ULTRAMAT 23
NDIR gas analyzers,
one to three IR channels
and oxygen

General

Overview

The ULTRAMAT 23 gas analyzer can measure up to 4 gas components at once: A maximum of three infrared sensitive gases such as CO, CO_2, NO, SO_2, CH_4 or R22 (freon, $CHClF_2$) plus O_2 with an electrochemical oxygen measuring cell.

ULTRAMAT 23 basic versions for:

- 1 infrared gas component with/without oxygen measurement
- 2 infrared gas components with/without oxygen measurement
- 3 infrared gas components with/without oxygen measurement.

ULTRAMAT 23

Benefits

- AUTOCAL with ambient air
  (depends on measured component)
  High efficiency so no calibration gas and accessories required
- High selectivity by multiple layer detectors, small cross sensitivity e.g. to water vapor
- Easy to clean sample cells,
  reduced maintenance cost
- Menu-assisted operation in plain text
  operation control without manual, high operational safety
- Service information and log book,
  preventive maintenance; help for service and maintenance personnel, cost reduction
- Coded operator level against unauthorized access,
  increased safety
- Open interface architecture (RS 485, RS 232; PROFIBUS, SIPROM GA);
  simplified process integration, remote control.

Application

Application areas

- Optimization of small firing systems
- Monitoring of exhaust gas concentration from firing systems with all types of fuel (oil, gas and coal) as well as operational measurements with thermal incineration plants
- Room air monitoring
- Monitoring of air in fruit stores, greenhouses, fermenting cellars and warehouses
- Monitoring of process control functions
- Atmosphere monitoring during heat treatment of steel
- For use in non-potentially explosive atmospheres.

Further applications

- Environmental protection
- Chemical plants
- Cement industry.

Special applications

The ULTRAMAT 23 with 2 IR components without pump is also available with two separate gas paths. This allows the measurement of two measuring points as used e.g. for the NO_x measurement before and after the NO_x converter.

The ULTRAMAT 23 gas analyzer can be used in emission measuring systems and for process and safety monitoring.

TÜV-approved versions of the ULTRAMAT 23 are available for measurement of CO, NO, SO_2 and O_2 according to 13. BImSchV and TA Luft.

Smallest TÜV-approved and permitted measuring ranges:

- 1- and 2-component analyzer
  - CO: 0 to 150 mg/m³
  - NO: 0 to 250 mg/m³
  - SO_2: 0 to 400 mgm³
- 3-component analyzer
  - CO: 0 to 250 mg/m³
  - NO: 0 to 400 mg/m³
  - SO_2: 0 to 400 mg/m³

All larger measuring ranges are also permitted.

Design

- 19" unit with 4 HU for installation
  - in swing frame
  - in cabinets, with or without slide rails
- Flowmeter for sample gas on front panel;
  Option: integrated sample gas pump (standard for bench-top version)
- Gas connections for sample gas input and output as well as combustion gas and combustion air, pipe diameter 6 mm or ¼"
- Gas and electrical connections at the rear (portable version: sample gas inlet at front).

Display and control panel

- Operation according to NAMUR recommendation
- Simple, fast programming and commissioning of analyzer
- Large, backlit LCD for measured values
- Menu-based inputs for programming, test functions and calibration
- Washable membrane keypad

- User help in plain text
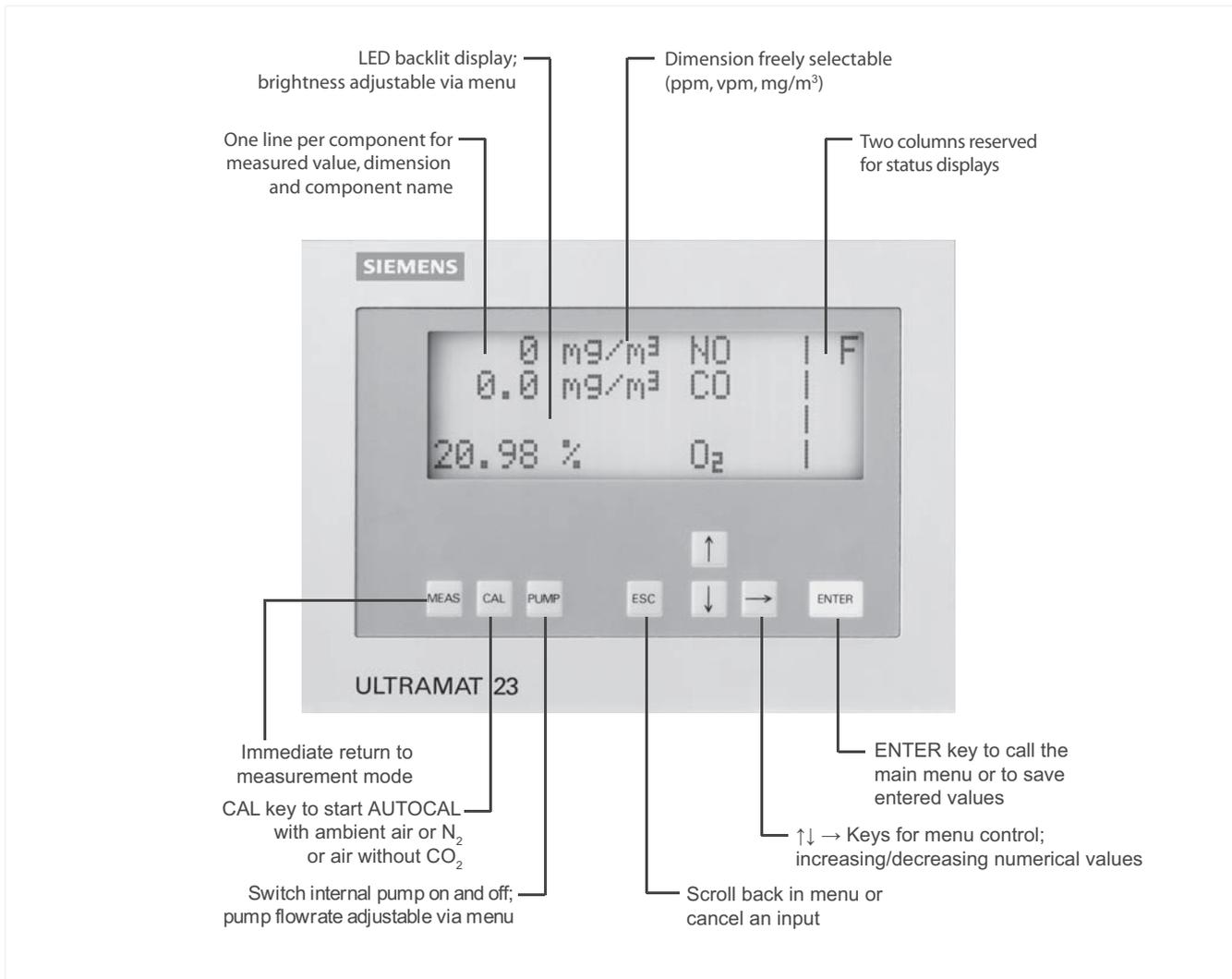- Multi-language operation software.

Inputs and outputs

- Three binary inputs for sample gas pump On/Off, triggering of AUTOCAL and synchronization of several devices
- Eight relay outputs can be freely configured for fault, maintenance request, maintenance switch, limits, range identification and external solenoid valves
- Eight additional relay outputs as an option
- Eight additional binary inputs as an option
- Electrically isolated analog outputs.

Communication

- RS 485 present in basic unit (connection from the rear).

Options

- Converter to RS 232
- Converter to TCP/IP Ethernet
- Incorporation in networks via PROFIBUS DP/PA interface
- SIPROM GA software as service and maintenance tool.

LED backlit display; brightness adjustable via menu

One line per component for measured value, dimension and component name

Dimension freely selectable (ppm, vpm, mg/m^3)

Two columns reserved for status displays

Immediate return to measurement mode

CAL key to start AUTOCAL with ambient air or N$_2$ or air without CO$_2$

Switch internal pump on and off; pump flowrate adjustable via menu

Scroll back in menu or cancel an input

↑↓ → Keys for menu control; increasing/decreasing numerical values

ENTER key to call the main menu or to save entered values

ULTRAMAT 23, membrane keypad and graphic display

General

Executions of the wetted parts

Gas path		19" unit	Desktop unit
With hoses	Condensation trap/gas inlet	-	PA (polyamide)
	Condensation trap	-	PE (polyethylene)
	Gas nipples 6 mm	PA (polyamide)	PA (polyamide)
	Gas nipples ¼"	SS, type No. 1.4571	SS, type No. 1.4571
	Hose	FPM (Viton)	FPM (Viton)
	Pressure switch	FPM (Viton) + PA6-3-T (Trogamide)	FPM (Viton) + PA6-3-T (Trogamide)
	Flowmeter	PDM/Duran glass/X10CrNiTi1810	PDM/Duran glass/X10CrNiTi1810
	Elbows/T-pieces	PA6	PA6
	Internal pump	PVDF/PTFE/EPDM/FPM/Trolene/ SS, type No. 1.4571	PVDF/PTFE/EPDM/FPM/Trolene/ SS, type No. 1.4571
	Solenoid valve	FPM70/Ultramide/1.4310/1.4305	FPM70/Ultramide/1.4310/1.4305
	Safety reservoir	PA66/NBR/PA6	PA66/NBR/PA6
	Sample cell		
	• Body	Aluminium	Aluminium
	• Cell lining	Aluminium	Aluminium
	• Stub	SS, type No. 1.4571	SS, type No. 1.4571
	• Window	CaF2	CaF2
	• Adhesive	E353	E353
	• O-ring	FPM (Viton)	FPM (Viton)
With pipes	Gas nipples (6 mm / ¼ ")	SS, type No. 1.4571	
	Pipes	SS, type No. 1.4571	
	Sample cell		
	• Body	Aluminium	
	• Cell lining	Aluminium	
	• Stub	SS, type No. 1.4571	
	• Window	CaF2	
	• Adhesive	E353	
	• O-ring	FPM (Viton)	

ULTRAMAT 23 also available as bench-top unit:
- 2 handles on top cover
- 4 rubber feet for setting up
- No mounting frame

80-digit display
(4 lines/20 characters)

Dust-tight and washable
membrane keypad

Also available
with slide rails

Flowmeter in conjunction with
pressure switch for monitoring
the sample gas flow

Gas and electrical
connections on rear
panel (portable version
simple gas at front)

Control keys
for menus

Optional O_2 sensor,
removable from front

3 function keys for
measurement, pump On/Off
and AUTOCAL

ULTRAMAT 23, design

General

Gas path

Key to gas path figures

1	Inlet fo sample gas/ calibration gas	9	Safety fine filter
2	Gas outlet	10	Solenoid valve
3	Inlet for AUTOCAL/zero gas or	11	Sample gas pump
	Inlet for sample gas/ adjusting gas (channel 2)	12	Pressure switch
4	Gas outlet (channel 2)	13	Flowmeter
5	Enclosure flushing	14	Infrared measuring cell
6	Atmospheric pressure sensor	15	Safety condensate trap
7	Inlet/chopper compartment flushing	16	Oxygen measuring cell
8	Condensation trap with filter		
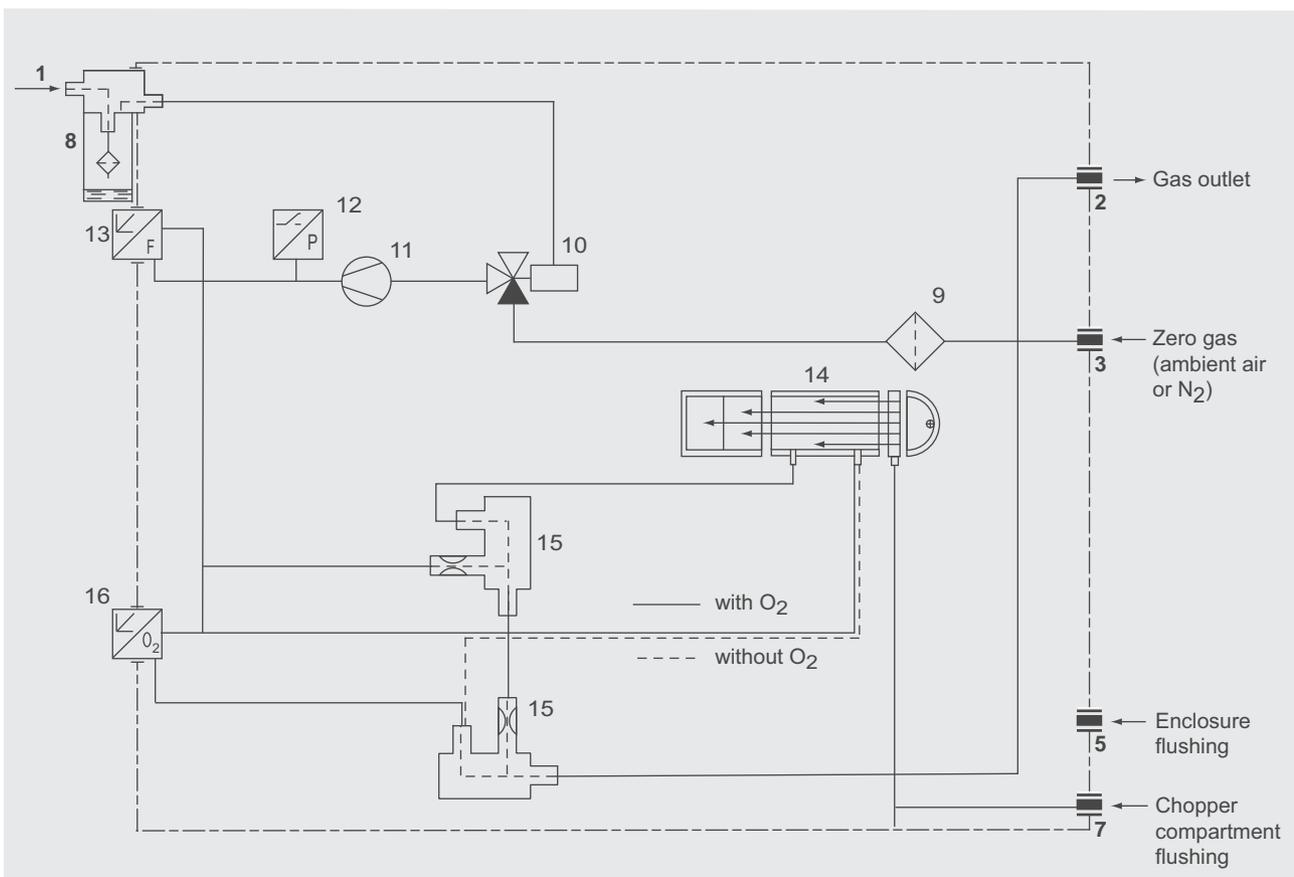
ULTRAMAT 23, portable, in sheet-steel housing with internal sample gas pump, condensation trap with safety filter on front panel, optional oxygen measurement
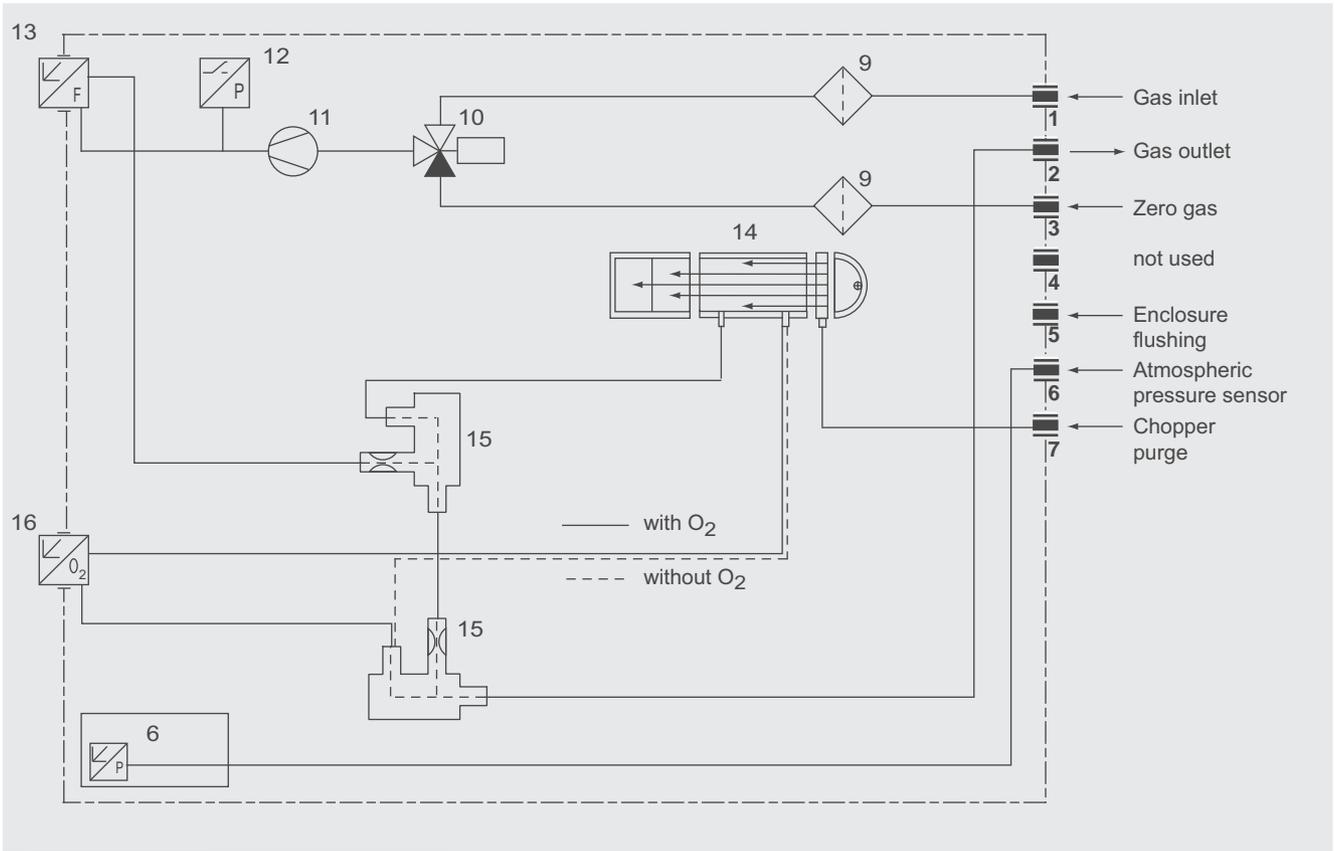
ULTRAMAT 23, 19" unit with internal sample gas pump, optional oxygen measurement
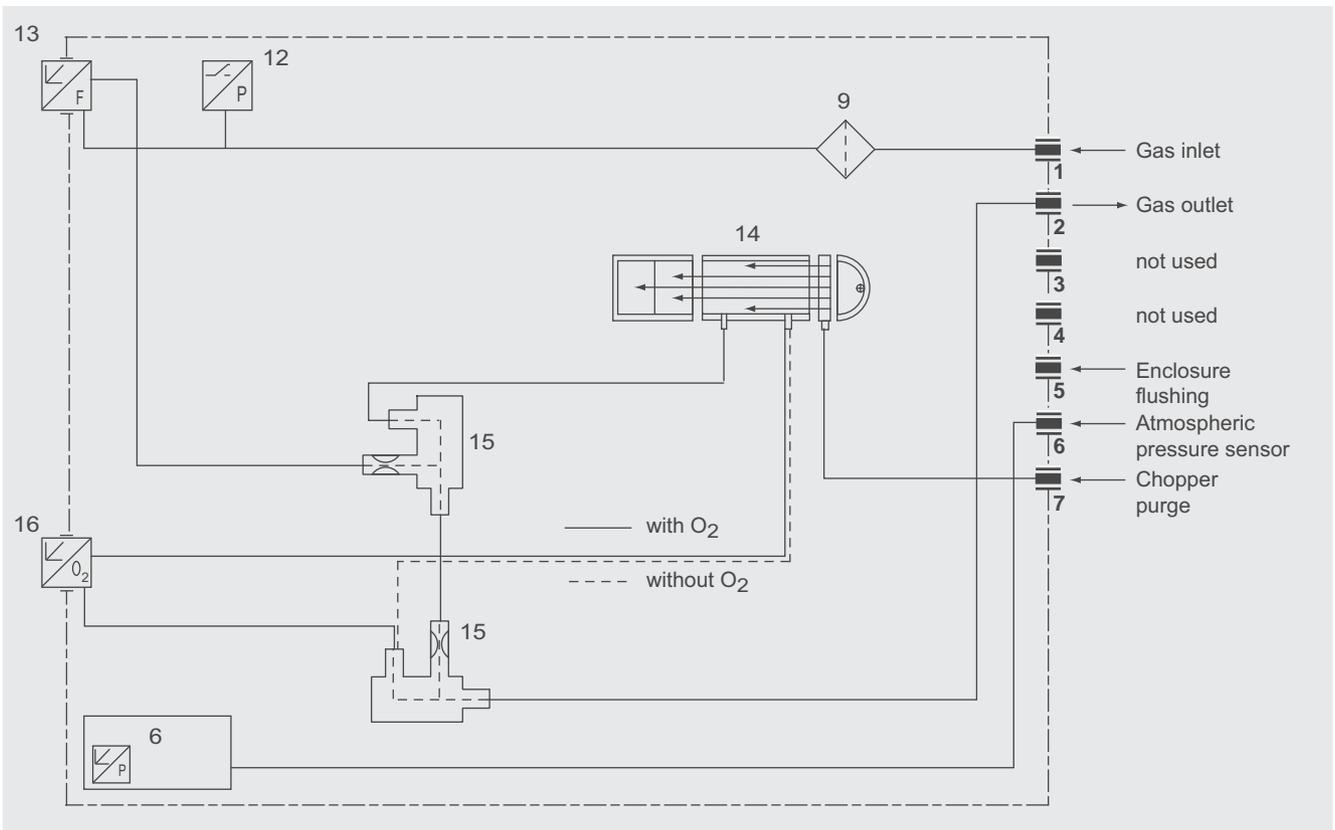
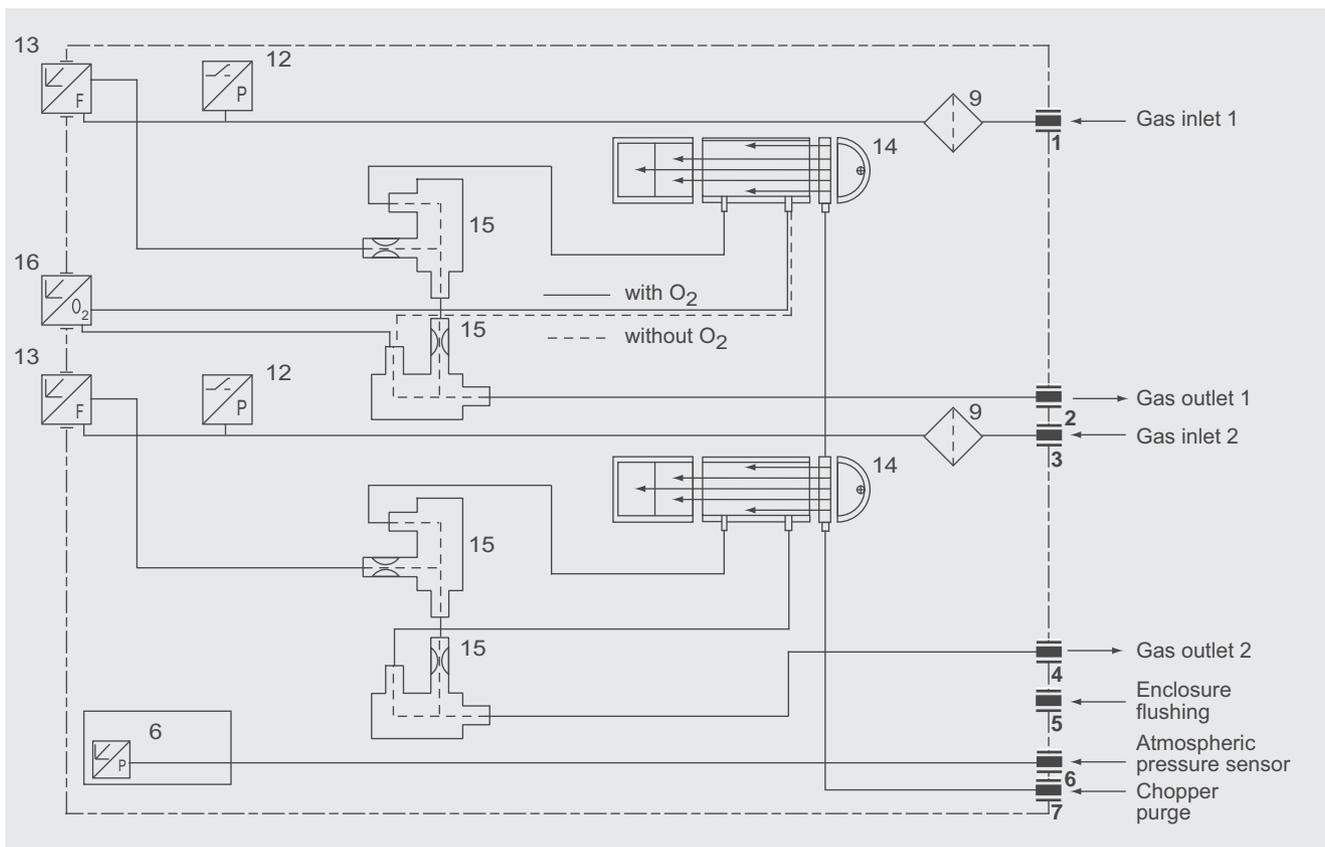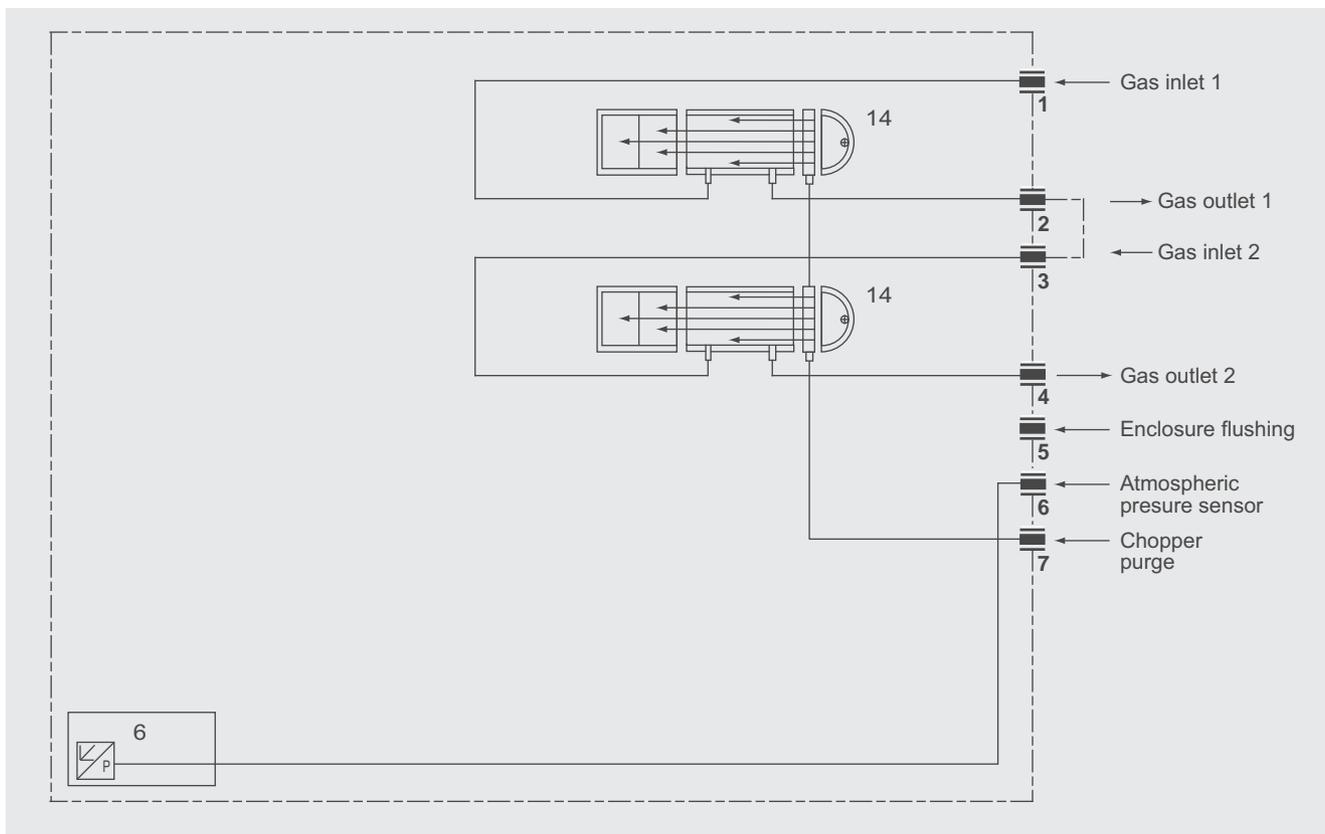ULTRAMAT 23, 19" unit without internal sample gas pump, optional oxygen measurement

General

ULTRAMAT 23, 19" unit without internal sample gas pump, with separate gas path for the second component or for the 2nd and 3rd components, optional oxygen measurement

ULTRAMAT 23, 19" unit, sample gas path version in pipes, optional separate gas path, always without safety filter and without safety trap

Function

Two independent, selective measuring principles are used in the ULTRAMAT 23.

Infrared measurement

An IR source (7) at 600 °C emits an infrared radiation which is modulated with 8 1/3 Hz by a chopper (5). After passing the sample cell (4), the intensity of the radiation is measured by the detector (11, 12).
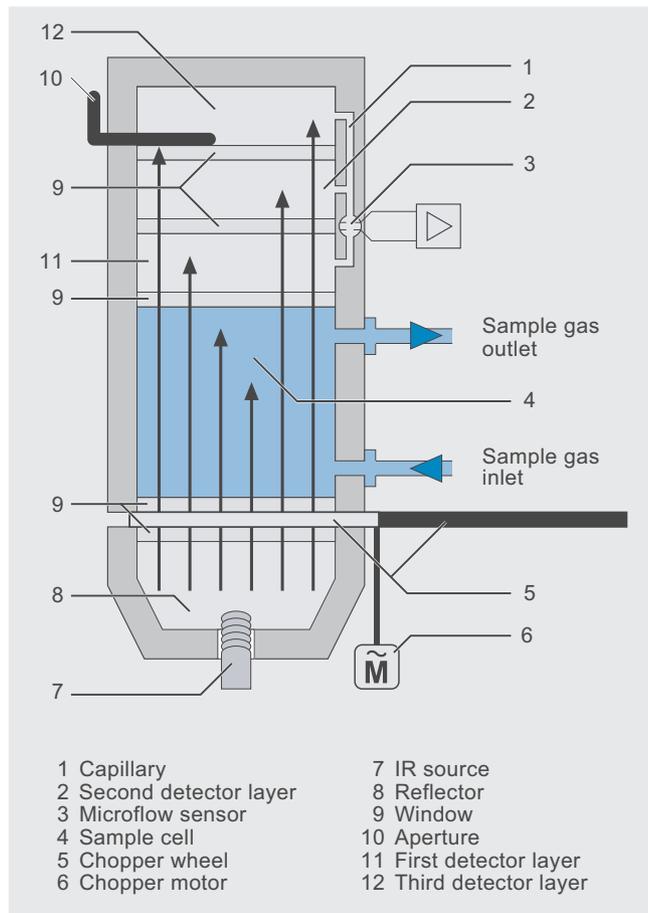
The represented detector is composed of layers filled with the component to be analyzed. The energy of the middles of the IR bands of the measured gases is mainly absorbed in the first layer. The second layer absorbs the edge energy which is tuned on high selectivity in the third layer via an aperture.

When passing through the layers the radiation absorption results in different pressure increases and so to a flow via the capillary hole. The microflow sensor there generates a signal which is nearly independent of interferences from components at the band edges.

Note

The sample gases have to enter the analyzer dustfree. Avoid condensate in the sample cells. Therefore an appropriated gas preparation is required depending of the application.

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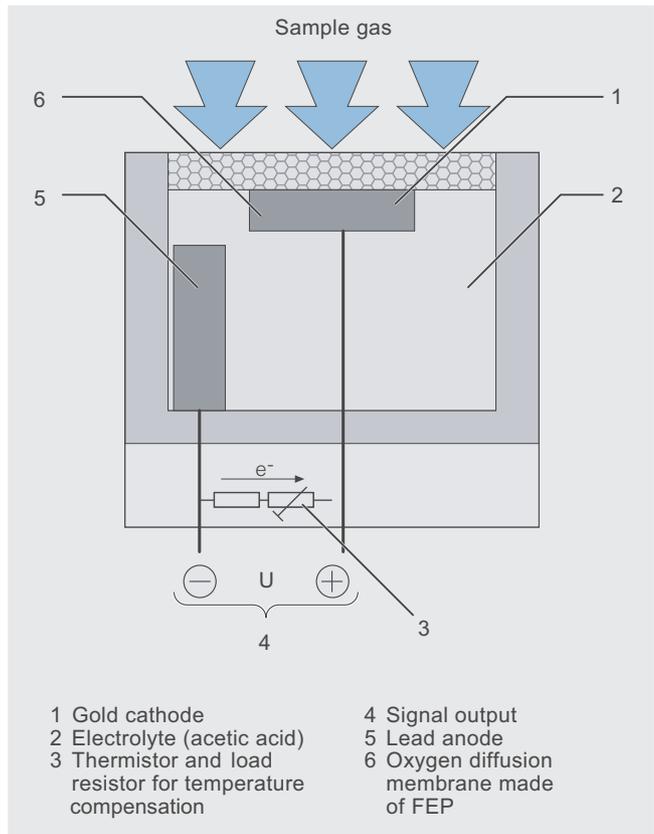

1 Capillary	7 IR source
2 Second detector layer	8 Reflector
3 Microflow sensor	9 Window
4 Sample cell	10 Aperture
5 Chopper wheel	11 First detector layer
6 Chopper motor	12 Third detector layer

ULTRAMAT 23, mode of operation of infrared channel (example with three-layer detector)

Oxygen measurement

The oxygen sensor operates according to the principle of a fuel cell. The oxygen is converted at the boundary layer between cathode and electrolyte; the resulting current is proportional to the concentration of oxygen.

This sensor version with an acid based electrolyte is less sensitive to cross interferences, especially CO_2, CO, CH_4 and H_2 than other sensor types.

1 Gold cathode	4 Signal output
2 Electrolyte (acetic acid)	5 Lead anode
3 Thermistor and load resistor for temperature compensation	6 Oxygen diffusion membrane made of FEP

ULTRAMAT 23, mode of operation of oxygen measuring cell

Essential characteristics

- Practically maintenance-free as a result of AUTOCAL with ambient air; both the zero and the span are calibrated in the process
- Calibration with calibration gas is only necessary every 12 months, depending on application
- Two measuring ranges can be set per component within defined limits;
  all measuring ranges linearized;
  autoranging with range identification
- Automatic correction of variations in atmospheric pressure
- Gas flow monitoring;
  Low-flow alarm at <1 l/min (with viton sample gas path only)
- Maintenance request alert
- Two limits can be freely configured for each component, for upward or downward violation.

General

■ Integration

Communication

Communications facilities

The gas analyzers of series 6 (ULTRAMAT 6, ULTRAMAT/OXYMAT 6, OXYMAT 6, OXYMAT 61, FIDAMAT 6 and CALOMAT 6), as well as the ULTRAMAT 23 offer the following communications facilities:
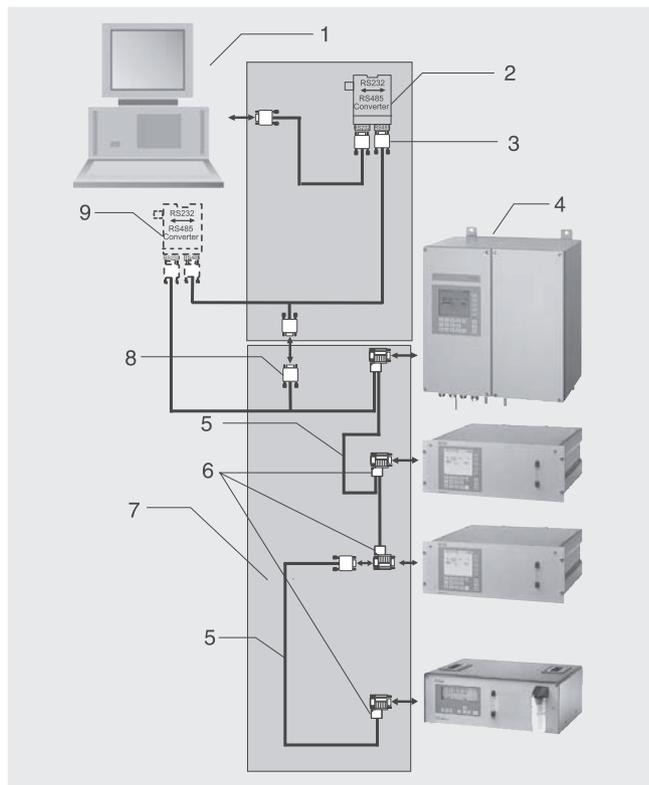
- RS 485 interface
- PROFIBUS DP/PA
- AK interface (only OXYMAT 6, ULTRAMAT 6 and ULTRAMAT/OXYMAT 6).

RS 485 interface (ELAN)

The standard integrated series interface permits to communicate between several gas analyzers via the internal bus (ELAN).

Up to 12 gas analyzers with max. four components can be networked.

The operating principle is shown in the following figure.

Typical design of an RS 485 network

Item	Designation
1	Computer
2	RS 485/RS 232 converter with RS 485/RS 232 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 SUB-D 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	**A5E00054148**
RS 485/RS 232 converter	**C79451-Z1589-U1**
RS 485/Ethernet converter	**C79451-A3364-D61**
Further accessories (e.g. cable, connectors, repeater, etc.)	**see Catalog IK PI**

RS 485 interface (SIPROM GA)

SIPROM GA is a software tool for service and maintenance. All analyzer functions (except factory functions) can be remote-controlled and monitored via RS 485/RS 232 converters.

Up to 12 gas analyzers with max. four components can be networked.

Networking of several gateways is possible when using the RS 485/Ethernet converter (gateway). 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
- Compreh26
- ensive diagnostics information
- Remote calibration
- Online help
- Cyclic saving of measured values and status on hard disk
- Exporting to commercially available application programs
- Downloading of new software.
- *Hardware requirements:*
- PC/Laptop Pentium 133 MHz, RAM 32 MB, CD-ROM drive
- Free disk capacity min. 10 MB
- Free COM-Port: RS 232 or RS 485:
  - for coupling to ELAN network RS 485/RS 232
  - Linking the RS 485/Ethernet converter requires a 10 MB standard network (RJ 45 connection) with TCP/IP. The distance should not exceed 500 m with an RS 485 network, a repeater should be inserted for a longer distance.

Software requirements:

- Windows 95
- Windows 98
- Windows NT 4.0
- Windows 2000
- Windows XP.

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 4.1) all langages	**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 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.

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 ratefor 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 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.
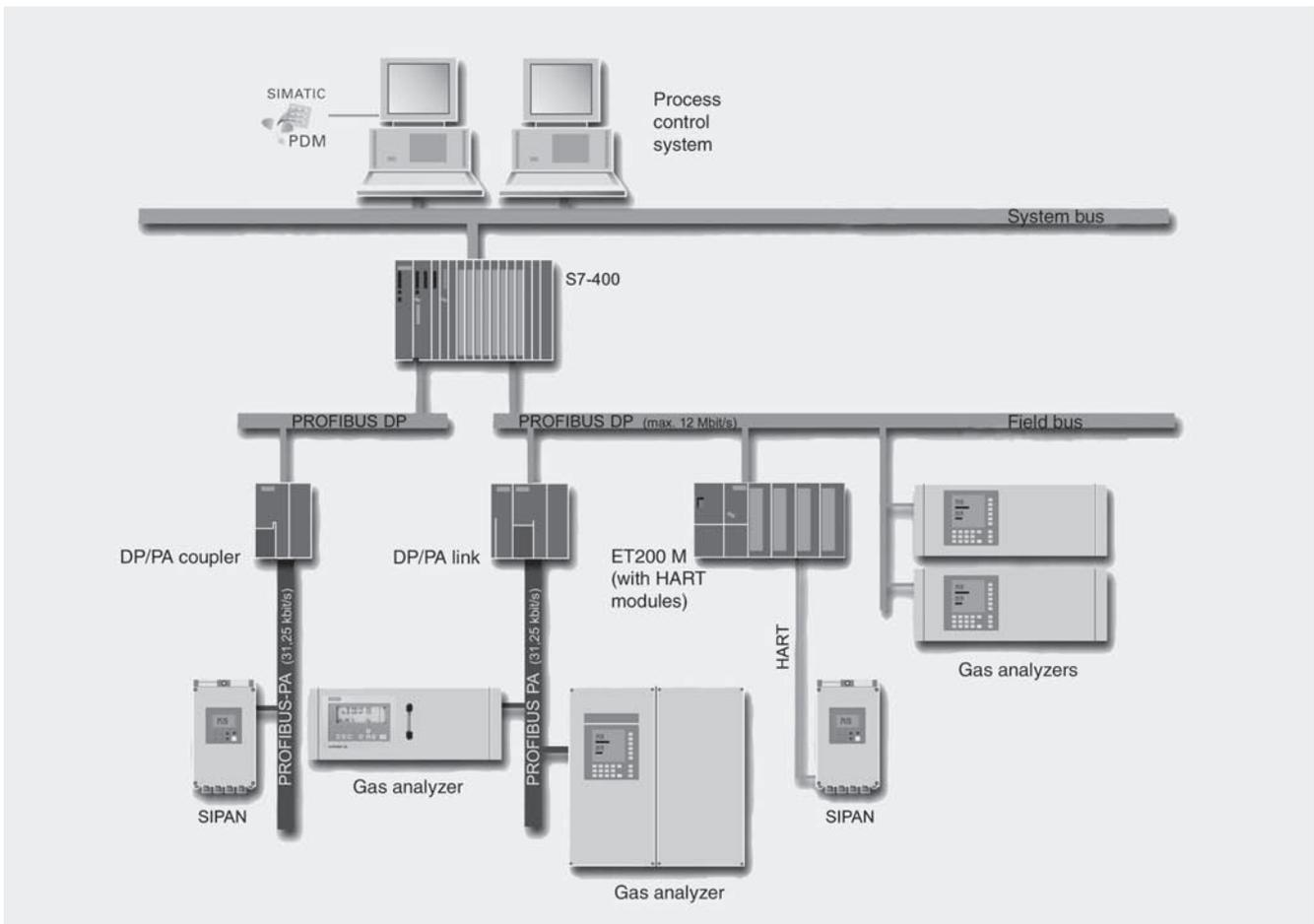
Basic structure of a PROFIBUS system

General

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, OXYMAT 61, FIDAMAT 6 and CALOMAT 6), as well as the ULTRAMAT 23 are suitable for PROFIBUS when fitted with the optional plug-in card.

AK interface (only OXYMAT 6, ULTRAMAT 6 and ULTRAMAT/OXYMAT 6)

The user benefits of numerous functions especially in the automotive industry, e.g. to operate a re-linearization

Unlike to PROFIBUS and ELAN, communication between only one unit and one PC is possible and operates according to the master-slave principle. The unit only transmits data on request with a command message, but always only command can be processed and answered.

Funktion 88 permits to call the menu and to set the parameters.

■ Technical specifications

General

Measured components	Max. 4, of which up to 3 infrared-sensitive gases plus oxygen
Measuring ranges	2 per channel
Characteristics	Linearized
Conformity	CE-identification to EN 61326/A1, EN 61010-1
Display	LCD with LED backlighting and contrast control, function keys 80 characters (4 lines/20 characters)
Position of use	Front panel vertical

Design, enclosure

Weight	Approx. 10 kg
Degree of protection, 19" unit and desktop unit	IP20 to EN 60529

Electrical characteristics

EMC interference immunity (Electro-Magnetic Compatibility), safety extra-low voltage (SELV) with safe isolation	According to standard requirements of NAMUR NE21 (08/98) or EN 50081-1, EN 50082-2
Power supply	100 V AC, +10%/-15%, 50 Hz, 120 V AC, +10%/-15%, 50 Hz, 200 V AC, +10%/-15%, 50 Hz, 230 V AC, +10%/-15%, 50 Hz, 100 V AC, +10%/-15%, 60 Hz, 120 V AC, +10%/-15%, 60 Hz, 230 V AC, +10%/-15%, 60 Hz
Power consumption	Approx. 60 VA

Electric inputs and outputs

Analog output	per component, 0/2/4 to 20 mA, floating, max. load 750 Ω
Relay outputs	8, with changeover contacts, freely selectable, e.g. for range identification, loading capacity, 24 V AC/DC /1 A, floating, non sparking
Binary inputs	3, designed for 24 V, floating
	• Pump
	• AUTOCAL
	• Synchronization
Serial interface	RS 485
AUTOCAL function	Automatic analyzer calibration with ambient air (depending on measured component), cycle time adjustable from 0 (1) to 24 hours
Options	Supplementary electronics with 8 additional binary inputs and relay outputs, e.g. for external automatic calibration and for PROFIBUS PA or PROFIBUS DP

Ambient conditions

Permissible ambient temperature

• Operation	+5 to +45 °C
• Storage and transport	-20 to +60 °C
Permissible ambient humidity	< 90% RH (relative humidity) for storage and transport
Permissible pressure variations	700 to 1200 hPa

Sample gas pressure

Messgasdruck

• Without pump	unpressurized
• With pump	unpressurized suction mode, factory-adjusted with 2-m hose at sample gas outlet; an upper range value calibration is required in case of other venting conditions
Sample gas flow	72 to120 l/h (1.1 to 2 l/min)
Sample gas temperature	0 to 50 °C
Sample gas humidity	< 90% RH (relative humidity) no condensation

Gas Analysis
ULTRAMAT 23

Technical data, infrared channel

Measuring ranges	See Ordering Data
Smallest measuring range	See Ordering Data
Largest measuring range	See Ordering Data

Time response

Warm-up period	Approx. 30 min (maximum accuracy is achieved after approx. 2 hours)
Response time (T_{90} time)	Dependent on the length of the sample gas cell, the sample line and the programmable damping
Damping (electronic time constant)	Selectable from 0 to 99.9 s

Measuring response

Noise of output signal	< 1 % of smallest measuring range (see rating plate)
Display resolution	Max. 4.5 digits, dependent on selected measuring range; the number of digits after the decimal point can be selected
Resolution of output signal	< 0.1% of output signal span
Characteristic	Linearized
Linearity error	In largest measuring range: < 1% of full-scale value; in smallest measuring range: < 2% of full-scale value
Reproducibility	≤ 1% of smallest measuring range

Influencing variables

Drift	
• With AUTOCAL	Negligible
• Without AUTOCAL	< 2% of smallest measuring range/week
Temperature	Max. 2% of smallest possible measuring range according to rating plate per 10 K with an AUTOCAL cycle time of 6 h
Atmospheric pressure	< 0.2% of measuring range per 1% change in pressure, corrected by internal pressure sensor
Power supply	< 0.1% of output signal span with a variation of ± 10%
Power frequency	± 2% of full-scale value with a frequency variation of ± 5%

Technical data, oxygen channel

Measuring ranges	0 to 5% or 0 to 25% O_2, parameter can be set
Auxiliary gas	the oxygen sensor must not be used when the auxiliary gas contains the following components: H_2S, chlorine or fluorine compounds, heavy metals, aerosols, mercaptans, alkaline components (as e.g. NH_3 in % range)
Typical combustion exhaust gas	Influence: < 0.05% O_2
Lifetime	Approx. 2 years with 21% O_2; continuous operation < 0.5% O_2 will damage the measuring cell

Time response

Response time (T_{90} time)	Dependent on dead time and selectable damping < 30 s with a sample gas flow of approx. 1.2 l/min

Measuring response

Noise of output signal	< 0.5% of full-scale value
Display resolution	< 0.2% of full-scale value
Resolution of output signal	< 0.2% of output signal span
Reproducibility	≤ 0.05% O_2

Influencing variables

Oxygen content	operation at times < 0.5 % O_2 distorts the measured value
Humidity	H_2O dew point≥ 2 °C; the oxygen sensor must not be used with dry sample gases (no condensation)
Drift	
• with AUTOCAL	Negligible
• without AUTOCAL	1 % O_2/year in air, typical
Temperature	< 0.5% O_2 per 20 K, referred to a measured value at 20 °C
Atmospheric pressure	< 0.2% of measured value per 1% pressure variation

19" unit and portable version

Ordering data	Order-No.
ULTRAMAT 23 gas analyzer **for measurement of 1 infrared component and oxygen**	7 M B 2 3 3 5 - ▪▪▪▪ 0 - ▪ A A ▪

Enclosure, version and gas paths
19" unit for cabinet mounting

Gas connections	Gas path	Internal sample gas pump	
6 mm pipe	Viton	without [2]	0
¼" pipe	Viton	without [2]	1
6 mm pipe	Viton	with	2
¼" pipe	Viton	with	3
6 mm pipe	SS, type No. 1.4571	without [2]	6
¼" pipe	SS, type No. 1.4571	without [2]	7

Portable, in sheet-steel enclosure, 6 mm gas connections, gas path made of Viton, with integrated sample gas pump, condensation trap with safety filter on the front panel | 8

Measured component	Possible with range classification code	
CO	D, E, F, G ... R, U, X	A
CO_2 [1]	D[8]), G[8]), H[8]), J[8]), K ... R	C
CH_4	H, L, N, P, R	D
C_2H_4	K	F
C_6H_{14}	K	M
SO_2	F ... L, W	N
NO	G ... J, V, W	P
N_2O[9])	E	S
R22	H	U
SF_6	H	V

Smallest measuring range	Largest measuring range	
0 to 50 vpm	0 to 250 vpm	D
0 to 100 vpm	0 to 500 vpm	E
0 to 150 vpm	0 to 750 vpm	F
0 to 200 vpm	0 to 1000 vpm	G
0 to 500 vpm	0 to 2500 vpm	H
0 to 1000 vpm	0 to 5000 vpm	J
0 to 2000 vpm	0 to 10000 vpm	K
0 to 0,5%	0 to 2,5%	L
0 to 1%	0 to 5%	M
0 to 2%	0 to 10%	N
0 to 5%	0 to 25%	P
0 to 10%	0 to 50%	Q
0 to 20%	0 to 100%	R
0 to 150 mg/m^3	0 to 750 mg/m^3	U
0 to 250 mg/m^3	0 to 1250 mg/m^3	V
0 to 400 mg/m^3	0 to 2000 mg/m^3	W
0 to 50 vpm	0 to2500 vpm	X

Oxygen measurement	
Without O_2 sensor	0
With O_2 sensor, not suitable with the SS type version	1

Power supply	
100 V AC, 50 Hz	0
120 V AC, 50 Hz	1
200 V AC, 50 Hz	2
230 V AC, 50 Hz	3
100 V AC, 60 Hz	4
120 V AC, 60 Hz	5
230 V AC, 60 Hz	6

Operating software, documentation [3])	
German	0
English	1
French	2
Spanish	3
Italian	4

19" unit and portable version

Further versions	Order code
Please add „-**Z**" to Order No. and specify Order code	
RS 485/RS 232 converter [4])	**A11**
Supplementary electronics with 8 binary inputs/outputs, PROFIBUS PA interface	**A12**
Supplementary electronics with 8 binary inputs/outputs, PROFIBUS DP interface	**A13**
Slide rails (2 rails, only possible for19" unit version)	**A31**
Set of Torx tools, socket spanner	**A32**
TAG labels (labeling to customer specification)	**B03**
Gas path for a short response time	**C01**
Chopper purge for gas connection 6 mm [8])	**C02**
Chopper purge for gas connection ¼" [8])	**C03**
Customer acceptance [5])	**Y01**
Drift recording	**Y03**
Measuring range in plain text [6])	**Y11**
Measurement of CO_2 in forming gas [10]) (only in relation with measuring range 0-20/0-100%) with optimized interference correction	**Y14**

Accessories	Order No.
CO_2 absorber cartridge	**7MB1933-8AA**

Retrofitting sets	
RS 485/Ethernet converter	**C79451-A3364-D61**
RS 485/RS 232 converter	**C79451-Z1589-U1**
Autocal function with 8 binary inputs/outputs and PROFIBUS PA	**A5E00056834**
Autocal function with 8 binary inputs/outputs and PROFIBUS DP	**A5E00057159**

1) For measuring ranges below 1% a CO_2 absorber cartridge can be used for the autocal (see Accessories).
2) Without separate zero gas input and without internal solenoid valve.
3) User language switchable.
4) Supplied separately (including interface description).
5) 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)..
6) Specific measuring range within min./max. range.
7) O_2 sensor in gas path of infrared measured component 1.
8) With chopper purge (with N_2 approx. 300 kPa for measuring ranges below 0.1 % CO_2 required),
   order in addition (see Order code C02 or C03).
9) Not suitable for stack emission.
10) CO_2 measurement in Ar or Ar/He (3:1); forming gas.

.

Ordering data   Order-No.

ULTRAMAT 23 gas analyzer   **7 M B 2 3 3 7 - ■ ■ ■ ■ 0 - ■ ■ ■ ■**
for measurement of 2 infrared components and oxygen

Enclosure, version and gas paths
19" unit for cabinet mounting

Gas connections	Gas path	Internal sample gas pump	Code
6 mm pipe	Viton, not separated	without [2]	0
¼" pipe	Viton, not separated	without [2]	1
6 mm pipe	Viton, not separated	with	2
¼" pipe	Viton, not separated	with	3
6 mm pipe	Viton, separated	without [2]	4
¼" pipe	Viton, separated	without [2]	5
6 mm pipe	SS, type No. 1.4571, separated	without [2]	6
¼" pipe	SS, type No. 1.4571, separated	without [2]	7

	Code
Portable, in sheet-steel enclosure, 6 mm gas connections, gas path made of Viton, with integrated sample gas pump, condensation trap with safety filter on the front panel	8

1st infrared component

Measured component	Possible with range classification code	Code
CO	D, E, F, G ... R, U, X	A
CO_2 [1]	$D^{[8]}$, $G^{[8]}$, $H^{[8]}$, $J^{[8]}$, K ... R	C
CH_4	H, L, N, P, R	D
C_2H_4	K	F
C_6H_{14}	K	M
SO_2	F ... L, W	N
NO	G ... J, V, W	P
$N_2O^{[9]}$	E	S
R22	H	U
SF_6	H	V

Smallest measuring range	Largest measuring range	Code
0 to 50 vpm	0 to 250 vpm	D
0 to 100 vpm	0 to 500 vpm	E
0 to 150 vpm	0 to 750 vpm	F
0 to 200 vpm	0 to 1000 vpm	G
0 to 500 vpm	0 to 2500 vpm	H
0 to 1000 vpm	0 to 5000 vpm	J
0 to 2000 vpm	0 to 10000 vpm	K
0 to 0,5%	0 to 2,5%	L
0 to 1%	0 to 5%	M
0 to 2%	0 to 10%	N
0 to 5%	0 to 25%	P
0 to 10%	0 to 50%	Q
0 to 20%	0 to 100%	R
0 to 150 mg/m³	0 to 750 mg/m³	U
0 to 250 mg/m³	0 to 1250 mg/m³	V
0 to 400 mg/m³	0 to 2000 mg/m³	W
0 to 50 vpm	0 to 2500 vpm	X

Oxygen measurement	Code
Without O_2 sensor	0
With O_2 sensor, not suitable with the SS type version	1

Power supply	Code
100 V AC, 50 Hz	0
120 V AC, 50 Hz	1
200 V AC, 50 Hz	2
230 V AC, 50 Hz	3
100 V AC, 60 Hz	4
120 V AC, 60 Hz	5
230 V AC, 60 Hz	6

2nd Infrared component

Measured component	Possible with range classification code	Code
CO	D, E, F, G ... R, U, X	A
CO_2 [1]	$D^{[8]}$, $G^{[8]}$, $H^{[8]}$, $J^{[8]}$, K ... R	C
CH_4	H, L, N, P, R	D
C_2H_4	K	F
C_6H_{14}	K	M
SO_2	F ... L, W	N
NO	G ... J, V, W	P
$N_2O^{[9]}$	E	S
R22	H	U
SF_6	H	V

19" unit and portable version

Ordering data

		Order-No.
ULTRAMAT 23 gas analyzer		**7 M B 2 3 3 7 -** ☐☐☐ **0 -** ☐☐☐☐
for measurement of 2 infrared components and oxygen		

Smallest measuring range	Largest measuring range	
0 to 50 vpm	0 to 250 vpm	D
0 to 100 vpm	0 to 500 vpm	E
0 to 150 vpm	0 to 750 vpm	F
0 to 200 vpm	0 to 1000 vpm	G
0 to 500 vpm	0 to 2500 vpm	H
0 to 1000 vpm	0 to 5000 vpm	J
0 to 2000 vpm	0 to 10000 vpm	K
0 to 0,5%	0 to 2,5%	L
0 to 1%	0 to 5%	M
0 to 2%	0 to 10%	N
0 to 5%	0 to 25%	P
0 to 10%	0 to 50%	Q
0 to 20%	0 to 100%	R
0 to 150 mg/m^3	0 to 750 mg/m^3	U
0 to 250 mg/m^3	0 to 1250 mg/m^3	V
0 to 400 mg/m^3	0 to 2000 mg/m^3	W
0 to 50 vpm	0 to 2500 vpm	X

Operating software, documentation [3]	
German	0
English	1
French	2
Spanish	3
Italian	4

Further versions

Please add „**-Z**" to Order No. and specify Order code

	Order code
RS 485/RS 232 converter [4]	**A11**
Supplementary electronics with 8 binary inputs/outputs, PROFIBUS PA interface	**A12**
Supplementary electronics with 8 binary inputs/outputs, PROFIBUS DP interface	**A13**
Verbindungsrohr aus Edelstahl (1.4571) 6 mm, komplett mit Verschraubung	**A27**
Connection pipe made of stainless steel (1.4571) ¼", complete with screwed gland	**A29**
Slide rails (2 rails, only possible for19" unit version)	**A31**
Set of Torx tools, socket spanner	**A32**
TAG labels (labeling to customer specification)	**B03**
Gas path for a short response time	**C01**
Chopper compartment purge for gas connection 6 mm	**C02**
Chopper compartment purge for gas connection ¼"	**C03**
Customer acceptance [5]	**Y01**
Drift recording	**Y03**
Measuring range in plain text [6]	**Y11**
Measurement of CO_2 in forming gas [10] (only in relation with measuring range 0-20/0-100%)	**Y14**

Accessories	Order No.
CO_2 absorber cartridge	**7MB1933-8AA**

Retrofitting sets	
RS 485/Ethernet converter	**C79451-A3364-D61**
RS 485/RS 232 converter	**C79451-Z1589-U1**
Autocal function with 8 binary inputs/outputs and PROFIBUS PA	**A5E00056834**
Autocal function with 8 binary inputs/outputs and PROFIBUS DP	**A5E00057159**

1) For measuring ranges below 1% a CO_2 absorber cartridge can be used for the autocal (see Accessories).
2) Without separate zero gas input and without internal solenoid valve.
3) User language switchable.
4) Supplied separately (including interface description).
5) 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)..
6) Specific measuring range within min./max. range.
7) O_2 sensor in gas path of infrared measured component 1.
8) With chopper purge (with N_2 approx. 300 kPa for measuring ranges below 0.1 % CO_2 required),
   order in addition (see Order code C02 or C03).
9) Not suitable for stack emission.
10) CO_2 measurement in Ar or Ar/He (3:1); forming gas.

Ordering data

Order-No.

ULTRAMAT 23 gas analyzer
for measurement of 3 infrared components and oxygen

7 M B 2 3 3 8 - ■■■■ 0 - ■■■■

Enclosure, version and gas paths
19" unit for cabinet mounting

Gas connections	Gas path	Internal sample gas pump	
6 mm pipe	Viton, not separated	without [2]	0
¼" pipe	Viton, not separated	without [2]	1
6 mm pipe	Viton, not separated	with	2
¼" pipe	Viton, not separated	with	3
6 mm pipe	Viton, separated	without [2]	4
¼" pipe	Viton, separated	without [2]	5
6 mm pipe	Stainless steel, separated	without [2]	6
¼" pipe	Stainless steel, separated	without [2]	7

Portable, in sheet-steel enclosure, 6 mm gas connections, gas path made of Viton, **8**
with integrated sample gas pump, condensation trap with safety filter on the front panel

1st and 2nd infrared components

	Smallest measuring range	Largest measuring range		
CO	0 to 500 vpm	0 to 2500 vpm	A	A
NO	0 to 500 vpm	0 to 2500 vpm		
CO	0 to 2000 vpm	0 to 10000 vpm	A	B
NO	0 to 1000 vpm	0 to 5000 vpm		
CO	0 to 1000 vpm	0 to 5000 vpm	A	C
NO	0 to 1000 vpm	0 to 5000 vpm		
CO	0 to 1%	0 to 5%	A	D
NO	0 to 1000 vpm	0 to 5000 vpm		
CO	0 to 250 mg/m^3	0 to 1250 mg/m^3	A	K
NO	0 to 400 mg/m^3	0 to 2000 mg/m^3		
CO	0 to 10%	0 to 50%	B	A
CO_2	0 to 10%	0 to 50%		
CO	0 to 10%	0 to 50%	B	B
CO_2	0 to 0,5%	0 to 2,5%		
CO	0 to 20%	0 to 100%	B	D
CO_2	0 to 20%	0 to 100%		
CO_2	0 to 5%	0 to 25%	B	J
CO	0 to 100 vpm	0 to 500 vpm		
CO_2	0 to 10%	0 to 50%	B	K
CO	0 to 0,5%	0 to 2,5%		
CO_2	0 to 5%	0 to 25%	C	A
CH_4	0 to 1%	0 to 5%		
CO_2	0 to 5%	0 to 25%	C	B
CH_4	0 to 2%	0 to 10%		

Oxygen measurement
Without O_2 sensor **0**
With O_2 sensor, not suitable with the SS type version **1**

Power supply
100 V AC, 50 Hz **0**
120 V AC, 50 Hz **1**
200 V AC, 50 Hz **2**
230 V AC, 50 Hz **3**
100 V AC, 60 Hz **4**
120 V AC, 60 Hz **5**
230 V AC, 60 Hz **6**

3rd infrared component

Measured component	Possible with range classification code	
CO	D, E, F, G ... R, U, X	A
CO_2 [1]	D[8], G[8], H[8], J[8], K ... R	C
CH_4	H, L, N, P, R	D
C_2H_4	K	F
C_6H_{14}	K	M
SO_2	F ... L, W	N
NO	G ... J, V, W	P
N_2O [9]	E	S
R22	H	U
SF_6	H	V

Smallest measuring range	Largest measuring range	
0 to 50 vpm	0 to 250 vpm	D
0 to 100 vpm	0 to 500 vpm	E
0 to 150 vpm	0 to 750 vpm	F
0 to 200 vpm	0 to 1000 vpm	G
0 to 500 vpm	0 to 2500 vpm	H
0 to 1000 vpm	0 to 5000 vpm	J
0 to 2000 vpm	0 to 10000 vpm	K

Gas Analysis
ULTRAMAT 23

Ordering data

Order-No.

ULTRAMAT 23 gas analyzer
for measurement of 3 infrared components and oxygen

`7 M B 2 3 3 8 - ▨▨▨▨ 0 - ▨▨▨▨`

0 to 0,5%	0 to 2,5%	
0 to 1%	0 to 5%	L
0 to 2%	0 to 10%	M
0 to 5%	0 to 25%	N
0 to 10%	0 to 50%	P
0 to 20%	0 to 100%	Q
0 to 150 mg/m^3	0 to 750 mg/m^3	R
0 to 250 mg/m^3	0 to 1250 mg/m^3	U
0 to 400 mg/m^3	0 to 2000 mg/m^3	V
0 to 50 vpm	0 to 2500 vpm	W
		X

Operating software, documentation [3])

German	0
English	1
French	2
Spanish	3
Italian	4

Further versions

Order code

Please add „**-Z**" to Order No. and specify Order code

RS 485/RS 232 converter [4])	**A11**
Supplementary electronics with 8 binary inputs/outputs, PROFIBUS PA interface	**A12**
Supplementary electronics with 8 binary inputs/outputs, PROFIBUS DP interface	**A13**
Connection pipe made of stainless steel (1.4571) 6 mm, complete with screwed gland	**A27**
Connection pipe made of stainless steel (1.4571) ¼", complete with screwed gland	**A29**
Slide rails (2 rails, only possible for19" unit version)	**A31**
Set of Torx tools, socket spanner	**A32**
TAG labels (labeling to customer specification)	**B03**
Gas path for a short response time	**C01**
Chopper compartment purge for gas connection 6 mm	**C02**
Chopper compartment purge for gas connection ¼"	**C03**
Customer acceptance [5])	**Y01**
Drift recording	**Y03**
Measuring range in plain text [6])	**Y11**
Measurement of CO_2 in forming gas [10]) (only in relation with measuring range 0-20/0-100%)	**Y14**

Accessories

Order-No.

CO_2 absorber cartridge	**7MB1933-8AA**

Retrofitting sets

|	
RS 485/Ethernet converter	**C79451-A3364-D61**
RS 485/RS 232 converter	**C79451-Z1589-U1**
Autocal function with 8 binary inputs/outputs and PROFIBUS PA	**A5E00056834**
Autocal function with 8 binary inputs/outputs and PROFIBUS DP	**A5E00057159**

1) For measuring ranges below 1% a CO_2 absorber cartridge can be used
   for the autocal (see Accessories).
2) Without separate zero gas input and without internal solenoid valve.
3) User language switchable.
4) Supplied separately (including interface description).
5) 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 cali-
   bration gas
   (recording in each case on XT recorder, logging of results)..
6) Specific measuring range within min./max. range.
7) O_2 sensor in gas path of infrared measured component 1.
8) With chopper purge (with N_2 approx. 300 kPa for measuring ranges below
   0.1 % CO_2 required),
   order in addition (see Order code C02 or C03).
9) Not suitable for stack emission.
10) CO_2 measurement in Ar or Ar/He (3:1); forming gas.

■ **Dimensional drawings**
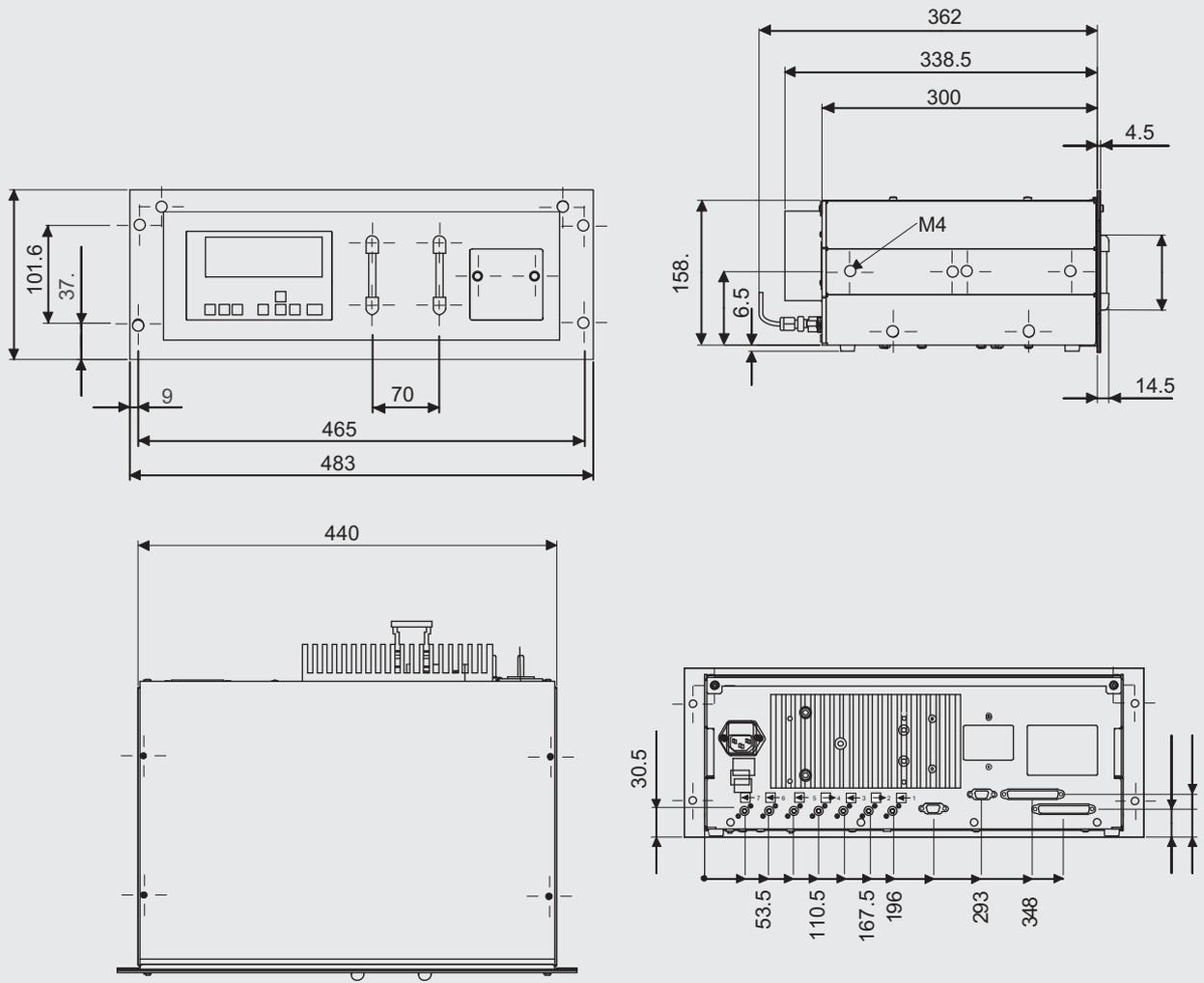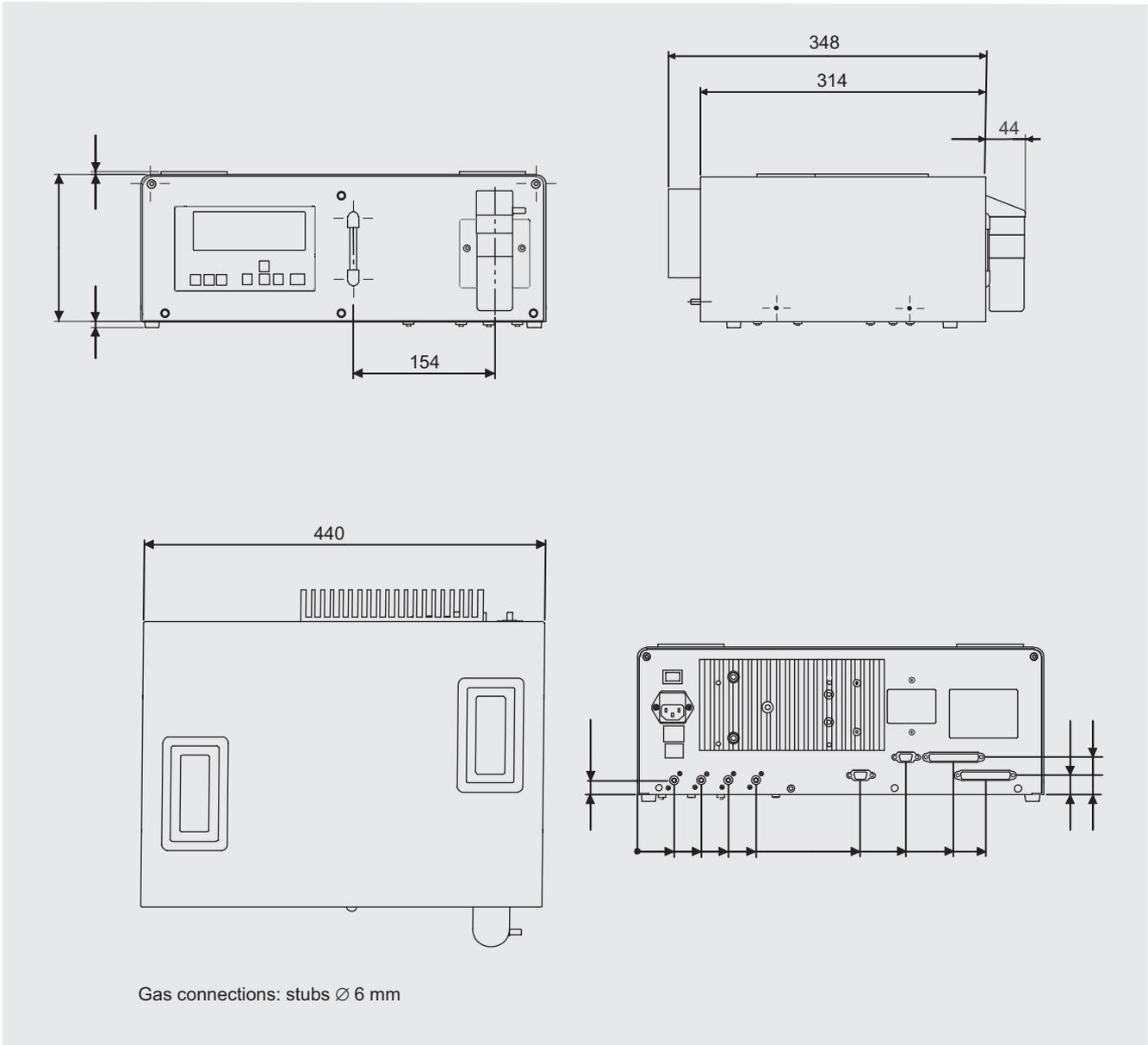

Gas connections: stubs ∅ 6 mm or ¼

Caution: always install on supporting rails when mounted in bench-top housing or in cabinet
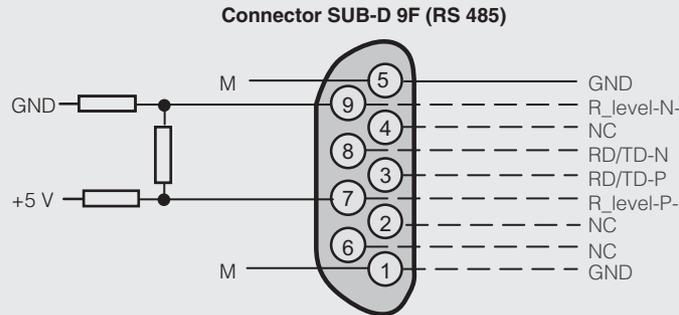
ULTRAMAT 23, 19" unit, dimensions in mm

19" unit and portable version

348

314

44

154

440

Gas connections: stubs ⌀ 6 mm

ULTRAMAT 23, desktop unit, dimensions in mm

Schematics

Pin assignment

Connector SUB-D 9F (RS 485)

GND

+5 V

M — 5 GND
9 — R_level-N-
4 — NC
8 — RD/TD-N
3 — RD/TD-P
7 — R_level-P-
2 — NC
6 — NC
M — 1 — GND

Possibility for connection of bus terminating resistors to pins 7 and 9

Connector SUB-D 37F

M — 19
37 — 18 — Analog output N
Analog output 1 P (for IR component 1) — 36 — 17 — Analog output N
Analog output 2 P (for IR component 2) — 35 — 16 — Analog output N
Analog output 3 P (for IR component 3) — 34 — Analog output N
Analog output 4 P (for O$_2$) — 15
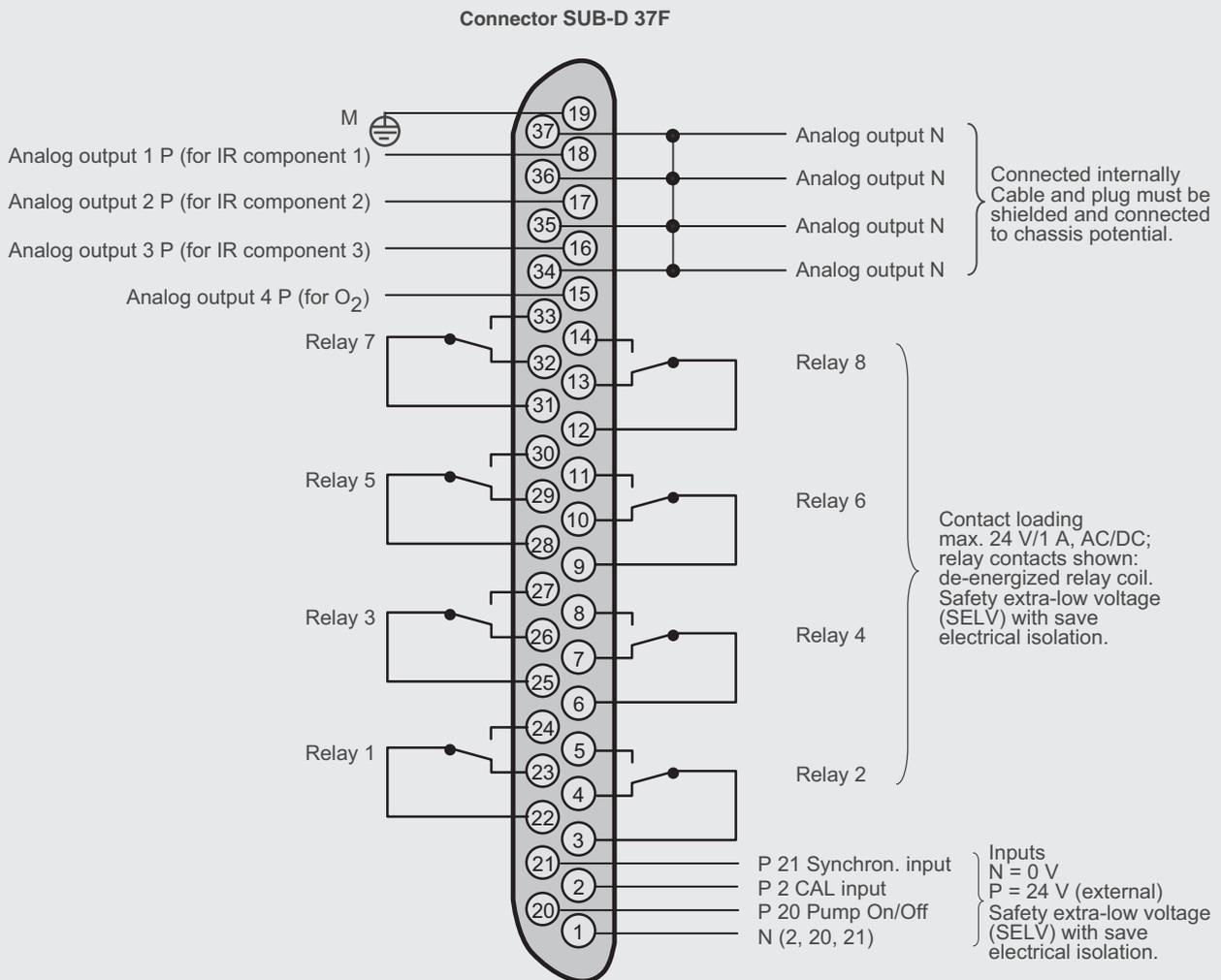
Connected internally
Cable and plug must be shielded and connected to chassis potential.

33
Relay 7 — 32 — 14
13 — Relay 8
31
12
30
Relay 5 — 29 — 11
10 — Relay 6
28
9
27
Relay 3 — 26 — 8
7 — Relay 4
25
6
24
Relay 1 — 23 — 5
4 — Relay 2
22
3
21 — P 21 Synchron. input
2 — P 2 CAL input
20 — P 20 Pump On/Off
1 — N (2, 20, 21)

Contact loading max. 24 V/1 A, AC/DC; relay contacts shown: de-energized relay coil. Safety extra-low voltage (SELV) with save electrical isolation.

Inputs
N = 0 V
P = 24 V (external)
Safety extra-low voltage (SELV) with save electrical isolation.

Note:
Cable and connectors must be shielded and connected to chassis potential.

ULTRAMAT 23, pin assignment (standard)

19" unit and portable version

Connector SUB-D 37F (option)

Pin	Signal
M — 37 / 19	GND
18	NC
36	NC
17	Binary input 14-P
35	Binary input 13-P
16	Binary input 12-P
34	Binary input 11-P
15	Binary input 10-P
33	Binary input 9-P
14	Binary input 8-P
32 / 13	Binary input 7-P
31	Binary input 7 to 14-N
12	Relay 16
30 / 11	Relay 15
29 / 10	Relay 14
28 / 9	
27 / 8	Relay 13
26 / 7	Relay 12
25 / 6	
24 / 5	Relay 11
23 / 4	Relay 10
22 / 3	
21 / 2	Relay 9
M — 20 / 1	GND

Floating via
opto isolator
"0" = 0 V (0 to 4.5 V)
"1" = 24 V (13 to 33 V)
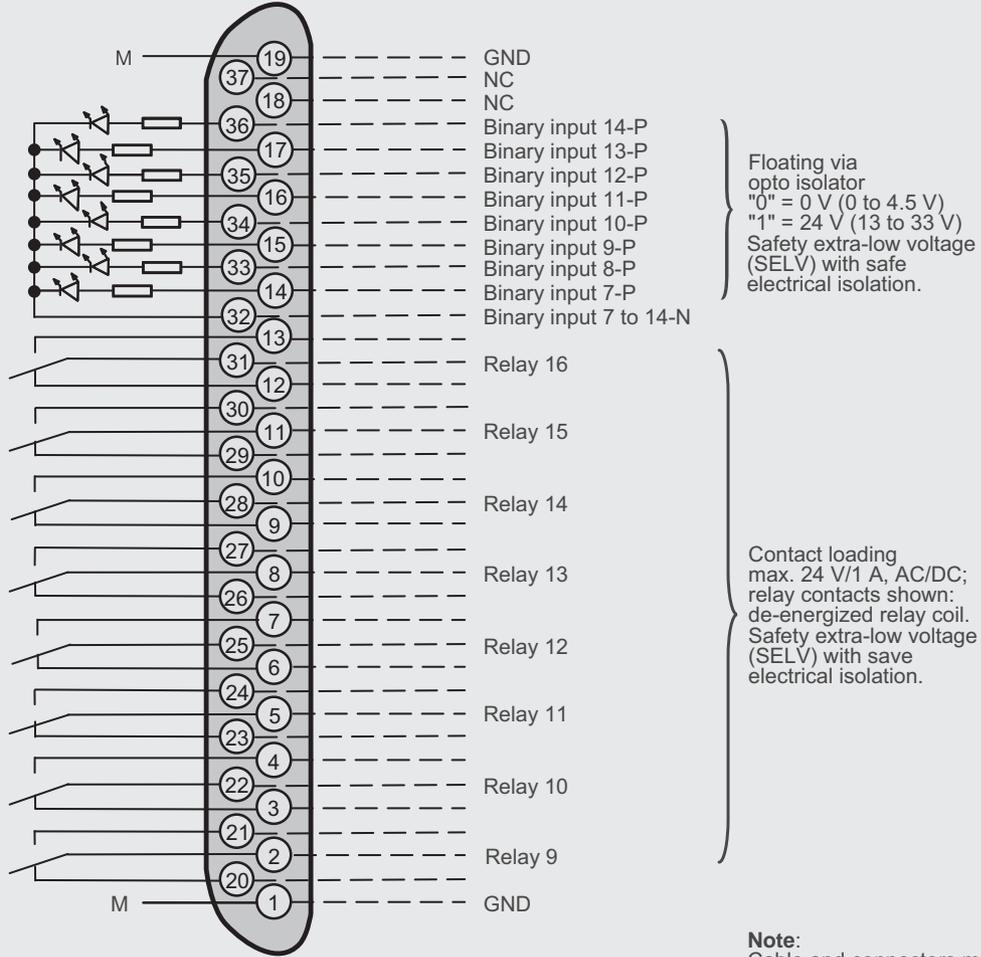Safety extra-low voltage
(SELV) with safe
electrical isolation.

Contact loading
max. 24 V/1 A, AC/DC;
relay contacts shown:
de-energized relay coil.
Safety extra-low voltage
(SELV) with save
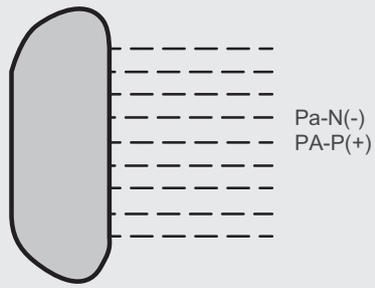electrical isolation.

Note:
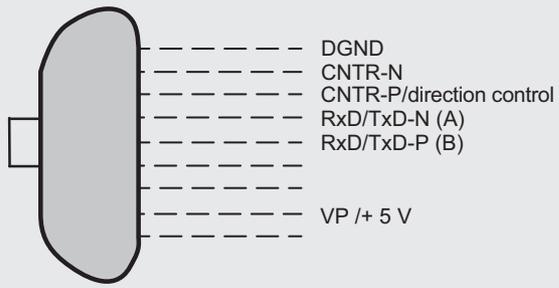Cable and connectors must
be shielded and connected
to chassis potential.

Connector SUB-D 9F -X90
PROFIBUS-DP

———— optional ————

Connector SUB-D 9M -X90
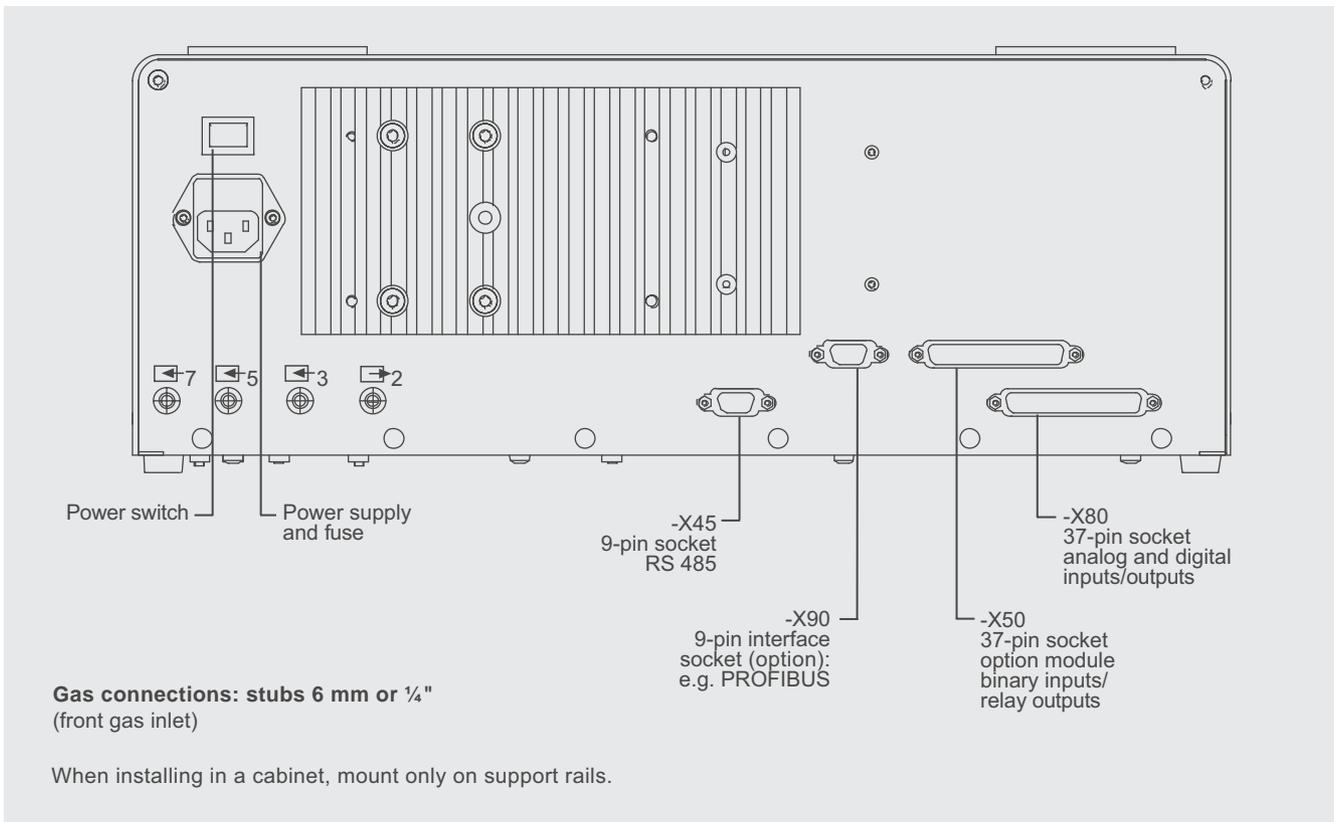**PROFIBUS-PA**

DGND
CNTR-N
CNTR-P/direction control
RxD/TxD-N (A)
RxD/TxD-P (B)
VP /+ 5 V

Pa-N(-)
PA-P(+)

ULTRAMAT 23, pin assignment of the optional PROFIBUS interface board

19" unit

Power supply
and fuse

-X45
9-pin socket
RS 485

-X80
37-pin socket
analog and digital
inputs/outputs

-X90
9-pin interface
socket (option):
e.g. PROFIBUS

-X50
37-pin socket
option module
binary inputs/
relay outputs
(option)

**Gas connections:
stubs 6 mm or ¼"**
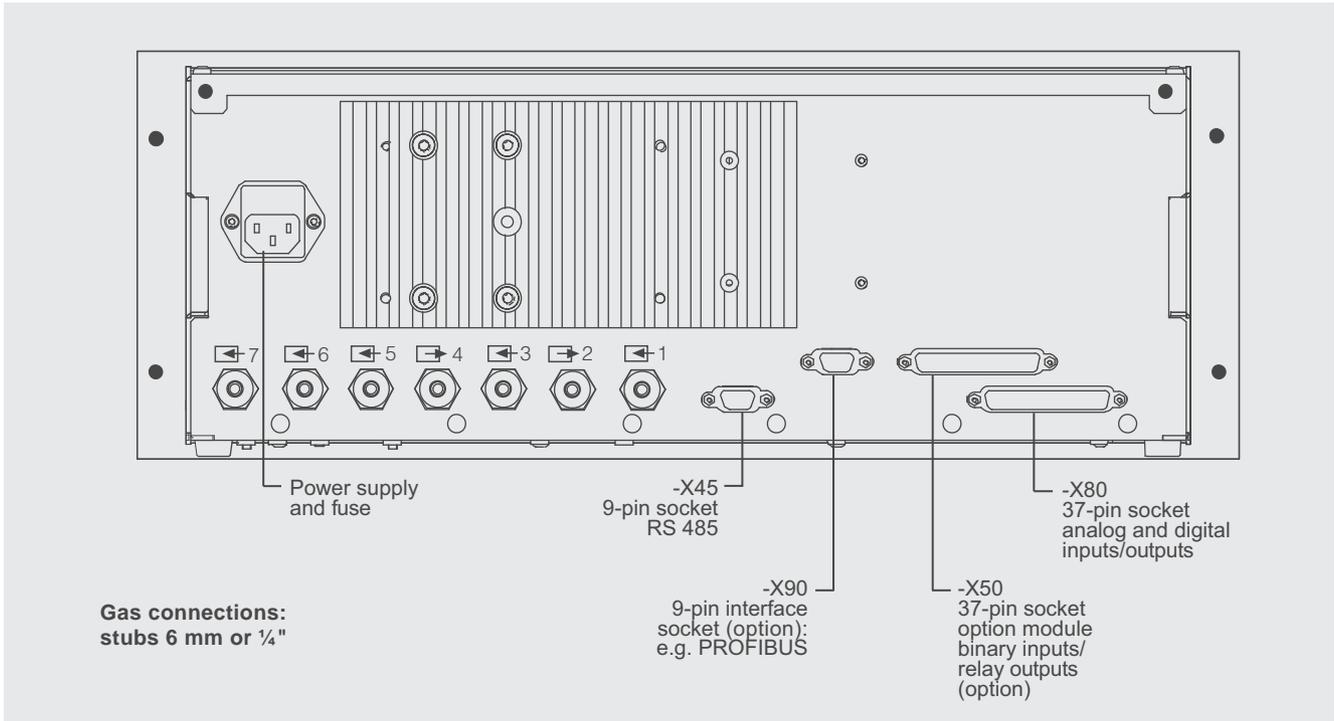
ULTRAMAT 23, 19" unit, e.g. one infrared component with oxygen measurement

Desktop unit

Power switch

Power supply
and fuse

-X45
9-pin socket
RS 485

-X80
37-pin socket
analog and digital
inputs/outputs

-X90
9-pin interface
socket (option):
e.g. PROFIBUS

-X50
37-pin socket
option module
binary inputs/
relay outputs

Gas connections: stubs 6 mm or ¼"
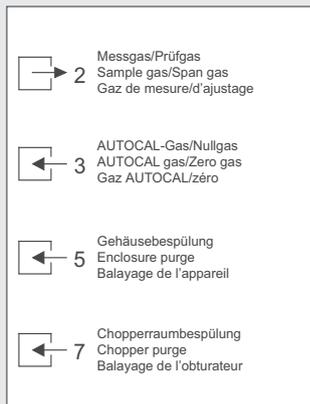(front gas inlet)

When installing in a cabinet, mount only on support rails.

ULTRAMAT 23, portable unit, in sheet-steel housing, gas and electrical connections

19" unit and portable version

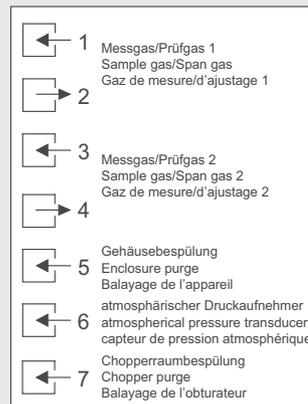|	
2 Messgas/Prüfgas Sample gas/Span gas Gaz de mesure/d'ajustage	
3 AUTOCAL-Gas/Nullgas AUTOCAL gas/Zero gas Gaz AUTOCAL/zéro	
5 Gehäusebespülung Enclosure purge Balayage de l'appareil	
7 Chopperraumbespülung Chopper purge Balayage de l'obturateur	

**Key to symbols
ULTRAMAT 23
portable, in sheet-steel
housing**

1 Messgas/Prüfgas Sample gas/Span gas Gaz de mesure/d'ajustage	
2	
3 AUTOCAL-Gas/Nullgas AUTOCAL gas/Zero gas Gaz AUTOCAL/zéro	
4 nicht belegt not used non utilisé	
5 Gehäusebespülung Enclosure purge Balayage de l'appareil	
6 atmosphärischer Druckaufnehmer atmospherical pressure transducer capteur de pression atmosphérique	
7 Chopperraumbespülung Chopper purge Balayage de l'obturateur	

**Key to symbols
ULTRAMAT 23
19" rack unit
with sample gas pump**

1 Messgas/Prüfgas Sample gas/Span gas Gaz de mesure/d'ajustage	
2	
3 nicht belegt not used non utilisé	
4 nicht belegt not used non utilisé	
5 Gehäusebespülung Enclosure purge Balayage de l'appareil	
6 atmosphärischer Druckaufnehmer atmospherical pressure transducer capteur de pression atmosphérique	
7 Chopperraumbespülung Chopper purge Balayage de l'obturateur	
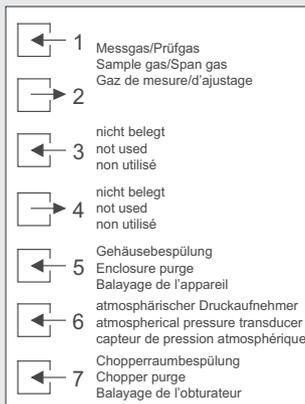
**Key to symbols
ULTRAMAT 23
19" rack unit
without sample gas pump**

1 Messgas/Prüfgas 1 Sample gas/Span gas Gaz de mesure/d'ajustage 1	
2	
3 Messgas/Prüfgas 2 Sample gas/Span gas 2 Gaz de mesure/d'ajustage 2	
4	
5 Gehäusebespülung Enclosure purge Balayage de l'appareil	
6 atmosphärischer Druckaufnehmer atmospherical pressure transducer capteur de pression atmosphérique	
7 Chopperraumbespülung Chopper purge Balayage de l'obturateur	

**Key to symbols
ULTRAMAT 23
19" rack unit
with two separate gas
paths or pipe version**

ULTRAMAT 23, designation of the different labels

■ More information

Documentation

Manual	Order No.
ULTRAMAT 23 Gasanalysengerät für IR-absorbierende Gase und Sauerstoff (German)	**C79000-G5200-C216**
ULTRAMAT 23 Gas Analyzers for IR-absorbing Gases and Oxygen (English)	**C79000-G5276-C216**
ULTRAMAT 23 Analyseurs de gaz pour la mesure de composants infrarouges et doxygène (French)	**C79000-G5277-C216**
ULTRAMAT 23 Analizadores para gases absorbentes de infrarrojo y oxígeno (Spanish)	**C79000-G5278-C216**
ULTRAMAT 23 Analizzatori ad infrarossi e per ossigeno (Italian)	**C79000-G5272-C216**

Proposition of spare parts for a 2-year and 5-year service

Description	Qty for 2 years	Qty for 5 years	Order No.
Analyzer section			
O-ring for sample cell, 180, 90, 20 mm	2	4	C71121-Z100-A99
Chopper			
• with motor, for 1 IR channel (7MB2335-...)	1	1	C79451-A3468-B515
• with motor, for 2 IR channels (7MB2337-..., 7MB2338-...)	1	1	C79451-A3468-B516
Electronics			
Motherboard	-	1	C74951-A3492-B601
Keypad	1	1	C79451-A3492-B605
LCD module	1	1	C79451-A3494-B16
Connector filter	-	1	W75041-E5602-K2
Mains switch	-	1	W75050-T1201-U101
Fuse 220 V ... 240 V	2	4	W79054-L1010-T630
Fuse 120 V	2	4	W79054-L1011-T125
Other			
Safety filter (zero gas), internal	2	2	A5E00059149
Safety filter (sample gas), internal	2	3	C79127-Z400-A1
Pressure switch	1	2	C79302-Z1210-A2
Flowmeter (version with pump only)	1	2	C79402-Z560-T1
Set of gaskets (membrane/valve kit) for sample gas pump	2	5	C79402-Z666-E20
Condensation trap (for portable unit)	1	2	C79451-A3000-B43
Filter (for portable unit, in sheet-steel enclosure)	1	2	C79451-A3008-B60
Oxygen sensor	1	1	C79451-A3458-B55
Sample gas pump 50 Hz	1	1	C79451-A3494-B10
Sample gas pump 60 Hz	1	1	C79451-A3494-B11
Solenoid valve	1	1	C79451-A3494-B33

Conditions of sale and delivery
Export regulations, contact addresses

Terms and Conditions of Sale and Delivery

in the Federal Republic of Germany

By using this catalog you can acquire hardware and software products described therein from the Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside the Federal Republic of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity.

for customers with a seat or registered office in the Federal Republic of Germany

The General Terms of Payment as well as the General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry shall apply.

For software products, the General License Conditions for Software Products for Automation and Drives for Customers with Seat or registered Office in Germany shall apply.

for customers with a seat or registered office outside of Germany

The General Terms of Payment as well as the General Conditions for Supplies of Siemens, Automation and Drives for Customers with a Seat or registered Office outside of Germany shall apply.

For software products, the General License Conditions for Software Products for Automation and Drives for Customers with Seat or registered Office outside of Germany shall apply.

General

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

In addition to the prices of products which include silver and/or copper, surcharges may be calculated if the respective limits of the notes are exceeded.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

The dimensions are in mm. Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

Comprehensive Terms and Conditions of Sale and Delivery are available free of charge from your local Siemens business office under the following Order Nos.:

- 6ZB5310-0KR30-0BA0
(for customers based in the Federal Republic of Germany)
- 6ZB5310-0KS53-0BA0
(for customers based outside of theFederal Republic of Germany)

or download them from the Internet:
www.siemens.com/automation/mall
(Germany: A&D Mall Online-Help System)

Export regulations

The products listed in this catalog / price list may be subject to European / German and/or US export regulations.

Therefore, any export requiring a license is subject to approval by the competent authorities.

According to current provisions, the following export regulations must be observed with respect to the products featured in this catalog / price list:

AL	Number of the German Export List.
	Products marked other than "N" require an export license. In the case of software products, the export designations of the relevant data medium must also be generally adhered to.
	Goods labeled with an "AL not equal to N" are subject to a European or German export authorization when being exported out of the EU.
ECCN	Export Control Classification Number.
	Products marked other than "N" are subject to a reexport license to specific countries.
	In the case of software products, the export designations of the relevant data medium must also be generally adhered to.
	Goods labeled with an "ECCN not equal to N" are subject to a US re-export authorization.

Even without a label or with an "AL: N" or "ECCN: N", authorization may be required due to the final destination and purpose for which the goods are to be used.

The deciding factors are the AL or ECCN export authorization indicated on order confirmations, delivery notes and invoices.

Subject to change without prior notice.

If you have any questions, please contact your local sales representative or any of the contact addresses below.

Siemens AG A&D PI 2M Process Analytics Oestliche Rheinbrueckenstr. 50 D-76187 Karlsruhe Germany	Siemens Applied Automation 500 West Highway 60 Bartlesville, OK 74003 USA	Siemens Pte. Limited A&D PI2 Regional Head Quarter The Siemens Center 60 MacPherson Road Singapore 348615
Tel.: +49 721 595 4234 Fax: +49 721 595 6375 E-Mail:processanalytics@siemens.com	Tel.: +1 918 662 7000 Fax: +1 918 662 7052 E-Mail: saaisales@sea.siemens.com	Tel.: +65 6490 8702 Fax: +65 6490 8703 E-Mail: splanalytics.sgp@siemens.com
www.processanalytics.com	www.sea.siemens.com/ia	www.siemens.com/processanalytics

---