

We measure it.



## Flue gas analysis – brilliantly easy: testo 350

– the first flue gas analyzer that thinks ahead



## The new flue gas analyzer testo 350 offers advantages and real benefits – as you can see!

- Innovative: The application-guided operation with helpful instrument pre-settings
- Elegant and clear: The large colour graphic display
- Robust design: The sealed housing makes the testo 350 insensitive to knocks and dirt
- Cost and time-savings: The new service concept offers fast access to wearing parts

3

### Analyzer box

robust, stable housing with integrated rubber edges, protects the sensors, pumps, analysis and memory electronics

The status display shows the current operational status, visible from a distance

1

### Control Unit

controls the analyzer box and displays the measurement values

2

### Colour graphic display

innovative operating convenience thanks to an easy, clear menu structure

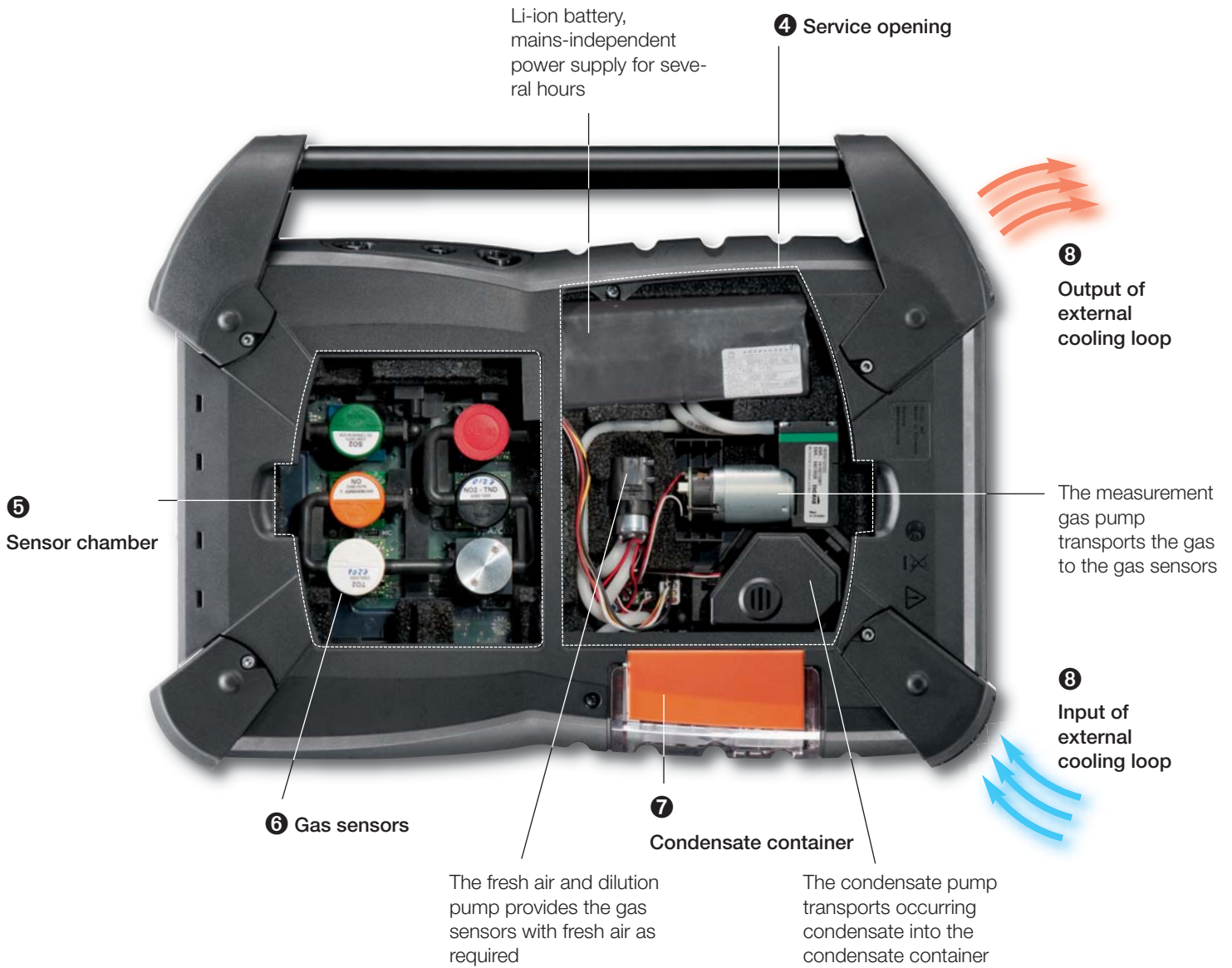
The connections are of industrial standard thanks to new, mechanically robust connection sockets



The dirt filters are easily accessible and can be changed without the use of tools



## The new flue gas analyzer testo 350 offers insights and creates transparency ...



Plug & play: Easy gas sensor replacement



Condensate container: Condensate container quickly and easily emptied

## testo 350 – Flue gas measurement at the highest level, thanks to:

### 4 Easily accessible service opening

The service opening in the underside of the instrument allows very easy access to all relevant service and wearing parts such as pumps and filters, which can then be quickly cleaned and/or exchanged on site. The advantages:

- ✓ Reduction of instrument unavailability due to service times.
- ✓ Cost savings due to instrument maintenance and/or exchange and cleaning of wearing parts by the user.
- ✓ Immediate access to all relevant wearing parts

### 5 Thermally separated sensor chamber

The sensor chamber is thermally separated from the other instrument components. This reduces possible sensor drifts caused by thermal influences.

This allows the maximum reliability of the measuring instrument to be achieved.

### 6 Easy exchange of the gas sensors

The gas sensors are pre-calibrated and can be exchanged, replaced or extended by further measurement parameters without test gas – if necessary directly at the measurement site.

- ✓ No more long service times
- ✓ Flexible extension of the testo 350 by further gas measurement parameters when applications or regulations change.
- ✓ A report is immediately issued when the NO sensor filter is used up. Then only the filter needs to be changed, and no longer the whole NO sensor.

### 7 Automatically monitored condensate trap

The automatic monitoring of filling level reports when the condensate container needs to be emptied, and a few minutes after the report, the measurement gas pump is automatically stopped. This provides the highest protection of the analyzer box and the gas sensors from damage by condensate entry.

### 8 External cooling loop

Closed cooling loops isolate the instrument electronics and sensors from the ambient air. The interior of the instrument is cooled via a heat exchanger and therefore does not come into contact with dirty or aggressive ambient air.

- ✓ Damage to the internal electronics are thus effectively prevented.
- ✓ The instrument can also be safely used in dusty or dirty atmospheres

### Further advantages...

#### Diagnosis function – integrated and intelligent

The testo 350 has a number of instrument diagnosis functions. Error reports are issued in clear text, and are thus easily understandable. The current status of the flue gas analyzer is constantly displayed.

This guarantees:

- ✓ Low downtimes thanks to early warning reports, for example when gas sensors are spent.
- ✓ No false measurements due to faulty instrument components.
- ✓ Better planning of measurement work
- ✓ More reliability in emission measurement and up-to-date information on the instrument status.

#### Automatic zeroing of the pressure sensor

This option allows volume and mass flow velocity to be measured without supervision over a longer period of time and parallel to the emission measurement. The pressure sensor is automatically zeroed at regular intervals. This avoids the typical drift of the pressure sensor when ambient conditions change.

#### Gas sensor zeroing

When the instrument is switched on, or manually if needed, the gas sensors are zeroed with ambient air. In the testo 350, this procedure is already completed in 30 seconds. This means that fast availability with tested and zeroed gas sensors is always guaranteed.



Filters can be easily exchanged without tools



Service opening with easy access to wearing parts



Continuous condensate drain-off for long-term measurements



Control unit connections

# Flue gas analysis – brilliantly easy: testo 350, the only one that thinks ahead!

The portable flue gas analyzer testo 350 is the ideal tool for professional flue gas analysis. Helpful instrument settings guide the user safely through typical measurement tasks such as:

- ✓ Flue gas analysis in commissioning, setting, optimization or operational measurements on industrial burners, stationary industrial engines, gas turbines and flue gas purification systems.
- ✓ Control and monitoring of officially prescribed emission limits in exhaust gas.
- ✓ Function testing of stationary emission measuring instruments.
- ✓ Control and monitoring of defined gas atmospheres in furnace rooms or kilns in different processes.

## 1 Control unit – small and convenient

The control unit is the operating and display unit of the testo 350. It can be removed and equipped as standard with a Li-ion rechargeable battery. All settings are carried out using the cursor button. The presentation of the measurement values takes place via the colour graphic display. Thanks to the internal memory, measurement data can be transferred from the analyzer box to the control unit. If required by the measurement, several analyzer boxes can conveniently be operated and controlled using one control unit

### The advantages of the testo 350 control unit:

- ✓ Operation of the analyzer box and transfer of the measurement data even when the flue gas pipe and the adjustment site are separated, especially helpful for industrial burners, for example.
- ✓ Measurement data can be transferred from the analyzer box to the control unit. This means the analyzer box can remain at the measurement site for further measurements, and the control unit taken away in order to process the measurement data.
- ✓ In order to protect the display in measurements over a longer period or during transport to different measurement sites in a system, the control unit can be attached to the analyzer box face-down.

## 2 Large colour graphic display with application-specific menu

The following measurement objects are available:

- Burner
- Gas turbine
- Engines (Select  $\lambda > 1$  or  $\lambda \leq 1$  regulated industrial engines)
- User-defined.



Control unit is simply clicked in



Control unit turned over: safe transport to the measurement site

Typical fuels, a practicable order of the exhaust gas parameters in the display, the corresponding calculations as well as useful instrument pre-settings, are stored under each of these measurement objects. Examples of these are the activation of the dilution in measurements on  $\lambda \leq 1$  regulated industrial engines and gas turbines, or the testing of the relevant gas sensor in the dilution slot.

### The advantages of the application-specific menu

- ✓ Information in the display guides the user through the menu.
- ✓ Easy operation without previous knowledge of the instrument
- ✓ Reduction of the work steps before the start of the measurement.

## 3 Analyzer box – industrial standard, robust and reliable

In the analyzer box are the gas sensors, the measurement gas and rinsing pumps, the Peltier gas preparation (optional), gas paths, filters, analysis and storage electronics as well as the mains unit and the Li-ion battery.

The robust housing has built-in impact protection (specially constructed X-shaped rubber edges), allowing the analyzer box to be used in tough conditions. Downtimes due to dirt in the instrument are almost completely eliminated by intelligent design and robustness. Inherently sealed chambers protect the interior of the instrument from dirt from the surroundings. Operation can be carried out with the control unit or in direct connection with a PC or notebook (USB, Bluetooth® 2.0 oder CANCase). The analyzer box can, after programming, independently carry out measurements and store measurement data.

The plug-in connections for the probes and bus cables are locked by bayonet fittings, and therefore securely connected to the analyzer box. This prevents unintentional removal, avoiding false measurements.

### The advantages of the analyzer box

- ✓ Special chambers offer comprehensive protection for the sensors and electronics from dust and deposits.



Robust flue gas analyzer for industrial use, even under the toughest conditions



**Ideal order suggestion for emission measurement on industrial engines**

	<b>Part no.</b>
testo 350 Control Unit	0632 3511
Option BLUETOOTH® wireless transmission	
testo 350 Analyzer box	0632 3510
Option CO (H <sub>2</sub> -compensated) sensor, 0 to 10000 ppm	
Option NO sensor, 0 to 4000 ppm, resolution 1 ppm	
Option NO <sub>2</sub> sensor, 0 to 500 ppm, resolution 0.1 ppm	
Option CxHy sensor (Pellistor)	
Option Peltier gas preparation incl. hose pump	
Option BLUETOOTH® wireless transmission	
Option fresh air valve for long-term measurement, incl. measuring range extension with dilution factor 5 for all sensors	
Option measuring range extension for individual slot with the following selectable dilution factors: 0, 2, 5, 10, 20, 40	
Flue gas probe for industrial engines, probe shaft length 335 mm, incl. cone, heat protection shield, special hose for NO <sub>2</sub> -/SO <sub>2</sub> measurement, Tmax probe shaft 1000 °C, hose length 2.2 m	0600 7550
Set BLUETOOTH® printer with wireless Bluetooth interface, incl. 1 roll of thermal paper, rech. battery, mains unit	0554 0553
easyEmission software	0554 3334
100-240 V AC / 6.3 V DC international mains unit	0554 1096
Transport case for safe and tidy storage for flue gas analyzer testo 350, gas sampling probe and accessories, dimensions 570 x 470 x 210 mm (LxWxH)	0516 3510

**Ideal order suggestion for emission measurement on burners**

	<b>Part no.</b>
testo 350 Control Unit	0632 3511
Option BLUETOOTH® wireless transmission	
testo 350 Analyzer box	0632 3510
Option CO (H <sub>2</sub> -compensated) sensor, 0 to 10000 ppm resolution 1 ppm)	
Option NO sensor, 0 to 4000 ppm, resolution 1 ppm	
Option NO <sub>2</sub> sensor, 0 to 500 ppm, resolution 0.1 ppm	
Option SO <sub>2</sub> sensor, 0 to 5000 ppm, resolution 1 ppm	
Option Peltier gas preparation incl. hose pump	
Option BLUETOOTH® wireless transmission	
Option measuring range extension for individual slot with the following selectable dilution factors: 0, 2, 5, 10, 20, 40	
Gas sampling probe, modular, incl. special hose for NO <sub>2</sub> -/SO <sub>2</sub> measurement, cone, thermocouple NiCr-Ni (Ti), probe shaft length 335 mm, Tmax probe shaft 1000 °C, hose length 2.2 m	0600 8764
100-240 V AC / 6.3 V DC international mains unit	0554 1096
Transport case for safe and tidy storage for flue gas analyzer testo 350, gas sampling probe and accessories, dimensions 570 x 470 x 210 mm (LxWxH)	0516 3510



### Advantages in emission measurement on industrial engines

#### ✓ Highly accurate NOx measurement

The testo 350 allows the separate measurement of NO and NO<sub>2</sub>. The high and fluctuating NO<sub>2</sub> components in engine exhaust gas make this measurement necessary, in order to display the real NOx value of the engine. In addition to this, the integrated gas preparation and the exhaust gas probe with a special hose provide protection from NO<sub>2</sub> and SO<sub>2</sub> absorption.

#### ✓ Automatic measurement range extension for unexpectedly high CO concentrations

In measurements on unfamiliar systems, or under less than ideal operating conditions, unexpectedly high emission values (e.g. CO concentrations up to 50,000 ppm) can occur. In these cases, the measurement range extension is automatically activated. This means maximum sensor life. These useful pre-settings are already stored application-specifically in the instrument – the testo 350 thinks ahead!

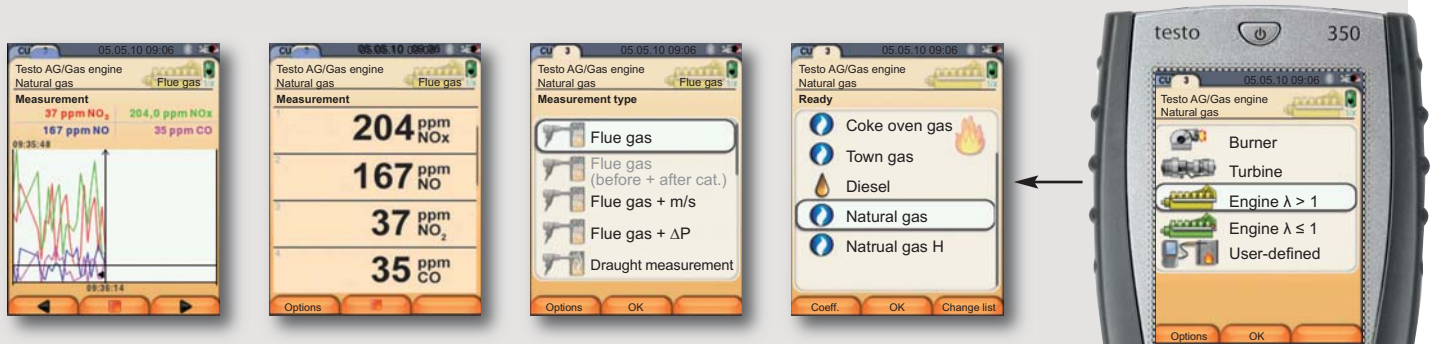
#### ✓ Special instrument menu for the testing of exhaust gas preparation systems

This exhaust gas menu allows the simultaneous measurement of exhaust gas concentrations before and after the catalytic converter. For this purpose, two analyzer boxes are connected to each other with the Testo databus cable. The measurement values of the two analyzer boxes are shown parallel to each other in the control unit's display, enabling a fast overview of the status of the converter.

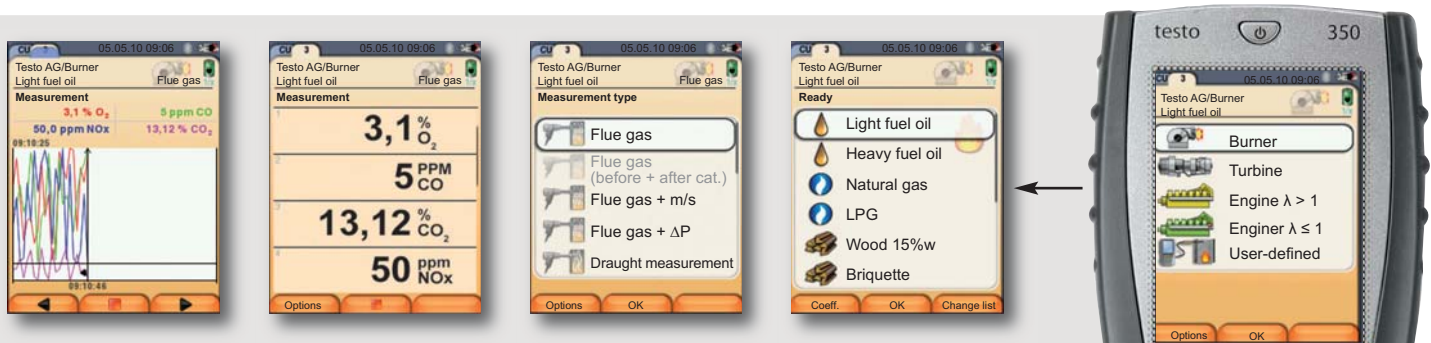
#### ✓ Spatial distances

For greater distances between the gas sampling site and the adjustment site, the control unit can be connected with the analyzer box either via the Testo databus cable or by Bluetooth®

## testo 350: Flue gas analysis



5. Documentation ← 4. Start measurement ← 3. Exhaust gas selection ← 2. Fuel selection ← 1. Application selection



### Advantages in emission measurement on burners

#### ✓ High availability even under difficult conditions

The instrument diagnosis as well as warning reports in clear text inform the user of the current status of the flue gas analyzer. The large service opening in the testo 350 provides easy access to all relevant wearing parts such as sensors, filters and pumps. This means they can be quickly and easily cleaned or exchanged on site. The pre-calibrated sensors allow the exchange of sensors without test gas.

#### ✓ High measurement accuracy even in unsupervised measurements

The integrated gas preparation prevents condensate from entering the measuring instrument and damaging it. Condensate which occurs is automatically pumped off by a peristaltic pump. In addition to this, the gas preparation and the PTFE hose in the gas sampling probe avoid NO<sub>2</sub> and SO<sub>2</sub> absorption. This makes highly accurate measurements possible.

#### ✓ Helpful instrument pre-settings save time

Typical fuels, a practicable order of the exhaust gas parameters in the display as well as useful instrument pre-settings are stored under each application (selection list in display). Information in the display guides the user through the menu, previous familiarity with the instrument is not necessary. The testo 350 is ready for use after only a few minutes.

#### ✓ Unrestricted measurement at high concentrations

When commissioning burners and in measurements on unfamiliar systems, very high concentrations can take the user by surprise. In these cases, the automatic measuring range extension is activated.





### Advantages in emission measurement on gas turbines

#### ✓ Easy, precise test gas adjustment by the user

In order to fulfil the highest accuracy and comparability requirements, the testo 350 can, if needed, be adjusted using test gas on site.

#### ✓ Use under tough conditions

Special chambers and closed cooling loops isolate the instrument electronics and sensors from the ambient air. This means the sensor chamber is thermally separated from the other instrument components, and possible drift of the sensors due to thermal influences are reduced.

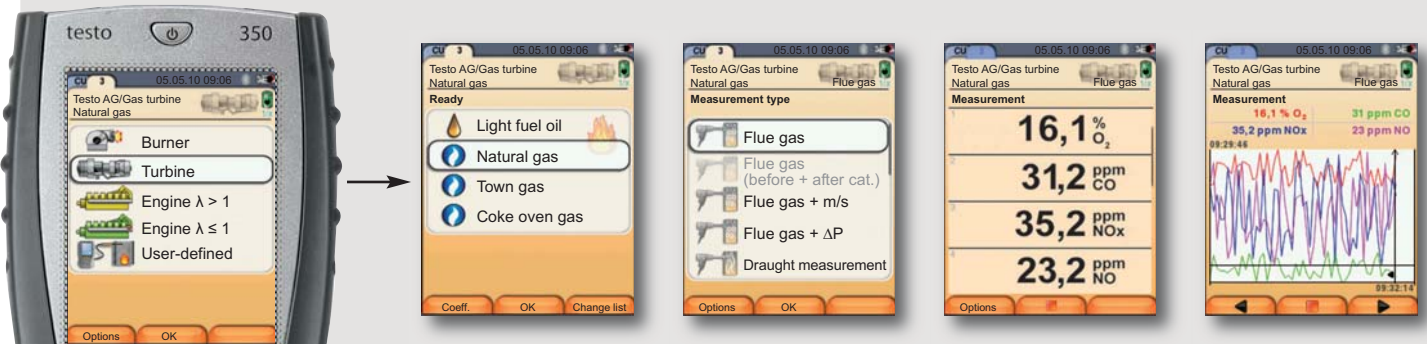
#### ✓ Highly accurate NOx measurements at low concentrations

Emission measurement during monitoring and adjustment work on Low-NOx gas turbines requires a very high level of measurement accuracy because of the low NO concentrations. Thanks to the combination of the NO<sub>2</sub> sensor and the special NOlow sensor with a resolution of 0.1 ppm, exactly these requirements are fulfilled. In addition to this, the integrated gas preparation and the special exhaust gas probe for industrial engines with a special hose provides protection from NO<sub>2</sub> absorption.

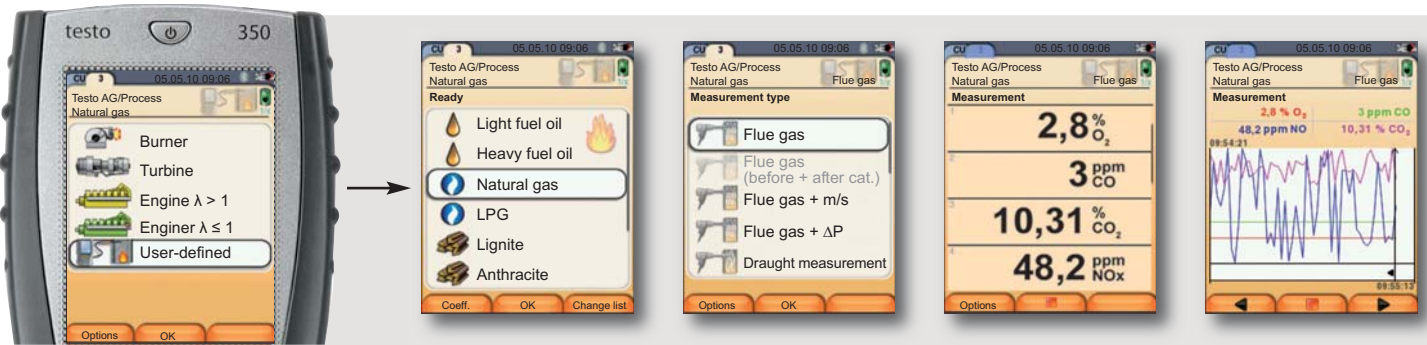
#### ✓ Combination of measuring range extension and COlow sensor

Thanks to the freely selectable dilution levels, concentrations of up to a maximum of 20,000 ppm can also be measured without any problems with the COlow sensor (measuring range 500 ppm).

## in only 5 steps



1. Application selection → 2. Fuel selection → 3. Exhaust gas selection → 4. Start measurement → 5. Documentation



### Advantages in emission measurement in thermal processes

#### ✓ Excellently suited to long-term measurements

Controlled by defined measurement procedures, processes/furnace cycles can be monitored and analyzed over several days. The testo 350 conducts the measurements and saves the data in its internal store. The control can also be carried out directly via a PC and the easyEmission software.

#### ✓ Simultaneous exhaust gas analysis at different measurement sites

In order to create a simultaneous profile of the furnace atmosphere and the combustion zones in large systems, up to 16 analyzer boxes can be connected with each other into a measurement system using the Testo databus cable. The control and operation can be carried out optionally either via the control unit or directly via a PC/notebook.

#### ✓ Ideal for measurements at high concentrations

Especially when recording extreme concentrations up to the % range, the measuring range extension is automatically activated. This allows the continuation of the measurement. The gas sensor is placed under no greater load than at low concentrations, a maximum sensor life is achieved – without additional costs for further gas sensors.

#### ✓ Industrial standard instrument functions for more security

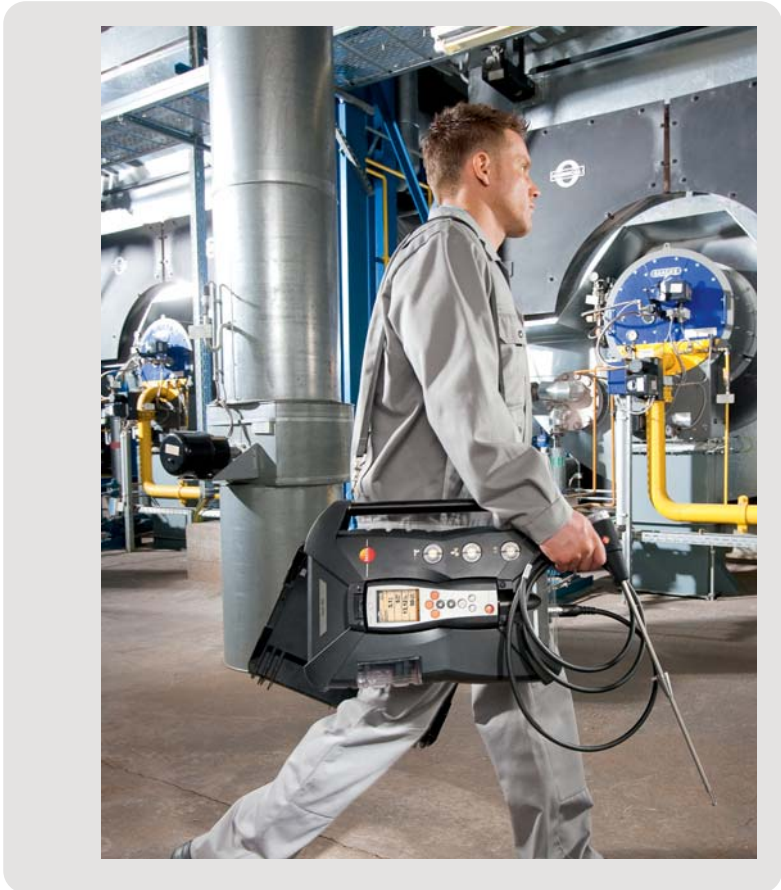
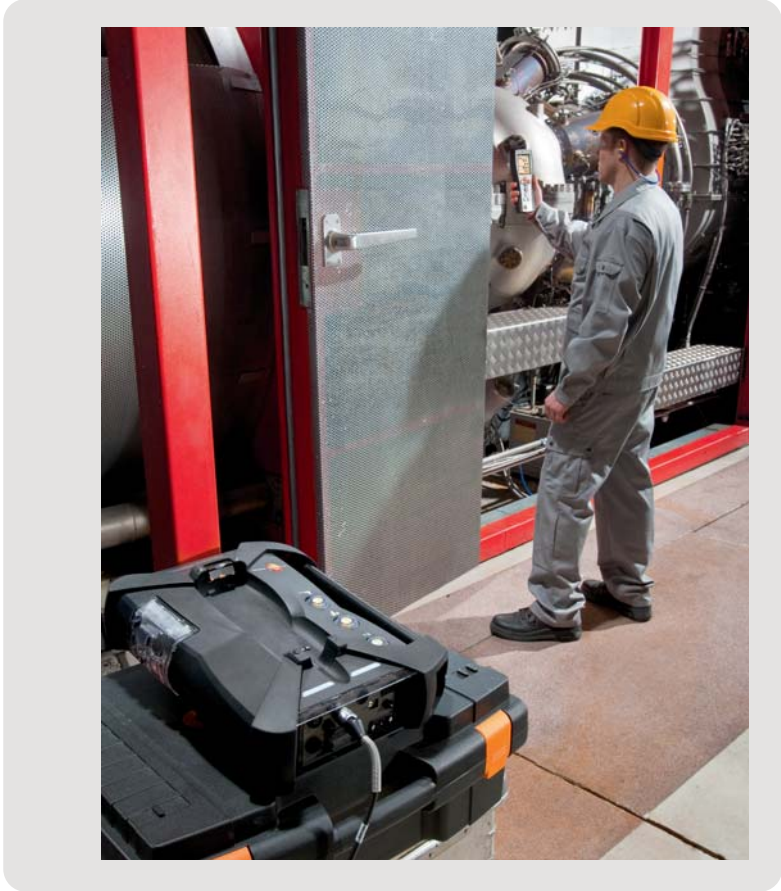
Inherently closed cooling loops isolate the instrument's electronics and sensor from the ambient air. This means using the testo 350 in dusty or dirty surroundings is no problem. The impact protection integrated into the housing protects the testo 350 from knocks and jars on the way to the measurement site.

#### Ideal order suggestion for emission measurement on gas turbines

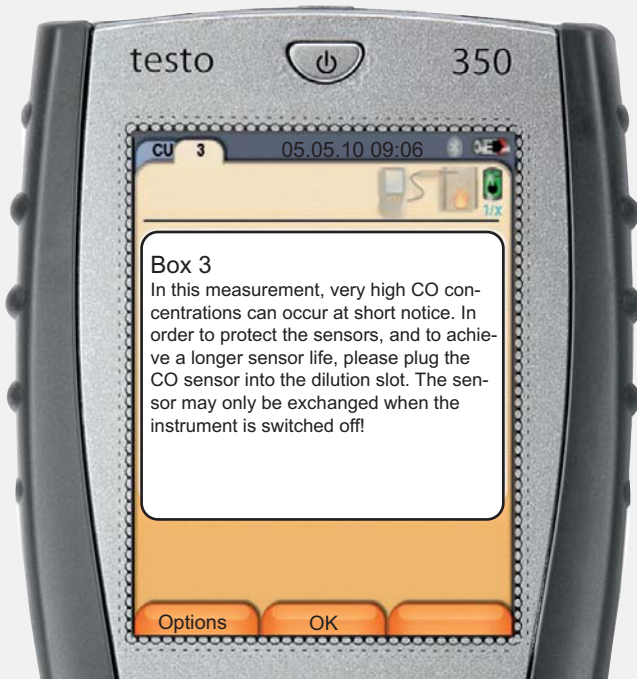
	<b>Part no.</b>
testo 350 Control Unit	0632 3511
Option BLUETOOTH® wireless transmission	
testo 350 Analyzer box	0632 3510
Option COlow (H <sub>2</sub> -compensated) sensor, 0 to 500 ppm, resolution 0.1 ppm	
Option NOlow-Sensor, 0 to 300 ppm, resolution 0.1 ppm	
Option NO <sub>2</sub> sensor, 0 to 500 ppm, resolution 0.1 ppm	
Option Peltier gas preparation incl. hose pump	
Option BLUETOOTH® wireless transmission	
Option fresh air valve for long-term measurement, incl. measuring range extension with dilution factor 5 for all sensors	
Option measuring range extension for individual slot with the following selectable dilution factors: 0, 2, 5, 10, 20, 40	
Flue gas probe for industrial engines, probe shaft length 335 mm, incl. cone, heat protection shield, special hose for NO <sub>2</sub> -/SO <sub>2</sub> measurement, Tmax probe shaft 1000 °C, hose length 2.2 m	0600 7550
100-240 V AC / 6.3 V DC international mains unit	0554 1096
Transport case for safe and tidy storage for flue gas analyzer testo 350, gas sampling probe and accessories, dimensions 570 x 470 x 210 mm (LxWxH)	0516 3510

#### Ideal order suggestion for emission measurement on thermal processes

	<b>Part no.</b>
testo 350 Control Unit	0632 3511
Option BLUETOOTH® wireless transmission	
testo 350 Analyzer box	0632 3510
Option CO (H <sub>2</sub> -compensated) sensor, 0 to 10000 ppm, resolution 1 ppm	
Option CO <sub>2</sub> (NDIR) sensor, 0 to 50 Vol %, resolution 0.01 Vol %, infrared measurement principle, incl. absolute pressure measurement, condensate container filling level monitoring and CO <sub>2</sub> absorption filter with filter pack	
Option NO sensor, 0 to 4000 ppm, resolution 1 ppm	
Option NO <sub>2</sub> sensor, 0 to 500 ppm, resolution 0.1 ppm	
Option Peltier gas preparation incl. hose pump	
Option BLUETOOTH® wireless transmission	
Gas sampling probe, modular, incl. special hose for NO <sub>2</sub> -/SO <sub>2</sub> measurement, cone, thermocouple NiCr-Ni (Ti), probe shaft length 335 mm, Tmax probe shaft 1000 °C, hose length 2.2 m	0600 8764
easyEmission software	0554 3334
100-240 V AC / 6.3 V DC international mains unit	0554 1096
Transport case for safe and tidy storage for flue gas analyzer testo 350, gas sampling probe and accessories, dimensions 570 x 470 x 210 mm (LxWxH)	0516 3510



## testo 350 facilitates emission measurements ...



Example of display of the control unit diagnosis function and information in clear text

### ... thanks to a colour display with graphic menu

- ✓ Step by step – Information in the display guides through the measurement, meaning no previous familiarity with the instrument is necessary
- ✓ Specific fuels are pre-set for the application
- ✓ Application-specific flue gas parameters are stored in the menu
- ✓ Instrument settings such as the dilution factor of gas sensors are activated by application
- ✓ Automatic testing of whether the relevant gas sensors are connected to the intended dilution slot
- ✓ Special measurement mode for the testing of catalytic converters with two flue gas analyzers
- ✓ Faster and easier analysis of the system status thanks to graphic and coloured presentation of the measurement values – a glance is enough!

### ... thanks to the instrument diagnosis

- ✓ Information on the current status of the flue gas analyzer testo 350 at any time
- ✓ Early warning reports of approaching replacement of wearing parts – to be on the safe side.

## Efficient emission measurements which are also cost-effective in the long term:

- Easy exchange of the gas sensor by the user.
- After a warning report from the flue gas analyzer, wearing parts can always be replaced in time.
- Probe shafts can be easily exchanged or replaced.
- Further gas measurement parameters can be added at any time. Simply order additional gas sensors, install, and measure safely.
- Thanks to the unique measuring range extension, measurements can be carried out flexibly with only one gas sensor.
- The cross-sensitivity filter of the NO sensor can be exchanged by the user after a report



Exchanging probe shaft

Replacing filter

## easyEmission software – convenient measurement data management

Using the "easyEmission" software, data can be read out, conveniently processed, archived and managed.

### Advantages of easyEmission

- ✓ Presentation of the measurement values as a table or a graph
- ✓ User-defined measurement intervals (from one measurement / second to one measurement / hour)
- ✓ Online measurement via BLUETOOTH® wireless transfer or by USB connection
- ✓ Customer and application-specific measurement protocols
- ✓ Data structure and measurement information are transferable from the PC/notebook to the instrument
- ✓ All instrument configurations and settings are easily carried out with easyEmission
- ✓ Direct export to Excel and PDF formats
- ✓ Easy implementation of individual formulas for the user's own calculations
- ✓ Calculation of fuel factors when using customer-specific fuels
- ✓ Control of the bus system with up to 16 flue gas analyzer boxes
- ✓ Implementation of individual cross-sensitivity adjustments of the gas sensors



## An overview of the testo 350 data interfaces

It is this easy to control measurements, read out, transfer and print measurement data! These data interfaces are selectable for easy communication and data transfer:


- **Bluetooth®**  
2.0 (up to 100 m without obstruction)
- **USB**
- **Infrared interface**  
(Communication with the Testo printer)
- **Testo databus**  
(up to 800m cable length) for the simultaneous operation of up to 16 analyzer boxes. Control optionally via PC, Testo databus controller or control unit.






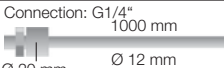
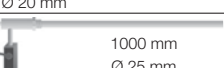
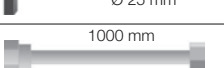



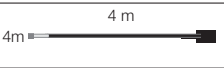

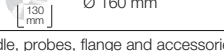

## Ordering data testo 350


testo 350 Control unit		Part no.
testo 350 Control Unit, displays measurement values and controls analyzer box, incl. rech. battery, measurement data store, USB interface and connection for Testo databus		0632 3511
testo 350 Option for control unit testo 350		
Option BLUETOOTH® wireless transmission		
testo 350 Accessories for control unit testo 350		
100-240 V AC / 6.3 V DC international mains unit		0554 1096
testo 350 analyzer box testo 350		Part no.
testo 350 analyzer box, equipped with O <sub>2</sub> , incl. differential pressure sensor, temperature probe input Type K NiCr-Ni and Type S Pt10Rh-Pt, connection Testo databus, rech. battery, integrated combustion air probe (NTC), trigger input, measurement data store, USB interface, updatable to max. 6 gas sensors selected from CO, COlow, NO, NOlow, NO <sub>2</sub> , SO <sub>2</sub> , CO <sub>2</sub> NDIR, CxHy, H <sub>2</sub> S		0632 3510
A second gas sensor must be installed in testo 350-S, otherwise the instrument is unable to function. Up to 5 additional sensors can be fitted.		
Option CO (H <sub>2</sub> -compensated) sensor, 0 to 10000 ppm, resolution 1 ppm		
Option COlow (H <sub>2</sub> -compensated) sensor, 0 to 500 ppm, resolution 0.1 ppm		
Option NO sensor, 0 to 4000 ppm, resolution 1 ppm		
Option NOlow sensor, 0 to 300 ppm, resolution 0.1 ppm		
Option NO <sub>2</sub> sensor, 0 to 500 ppm, resolution 0.1 ppm		
Option SO <sub>2</sub> sensor, 0 to 5000 ppm, resolution 1 ppm		
Option CO <sub>2</sub> (NDIR) sensor, 0 to 50 Vol %, resolution 0.01 Vol %, infrared measurement principle, incl. absolute pressure measurement, condensate container filling level monitoring and CO <sub>2</sub> absorption filter with filler pack. For long-term measurements > 15 minutes measurement time, the Peltier gas preparation is additionally recommended.		
Option CxHy sensor, methane 100 to 40000 ppm, propane 100 to 21000 ppm, butane 100 to 18000 ppm, resolution 10 ppm. Pellistor is adjusted to methane ex-works		
Option H <sub>2</sub> S sensor, 0 to 300 ppm, resolution 0.1 ppm		
Option BLUETOOTH® wireless transmission		
Option Peltier gas preparation incl. peristaltic pump for automatic condensate evacuation		
Option fresh air valve for long-term measurement, incl. measuring range extension with dilution factor 5 for all sensors. For measurements >2 hours, the option Peltier gas preparation is additionally recommended.		
Option measuring range extension for individual slot with the following selectable dilution factors: 0, 2, 5, 10, 20, 40		
Option DC voltage input 11V to 40V		
Option special gas pump for long-term measurements with extended guarantee. For measurements >2 hours, the option Peltier gas preparation is additionally recommended.		
Option automatic zeroing of pressure sensor for continuous flow velocity / differential pressure measurement		
Accessories testo 350 analyzer box and transport case Part no.		
Cable with battery terminals and adapter for connection to DC voltage input testo 350 analyzer box		0554 1337
Exchangeable filter NO sensor (1 off), blocks cross-gas SO <sub>2</sub>		0554 4150
Transport case for safe and tidy storage for flue gas analyzer testo 350, gas sampling probe and accessories, dimensions 570 x 470 210 mm (LxWxH) Carrying strap set for analyzer box testo 350		0516 3510
Carrying strap set for analyzer box testo 350		0554 0434
Spare dirt filter for analyzer box testo 350 (20 off)		0554 3381
Hose set to convey flue gas from analyzer box testo 350, length 5m		0554 0451
Wall holder for flue gas analyzer testo 350, lockable		0554 0203
Current/voltage cable (0 to 1000 mV, 0 to 10 V, 0 to 20 mA)		0554 0007
PC software and Testo databus		
Software "easyEmission", incl. USB connection cable instrument-PC. Functions: user-definable measuring intervals, transfer of readings to Microsoft EXCEL within seconds, user-definable fuels, representation of readings as table or graph, simple production of customer-specific measurement protocols etc.		0554 3334
Software "easyEmission", incl. Testo Databus Controller with USB-connection cable instrument-PC, cable for Testo databus. For example, if several Testo 350 flue gas analyzers are connected to the Testo databus, they can be controlled and read out via a PC (possible measurement interval in databus from 1 measurement per second)		0554 3336
Connection cable for Testo databus between Control Unit and analyzer box or between several analyzer boxes, with bayonet fitting, length 2 m		0449 0075
Connection cable for Testo databus between Control Unit and analyzer box or between several analyzer boxes, with bayonet fitting, length 5 m		0449 0076
Connection cable for Testo databus between Control Unit and analyzer box or between several analyzer boxes, with bayonet fitting, length 20 m		0449 0077
Other cable lengths up to 800 m on request		
Analog output box set, 6 channels, 4 to 20mA, for transfer of measurement values to e.g. analog recorder, set consists of analog output box, connection cable Testo databus, length 2 m, Testo databus input impedance.		0554 3149
Printers and accessories		
Testo fast printer with wireless infrared interface, 1 roll of thermal paper and 4 mignon batteries for printing readings out on site		0554 0549
Set BLUETOOTH® printer with wireless Bluetooth interface, incl. 1 roll of thermal paper, rech. battery and mains unit		0554 0553
Spare thermal paper for printer (6 rolls), permanent, measurement data documentation can be read for up to 10 years		0554 0568
Calibration certificates		
ISO calibration certificate flue gas, calibration points 2.5 Vol% O <sub>2</sub> 100 and 1000 ppm CO 800 ppm NO 80 ppm NO <sub>2</sub> 1000 ppm SO <sub>2</sub>		0520 0003
ISO calibration certificate flow velocity, hot wire/vane anemometer, Pitot tube; calibration points 1, 2, 5, 10 m/s		0520 0004
ISO calibration certificate flow velocity, hot wire/vane anemometer, Pitot tube; calibration points 5, 10, 15, 20 m/s		0520 0034

## Ordering data testo 350

Standard gas sampling probes	Part no.
<b>Modular flue gas probes, available in 2 lengths, incl. probe stop, NiCr-Ni thermocouple, 2.2 m hose and particle filter</b>	 Ø 8 mm
Gas sampling probe, modular, incl. special hose for NO <sub>2</sub> -/SO <sub>2</sub> measurement, cone, thermocouple NiCr-Ni (Ti), probe shaft length 335 mm, Tmax probe shaft 500°C, hose length 2.2 m	0600 9766
Gas sampling probe, modular, incl. special hose for NO <sub>2</sub> -/SO <sub>2</sub> measurement, cone, thermocouple NiCr-Ni (Ti), probe shaft length 335 mm, Tmax probe shaft 1000°C, hose length 2.2 m	0600 8764
Gas sampling probe with pre-filter, modular, incl. special hose for NO <sub>2</sub> -/SO <sub>2</sub> measurement, cone, thermocouple NiCr-Ni (Ti), probe shaft length 335 mm, Tmax probe shaft 1000°C, hose length 2.2 m, Ø pre-filter 14 mm	0600 8766
Gas sampling probe, modular, incl. special hose for NO <sub>2</sub> -/SO <sub>2</sub> measurement, cone, thermocouple NiCr-Ni (Ti), probe shaft length 700 mm, Tmax probe shaft 500°C, hose length 2.2 m	0600 9767
Gas sampling probe, modular, incl. special hose for NO <sub>2</sub> -/SO <sub>2</sub> measurement, cone, thermocouple NiCr-Ni (Ti), probe shaft length 700 mm, Tmax probe shaft 1000°C, hose length 2.2 m	0600 8765
Gas sampling probe with pre-filter, modular, incl. special hose for NO <sub>2</sub> -/SO <sub>2</sub> measurement, cone, thermocouple NiCr-Ni (Ti), probe shaft length 700 mm, Tmax probe shaft 1000°C, hose length 2.2 m, Ø pre-filter 14 mm	0600 8767

Accessories standard gas sampling probes	Part no.
Hose extension, length 2.8 m	0554 1202
Probe shaft with pre-filter, probe shaft length 335 mm, Tmax probe shaft 1000°C, Ø pre-filter 14 mm	0554 8766
Probe shaft with pre-filter, probe shaft length 700 mm, Tmax probe shaft 1000°C, Ø pre-filter 14 mm	0554 8767
Spare sintered filters (2)	0554 3372
Probe shaft, length 700 mm, Tmax probe shaft 500°C	0554 9767
Probe shaft, length 335 mm, Tmax probe shaft 1000°C	0554 8764
Probe shaft, length 700 mm, Tmax probe shaft 1000°C	0554 8765
Spare dirt filter for probe handle	0554 3385

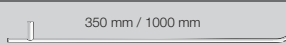
Industrial gas sampling probes – modular system	Part no.
Heated handle, voltage supply 115 to 230 V, 50/60Hz, temperature gas path > 180 °C, IP54, gas input G1/4", gas output M10x1 outer thread	 Power consumption: 200 watts; Temp. gas path: > 180 °C; Ready to operate: after approx. 20 min; Length of mains cable: 3 m; Protection class: IP54; Ambient temp.: -20 to +50 °C; gas inlet: G1/4"; gas outlet: M 10x1 outer thread; weight: 1.7 kg
Adapter, unheated, IP54, gas input G1/4", gas output M10x1 outer thread	 Ambient temp.: -20 to +50 °C; Protection class: IP54; Gas inlet: G1/4"; Gas outlet: M 10x1 outer thread; Weight: 0.4 kg
Unheated sampling probes +600 °C, stainless steel 1.4571, length 1 m	 Connection: G1/4" 1000 mm Weight: 400 g
Unheated sampling probe up to +1200 °C, Inconel 625, length 1 m	 Ø 20 mm Ø 12 mm Weight: 400 g
Unheated sampling probe up to +1800 °C, Al oxide, length 1 m	 Connection: G1/4" 1000 mm Weight: 400 g
Heated sampling probe, voltage supply 230 V / 50 Hz, stainless steel 1.4571, heating > 180°C, exhaust gas temperature max. +600 °C	 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
Extension shaft up to +600 °C, stainless steel 1.4571, length 1 m	 1000 mm Ø 12 mm Connection: Thread screw/screw socket G1/4"; Weight: 0.45 kg
Extension shaft up to +1200 °C, Inconel 625, length 1 m	 Ø 20 mm Ø 12 mm
Pre-filter for dusty flue gases, ceramic, dust load max. 20g/m <sup>3</sup> , filter pore size 20µm, temperature max. 1000 °C	 50 mm Ø 23 mm Dust load: max. 20 g / m <sup>3</sup> ; filter fineness: 20 µm; Temperature: max. 1000 °C; Material: ceramic; Connection: G1/4" thread nipple; Weight: 0.2 kg
Thermocouple, NiCr-Ni, -200 to +1200 °C, Inconel 625, 1.2 m long	 Ø 4 mm Connection: To analyser via 4 m connection cable with 8 pin plug; Weight: 0.15 kg.
Thermocouple, NiCr-Ni, -200 to +1200 °C, Inconel 625, 2.2 m long	 Ø 4 mm The length depends on the number of sampling and extension pipes used.
Special sampling hose for accurate NO <sub>2</sub> -/SO <sub>2</sub> - 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
Extension cable, length 5 m, between plug-in head cable and instrument	0409 0063
Mounting flange, stainless steel 1.4571, adjustable quick-action fitting, suitable for all sampling/extension pipes	 130 mm Ø 160 mm 0554 0760
Transport case for industrial probes, aluminium profile, space for: handle, probes, flange and accessories, dimensions 1270 x 320 x 140 mm (LxWxH)	0516 7900

Flue gas probes for industrial engines	Part no.
<b>Engine probes</b>	 Ø 8 mm Ø 14 mm
Flue gas probe for industrial engines, probe shaft length 335 mm, incl. cone, heat protection shield, special hose for NO <sub>2</sub> -/SO <sub>2</sub> measurement, Tmax probe shaft 1000 °C, hose length 2.2 m	0600 7550

Flue gas probe with pre-filter for industrial engines, probe shaft length 335 mm, incl. cone, heat protection shield, special hose for NO <sub>2</sub> -/SO <sub>2</sub> measurement, Tmax probe shaft 1000 °C, hose length 2.2 m	0600 7551
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Flue gas probe accessories for industrial engines	Part no.
Thermocouple for flue 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 flue gas temperature measurement, NiCr-Ni, length 400 mm, Tmax. +1000 °C with 5.2 m connection cable and additional temperature protection	0600 8895
Spare probe shaft with pre-filter for flue gas probe for industrial engines, probe shaft length 335 mm, Tmax probe shaft 1000°C	0554 7455

Temperature sensors	Part no.
Combustion air temperature probe, immersion depth 60 mm	0600 9797

Pitot tubes	Part no.
 350 mm / 1000 mm Ø 7 mm	
Pitot tube stainless steel, 350 mm long, for measurement of flow velocity	0554 2145
Pitot tube, 1000 mm long, stainless steel, measures flow velocity	0554 2345
Connection hose, silicon, length 5 m, load to maximum 700 hPa (mbar)	0554 0440
Straight Pitot tube, stainless steel, length 350 mm for measuring flow velocity, incl. temperature measurement, 3-fold hose (5 m length) and heat protection shield	0635 2041
Straight Pitot tube, stainless steel, length 750 mm for measuring flow velocity, incl. temperature measurement, 3-fold hose (5 m length) and heat protection shield	0635 2042

## Technical data Control Unit

	Control-Unit testo 350	Analog output box (mA Out)	
Oper. temp.	-5 to +45 °C	-5 to +45 °C	<p><b>Country permits BLUETOOTH® wireless transmission for flue gas analyzers testo 350</b></p> <p>The BLUETOOTH® wireless module used by Testo has permits for the following listed countries, and can only be used in those countries, i. e. BLUETOOTH® wireless transfer may not be used in any other country!</p> <p><b>Europe including all EU member states</b> Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and Turkey</p> <p><b>European countries (EFTA)</b> Iceland, Liechtenstein, Norway and Switzerland</p> <p><b>Non-European countries</b> Canada, USA, Japan, Ukraine, Australia, Colombia, El Salvador, Venezuela.</p>
Storage temp.	-20 to +50 °C	-20 to +50 °C	
Battery type	Li-Ionen	–	
Battery life	5 hh (without wireless connection)	–	
Memory	2 MB (250,000 measurement values)	–	
Weight	440 g	305 g	
Dimensions	88 x 38 x 220 mm	200 x 89 x 37 mm	
Warranty	2 years	3 years	
Protection class	IP 40	–	

## Technical data Analyzer box testo 350

	O <sub>2</sub> measurement	COlow meas. (H <sub>2</sub> compensated)*	COlow meas. (H <sub>2</sub> compensated)*	NO measurement	NOlow measurement	NO <sub>2</sub> measurement	SO <sub>2</sub> measurement	CO <sub>2</sub> meas. (IR)	H <sub>2</sub> S measurement
Meas. range	0 to +25 Vol. % O <sub>2</sub>	0 to +10000 ppm CO	0 to +500 ppm CO	0 to +4000 ppm NO	0 to +300 ppm NO	0 to +500 ppm NO <sub>2</sub>	0 to +5000 ppm SO <sub>2</sub>	0 to +50 Vol. % CO <sub>2</sub>	0 to +300 ppm H <sub>2</sub> S
Accuracy	±0.8% of fsv (0 to +25 Vol. % O <sub>2</sub> )	±5% of mv (+200 to +2000 ppm CO) ±10% of mv (+2001 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)	±5% of mv (+100 to +1999.9 ppm NO) ±10% of mv (+2000 to +4000 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 <sub>2</sub> ) ±5 ppm NO <sub>2</sub> (0 to +99.9 ppm NO <sub>2</sub> )	±5% of mv (+100 to +2000 ppm SO <sub>2</sub> ) ±10% of mv (+2001 to +5000 ppm SO <sub>2</sub> ) ±5 ppm SO <sub>2</sub> (0 to +99 ppm SO <sub>2</sub> )	±0.3 Vol. % CO <sub>2</sub> + 1% of mv (0 to 25 Vol. % CO <sub>2</sub> ) ±0.5 Vol. % CO <sub>2</sub> + 1.5% of mv (>25 to 50 Vol. % CO <sub>2</sub> )	±5% of mv (+40 to +300 ppm) ±2 ppm (0 to +39.9 ppm)
Resolution	0.01 Vol. % O <sub>2</sub> (0 to +25 Vol. % O <sub>2</sub> )	1 ppm CO (0 to +10000 ppm CO)	0.1 ppm CO (0 to +500 ppm CO)	1 ppm NO (0 to +3000 ppm NO)	0.1 ppm NO (0 to +300 ppm NO)	0.1 ppm NO <sub>2</sub> (0 to +500 ppm NO <sub>2</sub> )	1 ppm SO <sub>2</sub> (0 to +5000 ppm SO <sub>2</sub> )	0.01 Vol. % CO <sub>2</sub> (0 to 25 Vol. % CO <sub>2</sub> ) 0.1 Vol. % CO <sub>2</sub> (>25 Vol. % CO <sub>2</sub> )	0.1 ppm (0 to +300 ppm)
Reaction time	20 s	40 s	40 s	30 s	30 s	40 s	30 s	±10 s	35 s
Reaction type	t <sub>95</sub>	t <sub>90</sub>	t <sub>90</sub>	t <sub>90</sub>	t <sub>90</sub>	t <sub>90</sub>	t <sub>90</sub>	t <sub>90</sub>	t <sub>90</sub>

\* H2 display only as an indicator

## Individual dilution with selectable dilution factor (x2, x5, x10, x20, x40)

	CO (H <sub>2</sub> compensated)	COlow meas. (H <sub>2</sub> compensated)	NO measurement	NOlow measurement	SO <sub>2</sub> measurement	CxHy measurement
Meas. range	dilution factor-dependent	dilution factor-dependent	dilution factor-dependent	dilution factor-dependent	dilution factor-dependent	Methane: 100 to 40,000 ppm Propane: 100 to 21,000 ppm Butane: 100 to 18,000 ppm
Accuracy	±2 % of m.v. (additional error)	±2 % of m.v. (additional error)	±2 % of m.v. (additional error)	±2 % of m.v. (additional error)	±2 % of m.v. (additional error)	±2 % of m.v. (additional error)
Resolution	1 ppm	0.1 ppm	1 ppm	0.1 ppm	1 ppm	10 ppm

## Dilution of all sensors (Factor 5)

When dilution of all sensors is activated, the measurement values of O<sub>2</sub>, CO<sub>2</sub>-(IR) and CxHy are not shown in the display.

	CO (H <sub>2</sub> compensated)	COlow meas. (H <sub>2</sub> compensated)	NO measurement	NOlow measurement	SO <sub>2</sub> measurement	NO <sub>2</sub> measurement	H <sub>2</sub> S measurement
Meas. range	2500 to 50000 ppm	500 to 2500 ppm	1500 to 20000 ppm	300 to 1500 ppm	500 to 25000 ppm	500 to 2500 ppm	200 to 1500 ppm
Accuracy	±5 % of m.v. (additional error) Pressure range -100 to 0 mbar at probe tip	±5 % of m.v. (additional error) Pressure range -100 to 0 mbar at probe tip	±5 % of m.v. (additional error) Pressure range -100 to 0 mbar at probe tip	±5 % of m.v. (additional error) Pressure range -100 to 0 mbar at probe tip	±5 % of m.v. (additional error) Pressure range -100 to 0 mbar at probe tip	±5 % of m.v. (additional error) Pressure range -100 to 0 mbar at probe tip	±5 % of m.v. (additional error) Pressure range -100 to 0 mbar at probe tip
Resolution	1 ppm	0.1 ppm	1 ppm	0.1 ppm	1 ppm	0.1 ppm	0.1 ppm



## Technical data Analyzer box testo 350

	Degree of effectivity	Exhaust gas loss	CO <sub>2</sub> calculation	Differential pressure 1	Differential pressure 2	Flow velocity	Absolute pressurek (opt. if IR sensor equipped)	Flue gas dewpoint calculation
Meas. range	0 to +120 %	-20 to +99.9 % qA	0 to CO <sub>2</sub> max Vol. % CO <sub>2</sub>	-40 to +40 hPa	-200 to +200 hPa	0 to +40 m/s	-600 to +1150 hPa	0 to +99.9 °Ctd
Accuracy			Calculated from O <sub>2</sub> ±0.2 Vol. %	±1.5% of m.v. (-40 to -3 hPa) ±1.5% of m.v. (+3 to +40 hPa) ±0.03 hPa (-2.99 to +2.99 hPa)	±1.5% of m.v. (-200 to -50 hPa) ±1.5% of m.v. (+50 to +200 hPa) ±0.5 hPa (-49.9 to +49.9 hPa)		± 10 hPa	
Resolution	0.1 % (0 to +120 %)	0.1 % qA (-20 to +99.9 % qA)	0.01 Vol. % CO <sub>2</sub>	0.01 hPa (-40 to +40 hPa)	0.1 hPa (-200 to +200 hPa)	0.1 m/s (0 to +40 m/s)	1 hPa	0.1 °Ctd (0 to +99.9 °Ctd)
Reaction time			40 s					
Reaction type			t <sub>90</sub>					

Probe type	Type K (NiCr-Ni)	Type S (Pt10Rh-Pt)	Ambient temperature probe (NTC)
Meas. range	-200 to +1370 °C	0 to +1760 °C	-20 to +50 °C
Accuracy ± 1 Digit	±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)	±0.2 °C (-10 to +50 °C)
Resolution	0.1 °C (-200 to +1370 °C)	0.1 °C (0 to +1760 °C)	0.1 °C (-20 to +50 °C)

## Technical data CxHy sensor

Measurement parameter	Methane	Propane	Butane
Meas. range <sup>1</sup>	100 to 40,000 ppm	100 to 21,000 ppm	100 to 18,000 ppm
Accuracy	< 400 ppm (100 to 4000 ppm) < 10 % of m.v. (> 4000 ppm)	< 400 ppm (100 to 4000 ppm) < 10 % of m.v. (> 4000 ppm)	< 400 ppm (100 to 4000 ppm) < 10 % of m.v. (> 4000 ppm)
Resolution	10 ppm	10 ppm	10 ppm
Min. O <sub>2</sub> requirement in flue gas	2% + (2 x m.v. methane)	2% + (5 x m.v. propane)	2% + (6.5 x m.v. butane)
Response time t <sub>90</sub>	< 40 sec.	< 40 sec.	< 40 sec.
Response-Faktor <sup>2</sup>	1	1.5	2

<sup>1</sup> Lower explosion limit must be adhered to.

<sup>2</sup> The HC sensor is adjusted to methane in the factory. It can be adjusted to another gas (propane or butane) by the user.

## Other technical data

Dimensions:	330 x 128 x 438 mm	Max. humidity load:	+70 °C Dewpoint temperature at measurement gas input of analyzer box
Weight:	4800 g	Trigger input:	Voltage 5 to 12 Volt (rising or falling flank) Impulse width > 1 sec Load: 5 V/max, 5 mA, 12 V/max. 40 mA
Storage temperature:	-20 to +50 °C	Warranty:*	Measuring instrument 2 years (apart from wearing parts, e.g. gas sensors...);
Operating temperature:	-5 to +45 °C	Gas sensors:	CO/NO/NO <sub>2</sub> /SO <sub>2</sub> /H <sub>2</sub> S/C <sub>x</sub> H <sub>y</sub> : 1 year;
Housing material:	ABS	O <sub>2</sub> sensor:	1 1/2 years;
Memory:	250,000 Measurement values	CO <sub>2</sub> -IR sensor:	2 years.
Power supply:	AC mains unit 100V to 240V (50 to 60 Hz)	Rech. battery	1 year
DC voltage supply:	11V to 40V	Protection class:	IP40
Max. dust load:	20 g/m <sup>3</sup> dust in flue gas	Battery life:	Maximum load approx. 2.5 h
Dewpoint calculation:	0 to 99 °C td	*Warranty applies for average sensor load.	
Max. pos. pressure flue gas:	max. +50 mbar		
Max. neg. pressure:	min. -300 mbar		
Pump through-put:	1 l/min. with through-put monitoring		
Hose length:	max 16.2 m (corresp. to 5 probe hose extensions)		

