



Phoenix Mobilis

Operating instructions 300956073_C0

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We accept no liability for loss of profit, loss of market or any other indirect or consequential loss whatsoever.

Product warranty and limit of liability are dealt with in our standard terms and conditions of sale or negotiated contract under which this document is supplied.

You must use this product as described in this manual. Read the manual before you install, operate, or maintain the product.

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Safety and compliance

1 Safety and compliance

1.1 Definition of Warnings and Cautions



NOTICE:

For safe operation from the start, read these instructions carefully before you install or commission the equipment and keep them safe for future use.

Read all the safety instructions in this section and the rest of this manual carefully and make sure that you obey these instructions. The equipment must only be operated and maintained by trained personnel in the proper condition and as described in this instruction manual.

Obey local and state requirements and regulations. If you have any questions about safety, operation or maintenance of the device, please contact our nearest subsidiary.

Important safety information is highlighted as warning and caution instructions. Obey these instructions.



WARNING:

If you do not obey a warning, there is a risk of injury or death. Different symbols are used according to the type of hazard.



CAUTION:

If you do not obey a caution, there is a risk of minor injury, damage to equipment, related equipment or process.



NOTICE:

Information about properties or instructions for an action which, if ignored, will cause damage to the pump or the system.

We reserve the right to change the design and the stated data. The illustrations are not binding.

Keep the instructions for future use.

1.2 Trained personnel

“Trained personnel” for the operation of this equipment are

- skilled workers with knowledge in the fields of mechanics, electrical engineering, pollution abatement and vacuum technology and
- personnel specially trained for the operation of vacuum pumps.

Safety and compliance

1.3 Safety symbols

The safety symbols on the products show the areas where care and attention is necessary.

The safety symbols that follow are used on the product or in the product documentation.



Warning/Caution

An appropriate safety instruction must be followed or caution to a potential hazard exists.



Warning - Risk of explosion

There is a risk of explosion when you do the task.



Warning - WEEE symbol

Indicates that the equipment must be disposed of carefully.

Description

2 Description

The Phoenix Mobilis is a portable, battery-powered, hand-held gas leak detector. The indications of a leak can be identified (refer to [Figure: The Phoenix Mobilis](#)):

- on the digital display
- by a front-mounted LED flasher
- audible clicks from a rear panel loudspeaker.

The Phoenix Mobilis is supplied in a convenient storage and carrying case, together with a spare battery holder, an additional long flexible probe (for leak detection in areas where access is restricted) and a box-spanner for probe changing.

This manual provides installation, operation and maintenance instructions for the Phoenix Mobilis. You must use the Phoenix Mobilis as specified in this manual.

The units used throughout this manual conform to the SI international system of units of measurement.

Figure 1. The Phoenix Mobilis



- | | |
|----------------------------------|--|
| 1. Keypad | 2. LED flasher |
| 3. Display | 4. Probe cover (short probe installed) |
| 5. Speaker (on the rear of unit) | 6. Battery case (on the rear of unit) |

2.1 Principal of operation

The Phoenix Mobilis contains a heated thermistor bead that transmits heat to a block of material that remains at a constant temperature. As air is drawn through the detector chamber, a constant amount of heat passes from the bead to the block. Gases that have a different thermal conductivity to air will affect the rate at which heat transmits from the bead to the block. These rates of change are measured and can be displayed as leak rates.

2.2 Applications

You can use the Phoenix Mobilis on many types of applications, including:

- Quality assurance testing on manufactured component seals.
- Pneumatic applications, such as leak testing of pipeline joints, gaskets and so forth.
- Detection of leaks from:
 - Laboratory applications: the gas chromatographs, mass spectrometers, gas cylinders and fittings.
 - Industrial applications: the detection of leaks from gas installations, in cylinder receiving rooms, from pipeline assemblies, stored gases and vapours released from stored chemicals.
 - Medical applications: the gas bottles and pipelines and leak testing of membrane materials, glove boxes etc.

Technical data

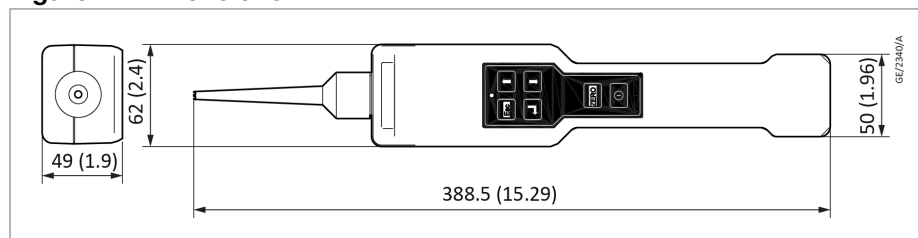
3 Technical data

3.1 General technical data

Table 1 Technical data

Parameter	Data
Operating temperature	0 to 50 °C
Storage temperature	-25 to 70 °C
Materials of construction for Phoenix Mobilis	Polypropylene
Materials of construction for storage case	Polyurethane
Battery requirements	MN1500 or equivalent i.e. M, LR6 (4 required)
Typical battery lifetime	40 hours (with backlight switched off)
Dimensions of the storage case	420 x 320 x 97 mm
Dimensions of Phoenix Mobilis	See Figure: Dimensions
Mass of Phoenix Mobilis	0.5 kg
Mass of complete unit (in storage case)	1.6 kg
Ingress ratings (minimum)	IP20

Figure 2. Dimensions



- All dimensions given are in mm (inch).
- Length of the long probe is 300 mm.

3.2 Performance

3.2.1 Response time

- Detection time to T90: 1 second (short probe), 9 seconds (long probe)
- Clear downtime: 1 second (short probe), 9 seconds (long probe)
- Minimum detectable leak: refer to [Table: Smallest detectable leak level](#).

3.2.2 Gas detection

The Phoenix Mobilis can detect any gas or vapour which has a different thermal conductivity to the ambient air in which it was made to zero. The larger the difference the greater the sensitivity, the Phoenix Mobilis is not highly sensitive to the gases normally found in large concentrations in the ambient air, for example N₂ (Nitrogen) and O₂ (Oxygen).

 **Note:**

The Phoenix Mobilis cannot identify and differentiate different gases.

Technical data

The Phoenix Mobilis is supplied with a list of calibration factors for common gases (refer to [Table: Smallest detectable leak level](#)). It comes with 5 generic 'gas groups' with a variation in sensitivities which can be used as a substitute for gases not listed in [Table: Smallest detectable leak level](#) (group 5 being the highest sensitivity through to group 1 being a low sensitivity). Contact us for advice on which groups to use.

Table 2 Smallest detectable leak level

Name	Abbreviation	Minimum sensitivity	
		ppm	(cc/sec)
Hydrogen	H ₂	50	7.7 E-6
Helium	He	65	1.0 E-5
Dichlorodifluoromethane	R12 CCl ₂ F ₂	175	2.7 E-5
Chlorodifluoromethane	R22 CHF ₂ Cl	166	2.6 E-5
Bromotrifluoromethane	R1301 CBrF ₃	159	2.4 E-5
Butane	C ₄ H ₁₀	155	2.4 E-5
Ammonia	NH ₃	155	2.4 E-5
Krypton	Kr	164	2.5 E-5
Neon	Ne	144	2.2 E-5
Sulphur dioxide	SO ₂	172	2.6 E-5
1,1,2 Trichlorotrifluoroethane	R113 C ₂ Cl ₃ F ₃	169	2.6 E-5
1,2 Dichlorotetrafluoroethane	R114 C ₂ Cl ₃ F ₄	179	2.7 E-5
Sulphur Hexafluoride	SF ₆	145	2.2 E-5
Methane	CH ₄	189	2.9 E-5
Trichloromethane	CHCl ₃	159	2.4 E-5
Refrigerant R502	R502 CHClF ₂	196	3.0 E-5
Xenon	Xe	147	2.3 E-5

Installation

4 Installation

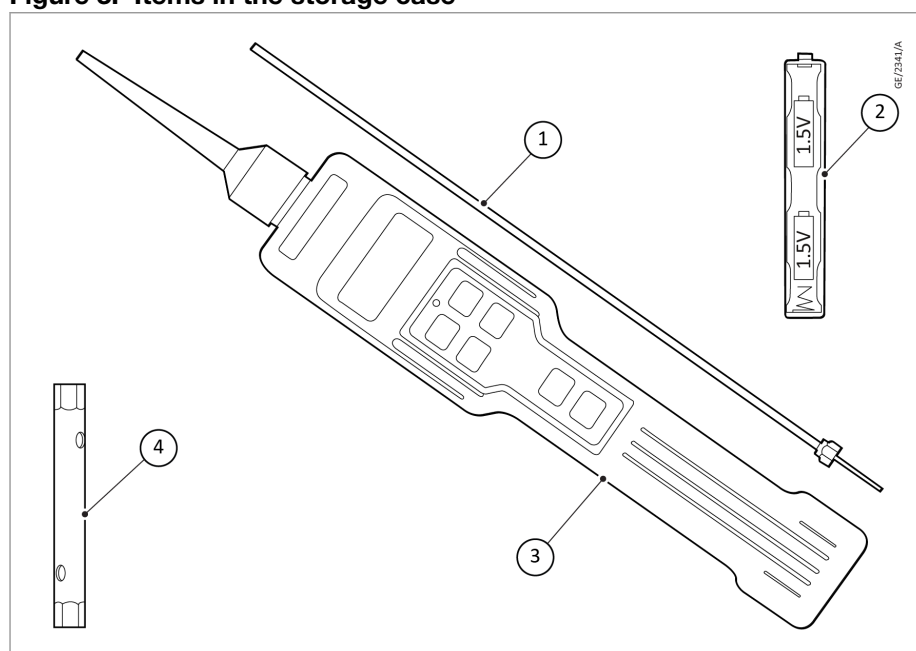
4.1 Unpack and inspect

1. Remove all the packaging materials.
2. Check the storage case or other item for signs of damage.
3. If the storage case or other item is damaged, notify your supplier and the carrier immediately. Give the supplier and the carrier the information that follows:
 - item number
 - serial number stamped on the rear case of the Phoenix Mobilis
 - order number
 - supplier's invoice number
4. Remove all packaging materials, then open the storage case and inspect the equipment.
5. Refer to [Figure: Items in the storage case](#) and check that the package contains the items listed in [Table: Checklist of items](#). If any of these items are missing, notify the supplier in writing within three days.

Table 3 Checklist of items

Quantity	Description	Check
1	Phoenix Mobilis (with short probe and nozzle installed)	<input type="checkbox"/>
1	Long probe	<input type="checkbox"/>
1	Box-spanner	<input type="checkbox"/>
1	Spare battery holder (with 4 batteries)	<input type="checkbox"/>

Figure 3. Items in the storage case



1. Long probe
2. Spare battery holder
3. Phoenix Mobilis (with short probe and nozzle installed)
4. Box-spanner

5 Operation

5.1 Getting started



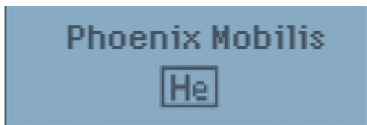
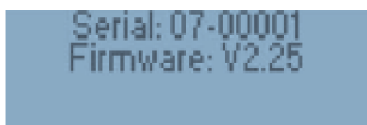

WARNING: EXPLOSION HAZARD

Risk of injury. Do not use the Phoenix Mobilis in potentially explosive atmospheres. The Phoenix Mobilis is not internally safe. Do not use the Phoenix Mobilis in safety critical applications.

Make sure that the batteries are installed as per the procedure detailed in [Replace or install batteries](#) on page 21.

When the Phoenix Mobilis is switched on a number of screens are displayed before the unit is ready to detect leaks see [Table: Screens displayed during Phoenix Mobilis startup](#).

Table 4 Screens displayed during Phoenix Mobilis startup

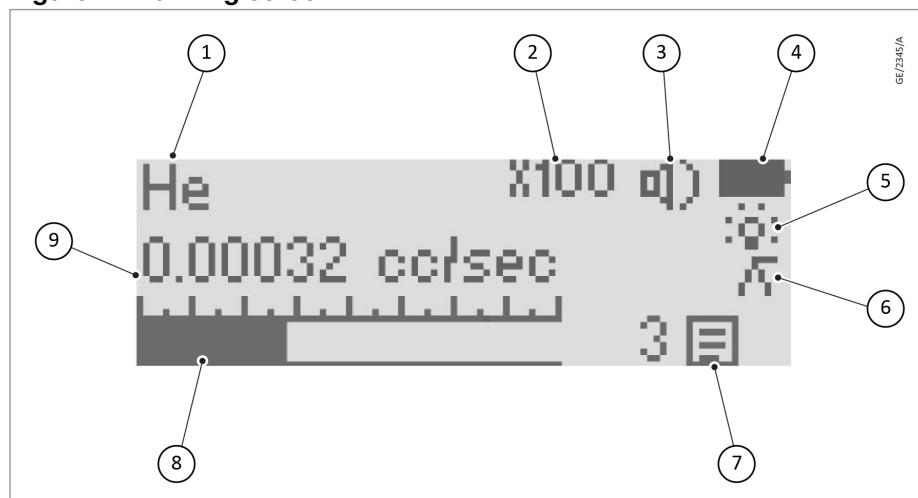
Display	Function
	Displays the gas with which the Phoenix Mobilis has been calibrated with.
	Displays the instrument serial number and the firmware version.
	Indicates that the Phoenix Mobilis is zeroing the input signal.

5.2 Phoenix Mobilis running screen

The Phoenix Mobilis displays the 'running screen' whenever the instrument is used to detect leaking gas. See [Figure: Running screen](#) for the information and various icons displayed.

Operation

Figure 4. Running screen



- | | |
|---|--------------------------------------|
| 1. Gas selection | 2. Sensitivity |
| 3. Sound indicator | 4. Battery status indicator |
| 5. Backlight indicator | 6. Peak hold indicator |
| 7. Data symbol indication of leak rate stored in memory | 8. Bar graph indication of leak rate |
| 9. Leak rate | |

5.3 Use of Phoenix Mobilis



CAUTION: WET AND DIRTY SURFACES

Risk of damage to the equipment. Avoid placing the instrument on wet or dirty surfaces. Blocking of the probe will result in instrument failure.



CAUTION: BENDING OF THE PROBES

Risk of damage to the equipment. Do not bend the probes. The accuracy of the Phoenix Mobilis will be affected.

Note:

Make sure that the ambient air is clean and free from any tracer gas when the Phoenix Mobilis is switched on. Failure to do so will result in inaccurate zero readings.

Do not touch the probe or brass sensor housing. Any changes in heat can result in significant changes in signal causing false readings.

Switch on the Phoenix Mobilis with the power key.

While on the running screen, make sure that the sensitivity is set to the 'x100' range as this is the most sensitive. Adjust the sensitivity with the up and down keys if required.

Hold the Phoenix Mobilis at 45° to the object under test and draw the probe across the test area at a rate of approximately 25 mm per second. When a leak is detected, the bar graph will fill, the reading will increase and the frequency of the LED flasher will increase. The frequency of the audio indicator will also increase if this function has been switched on in the main menu.

When a leak is detected, return the probe to the area where the leak was identified and move the probe around slowly until the exact source is identified. Hold the probe steady until the leak rate stabilizes.

 **Note:**

If the Phoenix Mobilis bar graph fills completely or the instrument display indicates a flashing 99999, the leak ate has exceeded the detection limit. In the event of the leak rate being too great, the sensitivity should be adjusted to a lower level using the up and down keys.

Variation in temperature, humidity or background gas may result in a constant offset being detected on the Phoenix Mobilis. To reset the zero, hold the Phoenix Mobilis away from the source of contamination and press the zero key. Human breath contains moisture and carbon dioxide which may also affect the readings of the instruments.

5.4 Phoenix Mobilis keypad

The Phoenix Mobilis is operated using a 6 button tactile keypad as shown in [Figure: Phoenix Mobilis keypad layout](#).

Figure 5. Phoenix Mobilis keypad layout

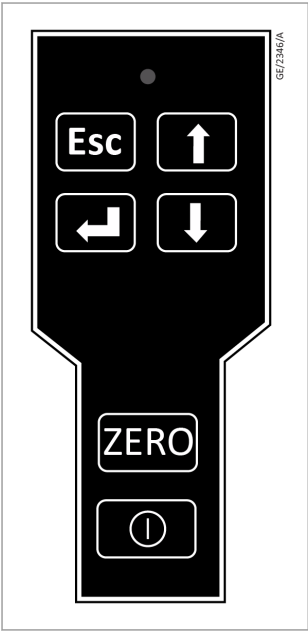








Table 5 Phoenix Mobilis keypad description

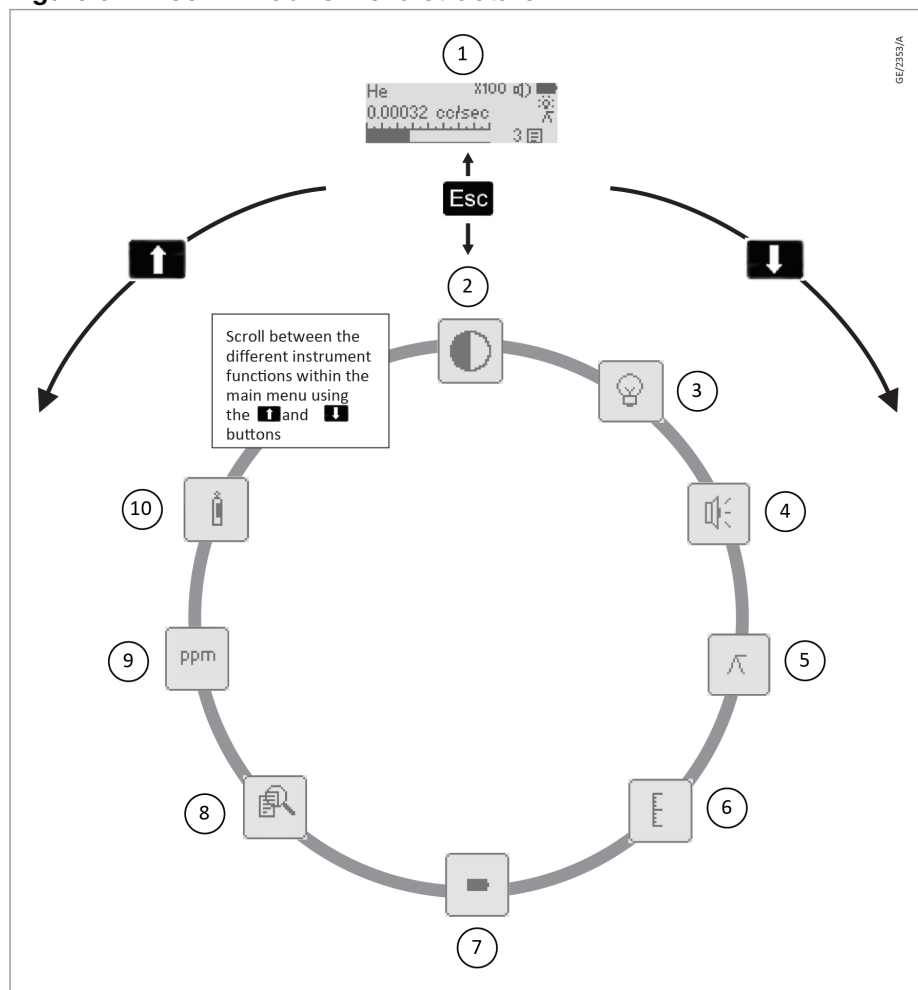
Button	Function
	Escape returns the display to the previous screen. Also used to abort an adjustment. Repeated pressing of Escape will return the display to the 'Running Screen'.
	Enter is used to select functions and to accept settings after parameter has been changed.
	Up is used to scroll up through the function menu. Also used to adjust settings.

Operation

Button	Function
	Down is used to scroll down through the function menu. Also used to adjust settings.
	Zero is used to zero the background reading.
	<p>Power is used to switch the unit on. Press and hold the key until the bar reaches the right hand side of the screen to switch the unit off.</p> <p>Note: The unit automatically switches off if no key presses are detected for approximately 10 minutes.</p>

Pressing the esc key switches the Phoenix Mobilis between the running screen and the main menu. Once in the main menu screen, pressing the up and down buttons scroll between the different instrument functions. See [Figure: Phoenix Mobilis menu structure](#).

Figure 6. Phoenix Mobilis menu structure



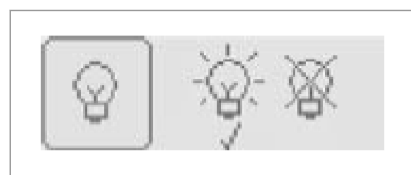
- | | |
|----------------------|-------------------|
| 1. Running screen | 2. Contrast |
| 3. Backlight | 4. Sound |
| 5. Peak hold | 6. Calibration |
| 7. Battery selection | 8. View data |
| 9. Units | 10. Gas selection |

Display



Function

Contrast adjusts the contrast of the Phoenix Mobilis LCD display. Significant variations in ambient temperature conditions may cause the display to appear too dark or dim. When selected a number appears indicating the contrast as a percentage; use the up or down keys to adjust the display contrast to the desired level. Press the esc key to exit to the main menu.



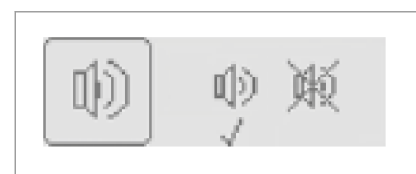
Backlight selects whether the backlight is on or off. In daylight, the user may not be able to determine if the backlight is on or off therefore a symbol on the main running screen shows the status. Use the up or down key to move the tick to the desired position and then press the esc key to return to the main menu.

Note: The backlight significantly reduces battery life.

Operation

Display

Function



The sound switches the audible indication of the leak rate on and off. The frequency of the signal increases as detected gas levels increase. Use the up or down key to move the tick to the desired position and then press the esc key to return to the main menu.

Note: An audible beep can also be heard whenever the keypad is pressed, this beep cannot be switched off.



Peak hold can be used to record the highest detected reading on the display until the enter key is pressed. Use the up or down key to move the tick to the desired position and then press the esc key to return to the main menu. When you use the Phoenix Mobilis in peak hold mode, press the enter key to clear the held reading. The reading held on the screen will be logged when the enter key is pressed.



Calibration can be used to switch between the factory calibration setting and user defined calibration parameters. Factory calibration cannot be adjusted. User defined calibration is described in [Calibration](#) on page 21.

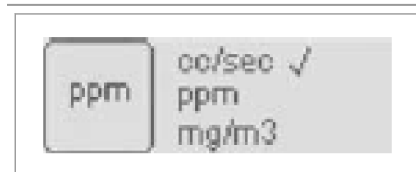


Battery selection can be used to select whether the batteries installed are Alkaline (non-rechargeable) or Nickel Metal Hydride (rechargeable). Select the battery type using the up or down key to move the tick to the desired position and then press the esc key to return to the main menu.

Note: If you do not select the correct battery type, it will not damage the instrument or affect its ability to detect gas, however it will cause the battery indicator to read incorrectly.



View data allows 10 readings to be logged in internal memory and recalled later. To store a reading press the enter key while on the main running screen. When readings are stored in memory a symbol will appear on the main running screen. When the memory is full the symbol will flash. The stored data can be viewed by scrolling through the logged readings using the up and down keys. To delete the stored data press and hold the enter key, the symbol will flash, continue holding the enter key until the data is deleted. Press the esc key to exit to the main menu.



Units selects the leak rate units displayed on the LCD screen. Select the required units using the up or down to move the tick to the desired position and then press the esc key to return to the main menu. The following units are available:

cc/sec = Cubic Centimetres per second (volumetric leak rate)

ppm = Parts per million, (concentration)

mg/m³ = Milligrams per metre cubed (concentration)

g/yr = Grams per year (an alternative volumetric leak rate)

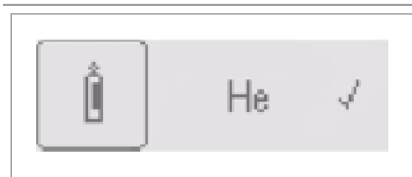


The display allows the cc/sec and g/yr units to be displayed in decimal or exponential format. Select the required format with the up or down key to move the tick to the desired position and then press the enter key to return to the main menu.

Note: Readings in ppm and mg/m³ can only be displayed in decimal form.)

Display

Function



The gas selection allows the correct calibration curve for the gas to be detected to be selected. See [Table: Smallest detectable leak level](#) for a list of gases available. Select the required format with the up or down key to move the tick to the desired position and then press the esc key to return to the main menu.

5.5 Probe options



CAUTION: SEMI TRANSPARENT PROBE SLEEVE

Risk of damage to the equipment damage. Do not remove the semi transparent probe sleeve, this makes the inner metal probe remains 1 mm from any surface in order to prevent any accidental dirt and moisture ingress.



CAUTION: OVER TIGHTENING

Risk of damage to the equipment damage. Only use the box spanner supplied with the Phoenix Mobilis to tighten the probes. Other tools may result in over tightening of the nut and permanent damage to the instrument.

In some circumstances, the grey probe cover may restrict access to the area to be leak tested. Remove the probe cover by pulling firmly with one hand to reveal the short probe, see [Figure: Remove the probe cover](#).

Some applications may require a longer probe in order to reach inaccessible areas. The Phoenix Mobilis is supplied with a 300 mm long probe in the storage case.

For probe installation see the procedure that follows:

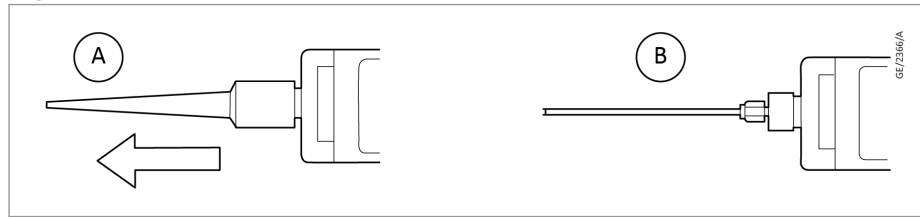
1. Make sure that the instrument is switched off. Remove the probe cover to access the short probe as shown in [Figure: Remove the probe cover](#).
2. Slide the box spanner over the short probe as shown in [Figure: Change between short and long probes](#).
3. Unscrew the probe counterclockwise.
4. Remove the spanner and the probe assembly. To replace the short probe with the long probe, perform the same sequence in reverse order.

Note:

When detecting leaks with the long probe installed, the response time of the Phoenix Mobilis is significantly increased. The speed at which the probe is drawn over the inspection surface should be reduced to around 10 mm per second.

Operation

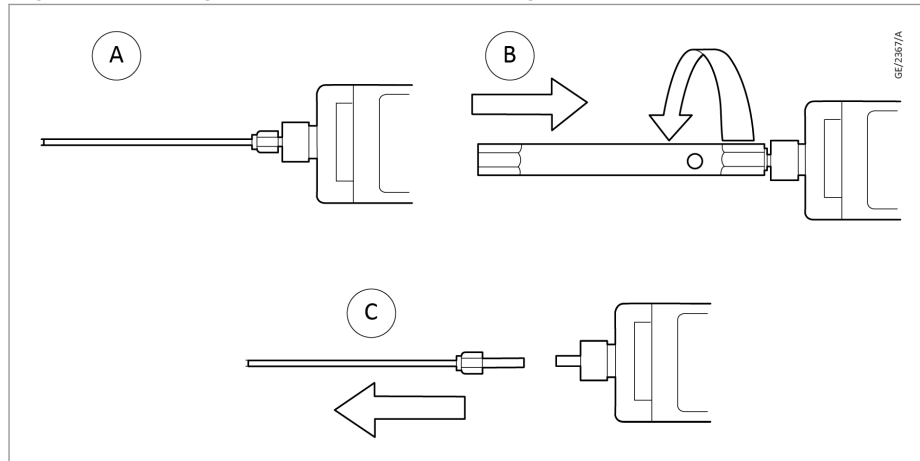
Figure 7. Remove the probe cover



A. With probe cover

B. Short probe

Figure 8. Change between short and long probes



A. Short probe

B. Box spanner over short probe

C. Probe assembly

6 Maintenance

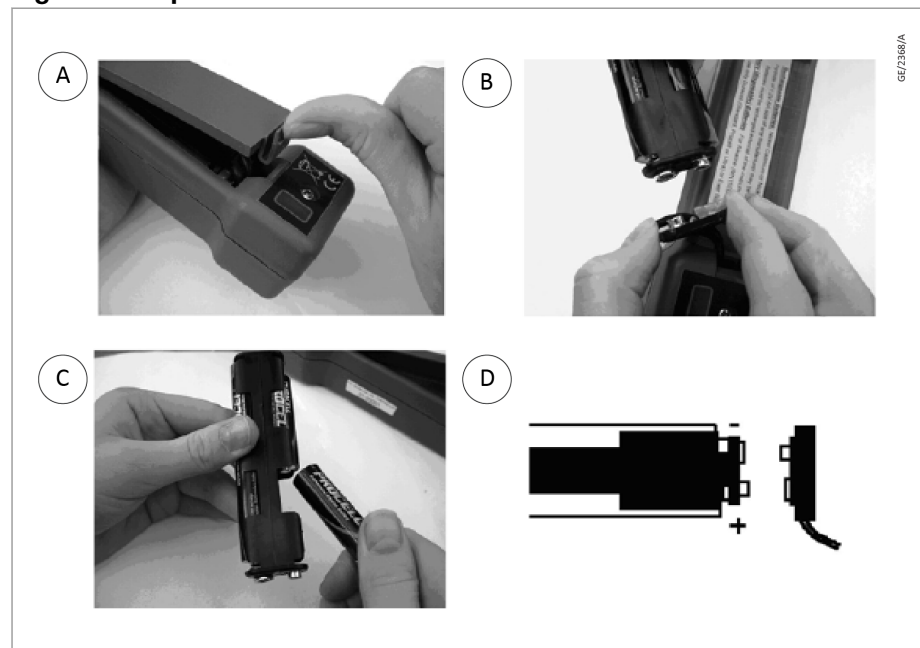
6.1 Replace or install batteries

To replace the battery (refer to [Figure: Replace batteries](#)) follow the procedure that follows:

- A. Remove the battery cover using a finger nail or small screwdriver.
- B. Unclip the battery holder from the clip.
- C. Remove the old batteries and replace with 4 new ones.
- D. Reconnect the battery holder to the Phoenix Mobilis and make sure that the polarity is correct.

The battery holder can then be placed back in the instrument. Make sure that the wires are not trapped when reinstalling the battery cover. It is recommended that after battery replacement, the Phoenix Mobilis is programmed with the correct battery selection (alkaline or nickel metal hydride) as described in [Phoenix Mobilis keypad](#) on page 15, this makes sure that the battery status indicator can correctly identify the remaining capacity of the battery.

Figure 9. Replace batteries



- A. Battery cover removal
- B. Unclip the battery holder
- C. Replacement with of battery
- D. Polarity check

6.2 Calibration

Calibration should only be attempted by qualified service engineers. We offer a calibration facility for Phoenix Mobilis instruments. Contact us for more details.

The Phoenix Mobilis is supplied with two calibration settings, factory and custom. The factory calibration setting cannot be changed. The custom calibration allows the user to calibrate the Phoenix Mobilis at the local atmospheric pressure which may offer an improvement over the factory calibration.

Maintenance

The custom calibration procedure varies depending on whether the unit has been set to concentrations (ppm or mg/m³) or volumetric leak rates (cc/sec or g/yr).

6.3 Custom calibration (concentration units)



CAUTION: BENDING OF THE PROBES


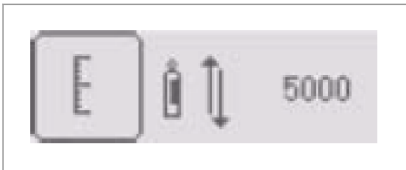

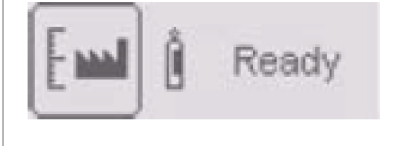

Risk of damage to the equipment. Do not bend the probes. The accuracy of the Phoenix Mobilis will be affected.

 **Note:**

Do not pressurise the sample bag when you do the calibration, it will cause significant errors in the calibration.

Read the instructions below before calibrating the Phoenix Mobilis. The following procedure should be followed if the Phoenix Mobilis has been set to concentrations (ppm or mg/m³).

Table 6 Calibration of the Phoenix Mobilis (concentration units)

Procedure	Image
1. Fill an empty (uncontaminated) sample bag with 5000 ppm helium gas before you start the calibration procedure. 2. Remove the outer grey probe cover from the Phoenix Mobilis.	
3. Select the calibration procedure on the main menu (see Phoenix Mobilis keypad on page 15). 4. Select custom cal by using the up or down key to move the tick to icon and press the enter key.	
5. An option appears to allow different concentrations of helium tracer in the test gas. 6. The Phoenix Mobilis can accommodate concentrations between 4900 and 5100 ppm helium. 7. Press the up or down keys to select the correct concentration and press the enter key.	
8. Make sure that the Phoenix Mobilis is in clean air and press enter key. The Instrument will take a few seconds to zero and then the ready screen will appear.	 

Procedure	Image
9. Fully insert the probe into the sample bag and press the enter key. 10. The Phoenix Mobilis will sequence through the cold and hot stages of calibration and will display a summary of values.	
11. Press the enter key to return to the main calibration screen. 12. Press the esc key to start the use of instrument or press enter key to calibrate again.	

6.4 Custom calibration (cc/sec leak rate units)



CAUTION: CALIBRATION ERROR

Risk of error in data. Do not breathe on the probe. The Phoenix Mobilis can detect changes in humidity and carbon dioxide and significant errors in the calibration will result.

Read the instructions below fully before calibrating the Phoenix Mobilis. The following procedure should be followed if the Phoenix Mobilis has been set to cc/sec.







Note:

Calibration of the Phoenix Mobilis in cc/sec leak rate units requires the use of a portable reference leak. Contact us for more details.

Table 7 Calibration of the Phoenix Mobilis (cc/sec leak rate units)

Display	Function
	<ul style="list-style-type: none">Make sure that the pressure on the portable reference leak is set correctly.Select the calibration procedure on the main menu (see Phoenix Mobilis keypad on page 15).Select custom cal by using the up or down key to move the tick to icon and press the esc key.

Maintenance

Display	Function
	<ul style="list-style-type: none"> Make sure that the Phoenix Mobilis is in clean air and press enter key. The Instrument will take a few seconds to zero and then the ready screen will appear.
	
	<ul style="list-style-type: none"> Fully insert the probe into the sample bag and press the enter key. The Phoenix Mobilis will sequence through the cold and hot stages of calibration and will display a summary of values.
	
	
	<ul style="list-style-type: none"> Press the enter key to return to the main calibration screen. Press the esc key to start the use of instrument or press enter key to calibrate again.

7 Storage

If you store the unit for a long time, we recommend that you remove the batteries in order to reduce the risk of damage due to battery leakage. Reinstall the Phoenix Mobilis in its storage case and store it in cool and dry conditions until required for use as described in [Table: Technical data](#). When ready for use unpack the equipment as described in [Installation](#) on page 12.

Disposal

8 Disposal

Dispose of the Phoenix Mobilis, components and used batteries safely in accordance with all local and national environmental safety requirements. Alternatively, you may be able to recycle the Phoenix Mobilis, contact us or your supplier for advice.

The Phoenix Mobilis is within the scope of the European Directive on Waste Electrical and Electronic Equipment, 2002/ 96/EC. We offer European customers a recycling service for the Phoenix Mobilis at the end of the product's life. Contact us for advice on how to return the Phoenix Mobilis for recycling.

9 Service

Our products, spares and accessories are available from our companies in Belgium, Brazil, China, France, Germany, Israel, Italy, Japan, Korea, Singapore, United Kingdom, U.S.A and a world-wide network of distributors. The majority of these centres employ service engineers who have undergone comprehensive our training courses.

Order spare parts and accessories from our nearest company or distributor. When ordering, state for each part required:

- Serial number stamped on the rear of your Phoenix Mobilis
- Item number and description of part

9.1 Return the equipment or components for service

Before you send your equipment to us for service or for any other reason, you must send us a completed Declaration of Contamination of Vacuum Equipment and Components – Form HS2. The HS2 form tells us if any substances found in the equipment are hazardous, which is important for the safety of our employees and all other people involved in the service of your equipment. The hazard information also lets us select the correct procedures to service your equipment.

We provide instructions for completing the form in the Declaration of Contamination of Vacuum equipment and Components – Procedure HS1.

If you are returning a vacuum pump, note the following:

- If a pump is configured to suit the application, make a record of the configuration before returning the pump. All replacement pumps will be supplied with default factory settings.
- Do not return a pump with accessories fitted. Remove all accessories and retain them for future use.
- The instruction in the returns procedure to drain all fluids does not apply to the lubricant in pump oil reservoirs.

Download the latest documents from leybold.com/en/downloads/download-documents/declaration-of-contamination/, follow the procedure in HS1, fill in the electronic HS2 form, print it, sign it, and return the signed copy to us.



NOTICE:

If we do not receive a completed HS2 form, your equipment cannot be serviced.

Spares and accessories

10 Spares and accessories

Table 8 Phoenix Mobilis spares and accessories

Spare	Item Number
Long probe	D14128802
Short probe	D14128801
Replacement battery holder	D14130802
Nozzle	D14130800

10.1 Calibration

Contact your supplier for details of the calibration service available, which includes the issue of a traceable certificate to National Standards.

Spares and accessories



Pioneering products. Passionately applied.

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