MRU AIRfair since 1984 ®
EMISSION MONITORING SYSTEMS

500GD

USER MANUAL

HC40X

RM400

HM400

IR400

RF400

CO400

CD400

6822EN

Manufacturer:

MRU · Messgeräte für Rauchgase und Umweltschutz GmbH
Fuchshalde 8 + 12
74172 Neckarsulm-Obereisesheim
Fon 07132 99620 · Fax 07132 996220
info@mru.de · www.mru.eu

Legal notices / Intellectual property rights comments

Original user manual

Edition: 2025-11-17, V5.11.EN

Table of content

1 Information for product and safety

1.1. Safety precautions

Read this manual before using the measuring device for the first time. Observe all warnings.

Instrument-specific safety and warning requirements in this manual are prefixed before dangerous actions.

The used categories of safety precautions are here explained once more.

⚠ DANGER

Identifies an immediate, impending hazard that, if ignored, will result in severe bodily injuries or death.

⚠ WARNING

Identifies an immediate, impending hazard that, if ignored, may result in severe bodily injuries, material damage or death.

⚠ CAUTION

Identifies a possibly dangerous situation that, if ignored, may result in minor injuries.

ATTENTION

Identifies a possibly harmful situation that, if ignored, may result in damages to the device or its surroundings.

NOTE

Identifies user tips and other especially important information.

The explanation of safety notices:

⚠ CAUTION

HOT – danger of burns and fire hazards from gas extraction probe.

Physical harm and property damage can be caused.

► Cool down the probe tube.

2 Introduction

- This user manual enables you to operate the analyser safely.
- Read this user manual carefully.
- Make yourself familiar with the analyser, before using it.
- The analyser may only be used by skilled personnel and may only be used for its intended purpose.
- Pay special attention to the security and warning precautions, in order to prevent injuries and product damages.
- MRU can't be held responsible for damages or injuries, by not following the instructions in this manual.
- Always keep this user manual near you, when working with the analyser, to be able to read instructions as needed.
- Ensure to hand over all documents to when handing the analyser over to other.

2.1. Intended use

The analyser is a multidetector. Due to interchangeable sensors, the analyser can be used for a wide range of applications:

- Usable with interchangeable sensor RM400 for leak detection on exhaust pipes.
- Usable with interchangeable sensor HC400, HC401 and HC402 for leak detection on gas lines in non-explosive environments.
- Usable with interchangeable sensor RF400 for leak detection on refrigeration systems.
- Usable with interchangeable sensor HM400 to measure environmental parameters (air pressure, humidity, air temperature and dew point).
- Usable with interchangeable sensor CO400 for monitoring the CO-concentration in the ambient air.
- Usable with interchangeable sensor CD400 for monitoring the CO_2-concentration in the ambient air.

The analyser records and stores measured values. The measured values can be exported by QR code.
The analyser was manufactured according to relevant standards and regulations. The analyser must be used according to the instructions for the intended used.

⚠ WARNING

Risk from manipulations to the measuring device

Operational safety hazard

- Modifications or changes to the measuring device are not allowed.

2.2. About us

The analyser is produced by the MRU GmbH in Neckarsulm, Germany (Founded in 1984), a medium sized company that specializes in developing, producing and marketing high quality emission monitoring analysers.
MRU GmbH produces a wide range of instruments, from standard analysers up to tailor made industrial analysers.

From left to right: Production - Sales, administration and development - Customer service

MRU GmbH
Fuchshalde 4 + 8 + 12
74172 Neckarsulm - Obereisesheim
GERMANY

Tel +49 71 32 99 62 0 (Front office)
Tel +49 71 32 99 62 61 (Service)
Fax +49 71 32 99 62 20
Email: info@mru.de
Site: www.mru.eu

3 Description

3.1. Purpose

The main purpose of the analyser in combination with various inter-changeable sensors is the detection of gases and exhaust gases in gas and heating installations.

For example, checking of:

- freely laid gas pipelines
- ambient air for combustible gases
- manholes and cavities
- Installations for external tightness
- newly laid gas pipelines for leaks.

In addition, the range of application of the analyser can be extended by further interchangeable sensors.

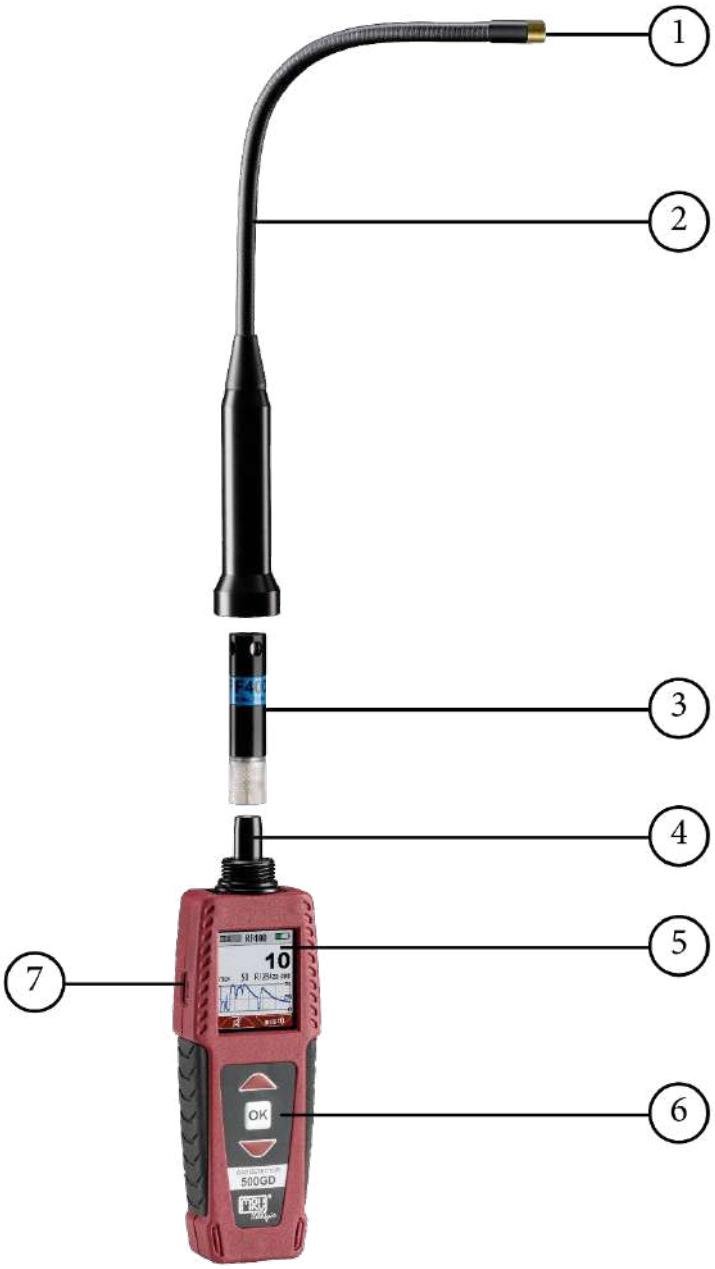
The following interchangeable sensors are available:

- Gas sensor H40x for detecting leaks in gas pipes.
- Humidity sensor RM400 for detecting leaks in flue pipes.
- Condensing humidity sensor RM400 for spillage tests on flue gas
- Systems
- Infrared temperature sensor IR400 for contactless measurement of surface temperature
- Hygrometer sensor HM400 for the check of indoor climate.
- Refrigerant detector RF400 for leak detection on refrigeration Systems
- Gas sensor CO400 for monitoring the CO-concentration in the ambient air.

Visit our webpage www.mru.eu to see available options or talk to your MRU representative.

3.2. The Analyser

The analyser consists of a compact and robust glass-fibre reinforced plastic housing.



No.	Description	No.	Description
1	Unscrewable filter grid	2	Flexible arm
3	Interchangeable Sensor	4	Sensor connector
5	Display	6	Keypad
7	Mini USB interface		

ATTENTION

Damage to the battery

Incorrect charging may damage the battery.

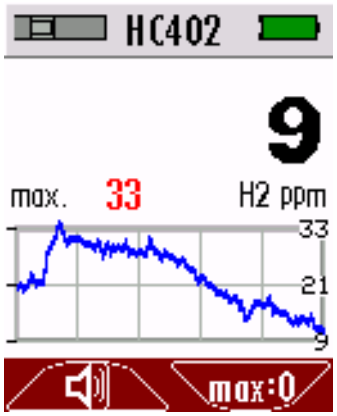
- The battery may only be charged using the power supply unit provided.
- Please observe the user guidelines for the battery.

3.3. User interface

All functions are selected from the analyser display.
Operation and navigation are carried out via a keypad.
In the individual menus and windows additional submenus are available.

Keypad

Start screen Measurement



3.4. Menu structure

All functions are available in the menu EXTRAS. The menu structure is dynamic. The menu structure changes depending on the inserted interchangeable sensor.
Without inserted interchangeable sensor the menu structure of the basic unit contains the following basic menu items:

Menu item	Explanation
Start	Start a measurement
Off	Switching off Analyzer
Settings	Setting QR-code Setting language Setting brightness Setting volume Setting Off time
Service	Status vales (Battery, USB ...)
Info	Information about the analyser

Sensor-specific menu items are explained in the corresponding explanation of the respective interchangeable sensor.

4 Operation

4.1. Commissioning

The analyser leaves the factory assembled. The analyser has been calibrated and is ready for use.

► Check the analyser for completeness and integrity.
► Charge the internal battery for at least 8 hours.

4.2. Charging the battery

The analyser has an integrated rechargeable battery.
The battery can be charged as follows:

- With optional mains plug via the USB socket.
- With a USB cable on the PC via the USB socket

The battery symbol displays the capacity of the battery. The indicator changes its colour from green to orange to red.

4.3. Switching on the analyser

► Press and hold the OK key for at least 3 seconds.
⇨ The MRU start screen appears.
⇨ A display for inserting an interchangeable sensor appears.

NOTE

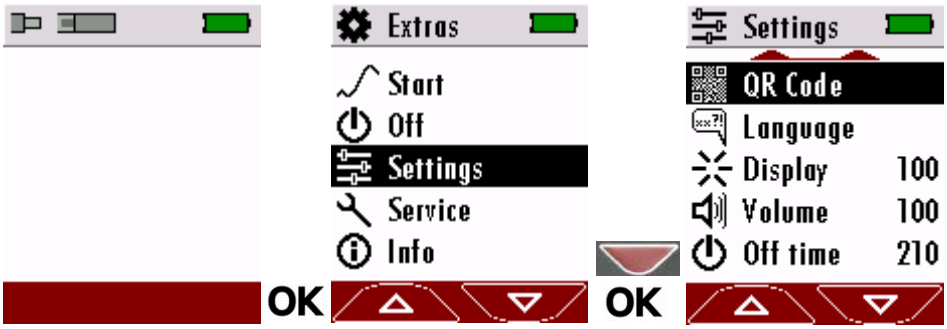
If you switch on the analyser for the first time, a screen for setting the language appears.

► Choose the desired language.
► Press “OK”.

►Insert an interchangeable sensor.
- ⇨ If necessary, a warm-up countdown appears (e. g. with HC400)
- ⇨ The measurement menu is being displayed after warmup.
- ⇨ The analyser is ready to measure.

4.4. Make settings on the basic unit

The menu structure is dynamic. The menu structure changes depending on the inserted interchangeable sensor. In the following, only settings are shown that can be carried out on the basic unit without am inserted interchangeable sensor. The settings shown here can also be made with an inserted interchangeable sensor. Sensor-specific menu items are explained in the corresponding explanation of the respective interchangeable sensor.



► Switch on the analyser.
- ⇨ The analyser indicates that an interchangeable sensor is missing.

► Press "OK".

► Choose "Settings".
- ⇨ A selection list appears.

► Choose the desired setting.

Setting options for QR code

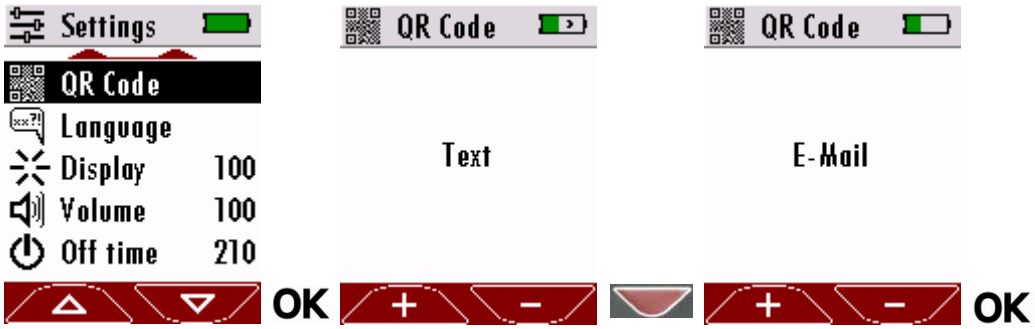
The analyser uses the QR code to transmit a simple "measurement protocol".
The analyser supports QR code from firmware version V1.00.20.
If an older firmware version is installed, the firmware can be updated.

The following options are available:

- Text mode:
  the protocol is transmitted in the form of a text module that can be pasted or saved in a document.
- E-mail mode:
  the protocol is transmitted in the form of a text module. The text

module is marked as an email, so a smartphone/PC automatically makes an e-mail draft.

- Off:
  The measurement is not protocolled.

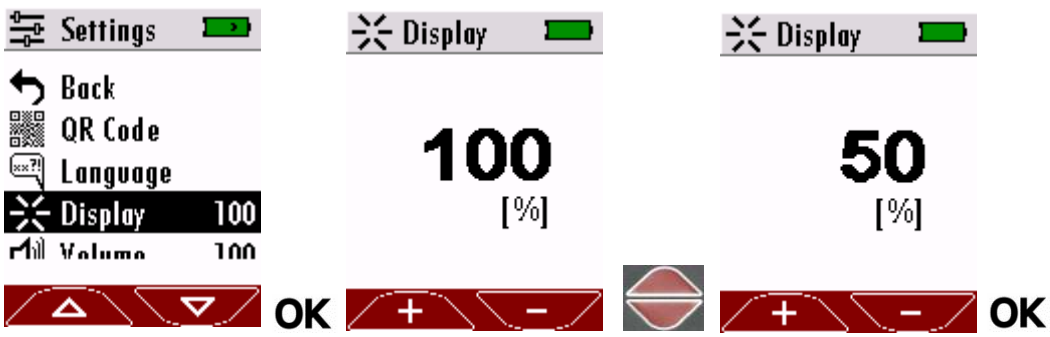


► Choose "QR Code".
► Press "OK".
► Choose the desired option.
► Press “OK”.
⇨ The option is saved.

Setting language

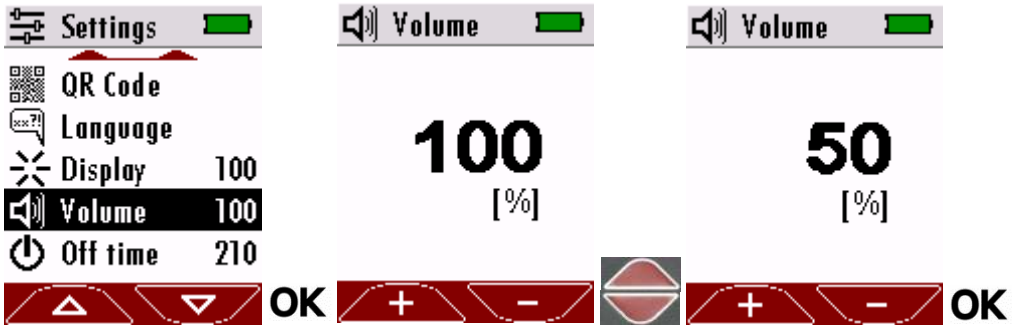
► Choose “Language”.
► Press “OK”.
► Choose the desired option.
► Press “OK”.
⇨ The desired language is saved.

Setting brightness



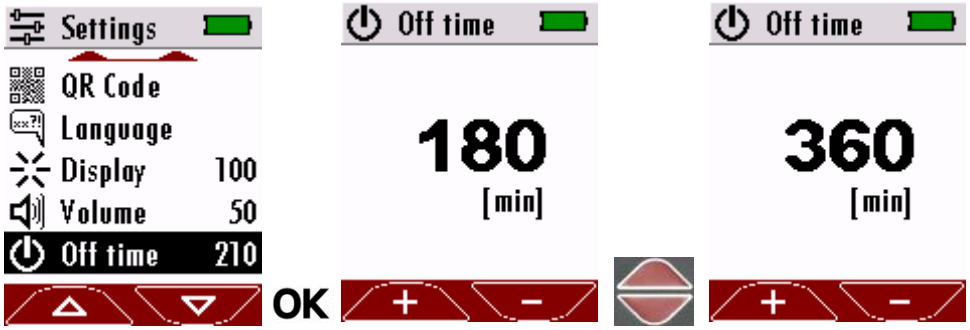
► Choose “Display”.
► Press “OK”.
► Select the desired brightness level.
⇨ The desired brightness level is saved.

Setting volume



► Choose “Volume”.
► Press “OK”.
► Select the desired volume level.
⇨ The desired volume is saved.

Setting Off time



► Choose “Off time”.
► Press ”OK”.
► Select the desired time period.
⇨ The desired time period is saved.
⇨ If no input command is received within the desired time period, the analyser switches off automatically.
⇨ 10 seconds before the desired time period expires, a countdown appears in the display.
⇨ Press a button before the countdown expires.
⇨ The analyser remains switched on.

4.5. Switching off the analyser

There are two possibilities to switch off the analyser.

► Select „Off“.

► Press „OK“.

⇨ The analyser switches off.

Alternatively, you can switch off the analyser as follows:

► Press and hold the OK key for at least 3 seconds.

⇨ The analyser switches off.

5 Measuring

DANGER

Danger when used improperly

Deadly accidents can be the result if the rules are not obeyed.

▶ The analyzer may only be used for its intended purpose.

DANGER

Explosion danger in EX zones

There is a possibility of explosion in an EX-zone.

▶ The analyzer may only be used in explosion free zones.

5.1. Inserting interchangeable sensor

Please note that there are two different ways of plugging in the interchangeable sensors. Some interchangeable sensors do not require a screwed-on probe tube. The analyser automatically detects whether a probe tube needs to be screwed on. The analyser will display a corresponding message.

Use interchangeable sensor without probe tube

▶ Insert the desired interchangeable sensor into the sensor connector.

▶ Make sure that the interchangeable sensor clicks into place audibly.

▶ Switch on the analyser.

☞ See also Chapter 4.3 Switching on the analyser, Page 13.

⇨ The analyser automatically identifies the inserted interchangeable sensor.

⇨ An information window appears in the display for approx. 5 seconds.

⇨ Depending on the interchangeable sensor, a warm-up phase appears.

Use interchangeable sensor with probe tube

► Insert the desired interchangeable sensor into the sensor connector.
► Make sure that the interchangeable sensor clicks into place audibly.
► Switch on the analyser.
  ☞ See also Chapter 4.3 Switching on the analyser, Page 13.
  ⇨ The analyser automatically identifies the inserted interchangeable sensor.
  ⇨ An information window appears in the display for approx. 5 Seconds.
  ⇨ A message “Attach the probe tube” appears.
  ⇨ Depending on the interchangeable sensor, a warm-up phase appears.
  ⇨ An animation for attaching the probe tube appears.
► Screw the probe tube onto the base unit.
  ⇨ A fan symbol appears in the display.

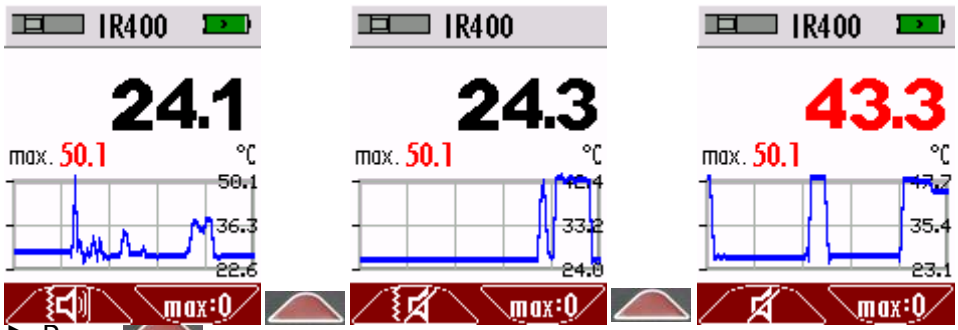
Set alarm mode

The analyser can indicate an exceeding of the set alarm thresholds by an acoustic signal as well as by vibration

You can set how the analyser should react when the set alarm threshold is exceeded.

NOTE

Note that a interchangeable sensor must be plugged in to set the alarm mode.
Note that the setting of the alarm mode is carried out in the measurement window.



► Press

⇨ The alarm mode changes.

Display	Description
	The analyser vibrates and makes acoustic signals.
	The analyser vibrates.
	The analyser does not vibrate and does not give any acoustic signals.

5.2. Detection with interchangeable sensor HC40X

ATTENTION

Damage to the device due to incorrect operation

Destruction of the HC sensor by exceeding the measuring range

► Observe the meas. range of the HC sensor, do not exceed it.

The interchangeable sensors HC400, HC401 and HC402 are gas sensors which are used for leak detection on gas lines in non-explosive environments.

You can use the interchangeable sensor...

- HC400 to detect CH_4 (methane).
- HC401 to detect CH_4 (methane) and C_3H_8 (propane).
- HC402 to detect CH_4 (methane) C_3H_8 (propane) and H_2 (hydrogen).

Using the interchangeable sensor HC402 as an example, the following shows how to start and configure a measurement.

Starting detection

⚠ DANGER

Risk due to improper use

Fatal accidents may occur if the measurement rules are disregarded.

► Only use the measuring device to locate gas leaks in the installation area**.**

► Even if the sensor does not locate a leak, this is not sufficient proof of the tightness of a pipe system. Observe the relevant valid rules.

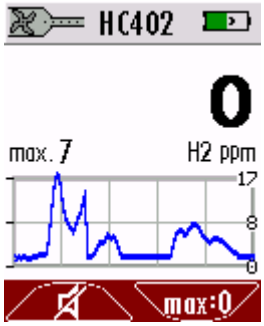
► Plug the desired interchangeable sensor into the sensor connection.

☞ See also chapter Use interchangeable sensor with probe tube, Page 19.

NOTE

Once the warm-up is complete, the measured values are guaranteed to meet the specifications. If you then wait another 1-2 minutes before measuring, you can achieve even more accurate measurements, as the sensor continues to heat up.

- ⇨ After the warm-up, the analyser automatically switches to the measuring mode.
- ⇨ The measurement starts.



► Guide slowly the interchangeable sensor along the areas to be tested.

- ⇨ If there is a leakage, the value changes.
- ⇨ The process is displayed graphically.
- ⇨ Optical and acoustic alarm signals indicate gas leakage.

Configuring detection

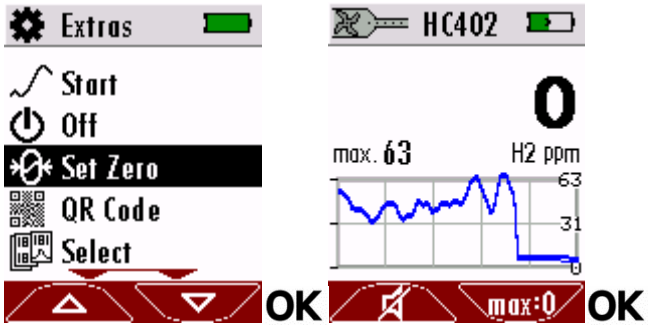
For settings that can be made on the basic unit

☞ See also chapter 4.4 Make settings on the basic unit, Page 14.

In the following, only sensor-specific settings are described.

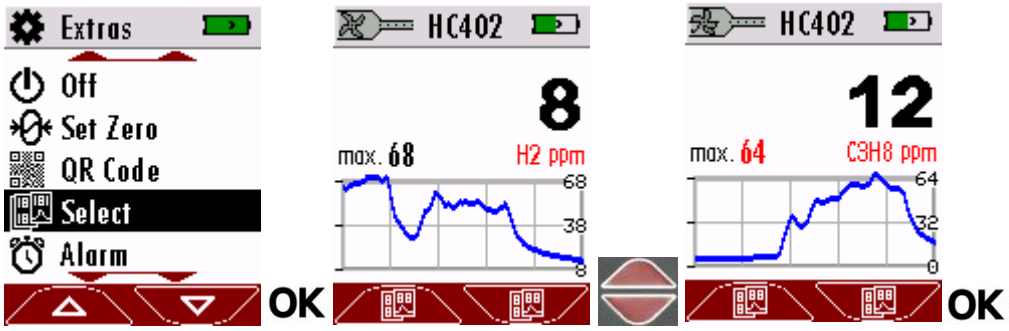
Setting Zeropoint

Leave the analyser in good fresh air for five minutes, if possible, without changing the temperature. Now you can take a zero point. You can repeat a zeroing as often as you like.



► Select „Set Zero“.
► Press „OK“.
  ⇨ A window appears.
  ⇨ Zero point is set automatically.
► Press „OK“.
  ⇨ The menu Extras appears.

Selecting gas

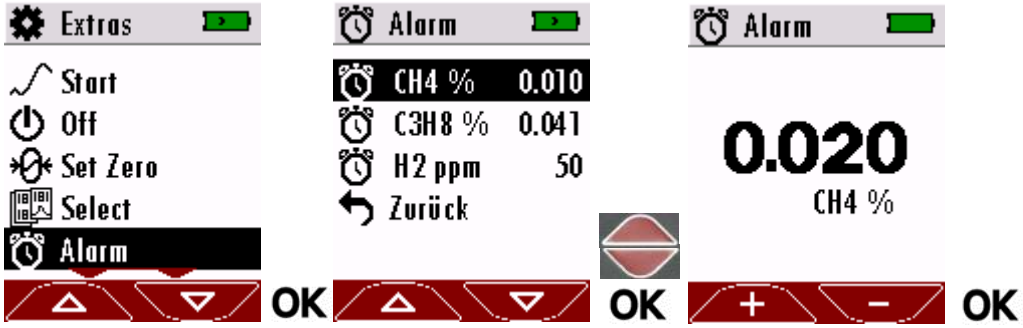


► Select „Select“.
► Press „OK“.
► Choose the desired gas.
► Press „OK“.
  ⇨ The desired gas is saved.
  ⇨ The menu Extras appears.

NOTE

For the detection of forming gas (5% H2 + 95% N) set the gas type H2.

Setting alarm threshold



► Select „Alarm“.
► Press „OK“.
► Choose the desired gas.
► Press „OK“.

⇨ A window appears.

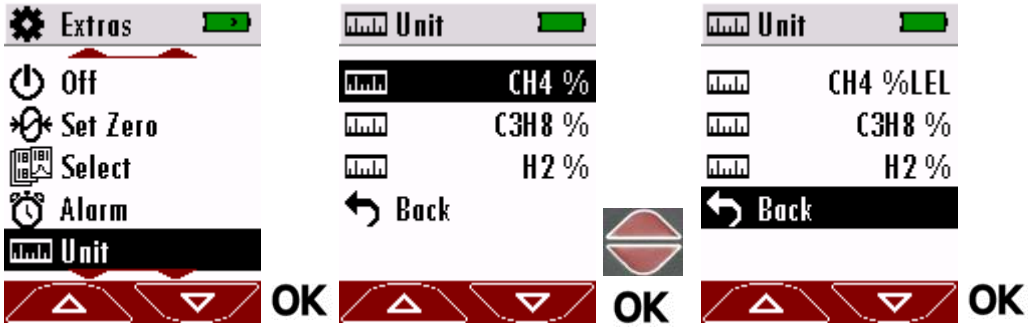
► Set the desired alarm threshold.
► Press “OK”

⇨ The alarm threshold is changed.

► Select “Back”.
► Press “OK”.

⇨ The menu Extras appears.

Setting unit



Seselect „Unit“.

► Press „OK“.
► Choose the desired gas.
► Press „OK“.

⇨ The unit is changed.

► Select „Back“.
► Press “OK”.

⇨ The menu Extras appears.

5.3. Measuring with interchangeable sensor RM400

The interchangeable sensor RM400 is used for leak detection on flue gas pipes.
The interchangeable sensor RM400 functions on the basis of a conductive sensor surface.

Starting measurement

⚠ DANGER

Risk due to improper use

Fatal accidents may occur if the measurement rules are disregarded.

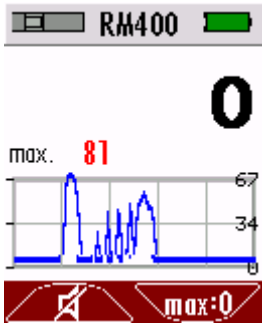
► Only use the measuring device to locate gas leaks **in the installation area**.

For measurement, the sensor surface must be dry and at room temperature.

► Plug the desired interchangeable sensor into the sensor connection.

☞ See also chapter Use interchangeable sensor without probe tube, Page 18.

⇨ The measurement starts.



► Guide slowly the interchangeable sensor along the areas to be tested.

⇨ If there is a leakage, the measured value changes.
⇨ The measurement process is displayed graphically.
⇨ Optical and acoustic alarm signals indicate gas leakage.

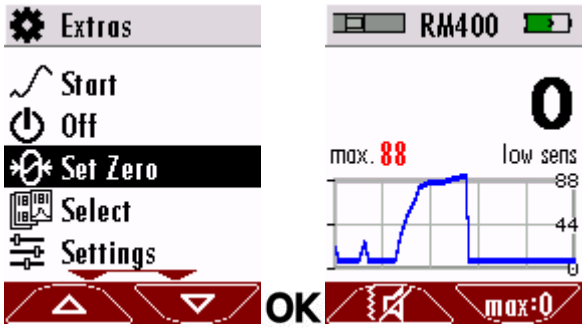
⇨ The flashing frequency of the red LED in the sensor foot increases with the increase of the measured gas concentration.

Configuring measurement

For settings that can be made on the basic unit

☞ See also chapter 4.4.Make settings on the basic unit, S.14

Setting Zeropoint



► Select „Set Zero“.
► Press „OK“.
⇨ A window appears.
⇨ Zero point is set automatically.
► Press „OK“.
⇨ The menu Extras appears.

5.4. Measuring with interchangeable sensor HM400

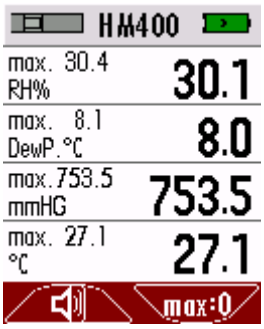
The interchangeable sensor HM400 is used to measure ambient parameters.

You can use the interchangeable sensor to...
- to measure the air humidity
- to measure the dew point
- to measure the air pressure
- to measure the air temperature

Starting measurement

► Plug the desired interchangeable sensor into the sensor connection.
☞ See also chapter Use interchangeable sensor without probe tube, Page 18.
⇨ In the Display "HM400" appears.

⇨ The measurement starts.



Configuring measurement

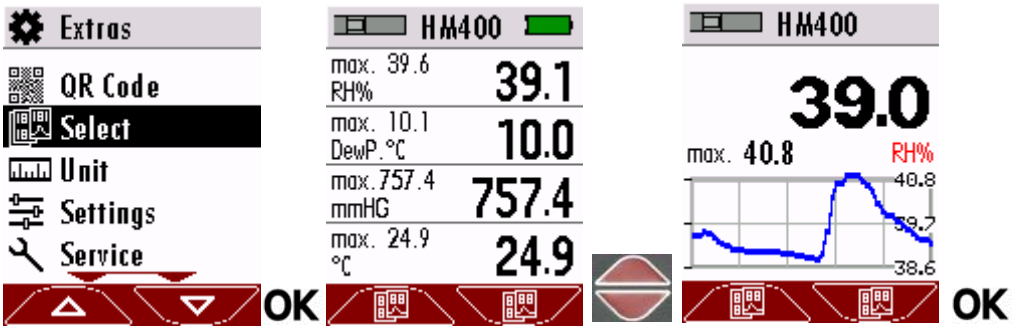
For settings that can be made on the basic unit

☞ See also chapter 4.4.Make settings on the basic unit, S.14

In the following, only sensor-specific settings are described.

Selecting measured values

With the interchangeable sensor HM400, it is possible to display all measured values on the display. However, you also have the option of displaying a single measured value with a measurement curve in the display.

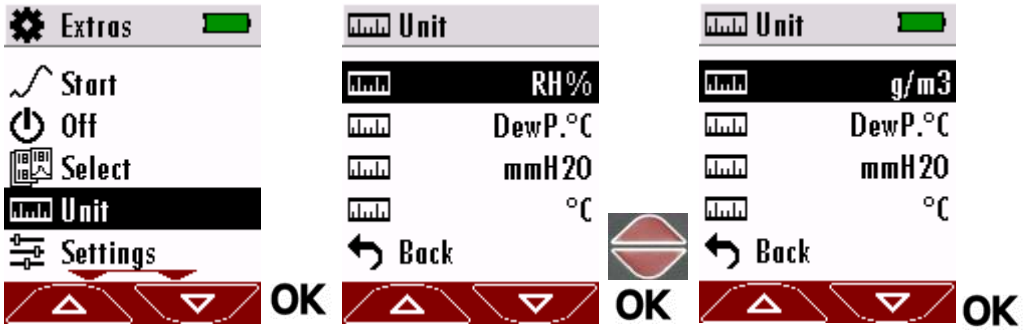


► Select „Select“.
► Press „OK“.
► Choose the desired measured value.
► Press „OK“.

⇨ The desired measured value is saved.

⇨ The menu Extras appears.

Setting unit



► Select „Unit“.
► Press „OK“.
► Choose the desired measured value.
► Press “OK”.

⇨ The unit is changing.

► Select “Back”.

⇨ The desired unit is saved.
⇨ The menu Extras appears.

The following setting are possible:

Criterion	*Adjustable units*
Humidity	% (relative), g/m^3 (absolut)
Dew point	° C, ° F
Air pressure abs.	hPa, inHG, mmHG, mmH_2O
Temperature	° C, ° F

5.5. Measuring with interchangeable sensor IR400

The interchangeable sensor IR400 is used for non-contact temperature measurement.

Starting measurement

⚠CAUTION

Beware of hot surface

Hot surfaces cause severe burns.

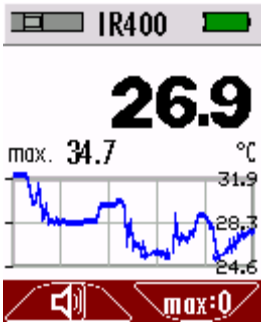
► Do not touch hot surfaces.

► Plug the desired interchangeable sensor into the sensor connection.

☞ See also chapter Use interchangeable sensor without probe tube, Page 18.

⇨ In the Display "IR400" appears.

⇨ The measurement starts.



► Guide slowly the interchangeable sensor along the areas to be tested. The measuring distance depends on the size of the surface to be measured. The measurement becomes more accurate, when you go close to the surface. The minimum distance is approx. 1 - 2 cm.

⇨ The measurement process is displayed graphically.

⇨ Visual and audible alarm signals indicate a measurement above the set alarm threshold.

⇨ The flashing frequency of the red LED in the sensor foot increases with a measurement above the set alarm threshold.

Configuring measurement

For settings that can be made on the basic unit

☞ See also chapter 4.4.Make settings on the basic unit, Page 14.

In the following, only sensor-specific settings are described.

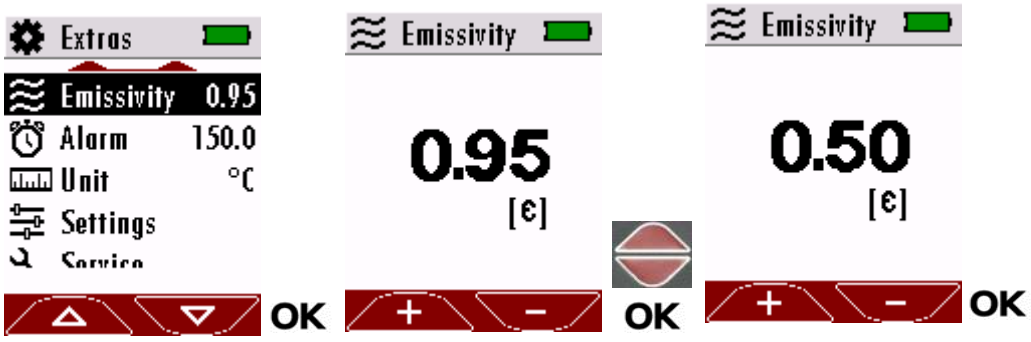
Setting emissivity

Measuring objects emit infrared radiation.
The interchangeable sensor IR400 detects the infrared radiation emitted and calculates the temperature from it.
The emissivity describes the ability to of a body to release infrared energy into its environment. The emissivity is given on a scale between 0 and 1. A black body is considered an ideal radiant heater and thus has an emissivity of 1. High emissivities between 0.8 and 1.0 are found in many non-ferrous metals with low reflective surfaces such as wood, stone and concrete and are well suited for IR measurement.
However, metals, especially those with polished or shiny surfaces, can have an emissivity of 0.1 and are poorly suited for IR measurement.
Set the corresponding emissivity before the measurement.
Otherwise, there may be large deviations in the measurement.

Emissivity of important materials:

Material	emissivity ε
Aluminium	0,02 – 0,31 (oxidized)
Concrete	0,93
Iron	0,13 – 0,85 (corroded)
Tiles	0,93
Glass	0,94
Rubber	0,94
Wood	0,94
Copper	0,03-0,76 (oxidized)
Plastics (PE, PP, PVC)	0,94
Brass (oxidized)	0,61
Black lacquer (matt)	0,97
Clay burned	0,91
Brick, Mortar, Plaster, Gypsum	0,9-0,95

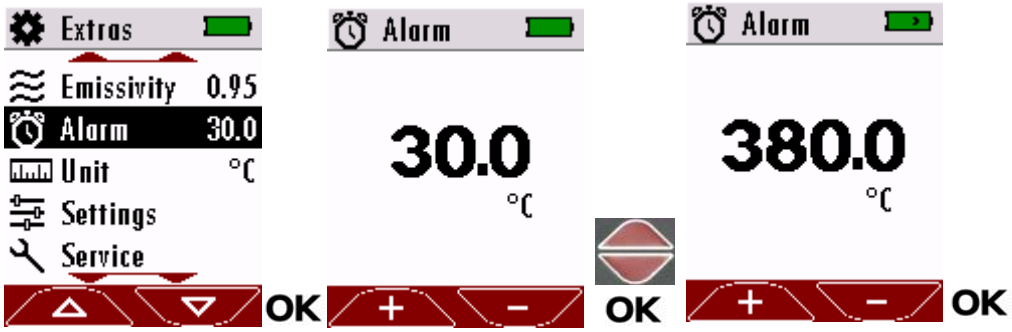
The emissivities given here serve as a rough orientation and may vary greatly depending on the variation of the material (e. g. not oxidized to oxidized). Research the emission levels relevant to you, e. g. on the Internet or in the relevant specialist literature.



► Select „Emissivity“.
► Press „OK“.
► Select the desired emissivity.
► Press „Ok“.

⇨ The desired emissivity is saved.
⇨ The menu Extras appears.

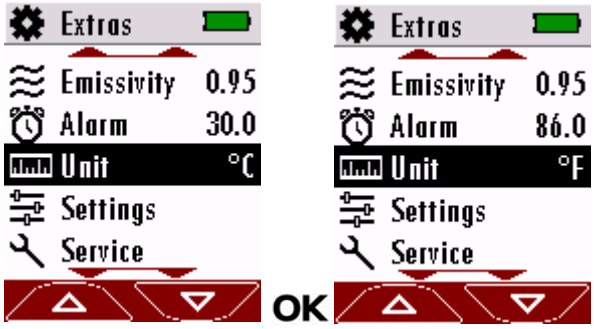
Setting alarm threshold



► Select „Alarm“.
► Press „OK“.
► Set the desired alarm threshold.
► Press „OK“.

⇨ The alarm threshold is saved.
⇨ The menu Extras appears.

Setting unit



► Select “Unit”.
► Press “OK”.

⇨ The unit is changing.

5.6. Detection with interchangeable sensor RF400

The interchangeable sensor RF400 is used for leak detection on air conditioners.

NOTE

Use of test leaks

- The suction must touch the exit of the test leak.
- The sensor must react within three seconds to pass the test.
- From experience, equivalent test leaks give a lower signal and have a greater inertia than refrigerants.

Starting detection

► Plug the desired interchangeable sensor into the sensor connection.

☞ See also chapter Use interchangeable sensor with probe tube, Page 19.

⇨ In the Display "RF400" appears.

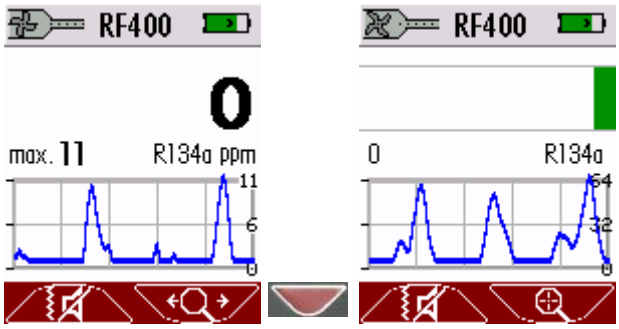
⇨ After the warm-up, the analyser automatically switches to the measuring mode.

⇨ The detection starts.

NOTE

With the RF400 interchangeable sensor, you have the option of switching between two display modes.

- Detection mode (bar display): optimised for fast response for rough location of a leak
- Search mode (PPM display): to determine the exact position and to evaluate the leakage



► Press the arrow key if necessary 

⇨ The display mode changes.

► Guide slowly the interchangeable sensor along the areas to be tested.

⇨ If there is a leakage, the measured value changes.

⇨ The measurement process is displayed graphically.

⇨ Optical and acoustic alarm signals indicate gas leakage.

Configuring detection

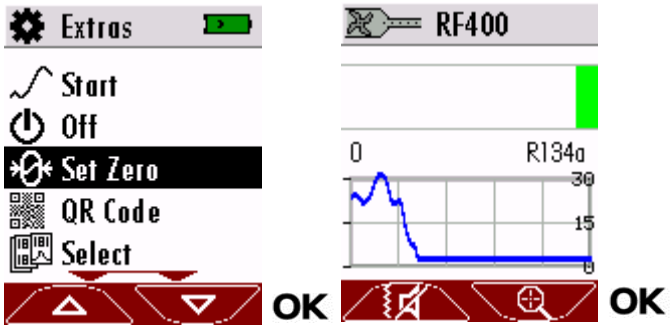
For settings that can be made on the basic unit

☞ See also chapter 4.4 Make settings on the basic unit, Page 14.

In the following, only sensor-specific settings are described.

Setting Zeropoint

Leave the analyser in good fresh air for five minutes, if possible, without changing the temperature. Now you can take a zero point. You can repeat a zeroing as often as you like.



► Select „Set Zero“.

► Press „OK“.

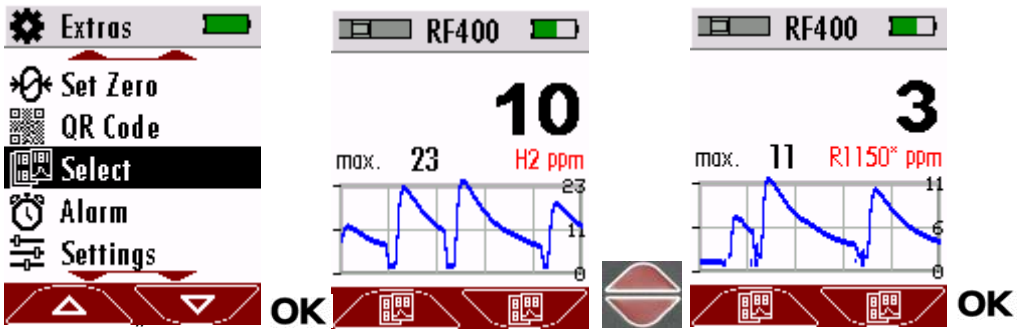
⇨ A window appears.

⇨ Zero point is set automatically.

► Press „OK“.

⇨ Window is closed.

Selecting refrigerant



► Press “OK”.

► Choose the desired refrigerant.
► Press “OK”.
  ⇨ The desired refrigerant is saved.
  ⇨ The menu Extras appears.

NOTE

For the detection of forming gas (5% H2 + 95% N) set the gas type to H2.

Setting alarm threshold

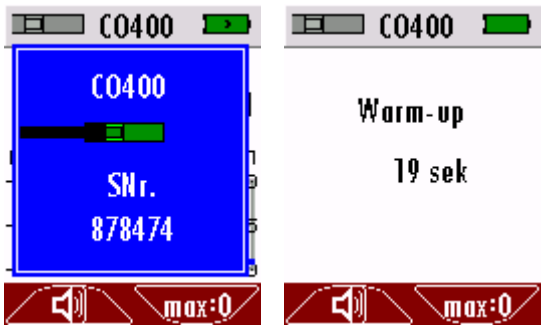
► Select „Alarm“.
► Press „OK“.
► Set the desired alarm threshold.
► Press „OK“.
  ⇨ The alarm threshold is saved.
  ⇨ The menu Extras appears.

5.7. Measuring with interchangeable sensor CO400

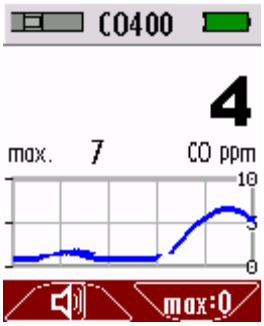
The interchangeable sensor CO400 is used for monitoring the CO-concentration in the ambient air.

Starting measurement

► Plug the desired interchangeable sensor into the sensor connection.
  ☞ See also chapter Use interchangeable sensor without probe tube, Page 18.
  ⇨ In the Display "CO400" appears.



⇨ After the warm-up, the analyser automatically switches to the measuring mode.
⇨ The measurement starts.



► Slowly guide the sensor to the location to be tested.
⇨ The measurement process is displayed graphically.
⇨ Visual and audible alarms indicate the escape of CO (carbon monoxide).
⇨ The flashing frequency of the red LED in the sensor foot increases with the increase of the measured gas concentration.

Configuring measurement

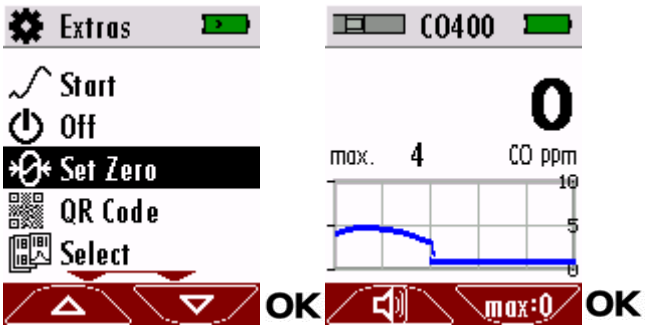
For settings that can be made on the basic unit

☞ See also Chapter 4.4.Make settings on the basic unit, S.14.

In the following, only sensor-specific settings are described.

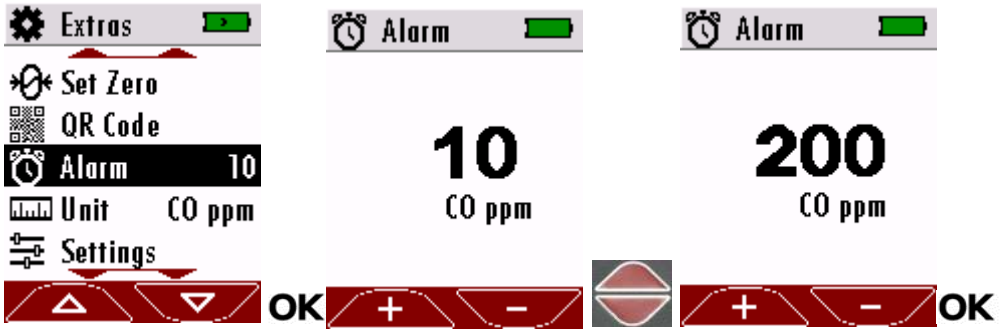
Setting Zeropoint

Leave the analyser in good fresh air for five minutes, if possible, without changing the temperature. Now you can take a zero point. You can repeat a zeroing as often as you like.



► Select „Set Zero“.
► Press „OK“.
⇨ A window appears.
⇨ Zero point is set automatically.
► Press „OK“.
⇨ The menu Extras appears.

Setting alarm threshold



► Select „Alarm“.
► Press „OK“.
► Set the desired alarm threshold.
► Press „OK“.
⇨ The alarm threshold is saved.
⇨ The menu Extras appears.

NOTE

Pay attention to the unit for which you set an alarm threshold for the interchangeable sensor CO400.
You can select CO ppm or CO mg/m³.

► If necessary, change the unit.
☞ See Setting unit, Page 35

Setting unit

► Select „Unit“.
► Press „OK“.
⇨ The unit is saved.

5.8. Measuring with interchangeable sensor CD400

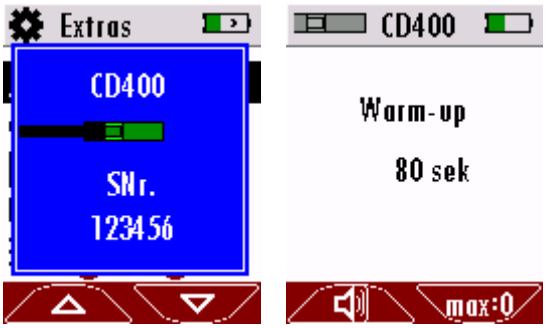
The interchangeable sensor CD400 is used for monitoring the CO_2-concentration in the ambient air.

Starting measurement

► Plug the desired interchangeable sensor into the sensor connection.

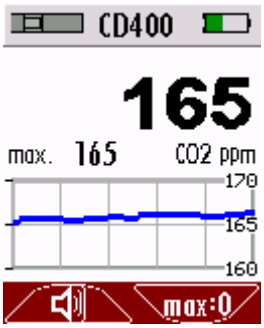
☞ See also chapter Use interchangeable sensor without probe tube, Page 18.

⇨ In the Display "CD400" appears.



⇨ After the warm-up, the analyser automatically switches to the measuring mode.

⇨ The measurement starts.



Configuring measurement

For settings that can be made on the basic unit

☞ See also chapter 4.4.Make settings on the basic unit, S.14.

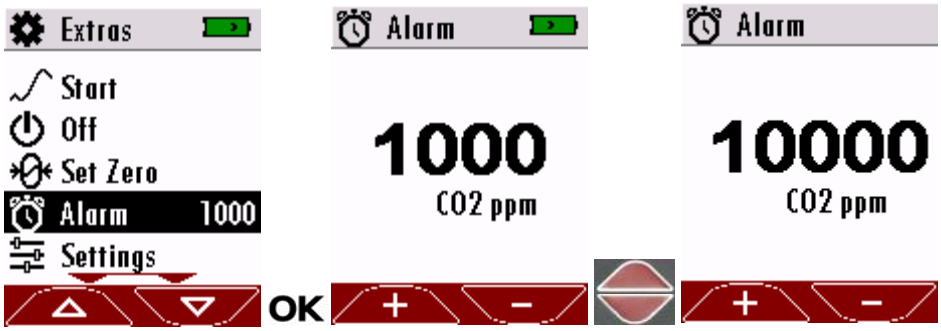
In the following, only sensor-specific settings are described.

Setting Zeropoint

When taking a zero point, the measured CO_2-value is set to 400ppm. When the analyser is switched on, no new zero point is taken.
You can set a new zero, if it no longer 400ppm (350...500ppm) is displayed in fresh air due to ageing or environmental conditions.
Leave the analyser in good fresh air for five minutes, if possible, without changing the temperature. Now you can take a zero point. You can repeat a zeroing as often as you like.

► Select „Set Zero“.
► Press „OK“.
⇨ A window appears.
⇨ Zero point is set automatically.

Setting alarm threshold



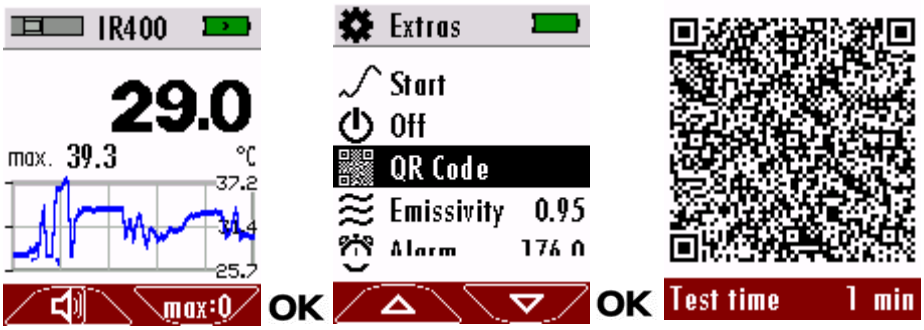
► Select „Alarm“.
► Press „OK“.
► Set the desired alarm threshold.
► Press „OK“.
⇨ The alarm threshold is saved.

5.9. Exporting the measurement protocol via QR code

You can create a measurement protocol of the current measurement using the QR code export.

To be exported:
- sensor name
- sensor serial number
- min. / max. Values
- duration of measurement

The following section describes how to export a measurement protocol using the IR400 interchangeable sensor as example.
The export with other interchangeable sensors follows the same principle.



► Press „OK".

⇨ The measurement window is closed.

⇨ Logging is interrupted.

► Select „QR Code".

⇨ A window with the QR code appears.

Scan the QR code. Use a smartphone.

NOTE

Note that the QR code is not compatible with the MRU4u app.
Any smartphone camera applications can scan QR codes (e.g. Apple, Huawei). This Android app works well to: "Barcode Scanner"
(Developer: ZXing Team)

⇨ The measuring protocol is exported according to the set options.

☞ See also chapter Setting options for QR code, page 14.

► Press max:0 or set a zero point to discard the current measurement protocol.

A new measurement protocol is started automatically.

NOTE

The measurement protocol is not saved in the analyser.
► Transfer the measurement protocol to a smartphone immediately after measurement.

6 Display device information

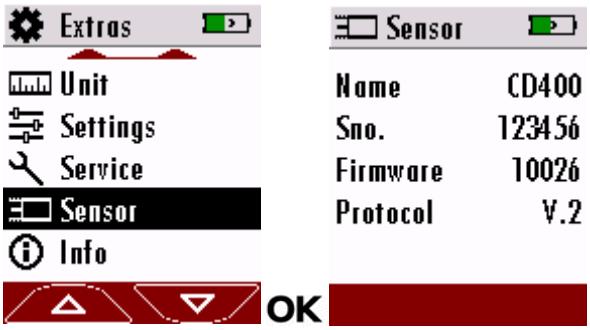
6.1. Display device information of the basic unit

In the Info menu, you can display the firmware version, among others.

► Select “Info”.
► Press “OK”.
  ⇨ The menu Info appears.
  ⇨ Device information of the basic device is displayed.
► Press “OK”.
  ⇨ The menu Extras appears.

6.2. Display sensor information

In the menu Sensor you can, among others, view the firmware version of the interchangeable sensor that is plugged in.



► Select “Sensor”.
► Press “OK”.
  ⇨ The menu Sensor appears.
  ⇨ Information of the interchangeable sensor is displayed.
► Press “OK”.
  ⇨ The menu Extras appears.

7 Maintenance and care

7.1. Maintenance

For accurate reading we suggest an annual service and calibration of the analyzer at a local authorized service location (www.mru.eu).

7.2. Testing reaction time

► Connect the interchangeable sensor to be calibrated onto the 400GD.
► Test the reaction time of the interchangeable sensor with test- or calibration gas.

⇨ If the gas reaches the interchangeable sensor by diffusion, the measured value must increase after 5 seconds at the latest.
⇨ If the gas is blown directly to the interchangeable sensor, the measured value must increase after 1 second at the latest.

NOTE

► You can build a test apparatus yourself.
► Fill 95% water into a vessel.
Fill 5% spirit into the vessel.
► Guide the interchangeable sensor to the opening of the vessel.

⇨ The measured value increases.

► For the interchangeable sensors HC40XC weekly test intervals are recommended.

7.3. Perform function test

NOTE

The test gas is not suitable for calibrating the analyser/interchangeable sensors. The test gas is only suitable for testing the function of the analyser or the interchangeable sensors.

☞ See also chapter 8.2 Interchangeable Sensors, Page 44.

For checking the functionality of the sensor head, a test gas system is needed. The picture below shows the analyser, connected with the available test gas system.

► Follow the steps below to test the HC40X interchangeable sensor.
► Switch on the analyser.
► Connect the HC40X interchangeable sensor to the analyser.
► Wait until the heating time has elapsed.
► Impinge the analyser with the test gas. (see picture above)
► Compare the setpoint of the gas bottle with the displayed actual value.

7.4. Care

This is a low maintenance analyser:

► If not used for a long time, charge the battery approx. every six months

7.5. Sensor-specific care instructions

RM400:

NOTE

The interchangeable sensor RM400 functions on the basis of a conductive sensor surface.

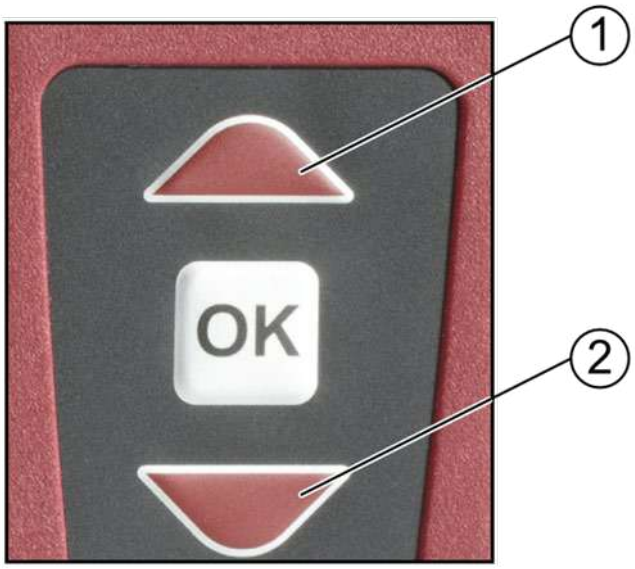
► Do not clean with alcohol or distilled water.

► If necessary, clean the sensor surface with saline water.

► Let the sensor surface dry after cleaning.

7.6. Resetting device

If the device no longer responds, you can perform a reset.



Position	Description
1	Key arrow up
2	Key arrow down

► Press the Key arrow up and the Key arrow down simultaneously.

8 Appendix

8.1. Technical data 500 GD

Specification	Values
Operating temperature	-10°C ... +50 °C
Rel. Humidity, non-condensing	0...95%
Storage Temperature	-20°C ... +60°C
Li-Ion internal battery pack, operating hours (depending on sensor type used)	Li-Ion typ. 5h-20h
Power supply	100 - 240 V / 5V DC / 500 mA
Weight	ca. 220g
Dimensions (without probe tube)	50 x25 x163 mm
Dimensions Unscrewable filter grid	Ø 7,6 mm
Housing material	PA6GF30
IP degree of protection	IP30
Display	45 mm (1.8") TFT
Interface for battery charging and SW update function	Mini-USB
Alarm	optical, acoustic, vibration
Supported languages (V1.00.68)	English, German, Italian, French, Czech, Romanian, Spanish, Hungarian, Dutch, Slovenian, Russian, Japanese, Portuguese, Bulgarian, Danish, Korean

8.2. Interchangeable Sensors

Interchangeable Sensor HC400 (Nr.11138)

The interchangeable sensor HC400 does not respond to sealing paste like "neo-fermit" or "plastic-fermit".

Specification	Values
Calibration Gas	CH_4
Measuring Range CH_4	0... 22000 ppm
Resolution	1 ppm
Response Time (until Alarm)	≤2s (500GD)
Operating principle	Gas-sensitive semiconductor
Cross sensitivities	Alcohol, CxHy, solvent
Recommended test interval	weekly
Test gas	1000ppm CH_4 (50%r.H.)
Heat up time	30 s
Operating temperature	+5°C ... +50 °C (-10...50°C*)
Storage Temperature	-20°C ... +60°C
Expected lifetime under normal use [years]	1...5
Typical application	Leak detection
Size	62mm x 13,5mm

* Operating temperature -10...+50°C: if the sensor is switched on above 0°C and warmed up for at least 10min, it can be used in environments down to -10°C. If the sensors are below 0°C, the sensor should be pre-heated (e.g. in a trouser pocket).

Interchangeable Sensor HC401 (Nr.11591)

The interchangeable sensor HC401 does not respond to sealing paste like "neo-fermit" or "plastic-fermit".

Specification	Values
Calibration Gas	CH_4, C_3H_8
Measuring Range CH_4	0 ... 22000 ppm
Measuring Range C_3H_8	0 ... 8500 ppm
Resolution	1 ppm
Response Time (until Alarm)	≤ 2s (500GD)
Operating principle	Gas-sensitive semiconductor

Cross sensitivities	Alcohol, CxHy, solvent
Recommended test interval	weekly
Test gas	1000ppm CH_4 (50%r. H.)
Heat up time	30s
Operating temperature	+5°C ... +50 °C (-10...50°C*)
Storage Temperature	-20°C ... +60°C
Expected lifetime under normal use [years]	1...5
Typical detection	Leak detection
Size	62mm x 13,5mm

* Operating temperature -10...+50°C: if the sensor is switched on above 0°C and warmed up for at least 10min, it can be used in environments down to -10°C. If the sensors are below 0°C, the sensor should be pre-heated (e.g. in a trouser pocket).

Interchangeable Sensor HC402 (Nr.11733)

The interchangeable sensor HC402 does not respond to sealing paste like "neo-fermit" or "plastic-fermit".

Specification	**Values**
Calibration Gas	CH_4, C_3H_8, H_2
Measuring Range CH_4	0 ... 22000 ppm
Measuring Range C_3H_8	0 ... 8500 ppm
Measuring Range H_2	0 ... 20000 ppm
Resolution	1 ppm
Response Time (until Alarm)	≤2s (500GD)
Operating principle	Gas-sensitive semiconductor
Cross sensitivities	Alcohol, CxHy, solvent
Recommended test interval	weekly
Test gas	1000ppm CH_4 (50% r. H.)
Heat up time	30s
Operating temperature	+5°C ... +50°C (-10...50°C*)
Storage Temperature	-20°C ... +60°C
Expected lifetime under normal use [years]	1...5
Typical detection	Leak detection

Size	62mm x 13,5mm

* Operating temperature -10...+50°C: if the sensor is switched on above 0°C and warmed up for at least 10min, it can be used in environments down to -10°C. If the sensors are below 0°C, the sensor should be pre-heated (e.g. in a trouser pocket).

Interchangeable Sensor RM400 (Nr.11191)

Specification	**Values**
Measuring range humidity	0 ... 100
Resolution	1
Response Time	≤1s
Operating principle	Resistance
Operating temperature	+5°C ... +50 °C
Storage temperature	-20°C ... +60°
Expected lifetime under normal use [years]	>5
Recommended test interval	yearly
Typical application	Leak detection
Size	89 x 13,5mm

Interchangeable Sensor IR400 (Nr.12121)

Specification	**Values**
Measuring range temperature	-70...380°C
Resolution	0,1°C
FOV (Fieled of View)	35°
IR-Optics	1,6: 1
Accuracy	+-2°C (-70...0°C) +-0.5°C (0...60°C) +-2°C (60...180°C) +-4°C (180...380°C)
Operating principle	Thermopile
Operating temperature	+5°C ... +50 °C
Storage Temperature	-20°C ... +60°
Expected lifetime under normal use [years]	>5
Recommended test interval	yearly
Typical application	Temperature measurement
Size	62 x 13,5mm

Interchangeable Sensor HM400 (Nr.11922)

Specification	**Values**
Ambient Humidity	
Range	0…100%rH
Resolution	0,1%
Accuracy (20…80%rH)	+-3%rH(Typ.) +-9%rH(Max)
Operating principle	Capacitive
Temperature	
Range	0…60°C
Resolution	0,1°C
Accuracy	+- 1°C(Typ.) +- 3°C (Max)
Operating principle	Silicon bandgap
Ambient pressure	
Range	300…1100hPa
Resolution	0,1hPa
Accuracy	+-1hPa (Typ.) +-3hPa (Max)
Dewpoint calculated from temperature and humidity	±0,5 °C
Operating temperature	+5°C ... +50°C
Storage Temperature	-20°C ... +60°C
Expected lifetime under normal use [years]	>5
Recommended test interval	yearly
Typical application	Air Hunidity
Size	62mm x 13,5mm

Interchangeable Sensor RF400 (Nr.11190)

Specification	**Values**
Measuring Range	0...1000 ppm
Resolution	1 ppm
Calibration medium	R134a, R32, R1234ze, $H_{2,}$
sensitive to	CFC, HCFC, PFC, HFC, HFO, Forming gas (5% hydrogen (H2) + 95% nitrogen(N))
Selectable at 500 GD	R134a, R1234ze, R32, H2, R22, R125, R152a, R170, R227, R290, R401A, R402, R404a, R407, R410a, R413a, R417a, R422, R427, R448a, R449a, R450a, R452a, R452b, R454, R513a, R600(a), R1150, R1234yf, R1270
Response threshold (500GD)	≤ 1g/a (R134a, R1234yf, R290)
Response Time (500GD)	≤1,5s (R134a, R1234yf, R290)
Recovery Time (500GD)	≤80s (R134a, R1234yf, R290)
Operating principle	Gas-sensitive semiconductor
Cross sensitivities	Alcohol, CxHy, solvent CFC, HCFC, PFC, HFC, HFO
Conform to	EN14624 (500GD proofed according to EN14624:2020)
Heat up time	75 sec / 150 sec (after one week storage)
Operating temperature	+5°C ... +50°C
Operating conditions humidity	20%RH ... 80%RH
Storage Temperature	-20°C ... +60°C
Expected lifetime under normal use [years]	1...5
Recommenden test interval	weekly
Recommended calibration frequency	yearly
Weight	~10g
Typical application	Leak detection
Size	62mm x 13,5mm

* Operating temperature -10...+50°C: if the sensor is switched on above 0°C and warmed up for at least 10min, it can be used in environments down to -10°C. If the sensors are below 0°C, the sensor should be pre-heated (e.g. in a trouser pocket).

Interchangeable sensor CO400 (Nr.12130)

Specification	**Values**
Calibration Gas	CO
Measuring range	0 – 1000 ppm
Resolution	1 ppm
Accuracy abs. / reading	±10 ppm / 5%
Response Time (T90)	<30s
Operating principle	electrochemical sensor
Operating temperature	+0°C ... +50°C
Rel. Humidity, non-condensing	15...95% RH
Air pressure	900...1100 hPa
Storage Temperature	-20°C ... +50°
Expected lifetime under normal use [years]	~4
Recommended test interval	monthly
Recommended calibration frequency	yearly
Typical application	Air qualitiy
Size	71 x 20,5 x16,5mm

Interchangeable sensor CD400 (Nr.12623)

Specification	**Values**
CO_2	
Range	400-10000 ppm
Resolution	1ppm
Temperature stability	+-2,5 ppm / °C
Accuracy	+-(50 ppm +3% Measured value)
Response Time (T90)	90s
Operating principle	NDIR
Heat up time	90s
Operating temperature	+0°C ... +50°C
Storage Temperature	-20°C ... +60°C

Expected lifetime under normal use [years]	>5
Recommended test interval	yearly
Typical application	Air quality
Size	71 x 28,5 x16,5mm

Interchangeable sensor LED400 (Nr.12698)

Specification	**Values**
Luminous flux	21lm
Color temperature	5000k
Expected lifetime under normal use [years]	<5
Typical application	Lightning
Size	62mm x 13,5mm

8.3. Service menu

The service menu is for authorized personnel only and is password protected.

9 Declaration of conformity

EU-Konformitätserklärung
Declaration of conformity

CE

MRU Messgeräte für Rauchgase und Umweltschutz GmbH

Fuchshalde 4 / 8 / 12
74172 Neckarsulm-Obereisesheim
Deutschland / *Germany*
Tel.: +49 (0) 7132 - 99 62 0
Fax: +49 (0) 7132 - 99 62 20
E-Mail / *mail:* info@mru.de
Internet / *site:* www.mru.eu

Bevollmächtigte Person, für die Zusammenstellung der technischen Unterlagen

Person authorized to compile the technical documents

Name / *name:*	Dierk Ahrends
Funktion / *function:*	QM-Beauftragter / *QM- Representative*
Firmenname / *company:*	Messgeräte für Rauchgase und Umweltschutz GmbH
Straße / *street:*	Fuchshalde 4 / 8 12
Ort / *city:*	74172 Neckarsulm
Land / *country:*	Deutschland / *Germany*

Produkt / Product

Bezeichnung */designation:*	Multi Anzeigegerät / *General Device*	
Produktname / *name:*	**500GD**	
Funktion / *function:*	Multifunktions Detektor In Kombination mit Wechselsensoren zur: • Gas-/ Abgasdetektion • _____ • _____ • _____ • _____	*Multipurpose Detector* *In combination with* *switch sensors for:* • *Gas- /Fluegas detection* • _____ • _____ • _____ • _____

Hiermit erklären wir, dass das oben beschriebene Produkt allen einschlägigen Bestimmungen entspricht, es erfüllt die Anforderungen der nachfolgend genannten Richtlinien und Normen:

We declare the conformity of the product with the applicable regulations listed below:

- EMV-Richtlinie / *EMV-directive* 2014/30/EU
- Niederspannungsrichtlinie / *low voltage directive* 2014/35/EU
- RoHS-Richtlinie / *RoHS directive* 2011/65/EU (RoHS II)

Neckarsulm, 06.07.2018

Erwin Hintz, Geschäftsführer / *Managing Director*

MRU · Messgeräte für Rauchgase und Umweltschutz GmbH
Fuchshalde 8 + 12
74172 Neckarsulm-Obereisesheim
Fon 07132 99620 · Fax 07132 996220
info@mru.de · www.mru.eu