MRU AIRfair since 1984 ®
EMISSION MONITORING SYSTEMS

Hand detector probe

USER MANUAL

HC40X

RM400

IR400

RF400

CO400

CD400

1112EN

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

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Original user manual

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1 Security and safety directions for the analyser

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 Hand Detector Probe 400DH safely.
- Read this user manual carefully.
- Make yourself familiar with the Hand Detector Probe 400DH, before using it.
- Pay special attention to the security and warning precautions, in order to prevent injuries and product damages.
- We 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 Hand Detector Probe 400DH, to be able to read instructions as needed.
- Ensure to hand over all documents to when handing the Hand Detector Probe 400DH over to others.

NOTE

This user manual only describes the Hand Detector Probe 400DH and the available interchangeable sensors. To operate your analyser, read the corresponding user manual.

2.1. Intended Use

Due to interchangeable sensors, the Hand Detector Probe 400DH 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.

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

► Do not use the interchangeable sensors outdoor.

The Hand Detector Probe 400DH records the measured values and displays them on the connected analyser for further processing.

The Hand Detector Probe 400DH cannot be used for personal protection or continuous monitoring tasks.

The Hand Detector Probe 400DH was manufactured according to relevant standards and regulations. The Hand Detector Probe 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.

The Hand Detector Probe 400DH must not be modified in terms of construction or safety. Modifications of this kind by the user will invalidate the declaration of conformity

2.2. The company MRU

The **400DH** is manufactured 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 manufactures a wide range of instruments, from standard analysers up to tailor made industrial analysers

Plant 1: Sales, Service, R&D

Plant 2: Production

MRU GmbH
Fuchshalde 8 + 12
74172 Neckarsulm – Obereisesheim GERMANY

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

3 Description

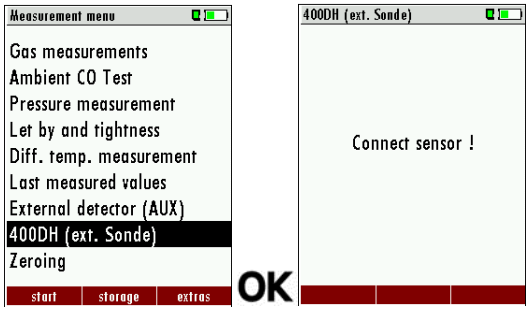
3.1. Connecting Detector Hand Probe 400DH with analyser.

► Connect the Detector Hand Probe 400DH to the analyser via the AUX socket.

► The red markings of the AUX socket on the analyser and on the plug the Detector Hand Probe 400DH must match.

NOTE

If necessary, find out about the position of the AUX socket in the user manual of the corresponding analyser.



► Select in the Measurement menu the menu item 400DH (ext. Sonde).

► Press OK.

⇨ Connect sensor! Appears.

NOTE

Note that the Detector Hand Probe 400DH alone does not support a measurement. Each measuring function is determined by the inserted interchangeable sensor.

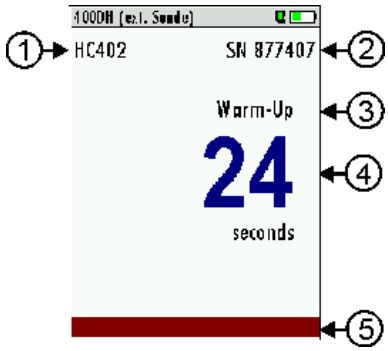
3.2. Inserting interchangeable Sensor

► Insert the desired interchangeable sensor into the sensor connector.

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

⇨ The analyser automatically identifies the

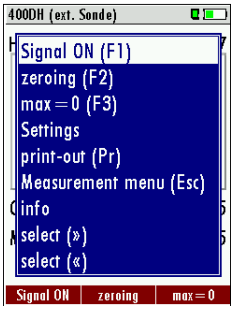
3.3. Terms and window designation



	Function	Explanation
1	Connect probe!	In case of a communication error, check that the probe is connected to the device via AUX connector and that an interchangeable sensor is correctly plugged in.
2	SN	The serial number of the mounted sensor is displayed.
3	Warm-up time	Depending on the sensor, a certain time is required to warm up the sensor to the required operating temperature.
4	Numeric value	Display of the elapsed warm-up time
5	Function bar	Displays the functions available for the sensor used

3.4. Context menu

Depending on the sensor type used, different functions are offered in the context menu:



Function	Explanation
Signal ON (F1)	If the sensor has a signal threshold, signal ON appears in the context menu and on the display (Key F1). With this function the signal is switched on.
Signal OFF (F1)	If the sensor has a signal threshold, signal ON appears in the context menu and on the display (F1). This function turns off the signal.
Zeroing(F2)	This function is sensor dependent. With this function the sensor is zeroed.
Max = 0 (F3)	The value Max is set to zero.
Setting	Depending on the sensor, the units and Signal thresholds are set.
Print-out (Pr)	Printout is generated, a printer is required for this function.
Measurement menu (Esc)	Exit measuring program
Info	The information (sensor name, serial number, firmware version) about the sensor is displayed here.
Select (>>) "Arrows right" select (<<) "Arrows left"	Varies depending on the interchangeable sensor: e. g. with HC402: Switching between CH_4, C_3H_8 and H_2

4 Measuring

DANGER

Danger when used improperly

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

► The analyser 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 analyser may only be used in explosion free zones.

4.1. 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 the meas. range of the HC sensor.

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**.**
- ► 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.

► Connect the Detector Hand Probe 400DH with the analyser.

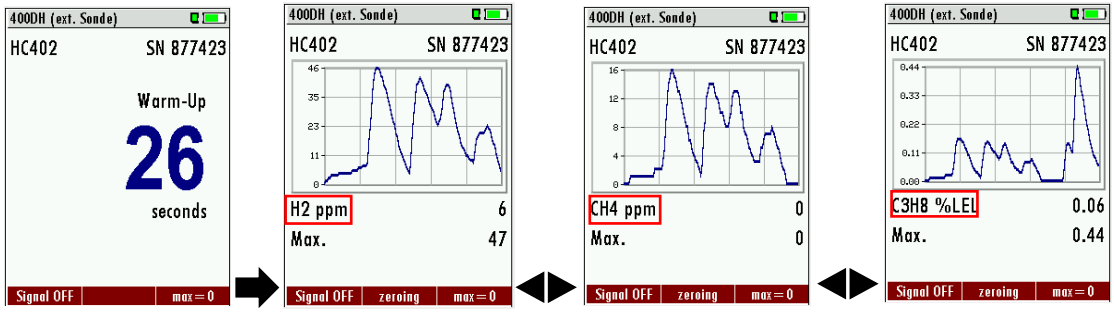
☞ See also chapter 3.1 Connecting Detector Hand Probe 400DH with analyser., page 9.

► Insert the desired interchangeable sensor into the sensor connector.

☞ See also chapter 3.2 Inserting interchangeable Sensor, page 9.

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

⇨ The measurement starts.



► If necessary, press the left/right arrow keys to switch between the available measured values.

NOTE

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

► If necessary, press F2 to take a new zero point.

► 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.

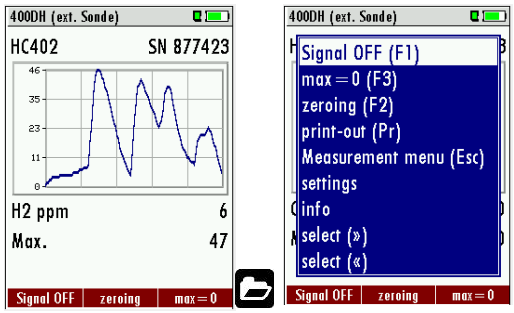
Open context menu

In the context menu you can configure the measurement.

► Press the context menu key.

⇨ The context menu

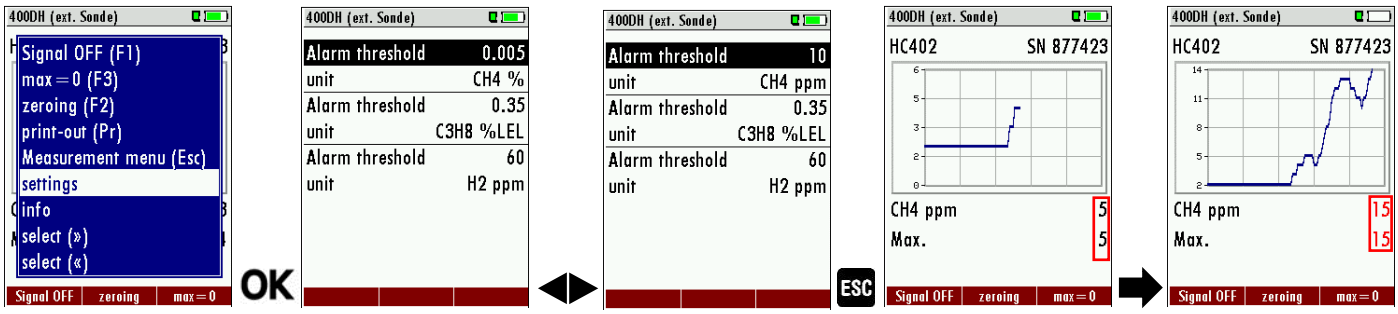
► Select the desired option.



Function	Explanation
Signal ON (F1)	With this function the signal is switched on.
Signal ON (F1)	With this function the signal is switched off.
Max=0 (F3)	The value max is set to zero
zeroing (F2)	With this function the sensor is zeroed.
Print-out (Pr)	Printout is generated, a printer is required for this function.
Measurement menu (Esc)	Exit measuring program
settings	Settings units Alarm thresholds ☞ See also Chapter Setting alarm thresholds and units, page 14.
Info	The information (sensor name, page number, firmware version) about the sensor is displayed here.
Select (>>) (<<) „Arrows right/left“	HC401: Switching between CH_4, C_3H_8 HC402: Switching between CH_4, C_3H_8 and H_2

Setting alarm thresholds and units.

You can set a defined alarm threshold for each measured value.
As soon as the defined alarm threshold is exceeded, an alarm is issued.
You can change the unit for each measured value.



► Go to the context menu.
► Select settings.
► Press OK.
  ⇨ A menu appears.
► Set the desired alarm threshold and unit for each measured value separately.
► Press ESC.
  ⇨ The measurement starts/continues.
  ⇨ As soon as the set alarm threshold is exceeded, the measured value turns red and an acoustic alarm signal will sound.

Gas	Adjustable Signal thresholds
CH_4 [ppm]	10 … 500 ppm
CH_4 [%]	0,001 … 0,050 %
CH_4 [% LEL]	0,02 … 1,14 % LEL
C_3H_8 [ppm]	10 … 500 ppm
C_3H_8 [%]	0,001 … 0,050 %
C_3H_8 [% LEL]	0,06 … 2,94 % LEL
H_2 [ppm]	10 … 500 ppm
H_2 [%]	0,001 … 0,050 %
H_2 [% LEL]	0,03 … 1,25 % LEL

4.2. Measuring with interchangeable sensor RM400

The interchangeable sensor RM400 is used for leak detection on flue gas pipes.

NOTE

The RM400 operates on a conductive sensor surface, so do not clean with alcohol or distilled water.
If necessary, clean the sensor surface with saline water and allow it to dry

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.

Before measuring, remove the protective cap from the interchangeable sensor. For measurement, the sensor surface must be dry and at room temperature.

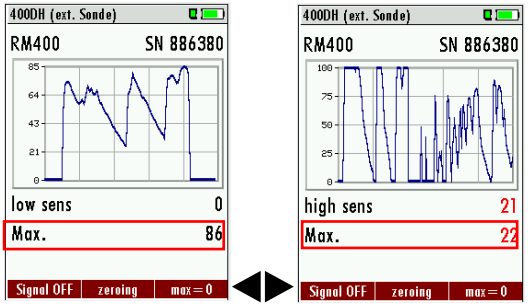
► Connect the Detector Hand Probe 400DH with the analyser.

☞ See also chapter 3.1 Connecting Detector Hand Probe 400DH with analyser., page 9.

► Insert the desired interchangeable sensor into the sensor connector.

☞ See also chapter 3.2 Inserting interchangeable Sensor, page 9.

⇨ The measurement starts.



► If necessary, press the left/right arrow keys to switch between low sens and high sens.

NOTE

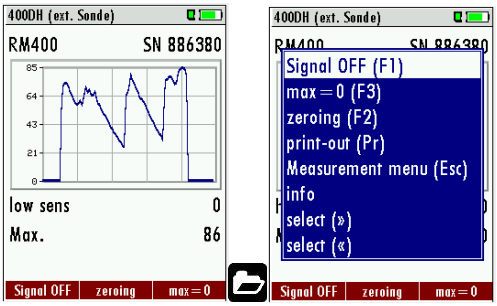
The interchangeable sensor RM400 can sometimes be too sensitive (e. g. in summer with high humidity).
You can reduce the sensitivity with “low sens”.

► If necessary, press F2 to take a new zero point.
► 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.

Open context menu

In the context menu you can configure the measurement.

► Press the context menu key.
  ⇨ The context menu
► Select the desired option.



Function	Explanation
Signal ON (F1)	With this function the signal is switched on.
Signal OFF (F1)	With this function the signal is switched off.
Max=0 (F3)	The value max is set to zero.
Zeroing	With this function the sensor is zeroed.
Print-out (Pr)	Printout is generated, a printer is required for this function.
Measurement menu (ESC)	Exit measuring program
Info	The information (sensor name, serial number, firm-ware version) about the sensor is displayed here.
Select (>>) (<<) „Arrows right/left“	Switching between high sens and low sens

NOTE

The RM400 operates on a conductive sensor surface, so do not clean with alcohol or distilled water.
If necessary, clean the sensor surface with saline water and allow it to dry

DANGER

Danger due to improper use
Non-compliance with the measurement rules can result in fatal accidents.
The meter may only be used for advertising purposes to locate gas leaks in the installation area.

4.3. Measuring with interchangeable sensor RM400

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

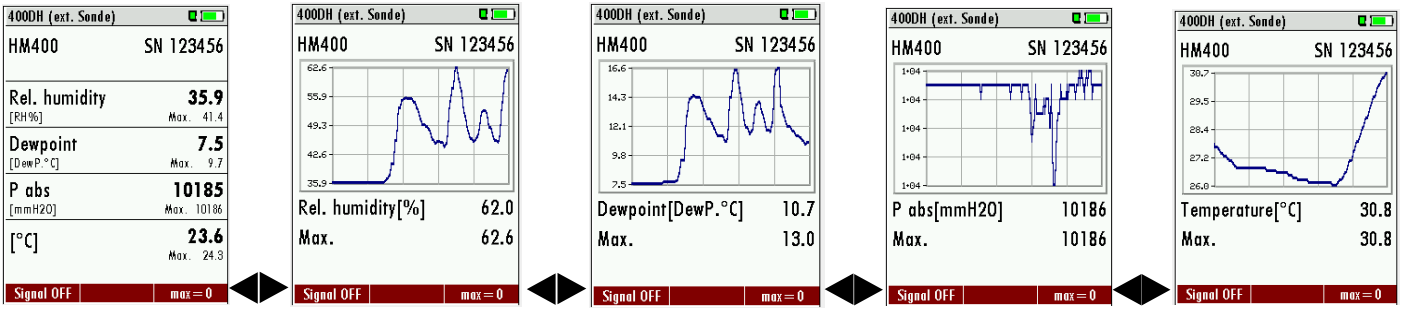
► Connect the Detector Hand Probe 400DH with the analyser.

☞ See also chapter 3.1 Connecting Detector Hand Probe 400DH with analyser., page 9.

► Insert the desired interchangeable sensor into the sensor connector.

☞ See also chapter 3.2 Inserting interchangeable Sensor, page 9.

⇨ The measurement starts.



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.

► If necessary, press the left/right arrow keys to switch between the overall display and the single measured values.

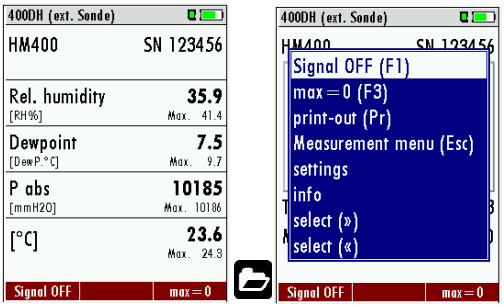
Open context menu

In the context menu you can configure the measurement.

► Press the context menu key.

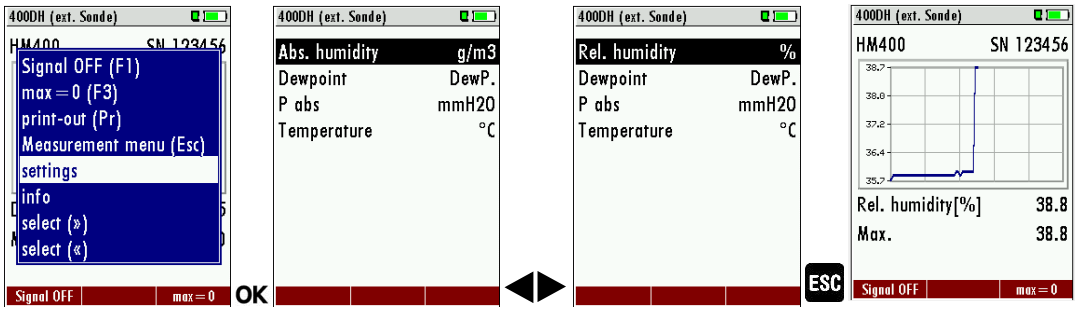
⇨ The context menu

► Select the desired option.



Function	Explanation
Signal ON (F1)	With this function the signal is switched on.
Signal OFF (F1)	With this function the signal is switched off.
Max=0 (F3)	The value max is set to zero.
Print-out (Pr)	Printout is generated, a printer is required for this function.
Measurement menu (ESC)	Exit measuring program
settings	Setting units See also Chapter Setting units, Page 20.
Info	The information (sensor name, serial number, firmware version) about the sensor is displayed here.
Select (>>) (<<) „Arrows right/left"	Switch between overall view and view of the single measurands as individual graphs.

Setting units



► Go to the context menu.
► Select settings.
► Press OK.
  ⇨ A menu appears.
► Select the desired measurand.
► Set the desired unit.
► Press ESC.
  ⇨ The unit is assigned to the corresponding measurand.

Measurand	Adjustable units
Humidity	% (relative), g/m^3 (absolute)
Dew point	° C, ° F
Air pressure abs.	hPa, inHG, mmHG, mmH$_2$O
Temperature	° C, ° F

4.4. Measurement with interchangeable sensor IR400

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

Starting measurement

⚠CAUTION

Beware of hot surface

Hot surfaces cause severe burns.

► Do not touch hot surfaces.

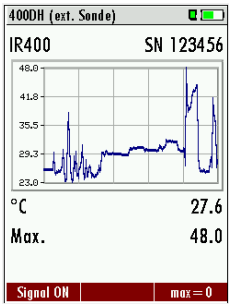
► Connect the Detector Hand Probe 400DH with the analyser.

☞ See also chapter 3.1 Connecting Detector Hand Probe 400DH with analyser., page 9.

► Insert the desired interchangeable sensor into the sensor connector.

☞ See also chapter 3.2 Inserting interchangeable Sensor, page 9.

⇨ 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.

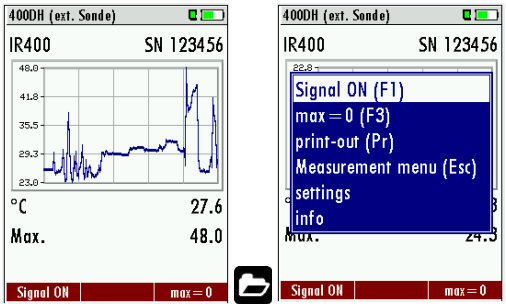
Open context menu

In the context menu you can configure the measurement.

► Press the context menu key.

⇨ The context menu

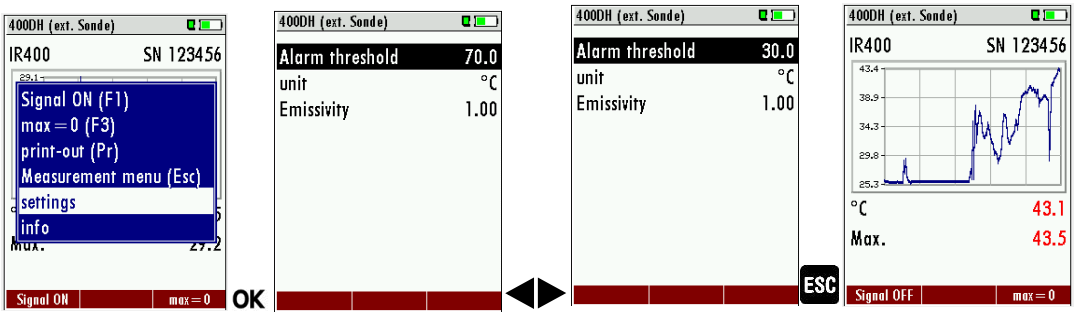
► Select the desired option.



Function	Explanation
Signal ON (F1)	With this function the signal is switched on.
Signal ON (F1)	With this function the signal is switched off.
Max = 0 (F3)	The value Max is set to zero.
Print-out (Pr)	Printout is generated, a printer is required for this function
Measurement menu (Esc)	Exit measuring program
settings	Setting Alarm threshold, Unit and Emissivity ☞ Setting Alarm threshold, Unit and Emissivity, S. 22.
Info	The information (sensor name, page number, firmware version) about the sensor is displayed here.

Setting Alarm threshold, Unit and Emissivity

You can set a defined alarm threshold.
As soon as the defined alarm threshold is exceeded, an alarm is issued.
You can change the unit.
You can set the emissivity.



► Go to the context menu.
► Select settings.
► Press OK.
  ⇨ A menu appears.
► Select Alarm threshold.
► Set the desired Alarm threshold.
► If necessary, set the unit and emissivity*
► Press ESC.
  ⇨ The measurement starts/continues.
  ⇨ As soon as the set alarm threshold is exceeded, the measured value turns red and an acoustic alarm signal will sound.

Signal threshold	30 °C ... 380 °C
Units	° C, ° F
Emissivity	0,10-1.00

*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 emissivity 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 emissivity 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.

4.5. Measurement with interchangeable sensor RF400

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

NOTE

Use of test leaks

- The sensor 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 measurement

► Connect the Detector Hand Probe 400DH with the analyser.

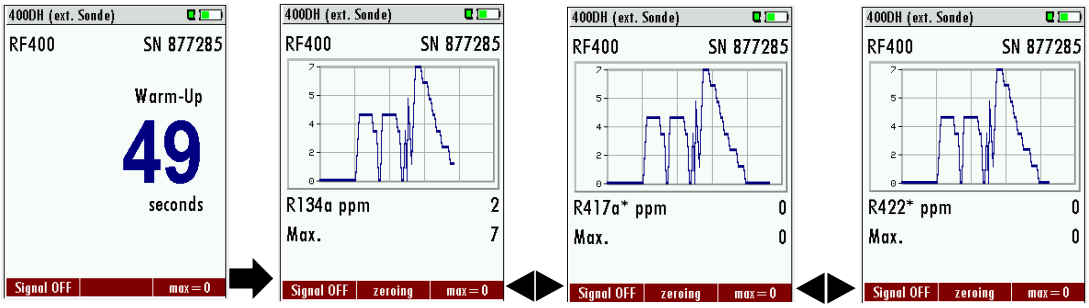
☞ See also chapter 3.1 Connecting Detector Hand Probe 400DH with analyser., page 9.

► Insert the desired interchangeable sensor into the sensor connector.

☞ See also chapter 3.2 Inserting interchangeable Sensor, page 9.

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

⇨ The measurement starts.



► If necessary, press the left/right arrow keys to switch between the available measured values.

NOTE

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

► If necessary, press F2 to take a new zero point.

► 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.

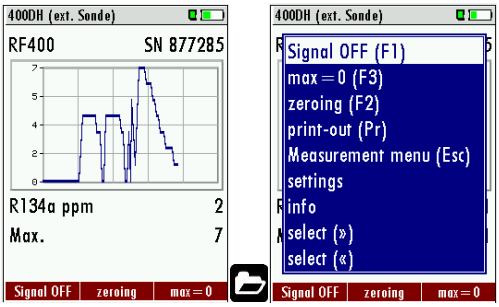
Open context menu

In the context menu you can configure the measurement.

► Press the context menu key.

⇨ The context menu

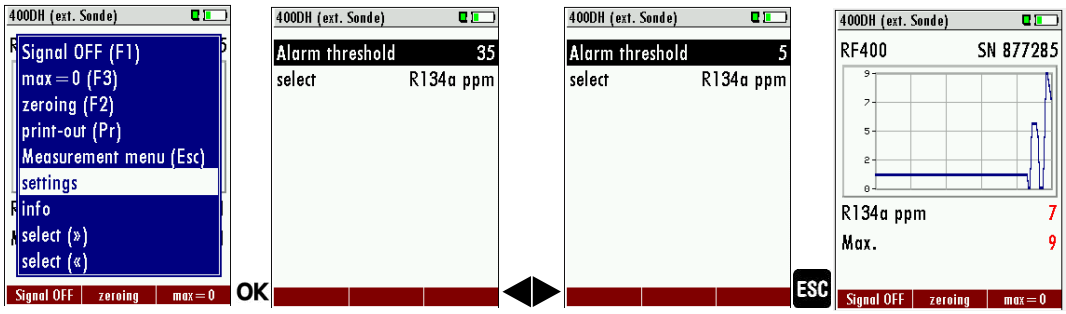
► Select the desired option.



Function	Explanation
Signal ON (F1)	With this function the signal is switched on.
Signal OFF (F1)	With this function the signal is switched off.
Max=0 (F3)	The value Max is set to zero
zeroing (F2)	With this function the sensor is zeroed.
Print-out (Pr)	Printout is generated, a printer is required for this function
Measurement menu (Esc)	Exit measuring program
settings	Setting Alarm thresholds ☞ See also chapter Settings Alarm threshold, page 27.
Info	The information (sensor name, page number, firmware version) about the sensor is displayed here
Select (>>) (<<) „Arrows right/left “	Switch between measurands

Settings Alarm threshold

You can set a defined alarm threshold.
As soon as the defined alarm threshold is exceeded, an alarm is issued.



► Go to the context menu.
► Select settings.
► Press OK.
  ⇨ A menu appears.
► Select select.
► Set the desired measurand.
► Select Alarm threshold.
► Set the desired Alarm threshold.
► Press ESC.
  ⇨ The measurement starts/continues.
  ⇨ As soon as the set alarm threshold is exceeded, the measured value turns red and an acoustic alarm signal will sound.

NOTE

Refrigerants marked with * are detectable.
Refrigerants that are not marked are referenced and calibrated

Refrigerant/Gases	Adjustable signal thresholds
R134a	5 … 200ppm
R454*	5 … 200ppm
R452b*	5 … 200ppm
R452a*	5 … 200ppm
R450a*	5 … 200ppm
R449a*	5 … 200ppm
R448a	5 … 200ppm
R427*	5 … 200ppm
R422*	5 … 200ppm
R417a*	5 … 200ppm
R413a*	5 … 200ppm
R410a*	5 … 200ppm
R407*	5 … 200ppm
R404a*	5 … 200ppm
R402*	5 … 200ppm
R170*	5 … 200ppm
R401A	5 … 200ppm
R227*	5 … 200ppm
R152a*	5 … 200ppm
R125*	5 … 200ppm
R22*	5 … 200ppm
H_2	5 … 200ppm
R32	5 … 200ppm
R1234ze	5 … 200ppm
R1150*	5 … 200ppm
R1270*	5 … 200ppm
R600(a)*	5 … 200ppm
R290*	5 … 200ppm
R513a*	5 … 200ppm
R1234yf*	5 … 200ppm

4.6. Measurement with interchangeable sensor CO400

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

Starting measurement

► Connect the Detector Hand Probe 400DH with the analyser.

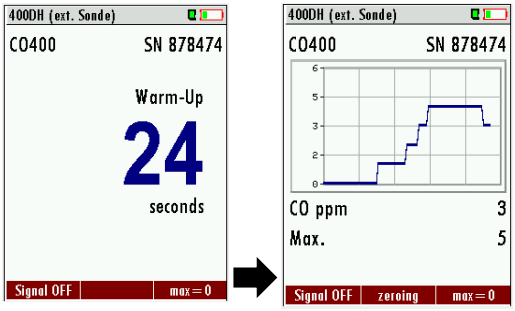
☞ See also chapter 3.1 Connecting Detector Hand Probe 400DH with analyser., page 9.

► Insert the desired interchangeable sensor into the sensor connector.

☞ See also chapter 3.2 Inserting interchangeable Sensor, page 9.

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

⇨ The measurement starts.



► If necessary, press F2 to take a new zero point.

► 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.

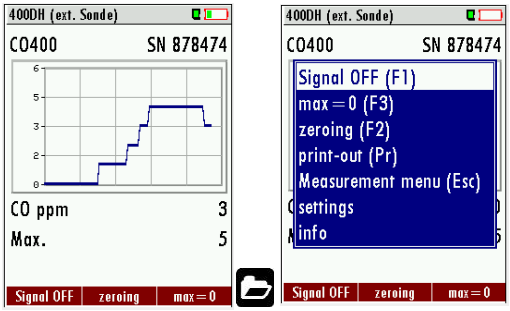
Open context menu

In the context menu you can configure the measurement.

► Press the context menu key.

⇨ The context menu

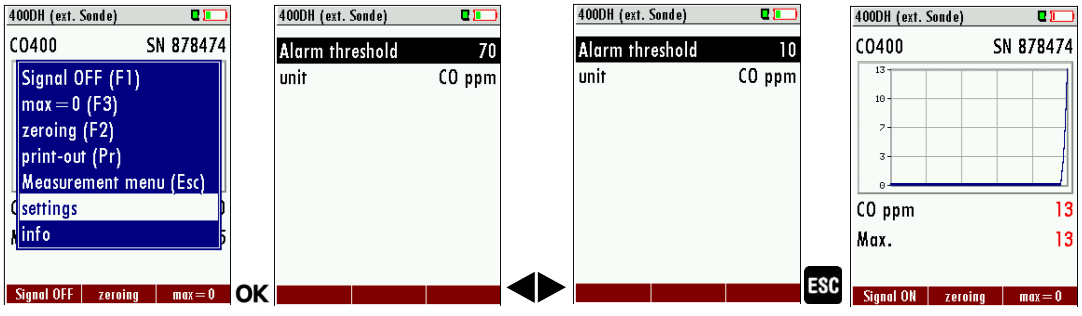
► Select the desired option.



Function	Explanation
Signal ON (F1)	With this function the signal is switched on.
Signal OFF (F1)	With this function the signal is switched off.
Max=0 (F3)	The value Max is set to zero
zeroing (F2)	With this function the sensor is zeroed
print-out (Pr)	Printout is generated, a printer is required for this function
Measurement menu (Esc)	Exit measuring program
settings	Setting unit ☞ See also chapter Setting alarm threshold and unit, page 30.
Info	The information (sensor name, page number, firmware version) about the sensor is displayed here

Setting alarm threshold and unit

You can set a defined alarm threshold.
As soon as the defined alarm threshold is exceeded, an alarm is issued.



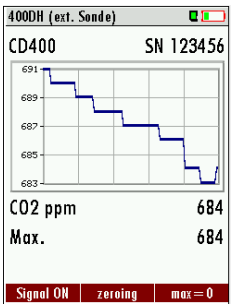
► Go to the context menu.
► Select settings.
► Press OK.
  ⇨ A menu appears.
► Select Alarm threshold.
► Set the desired Alarm threshold.
► Set the desired unit.
► Press ESC.
  ⇨ The measurement starts/continues.
  ⇨ As soon as the set alarm threshold is exceeded, the measured value turns red and an acoustic alarm signal will sound.

4.7. Measurement with interchangeable sensor CD400

The interchangeable sensor CD400 is used for CO400 for monitoring the CO_2-concentration in the ambient air.

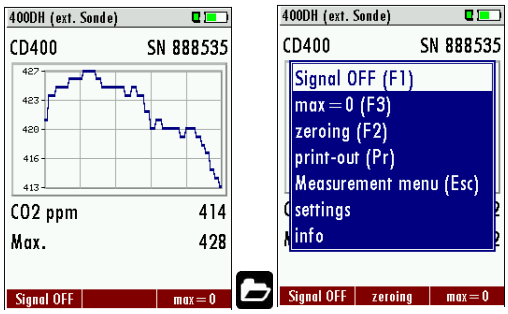
Starting measurement

► Connect the Detector Hand Probe 400DH with the analyser.
  ☞ See also chapter 3.1 Connecting Detector Hand Probe 400DH with analyser., page 9.
► Insert the desired interchangeable sensor into the sensor connector.
  ☞ See also chapter 3.2 Inserting interchangeable Sensor, page 9.
  ⇨ 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.
  ⇨ 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.

Open context menu



Function	Explanation
Signal ON (F1)	With this function the signal is switched on.
Signal OFF (F1)	With this function the signal is switched off.
Max=0 (F3)	The value Max is set to zero
zeroing (F2)	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.
Print-out (Pr)	Printout is generated, a printer is required for this function
Measurement menu (Esc)	Exit measuring program
settings	Setting Alarm threshold ☞ See also chapter Settings alarm threshold, Page 33.
Info	The information (sensor name, page number, firmware version) about the sensor is displayed here

Settings alarm threshold

► Go to the context menu.
► Select settings.
► Press OK.
  ⇨ A menu appears.
► Set the desired Alarm threshold.
► Press ESC.
  ⇨ The measurement starts/continues.

5 Technical data

Interchangeable Sensor HC400 (Nr.11138)

The interchangeable sensor HC400 doesn´t 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)	≤5 s (400DH)
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
Storage Temperature	-20°C ... +60°C
Expected lifetime under normal use [years]	1...5
Typical application	Leak detection
Size	62mm x 13,5mm

Interchangeable Sensor HC401 (Nr.11591)

The interchangeable sensor HC401 doesn´t respond to sealing paste like “neo-fermit” or “plastic-fermit”.

Specification	**Values**
Calibration Gas	CH_4, C_3H_8
Measuring Range CH4	0 ... 22000 ppm
Measuring RangeC3H8	0 ... 8500 ppm
Resolution	1 ppm
Response Time (until Alarm)	≤5 s (400DH)
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
Storage Temperature	-20°C ... +60°C
Expected lifetime under normal use [years]	1...5
Typical application	Leak detection
Size	62mm x 13,5mm

Interchangeable Sensor HC402 (Nr.11733)

The interchangeable sensor HC402 doesn`t 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)	≤5s (400DH)
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
Storage temperature	-20°C ... +60°C
Expected lifetime under normal use [years]	1...5
Typical application	Leak detection
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
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…100rH
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 (20…80%rH)	+- 1°C (Typ.) +- 3°C (Max)
Operating principle	Silicon bandgap
Ambient pressure	
Range	300…1100hPa
Resolution	0,1hPa
Accuracy	+- 1 hPa (Typ.) +- 3 hPa (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 Humidity
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, H_2

sensitive to	CFC, HCFC, PFC, HFC, HFO, Forming gas (5% Hydrogen (H2) + 95% nitrogen (N))
selectable from firmware version: RF400 Firmware V1.00.15	R134a, R1234ze, R32, H_2, 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 (DH400)	≤ 5g/a (R134a)
Response Time (DH400)	≤ 4s (R134a)
Recovery Time (DH400)	≤ 18s
Operating principle	gas sensitive semiconductor
Cross sensitivities	alcohol, CxHy, solvent, FCKW,HFCKW,FKW,HFKW,HFO
conform to	EN14624:2012
Heat up time	55 s
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
Recommended calibration frequency	yearly
Weight	~10g
Typical application	Leak detection
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 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
Calibration Frequency	yearly
Typical application	Air quality
Size	71 x 20,5 x16,5mm

Interchangeable sensor CD400 (Nr.12623)

Specification	**Values**
CO_2	
Range	400-10000 ppm
Resolution	1 ppm
Temperature stability	+- 2,5 ppm / °C
Accuracy	+-(50 ppm + 3%MeasuredValue)
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	Lighting
Size	62mm x 13,5mm

6 Declaration of conformity

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

MRU Messgeräte für Rauchgase und Umweltschutz GmbH

Fuchshalde 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 8 + 12
Ort / *city:*	74172 Neckarsulm
Land / *country:*	Deutschland / *Germany*

Produkt / Product

Bezeichnung /*designation:*	Detektor Handsonde / *Hand detector probe*
Produktname / *name:*	**400DH**
Funktion / *function:*	Detektor Handsonde In Kombination mit Messgerät und Wechselsensoren zur Detektion von: • Gas-/ Abgas • Kältemittel • Abgasrückstau • Raumklima • Temperatur (IR) *Hand detector probe* *In combination with measuring device and switch sensors for detection of:* • *Gas- / fluegas* • *Refrigerant* • Flue gas back pressure • Indoor climate • Temperature (IR)

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, 02.05.2019

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