Committing to the future



2010

Measurement Solutions for Emissions, Service and Thermal Processes





Accurate Values In The Name Of Efficiency and Environment

Modern emission analysis must fulfill a number of requirements – Testo constantly adapts to these requirements:

Starting with continuous emission checks through to tuning and optimization of burners to process monitoring in thermal manufacturing processes.

The adaptive flue gas analysis systems which Testo has been developing, producing and selling for the past 30 years not only concentrate on precision but also particularly on practicality and handling.

Directly to the customers

The requirements in the flue gas analysis sector are becoming more and more complicated and specialised – Testo has become active particularly in the industrial customers segment: Experienced Testo experts analyze the specifications profile, develop and define the optimum system solution. The transfer of qualified advice competence to the requirements on site has emerged and has established itself as an extremely important tool.

But that's not enough – fast reaction time in all service questions after purchase underline Testo's efficiency and competence.

Measurement projects instead of measurement products

The range of products in the emission measurement sector is highly specialised and can be adapted accordingly. Against this background, Testo offers real project management. After all, the aim is to design measurement systems, adapted to each other, which guarantee optimum results at the highest efficiency levels. A full overview of your analysis processes is the basis for solution systems made by testo.

For special applications in industry

The flue gas analyzer product line is geared especially toward industry requirements:

- High accuracy (comparable with infrared or chemical engineering from the stationary application sector).
- Long-term measurements (practically stationary) lasting several hours to several weeks.
- · Flexible sampling probe program for highly different sampling points.
- High to extreme measurement ranges for use in raw gas or in special oven atmospheres.
- \cdot Service is carried out by the user saving money and downtimes.
- Not affected by dusty and damp flue gases or "tough" ambient conditions.

The special benefits pay off during daily use

The practical Testo instrument design for emission measurement have important features: Pre-calibrated electrochemical gas sensors with electronics attached which are as easy to change as batteries as well as the long service life of the gas sensors which greatly reduce test gas adjustment intervals. One other striking feature of Testo instruments is the built-in Peltier gas preparation unit with hose pump for automatic condensate elimination.

Learning changes

Do you have your current emission limits under control? Important parameters under control? Documentation without any gaps? Optimum interplay of emission analysis components? If you have any queries, do not hesitate to call us.



Testo is a reliable partner

Hartmut Dobrocky, Operations Manager at SAACKE Service



The SAACKE GmbH & Co. KG with headquarters in Bremen stands worldwide for High Tech Engineering in thermal process engineering. The family business manufactures industrial burners for practically all combustible materials.

Mr. Dobrocky, the family business, SAACKE, has been in existence since 1931. How has industrial heat and energy generation technology developed in this time?

When the company first started, there were mainly heavy fuel oil burners which took over from the coal era. They were first used as ship burners. The development of rotary atomizers signified significant progress. Light oil burning came later and the oil crisis in the seventies led to the development of gas burners.

Have qualitative requirements influenced burner engineering?

In the past, it was mainly about engineering to generate process heat. Now, a responsible attitude towards the environment has top priority.

In your service team, you use Testo instruments almost exclusively. Do instruments with electrochemical gas sensors have special benefits?

When selecting the measurement method used, accuracy always has top priority. In the case of instruments with electrochemical gas sensors, we achieve measurement accuracies within the measurement ranges required which can be compared with other systems. One major advantage is the user-friendliness of the instruments. The flue gas analysis systems manufactured by Testo and used by us are about the size of a briefcase. This enables fast and easy operation.

SAACKE Service therefore relies on Testo measurement engineering on a daily basis?

In Germany alone, 65 service technicians are equipped with portable flue gas analysis systems made by Testo. The instruments have proven themselves in terms of efficiency and measurement accuracy as well as easy handling and often in difficult conditions. An additional reason for our close partnership with Testo which must be mentioned is the presence of Testo subsidiaries and sales partners in over 60 countries all over the world.

The right flue gas analyzer for ev

RLL ABOUT Industrial flue Grs Analysis

ery requirement

The approved reference flue gas analyzer for co	ontinuous emissio	on meas	urement					testo 360	
The flexible, portable flue gas analyzer (measur	rement system)			testo	350 S/XL/ MARITIME		1	-	÷
New measurement engineering for monitoring e	emissions		teste	o 335				S	
Introduction to portable flue gas analysis	testo CO.	325-I	1		0000	1			
Convenient introductory instrument for emission monitoring on coal and heavy oil burners	testo 325-I SO ₂ set			2 PPH 9 °C			,		
		testo 325-I SO ₂ set	testo 325-I CO _{high}	testo 325-I CO _{high} [0 ₂]	testo 335	testo 350 S	testo 350 XL	testo 350-MARITIME	testo 360
Maximum number of gas sensors		1	2	2	3	6	6	6	7
Possible measurable parameters	02							GL certified	
	CO							GL certified	
	CO _{low}								
	NO							GL certified	
	NU ₂							GL certified	
	H ₂ S 								
								GI certified	
						00.00			
Measurement range extension for the following gas sensors					$O, O_{low}, NO, NO_{low}, NO_2, SO_2$	CO, CO _{low} , NO ₂ , S	NU, NU _{low} , 0 ₂ , H ₂ S		CO, CO ₂ , NO, NO ₂ , SO ₂
Setting switch-off thresholds in gas sensors when specified concentrations are	e reached								
Built-in Peltier measurement gas preparation unit						Optional			
Data logger operation lasting several hours and days					Up to max. 2 hours				
Connection of robust, modular sampling probes for industrial applic	ations								
Easy-to-change gas sensors without test gas adjustment by the use	er								
Analysis software for meas. data management incl. analysis and graphics func	tion, online meas.								
Built-in data memory									
Interfaces for data transfer to PC					USB	RS232	RS232	RS232	RS232
RS232, data bus controller with USB connection									
BLUET00TH® wireless transmission									

Industrial flue gas – Affordable analysis and documentation

testo 325-I

121293

testo 325-I is the introduction to affordable flue gas analysis for SO2. It combines precision with user-friendly operation and low costs. It is the ideal instrument for checking emissions and monitoring thermal processes.

- User-friendly operation and handling Large display
- Gas sensor can be easily changed by the user
- Magnetic SoftCase protects from dirt and impact

Built-in condensate trap protects instrument

Prints readings with date

and time

Fast and easy checking of SO_{2} concentrations

testo 325-I SO₂

SO2 Set

SO2 Set includes analyzer and sampling probe (with Tygon® hose), with batteries and calibration protocol

Part no. 0563 3260

Printer and Accessories	Part no.
Testo fast printer with wireless infrared interface, 1 roll thermal paper and 4 AA batteries, for printing out measurements on site	0554 0549
External fast charger for 1-4 AA rech. batteries, incl. 4 Ni-MH rech. batteries with individual cell charging and charge control display, incl. impulse trickle charging, integrated discharge function, with built-in international mains plug, 100-240 V, 300 mA, 50/60 Hz	0554 0610
Spare thermal paper for printer (6 rolls)	0554 0569
Spare thermal paper for printer (6 rolls), permanent ink, measurement data documentation legible for up to 10 years	0554 0568
Additional Accessories and Spare Parts	Part no.
Sealing cone with knurled screw for sampling probe	0554 9050
Mains unit 230 V/ 8 V/ 1 A, for instrument (European plug), for mains operation and battery recharging	0554 1084
Spare particle filter (10 off)	0554 0040
Smoke tester with oil, soot sheet, for measuring soot in flue gas	0554 0307
Filter paper to determine smoke number, 40 strips for approx. 200 measurements	0554 0308
Transport and Protection	Part no.
Transport case (plastic) for instrument, probes and accessories, for safe and orderly storage	0516 3250

Technical data	
Meas. range	0 to +3000 ppm SO ₂
Accuracy ±1 digit	±5% of mv (+400 to +3000 ppm SO ₂) ±20 ppm SO ₂ (0 to +400 ppm SO ₂)
Resolution	1 ppm SO ₂
Reaction time	80 s
Dimensions	216 x 68 x 47 mm
Weight	500 g
Oper. temp.	+4 to +45 °C
Storage temp.	-20 to +50 °C
Battery type	4 AA batteries
Battery life	4 h
Material/Housing	ABS
Power supply	Mains unit
Voltage	115/230 V / 50/60 Hz
Display	LCD, 2 lines
Warranty	Measuring instrument: 2 years (excluding working parts, e.g. gas sensors,)
	Gas sensors: 6 months
	Power supply: Battery or mains unit

I	Description	Illustration	Part no.
	Sampling probe, 700 mm immersion depth, incl. probe stop, Tmax +1000°C, 3 m hose	700 mm	0699 3451/3
	Sampling probe, 300 mm, Ø 6 mm, Tmax. +5	00 °C, 3 m hose, without handle, is included in SO_2 set (see illustration above)	

Your introduction to portable flue gas analysis

testo 325-I CO_{high} [O₂]

The testo 325-I CO_{high} $[O_2]$ is your step to affordable flue gas analysis. Easy handling and low costs make it the ideal portable partner for

• checking the atmosphere of thermal processes in the production sector (funnel furnaces, hardening furnaces, smelting and annealing)

• adjusting process burners and gas motors.

tes	to 3	25-	I C	0 _{hi}	gh			
Flue	gas	ana	lyzei	r eq	uippe	ed	with	CO,

Transport case (plastic) for instrument, probes and accessories, for safe and orderly storage

Spare particle filter (10 off)

The readings are displayed constantly on the display for as long as the pump is running.

- Gas sensors can be easily changed by the user
- Instrument protection on account of detachable condensate trap

testo 325-I CO_{high} [O₂]

0554 0040

0516 3250

Flue gas analyzer equipped with CO, rechargeable batteries and calibration protocol included	Flue gas analyzer equipped with CO, O ₂ , rechargeable batteries and calibration protocol included				
Part no. 0632 3264	0632 3265				
Accessories Ordering data	Part no.				
Testo fast printer with wireless infrared interface, 1 roll t paper and 4 AA batteries		0554 0549			
Spare thermal paper for printer (6 rolls)	0554 0569				
Spare thermal paper for printer (6 rolls), permaner measurement data documentation legible for up t	0554 0568				
Mains unit 230 V/ 8 V/ 1 A, for instrument (Europe mains operation and battery recharging	0554 1084				

Technical data	со	0 ₂	Type K (NiCr-Ni)			
Meas. range	0 to 7 Vol. %	0 21 Vol. %	-40 to +1000 °C			
Accuracy ±1 digit	±40 ppm (0 to 0.08 Vol. %) ±5% of mv (0.08 to 0.2 Vol. %) ±10% of mv (0.2 to 7 Vol. %)	±0.2 Vol. %	±0.5 °C (-40 to +99.9 °C) ±0.5 % of mv (+100 to +1000 °C)			
Resolution	0.001 Vol. %	0.1 Vol. %	0.1 °C			
Oper. temp.	-5 to +45 °C	Storage temp.	-20 to +50 °C			
Warranty	farranty Meas. instr.: 2 years (excluding wear parts, e.g. gas senso); O ₂ sensor: 1.5 years; CO sensor: 1 year					



Tuning motors with the $\rm CO_{high}$ [O₂] analyser

Recommended Set: Basic Set testo 325-I CO_{high} [O₂] in case

Flue gas analyzer equipped with CO, O_2 , rechargeable batteries and calibration protocol ncluded	0632 3265
Mains unit 230 V/ 8 V/ 1 A, for instrument (European plug), for mains operation and battery recharging	0554 1084
Flexible flue gas probe, specially for measuring motor emissions, Tmax +500°C, 3 m nose	0600 9640
Spare particle filter (10 off)	0554 0040
Transport case (plastic) for instrument, probes and accessories, for safe and orderly storage	0516 3250

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D	escription	Illustration						Part no.
	Sampling probe, 700 mm immersion dept	h,			700 mm			0699 3451/3
	incl. probe stop, Tmax +1000°C, 3 m hos	e	<u> </u>		Ø 8 mm			
	Flexible flue gas probe, specially for measuring motor emissions. They +500%					lax. immersion dept	th: 235	0600 9640
	3 m hose			Ø 10 mm	FI	exible range: 160 m	nm	
D	escription II	lustration			Meas. range	Accuracy	t99	Part no.
	Waterproof immersion/penetration		114 mm	50 mm	-60 to +400 °C	Class 2	7 s	0602 1293
	probe, TC Type K		Ø 5 mm	Ø 3.7 mm				Conn.: Fixed cable
	Pipe wrap probe with Velcro strip, for temperature measurement on pipes with diameter up to max. 120 mm, Tmax +120°C, TC Type K	395 m	m	20 mm	-50 to +120 °C	Class 1	90 s	0628 0020 Conn.: Fixed cable
	Robust air probe, T/C Type K		115 mm Ø 4 mm	,	-60 to +400 °C	Class 2	25 s	0602 1793 Conn.: Fixed cable

testo 335 - New measurement engineering for monitoring emissions

How many ppm NO are there really?

1215110



How sure can you really be that your analyzer measures exactly what it should be measuring? Our

Knut Hoyer, Head of Product Development Gas

exclusive sensors, developed especially for

your respective applications, are unbeatable in terms of accuracy; confirmed also by independent test institutes such as TÜV.

The competence of our engineers is held in high esteem by expert groups and committees in Berlin and Brussels where they are involved in the developments of future guidelines in their capacity as representatives of industry.

A comprehensive exchange of knowledge and experience with official measurement institutes around the world (e.g. DKD for humidity, temperature) ensures that your Testo measuring instrument can hold up to any comparison of accuracy. Indeed, these efforts do have an objective: whoever uses Testo measurement engineering, can be assured that he is using the industrial standard.

Of further benefit to you: We know today about the guidelines and test specifications we will be faced with in the future.

Flue gas probes in different lengths and diameters for all applications. Probe preliminary filters for dusty flue gases



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Highest flexibility – testo 335 with $\rm O_2$ sensor as standard. Two additional toxic gas sensors such as CO, CO_{Jow}, NO, NO_{Jow}, NO₂ or SO₂ can be selected by the user.

> 40 250 000 407 101 2 007 \$3.4 17 000 :01 38

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Powerful, automatically controlled diaphragm pump Pump flow is shown in the display. In addition,

pumping capacity is automatically controlled (audibly) over a wide negative or positive pressure range (-200 to +50 mbar) or pump flow is kept constant.

Gas sensor can be changed quickly and easily

by user on-site



NEW!* Now with



*Country permits BLUETOOTH® wireless transfer cf. page 12

Compact flue gas analyzer

testo 335

testo 335 is the new generation flue gas analyzer, specially tailored to industrial applications' requirements. testo 335 can be used for all emission monitoring applications by the operators of industrial furnaces such as processing and power plants, by service technicians for burner/furnace manufacturers, for plant construction as well as for stationary motors. Even spot measurements for up to 2 hours are possible.

- $\label{eq:loss} \begin{array}{l} \bullet \mbox{Two toxic sensors freely} \\ \mbox{selectable} \mbox{CO}, \mbox{ CO}_{\rm low}, \mbox{ NO}, \\ \mbox{NO}_{\rm low}, \mbox{ NO}_2, \mbox{ SO}_2 \end{array}$
- Two different measurement range extensions – To continue measurement despite high CO concentrations

 $\underline{-$ Standard: Single dilution Slot 2 (CO, NO₂, SO₂) with dilution factor 5

<u>- Option:</u> Dilution for all sensors with dilution factor 2

 Option: Parallel ΔP or m/s measurement for flue gas analysis – Simultaneous, convenient flow or mass flow measurement Powerful, automatically controlled diaphragm pump – Benefits:

- Constant pump flow over a wide negative or positive pressure range (-200 to +50 hPa)

- Gas sampling hose up to max. 7.8 m long (corresponds to two hose extensions, each 2.8 m)

- 18 standard fuels and an additional 10 user-defined fuels

 Fuel data is calculated using the new "easyEmission" software
- Industrial probes with a new probe preliminary filter Up to max. 1000 °C
- Graphic representation of sensor calibration data
- Calculated flue gas dewpoint parameter
- Logger function Records data in analyser for up to 2 hours
- Initialisation of gas sensors without removing probe from flue
- Accuracy approved for O₂, CO₂, CO, NO, NO_{low}, °C, hPa to EN Standard 50379 Part 2



Measurement in dusty flue gases with probe preliminary filter

testo 335

testo 335 flue gas analyzer, rechargeable battery and calibration protocol included, equipped with O2 sensor

Part no. 0632 3350

A second gas sensor must be fitted in testo 335, the instrument will not be able to function otherwise. A maximum of two additional sensors can be fitted.

350 See

See Ordering Data on Page 10

Good reasons for flue gas analysis

Flue gas duct

testo 335's easy handling and its independence of the power supply system (battery operation) enable measurements at difficultto-access points in a flue gas duct. Filter function is checked quickly and easily using differential pressure measurement (optional).

Monitoring emissions

Flow speed is also measured during quick emission checks. It is possible, for example, to check the position of a stationary sampling probe. testo 335 can be calibrated very accurately with test gas when measuring emission levels.

Combustion chamber analysis

testo 335 has very wide measurement ranges to reliably detect CO "nests" and check for reducing atmosphere. Sampling probes can be used at temperatures up to 1800 °C.

Tuning burners

For the purpose of efficient burner tuning, testo 335 calculates air ratio and efficiency. Combustion chamber pressure (optional) is measured at the same time as flue gas values. This is particularly important for multi-stage burners.

Accessories

121-5

Testo fast printer

The universal printer with IRDA and infrared interface saves time, because it stores the data before it prints them. Data transfer takes place within 2 seconds. After this, the printer is imeediately ready for use again. The measurement data are saved black on white incl. date and time.



Testo fast printer with wireless infrared interface, 1 roll thermal paper and 4 AA batteries

Part no. 0554 0549

Holster (SoftCase)

The holster (SoftCase) protects the instrument from impact. It is made of elastic plastic and a practical strap facilitates easy transport.



Holster (SoftCase) for testo 335/testo 330 with belt

Part no. 0516 0335

Software: "easyEmission"

The complete solution to manage data for

- flue gas analysis • User-defined measurement intervals (1
- measurement/second up to 1 measurement/hour)
- Readings transmitted in seconds to Microsoft EXCEL®
 User-defined fuels
- Readings are shown in table or graphics form
- Easy generation of customer-specific measurement protocols
- "easyEmission" software for testo 335, with USB cable to connect instrument to PC

Part no. 0554 3334

Transport case for safe and

gas probe is positioned in lid.

convenient storage of measuring

instrument, probe, accessories. Flue

Case

Transport case

Part no. 0516 3350



Software with analysis and graphics functions, online measurement



Transport case, easy-find storage of instrument, probes and accessories

Instrument/Options	Part no.
testo 335 flue gas analyzer, rechargeable battery and calibration protocol included, equipped with O2 sensor	0632 3350
A second gas sensor must be fitted in testo 335, the instrument will not be able to function otherwise. A maximum of two additional	al sensors can be fitted.
Option: CO gas sensor, 0 to 10000 ppm	0440 3988
Option: COlow sensor, 0 to 500 ppm	0440 3936
Option: NO gas sensor, built-in in analyser box, 0 to +3000 ppm NO	0440 3935
Option: NOlow gas sensor, 0 to +300 ppm NO	0440 3928
Option: NO2 gas sensor, 0 to +500 ppm NO ₂	0440 3926
Option: SO2 gas sensor, 0 to +5000 ppm SO_2	0440 3927
NEW! BLUETOOTH® module	0344 0011
Option: dilution of all sensors	0440 3350
Option: pressure/flow measurement (not upgradable)	0440 3351
Accessories	Part no.
100-240 V AC / 6.3 V DC international mains unit, for mains operation or battery charging in instrument	0554 1096
"easyEmission" software for testo 335, with USB cable to connect instrument to PC	0554 3334
USB connection cable, instrument to PC	0449 0047
Testo fast printer with wireless infrared interface, 1 roll thermal paper and 4 AA batteries	0554 0549
Spare thermal paper for printer (6 rolls), permanent ink, measurement data documentation legible for up to 10 years	0554 0568
Spare thermal paper for printer (6 rolls)	0554 0569
Holster (SoftCase) for testo 335/testo 330 with belt	0516 0335
Charger for spare battery	0554 1103
Spare particle filter (10 off)	0554 3385
Li-ion battery pack	0515 0100
Instrument cleaner (100 ml), for easy and fast removal of dirt from housing, display screen, keypad, probe handle and probe cable	0554 1207
Multiple licence software "easyEmission" for testo 335	0554 3338
Cases	Part no.
Transport case, for measuring instrument and probes	0516 3350
Calibration Certificates	Part no.
ISO calibration certificate/flue gas, calibration points 2.5% O2; 100 and 1000 ppm CO; 800 ppm NO; 80 ppm NO2; 1000 ppm SO2	0520 0003
Instrument options as upgrades	
Information about instrument upgrades and prices available on request.	

Probes

Standard gas sampling probes			Part no.
Flue gas probe, modular, 335 mm immersion depth, incl. μ NiCr-Ni (TI) Tmax 500°C and hose 2.2 m	probe stop, thermocouple		0600 9766
Flue gas probe, modular, 700 mm immersion depth, incl. $\rm p$ NiCr-Ni (TI) Tmax 500°C and hose 2.2 m	probe stop, thermocouple		0600 9767
Flue gas probe, modular, 335 mm immersion depth, incl. $\rm p$ NiCr-Ni (TI) Tmax 1000°C and hose 2.2 m	probe stop, thermocouple	Ø8mm	0600 8764
Flue gas probe, modular, 700 mm immersion depth, incl. $\rm p$ NiCr-Ni Tmax 1000°C and hose 2.2 m	probe stop, thermocouple	Madular flue gas probes, susilable is 2 langths	0600 8765
Flue gas probe, modular, with preliminary filter, 335 mm improbe stop, thermocouple NiCr-Ni (TI) Tmax 1000°C and h	mersion depth, incl. nose 2.2 m	incl. probe stop, NiCr-Ni thermocouple, 2.2 m hose and particle filter	0600 8766
Flue gas probe, modular, with preliminary filter, 700 mm im probe stop, thermocouple NiCr-Ni (TI) Tmax 1000°C and h	mersion depth, incl. nose 2.2 m		0600 8767
Probe accessories			Part no.
Hose extension, 2.8 m, extension cable for probe and ana	lyser	A	0554 1202
Probe shaft with preliminary filter, 335 mm long, with probe sto	op, Ø 8 mm, Tmax 1000 °C		0554 8766
Probe shaft with preliminary filter, 700 mm long, with probe sto	op, Ø 8 mm, Tmax 1000 °C		0554 8767
Spare sintered filter (2 off)		Ø 8 mm Ø 14 mm	0554 3372
Probe shaft, 700 mm long, with probe stop, Ø 8 mm, Tma	x 500 °C		0554 9767
Probe shaft, 335 mm long, with probe stop, Ø 8 mm, Tma	x 1000 °C		0554 8764
Probe shaft, 700 mm long, with probe stop, Ø 8 mm, Tma	x 1000 °C	Ø8mm	0554 8765
Gas sampling probes for measurements on industrial	notors		Part no.
Flue gas probe for industrial motors, 335 mm immersion depth, with	probe stop, built-in		0600 7560
condensate trap and heat protection plate, Tmax 1000 °C, special h measurements, 2.2 m long	hose for NO ₂ /SO ₂	Ø 8 mm	
Flue gas probe for industrial motors with probe shaft prefilter, 335 m probe stop, built-in condensate trap and heat protection plate, Tma NO_2/SO_2 measurements, 2.2 m long	m immersion depth, with x 1000 °C, special hose for	Ø8 mm Ø14 mm	0600 7561
Accessories for the gas sampling probes for measurer	nents on industrial engine	IS	Part no.
Thermocouple for exhaust gas temperature measurement (NiCr-Ni, le	ngth 400 mm, Tmax. +1000 °C),	with 2.4 m connection cable and additional temperature protection	0600 8894
Spare particle filter (10 off) for condensate trap in gas sam	pling hose and measuremer	nt range extension (gas dilution)	0554 3371
Spare sintered filter (2 off)			0554 3372
Industrial gas sampling probes – Modular system			Part no.
			0600 7911
Adapter, non-heated		Ambient temp.: -20 to +50 °C; Protection class: IP54; Gas inle G1/4"; Gas outlet: M 10x1 outer thread; Weight: 0.4 kg	t:
Extension pipe to +600 °C, stainless steel 1.4571	1000 mm	Connection: Thread acrow/acrow applicate C1/4"; Waight: 0.45	0600 7802
Extension pipe to +1200 °C, Inconel 625	Ø 20 mm Ø 12 mm	kg	0600 7804
Non-heated sampling pipe to +600 °C, stainless steel 1.4571	Connection: G1/4"		0600 7801
Non-heated sampling pipe to +1200 °C, Inconel 625	Ø 20 mm	Weight: 400 g	0600 7803
	Connection: G1/4"		0600 7805
Non-heated sampling pipe to +1800 °C, Al-Oxide	Ø 20 mm Ø 12 mm	Weight: 400 g	
Preliminary filter for dusty flue gases, ceramic	50 mm	Dust load: max. 20 g / m3; filter fineness: 20 µm; Temperature	0554 0710
Preliminary filter can only be mounted on extension pipe 0600 7802 or 0600 7804.	Ø 23 mm	max. 1000 °C; Material: ceramic; Connection: G1/4" thread nipple; Weight: 0.2 kg	
Gas sampling hose for accurate $\rm NO_2/SO_2$ measurements with built-in condensate trap, 2.2 m long			0554 3352
Thermocouple, NiCr-Ni, -200 to +1200 °C, Inconel 625, 1.2 m		Connection: To apply on via A manufaction pable with O win	0430 0065
long Thermocouple NiCr-Ni -200 to +1200 °C Inconel 625, 2.2 m		plug; Weight: 0.15 kg.	0430 0066
long	Ø 4 mm	The length depends on the number of sampling and extension	0400 0000
Inermocouple, NICr-NI, -200 to +1200 °C, Inconel 625, 3.2 m long		pipes usea.	0430 0067
Mounting flange, stainless steel 1.4571, adjustable quick- action fitting suitable for all sampling/extension pipes	L ₁₃₀] Ø 160 mm		0554 0760
Temperature probes	llustration	Meas. range Accuracy t99 Conn.	Part no.
Mini ambient air probe, Tmax +80°C, for separate ambient air temperature measurement		0 to +80 °C	0600 3692
Pipe wrap probe for pipes with diameter of up to 2", for flow/return temp. meas. in hydronic systems		-60 to Class 2 5 s Fixed cable +130 °C	0600 4593
Mini ambient air probe, 60 mm immersion depth, w. probe	stop, magnetic clip, Tmax	+100°C, for dual wall clearance temp. meas. in systems	0600 9797

testo



Additional Accessories/Sets

Pitot tubes	Illustration	Meas. range	Probe type	Part no.
Pitot tube, 350 mm long, stainless steel, for measuring flow velocity	350 mm Ø 7 mm	Oper. temp. 0 to +600 °C		0635 2145
Pitot tube, 1000 mm long, stainless steel, for measuring flow velocity	Ø 7 mm	Oper. temp. 0 to +600 °C		0635 2345
Pitot tube, stainless steel, 350 mm long, measures flow speed with temperature, 3 x hoses (5 m long) and heat protection plate	Ø 8 mm 350 mm	-40 to +1000 °C	Type K (NiCr-Ni)	0635 2041
Pitot tube, stainless steel, 750 mm long, measures flow speed with temperature, 3x hoses (5 m long) and heat protection plate	Ø 8 mm 750 mm	-40 to +1000 °C	Type K (NiCr-Ni)	0635 2042
Calibration Certificates				Part no.
ISO calibration certificate velocity, hot wire, vane anemo	meter, Pitot tube; calibration points 1; 2; 5; 10 m	n/s		0520 0004
ISO calibration certificate/Velocity, hot wire, vane anemo	0520 0034			
Additional probe accessories				Part no.
Connection hose, silicone, 5m long, max. load 700 hPa	(mbar)			0554 0440

Recommended set: Professional set for measuring emissions

During quick checks on emissions, flow speed is also measured simultaneously with flue gas. In this way, for example, the position of a stationary sampling probe can be checked or mass flow can be calculated simultaneously.

Benefit:

- Measurement range extension for all sensors gas sensors can be protected in the case of unexpectedly high concentrations of different gases and the measurement can continue
- Automatically regulated gas pump for constant pump flow at a negative pressure of -200 mbar up to a positive pressure of max. 50 mbar

Recommended set: Professional set for measuring emissions

testo 335 flue gas analyzer, rechargeable battery and calibration protocol included, equipped with O2 sensor	0632 3350
Option: CO gas sensor	0440 3988
Option: NO gas sensor	0440 3935
Option: dilution of all sensors	0440 3350
Option: pressure/flow measurement	0440 3351
Modular flue gas probe, immersion depth 335 mm, Ø 8 mm, Tmax 1000°C	0600 8764
Pitot tube, stainless steel, 350 mm long, measures flow speed with temperature, 3 x hoses (5 m long) and heat protection plate	0635 2041
100-240 V AC / 6.3 V DC international mains unit, for mains operation or battery charging in instrument	0554 1096
Spare particle filter (10 off)	0554 3385
Connection hose, silicone, 5m long, max. load 700 hPa (mbar)	0554 0440
Transport case	0516 3350



Country permits BLUETOOTH® wireless transfer for testo 335

The BLUETOOTH[®] radio module used by Testo is permitted for the following countries and may only be used in those countries, i.e. the BLUETOOTH[®] wireless transmission may not be used in any other country!

Europe including all EU member states

Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Finnland, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Sweden, Slovakia, Slovenia, Spain and Turkey

European countires (EFTA)

Iceland, Liechtenstein, Norway, Switzerland

Non-European countries

Ukraine, Colombia und El Salvador

Technical data

	Meas. range	Accuracy	Resolution	Response time
O ₂ 0 to 25 Vol. % ±0.2		±0.2 Vol. %	0.01 Vol. %	t ₉₀ <20 s
CO measurement (H ₂ compensated)	0 to 10000 ppm	±10 ppm or ±10% of mv (0 to 200 ppm) ±20 ppm or ±5% of mv (201 to 2000 ppm) ±10% of mv (2001 to 10000 ppm)	1 ppm	t ₉₀ (40 s
CO _{low} measurement (H ₂ compensated)	0 to 500 ppm	 \$500 ppm ±2 ppm (0 to 39.9 ppm) ±5% of mv (remaining range)^X ^xData correspond to 20°C ambient temperature. Additional temperature coefficient 0.25% of mv/K. 		t ₉₀ <40 s
NO measurement 0 to 3000 ppm ±5 ppm (0 to 9 ±5% of mv (100 ppm) ±10% of mv (20 3000 ppm) ±10% of mv (20 3000 ppm)		±5 ppm (0 to 99 ppm) ±5% of mv (100 to 1999 ppm) ±10% of mv (2000 to 3000 ppm)	1 ppm	t ₉₀
NO _{low} measurement	0 to 300 ppm	±2 ppm (0 to 39.9 ppm) ±5% of mv (remaining range)	0.1 ppm	t ₉₀ ⟨30 s
NO ₂ measurement*	0 to 500 ppm	±10 ppm (0 to 199 ppm) ±5% of mv (remaining range)	0.1 ppm	t ₉₀ <40 s
SO ₂ measurement*	0 to 5000 ppm	±10 ppm (0 to 99 ppm) ±10% of mv (remaining range)	1 ppm	t ₉₀ <40 s

Maasuramant range extension						
Single dilution fact	Single dilution factor 5 (standard)					
CO measurement (H ₂ compensated)	Meas. range Accuracy Resolution	700 ppm to 50000 ppm ±10 % of mv (additional error) 1 ppm				
CO _{low} measurement (H ₂ compensated)	Meas. range Accuracy Resolution	500 ppm to 2500 ppm ±10 % of mv (additional error) 0.1 ppm				
NO ₂ measurement	Meas. range Accuracy Resolution	200 ppm to 2500 ppm ±10 % of mv (additional error) 0.1 ppm				
SO ₂ measurement	Meas. range Accuracy Resolution	500 ppm to 25000 ppm ±10 % of mv (additional error) 1 ppm •, Part no. 0440 3350)				
O ₂ measurement	If measurement range extension is activated on all sensors: Accuracy: ±1 vol.% additional error (0 to 4.99 vol.%) ±0.5 Vol.% additional error (5 to 25 vol.%)					

	±0.5 Vol.% additiona	l error (5 to 25 vol.%)
CO measurement (H ₂ compensated)	Meas. range Accuracy Resolution	700 ppm to 20000 ppm ±10 % of mv (additional error) 1 ppm
CO _{low} measurement (H ₂ compensated)	Meas. range Accuracy Resolution	500 ppm to 1000 ppm ±10 % of mv (additional error) 0.1 ppm
NO measurement	Meas. range Accuracy Resolution	500 ppm to 6000 ppm ±10 % of mv (additional error) 1 ppm
NO _{low} measurement	Meas. range Accuracy Resolution	300 ppm to 600 ppm ±10 % of mv (additional error) 0.1 ppm
NO ₂ measurement	Meas. range Accuracy Resolution	200 ppm to 1000 ppm ±10 % of mv (additional error) 0.1 ppm
SO ₂ measurement	Meas. range Accuracy Resolution	500 ppm to 10000 ppm ±10 % of mv (additional error) 1 ppm

	Meas. range	Accuracy	Resolution	General technical data		
Temperature meas. Probe type Type K (NiCr-Ni)	-40 to +1200 °C	±0.5 °C (0 to +99 °C) ±0.5 % of mv (remaining range)	0.1 °C	Memory	Maximum Per folder Per site Max. number of protoc folders or sites	100 folders max. 10 sites max. 200 protocols cols is determined by the number of
Draught measurement	-40 to +40 hPa	±0.03 hPa (-2.99 to +2.99 hPa) ±1.5 % of mv (remaining range)	0.01 hPa	Controlled diaphragm p	Imp: Pump flow Hose length probe hose extensions	0.6l/min (controlled) max. 7.8 m (corresponds to two
Differential pressure measurement	-200 to 200 hPa	±0.5 hPa (-49.9 to 49.9 hPa) ±1.5 % of mv (remaining range)	0.1 hPa	– User-defineable fuels	Max positive pressure/ Max negative pressure/ 10 user-defineable fuel	, Flue gas +50 mbar /Flue gas -200 mbar s incl. test gas as fuel
Absolute pressure measurement	600 to +1150 hPa	±10 hPa	1 hPa	Weight Dimensions	600 g 270 x 90 x 65 mm	
Derived parameters				 Storage temp. Oper. temp. 	-20 to +50 °C -5 to +50 °C	
Efficiency	0 to 120 %		0.1 %	Display	Graphics display: 160 >	x 240 pixels
Flue gas loss	0 to 99.9 %		0.1 %	Power supply	Rech. block: 3.7V/2.2A	Ah
Flue gas dewpoint	0 to 99.9 °C		0.1 °C	NA 1 1 1/1 1	POWER: 0.3 V/1.2A	
$\frac{\text{CO}_{2} \text{ measurement}}{(\text{calculation from O}_{2})}$ Response time t90 = \langle 40 s	0 to CO ₂ max.	±0.2 Vol. %	0.1 Vol. %	Protection class Warranty	IPE PC IP40 Analyzer 2 years (exclud Rech. batt. 1 year Gas sensors CO, COlor O2 gas sensors: 1.5 year	ding wearing parts, e.g. gas sensors) w,NO, NOlow, NO2, SO2 1 year ars

*Max. measurement duration of 2 hours should not be exceeded in order to avoid absorption.

10

testo 350 S/XL, portable flue gas analysis system

Good advice IS possible!

0510



Head Sales

Highly qualified personnel is needed to provide it. Understanding, a little creativity, time to listen and accessibility when the matter Manager Germany is urgent are also necessary.

Our qualified personnel would be delighted to answer your questions. They are there when you need them. Good to know when the situation requires.

All of the above elements ensure that we can provide you with the highly qualified advice which is our standard.

Our experience has shown that it is needed and appreciated. Qualified advice provides you with the assurance you need to make the right decisions, particularly in the case of complicated measurement tasks.



Gas sensors can be changed quickly and easily by the user on site



Condensate trap – Built-in Peltier gas preparation unit with hose pump for disposing of condensate for long-term measurements lasting several hours



Infrared (NDIR) gas sensor for direct CO, measurement

NEW! Now with





Gas sensor heating element - protects from damage caused by condensate and increases sensor reaction times when ambient temperatures are low



Program

Flexible flue gas analysis system testo 350 S/XL

testo 350 S/XL

testo 350 is a flexible, portable analysis system which is basically made up of a control unit, a flue gas analyzer and a flue gas probe, depending on customer requirements.

The detachable control unit can control the analysis system and read out data. The testo 350 XL control unit can also be used as a separate hand-held analyzer for differential pressure (built-in) and also for temperature, humidity, flow etc. thanks to its additional probe socket. Readings are printed on the built-in printer.

The flue gas analyzer is the "heart" of the analysis system and is available in two different versions:

- testo 350 S Basic version
- testo 350 XL Advanced version.

The testo 350 S flue gas analyzer is equipped with a gas sensor for O₂ as standard. One sensor must be fitted or up to 5 additional sensors for NO (option), NO₂ (option), SO₂ (option), NO_{low} (option), CO (Option), CO low (option), H₂S (option), HC (Option) or CO2 via infrared gas sensor (option) can be fitted. Temperature and differential pressure as well as the usual parameters such as Δ , qA, etc. are also calculated.

The even more convenient testo 350 XL flue gas analyzer is

equipped with gas sensors for O₂, CO, NO and NO₂ as standard. Additional sensors for HC (option), NO_{low} (option), CO_{low} (option), SO_2 (Option), H_2S (option) or CO₂ via infrared gas sensor (option) are available. In addition to the features of the S version, the testo 350 XL flue gas analyzer also has a Peltier gas preparation unit with a hose pump to regulate condensate disposal as well as a fresh air valve for long-term measurements lasting several hours.

Both versions of the flue gas analyzers can be equipped with up to 6 gas sensors, have a builtin rechargeable battery as standard, (for battery operation), data logger (250,000 readings) as well as a Testo data bus connection.

The testo 350 S flue gas analyzer can be retrofitted with all the features/functions of the testo 350 XL flue gas analyzer.

Tests and permits

- TÜV Bayern RgG 211

- Conforms to DIN EN 50379 Part 2

Differences between control units a	at a glance		
		testo 350 S control unit	testo 350 XL control unit
Built-in printer			
Differential pressure measurement (-40 to +40 hPa / -200 to +200 h	nPa)	_	
1 user-defined probe socket (for e.g. temperature, relative humidity m	easurement, etc.)	_	
Touchscreen		_	0
Connection from a flue gas analyzer to the Testo data bus			
Connection of several flue gas analyzers, analog output boxes and tes Testo data bus	to 454 loggers to the	_	
NiMH rechargeable battery pack		0	0
Internal memory for 250,000 readings		_	
BLUETOOTH® wireless transmission		0	_
\blacksquare = Standard \bigcirc = option		– = Not possible	e



Easy and convenient measurement on engines for onsite check and tuning

Differences between flue gas analysers at a glance

		testo 350 S	testo 350 XL
Maximum no. o	f gas sensors	6	6
02	0 – 25 Vol.		
C0 (H2)	0 – 10,000 ppm	0	
CO _{low} (H2)	0 — 500 ppm	0	0
NO	0 – 3,000 ppm (0.1 ppm resolution)	0	
NO _{low}	0 – 300 ppm (0.1 ppm resolution)	0	0
NO ₂	0 – 500 ppm (0.1 ppm resolution)	0	
SO2	0 — 5,000 ppm	0	0
HC	0 - 4 Vol. % (0.001 % resolution)	0	0
H ₂ S	0 – 300 ppm (0.1 ppm resolution)	0	0
CO ₂ (NDIR)	0 – 50 Vol. %	0	0
Built-in gas preparation unit (is recommended with high humidity levels in flue gas and during long-term measurements >2 hrs measuring time)		0	
Automatic fresh air rinse with valve (incl. measurement range extension with dilution factor 5 for all sensors)		0	
Special gas pump for long-term measurements with extended warranty		0	0
Measurement r	ange extension for CO gas sensor (with selectable dilution factors)	0	0
CO gas sensor	switch-off via adjustable switch-off threshold		
Trigger input –	stops and starts measurement externally	0	0
Differential pres	ssure measurement (-40 to +40 hPa / -200 to +200 hPa)		
Built-in recharg	eable battery		
2 temperature	probe sockets (Type K NiCr-Ni)		
Data logger (25	i0,000 readings)		
Testo data bus	connection		
BLUET00TH®	wireless transmission	0	0
Standard	n = option		

- testo

Measurement system



Measurement system

The testo 350 S/XL system concept

For many applications in the industrial sector, an analyzer with additional features is needed to fulfill the following requirements:

• Simultaneous gas and process analysis at different measurement points without a time-consuming measurement point changeover switch

• Option of connecting additional parameters such as °C; %RH; mA/mV etc.

• Long-term measurements in order to be able to assess different system cycles

• Flexibility of system in order to be able to react to the different requirements of the various systems. The **testo 350 S/XL**

measurement system fulfills these requirements. Several analyzer boxes, equipped differently, can be connected together, depending on the application.

If several analyzer boxes, for example, are connected to the Testo data bus, they can be controlled, read out or programmed via the following two options:

• One analyzer box after the other via the testo 350 XL control unit, for example, or via the PC and an RS 232 cable

<u>Alternatively:</u>

Several flue gas analyzers

simultaneously via your PC and the Testo data bus controller with USB connection.

Parameters

Parameters which can be measured using **testo 350 S/XL**:

a) testo 350 S/XL flue gas analyzer

• Flue gas parameters such as O_2, CO, NO_x, SO_2, H_2S, HC, CO_2(IR)

• Differential pressure, e.g. for combustion chamber pressure measurement

• Flow measurement with Pitot tube

The testo 350 S or testo 350 XL flue gas analyzers are positioned at the respective measurement point. They are operated either connected to each other via the Testo data bus or as a separate data logger without being connected. Separate measurement programs are saved in the flue gas analyzer using the testo 350 XL control unit or PC. Included are, for example, start/stop criteria, measurement cycles, fresh air phases etc. testo 350 S and testo 350 XL flue gas analyzers, equipped differently, can be used.

Likewise, logger boxes and analog output boxes (6 channels, 4-20mA) can be connected in this way.

b) Logger box

- Temperature, e.g. of surfaces, liquids
- Humidity, e.g. in suction ducts or ambient air (no exhaust gas humidity)
- Pressure, e.g. with differential pressure and high pressure probes

• Flow and volume flow, e.g. with vanes, hot wire probes

• rpm etc.

Standard gas sampling probes

conditions when measuring flue gases:

- High temperatures
- Corrosive condensate
- Dust
- Mechanical loads.

The selection of the right probe is critical for accurate and consistent measurements. Because the sampling locations are often different, it's beneficial to have a standard probe designed for a wide variety of applications. In addition to the

The probe has to endure extreme standard sampling probes, Testo also offers probe systems for specific industrial applications.

Standard gas sampling probes

The affordable standard sampling probe is available in lengths of 335 mm and 700 mm and for different temperature ranges. The outer shaft with filter is used for dusty flue gases. The hose has a standard length of 2.2 m (5 m, optional).



Standard gas sampling probes, available in lengths of 335 mm and 700 mm

Standard flue gas sampling probe, 335 mm long	Part no.
Basic flue gas probe, 335 mm immersion depth, with probe stop, NiCr-Ni (TI) T/C, probe shaft: stainless steel 1.4361 (Tmax 500°C), 2.2 m hose, robust plug-in coupling Ø 8 mm	0600 7451
Options: 335 mm	0440 7435
Heat-resistant probe shaft with pre-filter, Tmax. +1000 °C, 335 mm long, for dusty flue gases, 3 µm pore size, probe shaft: stainless steel 1.4841 Ø 8 mm	
or: Heat-resistant probe shaft without pre-filter (material: stainless steel 1.4841), Tmax +1000 °C, with heat-resistant plate, 335 mm long	0440 7437
Hose, 5 m long	0440 7443
Special hose for NO2/SO2 measurements, 2.2 m long*	0440 7442
Special hose for NO2/SO2 measurements, 5 m long*	0440 7445
Standard gas sampling probe, 700 mm long	Part no.
Basic flue gas probe, 700 mm immersion depth, with probe stop, NiCr-Ni (TI) T/C, probe shaft: stainless steel 1.4361 (Tmax 500°C), 2.2 m hose, robust plug-in coupling Ø 8 mm	0600 7452
Options: 700 mm	0440 7436
Heat-resistant probe shaft with pre-filter, Tmax. +1000°C, 700 mm long, for dusty flue gases, 3 µm pore size, probe shaft: stainless steel 1.4841 Ø 8 mm Ø 14 mr	n
or: Heat-resistant probe shaft without pre-filter (material: stainless steel 1.4841), Tmax +1000 °C, with heat-resistant plate, 700 mm long	0440 7438
Hose, 5 m long	0440 7444
Special hose for NO2/SO2 measurements, 2.2 m long*	0440 7442
Special hose for NO2/SO2 measurements, 5 m long*	0440 7446
* Use outer shaft with filter for dusty flue gases.	
Accessories for outer pipe with filter	Part no.
Spare sintered filter (2 off)	0554 3372
Gas sampling probes for measurements on industrial motors	Part no.
Flue gas probe for industrial motors, 335 mm immersion depth, with probe stop and heat protection plate, Tmax 1000 °C, special hose for NO ₂ /SO ₂ measurements, 2.2 m long Ø 8 mm	0600 7550
Exhaust gas probe for industrial engines, 335 mm immersion depth incl. cone and heat shield, Tmax +1000 °C, special hose for NO2-/SO2 measurements, length 5 m	0600 7552
Flue gas probe for industrial motors with probe shaft prefilter, 335 mm immersion depth, with probe stop and heat protection plate, Tmax 1000 °C, special hose for NO ₂ /SO ₂ measurements, 2.2 m long Ø 8 mm Ø 14 mm	0600 7551
Exhaust gas probe for industrial engines with probe shaft pre-filter, 335 mm immersion depth incl. cone and heat shield, Tmax +1000 °C, special hose for NO2-/SO2 measurements, length 5 m	0600 7553
Accessories for the gas sampling probes for measurements on industrial engines	Part no.
Thermocouple for exhaust gas temperature measurement (NiCr-Ni, length 400 mm, Tmax. +1000 °C), with 2.4 m connection cable and additional temperature protection	0600 8894
Thermocouple for measuring exhaust gas temperature (NiCr-Ni, length 400 mm, Tmax +1000 °C), with 5.2 m connection cable and additional temperature protection	0600 8895
Spare sintered filter (2 off)	0554 3372

Industrial gas sampling probes – Modular system

We are dealing here with a modular, portable probe system. The basis for the system is the heated handle or the non-heated adapter to which the sampling hoses are connected.

A thermocouple, which is connected to the testo 350 S/XL flue gas analyzer, is used for simultaneous temperature measurements. The probe can be adapted for larger flue gas ducts using extension pipes (up to max. 3m). A preliminary filter is screwed on to protect the probe in dusty gases.

The heated probe is used for moist flue gases to avoid incorrect readings caused by the absorption of NO_2 and SO_2 . The probes are attached quickly and securely to the flue gas duct using the mounting flange.

Non-heated probe pipes are used for flue gases up to 1200 °C. The non-heated adapter can be used instead of a heated handle to measure O_2 , CO and NO or dry flue gases.

Ceramic sampling pipes which can withstand the enormous thermal load are used for measurements at more than 1200 °C.



Industrial gas sampling probes, a modular probe system suitable for every application

Industrial gas sampling probes – Modular system			Part no.
Heated handle, power supply 115 to 230 V, 50/60 Hz		Power consumption: 200 watts; Temp. gas path: > 180 °C; Ready to operate: after approx. 20 min; Length of mains cable: 3 m; Protection IP54; Ambient temp.: - 20 to $+50$ °C; gas inlet: G1/4"; gas outlet: M 10 outer thread; weight: 1.7 kg	0600 7920 class: x1
Adapter, non-heated		Ambient temp.: -20 to +50 °C; Protection class: IP54; Gas G1/4"; Gas outlet: M 10x1 outer thread; Weight: 0.4 kg	s inlet: 0600 7911
Non-heated sampling pipe to +600 °C, stainless steel 1.4571	Connection: G1/4"	am	0600 7801
Non-heated sampling pipe to +1200 °C, Inconel 625	Ø 20 mm Ø 12 m	Weight: 400 g	0600 7803
	Connection: G1/4" 1000 m	nm	0600 7805
Non-neated sampling pipe to +1800 °C, Al-Oxide	Ø 20 mm Ø 12 m	Weight: 400 g Im	
Heated sampling pipe, power supply 230 V / 50 Hz, stainless steel 1.4571	1000 m Ø 25 m	Heating: > +180 °C; power consumption: 650 watts; Connection: electr. connection to heated handle, connection adapter with thread connection/screw socket G1/4"; Max. gas temp.: +600 °C	0600 7820 on flue
Extension pipe to +600 °C, stainless steel 1.4571	1000 mm	 Connection: Thread screw/screw socket G1/4": Weight: 0 	45 0600 7802
Extension pipe to +1200 °C, Inconel 625	Ø 20 mm Ø 12 mm	kg	0600 7804
Preliminary filter for dusty flue gases, ceramic	50 mm	Dust load: max. 20 g / m3; filter fineness: 20 µm; Temperature:	ture: 0554 0710
Preliminary filter can only be mounted on extension pipe 0600 7802 or 0600 7804.	Ø 23 mm	max. 1000 °C; Material: ceramic; Connection: G1/4* threa nipple; Weight: 0.2 kg	d
Thermocouple, NiCr-Ni, -200 to +1200 °C, Inconel 625, 1.2 m		Connection: To analyser via 4 m connection cable with 8 p	_{oin} 0430 0065
Thermocouple, NiCr-Ni, -200 to +1200 °C, Inconel 625, 2.2 m	Ø 4 mm	plug; Weight: 0.15 kg. The length depends on the number of sampling and exten	0430 0066 sion
Thermocouple, NiCr-Ni, -200 to +1200 °C, Inconel 625, 3.2 m long		pipes used.	0430 0067
Standard sampling hose, length 4 m	4 m	Wejaht: 0.4 kg	0554 3382
Special sampling hose for accurate $\rm NO_2^-$ /SO ₂ - measurements, length 4m	4 m	Hose material inside: PFFE hose with 2 mm inner diameter (lowest absorption, self-cleaning effect); Material outside: rubber; length: 4.0 m; Weight: 0.45 kg	r 0554 3384
Mounting flange, stainless steel 1.4571, adjustable quick- action fitting suitable for all sampling/extension pipes	[130] Ø 160 mm		0554 0760
Cases			Part no.
Transport case for industrial probes, aluminium, space for:	handle, probes, flang	ge and accessories, dimensions: 1270 x 320 x 140 mm	0516 7900

Robust protective case with trolley function

The robust protective case provides unique protection for the flue gas analyzer testo 350-S/-XL. The impact-proof case is absolutely suitable anywhere where the testo -S/-XL needs to be protected form special loads – making the case indispensible, especially in "heavy-duty" applications!

In order to ensure ideal ventilation of the case, it is equipped with a ventilator fan as standard. This is switched on automatically by a thermal switch at external temperatures >+15 °C, and off again at temperatures (+15 °C. This allows the testo 350-S/-XL to be used in a closed case at ambient temperatures from -10 °C to +50 °C.

A built-in filter in the case aditionally protects the testo 350-S/-XL from dust and particles from the surrounding air. Even when the cover is open, the case still complies with the requirements of the protective class IP42.

All connections of the testo 350-S/-XL are accessible from the outside through a cover in the baseplate of the protective case. The cover only needs to opened in order to connect all the necessary cables and lines.

Your benefits at a glance

- Protection for the testo 350-S7-XL even in rough ambient conditions, thanks to operation in the closed case
- Fast availabilitity of the testo 350-S/-XL. Fast and easy access to all connections through the cover in the baseplate
- For easy transport, e.g. in rough country or airports, the case is equipped as follows:

extendable handle (trolley function)

stainless steel ball-bearing wheels in the baseplate

- High stability and flexibility to withstand external influences thanks to an extremely impactproof polypropylene copolymer. This makes it possible to check the testo 350-S/-XL in the protection case in as regular luggage on a flight.
- More safety from theft and vandalism thanks to a metal reinforcement at the catches in order to securely attach a padlock.
- Protection class IP 42



Cover in the baseplate, for easy access to the connections of the testo 350-S/-XL

Perfect protection for the testo 350-S/-XL in tough and dirty surroundings.



Technical data	
Dimensions	56.5 x 45.5 x 26.5 cm
Oper. temp.	-10 to +50 °C No direct sunlight
Storage temp.	-20 to +50 °C
Protection class	IP42

Robust protective case

Robust protective case with trolley function for operating the testo 350 in the case in dusty and tough surroundings

Part no. 0516 0355

Additional probes for exhaust gas analyzer testo 350-S/-XL

F	TÜV approved gas sampling probes (specially for the trade sector) Part no.					
	TÜV approved flue gas probe, 335 mm immersion depth, up			335 mm	0600 9557	
l	to +500°C, corresponding to the latest instrument test guidelines, also for atmospheric gas systems, 2.2 m hose		Ŧ	Ø 8 mm		

۷	elocity, pressure probes	Illustration	Meas. range	Accuracy	Part no.
	Pitot tube, 350 mm long, stainless steel, for measuring flow velocity ¹⁾		Oper. temp.		0635 2145
	Pitot tube, 1000 mm long, stainless steel, for measuring flow velocity $^{1\!$		0 to +600 °C		0635 2345
	Pitot tube, stainless steel, 500 mm long, measures flow velocity with temperature $^{\rm 2)}$	500 mm / 1000 mm	-40 to +600 °C		0635 2140
	Pitot tube, stainless steel, 1000 mm long, measures flow velocity with temperature $^{\rm 2)}$	Ø 8 mm			0635 2240
	Pitot tube, stainless steel, 350 mm long, measures flow speed with temperature, 3 x hoses (5 m long) and heat protection plate ²⁾	350 mm / 750 mm	-40 to +1000 °C		0635 2041
	Pitot tube, stainless steel, 750 mm long, measures flow speed with temperature, 3x hoses (5 m long) and heat protection plate $^{\rm 2}$	Ø 8 mm			0635 2042

 Direct connection to analyzer box possible, please also order hose connection set 0554 0315
 Direct connection to analyzer box possible

Temperature probes	Illustration	Meas. range	Accuracy	t99	Conn.	Part no.
Ambient air probe, 300 mm immersion depth, with probe stop for separate measurement of ambient air temperature (e.g. systems with outside primary air intakes)	300 mm Ø 5 mm	0 to +100 °C		30 s		0600 9791
Ambient air probe, immersion depth 190 mm, with probe stop, magnetic clip, Tmax + 100°C, for ambient air temperature measurement in systems dependent on/independent of ambient air	190 mm 0 4 mm	0 to +100 °C				0600 9787
Mini ambient air probe, 60 mm immersion depth, w. probe stop, magnetic clip, Tmax +100°C, for dual wall clearance temp. meas. in systems w. outside primary air intakes	60 mm Ø 4 mm	0 to +100 °C		30 s		0600 9797
Mini ambient air probe, Tmax +80°C, for separate ambient air temperature measurement		0 to +80 °C				0600 3692
Pipe wrap probe for pipes with diameter of up to 2", for flow/return temp. meas. in hydronic systems Spare meas. head for pipe wrap probe, TC Type K		-60 to +130 °C	Class 2	5 s	Fixed cable	0600 4593 0602 0092
Quick-action surface probe with sprung thermocouple strip, measuring range short-term to +500°C	150 mm Ø 10 mm	-200 to +300 °C	Class 2	3 s	Plug-in head. connection cable 0430 0143 or 0430 0145 required	0604 0194
Adapter to connect NiCr-Ni thermocouples and probes with open wire ends					Fixed cable	0600 1693

6510

Suitable probes for Control Unit testo 350-XL and logger testo454

	A	III	M	041	Deutore
N	Nore probes	lilustration	meas. range	Other features	Рап по.
	Gas leak probe		0 to +10000 ppm CH	₄ / C ₃ H ₈	0632 3330
	Ambient CO probe, for detecting CO in buildings and rooms		0 to +500 ppm CO	±5% of mv (+100.1 to +500 ppm CO) ±5 ppm CO (0 to +100 ppm CO)	0632 3331
	CO2 probe measures indoor air quality and monitors the workplace. With plug-in head, connection cable 0430 0143 or 0430 0145 required		0 +1 Vol. % CO ₂ 0 +10000 ppm CO ₂	$\begin{array}{l} \pm (50 \text{ ppm CO}_2 \pm 2\% \text{ of mv}) (0 \text{ to} \\ \pm 5000 \text{ ppm CO}_2) \\ \pm (100 \text{ ppm CO}_2 \pm 3\% \text{ of mv}) (\pm 5001 \\ \text{to} \pm 10000 \text{ ppm CO}_2) \end{array}$	0632 1240
	Current/voltage cable (±1 V, ±10 V, 20 mA)		0 to +1000 mV 0 to +10 V 0 to +20 mA	±1 mV (0 to +1000 mV) ±0.01 V (0 to +10 V) ±0.04 mA (0 to +20 mA)	0554 0007
	Mechanical rpm probe with plug-in head Included 2 probe tips Ø 8 and Ø 12 mm 1 hollow cone Ø 8 mm 1 surface speed disc Ø 19 mm to measure rotational rotational speed in mm/s	speed: rpm =	20 to 20000 rpm	Plug-in head. connection cable 0430 0143 or 0430 0145 required	0640 0340

Accessories for CO ₂ , temperature and flow velocity probes	Part no.
Hose connection set, incl. silicone hose and connection adapter, For separate gas pressure measurement	0554 0315
ISO calibration certificate velocity, hot wire, vane anemometer, Pitot tube; calibration points 1; 2; 5; 10 m/s	0520 0004
ISO calibration certificate/Velocity, hot wire, vane anemometer, Pitot tube; calibration points 5; 10; 15; 20 m/s	0520 0034
Cable, 1.5 m long, connects probe with plug-in head to meas. instrument, PUR coating material	0430 0143
Cable, 5 m long, connects probe with plug-in head to measuring instrument, PUR coating material	0430 0145
Extension cable, 5 m long, between plug-in head cable and instrument, PUR coating material	0409 0063
Instrument cleaner (100 ml), for easy and fast removal of dirt from housing, display screen, keypad, probe handle and probe cable	0554 1207
ISO calibration certificate/temperature, meas. instr. with surface probe; calibration points +60°C; +120°C; +180°C	0520 0071
ISO calibration certificate/CO2, CO2 probes; calibration points 0; 1000; 5000 ppm	0520 0033

testo

Accessories for testo 350 S/ XL

"easyEmission" software, RS232 cable included

The complete data management solution for flue gas analysis

- User-defined measurement intervals (1 measurement/s up to 1 measurement/hour)
- Readings transferred in seconds to Microsoft EXCEL®
- User-defined fuels
- Readings shown in tables or graphs
- Easy to produce custom-designed measurement logs

"easyEmission" software for testo 350-S/-XL, RS232 cable for connecting instrument to PC included

Part no. 0554 3335

Analog output box (mA out)

Analog output boxes can be looped into the data bus to output the measurement data as an analog signal (4 - 20 mA). Each box has 6 user-defined channels which can be scaled according to application.

Part no. 0554 0845

Cases

1 Transport case for analyser, probes and accessories

Part no. 0516 0351

2 System case (aluminium), for analyzer, probes, incl. drawer for accessories

Part no. 0516 0352



Analog output box for output on an

analog recorder or for control purposes

Software with analysis and graphics

functions, online measurement

1 Transport case 2 System case

Protection hood and wall holder for analyzer box

1 Protection hood protects from dirt and dust

Part no. 0554 0199

2 Wall holder for analyzer box incl. heat protection plate, can be locked

Part no. 0554 0203



1 Protection hood 2 Wall holder



If, for example, several testo 350 S/ XL flue gas analyzers are connected to the Testo data bus, they can then be controlled and read out on your PC. In this way, a faster measurement cycle (<5 s) can be set for each flue gas analyzer than with the RS232 cable.

"easyEmission" software for testo 350 S/XL Testo data bus controller included, with USB to connect instrument to PC, cable for Testo data bus and terminal plug

Part no. 0554 3336



Software with analysis and graphics functions, online measurement

Robust protective case with trolley function

- For the operation of testo 350 in the case in dusty and tough surroundinas.
- Extendable handle and stainless steel ball bearing rollers for
- Extremely impact-resistant polypropylene copolymer for high stability and flexibility to protect from external impact.
- The protective case is equipped with a ventilator as standard. A thermal switch switches this on at outer temperatures >+15 °C and off at temperatures <+15 °C.
- Operation of the testo 350 in the closed case.
- the case, all connections of the outside.
- Dimensions:
- Storage temperature: -20 to +50
- °C
- sunlight): -10 to +50 °C

Part no. 0554 1337

Cables and adapters

Cable with battery clamps and adapter for connection to testo 350-S/-XL



- effortless transport.
- Thanks to a cover in the base of
- testo 350 are accessible from the

Technical data:

- 56.5 x 45.5 x 26.5 cm
- Operating temperature (no direct
- Protection class: IP42





Measurement System and Practical Accessories

testo 350-S control unit	Part no.
Control unit displays measurement data and controls measurement system, built-in printer, connection for Testo data bus and terminal plug included	0563 0369
Further options only for Control Unit testo 350-S	
NEW! BLUETOOTH® wireless transmission*	0440 0550
Spare thermal paper for printer (6 rolls)	0554 0569
Testo rechargeable battery pack NiMH for control unit, logger	0515 0097
testo 350 XL control unit	Part no.
Control unit displays measurement data and controls the measurement system, incl. built-in printer, pressure measurement 40/200 hPa, 1 user defined probe socket, programmable measurements and memory space for 250,000 readings, connection for Testo data bus, incl. terminal plug	0563 0353
Additional options only for control unit testo 350 XL	
Touch screen with pen (available only with original order), for easy input of text and values	0440 0559
Spare thermal paper for printer (6 rolls)	0554 0569
Testo rechargeable battery pack NiMH for control unit, logger	0515 0097
Mains unit 230 V/ 8 V/ 1 A, for instrument (European plug)	0554 1084
testo 350 S flue gas analyzer testo 350-S flue gas analyzer, equipped with: O_2 , differential pressure measurement, 2 temperature probe sockets, testo data bus connection, built-in rechargeable battery, data logger, can be upgraded to max. 6 sensors (with NO, NO ₂ , CO, H ₂ S, HC, SO ₂ , CO ₂ NDIR) A second cas sensor must be installed in testo 350-S, otherw	0563 0368
to function. Up to 5 additional sensors can be fitted.	
Option: COlow sensor	0440 3936
Option: CO gas sensor	0440 3988
Option: CO2 sensor (infrared meas. principle, absolute pressure meas. and CO2 absorption filter with refill pack incl.)	0440 0417
Option: HC sensor (nonburned hydrocarbons)	0440 3929
Option: H2S sensor	0440 3930
Option: NO gas sensor	0440 3935
Option: NOlow gas sensor	0440 3928
Option: NO2 gas sensor	0440 3926
Option: SO2 gas sensor	0440 3927
NEW! BLUETOOTH [®] wireless transmission*	0440 0550
Option: Peltier gas preparation with hose pump to empty condensate automatically	0440 0355
Fresh air valve for long-term measurement (measurement range extension with dilution factor 5 for all sensors included)	0440 0557
Measuring range extension for CO sensor (dilution), built into analyser box, selectable dilution factors: 0, 2, 5, 10, 20, 40	0440 0555
Event trigger socket, for starting and stopping measurement	0440 3932
Special gas pump for long-term measurements with extended warranty (For continuous measurements >2 h measurement time, the option Peltier gas praparation 0440 0355 is additionally recommended)	0440 0378
testo 350 XL flue gas analyzer box	
testo 350 XL analyzer box, equipped with O ₂ , CO (with switch-off and rinse function), NO, NO ₂ , differential pressure measurement, 2 temperature probe sockets, gas preparation, Testo data bus adapter, automatic fresh air rinse with valve (including measurement range extension with dilution factor 5 for all sensors), built-in rechargeable battery, data memory, can be upgraded to max. 6 gas sensors (with H ₂ S, HC, SO ₂ , CO ₂ NDIR)	0563 0350
Option: COlow gas sensor	0440 3925
Option: CO2 sensor (infrared meas. principle, absolute pressure meas. and CO2 absorption filter with refill pack incl.)	0440 0417
Option: NOlow gas sensor	0440 3934
Option: SO2 gas sensor	0440 3927
Option: HC sensor (nonburned hydrocarbons)	0440 3929
Option: H2S sensor	0440 3930
NEW! BLUETOOTH® wireless transmission*	0440 0550
Measuring range extension for CO sensor (dilution), built into analyser box, selectable dilution factors: 0, 2, 5, 10, 20, 40	0440 0555
Event trigger socket, for starting and stopping measurement externally, built into analyser box	0440 3932
Special gas pump for long-term measurements with extended warranty	0440 0378

Transport case and accessories for flue gas analyzer box	Part no.
Robust protective case with trolley function for operating the testo 350 in the case in dusty and tough surroundings	0516 0355
Wall holder for analyzer box incl. heat protection plate, can be locked	0554 0203
Protective cover for analyser box (can also be used with wall holder)	0554 0199
Carrying belt set for analyser box and control unit	0554 0434
Transport case for analyser, probes and accessories	0516 0351
System case (aluminium), with drawer for accessories, for transport and protection during measurement	0516 0352
Transport case for industrial probes, aluminium; space for: handle, probes, flange and accessories	0516 7900
Calculation of fuel-specific factors to accurately display calculated variables in deviating fuels (calculation for one fuel)	0991 0030
Spare particle filter, pack of 20	0554 3381
Hose set to convey flue gas from analyzer box, 5 m long	0554 0451
Refill pack of filter pellets for CO2 absorption filter	0554 0369
ISO calibration certificate/flue gas, calibration points 2.5% O2; 100 and 1000 ppm CO; 800 ppm NO; 80 ppm NO2; 1000 ppm SO2	0520 0003
testo 454 logger and accessories	Part no.
Logger, measures and saves (max. 250,000 readings), incl. 4 user defined probe sockets, alarm output/event trigger socket, stand/wall holder	0577 4540
Alarm/trigger cable	0554 0012
Power box, connected to control unit to increase operating life, for a battery-operated measuring system	0554 1045
Power supply for power box (110/230 V; 50/60 Hz, 12 V, 3 A)	0554 1143
Analog output box, 6 channels, 4 to 20 mA, for output on an analog recorder, (please also order mains unit 0554 1084)	0554 0845
Testo rechargeable battery pack NiMH for control unit, logger	0515 0097
Accessories for Testo data bus	Part no.
Terminal plug for Testo data bus, for loggers and special lengths	0554 0119
Connection cable, 2 m, for Testo data bus	0449 0042
Connection cable, 5 m, for Testo data bus	0449 0043
Connection cable, 20 m, for Testo data bus	0449 0044
Additional cable le	enaths up to 1000 m on request
PC software	Part no
"easyEmission" software for testo 350-S/-XL, RS232 cable for connecting instrument to PC included	0554 3335
"easyEmission" software for testo 350 S/XL, Testo data bus controller included, with USB to connect instrument to PC, cable for Testo data bus and terminal plug	0554 3336
Multiple licence software "easyEmission" for testo 350-S/-XL	0554 3337
RS232 cable, connects instrument to PC (1.8 m) for data transfer	0409 0178
Accessories for flue gas analyzer	Part no.
Cable with battery clamps and adapter for connection to testo 350-S/-XL	0554 1337
Instrument options as upgrades	
Information about instrument upgrades and prices available on re-	quest.

*Country permits for $\mathsf{BLUETOOTH}^{\texttt{®}}$ wireless transmission are listed on page 26

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Recommended for your applications



testo 350 S: Set for fast emission monitoring on industrial burners (O_2 , CO, NO)

teste 250 C septral unit	0562 0260
testo 350-5 control unit	0203 0309
BLUETOOTH [®] wireless transmission	0440 0550
Testo rechargeable pack for control unit	0515 0097
testo 350-S flue gas analyser box	0563 0368
BLUETOOTH® wireless transmission	0440 0550
Option: NO gas sensor	0440 3935
Option: CO gas sensor	0440 3988
Flue gas probe, 335 mm immersion depth, Thermocouple NiCr-Ni (TI), Hose 2.2 m	0600 7451
Heat-resistant probe shaft, 335 mm long, Tmax. +1000°C	0440 7437
Connection cable, 2 m, for Testo data bus	0449 0042
Protective cover for analyzer box	0554 0199
Carrying belt set for analyzer box	0554 0434
Transport case for analyser, probes and accessories	0516 0351
Spare particle filter, pack of 20	0554 3381
Spare thermal paper for printer (6 rolls)	0554 0569



testo 350 XL: Standard set for measurements on process systems (O_2 , CO, NO, NO₂)

testo 350 XL control unit	0563 0353
Testo rechargeable pack for control unit	0515 0097
testo 350 XL flue gas analyzer box	0563 0350
Flue gas probe, 335 mm immersion depth, Thermocouple NiCr-Ni (TI), Hose 2.2 m	0600 7451
Heat-resistant probe shaft, 335 mm long, Tmax. +1000°C	0440 7437
Special hose for NO2/SO2 measurements, 2.2 m long	0440 7442
Connection cable, 2 m, for Testo data bus	0449 0042
"easyEmission" software for testo 350 S/XL	0554 3335
Carrying belt set for analyzer box	0554 0434
Robust protective case with trolley function for operating the testo 350 in the case in dusty and tough surroundings	0516 0355
Spare particle filter, pack of 20	0554 3381
Spare thermal paper for printer (6 rolls)	0554 0569



testo 350 XL: Portable measurements on motors (O $_{\rm 2},$ CO, NO, NO $_{\rm 2})$

testo 350 XL control unit	0563 0353
Testo rechargeable pack for control unit	0515 0097
testo 350 XL flue gas analyzer box	0563 0350
Measurement range extension for CO gas sensor (dilution)	0440 0555
Flue gas probe for industrial motors	0600 7550
Thermocouple for exhaust gas temperature measurement (NiCr-Ni, length 400 mm, Tmax. +1000 °C), with 2.4 m connection cable and additional temperature protection	0600 8894
Connection cable, 5 m, for Testo data bus	0449 0043
"easyEmission" software for testo 350 S/XL	0554 3335
Carrying belt set for analyzer box	0554 0434
Robust protective case with trolley function for operating the testo 350 in the case in dusty and tough surroundings	0516 0355
Spare particle filter, pack of 20	0554 3381
Spare thermal paper for printer (6 rolls)	0554 0569



testo 350 XL: Portable measurements on gas turbines (O_2, CO_{low}, NO_{low}, NO_2)

testo 350 XL control unit	0563 0353
Testo rechargeable pack for control unit	0515 0097
Touchscreen with reader	0440 0559
testo 350 XL flue gas analyzer box	0563 0350
COlow gas sensor, 0 to 500 ppm, built-in in analyzer box	0440 3925
NOlow gas sensor, 0 to 300 ppm, built-in in analyzer box	0440 3934
Measurement range extension for CO gas sensor (dilution)	0440 0555
Flue gas probe, 335 mm immersion depth, Thermocouple NiCr-Ni (TI), Hose 2.2 m	0600 7451
Heat-resistant probe shaft, 335 mm long, Tmax. +1000°C	0440 7437
Special hose for NO2/SO2 measurements, 5 m long	0440 7445
Connection cable, 5 m, for Testo data bus	0449 0043
"easyEmission" software for testo 350 S/XL	0554 3335
Protective cover for analyzer box	0554 0199
Carrying belt set for analyzer box	0554 0434
System case (aluminium), incl. drawer	0516 0352
Spare particle filter, pack of 20	0554 3381
Spare thermal paper for printer (6 rolls)	0554 0569



Technical Data for testo 350 S/XL control unit and testo 454 logger box

	testo 350-S control unit	testo 350 XL control unit		
Oper. temp.	-5 to +45 °C	-5 to +45 °C		
Storage temp.	-20 to +50 °C	-20 to +50 °C		
Battery type	4 AA batteries	4 AA batteries		
Battery life	8 h	8 h		
Memory	-	250000 readings		
Weight	850 g	850 g		
Dimensions	252 x 115 x 58 mm	252 x 115 x 58 mm		
Warranty	2 years	2 years		

Logger, measures and
saves readingsAnalog output box (mA
out)-10 to +50 °C-10 to +50 °C-25 to +60 °C-25 to +60 °CAlkali manganese-24 h-250000 readings-450 g305 g200 x 89 x 37 mm200 x 89 x 37 mm3 years3 years

Country permits BLUETOOTH $^{\odot}$ wireless transmission for control unit testo 350-S and the flue gas analyzers testo 350-S/-XL

The BLUETOOTH[®] radio module used by Testo is permitted for the following countries and may only be used in those countries, i.e. the BLUETOOTH[®] wireless transmission may not be used in any other country!

Europe including all EU member states

Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Finnland, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Sweden, Slovakia, Slovenia, Spain and Turkey

European countires (EFTA)

Iceland, Liechtenstein, Norway, Switzerland

Non-European countries

Canada, USA , Japan, Ukraine, Australia, Colombia and El Salvador

Technical data for testo 350 XL control unit and testo 454 logger box

Probe type	Vane	Thermal	Testo humid. sensor, cap.	Pressure	
Meas. range	0 to +60 m/s	0 to +20 m/s	0 to +100 %RH	10 to 30000 hPa	
Accuracy ±1 digit	See probe data for system accuracy	±0.01 m/s (0 to +1.99 m/s) ±0.02 m/s (+2 to +4.99 m/s) ±0.04 m/s (+5 to +20 m/s)	See probe data	Probe 0638 1345 Probe 0638 1445 Probe 0638 1545 Probe 0638 1645 ±0.1% of m.v.	
Resolution	0.01 m/s (for Ø 60/100 mm), 0.1 m/s (for remaining probes)	0.01 m/s (0 to +20 m/s)	0.1 %RH (0 to +100 %RH)	0.001 hPa (probe 0638 1345) 0.001 hPa (probe 0638 1445) 0.01 hPa (probe 0638 1545)	
Probe type	Pt100	Type K (NiCr-Ni)	Type S (Pt10Rh-Pt)	Type J (Fe-CuNi)	Type T (Cu-CuNi)
Meas. range	-200 to +800 °C	-200 to +1370 °C	0 to +1760 °C	-200 to +1000 °C	-40 to +350 °C
Accuracy ±1 digit	±0.1 °C (-49.9 to +99.9 °C) ±0.4 °C (-99.9 to -50 °C) ±0.4 °C (+100 to +199.9 °C) ±1 °C (-200 to -100 °C) ±1 °C (+200 to +800 °C)	±0.4 °C (-100 to +200 °C) ±1 °C (-200 to -100.1 °C) ±1 °C (+200.1 to +1370 °C)	±1 °C (0 to +1760 °C)	±0.4 °C (-150 to +150 °C) ±1 °C (-200 to -150.1 °C) ±1 °C (+150.1 to +199.9 °C)	±0.4 °C (-40 to +200 °C) ±1 °C (+200.1 to +350 °C)
Resolution	0.001 °C (-9.999 to +300 °C) 0.1 °C (-200 to -100 °C) 0.1 °C (+301 to +800 °C)	0.1 °C (-200 to +1370 °C)	1 °C (0 to +1760 °C)	0.1 °C (-200 to +1000 °C)	0.1 °C (-40 to +350 °C)
Probe type	NTC	CO probe	CO2 probe	CO2 probe	
Meas. range	-40 to +150 °C	0 to +500 ppm CO	0 to +1 Vol. % CO ₂	0 to +10000 ppm CO ₂	
Accuracy ±1 digit	±0.2 °C (-10 to +50 °C) ±0.4 °C (-40 to -11 °C) ±0.4 °C (+51 to +150 °C)	±5% of mv (0 to +500 ppm CO)	See probe data	See probe data	
Resolution	0.1 °C (-40 to +150 °C)				
Probe type	Mechanical	Current/voltage measurement	Current/voltage measurement	Control unit, integ. press. se	ensor
Meas. range	20 to 20000 rpm	0 to +20 mA	0 to +10 V	-200 to +200 hPa	-40 to +40 hPa
Accuracy ±1 digit	±1 digit	±0.04 mA (0 to +20 mA)	±0.01 V (0 to +10 V)	±1.5% of mv (-50 to -200 hPa) ±1.5% of mv (+50 to +200 hPa) ±0.5 hPa (-49.9 to +49.9 hPa)	±1.5% of mv (-3 to -40 hPa) ±1.5% of mv (+3 to +40 hPa) ±0.03 hPa (-2.99 to +2.99 hPa)
Resolution	1 rpm	0.01 mA (0 to+20 mA)	0.01 V (0 to +10 V)	0.1 hPa (-200 to +200 hPa)	0.01 hPa (-40 to +40 hPa)

Technical data/testo 350 S/XL flue gas analyzer

Probe type	Temperature measurement	O ₂ measurement	CO (H2 compensated)	COlow meas. (H2 compensated)	CO ₂	NO measurement	NOlow measurement	NO ₂ measurement	SO2 measurement
Meas. range	-40 to +1200 °C	0 to +25 Vol. % O ²	0 to +10000 ppm CO	0 to +500 ppm CO	0 to $\rm CO_2 max$ Vol. % $\rm CO_2$	0 to +3000 ppm NO	0 to +300 ppm NO	0 to +500 ppm NO ²	0 to +5000 ppm SO ²
Accuracy	±0.5% of mv (+100 to +1200 °C) ±0.5 °C (-40 to +99.9 °C)	±0.8% of fsv (0 to +25 Vol. % O ₂)	±5% of mv (+200 to +2000 ppm CO) ±10% of mv (+2201 to +10000 ppm CO) ±10 ppm CO (0 to +199 ppm CO)	±5% of mv (+40 to +500 ppm CO) ±2 ppm CO (0 to +39.9 ppm CO)	Calculated from O ₂	±5% of mv (+100 to +1999.9 ppm NO) ±10% of mv (+2000 to +3000 ppm NO) ±5 ppm NO (0 to +99 ppm NO)	±5% of mv (+40 to +300 ppm NO) ±2 ppm NO (0 to +39.9 ppm NO)	±5% of mv (+100 to +500 ppm NO ₂) ±5 ppm NO ₂ (0 to +99.9 ppm NO ₂)	$\begin{array}{l} \pm 5\% \text{ of mv (+100} \\ \text{to +2000 ppm} \\ \text{SO}_{2} \\ \pm 10\% \text{ of mv} \\ (+2001 \text{ to +5000} \\ \text{ppm SO}_{2} \\ \pm 5 \text{ ppm SO}_{2} (0 \text{ to} \\ +99 \text{ ppm SO}_{2}) \end{array}$
Resolution	0.1 °C (-40 to +1200 °C)	0.01 Vol. % O ₂ (0 to +25 Vol. % O ₂)	1 ppm CO (0 to +10000 ppm CO)	0.1 ppm CO (0 to +500 ppm CO)	0.01 Vol. % CO ₂	1 ppm NO (0 to +3000 ppm NO)	0.1 ppm NO (0 to +300 ppm NO)	0.1 ppm NO ₂ (0 to +500 ppm NO ₂)	1 ppm SO ₂ (0 to +5000 ppm SO ₂)
Reaction time		20 s	40 s	40 s	20 s	30 s	30 s	40 s	30 s
Reaction type		_t 95	, _t 90	,90	,95	_t 90	,90	,90	,90
Probe type	Efficiency	Flue gas loss	Differential pressure 1	Differential pressure 2	Velocity	CO ₂ meas. (IR)	H2S measurement		
Meas. range	0 to +120 %	-20 to +99.9 % qA	-200 to +200 hPa	-40 to +40 hPa	0 to +40 m/s	0 to +50 Vol. % CO ₂	0 to +300 ppm H ₂ S		
Accuracy			±1.5% of mv (-50 to -200 hPa) ±1.5% of mv (+50 to +200 hPa) ±0.5 hPa (- 49.9 to +49.9 hPa)	±1.5% of mv (-40 to -3 hPa) ±1.5% of mv (+3 to +40 hPa) ±0.03 hPa (- 2.99 to +2.99 hPa)		±0.3 Vol. % CO2 + 1% of mv (0 to 25 Vol. % CO2) ±0.5 Vol. % CO2 + 1.5% of mv (>25 to 50 Vol. % CO2	±5% of mv (+40 to +300 ppm) ±2 ppm (0 to +39.9 ppm)		
Resolution	0.1 % (0 to +120 %)	0.1 % qA (-20 to +99.9 % qA)	0.1 hPa (-200 to +200 hPa)	0.01 hPa (-40 to +40 hPa)	0.1 m/s (0 to +40 m/s)	$\begin{array}{c} 0.01 \; \text{Vol.} \; \% \; \text{CO}_2 \\ (0 \; \text{to} \; 25 \; \text{Vol.} \; \% \; \text{CO}_2) \\ 0.1 \; \text{Vol.} \; \% \; \text{CO}_2 \\ (> 25 \; \text{Vol.} \; \% \; \text{CO}_2) \end{array}$	0.1 ppm (0 to +300 ppm)		
Reaction time						<10 s	35 s]	
Reaction type						_t 90	_t 90		

Measurement range extension

Single dilution w	ith selectable d	ilution factor (option)	Parameter	Methane
CO measurement (H _o compensated)	Meas. range Accuracy	depending on factor selected +2 % of my (additional error)	Meas. range 1	100 to 40,000 pp
CÓ _{low} meas. (H ₂ compensated)	Resolution	1 ppm or 0.1 ppm at CO ^{IOW}	Accuracy	less than 400 ppm (to 4000 ppm) less than 10 % of m
Dilution of all sei	nsors by factor	5 (standard testo 350 XL)		(greater than 4000 p
O ₂ measurement	Reading is not	shown in display	Resolution	10 ppm
HC measurement	Reading is not	shown in display	Min 02 reg in	2% + (2 x metha
CO ₂ (IR) meas.	Reading is not	shown in display	flue gas	reading)
CO measurement	Meas. range	2500 to 50000 ppm	Reaction time t90	less than 40 s
compensated)	Resolution	Pressure range -150 to 0 mbar at probe tip	Response factor ²	1
CO _{low} meas. (H ₂ compensated)	Meas. range Accuracy Resolution	500 to 2500 ppm ±5 % of mv (additional error) Pressure range -100 to 0 mbar at probe tip 0.1 ppm	[–] ¹ Lower explosion ² The HC sensor i (propane or butar	l limit must be adh s adjusted to meth ne) by the user.
NO measurement	Meas. range Accuracy Resolution	1500 to 15000 ppm ±5 % of mv (additional error) Pressure range -100 to 0 mbar at probe tip 1 ppm	Additional Technical data Dimensions: 395 x 275 x 95 mm Weight: 3200 g Storage temperature: -5 to +50 °C Operating temperature: -5 to +45 °C Housing material: ABS Memory: 250 000 readings Power supply: Via built-in mains unit (90 V, 47 to 63 Hz) or exchangeable recharge batteries Electrial power consumption: 0.5 A (110 0.3 A (230 V AC) Dewpoint calculation: 0 to 99 °C td Maximum positive pressure: 200 hPa (2 water column) Pump flow: 1 l/min. with flow monitoring	
NO _{low} measurement	Meas. range Accuracy Resolution	300 to 1500 ppm ±5 % of mv (additional error) Pressure range -150 to 0 mbar at probe tip 0.1 ppm		
NO ₂ measurement	Meas. range Accuracy Resolution	500 to 2500 ppm ±5 % of mv (additional error) Pressure range -50 to 0 mbar at probe tip) 0.1 ppm		
SO ₂ measurement	Meas. range Accuracy Resolution	500 to 25000 ppm ±5 % of mv (additional error) Pressure range -100 to 0 mbar at probe tip 1 ppm		
H ₂ S measurement	Meas. range Accuracy Resolution	200 to 1500 ppm ±5 % of mv (additional error) Pressure range -100 to 0 mbar at probe tip 0.1 ppm		

Technical data for HC sensor

Parameter	Methane	Propane	Butane
leas. range 1	100 to 40,000 ppm	100 to 21,000 ppm	100 to 18,000 ppm
ccuracy	less than 400 ppm (100 to 4000 ppm) less than 10 % of m.v. (greater than 4000 ppm)	less than 400 ppm (100 to 4000 ppm) less than 10 % of m.v. (greater than 4000 ppm)	less than 400 ppm (100 to 4000 ppm) less than 10 % of m.v. (greater than 4000 ppm)
esolution	10 ppm	10 ppm	10 ppm
lin. 02 req. in ue gas	2% + (2 x methane reading)	2% + (5 x propane reading)	2% + (6.5 x butane reading)
eaction time t90	less than 40 s	less than 40 s	less than 40 s
esponse factor ²	1	1.5	2

t must be adhered to. justed to methane in the factory. It can be adjusted to another gas the user.

nical data

	Max. dust load: 20 g/m³ dust in flue gas Max. humidity load: +70 °C Dewpoint temperature at sample gas inlet of
	analyzer box
	Trigger input: Voltage 5 to 12 Volt (rising or falling edge)
'90 V to 260	Pulse width > 1 s
arapahla	Load: 5 V/max 5 mA 12 V/max 40 mA
argeable	Newset a Arabitrary Octave (such discussed in a
	warranty: Analyzers 2 years (excluding working
10 V AC),	parts, e.g. gas sensors); CO/NO/NO2: 1 year;
	O2 gas sensor: 1 1/2 years: CO2 IB gas sensor:
	2 years The warranty applies for average sensor
50 hDa (500	lead
50 nPa (500	1080.
a (2000 mm	

212730

The portable exhaust gas analyzer for marine diesel engines

testo 350-MARITIME

615110

Fast and easy measurement according to MARPOL Annex VI and NOx Technical Code

The certified testo 350-MARITIME is the first portable exhaust gas analyzer for the measurement of exhaust gas emissions according to MARPOL Annex VI and the MEPC.103(49)guideline in the world.

The system carries the Germanische Lloyd (GL) certificate no. 59 488 – 08 HH according to MARPOL 73/78 Annex VI, NOx Technical Code and the MEPC.103(49) guideline.

Gas sampling is carried out using a special sampling probe which can be installed with the help of a flange. The certified and durable electrochemical gas sensors (ECS) provide a highly accurate and long-term stable determination of the concentration of the exhaust gas components O₂, CO und NO_x (NO + NO₂ separately). CO₂ is recorded using the certified IR measurement principle. In order to meet the tough conditions at sea, the complete exhaust gas analyzer is housed in a robust protective case.



testo 350-MARITIME – non-complicated and versatile exhaust gas analysis on marine diesel engines



testo 350-MARITIME certified by Germanischer LLoyd (GL)



CT:

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22

The complete exhaust gas analysis set in a practical case



Easy installation of the gas sampling probe thanks to the installation flange

The application possibilities of testo 350-MARITIME

On-board verification examination according to NOx Technical Code

The testo 350-MARITIME can be used to measure the gaseous exhaust gas concentrations of O₂, CO, CO₂ and NO_x as a system component for the following procedures:

- · Periodical examinations and for intermediary examinations for direct measurement and monitoring on board
- Simplified test and measurement procedures

Testing NOx limit values stipulated in MARPOL Annex VI

 Official NO_x control measurements on board

NOx measurements as proof in special regional zones

• e.g. as proof of NO_x reduction for NO, tax purposes in Norway

Part no.



necessary cable and line connections through the cover

> testo 350-MARITIME - the portable exhaust gas analyzer for maritime use

Technical data			
Parameters	Meas. range	Tolerance	
°C, exhaust gas	-40 to +1000 °C	max. ±5 K	
0 ₂	0 to 25 Vol. %		
СО	0 to 3000 ppm		
NO	0 to 3000 ppm	Corresponding to	
NO ₂	0 to 500 ppm	NO Technical Code	
SO ₂	0 to 3000 ppm		
CO ₂ (IR)	0 to 40 Vol. %		
P _{abs}	600 to 1150 hPa	±5 hPa at +22 °C ±10 hPa at -5 to +42 °C	
Oper. temp.	+5 to +50 °C	<u>.</u>	
Storage temp.	-10 to +50 °C		
Voltage supply	11 to 40 V DC or 110 to 230 V AC 50/60 Hz buffer battery NiMH 8.4 V/4.5 A		
Electrical power consumption	max. 40 W		
Max. positive pressure at gas input	50 hPa		
Max. negative pressure at gas input	-200 hPa		
Weight (Instrument in case)	Approx. 17 kg		
Dimensions (Case)	56.5 x 45.5 x 26.5 cm		

Accessories Ordering data	Part no.
Standard ambient air probe up to +70°C	0636 9740
Cable, 1.5 m long, connects probe with plug-in head to meas. instrument	0430 0143

	Type Approval Compliant	GL
TI LE		

Germanische Lloyd (GL) certificate no. 59 488 - 08 HH

testo 350-MARITIME

Exhaust gas analysis box testo 350-MARITIME, equipped 0563 3500 with: O2, CO, CO2-(IR), NO and NO2, gas preparation, integrated battery and measurement data store; Control Unit testo 350-MARITIME; connection line (2m) between exhaust gas analyzer and Control Unit; gas sampling probe with probe pre-filter and special hose for NO₂-/SO₂ measurements (length 2.2 m); installation flange for gas sampling probe; robust protective case with trolley function; cable with battery clamps for connection to the testo 350-MARITIME; Germanischer LLoyd (GL) certificate no. 59 488 - 08 HH; incl. on site spare part service for sensors within Germany

Further options for the testo 350-MARITIME	
SO ₂ measurement	0440 3937
Exhaust gas probe for industrial engines with probe pre-filter, 335 mm immersion depth incl. cone and heat shield, Tmax +1000 °C, special hose for NO ₂ -/SO ₂ measurements, length 5, incl. Thermocouple for measuring exhaust gas temperature (NiCr-Ni, length 400 mm, Tmax +1000 °C), with 5.2 m connection cable and additional temperature protection	0440 7553

Portable reference analyzer for industrial flue gases

testo 360

Today, official emission measurements on industrial flue gases are ideally carried out using a compact, portable analyzer of robust design. Advantage: Easy to transport by car and easy to handle.

When monitoring thermal processes, the aim is to maintain and improve quality. Often conditions are extreme with a high gas concentration, dust load, high ambient temperatures and long-term measurements are required.

When monitoring emissions, testo 360 can determine even extreme values thanks to a switchable measuring range extension and it can withstand high ambient temperatures and radiant heat.

For service on industrial furnaces, total accuracy is required of portable multi-function analyzers because of the numerous subsequent emission inspections; the analyzer should also be robust to withstand continuous measurements for the optimum tuning of burners. A high efficiency level and low subsequent costs are also a priority.

• Data logger function for several days or weeks

• Maintenance-friendly design reduces costs

Industrial flue gas inspections require flexible analyzers which are easy to transport and correspond to stationary systems in terms of accuracy levels.

Germany

The approval for long-term emission measurements was carried out by RWTÜV Anlagentechnik GmbH in Essen, Germany. The NO, NO₂, SO₂, CO and O₂ components were tested. Unlimited approval of testo 360 for use on TA Luft systems was confirmed.

USA

testo 360 meets US EPA's Performance Specifications for measuring NO_x, CO and O₂. Also fulfills CTM-030 and -034 as well as US EPAs 40 CFR, Part 60, App. A and B and Part 75 Subpart C. (testo 360 is also approved by California South Coast Air Quality Management District for measuring NO_x.)

Russia

testo 360 has GOS standard approval for all parameters.

Switzerland

testo 360 is approved by BUWAL for official emission measurements.

If you require support when commissioning, we will be happy to make you an individual offer.



Approved for continuous emission measurements



testo 360 - For practically stationary applications such as motor test rigs, for example

Benefits at a glance

- Accuracy fully compatible with stationary measuring technology
- All in one analyzer: NO_x, CO, CO2, SO2, O2, HC
- Water level in flue gas, velocity and differential pressure, temperature
- Long-term stable sensor, calibration gas on site is not necessary
- Integrated, low-absorption Peltier gas penetration unit (patented)
- Can be used in extreme conditions
- Data logger operation for several days and weeks without staff supervision

- Extreme measurement ranges in % range with high precision at low concentrations
- Easy maintenance reduces follow up costs

testo 360 system overview



Design and function

The testo 360 reference measuring system consists of an analyzer unit, a notebook and the flue gas probe. All of the sensors (max. 7 gas sensors), the flue gas moisture measurement unit (optional), the measuring range extension unit (gas dilution, optional), velocity measurement (optional) as well as a low absorption gas preparation Peltier cooling unit are located in the analyzer box.

The option of an external additional probe unit is available for parallel measurement of temperatures or mA/mV signals (e.g. from FID) and the output of analog signals (4-20 mA). The flue gas probe is connected to the heated hose with built-in filter: either the modular industrial probe or any non-Testo or special probes via an adapter.

Handling

testo 360 is easily transported by the operator. The fold-up trolley on which the analyzer is placed when working is ideal for this purpose.

Operation and Analysis

The notebook is protected from ambient influences during longterm measurements by the lid which can be locked. Measurements are taken using WINDOWS® software. The measured data is saved as ASCII

on the notebook's hard disk and can be integrated into any analysis program.

The analyzer can be operated and data can be transmitted via telephone modem or computer network.

Continuous measurements

Calibration gas can be automatically supplied to the probe for accuracy checks by means of a calibration gas switchover unit (accessory) or directly to the analyzer by means of a calibration gas inlet (optional).

Maintenance and Service

testo 360 has been designed so that the user can easily change the sensors – also without calibration gases.

Accessories

Industrial gas sampling probes – Modular system Part no.					
Heated handle, power supply 115 to 230 V, 50/60 Hz			Power consumption: 200 watts; Temp. gas path: > 180 °C; Ready to operate: after approx. 20 min; Length of mains cable: 3 m; Protection class: IP54; Ambient temp.: 20 to \pm 50 °C; gas inlet: G1/4"; gas outlet: M 10x1 outer thread; weight: 1.7 kg	0600 7920	
Adapter, non-heated			Ambient temp.: -20 to +50 $^\circ\text{C};$ Protection class: IP54; Gas inlet: G1/4*; Gas outlet: M 10x1 outer thread; Weight: 0.4 kg	0600 7911	
Non-heated sampling pipe to +600 °C, stainless steel 1.4571	Connectio	n: G1/4" 1000 mm		0600 7801	
Non-heated sampling pipe to +1200 °C, Inconel 625	Ø 20 mm	Ø 12 mm	Weight: 400 g	0600 7803	
Non-heated sampling pipe to +1800 °C, Al-Oxide	Connectio Ø 20 mm	n: G1/4" 1000 mm Ø 12 mm	Weight: 400 g	0600 7805	
Heated sampling pipe, power supply 230 V / 50 Hz, stainless steel 1.4571	1	1000 mm Ø 25 mm	Heating: > +180 °C; power consumption: 650 watts; Connection: electr. connection to heated handle, connection adapter with thread connection/screw socket G1/4"; Max. flue gas temp.: +600 °C	0600 7820	
Extension pipe to +600 °C, stainless steel 1.4571		1000 mm	Connection: Thread screw/screw socket G1/4": Weight: 0.45	0600 7802	
Extension pipe to +1200 °C, Inconel 625	Ø 20 mm	Ø 12 mm	kg	0600 7804	
Preliminary filter for dusty flue gases, ceramic		50 mm	Dust load: max. 20 g / m3; filter fineness: 20 µm; Temperature:	0554 0710	
Preliminary filter can only be mounted on extension pipe 0600 7802 or 0600 7804.	Ø 23 mm		max. 1000 °C; Material: ceramic; Connection: G1/4" thread nipple; Weight: 0.2 kg		
Thermocouple, NiCr-Ni, -200 to +1000 °C, Inconel 625,				0430 0361	
Thermocouple, NiCr-Ni, -200 to +1000 °C, inconel 625,		Ø 4 mm	plug; weight: 0.15 kg. The length depends on the number of	0430 0362	
Thermocouple, NiCr-Ni, -200 to +1000°C, Inconel 625, length 3.2 m			sampling/extension pipes used.	0430 0363	
Mounting flange, stainless steel 1.4571, adjustable quick- action fitting suitable for all sampling/extension pipes	[130] mm	Ø 160 mm		0554 0760	
Cases	Cases Part no.				
Transport case for industrial probes, aluminium, space for	: handle, p	robes, flange and ac	ccessories, dimensions: 1270 x 320 x 140 mm	0516 7900	

Heated hose

For accurate NO_{X} and SO_{2} measurements – avoids absorption

 Part no.
 0401 0398 (2.2 m length)

 Part no.
 0401 0399 (4.0 m)

 Part no.
 0401 0394 (8.0 m)



Voltage supply: 115/230 V; 50 to 60 Hz (2.2 m and 4 m) 230 V/50 Hz (8.0 m) Inner temperature: approx. 180 °C Material inner hose: PTFE Material outer hose: PTE (max. 150 °C) Max. bend radius: 0.2 m Diameter: 28 mm Ambient temperature: -25 to +0 °C Inner filter part no.: 0554 0393 (5 in pack) Material: PTFE Filter fineness: 5 μm Dimensions: Ø 12 mm, 55 mm length



Accessories

Trolley

For analyzer bo accessories	x testo 360 and
Part no.	0554 3600
Dimensions	610 x 430 x 1060 mm (W x D x H)
Weight	14 kg
Material	Aluminium



Transport case

For testo 360 incl. accessories		
Part no.	0516 0360	
Outer dim.	770 x 440 x 480 mm (W x D x H)	
Empty weight	11.4 kg	
Other features	2 transport rollers, 2 carrying handles, 3 lid locks	



testo 360-3, analyzer Part no. A notebook is required for the operation of the testo 360! testo 360-3 analyzer, approved, without notebook, fitted with O2 0563 3600 gas sensor, gas preparation, housing heating Options Part no. NO gas sensor 0440 0068 CO2 gas sensor (incl. absolute pressure measurement) 0440 0084 0440 0099 HC gas sensor NO2 gas sensor 0440 0069 SO2 gas sensor 0440 0070 0440 0065 CO gas sensor (with CO flushing), up to 10,000 ppm, H2-comp. 0440 0067 CO gas sensor up to 40,000 ppm 0440 0059 Measuring range extension (gas dilution) Flue gas moisture measurement to determine water level 0440 0063 Manual flow measurement (differential pressure measurement) for using Pitot tubes 0440 0016 0440 0088 Option automatic velocity measurement Automatic calibration gas supply for 1 calibration gas bottle in instrument 0440 0061 Quick-action coupling for calibration gas connection 0699 2832/3 Software Part no. Automatic software 0554 0378 Analysis software 0554 0380 Basic software 0554 0364

Accessories	Part no.			
Trolley	0554 3600			
Transport case	0516 0360			
Voltage cable	0699 2757/1			
Mains/charger unit for analog output, 220 V	0554 0085			
Temperature probes and accessories	Part no.			
Ambient air probe, 300 mm immersion depth, with probe stop for separate measurement of ambient air temperature (e.g. systems with outside primary air intakes)	0600 9791			
Mini ambient air probe, 60 mm immersion depth, w. probe stop, magnetic clip, Tmax +100°C, for dual wall clearance temp. meas. in systems w. outside primary air intakes	0600 9797			
Ambient air probe, immersion depth 190 mm, with probe stop, magnetic clip, Tmax + 100°C, for ambient air temperature measurement in systems dependent on/independent of ambient air	0600 9787			
Mini ambient air probe, Tmax +80°C, for separate ambient air temperature measurement	0600 3692			
Pipe wrap probe for pipes with diameter of up to 2", for flow/return temp. meas. in hydronic systems	0600 4593			
Spare meas. head for pipe wrap probe, TC Type K	0602 0092			
Quick-action surface probe with sprung thermocouple strip, measuring range short-term to +500°C	0604 0194			
Cable, 1.5 m long, connects probe with plug-in head to meas. instrument	0430 0143			
Cable, 5 m long, connects probe with plug-in head to measuring instrument	0430 0145			
Pitot tubes and accessories	Part no.			
Pitot tube, 350 mm long, stainless steel, for measuring flow velocity	0635 2145			
Pitot tube, 1000 mm long, stainless steel, for measuring flow velocity	0635 2345			
Pitot tube, stainless steel, 500 mm long, measures flow velocity with temperature	0635 2140			
Pitot tube, stainless steel, 1000 mm long, measures flow velocity with temperature	0635 2240			
Pitot tube, stainless steel, 350 mm long, measures flow speed with temperature, 3 x hoses (5 m long) and heat protection plate	0635 2041			
Pitot tube, stainless steel, 750 mm long, measures flow speed with temperature, 3x hoses (5 m long) and heat protection plate	0635 2042			
Connection hose, silicone, 5m long	0554 0440			
Instrument options as upgrades				
Information about instrument upgrades and prices available on request.				

Assembled for your application



testo 360: Typical set for official measurement

A notebook is required for the operation of the testo 360!	
testo 360-3 analyzer, approved, without notebook, fitted with O2 gas sensor, gas preparation, housing heating	0563 3600
CO2 gas sensor (incl. absolute pressure measurement)	0440 0084
SO2 gas sensor	0440 0070
Manual flow velocity measurement (deltaP measurement) with Pitot tube	0440 0016
Basic software	0554 0364
Heated gas sampling hose, 4 m long	0401 0399
Hose filter insert	0554 0393
Trolley	0554 3600
Transport case	0516 0360
Heated handle	0600 7920
Heated sampling pipe	0600 7820
Extension pipe to +600 °C, stainless steel 1.4571	0600 7802
Preliminary filter for dusty flue gases, ceramic	0554 0710
Mounting flange, stainless steel 1.4571	0554 0760
Transport case for industrial probes, aluminium	0516 7900



testo 360: Typical set for thermal process measurement

A notebook is required for the operation of the testo 360!	
testo 360-3 analyzer, approved, without notebook, fitted with O2 gas sensor, gas preparation, housing heating	0563 3600
CO2 gas sensor (incl. absolute pressure measurement)	0440 0084
Measuring range extension (gas dilution)	0440 0059
Flue gas moisture measurement to determine water level	0440 0063
Basic software	0554 0364
Automatic software	0554 0378
Analysis software	0554 0380
Heated gas sampling hose, 4 m long	0401 0399
Hose filter insert	0554 0393
Trolley	0554 3600
Adapter, non-heated	0600 7911
Non-heated sampling pipe to +1800 °C, Al-Oxide	0600 7805



testo 360: Typical set for service and adjustment

A notebook is required for the operation of the testo 360!	
testo 360-3 analyzer, approved, without notebook, fitted with O2 gas sensor, gas preparation, housing heating	0563 3600
NO gas sensor	0440 0068
NO2 gas sensor	0440 0069
CO gas sensor (with CO flushing)	0440 0065
CO2 gas sensor (incl. absolute pressure measurement)	0440 0084
Basic software	0554 0364
Automatic software	0554 0378
Analysis software	0554 0380
Heated gas sampling hose, 4 m long	0401 0399
Hose filter insert	0554 0393
Trolley	0554 3600
Transport case	0516 0360
Heated handle	0600 7920
Heated sampling pipe	0600 7820
Extension pipe to +600 °C, stainless steel 1.4571	0600 7802
Preliminary filter for dusty flue gases, ceramic	0554 0710
Mounting flange, stainless steel 1.4571	0554 0760
Transport case for industrial probes, aluminium	0516 7900



testo 360: Typical set for research and development

A notebook is required for the operation of the testo 360!	
testo 360-3 analyzer, approved, without notebook, fitted with O2 gas sensor, gas preparation, housing heating	0563 3600
NO gas sensor	0440 0068
NO2 gas sensor	0440 0069
CO gas sensor (with CO flushing)	0440 0065
CO2 gas sensor (incl. absolute pressure measurement)	0440 0084
SO2 gas sensor	0440 0070
HC gas sensor	0440 0099
Measuring range extension (gas dilution)	0440 0059
Flue gas moisture measurement to determine water level	0440 0063
Manual flow velocity measurement (deltaP measurement) with Pitot tube	0440 0016
Basic software	0554 0364
Heated gas sampling hose, 4 m long	0401 0399
Hose filter insert	0554 0393
Trolley	0554 3600
Transport case	0516 0360
Heated handle	0600 7920
Heated sampling pipe	0600 7820
Extension pipe to +600 °C, stainless steel 1.4571	0600 7802
Preliminary filter for dusty flue gases, ceramic	0554 0710
Mounting flange, stainless steel 1.4571	0554 0760
Transport case for industrial probes, aluminium	0516 7900

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Technical data

General measuring ranges

In testo 360 the measuring range end value is determined by the choice of test gases. Example: CO desired measuring range up to 300 ppm => test gas concentration approx. 240-260 ppm (approx. 80 % of measuring range end value). However, the recording of measurement values over the measuring range thus defined is possible.

Parameter	Greatest measuring range	Greatest measuring range with measuring range extension	Permitted accuracy at 6 m gas path ¹⁾	Accuracy achieved in the test DIN 33962 ¹⁾	Adjustment time t ₉₀
0 ₂	0 to +21 Vol. % O ₂	0 to 21 Vol. % O ₂	<5% of MR end value	≤ 1.2 % of MR end value	30 sec.
NO	0 to +3000 ppm NO 0 to +6160 mg/m ³ NO	0.1 to 6.0 Vol. % NO	<5% of MR end value	\leq 2.8 % of MR end value	30 sec.
NO ₂	0 to +500 ppm NO ₂ 0 to +1030 mg/m ³ NO ₂	0.1 to 1.0 Vol. % NO ₂	<5% of MR end value	\leq 1.0 % of MR end value	80 sec.
NO _X (NO+NO ₂)	0 to +3500 ppm NO _x 0 to +7190 mg/m ³ NO _x	0.1 to 7.0 Vol. % NO _X	<5% of MR end value	\leq 3.8 % of MR end value	-
SO ₂	0 to +5000 ppm SO ₂ 0 to +14650 mg/m ³ SO ₂	0.1 to 10.0 Vol. % SO ₂	<5% of MR end value	\leq 2.5% of MR end value	70 sec.
CO ₂	0 to +25 Vol. % CO ₂	0.1 to 100 Vol. % CO ₂	<5% of MR end value	-	20sec.
with integr. absolute pressure measurement	+40 to +1200 hPa	+400 to +1200 hPa	$\leq \pm 14$ hPa (+40 to +1200 hPa)	-	-
CO	0 to +10000 ppm CO 0 to +12560 mg/m ³ CO	0.1 to 20 Vol. % CO	<5% of MR end value	\leq 2.0 % of MR end value*	60 sec.
Exhaust gas humidity	+2 to +31 %H ₂ O +15 to +70 °C td	-	\leq 4 Vol. % H ₂ O absolute	-	30 sec.
Temperature FT	-40 to +1200 °C	-	≤ 0.5 °C (0 to +100 °C) 0.5% of mv (> 100 °C)	-	≤ 180 sec. (t ₉₈) ≤ 100 sec. (t ₉₈)
Flow velocity calculated from pressure difference	+5 to +40 m/s 0 to +50 hPa	-	≤ 1.5 m/s (at +200 °C FT and 950 hPa (absolute pressure) ≤ 0.05 hPa plus 1 % of meas. value*	-	2 sec.

¹⁾ All accuracies stated without the option "measuring range extension". With measuring range extension, a fixed value of ±2 % must be added.

Parameter HC	Smallest measuring range	Largest measuring range	Accuracy	Resolution	Min. O2 requirememt in exhaust gas	Reaction time t90	Response factor ³⁾
Methane	80 to 3000 ppm (explosion threshold)	to 5 % (= lower explosion threshold)	<10 % of MREV	0.001 Vol. % = 10 ppm	2 % + (2 x m.v. methane)	20sec.	1
Propane	80 to 3000 ppm (explosion threshold)	to 2.1 % (= lower explosion threshold)	<10 % of MREV	0.001 Vol. % = 10 ppm	2 % + (5 x m.v. propane)	20sec.	1.5
Butane	80 to 3000 ppm (explosion threshold)	to 1.8 % (= lower explosion threshold)	<10 % of MREV	0.001 Vol. % = 10 ppm	2 % + (6.5 x m.v. butane)	20sec.	2

²⁾ Lower explosion limit (LEL) must be observed.

³⁾ The HC module is adjusted to methane in the factory. It can be adjusted to another gas by the user.

Technical data from suitability tests

Suitable for the measurement of the parameters below in exhaust gas in systems according to TI air, 13. BImSchV (large furnace systems) and 17. BImSchV (waste combustion systems).

Time change during the maintenance interval

Parameter	Max. measuring range acc. t suitability test	o Smallest tested measuring range	Parameter	Zero point	Reference point
0 ₂	0 to +21 Vol. % O ₂	0 to +21 Vol. % O ₂	CO	< 0.1 %	< +3.1 %
СО	0 to 3750 mg/m ³ 0 to 3000 ppm	0 to 75 mg/m ³ 0 to 60 ppm	SO ₂	< +0.3 %	< -1.1 %
NO	0 to 2055 mg/m ³ 0 to 1000 ppm	0 to 300 mg/m ³ 0 to 146 ppm	NO	< 0.1 %	< 2.0 %
NO ₂	0 to 410 mg/m ³ 0 to 200 ppm	0 to 100 mg/m ³ 0 to 49 ppm	NO ₂	< +1.3 %	< +1.2 %
SO ₂	0 to 4410 mg/m ³ 0 to 1500 ppm	0 to 75 mg/m ³ 0 to 26 ppm	02	< 0.02 Vol. %	< 0.02 Vol. %
Availability:	:	96.1 % for all components	Time change of	zero point	
Maintenance interval: 14		14 days (in constant operation)	and sensitivity:		<2 % of target value
Proof limit: C (mean values, of display ranges) 0,		CO: 0.92 % NO : 0.04 %	Adjustment time	• t ₉₀ :	maximum 30 seconds
		: 0.01 Vol %, NO: 0.24 %, SO ₂ : 2.1 % Cross-se		Cross-sensitivity (to CO_2 , NO, NO ₂ , HCL, SO ₂ , CH ₄ , NH ₃ and H ₂ O in percent of display range): (1.3 % reading	
Influence of barometric air pressure changes on the measurement signal Test gas flow: no		no influence	Discrepancy of current/target value of instrument characteristic curve:		
Permitted ambient temperature: -20 °C		-20 °C to +50 °C	Reproduceability: NO: R = 56; SO.,:		NO: $R = 56$; SO ₂ : $R = 92$ (70*)
Temperature dependency of zero point:		0%	O_2 : R = 434; NO_2 :		O_2 . n = 434; NO ₂ : N = 61; OO: 111 (69")
Temperature dependency of sensitivity:		maximum 2.8 %	* Note: Measuring range 17. BImSchV		

Pressure measurement for service and adjustment work

testo 312-2/-3

121293

The versatile testo 312-3 pressure meter facilitates load and gas-tightness tests on gas and water pipelines up to 6000 hPa (6 bar), fuel pressure measurements on stationary gas motors, vacuum or differential pressure measurement in motor suction pipes.

Use the testo 312-2 precision manometer to check flue gas draught, differential pressure in the combustion chamber compared with ambient pressure or gas flow pressure with high resolution. Fine pressures with a resolution of 0.01 hPa can be measured in the range from 0 to 40 hPa.

testo 312-2

protocol

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Up to 40/200 hPa

Part no. 0632 0313

Printers and Accessories

Precision manometer up to 40/200

hPa, DVGW approval, incl. alarm

display, battery and calibration

- Switchable measuring ranges, ideal resolution
- Compensation of reading deviations caused by temperature
- Alarm display when user defined limit values are exceeded
- Clear display with time

testo 312-3

protocol

Up to 300/600 hPa

Part no. 0632 0314

Versatile pressure meter up to

300/6000 hPa, DVGW approval, incl.

alarm display, battery and calibration

Part no.

Testo fast printer with wireless infrared interface, 1 roll thermal paper and 4 AA batteries	0554 0549
Spare thermal paper for printer (6 rolls)	0554 0569
Spare thermal paper for printer (6 rolls), permanent ink, measurement data documentation legible for up to 10 years	0554 0568
Additional Accessories and Spare Parts	Part no.
9V rech. battery for instrument, instead of battery	0515 0025
Recharger for 9V rechargeable battery, for external recharging of 0515 0025 battery	0554 0025
Transport and Protection	Part no.
TopSafe (protection case), with bench stand, protects instrument from dirt and impact	0516 0443
Case, for secure storage of measuring instrument	0516 0191
Transport case (plastic), for transport and secure storage of measuring instrument and accessories	0516 3120

Technical data	testo 312-2	
Meas. range	-40 to +40 hPa	-200 to +200 hPa
Accuracy ±1 digit	±1.5% of mv. (+3 to +40 hPa) ±0.03 hPa (0 to +3 hPa)	±0.5 hPa (0 to +50 hPa) ±2 hPa (+50 to +200 hPa)
Resolution	0.01 hPa	0.1 hPa
Overload	±1000 hPa	±1000 hPa
Technical data	testo 312-3	
Meas. range	-300 to +300 hPa	-6000 to +6000 hPa
Accuracy ±1 digit	±0.5 hPa (0 to +50 hPa) ±1.5 hPa (+50 to +300 hPa)	±2% of mv. (+400 to +2000 hPa) ±4% of mv. (+2000 to +6000 hPa) ±4 hPa (0 to +400 hPa)
Resolution	0.1 hPa	1 hPa
Overload	±8000 hPa	±8000 hPa
Common data	testo 312-2/-3	
Dimensions	215 x 68 x 47 mm	
Weight	300 g	



Pressure measurement

Suitable probes at a gian	ce	ran no.
Pressure set with flue draught probe, consisting of: $2 \times$ silicone hoses Ø 4 mm and Ø 6 mm respectively, 4 mm and 6 mm T-piece, connection piece		0554 3150
	215 mm	
	Ø 5 mm	

Flexible fiberscope for fast diagnoses

testo 319

The testo 319 fibre-glass fiberscope facilitates easy inspections at difficult-to-access points.

Highly flexible with a bending radius of only 50 mm and a diameter of only 6mm, with middle flexibility or stiff; extraordinarily versatile applications thanks to different, push-on casings.

- Optics: 6,000 pixels with a field of view of 50°
- Low bending radius (50 mm), small diameter (6 mm)
- Stability thanks to Decabon pipe
- · Gooseneck casing for medium flexibility
- 3-arm gripper: Grips small objects (optional)



LED light, high contrast display



Inspects air duct, with gooseneck casing, middle flexibility

testo 319

testo 319 fiberscope

Part no. 0632 3191

testo 319 set

Fiberscope set, consisting of testo 319 fiberscope, gooseneck tube, magnet and mirror attachments, bag

Technical data 6,000 No. of pixels Fibre-optic field of view: 50° 45° +/- 5° Angle of field of view: Min. focus distance: 15 mm (close) 150 mm (light) Max. focus distance:

Part no. 0563 3191

Non-contact temperature measurement – With laser sighting

testo 830-T1

Fast and versatile infrared thermometer with 1 point laser sighting

- 10:1 optics
- Backlit display
- Audible/optical alarm
- Adjustable emissivity 0.2 to 1.0

testo 830-T1

Part no. 0560 8301

Technical data

Meas. range

Accuracy

Resolution

Oper. temp.

Dimensions

Storage temp.

±1 digit

Infrared thermometer with 1 point laser sighting, adjustable limit values and alarm function, incl. batteries

Infrared thermometer

±1.5 °C or 1.5 % of mv (+0.1 to

±2 °C or ±2 % of mv (-30 to 0 °C)

-30 to +400 °C

+400 °C)

0.5 °C

-20 to +50 °C

-40 to +70 °C

190 x 75 x 38 mm

testo 830-T2

In addition, testo 830-T2 has a 2 point laser sighting and a socket for an external probe for contact measurement.

• 12:1 optics

testo 830-T2

probes, incl. batteries

Part no. 0560 8302

Battery type

Battery life

Weight

• Emissivity with external T/C probe

Infrared thermometer with 2-point laser

-50 to +500 °C

0.1 °C

±0.5 °C +0.5% of mv

15 h

200 g

Contact measurement (type K)

9V block battery

sighting, adjustable limit values, alarm

function and connection of external

830-T2, 2 point laser sighting (real measurement point)

830-T2, connection

option for an external

Accessories Ordering data

0602 0393

instrument, including belt holder

Part no. 0516 8302

Leather case to protect measuring

Type K

Part no.

probe

Fast-action surface probe with sprung thermocouple strip, also for uneven surfaces, measurement range short-term to +500°C, TC





Temperature spot check on technical systems

testo 830-T2 Set

Measuring instrument, fast-action surface probe for contact meas. and leather protection case

Part no. 0563 8302





Notes

Notes



testo



At Your Service!

Please send for more information:

Monitoring Instruments for Food Production, Transport and Storage	Measuring Instruments For Temperature
Measurement Engineering for Restaurants, Catering and	Measuring Instruments for Humidity
Supermarkets	Measuring Instruments For Velocity
Measurement Engineering for Air Conditioning and Ventilation	Measuring Instruments for Pressure and Refrigeration
Measurement Engineering for Heating and Installation	Multi-Function Measuring Instruments
Measurement Solutions for Emissions, Service and Thermal Processes	Measuring Instruments for Flue Gas and Emissions
	Measuring Instruments for RPM, Analysis, Current/Voltage
Measurement Solutions for Refrigeration Technology	Measuring Instruments For Indoor Air Quality, Light And Sound
Stationary Measurement Solutions for Air Conditioning, Drying, Cleanrooms and Compressed Air	Stationary Measurement Technology Humidity / Differential Pressure / Temperature / Process Displays
Measurement Solutions for Production, Quality Control and Maintenance	Stationary Measurement Technology Compressed Air Humidity / Compressed Air Consumption
Measurement Solutions for Climate Applications in Industry	
Reference Measurement Technology for Industry	





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- 50 years' experience, more than one million measuring instruments in use
- DIN EN ISO 9001 certification
- Worldwide presence and accessibility

More user-friendliness with

 Uncomplicated and fast exchange of wearing parts such as batteries, rechargeable batteries, gas sensors