3

Measuring equipment for dissolved oxygen

Application

- The **SIPAN 32, SIPAN 32X** and **SIPAN 34** measuring equipment is designed to determine the concentration of oxygen in aqueous solutions within wide concentration ranges.
- The measuring range extends from almost oxygen-free water (approx. 0.1 µg/l O_2) up to very high concentrations (approx. 60 mg/l O_2).
- The **SIPAN 32, SIPAN 32X** and **SIPAN 34** measuring equipment consists of:
  - An oxygen sensor (O_2 sensor)
  - A flow, immersion or replacement fitting
  - A **SIPAN 32, SIPAN 32X** or **SIPAN 34** analyzer.

Application examples

- Monitoring of very low oxygen concentrations in the steam circuit of steam generating plants to prevent corrosion.
- Checking of the oxygen content of foods, especially for monitoring storage life in the drinks industry.
- Oxygen concentration as a decisive parameter for the environmental analysis of rivers and lakes.
- Oxygen measurements in sewage treatment plants up to very high concentrations in the aeration tank.
- Monitoring of the O_2 requirement of microorganisms in biotechnology

Special characteristics

- Almost independent of flow rate (minimum flow only 0.005 m/s)
- Extremely long service life
- Automatic sensor monitoring and regeneration display
- Fast replacement of membrane as result of robust special membrane, insensitive to contamination
- Automatic correction of atmospheric pressure during measurement and calibration
- O_2 sensor for food applications can be sterilized and can be fitted in a bypass or inline using an attachment fitting or a replacement fitting.
- Single-point calibration of sensor using air (sensor is free of residual current).
- No calibration liquid required
- Design with explosion protection for zone 1

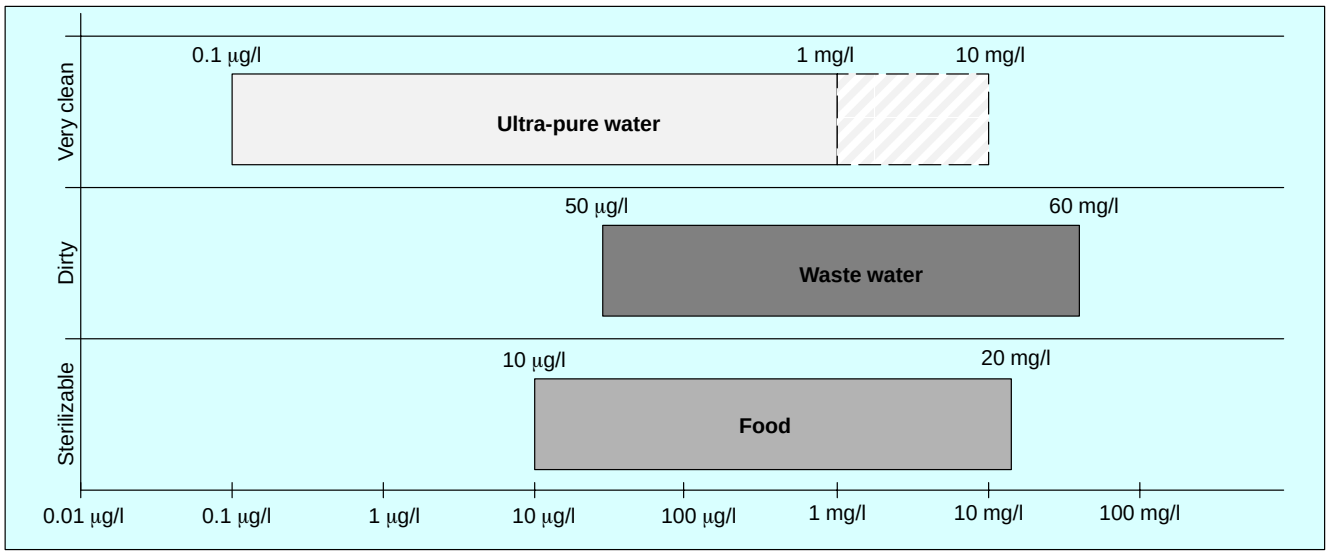


Fig. 3/1 Measuring equipment for dissolved oxygen, selection table according to fields of application

Measurement of dissolved oxygen in water

- The amount of dissolved oxygen in water may be important for various reasons.
- We use the polarographic measuring procedure for the three different fields of application for oxygen measurements which differentiate by three orders of magnitude.

Measurement of dissolved oxygen in boiler feedwater (ultra-pure water)

Measured medium with low concentrations of
0.1 µg/l to 10 mg/l
dissolved oxygen

It is important that there is as little oxygen as possible in the water of steam circuits of large power plants to prevent damage caused by corrosion. The dissolved oxygen should be monitored there with an order of magnitude µg O_2/l water.

In these water/steam circuits, water with an extremely low contamination is required to prevent deposits which could lead to a reduction in economy and to faults. Such ultra-pure water is aggressive. A layer of insoluble Fe_3O_4 is formed in the pipelines and therefore builds up a protective layer. However, if dissolved oxygen is present in a water/steam circuit, it is assumed that this protective layer is attacked at the high temperatures and pressures which exist, and that damage due to corrosion may result following further effects of the dissolved oxygen.

According to the guidelines for boiler feedwater conditioning, the oxygen concentration should be below 20 µg O_2/l, where an attempt is made to reduce the value far below this. In order to achieve this, the boiler feedwater is usually thermally degassed. Depending on the plant design, this thermal degassing is often followed by chemical degassing where hydrazine or ammonia are added to the water.

Measurement of the traces of dissolved oxygen in boiler feedwater usually then provides results of less than 2/1000000 percent by mass.

Such trace measurements can only be carried out with great difficulty in a laboratory since sampling completely free of oxygen is difficult. Furthermore, the time intervals are usually too great if it is considered that even completely invisible leaks can already easily lead to a dangerous oxygen concentration of 100 µg O_2/l which would probably be detected too late by occasional laboratory measurements.

Therefore industrial measuring instruments are appropriate for such cases. Such instruments should require little maintenance to provide economic use and high operational reliability, and they must also be highly sensitive trace analyzers.

The feedwater inlet upstream of the boiler is recommendable as the measuring location, although measurements are occasionally also made upstream of the feedwater pump because it is then unnecessary to have expansion equipment.

A second measuring location is the outlet line from the condenser. The measurement is important here in order e.g. to rapidly detect leaks on the condenser and the machine.

Similar or even higher water quality demands are placed during semiconductor (chip) manufacturer.

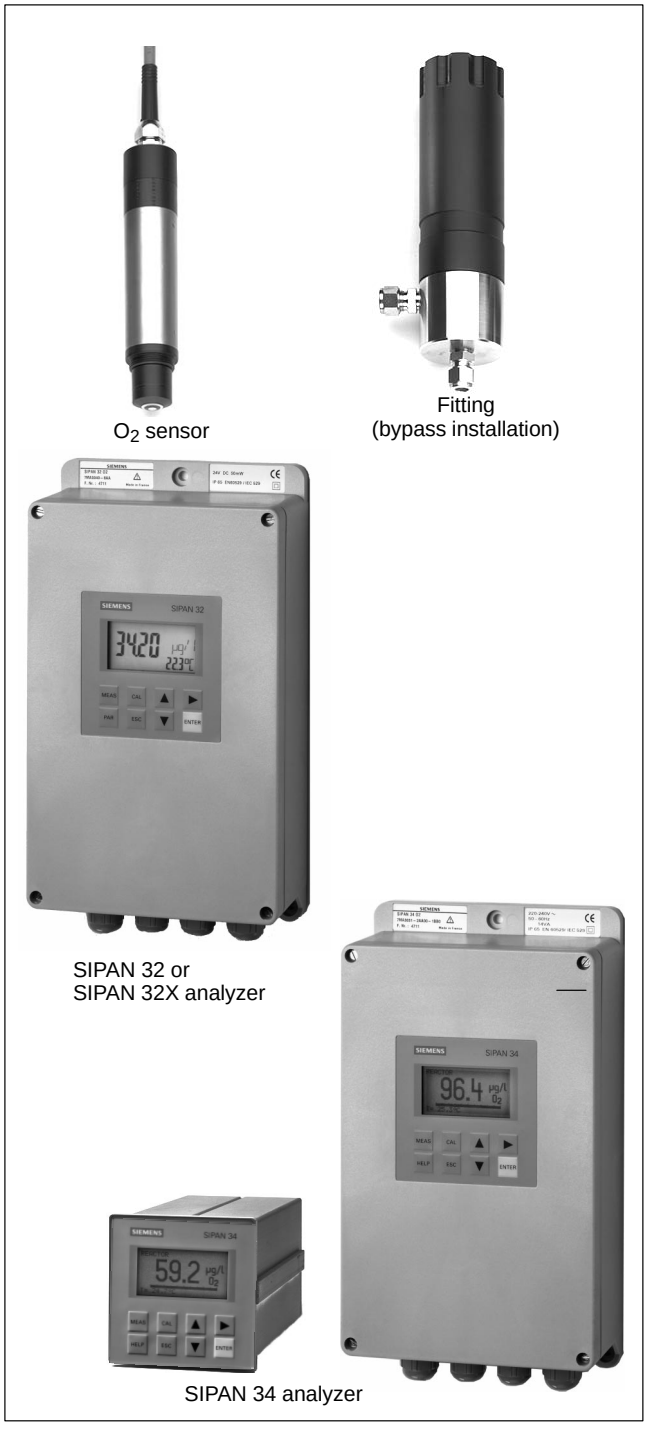


Fig. 3/2 Measuring equipment for dissolved oxygen, fittings (selection), SIPAN 32, SIPAN 32X or SIPAN 34 analyzer, for ultra-pure water in power plants

Application

Technical description

Measurement of dissolved oxygen in rivers, lakes and waste water

Measured medium with high concentrations of
50 µg/l to 60 mg/l
dissolved oxygen

In this case, the dissolved oxygen in the water is essential to preserve life. Sufficient quantities of dissolved oxygen must be present in rivers or lakes to preserve animal life and the biological equilibrium. In sewage treatment plants, oxygen must even be introduced into the waste water to preserve and promote bacterial cultures for the biological decomposition of contaminants in the water. Economical operation is also an important factor here. In these cases, the oxygen concentration has an order of magnitude of several mg O_2/l.

The increasing contamination of rivers and lakes by toxic materials, organic and inorganic ballast, and by increased water temperatures resulting from the use of cooling plants means that water monitoring is becoming increasingly important.

The main task of such monitoring is to guarantee biological equilibrium by using appropriate measures. This equilibrium is essential to preserve animal life and to prevent the contamination of surface water for drinking and service purposes.

One of the most important measured variables is the dissolved oxygen, where concentrations of several mg O_2/l must be measured.

In addition to mechanical cleaning, biological clarification is used in sewage treatment plants to break down organic compounds using bacteria. A dissolved oxygen concentration of approx.
1.5 to 2,5 mg O_2/l must be present in the waste water to activate and sustain this treatment process. This oxygen is passed mechanically into the aeration tanks using air.

The energy required for input of air/oxygen is quite significant, and the amount of oxygen entered should therefore be carried out as economically as possible. Measurement of the dissolved oxygen in the waste water is therefore necessary.

Fig. 3/3 Measuring equipment for dissolved oxygen, fittings (selection), SIPAN 32, SIPAN 32X or SIPAN 34 analyzer, for waste water

Measurement of dissolved oxygen in the food industry and in biotechnology process plants

Measured medium with average concentrations of
10 µg/l to 20 mg/l
dissolved oxygen

A long storage life for manufactured products is becoming increasingly important in the food industry for economy reasons. For this reason, the individual parameters must be strictly checked in the production plants.

The amount of dissolved oxygen is of decisive importance for the storage life of a number of products. For example, a typical value for freshly filled beer is 20 µg/l, and a lower amount increases its life. This is particularly important if beer is brewed according to the German beer purity regulations which forbid the addition of conservation agents.

It is important to exactly control the process sequence of biotechnology plants. An important variable is the amount of dissolved oxygen. Since food and biotechnology plants are sensitive to foreign germs, all used components must have a sterilizable design.

Cleaning using steam sterilization is carried out regularly at defined intervals. It is therefore important to have a temperature-stable design of the wetted parts materials. Our stainless steel components have been proven as suitable for this technology.

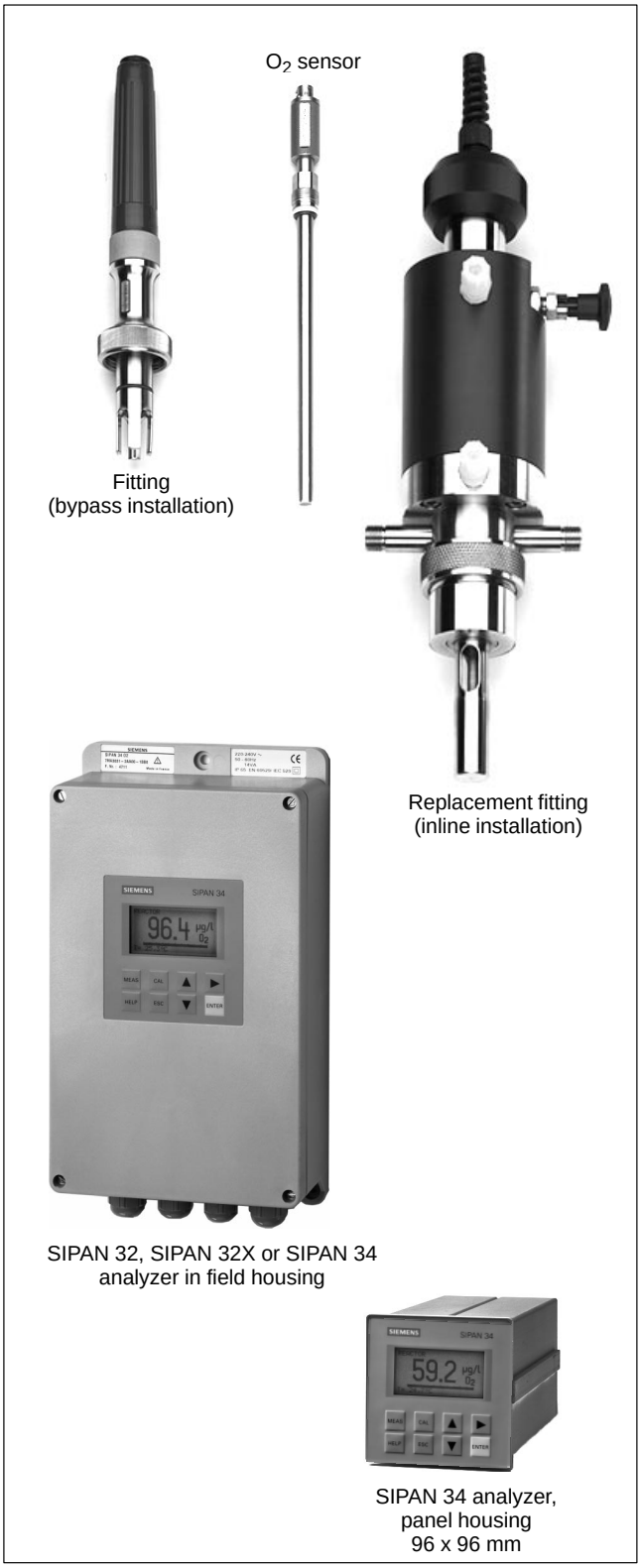


Fig. 3/4 Measuring equipment for dissolved oxygen, fittings (selection), SIPAN 32, SIPAN 32X or SIPAN 34 analyzer, for food

Mode of operation

SIPAN 32, SIPAN 32X and SIPAN 34 analyzers

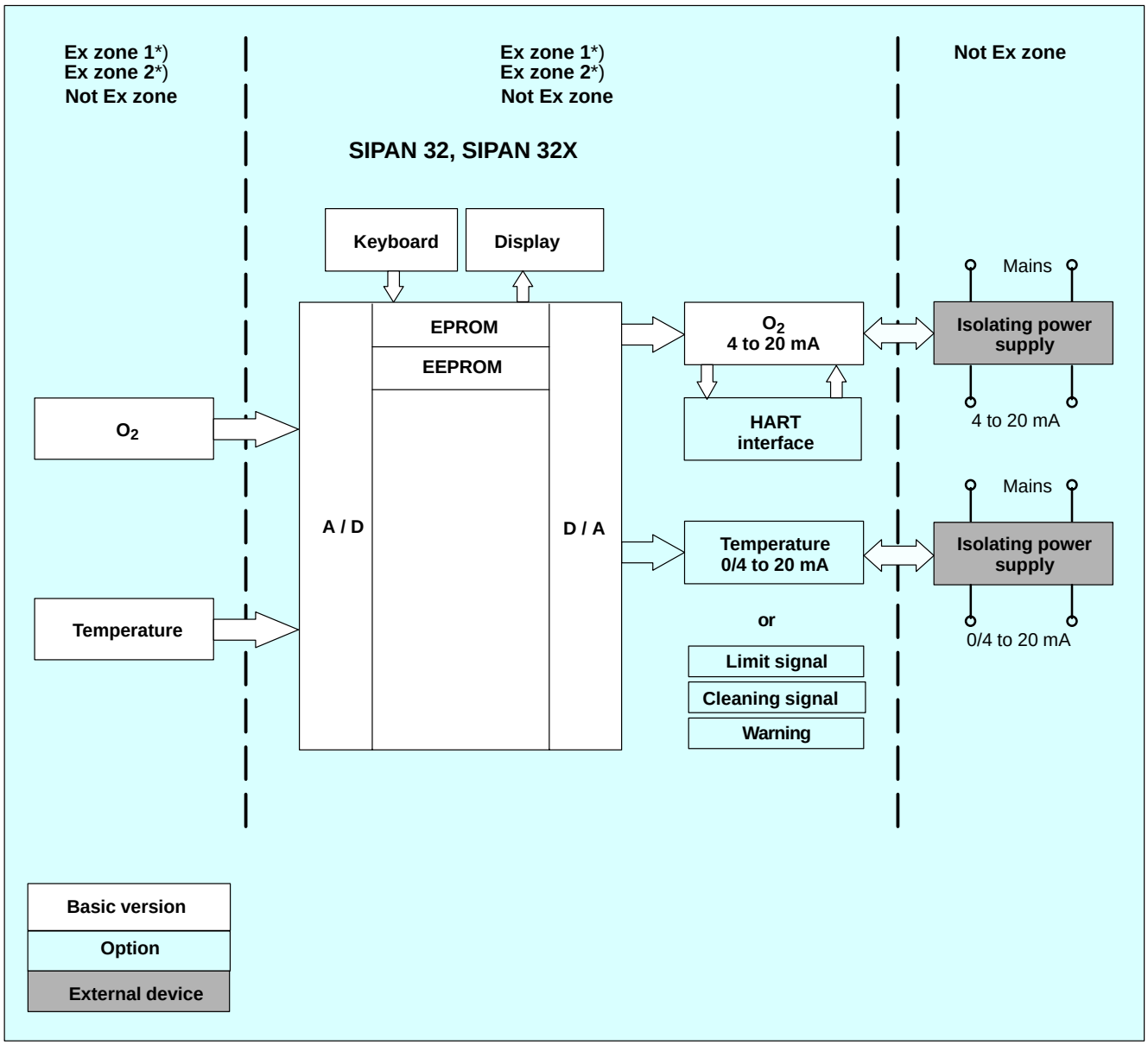


Fig. 3/5 SIPAN 32 and SIPAN 32X analyzers, mode of operation

*) Only with SIPAN 32X

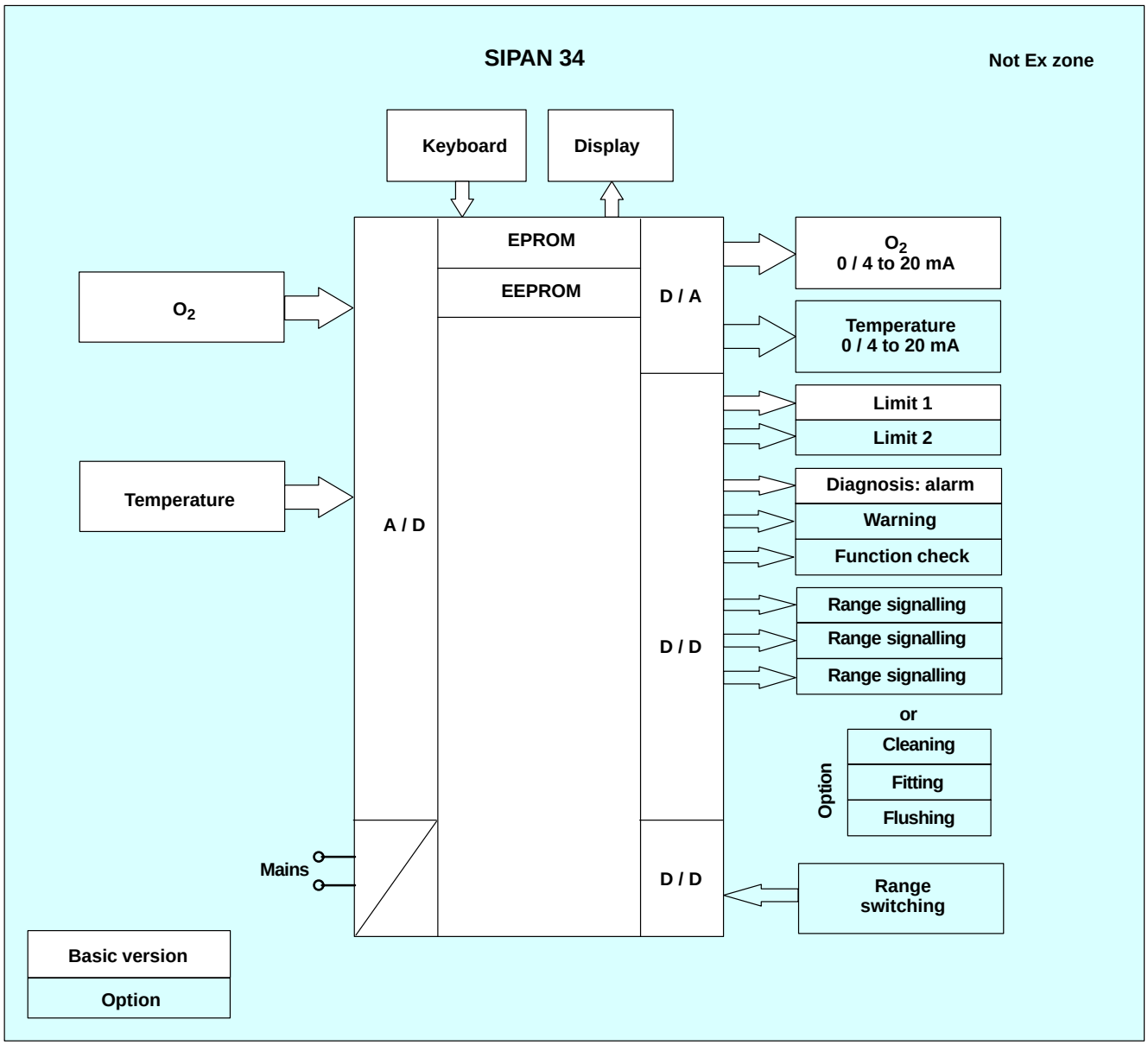


Fig. 3/6 SIPAN 34 analyzer, mode of operation

Mode of operation

SIPAN 32, SIPAN 32X and SIPAN 34 analyzers

Measured-value processing

The signals delivered by the analog input amplifiers are processed into a temperature-compensated value by the digital data processing function.

Oxygen

Oxygen is reduced by the polarization voltage present between the working and reference electrodes according to the simplified equation:

$O_2 + 2H_2O + 4e^- \rightleftharpoons 4OH^-$

The electrons are supplied by the silver reference electrode, simplified according to:

$4Ag \rightleftharpoons 4Ag^+ + 4e^-$

Temperature compensation

Oxygen:
The input signal which is temperature-compensated by the sensor preamplifier is converted into a standardized output signal by a range-dependent amplifier circuit.

Temperature:
The temperature of the measured medium is converted into a standardized output signal corresponding to a measuring range of 0 to +60 °C. An NTC resistor is fitted in the sensor as the thermometer.

Ex protection (SIPAN 32X)

Analyzers with type of protection "Increased intrinsic safety" EEx ia can be mounted in potentially explosive atmospheres (zone 1). The conformity certificate corresponds to the European standard (CENELEC).

Parameter sets (SIPAN 34) (option)

The analyzer contains complete parameter sets for 4 methods which can be set independent of one another (see page 3/13). Thus optimum adaptation is possible in a process in which different media are to be measured in succession in one line. Selection of the respective parameter set can be controlled externally.

Depending on the parameter settings of the analyzer, the following functions are executed in addition to output of the measured value:

Functions	SIPAN	
	32, 32X	**34**
Output of measured signal on the display	X	X
Output of measuring range and trend on the display		X
Switching of respective parameter set onto the display		X
Output of temperature via the second current output	X	X
Limit monitoring	X	X
Monitoring of sensor	X	X
Digital communication via the interface	X	
Diagnostic functions	X	X
Cleaning and timer function	X	X
PI controller		X
Software clock	X	X
Logbook	X	X
Illuminated display		X
Output of measuring-point name on the display		X

Mode of operation

Measurement of dissolved oxygen

Water free of oxygen absorbs oxygen when in contact with atmospheric air depending on the atmospheric pressure and the temperature until a state of equilibrium has been reached, i.e. the partial pressure of oxygen in the water is equal to that of the surrounding air.

The sensors which can be combined with the **SIPAN 32** and **SIPAN 34** analyzers operate according to the polarographic principle.
The so-called Clark sensors basically consist of a precious metal working electrode (cathode), a silver reference electrode (anode) and a membrane which is permeable to oxygen.

A silver counterelectrode is also present in sensors with a three-electrode system.

The analyzer delivers a constant polarization voltage at the cathode. The O_2 molecules diffusing through the FEP or PTFE membrane are reduced at the gold cathode, and at the same time anode metal (silver) passes into solution in the electrolyte following oxidation.
Thus the circuit between the anode and cathode is closed by the passage of ions via the electrolyte.

The resulting current is proportional to the partial pressure of oxygen in the measured medium and is measured by the amplifier.

The quantity of oxygen diffusing through the membrane per unit of time not only depends on the external partial pressure of oxygen but also on the temperature of the membrane.

To permit temperature compensation, a temperature sensor (NTC thermistor) is fitted in oxygen sensor such that it is connected thermally to the measured medium and can therefore signal its temperature to the analyzer.

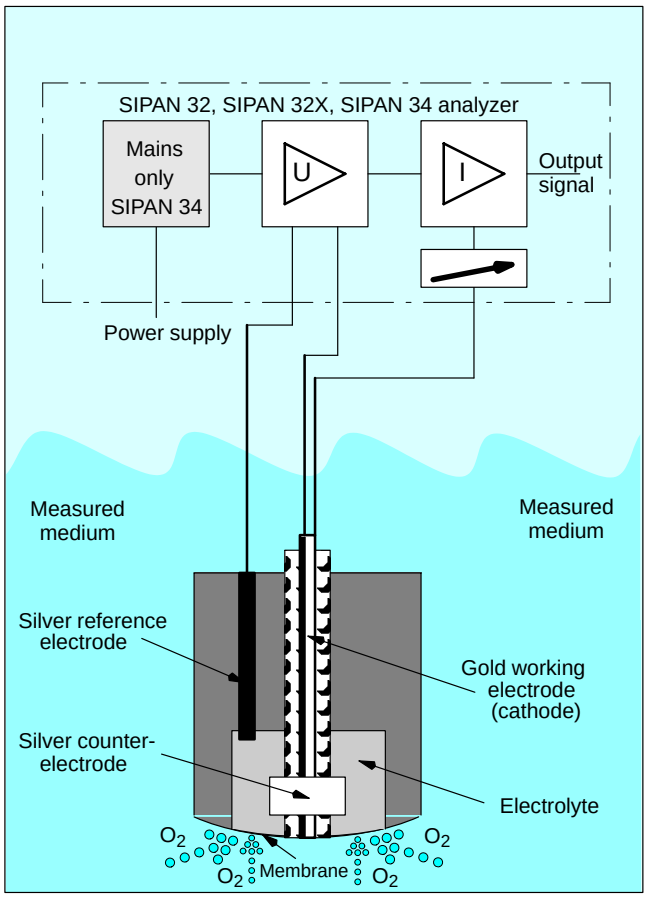


Fig. 3/7 Mode of operation of oxygen sensors with three-electrode system

Calibration and regeneration of the oxygen sensors

The sensor is **calibrated** using a single point (sensor is free of residual current), preferably **using air**.
The sensor is adjusted for 100 % saturation.

The calibration cycle depends on the conditions of use and the required accuracy.

The sensor must be regenerated, i.e. the electrolyte must be refilled and the membrane head replaced, if it can no longer be calibrated or if the membrane is damaged.

Variations in atmosphere pressure are automatically corrected in the SIPAN 34 during measurements/calibration.

The microprocessor analyzer operates with a non-linear temperature characteristic which is individually matched to the sensor to permit temperature compensation.

SIPAN 32 and SIPAN 32X analyzers

Characteristics

Characteristics

SIPAN 32 and SIPAN 32X are analyzers of the new two-wire generation with state-of-the-art micro-power technology with microprocessor control and multi-segment display.
The **SIPAN 32 and SIPAN 32X** analyzers are optionally available with special features for process use.

The **SIPAN 32 and SIPAN 32X** analyzers are available in field housings.

They contain the analog and digital data processing functions for the signal delivered by the sensor.

A **SIPAN 32 or SIPAN 32X** analyzer can be used for all measuring ranges.

Special characteristics of SIPAN 32

- Two-wire analyzer with state-of-the-art micro-power technology
- Extremely simple field installation with only two wires
- Complete basic configuration
- Menu-based operation with understandable symbols (based on IEC)
- Complete local operation with directly accessible keypad with 8 keys and large, clearly-arranged multi-segment display
- Display of µg/l, mg/l, mbar, ppb, hPA, % saturation
- All measuring procedures for O_2 in ultra-pure water, food, waste water are available
- Additional permanent temperature display selectable in °C or °F
- Logbook with entry of faults or calibration procedures with date and time
- Output signal 4 to 20 mA
- Fault or limit output > 20 mA
- Automatic HOLD function
- Comprehensive fault diagnosis system
- 3 operating levels with coded protection for monitoring, routine and specialists
- Selectable tests for: display, keys, RAM, EPROM, EEPROM
- Output of defined current values for test purposes
- Maximum electromagnetic compatibility according to CE and NAMUR, sensitive lightning protection
- Robust field housing (IP 65/NEMA 4X) with four Pg screwed glands for easy connection
- No special or expensive mounting set required for wall or panel mounting

Special characteristics of SIPAN 32X

- Analyzers with type of protection "Increased intrinsic safety" EEx ia can be used within the potentially explosive atmospheres (zone 1, CENELEC).

Options

- Second passive output, freely-parameterizable for second current output, temperature or for flushing function, limit, warning (pre-alarm)
- HART communication via handheld communicator or PC
- Available via HART interface: 4 parameter sets with remote selection for complete methods, not only for measuring ranges, e.g. also limits, physical dimensions, hysteresis

Functions

	Basic analyzer	Options
Inputs	O_2 value Temperature	HART interface, thus access to 4 complete parameter sets for complete methods including measuring ranges, limits, physical dimensions, hysteresis
Outputs	Analog output with alarm 21 mA	2nd analog output for temperature or flushing function or limit or warning
Contacts	-	-

Remote switching of method

Method number	1	2	3	4
Medium	Biofermenter	Water	Biofermenter	Water
Range	20 to 30	0.001 to 1	30 to 400	0.001 to 1
Dimension	µg/l	mg/l	µg/l	mg/l
Limit				
	30 max.	0.5 max.	300 min.	0.8 min.

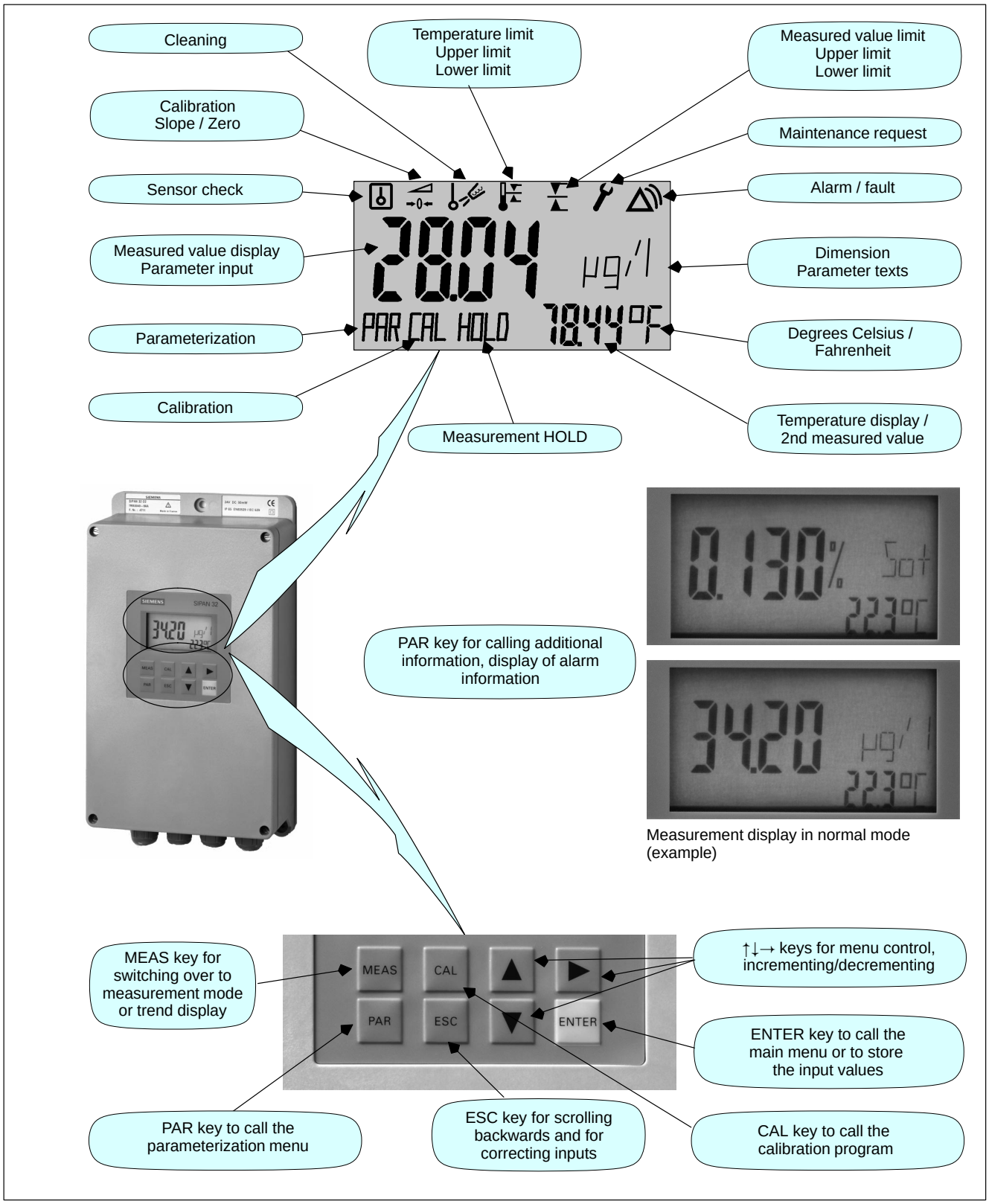


Fig. 3/8 SIPAN 32, SIPAN 32X analyzers, display and control panel

SIPAN 32 and SIPAN 32X analyzers

Dimensions, design

Display		
Measured value		Four 16-mm digits
Secondary display		Four 8-mm digits
Text display		Five digits
Others		Symbol displays
Input display		Symbols
Inputs		According to NAMUR
8 keys:	MEAS	Measurement
	PAR	Parameterization
	CAL	Calibration
	ESC	1 step backwards in menu
	▲	Increment the number
	▼	Decrement the number
	▶	1 digit to right
	ENTER	Acceptance of entered value
Coding		3 coding levels for operations (display level, user level, specialist level)
Languages		Display texts universally understandable, Instruction Manual in 5 languages
Dimension		µg/l, mg/l, mbar, ppb, hPa, % saturation
Measuring range		See technical data of sensors
Measuring span (expansion)		Any, but at least 10% of smallest measuring range
Output range		Optionally selectable between 0 and maximum full-scale value
Measuring range for temperature		0 to 100 °C (7MA3100-8CA) 32 to 212 °F
Meas. span for temp.		Any, but at least 10% of meas. range
Temperature compensation		7MA3100-8CC, -8CE, -8CD, internal sensor 7MA3100-8CA, compensation of membrane diffusion
Error limits		
Oxygen measurement (at rated conditions)		< 1.5 % of measured value ± 5 µg/l (7MA3100-8CC, -8CE, -8CD) ± 7 µg/l (7MA3100-8CA)
Error limits		
Temperature (at rated conditions)		< 0.3 K
Influencing effects		To DIN IEC 746, Part 1
Repeatability		< 0.2 % of full-scale value
Linearity		< 0.3 % of measured value
Ambient temperature		< 0.2 %/10 K
Power supply		< 0.2 % of measured value
Load		< 0.1 %/100 Ω
Zero error		< 0.2 % of measured value, ± 3 µg/l (7MA3100-8CC, -8CE, -8CD) ± 5 µg/l (7MA3100-8CA)
Output signal		Electrically isolated from sensor, 4 to 20 mA linear to meas. value or bilinear to measured value (2 linear partial ranges with a knee at 12 mA, see Fig. 3/9
Max. permissible load		(power supply - 14) V/0.02 A
Logbook		Automatic recording of warning and failure messages with date and time, 20 entries with overflow, non-erasable
Data storage		> 10 years (EEPROM)
Device self-test		Testing of RAM, EPROM, EEPROM, display, keyboard
Clock		Software clock
Identification		CE marking
EMC		To NAMUR NE 21

Radio interf. suppression	EN 55011 and EN 55022
Applied harmonized standards	EN 61010 (IEC 1010) EN 55022 class B IEC 1000-3-2 IEC 1000-4-2 class 2 IEC 1000-4-3 class 3(2) IEC 1000-4-4 class 4 IEC 1000-4-5 class 3 IEC 801-6 class 3 (pr IEC 1000-4-6/1995) pr EN 61000-4-11 class C
Mechanical stress	Vibration load of modules to IEC 68-2-6 Repetitive shocks to IEC 68-2-27
Climatic loading	IEC 721-3-3, IEC 721-3-2
Transport loading	IEC 68-2-6
Electrical safety	IEC 1010, IEC 664
Lightning protection	EN 61000-4-5
Foreign matter/ water protection	IEC 529
Degree of protection	IP 65 to EN 60529 or NEMA 4X
Quality assurance system	DIN ISO 9001 / EN 29000
Material	Macrolon (polycarbonate + 20% glass fiber)
Permissible ambient temperature	
Operation	-20 to +55 °C
Transport and storage	-25 to +85 °C
Permissible rel. humidity	10 to 95 %, no condensation
Compens. of atmos. press.	Can be entered manually
Calibration	Manual using air
Power supply	DC 24 V (14 V to 30 V), 0.8 W protection class II
Dimensions	See Fig. 3/12
Weight	2.5 kg, field housing
Options	See page 3/10
2nd passive analog output	0/4 to 20 mA linear to temperature, or flushing function, or limit, or warning (pre-alarm)
Communication	PC/laptop or HART communicator with SIPAN 32 and SIPAN 32X analyzers
Load with connection of	
HART modem	250 to 500 Ω
HART communicator	250 to 500 Ω
Line	Two-conductor, screened: ≤ 1.5 km
Protocol	HART, version 5.1
SIPAN 32X with Ex protection	
Explosion protection to DIN EN 50014 and DIN EN 50020	Type of protection "Increased intrinsic safety ia" II 2G EEx ia IIC T4
Permissible ambient temperature during operation	-20 to +50 °C
Power supply/output signal circuit	With type of protection "Intrinsic safety EEx ia IIC" only for connection to certified intrinsically-safe circuits with the following maximum values: U_i = 30 V,, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω, Effective internal inductance: L_i = negligible Effective int. capacitance: C_i = 16 nF

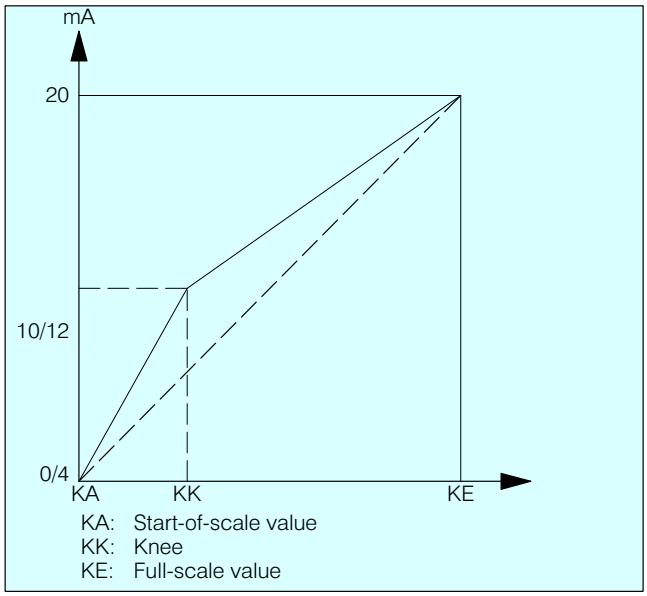


Fig. 3/9 Linear and bent characteristics

Parameter sets (example)

Parameter set	1	2	3	4
Medium	Biofermenter	Water	Biofermenter	Water
Measuring range	20 to 30 µg/l	0.001 to 1	30 to 400 µg/l	0.001 to 1
Dimension	µg/l	mg/l	µg/l	mg/l
Limit				
	30 max.	0.5 max.	300 min.	0.8 min.

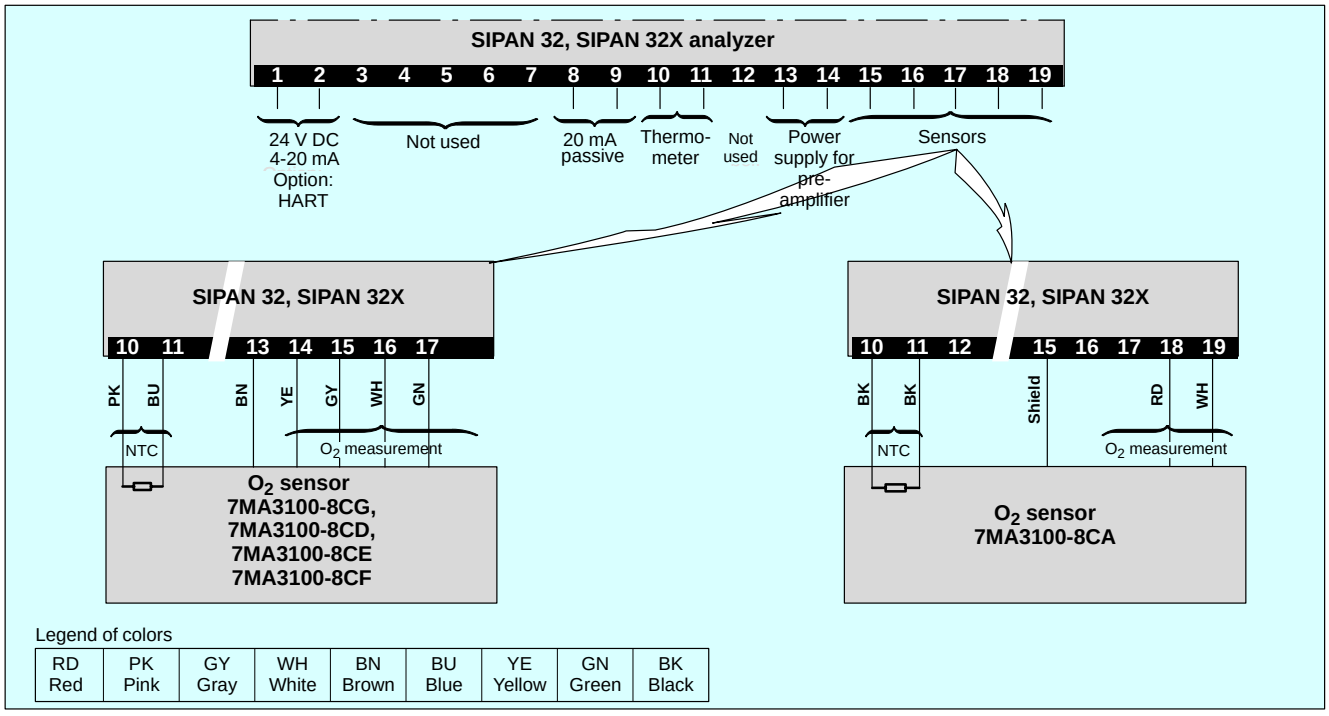


Fig. 3/10 SIPAN 32, SIPAN 32X analyzer, electric connections

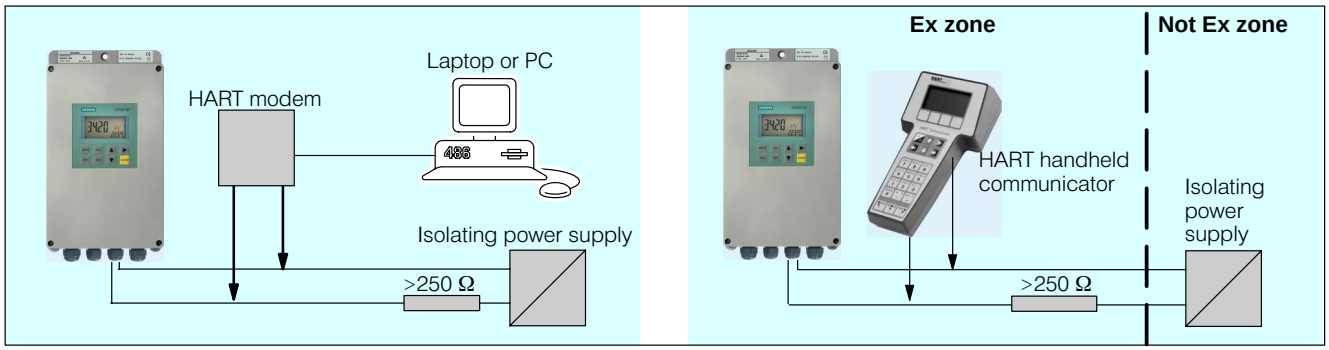


Fig. 3/11 SIPAN 32 or SIPAN 32X analyzer, electric connections; shown at bottom is communication between SIPAN 32 or SIPAN 32X and HART communicator or with HART modem and PC

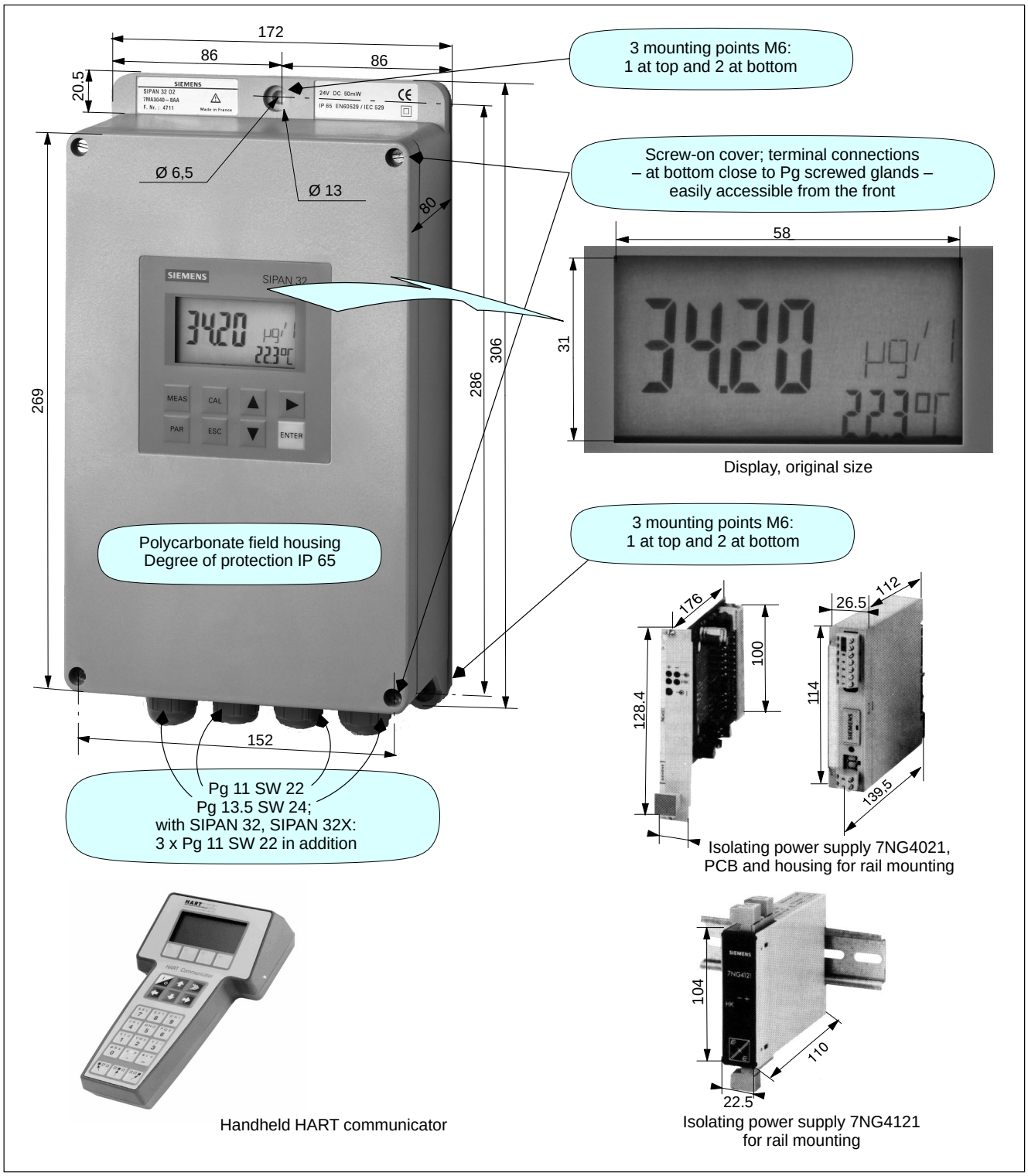


Fig. 3/12 SIPAN 32, SIPAN 32X analyzer, isolating power supply and handheld communicator, dimensions in mm

	Order No.
SIPAN 32 analyzer **Two-wire system,** **for the measurement of dissolved O_2** Microprocessor-based, membrane keyboard with multi-segment display, menu control, logbook, concentration display, temperature compensation, diagnostic software, 1 parameter set, power supply: DC 24 V, in field housing	**7MA3040-8A** □
Standard version, 1 signal output: 4 to 20 mA without interface	**A**
1 signal output: 4 to 20 mA, with HART interface	**B**
2 signal outputs with HART interface: 1st signal output: measured value 4 to 20 mA, 2nd signal output: temperature or switching contact for limit or cleaning or warning	**C**

	Order No.
SIPAN 32X analyzer with Ex protection, intrinsically-safe version, **II 2G EEx ia IIC T4,** **two-wire system,** **for the measurement of dissolved O_2** Microprocessor-based, membrane keyboard with multi-segment display, menu control, logbook, concentration display, temperature compensation, diagnostic software, 1 parameter set, power supply: DC 24 V, in field housing	**7MA3041-8A** □
Standard version, 1 signal output: 4 to 20 mA without interface	**A**
1 signal output: 4 to 20 mA, with HART interface	**B**
2 signal outputs with HART interface: 1st signal output: measured value 4 to 20 mA, 2nd signal output: temperature or switching contact for limit or cleaning or warning	**C**

	Order No.
Isolating power supply (see MP 19, Section 5 for technical data)	
• With AC/DC 24 V power supply, DIN rail mounting	**7NG4121-1AA00-1NN0**
• With AC/DC 24 V power supply, PCB, individual locking	**7NG4021-4CA33-0NN0**
• With AC 115 V power supply, DIN rail mounting	**7NG4021-6BA33-0NN0**
• With AC 230 V power supply, DIN rail mounting	**7NG4021-6AA33-0NN0**
• HART version with Ex protection EEx ia IIC, smart, with AC/DC 24 V power supply, compact subassembly, DIN rail mounting	**7NG4121-1AA20-1AN0**
• HART version with Ex protection EEx ia IIC, smart, with AC/DC 24 V power supply, PCB, individual locking	**7NG4021-4CA33-2NA1**

	Order No.
Handheld HART communicator Intrinsically-safe version EEx ia IIC T4 (see MP 17, Section 5 for technical data)	
• German version	**7MF4998–8KF**
• English version	**7MF4998-8KT**
HART modem	**7MF4997-1DA**
Software for PC	**On request**

Accessories/mounting material	Order No.
For mounting of analyzer or isolating power supply on a pipeline (see page 1/28 for dimensional drawing)	
Protective hood (mat. No. 1.4571) with base plate	**C79451-A3177-D12**
Pipe clamp (mat. No. 1.4571)	**7MA8500-8DG**
Base plate (mat. No. 1.4571)	**C79451-A3177-D11**
Set of screwdrivers "TORX"	**C79451-A3246-D50**

SIPAN 34 analyzer

Characteristics

SIPAN 34 is an analyzer of the four-wire generation with state-of-the-art technology with microprocessor control and illuminated graphic display.
The **SIPAN 34** analyzer is optionally available with special features for process use.

The **SIPAN 34** analyzer is available in two designs:
- With a field housing
- With a panel housing 96 x 96.

It contains the analog and digital data processing functions for the signal delivered by the sensor.

A **SIPAN 34** analyzer can be used for all measuring ranges.

Special characteristics

- Four-wire analyzer with extremely easy operation
- Universal power supply (24 V AC/DC, 115 V AC, 230 V AC)
- Complete basic configuration
- Self-explanatory menu operation in plain text in five languages (German, English, French, Spanish, Italian), without Instruction Manual, help function
- Operation according to NAMUR, i.e. complete local operation with directly accessible keypad with 8 keys and large, illuminated, full-graphic display
- Display of µg/l; mg/l; mbar; ppb; hPa; % saturation
- Additional permanent bargraph of measuring range
- Graphic trend display of measured value
- Additional permanent temperature display in °C
- Output signal 0/4 to 20 mA, floating
- Freely-programmable, permanent measuring-point designation (saves tag labels)
- Logbook with entry of faults or calibration procedures with date and time
- Fault and limit contacts
- Maintenance switch with automatic HOLD function
- Comprehensive fault diagnosis and preventive maintenance system in plain text
- 3 operating levels with coded protection for monitoring, routine and specialists
- Selectable tests for: keys, RAM, EPROM, EEPROM, display
- Output of freely-defined current values for test purposes
- Maximum electromagnetic compatibility according to CE and NAMUR, sensitive lightning protection
- Panel housing made completely of metal, CE safety for every control cabinet installation engineer
- Robust field housing (IP 65) with seven Pg screwed glands for easy connection
- No special or expensive mounting set required for wall or panel mounting

Options

- Second current output for measured value or temperature with additional limit
- Four parameter sets with remote selection for complete methods, not only for measuring ranges, e.g. also limits, physical dimensions, hysteresis
- Individual calibration of each parameter set possible
- Automatic cleaning function (3 relays) for cleaning, flushing, fitting control with cyclic time input, waiting and holding functions
- Two-point controller for pulse length (dosing valves) or pulse frequency (diaphragm pumps)
- Additional switching contacts for maintenance (function check) and pre-alarm (warning)

Functions

	Basic analyzer	Options
Inputs	 Dissolved oxygen  Temperature	 Remote switching of range for 4 parameter sets, thus access to 4 complete parameter sets for complete methods including ranges, limits, hysteresis
Outputs	 Analog output	 2nd analog output for temperature
Contacts	 1x failure 1x limit and 2x NAMUR contacts	 or   Second limit — 2 limits with controller function — 3 x cleaning or 3 x range signalling contacts

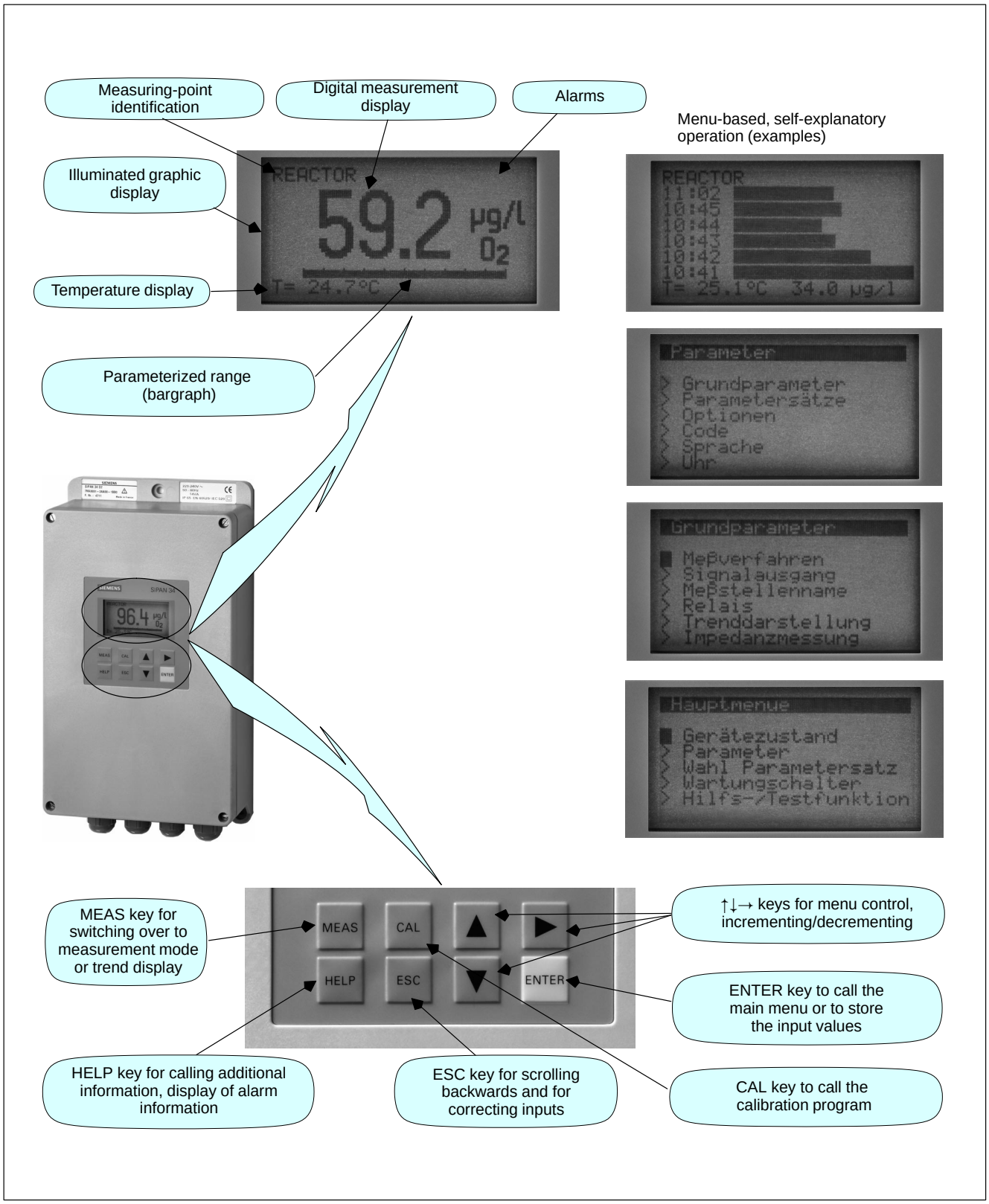


Fig. 3/13 SIPAN 34 analyzer, display and control panel

SIPAN 34 analyzer

Technical data (four-wire system)

Display		Graphic
Measured value		Four 15-mm digits or trend display: 5 bars, 3 mm high
Others		Temperature, alarms, measuring-point identification, 3-mm digits Current output as bargraph, 3 mm high
With inputs		8 lines of text 1 heading (inverted display) and 6 text lines, letters 4 mm high
Illumination		LED
Inputs		According to NAMUR
8 keys:	MEAS	Measurement/trend
	HELP	Help
	CAL	Calibration
	ESC	1 step backwards in menu
	▲	Increment the number / 1 line upwards
	▼	Decrement the number / 1 line downwards
	▶	1 digit to right with numbers
	ENTER	Calling a menu item / acceptance of entered value
Languages		5: German, English, French, Italian, Spanish; selectable
Coding		3 coding levels for operations (display level, user level, specialist level)
Dimension		µg/l, mg/l, mbar, ppb, hPa, % saturation
Measuring span O_2 (expansion)		Any, but at least 10% of smallest measuring range
Output range		Optionally selectable between 0 and maximum full-scale value
Measuring range for temperature		Input: NTC -20 to +60 °C (7MA3100-8CC, -8CE, -8CD) -20 to +150 °C (7MA3100-8CA)
Measuring span for temperature		Any, but at least 10% of measuring range
Temperature compensation		7MA3100-8CC, -8CE, -8CD internal sensor 7MA3100-8CA, compensation of membrane diffusion
Compensation of atmospheric pressure		Automatic, by barometric pressure correction
Error limits		
Oxygen measurement (at rated conditions)		< 1.5 % of measured value ± 3 µg/l (7MA3100-8CC, -8CE, -8CD) ± 5 µg/l (7MA3100-8CA)
Error limits		
Temperature (at rated conditions)		< 0.3 K
Influencing effects		To DIN IEC 746, Part 1
Repeatability		< 0.2 % of full-scale value
Linearity		< 0.3 % of measured value
Ambient temperature		< 0.2 %/10 K
Power supply		< 0.2 % of measured value
Load		< 0.1 %/100 Ω
Zero error		< 0.2 % of measured value, ± 1 µg/l (7MA3100-8CC, -8CE, -8CD) ± 3 µg/l (7MA3100-8CA)

Salinity correction	Possible
Output signal	0/4 to 20 mA floating, linear to measured value or bilinear to measured value (2 linear partial ranges with knee at 10 or 12 mA), see Fig. 3/14
Max. permissible load	750 Ω
Current limiting	0 or 21 mA (0 to 20 mA) 3.6 mA or 21 mA (4 to 20 mA)
Limit	1 NO or NC contact selectable, adjustable hysteresis and response time
Alarm contact	1 alarm (failure)
Relay contacts	NO contact, rating DC 24 V, 1 A
Logbook	Automatic recording of warning and failure messages with date and time, 20 entries with overflow
Data storage	> 10 years (EEPROM)
Device self-test	Testing of RAM, EPROM, EEPROM, display, keyboard; data can be called on display
Clock	Without battery backup
Identification	CE marking
EMC	To NAMUR NE 21
Applied harmonized standards	EN 61010 (IEC 1010) EN 55022 class B IEC 1000-3-2 IEC 1000-4-2 class 2 IEC 1000-4-3 class 3(2) IEC 1000-4-4 class 4 IEC 1000-4-5 class 3 IEC 801-6 class 3 pr IEC 1000-4-6/1995) pr EN 61000-4-11 class C
Radio interference supp.	EN 55011 and EN 55022
Mechanical stress	Vibration load of modules to IEC 68-2-6 Repetitive shocks to IEC 68-2-27
Climatic loading	IEC 721-3-3, IEC 721-3-2
Transport loading	IEC 68-2-6
Electrical safety	IEC 1010, IEC 664
Lightning protection	EN 61000-4-5
Foreign matter/ water protection	IEC 529
Degree of protection	
Field device	IP 65 to EN 60529 or NEMA 4X
Panel mounting	IP 54 to EN 60529 (front)
Quality assurance system	DIN ISO 9001 / EN 29000
Material	
Field housing	Macrolon (polycarbonate + 20% glass fiber)
Panel mounting housing	Aluminium

Permissible ambient temp.	
Operation (field device)	-20 to +55 °C
Operation (panel mounting)	-5 to +70 °C
Transport and storage	-25 to +85 °C
Permissible relative humidity	10 to 95 %, no condensation
Compensation of atmospheric pressure	Manual, can be entered
Calibration	Manual using air
Power supply	AC 120 V (94 V to 132 V), 48 to 63 Hz, 10 VA AC 230 V (187 V to 264 V), 48 to 63 Hz, 10 VA AC 24 V (20 V to 26 V), 48 to 63 Hz, 10 VA DC 24 V (20 V to 30 V), 8 W Protection class II (field housing)
Dimensions	See Fig. 3/16
Weight	2.5 kg field housing 2.0 kg panel housing
Options	See page 3/16
Second output signal	0/4 to 20 mA linear to temperature
Additional limit	1 x NO or NC contact selectable, any assignment to measured value or temperature
Parameter sets	4
Range signalling	Signalling of current measuring range (3 contacts)
Cleaning contacts with timer	3, fitting control, cleaning and flushing
Range switchover	4, parameterizable as desired using range selection; external control possible
Controller	2 floating contacts (instead of limits) as PI controller

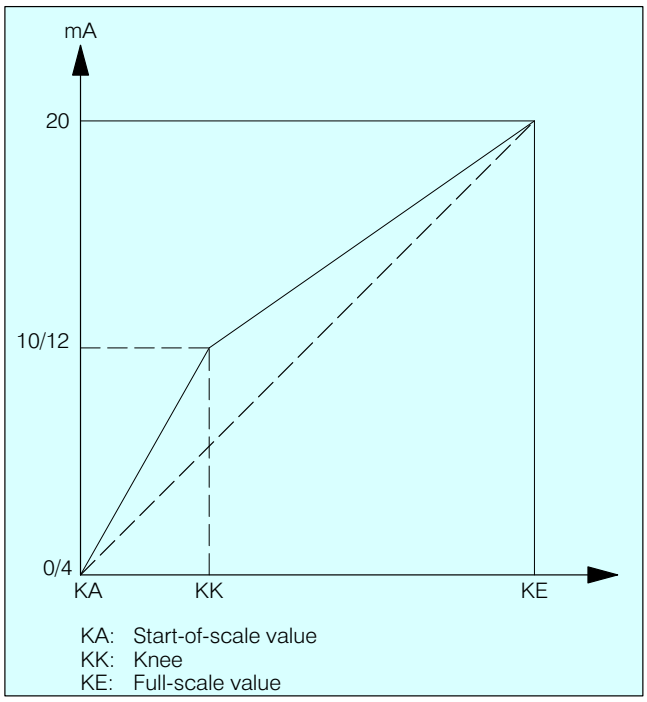


Fig. 3/14 Linear and bent characteristics

SIPAN 34 analyzer

Technical data (four-wire system)

Parameter sets

Parameter set	1	2	3	4
Medium	Biofermenter	Water	Cleaning 1 (biofermenter)	Water
Dissolved O_2 range	20 to 30 µg/l	0.001 to 1	300 to 400 µg/l	0.001 to 1
Dimension	µg/l	mg/l	µg/l	mg/l
Special calibrated value	Yes			
Two special limits each with freely selectable hysteresis for:				
Measured value	Min. e.g. 20 to max. e.g. 30 µg/l	Min. 0.01 to max. 0.5 mg/l	Min. 300 to max. 400 µg/l	Min. 0.01 to max. 0.8 mg/l
or temperature	Min. e.g. -10 °C to max. e.g. 15 °C	Min. e.g. 20 °C to max. e.g. 50 °C	Min. e.g. -10 °C to max. e.g. 15 °C	Min. e.g. 20 °C to max. e.g. 50 °C
Two diagnostic contacts (pre-alarm, maintenance)	Yes			
Range signalling:				
Contact 1	Off	On		
Contact 2	Off		On	
Contact 3	Off			On

Range switchover

Measuring range (parameter setting)	1	2	3	4
Medium	Biofermenter	Water	Biofermenter	Water
Dissolved O_2 range	20 to 30	0.001 to 1	300 to 400 µg/l	0.001 to 1
2 limits	30 µg/l max.	0.5 mg/l max.	300 µg/l min.	0.8 mg/l max.
Contact state				
1	Open	Closed	Open	Closed
2	Open		Closed	

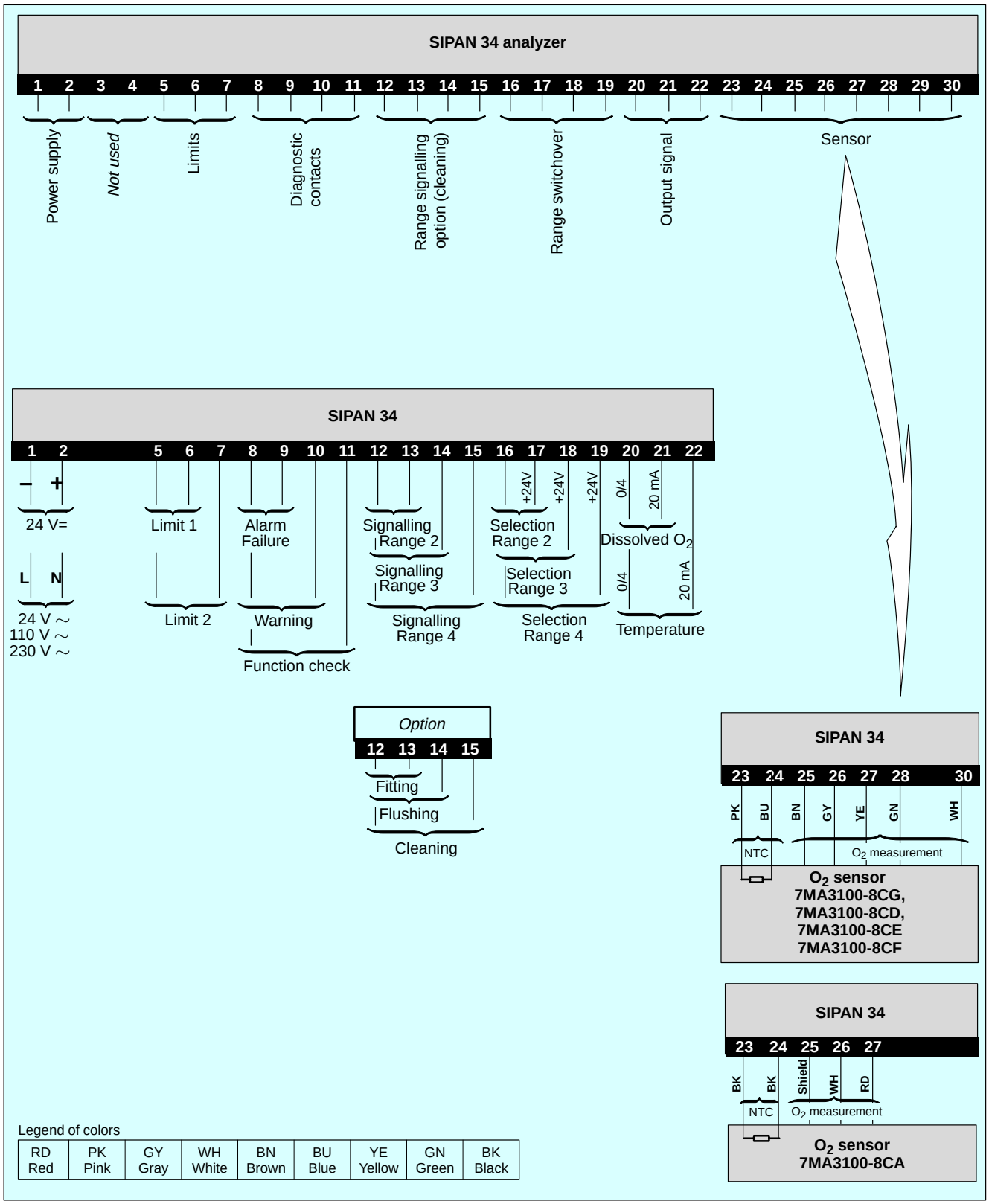


Fig. 3/15 SIPAN 34 analyzer, electric connections

SIPAN 34 analyzer

Dimensions, design

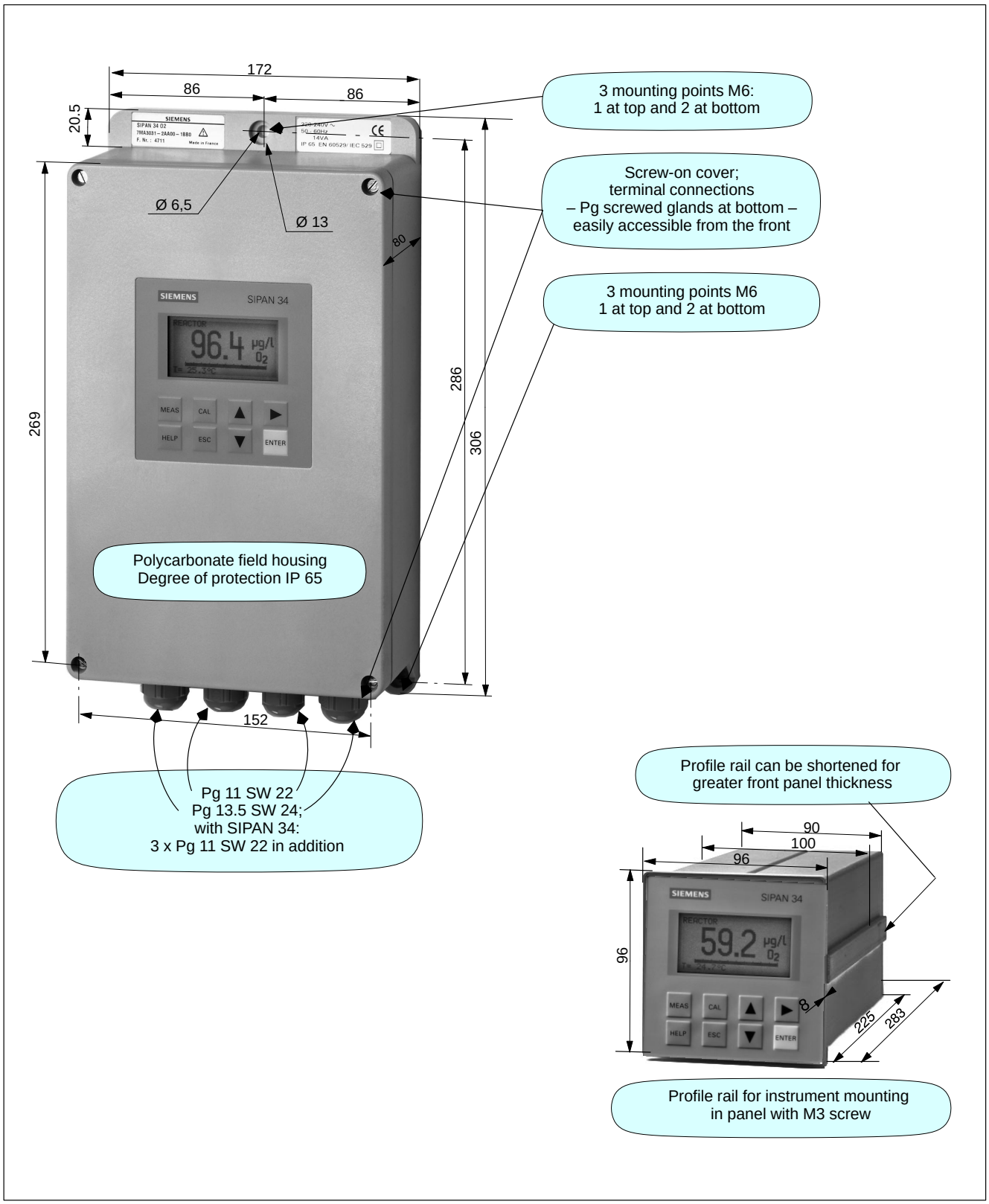


Fig. 3/16 SIPAN 34 analyzer, shown at top as field housing and at bottom as panel housing, dimensions

Analyzer SIPAN 34

Ordering data

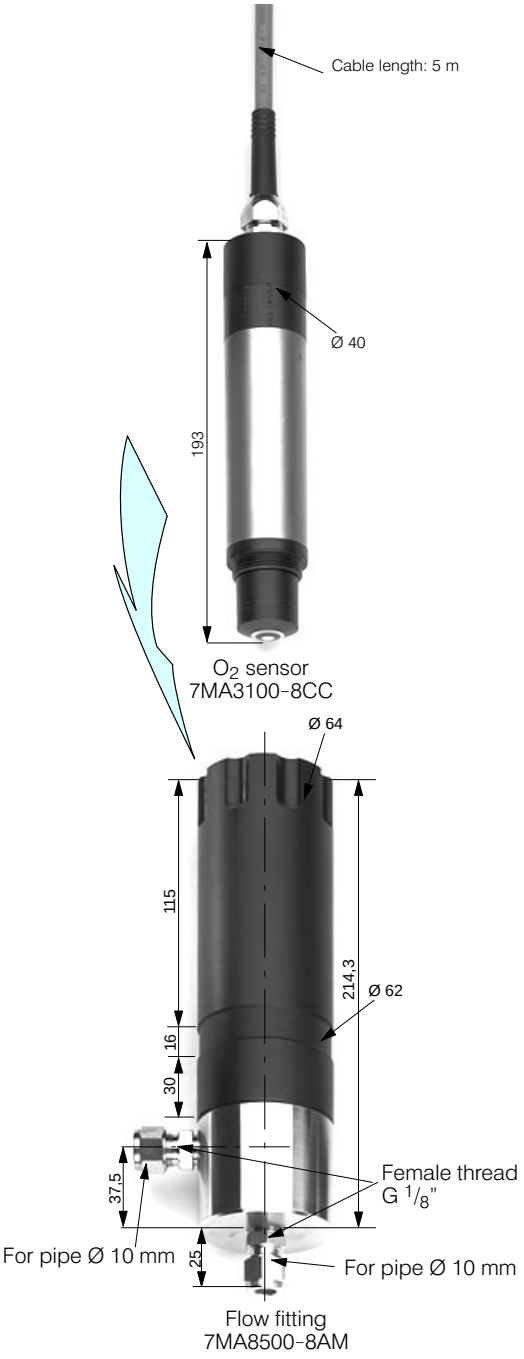
	Order No.
Analyzer SIPAN 34 **Four-wire system,** **for measurement of** **dissolved oxygen,** microprocessor-based with illuminated graphic display, membrane keyboard, menu-based operation in 5 languages, diagnostic software, trend display, concentration display, logbook, temperature compensation, compensation of atmospheric pressure, 1 parameter set, 1 signal output 0/4 to 20 mA, 1 alarm contact, 2 limit contacts and 2 diagnostic contacts	**7MA3034-** □□□□□**0** - **0**□□**0**
Power supply DC 24 V / AC 24 V, 48 to 63 Hz AC 120 V, 48 to 63 Hz AC 230 V, 48 to 63 Hz	**0** **1** **2**
Measuring procedure: Food Waste water Ultra-pure water	**A** **B** **C**
Instrument design Field housing Panel housing 96 x 96	**A** **B**
Options ● Without ● With second signal output 0/4 to 20 mA and second limit contact ● With 4 selectable parameter sets and 3 range signalling contacts ● With second signal output 0/4 to 20 mA, second limit contact, 4 selectable parameter sets and 3 range signalling contacts	 **0** **1** **2** **3**
Limits with controller function Without With	 **A** **B**
Automatic cleaning/flushing (3 contacts + timer for fitting, cleaning, flushing) Without With	 **A** **B**

Accessories	Order No.
For mounting of analyzer on a pipeline (see Fig. 3/21 for dimensional drawing)	
Protective hood (mat. No. 1.4571) with base plate	**C79451-A3177-D12**
Pipe clamp (mat. No. 1.4571)	**7MA8500-8DG**
Base plate (mat. No. 1.4571)	**C79451-A3177-D11**
Set of screwdrivers "TORX"	**C79451-A3246-D50**

Oxygen sensors, fittings, accessories

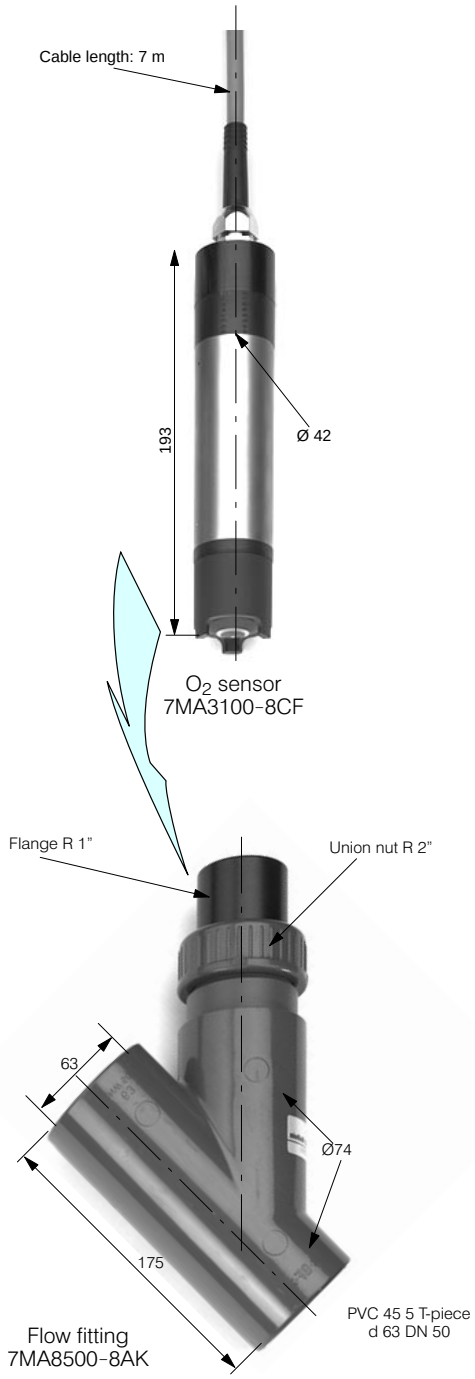
Dimensions, oxygen sensors for ultra-pure water, waste water

O_2 measurement in ultra-pure water



When fitting the O_2 sensor 7MA3100–8CC, the flow fitting 7MA8500–8AM must always be used in the bypass with suitable piping in order to avoid contact between the measured medium and the ambient air and thus to prevent excessively high measured values.

O_2 measurement in waste water



The O_2 sensor 7MA3100–8CD is fitted in the bypass in the PVC flow fitting 7MA8500–8AK.

Fig. 3/17 Oxygen sensors, matching fittings and accessories, dimensions in mm

Oxygen sensors, fittings, accessories

Ordering data, oxygen sensors for ultra-pure water, waste water

	Order No.
Measuring equipment for dissolved O_2 in ultra-pure water[1)] Measuring range: 0 ... 10 µg/l to 0 ... 1000 µg/l, comprising: – O_2 sensor with fixed cable, 5 m long, 7MA3100–8CC – Flow fitting, complete, 7MA8500–8AM – Membrane kit 1, 7MA8500–8CC – Cleaning attachment, 7MA8500–8DL – Analyzer (not included in delivery)[1)]	**7MA3100–8EF**

Accessories	Order No.
Oxygen sensor for dissolved O_2 in waste water Measuring range: 0 ... 5 mg/l to 0 ... 60 mg/l for installation in flow fitting 7MA8500–8AK, with fixed cable, 7 m long	**7MA3100–8CF**
Flow fitting for inline installation, PVC, mounting: union nut R 2”	**7MA8500–8AK**

Spare parts	Order No.
Membrane kit 1 (ultra-pure water) for O_2 sensor 7MA3100–8CC comprising: 2 membrane heads, polished foil, cleaning solution, electrolyte	**7MA8500–8CC**
Cleaning attachment for O_2 sensor 7MA3100–8CC	**7MA8500–8DL**

	Order No.
Analyzer **SIPAN 32** **SIPAN 34**	See page 3/15 See page 3/23

	Order No.
Standard combination for oxygen measurements in ultra-pure water	See page 3/33

Spare parts	Order No.
Membrane kit 3 (waste water) for O_2 sensor 7MA3100–8CD comprising: 2 membrane heads, polished foil, cleaning solution, electrolyte	**7MA8500–8CD**
Cleaning attachment for O_2 sensor 7MA3100–8CD	**7MA8500–8DL**

	Order No.
Analyzer **SIPAN 32** **SIPAN 34**	See page 3/15 See page 3/23

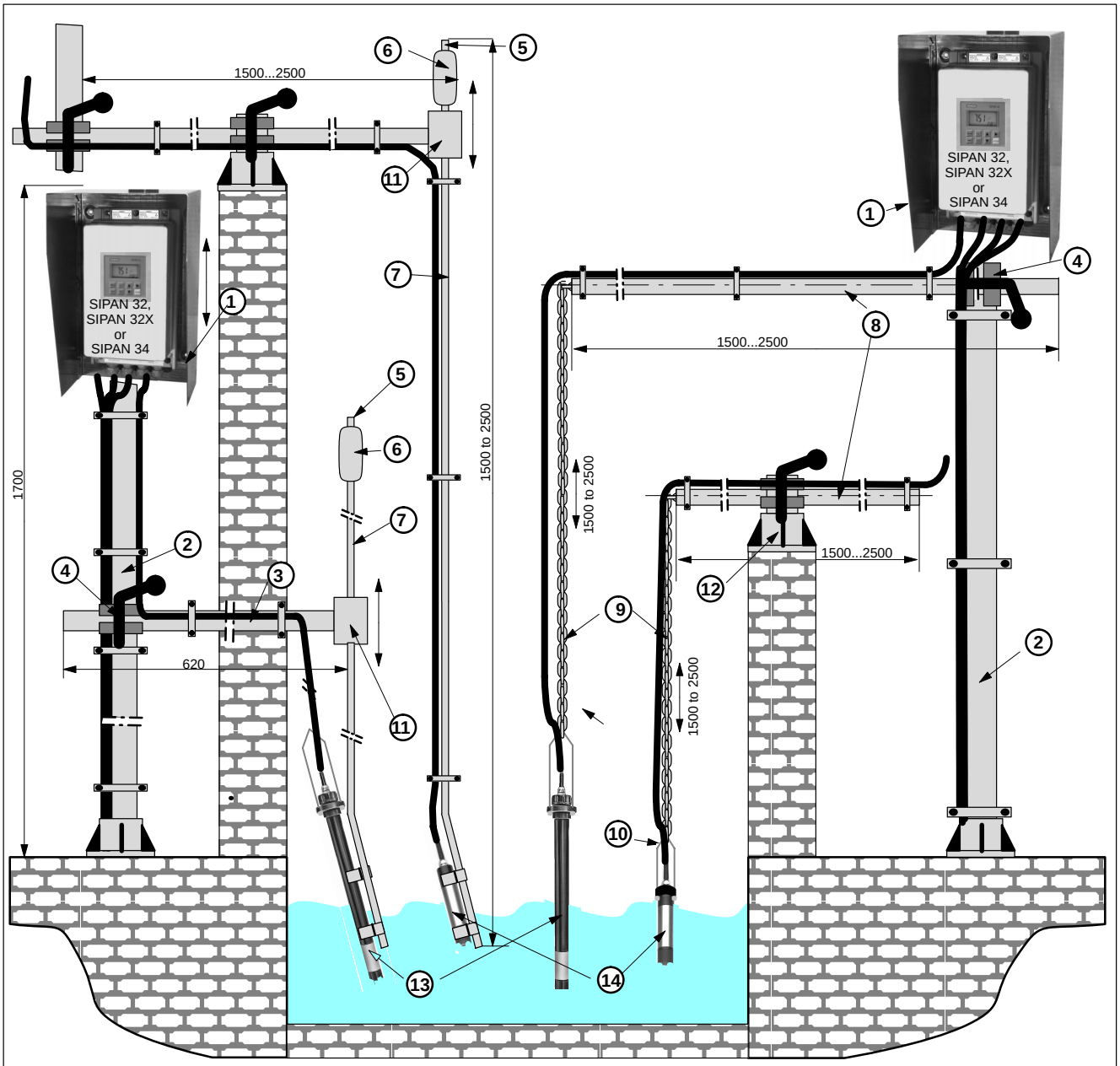
	Order No.
Standard combination for oxygen measurements in waste water	See page 3/33

[1)] Only in conjunction with SIPAN 34 analyzer.
Analyzer must be ordered separately.
Recommended: 7MA3031 – • C • 0 • –• • • •

Available ex-stock

Oxygen sensors, fittings, accessories

Dimensions, oxygen measurements in waste water



Support 7MA8500–8CJ for mounting stand 7MA8500–8CG or wall mount 7MA8500–8BP

Swinging support 7MA8500–8CH for mounting stand 7MA8500–8CG or wall mount 7MA8500–8BP

1 Protective hood C79451–A3177–D12
2 Mounting stand, Ø 50 mm, stainless steel, 7MA8500–8CG
3 Support for free rod, pipe 30 x 1.5, stainless steel, 7MA8500–8CJ
4 Mount
5 Freely suspended rod, drawn offset by 90°
6 Counterweight with adjustable height
7 Pipe 18 x 1, stainless steel
8 Swinging support, pipe 30 x 1.5, stainless steel
9 Variable-height plastic chain, 4 m
10 Handle for removing the immersion fitting
11 Suspension bearing with prism guide
12 Wall mount
13 O_2 sensor as immersion fitting 550 mm, 7MA3100–8CE
14 O_2 sensor 7MA3100–8CF (handle 7MA8500–8BQ)

The O_2 sensors 7MA3100–8CE and 7MA3100–8CF can be mounted with a support 7MA8500–8CJ or a swinging support 7MA8500–8CH on the mounting stand 7MA8500–8CG or on the wall mount 7MA8500–8BP.
The stainless steel stand provides additional space for a SIPAN 32 or SIPAN 34 analyzer under a protective hood.

Fig. 3/18 Oxygen sensors, matching fittings and accessories, dimensions in mm

Oxygen sensors, fittings, accessories

Ordering data, oxygen measurements in waste water

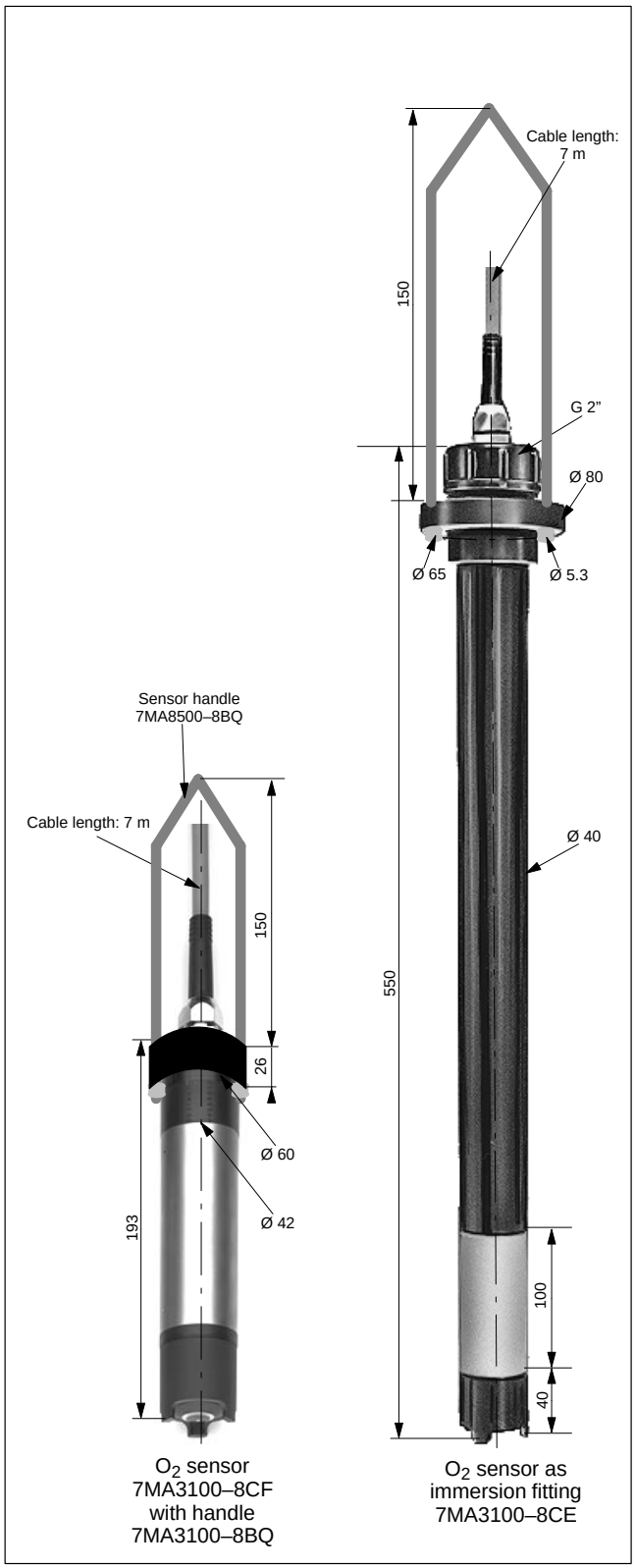


Fig. 3/19 Oxygen sensor as immersion fitting for waste water, dimensions in mm

	Order No.
Oxygen sensor for dissolved O_2 in waste water, measuring range 0 ... 5 mg/l to 0 ... 60 mg/l, with fixed cable, 7 m long, for mounting on support 7MA8500–8CJ or with sensor handle 7MA8500–8BQ on swinging support 7MA8500–8CH	**7MA3100–8CF**
Oxygen sensor for dissolved O_2 in waste water, fixed installation in PVC immersion fitting, 550 mm long, with sensor handle, measuring range 0 ... 5 mg/l to 0 ... 60 mg/l, with fixed cable, 7 m long	**7MA3100–8CE**

Accessories	Order No.
Mounting stand made of stainless steel	**7MA8500–8CG**
Wall mount made of stainless steel	**7MA8500–8BP**
Swinging support made of stainless steel for fitting on mounting stand 7MA8500–8CG or wall mount 7MA8500–8BP	**7MA8500–8CH**
Support for free rod made of stainless steel for fitting on mounting stand 7MA8500–8CG or wall mount 7MA8500–8BP	**7MA8500–8CJ**
Sensor handle made of stainless steel, for fitting of sensor 7MA3100–8CF on swinging support 7MA8500–8CH	**7MA8500–8BQ**

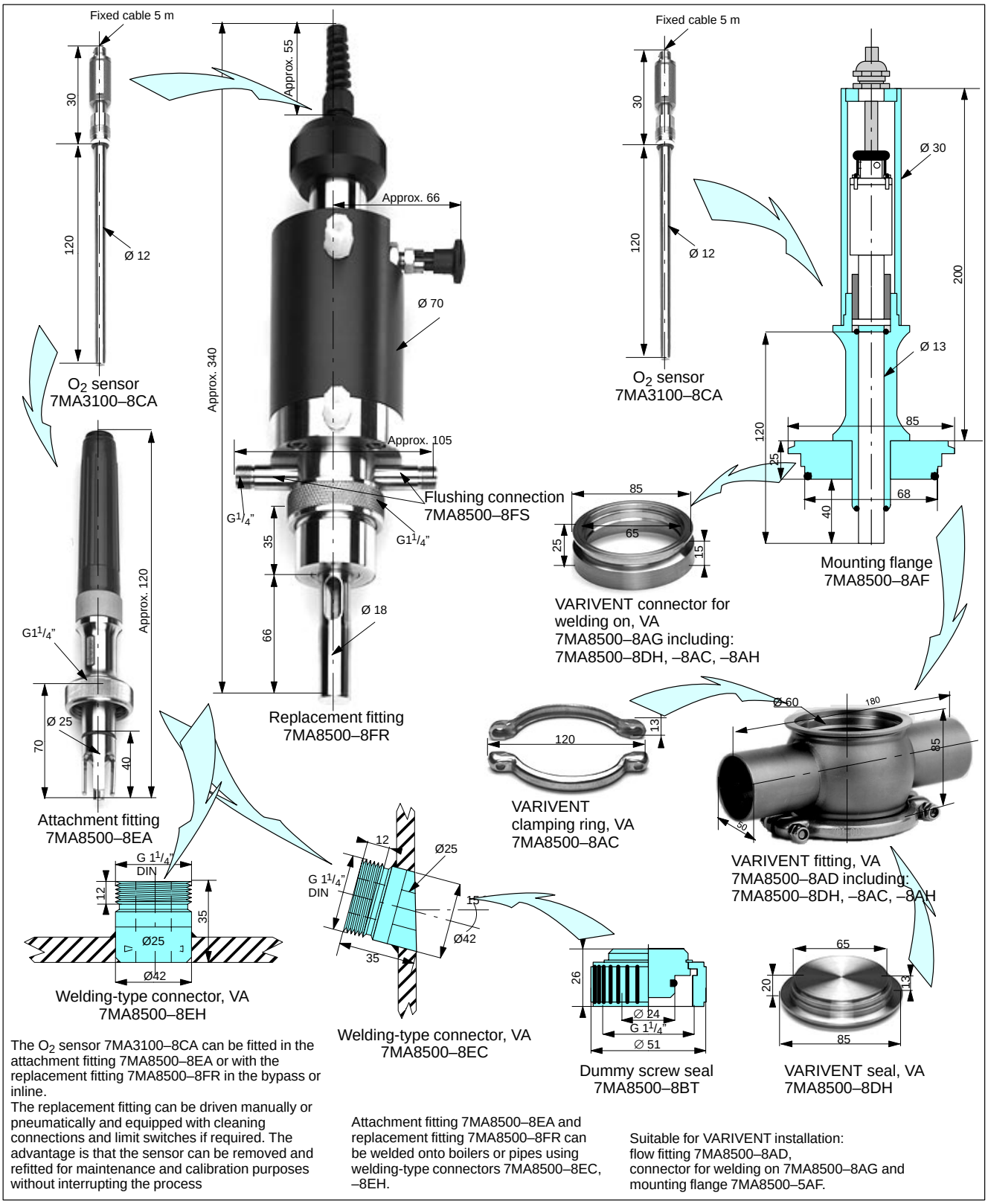
Spare parts	Order No.
Membrane kit 3 (waste water) for O_2 sensors 7MA3100–8CE and 7MA3100–8CF comprising: 2 membrane heads, polished foil, cleaning solution, electrolyte	**7MA8500–8CD**
Cleaning attachment for O_2 sensors 7MA3100–8CF and 7MA3100–8CE	**7MA8500–8DL**

	Order No.
Analyzer **SIPAN 32** **SIPAN 34**	 See page 3/15 See page 3/23

	Order No.
Standard combination for oxygen measurements in waste water	See page 3/33

Oxygen sensors, fittings, accessories

Dimensions, oxygen measurements in the food industry and in biotechnology



The O_2 sensor 7MA3100–8CA can be fitted in the attachment fitting 7MA8500–8EA or with the replacement fitting 7MA8500–8FR in the bypass or inline.
The replacement fitting can be driven manually or pneumatically and equipped with cleaning connections and limit switches if required. The advantage is that the sensor can be removed and refitted for maintenance and calibration purposes without interrupting the process

Attachment fitting 7MA8500–8EA and replacement fitting 7MA8500–8FR can be welded onto boilers or pipes using welding-type connectors 7MA8500–8EC, –8EH.

Suitable for VARIVENT installation:
flow fitting 7MA8500–8AD,
connector for welding on 7MA8500–8AG and
mounting flange 7MA8500–5AF.

Fig. 3/20 Oxygen sensors, matching fittings and accessories, dimensions in mm

Oxygen sensors, fittings, accessories

Ordering data, oxygen measurements in the food industry and in biotechnology

	Order No.
Oxygen sensor for dissolved O_2 in the food industry with fixed cable, 5 m long, measuring range: 0...100 µg/l to 0...20 mg/l for installation in: – Flow fitting 7MA8500–8EA or – Replacement fitting 7MA8500–8FR or – Mounting flange 7MA8500–8AF for VARIVENT fittings	**7MA3100–8CA**

	Order No.
Attachment fitting for inline installation, stainless steel, mounting: union nut G $1^1/_4$"	**7MA8500–8EA**
Welding-type connector, straight, stainless steel, G $1^1/_4$"	**7MA8500–8EH**
Welding-type connector, angled 15°, stainless steel, G $1^1/_4$"	**7MA8500–8EC**
Dummy screw seal, stainless steel, with union nut G $1^1/_4$" for tight sealing of welding-type connectors 7MA8500–8EH and 7MA8500–8EC	**7MA8500–8BT**

	Order No.
Replacement fitting for inline installation and for mounting on vessels, made of stainless steel/Viton (FPM), mounting with thread G$1^1/_4$", for 120-mm plug head sensors 7MA8500–8FA, –8FF, –8DP and –8FG, with polymer electrolyte	
• Standard version (without flushing connections or pneumatic drive)	**7MA8500–8FR**
• With 2 flushing connections	**7MA8500–8FS**
• With 2 flushing connections and pneumatic drive	**7MA8500–8FT**
Replacement fitting for inline installation, plastic version and tri-clamp 2" process connection, Hastelloy (flushing connections not included in delivery)	**On request**
Welding-type connector, straight, stainless steel, G $1^1/_4$"	**7MA8500–8EH**
Welding-type connector, angled 15°, stainless steel, G $1^1/_4$"	**7MA8500–8EC**
Dummy screw seal, stainless steel, with union nut G $1^1/_4$" for tight sealing of welding-type connectors 7MA8500–8EH and 7MA8500–8EC	**7MA8500–8BT**

	Order No.
Mounting flange, stainless steel, for mounting in VARIVENT fitting 7MA8500–8AD, with threaded socket for O_2 sensor 7MA3100–8CA	**7MA8500–8AF**
VARIVENT fitting, stainless steel (mat. No. 1.4404) as flow fitting for DN 50 pipes, with – 1 seal 7MA8500–8DH – 2 clamping rings 7MA8500–8AC – 2 EPDM gaskets 7MA8500–8AH	**7MA8500–8AD**
VARIVENT connector for welding on, stainless steel (mat. No. 1.4404) for mounting on vessels, with – 1 seal 7MA8500–8DH and – 1 clamping ring 7MA8500–8AC – 1 EPDM gasket 7MA8500–8AH	**7MA8500–8AG**
VARIVENT seal, stainless steel (mat. No. 1.4404)	**7MA8500–8DH**
VARIVENT clamping ring, stainless steel (mat. No. 1.4404)	**7MA8500–8AC**

Spare parts	Order No.
Membrane kit 2 (food industry) for O_2 sensor 7MA3100–8CA comprising: 1 membrane head, O-ring, electrolyte	**7MA8500–8EE**
VARIVENT gasket Standard EPDM gaskets (set of 5) Special Viton gaskets (set of 25)	**7MA8500–8AH** **7MA8500–8AJ**

	Order No.
Analyzer **SIPAN 32, SIPAN 32X** **SIPAN 34**	See page 3/15 See page 3/23

	Order No.
Standard combination for oxygen measurements in the food industry	See page 3/33

Technical data

Oxygen sensors

	O_2 sensor 7MA3100-8CA	O_2 sensor 7MA3100-8CC[1)]	O_2 sensor 7MA3100-8CD	O_2 sensor 7MA3100-8CE	O_2 sensor 7MA3100-8CF
Application	Food industry	Ultra-pure water	Waste water		
Measuring range	Continuous 0 to 20.0 mg/l	Continuous 0 to 1000 µg/l Short-term 0 to 10.0 mg/l	0 ... 5 mg/l to 0 ... 60.0 mg/l (15 °C) 0 to 600% saturation		
Electrode material	Cathode: platinum Anode: silver	Cathode: gold Reference electrode and counterelectrode: silver	Cathode: gold Anode: silver Counterelectrode: silver		
Permissible operating temperature T_B	0 to +60 °C Sterilization max. +130 °C	0 to +50 °C	0 to +50 °C		
Permissible storage temperature	-5 to +50 °C				
Permissible operating pressure P_B	4 bar	10 bar	10 bar	0.5 bar	10 bar
Response time (90% time)	< 80 s	< 30 s	< 180 s		
Starting time following regeneration	6 h	3 h	1 h		
Flow rate	> 0.2 m/s		> 0.005 m/s		
Flow quantity	> 6 l/h				
Electrode diameter	12 mm	40 mm	40 mm		
Connection cable	5 m fixed		1.5 m fixed	7 m fixed	
Max. permissible length	10 m	100 m	100 m		
Installation	Attachment fitting 7MA8500-8EA Replacement fitting 7MA8500-8FR VARIVENT mounting flange 7MA8500-8AF	Flow fitting 7MA8500-8AM	Flow fitting 7MA8500-8AK	Sensor is designed as immersion fitting	Directly as immersion sensor
Weight	Approx. 0.6 kg	Approx. 1 kg	Approx. 0.5 kg	Approx. 0.9 kg	
Dimensions	See Fig. 3/20	See Fig. 3/17		See Figs. 3/18 and 3/19	
Degree of protection to EN 60529	IP68				
Membrane material	PTFE[2)]	FEP[3)]	FEP[3)]		
Sensor body material	Stainless steel 18 / 8 / 2.5 DIN 1.4435	Stainless steel 1.4571 / POM[4)]	Stainless steel 1.4571 / POM[4)]		
Mounting length	120 mm	193 mm	196 mm with protective cage	550 mm	196 mm
Explosion protection to DIN 50014/EN 50020	In conjunction with SIPAN 32X, this sensor is suitable for use in Ex zone 1	–	–	–	–

[1)] Only possible with SIPAN 34 analyzer, version 7MA3031-.C..0-...0
[2)] PTFE: polytetrafluoroethylene
[3)] FEP: perfluoroethylenpropylene
[4)] POM: polyoxymethylene

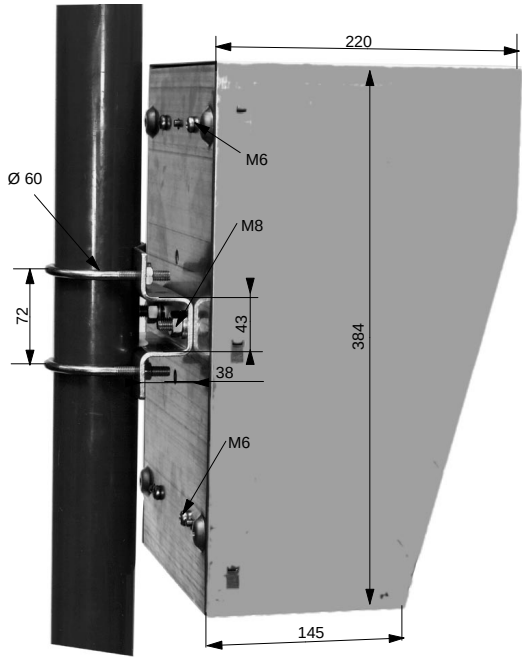
	Flow fitting		Attachment fitting	Replacement fitting	Welding-type connector Dummy seal
	7MA8500-8AM	7MA8500-8AK	7MA8500-8EA	7MA8500-8FR	7MA8500-8EC 7MA8500-8EH 7MA8500-8BT
Permissible operating temperature T_B	0 to +50 °C	-5 to +40 °C	0 to 130 °C	Immersion tube: -30 to + 130 °C Head: -30 to +80 °C	-30 to +140 °C
Permissible operating pressure P_B	6 bar	4 bar	4 bar	6 bar	10 bar
Wetted parts material	Stainless steel mat. No. 1.4571	PVC[3)]	Stainless steel mat. No. 1.4435	Stainless steel mat. No. 1.4571	Stainless steel mat. No. 1.4435
Connection	Union nut: POM[1)] Pipe clamp: PP[2)] Female thread G $^1/_8$", Screw-in for pipe diam. 10 mm	Flange R1" PVC[3)] with internal thread	Welding-type connector G $1^1/_4$ DIN	Welding-type connector G $1^1/_4$ DIN	G $1^1/_4$" DIN
Weight	Approx. 2 kg	Approx. 1 kg	Approx. 1 kg	Approx. 3 kg	Approx. 0.5 kg
Dimensions	See Fig. 3/17		See Fig. 3/20		

	Mounting flange	VARIVENT fittings			
	7MA8500-8AF	7MA8500-8AD	7MA8500-8AG	7MA8500-8AC	7MA8500-8DH
Permissible operating temperature T_B	130 °C	135 °C with EPDM gaskets[4)] 200 °C with Viton gaskets[5)]			
Permissible operating pressure P_B	4 bar	25 bar			
Wetted parts material	Stainless steel mat. No. 1.4435	Stainless steel mat. No. 1.4404			
Connection	DN 50	DN 50 for welding on (DN40 to DN 125 possible)	For welding on	-	
Flow	Recommended 0.1 to 0.5 l/min (max. 10 l/min)			-	
Weight	Approx. 1.5 kg	Approx. 0.850 kg	Approx. 2 kg	Approx. 0.2 kg	Approx. 1 kg
Dimensions	See Fig. 3/20	See Fig. 3/20			

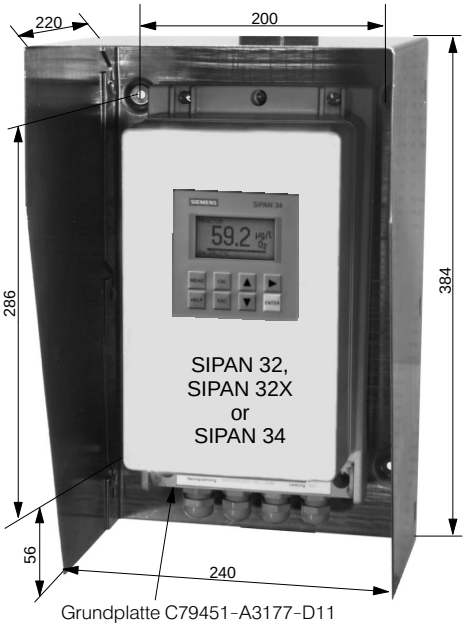
1) POM: polyoxymethylene
2) PP: polypropylene
3) PVC: polyvinylchloride
4) EPDM: ethylene propylene caoutchouc
5) Viton: fluor caoutchouc

Accessories for SIPAN 32, SIPAN 32X and SIPAN 34 analyzers

Dimensions, installation



Protective hood C79451-A3177-D12 complete with base plate C79451-A3177-D11) fitted on pipe clamp 7MA8500-8DG



Analyzer fitted in protective hood (base plate also available separately)

Fig. 3/21 Accessories for SIPAN 32, SIPAN 32X and SIPAN 34 analyzers, dimensions in mm

Standard combinations

1 Oxygen measuring equipment in ultra-pure water (e.g. boiler feedwater) Temperature 0 to 50 °C, pressure up to 6 bar

- O_2 measuring equipment
  Order No.: **7MA3100-8EF**
- Analyzer
  Order No.: **7MA3040-8AA** (SIPAN 32)
  Order No.: **7MA3034-2CA10-0AA0** (SIPAN 34)
- Option:
  Membrane kit 1
  Order No.: **7MA8500-8CG**

2 Oxygen measuring equipment in the food industry (e.g. drinks manufacture) Temperature 0 to 60 °C, sterilization up to 130 °C, pressure up to 4 bar

- O_2 sensor
  Order No.: **7MA3100-8CA**
- Stainless steel replacement fitting
  Order No.: **7MA8500-8FR**
- Straight welding-type connector
  Order No.: **7MA8500-8EH**
- Analyzer
  Order No.: **7MA3040-8AA** (SIPAN 32)
  or **7MA3034-2AA00-0AA0** (SIPAN 34)
  or with explosion connection
  Order No.: **7MA3041-8AA** (SIPAN 32X)
- Dummy seal
  Order No.: **7MA8500-8BT**
- Option:
  - Replacement fitting with flushing connections (only with SIPAN 34 7MA3031-2AA00-0AB0)
    Order No.: **7MA8500-8FS**
  - Replacement fitting with flushing connections and pneumatic drive (only with SIPAN 34 7MA3031-2AA00-0AB0)
    Order No.: **7MA8500-8FT**
  - Dummy screw seal for welding-type connectors
    Order No.: **7MA8500-8BT**
  - Membrane kit 2
    Order No.: **7MA8500-8EE**

3 Oxygen measuring equipment in the food industry VARIVENT fitting Temperature 0 to 60 °C, sterilization up to 130 °C, pressure up to 4 bar

- O_2 sensor
  Order No.: **7MA3100-8CA**
- Mounting flange
  Order No.: **7MA8500-8AF**
- VARIVENT fitting
  Order No.: **7MA8500-8AD**
- Analyzer
  Order No.: **7MA3040-8AA** (SIPAN 32)
  Order No.: **7MA3034-2AA00-0AA0** (SIPAN 34)
  or with explosion protection
  Order No.: **7MA3041-8AA** (SIPAN 32X)
- Option:
  - Seal for VARIVENT fitting
    Order No.: **7MA8500-8DH**
  - Membrane kit 2
    Order No.: **7MA8500-8EE**

4 Oxygen measuring equipment in waste water purification plant (e.g. inflow to sewage treatment plant) Temperature 0 to 50 °C, pressure up to 10 bar

- O_2 sensor as immersion sensor with handle
  Order No.: **7MA3100-8CE**
- Stainless steel mounting stand
  Order No.: **7MA8500-8CG**
- Protective hood for analyzer
  Order No.: **C79451-A3177-D12**
- Freely suspended rod for connection to mounting stand
  Order No.: **7MA8500-8CJ**
- Analyzer
  Order No.: **7MA3040-8AA** (SIPAN 32)
  Order No.: **7MA3034-2BA00-1AA0** (SIPAN 34)
- Option:
  Membrane kit 3
  Order No.: **7MA8500-8CD**

5 Oxygen measuring equipment in waste water purification plant (e.g. biological treatment in basin) or fish farm Temperature 0 to 50 °C, pressure up to 10 bar

- O_2 sensor
  Order No.: **7MA3100-8CF**
- Sensor handle
  Order No.: **7MA8500-8BQ**
- Wall mount
  Order No.: **7MA8500-8BP**
- Swinging support
  Order No.: **7MA8500-8CH**
- Analyzer
  Order No.: **7MA3040-8AA** (SIPAN 32)
  Order No.: **7MA3034-2BA00-1AA0** (SIPAN 34)
- Option:
  Membrane kit 3
  Order No.: **7MA8500-8CD**

Documentation

Catalog PA 20

	Order No.
Flüssigkeitsanalytik *(German)*	**E86060-K3520-A101-A1**
Liquid analysis *(English)*	**E86060-K3520-A101-A1-7600**
Analyse de liquide *(French)*	**E86060-K3520-A101-A1-7700**
Análisis de liquidos *(Spanish)*	**E86060-K3520-A101-A1-7800**
Analisi de liquidi *(Italian)*	**E86060-K3520-A101-A1-7200**

Manual

	Order No.
Printed version of Manual (each language separately) **SIPAN 32** Meßeinrichtung für gelösten Sauerstoff *(German)*	**C79000-B5400-C47**
SIPAN 32 Measuring Equipment for Dissolved Oxygen *(English)*	**C79000-B5476-C47**
SIPAN 32 Dispositif de mesure pour oxygène dissous *(French)*	**C79000-B5477-C47**
SIPAN 32 Equipo de medición de oxigeno disuelto *(Spanish)*	**C79000-B5478-C47**
SIPAN 32 Dispositivo per la misura dell'ossigeno disciolto *(Italian)*	**C79000-B5472-C47**
SIPAN 32 (5 languages on CD[1]) Meßeinrichtung für gelösten Sauerstoff *(German)* Measuring Equipment for Dissolved Oxygen *(English)* Dispositif de mesure pour oxygène dissous *(French)* Equipo de medición de oxigeno disuelto *(Spanish)* Dispositivo per la misura dell'ossigeno disciolto *(Italian)*	**C79000-G5464-C48**
Printed version of Manual (each language separately) **SIPAN 34** Meßeinrichtung für gelösten Sauerstoff *(German)*	**C79000-G5400-C43**
SIPAN 34 Measuring Equipment for Dissolved Oxygen *(English)*	**C79000-G5476-C43**
SIPAN 34 Dispositif de mesure pour oxygène dissous *(French)*	**C79000-G5477-C43**
SIPAN 34 Equipo de medición de oxigeno disuelto *(Spanish)*	**C79000-G5478-C43**
SIPAN 34 Dispositivo per la misura dell'ossigeno disciolto *(Italian)*	**C79000-G5472-C43**
SIPAN 34 (5 languages on CD[1]) Meßeinrichtung für gelösten Sauerstoff *(German)* Measuring Equipment for Dissolved Oxygen *(English)* Dispositif de mesure pour oxygène dissous *(French)* Equipo de medición de oxigeno disuelto *(Spanish)* Dispositivo per la misura dell'ossigeno disciolto *(Italian)*	**C79000-G5464-C50**

[1]) Included in delivery of analyzer (free-of-charge)

Available ex-stock