OXYMAT 6
Gas Analyzers for the Determination of Oxygen

Siemens Extract PA 10 · November 2002

General

Application

The OXYMAT 6 gas analyzers are 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 are also available on request.

Application examples

Measurement of O_2

- For boiler control in firing systems
- In safety-relevant areas
- As a reference variable for emission measurements according to TA-Luft, 13. and 17. BImSchV
- In the automotive industry (engine test systems)
- Warning equipment
- In chemical plants
- In ultra-pure gases for quality monitoring
- Version to analyze flammable and non-flammable gases or vapors for use in hazardous areas (zone 1 and zone 2). (Use in hazardous areas of zone 0 is not permissible.)

Essential characteristics

- Four freely-parameterizable measuring ranges, also with zero offset, all measuring ranges linear
- Electrically isolated signal output selectable as 0/2/4 to 20 mA (also inverted)
- 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
- Simple handling using menu-based operation
- Short response time
- Low long-term drift
- Two-stage access code to prevent unintentional and unauthorized inputs
- 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
- Automatic range calibration can be parameterized
- Operation based on NAMUR Recommendation
- Measuring-point selection for up to 6 measuring points (programmable)
- Measuring point identification
- Measuring range identification
- Monitoring of sample gas and/or reference gas (option)
- Monitoring of reference gas with reference gas connection 2000 to 4000 hPa (option)
- Different smallest spans (0.5 %, 2.0 % or 5.0 % O_2), depending on version
- Customer-specific analyzer options such as e.g.:
  - Customer acceptance
  - Tag labels
  - Drift recording
  - Clean for O_2 service
  - Kalrez gaskets
- 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
- Simple analyzer exchange since electric connections are easy to remove.
- Sample cell for use in presence of highly corrosive sample gases.

19“ unit: essential characteristics

- 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: flexible tube 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"

Field unit: essential characteristics

- Two-door housing with gas-tight separation of analyzer and electronics sections
- Each half of the enclosure can be purged separately
- Analyzer section and piping can be heated up to 130 °C (option)
- Gas path and pipe conections made of stainless steel (type No. 1.4571) or titanium
- Purging gas connections: pipe diameter 10 mm or 3/8"
- Gas connections for sample gas input and output and for reference gas: clamping ring connection for pipe diameter 6 mm or 1/4"
- Simple analyzer exchange since electric connections are easy to remove.

Design

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/French, French/English, Spanish/English, Italian/English.

Inputs and outputs

- 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, processing external signals from sample conditioning)
- Six relay outputs freely configurable (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; with 19“ unit also possibility of connection 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

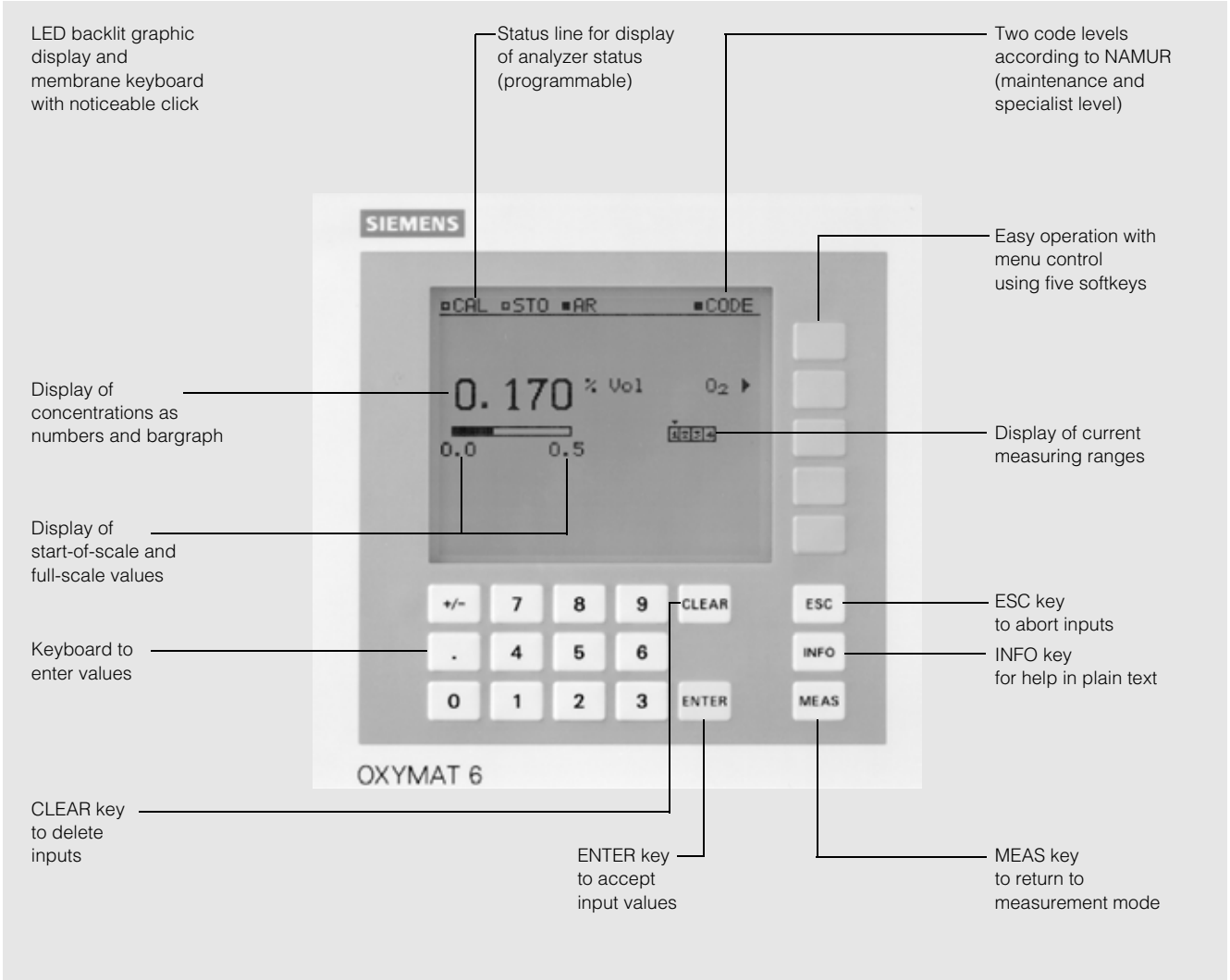


Fig. 1 OXYMAT 6, membrane keyboard and graphic display

General

Mode of operation

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 **OXYMAT 6**, one gas (1, Fig. 2) 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.

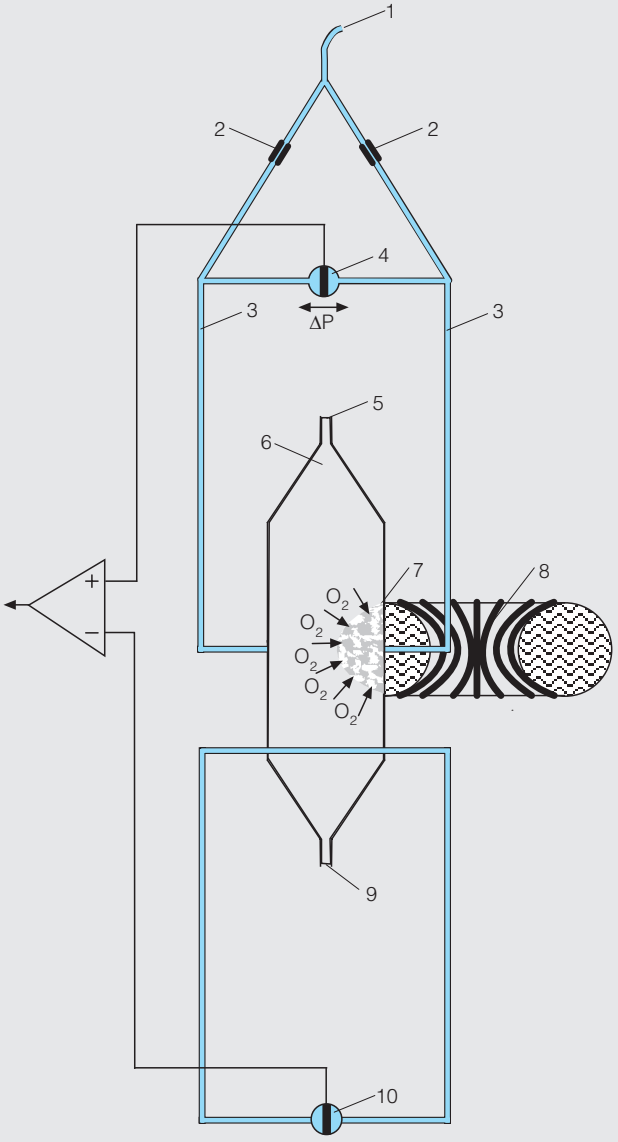
The sample cell is directly in the sample path and has a small volume. The microflow sensor thus responds quickly, resulting in a very short response time for the **OXYMAT 6**.

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).

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.



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)

Fig. 2 OXYMAT 6, mode of operation

Reference gases

Measuring range	Recommended reference gas	Reference gas pressure	Remarks
0 to . . . % v/v O_2	N_2	2000 to 4000 hPa above sample gas pressure (max. 5000 hPa absolute)	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	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

Correction of zero error / Cross interferences

Residual gas (concentration 100 % v/v)		Zero deviation in % v/v O_2 absolute
Organic gases		
Acetic acid	CH_3COOH	-0.64
Acetylene	C_2H_2	-0.29
1,2 butadiene	C_4H_6	-0.65
1,3 butadiene	C_4H_6	-0.49
iso-butane	C_4H_{10}	-1.30
n-butane	C_4H_{10}	-1.26
1-butene	C_4H_6	-0.96
iso-butene	C_4H_8	-1.06
Cyclo-hexane	C_6H_{12}	-1.84
Dichlorodifluoromethane (R12)	CCl_2F_2	-1.32
Ethane	C_2H_6	-0.49
Ethylene	C_2H_4	-0.22
n-heptane	C_7H_{16}	-2.4
n-hexane	C_6H_{14}	-2.02
Methane	CH_4	-0.18
Methanol	CH_3OH	-0.31
n-octane	C_8H_{18}	-2.78
n-pentane	C_5H_{12}	-1.68
iso-pentane	C_5H_{12}	-1.49
Propane	C_3H_8	-0.87
Propylene	C_3H_6	-0.64
Trichlorofluoromethane (R11)	CCl_3F	-1.63
Vinyl chloride	C_2H_3Cl	-0.77
Vinyl fluoride	C_2H_3F	-0.55
1,1 vinylidene chloride	$C_2H_2Cl_2$	-1.22

Residual gas (concentration 100 % v/v)		Zero deviation in % v/v O_2 absolute
Inert gases		
Argon	Ar	-0.25
Helium	He	+0.33
Krypton	Kr	-0.55
Neon	Ne	+0.17
Xenon	Xe	-1.05
Anorganic gases		
Ammonia	NH_3	-0.20
Carbon dioxide	CO_2	-0.30
Carbon monoxide	CO	+0.07
Chlorine	Cl_2	-0.94
Dinitrogen monoxide	N_2O	-0.23
Hydrogen	H_2	+0.26
Hydrogen bromide	HBr	-0.76
Hydrogen chloride	HCl	-0.35
Hydrogen fluoride	HF	-0.10
Hydrogen iodide	HI	-1.19
Hydrogen sulphide	H_2S	-0.44
Oxygen	O_2	+100
Nitrogen	N_2	0.00
Nitrogen dioxide	NO_2	+20.00
Nitrogen oxide	NO	+42.94
Sulphur dioxide	SO_2	-0.20
Sulphur hexafluoride	SF_6	-1.05
Water	H_2O	-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 mentionned in Table 2 must be multiplied with a correction factor (k):

- with diamagnetic gases: $k = 333\ K / (\upsilon\ [°C] + 273\ K)$
- with paramagnetic gases: $k = [333\ K / (\upsilon\ [°C] + 273\ K)]^2$

(all diamagnetic gases have a negative zero error).

Versions - Wetted parts

Standard

Gas path		19“ unit	Field unit	Explosion-protected field 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)		
with pipes	Nipple Pipe Sample cell Restrictor O-rings		Hastelloy C22 Hastelloy C22 1.4571 or Tantal Hastelloy C22 FKM (Viton) or Kalrez	

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

Options

Flowmeter	Metering pipe Float Float limit Elbows	Duran glass Duran glass, black Teflon Viton	—	—
Pressure switch	Membrane 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.

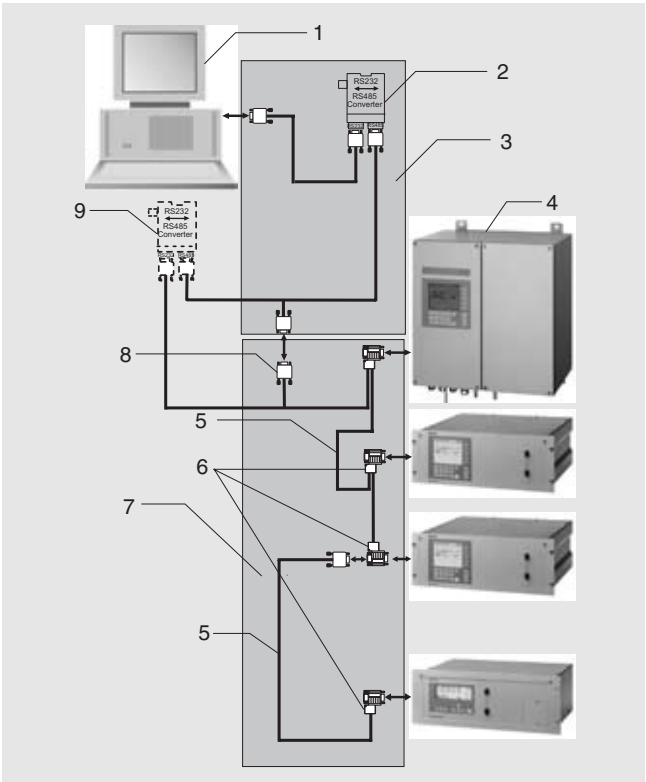


Fig. 3 Typical design of an RS 485 network

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	Order No.
Interface description (German)	**A5E000 54148**
RS 485/RS 232 converter	**C79451-Z1589-U1**
RS 485/Ethernet converter	**C79451-A3364-D61**
SIMATIC cable/bus cable	**6XV1 830-0EH10**
SIMATIC bus connector	**6ES7 972-0BB11-0XA0**
9-pin DSUB plug	**6ES7 972-0BB11-0XA0**
Repeater (see also Catalog CA 01 or IK PI)	**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 operatable 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	Order No.
SIPROM GA software German/English selectable during installation, comprising 1 CD, with installation instructions, software product certificate and registration form	**S79610-B4014-A1**
Firmware retrofitting sets for older analyzers:	
ULTRAMAT 23 (prior to SW version 2.06) All languages	**C79451-A3494-S501**
ULTRAMAT 6 (prior to SW version 4.1)	
• German	**C79451-A3478-S501**
• English	**C79451-A3478-S502**
• French	**C79451-A3478-S503**
• Spanish	**C79451-A3478-S504**
• Italian	**C79451-A3478-S505**
OXYMAT 6 (prior to SW version 4.1)	
• German	**C79451-A3480-S501**
• English	**C79451-A3480-S502**
• French	**C79451-A3480-S503**
• Spanish	**C79451-A3480-S504**
• Italian	**C79451-A3480-S505**

PROFIBUS-DP/-PA

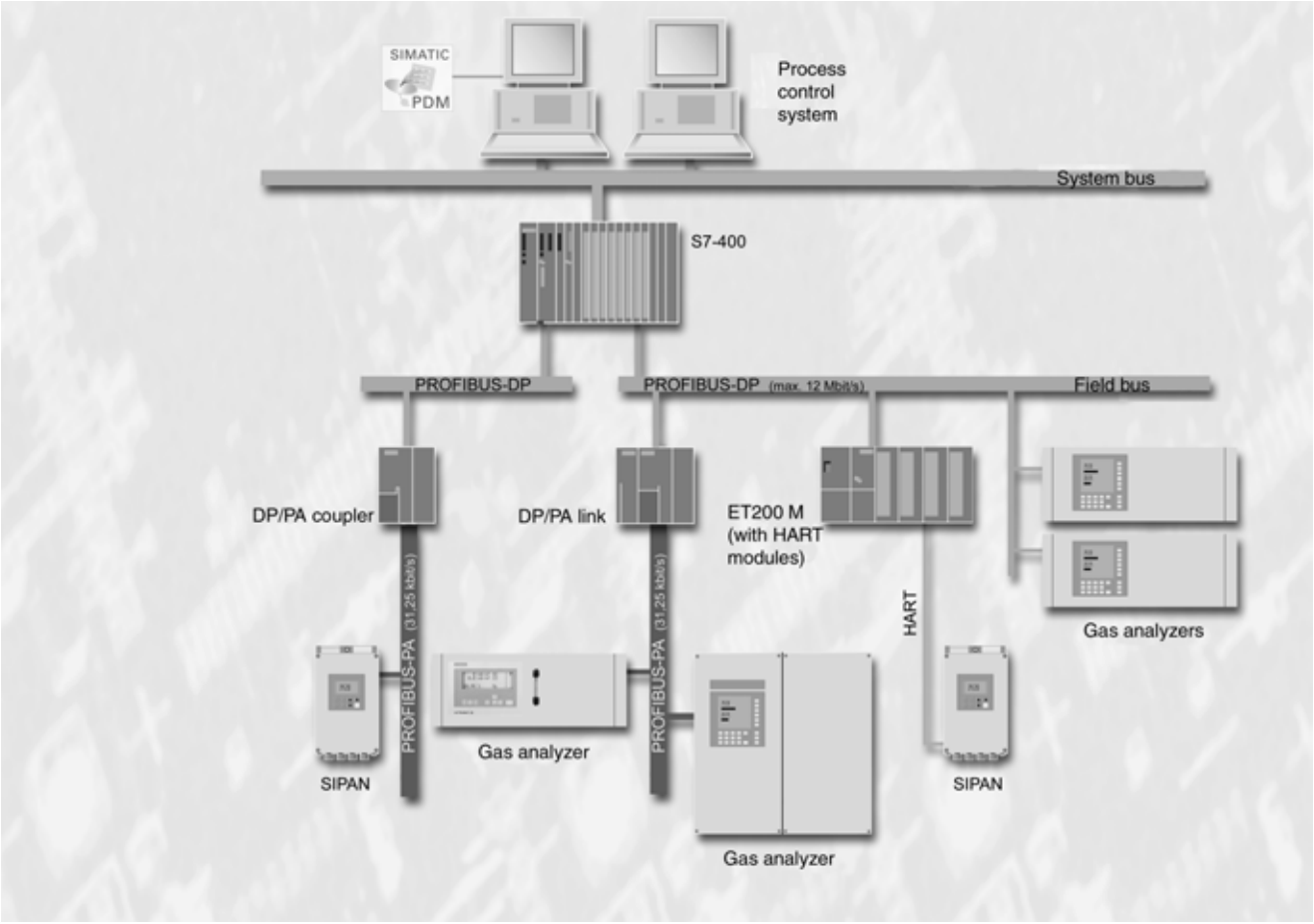


Fig. 4 Basic structure of a PROFIBUS system

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

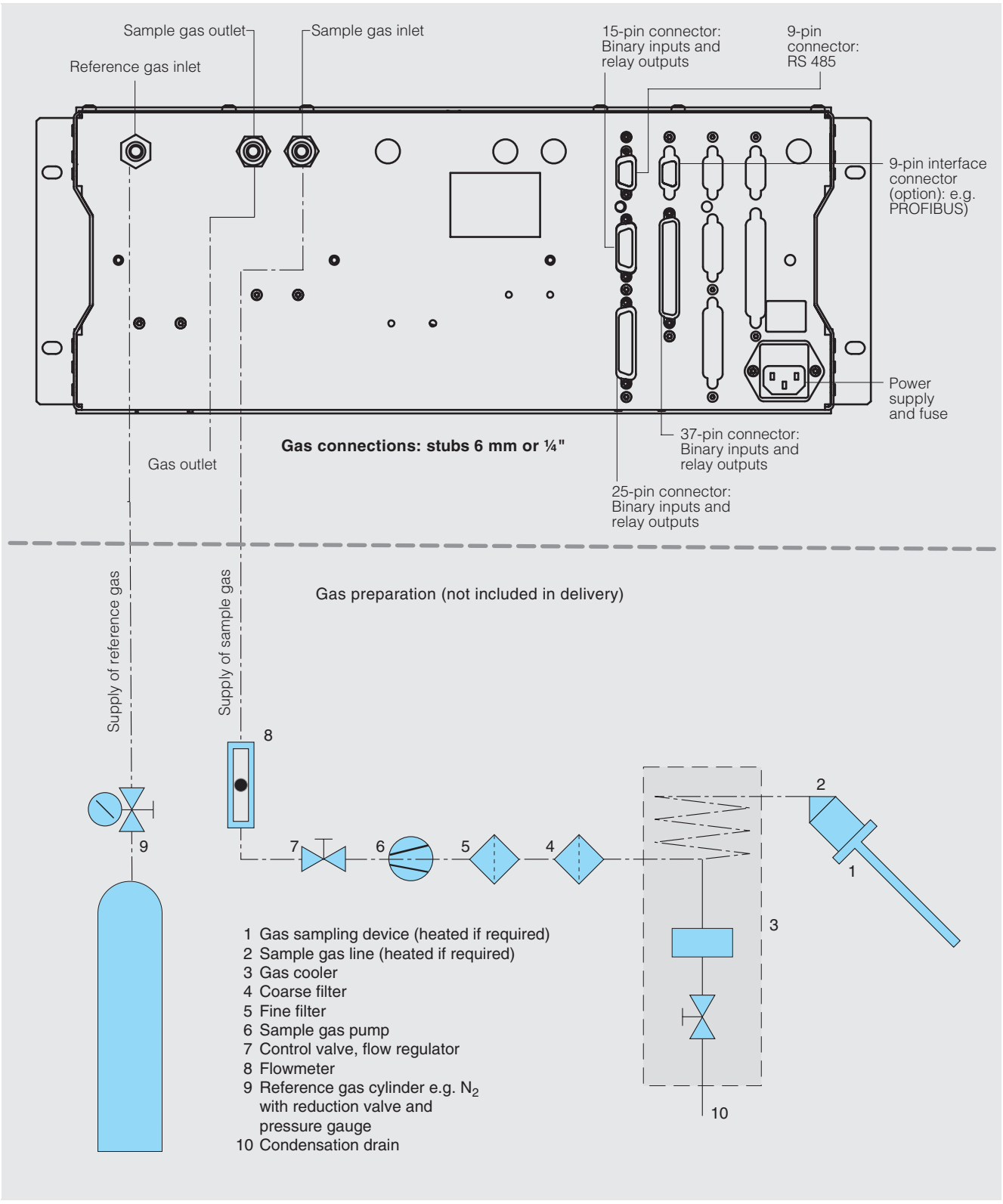


Fig. 5 OXYMAT 6, 19" unit, gas and electrical connections shown at top, typical installation shown at bottom

Gas paths

Internal gas paths, gas flow diagrams, basic layout

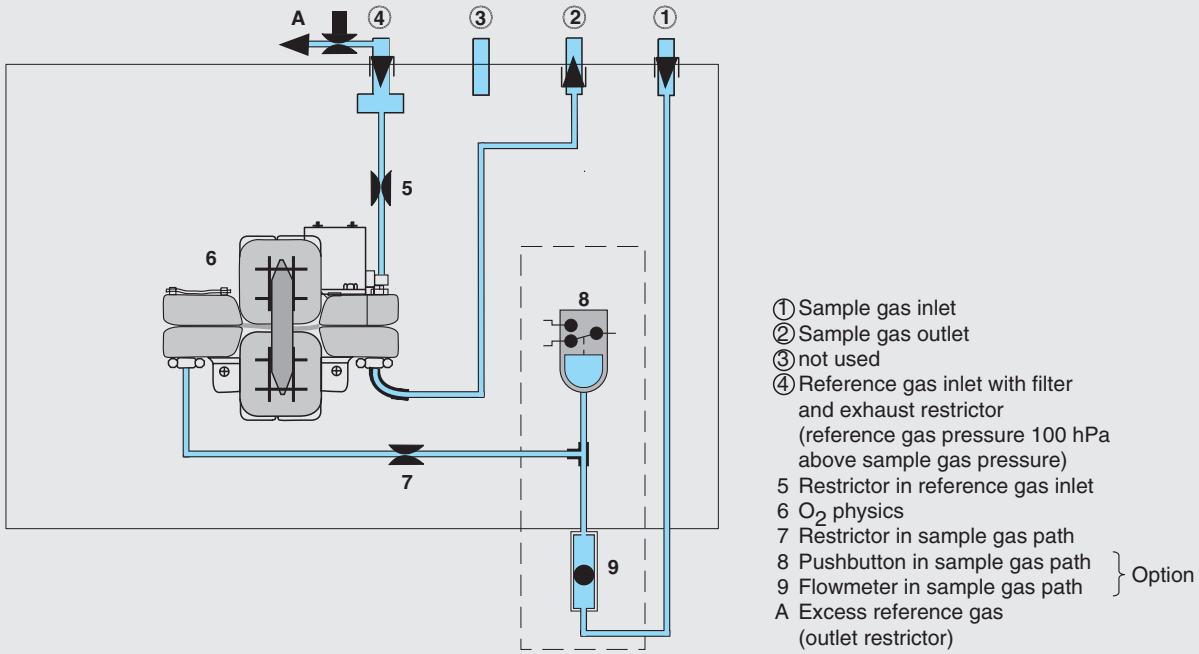


Fig. 6 Gas path OXYMAT 6E with reference gas connection 100 hPa

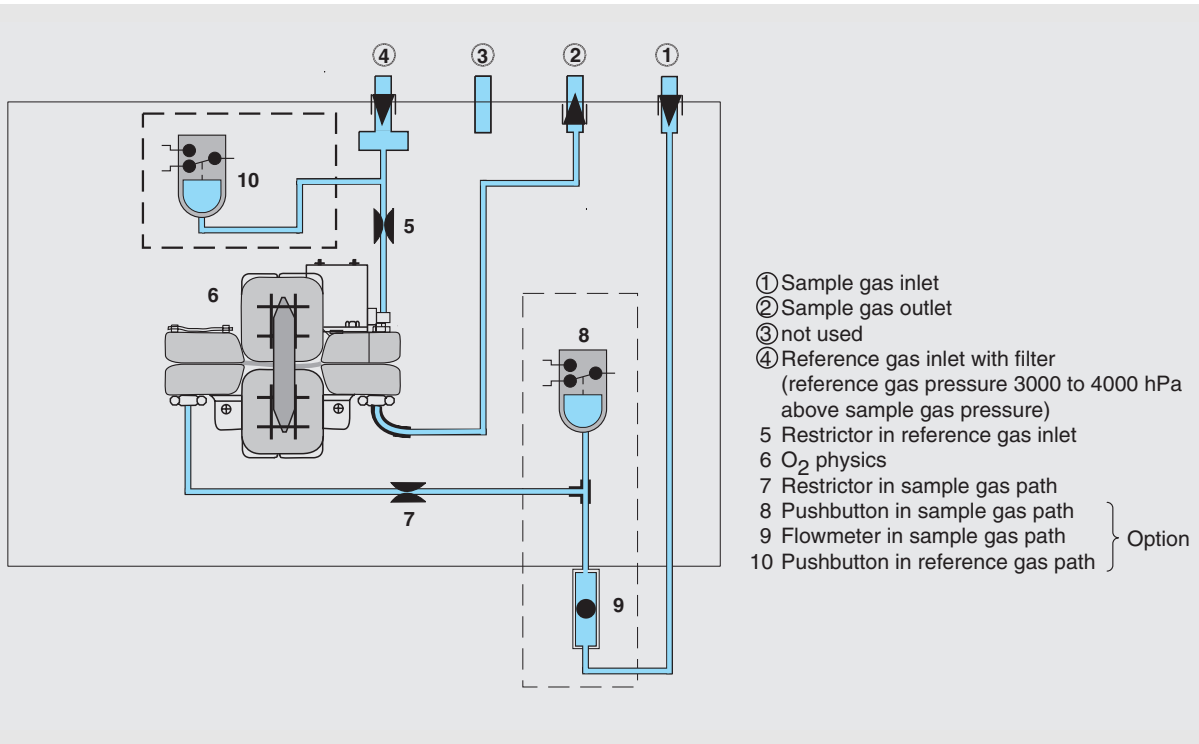


Fig. 7 Gas path OXYMAT 6E with reference gas connection 3000 to 4000 hPa

Pin assignment

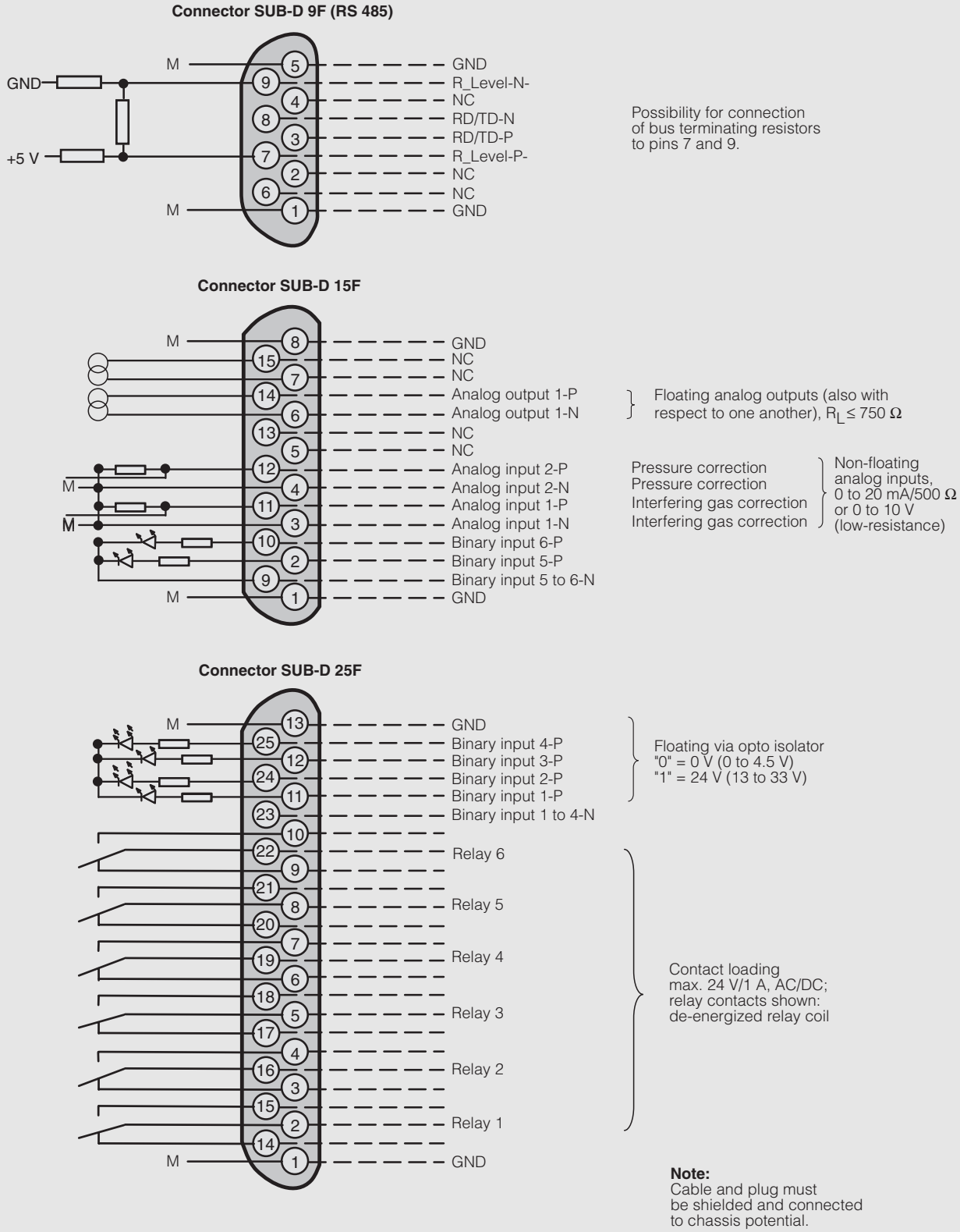


Fig. 8 OXYMAT 6, 19“ unit, pin assignment

Electrical connection

Pin assignment

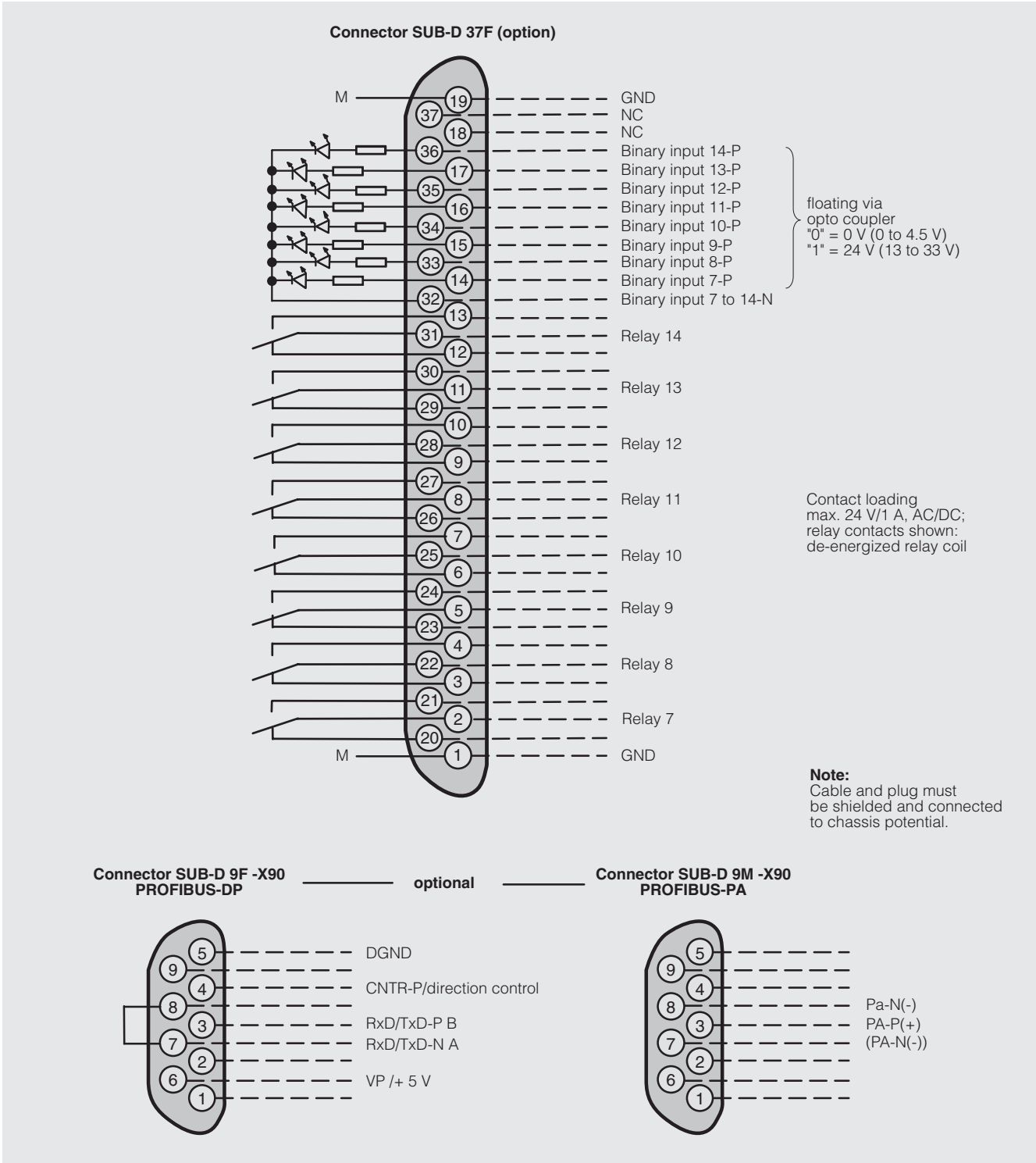


Fig. 9 OXYMAT 6, 19“ unit, pin assignment of Autocal board and PROFIBUS connectors

Technical data

General	
Measuring ranges	4, switchable internally and externally; autoranging is also possible
Smallest possible measuring span [1])	0.5 % v/v, 2 % v/v or 5 % v/v O_2
Largest possible measuring span	100 % v/v O_2 (25 % v/v O_2 for a pressure beyond 2000 hPa)
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
Position of use	Front panel vertical
Conformity	CE identification EN 50081-1, EN 50082-2
Design, enclosure	
Degree of protection	IP 20 according to EN 60529
Dimensions	see Fig. 10
Weight	Approx. 13 kg
Electrical characteristics	
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. 35 VA
EMC interference immunity (**E**lectro**M**agnetic **C**ompatibility)	According to standard requirements of NAMUR NE21 (08/98)
Electrical safety	According to EN 61010-1 overvoltage category III
Fuses	100...120 V: 1.0T/250 200...240 V: 0.63T/250
Gas inlet conditions	
Perm. sample gas pressure	
• for analyzers with pipes	500 to 3000 hPa absolute
• for analyzers with hoses	
- without pressure switch	500 to 1500 hPa absolute
- with pressure switch	500 to 1300 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 [2])
Time response	
Warm-up period	With ambient temperature < 30 min [3])
Response time (T_{90} 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

[1]) Referred to 1000 hPa absolute sample gas pressure, 0.5 l/min sample gas flow and 25 °C ambient temperature.
[2]) RH: relative humidity.
[3]) Maximum accuracy achieved after 2 hours.
[4]) Dew point must not be fallen below.
[5]) With air (100 hPa) as reference gas, a correction of the atmospheric pressure fluctuations is only possible when the sample gas is vented to ambient air.

Pressure correction range	
Pressure sensor	
• internal	500 to 2000 hPa absolute
• external	500 to 3000 hPa absolute
Measuring response [1])	
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 measuring span specified on rating plate
Measured-value drift	< 0.5 %/month of respective measuring span
Repeatability	< 1 %/month of respective measuring span
Linearity error	< 1 %/month of respective measuring span
Influencing variables [1])	
Ambient temperature	< 0.5 %/10 K referred to the smallest possible measuring span according to rating plate
Sample gas pressure [5])	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, page 5)
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 %
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
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 binary inputs and 8 relay outputs, also with PROFIBUS-PA or 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 [2]) as annual average, during storage and transport [4])

Dimensions

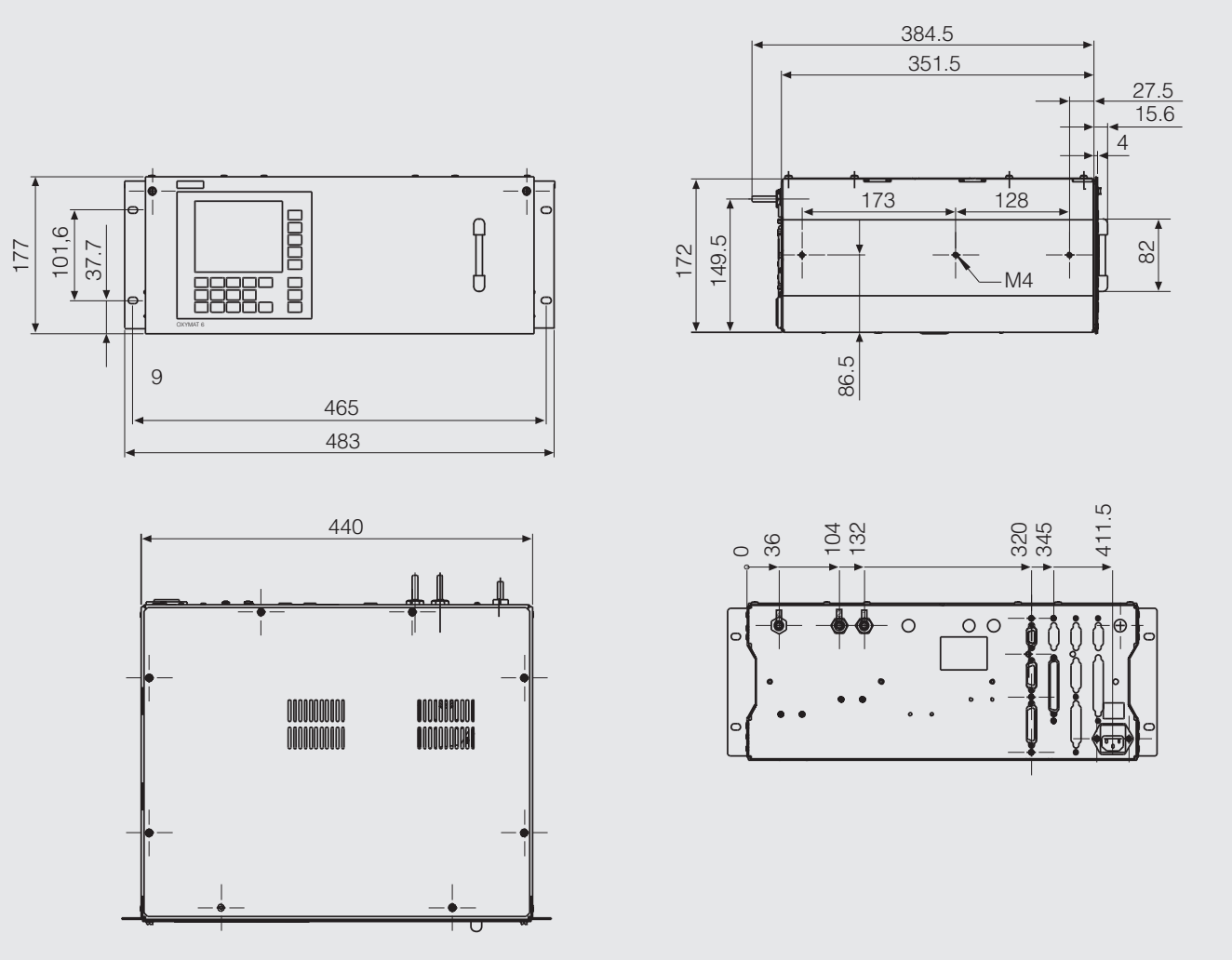


Fig. 10 OXYMAT 6, 19“ unit, dimensions in mm

Ordering data

Order No.

OXYMAT 6 gas analyzer
19“ unit for installation in cabinets

7MB2021- - ■■■■ **0** - ■■■■ **cannot be combined**

Gas connections for sample gas and reference gas	
Piping with outer diameter 6 mm	**0**
Piping with outer diameter ¼"	**1**
Smallest possible span O_2	
0.5 % Reference gas pressure 3000 hPa	**A**
0.5 % Reference gas pressure 100 hPa (external pump)	**B**
2 % Reference gas pressure 3000 hPa	**C**
2 % Reference gas pressure 100 hPa (external pump)	**D**
5 % Reference gas pressure 3000 hPa	**E**
5 % Reference gas pressure 100 hPa (external pump)	**F**
Sample cell	
• Without flow-type compensation branch	
- Made of stainless steel, type No. 1.4571	**A**
- Made of tantalum	**B**
• With flow-type compensation branch	
- Made of stainless steel, type No. 1.4571	**C**
- Made of tantalum	**D**
Internal gas paths	
Viton hose	**0**
Titanium piping	**1**
Pipe made of stainless steel	**2**
Power supply	
100 V to 120 V AC, 48 to 63 Hz	**0**
200 V to 240 V AC, 48 to 63 Hz	**1**
Monitoring (reference gas, sample gas)	
Without	**A**
Only reference gas	**B**
Reference gas and sample gas (with flowmeter and pressure switch for sample gas)	**C**
Sample gas only	**D**
Additional electronics	
Without	**A**
With additional 8 binary inputs and outputs	**B**
With serial interface for the automotive industry (AK)	**D**
Additional electronics with 8 binary inputs/outputs and PROFIBUS-PA interface	**E**
Additional electronics with 8 binary inputs/outputs and PROFIBUS-DP interface	**F**
Language	
German	**0**
English	**1**
French	**2**
Spanish	**3**
Italian	**4**

Ordering data

Ordering data (continued)

Further versions Please add „**-Z**" to Order No. and specify Order code	Order code
RS 485/RS 232 converter	**A11**
Slide rails (2 rails)	**A31**
Set of Torx tools, socket spanner	**A32**
Kalrez gaskets in sample gas path	**B01**
TAG labels (customer-defined inscriptions)	**B03**
Customer acceptance (in factory before delivery) [1])	**Y01**
Clean for O_2 service (specially cleaned gas path)	**Y02**
Drift recording [2])	**Y03**
Measuring range in plain text, if different from standard setting [3])	**Y11**
TÜV version according to 17.BImSch	**Y17**
Pressure attenuator (to reduce pump pressure pulses)	**Y20**
Retrofitting sets	
RS 485/Ethernet converter	**C79451-A3364-D61**
RS 485/RS 232 converter	**C79451-Z1589-U1**
Additional electronics with 8 binary inputs/outputs	**C79451-A3480-D511**
Additional electronics with 8 binary inputs/outputs and PROFIBUS-PA	**A5E00057307**
Additional electronics with 8 binary inputs/outputs and PROFIBUS-DP	**A5E00057312**

[1]) 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).

[2]) 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.

[3]) Standard setting: Measuring range 1: 0 to smallest possible span
Measuring range 2: 0 to 10 %
Measuring range 3: 0 to 25 %
Measuring range 4: 0 to 100 %.

Gas and electrical connections (unit underside)

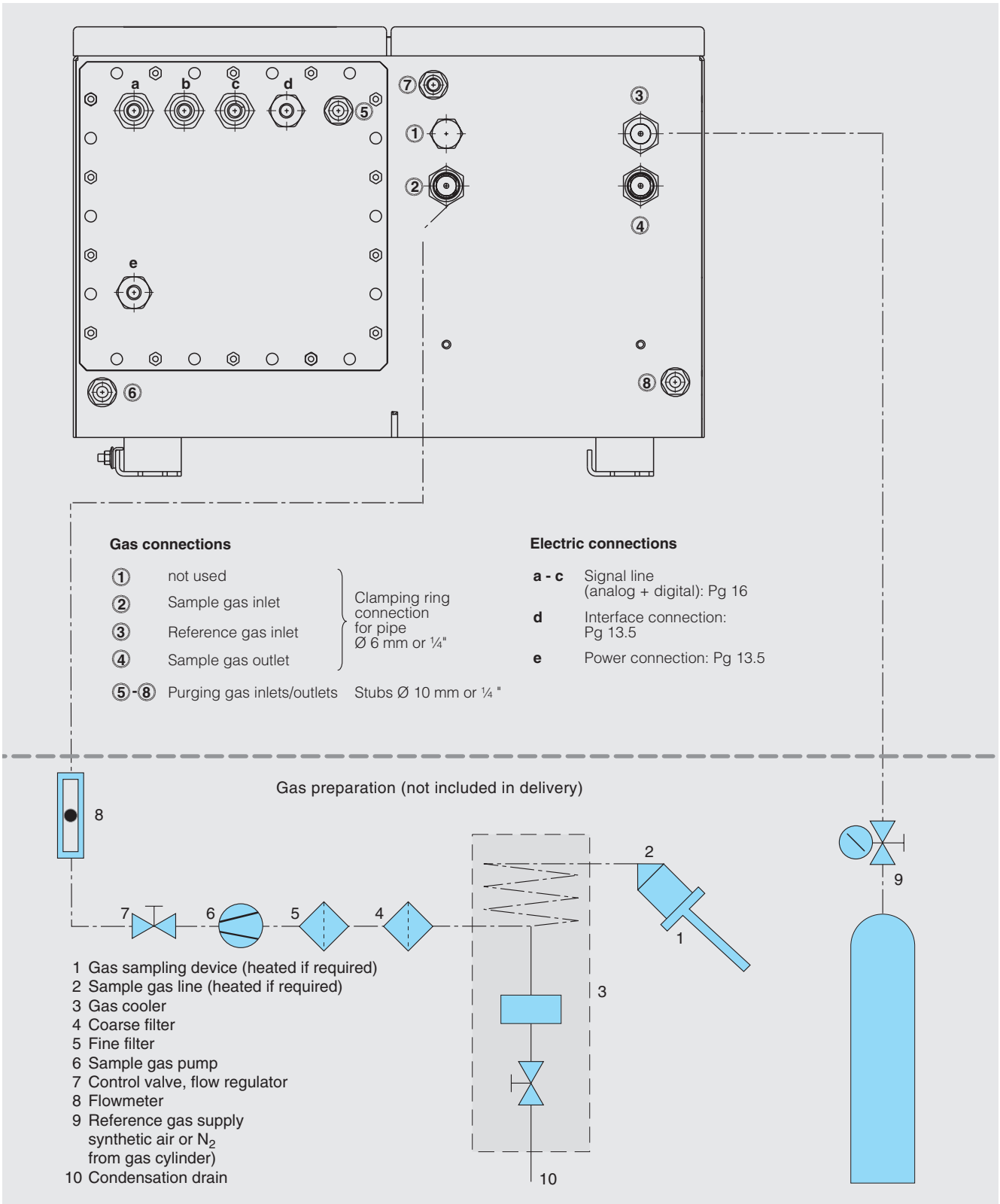
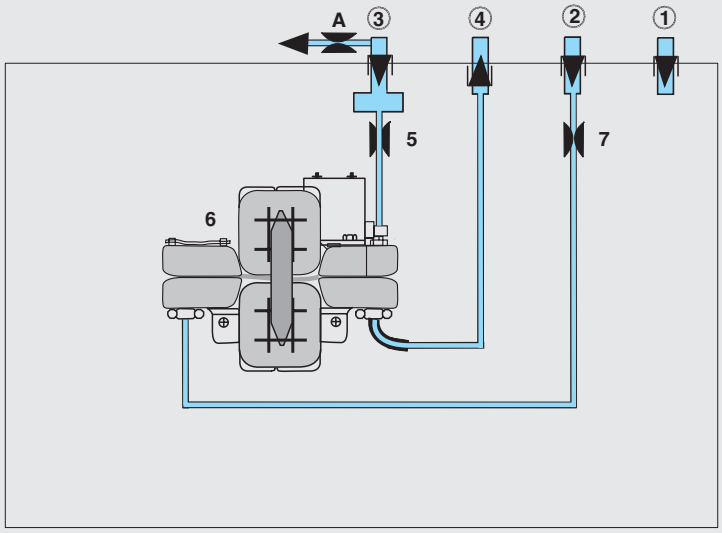


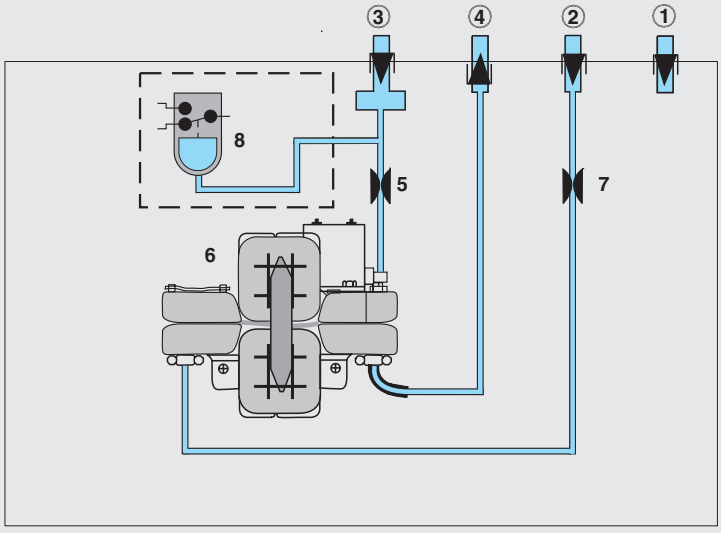
Fig. 11 OXYMAT 6, field unit, gas and electrical connections shown at top, external installation preparation (example) shown at bottom

Internal gas paths, gas flow diagrams, basic layout



①not used
②Sample gas inlet
③Reference gas inlet with filter and exhaust restrictor (reference gas pressure 100 hPa above sample gas pressure)
④Sample gas outlet
5 Restrictor in reference gas inlet
6 O_2 physics
7 Restrictor in sample gas path
A Excess reference gas (outlet restrictor)

Fig. 12 Gas path OXYMAT 6F with reference gas connection 100 hPa (e.g. external pump)



①not used
②Sample gas inlet
③Reference gas inlet with filter (reference gas pressure 3000 to 4000 hPa above sample gas pressure)
④Sample gas outlet
5 Restrictor in reference gas inlet
6 O_2 physics
7 Restrictor in sample gas path
8 Pressure switch in sample gas path (option)

Fig. 13 Gas path OXYMAT 6F with reference gas connection 3000 to 4000 hPa

Pin assignment

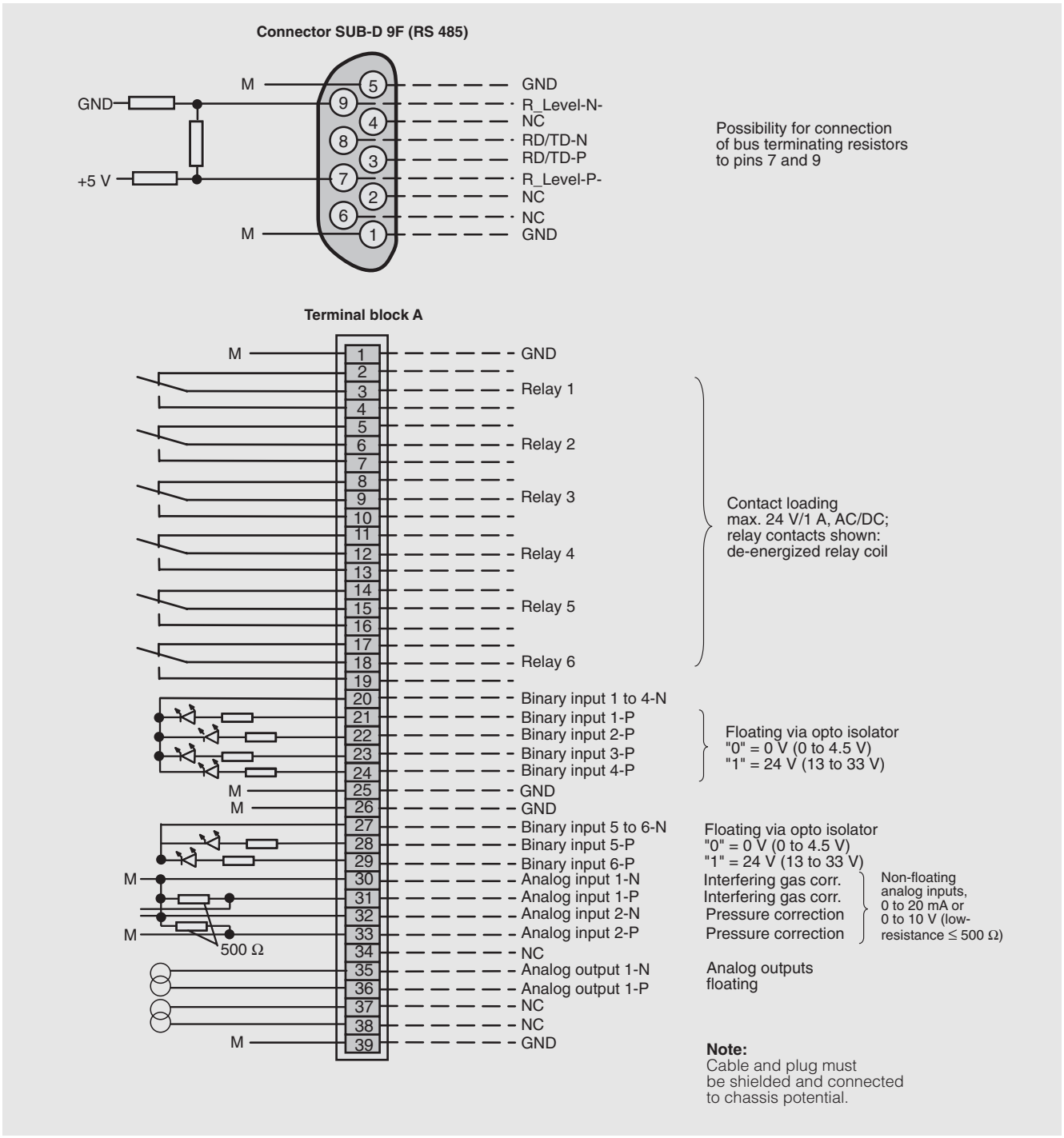


Fig. 14 OXYMAT 6, field unit, connector and terminal assignment

Pin assignment (continued)

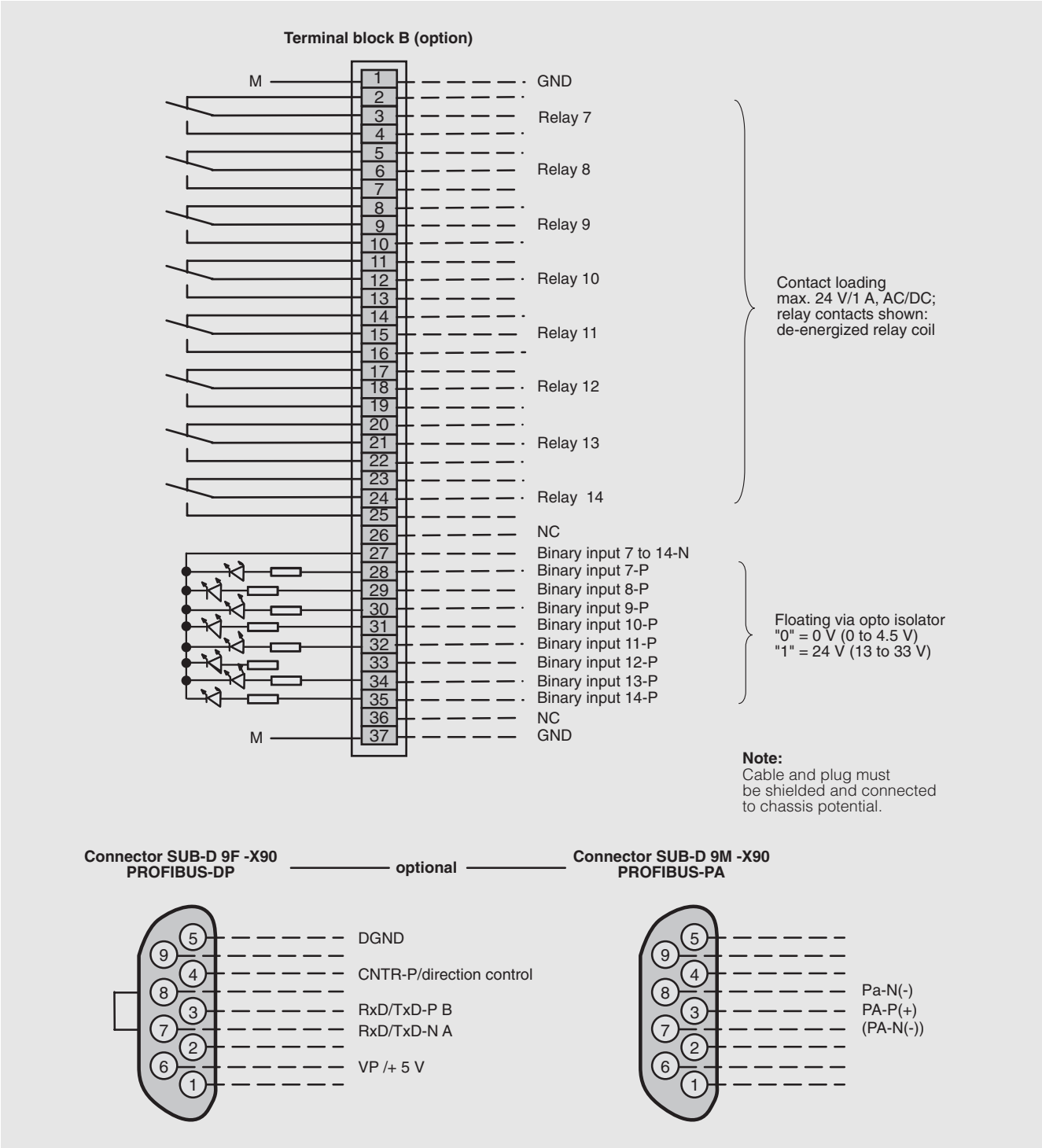


Fig. 15 OXYMAT 6, field unit, connector and terminal assignment of the Autocal board and PROFIBUS connectors

Technical data

General	
Measuring ranges	4, switchable internally and externally; autoranging is also possible
Smallest possible measuring span [1) 5)]	0.5 % v/v, 2 % v/v or 5 % v/v O_2
Largest possible measuring span	100 % v/v O_2 (25 % v/v O_2 for a pressure beyond 2000 hPa)
Measuring ranges with suppressed zero	Any zero point is possible between 0 to 100 % v/v as long as a suitable calibration gas is used (see also Table 1)
Position of use	Front panel vertical
Conformity	CE identification EN 50081-1, EN 50082-2
Design, enclosure	
Dimensions	see Fig. 16
Weight	Approx. 28 kg
Degree of protection	IP 65 according to EN 60529 restricted breathing to EN 50021
Electrical characteristics	
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. 35 VA; with heated unit approx. 330 VA
EMC interference immunity (**E**lectro**M**agnetic **C**ompatibility)	According to standard requirements of NAMUR NE21 (08/98)
Electrical safety • heated analyzers • non heated analyzers	According to EN 61010-1 overvoltage category II overvoltage category III
Fuses (unit without heater) • 100...120 V • 200...240 V	 F3: 1T/250 F4: 1T/250 F3: 0.63T/250 F4: 0.63T/250
Fuses (unit with heater) • 100...120 V • 200...240 V	 F1: 1T/250 F2: 4T/250 F3: 4T/250 F4: 4T/250 F1: 0.63T/250 F2: 2.5T/250 F3: 2.5T/250 F4: 2.5T/250
Gas inlet conditions	
Perm. sample gas pressure • with hoses • with pipes, Ex version - Leakage compensation - Continuous purging	 500 to 1500 hPa absolute 500 to 1160 hPa absolute 500 to 3000 hPa absolute
Purging gas flow • permanent • for short periods	 < 165 hPa above ambient max. 250 hPa above ambient
Sample gas flow	18 to 60 l/h (0.3 to 1 l/min)
Sample gas temperature	0 to 50 °C (without heater), or to 15 °C over temperature of analyzer section (with heater)
Sample gas humidity	< 90 % relative humidity
Time response	
Warm-up period	With ambient temperature < 30 min [2)]
Reading delay time	T_{90} < 1.5 s
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 s
Time for internal signal processing	< 1 s

Pressure correction range	
Pressure sensor • internal • external	 500 to 2000 hPa absolute 500 to 3000 hPa absolute
Measuring response [1)]	
Output signal fluctuation	< 0.75 % of smallest possible measuring range specified on rating plate with an electric 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 span
Repeatability	< 1 %/month of respective span
Linearity error	< 1 %/month of respective span
Influencing variables [2)]	
Ambient temperature	< 0.5%/10 K referred to the smallest possible measuring span according to rating plate
Sample gas pressure [4)]	With no 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
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; up to double error for analyzer with heater (< 2 %) [1)]
Power supply	< 0.1 % of output signal span with rated voltage ± 10 %
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
Analog inputs	2, designed for 0/2/4 to 20 mA, for external pressure sensor and correction of residual gas (correction of cross interferences)
Binary inputs	6, designed for 24 V, floating, freely-selectable e.g. for range switching
Serial interface	RS 485
Options	Autocal function with 8 binary inputs and 8 relay outputs, also with PROFIBUS-PA or PROFIBUS-DP
Ambient conditions	
Perm. ambient temperature	-30 to +70 °C during storage and transport, +5 to +45 °C during operation
Permissible humidity	< 90 % rel. humidity as annual average, during storage and transport [3)]

[1)] Referred to 1000 hPa absolute sample gas pressure, 0.5 l/min sample gas flow and 25 °C ambient temperature.
[2)] Maximum accuracy achieved after 2 hours.
[3)] Dew point must not be fallen below.
[4)] With air (100 hPa) as reference gas, a correction of the atmospheric pressure fluctuations is only possible when the sample gas is vented to ambient air.
[5)] Smallest possible span with a heated analyzer: 0.5 % (< 65 °C); 0.5 to 1 % (65 to 90 °C); 1 to 2 % (90 to 130 °C).

Dimensions

Dimensions

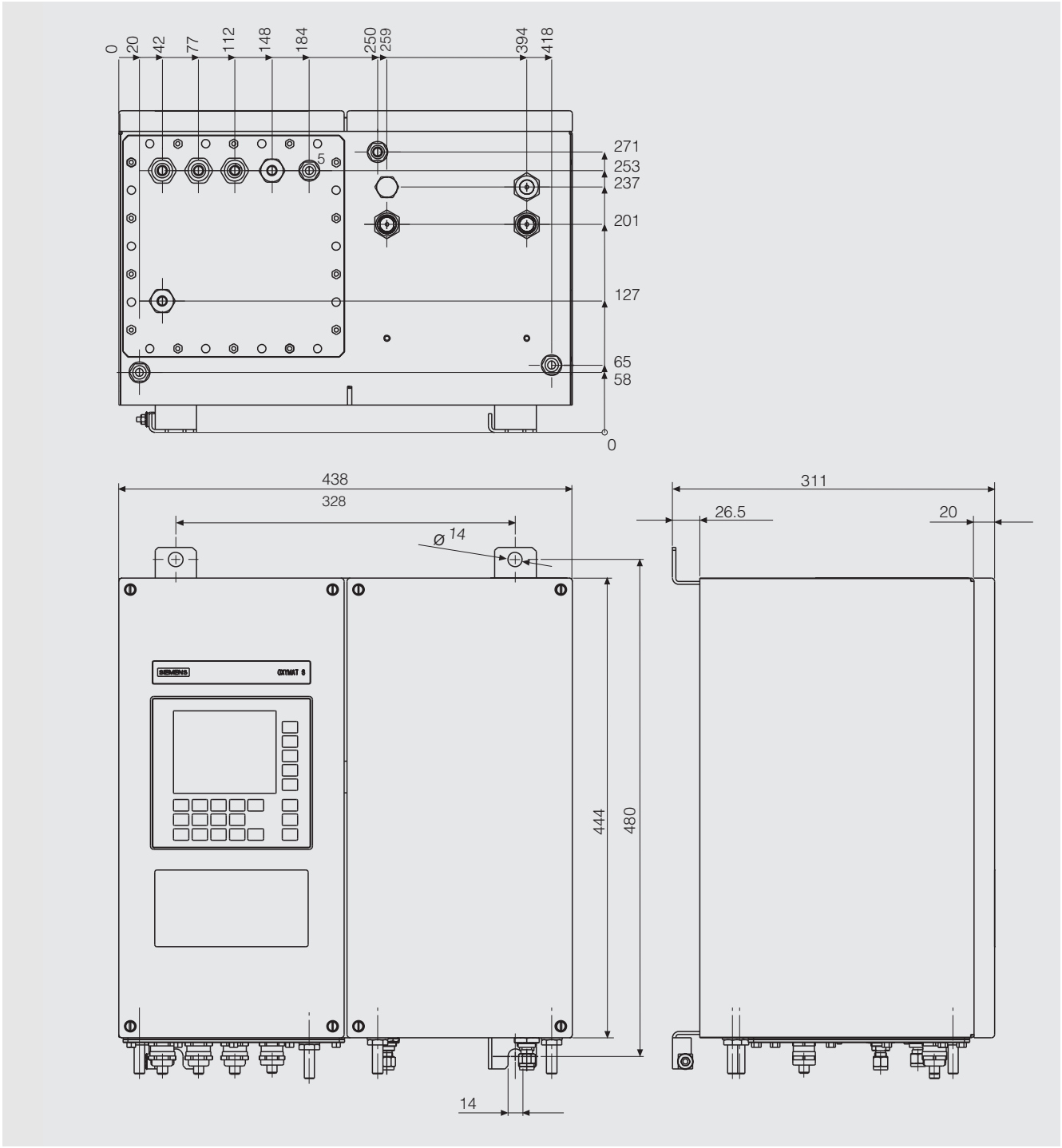


Fig. 16 OXYMAT 6, field unit, dimensions in mm

Ordering data

Order No.

OXYMAT 6 gas analyzer for field mounting

7MB2011- - 0 - **cannot be combined**

Gas connections for sample gas and reference gas	
• Clamping ring connection of stainless steel (type No. 1.4571)	
- Piping with outer diameter 6 mm	0
- Piping with outer diameter ¼"	1
• Clamping ring connection of titanium	
- Piping with outer diameter 6 mm	2
- Piping with outer diameter ¼"	3
• Piping and gas connections with Hastelloy C22: 7MB2011-0... + Order code D01 or D02	
Smallest possible span O_2	
0.5 % Reference gas pressure 3000 hPa	A
0.5 % Reference gas pressure 100 hPa (external pump)	B
2 % Reference gas pressure 3000 hPa	C
2 % Reference gas pressure 100 hPa (external pump)	D
5 % Reference gas pressure 3000 hPa	E
5 % Reference gas pressure 100 hPa (external pump)	F
Sample cell	
• Without flow-type compensation branch	
- Made of stainless steel, type No. 1.4571	A
- Made of tantalum	B
• With flow-type compensation branch	
- Made of stainless steel, type No. 1.4571	C
- Made of tantalum	D
Heating of internal gas paths and analyzer section	
Without	0
With (65 to 130 °C)	1
Power supply	
100 V to 120 V AC, 48 to 63 Hz	0
200 V to 240 V AC, 48 to 63 Hz	1
100 V to 120 V AC, 48 to 63 Hz, to ATEX 100, hazardous zone 1 [1]) (protection mode: leakage compensation)	2
200 V to 240 V AC, 48 to 63 Hz, to ATEX 100, hazardous zone 1 [1]) (protection mode: leakage compensation)	3
100 V to 120 V AC, 48 to 63 Hz, to ATEX 100, hazardous zone 1 [1]) (operating mode: continuous purging)	6
200 V to 240 V AC, 48 to 63 Hz, to ATEX 100, hazardous zone 1 [1]) (operating mode: continuous purging)	7
Reference gas monitoring	
Without	A
With	B
Additional electronics	
Without	A
With additional 8 binary inputs and 8 relay outputs	B
Additional electronics with 8 binary inputs/outputs and PROFIBUS-PA interface	E
Additional electronics with 8 binary inputs/outputs and PROFIBUS-DP interface	F
With additional electronics for connection to PROFIBUS-PA Ex i	G
Language (supplied documentation, software)	
German	0
English	1
French	2
Spanish	3
Italian	4

[1]) Only in relation with an approved purging unit.

Ordering data

Ordering data (continued)

Further versions Please add „**-Z**“ to Order No. and specify Order code	Order code
RS 485/RS 232 converter	**A11**
Set of Torx tools, socket spanner	**A32**
Kalrez gaskets in sample gas path	**B01**
TAG labels (customer-defined inscriptions)	**B03**
Gas connections and piping made of Hastelloy C22, external diameter 6 mm	**D01**
Gas connections and piping made of Hastelloy C22, external diameter ¼"	**D02**
Certificate: ATEX 100; II 3G EEx nR; restricted breathing (Ex zone 2) (only for gas compound < LEL)	**E11**
Certificate: ATEX 100; II 2/3G EEx nRP; (Ex zone 2) [4])	**E12**
Customer acceptance (in factory before delivery) [1])	**Y01**
Clean for O_2 service (specially cleaned gas path)	**Y02**
Drift recording [2])	**Y03**
Customer acceptance explosion-protected units incl. BARTEC purging enclosure	**Y04**
Measuring range in plain text, if different from standard setting [3])	**Y11**
Additional units for explosion-proof versions, ATEX category 2G (zone 1)	Order No.
Bartec EEx p control unit, 230 V, „Leakage compensation“	**7MB8000-2BA**
Bartec EEx p control unit, 115 V, „Leakage compensation“	**7MB8000-2BB**
Bartec EEx p control unit, 230 V, „Continuous purging“	**7MB8000-2CA**
Bartec EEx p control unit, 115 V, „Continuous purging“	**7MB8000-2CB**
Explosion-protected isolation amplifier	**7MB8000-3AA**
Explosion-protected isolating relay	**7MB8000-4AA**
Differential pressure switch for corrosive gases	**7MB8000-5AA**
Differential pressure switch for non-corrosive gases	**7MB8000-5AB**
Flame inhibitor made of stainless steel	**7MB8000-6AA**
Flame inhibitor made of Hastelloy	**7MB8000-6AB**
Supplementary units for Ex versions, ATEX category 3G (zone 2)	Order No.
Ex purging unit MiniPurge FM	**7MB8000-1AA**
Bartec EEx p control unit (for units with Order code E12)	**7MB8000-1BA**
Retrofitting sets	Order No.
RS 485/Ethernet converter	**C79451-A3364-D61**
RS 485/RS 232 converter	**C79451-Z1589-U1**
Autocal function with 8 binary inputs/outputs	**A5E00064223**
Autocal function with 8 binary inputs/outputs and PROFIBUS-PA	**A5E00057315**
Autocal function with 8 binary inputs/outputs and PROFIBUS-DP	**A5E00057318**
Autocal function with 8 binary inputs/outputs and PROFIBUS-PA Ex i (requires Firmware 4.1.10)	**A5E00057317**

[1]) 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).

[2]) 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.

[3]) Standard setting: Measuring range 1: 0 to smallest possible span
Measuring range 2: 0 to 10 %
Measuring range 3: 0 to 25 %
Measuring range 4: 0 to 100 %.

[4]) Only in relation with an approved purging unit.

Use of the OXYMAT 6 in hazardous areas

Suitability-tested field analyzers of series 6 must be used to measure gases in hazardous areas. The preferred explosion protection for these analyzers is the pressurized enclosure EEx p for zone 1 or the simplified pressurized enclosure EEx n P for zone 2. In addition, these analyzers must be connected to monitoring equipment which must also be suitability-tested for zone 1.

Exception: a pressurized enclosure is not required in zone 2 for the measurement of gases whose composition always remains below the lower explosion limit (LEL); in this case it is sufficient for the field housing to be gas damp-proof (type of protection EEx n R).

Following pre-purging of 5 minutes, the monitoring equipment ensures that no gas damp can enter the housing, and accumulation of the sample gas in the housing is prevented. The volume flow during the pre-purging phase is > 50 l/min. The protective gas is usually fed into the analyzer housing from a supply network via the monitoring equipment.

Ex zone 1

Two versions of pressurized enclosure EEx p complying with directive 94/9/EC are available for use in zone 1:

- *Pressurized enclosure with compensation of losses resulting from leaks*
  Only that volume of protective gas required to hold an overpressure of at least 50 Pa compared to the sample gas pressure *and* atmospheric pressure is fed into the housing.
  The maximum purging gas pressure is 165 hPa; this causes a max. permissible sample gas pressure of 160 hPa.
  Test certificate: PTB 00 ATEX 2022 X
  Analyzer identification: II 2 G EEx p [ia] ia IIC T4
- *Pressurized enclosure with continuous purging*
  Protective gas continuously flows through the housing with a volume flow of at least 1 l/min; furthermore, the flow results in an overpressure in the housing of at least 50 Pa compared to atmospheric pressure.
  The max. permissible purging gas pressure is 25 hPa. The max. permissible sample gas pressure is equivalent to the analyzer sample gas pressure.
  Test certificate: TÜV 01 ATEX 1708 X
  Analyzer identification: II 2 G EEx p [ia] ia IIC T4

The fundamental safety requirements are satisfied by compliance with the European standards EN 50014:1997, EN 50016:1995, EN 50020:1994 and EN 954:1996.

The EExp monitoring equipment is a stand-alone unit which is connected electrically and pneumatically to the analyzer. Ex protection is only provided when these two units are connected together.

Ex zone 2

Two versions complying with directive 94/9/EC are available for use in zone 2:

- *Ex protection resulting from gas damp-proof housing*
  The housing is sealed sufficiently such that gas damp cannot penetrate. With this type of protection, only sample gases may be connected which are below the LEL.
  Test certificate: TÜV 01 ATEX 1686 X
  Analyzer identification: II 3 G EEx n R II T6
- *Simplified pressurized enclosure with continuous purging*
  This type of protection must always be selected if flammable gases or gas mixtures are to be connected.
  Protective gas continuously flows through the housing with a volume flow of at least 1 l/min; furthermore, the flow results in an overpressure in the housing of at least 50 Pa compared to atmospheric pressure. Manually controlled pre-purging with the analyzer power supply switched off is sufficient for the simplified pressurized enclosure. It is not necessary for the analyzer to be switched off automatically should the protective gas fail.
  Test certificate: TÜV 01 ATEX 1697 X
  Analyzer identification: II 2/3 G EEx n P II T4

The fundamental safety requirements are satisfied by compliance with the European standards EN 50021:1999, EN 60079:1997, Sec. 13 and ZH 1/10, Sec. 1.

The EEx nP monitoring equipment is a stand-alone unit which is connected electrically and pneumatically to the analyzer. Ex protection is only provided when these two units are connected together.

FM Class 1 Div 2

The same applies here as to the simplified pressurized enclosure with continuous purging; the required Ex protection is only provided when appropriate equipment is connected.

Type of protection and flame inhibitor

It generally applies that selection of the protective gas and use of flame inhibitors depend on the type of sample gas:

- Connection of combustible gases above the LEL always require an inert gas (e.g. N_2) as the protective gas. Furthermore, the process must be protected by flame inhibitors if it cannot be excluded that explosive gas mixtures could occasionally be present in the sample gas path.
- Gas mixtures which could be frequently or permanently explosive must not be connected!
- With gases below the LEL, air can also be used as the protective gas, and flame inhibitors can be omitted.

Explosion-proof design

Type of gas / Zone	Sample gas non-flammable or permanently below the lower explosive limit (LEL)	Sample gas seldom above LEL, and only briefly in such cases	Sample gas occasionally above LEL
0	**Not possible**	**Not possible**	**Not possible**
1	•Analyzer in ATEX 100a - EEx p version •Metal pipe for gas path •EEx p control unit in mode "Leakage compensation"	•Analyzer in ATEX 100a - EEx p version •Metal pipe for gas path Sample gas pressure < 165 hPa, fail-safe: •EEx p control unit in mode "Leakage compensation" •Differential pressure switch (if the sample gas pressure is not controlled fail-safe) Sample gas pressure occasionally >165 hPa: •EEx p control unit in mode "Continuous purging"	•Analyzer in ATEX 100a - EEx p version •Metal pipe for gas path •Flame inhibitors in sample gas inlet and outlet Sample gas pressure < 165 hPa, fail-safe: •EEx p control unit in mode "Leakage compensation" •Differential pressure switch (if the sample gas pressure is not controlled fail-safe) Sample gas pressure occasionally > 165 hPa: •EEx p control unit in mode "Continuous purging"
2	•Analyzer in field housing with degree of protection EEx nR (restricted breathing enclosure) •Metal pipe for gas path	•Analyzer in field enclosure with degree of protection EEx nP •Metal pipe for gas path •Simplified pressurized enclosure with continuous purging with inert gas or EEx nRP (restricted breathing enclosure for electronics unit, and simplified pressurized enclosure for physical unit with continuous purging with inert gas)	•Analyzer in field enclosure with degree of protection EEx nP •Metal pipe for gas path •Flame inhibitors in sample gas inlet and outlet •Simplified pressurized enclosure with continuous purging with inert gas

Table 3 Explosion-proof configuration – Principle selection criteria

Additional units (Ex zone 1)

	Signal line guide		
	Ex 1 → Ex 1	**Ex 1 → Ex 2**	**Ex 1 → Ex free**
Ex-i isolation amplifier	required	conditional use (when energy recovery cannot be excluded)	conditional use (when energy recovery cannot be excluded)
Isolating relay	required	not required	not required
Pressure switch **• non-flammable gases** **• flammable gases**	•not required •required (when customer pressure is not controlled fail-safe)		
Flame inhibitors	see above		

Table 4 Additional units

Description „Leakage compensation“

The APEX 2003.SI/A2 control unit controls and monitors the prepurging phase and the operating phase of gas analyzers with „Containment Systems“.
The control unit redundantly monitors the set overpressure of the purging gas. When the overpressure decreases, it is corrected to the adjustable setpoint (max. purging gas pressure 165 hPa).

4 programmable relay outputs and 8 relay contacts are available to interrupt the data lines.

Additional function

Due to the connection of additional pressure sensors, the internal pressure of the enclosure is maintained at a pressure higher than the sample gas with a proportional valve. During the prepurging phase the purging gas flow is max. 4100 Nl/h with an internal enclosure pressure of 50 hPa.

4 programmable relay inputs and 8 relay contacts are available to separate the data lines.

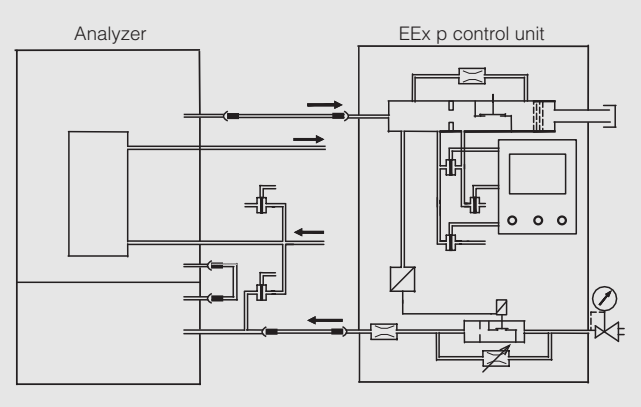


Fig. 17 BARTEC control unit, gas connection diagram

Technical data

Guidelines	EC EMC guideline 89/336/EEC EC low voltage RL 73/23/EWG Ex guideline 94/9EC
Design	Explosion-protected enclosure (EEx e) with viewing window in the cover
Enclosure material	glas-fiber reinforced polyester
Degree of protection	IP 65
Terminals	2.5 mm, stranded conductor
Pressure sensors	MIN A = 0 to 300 hPa MIN B = 0 to 300 hPa MAX = 0 to 300 hPa MAX 1 = 0 to 300 hPa DIFF A = 0 to 25 hPa DIFF B = 0 to 25 hPa
Prepurging time	0 to 99 min; 5 s delayed
Weight	11 kg
Electrical data	
Supply voltage	230 V AC (115 V AC)
Power consomption	21 W /230 V
NO contact	K2/3; max. 250 V, 5 A with cos φ = 1, K4/K5; supply voltage or floating, max. 250 V, 5 A with cos φ = 1
Communication	RS 485 interface
Temperature switching value (option)	0 to + 40 °C
Explosion-protected type	
Marking	EEx e d ib [ia p] IIC T4/T6
Certification	DMT 99 ATEX E 082
Ambient temperature	-20 to +40 °C

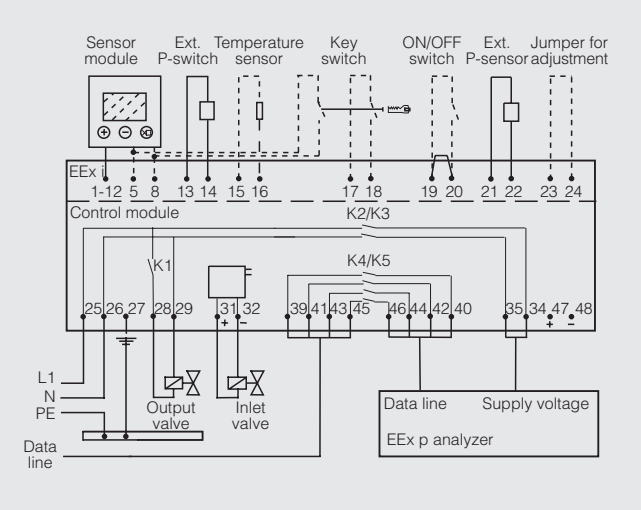


Fig. 18 BARTEC control unit, electric connection diagram

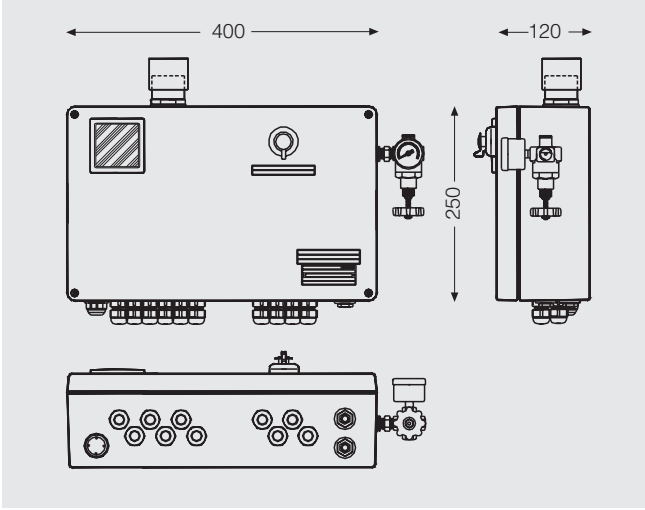


Fig. 19 BARTEC control unit, dimensions in mm

BARTEC EEx p control unit

Description „Continuous purging“

The APEX 2003.SI/A4 control unit controls and monitors the prepurging phase and the operating phase of gas analyzers with „Containment Systems“.
The control unit redundantly monitors a continuous current of protection gas through the connected analyzer and thereby dilutes the eventually appearing sample gas below the lower explosive limit (max. purging gas pressure 25 hPa).

4 programmable relay outputs and 8 relay contacts are available to interrupt the data lines.

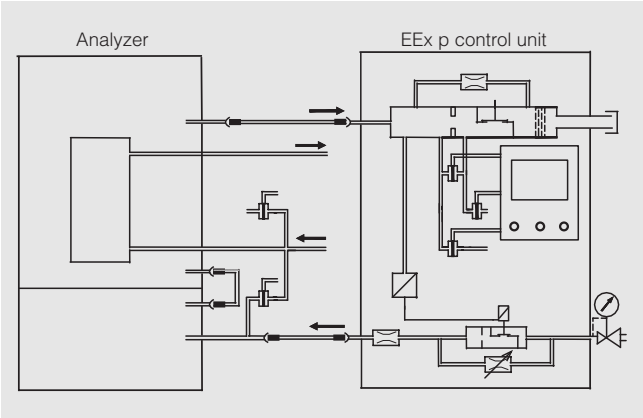


Fig. 20 BARTEC control unit, gas connection diagram

Technical data

Guidelines	EC EMC guideline 89/336/EEC EC low voltage RL 73/23/EWG Ex guideline 94/9EC
Design	Explosion-protected enclosure (EEx e) with viewing window in the cover
Enclosure material	glas-fiber reinforced polyester
Degree of protection	IP 65
Terminals	2.5 mm, stranded conductor
Pressure sensors	MIN A = 0 to 25 hPa MIN B = 0 to 25 hPa MAX = 0 to 25 hPa MAX 1 = 0 to 25 hPa DIFF A = 0 to 25 hPa DIFF B = 0 to 25 hPa
Prepurging time	0 to 99 min; 5 s delayed
Weight	10 kg
Electrical data	
Supply voltage	230 V AC (115 V AC)
Power consomption	14 W / 230 V
NO contact	K2/3; max. 250 V, 4 A with cos φ = 1, K4/K5; supply voltage or floating, max. 250 V, 5 A with cos φ = 1
Communication	RS 485 interface
Temperature switching value (option)	0 to + 40 °C
Explosion-protected type	
Marking	EEx e d ib [ia p] IIC T4/T6
Certification	DMT 99 ATEX E 082
Ambient temperature	-20 to +40 °C

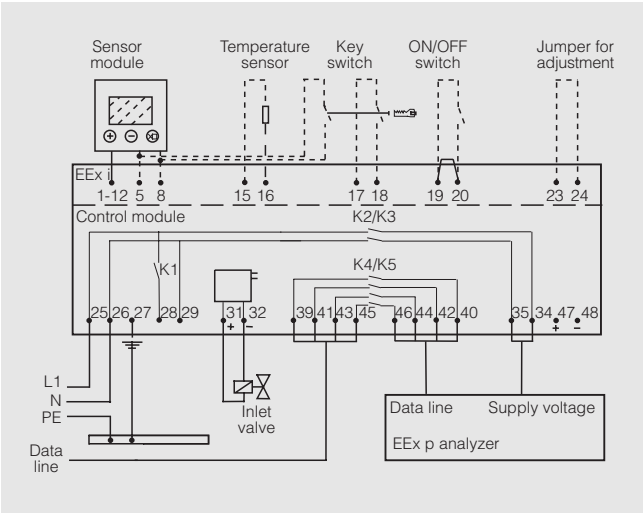


Fig. 21 BARTEC control unit, electric connection diagram

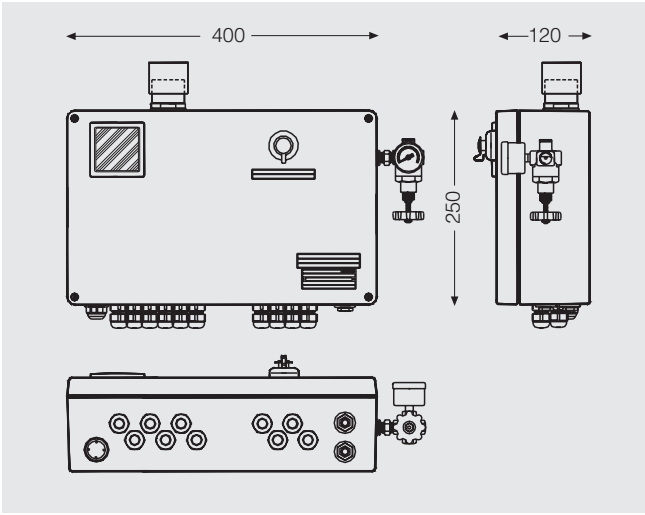


Fig. 22 BARTEC control unit, dimensions in mm

Description, for flammable gases

Compact EEx p control unit for the explosion protection of pressurized analyzers in zone 2, inclusive redundant surveillance of the purging gas pressure and flow during purging and operating phase.

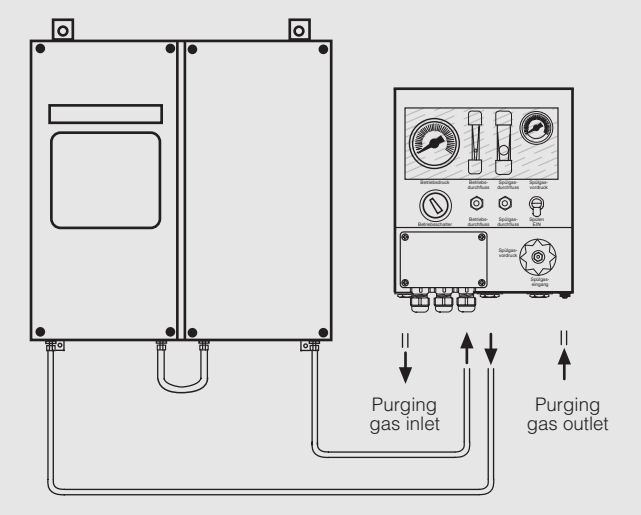


Fig. 23 BARTEC control unit, gas connection diagram

Technical data

Guidelines	EC EMC guideline 89/336/EEC RL 73/23/EWG Ex guideline 94/9EC
Design	Explosion-protected enclosure (EEx e) with viewing window in the cover
Enclosure material	stainless steel
Terminals	2.5 mm, stranded conductor
Pressures • Purging gas pressure • Purging gas flow • Operating pressure • Operating flow	 0.2 MPa to 1,0 MPa (0.2 MPa) 0 to 3.5 m^3/h (2,0 m^3/h) 0 to 60 hPa (8 hPa) 0 to 1.5 l/min (1 l/min)
Weight	4.3 kg
Electrical data	
Line voltage	0...230 V AC, 0...30 V DC
Switching capacity	max. 6 A with cos φ = 1 / max. AC 253 V max. 1.5 A with cos φ = 0,6 / max. AC 253 V max. 2 A with L/R ~ 0 ms / max. DC 30 V
Explosion-protected type	
Marking	EEx n A C R (P) II C T6
Certification	TÜV 01 ATEX 1748 X
Ambient temperature	-20 to +60 °C

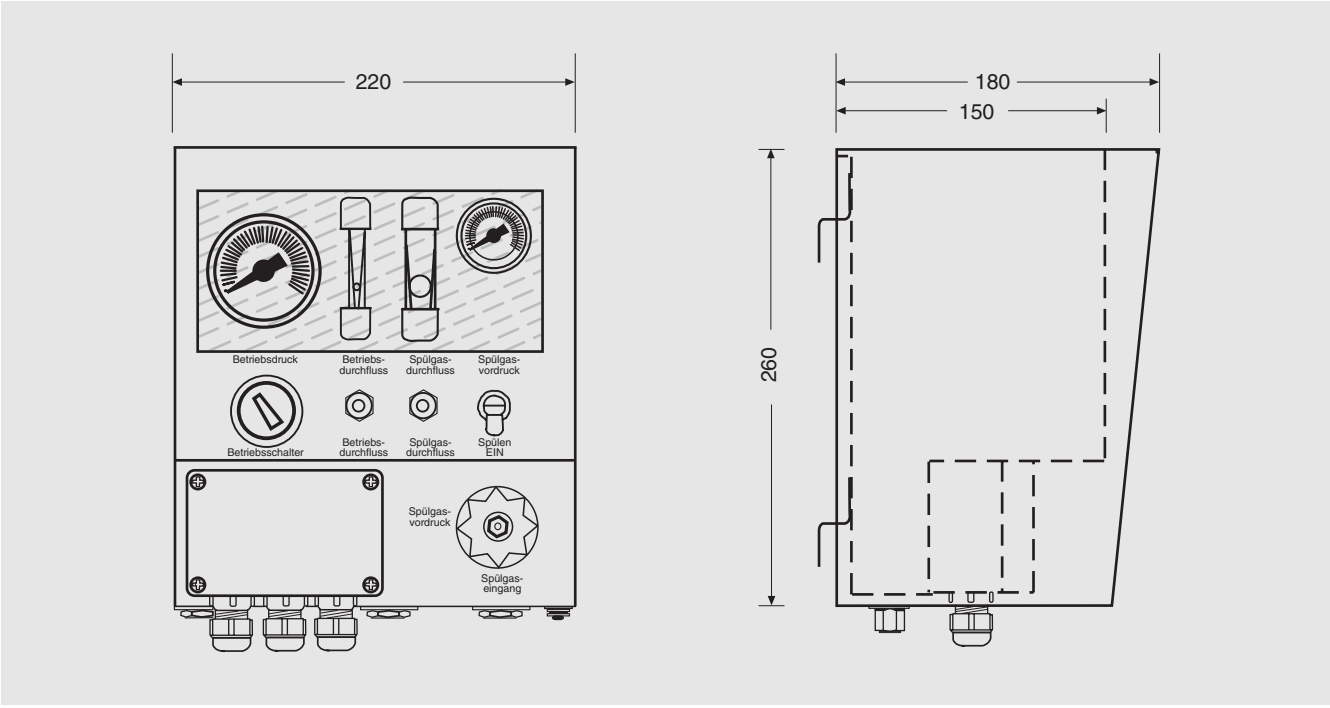


Fig. 24 BARTEC control unit, dimensions in mm

Ex purging unit MiniPurge FM

Description

The Ex purging unit MiniPurge FM is used to monitor the pressure during continuous purging of an analyzer with purging gas or inert gas. If the pressure falls below the set value, an optical display is triggered and the relay is activated. This monitoring unit is driven by the purging gas pressure and therefore does not require an additional power supply.

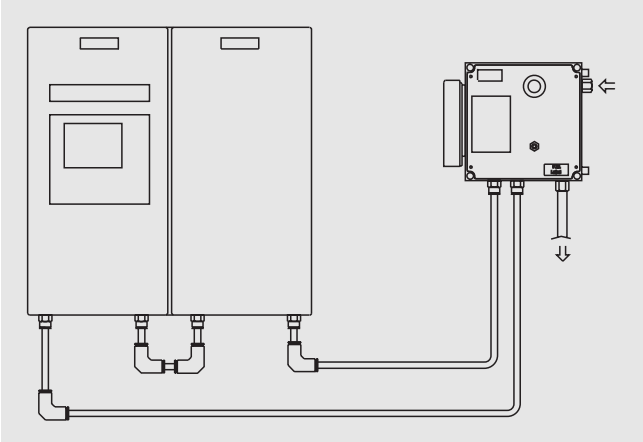


Fig. 25 MiniPurge, gas connections

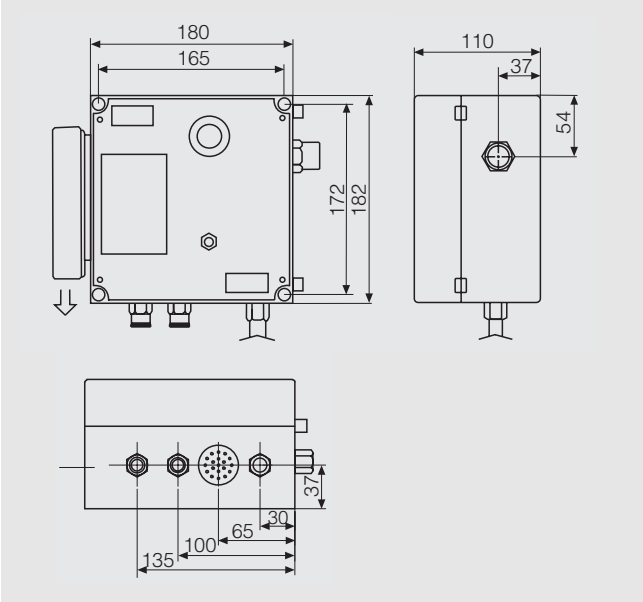


Fig. 26 MiniPurge, dimensions in mm

Technical data

Classification	Class 1 Division 2
Enclosure dimensions (in mm)	444 x 438 x 275
Enclosure volume (l) for purging	Approx. 50 l
Enclosure pressure (normal)	1 hPa
FM certificate	Certificate of compliance 1X8A4.AE / 0B3A3.AE
Reaction upon failure of pressure	Opening of switching contact, and alarm via signal indicator (red display)
System type	MiniPurge complete system
Operating mode	Continuous purging
Type of enclosure	Strengthened polycarbonate
Enclosure surface	RAL 7035 gray with transparent cover
Pressure supply	Dry, oil-free air or inert gas with regulated pressure of approx. 30 psi/2000 hPa at inlet of MiniPurge
Supply connections	Pressure via ¼ BSPP connection, pressure hose at least ½" or 12 mm
Display (signal indicator)	Pneumatically driven color signal: green/red
Switching contact	Via SPCO switch approved for Class 1 Division 2
Settings	Lower operating limit 0.5 hPa set relative to purging gas flow of 1 to 2 l/min
Prepurging time	Is defined by operator, and controlled manually
Housing pressure limitation	By means of stainless steel RLV 25 output valve with integral flame arrestor; opens at 10 hPa ± 10 %

Proposition of spare parts for a 2-year service (standard units, without heater)

Ordering data

Description	Qty	Order No.
Analyzer section		
Measuring cell		
• SS, type No. 1.4571, without flow-type compensation branch	1	**C79451-A3277-B35**
• Tantalum, without flow-type compensation branch	1	**C79451-A3277-B36**
• SS, type No. 1.4571, with flow-type compensation branch	1	**C79451-A3277-B37**
• Tantalum, with flow-type compensation branch	1	**C79451-A3277-B38**
• O-ring	4	**C79121-Z100-A32**
• O-ring	4	**C71121-Z100-A159**
Measuring head for neasuring cell		
• without flow-type compensation branch	1	**C79451-A3460-B25**
• with flow-type compensation branch	1	**C79451-A3460-B26**
Measuring gas path		
• Restrictor made of stainless steel, type No. 1.4571, gas path hose	2	**C79451-A3480-C10**
• Restrictor made of titanium, gas path pipe	2	**C79451-A3480-C37**
Reference gas path		
• Capillary tube, 3000 hPa, tube and screw connection parts	1	**C79451-A3480-D518**
• Capillary tube, 100 hPa, tube and screw connection parts	1	**C79451-A3480-D519**
Electronics		
Fuse		
• 0.63 A / 250 V (220-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 (19“ unit only)	1	**C79165-A3042-B5**

Catalog extract	Order No.
OXYMAT 6 Gasanalysengeräte für die Bestimmung von Sauerstoff (German)	**E86060-K3510-B101-A3**
OXYMAT 6 Gas Analyzers for the Determination of Oxygen (English)	**E86060-K3510-B101-A3-7600**
OXYMAT 6 Analyseurs de gaz pour la détermination d'oxygène (French)	**E86060-K3510-B101-A3-7700**

Manual	Order No.
ULTRAMAT 6 / OXYMAT 6 Gasanalysengerät für IR-absorbierende Gase und Sauerstoff (German)	**C79000-G5200-C143**
ULTRAMAT 6 / OXYMAT 6 Gas Analyzers for IR-absorbing Gases and Oxygen (English)	**C79000-G5276-C143**
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**
ULTRAMAT 6 / OXYMAT 6 Analizadores para gases absorbentes de infrarrojo y oxígeno (Spanish)	**C79000-G5278-C143**

Notes

Conditions of sale and delivery
Export regulations, contact addresses

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