

ULTRAMAT/OXYMAT 6

Gas Analyzer for the combined Measurement of Oxygen and Infrared Absorbing Gases



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ULTRAMAT/OXYMAT 6

General

Application

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 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, CH₄ and other hydrocarbons.

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

Special applications

Besides the standard combinations special applications concerning material of the gas path, material of sample cells and sample components are also available on request.

Application examples

- Measurements for boiler control in combustion plants
- Measurements in safety-relevant areas
- Measurement as reference variable for emission monitoring according to TA-Luft, 13. and 17. BImSchV
- Measurements in the automotive industry (test bay systems)
- Warning equipment
- Emission measurements in incineration plants
- Process gas concentrations in chemical plants
- Trace measurements in pure gas processes for quality monitoring
- Use in non hazardous areas.

Essential characteristics

- Four freely-programmable measuring ranges per channel
 - also with suppressed zero, all measuring ranges linear
 - measuring ranges with suppressed zero possible
- One electrically isolated signal output 0/2/4 to 20 mA per channel
- Autoranging, remote switching or manual range selection 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 channel can be matched to the respective application
- Measuring range identification

- Measuring-point selector (for up to 6 measuring points)
- Measuring point identification
- Measuring range selection
- Simple handling using menu-based operation
- Fast response time
- Low long-term drift
- Two operation levels with separate code to prevent unintentional and unauthorized inputs
- Customer-specific analyzer options such as e.g.:
 - Customer acceptance
 - Tag labels
 - Drift recording
 - Clean for O₂ service
 - Kalrez gaskets
- Simple analyzer exchange since electric connections are easy to remove
- Automatic range calibration can be parameterized
- Operation based on NAMUR Recommendation
- Sample cell for use in presence of corrosive sample gases.

ULTRAMAT 6 channel

- Monitoring of sample gas (flow and pressure)
- Internal pressure sensor for correction of pressure variations in sample gas 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.

OXYMAT 6 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), only with piping as the gas path
- Monitoring of reference gas with reference gas connection 3000 to 4000 hPa (option).

Design and gas path

- 19" unit with 4 HU for installation
 - in swing frame
 - in cabinets, with or without slide rails
- Front panel for service can be hinged down (laptop connection)
- Internal gas paths: hose made of Viton or pipe made of titanium
- Gas connections for sample gas input and output and for reference gas: pipe diameter 6 mm or 1/4"
- Flowmeter for sample gas on front plate (option) (both channels)
- Sample cell (OXYMAT channel) – with or without flow-type compensation branch – made of stainless steel (SS, type No. 1.4571) or tantalum for highly corrosive sample gases (such as HCl, Cl₂, SO₂, SO₃, etc.)
- Monitoring (option) of sample gas and/or reference gas (both channels).

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
- Operating software in two languages:
German/English, English/Spanish, French/English, Spanish/English, Italian/English.

Inputs and outputs per channel

- One analog output for measured value
- Two analog inputs programmable (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, maintenance switch, limit alarm, external solenoid valves
- Extension with eight additional binary inputs and eight additional relay outputs for automatic calibration with up to four calibration gases.

Communication

- RS 485 present in basic unit (connection at the rear and also behind the front plate).

Options

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

ULTRAMAT/OXYMAT 6

General

Design

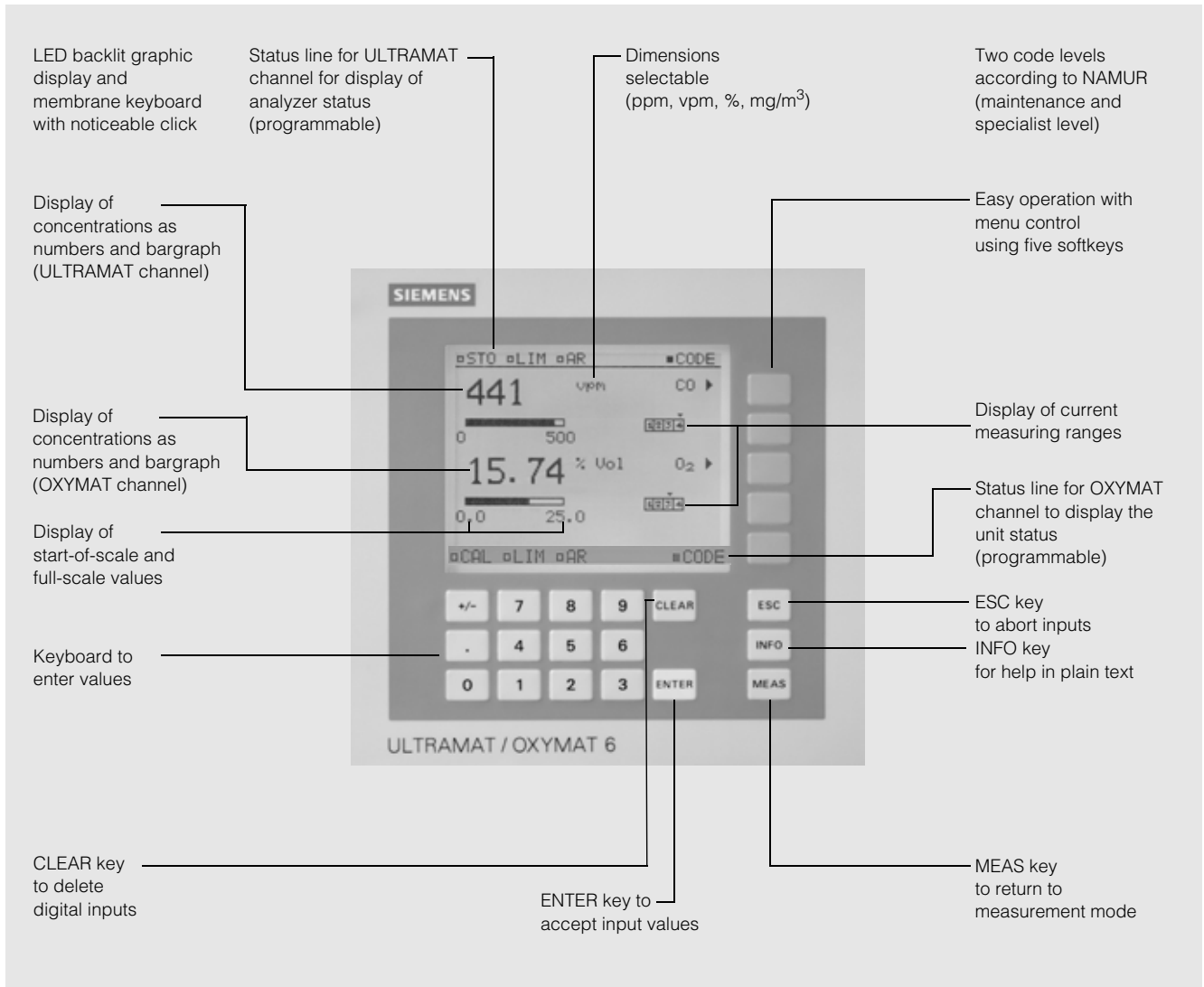


Fig. 1 ULTRAMAT/OXYMAT 6, membrane keyboard and graphic display

Mode of operation ULTRAMAT channel

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.

Fig. 2 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 current is generated 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.

Note:

The sample gas have to enter the analyzer dustless. Condensate in the cells must be avoided. That is why the most measuring tasks require an appropriate gas preparation.

The analyzer ambient air should not have a too high concentration of the measuring component.

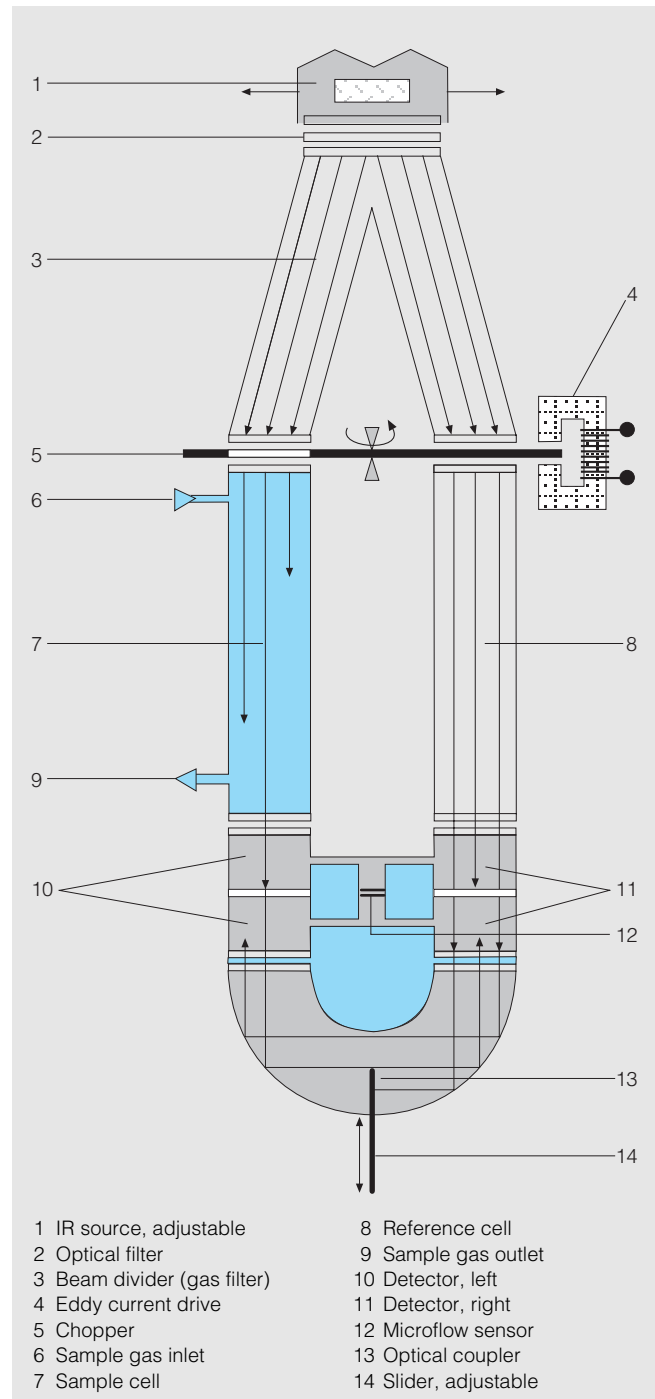


Fig. 2 ULTRAMAT/OXYMAT 6, ULTRAMAT channel, mode of operation

ULTRAMAT/OXYMAT 6

General

Mode of operation

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 6** gas analyzers.

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

In the case of the **OXYMAT 6**, one gas (1, Fig. 3) 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 for the **OXYMAT 6**.

Vibrations frequently occur at the place of measurement 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).

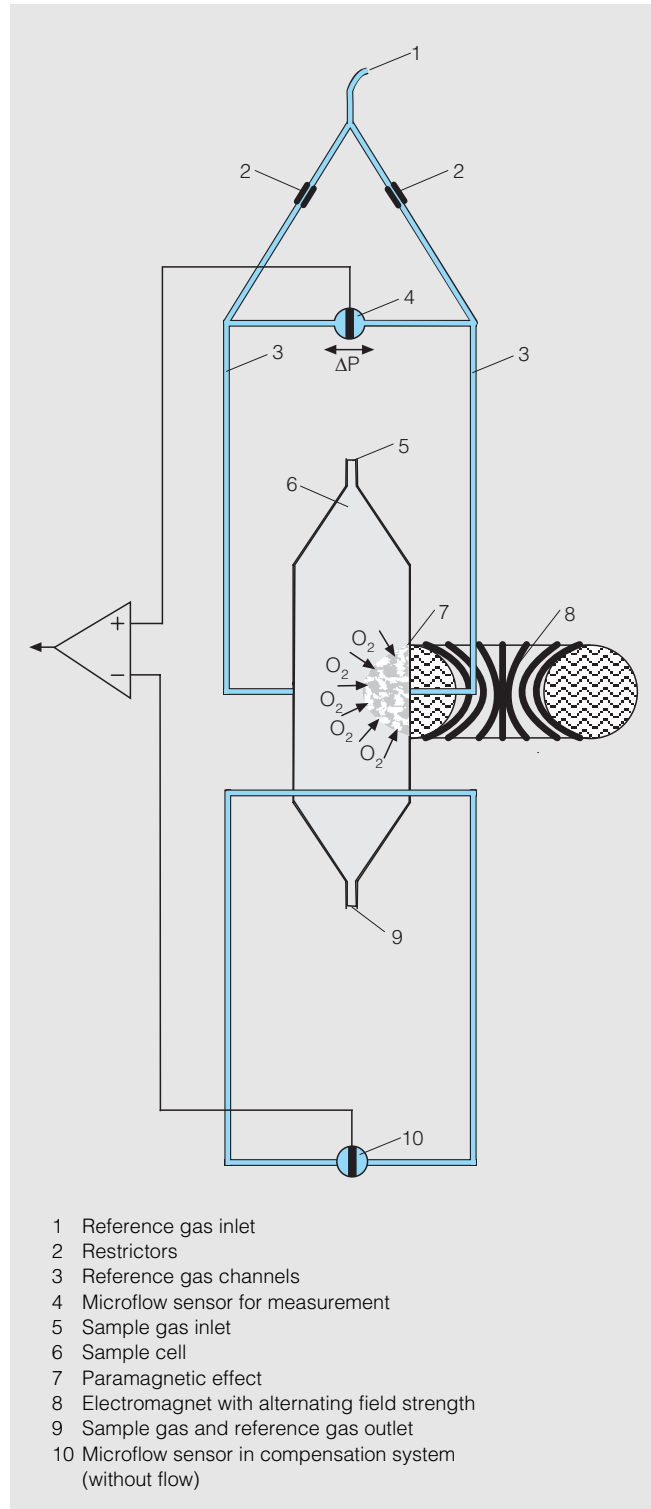


Fig. 3 ULTRAMAT/OXYMAT 6, OXYMAT channel, mode of operation

Reference gases

Measuring range	Recommended reference gas	Reference gas pressure	Remarks
0 to ... % v/v O ₂	N ₂	3000 to 4000 hPa above sample gas pressure (max. 5000 hPa absolute) (reference gas from cylinder)	The reference gas flow is set automatically to 5 to 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		

Table 1 Reference gases for the OXYMAT channel

Correction of zero error / cross sensitivity

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) for the OXYMAT channel

Conversion to other temperatures:

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

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

(all diamagnetic gases have a negative zero error).

ULTRAMAT/OXYMAT 6

General

Executions - Wetted parts

Standard

Gas path ULTRAMAT channel		19" unit
with hoses	Nipple Hose Hose coupling Sample cell: •Body •Cell lining •Stub •Window	Titanium Viton Polyamide 6 Aluminium Aluminium Titanium, O-ring: Viton or Kalrez CaF ₂ , adhesive: E353, O-ring: Viton or Kalrez
with pipes	Nipple Pipe Sample cell: •Body •Cell lining •Window	Titanium Titanium, O-ring: Viton or Kalrez Aluminium Tantalum CaF ₂ , adhesive: E353, O-ring: Viton or Kalrez

Special applications (examples)

Gas path		19" unit
with pipes	Nipple Pipe Sample cell: •Body •Cell lining •Window	Titanium Titanium, O-ring: Viton or Kalrez Titanium Tantalum CaF ₂ , without adhesive O-ring: Viton or Kalrez
with pipes	Nipple Pipe Sample cell: •Body •Cell lining •Window	SS, type No. 1.4571 (316SS) SS, type No. 1.4571, O-ring: Viton or Kalrez SS, type No. 1.4571 Tantalum CaF ₂ , without adhesive O-ring: Viton or Kalrez

Further versions on request

Standard

Gas path OXYMAT channel		19" unit
with hoses	Nipple Hose Sample cell Stub sample cell Restrictor O-rings	SS, type No. 1.4571 Viton SS, type No. 1.4571 SS, type No. 1.4571 PTFE (Teflon) Viton
with pipes	Nipple Pipe Sample cell Restrictor O-rings	Titanium Titanium SS, type No. 1.4571 or tantalum Titanium Viton or FFKM (Kalrez)
with pipes	Nipple Pipe Sample cell Restrictor O-rings	SS, type No. 1.4571 SS, type No. 1.4571 SS, type No. 1.4571 or tantalum SS, type No. 1.4571 Viton or FFKM (Kalrez)

Further versions (e.g. with Hastelloy C) available as special application.

Options

Gas path ULTRAMAT channel + OXYMAT channel		19" unit
Flowmeter	Metering pipe Float Float limit Elbows	Duran glass Duran glass PTFE (Teflon) Viton
Pressure switch	Diaphragm Enclosure	Viton PA 6.3T

Communications

The gas analyzers of series 6, ULTRAMAT 6, ULTRAMAT/OXYMAT 6, OXYMAT 6, OXYMAT 61 and CALOMAT 6, as well as the ULTRAMAT 23 offer the following communications facilities:

- Serial **RS 485** interface present as standard with internal communications bus (ELAN) which permits communication between the analyzers and – with multi-channel analyzers – from one channel to the other via the serial interface even without a PC for e.g. information on the process gas pressure and compensation of the influences of interfering gases.
- **SIPROM GA**, a software tool especially for servicing and maintenance tasks. All functions of the analyzers, whether an individual device or where several are networked together, can be remote controlled and monitored using SIPROM GA.
- **PROFIBUS-DP/PA** is the leading field bus on the market. All Siemens gas analyzers are suitable for PROFIBUS when equipped with an optional plug-in card (retrofitting also possible) and satisfy the binding "Device profile for analyzers" defined by the **PNO** (PROFIBUS user organization). Central access to the analyzers in the system is possible using the **SIMATIC PDM** operator input software.

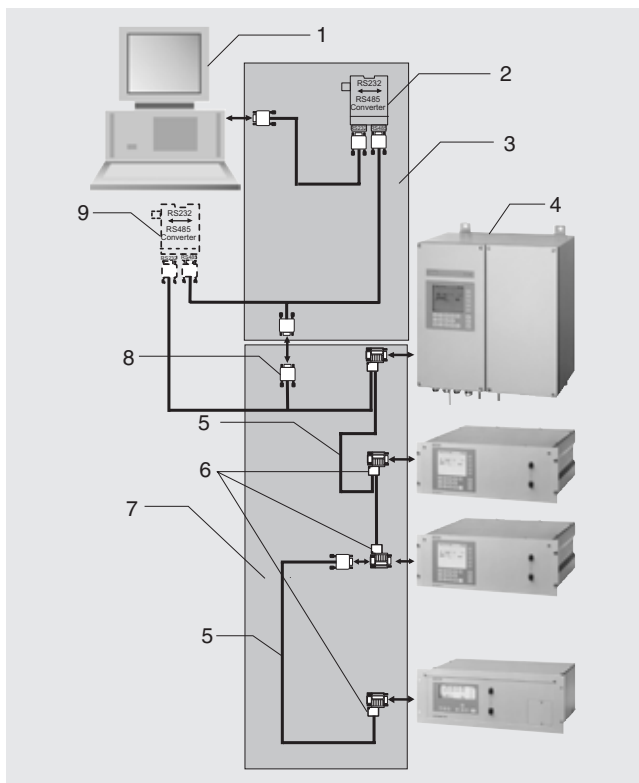


Fig. 4 Typical design of an RS 485 network

Item	Designation
1	Computer
2	RS 485/RS 232 converter with RS 232/RS 485 cable
3	RS 485 bus connector with jumper
4	Analyzers
5	RS 485 cable
6	RS 485 bus connector
7	RS 485 network
8	9-pin DSUB plug
9	Option: RS 485 repeater

Interface parameters

Level	RS 485
Baud rate	9600
Data bits	8
Stop bit	1
Start bit	1
Parity	None
No echo mode	

Ordering information

Interface description (German)
 RS 485/RS 232 converter
 RS 485/Ethernet converter
 SIMATIC cable/bus cable
 SIMATIC bus connector
 9-pin DSUB plug
 Repeater
 (see also Catalog CA 01 or IK PI)

Order No.

A5E000 54148
C79451-Z1589-U1
C79451-A3364-D61
6XV1 830-0EH10
6ES7 972-0BB11-0XA0
6ES7 972-0BB11-0XA0
6ES7 972-0AA01-0XA0

SIPROM GA

Application: communications software for remote maintenance and servicing of Siemens process gas analyzers; max. 12 analyzers with up to 4 components each. Networking of several gateways is possible when using the RS 485/Ethernet converter. The number of operable analyzers is increased correspondingly.

Functions: display and saving of all analyzer data, remote operation of all analyzer functions, parameter and configuration settings; comprehensive diagnostics information, remote calibration; online help; cyclic saving of measured values and status on hard disk and exporting to commercially available application programs, downloading of new software.

Hardware requirements: PC/laptop; recommended with Pentium II 6 MB RAM, free COM port: RS 232 or RS 485, CD drive.

Software requirements: Windows 95 or NT 4 (SP6), Windows 2000 or Windows X-P.

Ordering information

SIPROM GA software
 German/English selectable during installation, comprising 1 CD, with installation instructions, software product certificate and registration form

Firmware retrofitting sets for older analyzers:

ULTRAMAT 23
 (prior to SW version 2.06)
 All languages

ULTRAMAT 6
 (prior to SW version 4.1)
 • German
 • English
 • French
 • Spanish
 • Italian

OXYMAT 6
 (prior to SW version 4.1)
 • German
 • English
 • French
 • Spanish
 • Italian

Order No.

S79610-B4014-A1

C79451-A3494-S501

C79451-A3478-S501
C79451-A3478-S502
C79451-A3478-S503
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ULTRAMAT/OXYMAT 6

General

Communication

PROFIBUS-DP/PA

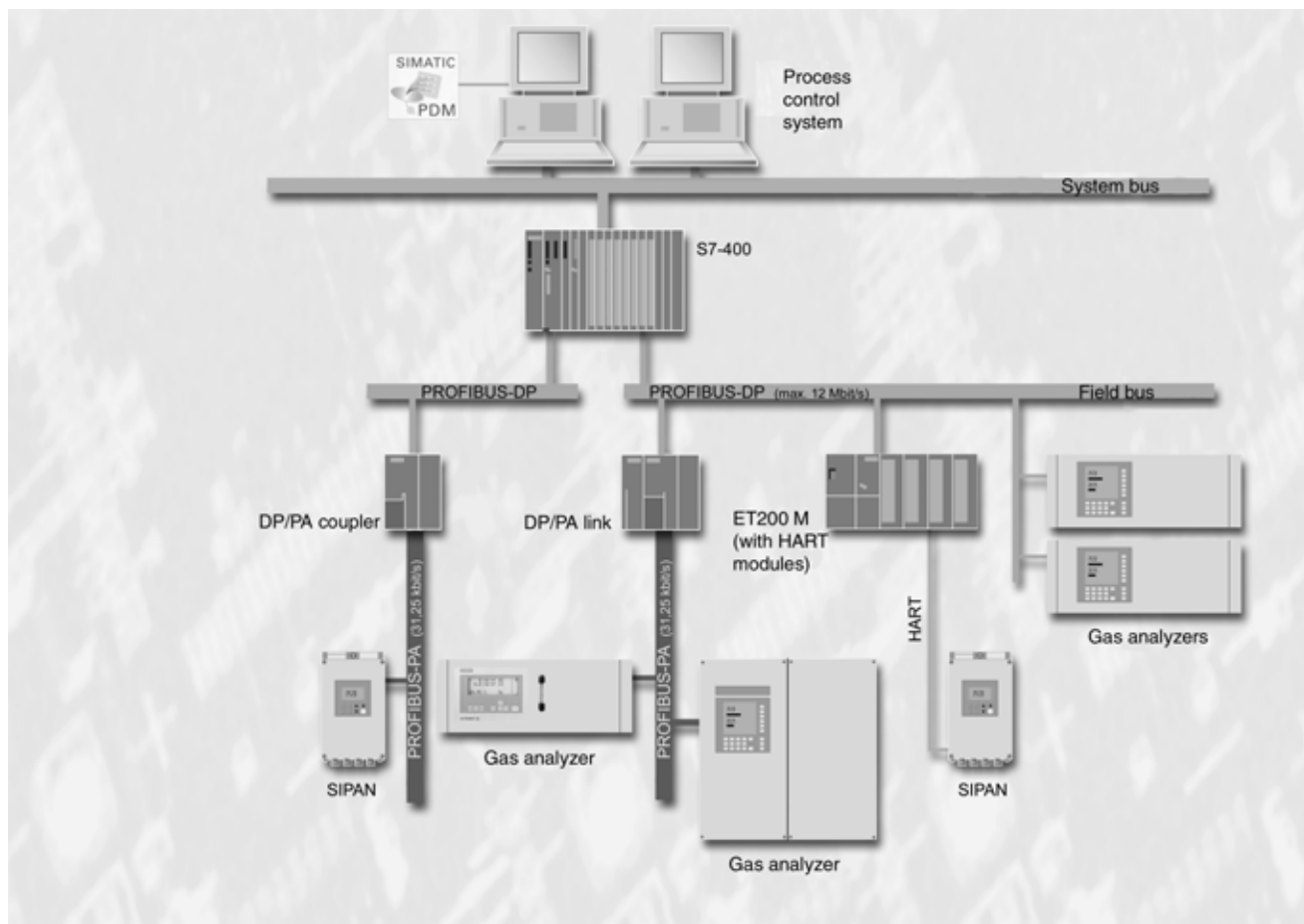


Fig. 5 Basic structure of a PROFIBUS system

The term "Field bus" describes a digital communications system with which distributed field devices in a plant are networked together via one single cable, and connected at the same time to programmable controllers or to a process control system. PROFIBUS is the leading field bus on the market. The **PROFIBUS-DP** version is widely used for production automation because of its high transmission rate for relatively small data quantities per device, whereas **PROFIBUS-PA** particularly takes into account the features required for process engineering, e.g. large data quantities and application in potentially explosive atmospheres.

User benefits can be found in the extremely high potentials for cost savings in all areas of the plant, covering configuring and commissioning, operation and maintenance, and up to later plant extensions.

Operation of the gas analyzers from a control system or separate PC is possible using the SIMATIC PDM (Process Device Manager) operator input tool which is software executing under Windows 95/98/NT and which can also be incorporated into the SIMATIC PCS 7 process control system. This permits clear display of both the incorporation of devices into the system and the complex parameter structure of the analyzers, permitting operation to be carried out simply by clicking.

The PROFIBUS user organization (PNO) is an independent international institution, and represents the interests of many vendors and users. In addition to services such as consultation, training

and device certification, its prime task is the further development, standardization and promotion of the PROFIBUS technology. The definition of a binding functionality for a device class in a profile is a prerequisite for the uniform response of devices from different vendors, the so-called interoperability. The **profile for analyzers** was defined as binding at the end of 1999, thus guaranteeing the interaction of all PROFIBUS-based devices in a plant.

This profile defines the functionality of the analyzers in a block model: e.g. the **physical block** describes the measuring procedure, analyzer and vendor names, serial number and operating state (operation, maintenance). Various **functional blocks** contain the execution of specific functions such as the processing of measured values or alarms. The **transducer blocks** describe the functionality of the actual measuring procedure and its control, e.g. preprocessing of a measured value, correction of cross-interferences, characteristics, measuring ranges as well as switching and control procedures. Protocols define the data transmission between the stations on the bus. A differentiation is made between **cyclic and acyclic services**. Cyclic services are used to transmit time-critical data such as measured values and statuses. The acyclic services permit the scanning or modification of device parameters during operation.

All gas analyzers of Series 6, ULTRAMAT 6, ULTRAMAT/OXYMAT 6, OXYMAT 6/61 and CALOMAT 6, as well as the ULTRAMAT 23, are suitable for PROFIBUS when fitted with the optional plug-in card (retrofitting also possible, see Ordering information).

Gas and electrical connections

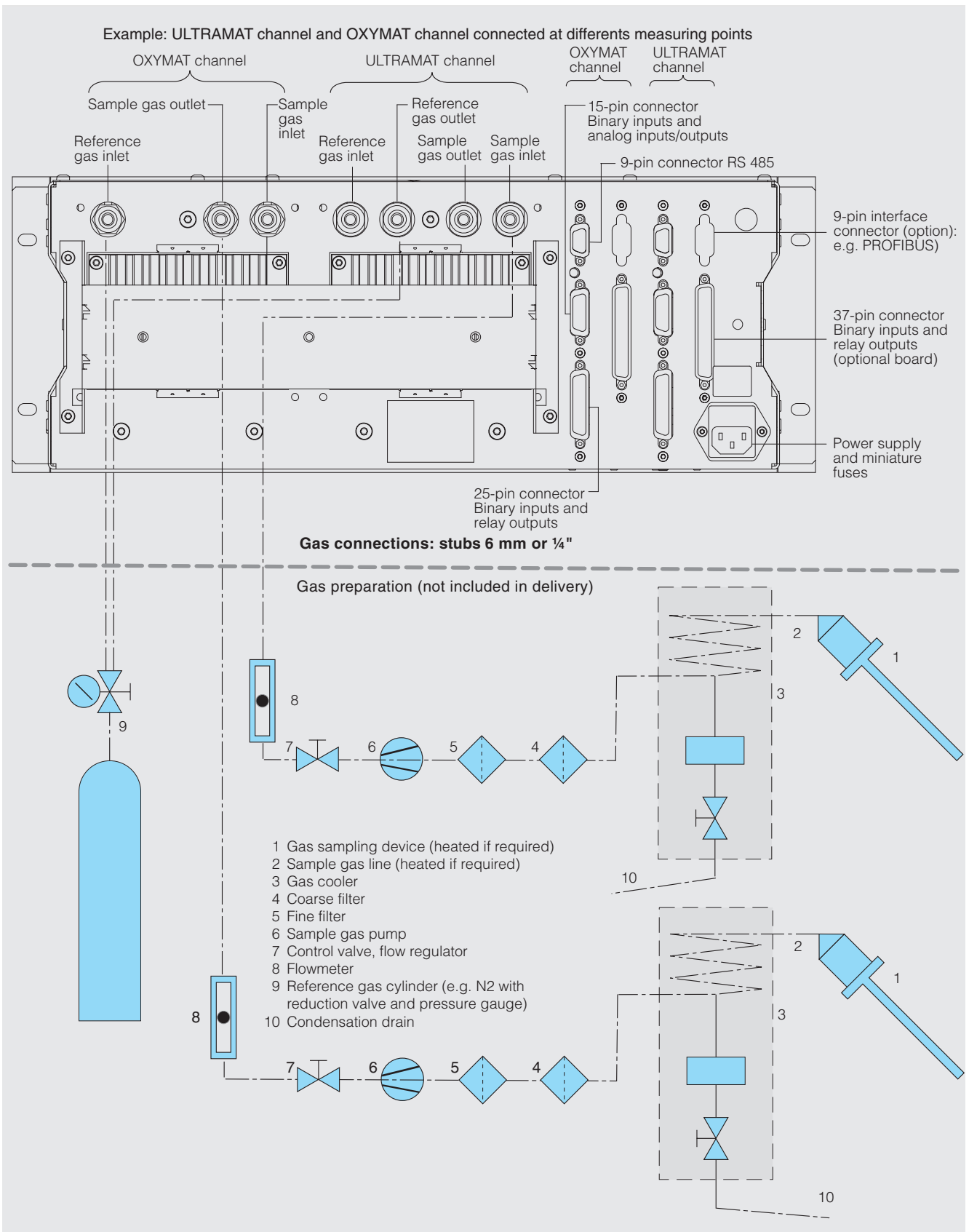


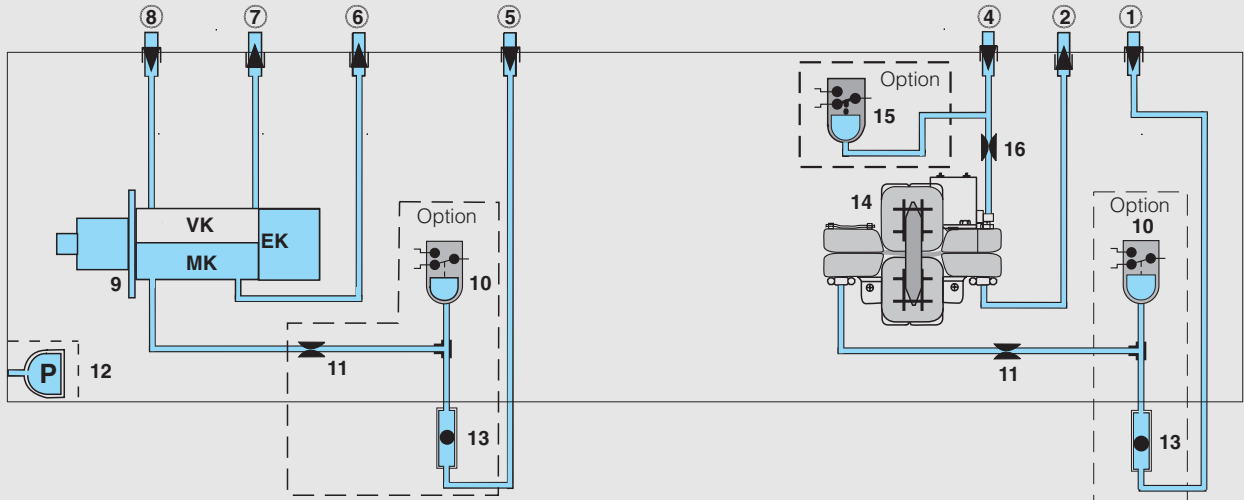
Fig. 6 ULTRAMAT/OXYMAT 6, gas and electrical connections shown at top, typical installation preparation with two separate gas sampling devices at bottom

ULTRAMAT/OXYMAT 6

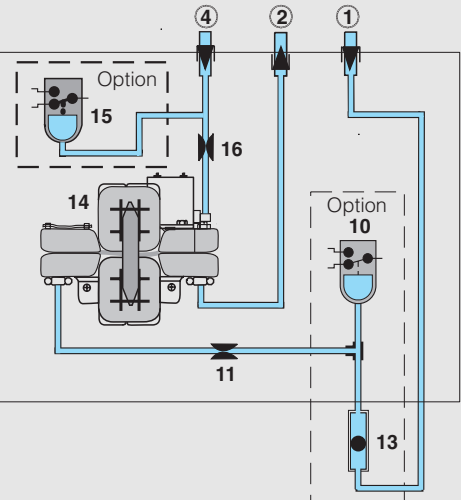
19" unit

Gas paths

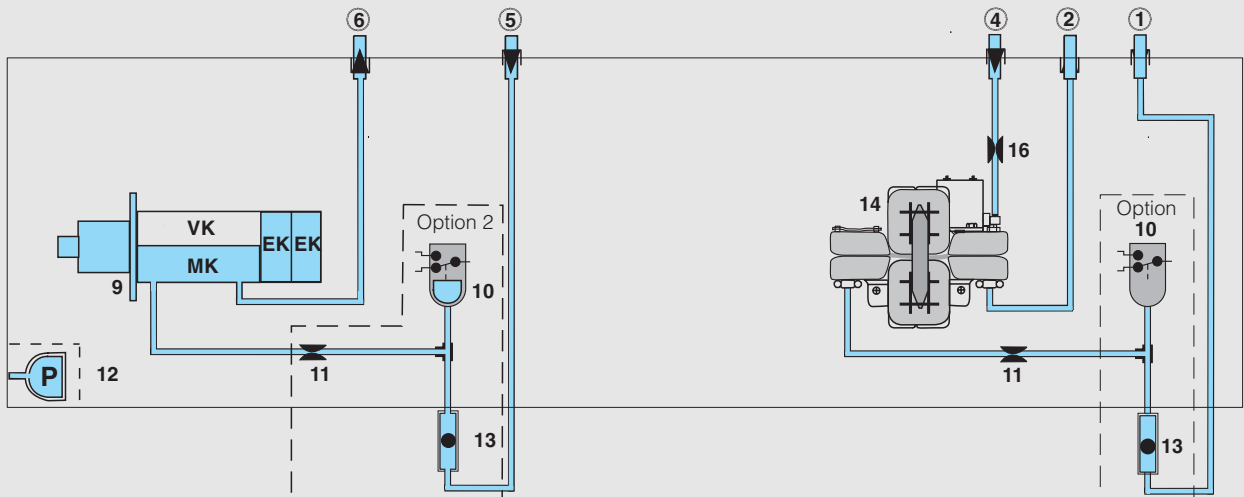
Internal gas paths, gas flow diagrams, basic layout



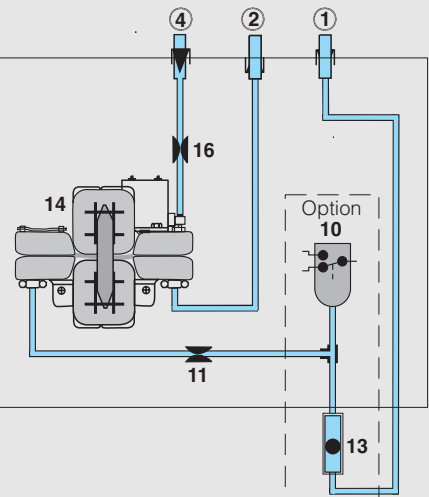
ULTRAMAT channel with sample gas monitoring, flow-type reference cell



OXYMAT channel, reference gas from cylinder (3000 to 4000 hPa)



ULTRAMAT channel (2-component units) with sample gas monitoring, non-flow type reference cell



OXYMAT channel, reference gas connection with pump (100 hPa)

- ① ⑤ Sample gas inlet
- ② ⑥ Sample gas outlet
- ⑦ Reference gas outlet
- ④ ⑧ Reference gas inlet
- 9 IR physics
- 10 Pressure switch in sample gas path
- 11 Restrictor in sample gas path (pushed into hose)
- 12 Pressure sensor to correct variations in atmospheric pressure
- 13 Flowmeter
- 14 O₂ physics
- 15 Pressure switch in reference gas path
- 16 Restrictor in reference gas path inlet

- EK Receiver cell
 - MK Sample cell
 - VK Reference cell, flow-type (optional)
- } IR physics

Fig. 7 ULTRAMAT/OXYMAT 6, example of possible combinations

Pin assignment

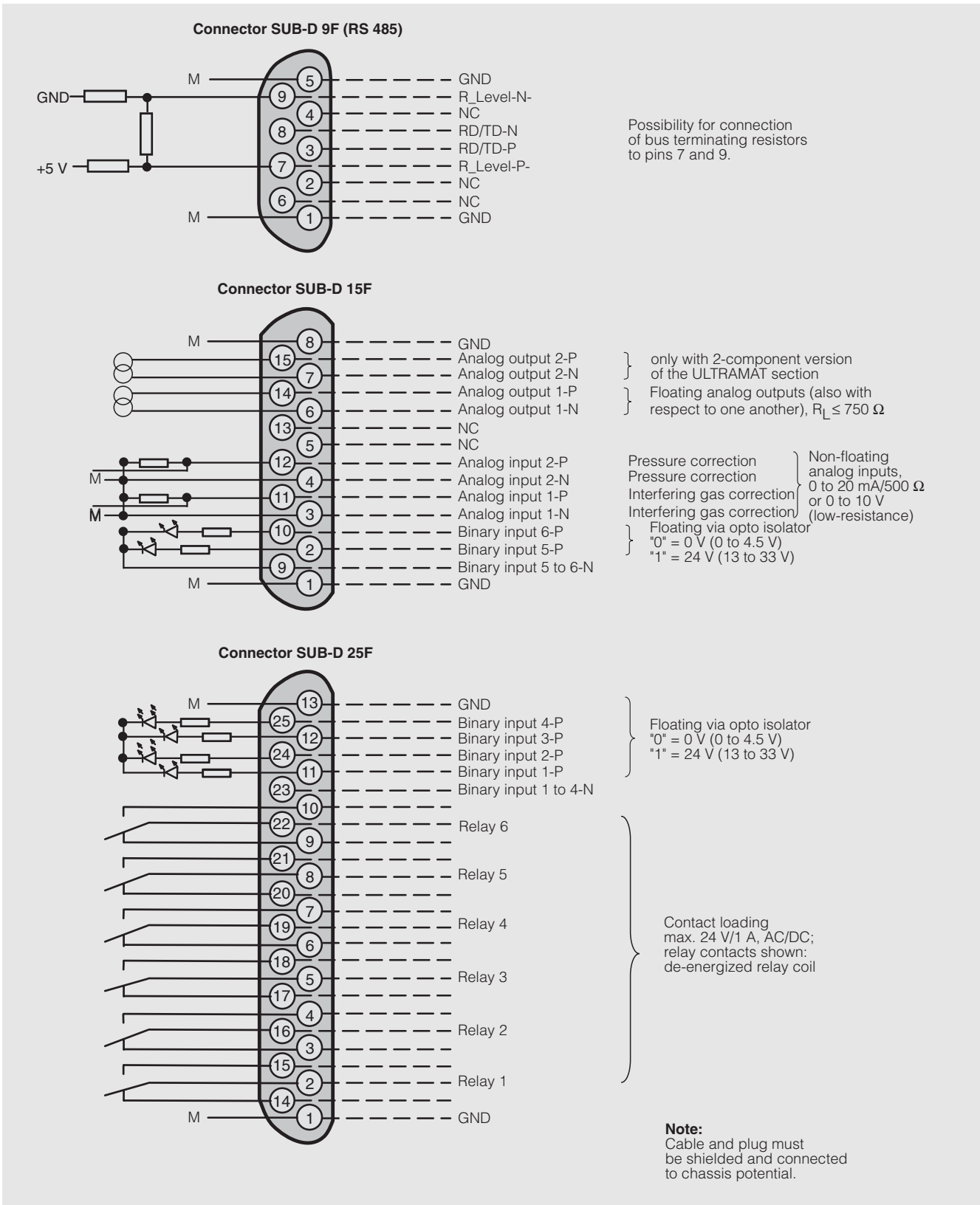


Fig. 8 ULTRAMAT/OXYMAT 6, pin assignment

ULTRAMAT/OXYMAT 6

19" unit

Electrical connection

Pin assignment

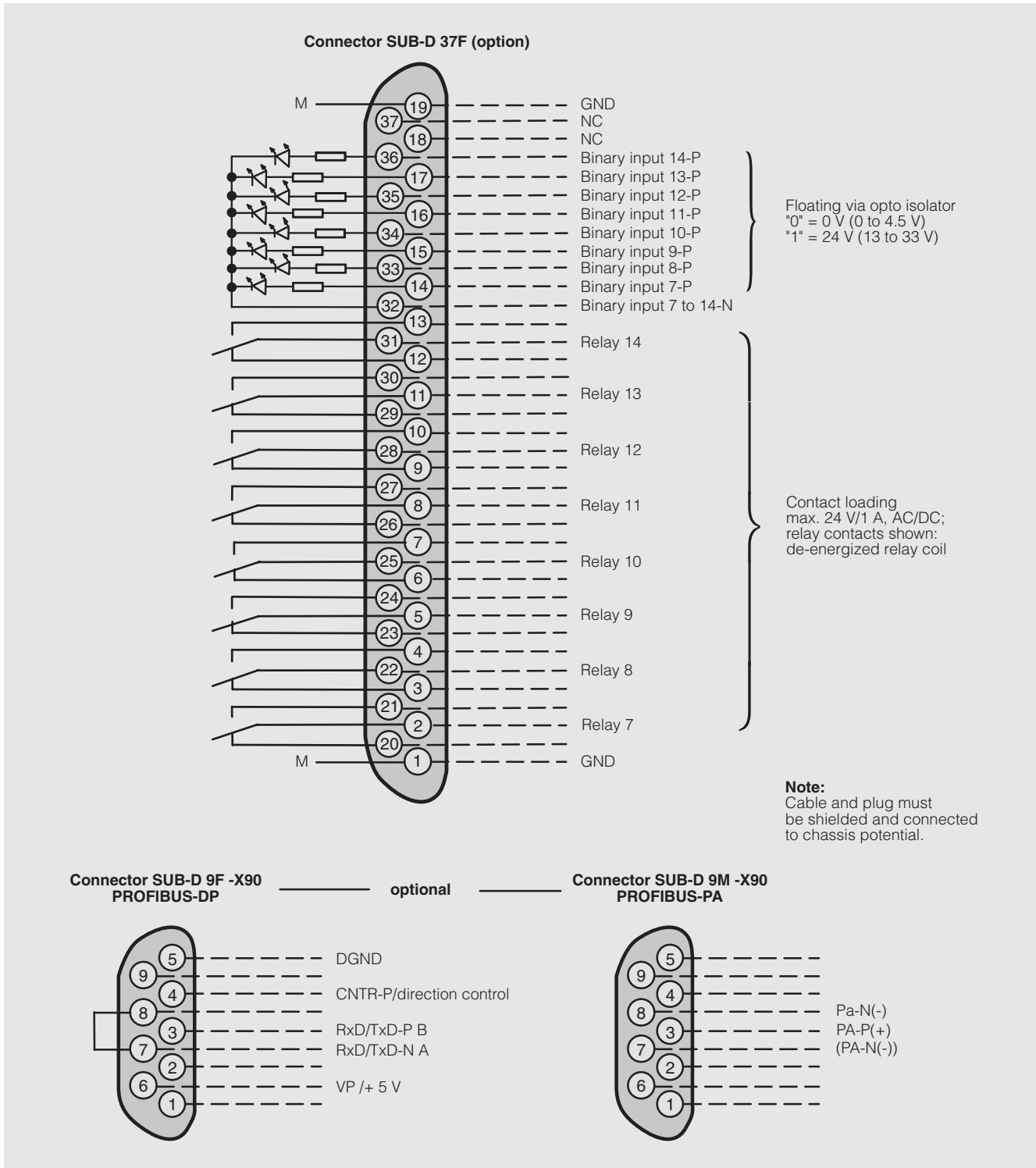


Fig. 9 ULTRAMAT/OXYMAT 6, connector assignment of Autocal board and PROFIBUS connectors

General

Position of use	Front panel vertical
Conformity	CE identification EN 50081-1, EN 50082-2
Design, enclosure	
Dimensions	see Fig. 10
Weight	approx. 21 kg
Degree of protection	IP 20 according to EN 60529
Electrical characteristics	
EMC interference immunity (ElectroMagnetic Compatibility)	According to standard requirements of NAMUR NE21 (08/98)
Electrical safety	According to EN 61010-1 overvoltage category III
Power supply	100 to 120 V AC (rated range 90 V to 132 V), 48 to 63 Hz or 200 to 240 V AC (rated range 180 V to 264 V), 48 to 63 Hz
Power consumption	Approx. 70 VA
Fuses	120...120 V: F1/F2 = T 1.6 A 200...240 V: F1/F2 = T 1 A
Electric inputs and outputs	
Analog output	0/2/4 to 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 to 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 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	
Perm. ambient temperature	-30 to +70 °C during storage and transport, +5 to +45 °C during operation
Permissible humidity	< 90 % RH ¹⁾ as annual average, during storage and transport ²⁾

Technical data, ULTRAMAT channel

Measuring ranges	4, switchable internally and externally; autoranging is also possible
Smallest possible measuring range	depending on application, e.g. CO: 0 to 10 vpm CO ₂ : 0 to 5 vpm
Largest possible measuring range	Depending on application
Measuring ranges with suppressed zero	Any zero point is possible between 0 and 100 %; smallest possible span 20 %
Characteristic	Linearized
Gas inlet conditions	
Permissible sample gas pressure	600 to 1500 hPa (absolute) 600 to 1300 hPa (absolute)
• without pressure switch	600 to 1500 hPa (absolute)
• with integrated pressure switch	600 to 1300 hPa (absolute)
Sample gas flow	18 to 90 l/h (0.3 to 1.5 l/min)
Sample gas temperature	0 to 50 °C
Sample gas humidity	< 90 % RH ¹⁾ or depending on application
Time response	
Warm-up period	With amb. temperature < 30 min ³⁾
Response time (T ₉₀ time)	Dependent on length of analyzer cell, sample gas line and parameterizable damping
Damping (electric time constant)	0 to 100 s, programmable
Dead time (purging time of gas path in analyzer at 1 l/min)	Approx. 0.5 to 2.5 s depending on version
Time for internal signal processing	< 1 s
Pressure correction range	
Pressure sensor	600 to 1200 hPa absolute
• internal	600 to 1500 hPa absolute
• external	600 to 1500 hPa absolute
Measuring response ⁴⁾	
Output signal fluctuation	± 0,1 % to ± 1 % of smallest possible measuring range specified on rating plate depending on the unit electronic time constant (corresponds to ± 0.33 % with 2 σ)
Zero drift	< 1 % of measuring range/week
Measured-value drift	< 1 % of measuring range/week
Repeatability	≤ 1 % of respective measuring range
Linearity error	< 0.5 % of full-scale value
Influencing variables ⁴⁾	
Ambient temperature	< 1 % of measuring range/10 K
Sample gas pressure	With pressure compensation: < 0.15 % of span/1 % change in atmospheric pressure 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

¹⁾ RH: relative humidity.

²⁾ Dew point must not be fallen below.

³⁾ Referred to 1000 hPa absolute sample gas pressure, 0.5 l/min sample gas flow and 25 °C ambient temperature.

⁴⁾ Maximum accuracy achieved after 2 hours.

ULTRAMAT/OXYMAT 6

19" unit

Technical data

Technical data, OXYMAT channel

Measuring ranges	4, switchable internally and externally; autoranging is also possible
Smallest possible measuring span ³⁾	0.5 % v/v, 2 % v/v or 5 % v/v O ₂
Largest possible measuring range	100 % v/v O ₂
Measuring ranges with suppressed zero	Any zero point is possible between 0 to 100 % v/v as long as a suitable reference gas is used (see also Table 1 on page 7)
Gas inlet conditions	
Perm. sample gas pressure	
• for analyzers with hoses	
- without pressure switch	500 to 1500 hPa absolute
- with pressure switch	500 to 1300 hPa absolute
• for analyzers with pipes	500 to 3000 hPa absolute
Sample gas flow	18 to 60 l/h (0.3 to 1 l/min)
Sample gas temperature	0 to 50 °C
Sample gas humidity	< 90 % RH ¹⁾
Time response	
Warm-up period	With ambient temperature < 30 min ²⁾
Reading delay time	min. 1.5 to 3.5 s, depending on version
Damping (electric time constant)	0 to 100 s, programmable
Dead time (purging time of gas path in analyzer at 1 l/min)	Approx. 0.5 to 2.5 s depending on version
Time for internal signal processing	< 1 s

Pressure correction range	
Pressure sensor	
• internal	500 to 2000 hPa absolute
• external	500 to 3000 hPa absolute
Measuring response ²⁾	
Output signal fluctuation	< 0.75 % of smallest possible measuring range specified on rating plate with an electronic time constant of 1 s (corresponds to ± 0.25 % with 2 σ)
Zero drift	< 0.5 %/month of smallest possible meas. span specified on rating plate
Measured-value drift	< 0.5 %/month of respective measuring span
Repeatability	< 1 % of respective measuring span
Linearity error	< 1 %/month of respective measuring span
Influencing variables ³⁾	
Ambient temperature	< 0.5 %/10 K referred to the smallest possible measuring span according to rating plate
Sample gas pressure	Without pressure compensation: < 2 % of measuring span/1 % change in pressure With pressure compensation: < 0.2 % of measuring span/1 % change in pressure
Residual gases	Deviation in zero point corresponding to paramagnetic or diamagnetic deviation of residual gas (see Table 2 on page 7)
Sample gas flow	< 1 % of smallest possible measuring span according to rating plate with a change in flow of 0.1 l/min within the permissible flow range
Power supply	< 0.1 % of output signal span with rated voltage ± 10 %

¹⁾ RH: relative humidity.

²⁾ Maximum accuracy achieved after 2 hours.

³⁾ Referred to 1000 hPa absolute sample gas pressure, 0.5 l/min sample gas flow and 25 °C ambient temperature.

ULTRAMAT/OXYMAT 6

19" unit

Dimensions

Dimensions

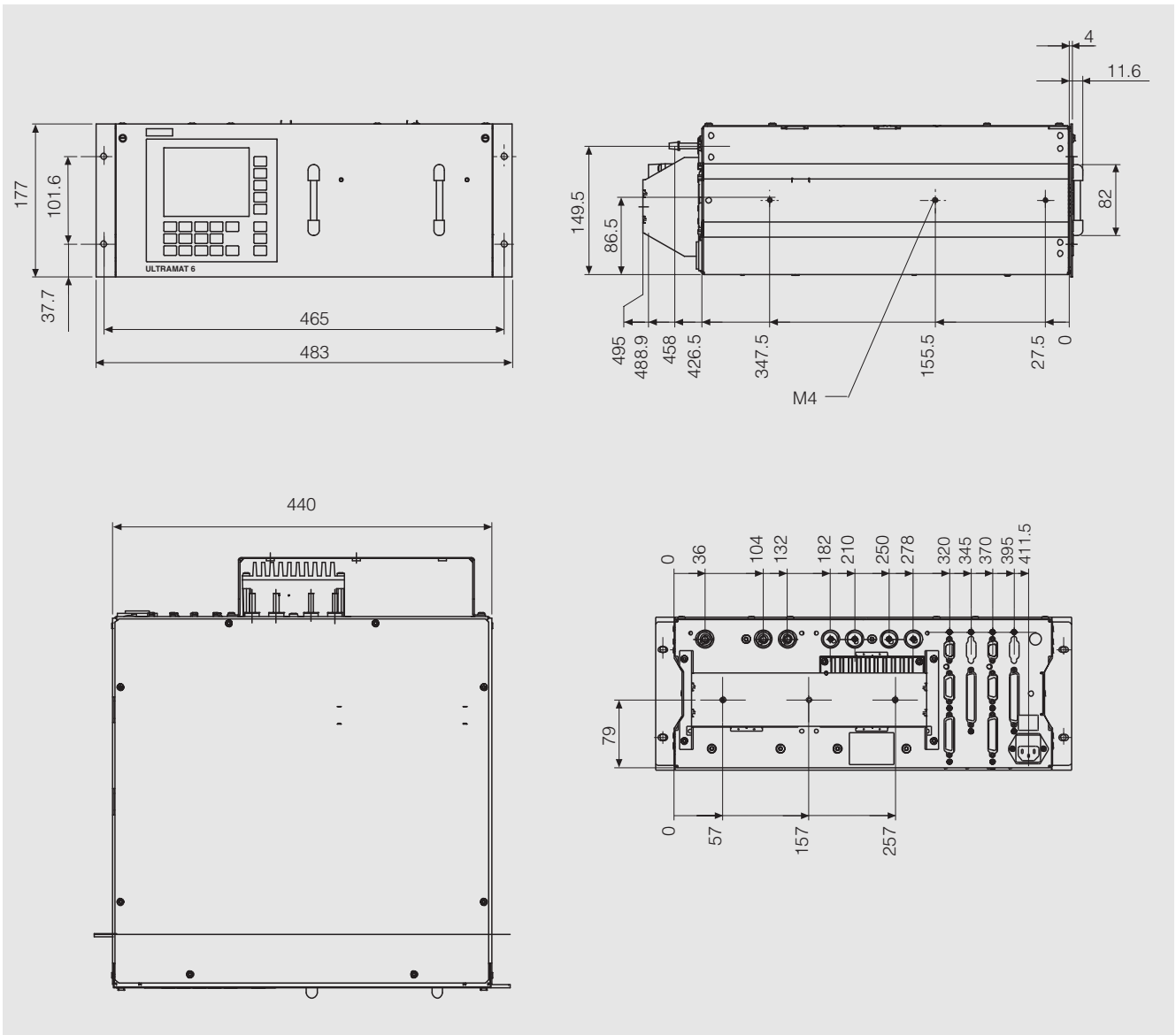


Fig. 10 ULTRAMATOXYMAT 6, dimensions in mm

ULTRAMAT/OXYMAT 6

19" unit

ULTRAMAT/OXYMAT 6,
1 channel for 1 IR component, 1 channel for O₂

Ordering data

ULTRAMAT/OXYMAT 6 gas analyzer

19" unit for installation in cabinets
combined measurement of O₂ and IR absorbing gases

Gas connections for sample gas and reference gas

Piping with outer diameter 6 mm

Piping with outer diameter 1/4"

Smallest possible span O₂

0.5 % Reference gas pressure 3000 hPa

0.5 % Reference gas pressure 100 hPa (external pump)

2 % Reference gas pressure 3000 hPa

2 % Reference gas pressure 100 hPa (external pump)

5 % Reference gas pressure 3000 hPa

5 % Reference gas pressure 100 hPa (external pump)

Sample cell (OXYMAT channel)

- Without flow-type compensation branch
 - Made of stainless steel, type No. 1.4571
 - Made of tantalum
- With flow-type compensation branch
 - Made of stainless steel, type No. 1.4571
 - Made of tantalum

Internal gas paths (both channels)	Sample cell (lining) (ULTRAMAT chan.)	Reference cell (flow) (ULTRAMAT chan.)
Viton hose	Aluminium	Non-flow-type Flow-type
Titanium pipe	Tantalum	Non-flow-type Flow-type
with sample gas monitoring (both channels)		
Viton hose	Aluminium	Non-flow-type Flow-type

Additional electronics

Without

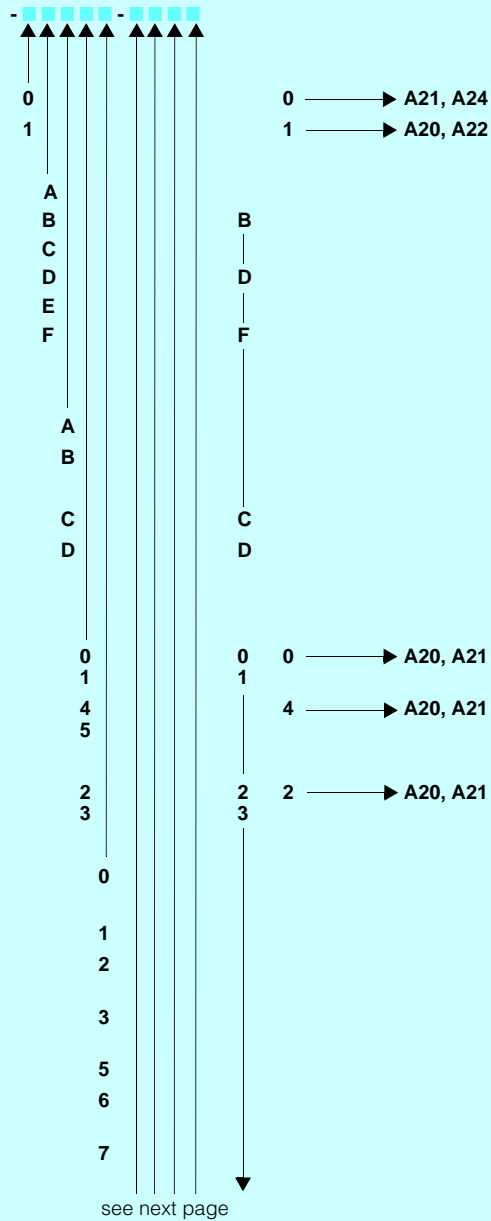
Autocal function

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

Order No.

7MB2023-

cannot be combined



ULTRAMAT/OXYMAT 6 19" unit

ULTRAMAT/OXYMAT 6,
1 channel for 1 IR component, 1 channel for O₂

Ordering data (continued)

ULTRAMAT/OXYMAT 6 gas analyzer

19" unit for installation in cabinets
combined measurement of O₂ and IR absorbing gases

Power supply

100 V to 120 V AC, 48 to 63 Hz
200 V to 240 V AC, 48 to 63 Hz

ULTRAMAT channel Measured component	Possible with range codes
CO	11 ¹⁾ , 12 to 30
CO highly selective (with optical filter)	12 ¹⁾ , 13 to 30
CO (TÜV, see additional version p. 24)	
CO ₂	10 ¹⁾ , 11 to 30
CH ₄	13 ¹⁾ , 14 to 30
C ₂ H ₂	15 ¹⁾ , 16 to 30
C ₂ H ₄	15 ¹⁾ , 16 to 30
C ₂ H ₆	14 ¹⁾ , 15 to 30
C ₃ H ₆	14 ¹⁾ , 15 to 30
C ₃ H ₈	13 ¹⁾ , 14 to 30
C ₄ H ₆	15 ¹⁾ , 16 to 30
C ₄ H ₁₀	14 ¹⁾ , 15 to 30
C ₆ H ₁₄	14 ¹⁾ , 15 to 30
SO ₂ (TÜV, see additional version page 24)	13 ¹⁾ , 14 to 30
NO (TÜV, see additional version page 24)	14 ¹⁾ , 15 to 30
NH ₃ (dry)	14 ¹⁾ , 15 to 30
H ₂ O	17 ¹⁾ , 18 to 20.22
N ₂ O	13 ¹⁾ , 14 to 30

Smallest measuring range	Largest measuring range	Range code
0 to 5 vpm	0 to 100 vpm	10
0 to 10 vpm	0 to 200 vpm	11
0 to 20 vpm	0 to 400 vpm	12
0 to 50 vpm	0 to 1 000 vpm	13
0 to 100 vpm	0 to 1 000 vpm	14
0 to 300 vpm	0 to 3 000 vpm	15
0 to 500 vpm	0 to 5 000 vpm	16
0 to 1 000 vpm	0 to 10 000 vpm	17
0 to 3 000 vpm	0 to 10 000 vpm	18
0 to 3 000 vpm	0 to 30 000 vpm	19
0 to 5 000 vpm	0 to 15 000 vpm	20
0 to 5 000 vpm	0 to 50 000 vpm	21
0 to 1 %	0 to 3 %	22
0 to 1 %	0 to 10 %	23
0 to 3 %	0 to 10 %	24
0 to 3 %	0 to 30 %	25
0 to 5 %	0 to 15 %	26
0 to 5 %	0 to 50 %	27
0 to 10 %	0 to 30 %	28
0 to 10 %	0 to 100 %	29
0 to 30 %	0 to 100 %	30

Language (operating software and documentation)

German	0
English	1
French	2
Spanish	3
Italian	4

Order No.

7MB2023-

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ULTRAMAT/OXYMAT 6

19" unit

ULTRAMAT/OXYMAT 6,
1 channel for 1 IR component, 1 channel for O₂

Ordering data

Further versions Please add „-Z“ to Order No. and specify Order code	Order code
RS 485/RS 232 converter	A11
Flow-type reference side with reduced flow, 6 mm (ULTRAMAT channel) ¹⁾	A20
Flow-type reference side with reduced flow, ¼" (ULTRAMAT channel) ¹⁾	A21
Connection pipe made of titanium 6 mm, complete with screwed gland, for sample gas side	A22
Connection pipe made of titanium ¼", complete with screwed gland, for sample gas side	A24
Reference gas monitoring (pressure switch up to 3000 hPa) (OXYMAT channel only)	A26
Slide rails (2 rails)	A31
Set of Torx tools, socket spanner	A32
Kalrez gaskets in sample gas path (O ₂ side)	B01
TAG labels (customer-defined inscriptions)	B03
Kalrez gaskets in sample gas path (IR side)	B04
Customer acceptance (in factory before delivery) ²⁾	Y01
Clean for O ₂ service (specially cleaned gas path) (ULTRAMAT channel and OXYMAT channel)	Y02
Drift recording ³⁾	Y03
Measuring range in plain text, if different from standard setting ⁴⁾	Y11
Special setting (only in conjunction with an application No., e.g. extended measuring range, ULTRAMAT channel only)	Y12
Extended special setting (only in conjunction with an appl. No., e.g. determination of cross interferences, ULTRAMAT channel only)	Y13
TÜV version according to 17. BImSch (ULTRAMAT channel only)	Y17
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 for each ULTRAMAT channel or OXYMAT channel	C79451-A3480-D511
Autocal function with 8 binary inputs/outputs and PROFIBUS-PA for each ULTRAMAT channel or OXYMAT channel	A5E00057307
Autocal function with 8 binary inputs/outputs and PROFIBUS-DP for each ULTRAMAT channel or OXYMAT channel	A5E00057312

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

²⁾ Customer acceptance: ½ day at factory in presence of customer.
The following work is carried out: comparison of analyzer with ordering data; linearization check (zero, mid-point value and full-scale value); reproducibility check with calibration gas (recording in each case on XT recorder, logging of results).

³⁾ Drift recording: an XT recording is supplied when the analyzer is delivered: zero drift with 16 hours continuous operation and sensitivity drift (largest measuring range) with 6 hours continuous operation.

⁴⁾ Standard setting:

smallest possible measuring range	} in % or	
25 % of largest possible range		ppm
50 % of largest possible range		(vpm)
largest range		

Note : conversion factors with optional selection of dimensions ppm (vpm) mg/m³ at normal conditions
 SO₂ : 0.38 ppm ≈ 1 mg/m³
 NO : 0.80 ppm ≈ 1 mg/m³
 CO : 0.86 ppm ≈ 1 mg/m³.

ULTRAMAT/OXYMAT 6 19" unit

ULTRAMAT/OXYMAT 6E-2R,
1 channel for 2 IR components, 1 channel for O₂

Ordering data

ULTRAMAT/OXYMAT 6 gas analyzer

19" unit for installation in cabinets
combined measurement of O₂ and IR absorbing gases

Gas connections for sample gas and reference gas

Piping with outer diameter 6 mm

Piping with outer diameter 1/4"

Smallest possible span O₂

0.5 %	Reference gas pressure 3000 hPa
0.5 %	Reference gas pressure 100 hPa (external pump)
2 %	Reference gas pressure 3000 hPa
2 %	Reference gas pressure 100 hPa (external pump)
5 %	Reference gas pressure 3000 hPa
5 %	Reference gas pressure 100 hPa (external pump)

Sample cell (OXYMAT channel)

- Without flow-type compensation branch
 - Made of stainless steel, type No. 1.4571
 - Made of tantalum
- With flow-type compensation branch
 - Made of stainless steel, type No. 1.4571
 - Made of tantalum

Internal gas paths (both channels)	Sample cell (lining) (ULTRAMAT chan.)	Reference cell (flow) (ULTRAMAT chan.)
Viton hose	Aluminium	Non-flow-type Flow-type
Titanium pipe	Tantalum	Non-flow-type Flow-type

with sample gas monitoring (both channels)

Viton hose	Aluminium	Non-flow-type Flow-type
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Additional electronics

Without

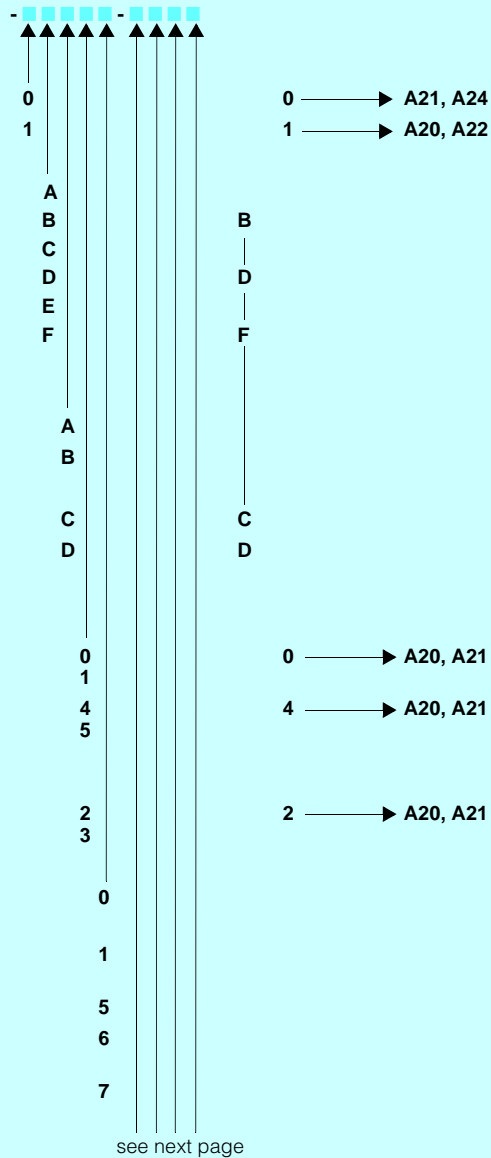
Autocal function

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

Order No.

7MB2024-

cannot be combined



see next page

ULTRAMAT/OXYMAT 6

19" unit

ULTRAMAT/OXYMAT 6E-2R,
1 channel for 2 IR components, 1 channel for O₂

Ordering data (continued)

Order No.

ULTRAMAT/OXYMAT 6 gas analyzer

19" unit for installation in cabinets
combined measurement of O₂ and IR absorbing gases

Power supply

100 V to 120 V AC, 48 to 63 Hz

200 V to 240 V AC, 48 to 63 Hz

ULTRAMAT chan. Meas. component	Smallest measuring range	Largest measuring range
CO/NO TUV (s. page 24)	CO 0 to 100 ppm	0 to 1 000 ppm
	NO 0 to 300 ppm	0 to 1 000 ppm
CO/NO	CO 0 to 300 ppm	0 to 3 000 ppm
	NO 0 to 500 ppm	0 to 3 000 ppm
CO/NO	CO 0 to 1 000 ppm	0 to 10 000 ppm
	NO 0 to 1 000 ppm	0 to 10 000 ppm
CO ₂ /CO	CO ₂ 0 to 100 ppm	0 to 1 000 ppm
	CO 0 to 100 ppm	0 to 1 000 ppm
CO ₂ /CO	CO ₂ 0 to 300 ppm	0 to 3 000 ppm
	CO 0 to 300 ppm	0 to 3 000 ppm
CO ₂ /CO	CO ₂ 0 to 1 000 ppm	0 to 10 000 ppm
	CO 0 to 1 000 ppm	0 to 10 000 ppm
CO ₂ /CO	CO ₂ 0 to 3 000 ppm	0 to 30 000 ppm
	CO 0 to 3 000 ppm	0 to 30 000 ppm
CO ₂ /CO	CO ₂ 0 to 1 %	0 to 10 %
	CO 0 to 1 %	0 to 10 %
CO ₂ /CO	CO ₂ 0 to 3 %	0 to 30 %
	CO 0 to 3 %	0 to 30 %
CO ₂ /CO	CO ₂ 0 to 10 %	0 to 100 %
	CO 0 to 10 %	0 to 100 %
CO ₂ /CH ₄	CO ₂ 0 to 10 %	0 to 100 %
	CH ₄ 0 to 10 %	0 to 100 %
CO ₂ /NO	CO ₂ 0 to 100 ppm	0 to 1 000 ppm
	NO 0 to 300 ppm	0 to 1 000 ppm
CO ₂ /NO	CO ₂ 0 to 300 ppm	0 to 3 000 ppm
	NO 0 to 500 ppm	0 to 3 000 ppm

Language (operating software and documentation)

German
English
French
Spanish
Italian

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Ordering data (continued)

Further versions Please add „-Z“ to Order No. and specify Order code	Order code
RS 485/RS 232 converter	A11
Flow-type reference side with reduced flow, 6 mm (ULTRAMAT channel) ¹⁾	A20
Flow-type reference side with reduced flow, ¼" (ULTRAMAT channel) ¹⁾	A21
Connection pipe made of titanium 6 mm, complete with screwed gland, for sample gas side	A22
Connection pipe made of titanium ¼", complete with screwed gland, for sample gas side	A24
Reference gas monitoring (pressure switch up to 3000 hPa) (OXYMAT channel only)	A26
Slide rails (2 rails)	A31
Set of Torx tools, socket spanner	A32
Kalrez gaskets in sample gas path (O ₂ side)	B01
TAG labels (customer-defined inscriptions)	B03
Kalrez gaskets in sample gas path (IR side)	B04
Customer acceptance (in factory before delivery) ²⁾	Y01
Clean for O ₂ service (specially cleaned gas path) (OXYMAT channel and ULTRAMAT channel)	Y02
Drift recording ³⁾	Y03
Measuring range in plain text, if different from standard setting ⁴⁾	Y11
Special setting (only in conjunction with an application No., e.g. extended measuring range, ULTRAMAT channel only)	Y12
Extended special setting (only in conjunction with an appl. No., e.g. determination of cros-interferences, ULTRAMAT channel only)	Y13
TÜV version according to 17. BImSch (ULTRAMAT channel only)	Y17
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 for each ULTRAMAT channel or OXYMAT channel	C79451-A3480-D511
Autocal function with 8 binary inputs/outputs and PROFIBUS-PA for each ULTRAMAT channel or OXYMAT channel	A5E00057307
Autocal function with 8 binary inputs/outputs and PROFIBUS-DP for each ULTRAMAT channel or OXYMAT channel	A5E00057312

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

²⁾ Customer acceptance: ½ day at factory in presence of customer.
The following work is carried out: comparison of analyzer with ordering data; linearization check (zero, mid-point value and full-scale value); reproducibility check with calibration gas (recording in each case on XT recorder, logging of results).

³⁾ Drift recording: an XT recording is supplied when the analyzer is delivered: zero drift with 16 hours continuous operation and sensitivity drift (largest measuring range) with 6 hours continuous operation.

⁴⁾ Standard setting: smallest possible measuring range

25 % of largest possible range	}	in % or ppm (vpm)
50 % of largest possible range		
largest range		

Note : conversion factors with optional selection of dimensions ppm (vpm) mg/m³ at normal conditions

SO₂ : 0.38 ppm ≈ 1 mg/m³

NO : 0.80 ppm ≈ 1 mg/m³

CO : 0.86 ppm ≈ 1 mg/m³.

ULTRAMAT/OXYMAT 6

19" unit

Ordering data
Additional version for TÜV units

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	1 500 mg/m ³		
D	50 mg/m ³	1 000 mg/m ³	300 mg/m ³	3 000 mg/m ³		
E			500 mg/m ³	5 000 mg/m ³	100 mg/m ³	2 000 mg/m ³
F	300 mg/m ³	3 000 mg/m ³	1 000 mg/m ³	10 000 mg/m ³	300 mg/m ³	3 000 mg/m ³
G	500 mg/m ³	5 000 mg/m ³			500 mg/m ³	5 000 mg/m ³
H	1 000 mg/m ³	10 000 mg/m ³	3 000 mg/m ³	30 000 mg/m ³	1 000 mg/m ³	10 000 mg/m ³
K	3 000 mg/m ³	30 000 mg/m ³	10 g/m ³	100 g/m ³	3 000 mg/m ³	30 000 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	1 000 g/m ³	30 g/m ³	300 g/m ³
V	100 g/m ³	1 160 g/m ³	300 g/m ³	2 630 g/m ³	100 g/m ³	1 250 g/m ³

Example for ordering

ULTRAMAT/OXYMAT 6, TÜV

IR channel:

component CO

measuring range 0 to 50/1000 mg/m³

with hoses, non-flow-type reference side

without automatic calibration (Autocal)

230 V, German

7MB2023-0EA00-1XD0-Z + Y17

2 components in series (2R version) (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	1 000 mg/m ³	200 mg/m ³	2 000 mg/m ³
AJ	300 mg/m ³	3 000 mg/m ³	300 mg/m ³	3 000 mg/m ³
AC	1000 mg/m ³	10 000 mg/m ³	1 000 mg/m ³	10 000 mg/m ³

Example for ordering

ULTRAMAT/OXYMAT 6-2R, TÜV

IR channel:

components CO/NO

measuring range CO: 0 to 75/1000 mg/m³

NO: 0 to 200/2000 mg/m³

with hoses, non-flow-type reference side

without automatic calibration (Autocal)

230 V, German

7MB2024-0EA00-1AH0-Z +Y17

General

Description	Qty	Order No.
Electronics		
Fuse		
• 0.63 A / 250 V (230-V version)	2	W79054-L1010-T630
• 1.0 A / 250 V (110-V version)	2	W79054-L1011-T100
LC-display	1	W75025-B5001-B1
Adapter board LCD/keyboard	1	C79451-A3474-B605
Front panel with keyboard	1	C79165-A3042-B6

ULTRAMAT channel

Description	Qty	Order No.
Analyzer section		
IR source	1	C79451-A3462-B12
Chopper	1	C79451-A3462-B510
Chopper holder	1	C79451-A3462-B501
Cover (window)		
• for analyzer cell length 0.2 to 6 mm	2	C79451-A3462-B152
• for analyzer cell length 20 to 180 mm	2	C79451-A3462-B151
O-ring		
• Cooling element	1	C75121-Z101-C5
• Forked cell	1	C75121-Z101-C1
• Chopper plate	1	C75121-Z101-C2
• Reflector	1	C75121-Z101-C3
• Sample cell	1	C75121-Z101-C4
• Cover (window)	4	C79121-Z100-A24
• Connection stub sample cell (10 stubs)	1	A5E00124182
Flowmeter (only for ULTRAMAT 6E with sample gas monitoring)	1	C79402-Z560-T1

OXYMAT channel

Description	Qty	Order No.
Analyzer section		
Measuring cell		
• SS, type No. 1.4571, without flow-type compensation branch	1	C79451-A3277-B535
• Tantalum, without flow-type compensation branch	1	C79451-A3277-B536
• SS, type No. 1.4571, with flow-type compensation branch 1	1	C79451-A3277-B537
• Tantalum, with flow-type compensation branch	1	C79451-A3277-B538
• O-ring	4	C79121-Z100-A32
• O-ring	4	C71121-Z100-A159
Measuring head for measuring cell		
• without flow-type compensation branch	1	C79451-A3460-B525
• with flow-type compensation branch	1	C79451-A3460-B526
Sample gas path		
• Restrictor, gas path hose made of stainless steel, type No. 1.4571	2	C79451-A3480-C10
• Restrictor, gas path pipe made of titanium	2	C79451-A3480-C37
Reference gas path		
• 3000 hPa, 6 mm (set of parts)	1	A5E00118833
• 3000 hPa, ¼" (set of parts)	1	A5E00118834
• 100 hPa, 6 mm (set of parts)	1	A5E00118835
• 100 hPa, ¼" (set of parts)	1	A5E00118836

ULTRAMAT/OXYMAT 6

Documentation

Catalog extract	Order No.	Manual	Order No.
ULTRAMAT/OXYMAT 6 Gasanalysengerät für die kombinierte Messung von Sauerstoff und IR-absorbierende Gase (German) (PDF only)	E86060-K3510-B161-A2	ULTRAMAT 6 / OXYMAT 6 Gasanalysengerät für IR-absorbierende Gase und Sauerstoff (German)	C79000-G5200-C143
ULTRAMAT/OXYMAT 6 Gas Analyzer for the Combined Measurement of Oxygen and Infrared Absorbing Gases (English)	E86060-K3510-B161-A2-7600	ULTRAMAT 6 / OXYMAT 6 Gas Analyzers for IR-absorbing Gases and Oxygen (English)	C79000-G5276-C143
ULTRAMAT/OXYMAT 6 Analyseur de gaz pour une mesure combinée d'oxygène et de composants gazeux infrarouges (French) (PDF only)	E86060-K3510-B161-A2-7700	ULTRAMAT 6 / OXYMAT 6 Analyseurs de gaz pour la mesure de composants infrarouges et d'oxygène (French)	C79000-G5277-C143
		ULTRAMAT 6 / OXYMAT 6 Analizzatori per i gas assorbenti raggi infrarossi ed ossigeno (Italian)	C79000-G5272-C143
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ULTRAMAT/OXYMAT 6



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