SONOTEC

Ultrasonic Testing Device

SONAPHONE® E

Operating Manual

Table of Content

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1 Information on this document

1.1 General notes

This manual forms part of the ultrasonic testing device and should therefore be stored in its immediate vicinity where it can be accessed by all operators at any time. It contains all the information needed to ensure proper and efficient use, along with all the instructions to ensure safe operation of the SONAPHONE. It must therefore be read prior to first use and before carrying out any further steps.

This document has been created with all due care. SONOTEC does not assume any guarantee of the completeness, correctness and current validity of the provided data, and is not liable for errors or omissions.

1.2 Symbols used

Hazards or special information are indicated in the following ways:

⚠ DANGER

Warns of **imminent threat of danger** with very high risk. If not avoided, it will result in **death or serious injury**.

⚠ WARNING

Warns of possible imminent danger which, if ignored, may lead to lasting **adverse health effects and/or serious material damages**.

⚠ CAUTION

Warns of dangers which, if ignored, may lead to **injury and/or material** damages – including financial losses due to operational interruptions.

(1) List with more than one safety instruction.

(2) List with more than one safety instruction.

ATTENTION

Warns of dangers which, if ignored, may lead to **material damage** – including financial losses due to operational interruptions.

Note!

This section provides information or draws attention to specific features.

2 Safety precautions

2.1 Instructions for your safety

The SONAPHONE® E conforms to the best available technology and safety rules. The manufacturer has made every effort to ensure safe operation. The device has been tested in the factory and was delivered in a safe operating condition. The user must ensure that its safe use is not affected.

The following safety instructions must be complied with when working with the SONAPHONE® E and its accessory parts.

The handling-related safety information at the start of the individual operating steps must be observed.

Failure to observe the safety information can lead to serious injury of personnel, and to the destruction of, or damage to, systems or device components.

2.2 Requirements for user qualification

⚠ DANGER

Risk of death or severe injury. Incorrect operation of the SONAPHONE® E and accessories can endanger the explosion protection or damage the device as well as accessories.

The device may only be used by persons instructed with its use.

The SONAPHONE® E ultrasonic testing device must only be used by users who have read (in full) and understood the safety instructions as well as all further instructions in the operating manual.

SONOTEC GmbH accepts no liability for damage, including to third parties, caused by improper handling of the device.

2.3 Instructions on the operating conditions of the SONAPHONE® E in potentially explosive atmospheres

⚠ DANGER

Risk of death or severe injury. Incorrect operation, damage to the device as well as damage to accessories can impair the explosion protection.

(1) The SONAPHONE® E is intended for use in areas where there is a risk of explosion due to gases, vapors and mists in accordance with the device marking.

(2) Use is not permitted if there is a risk of explosion due to dust.

(3) The SONAPHONE® E is not approved for use in pits at risk of firedamp.

(4) Approved for the **use in Ex Zone 0** are
- solely the ultrasonic probes L60 and L61 in connection with the probe extension cable using the grounding kit.

The bringing in and use of the other equipment in zone 0 is explicitly prohibited.

(5) Approved for the **use in Ex Zone 1** are
- the SONAPHONE® E and the permitted accessories.

It is prohibited to bring the equipment into Zone 0.

(6) **It is prohibited to operate and / or bring**
- the transportation case
- the Ultrasonic Transmitter SONAPHONE® T (optional) and the related accessories as well as
- the Spherical Transmitter SONOSPHERE®

into hazardous areas. These are not approved for this purpose.

(7) The SONAPHONE® E is not suitable for use in strong electromagnetic fields.

(8) The permissible operating temperature range of the SONAPHONE® E and the probes is limited to 0 ... 40 °C.

(9) The SONAPHONE® E in conjunction with the temperature sensor is suitable for measuring surface temperatures of up to 800 °C, whereby such high temperatures are only encountered outside potentially explosive areas.

The SONAPHONE® E, the surface temperature sensor and the headphones comply with EPL (Equipment protection level) b.

SONAPHONE® E
II2G Ex ia IIC T4 Gb

The ultrasonic probes L60, L61, L62 and L63 comply with EPL (Equipment protection level) b for gas group IIC, IIB and IIA.

Ultrasonic probes L60, L61, L62 and L63
II2G Ex ia IIC T4 Gb

In addition, the ultrasonic probes L60 and L61 comply with EPL (Equipment protection level) 'a' for gas groups IIB + IIA. These probes may be taken into Ex zone 0 (only for group IIA + IIB). They may be temporarily installed in zone 0, taking the gas groups into account. Permanent installation is not permitted.

Ultrasonic probes L60 and L61
II1G Ex ia IIB T4 Ga and II2G Ex ia IIC T4 Gb

Device / Probe	EPL - Gb (zone 1)			EPL - Ga (zone 0)		
	Gas group			Gas group		
	IIA	IIB	IIC	IIA	IIB	IIC
SONAPHONE® E	✓	✓	✓	⊖	⊖	⊖
L60 | L61	✓	✓	✓	✓*	✓*	⊖
L62 | L63	✓	✓	✓	⊖	⊖	⊖
Surface temperature sensor	✓	✓	✓	⊖	⊖	⊖
Headphones	✓	✓	✓	⊖	⊖	⊖

** short-term, not permanent*

Code for marking explosion protected devices

Equipment group	II (aboveground applications)
Category group	2 (high safety, suitable for Ex-Zones 1 and 2) 1 (very high security, suitable for Ex-Zones 0, 1 and 2)
Atmosphere	G (gas, dust, vapors)
Type of protection	ia (intrinsic safety)
Gas group	IIA (less ignitable) ··· IIB ··· IIC (easy to ignite)
Temperature class	T4 Minimum ignition temperature of the atmosphere 135°C
EPL (Equipment protection level)	Explosive gas atmosphere areas: Ga (Zone 0) / Gb (Zone 1)

2.4 General safety instructions for use of the SONAPHONE® E in potentially explosive atmospheres

⚠ DANGER

Risk of death or severe injury. Incorrect operation, damage to the device as well as damage to accessories can impair the explosion protection.

(1) Connect solely the supplied accessories to the SONAPHONE® E: Headphones, surface temperature sensor, ultrasonic probes, probe accessories and telescopic rod.

(2) Other probes / sensors – hereinafter referred to as 'Additional sensors' – are only permitted to be connected to the SONAPHONE® E if all defined conditions are met.

(3) Only those sensors which are offered by SONOTEC® as accessories are permitted to be used as 'additional sensors'. If the 'additional sensor' is connected, the complete device set must only be used in zones 1 and 2. The protection level drops to ib.

(4) Connection and operation of the USB interface in hazardous areas is prohibited.

(5) Always observe the ambient conditions specified in the chapter 'Technical specifications'. It is forbidden to exceed or fall below the specified limits – even for a short time.

(6) Protect the SONAPHONE® E from penetrating moisture.

(7) Prevent under all circumstances any friction and impact sparks that could occur, for example, when the probes made of light metal alloy are dropped.

(8) Prevent electrostatic charges on plastic parts of the device technology. Plastic case, handles, probe accessories, cables and coatings must never be rubbed against each other or other objects.

(9) Never open the battery compartment of the SONAPHONE® E in a potentially explosive area and never when it is switched on or with an active USB connection.

(10) Never open the housing of the SONAPHONE® E or its accessories and never carry out unauthorized repairs. Repairs must solely be carried out by the manufacturer.

(11) Any kind of conversion or modification of the hardware and software of the device, probes or accessories is prohibited.

(12) If there is any malfunction or damage, or if there is a suspicion that the device technology is no longer functioning properly, take it out of operation immediately and remove it as soon as possible from the hazardous area.

2.5 General safety instructions for operating the SONAPHONE® E

⚠ DANGER

Risk of death or severe injury. Incorrect operation, damage to the device as well as damage to accessories can impair the explosion protection.

(1) Ensure that you always have a clear view of the SONAPHONE® E and the probes while working.

(2) Never work with the probes or the telescopic rod in the vicinity of exposed live parts or without visual contact in areas unknown to you.

(3) Keep a sufficient safety distance when locating ultrasonic signals on electrical installations. Prevent electrical flashovers.

(4) Use the carrying strap when using stairs, ladders, platforms etc. so that you can use your hands to secure yourself.

(5) Protect the SONAPHONE® E, the probes and all accessories from damage. They have a stable housing construction, but strong mechanical stresses or impact loads must still be prevented.

3 Scope of delivery

3.1 Overview

SONAPHONE® E testing device for use in potentially explosive atmospheres *

Probes for the use in potentially explosive atmospheres: **

- Airborne sound probe L60
- Structure-borne sound probe L61
- Structure-borne sound probe L62 with stainless steel tip
- Flexible airborne sound probe L63

Accessories for the use in potentially explosive atmospheres: **

- Headphones (with high sound attenuation)
- Carrying strap for the SONAPHONE® E
- Grounding kit for probes L60 and L61
- Probe extension cable 30 cm
- Directional tube with tip (Attachment for airborne sound probe L60)
- Acoustical horn (Attachment for airborne sound probe L60)
- Surface temperature sensor (T_{max} = 800 °C)
- Extension cable for the surface temperature sensor
- Aluminum telescope bar
- Operating manual

Additional accessories (for use outside potentially explosive atmospheres): **

- Hexagon socket wrench SW3
- PC Software SONAPHONE® E Communicator
- USB cable
- Transportation case

**) After adaptation of the housing materials the prescribed leather bag is no longer required for devices marked with Mod. B (see type plate).*
***) Please do notice, that the scope of delivery varies according to your order.*

3.2 Arrangement of devices and accessories in the transportation case

1 *Directional tube with tip*

2 *Carrying strap*

3 *Flexible airborne sound probe L63*

4 *Surface temperature sensor*

5 *Air-borne sound probe L60 with probe extension cable*

6 *Extension cable for the temperature sensor*

7 *SONAPHONE® E*

8 *Hexagon socket wrench*

9 *Headphones*

10 *Structure-borne sound probe L62*

11 *Structure-borne sound probe L61*

12 *Operating manual*

4 Function description

4.1 Designated use

The SONAPHONE® E is used for the detection, recording and evaluation of ultrasonic signals.

The testing device is a battery-powered, mobile hand-held unit. Various probes, which are connected to the testing device either directly or via a cable, serve to detect the ultrasound. The probe type is automatically recognized by the SONAPHONE® E by means of probe coding. The surface temperature sensor (thermocouple type K, NiCr-Ni) with circular plug-in connector is used for temperature measurement (optional). It can be extended with the appropriate extension cable.

Any use other than the intended one is prohibited and can lead to personal injury or damage to property. SONOTEC GmbH is not liable for damages, also not to third parties, which are caused by improper handling of the device and accessories.

4.2 General information

Ultrasound is generated due to friction caused by the flow of gases, liquids and solids in pipes and leakages. These ultrasonic signals are recorded by the SONAPHONE® E, their intensity is shown on the display screen and made audible through speaker or headphones. As an option, surface temperatures can be measured with a temperature sensor. The recorded data can be stored and transmitted to a computer using the integrated USB interface outside potentially explosive atmospheres.

Ultrasound can be generated in a wide variety of processes, for example:

- at leaks in compressed air, steam and vacuum systems
- at steam traps
- on leaking valves, gate valves, shut-off valves or taps in pipe systems
- from roller bearing damages
- from cavitation at pumps and compressors
- from flash-overs and corona discharges on electrical installations

Using the SONAPHONE® E, it is possible to locate precisely the defects and estimate their magnitude.

Tightness testing (outside potentially explosive areas)

The ultrasonic transmitter SONAPHONE® T (optional accessory) can be used to detect leaky spots in vehicles, freight containers, other types of containers and ventilation technique systems where no ultrasound is generated. The transmitter generates ultrasonic waves which emerge at the leaks. The precise location is determined externally using the SONAPHONE® E.

4.3 SONAPHONE E connections, control- and display elements

5 Operation

5.1 Insert the batteries

⚠ DANGER

Death or serious injury possible. Incorrect operation, damage to the device as well as damage to accessories can impair the explosion protection.

(1) Never open the battery cover in a hazardous area. Never change the batteries in a hazardous area, with an active USB connection or when the power is on.

(2) Only the following battery types (alkaline primary cells) are permitted for operation of the SONAPHONE® E:

- Varta High Energy 4906 MN1500
- Duracell Plus MN1500

(3) Always observe the installation position (engraved) on the battery block regarding the polarity of the batteries.

Performing the battery change

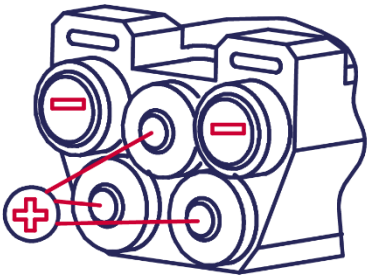
⚠ **Leave the hazardous area, disconnect the USB connection if necessary and switch off the device.**

1. Remove the carrying strap from the battery compartment cover.
2. Hold the battery block and the device firmly in your hand (see photo below). Turn the locking screw of the battery compartment back to the stop using the hexagon socket wrench. The battery block moves in the direction of the locking screw.

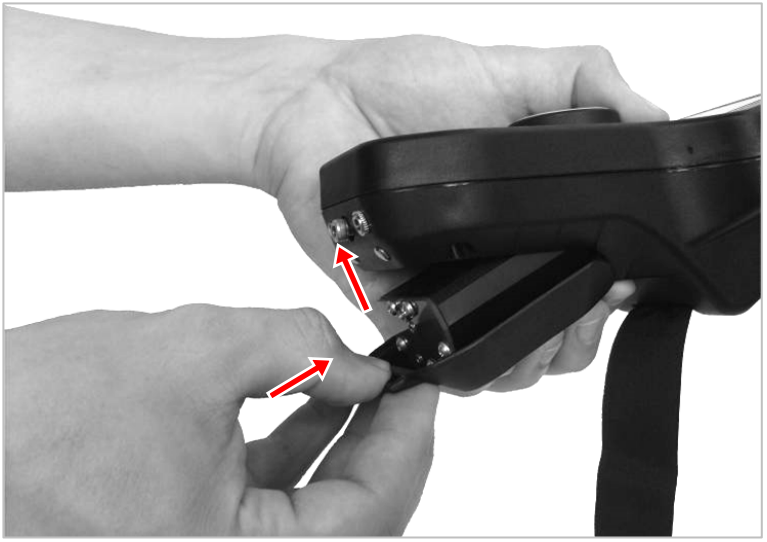
3. Press down the battery compartment and pull it out of the unit.

4. Take the batteries out of the battery block.
5. Insert new batteries into the block.

   Observe correct arrangement of the polarity of the batteries on the upper side of the battery block.



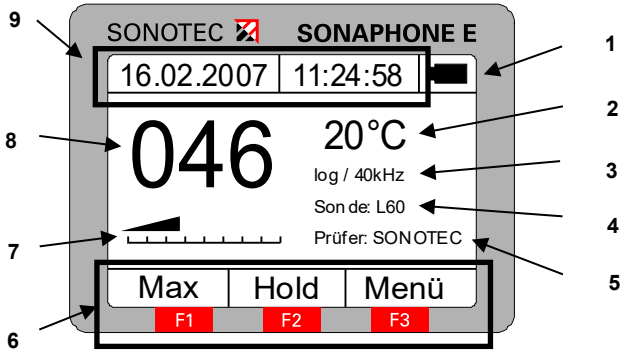
6. Re-insert the battery compartment into the casing.



7. Tighten the locking screw of the battery compartment.
8. Fasten the shoulder strap to the battery compartment lid.

5.2 Starting up the unit

The device is switched on by pressing the ON/OFF button. After displaying the splash screen, it switches automatically to the testing mode. The following is shown on the display*:



1 *Battery or USB operation battery status indicator*

2 *Temperature*

3 *Testing mode / mixer frequency*

4 *Type of probe*

5 *Tester*

6 *Currently available functions of keys "F1-F3"*

7 *Intensity bar for ultrasonic test value*

8 *Ultrasonic test value*

9 *Date / time*

5.3 Battery status indicator

The symbol (labelled '1' in the above illustration) at the top right edge of the display provides information about the status of the batteries in the unit and about the kind of power supply:

Battery operation (about 60 %)	USB operation
	

** (The display may vary depending on the settings.)*

5.4 General settings

Control elements

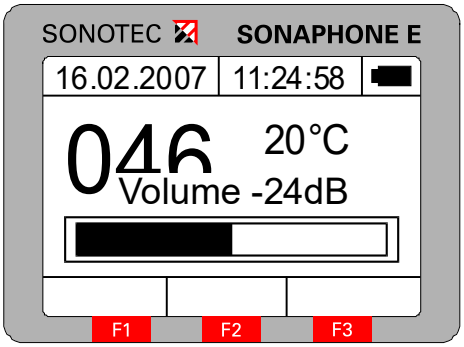
Turning the rotary knob:	Volume adjustment
Pressing the rotary knob:	Storing the test values (see Section: **Single test**)
F1 (Max):	Turns on or off "Max“ function
F2 (Hold):	Turns on or off "Hold“ function
F3 (Menu):	Switch to menu in order to adjust the settings of the unit
“LIGHT“:	Controls the display lighting *(Off – Level I – Level II – Level I – Off)*

To switch the unit on or off press the ON/OFF button. Depending on the intended use, connect the appropriate probe or the temperature sensor to the SONAPHONE E (see Section: **Using the probes**).

A probe for structure-borne ultrasound is used for locating leaks. The ultrasonic value is besides the magnitude of the sound source also dependent on the probe’s direction and distance from the sound source. This effect can be used to locate and evaluate leaks. If no probe is plugged into the unit, the message “No Probe” is displayed instead of the ultrasonic value.

Volume adjustment

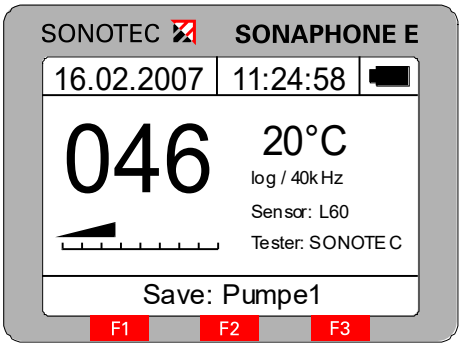
When the rotary knob is turned, a volume bar and an intensity value are displayed for about two seconds, as shown below:



Turning the rotary knob clockwise increases the volume and turning it anti-clockwise decreases the volume.

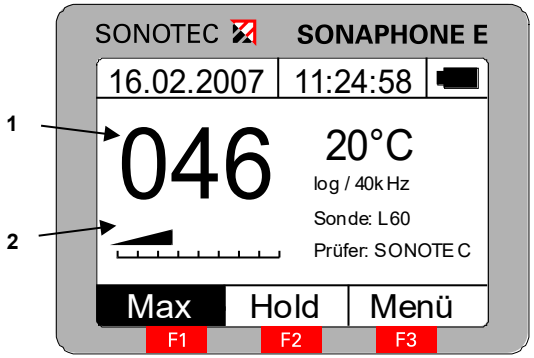
Storing the test values

When the rotary knob is pressed in the check mode (provided that at least one **Single test** has been prepared), the ultrasonic test values and the current temperature are stored in the individual test selected as “Active”. During this process, “Save” and the name of the single test appear briefly on the display:



“Max” function

The F1 key activates the “Max” function. In this state, the number displayed corresponds to the maximum ultrasonic value and the intensity bar to the current ultrasonic value. The activation of the “Max” function is signaled by highlighting the function key description:



1 *Maximum ultrasonic value*

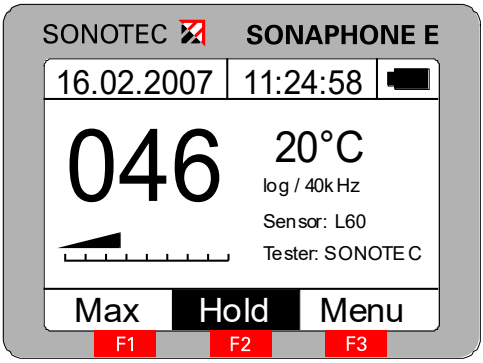
2 *Current ultrasonic value*

Pressing the rotary knob, stores the currently **displayed value**, in other words the maximum value, in the individual test that is active.

Press the „F1” function key again to deactivate the “Max” function.

“Hold” function

Press the F2 function key to activate the “Hold” function. This serves to register ultrasonic values, for example, if the display is not visible at the moment of testing. Thereby, the ultrasonic values, which was recorded at the moment the F2 key was pressed, is stored in the display.

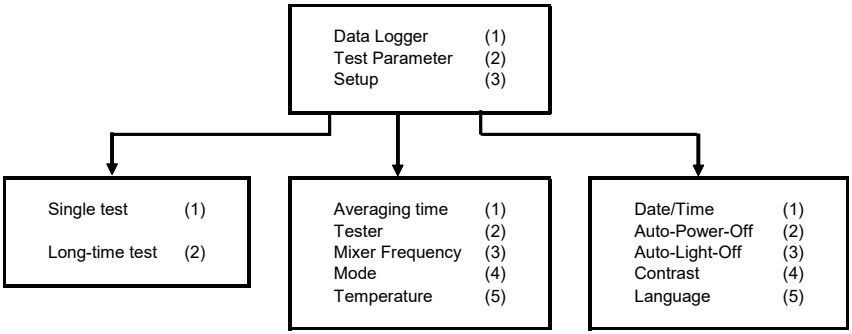


Press the rotary knob to store the currently **displayed value**, in other words the “Hold” value, in the individual test that is active.

Press the F2 key again to deactivate the “Hold” function.

5.5 Main menu

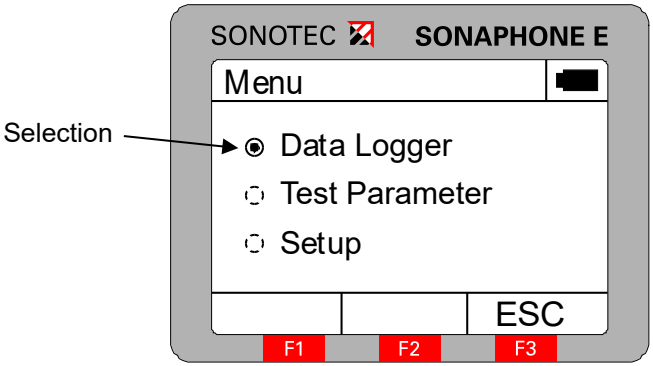
Menu structure



Operation

There is a choice of three menu items in the main menu: the data logger for storing the test values, the test parameters for changing all parameters relevant to the test and the setup for changing the device's parameters. The selection is carried out by turning the rotary knob. Press it to open the respective menu. Press the F3 function key to return the unit to the check mode.

The selected menu item is indicated by a dot in the selection circle:



5.6 Data logger

General information

Ultrasonic values and temperature test values can be stored in the data logger. The data record includes the date, the tester (maximum eight characters), the test site (maximum 16 characters), the type of probe used, the ultrasonic values and the temperature. There are two kinds of tests:

1. Long-time test:	Storing ultrasonic and temperature test values over a longer period at constant time intervals. A maximum of 250 Long-time tests with 73 datasets each, or 1 Long-time test with 20,000 datasets can be recorded. 1 record consists of the ultrasonic test value and the temperature test value.
2. Single test:	Storing current ultrasonic and temperature test values in one file. A maximum of 250 individual tests with 25 datasets each, or one individual test with 6,000 datasets can be recorded.

Use the PC software SONAPHONE® Communicator, available as an accessory, for archiving the measurement data.

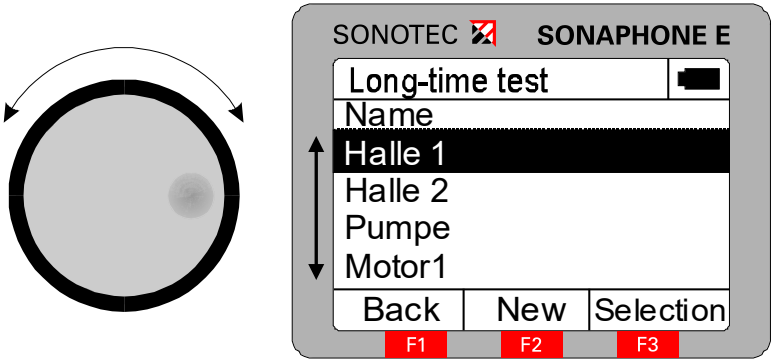
Long-time test

ATTENTION

Records in different test modes are not comparable.

For comparative tests, make absolutely sure that you have selected the same test mode (see chapter ‚Setting the test mode', page 40).

Once the Long-time test has been selected, a summary of all Long-time tests created until then appears, showing the respective test site and the date of creation:

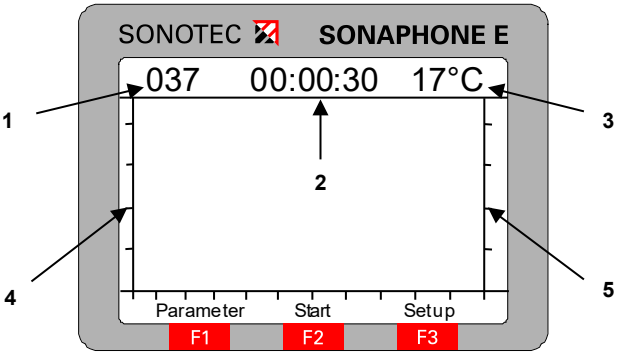


In this menu, the user has a choice of the following options:

Pressing the rotary knob:	Detailed information about the selected Long-time test
F1 (Return):	Return to the Data Logger menu
F2 (New):	Create a new Long-time test
F3 (Selection):	Record test values for the selected Long-time test

1. Create new Long-time test

To create a new Long-time test, press function key F2 to open a new screen:



1 *Ultrasonic test value*

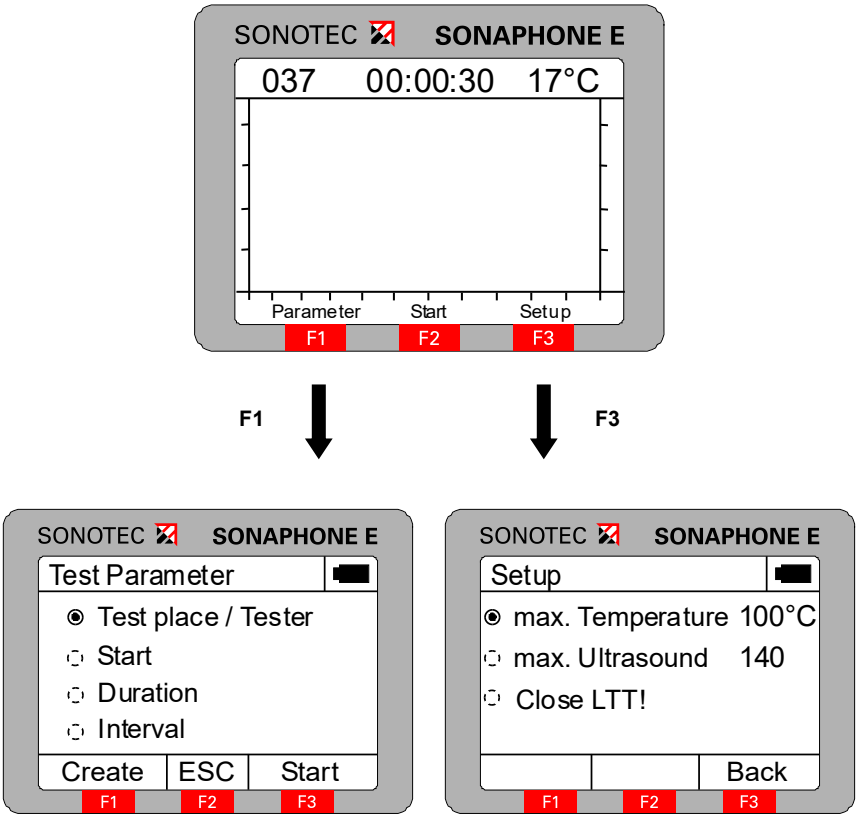
2 *Test duration*

3 *Temperature*

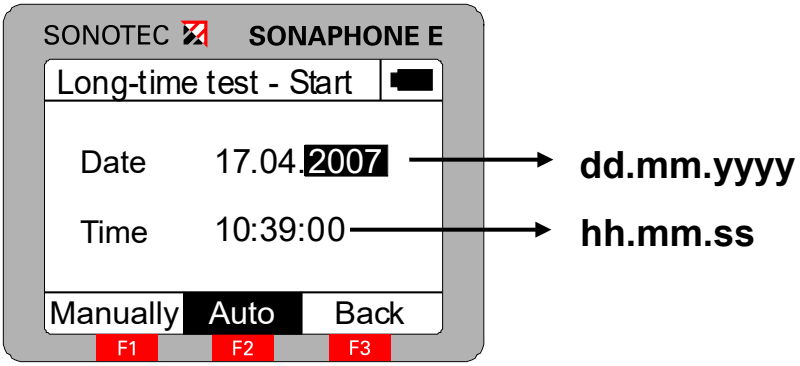
4 *Scale for the ultrasonic test value*

5 *Scale for the temperature test value*

To set the testing parameters, open the parameter menu using the function key “F1”. In order to make adjustments to the display of the Long-time test, or to end the Long-time test, the menu item “setup” has to be opened by pressing function key “F3”:



See section **Setting the tester** for instructions on setting the test place and tester. In the start menu, the user can set the type and starting time of the Long-time test:



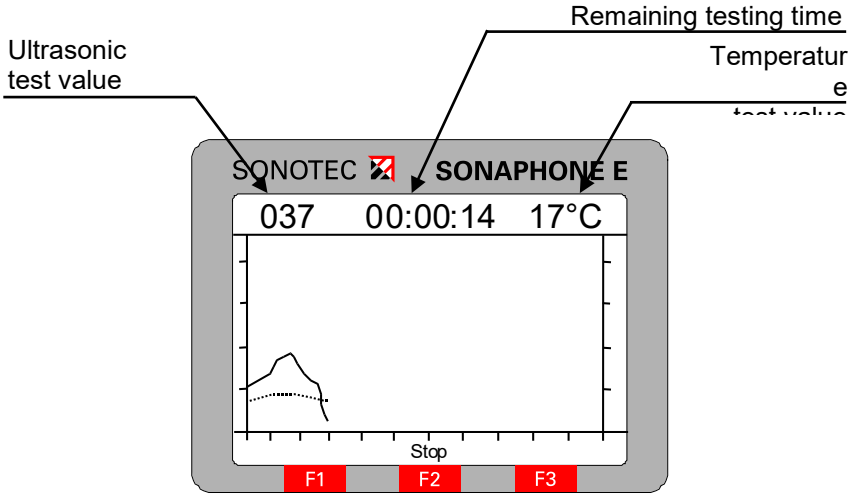
When this menu is opened, the start of the Long-time test is set to “Auto”. The SONAPHONE E will thus start the Long-time test automatically at the time that has been set. If the time entered is earlier than the present time, the test is started immediately.

Switching to “manual” enables to start the Long-time test manually. Select the element to be edited by pressing the rotary knob. Adjustments can be made by turning the rotary knob. Press function key F3 to store the starting time for the selected Long-time test.

The scaling of the ultrasonic and temperature test values depends on the limits for maximum temperature and maximum ultrasonic value which have been set under setup.

2. Start the Long-time test

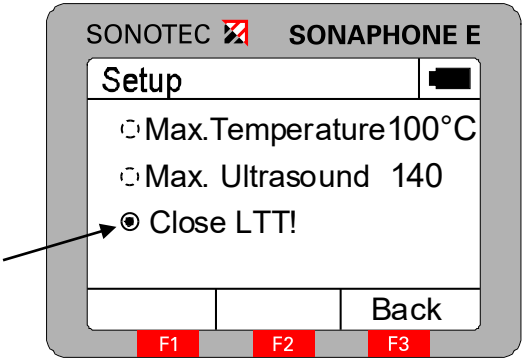
The Long-time test can be manually started in the measuring screen by pressing function key F2:



The ultrasonic test values are represented by a solid line, and the temperature values by a dotted line. The remaining time of the test is shown at the top center of the screen. The Long-time test can be cancelled at any time by pressing function key F2. The values recorded up to that time are stored and the entry for the duration of the test is updated.

3. Finishing the Long-time test

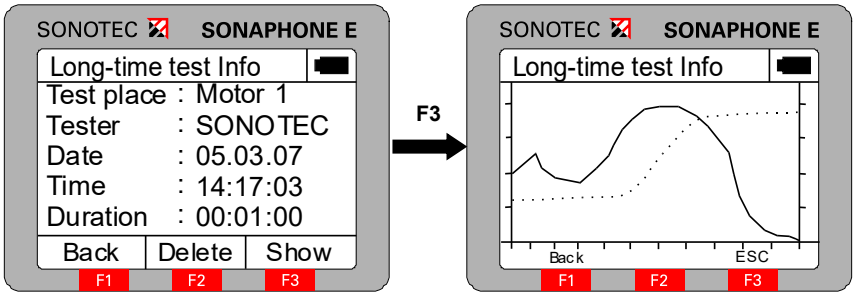
To exit the recording of Long-time test (LTT) choose “Close LTT“ in the menu setup and activate the point Long-time test.



All test values, which have been recorded until this point, are kept and displayed in the overview of the Long-time tests, which are stored in the device.

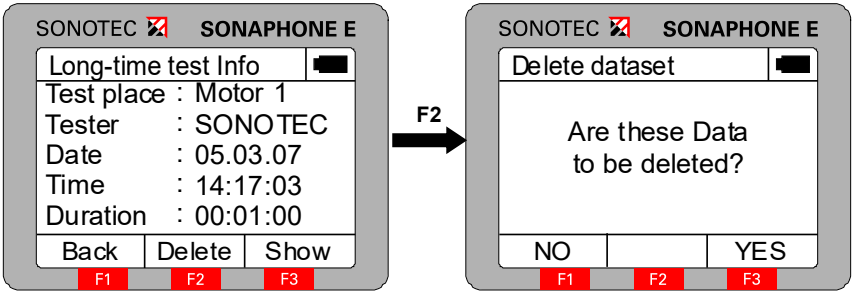
4. Details of the selected Long-time test

Select the “Menu” (F3) → “Data Logger” → “Long-time test” → (*Entry)*, to show details. In the following, information about tester, testing site, date, time, duration and intervals of the test is given. Now, you have the option of deleting the Long-time test or viewing the test values in form of a diagram.



Ultrasonic test values are represented by a solid line and temperature values by a dotted line. The visible time period is a maximum of 60 seconds. If the duration of the test is longer than 60 seconds, it is possible to shift the window of time by turning the rotary knob. The ultrasonic test values are shown over a range of 0 - 140 scale divisions for the logarithmic scaling, and 0 - 240 divisions for the linear scaling. The temperature is shown over the range 0…800 °C or 0…1472 °F.

Press function key F2 in the detail screen to delete the current data record. As a safety measure, you are asked if this record should definitively be deleted:



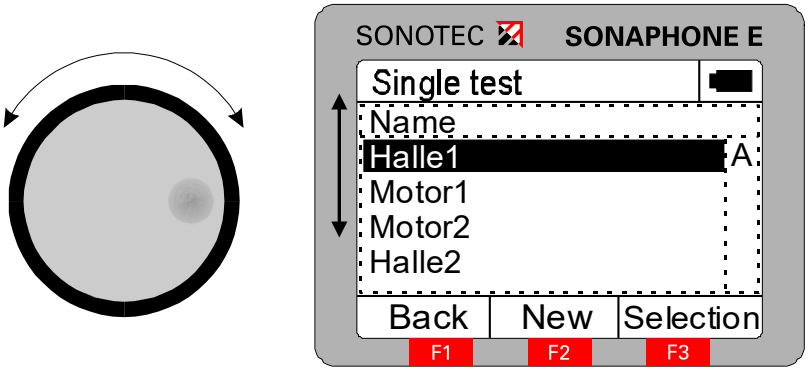
To confirm, press function key F3, to cancel this action press F1.

5. Start/overwrite Long-time test selected

By pressing function key “F3” you have the option of starting a Long-time test that is already parameterized, or overwriting an existing Long-time test.

Single test

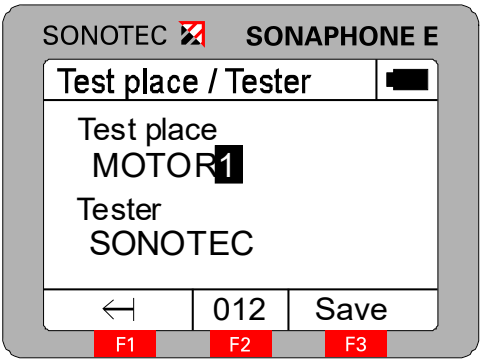
Once the individual test has been selected, a summary of all individual tests created previously, with their respective testing sites and corresponding status, appears. The test data, that has to be stored, is filed in the Single test marked “active”.



By pressing function key “F2” you can create a new Single test, by turning the rotary knob you can edit the current Single test, and you are able to activate the selected Single test by pressing “F3”.

The result of activating a Single test is that the test values are stored in this individual test within the test mode. Only one Single test at a time can have the “active” status; it is not possible to activate more than one Single test simultaneously.

A Single test is edited or created in the following menu:



The character to be edited is selected by pressing the rotary knob and set by turning it. To edit the last character again press the Button “F1”. The character sets (*ABC* ➔ *abc* ➔ *012* ➔ *:;<*) are switched over by pressing the "F2" key. Press “F3” to store both the tester’s name and the test site for the corresponding Single test.

The test values are stored in the test mode by pressing the rotary knob. The following data is stored for each test:

- Date / time
- Type of probe
- Test mode / mixer frequency
- Ultrasonic test value
- Temperature value

Archiving the individual tests is only possible by using the PC software SONAPHONE Communicator, available as an accessory tool.

5.7 Test parameters

Note!

Altering all test parameters have a direct influence on the test values displayed. In order to ensure reproducibility, tests which have to be compared must be recorded with identical test parameters.

Device reset

Pressing key „F1“ when the splash screen is displayed resets all test parameters to the delivery status.

Averaging time:	4 s
Tester:	SONOTEC
Mixer frequency:	40 kHz
Check mode:	logarithmic
Temperature:	°C

Note!

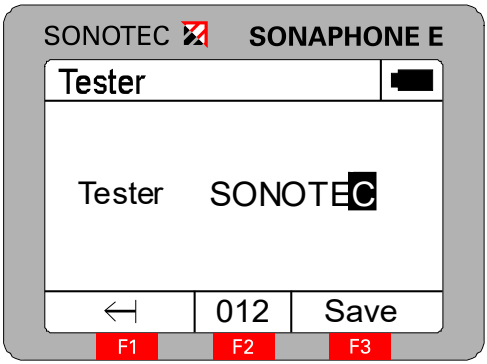
The test values stored in the device are not affected by the device reset. Only the test parameters are reset to the initial settings.

Setting the averaging time

The SONAPHONE E provides the option of averaging the test values recorded over a variable period. The time is set between 0 and 10 seconds in half second increments in the Averaging time menu. By turning the rotary knob the settings can be changed and stored in the device. By pressing of „F1“ you can reach the menu test parameters and by pressing „F3“ you can leave the settings and return to the test monitor.

Setting the tester

In this menu, you have the option of entering 8-character-long designations for the tester. To switch between character sets (*ABC* ➔ *abc* ➔ *012* ➔ *.;<*), press function key “F2”.



The character to be edited is selected by pressing the rotary knob and set by turning it. Press “F3” to store the tester’s name in the device.

Setting the mixer frequency

In the SONAPHONE® E, ultrasound is transformed into audible sound by a frequency conversion process. The unit provides the option of setting the working frequency via the mixer frequency. The frequency range can be set between 20 and 60 kHz, in increments of 2 kHz. The default value is 40 kHz. By turning the rotary knob the settings can be changed and stored in the device. By pressing of „F1“ you can reach the menu test parameters and by pressing „F3“ you can leave the settings and return to the test monitor.

Note!

Changing the mixer frequency makes only sense when using the probe for structure-borne ultrasound L 62, since this probe has the necessary bandwidth.

Setting the test mode

The SONAPHONE E has three different display modes for the ultrasonic test value:

Mode	**Scaling**
Linear	0 ... 240
Logarithmic (log) (= Default Value)	0 ... 140
dBµV (Microphone voltage 1 µV = 0 dBµV)	-3.0 ... 63.5 (Display ≤ 3.0: --.--)

This can be set in the „Menu“ (F3) → „Test Parameter“ → „Mode“. By turning the rotary knob the settings can be changed and stored in the device. By pressing of „F1“ you can reach the menu test parameters and by pressing „F3“ you can leave the settings and return to the test monitor.

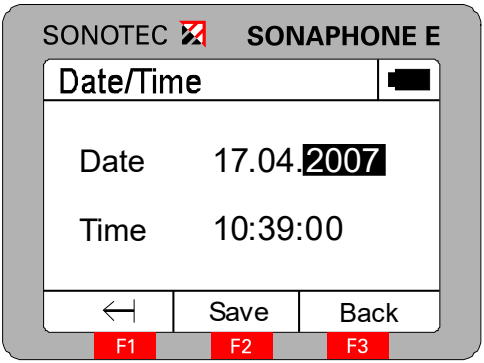
Setting the temperature display

The SONAPHONE E provides the option of showing the temperature in °C or in °F. The switch over between the two types of display can be done in this menu. By turning the rotary knob the settings can be changed and stored in the device. By pressing of „F1“ you can reach the menu test parameters and by pressing „F3“ you can leave the settings and return to the test monitor.

5.8 Settings (Device)

Date/Time

In this menu item, the date and time of day are set. You can select the desired element by pressing the rotary knob and set the desired value by turning it. It is not possible to set the seconds. These are reset to “00” when the menu is opened.



The element to be edited is selected by pressing the rotary knob, and set by turning it. To edit the last element again press the function key F1. Pressing function key F2 stores the time. Pressing function key F3 deletes the settings and returns the unit to the previous menu.

Auto Power Off

The Auto–Power Off function allows the SONAPHONE E to be switched off automatically after a set length of time. Times between 1 and 25 minutes can be set in one minute increments by turning the rotary knob. By pressing of „F1“ you can reach the previous menu and by pressing „F3“ you can return to the test mode.

Auto Light Off

The Auto Light Off function allows the display background lighting to be switched off automatically after a set length of time. Times between 0 and 2 minutes can be set in 30 second increments by turning the rotary knob. Press function key F1 to return to the previous menu and F3 return to the test mode.

Contrast

In order to adjust the readability of the display to the particular conditions it may be necessary to adjust individually the contrast. This can be done in the contrast menu by turning the rotary knob. The changes take effect immediately on the screen.

Language

The menu prompts on the SONAPHONE E can be either in German or in English. This is set in the language menu by turning the rotary knob. Press function key F1 to return to the previous menu and F3 to return to the test mode.

6 Using the probes

6.1 Air-borne sound probe L60

⚠ DANGER

Death or serious injury possible. Incorrect operation, damage to the device as well as damage to accessories can impair the explosion protection.

(1) When using the ultrasonic probe L60 in Ex zone 0, it is imperative that it is connected via the probe extension cable and the housing is connected to the local potential equalization. Only the grounding kit supplied by SONOTEC® should be used for this purpose.

(2) Prevent friction and impact sparks that could occur, for example, when the probe is dropped.

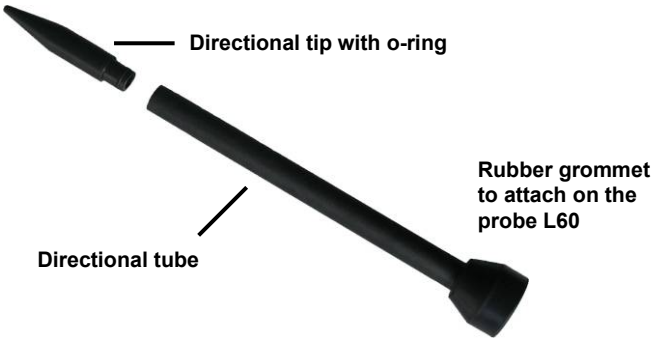
For connecting the grounding kit: see ‚7.3 Using the grounding kit'!

The L60 probe for air-borne ultrasound serves for general detection of leakages in excess pressure and in vacuum range. The slot for probes is provided with a notch which indicates the correct position for insertion. Install the required probe in the specified position. You must feel the connector click into place.

ATTENTION

When placing the directional tube onto the air-borne probe L50 the tube could detach from the rubber grommet and damage the probe grid. Put the rubber grommet very carefully over the probe and never push with the tube.

The precision of location is increased by mounting the directional tube. For precise fault location mount the tip onto the directional tube as well.



If the leak cannot be located with the probe mounted directly on the SONAPHONE® E, the probe extension cable can be used.

The acoustic horn serves as attachment for airborne sound probe L60 to increase the range up to 5 … 6 meter.

6.2 Structure-borne sound probe L61 for valve inspection (oil and water resistant)

⚠ DANGER

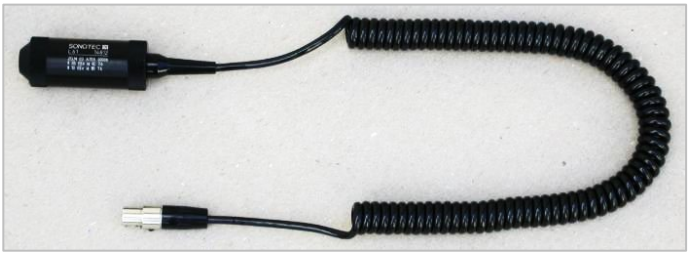
Death or serious injury possible. Incorrect operation, damage to the device as well as damage to accessories can impair the explosion protection.

(1) When using the ultrasonic probe L61 in Ex zone 0, it must be connected via the probe extension cable and the housing must be connected to the local potential equalization. Solely the grounding set supplied by SONOTEC® should be used for this purpose.

(2) Prevent friction and impact sparks that could occur, for example, when the probe is dropped.

For connecting the grounding kit: see ‚7.3 Using the grounding kit'!

The L61 probe for structure-borne ultrasound is especially suitable for the determination of the ultrasonic value at defective and damaged fittings (valves or gate valves). It is used for example to trace inner leaks, to detect defects at the valve ball or the valve seat or to track errors at rotating equipment.



Since the probe for structure-borne ultrasound is watertight, it can also be used for ultrasonic inspections in moist environments or in water systems. After the use, the probe must be dried.

6.3 Structure-borne sound probe L62 for long-time tests and detection of bearing wear, steam trap testing

⚠ DANGER

Death or serious injury possible. Incorrect operation, damage to the device as well as damage to accessories can impair the explosion protection.

(1) Prevent friction and impact sparks that could occur, for example, when the probe is dropped.

⚠ WARNING

Serious injury from the probe tip possible.

(1) Always use the probe with care and caution so that there is no risk of injury from the probe tip.

(2) When transporting outside the case or when the probe is not in use, use the probe quiver on the shoulder strap.

⚠ WARNING

Severe burns and injuries possible when testing steam traps.

(1) Be aware that steam and the surfaces of steam traps can become extremely hot. Keep sufficient distance when testing with the L62.

The probe L62 for structure-borne ultrasound is used to detect ultrasound in solid objects, e.g. for the poof of bearing wear or steam traps.

It has to be pressed gently by hand against the spot that has to be examined. In order to achieve reproducible results, the contact pressure and direction must be kept constant.

Note!

For optimizing the test procedure the mixer frequency of the device can be changed (section 5.7 page 39) between 20 and 60 kHz in 2 kHz increments. Changing the mixer frequency affects the shown test values directly. In order to ensure reproducibility, values that have to be compared must be recorded with identical mixer frequencies.

6.4 Flexible air-borne sound probe L63

⚠ DANGER

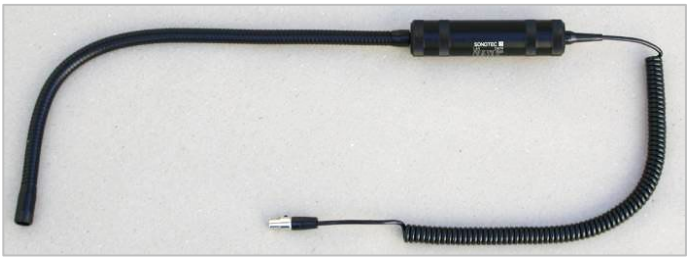
Death or serious injury possible. Incorrect operation, damage to the device as well as damage to accessories can impair the explosion protection.

(1) When working with the L63 probe, never work in the vicinity of exposed live parts or without visual contact in areas unknown to you.

(2) Keep a sufficient safety distance when locating ultrasonic signals on electrical equipment. Prevent electrical flashovers.

(3) Prevent friction and impact sparks that could occur, for example, when the probe is dropped.

The flexible probe for air-borne ultrasound serves to detect ultrasound at areas that are particularly difficult to reach.



7 Using accessories

7.1 Telescoping rod

⚠ DANGER

Death or serious injury possible. Incorrect operation, damage to the device as well as damage to accessories can impair the explosion protection.

(1) When working with the telescopic rod, never work in the vicinity of exposed live parts or without visual contact in areas unknown to you.

(2) Keep a sufficient safety distance when locating ultrasonic signals on electrical equipment. Prevent electrical flashovers.

The telescoping rod increases the reach when handling the probes.

To use it, clamp the probe in the rotatable clamp and connect the plug connector near the clamp. The telescoping rod is connected by cable to the SONAPHONE® E.

⚠ CAUTION

Risk of crushing when operating the telescopic rod. Take care of your hands when pulling and pushing together. Do not grab the edge.

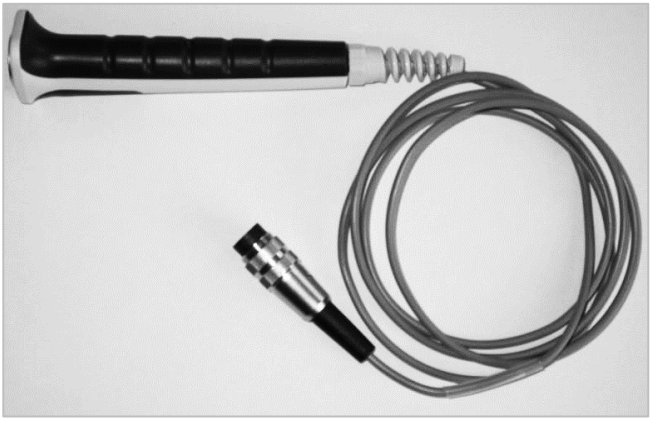
The length of the telescoping rod is continuously adjustable from about 1.70 metres to about 3 metres. To do this, loosen the black coupling ring between the inner and outer tubes of the telescoping rod.

When contracting the telescoping rod, carefully draw the cable out of the outer tube and wrap the cable.

7.2 Surface temperature sensor

In general, temperatures in the range of 0 °C ... 800 °C can be measured. In explosive atmospheres, maximum temperatures of up to 450 °C will occur.

The surface temperature sensor can either be plugged into the SONAPHONE® E directly or by using the extension cable.



If no temperature sensor is plugged in, (---) will be shown on the display.

Note!

Before measuring, make sure that the temperature of the SONAPHONE® E has adapted to the ambient temperature, as temperature measurement with a thermocouple is a comparative measuring method. The temperature difference between the measuring and reference junction (probe tip) is determined. The reference junction is the SONAPHONE® E.

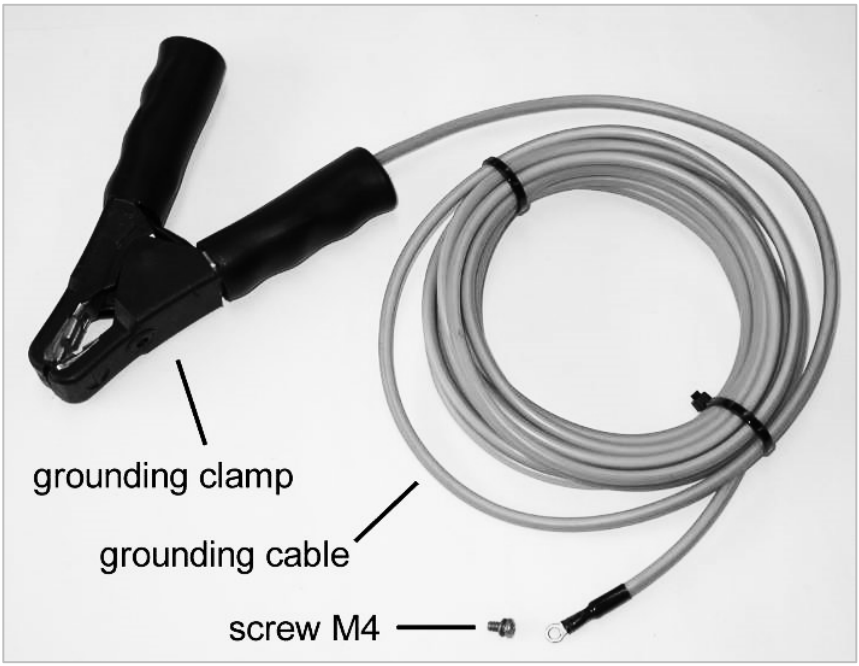
7.3 Using the grounding kit

⚠ GEFAHR

Death or serious injury possible. Placing the SONAPHONE® E in Ex-Zone 0 endangers the explosion protection.

The SONAPHONE® E is not intended for use in Zone 0. Only the probes in conjunction with the grounding set are suitable for short-term use in Ex-Zone 0.

When using the ultrasonic probes L60 and L61 in Ex-zone 0, the casing of the probes must be connected to the local equipotential bonding conductor. Only the grounding set supplied by SONOTEC GmbH may be used for this purpose.



Before taking probes L60 or L61 into the Ex-zone 0, connect the grounding set in the following order!

1. Connect the probe L60 or L61 by means of the M4 screw. Screw the M4 screw into the side thread on the casing of the probe and tighten it with a suitable tool.
2. Clamp the grounding clamp to the local equipotential bonding conductor. Connect and position the grounding set in the way that it also secures the probe from falling (in order to prevent friction or impact sparks if the probe should drop onto a metal surface).
3. Now, the probe can be taken into the Ex-zone 0!

The grounding cable must not be rolled up in a hazardous area!

7.4 Connecting ‘additional sensors’

⚠ DANGER

Death or serious injury possible. Connecting unsuitable probes or sensors to the SONAPHONE® E endangers the explosion protection.

The SONAPHONE® E may only be operated with the accessories specified by SONOTEC®. Never connect probes or sensors that are not delivered by SONOTEC® or that have been tested for suitability by SONOTEC®.

Allowed 'additional sensors' must be offered by SONOTEC® as accessories. If the additional sensor is connected, the complete device set may only be used in zones 1 and 2 (protection level drops to ib).

8 PC connection & data transfer

Installation of ‘SONAPHONE® Communicator’ under Windows

The SONAPHONE® E can be connected to a computer using a USB cable. ‘SONAPHONE® Communicator’ software is needed for the device communication with the computer. This contains all necessary drivers to log the SONAPHONE® E into the operating system and to ensure a power supply to the unit through the computer. The operation on a computer is not possible without these drivers.

The ‘SONAPHONE® Communicator’ provides the following functions:

- Planning of routes
- Pre-parameterizing Single tests and Long-time tests
- Reading out and managing Single tests and Long-time tests
- Archiving test data
- Performing online tests
- Parameterizing the device
- Memory management

Note!

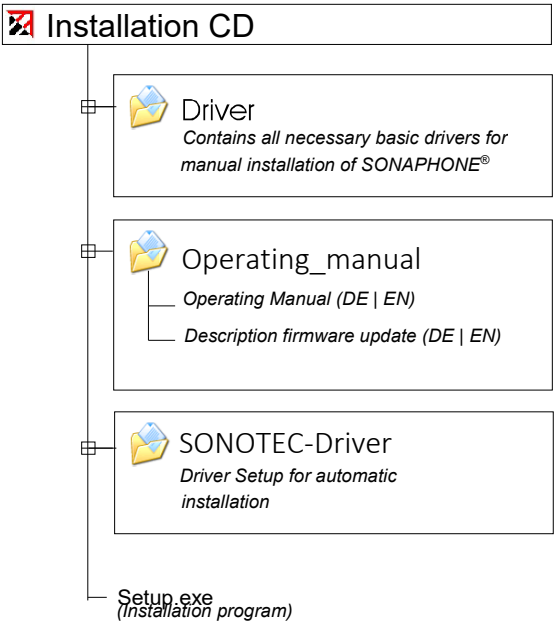
Ensure that you have 'admin' rights for the installation.

Disconnect the SONAPHONE® E before starting the installation.

When the installation CD is inserted into the appropriate drive, the following message appears at the bottom of the screen:

Click on the message and select 'Open folder to view files'.

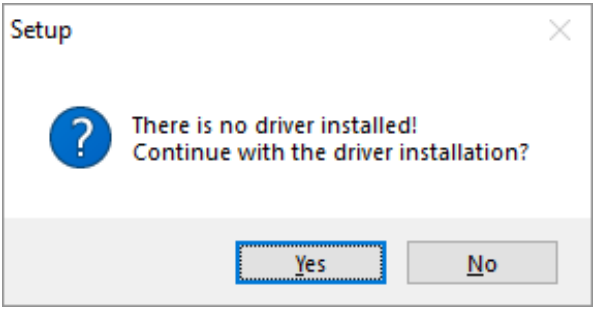
Directory structure of the installation CD



Start the <setup.exe> manually from installation CD.

After the start the following window appears:

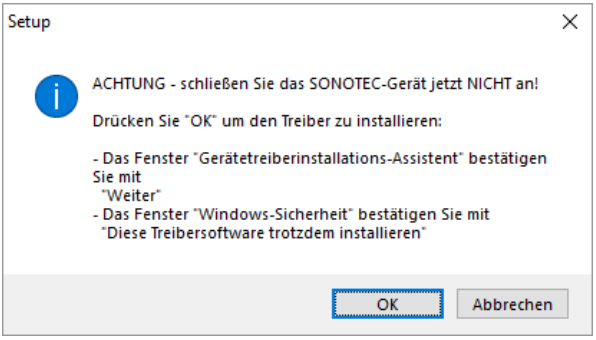
After clicking on <Next>, the setup automatically checks whether you have already installed the driver for the SONAPHONE® E. If this has not yet been done, the following window appears:



Click on <Yes> to start the driver installation.

If the device is already connected to the PC, please disconnect it, start the installation with <Next> and follow the instructions.

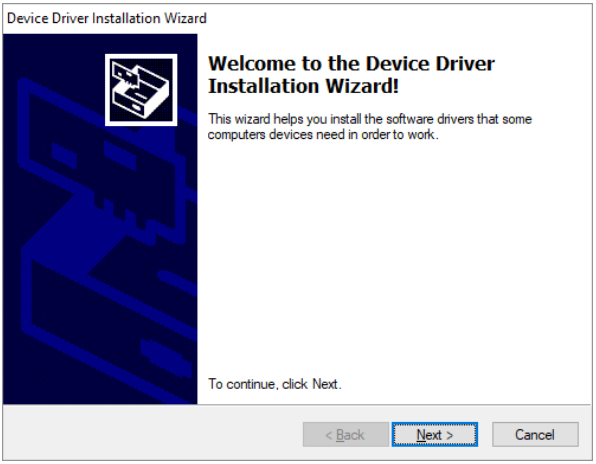
Continue with the driver installation by clicking on <OK>:



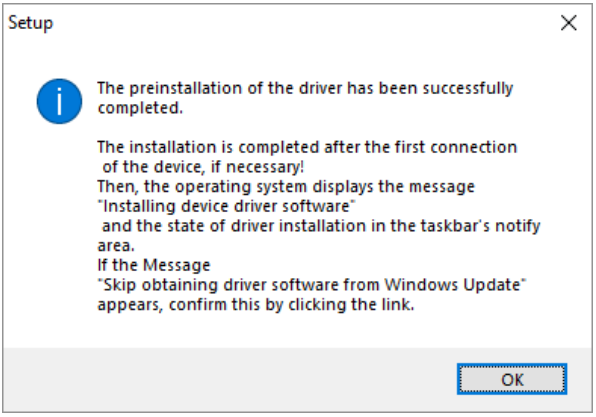
The Found New Hardware Wizard will start. By clicking on <Next> the driver installation will be executed.

After the successful driver installation, the setup wizard changes to the device driver installation.

The following window appears:



Click on <Next>. The following window informs about the further procedure:



Continue the installation process by clicking on <OK>.

Click on <Finish> in the following window to exit the setup wizard and complete the installation process.

Note!

If the above message box does not appear at startup of the "SONAPHONE® Communicator", either no SONAPHONE® E is connected to the computer or the computer does not support the supply of the SONAPHONE® E.

The driver installation is terminated and the setup for installing the SONAPHONE® E Communicator continues. Follow the instructions on the screen.

8.1 Power supply via USB

DANGER

Death or serious injury possible. Incorrect operation, damage to the device as well as damage to accessories can impair the explosion protection.

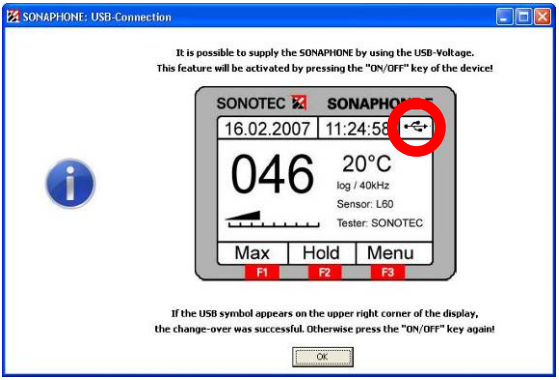
Connect the SONAPHONE® E to a computer only with the battery cover closed and outside the hazardous area.

To use the USB interface, connect the SONAPHONE® E using only the cable supplied and ensure that the maximum voltage of 60 V is not exceeded. This is guaranteed for devices with CE marking.

The SONAPHONE® E has a USB interface, which makes it possible to establish a connection with a computer.

The SONAPHONE® E can (depending on the computer used) be powered outside the hazardous area via the USB interface of the connected computer.

If this is possible, the following message window appears when starting the "SONAPHONE® Communicator":



Switch off the SONAPHONE® E.

If the USB symbol appears in the upper right corner after pressing the <ON/OFF> button, the switchover was successful.

Otherwise, press the <ON/OFF> key again. If the unit is switched off by pressing the <ON/OFF> key, it is not possible to supply power via USB.

Note!

If the message window shown above does not appear when starting the "SONAPHONE® Communicator", either no SONAPHONE® E is connected to the computer or the computer does not support the supply of power to the SONAPHONE® E. Contact our service department.

9 Cleaning

ATTENTION

Damage to SONAPHONE® E possible. Aggressive cleaning agents may attack the plastic housing and impair the mechanical stability. The use of cleaning agents containing solvents is prohibited.

Use damp cloths to clean the device and all accessories.

10 Troubleshooting and self-help in case of errors

Not every malfunction must be an actual defect in the equipment. You save time and money if you can eliminate simple causes of faults yourself.

The following information should help you:

Fault	Possible cause	Remedy
Device cannot be switched on	Batteries are empty	Insert fresh batteries
No acoustic signal detectable	Volume control set too low	Adjust volume
	Probe is not connected properly	Put in the plug completely
	Headphones are not connected properly	Put in the plug completely
	Unit switched off automatically	Switch unit on again
	Defective probe	Check with another probe

11 Technical specifications

Operating frequency	Ca. 40 kHz (20… 60 kHz in 2 kHz steps)
Connections	Ultrasonic sensor Temperature sensor Headphone USB interface (USB 2.0)
Display	Graphical display Background lighting Menu control
Temperature measurement range	0 °C … 800 °C
Dimensions	190 mm x 110 mm x 85 mm
Weight	Ca. 650 g
Operating temperature	0 … +40 °C
Storage temperature	-10 … +50 °C
Explosion protection	Unit: II2G Ex ia IIC T4 Gb Probes L60 & L61: II1G Ex ia IIB T4 Ga u. II2G Ex ia IIC T4 Gb Probes L62 & L63: II2G Ex ia IIC T4 Gb Designation: ZELM 03 ATEX 0130X
Type plate SONAPHONE® E	

12 Warranty

SONOTEC GmbH provides a warranty of twelve months from the date of sale for the SONAPHONE® E and their accessories. Within the warranty period, SONOTEC GmbH will correct all defects caused by faults in material or manufacturing without extra charge. SONOTEC GmbH will fulfil the warranty agreement by either repairing or replacing the defective device or component.

Not covered by the warranty are primary or secondary batteries and damages due to incorrect use, abrasion, or interference with the equipment. Furthermore, the warranty does not cover those defects which affect the value or usability of the equipment only insignificantly.

➔ We reserve the right to make technical changes without notice. Supply is based on availability.

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