



Products for Process Automation

Analyzers for gases and liquids, dust and volume flow measuring devices, analysis systems, gas flow measuring devices and tunnel sensors

SICK Process Automation – Innovation, Technology, Service



Climatic change, health protection and pollution control as predominant topics of our time: SICK offers future-oriented technologies and solutions for compliance with ever-changing new regulations and directives. Modern, reliable, efficient and everything from one source from development to service.

SICK Sensor Intelligence

SICK AG is one of the world's leading producers of sensors and sensor solutions for industrial applications, in factory and logistics automation as well as process automation segments. Always one step ahead with innovative products, for example, continuously measuring analyzers for gases, dust and process liquids, gas flow measuring devices or tailored systems. Based on many years of experience, process automation contributes decisively to the solution of complex measuring tasks.

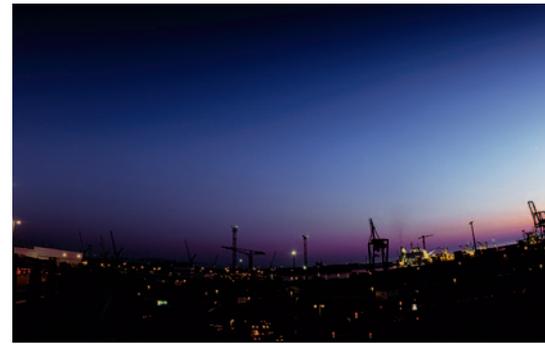
Service and support from the start

Competent consulting, qualified planning support, detailed project planning and engineering, installation and start-up – at SICK you get everything from one source. Of course, we are available for reliable support in maintenance and repair – and, of course, after purchase.

The complete package is of primary importance: Fast reaction times by close-meshed network between the central office and our own partners worldwide. The decisive advantage – first-class technical knowledge directly onsite.

Industries

- Power plants
- Cement plants
- Biogas/biomass plants
- Waste treatment
- Chemical and petrochemical industry
- Refineries
- Oil and natural gas industry
- Metal production and processing
- Pulp and paper industry
- Traffic and transport
- Food, beverages and luxury food



Product and System Overview

GAS ANALYZERS

- Comprehensive product range of continuously measuring analyzers
- State-of-the-art measuring principles
- Many years of experience in emission and process monitoring
- Solution of complex measuring tasks using extractive and in-situ measurement technology

MULTI-COMPONENT ANALYSIS SYSTEMS

- Robust hot measurement systems for emission-typical applications
- Modular analysis systems for the use of proven standard components
- Application-related solutions for measuring tasks in emission and process monitoring

DUST MONITORS

- Low-maintenance measuring devices for registration and monitoring of dust concentrations
- Simple integration into existing measuring landscapes
- Low effort for installation and start-up of devices
- Comfortable operation

VOLUME FLOW MEASURING DEVICES

- Precise measured values for exact determination of amount of pollutants, for example for global emission trading
- Leaders in ultrasonic measurement technology
- Continuous determination of exhaust gas volume flow

SYSTEM DESIGN AND MEASURED DATA PROCESSING

- Tailored system versions for the most varied customer requirements
- Standard solutions and turnkey analysis units including all peripheral equipment
- Reliable acquisition, evaluation, storage and transfer of emission data

LIQUID ANALYZERS

- Water analysis (TOC) of waste water, drinking water, surface water, process water and much more
- Fluid analysis for process monitoring and control and for quality control and use in research

AUTOMOTIVE

- Mobile, compact measuring systems for efficient exhaust gas measurement of ammonia, oxygen, soot value and gas flow on engine and roller test benches in the automotive industry

TRAFFIC SENSORS

- Highly sophisticated measuring systems for visibility, air velocity and overheight detection
- Tunnel monitors for analysis of air quality with ever increasing traffic density – for economic control of ventilation systems

GAS FLOW MEASURING DEVICES

- Online measurement of exact throughflow values and making them permanently available for control purposes
- The FLOWSIC series can perform almost all measuring tasks
- As measuring device in a process chain and as calibratable gas meter for billing of natural gas

Contents

Gas analyzers		Liquid analyzers	
Extractive analyzers			TOCOR70018
	DEFOR5		MCS300P18
	SIDOR5	Automotive	
	S700 Series6		GM700 (Car)19
	MCS300P6		FLAWSIC150 Carflow19
	EuroFID7		DIESEL MONITOR19
	FID30067	Traffic sensors	
	MONOCOLOR7	Tunnel	
In-situ analyzers			SMOTEC45020
	GM328		VICOTEC41020
	GM358		VICOTEC32021
	GM7009		VICOTEC45021
	GM9019		FLAWSIC20021
	ZIRKOR3029	Road	
Multi-component analysis systems			VISIC62022
	MCS100FT10		HISIC45022
	MCS100E HW/PD/CD10	Gas flow measuring devices	
	MKAS11	Process and flare gas applications	
	MKAS Compact11		FLAWSIC100 Process
	MERCEM11		PN16/CL15023
Dust monitors			FLAWSIC100 Process
	DUSTHUNTER T12		EX-Z2/EX-Z2-RE23
	DUSTHUNTER S12		FLAWSIC100 Process
	DUSTHUNTER C13		PR-EX-Z224
	FWE20013		FLAWSIC100 Flare EX-S24
	GRAVIMAT SHC50013		FLAWSIC100 Flare EX25
Volume flow measuring devices for emission monitoring			FLAWSIC100 Flare EX-PR ...25
	FLAWSIC100 H14	For traffic and process applications requiring calibration	
	FLAWSIC100 M14		FLAWSIC600 2-path26
	FLAWSIC100 S15		FLAWSIC600 4-path26
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System design			FLAWSIC600 2plex27
	SYSTEM DESIGN16		FLAWSIC600 Quatro27
Integration of measured data processing			
	MEAC200017		

Extractive analyzers

- Measurement of numerous components
- Optimally configurable analyzers for versatile applications
- Precise measuring results through proven measuring principles
- Detection of aggressive, corrosive or combustible gases
- Able to fulfill QAL3 regulations according to EN 14181
- Explosion protected versions for zone 1 and zone 2



GAS ANALYZERS	DEFOR	SIDOR
	Modular UV gas analyzer, up to 5 components	NDIR gas analyzer, 2 IR components plus O ₂
Measuring principle	UV Resonance Absorption Spectrometry (UVRAS)	NDIR absorption Paramagnetic/electrochemical (O ₂)
Measuring components	Cl ₂ , NO, NO ₂ , SO ₂ , NH ₃ , CS ₂ , COS, H ₂ S, O ₂ , H ₂	CH ₄ , CO, CO ₂ , NO, SO ₂ , O ₂
Measuring task, application	Emission measurement, for example, of low NO concentrations in power plants or gas turbines, NO _x monitoring in DeNO _x plants, emission monitoring in the pulp and paper industry Process monitoring, for example, of Cl ₂ measurements, sulfur compounds in process gas, NO, NO ₂ , NH ₃ measurements in applications with nitric acid, high H ₂ S concentrations in reactive or acidic gases; additionally, measurement of O ₂ and H ₂ with auxiliary modules	Emission and operational applications Incineration optimization of small boilers Single or simultaneous measurement of up to 2 IR gas components and, additionally, O ₂ using auxiliary modules Landfill and biogas monitoring (ATEX)
Advantages	<ul style="list-style-type: none"> • Simultaneous measurement of NO and NO₂ with subsequent compilation • Very long service life of UV lamp (typically 2 years) • Low drifts and high stability • True reference measurement for low-drift, stable measurement • All modules "temperature controlled"; therefore independent of ambient temperature fluctuations 	<ul style="list-style-type: none"> • Low test gas consumption (feeding 6 months min.) with a long term stable measuring cell • High selectivity and measuring sensitivity • Automatic readjustment with component-free ambient air • Simple maintenance, can be repaired locally • High availability through local service
Compliances, regulations	CE, ATEX	CE, 2001/80/EC, 27 th FICA ^{*)} , ATEX, EN 14181, GOST, MCERTS, TI Air, cCSA _{US}
Measuring location		
Model	<ul style="list-style-type: none"> • Comfortable 19" mounting • Wall housing 	Comfortable 19" mounting
Maintenance, repairs	<ul style="list-style-type: none"> • Low maintenance effort, no converter function check during NO and NO₂ measurement • No test gases required when the optional adjustment unit is used • Simple housing care 	<ul style="list-style-type: none"> • Calibration possible with ambient air, test gases required only every half year • Low effort • Able to fulfill QAL3 regulations • Simple housing care

^{*)} FICA = Federal Implementation of Clean Air Act



	S700 SERIES	MCS300P
	Modular gas analyzer, up to 4 components	Multi-component process analyzer, up to 6 components plus O ₂
Measuring principle	NDIR absorption Paramagnetic/electrochemical (O ₂) Interference filter correlation Thermal conductivity	Single-beam photometry Bifrequency and gas filter correlation
Measuring components	CO, CO ₂ , SO ₂ , NO, NH ₃ , H ₂ , N ₂ O, CH ₄ , C ₂ H ₂ , C ₂ H ₄ , C ₂ H ₆ , C ₃ H ₆ , C ₃ H ₈ , C ₄ H ₆ , C ₄ H ₁₀ , C ₆ H ₁₄ , O ₂ and many more	IR, NIR, VIS absorbing gases, for example, CO, CO ₂ , NO, NO ₂ , N ₂ O, HCl, NH ₃ , H ₂ O, hydrocarbons, Cl ₂
Measuring task, application	Emission and process monitoring Standard equipment with up to 3 analyzer modules possible. 6 different analyzer modules are available for analyzing more than 60 gas components. Single or simultaneous measurement of up to 4 components	In production plants in the chemical industry Raw gas measurement for control of exhaust gas purification plants, such as waste incineration and multifuel furnace plants
Advantages	<ul style="list-style-type: none"> Extremely compact analyzer Explosion-protected version optional Fully automatic measuring mode Low maintenance, easy to use Flexible configuration options through a variety of analog/digital interfaces Monitoring of external status signals 	<ul style="list-style-type: none"> Proven sample cuvettes for corrosive, aggressive sample gases Process cuvettes with integrated protection devices Robust system with hot measurement method for trouble-free acquisition of very high raw gas concentrations Can be used reliably even at a high acid dew point Short reaction times (≤ 1 min) and variable measuring ranges from very low (ppm) to high (% by volume) concentrations
Compliances, regulations	CE, 2000/76/EC 2001/80/EC, 27 th FICA ^{*)} , EN 14181, GOST, MCERTS, TI Air, cCSA _{US}	CE, EMC 2004/108/EC, Low Voltage Directive 2006/95/EC
Measuring location		
Model	<ul style="list-style-type: none"> Enclosure S710: Comfortable 19" mounting Enclosure S715: Easy to install wall housing, also for usage in explosion zone 2 Enclosure S720 Ex: Pressurized housing for usage in explosion zone 1 	<ul style="list-style-type: none"> Compact process analyzer for easy wall fitting Raw gas measuring system: Analysis cabinet version
Maintenance, repairs	<ul style="list-style-type: none"> With adjustment unit (option), calibration possible (only IR) Low effort Able to fulfill QAL3 regulations Simple housing care 	<ul style="list-style-type: none"> Low maintenance effort Automatable check cycle for zero and reference point monitoring Adjusting filter wheel (option) for a quick check without test gas Simple housing care

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EUROFID	FID3006	MONOCOLOR
Total hydrocarbon analyzer	Portable total hydrocarbon analyzer	Hydrogen sulfide gas analyzer
Flame ionization detector	Flame ionization detector	Colorimetry (discoloring of test paper)
Total hydrocarbon (C _{org})	Total hydrocarbon (C _{org})	H ₂ S
<p>Exhaust gas measurement of VOC emissions in raw and clean gases</p> <p>Emission monitoring in waste incineration plants and cement plants or thermal, catalytic or biological exhaust air purification plants</p> <p>LEL monitoring in production and processing of products containing solvents</p> <p>Workplace monitoring and VOC measurements in the ambient air</p>	<p>Exhaust gas measurements of VOC emissions in raw and clean gases (same as EuroFID)</p> <p>Compact, portable unit for flexible use.</p> <p>Measurement of organic substances even at measuring points difficult to access</p>	<p>Monitoring hydrogen sulfide in natural gas, biogas, land fill gas, coke oven gas</p> <p>Ambient air monitoring</p> <p>Emission measurement in desulphurization plants, pulp and paper industry, chemical and petrochemical industry</p>
<ul style="list-style-type: none"> No wear and tear due to moving parts Integrated sample gas dilution Overpressure method for minimum errors All gas paths heated, therefore no condensation in the analyzer EC type approval as gas detector according to 94/9/EC 	<ul style="list-style-type: none"> Automatic fuel gas switch-off when flame extinguished Precise measurement through patented analysis chamber Low fuel gas consumption Low operational costs Short warming up time Complete accessories program 	<ul style="list-style-type: none"> Quasi-continuous, colorimetric measuring principle with dry reaction on a test paper strip Very selective measuring method even in case of other sulfur compounds in the sample gas; measurement of very low H₂S concentrations
CE, 2000/76/EC EN 14181, MCERTS, GOST, U.S. EPA, ATEX, TI Air	CE, 2 nd FICA ^{*)} , 2000/76/EC MCERTS, UL, CSA, TI Air	CE, GOST
<ul style="list-style-type: none"> Wall fitting configuration for plate assembly Inline configuration for direct duct installation 	<ul style="list-style-type: none"> No mounting – mobile device 	<ul style="list-style-type: none"> Version MONOCOLOR 1N: 19" rack for use in non-ex areas Version MONOCOLOR 2Ex: Wall-mounted housing for use in ex zone 1, IP 65, EEx de (ib) IIB T4
<ul style="list-style-type: none"> Low effort (replacement of gas filter) Able to fulfill QAL3 regulations 	<ul style="list-style-type: none"> Low effort (replacement of gas filter) Able to fulfill QAL3 regulations Simple housing care 	<ul style="list-style-type: none"> Simple housing care

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In-situ analyzers

- Fast, continuous measurement directly at the measuring location (in-situ)
- No sampling required
- Very low reaction times and very low maintenance effort
- Representative measurement across the complete duct cross-section
- QAL3 functions according to EN14181



	GM 32	GM 35
	Multi-component analyzer up to 6 components	Multi-component analyzer up to 5 components
Measuring principle	UV spectroscopy DOAS evaluation method PT1000, piezo-resistive	Filter correlation (IR) Gas filter correlation PT1000, piezo-resistive
Measuring components	SO ₂ , NO, NO ₂ , NH ₃ , temperature, pressure O ₂ (option)	CO, CO ₂ , H ₂ O, temperature, pressure
Measuring task, application	Control for flue gas purification (desulphurization and denitrification plants, scrubber and converter systems) Emission monitoring (plants according to EU Directives, plants worldwide according to local regulations) Monitoring process parameters (Claus plant, monitoring landfill gases, ammonia production)	For efficient control of incineration processes and drying plants as well as emission monitoring, for example, in cement plants Control of water injection before electric filters Monitoring incineration efficiency in special waste incineration Process monitoring in urea production
Advantages	<ul style="list-style-type: none"> • Representative measurement across the duct cross-section (cross-duct) • Ideal for aggressive or very hot gases – no duct installations • Lowest measuring ranges for large duct cross-sections • Due to probe technology, installation on one side only, for high dust concentrations or turbulent gas flows 	<ul style="list-style-type: none"> • Representative measurement across the complete duct cross-section (cross-duct) • Ideal for aggressive or very hot gases – no duct installations • Lowest measuring ranges for large duct cross-sections • Due to probe technology, installation on one side only, for high dust concentrations or turbulent gas flows
Compliances, regulations	2001/80/EC, 2000/76/EC, plants of the 27 th FICA ^{*)} , EN 15267-3, EN 14181 and DIN ISO 14956	2001/80/EC, 2000/76/EC, 27 th FICA ^{*)} , MCERTS, GOST, U.S. EPA, TI Air
Measuring location		
Model	<ul style="list-style-type: none"> • Configuration with probe: Installation on one side • Cross-duct configuration: Installation on both sides (opposite each other) 	<ul style="list-style-type: none"> • Configuration with probe: Installation on one side • Cross-duct configuration: Installation on both sides (opposite each other)
Maintenance, repairs	<ul style="list-style-type: none"> • Minimum maintenance effort • Able to fulfill QAL3 regulations • Cleaning of optical windows only: Intervals approx. 3 to 6 months 	<ul style="list-style-type: none"> • Minimum maintenance effort • Able to fulfill QAL3 regulations • Zero point control and cleaning of optical interfaces: Intervals approx. 3 to 6 months

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GM700	GM901	ZIRKOR302
Laser analyzer	Carbon monoxide analyzer	Oxygen analyzer
Laser spectroscopy (TDLS)	Gas filter correlation	Zirconium dioxide (current sensor)
HCl, HF, NH ₃ , O ₂ , NH ₃ /H ₂ O, HCl/H ₂ O	CO	O ₂
Emission monitoring, for example in fertilizer production, waste incineration, aluminium and building material industry NH ₃ slip monitoring in DeNO _x plants Scrubber monitoring in the iron and steel industry, ammonia measurement in urea production Hydrochloric acid measurement in raw gas before the scrubber in waste incineration plants	Process control, for example, for monitoring incineration plants in the power plant industry, cement industry, steel industry or chemical industry For difficult measuring tasks (high dust loads, overpressure, "wet" flue gases, extremely high gas concentrations)	Optimizing industrial incineration processes and calculation of reference values Used, for example, in power and heating plants, waste incineration plants, crucible furnaces, lime cement kilns, curing ovens, sintering, melting and tempering furnaces
<ul style="list-style-type: none"> • Compact system without moving parts • High spectral resolution • Wave length stability • Drift and calibration-free • Gas test possible (with gas diffusion probe) • "Hot-wet" analyzer in the extractive version (GME700) 	<ul style="list-style-type: none"> • Fast and simple installation and start-up • Simple operation directly on the evaluation unit • Measured value, measuring range and limit value can be read off directly • Very low maintenance requirements 	<ul style="list-style-type: none"> • Extendable: Up to three O₂ analyzers can be connected to one evaluation unit • Short reaction time for process control • Temperatures up to 1,400 °C (2,550 °F) • Fixed physical zero point • Automatic calibration • No calibration gas required; calibration gas = ambient air
CE, GOST	CE, GOST, U.S. EPA (probe version)	2001/80/EC, 2000/76/EC, GOST, U.S. EPA, TI Air
<ul style="list-style-type: none"> • Configuration with probe: Installation on one side • Cross-duct configuration: Installation on both sides (opposite each other) • Extractive version Comfortable 19" mounting 	<ul style="list-style-type: none"> • Configuration with probe: Installation on one side • Cross-duct configuration: Installation on both sides (opposite each other) 	<ul style="list-style-type: none"> • Probe technology: Installation on one side
<ul style="list-style-type: none"> • Minimum maintenance effort • Cleaning of optical windows only: Intervals approx. 3 to 6 months 	<ul style="list-style-type: none"> • Minimum maintenance effort • Zero point control and cleaning of optical interfaces: Intervals approx. 3 to 6 months 	<ul style="list-style-type: none"> • Very low effort • No expandable materials • Able to fulfill QAL3 regulations • Intervals approx. 3 to 6 months

- Efficient standard systems for emission-typical applications
- Systems configured according to customer specifications for many process applications
- Simple retrofitting, easy installation and start-up
- Compact and sturdy design
- Complies with the new European Directive EN 15267 for emission measurements



MULTI-COMPONENT ANALYSIS SYSTEMS	MCS100FT	MCS100E HW/PD/CD
	Multi-component analysis system, more than 10 components simultaneously	Multi-component analysis system, more than 10 components
Measuring principle	FTIR spectroscopy	Single-beam photometer, bifrequency and gas filter correlation method
Measuring components	HF, HCl, SO ₂ , NO, NO ₂ , NO _x , CO, NH ₃ , N ₂ O, CH ₄ and additionally CO ₂ , H ₂ O, O ₂ and VOC	Simultaneously max. 8 IR absorbing gas components
Measuring task, application	Continuous emission measurements, for example, in waste incineration and multifuel furnace plants, cement plants, power plants, also with additional fuels, plants with chemical incineration as well as aluminium production, steel and iron production	Continuous monitoring of flue gases, for example, in waste incineration and multifuel furnace plants, cement plants, power plants, also with additional fuels, plants with chemical incineration, aluminium production, steel and iron production as well as smelting and industrial exhaust air MCS100E system variants: <ul style="list-style-type: none"> • MCS100E-HW for raw gas/clean gas monitoring with hot measurement method, also with high acid dew point • MCS100E-PD and -PD for very small measuring ranges, especially for SO₂, NO, NO₂ for monitoring guaranty values
Advantages	<ul style="list-style-type: none"> • Very sturdy analysis system based on standardized system technology according to the hot measurement method • True monitoring of strict HF limit values from 0 ... 3.0 mg/m³ • Specially optimized analysis, from sampling to the sample gas cell • Usage of state-of-the-art FTIR technology (Cube Corner interferometer): Precise and reliable measuring results • Complies with the minimum requirements of Directive EN 15267-3 (QAL1) and the EN 14181 requirements for QAL2 and QAL3 	<ul style="list-style-type: none"> • Detection of elemental and ionic mercury • Automatic zero and test gas feeding • Reliable, proven systems • Very low maintenance requirements • Several measuring points with one system • Integrated QAL3 function, can also be performed with internal calibration filter – no test gas required
Compliances, regulations	2001/80/EC, 2000/76/EC, US EPA, TI Air, EN 15267-3, EN 14181	2001/80/EC, 2000/76/EC, MCERTS, GOST, TI Air, EN 15267-3, EN 14181
Measuring location		
Model	<ul style="list-style-type: none"> • FTIR analyzer • Heated measuring gas cell • Electronics • IO modules • System control unit for operation • FID unit (optional) 	<ul style="list-style-type: none"> • MCS100E: Compact analyzer in a housing • MCS100E system in a cabinet: <ul style="list-style-type: none"> – Sample gas transportation and conditioning (sample gas cooler/permeation dryer, pump) – MCS100E analyzer – Temperature control – FID (optional)
Maintenance, repairs	<ul style="list-style-type: none"> • Low effort • Able to fulfill QAL3 regulations 	<ul style="list-style-type: none"> • Low effort • Able to fulfill QAL3 regulations



MKAS	MKAS COMPACT	MERCEM
Modular multi-component analysis system	Multi-component analysis system	Mercury analysis system
Depending on the built-in analyzers (S710, SIDOR, DEFOR)	Depending on the built-in analyzers (S710, SIDOR, DEFOR)	Cold-vapor atomic absorption, photometry
Depending on the built-in analyzer, for example: CO, NO, SO ₂ , CO ₂ , H ₂ , CH ₄ , O ₂ and others	Depending on the built-in analyzer, for example: CO, NO, SO ₂ , CO ₂ , H ₂ , CH ₄ , O ₂ and others	Hg
Emission measurements according to the new European Directive EN 15267 MKAS system versions: <ul style="list-style-type: none"> • MKAS Basic for operative measurements • MKAS Comfort – automatic measuring system (AMS) for emission monitoring in compliance with EU standards • MKAS Multipoint with sample point switching function from 2 to 8 sample points • MKAS Twin – space-saving parallel analysis of 2 emission sample points • MKAS HD – heavy-duty system suitable for high concentrations, acidic or extremely dusty sample gases 	A complete, very compact analysis system Compact and intelligent integrated cabinet solution for the installation of a standard analyzer (19")	Detection of elemental and ionic mercury As independent system or in combination with a MCS100E-HW
<ul style="list-style-type: none"> • Use of well-proven standard components • Easy to upgrade or retrofit due to modular concept • Optimized sample gas cooler (one or two stage operation) incl. condensate pump, filter and flowmeter • Intelligent sample point switching (2 ... 8 sample points) • Complete system mounted in a sheet steel or GRP cabinet and wired and tested ready for use 	<ul style="list-style-type: none"> • Effective price/performance ratio • Very economic due to favorable purchasing costs and low maintenance effort 	<ul style="list-style-type: none"> • Detection of elemental and bound mercury • Very low detection limits • Very low cross-sensitivity • By adjusting the amalgamation procedure, the sensitivity can be varied to meet individual requirements, especially for very small measurement ranges
Depending on the built-in analyzer	Depending on the built-in analyzer	2000/76/EC, MCERTS, TI Air
<ul style="list-style-type: none"> • Up to 3 analyzers with up to 12 measuring components • High-performance sample gas cooler • Heated sample gas line, probe • Control systems for heating circuits • Air conditioner or fan • Sample point switching • NO_x converter • Matching filters and sample gas pumps 	<ul style="list-style-type: none"> • Analyzer (S710, DEFOR or SIDOR) • Gas cooler (1-stage) • Sample gas pump • Heat controller 	<ul style="list-style-type: none"> • Sample gas pump • Analyzer • Sample gas conditioning • System control unit
<ul style="list-style-type: none"> • Minimum maintenance effort 	<ul style="list-style-type: none"> • Minimum maintenance effort 	<ul style="list-style-type: none"> • Low effort • Able to fulfill QAL3 regulations

- New standards in dust measurement technology with sturdy, low-maintenance dust monitors
- Simple integration into existing measuring landscapes
- Low effort for installation and start-up of devices
- Attainment of proven measuring results with the innovative principles of transmissometry, scattered light, gravimetric comparison measurement



DUST MONITORS	DUSTHUNTER T	DUSTHUNTER S
	Modular dust monitor in three configurations: T50, T100, T200	Modular dust monitor in four configurations: SB50, SB100, SP100, SF100
Measuring principle	Transmissometry	Scattered light
Measuring components	Transmission, opacity, extinction, dust concentration	Dust concentration
Measuring task, application	Emission monitoring, for example, in power plants and heating plants, waste incineration plants and waste disposal, metal processing (steel and aluminum plants, smelting works, foundries), cement production. Monitoring of filter systems Measurement of dust concentration in exhaust gas and exhaust air ducts before and after dust filters Monitoring of the dust load in workshops, control of exhaust air/fresh air systems	Emission monitoring, for example, in power plants and heating plants, waste incineration plants and waste disposal, metal processing (steel and aluminum plants, smelting works, foundries), cement production. Monitoring of filter systems Measurement of dust concentration in exhaust gas and exhaust air ducts before and after dust filters
Advantages	<ul style="list-style-type: none"> • Application for medium to high dust concentrations with small to large active measuring paths <ul style="list-style-type: none"> – Automatic zero and reference point measurement and contamination measurement and correction (T100, T200) – Automatic self-alignment of optical axis (T200) • Measurement of dust concentrations irrespective of gas velocity, moisture or charging of the particles • Simple installation and start-up as well as comfortable operation • Long maintenance intervals • Status-dependent maintenance message • Inputs/outputs extendable with additional modules 	<ul style="list-style-type: none"> • Application for low and medium dust concentrations <ul style="list-style-type: none"> – One-sided installation, no light absorber – Automatic zero and reference point measurement – Contamination measurement and correction (SB100, SP100, SF100) • Measurement of dust concentrations irrespective of gas velocity, moisture or charging of the particles • Simple installation (one-sided installation, except SF100) and start-up as well as comfortable operation • Long maintenance intervals • Status-dependent maintenance message • Inputs/outputs extendable with additional modules
Compliances, regulations	2001/80/EC, 2000/76/EC, MCERTS, US EPA (in preparation), GOST (in preparation), EN 15267-3, EN 14181	2001/80/EC, 2000/76/EC and plants of the 27 th FICA ^{*)} , MCERTS, GOST (in preparation), EN 15267-3, EN 14181
Measuring location		
System components	<ul style="list-style-type: none"> • Sender/receiver unit • Reflector • MCU-P control unit with integrated purge air or • MCU-N control unit and external purge air (option) 	<ul style="list-style-type: none"> • Sender/receiver unit • For SF100 only: Sender unit, scattered light receiver • MCU-P control unit with integrated purge air or • MCU-N control unit and external purge air (option)
Maintenance, repairs	<ul style="list-style-type: none"> • Minimum maintenance effort • Able to fulfill QAL3 regulations • Cleaning of optical windows only: Intervals approx. 3 to 6 months 	<ul style="list-style-type: none"> • Minimum maintenance effort • Able to fulfill QAL3 regulations • Cleaning of optical windows only: Intervals approx. 3 to 6 months

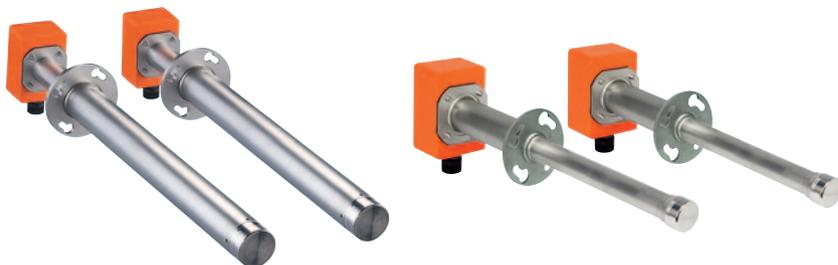
^{*)} FICA = Federal Implementation of Clean Air Act



DUSTHUNTER C	FWE200	GRAVIMAT SHC500
Combined measuring device with two measuring principles C200	Extractive dust measuring device	Mobile dust measuring system
Transmissometry, scattered light	Scattered light	Gravimetry
Transmission, opacity, extinction, dust concentration	Dust concentration	Dust concentration
Emission monitoring, for example, in power plants and heating plants, waste incineration plants and waste disposal, metal processing (steel and aluminum plants, smelting works, foundries), cement production. Monitoring of filter systems Measurement of dust concentration in exhaust gas and exhaust air ducts before and after dust filters	In saturated gas downstream of desulphurization plants In wet scrubbing plants, e.g. of waste incineration plants Registration of dust concentrations in wet exhaust air from technological processes of different industries	Calibration of continuous dust measuring systems Performance measurements at filter plants Non-continuous control measurements Flow and temperature profile measurements, determination of the flow direction (turbulence)
<ul style="list-style-type: none"> • Application for very low and high dust concentrations • Redundant dust measurement by combination of both measuring principles (transmissometry, scattered light) • Reliable application through redundant measuring technology • Self-monitoring function • Scattered light measuring principle for very low dust concentrations (< 5 mg/m³) • Transmission measuring principle for high dust concentrations (< 10,000 mg/m³) • Contamination measurement and correction on both sides • Long maintenance intervals • Future-proof for decreasing limit values and changing concentrations 	<ul style="list-style-type: none"> • Extractive dust measurement for very low to medium concentrations • Automatic test cycle of zero point and reference point • Gas sampling and gas recirculation combined in one probe • Automatic check of zero and reference point; contamination monitoring • Easy installation and assembly due to compact design 	<ul style="list-style-type: none"> • No dust losses during filter handling • Highest measuring accuracy also at low level dust concentrations • Automatic data recording and system control • Isokinetic control in real time • Automatic storage and evaluation of measured values • Measurement results immediately available after sampling • Automatic measurement of the flow angle • Detection of turbulence effects • Compact design, low number of components
2001/80/EC, 2000/76/EC and plants of the 27 th FICA ^{*)} , MCERTS, US EPA (in preparation), GOST (in preparation), EN 15267-3, EN 14181	2001/80/EC, 2000/76/EC, MCERTS	VDI 2066/EN 13284-1, US-EPA Method 17, GOST
<ul style="list-style-type: none"> • Sender/receiver unit • Reflector/scattered light receiver • MCU-P control unit with integrated purge air or • MCU-N control unit and external purge air (option) 	<ul style="list-style-type: none"> • Measuring and control unit • Thermo cyclone • Blower unit 	<ul style="list-style-type: none"> • Automatic unit • Filter head probe GS5
<ul style="list-style-type: none"> • Minimum maintenance effort • Able to fulfill QAL3 regulations • Cleaning of optical windows only: Intervals approx. 3 to 6 months 	<ul style="list-style-type: none"> • Low maintenance effort – depending on application conditions 	<ul style="list-style-type: none"> • Low maintenance requirements

^{*)} FICA = Federal Implementation of Clean Air Act

- Exact, continuous measurement of exhaust gas volume flow
- Rugged titanium transducer for high durability
- Measuring results independent from pressure, temperature and gas composition
- No moving parts, therefore very low maintenance effort
- No interference on flow, minimal loss of pressure



VOLUME FLOW MEAS. DEVICES FOR EMISSION MONITORING	FLAWSIC100 H	FLAWSIC100 M
	High Power	Medium Power
Measuring principle	Measurement of difference in ultrasonic transit time	Measurement of difference in ultrasonic transit time
Measured variables	Gas velocity, volume flow (act. ^{*)} , volume flow (std. ^{**}), gas temperature, sound velocity	Gas velocity, volume flow (act. ^{*)} , volume flow (std. ^{**}), gas temperature, sound velocity
Measuring task, application	High power version for large stacks with up to 13 m (42.7 ft) diameters Suitable for high dust application Use in aggressive gases	Medium power version, best suitable for stack diameters up to 3.4 m (11 ft) Use in aggressive gases
Advantages	<ul style="list-style-type: none"> • Corrosion resistant probe materials • Innovative internal cooling ("AC" types) • Integral measurement over the entire duct diameter • Very low installation requirements and low operating costs • For gas temperatures up to 260 °C (500 °F) (standard), with internal cooling up to 450 °C (840 °F) • No purge air • Fully automatic zero and span check 	<ul style="list-style-type: none"> • Corrosion resistant probe materials • Innovative internal cooling ("AC" types) • Integral measurement over the entire duct diameter • Very low installation requirements and low operating costs • For gas temperatures up to 260 °C (500 °F) (standard), with internal cooling up to 450 °C (840 °F) • No purge air • Fully automatic zero and span check
Compliances, regulations	2001/80/EC, 2000/76/EC, plants of the 27 th FICA ^{***} , MCERTS, U.S. EPA, GOST, TI Air, EN 15267-3	2001/80/EC, 2000/76/EC, plants of the 27 th FICA ^{***} , MCERTS, U.S. EPA, GOST, TI Air, EN 15267-3
Measuring location		
Model	<ul style="list-style-type: none"> • Sender/receiver units • Control unit • Connection box 	<ul style="list-style-type: none"> • Sender/receiver units • Control unit • Connection box
Maintenance, repairs	Very low maintenance thanks to no moving parts, corrosion resistant probe materials and no purge air is used	Very low maintenance thanks to no moving parts, corrosion resistant probe materials and no purge air is used

^{*)} act. = in operating state; ^{**}) std. = in standard state; ^{***}) FICA = Federal Implementation of Clean Air Act



FLOWSIC100 S	FLOWSIC100 PR
Small Size	Probe Type
Measurement of difference in ultrasonic transit time	Measurement of difference in ultrasonic transit time
Gas velocity, volume flow (act.*), volume flow (std.**), gas temperature, sound velocity	Gas velocity, volume flow (act.*), volume flow (std.**), gas temperature, sound velocity
Small transducer size, optimized for small stack diameters of 0.15 up to 1.7 m (0.5 up to 5.6 ft) Use in aggressive gases	For stack diameters greater than 0.4 m (1.3 ft) Probe type with two transducers for installation on one side only
<ul style="list-style-type: none"> • Corrosion resistant probe materials • Integral measurement over the entire duct diameter • Very low installation requirements, low operating costs • For gas temperatures up to 150 °C (300 °C) • No purge air • Fully automatic zero and span check 	<ul style="list-style-type: none"> • Corrosion resistant probe materials • Innovative internal cooling (“AC” types) • Very low installation requirements, low operating costs • For gas temperatures up to 260 °C (500 °C) (standard), with internal cooling up to 350 °C (660 °C) • No purge air • Fully automatic zero and span check
–	2001/80/EC, 2000/76/EC, 27 th FICA***, MCERTS, U.S. EPA, EN 15267-3
<ul style="list-style-type: none"> • Sender/receiver units • Control unit • Connection box 	<ul style="list-style-type: none"> • Sender/receiver unit with probe • Control unit
Very low maintenance thanks to no moving parts, corrosion resistant probe materials and no purge air is used	Very low maintenance thanks to no moving parts, corrosion resistant probe materials and no purge air is used

* act. = in operating state; ** std. = in standard state; *** FICA = Federal Implementation of Clean Air Act

- Tailored solutions or standard components
- Complete equipment
- Own factory acceptance included (Factory Acceptance Test)
- Best Solutions
- Detailed consulting based on experience with many realized system solutions



SYSTEM DESIGN	SYSTEM DESIGN
	Tailored solutions or standard components
Technology	Integration of various measuring principles and methods
Components, system	Up-to-date analyzers and systems Data processing and remote monitoring components included Comprehensive selection of measuring devices
Application	Stand-alone operation of measuring units Integration of complex measuring systems as turnkey Emission monitoring – from sample gas sampling up to data evaluation Economical process monitoring Application in explosion-protected areas
Advantages	<ul style="list-style-type: none"> • Tailored systems in compliance with international requirements • International presence – local experts available • Systems configured according to customer specifications for many process applications • Minimal interfaces can be easily integrated • Simple retrofitting, simple installation and start-up • Many years of industrial experience • Complex solutions from one source
Compliances, regulations	Measuring systems compliant with the respective provisions and directives
Installation location	
Model	<ul style="list-style-type: none"> • Complete analysis units • Complete equipment, from gas sampling over processing and analysis up to data evaluation
Professional project management	<ul style="list-style-type: none"> • Planning, engineering, production and own factory acceptance included (Factory Acceptance Test) • Local installation, start-up and service • Project management in close cooperation with the customer • Best Solutions as agreed

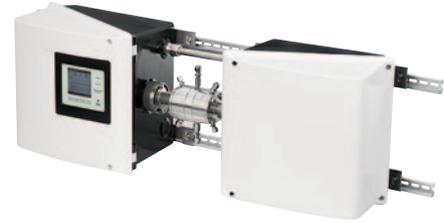
- Continuous measured value recording
- Evaluation of emission data according to regulations
- Reliable data storage
- Flexible data presentation



INTEGRATION OF MEASURED DATA PROCESSING	MEAC2000
	Electronic evaluation system: Acquisition, conversion, averaging, scaling, evaluation (classification), visualization, logging, long-term storage and transfer of measured data
Technology	Analog I/O modules, digital linking, PC with Windows application
Components, system	Data acquisition unit (DAU), field module (FM), digital linking Emission PC (EPC) with Windows XP® operating system Evaluation software (D and EU version) with data model
Application	Continuous emission monitoring for plants according to the 27 th and 30 th FICA ^{*)} and TI Air as well as EU Directives 2000/76/EC and 2001/80/EC, including: Electronic acquisition and evaluation of operational parameters (e.g. thermal capacity) and operating modes (e.g. start-up) Cyclical output of official protocols and operator-specific reports Remote transfer of emission data to a MEAC2000 central system or a German environmental authority according to the definition of modem interfaces of the LAI of 2005
Advantages	<ul style="list-style-type: none"> • Simple and transparent parameter setting • Freely configurable representation of values as bars, curves, table or process diagram • Distributed visualization in corporate networks, optionally by means of a MySQL database • Decentralized data acquisition close to the measuring device with buffer for 7-20 days • Central evaluation of data from up to 16 decentralized acquisition units • Language support in EU version • High data security through local and external memory redundancy • Auxiliary module for annual to annual emission report in compliance with the 11th FICA^{*)} • Analog acquisition of control data for quality assurance QAL3 of a measuring device according to DIN EN 14181 • Digital linking with process control systems (DCS) via Modbus RTU/TCP, Profibus DP and OPC DA2.0 for data acquisition and output • Remote maintenance via modem and VPN
Compliances, regulations	2001/80/EC, 2000/76/EC, 27 th and 30 th FICA ^{*)} , TI Air, DIN EN 14181
Installation location	
Model	<ul style="list-style-type: none"> • Data acquisition unit(s), each with up to 80 analog and 256 digital inputs for data transfer to the emission PC via serial bus or network • Emission PC with digital interfaces to link acquisition and output systems • Evaluation software with communication, display and configuration modules
Extra benefits	<ul style="list-style-type: none"> • Calculation of optional Boolean, algebraic, conditional formula expressions, for example, to determine emission masses (loads) by means of the flue gas volume flow • Continuous provision of calculated data for process control via analog outputs of the data acquisition units or digital communication • Spontaneous alarms for events, such as limit value violations via analog status outputs of the data acquisition units or digital communication

^{*)} FICA = Federal Implementation of Clean Air Act

- Water analysis (TOC) of waste water, drinking water, surface water, process water and much more
- Fluid analysis for process monitoring and control and for quality control and use in research



LIQUID ANALYZERS, AUTOMOTIVE	TOCOR700	MCS300P
	With thermal or UV reactor	Multi-component process analyzer, with up to 6 components plus O ₂
Measuring principle	NDIR measurement after oxidation	Single-beam photometry Bifrequency and gas filter correlation
Measuring components	C _{org} (TOC)	IR, NIR, VIS absorbing liquids; suitable especially for measuring traces of water in organic liquids
Measuring task, application	Continuous, extractive water analysis for cumulative determination of carbon content from carbon compounds or elementary carbon Application in the chemical industry for analysis of process steam, surface water or raw sewage Monitoring for contamination in process water Monitoring of condensate in cooling circuits	In production plants in the chemical industry For monitoring the water concentration in EDC/VC in PVC production Measurement of isocyanate traces in chlorobenzene
Advantages	<ul style="list-style-type: none"> • Longer service life of the filters because conditioned carrier gas up to 300 ppm CO₂ is generated by TOCOR700 itself to some extent • Can be equipped with sample point switching for up to 4 sample points • Standard in water measurement technology according to legal specifications • Very high measuring precision for small TOC concentrations • Longer service life of filters because carrier gas for CO₂ concentrations up to 300 ppm is generated and conditioned by TOCOR700 itself 	<ul style="list-style-type: none"> • Special liquid cuvettes for corrosive, toxic liquids with integrated protection devices • Liquid pre-thermostat (option) and thermostatically controlled liquid cuvettes ensure very high measuring stability • A media pressure up to 60 bar ensures high reliability even under difficult conditions
Compliances, regulations	CE, ATEX	CE, EMC 2004/108/EC, Low Voltage Directive 2006/95/EC
Measuring location		
Model	<ul style="list-style-type: none"> • TOCOR700 TH with thermal reactor for use with unknown water compounds • TOCOR700 UV with UV reactor for use with known water compounds • Versions for use in ex zone 1 or ex zone 2 • Version as stand-alone unit or wall-mounted unit 	<ul style="list-style-type: none"> • Compact process analyzer for easy wall fitting • Optional versions in analysis cabinet with integrated sample handling
Maintenance, repairs	<ul style="list-style-type: none"> • Reduction of downtimes caused by maintenance from 12 hours to 15 minutes by use of two thermal reactors (option) • Very easy to maintain due to high absorption capacity for salts and solids 	<ul style="list-style-type: none"> • Low maintenance effort • Automatable check cycle for zero and reference point monitoring • Adjusting filter wheel (option) for quick check • Simple housing care



GM700 (CAR)	FLOWSIC150 CARFLOW	DIESEL MONITOR
Mobile, compact measuring system	Mobile, compact measuring system	Mobile, compact measuring system
Laser spectroscopy (TDLS)	Measurement of difference in ultrasonic transit time	Transmissometry
HCl, HF, NH ₃ , O ₂	Gas velocity, volume flow (act.*), volume flow (std.**), gas temperature, absolute pressure, sound velocity	Soot value according to Bosch and Bacharach
Ammonia measurement of exhaust emissions at engine test benches Emission minimization of prototypes during development Individual optimization of series motors on automatic engine test benches	Direct measurement of exhaust gas volume flow of roller test benches as well as test benches for diesel and gasoline engines in the automotive industry Direct, time-coupled emission assignment Measurement of undiluted exhaust gas, simultaneous gas analysis with very low pollutant concentrations possible	Individual optimization of series motors on automatic engine test benches Monitoring of prototypes during development Exhaust gas measurement on test benches for diesel and gasoline engines
<ul style="list-style-type: none"> • Fast, direct measurement in exhaust pipe • Very low response time, 5 measurements per second • No sampling and gas processing required • No cross-sensitivities • High availability • Mobile device layout for versatile use 	<ul style="list-style-type: none"> • No moving parts, no wear • High response speed (real-time measurement), optimization of engine and electronic components possible • Practically no pressure loss, no influence on engine characteristics • Single or multipath measurements for very high precision – also at low speeds 	<ul style="list-style-type: none"> • Fast, direct measurement in exhaust pipe • Contact-free and fast measurements – also for lowest concentrations • No moving parts, no pressure losses or influences on engine characteristics • Saving of up to 5000 measured values in intervals of 1 s to 2 h • Registration of 500 events with date and time
Mobile measuring system with compact measuring cell, analyzer, integrated operating and gas control unit	Mobile measuring system with compact measuring cell with embedded ultrasonic transducers and integrated operating unit	Easy installation and operation
<ul style="list-style-type: none"> • Very low maintenance effort • Simple housing care 	<ul style="list-style-type: none"> • Almost maintenance-free • Simple housing care 	<ul style="list-style-type: none"> • Very low maintenance effort • Simple housing care

*) act. = in operating state;

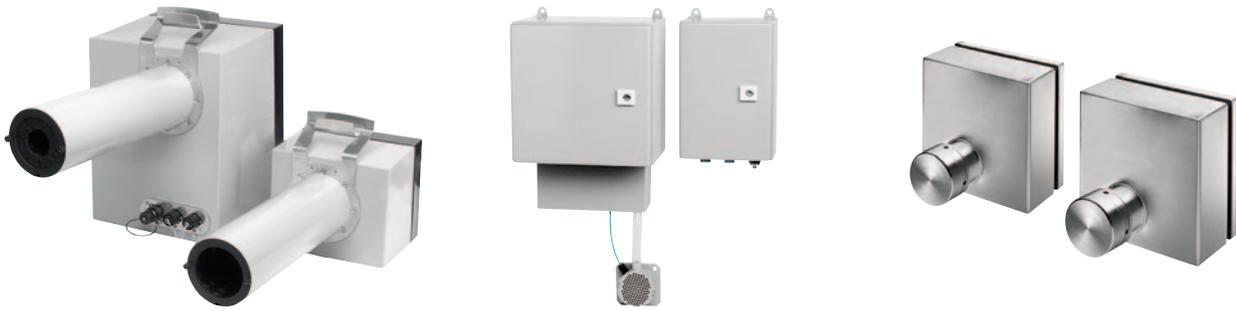
**) std. = in standard state

Tunnel

- Innovative, sophisticated sensors and measuring systems based on many years of know-how from the market leader
- Optical measurement technology for precise measuring results
- Tailored to user requirements



TRAFFIC SENSORS	SMOTEC450	VICOTEC410
	Robust smoke detector	Visibility and CO measuring system
Measuring principle	Scattered light	Transmissometry Negative gas correlation
Measuring components	Smoke	Visibility (VIS), CO
Measuring task, application	Extremely reliable and rapid detection even of small fires in tunnels	Ventilation control in traffic tunnels
Advantages	<ul style="list-style-type: none"> • No false alarm by fog • Exhaustive self-test • Regular, automatic calibration • Lowest false alarm rate (similar to visibility measuring: < 0.01 per km and year) • Very easy integration into existing system on site • High availability due to robust design and comprehensive self-test 	<ul style="list-style-type: none"> • Short reaction time • Maintenance prompt when contaminated • Representative measuring results thanks to in-situ technology • Automatic adjustment function for efficient start-up • Robust and well proven
Directive	Usable in solutions according to the most common European Tunnel Directives	Usable in solutions according to the most common European Tunnel Directives
Measuring location		
Model	<ul style="list-style-type: none"> • Measuring unit VCME with integrated suction • MCU control unit 	<ul style="list-style-type: none"> • Pair of sensors • Evaluation unit • 2 mounting brackets
Maintenance, repairs	<ul style="list-style-type: none"> • Long maintenance intervals, therefore low maintenance effort • Maintenance request • Long-lasting operation, even in harsh tunnel environment 	<ul style="list-style-type: none"> • Long maintenance intervals, therefore very low maintenance effort • Maintenance request • Long-lasting operation, even in harsh tunnel environment



VICOTEC320	VICOTEC450	FLOWSIC200
NO ₂ , NO and visibility measuring system	Extractive visibility measuring system	Measurement of flow speed, flow direction and air temperature (optional)
UV spectroscopy (DOAS) In-situ	Scattered light Extractive	Ultrasonic run-time difference In-situ
NO ₂ , NO, visibility (VIS), temperature	Visibility (VIS), smoke alarm	Air velocity, flow direction
Ventilation control, filter monitoring in road tunnels	Ventilation control in road tunnels	Ventilation control in road tunnels Detection of smoke spread during tunnel fires
<ul style="list-style-type: none"> • Very low detection limits • Simple, maintenance-free operation without expendable materials and test gases • Automatic adjustment function • No relevant cross-sensitivity • Future-proof with the NO₂ measurement in road tunnels which has been demanded for a long time • Due to a very sturdy housing (IP 69K), the VICOTEC320 withstands thorough tunnel cleaning without problems • Combined measurement of up to 4 measured variables simultaneously and fast 	<ul style="list-style-type: none"> • Extractive measuring device allows installation outside the tunnel tube • No cross-sensitivity to fog • Exhaustive self-test • Regular, automatic calibration 	<ul style="list-style-type: none"> • Ultrasonic transducer made of aluminium or titanium • Non-contact measuring principle without mechanically moved parts • Integral measurement over full tunnel width for representative results • Minimum operating costs • Very long measuring sections, up to 40 m (130 ft) • Extremely robust components made of titanium, stainless steel and pressure casting
Usable in solutions according to the most common European Tunnel Directives which require NO/NO ₂ measurement	Usable in solutions according to the most common European Tunnel Directives	Usable in solutions according to the most common European Tunnel Directives
<ul style="list-style-type: none"> • Sender/receiver unit • Reflector • Connection unit • 2 mounting brackets 	<ul style="list-style-type: none"> • Measuring unit VCME with integrated suction • MCU control unit • Temperature sensor (optional) 	<ul style="list-style-type: none"> • Version with aluminium die-cast enclosure • Version with stainless steel enclosure • Each with 2 sender/receiver units and 1 control unit
<ul style="list-style-type: none"> • Simple, maintenance-free operation without expendable materials and test gases • Very low effort, cleaning once a year is sufficient 	<ul style="list-style-type: none"> • Long maintenance intervals, therefore low maintenance effort • Maintenance request • Long-lasting operation, even in harsh tunnel environment 	<ul style="list-style-type: none"> • Minimum maintenance effort • Long maintenance intervals: From 1 to 2 years (FLOWSIC200 M) up to 5 years (FLOWSIC200 H)

Road

- Intelligent traffic measuring systems for the demands of modern traffic control systems
- Highly sophisticated measuring systems for visibility measurement, overheight and precipitation detection



	VISIC620	HISIC450
	Visibility measuring device	Overheight detector
Measuring principle	Scattered light In-situ	Duplex photoelectric switch
Measuring components	Visibility	Overheight yes/no
Measuring task, application	Reliable fog detection by determination of range of vision on roads, sea routes, tunnel portals Automatic meteorological observation stations	Overheight detection before tunnel portals, bridges or similar structures
Advantages	<ul style="list-style-type: none"> • Reliable fog detection through automatic self-test • Plug & Play onsite due to minimum space requirements, low weight, robust housing and very simple parameter setting • Large measuring range in range of visibility • Contamination monitoring • GSM/GPRS modem (option), low energy requirements for solar operation • Optional precipitation measurement • Durable due to long-life housing made of stainless steel with powder coating 	<ul style="list-style-type: none"> • Functions in almost every weather situation through high light reserves • Reliable detection of vehicles higher than the maximum height through redundant installation • Robust and weatherproof design with weatherproof cover • Heated front lenses against condensation/icing (option) • Optical alignment aid, insensitive to residual light
Directive	RABT ^{*)}	RABT ^{*)}
Measuring location		
Model	<ul style="list-style-type: none"> • One device version (housing of stainless steel with holder) for all applications 	<ul style="list-style-type: none"> • Redundant pair of sensors, each with 1 sender and 1 receiver
Maintenance, repairs	<ul style="list-style-type: none"> • Requirement prompt for cleaning • Long maintenance intervals <ul style="list-style-type: none"> – Only every five years (apart from cleaning) 	<ul style="list-style-type: none"> • Very low maintenance requirements

^{*)} Technical equipment of road tunnels; "Richtlinien für die Ausstattung und den Betrieb von Straßentunneln (RABT)", version 2006

Process and flare gas applications

- Exact, continuous measurement of exhaust gas volume and mass flow
- Measuring results independent from pressure, temperature and gas composition
- Innovative high-speed sensor design for maximum gas velocities (flare gas)
- Probe versions for simple installation on one side only

Process applications



GAS FLOW MEASURING DEVICES	FLOWSIC100 PROCESS PN16/CL150	FLOWSIC100 PROCESS EX-Z2/EX-Z2-RE
	Volume flow measuring device	Volume flow measuring device
Measuring principle	Ultrasonic transit time measurement	Ultrasonic transit time measurement
Measured variables	Gas velocity, volume flow (act. ^{*)} , volume flow (std. ^{**}), gas temperature, sound velocity, mass flow	Gas velocity, volume flow (act. ^{*)} , volume flow (std. ^{**}), gas temperature, sound velocity, mass flow
Application	Ambient pressure up to 16 barg Hermetically sealed stainless steel or titanium	Ambient pressure up to 16 barg Ex-protected version for use in hazardous area zone 2 according to ATEX guideline 94/9/EC (version for zone 1 on request) Hermetically sealed stainless steel or titanium Optional: Flange with retractable device for sender/receiver units
Advantages	<ul style="list-style-type: none"> • Rugged transducers in stainless steel or titanium for higher durability • Corrosion resistant probe materials available for use with aggressive gases • Integral measurement over the entire duct diameter for representative measuring results (apart from probe version) • Contact-free measurement • No moving parts, therefore low maintenance effort • High measuring accuracy even at lowest gas velocity • Fully automatic zero and span check 	<ul style="list-style-type: none"> • Rugged transducers in stainless steel or titanium for higher durability • Corrosion resistant probe materials available for use with aggressive gases • Integral measurement over the entire duct diameter for representative measuring results (apart from probe version) • Contact-free measurement • No moving parts, therefore low maintenance effort • High measuring accuracy even at lowest gas velocity • Fully automatic zero and span check
Compliances, regulations	–	ATEX II 3 G EEx nA II T4 (manufacturer license); zone 1 on request
Measuring location		
System components	<ul style="list-style-type: none"> • Sender/receiver units • Control unit • Connection box 	<ul style="list-style-type: none"> • Sender/receiver units • Control unit • Optional: Flange with retractable device for sender/receiver units
Maintenance, repairs	<ul style="list-style-type: none"> • Integrated zero and span check 	<ul style="list-style-type: none"> • Integrated zero and span check

^{*)} act. = in operating state; ^{**)} std. = in standard state

Flare gas applications



	FLOWSIC100 PROCESS PR-EX-Z2	FLOWSIC100 FLARE EX-S
	Volume flow measuring device	Gas mass flow measuring device Pipe size 4" to 72"
Measuring principle	Ultrasonic transit time measurement	Ultrasonic transit time measurement
Measured variables	Gas velocity, volume flow (act. ^{*)} , volume flow (std. ^{**}), gas temperature, sound velocity, mass flow	Mass flow, volume flow (act. ^{*)} , volume flow (std. ^{**}), molecular weight, gas volume and mass, gas velocity, gas temperature, sound velocity
Application	Ambient pressure up to 0.1 barg Ex-protected probe version for use in hazardous area zone 2 according to ATEX guideline 94/9/EC Material: Stainless steel or titanium Installation on one duct side only	Cross-duct high speed version (patent pending) 90° nozzle installation Optional: Retractable under process conditions Hermetically sealed stainless steel and titanium probes ATEX and CSA approved for use in hazardous areas
Advantages	<ul style="list-style-type: none"> Rugged transducers in stainless steel or titanium for higher durability Corrosion resistant probe materials available for use with aggressive gases Integral measurement over the entire duct diameter for representative measuring results (apart from probe version) Contact-free measurement No moving parts, therefore low maintenance effort High measuring accuracy even at gas velocity near zero Fully automatic zero and span check 	<ul style="list-style-type: none"> Operation under very high gas velocities – using an innovative high speed sensor design Accurate operation at low gas flow near zero Easy installation procedure – welding of nozzles perpendicular to pipeline Remote installation of control unit up to 1,000 m (3,300 ft) – serial connection Improved accuracy – spool piece solution Assured and reliable device function – automatic self diagnosis
Compliances, regulations	ATEX II 3 G EEx nA II T4 (manufacturer license)	SR-unit Zone 1: ATEX II 2G Ex d [ia] IIC T4; ATEX II 2G Ex de [ia] IIC T4; CSA Cl I, Div1/Div2; Cl I, Zone; 1/Zone 2 Option: Temp. class T6; Zone 0 for ultrasonic transducers ATEX I/2G Ex d [ia] IIC T4 SR-unit Zone 2: ATEX II 3G Ex nA II T4 MCU control unit: Non-ex: Remote installation with up to 1,000 m (3,300 ft) distance to sample point Zone 1: ATEX II 2G Ex dIIC T4; CSA Cl, Div.1: Cl I, Zone 1 (pending) Zone 2: ATEX II 3G Ex nA II T4; CSA Cl I, Zone 2
Measuring location		
System components	<ul style="list-style-type: none"> Sender/receiver units Control unit 	<ul style="list-style-type: none"> Sender/receiver units Control unit
Maintenance, repairs	Integrated zero and span check	Integrated zero and span check

^{*)} act. = in operating state; ^{**)} std. = in standard state

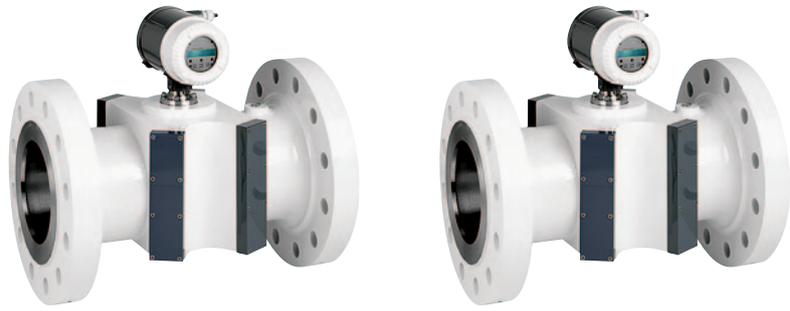


FLOWSIC100 FLARE EX	FLOWSIC100 FLARE EX-PR
Gas mass flow measuring device Pipe size 6" to 72"	Gas mass flow measuring device Pipe size 12" to 72"
Ultrasonic transit time measurement	Ultrasonic transit time measurement
Mass flow, volume flow (act.*), volume flow (std.**), molecular weight, gas volume and mass, gas velocity, gas temperature, sound velocity	Mass flow, volume flow (act.*), volume flow (std.**), molecular weight, gas volume and mass, gas velocity, gas temperature, sound velocity
Cross-duct high power version for sound damping gas compositions Optional: Retractable under process conditions Hermetically sealed stainless steel and titanium probes ATEX and CSA approved for use in hazardous areas	High speed probe version (patent pending) Single flange installation Optional: Retractable under process conditions Hermetically sealed stainless steel and titanium probes ATEX and CSA approved for use in hazardous areas
<ul style="list-style-type: none"> • Operation under very high gas velocities – using an innovative high speed sensor design • Accurate operation also at low gas flow (near zero) • Easy installation procedure – welding of nozzles perpendicular to pipeline • Remote installation of control unit up to 1,000 m (3,300 ft) – serial connection • Improved accuracy – spool piece solution • Assured and reliable device function – automatic self diagnosis 	<ul style="list-style-type: none"> • Operation under very high gas velocities – using an innovative high speed sensor design • Accurate operation also at low gas flow (near zero) • Easy installation procedure – welding of nozzles perpendicular to pipeline • Remote installation of control unit up to 1,000 m (3,300 ft) – serial connection • Single flange installation (probe version) • Improved accuracy – spool piece solution • Assured and reliable device function – automatic self diagnosis
SR-unit Zone 1: ATEX II 2G Ex d IIC T4; ATEX II 2G Ex de IIC T4; CSA Cl I, Div1/Div2; Cl I, Zone 1/Zone 2 Option: Temp. class T6 SR-unit Zone 2: ATEX II 3G Ex nA II T4 MCU control unit: Non-ex: Remote installation with up to 1,000 m (3,300 ft) distance to sample point Zone 1: ATEX II 2G Ex dIIC T4; CSA Cl, Div.1: Cl I, Zone 1 (pending) Zone 2: ATEX II 3G Ex nA II T4; CSA Cl I, Zone 2	SR-unit Zone 1: ATEX II 2G Ex d [ia] IIC T4; ATEX II 2G Ex de [ia] IIC T4; CSA Cl I, Div1/Div2; Cl I, Zone; 1/Zone 2 Option: Temp. class T6; Zone 0 for ultrasonic transducers; ATEX I/2G Ex d [ia] IIC T4 SR-unit Zone 2: ATEX II 3G Ex nA II T4 MCU control unit: Non-ex: Remote installation with up to 1,000 m (3,300 ft) distance to sample point Zone 1: ATEX II 2G Ex dIIC T4; CSA Cl, Div.1: Cl I, Zone 1 (pending) Zone 2: ATEX II 3G Ex nA II T4; CSA Cl I, Zone 2
<ul style="list-style-type: none"> • Sender/receiver units • Control unit 	<ul style="list-style-type: none"> • Sender/receiver units • Control unit
Integrated zero and span check	Integrated zero and span check

* act. = in operating state; ** std. = in standard state

For traffic and process applications requiring calibration

- Gas flow measurements at the highest level
- Path layout without reflection
- Very efficient titanium transducers for almost all industrial requirements
- Innovative software MEPAFLOW600 CBM for condition based maintenance



	FLOWSIC600 2-PATH	FLOWSIC600 4-PATH
	Ultrasonic compact gas meter 2" ... 48", Process	Ultrasonic compact gas meter 2" ... 48", calibratable
Measuring principle	Ultrasonic run-time difference	Ultrasonic run-time difference
Measured variables	Gas volume flow (act.*), gas volume (act.*), gas velocity, sound velocity in gases	Gas volume flow (act.*), gas volume (act.*), gas velocity, sound velocity in gases
Application	2 measuring paths 2" ... 48"/DN50 ... DN1200 Measurement uncertainty $\pm 1\%$ Integrated performance monitoring	4 measuring paths 3" ... 48"/DN80 ... DN1200 Measurement uncertainty $\pm 0.2\%$ Integrated performance monitoring
Advantages	<ul style="list-style-type: none"> • Bidirectional measurement, no loss of pressure • Path layout without reflection • Highly efficient ultrasonic transducers • Insensitive to ultrasonic noise • Large measuring range up to 1:120 • Overload safe • Integrated logbook and 4 volume counters • Intelligent self-diagnosis • Power consumption <1 W • Calibration with air possible at ambient pressure 	<ul style="list-style-type: none"> • Bidirectional measurement, no loss of pressure • Path layout without reflection • Highly efficient ultrasonic transducers • Insensitive to ultrasonic noise • Large measuring range up to 1:120 • Overload safe • Integrated logbook and 4 volume counters • Intelligent self-diagnosis • Power consumption <1 W • Calibration with air possible at ambient pressure
Compliances, regulations	ATEX, CSA, PED	ATEX, CSA, Ped, OIML, AGA, API, PTB, NMI, GOST
Measuring location		
Model	<ul style="list-style-type: none"> • Measuring sensor (meter body) • Measuring transducer (electronics) • Ultrasonic sensors 	<ul style="list-style-type: none"> • Measuring sensor (meter body) • Measuring transducer (electronics) • Ultrasonic sensors
Maintenance, repairs	No cyclic maintenance	No cyclic maintenance

* act. = in operating state



	FLOWSIC600 2 PLEX	FLOWSIC600 QUATRO
	Ultrasonic compact gas meter 2" ... 48", calibratable	Ultrasonic compact gas meter 2" ... 48", calibratable
Measuring principle	Ultrasonic compact gas meter	Ultrasonic compact gas meter
Measured variables	Gas volume flow (act.*), gas volume (act.*), gas velocity, sound velocity in gases	Gas volume flow (act.*), gas volume (act.*), gas velocity, sound velocity in gases
Application	4 + 1 measuring paths 3" ... 48"/DN80 ... DN1200 Measurement uncertainty $\pm 0.2\%$ Integrated performance monitoring Condition based maintenance by monitoring the installation close to the meter (contamination, blockage and pulsation) Redundancy	4 + 4 measuring paths 3" ... 48"/DN80 ... DN1200 Measurement uncertainty $\pm 0.2\%$ Integrated performance monitoring 2 independent fiscal meters in one meter body As 8 path version suitable for flow test facilities
Advantages	<ul style="list-style-type: none"> • Bidirectional measurement, no loss of pressure • Path layout without reflection • Highly efficient ultrasonic transducers • Insensitive to ultrasonic noise • Large measuring range up to 1:120 • Overload safe • Integrated logbook and 4 volume counters • Intelligent self-diagnosis • Power consumption <1 W • Calibration with air possible at ambient pressure 	<ul style="list-style-type: none"> • Bidirectional measurement, no loss of pressure • Path layout without reflection • Highly efficient ultrasonic transducers • Insensitive to ultrasonic noise • Large measuring range up to 1:120 • Overload safe • Integrated logbook and 4 volume counters • Intelligent self-diagnosis • Power consumption <1 W • Calibration with air possible at ambient pressure
Compliances, regulations	ATEX, CSA, Ped , OIML, AGA, API, PTB, NMi, GOST	ATEX, CSA, Ped , OIML, AGA, API, PTB, NMi, GOST
Measuring location		
Model	<ul style="list-style-type: none"> • Measuring sensor (meter body) • Measuring transducer (electronics) • Ultrasonic sensors 	<ul style="list-style-type: none"> • Measuring sensor (meter body) • Measuring transducer (electronics) • Ultrasonic sensors
Maintenance, repairs	Low-maintenance, fail-safe operation due to compact design with integrated cable conduit No cyclic maintenance	Low-maintenance, fail-safe operation due to compact design with integrated cable conduit No cyclic maintenance

* act. = in operating state

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- Accident protection and personal safety using sensors, as well as safety software and services

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Sensors made by SICK form the basis for automating material flows and the optimization of sorting and warehousing processes.



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- Detecting volume, position, and contours of objects and surroundings with laser measurement systems

Process automation

Optimized system solutions from SICK ensure efficient acquisition of environmental and process data in many industrial processes.



- Precise measurement of gases, liquids and dust concentrations for continuous monitoring of emissions and the acquisition of process data in production processes
- Gas flow measurements with maximum accuracy thanks to compact gas meters