Operating Instructions Dräger FG7500

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Contents

1. Information

The manufacturer of this product, Dräger MSI GmbH, is referred to as Dräger MSI in the following.
The displays shown in this manual are examples!

1.1 Warning signs

Symbol	Text
	**Warning** Indication of a potential dangerous situation. Avoiding this warning can lead to death or severe injuries.
	**Caution** Indication of a potential dangerous situation. Avoiding this warning can lead to injuries or damages to the product or the environment. Can also be used as a warning against improper use.
	**Information** Additional information regarding the use of the product.

1.2 For your safety

- Please read these operating instructions and those for the corresponding products carefully before using the product.
- The operating instructions must be strictly followed. The user must completely understand the instructions and follow them precisely. This product may only be used in compliance with the designated use.
- Do not dispose of the operating instructions. Ensure safekeeping and proper use by the users.
- Only trained and competent personnel are permitted to use this product.
- Observe local and national guidelines pertaining to this product.
- Maintenance work may only be conducted by Dräger MSI or by qualified personnel trained by Dräger MSI- Otherwise the responsibility for the proper functioning of the product after maintenance and for the validity of approvals is rejected by Dräger MSI.
- Only use original Dräger parts and accessories for maintenance work. Otherwise the proper use of the product can be compromised.
- Do not use defective or incomplete products. Do not modify the product in any way.

1.3 Safety instructions and warnings

- Do not operate the product if there is damage to the housing, power supply or supply lines. Mark the product, to protect it against further use.
- Do not conduct any measurements, which could lead to contact with uninsulated, hot parts.
- Only use the product appropriately and as intended and within the parameters specified in the technical specifications. The improper use of this product can result in death, severe injuries or the destruction or damage of the product.
- Do not use this product in environments exposed to explosion hazards.
- This product is equipped with a magnetic holder. The magnetic field can be hazardous to the health of persons with pacemakers.
- Do not open rechargeable batteries or batteries and do not throw them into fire.

- Store this product in a place at room temperature without exposure to solvents, plasticizers agents, emissions or combustible materials.
- Only use this product in closed and dry rooms. Protect it against rain and moisture.
- Independent modifications to the product can lead to malfunctions and are prohibited for safety reasons. The responsibility for the proper functioning of the product after modification and for the validity of the certifications is otherwise refused by Dräger MSI.
- This product is equipped with a magnetic holder. The magnetic field can damage other products. Keep a safe distance from other products (e.g. mobiles, computers, monitors, credit cards, memory cards, etc.).

1.4 Bluetooth

Changes or modifications not specifically approved by the responsible admissions office can lead to the revocation of the operating license. Data transmission can be destroyed by devices transmitting in the same ISM radio band, e.g. mobiles, WLAN, microwaves, etc.

Among others, the use of radio communication is prohibited in aircraft and hospitals.

1.5 Disclaimer

Dräger MSI does not assume any liability or warranty for damages or consequential damage arising from non-compliance with technical regulations, instructions and recommendations. Dräger MSI and the sales companies are not liable for costs or damages resulting from the use of the product by the user or third parties, especially in the case of improper use of the product. Neither Dräger MSI nor the sales companies are liable for the incorrect use of the product.

1.6 Maintenance and servicing

To ensure proper functioning and measurement accuracy, calibration and adjustment should be conducted annually by service specialists trained by the Dräger MSI GmbH. If the measuring device is used for officially recognized measurements, the measuring device must be inspected semi-annually by the office approved by the responsible authority for the calibration of proof tested measuring devices, to adhere to the minimum requirements.
The device can be cleaned with a damp, not wet, cloth. Do not use any chemical cleaning agents. Please make sure that the device connections are not clogged or dirty.

1.7 Disposal

The EU-wide directives for the disposal of electrical and electronic equipment apply. Please observe the applicable local environmental regulations for disposal or return the product to Dräger MSI or your national dealer for disposal. Defective rechargeable batteries are considered hazardous waste and must be brought to the designated collection points for disposal.

2. Application

The Dräger FG7500 is an all-purpose, electronic multichannel measuring device for calibration and testing work on small and medium-sized incinerators.

It is not suitable for continuous operation or as a safety or alarm device.

A typical measurement cycle takes approx. 3 minutes.
All tests and measurements can be documented through print outs or storage.

The device employs combustible specific formulas, to calculate CO_2 and qA (exhaust gas loss) combustion parameters. For this reason, these combustion parameters can only be calculated for the combustible materials stored in the fuel table of the device. The following fuels can be set:
Light fuel oil, natural gas, propane, heavy fuel oil, pellets, wood, brown coal, stone coal, stone coal briquettes, stone coal coke, anthracite coal, biogas, butane, city gas, coke oven gas.
When measuring according to the 1st BImSchV, only the fuels fuel oil EL, natural gas L, natural gas H, liquid gas propane, liquid gas butane, biogas, town gas and coke oven gas may be used.

The service life of the sensors used in the Dräger FG7500 is typically 4 years for the O2 and CO sensor and 2 years for the NO sensor. The pressure sensor has no limited service life under normal conditions of use.

To avoid influencing the measuring accuracy of the sensors, the Dräger FG7500 must not be exposed to solvents, combustible materials or plasticizers during operation or storage.

Only use a 5 V DC / 1 A USB power supply unit, to always fully charge the Dräger FG7500 via the USB port and the delivered USB cable (<1 m). We recommend monthly recharging in the event of longer periods of non-use.
Incomplete charging affects the charging capacity of the battery in the long run.
Do not conduct any measurements while the battery is charging.

3. The product

3.1 The measuring device

3.2 The flue gas probe

The green LED indicates the exhaust probe being ready for measurement.

The yellow LED lights up when the highest temperature in the exhaust pipe is measured. It starts blinking when moving away from the spot with the highest temperature.

A sensor for the flue draft measurement is integrated in the exhaust probe.

3.3 The multi-hole adapter

The multi-hole adapter is positioned on the probe tube of the exhaust probe for the measurement and locked into place.

3.4 The annular adapter

The annular adapter is inserted on the probe tube of the exhaust probe for the measurement and locked into place.

4. First time use and operation

4.1 Preparation for first time use

Before using the measuring device for the first time, the integrity of all components must be checked, e.g.:

- device does not exhibit any visible damage
- there is no condensation in the gas conditioner
- the gas conditioner filter is clean
- gas hoses do not exhibit any defects
- visual inspection of the probe

Insert the combo-plug on the flue gas probe into the probe inlet of the measuring device. Prior to each measurement, make sure that a clean filter is inserted in the gas conditioner!

Only turn the Dräger FG7500 on, if the flue gas probe has fresh air. The zero signals of the sensors are synchronized with the fresh air.

4.1.2 Prior to each measurement

The impermeability of the gas duct can be easily tested: Close the gas inlet of the probe using the round cap. The probe has an integrated draft sensor. In the event of an impervious gas duct, the device determines a high negative pressure through the pump output via the integrated draft measurement, turns off the pump and creates the “probe is blocked!” message on the display. This clearly indicates that the gas duct is impervious.
If this message is not displayed, the gas duct must be tested using a gas flow meter.

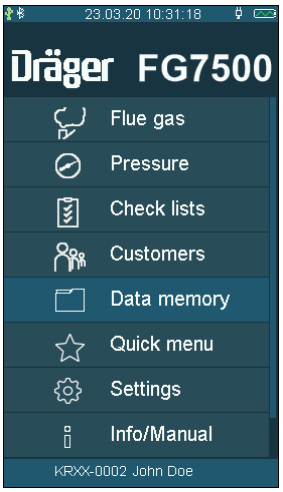
4.1.3 Touchscreen

The Dräger FG7500 is operated using the capacitive touchscreen display. You can execute the tapping and swiping function on the screen with your finger. Menus and lists can be moved up and down by up/down swiping gestures (scrolling).
Menus and list positions are highlighted by tapping on them. The selected item is activated via the **Select** button or by tapping again.

Touching the display with sharp or pointy objects can lead to the destruction of the display.

4.2 Switching on / off

Switch on: Briefly press the On/Off button . The device switches on. When switching the device on for the first time, please select your language.
When the start screen is activated, it displays the model and a logo. You can insert your logo with the measurement data management software PC200P. The battery symbol indicates the charge state of the battery; information on whether the device is charged, a USB cable is connected, whether Bluetooth is activated, whether the pump is running, whether the start phase is completed and whether an exhaust probe or an external sensor is connected is also shown.
You can access the start information or the icon main menu using the **Next** button or by entering the PIN.



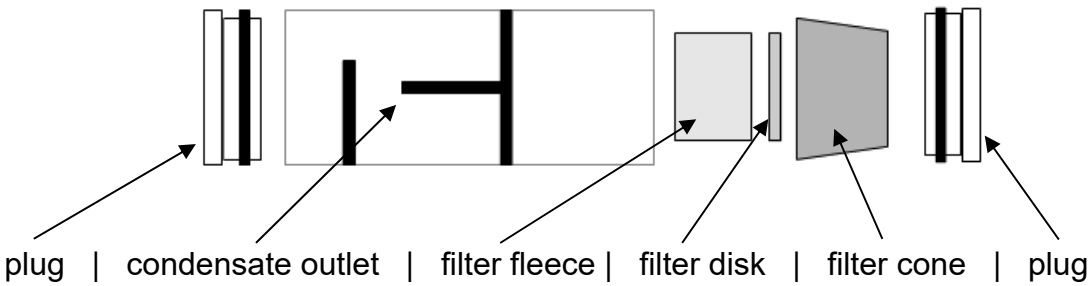
During the first 30 seconds, the device conducts a stabilization and a system check. This is shown by the progress bar below the time display and by the green square in the header. The measuring function cannot be used during this time. Administrative functions can be used during this time.
If scheduled maintenance is pending, the device issues a reminder one month prior to the date of scheduled maintenance.

Switching off: Press the "**Switch off**" icon in the main menu or the On/Off button. If a program is being used, the On/Off button switches back to the main menu when pressed.

4.2.1 After each measurement

After the measurement, remove the probe from the exhaust gas flow and allow it to draw in fresh air for 1-2 minutes, then switch off the device. Empty and clean the gas conditioner. To open the gas conditioner, pull it out of the device; remove both plugs manually. Check the filter disks and the filter fleece for soiling/contamination and if necessary, replace them.

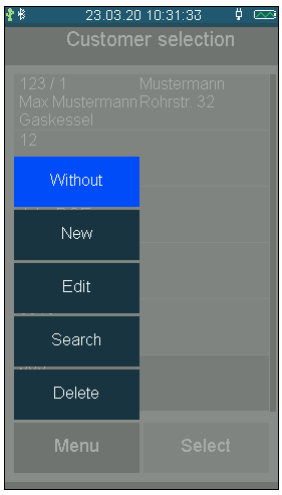
Gas conditioner:

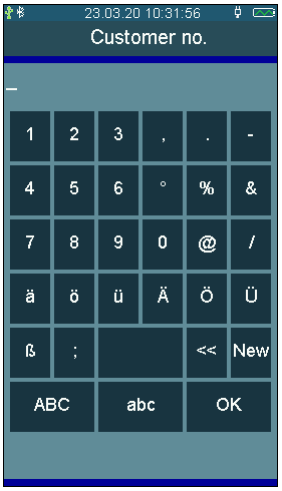


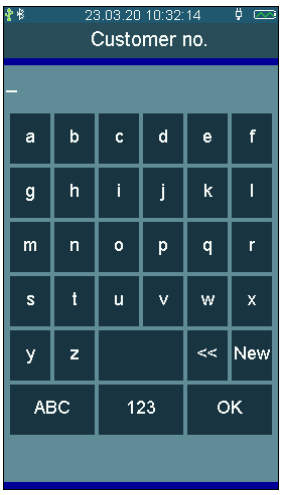
4.3 Buttons

Menu	= opens the context menu for the selection and editing of system data
Select	= enables the marked position
OK	= confirms a selection
Done	= leads to the next step of a function after an action
Next	= leads to the next step of a function
Cancel	= ends a function, switches to the main menu
>>	= scrolls forwards, display switches to chart
<<	= scrolls backwards, display switches to statistical data
Null	= readjusts the zero point of the pressure sensor
Start	= starts the measurement
Stop	= stops the measurement
New	= prepares a new measurement
Docu	= switches to the documentation menu
Back	= switches to the results display from the documentation menu
Customer	= switches from the documentation menu to system selection
Print	= prints the measurement result via the IR transmitter
Save	= saves the measurement result in data memory
End	= switches from the documentation menu to the main menu
Quit	= prematurely ends a measurement period
Input	= opens the input option for printer text

4.4 Customer and system management

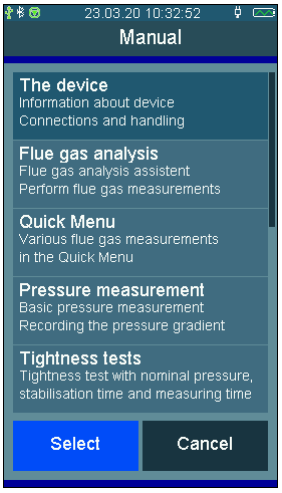


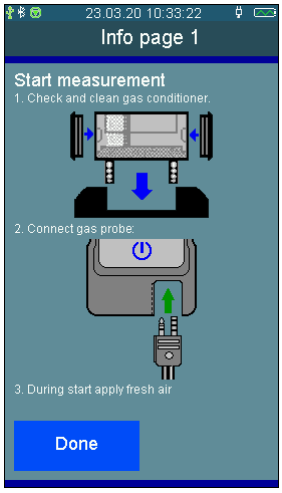




The **Menu** button opens a context menu. Depending on the menu item, the context menu offers various editing options and commands. Customer data and comments can be entered via an on-screen keyboard.

4.5 Operating instructions



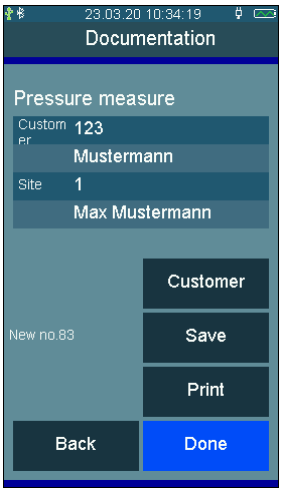


Operating instructions are stored in the menu item **Info.**

Scroll between pages using **>>** and **<<**.

You can return to the menu item **Info** using the **Done** button.

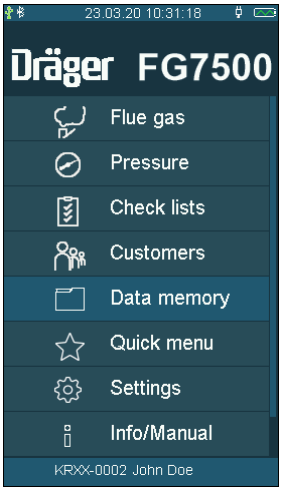
4.6 Documentation menu



After completion of a measurement, the documentation menu can be accessed.
If no customer was selected before the measurement, a customer can be selected here using **Customer** or a new customer can be created.
The measurement result is assigned to the customer via **Save**.
If no customer was selected, the measurement result is only stored under the date and time.
The measurement result can be transmitted to an infrared printer via the installed IR transmitter with **Print.**

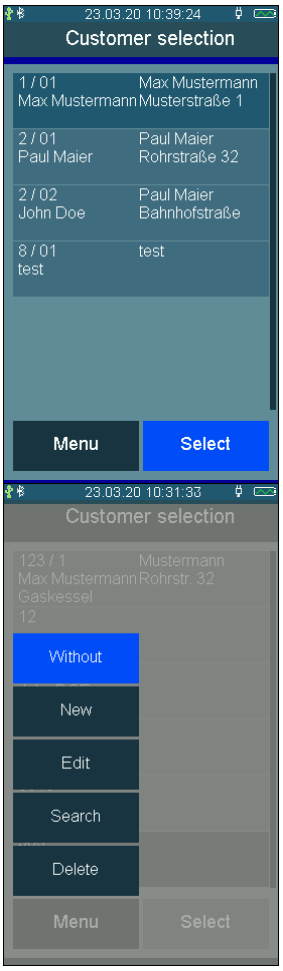
5. Main menu

Selectable menu items are:



Flue gas	Start flue gas measurement assistant
Pressure	General pressure measurement
Check lists	Select and edit checklist
Customers	Open customer selection / management
Data memory	View measurement database
Quick menu	Quick measurements
Settings	Change device and measurement settings and printer text, set clock
Info	Device information, open manual
Switch off	Switch off the measuring device

6. Selecting and entering customer data



Customers and system data sets can be created and edited under the Customer menu item. Conducted measurements can then be saved under the created customers and systems. Customers and systems can also be created

Select: The selected customer number is accepted.

Menu: The context menu is opened.

Without: Measurements are saved with date and time.

New: New customer data can be created.

Edit: Existing data sets can be edited.

Search: A string can be searched for.

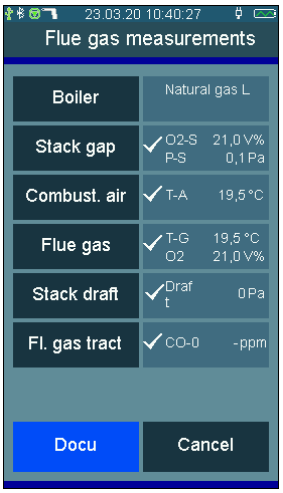
Delete: The selected data set can be deleted. This is only possible if there is no measurement data saved in the device.

The following can be stored: Customer number, name, system type, installation location, system number, street, post code, city, customer name, customer street, customers post code, customer city, customer phone number, boiler manufacturer, boiler type and year of manufacture, boiler output, burner manufacturer, burner type and year of manufacture, burner model and combustible material.

The acquired customer number applies to all subsequent measurements until the device is switched off or another number is selected.

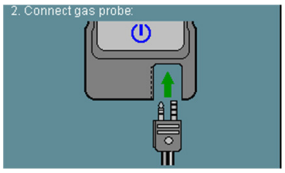
7. Flue gas measurements

The flue gas measurement works with several measurement programs. The individual measurement programs can be executed in any order.
An executed measurement program can be recognized by the green check mark behind the menu item.



7.1 Connecting the flue gas probe

Insert the combo-plug on the probe into the device. The probe must be able to draw in fresh air.



The gas outlet below the probe connection must be free and may not be closed or clogged!

7.2 Starting the flue gas measurement.

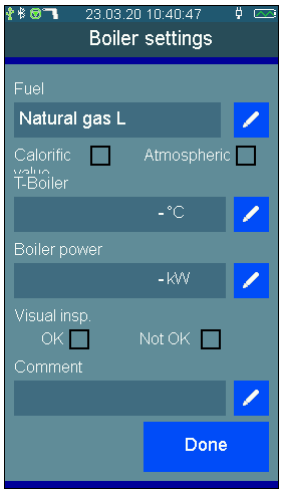
Switch on the Dräger FG7500, wait for system check to be completed and select **Flue gas**.

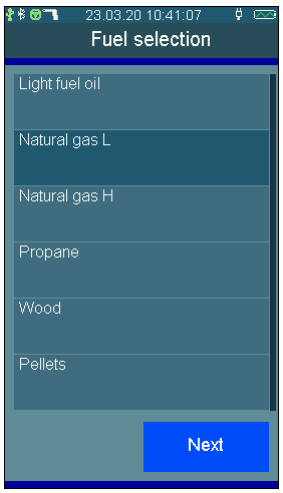
If the pump was switched off prior to selecting the flue gas measurement function, a brief stabilization phase follows

7.3 Selecting fuels, heat carrier temperature

Prior to the measurement, please select the fuel using the input functions for the boiler data, the heat carrier temperature, the boiler output, the calculation for the condensing boiler, etc.

The inspection of the system can be documented with the entries for the visual inspection and the comments.



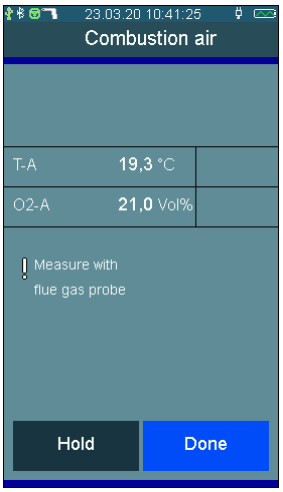


7.4 Measuring combustion air temperature

If a separate combustion air sensor is not being used, the combustion air data must be measured using the flue gas probe prior to the flue gas measurement. This menu item can be skipped in the case of a flue gas measurement using a separate combustion air sensor.

7.4.1 Measurement with the flue gas probe

Start the combustion air measurement with “**Combust. Air**”



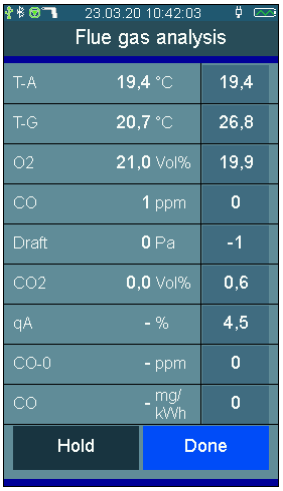
Insert the flue gas probe into the opening of the combustion air supply intended for testing or optionally, hold the exhaust probe in the indoor air.

As soon as the combustion air values have stabilized, press **Hold**. If the combustion air supply has an oxygen-content below 21%, this can be an indicator for a leak in the exhaust pipe in the air/exhaust system.

7.4.2 Measurement with the combustion air sensor

As an alternative, the combustion air temperature can be measured during the flue gas measurement. To do so, the optionally available combustion air sensor must be connected prior to the measurement and positioned in the combustion airflow.
In this case, the combustion air temperature is accepted when determining the measurement readings or during averaging.

7.5 Flue gas measurement

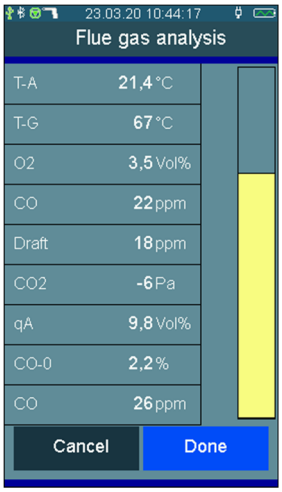


There are areas in the exhaust gas flow, which are only partially mixed with exhaust. Therefore, it is necessary to obtain the sample from the core stream. The core stream is distinguished by a maximum exhaust temperature and a minimum oxygen concentration.
Start the flue gas measurement with “**Flue gas**”.
Now, insert the flue gas probe into the exhaust pipe, move it in the exhaust gas flow and position it, so that the tip of the probe is in the core stream (highest gas temperature, lowest oxygen concentration). In the process, you can use the yellow LED in the flue gas probe for orientation. The LED lights up when the maximum exhaust temperature has been reached; if you move the flue gas probe out of the core stream, the LED starts blinking. After you have found the core stream and the readings have stabilized, secure the flue gas probe in this optimum position with the probe cone. A summary of the currently measured combustion values is shown. Now, press the **Hold** button.
If you press the currently measured or calculated value, the display switches to the diagram.

7.5.1 Average measurement

The 1st Federal Immission Control Ordinance (BImSchV) requires the simultaneous determination of oxygen content of the exhaust and exhaust temperature as an average value for a duration of 30 seconds. Insofar as the **BImSchV** measurement was activated in the settings, you can start the 30-second averaging process using **Start;** then, you do not need to use **Hold.**

The progress of the averaging process is shown using a vertical progress bar on the right side of the screen. After completion of the averaging process, the calculated measurements are highlighted in yellow on the right side of the screen.



7.5.2 Draft measurement

Draft measurement takes place simultaneously during the flue gas measurement and is also included in the averaging process.

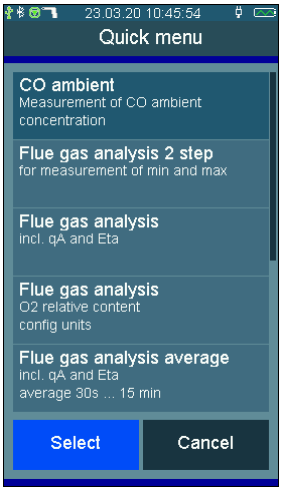
7.5.3 List of display values

T-A	Combustion air temperature
T-G	Exhaust gas temperature
O2	Measured oxygen content
CO	Measured carbon monoxide content
NO	Measured nitrogen monoxide content
P-D	Measured flue draft
CO_2	Measured carbon dioxide
qA	Determined exhaust gas loss of exhaust gas
CO-0	Determined carbon monoxide content relative to 0 vol. % oxygen
Eta	Determined combustion-technical efficiency of combustion
T-Tau	Determined temperature of the dew point
Lambda	Determined combustion air ratio
NOx	NOx value calculated from NO shown as NO2
O2-A	Measured oxygen content of combustion air
Smoke no.	Average of entered smoke numbers
Oil der.	Consideration of oil derivatives
O2-S	Measured oxygen content in the annular passage
T-S	Measured combustion air temperature in the annular passage
P-S	Measured pressure in the annular passage
PI	Poison index

An invalid result, e.g. CO > 30,000 ppm, is displayed with "- -" for a flue gas measurement.

8. Quick menu

The quick menu bundles the most important measurements.
It allows the following to be performed:



8.1 CO ambient

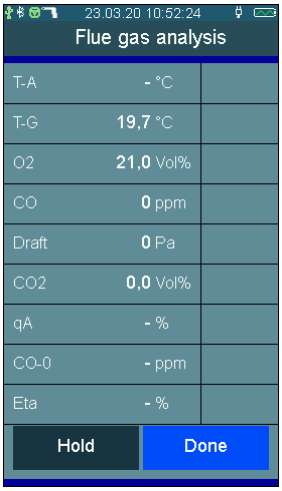
The regulations of some countries require that the tightness of a combustion installation must be ensured by a measurement of the CO concentration in the ambient air. For the CO ambient air measurement the Dräger FG7500 doesn't need a separate CO sensor. At a location with fresh air, without CO content, the value has to be 0 ppm. If the reading is not 0 ppm, pull off the Combo-plug of the gas probe from the device, wait for a short while and press **Null**. The now displayed value will be set to zero. This zero point is independent from the CO zero point of the normal flue gas measurement.

8.2 Flue gas analysis 2 step

After you selected a fuel, a flue gas analysis 2 step will be performed. In the 2-step flue gas analysis, for example, min. and max. measurements can be carried out on the boiler.
To change to measurement number two, press **>> No. 2** key.

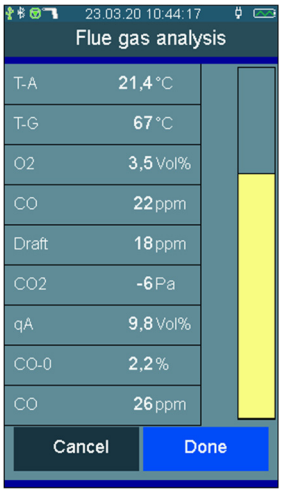
8.3 Flue gas analysis Standard

After you selected a fuel, a Standard flue gas measurement will be performed. All relevant measurement values and calculations will be displayed. If the measurement is performed at a calorific value boiler, you should activate the calorific value setting in the general settings. Only in this case negative losses and efficiency higher than 100% will be calculated.



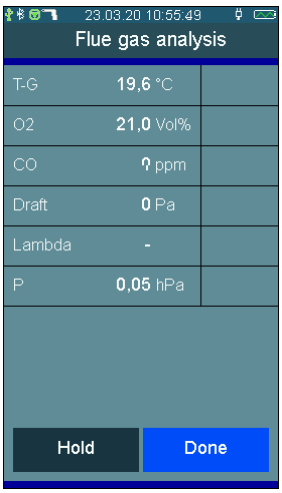
8.4 Flue gas analysis average

In many cases average value measurements are used to get reproducible results, despite of time alterable combustion states. For this is a averaging in certain time called. E.g. the German regulation 1st BImSchV calls for averaging of 30 s average values. For solid fuels it calls for averaging of 15 min average values. After selecting the fuel, you can select the averaging time from a table:
30 s, 1 min, 5 min, 15 min, 30 min or 60 min.

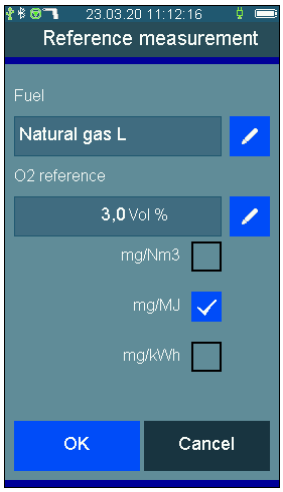


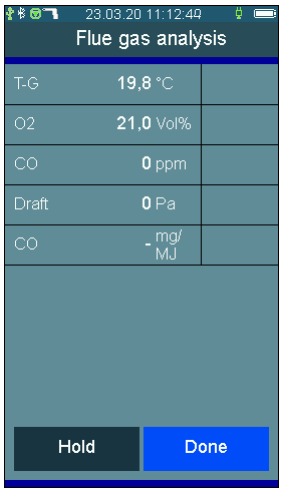
8.5 Flue gas analysis quick

The flue gas analysis quick allows to display only measured values without fuel selection and no fuel depending calculations. Displayed values: flue gas temperature, measured oxygen, measured carbon monoxide, measured nitrogen monoxide (option), measured induced draft, and determined combustion air ratio.



8.6 Flue gas analysis – gas only



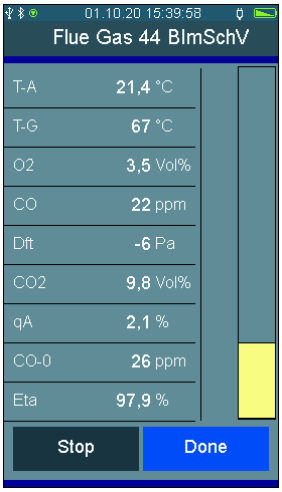


Before starting the measurement, which is displayed in mg/Nm3, mg/MJ, and mg/kWh, you have to select the fuel and the O_2 reference value. The standard O2 reference value for a fuel is preset.

If a solid fuel, such as pellets, is selected, an average value measurement can also be performed.

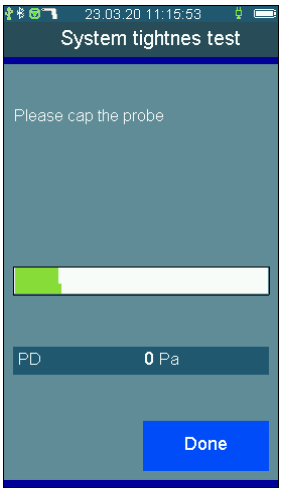
8.7 Flue Gas 44 BImSchV

In many cases average value measurements are used to get reproducible results, despite of time alterable combustion states. For this is a averaging in certain time called. E.g. the German regulation 44th BImSchV calls for averaging of 180 s average values.



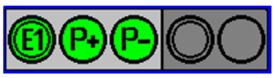
8.8 System tightness test

The regulations of some countries require a tightness test of the system of measurement device and gas probe.
After starting the test, the gas probe is closed with a sealing cap for approx. 20 seconds.



9. Pressure measurements

9.1 Connection diagram



Connect the metering point with the pressure inlet **P+** on the measuring device using the burner pressure hose for pressure measurements up to a max. of 160 hPa (mbar) (gas, nozzle or kinetic pressure).

9.2 Pressure measurement

Selectable functions are:

Null:	The displayed value is set to zero
>> / <<:	Switching between statistics and chart
Start:	Starts the pressure measurement
Cancel:	Cancels the pressure measurement

Press the **Start** button, to start; after the required time period, stop the measurement with **Stop.** After the pressure measurement is started, the current pressure, the starting pressure, the difference to the starting pressure and the previous duration of the measurement are shown. The final pressure is shown when the measurement is stopped. The arrow key **>>** can be used during the measurement, to switch to the diagram view. After completing the pressure measurement, the result is displayed.

9.3 Tightness test

Test pressure, stabilization time and measurement time can be set for the general tightness test.

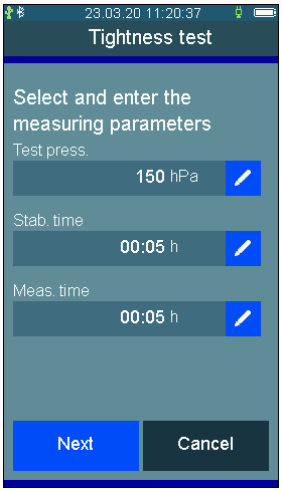
This function also allows conducting tightness tests for gas pipes, liquid gas pipes and drinking water installations.

Work on gas pipes requires precise knowledge and adherence to the respective standards and worksheets of your country-specific applicable legal regulations!

Limit the test pressure to the metering range of the pressure sensor used. Higher pressures destroy the pressure sensor.

The test pressure can be adjusted between 20 and 25,000 hPa (mbar) for tightness tests, the stabilization time and the measurement time between 5 minutes and 6 hours. Optionally available high pressure sensors must be used for pressures exceeding 150 hPa (mbar).

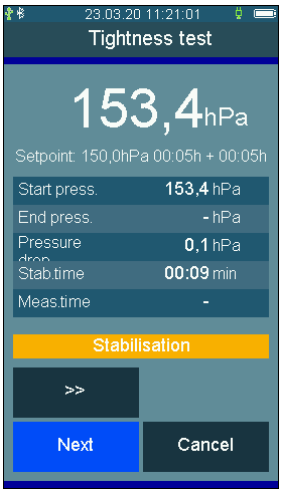
The input function begins with the selection buttons behind the values.



"**Next**" starts the measurement program. During the measurement, "**>>/<<**" can be used at any time to switch between table and diagram display.

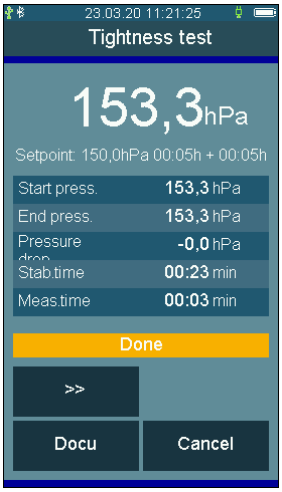
Pressure built-up: In this phase, the measuring device waits for the test pressure to build up. "**Done**" confirms that the test pressure has been reached.

Stabilization phase: The measuring device waits until the specified stabilization time lapses and then automatically switches to measurement. The stabilization phase can be ended manually by using "**Next**".



Measurement: The pressure pattern as well as the starting, end and differential pressure are recorded during the measurement period. The selected measurement period can be shortened using "Quit".

Done: After the measurement, the recorded results are available.



9.4 Leak test

Work on gas lines requires precise knowledge and adherence to the respective standards and worksheets of your country-specific applicable legal regulations!

Gas pipeline installations, which are in operation, must be assessed by the degree of their serviceability. The measurement of the existing leak rate in liters per hour (amount of leakage measurement) is the basis for the assessment of serviceability.

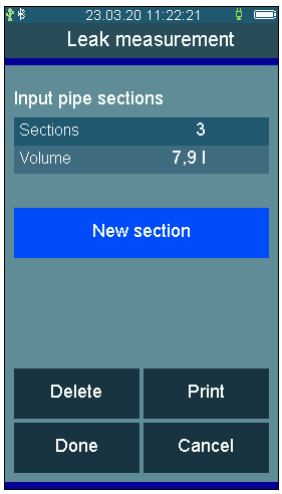
Serviceability is divided into the following criteria:

Unlimited serviceability	=	amount of gas leakage < 1 l/h
Reduced serviceability	=	amount of gas leakage 1 l/h to < 5 l/h
No serviceability	=	amount of gas leakage > 5 l/h

A semi-automatic serviceability test **with air** can be conducted with the FG7500 in accordance with the German Technical and Scientific Association for Gas and Water (DVGW) TRGI 2018 G600 Appendix 4 on gas lines with 23 hPa (mbar) operating pressure.
To do so, the gas line to be tested must be closed off using valves and rinsed with air. After determining the line volume and increasing the pressure in the line to 50 hPa (mbar), the pressure in the line is measured for 1 minute after a stabilization phase. The amount of leakage for natural gas is calculated from the measured changes in pressure, is displayed and can be documented.

9.4.1 Calculation of the gas pipe volume

To calculate the volume of the piping system, the program has an input and calculation function for the pipe table with up to 20 pipe sections and automatic total volume calculation. Individual pipe sections can be entered with diameter and length or partial volumes or total volumes.
Selectable cross sections are: ´Volume input´, 35 mm, 28 mm, 22 mm, 18 mm, 15 mm, 2”, 1 ½”, 1 ¼”, 1”, ¾” and ½”.



A table with the individual pipe sections can be printed.

9.4.2 Starting the serviceability test

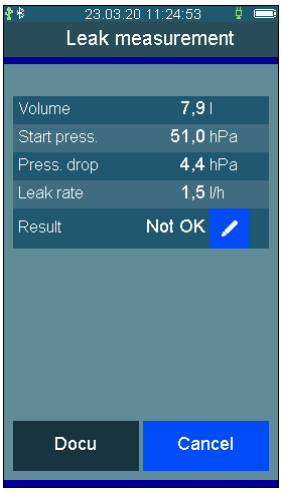
Increase the pressure in the gas line to 50 hPa (mbar) with a hand pump via a valve. Then, close the valve on the pump and start the measurement.

The measurement is automatically started after a stabilization phase of 30 sec.

The current pressure, the pressure at the beginning of the measurement, the measurement time elapsed so far, the drop in pressure and the currently calculated leak rate are shown.

9.4.3 Result of the serviceability test

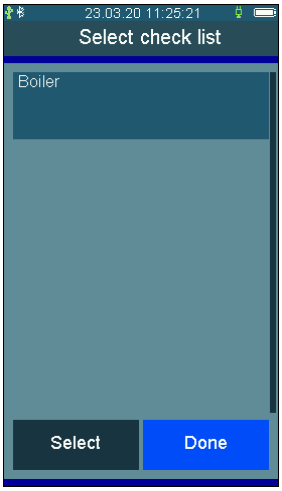
The measurement is concluded after one minute and the entered volume, the pressure at the beginning of the measurement, the measured drop in pressure and the calculated leak rate in liter/hour based on the operating pressure are shown.

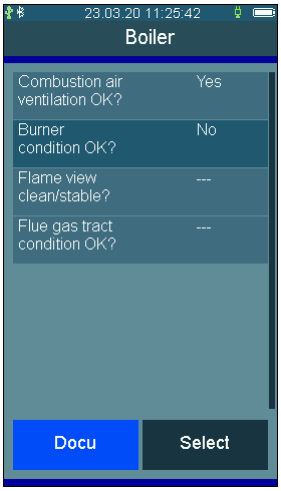


In conclusion of the measurement, the piping system must be assessed. In addition to the amount of leakage, the external condition and functionality of the components must be included in the assessment.

10. Checklists

Measurement specifications often include visual inspections and other examinations. Such additional information regarding the measurements or the equipment can be recorded with checklists. Even work instructions can be created and processed in this manner.



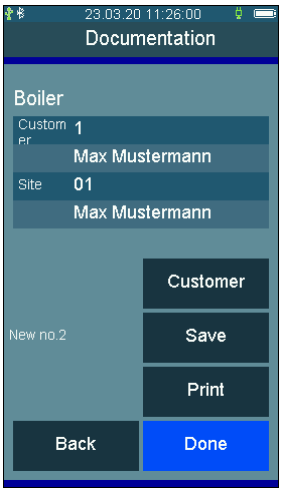


Up to 4 checklists each with a maximum of 20 entries can be created using the PC measurement data management. Each entry can be created so that it can be answered with Yes / No, or with an entry consisting of a max. of 5 characters. If no input has been provided, the entry is shown using ---.

11. Data memory

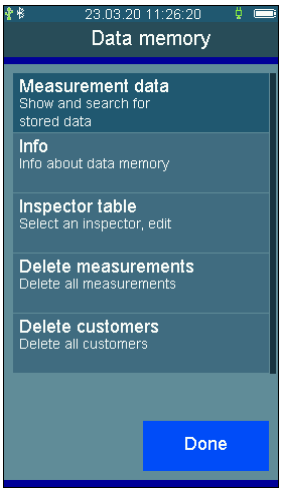
11.1 Saving measurements

If a system number was not selected before the measurement, the measurement of a system can be allocated from the documentation menu using **Customer,** before saving.
Without system allocation, the measurement is saved with date and time.
With system allocation, the system number is also shown.



11.2 Data memory functions

Selectable functions are:

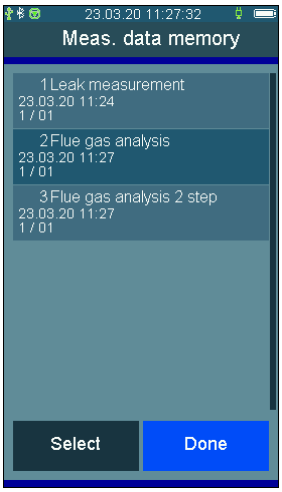


Measurement data:	Saved measurement data indicates
Info:	Data storage information
Inspector table:	Viewing and editing the inspector table
Delete measurements:	Delete measurement data storage
Delete customers:	Delete all customer data

11.3 Measurement data

The measurements are saved with date and time and system number, if allocated.
Select calls up the measurement results display.

From there, the allocated system is shown and the measurement result can be printed with system and inspector.

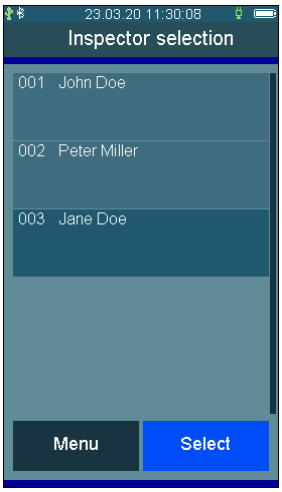


11.4 Data storage information

The information about the data memory shows the number of saved customers and measurements and the total number of occupied storage locations.
Depending on the type, one measurement occupies 1 – 11 storage locations.

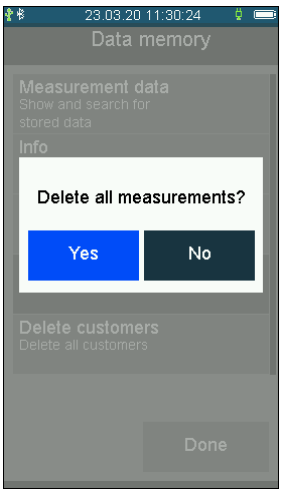
11.5 Inspector table

Various inspectors with inspector numbers, name, street, postal code, city and telephone number can be entered in the inspectors table. The selected inspector is linked with the saved measurement data set.
The selected inspector remains selected even after switching off the device.
A tester can only be deleted if there is no measurement data saved in the device.



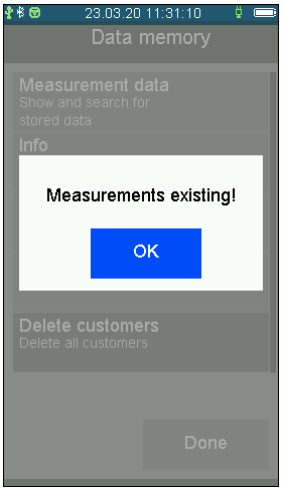
11.6 Deleting measurement data

Deleting measurement data: All saved measurement data is deleted. There is a confirmation prompt before deletion is executed.



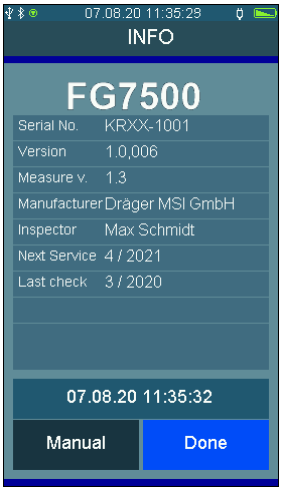
11.7 Deleting customers

All saved customer and system data is deleted. There is a confirmation prompt before deletion is executed. It is not possible to delete customer and system data when measurements are stored.



12. Device information

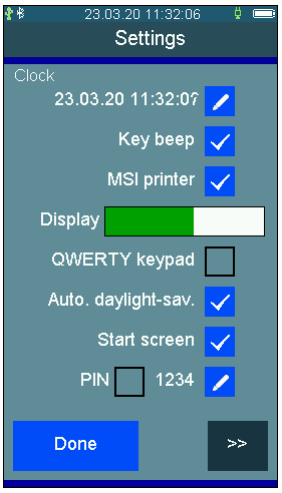
This function provides information about the measuring device model (FG7500), the serial number of the measuring device, the version of the measuring device software (here 1.0,006), the measurement version, the manufacturer Dräger MSI GmbH, the selected inspector, the next scheduled maintenance, the set date and time.

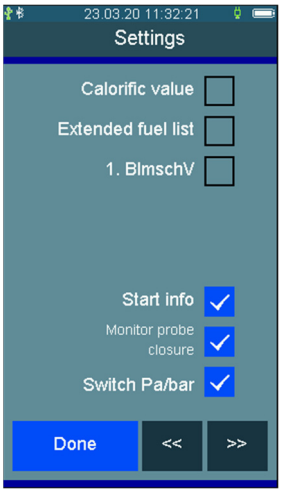


Manual opens the integrated operating instructions.

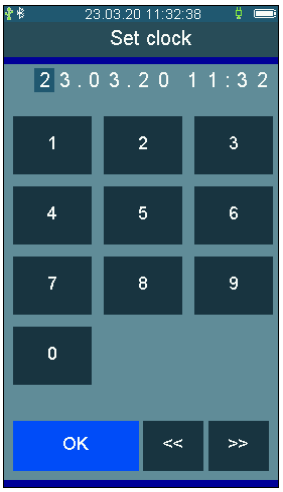
13. Settings

The measuring device can be configured according to the user's requirements. Using the buttons, the functions can be switched on and off or you can switch to entries.





13.1 Date and time



Setting and changing date and time.
Enter the desired date and time using the numeric keypad. Switch to the positions you would like to change using the arrow keys **<< / >>**. Confirm the input with **OK**.

13.2 Key beep

This function allows you to turn the key beep on and off.

13.3 MSI printer

This function allows you to switch between the printer logs for MSI printer and HP printers.

MSI IR3 printers: Data transmission and printing rates are faster than HP protocol compatible printers.

HP printers: The data transmission rate corresponds to the HP protocol and is also suitable for all HP protocol compatible printers, and of course for the MSI IR3.

13.4 Display illumination

This function allows you to set the brightness of the display by moving the indicator bar. The brightness of the display affects the battery life.

13.5 QWERTY keyboard

Entries can be switched to the QWERTY keyboard using this function. Otherwise, an ABC keyboard is active.

13.6 Automatic daylight saving time

This function allows you to turn automatic daylight saving time on and off.

13.7 Start screen

Turning the start screen on and off. When the device is switched on, the start screen appears with your company logo. The company logo can be uploaded to the device via the PC measurement data management.

13.8 PIN

You can protect your device against unauthorized access by using your personal 4-digit PIN.

13.9 Calorific value

If activated, negative losses (qA) and degrees of efficiency (ETA) exceeding 100% are considered in the measurement. This function should always be activated for condensing boiler systems, so that measurement results are valid. This setting has an effect on the measurements in the Quick menu.

13.10 Extended fuel list

The fuel list with the combustible materials light fuel oil, natural gas L, natural gas H, propane, wood and pellets is extended by the following combustible materials:
Heavy fuel oil, brown coal, stone coal, stone coal briquettes, stone coal coke, anthracite coal, biogas, butane, city gas, coke oven gas

13.11 Federal Immission Control Ordinance (BImSchV) average value

The 30 second average measurement according to BImSchV during the exhaust measurement can be switched on or off.

13.12 NO_x factor

This function only applies to devices with NO meter flume. It allows considering the percentage of NO_2 from NO_x for the calculation of NO_x. For example, if the NO_2 percentage was determined with a 6% of the NO percentage by means of a measurement, the measured NO value must be multiplied with 1.06, to obtain NO_x. For this purpose, the NO_x factor must be set to 1.06.

13.13 Start information

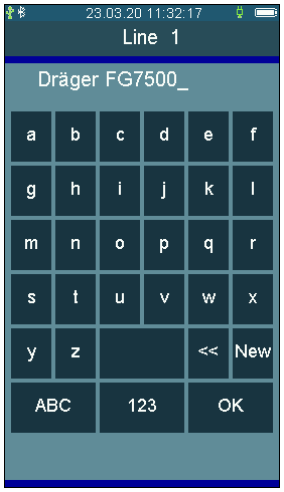
This function can be used to turn the information display after the start screen on and off.

13.14 Switch bar -> Pa

Via that function the pressure unit can be switched on and off according to TRGI 2018. Changing the pressure unit is applied to all measurements.

13.15 Printer footer texts

With this feature, the printer footer text for the infrared printer can be changed line by line. Pressing OK after entry changes to the next line.



13.16 Language

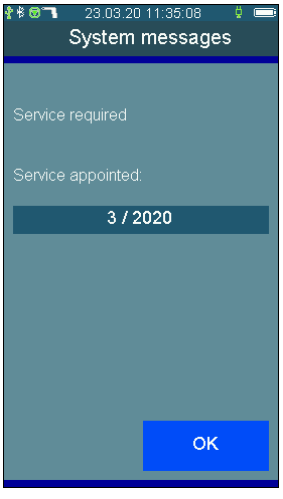
A country-specific language configuration can be set with this function.

14. System messages

When being switched on and during measuring mode, the measuring device checks for proper functioning. System messages are shown after the start-up phase and during normal functioning.

Message	Problem	Corrective
O2 sensor	Probe was in the exhaust duct. Sensor is defective.	Recalibrate in the fresh air. Service
CO sensor	Probe was in the exhaust duct. Sensor is defective.	Recalibrate in the fresh air. Service
NO sensor	Probe was in the exhaust duct. Sensor is defective.	Recalibrate in the fresh air. Service
Clock not set	E.g. changed battery.	Set clock.
Probe is blocked	Probe clogged.	Clean probe, remove blockage.
Charge control	Error in configuration memory.	Service
Settings	Error in configuration memory.	Service
Printer texts	Error in configuration memory.	Service
Data memory	Error in configuration memory.	Service
Calibration	Error in configuration memory.	Service
Options	Error in configuration memory.	Service
Fuel table	Error in configuration memory.	Service
Pump adjustment	Error in configuration memory.	Service
Bluetooth	Error in configuration memory.	Service

If the recommended scheduled maintenance is required, a respective message appears one month prior to that date. You should then have the device checked and readjusted by specialists trained by Dräger MSI.



15. Power supply

15.1 General power supply information

A chargeable lithium-ion battery installed in the measuring device enables mains-independent operation. The operating time with fully charged battery is up to 8 hours; this can vary depending on the type of measurements and the brightness set for the display. The battery life is at least 300 full charge cycles.

15.2 Charging batteries

The charge state of the battery is monitored by the measuring device and shown on the display. The battery symbol on the display indicates the charge state. The red charge control light on the side of the device blinks when the battery is empty. The device should be charged now. Only charge the measuring device using a 5 V DC / 1 A USB power supply unit. We recommend monthly recharging in the event of longer periods of non-use for at least 8 hours. The USB power supply provided with the device is designed to operate at 100 - 240 V AC. For safety reasons, the condition of the power supply should be checked regularly for damage.

The charging process takes 1 - 5 hours, depending on the charge state. The green LED on the side of the device blinks during the charging process. The blinking changes to a continuously lit light at the end of the charging process. This means that the battery is full and is now powered with a trickle charge current.

If battery charging fails, the device switches off automatically. If the device can no longer be turned on due to low voltage, the USB power supply unit must be connected and the device must be switched on again!

Please avoid a total discharge of the battery. This can damage the battery.

16. Technical specifications

16.1 General technical specifications

Display:	Colour display with touchscreen
Interfaces:	USB, IR
Power supply:	Li-ion battery, 3.6 V, 3400 mAh, charge level indicator, primary charger 100 - 240 V AC; secondary 5 V DC; 1 A
Battery life:	Up to 8 hours (depending on the type of measurement and the brightness of the display set)
Dimensions:	93 x 225 x 40 mm (w x h x d)
Weight:	approx. 540 g
Operating temperature:	+ 5 °C ... + 40 °C
Storage temperature:	- 20 °C ... + 50 °C
Relative humidity:	10 - 90% RH, non-condensing
Air pressure:	800 to 1100 hPa
Certification:	DIN EN 50379 Part 1 and Part 2, TÜV by RgG 320 VDI 4206 Part 1

16.2 Technical specifications Exhaust and pressure measurements

Display	Metering range	Resolution	Accuracy
Combustion air temperature	- 10 … + 100°C	0.1 °C	± 1 °C
Exhaust gas temperature	0 … + 600 °C	0.1 °C (< 100 °C) 1 °C (≥ 100 °C)	± 2 °C or 1.5% from MV*
O2	0 … 25 vol. %	0.1 vol. %	± 0.3 vol. %
CO	0 … 8,000 ppm	1 ppm	0 … 2,000 ppm: ± 20 ppm or 5% from MV* 2000 … 8,000 ppm: ± 10% from MV*
NO(1)	0 ... 2,000 ppm	1 ppm	0 …600 ppm: < ± 5 ppm or 5% from MV*
Draft(2)	- 500 … + 500 Pa	0.1 Pa	- 50 … + 200 Pa: ± 2 Pa or 5% from MV*
Pressure(3)	0 … 100 hPa (mbar) + 101 … 160 hPa (mbar)	0.01 hPa (mbar) 0.1 hPa (mbar)	0,5 hPa (mbar) or 1% from MV* 5% from MV*
Medium pressure(4) (ext.sensor, option)	-100 … +3,500 hPa (mbar)	1 hPa (mbar)	< 1% from MR**
High pressure(5) (ext.sensor, option)	0.01 MPa … 2.5 MPa (0.1 … 25.00 bar)	0.001 MPa (0.01 bar)	< 1% from MR**

*MV = measurement value **MR = metering range
(1) NO sensor only with NO configuration
(2) = Pmax. 1,250 Pa
(3) = Pmax 750 hPa (mbar)
(4) = Pmax 4,000 hPa (mbar)
(5) = Pmax = 35 bar

Calculated values

CO, undiluted	calculated	0 … 9,999 ppm	1 ppm
CO_2, carbon dioxide	calculated	0 … CO_2 max.	0.1 vol. %
Exhaust gas losses	calculated	0 … + 100% - 20 … + 100%*	0.1%
Efficiency	calculated	0 … + 100% 0 … + 120%*	0.1%
Excess air	calculated	1.00 ... 9.99	0.01
CO/CO_2 ratio	calculated	0 … 0.01	0.0001

* = taking the calorific value gain into consideration

17. PC measurement data management

Please go to our website www.draeger-msi.de to download the measurement data management. You can find the measurement data management software PC200P, which you can download after a brief registration with your device number and your address data under the menu item **Services→Downloads→FG7500→Software**.

18. Consumables and accessories

5600919	Combustion air sensor 130 mm
5600918	Flue gas probe FG7x00
5600923	Multi-hole adapter
5600926	Annular adapter
5610901	Gas pressure hose with bayonet connector
5600401	IR3 printer with infrared data transmission
5690151	Printing paper for IR3 printer
5680124	USB power supply plug 100 – 240 VAC
5650840	USB cable, 1 m
5600920	Carrying case FG7x00
5600921	Consumables set incl. 10 filter fleece and 5 filter discs
5600876	Pump adapter 150 mbar with quick coupling and Schrader valve connection to connect a pump The ½” adapter or the single-pipe cover is also required
5600875	Pressure sensor EP35 3.5 bar with quick coupling and Schrader valve connection with the option of connecting a pump The ½” adapter or the single-pipe cover is also required
5600877	Pressure sensor EP250 25 bar with quick coupling The ½” adapter or the single-pipe cover is also required to pump up to 10 bar with air, the pump adapter 10 bar is required
5600882	Pump adapter 10 bar with quick coupling and Schrader valve connection The ½” adapter or the single-pipe cover is also required

5600813	½” adapter with quick coupling
5600842	Single-pipe cover (≤ 3.5 bar) with quick coupling
5600880	Hand pump