrier gas inflow correction (diagonal gas correction)
Binary inputs	6, designed for 24 V, potential-free, freely parameterizable, e.g. for measurement range change-over
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% relative humidity, during storage and transportation (dew point must not be undershot)

Technical data, ULTRAMAT channel

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 ranges with suppressed zero point	Within 0 ... 100 vol.%, any zero point can be implemented; smallest possible measuring span 20%
Characteristic	Linearized

Technical data, ULTRAMAT channel

Gas inlet conditions

Permissible sample gas pressure	<ul style="list-style-type: none"> • Without pressure switch • With integrated pressure switch 	<ul style="list-style-type: none"> • 600 ... 1500 hPa (absolute) • 600 ... 1300 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% (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)	Approx. 0.5 ... 5 s, depending on version
Time for device-internal signal processing	< 1 s

Pressure correction range

Pressure sensor	<ul style="list-style-type: none"> • Internal • External 	<ul style="list-style-type: none"> • 600 ... 1200 hPa absolute • 600 ... 1500 hPa absolute
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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 variables (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

Continuous Gas Analyzers, extractive

ULTRAMAT/OXYMAT 6

19" unit

2

Technical data, OXYMAT channel

Measuring ranges	4, internally and externally switchable; automatic measuring range changeover also possible
Smallest possible measuring span (relating to sample gas pressure 1000 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature)	0.5 vol.%, 2 vol.% or 5 vol.% O ₂
Largest possible measuring range	100 vol.% O ₂
Measuring ranges with suppressed zero point	Within 0 to 100 Vol%, any zero point can be implemented, provided that a suitable reference gas is used

Gas inlet conditions

Permissible sample gas pressure	
• With pipes	500 ... 3000 hPa absolute
• With hoses	
- Without pressure switch	500 ... 1500 hPa absolute
- With pressure switch	500 ... 1300 hPa absolute
Sample gas flow	18 ... 60 l/h (0.3 ... 1 l/min)
Sample gas temperature	0 ... 50 °C
Sample gas humidity	< 90% RH (relative humidity)

Dynamic response

Warm-up period	At room temperature < 30 min (the technical specification will be met after 2 hours)
Display delay (t ₉₀ -time)	Min. 1.5 ... 3.5 s, depending on version
Damping (electrical time constant)	0 ... 100 s, parameterizable
Dead time (purging time of the gas path in the unit at 1 l/min)	Approx. 0.5 s ... 2.5 s, depending on version
Time for device-internal signal processing	< 1 s

Technical data, OXYMAT channel

Pressure correction range

Pressure sensor	
• Internal	500 ... 2000 hPa absolute
• External	500 ... 3000 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	< 0.75% of the smallest possible measuring range according to rating plate, with electronic damping constant of 1 s (corresponds to ± 0.25% at 2 σ)
Zero point drift	< 0.5%/month of the smallest possible measuring span according to rating plate
Measured value drift	< 0.5%/month of the current measuring range
Repeat precision	< 1%/month of the current measuring range
Minimum detectable quantity	1% of the current measuring range
Linearity error	1% of the current measuring range

Influencing variables (relating to sample gas pressure 1013 hPa absolute, 0.5 l/min sample gas flow and 25 °C ambient temperature)

Ambient temperature	< 0.5%/10 K relating to the smallest possible measuring span according to rating plate At measuring span 0.5%: 1%/10 K
Sample gas pressure (with air (100 hPa) as reference gas, correction of the atmospheric pressure fluctuations is only possible if the sample gas can vent to ambient air)	When pressure compensation has been switched off: < 2% of the current measuring range/1% atmospheric pressure change When pressure compensation has been switched on: < 0.2% of the current measuring range/1% atmospheric pressure change
Carrier gases	Deviation in zero point corresponding to paramagnetic or diamagnetic deviation of carrier gas
Sample gas flow	< 1% of the smallest possible measuring span according to rating plate with a change in flow of 0.1 l/min within the permissible flow range
Auxiliary power	< 0.1% of the current measuring range with rated voltage ± 10%

Continuous Gas Analyzers, extractive ULTRAMAT/OXYMAT 6

19" unit

2

Selection and Ordering Data

Order No.

ULTRAMAT/OXYMAT 6 gas analyzer

D) 7MB2023- [] - []

Cannot be combined

19" unit for installation in cabinets
Combined measurement of IR-absorbing gas and O₂

Gas connections for sample gas and reference gas

Pipe with 6 mm outer diameter

0

0 → A21

Pipe with 1/4" outer diameter

1

1 → A20

Smallest possible measuring span O₂

0.5% reference gas pressure 3000 hPa

A

0.5% reference gas pressure 100 hPa (external pump)

B

B → A26, Y02

2% reference gas pressure 3000 hPa

C

2% reference gas pressure 100 hPa (external pump)

D

D → A26, Y02

5% reference gas pressure 3000 hPa

E

5% reference gas pressure 100 hPa (external pump)

F

F → A26, Y02

Sample cell (OXYMAT channel)

• Non-flow-type compensation branch

- Made from stainless steel, Mat. No. 1.4571
- Made from tantalum

A
B

• Flow-type compensation branch

- Made from stainless steel, Mat. No. 1.4571
- Made from tantalum

C
DInternal gas pathsSample cell¹⁾Reference cell

(both channels) (lining) (ULTRAMAT channel) (flow-type) (ULTRAMAT channel)

Hose made from FKM (Viton)

Aluminum

Non-flow-type

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 (both channels)

Hose made from FKM (Viton)

Aluminum

Non-flow-type

2

2 → A20, A21

Aluminum

Flow-type

3

3

Supplementary electronics

Without

0

AUTOCAL function

- With 8 additional binary inputs and outputs for OXYMAT channel
- With 8 additional binary inputs and outputs for ULTRAMAT channel
- With 8 additional binary inputs and outputs for ULTRAMAT channel and OXYMAT channel
- With serial interface for the automotive industry (AK)
- With an additional 8 binary inputs/outputs and PROFIBUS PA interface for ULTRAMAT channel and OXYMAT channel
- With an additional 8 binary inputs/outputs and PROFIBUS DP interface for ULTRAMAT channel and OXYMAT channel

1

2

3

5

6

7

5 → Y02

1) Only for cell lengths between 20 and 180 mm

D) Subject to AL export regulations: 91999, ECCN: N

Continuous Gas Analyzers, extractive

ULTRAMAT/OXYMAT 6

19" unit

2

Selection and Ordering Data

Order No.

ULTRAMAT/OXYMAT 6 gas analyzer

D) 7MB2023 - ■■■■ - ■■■■

Cannot be combined

19" unit for installation in cabinets

Combined measurement of IR-absorbing gas and O₂Auxiliary power

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

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

ULTRAMAT channelMeasured componentPossible withMeasuring range codes

CO	11 ¹⁾ , 12 ... 30
CO highly selective (with optical filter)	12 to ¹⁾ , 13 ... 30
CO (TÜV; see table TÜV, 2 components)	
CO ₂	10 ¹⁾ , 11 ... 30
CH ₄	13 ¹⁾ , 14 ... 30
C ₂ H ₂	15 ¹⁾ , 16 ... 30
C ₂ H ₄	15 ¹⁾ , 16 ... 30
C ₂ H ₆	14 ¹⁾ , 15 ... 30
C ₃ H ₆	14 ¹⁾ , 15 ... 30
C ₃ H ₈	13 ¹⁾ , 14 ... 30
C ₄ H ₆	15 ¹⁾ , 16 ... 30
C ₄ H ₁₀	14 ¹⁾ , 15 ... 30
C ₆ H ₁₄	14 ¹⁾ , 15 ... 30
SO ₂ (TÜV; see table TÜV, 2 components)	13 ¹⁾ , 14 ... 30
NO (TÜV; see table TÜV, 2 components)	14 ¹⁾ , 15 ... 20, 22
NH ₃ (dry)	14 ¹⁾ , 15 ... 30
H ₂ O	17 ¹⁾ , 18 ... 20, 22
N ₂ O	13 ¹⁾ , 14 ... 30

Smallest meas. range Largest meas. range Measuring range code

0 ... 5 vpm	0 ... 100 vpm	10
0 ... 10 vpm	0 ... 200 vpm	11
0 ... 20 vpm	0 ... 400 vpm	12
0 ... 50 vpm	0 ... 1000 vpm	13
0 ... 100 vpm	0 ... 1000 vpm	14
0 ... 300 vpm	0 ... 3000 vpm	15
0 ... 500 vpm	0 ... 5000 vpm	16
0 ... 1000 vpm	0 ... 10000 vpm	17
0 ... 3000 vpm	0 ... 10000 vpm	19
0 ... 3000 vpm	0 ... 30000 vpm	19
0 ... 5000 vpm	0 ... 15000 vpm	20
0 ... 5000 vpm	0 ... 50000 vpm	21
0 ... 1%	0 ... 3%	22
0 ... 1%	0 ... 10%	23
0 ... 3%	0 ... 10%	24
0 ... 3%	0 ... 30%	25
0 ... 5%	0 ... 15%	26
0 ... 5%	0 ... 50%	27
0 ... 10%	0 ... 30%	28
0 ... 10%	0 ... 100%	29
0 ... 30%	0 ... 100%	30

Operator software and documentation

German

English

French

Spanish

Italian

0

1

A

B

X

C

D

E

F

G

H

J

K

L

M

N

P

Q

R

S

V

Q

R

A

B

C

D

E

F

G

H

J

K

L

M

N

P

Q

R

S

T

U

V

W

0

1

2

3

4

1) Can be ordered as special application (no. 3100 with order code Y12).

D) Subject to AL export regulations: 91999, ECCN: N

Continuous Gas Analyzers, extractive ULTRAMAT/OXYMAT 6

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 (ULTRAMAT channel) ¹⁾	A20	
Flow-type reference compartment with reduced flow, 1/4" (ULTRAMAT channel) ¹⁾	A21	
Reference gas monitoring (pressure switch up to 3000 hPa), for OXYMAT channel only	A26	
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, 1/4", complete with screwed gland, for sample gas compartment	A24	
• 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, 1/4", complete with screwed gland, for sample gas compartment	A29	
Telescopic rails (2 units)	A31	
Set of Torx screwdrivers, Allen screwdrivers	A32	
Kalrez gaskets in sample gas path (O ₂ compartment)	B01	
TAG labels (specific inscription based on customer information)	B03	
Kalrez gaskets in sample gas path (IR compartment)	B04	
CSA certificate – Class I Div 2	E20	
Clean for O ₂ service (specially cleaned gas path) (ULTRAMAT channel and OXYMAT channel)	Y02	→ A22, A24
Measuring range indication in plain text ²⁾ , if different from the standard setting	Y11	
Special setting (only in conjunction with an application no., e.g. extended measuring range, only ULTRAMAT channel)	Y12	
Extended special setting (only in conjunction with an application no., e.g. determination of interference influences, ULTRAMAT channel only)	Y13	
TÜV version acc. to 17. BImSch (ULTRAMAT channel only)	Y17	→ E20
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 interfaces for the automotive industry (AK)	D) C79451-A3480-D33	
AUTOCAL function with 8 binary inputs/outputs for ULTRAMAT channel or OXYMAT channel	D) C79451-A3480-D511	
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS PA for ULTRAMAT channel or OXYMAT channel	D) A5E00057307	
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS DP for ULTRAMAT channel or OXYMAT channel	D) A5E00057312	

¹⁾ Cannot be combined with non-flow-type reference compartment.

²⁾ Standard setting: $\left. \begin{array}{l} \text{Smallest measuring range} \\ 25\% \text{ of largest measuring range} \\ 50\% \text{ of largest measuring range} \\ \text{Largest measuring range} \end{array} \right\} \begin{array}{l} \text{in \% or} \\ \text{ppm (vpm)} \end{array}$

D) Subject to AL export regulations: 91999, ECCN: N

Continuous Gas Analyzers, extractive

ULTRAMAT/OXYMAT 6

19" unit

2

Selection and Ordering Data

Order No.

ULTRAMAT/OXYMAT 6 gas analyzer

D) 7MB2024- [colorful bar]

Cannot be combined

19" unit for installation in cabinets
Combined measurement of IR-absorbing gas and O₂

Gas connections for sample gas and reference gas

Pipe with 6 mm outer diameter

0

0 → A21

Pipe with 1/4" outer diameter

1

1 → A20

Smallest possible measuring span O₂

0.5% reference gas pressure 3000 hPa

A

2% reference gas pressure 100 hPa (external pump)

B

B → A26, Y02

2% reference gas pressure 3000 hPa

C

2% reference gas pressure 100 hPa (external pump)

D

D → A26, Y02

5% reference gas pressure 3000 hPa

E

5% reference gas pressure 100 hPa (external pump)

F

F → A26, Y02

Sample cell (OXYMAT channel)

• Non-flow-type compensation branch

- Made from stainless steel, Mat. No. 1.4571
- Made from tantalum

A
B

• Flow-type compensation branch

- Made from stainless steel, Mat. No. 1.4571
- Made from tantalum

C
D

Internal gas paths	Sample cell ¹⁾ (lining) (ULTRAMAT channel)	Reference cell (flow-type) (ULTRAMAT channel)
(both channels)		

Hose made from FKM
(Viton)

Aluminum

Non-flow-type

0

0 → A20, A21

Aluminum

Flow-type

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 (both channels)Hose made from FKM
(Viton)

Aluminum

Non-flow-type

2

2 → A20, A21

Aluminum

Flow-type

3

Supplementary electronics

Without

0

AUTOCAL function

- With 8 additional binary inputs and outputs for ULTRAMAT channel and OXYMAT channel

1

- With serial interface for the automotive industry (AK)

5

5 → Y02

- With an additional 8 binary inputs/outputs and PROFIBUS PA interface for ULTRAMAT channel and OXYMAT channel

6

- With an additional 8 binary inputs/outputs and PROFIBUS DP interface for ULTRAMAT channel and OXYMAT channel

7

¹⁾ Only for cell lengths between 20 and 180 mm

D) Subject to AL export regulations: 91999, ECCN: N

Continuous Gas Analyzers, extractive ULTRAMAT/OXYMAT 6

19" unit

2

Selection and Ordering Data

Order No.

ULTRAMAT/OXYMAT 6 gas analyzer

D) 7MB2024- - - - -

19" unit for installation in cabinets

Combined measurement of IR-absorbing gas and O₂Auxiliary power

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

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

ULTRAMAT channel	Measured component	Smallest measuring range	Largest measuring range	
------------------	--------------------	--------------------------	-------------------------	--

CO/NO	CO	0 ... 100 vpm	0 ... 1000 vpm	A H
	NO	0 ... 300 vpm	0 ... 1000 vpm	

CO/NO	CO	0 ... 300 vpm	0 ... 3000 vpm	A J
	NO	0 ... 500 vpm	0 ... 3000 vpm	

CO/NO	CO	0 ... 1000 vpm	0 ... 10000 vpm	A C
	NO	0 ... 1000 vpm	0 ... 10000 vpm	

CO ₂ /CO	CO ₂	0 ... 100 vpm	0 ... 1000 vpm	B A
	CO	0 ... 100 vpm	0 ... 1000 vpm	

CO ₂ /CO	CO ₂	0 ... 300 vpm	0 ... 3000 vpm	B B
	CO	0 ... 300 vpm	0 ... 3000 vpm	

CO ₂ /CO	CO ₂	0 ... 1000 vpm	0 ... 10000 vpm	B C
	CO	0 ... 1000 vpm	0 ... 10000 vpm	

CO ₂ /CO	CO ₂	0 ... 3000 vpm	0 ... 30000 vpm	B D
	CO	0 ... 3000 vpm	0 ... 30000 vpm	

CO ₂ /CO	CO ₂	0 ... 1%	0 ... 10%	B E
	CO	0 ... 1%	0 ... 10%	

CO ₂ /CO	CO ₂	0 ... 3%	0 ... 30%	B F
	CO	0 ... 3%	0 ... 30%	

CO ₂ /CO	CO ₂	0 ... 10%	0 ... 100%	B G
	CO	0 ... 10%	0 ... 100%	

CO ₂ /CH ₄	CO ₂	0 ... 10%	0 ... 100%	C G
	CH ₄	0 ... 10%	0 ... 100%	

CO ₂ /NO	CO ₂	0 ... 100 vpm	0 ... 1000 vpm	D H
	NO	0 ... 300 vpm	0 ... 1000 vpm	

CO ₂ /NO	CO ₂	0 ... 300 vpm	0 ... 3000 vpm	D J
	NO	0 ... 500 vpm	0 ... 3000 vpm	

Operator software and documentation

German

English

French

Spanish

Italian

0

1

2

3

4

D) Subject to AL export regulations: 91999, ECCN: N

Continuous Gas Analyzers, extractive

ULTRAMAT/OXYMAT 6

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 (ULTRAMAT channel) ¹⁾	A20	
Flow-type reference compartment with reduced flow, 1/4" (ULTRAMAT channel) ¹⁾	A21	
Reference gas monitoring (pressure switch up to 3000 hPa), for OXYMAT channel only	A26	
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, 1/4", complete with screwed gland, for sample gas compartment	A24	
• 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, 1/4", complete with screwed gland, for sample gas compartment	A29	
Telescopic rails (2 units)	A31	
Set of Torx screwdrivers, Allen screwdrivers	A32	
Kalrez gaskets in sample gas path (O ₂ compartment)	B01	
TAG labels (specific inscription based on customer information)	B03	
Kalrez gaskets in sample gas path (IR compartment)	B04	
CSA certificate – Class I Div 2	E20	
Clean for O ₂ service (specially cleaned gas path) (ULTRAMAT channel and OXYMAT channel)	Y02	→ A22, A24
Measuring range indication in plain text ²⁾ , if different from the standard setting	Y11	
Special setting (only in conjunction with an application no., e.g. extended measuring range, only ULTRAMAT channel)	Y12	
Extended special setting (only in conjunction with an application no., e.g. determination of interference influences, ULTRAMAT channel only)	Y13	
TÜV version acc. to 17. BImSch (ULTRAMAT channel only)	Y17	→ E20
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 interfaces for the automotive industry (AK)	D) C79451-A3480-D33	
AUTOCAL function with 8 binary inputs/outputs for ULTRAMAT channel or OXYMAT channel	D) C79451-A3480-D511	
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS PA for ULTRAMAT channel or OXYMAT channel	D) A5E00057307	
AUTOCAL function with 8 binary inputs/outputs and PROFIBUS DP for ULTRAMAT channel or OXYMAT channel	D) A5E00057312	

¹⁾ Cannot be combined with non-flow-type reference compartment.

²⁾ Standard setting:

Smallest measuring range	}	in % or ppm (vpm)
25% of largest measuring range		
50% of largest measuring range		
Largest measuring range		

D) Subject to AL export regulations: 91999, ECCN: N

Continuous Gas Analyzers, extractive ULTRAMAT/OXYMAT 6

19" unit

2

TÜV, single component (IR channel)

Component	CO (TÜV)		SO ₂ (TÜV)		NO (TÜV)	
	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/OXYMAT 6, TÜV
IR channel
Component CO
Measuring range 0 ... 50/1000 mg/m³
with hoses, non-flow-type reference compartment
without automatic calibration (AUTOCAL)
230 V AC; English
7MB2023-0EA00-1XD1-Z +Y17

TÜV, 2 components in series (IR channel)

Component	CO (TÜV)		NO (TÜV)	
	Smallest measuring range from 0 to ...	Largest measuring range from 0 to ...	Smallest measuring range from 0 to ...	Largest measuring range from 0 to ...
AH	75 mg/m ³	1000 mg/m ³	200 mg/m ³	2000 mg/m ³
AJ	300 mg/m ³	3000 mg/m ³	500 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

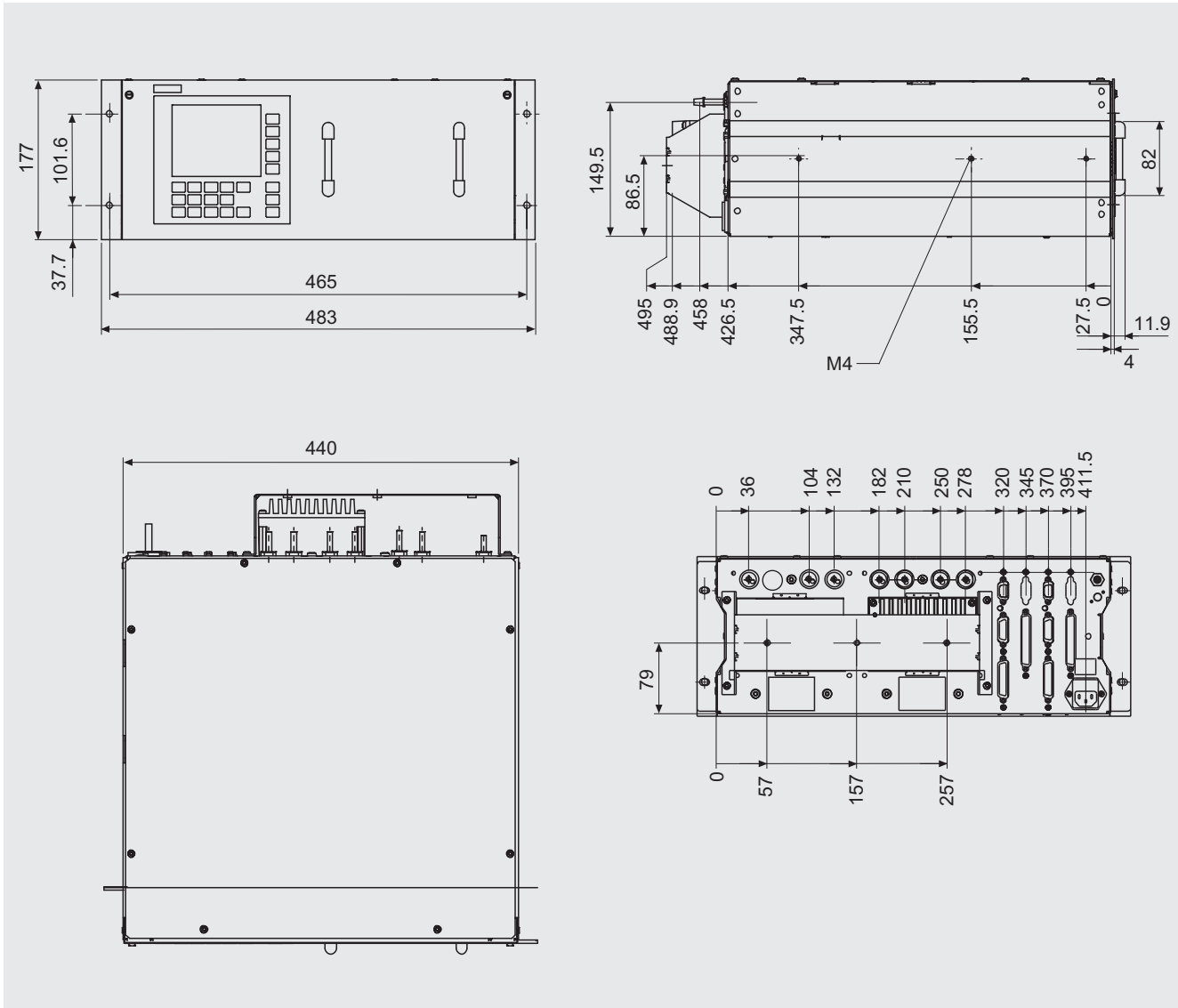
ULTRAMAT/OXYMAT 6, TÜV
IR channel
Components CO/NO
Measuring range CO: 0 ... 75/1000 mg/m³,
NO: 0 ... 200/2000 mg/m³
with hoses, non-flow-type reference compartment
without automatic calibration (AUTOCAL)
230 V AC; English
7MB2024-0EA00-1AH1-Z +Y17+Y18

Continuous Gas Analyzers, extractive ULTRAMAT/OXYMAT 6

19" unit

Dimensional drawings

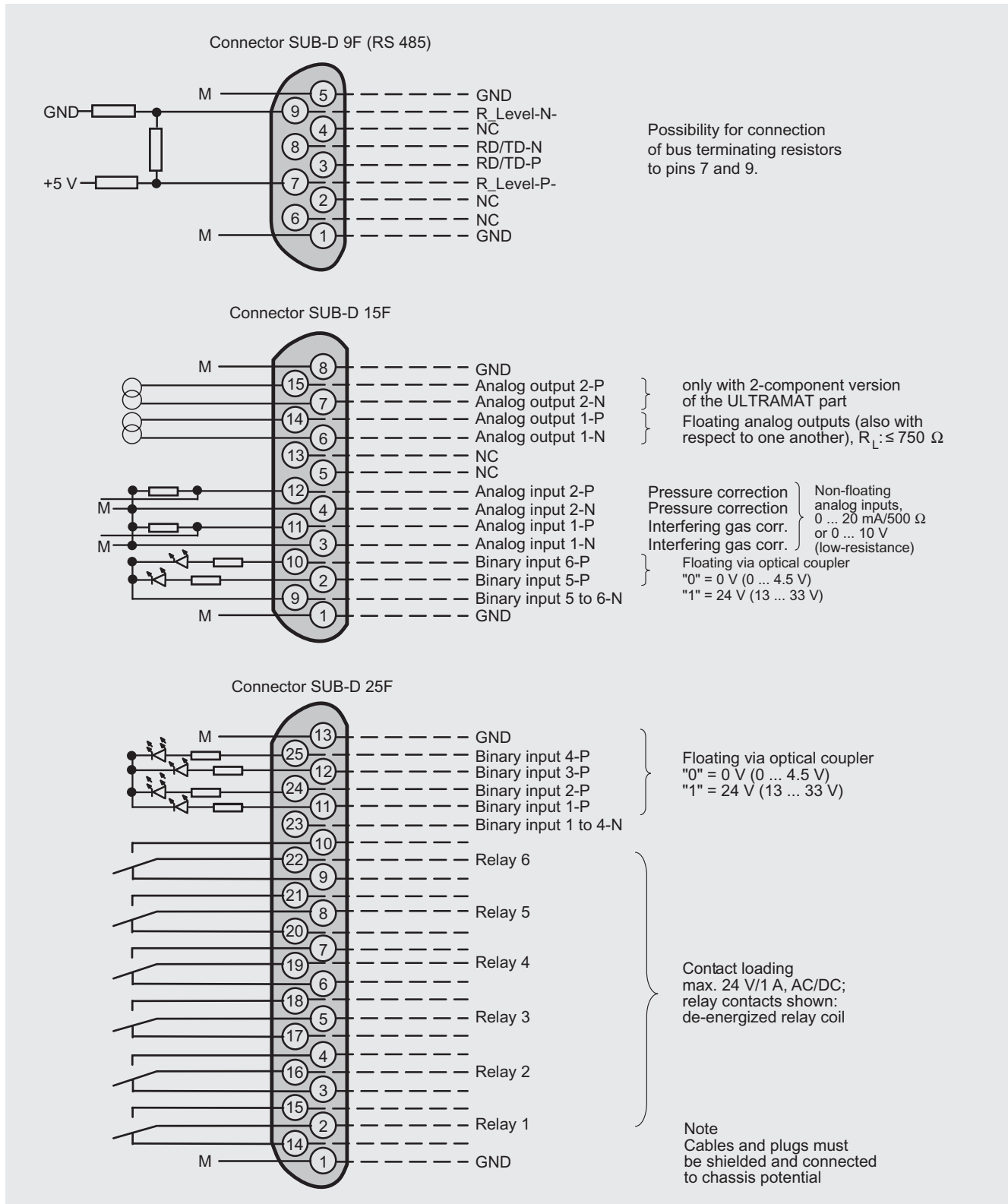
2



ULTRAMAT/OXYMAT 6, 19" unit, dimensions in mm

Schematics

Pin assignment (electrical and gas connections)



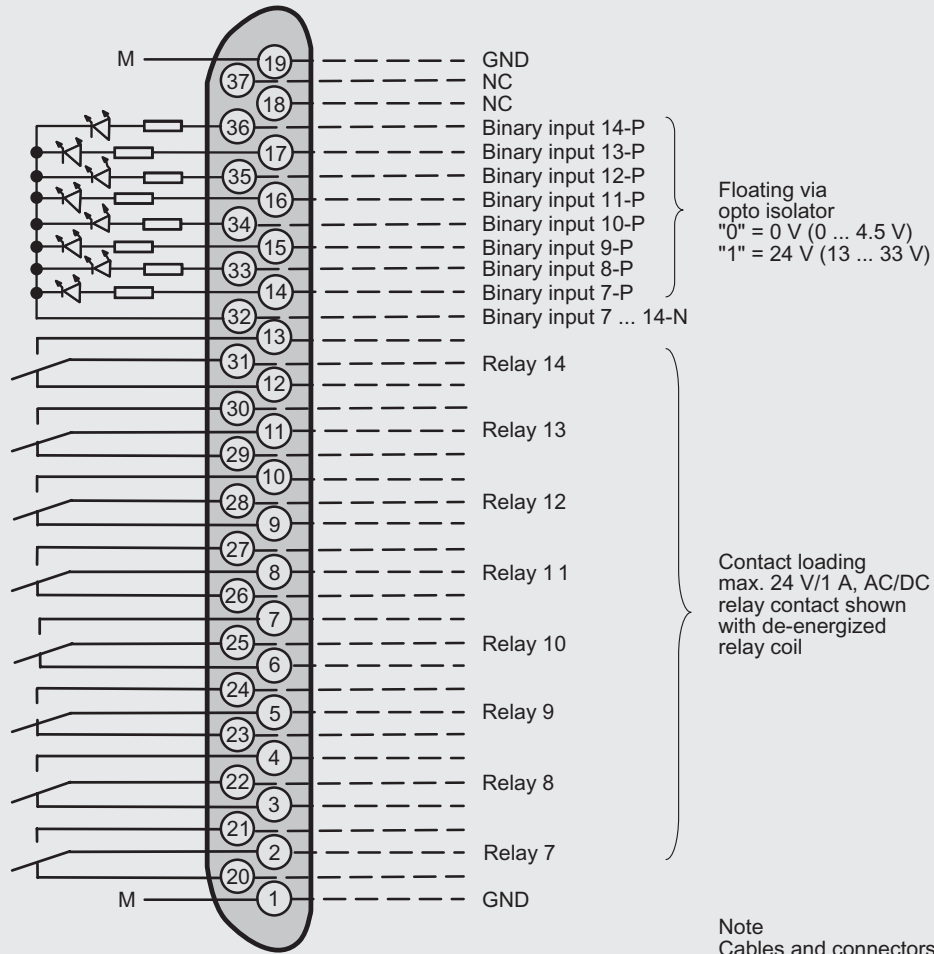
ULTRAMAT/OXYMAT 6, 19" unit, pin assignment

Continuous Gas Analyzers, extractive ULTRAMAT/OXYMAT 6

19" unit

2

Connector SUB-D 37F (Option)

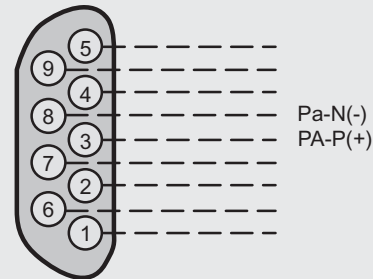
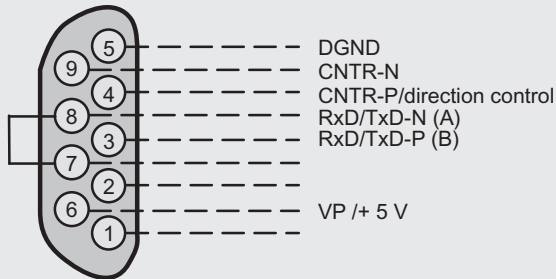


Note
Cables and connectors must be shielded and connected to chassis potential.

Connector SUB-D 9F -X90
PROFIBUS DP

optional

Connector SUB-D 9M -X90
PROFIBUS PA

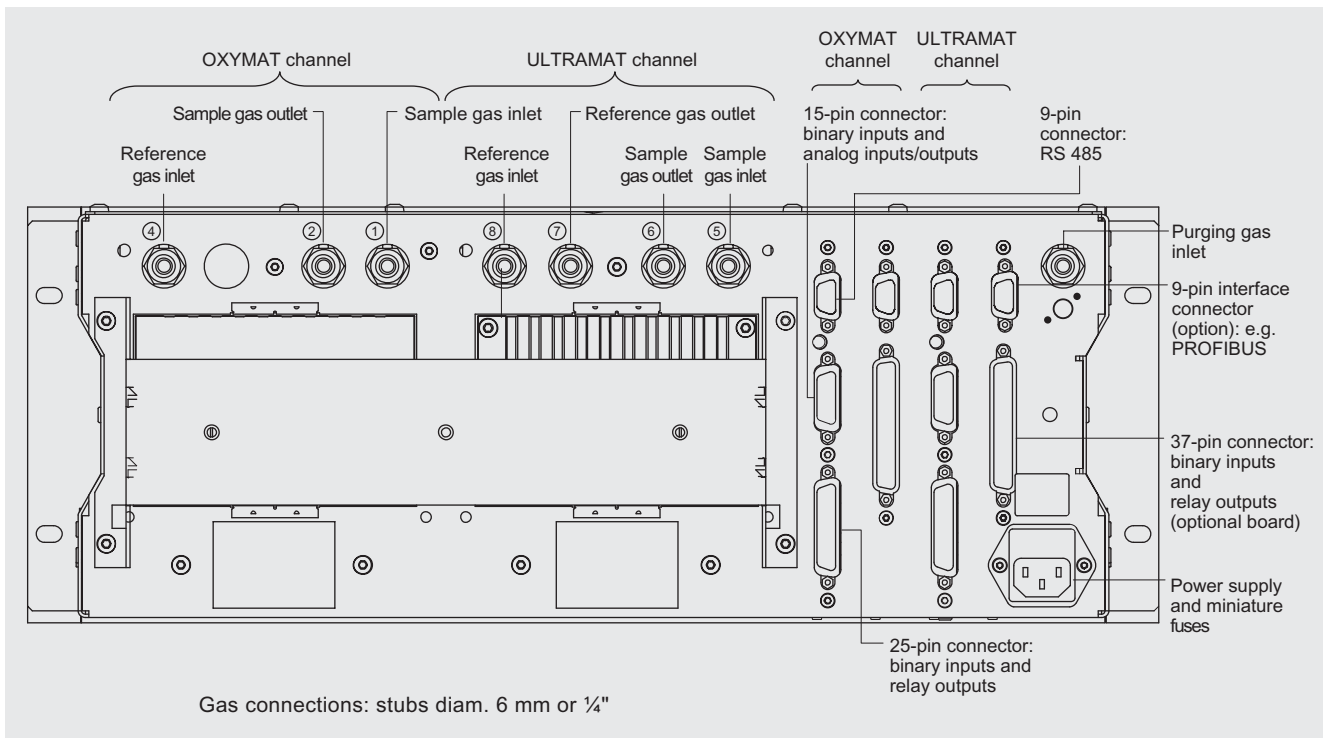


ULTRAMAT/OXYMAT 6, 19" unit, pin assignment of AUTOCAL board and PROFIBUS connectors

Continuous Gas Analyzers, extractive ULTRAMAT/OXYMAT 6

19" unit

2



ULTRAMAT/OXYMAT 6, 19" unit, gas and electrical connections

Continuous Gas Analyzers, extractive

ULTRAMAT/OXYMAT 6

Documentation

Selection and Ordering Data

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

D) Subject to AL export regulations: 91999, ECCN: N

Continuous Gas Analyzers, extractive ULTRAMAT/OXYMAT 6

Proposition of spare parts

2

Selection and Ordering Data

Description	7MB2023	7MB2024	2 years (quantity)	5 years (quantity)		Order No.
Analyzer part						
<u>Analyzer part, ULTRAMAT channel</u>						
• O-ring for Y cell	x	x	1	2	D)	C75121-Z101-C1
• O-ring for chopper	x	x	1	2	D)	C75121-Z101-C2
• O-ring for reflector	x	x	1	2	D)	C75121-Z101-C3
• O-ring for cover (window, front side)	x	x	2	2	D)	C75121-Z101-C4
• O-ring for cooling element	x	x	1	1	D)	C75121-Z101-C5
• O-ring for cover (window, rear side)	x	x	2	2	D)	C79121-Z100-A24
• Radiator	x	x	1	1		C79451-A3462-B12
• Cover (cell length 20 ... 180 mm)	x	x	2	2	D)	C79451-A3462-B151
• Cover (cell length 0.2 ... 6 mm)	x	x	2	2	D)	C79451-A3462-B152
• O-rings, set	x	x	—	1	D)	C79451-A3462-D501
<u>Analyzer section, OXYMAT channel</u>						
• O-ring	x	—	1	2	D)	C74121-Z100-A6
• O-ring (measuring head)	x	x	2	4	D)	C79121-Z100-A32
• Spacer	x	x	—	1	D)	C79451-A3277-B22
• Sample cell, stainless steel, mat. no. 1.4571; non-flow-type compensation branch	x	x	—	1	D)	C79451-A3277-B535
• Sample cell, tantalum, non-flow-type compensation branch	x	x	—	1	D)	C79451-A3277-B536
• Sample cell, stainless steel, mat. no. 1.4571; flow-type compensation branch	x	x	—	1	D)	C79451-A3277-B537
• Sample cell, tantalum, flow-type compensation branch	x	x	—	1	D)	C79451-A3277-B538
• Measuring head, non-flow-type compensation branch	x	x	1	1	D)	C79451-A3460-B525
• Measuring head, flow-type compensation branch	x	x	1	1	D)	C79451-A3460-B526
Sample gas path						
O-ring (hose clip)	x	x	2	4	D)	C71121-Z100-A159
Pressure switch	x	x	1	2	D)	C79302-Z1210-A2
Flow indicator (version with pump only)	x	x	1	1	D)	C79402-Z560-T1
<u>Sample gas path, ULTRAMAT channel</u>						
• O-ring (chopper)	x	x	1	2	D)	C75121-Z100-C3
• Hose clip	x	x	—	1	D)	C79451-A3478-C9
<u>Sample gas path, OXYMAT channel</u>						
• Restrictor, stainless steel, mat. no. 1.4571; hose gas path	x		2	2	D)	C79451-A3480-C10
• Restrictor, titanium, pipe gas path	x	x	2	2	D)	C79451-A3480-C37
• Reference gas path, 3000 hPa	x	x	1	1	D)	C79451-A3480-D518
• Capillary tube, 100 hPa, connection set	x	x	1	1	D)	C79451-A3480-D519
• Restrictor, stainless steel, mat. no. 1.4571; pipe gas path	x	x	1	1	D)	C79451-A3250-C5
Electronics						
Front plate with keyboard	x	x	1	1	D)	C79165-A3042-B506
Adapter board, LCD/keyboard	x	x	1	1	D)	C79451-A3474-B605
LC display	x	x	1	1	D)	W75025-B5001-B1
Connector filter	x	x	—	1	D)	W75041-E5602-K2
Fusible plug, T 0.63/250 V	x	x	2	3	D)	W75054-L1010-T630
Fusible plug, 1 A, 110/220 V	x	x	2	3	D)	W75054-L1011-T100
Fusible plug, 2.5 A, 250 V	x	x	2	3	D)	W75054-L1011-T250
<u>Electronics, ULTRAMAT channel</u>						
• Motherboard, with firmware: see spare parts list	x	x	—	1		
• Fusible plug, 1.6 A, 250 V	x	x	2	3	D)	W75054-L1011-T160
<u>Electronics, OXYMAT channel</u>						
• Motherboard, with firmware: see spare parts list	x	x	—	1		
• Temperature fuse	x	—	—	1		W75054-T1001-A150

D) Subject to AL export regulations: 91999, ECCN: N

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