400GD

USER MANUAL

MRU ATR fair since 1984 ®
EMISSION MONITORING SYSTEMS

6812EN

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1 Information for product and safety

1.1. Safety manual

All general information and safety precautions of MRU products are listed in the supplied separate safety manual.
Therefore, this manual must be read and observed before the first use of the analyser.
Instrument-specific safety and warning requirements in this manual are prefixed before dangerous actions.

1.2. Safety precautions

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

- Read and observe the safety manual supplied separately.
- 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.

Note that all interchangeable sensors are developed for indoor use only.

► Do not use the interchangeable sensors outdoor.

The analyzer records and stores measured values. The measured values can be exported by QR code.
The analyser was manufactured according to relevant normatives and regulations. The analyzer 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 analyzer 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 analyzers.
MRU GmbH produces a wide range of instruments, from standard analyzers up to tailor made industrial analyzers.

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3 Description

3.1. Purpose

The main purpose of the analyzer in combination with various interchangeable 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 analyzer 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 Analyzer

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

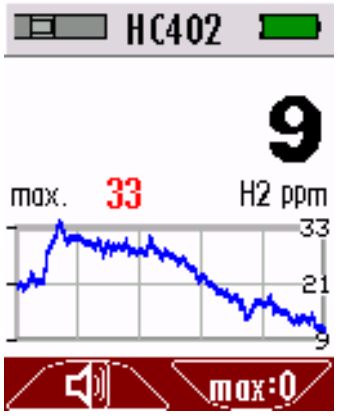
1	Flexible arm	2	Display
3	Keypad	4	Mini-USB port
5	Sensor connector		

3.3. User interface

All functions are selected from the analyzer 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 analyzer

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

4 Operation

4.1. Commissioning

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

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

4.2. Charging the battery

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

- With an 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.

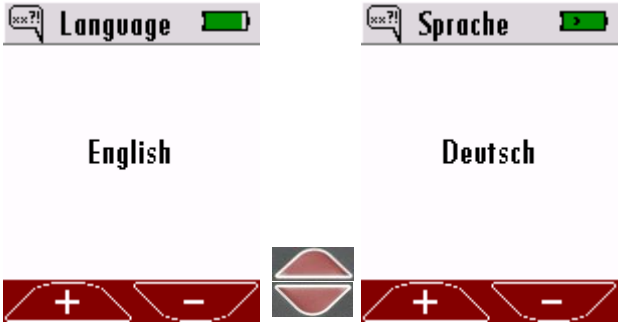
4.3. Switching on the analyzer

► 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 analyzer for the first time, a screen for setting the language appears.

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

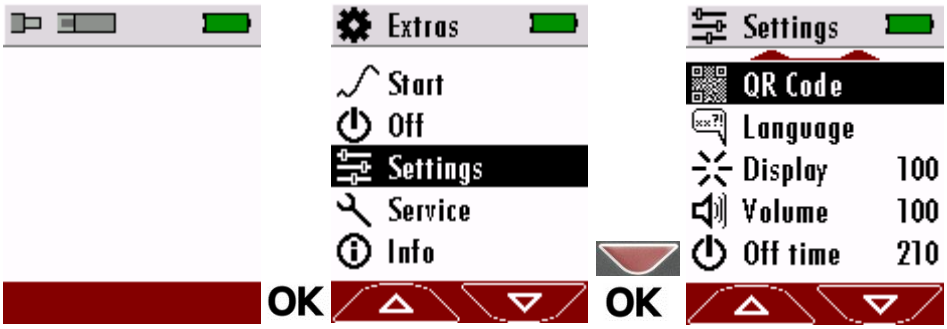


► Insert an interchangeable sensor.
⇨ If necessary, a warm-up countdown appears (e.g. with HC400)

⇨ The measurement menu is being displayed after warmup.
⇨ The analyzer 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 analyzer.
⇨ The analyzer indicates that an interchangeable sensor is missing.
► Press "OK".
► Choose "Settings".
⇨ A selection list appears.
► Choose the desired setting.

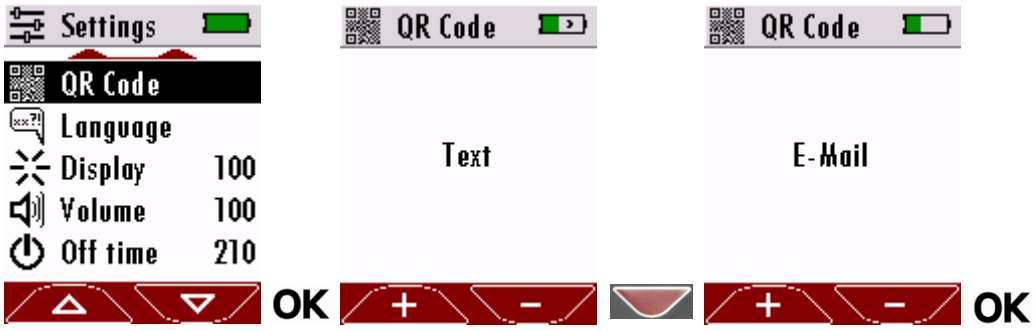
Setting options for QR code

The analyzer uses the QR code to transmit a simple "measurement protocol".
The analyzer 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”.

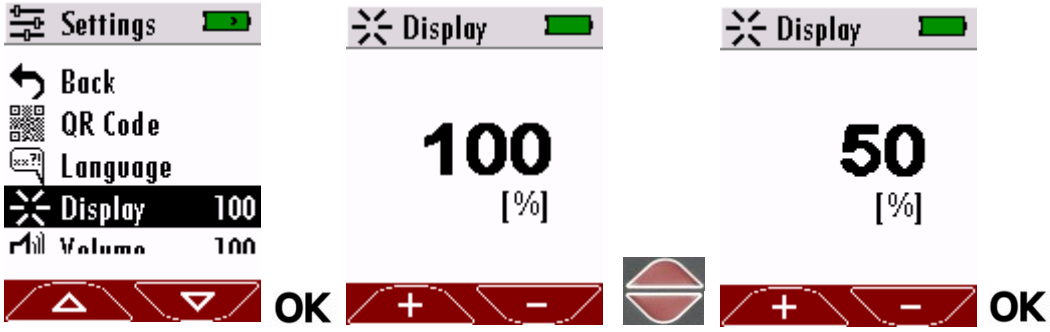
⇨ The option is saved.

Setting language

► Choose “Language”.
► Press “OK”.
► Choose the desired option.
► Press “OK”.

⇨ The desired language is saved.

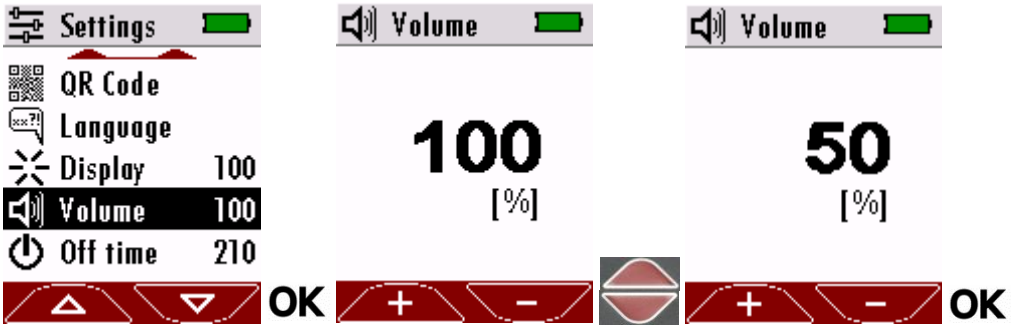
Setting brightness



► 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 analyzer 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 analyzer remains switched on.

4.5. Switching off the analyzer

There are two possibilities to switch off the analyzer.

- ▶ Select „Off".
- ▶ Press „OK".
  ⇨ The analyzer switches off.

Alternatively, you can switch off the analyzer as follows:

- ▶ Press and hold the OK key for at least 3 seconds.
  ⇨ The analyzer 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

- ▶ Insert the desired interchangeable sensor into the sensor connector.
- ▶ Make sure that the interchangeable sensor clicks into place audibly.
- ▶ Switch on the analyzer. ☞ See 4.3, Page 13.
- ⇨ The analyzer automatically identifies the inserted interchangeable sensor.
- ⇨ An information window appears in the display for approx. 5 seconds.

5.2. Measuring 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 measurement

⚠ DANGER

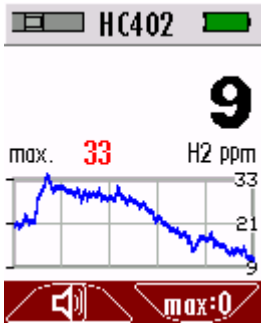
Risk due to improper use

Fatal accidents may occur if the measurement rules are disregarded.

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

⇨ After switching on, the LED on the interchangeable sensor flashes.
⇨ In the Display "HC402" appears.
⇨ In the Display a 30-second Warm-up countdown appears.

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



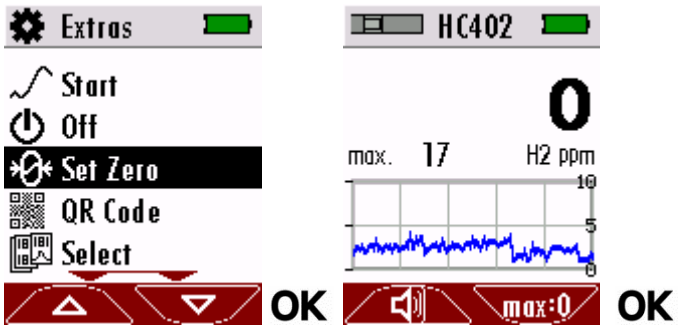
► Guide slowly the interchangeable sensor along the areas to be tested.

⇨ If there is a leakage, the 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

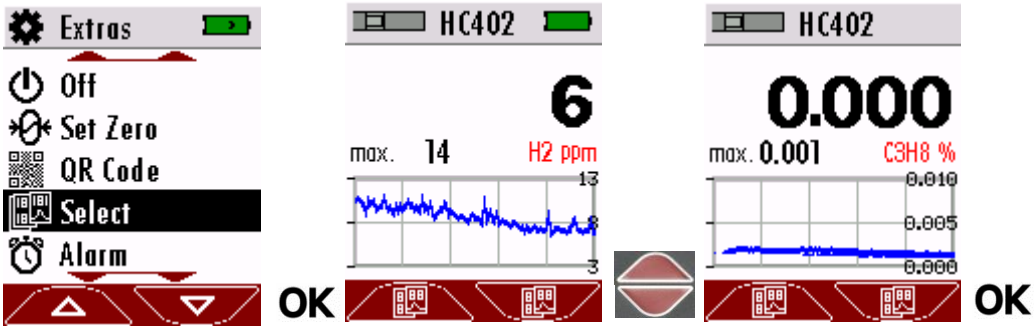
For settings that can be made on the basic unit
☞ see 4.4 Make settings on the basic unit, Page 14.
In the following, only sensor-specific settings are described.

Setting Zeropoint



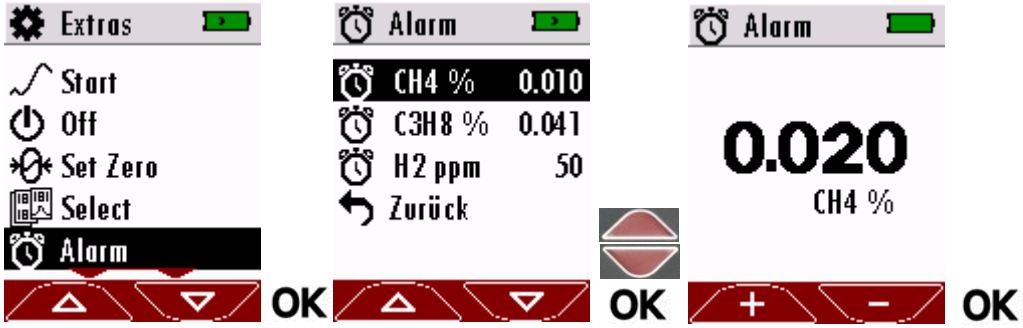
► Select „Set Zero“.
► Press „OK“.
⇨ A window appears.
⇨ Zero point is set automatically.
► Press „OK“.
⇨ Window is closed.

Selecting gas



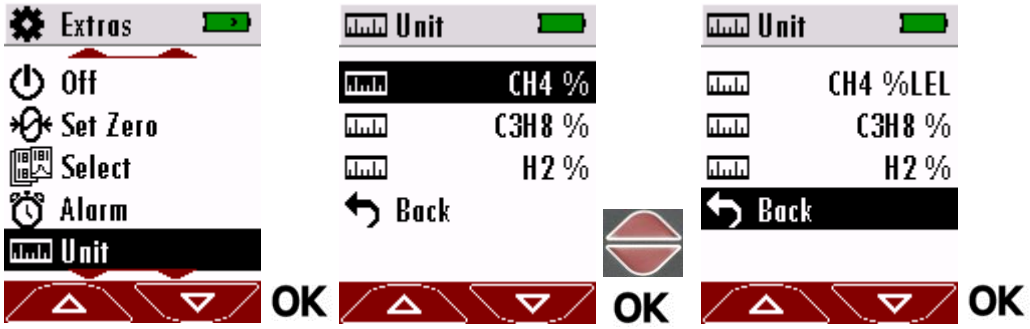
► Select „Select“.
► Press „OK“.
► Choose the desired gas.
► Press „OK“.
⇨ The desired gas is saved.

Setting alarm threshold



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

Setting unit



► Select „Unit“.
► Press „OK“.
► Choose the desired gas.
► Press „OK“.
⇨ The unit is changing.
► Go „Back“
⇨ The unit is saved.

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

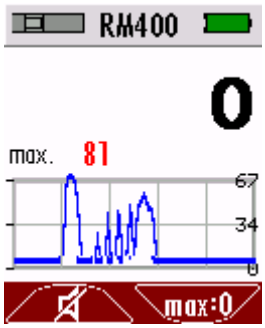
Fatal accidents may occur if the measurement rules are disregarded.

► 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.

⇨ After switching on, the LED on the interchangeable sensor flashes.
⇨ In the Display "HC402" appears.

⇨ 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 4.4.Make settings on the basic unit, S.14
Further settings are not possible with the interchangeable sensor RM400.

5.4. Measuring with interchangeable sensor HM400

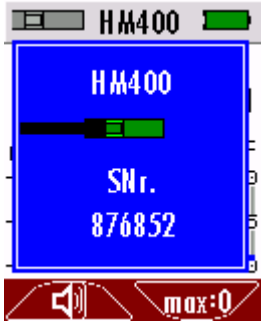
The interchangeable sensor HM400 is used to measure ambient parameters.

You can use the interchangeable sensor to...

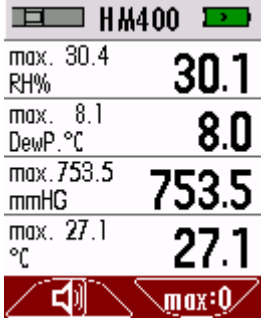
- to measure the air humidity
- to measure the dew point
- to measure the air pressure
- to measure the air temperature

Starting measurement

⇨ In the Display "HM400" appears.



⇨ The measurement starts.

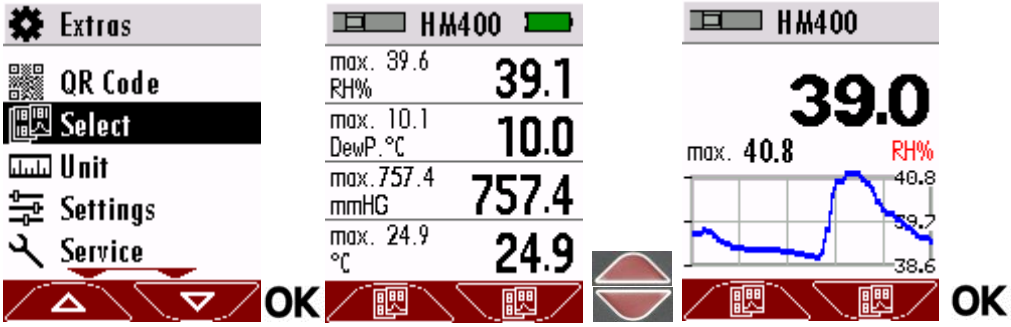


Configuring measurement

For settings that can be made on the basic unit
☞ see 4.4.Make settings on the basic unit, S.14
In the following, only sensor-specific settings are described.

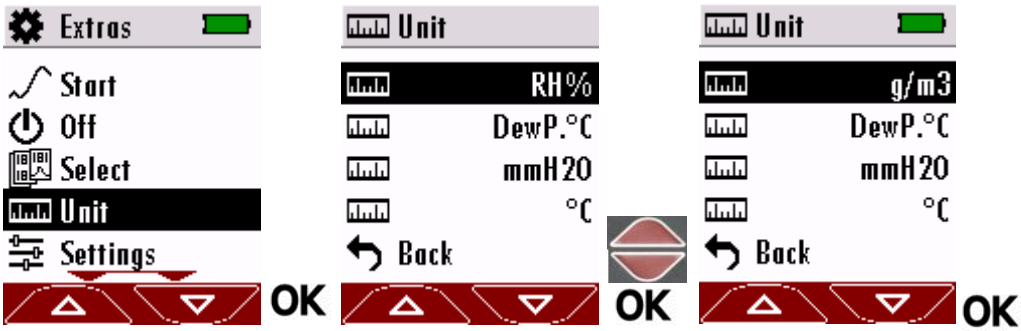
Selecting measured values

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.

Setting unit



► Select „Unit“.
► Press „OK“.
► Choose the desired measured value.
► Press “OK”.
⇨ The unit is changing.
► Go “Back”.
⇨ The desired unit is saved.

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

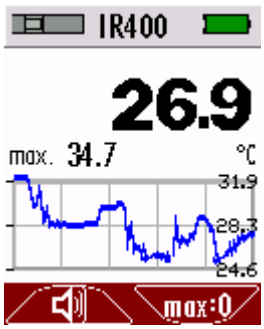
Beware of hot surface

Hot surfaces cause severe burns.

► Do not touch hot surfaces.

⇨ 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 4.4.Make settings on the basic unit, S.14
In the following, only sensor-specific settings are described.

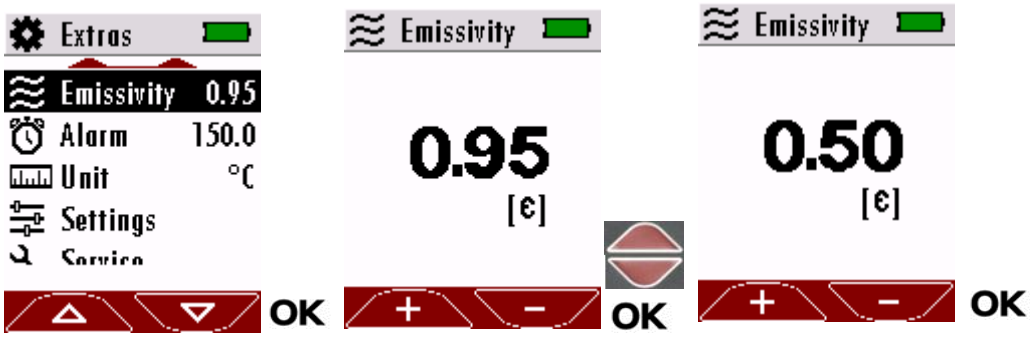
Setting emissivity

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:

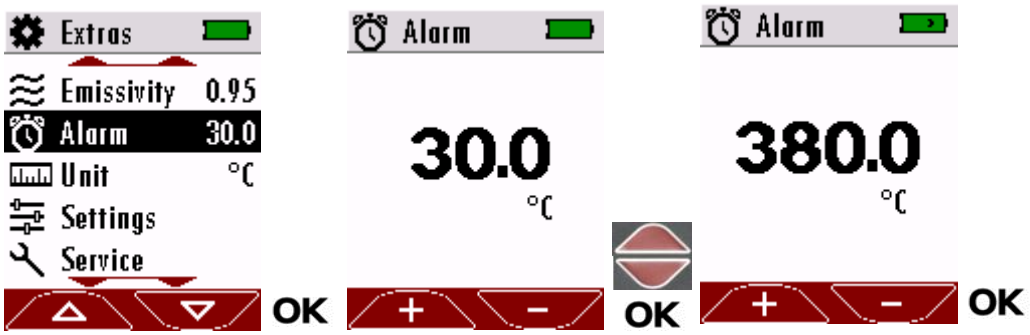
Material	emissivity ε
Aluminium	0,02 – 0,31 (oxidized)
Concrete	0,93
Iron	0,13 – 0,85 (corroded)
Tiles	0,93
Glass	0,94
Rubber	0,94
Wood	0,94
Copper	0,03-0,76 (oxidized)
Plastics (PE, PP, PVC)	0,94
Brass (oxidized)	0,61
Black lacquer (matt)	0,97
Clay burned	0,91
Brick, Mortar, Plaster, Gypsum	0,9-0,95

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.



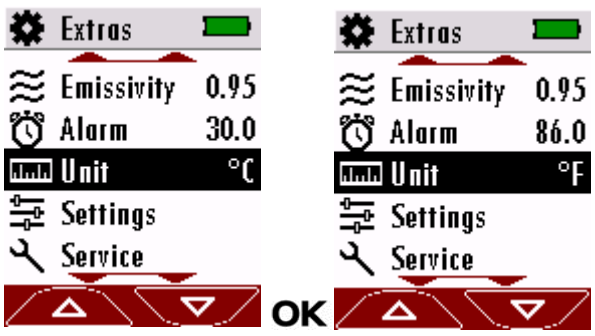
► Select „Emissivity“.
► Press „OK“.
► Select the desired emissivity.
► Press „Ok“.
⇨ The desired emissivity is saved.

Setting alarm threshold



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

Setting unit



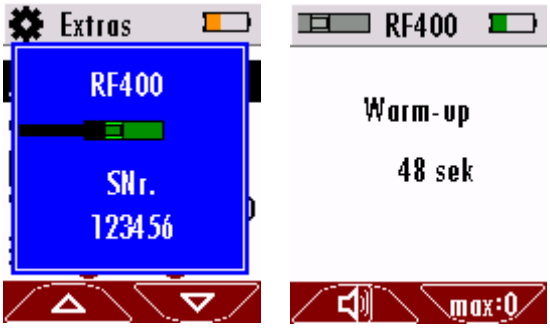
► Select “Unit”.
► Press “OK”.
⇨ The unit is changing.

5.6. Measuring with interchangeable sensor RF400

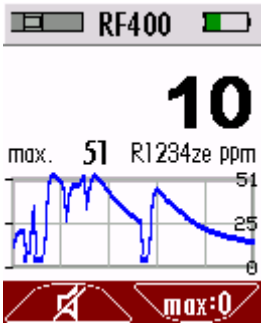
The interchangeable sensor RF400 is used for leak detection on air conditioners.

Starting measurement

⇨ After switching on, the LED on the interchangeable sensor flashes.
⇨ In the Display "RF400" appears.
⇨ In the Display a 55-second Warm-up countdown appears.



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

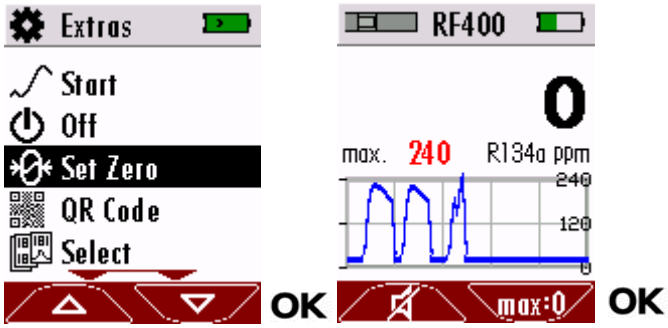


► Guide slowly the interchangeable sensor along the areas to be tested.
⇨ If there is a leakage, the measured value changes.
⇨ The measurement process is displayed graphically.
⇨ Optical and acoustic alarm signals indicate gas leakage.
⇨ The flashing frequency of the red LED in the sensor foot increases with the increase of the measured gas concentration.

Configuring measurement

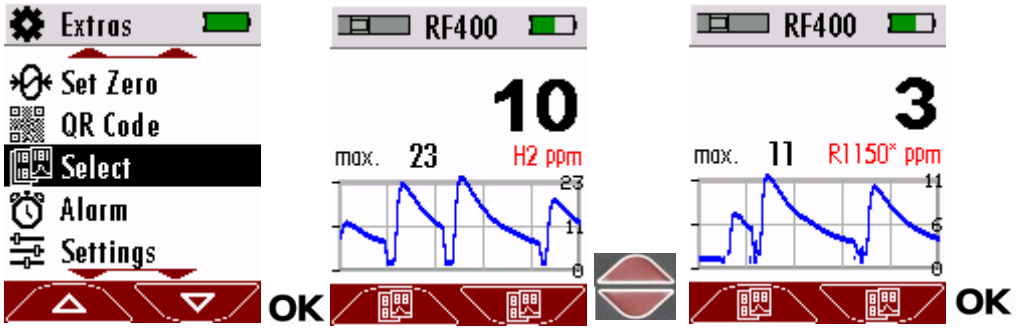
For settings that can be made on the basic unit
☞ see 4.4.Make settings on the basic unit, S.14
In the following, only sensor-specific settings are described.

Setting Zeropoint



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

Selecting refrigerant



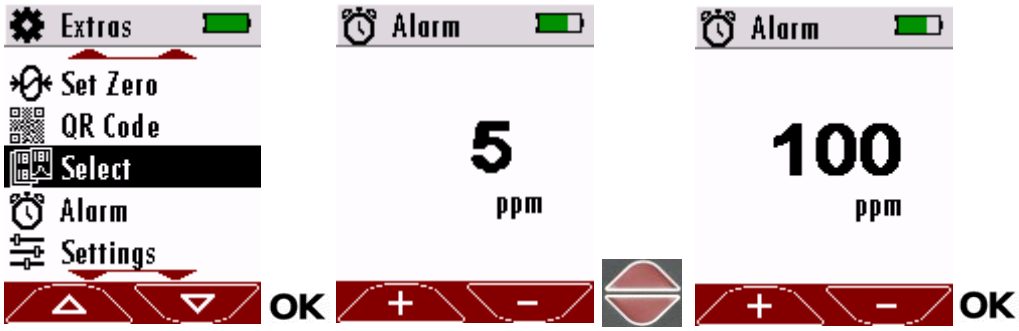
► Select „Select“.
► Press “OK”.
► Choose the desired refrigerant.
► Press “OK”.
  ⇨ The desired refrigerant is saved.

NOTE

Refrigerants marked with * are detectable.
Refrigerants that are not marked are referenced and calibrated
To select all refrigerants, you need the following firmware:

- For interchangeable sensor RF400 from V1.00.15
- For basic unit 400GD from V1.00.33

Setting alarm threshold



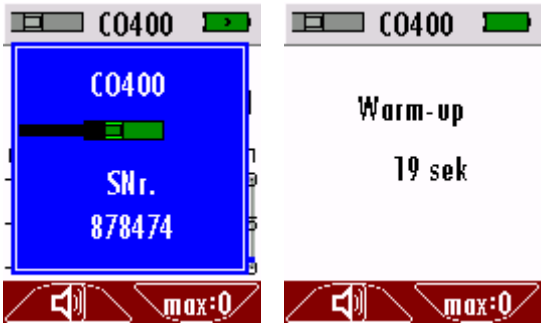
► Select „Select“.
► Press „OK“.
► Set the desired alarm threshold.
► Press „OK“.
⇨ The alarm threshold is saved.

5.7. Measuring with interchangeable sensor CO400

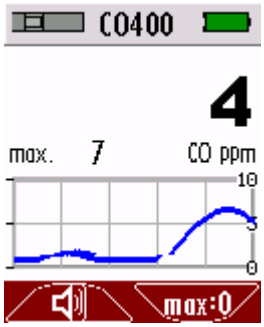
The interchangeable sensor CO400 is used for monitoring the CO-concentration in the ambient air.

Starting measurement

⇨ After switching on, the LED on the interchangeable sensor flashes.
⇨ In the Display "CO400" appears.
⇨ In the Display a 30-second Warm-up countdown appears.



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



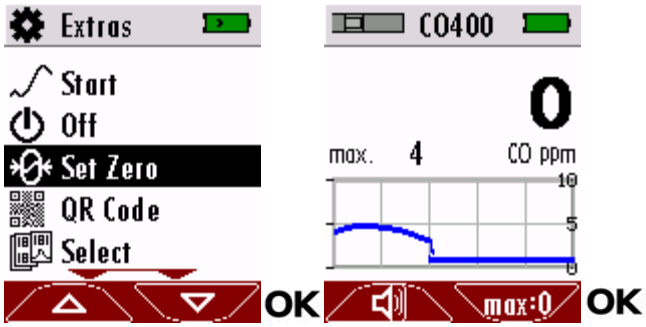
► Slowly guide the sensor to the location to be tested.

- ⇨ 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 4.4.Make settings on the basic unit, S.14.
In the following, only sensor-specific settings are described.

Setting Zeropoint



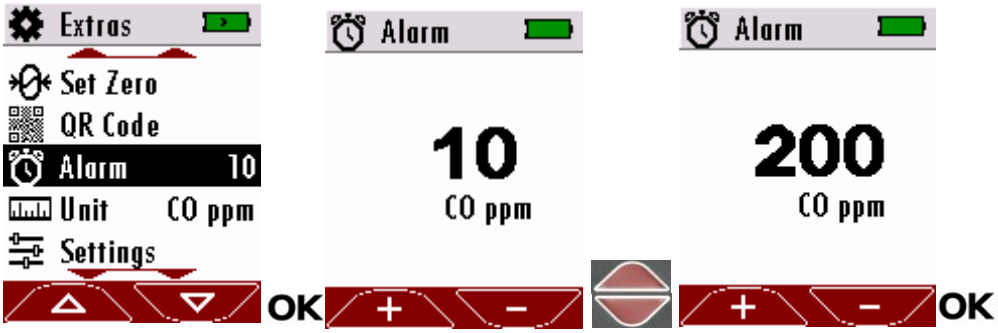
► Select „Set Zero“.
► Press „OK“.

- ⇨ A window appears.
- ⇨ Zero point is set automatically.

► Press „OK“.

- ⇨ Window is closed.

Setting alarm threshold



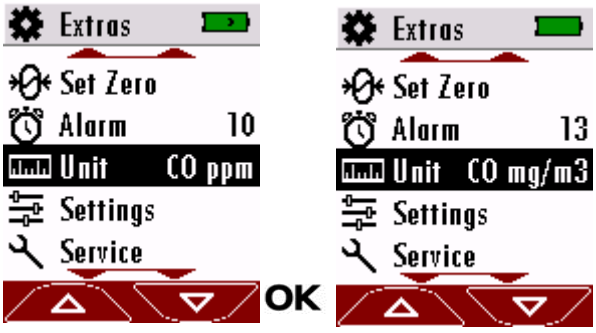
► Select „Select“.
► Press „OK“.
► Set the desired alarm threshold.
► Press „OK“.
⇨ The alarm threshold is saved.

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 32

Setting unit



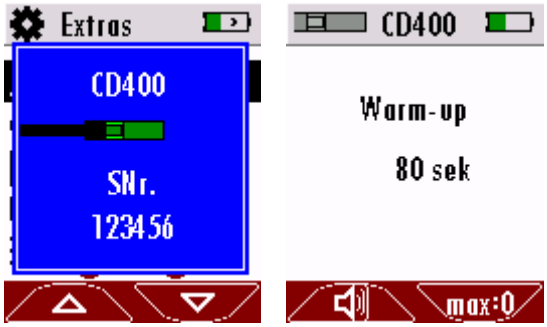
► Select „Unit“.
► Press „OK“.
⇨ The unit is saved.

5.8. Measuring with interchangeable sensor CD400

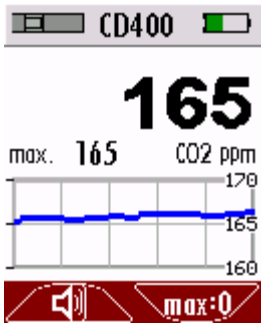
The interchangeable sensor CD400 is used for monitoring the CO_2-concentration in the ambient air.
In addition, the interchangeable sensor CD400 can be used to measure ambient humidity and temperature.

Starting measurement

- ⇨ After switching on, the LED on the interchangeable sensor flashes.
- ⇨ In the Display "CD400" appears.
- ⇨ In the Display a 90-second Warm-up countdown appears.



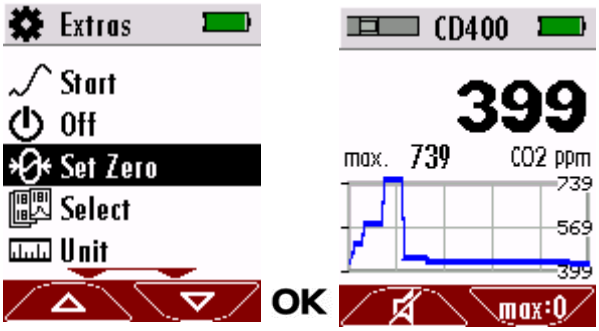
- ⇨ After the warm-up, the analyzer automatically switches to the measuring mode.
- ⇨ The measurement starts.



Configuring measurement

For settings that can be made on the basic unit ☞ see 4.4.Make settings on the basic unit, S.14.
In the following, only sensor-specific settings are described.

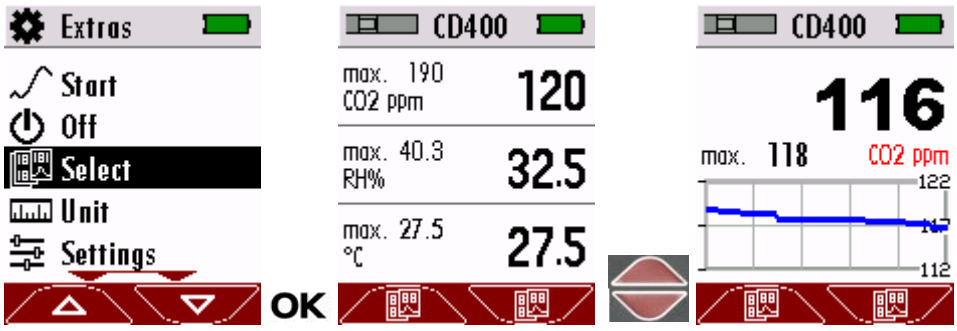
Setting Zeropoint



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

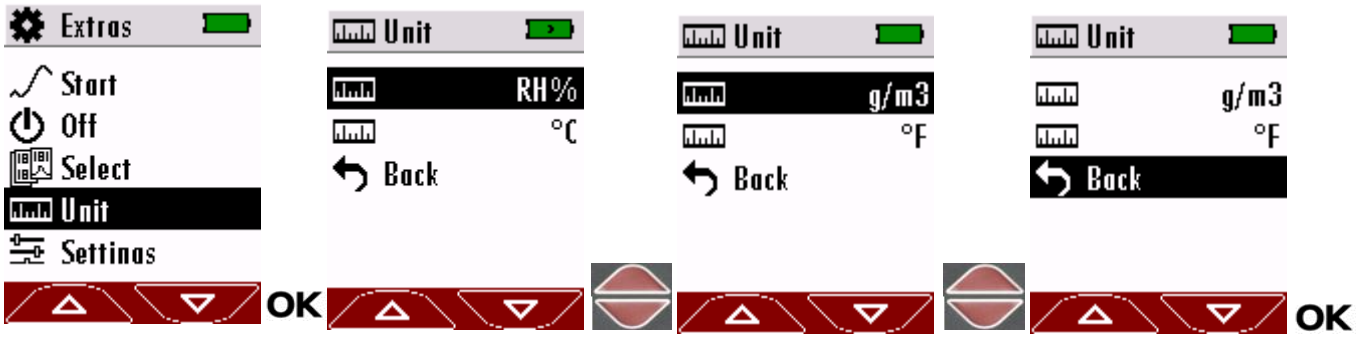
Selecting measured values

With the interchangeable sensor CD400 all measured values can be shown on the display. You also have the possibility of having a single measured value shown on the display with a measurement curve.



► Select „Select“.
► Press „OK“.
► Choose the desired measured value.
► Press „OK“.
  ⇨ The desired measured value is saved.

Setting unit



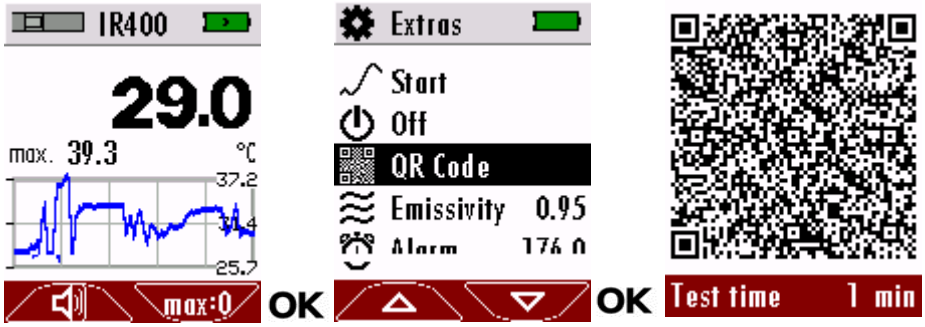
► Select „Unit“.
► Press „OK“.
► Choose the desired measured value.
► Press “OK”.
⇨ The unit is changing.
► Go “Back”.
⇨ The desired unit is saved.

5.9. Transporting measurement protocol

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

To be transmitted:
- 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.

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 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 analyzer.

► Transfer the measurement protocol to a smartphone immediately after measurement.

6 Maintenance and care

6.1. Maintenance

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

6.2. Care

This is a low maintenance analyzer:

- ▶ Charge the battery if the analyzer will not be used for a longer period, then recharge the batteries every 6 months.

6.3. 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 Appendix

7.1. Technical data 400 GD

Specification	Values
Operating temperature	+5°C ... +50 °C
Rel. Humidity, non-condensing	95%
Storage Temperature	-20°C ... +60°C
Li-Ion internal battery pack, operating hours (depending on sensor type used)	Li-Ion typ. 20h
Power supply	100 - 240 V / 5V DC / 500 mA
Weight	ca. 230g
Dimensions	50 x25 x135 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 (V1.00.37)	Default: English Others: German, French, Italian, Czech, Romanian, Hungarian, Spanish, Bulgarian, Russian, Portuguese, Dutch, Slovenian, Japanese, Danish

7.2. Interchangeable Sensors

Interchangeable Sensor HC400 (Nr.11138)

Specification	Values
Calibration Gas	CH4
Measuring Range CH4	0.. 44000 ppm
Resolution	1 ppm
Response Time (until Alarm)	≤ 5 s
Operating principle	Gas-sensitive semiconductor
Cross sensitivities	Alcohols, hydrocarbons, solvents
Recommended test interval	weekly
Test gas	1000ppm CH4 in air (50%rel. humidity)
Heat up time	30 s
Operating temperature	+5°C ... +50 °C
Storage Temperature	-20°C ... +60°C
Size	62mm x 13,5mm

Interchangeable Sensor HC401 (Nr.11591)

Specification	Values
Calibration Gas	CH4, C3H8
Measuring Range CH4	0 .. 44000 ppm
Measuring RangeC3H8	0 .. 17000 ppm
Resolution	1 ppm
Response Time (until Alarm)	≤ 5 s
Operating principle	Gas-sensitive semiconductor
Cross sensitivities	Alcohols, hydrocarbons, solvents
Recommended test interval	weekly
Test gas	1000ppm CH4 in air (50%rel. humidity)
Heat up time	30 s
Operating temperature	+5°C ... +50 °C
Storage Temperature	-20°C ... +60°C
Size	62mm x 13,5mm

Interchangeable Sensor HC402 (Nr.11733)

Specification	Values
Calibration Gas	CH4, C3H8, H2
Measuring Range CH4	0 .. 44000 ppm
Measuring Range C3H8	0 .. 17000 ppm
Measuring Range H2	0 .. 40000 ppm
Resolution	1 ppm
Response Time (until Alarm)	≤ 5s
Operating principle	Gas-sensitive semiconductor
Cross sensitivities	Alcohols, hydrocarbons, solvents
Recommended test interval	weekly
Test gas	1000ppm CH4 in air (50%rel. humidity)
Heat up time	30 s
Operating temperature	+5°C ... +50 °C
Storage Temperature	-20°C ... +60°C
Size	62mm x 13,5mm

Interchangeable Sensor RM400 (Nr.11191)

Specification	Values
Measuring range humidity	0 .. 100
Resolution	1
Response Time	≤ 1s
Operating principle	Resistance measurement (condensation)
Operating temperature	+5°C ... +50 °C
Storage temperature	-20°C ... +60°
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°
Size	62 x 13,5mm

Interchangeable Sensor HM400 (Nr.11922)

Specification	**Values**
Ambient Humidity Range Resolution Accuracy	 0...100 % rH 0,1% +-3 % rH (20...80 % rH)
Temperature Range Resolution Accuracy	 0...60°C 0,1 °C ± 01 °C
Ambient pressure Range Resolution Accuracy	 300...1100 hPa 0,1 hPa ±1 hPa
Dewpoint calculated from temperature and humidity	±0,5 °C
Operating temperature	+5°C ... +50 °C
Storage Temperature	-20°C ... +60°C
Size	62mm x 13,5mm

Interchangeable Sensor RF400 (Nr.11900)

Specification	**Values**
Measuring Range	0...1000 ppm
Resolution	1 ppm
Calibration medium	R134a, R32, R1234ze, H2
sensitive to	FCKW, HFCKW, FKW, HFKW, HFKW, HFO
selectable at 400 GD *RF400 Firmware V1.00.15; 400GD Firmware V1.00.33*	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	≤ 5g/a (R134a)
Response Time (until Alarm)	≤ 4s (R134a)
Recovery Time	18s
Operating principle	Gas-sensitive semiconductor
Cross sensitivities	Alcohols, hydrocarbons, solvents
Heat up time	55 s
Operating temperature	+5°C ... +50 °C
Operating conditions humidity	20%RH ... 80%RH
Storage Temperature	-20°C ... +60°C
Calibration Frequency	Yearly
Weight	~10g
Size	62mm x 13,5mm

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
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	4 Jahre
Calibration Frequency	Yearly
Size	71 x 20,5 x16,5mm

Interchangeable sensor CD400 (Nr.12623)

Specification	Values
CO2	
Range	400 – 10000 ppm
Resolution	1 ppm
Temperature stability	± 2.5 ppm / °C
Accuracy	± (50 ppm + 3%MessuredValue)
Response Time (T90)	90sek
Operating principle	NDIR
Ambient Humidity	
Range	0...100%rH
Resolution	0,1%
Accuracy	± 3%rH (20...80%rH)
Response Time (T90)	30sek
Temperature	
Range	0...50°C
Resolution	0,1 °C
Accuracy	± 01 °C
Response Time (T90)	30sek
Heat up time	90sek
Operating temperature	+0°C ... +50 °C
Storage Temperature	-20°C ... +60°C
Size	71 x 28,5 x16,5mm

7.3. Service menu

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

8 Declaration of conformity

MRU AIRfair seit 1984 EMISSIONSMESSTECHNIK	**EU-Konformitätserklärung** ***Declaration of conformity***	CE

MRU Messgeräte für Rauchgase und Umweltschutz GmbH

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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
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Ort / *city:*	74172 Neckarsulm
Land / *country:*	Deutschland / *Germany*

Produkt / Product

Bezeichnung /*designation:*	Multi Anzeigegerät / *General Device*	
Produktname / *name:*	**400GD**	
Funktion / *function:*	Multifunktions Detektor In Kombination mit Wechselsensoren zur:	*Multipurpose Detector* *In combination with* *switch sensors for:*
	• Gas-/ Abgasdetektion	• *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*