SIDOR
Gas Analyzer

Measurement of 1 or 2 gas components
Optional oxygen measurement
(electrochemical or paramagnetic)

SIDOR is an extractive gas analysis instrument for the measurement of 1 or 2 gas components. With the addition of an electrochemical or paramagnetic measuring cell, oxygen* can be measured as well.

The innovative signal processing and highly stable detector provide the highest degree of long term signal stability available to date. The stability of the detectors means that calibration routine adjustments are only required quarterly and only with inert gas or measuring component-free ambient air. Sample gas pressure compensation is included as standard.

SIDOR can be used everywhere where emission measurement is required according to European regulations 2001/80/EC and can also be used in bio gas and landfill gas measurements or for process gas analysis.

SIDOR in its short 19“ chassis enclosure can be installed anywhere, where space is a problem or replacement of older analog instruments with newer technology is required.

The following options can be built into the SIDOR:

- 2nd SIDOR module for the measurement of a 2nd gas component
- Sample gas pump
- Flowmeter
- Moisture sensor
- Electrochemical oxygen sensor OXOR-E
- Paramagnetic oxygen sensor OXOR-P

An extensive array of freely configurable digital in- and outputs make the construction of a complete system much simpler.

A microprocessor controls the fully automatic and low maintenance operation with control functions for process measurements, the adjustment of SIDOR as well as self-monitoring and fault diagnostics.

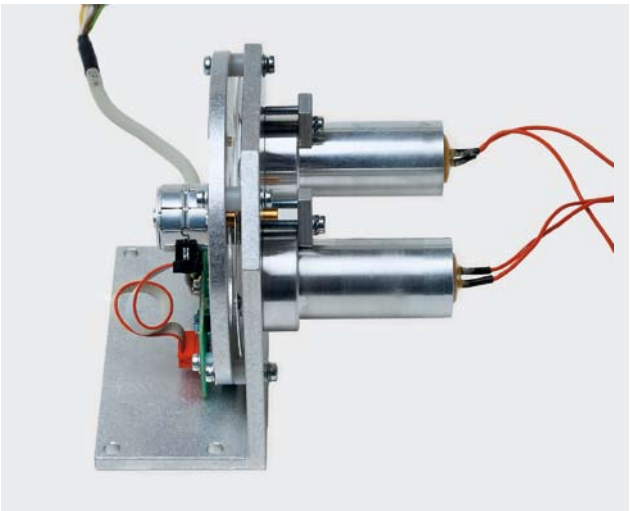
Easy to understand texts on a large LC-display and help menus in different languages make operation of the instrument very easy.

* Option

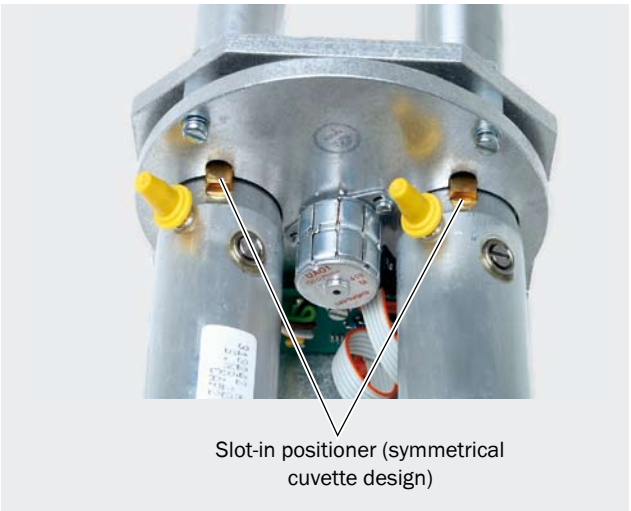
SICK | MAIHAK
Analyzers and Process Instrumentation

SIDOR Measuring Technology

The measurement values are automatically normed by using the latest signal evaluation technology, thereby enormously reducing the influence of signal noise.
The chopper wheel unit is designed to allow inclusion of a second IR source assembly, so that two IR active gases can be measured simultaneously but completely independent from one another.



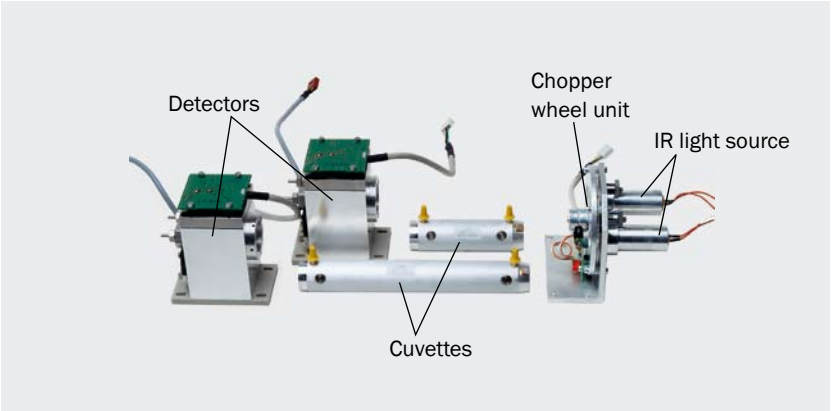
Such an innovative concept simplifies field work. For example, cuvettes can be replaced locally without time-consuming alignments.
This is made possible due to the symmetrical design of the cuvette which always slots into the correct position with the aid of a positioner.



Slot-in positioner (symmetrical cuvette design)

The exchange of other device components is just as easy and fast; high precision in the manufacturing process of the components makes on-site repair possible without laborious factory temperature adjustment. In addition – the exchange of a new SIDOR with an old analyzer is fast and easy. Compact and short, the 19" rack unit can be installed in existing systems where space is limited.

Components for up to two SIDOR modules



Features

Measuring Value, Status and Control Outputs	
Measurement signals (analog)	• 4 ... 20 mA, linear • Potential-free (galvanically isolated) • Max. load 500 Ohm • During adjustment the output signal can be selected to show the adjustment values or to hold the last measuring signal
Output ranges	• Standard: according to customer specification • Additional output range (optional) freely selectable within basic measuring range • Max. range switching ratio 1:5
Status- and control outputs	• 8 relay contacts • 8 open collector outputs • 3 relay contacts pre-set, all other contacts can be freely allocated • Freely selectable logic • 4 alarm levels, freely programmable for high or low alarm limits • Fault • Service required • (NAMUR signal 'Function monitoring') • Service/adjustment (NAMUR signal 'Function monitoring') • 4 measuring range ID signals • Control for a solenoid valve* to switch on ambient air or inert gas for automatic adjustment • Signals to control the solenoid valves for a manual or automatic adjustment for sample gas, zero gas and test gases • Manual control of an external sample gas pump and automatic shut-down in the event of a fault: external sample gas pump ON/OFF

Control inputs	
Control inputs	• 8 inputs • Over 30 different functions, such as: – Adjustment control – Monitoring of external system components such as cooler, test gas bottles, etc. – Service/adjustment block (NAMUR signal 'Communication') to ensure uninterrupted sample gas analysis

Analyzer Options	
SIDOR	Additional SIDOR module for measuring a second IR component
Sample gas pump	For sample gas delivery
Flow sensor	To monitor if enough gas is flowing through the analyzer
Moisture sensor	For emergency shut-down of the entire measuring system if condensate enters the analyzer
Additional module OXOR-P	OXOR-P used for the measurement of oxygen with the paramagnetic principle
Additional module OXOR-E	OXOR-E determines the oxygen content with an electrochemical cell

Construction	
Slide-in chassis	• 19", 3HU • IP 20 • Dimensions: see dimensional drawing • Weight: 9 ... 12 kg, depending on the components

Digital Interfaces	
RS232 C (uni-directional)	Automatic output of measuring values and status with date and time
RS232 C (bi-directional)	• Limited AK protocol • MODBUS protocol • Remote control via modem or serial PC • Direct connection with MARC 2000 software

Features

Display and Menu Drive	
Display	Back-lit LC graphic display (120 mm wide, 90 mm high)
Measuring value display	• Digital, 5-digit (17.5 mm high) quasi-analog (bargraph) in engineering units: ppm, %, mg/m³; please specify when ordering • Measuring value and status messages are always shown
Menu drive	• Clear and descriptive texts in three levels in accordance with NAMUR standard • Two levels protected against unauthorized access • Context-related and explanatory help texts always accessable
Clear text messages	Clear text messages such as: – status conditions ('calibrating', ...) – fault diagnostics ('gas flow', 'IR source', ...) – service required ('zero point drift', ...) etc.
Available languages	German, English, French, Italian, Spanish, Dutch, Polish, Swedish

Adjustment	
Automatic	• One-point adjustment with ambient air or inert gas • Via completely automatic admission of test gases in pre-defined intervals, using manual start or via external start signal • Adjustment lock-out function for critical measuring situations also available • Routine one-point adjustment provides long service intervals of 3 months, eliminates the need for test gas
Manually	• One-point adjustment with ambient air or inert gas with the use of zero and span gases

Gas Connections	
Fittings	• Bulkhead fittings, made of PVDF for 6 x 1 mm hose • 6 mm SWAGELOK* • 1/4" SWAGELOK*

Gas Inlet and Outlet Conditions	
Gas temperature	0 ... +45 °C [32 ... 115 °F]
Gas characteristics	Dew point must be below ambient temperature, gas must be free of dust and aerosols
Gas pressure relative to ambient pressure	–200 ... +300 hPa (–0.2 ... +0.3 bar) [-3 ... +4 psi]
Sample gas pump	• Max. 60 l/h at 100 hPa (0.1 bar) subpressure • Pump capacity of the built-in pump* adjustable by software
Sample gas flow	30 ... 60 l/h

General Data	
Line voltage	100, 115 oder 230 VAC,(+10 % ... –15 %), selectable, fuse change necessary; 48 ... 62 Hz
Power consumption	Max. 150 VA, typically 50 VA
Ambient temperature during operation	+5 ... +45 °C [40 ... 115 °F]
Transport and storage temperature	–20 ... +70 °C [-4 ... 160 °F]
Relative humidity	Humidity class F (DIN 40040) • ≤ 75 % annual average • ≤ 95 % occasionally • non-condensing

EMI -Protection / Electrical Safety	
EMI-testing	According to EN 61326
Protection class	I, tested to VDE 0411, Part 1 / IEC 348
CE label	According to EMI guidelines 89/336/EC, low voltage guidelines 72/23/EC and EMI requirements DIN EN 60950
CSA US	According to 61010.1-04

*) Option

Measuring unit SIDOR

SIDOR is a precise NDIR gas analyzer for continuous measurement of one IR component. It offers a high degree of selectivity and sensitivity. Adjustments are required once quarterly at the most due to a high degree of long term stability.

Technical Specifications	
Zero point drift	≤ 2 % of the smallest measuring span /1/4 year with auto. one-point adjustment
Sensitivity drift	≤ 2 % / 1/4 year with automatic one-point adjustment
Detection limits	• ≤ 1 % of measuring span • ≤ 2 % of measuring span for spans < 2 times the smallest allowable measuring span
Linearity deviation	• ≤ 1 % of the measuring span • ≤ 2 % of the measuring span for spans < 2 times the smallest allowable measuring span
Influence of inclined position	None for inclinations up to +/–15 % in all directions
Influence of ambient temperature	≤ 2 % of the measuring span / 10 K
Flow dependency	< 0.6 % change in measurement in the range of 30 ... 60 l/h with 10 l/h change in flow, often better.
Air pressure influence	With integrated sample gas pressure compensation: ≤ 0.1 % change in measurement with 1 % change in pressure
Line voltage, line frequency influence	≤ 0.1 % of the measuring span within the specified voltage and frequency ranges

Cross sensitvities	
Cross sensitivities	• Inside tolerance range as required by regulation for emission applications • Other gas compounds on request

Durations	
Display delay (T_{90})	Dependant on the cuvette length and gas flow, typically 3 s at 60 l/h
Time constant ($T_{90,el}$)	1 ... 120 s adjustable
Warm-up time	120 min

Measuring Components and Lowest Measuring Ranges				
Measuring components	**Measuring range**			
	Smallest range		**Largest range**	
	ppm	mg/m^3	%Vol.	g/m^3
Carbon monoxide CO	0 ... 60	0 ... 75	0 ... 100	0 ... 1250
Carbon dioxide CO_2	0 ... 500	0 ... 980	0 ... 100	0 ... 1965
Methane CH_4	0 ... 5000	0 ... 3500	0 ... 100	0 ... 716
Sulphur dioxide SO_2	0 ... 35	0 ... 100	0 ... 3	0 ... 86
Nitric oxide NO	0 ... 93	0 ... 125	0 ... 3	0 ... 40
Nitrous oxide N_2O	0 ... 100	0 ... 200	0 ... 100	0 ... 1965

All data valid for a mixture of sample gas in exhaust gas or nitrogen.
For other gas compositions please contact SICK MAIHAK.

General Data	
Materials in contact with sample gas	Viton B, PVDF, glass, stst 1.4571, aluminium

Certifications (TÜV)	
13th BImSchV/ TA Air	CO: 0 ... 75 mg/m^3 NO: 0 ... 125 mg/m^3 SO_2: 0 ... 100 mg/m^3
27th BImSchV	CO: 0 ... 75/3000 mg/m^3

Option: OXOR-P

The paramagnetic oxygen sensor OXOR-P is a high precision oxygen analyzer. The sensor operates on the principle of a rotating dia-magnetic dumbbell, which is suspended in an inhomogeneous magnetic field. The paramagnetic characteristic of oxygen exerts torque on the dumbbell which is proportional to the concentration of O_2 in the sample gas.

Technical Data	
Zero point drift	• ≤ 1 % of the measuring span/week or • ≤ 0.05 % O_2 / week for measuring spans less than 5 % O_2 • ≤ 2 % every 1/4 year during regular one-point adjustment
Sensitivity drift	• ≤ 1 % / of the measuring value/week • ≤ 2 % every 1/4 year during regular one-point adjustment
Detection limit	≤ 0.5 % of span
Linearity deviation	≤ 1 % of the respective span
Influence of inclined position	≤ 0.05 % O_2 / 1° change
Influence of ambient temperature	• ≤ 2 % of the measuring span / 10 K • Influence ≤ 0.1 % O_2 / 10 K for spans ≤ 5 % O_2
Flow dependency	≤ 0.2 % O_2 within range of 30 ... 60 l/h
Influence of air pressure	With integrated barometric correction and open sample gas outlet: 0.1 % change in measuring value with 1 % change in pressure
Line voltage, influence of line frequency	≤ 0.5 % of the smallest meas. span within the specified voltage and frequency ranges

Measuring and Output ranges	
Basic measuring ranges	O_2: 0 ... 3 % to 0 ... 100 %
Output ranges	• Additional output range freely selectable within the basic measuring range • Smallest output range 3 % O_2 • Max. range ratio 1:5

Time	
Display delay (T_{90})	≤ 4 s, standard (at $T_{90, el}$=1 s and sample gas flow = 60 l/h)
Time constant($_{T90}$,el)	1 ... 120 s adjustable
Warm-up time	120 min

General Data	
Materials in contact with sample gas	Viton B, PVDF, Glass, stst 1.4571, Aluminium, Platinum, Ni

Certifications (TÜV)		
13th BImSchV/ TA Air	0 ... 10	0 ... 25 Vol.% O_2
27th BImSchV	0 ... 10	0 ... 25 Vol.% O_2

Option: OXOR-E

The oxygen sensor OXOR-E is a high-precision oxygen analyzer. It operates on the principle of an electrochemical cell.

Technical Data	
Zero point drift	• ≤ 2 % of the measuring span /month • ≤ 2 % per 1/4 year with routine one-point adjustment
Sensitivity drift	• ≤ 1 % / week • ≤ 2 % per 1/4 year with routine one-point adjustment
Noise	≤ 0.1 Vol.% O_2
Linearity deviation	≤ 1.5 % of the measuring span
Influence of inclined position	none
Influence of ambient temp.	≤ 1.5 % of the measuring span/10 K
Flow dependency	≤ 0.1 % change in meas. value in the range of 30 ... 60 l/h with 10 l/h change in flow rate
Influence of air pressure	With integrated sample gas pressure compensation: ≤ 0.1 % change in measuring value with 1 % change in pressure
Line voltage, influence of frequency	≤ 0.5 % of the smallest measuring span within the specified voltage and frequency ranges

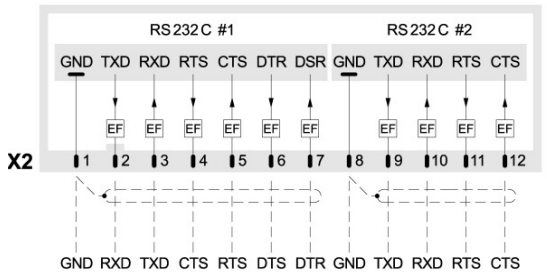
Measuring and Output Ranges	
Basic measuring ranges	O_2: 0 ... 10 % up to 0 ... 25 %
Output ranges	• Additional output range freely selectable within the basic measuring range, smallest output range 10 % O_2 • Max. range ratio 1:5

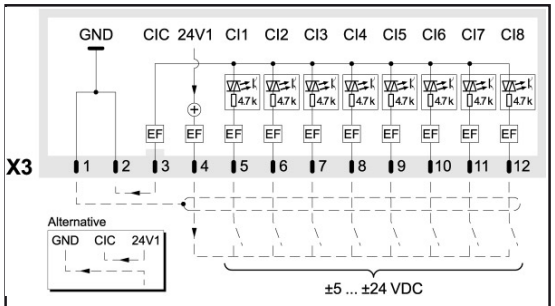
Time	
Display delay (T_{90})	≤ 4 s, standard (at $T_{90, el}$=1 s and sample gas flow = 60 l/h)
Time constant ($T_{90,el}$)	1 ... 120 s adjustable
Warm-up time	none

General Data	
Materials in contact with sample gas	Viton B, PVDF, stst 1.4571

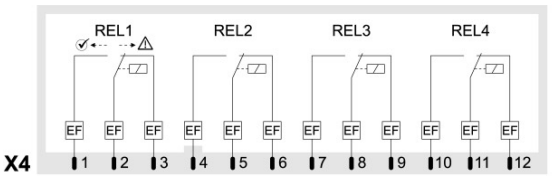
Certifications (TÜV)		
13th BImSchV/ TA Luft	0 ... 10	0 ... 25 Vol.% O_2
27th BImSchV	0 ... 10	0 ... 25 Vol.% O_2

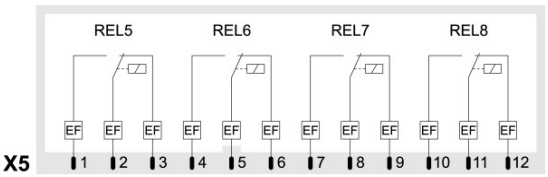
Enclosures and Signal Connections



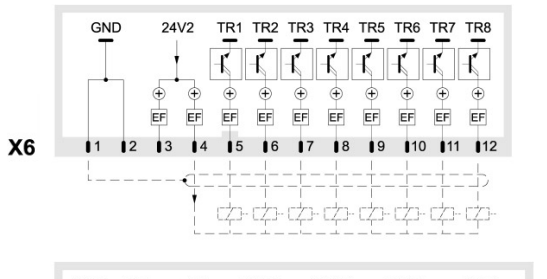


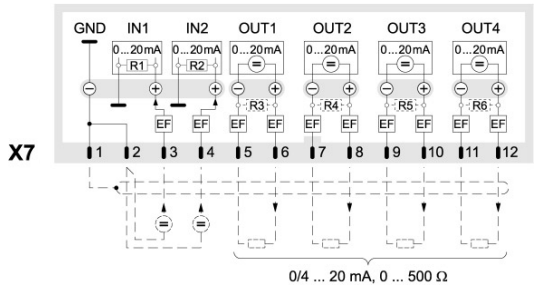
Keep away from external voltages!



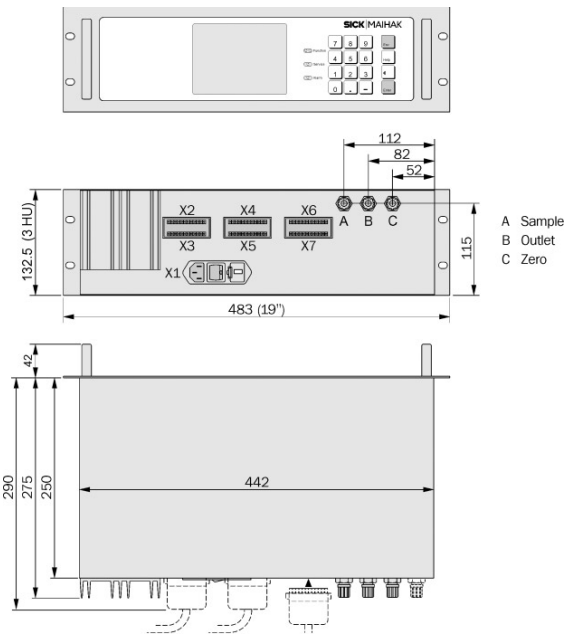


- Max. 48 V peak voltage (34 V AC / 48 V DC)
- Max. 500 mA
- Inductive loads must be equipped with discharging diodes





- Only use internal voltage sources (24 V DC)
- Max. 500 mA single
- Max. 1000 mA total (TR 1 ... TR 8)
- Inductive loads must be equipped with discharging diodes



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