User manual

LEADER Search

LEADER

Product references

D11.04.330	**LEADER Search 2 wired sensors.**
D11.04.331	**LEADER Search 3 wired sensors.**
D11.04.332	**LEADER Search 2 wireless sensors.**
D11.04.333	**LEADER Search 3 wireless sensors.**
D11.04.334	**LEADER Search 6 sensors (3 wired + 3 wireless).**
D11.04.361	**LEADER Search 2 wired sensors (version basic pack piles).**
D11.04.364	**LEADER Search 2 wireless sensors (version basic pack piles).**
D11.04.365	**LEADER Search 4 sensors (2 wired + 2 wireless) with probe COM**

Contents

1 INTRODUCTION

1.1 LEADER Search presentation

The **LEADER Search** is designed for use in rescue operations and uses seismic technology to find signs of life. It is used to detect the presence of victims buried under rubble and pinpoint their exact location.

This exceptionally sensitive device is likely to detect the slightest sounds made by victims.

The **LEADER Search** is fitted with ultra-sensitive wireless and wired seismic detector sensors and an audio probe (only in its full 6 sensors version otherwise it is an option). It adapts to the type of use without any adjustments. It is available in a 2 wireless sensor version, a 3 wireless sensor version, a 2 wired sensor version, a 3 wired sensor version and a 3 wireless plus 3 wired sensor version.

This equipment is fitted with adjustable filters that are used to reduce parasite noise such as pneumatic drills, the passage of trucks, etc.

1.2 LEADER Search composition

- 1 watertight and shock proof transport case.
- 1 control box with screen and keyboard with its straps (shoulder strap and hand strap).
- 1 stereo anti-noise headset with microphone.
- 1 waterproof audio probe for communication with the victim, depending on version.
- 2 to 6 wireless, high sensitivity seismic sensors, depending on version.
- 3 to 9 AAA batteries to power the wireless seismic sensors, depending on version.
- 2 to 6 magnetic plates (magnets) for the use of the sensors on metal structures.
- 2 to 6 probes for use of the sensors on loose soil.
- 1 removable antenna to be fitted on the control box to enable wireless communications between the sensors and the control box.
- 1 rechargeable control box battery pack.
- 1   100/240V 50/60Hz charger block.
- 1 set of international adapters.
- 1 backup battery pack for 10 AAA batteries (not included).
- 1 sun shield.

  ➢ **Different release:**

	Wire sensor	Wireless Sensor	Probe for COM
D11.04.330	x2	-	-
D11.04.331	x3	-	-
D11.04.332	-	x2	-
D11.04.333	-	x3	-
D11.04.334	x3	x3	x1
D11.04.361	x2	-	-
D11.04.364	-	x2	-
D11.04.365	x2	x2	x1

Available options:

- 1 seismic wire sensor fitted with 8 m or 26 ft of cable and a reel.**(Réf: D11.04.336)**
- 1 seismic wireless sensor (range: over 100 m or 330 ft in open field). **(Réf: D11.04.335)**
- 1 Magnetic plates (magnets). **(Réf: 2003514)**
- 1 Spikes for use of the sensors on loose soil. **(Réf: 2003113)**
- 1 stereo anti-noise headset with adapted microphone and connectors.**(Réf: D11.04.340)**
- 1 waterproof audio probe for communication with the victim. **(Réf: D11.04.347)**
- Extension for the audio sensor cable up to 100 metres or 330 ft on a reel.
- Extra battery pack. **(Réf: D11.04.341)**

⚠️
- Read the instructions carefully before using the product.
- The device should not be dropped or suffer shocks.
- Do not disassemble the product as this will invalid the warranty.
  Do not attempt to repair the product or replace parts (except when this manual provides specific instructions to do so). Refer all servicing to your distributor, or at **LEADER** maintenance service.

1.3 General functions

FUNCTIONS	IN SEIMSIC SEARCH MODE
Audio headset volume control	Yes
Microphone volume control	Yes
Push to Talk	Yes
Screen brightness control	Yes
Noise filter control (low and high pitch)	Yes
Wireless sensor charge level indication	Yes
Battery charge level indication	Yes
Separate control of each seismic sensor	Yes
Mono or Stereo listening mode (listen to selected sensors using 1 or both ears)	Yes
Visualisation markers to identify the strongest seismic peak	Yes

1.4 Detailed technical specifications

Refer to product data sheet available on our website at www.leader-group.eu.

2 LEADER Search DESCRIPTION

2.1 Control box description

The polypropylene control box is composed of:

- A 5 inch TFT colour 16/9 high brightness screen.

- A keyboard for settings and scrolling through the different menus.

- A rechargeable battery pack.

- A removable aerial to communicate with the wireless seismic sensor(s).

- Connectors for the watertight connection of the Sensor and Probe COM, antenna and audio headset. Colour coding to assist in the rapid connection of each element to its corresponding connectors.

- A waterproof cap to fit to the aerial connector when not used.

- A rubber band around the edge for better shock protection.

- 4 attachments to fix the carrying strap and the handle.

The control box:

- Has an ergonomic graphic interface including an intuitive menu with subtitles in English only.

- Is reversible for use by a right handed or left handed operator (function selectable from the menu).

- Is IP54, i.e. water and dust resistant.

- Has been tested to be resistant to 2 metre falls.

- Offers the possibility of using a second optional headset at the same time as the first, for use by an interpreter, a doctor or an instructor.

- Is supplied with a sun shield.

- To clean, use a dry and soft cloth.
- Never use solvents, or alcohols of any kind, to avoid of discoloration and / or distortion of the unit.
- Avoid blows or excessive pressure on the screen.
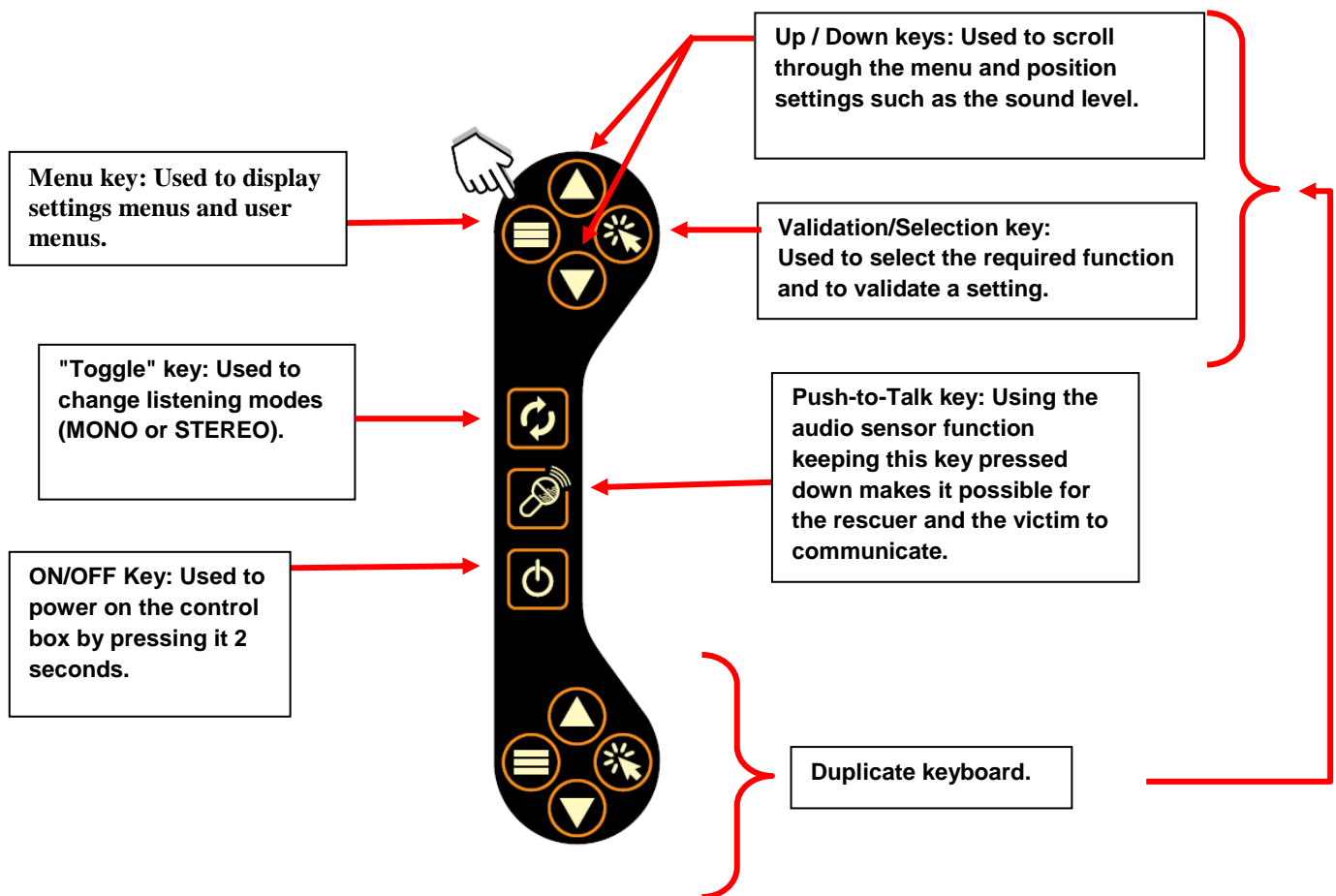
2.2 Connection description

For easier connection of the accessories:

- Each female connector on the control box is identified using a colour code and a symbol.
- Similarly, the cable for each accessory has a coloured ring around the male connector corresponding to the colour code on the control box connectors.

Aerial connector

Wire Sensor or Probe COM connector

Audio headset connector
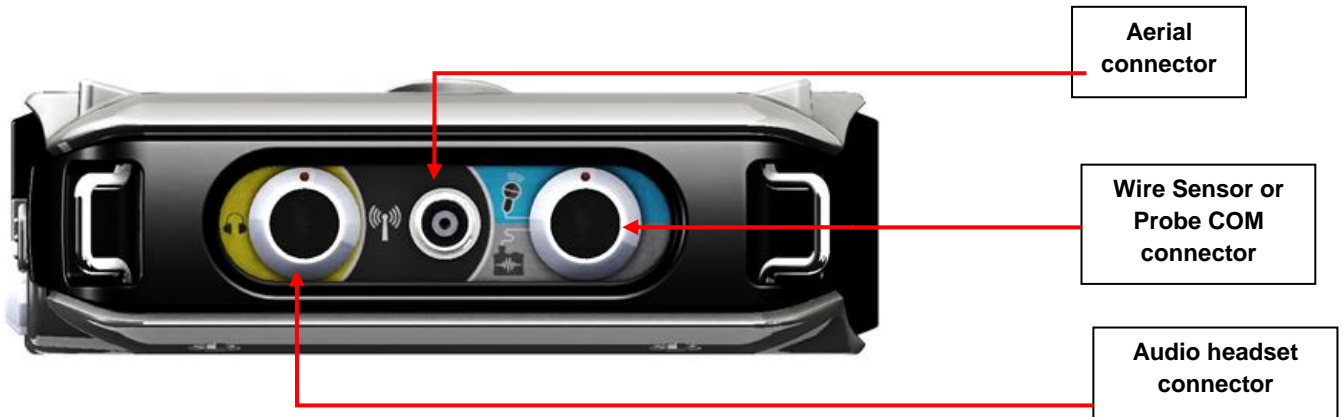
2.3 Keyboard description

The keyboard has photo luminescent keys for better visibility in the dark.

Up / Down keys: Used to scroll through the menu and position settings such as the sound level.

Menu key: Used to display settings menus and user menus.

Validation/Selection key: Used to select the required function and to validate a setting.

"Toggle" key: Used to change listening modes (MONO or STEREO).

Push-to-Talk key: Using the audio sensor function keeping this key pressed down makes it possible for the rescuer and the victim to communicate.

ON/OFF Key: Used to power on the control box by pressing it 2 seconds.

Duplicate keyboard.

Used to refine the listening mode for **wireless sensors.**

Used to refine the listening mode for **wired sensors.**

Control Box

Headset

Wireless Sensor

Wire Sensor

Probe COM

2.4 Description of the wireless seismic sensor

The **LEADER Search** has the wireless seismic sensors which are used to locate a buried victim.
These **exceptionally sensitive** sensors are capable of detecting the slightest sounds made by victims.

The different search methods are not explained in this manual. Refer to the operational search instructions used in your field interventions.

In an open area these wireless sensors have a maximum range of 100 m.

In operation, depending on the configuration of the zone, these wireless sensors can be used up to about 30 m.

A wireless sensor has:
- **A** / a removable base to access the battery compartment (3 AAA batteries).
- **B** / an aerial.
- **C** / an **ON/OFF** button with LED.
- **D** / a strap to handle the sensor in the ruins or rubble.
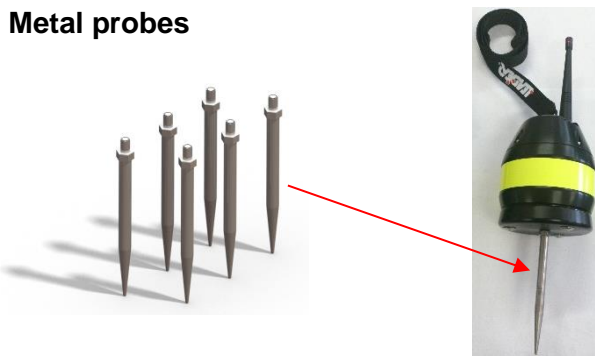- **E** / a number corresponding to its pairing number.
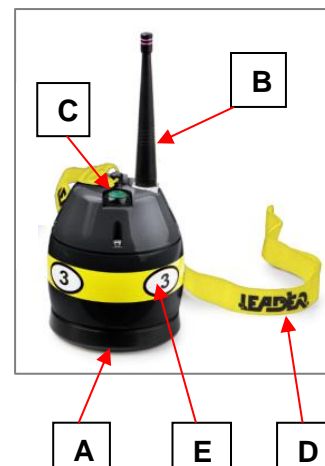
Magnetic plates (magnets)
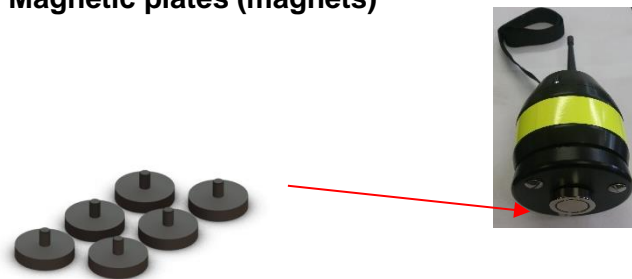
Each wireless sensor is shipped with a magnetic plate that can be screwed directly onto its lower part. This plate can be used on the metal beams of collapsed buildings which are well known to conduct vibrations optimally.
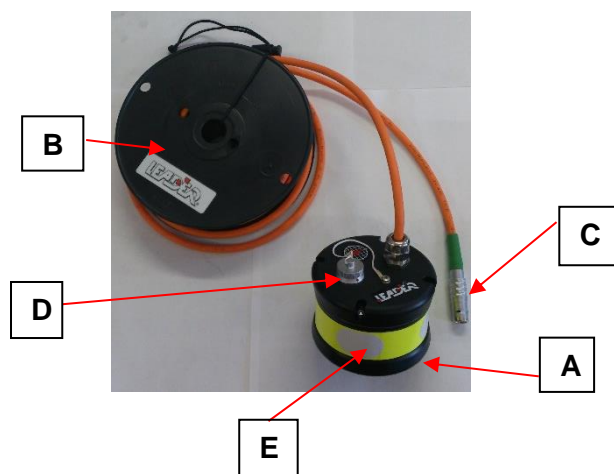
Metal probes

Each sensor is also shipped with a probe that can be screwed directly onto its lower part. These probes are used on loose soil to increase vibration reception.
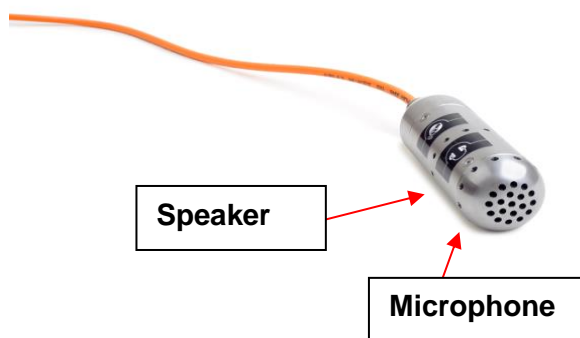

A wire sensor has:
- **A** / wire sensor.
- **B** / cable reel with 8m.
- **C** / connector to box or 2nd sensor.
- **D** / connector for 2nd sensor.
- **E** / sensor corresponding number.

The first sensor is wired to connect on the box, the second is to connect the first sensor.

2.5 Description of the audio probe

The audio sensor can be used both to communicate with and listen to a victim. Its 8 metre or 26 ft cable makes it possible to communicate with the victim in most cases. It is water resistant (IP 67) and its 38 mm or 1.5 in diameter makes it possible to use it in core sample drill holes. The sensitivity of the microphone makes it possible to hear whispers.

Speaker

Microphone

2.6 Description of the headset

The audio headset is used to:

- Communicate with the victim.
- To listen to the wireless sensors.

A second optional headset can be connected to the control box using a Y connector allowing two headsets to be connected to the same connector.

3 USING THE CONTROL BOX

3.1 Control box power supply

The **LEADER Search** is delivered with a lithium polymer battery pack which is inserted into the back of the control box.

The battery pack is recharged SEPARATELY from the control box.

Charging can be carried out at between 0°C and 45°C (maximum temperature) using the supplied charger.

During charging, a LED located on the charger provides the following indications:

- ● Green: battery charged or battery not connected to the charger.
- ● Red: battery charging.

During operations, if the battery pack is run down, the user can either use another battery pack (supplied as an option), or the backup battery pack as a replacement for the initial battery pack. The backup battery pack requires 10 AAA batteries (not provided).

The battery pack can ONLY be charged using the supplied charger block. It can be used with 100/240VAC - 50/60Hz

The international adapters can be used to recharge the battery pack on all US, Australian, European, and UK power outlets.

Battery pack

Charger block

Mains adapters

Once the appliance is powered on, if the camera or at least one seismic sensor is turned on, an icon showing the battery pack charge level remains displayed on the top right of the screen.

5 icons to show the control box battery pack charge level.

**Icon displayed when the backup battery pack is being.**

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3.2 Powering on the control box

Powering on

The device is powered on by pressing the **ON/OFF** key once.

On powering on, a first screen is displayed.

A loading screen quickly follows. On the bottom left of the screen it shows the version of the device software and on the bottom right the serial number.

LEADER Search version 1.0.3
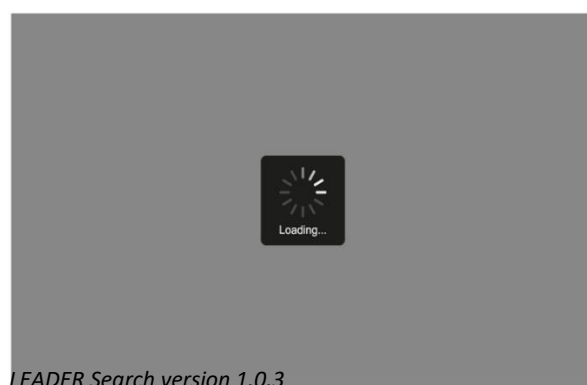
If neither the probe nor the sensors are connected, the screen shows the following icons "sensor not connected". The device will remain on this screen for 5 minutes before powering off automatically if no action is detected.
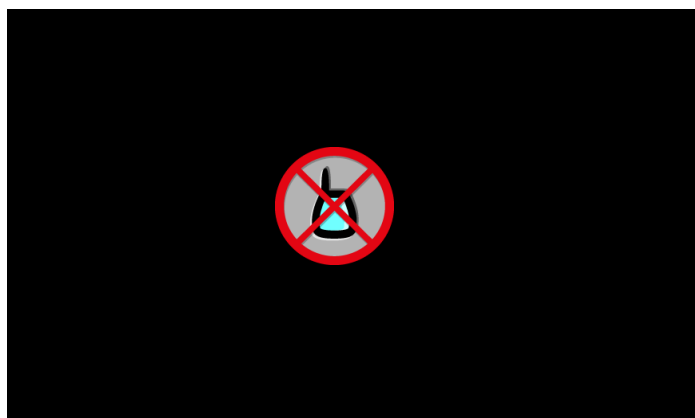
Turning off the control box

To turn off the control box, press the **ON/OFF** key for 2 seconds.

3.3 Using the sun shield

In bright light, the sun shield is used to place the screen in a dark area to be able to see it better.
To hold the sun shield on the control box it must be correctly positioned on the face on the forms designed to this effect. The red line shows the position.

The wide elastics are used to ft it quickly and easily.
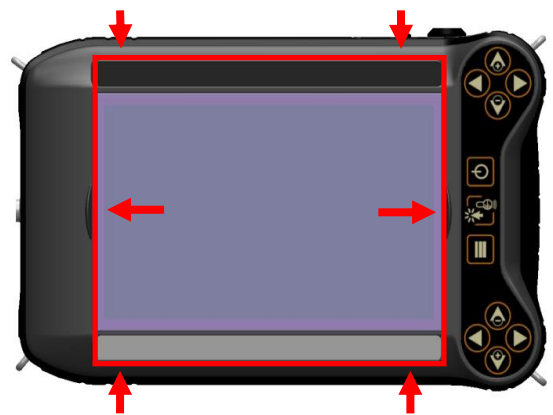
It is stored flat for easier transport. An elastic on its side is used to keep it flat and fix it to the control box. By placing it on the screen face, it protects the screen when moving around when the search device is not in use.

4 SEISMIC SEARCH MODE

4.1 Using the seismic sensor

To power on the wireless sensor, the push button must be pressed for at least 1 second. When the sensor is powered on, the green push button LED lights:

- **Slow flashing:** no connection with the control box.

- **Fixed:** connection with the control box in progress.

- **Fast flashing:** connection with the control box established.

- **Very fast flashing:** pairing sequence in progress (see Pairing section).

To power off the sensor, the push button must be pressed for at least 1 second.

If the sensor does not connect with the control box, it powers off automatically after 20 seconds.

To connect several wireless sensors, it is important to use the following powering on sequence:

1. Power on the control box until the **LEADER Search** logo is displayed.

2. Press the sensor push button. When its LED flashes quickly the connection is complete and the corresponding sensor bar chart appears on the control box screen.

3. Repeat step 2 for the next sensor.

 Important: Do not power on all the sensors at the same time, but one after the other. Wait for the powered on sensor to appear on the screen before powering on the next sensor.

4.2 Pairing the seismic sensor

To be recognised by a control box, the sensors must be paired to it. Initially the sensors are paired with the control box they are delivered with in the factory.

However, each sensor can be used on any **LEADER Search** control box.

If you need to pair a sensor to another control box, follow the sequence described below:

1. Turn off the control box.
2. With the sensor powered off, press the push button for 15 seconds and then release it. The green LED will flash very quickly and then go out at this stage the sensor is no longer paired to any control box.
3. Turn on the sensor to be paired. The sensor's LED flashes very quickly again. If the LED on the sensor to be paired does not flash quickly, repeat step 2.
4. Turn on the control box. The sensor will then carry out the pairing sequence for a few seconds and then switch off automatically.
5. Switch the sensor back on. it is now recognised by the control box and its bar-chart format signal appears on the screen.

A selector in the sensor battery compartment can be used to select the sensor number **(n°1, n°2 or n°3).**

The sensor number is memorised by the sensor during the pairing sequence. To make the sensor memorise a new number, it should first be unpaired, the switch must be placed on the required sensor number, and then the pairing sequence carried out.

Once paired, the sensor keeps the number assigned to it, even if the selector is mistakenly positioned on another number.
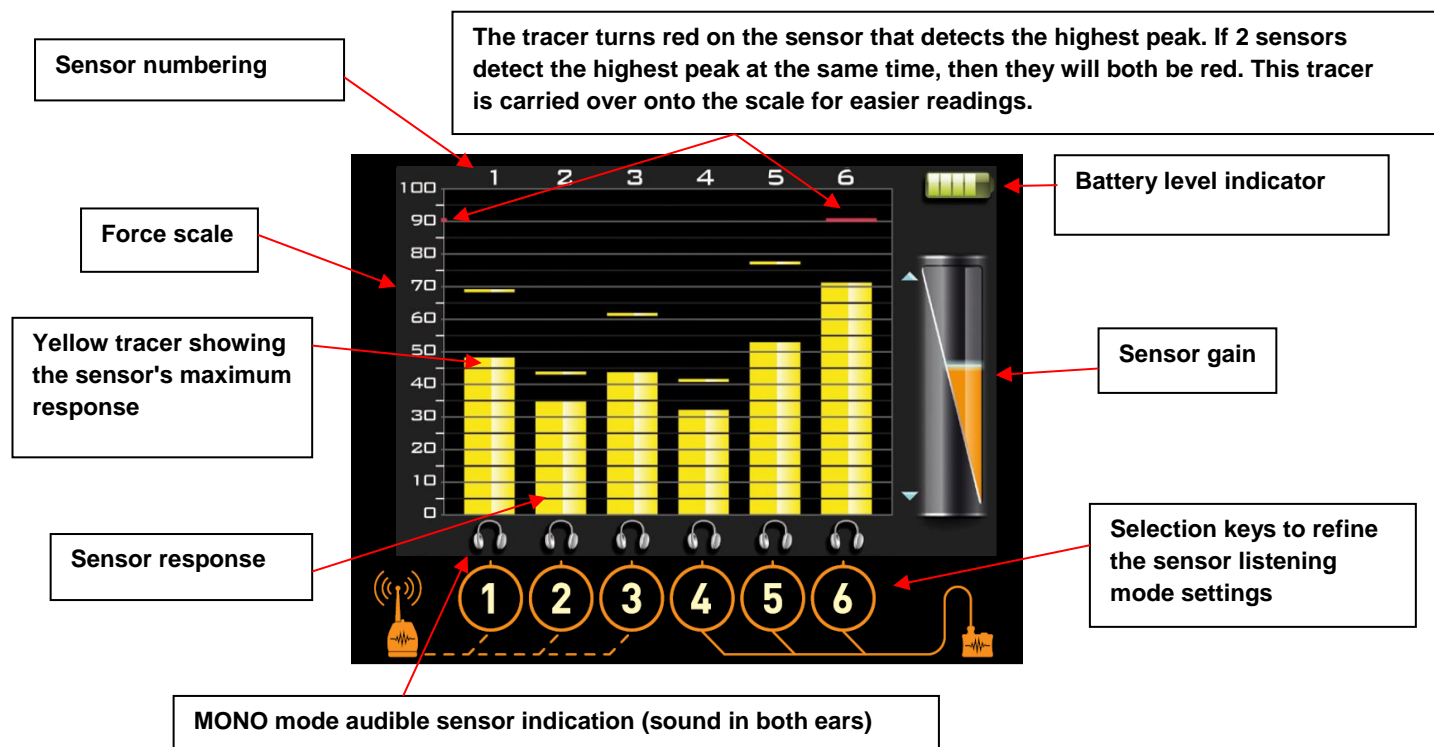

Selector :
Sensor n°1 or
Sensor n°2 or
Sensor n°3
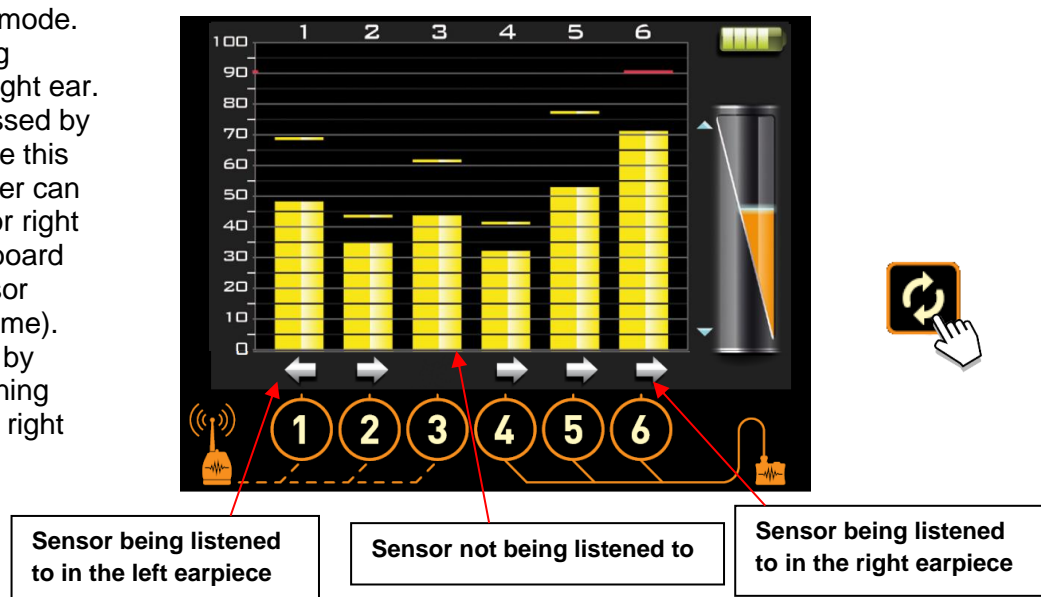
4.3 Menu: Description of the Seismic mode functions

4.3.1 Seismic mode

The seismic menu appears when one or more seismic sensors are connected. The bar-charts are shown for each connected sensor, with the maximum level carried over. By default the sensor sound gain is set to 50%. The browser "▲" keys increase the gain for all sensors and the "▼" keys reduce it.
A headset icon placed under each bar graph indicates that the sensor is audible. It is MONO: the sound can be heard in both ears.

The option to listen or not listen to a sensor is made using the keyboard keys located below each bar chart. In the configuration below each sensor can be heard in both earphones on the headset.

The tracer turns red on the sensor that detects the highest peak. If 2 sensors detect the highest peak at the same time, then they will both be red. This tracer is carried over onto the scale for easier readings.

Sensor numbering

Battery level indicator

Force scale

Sensor gain

Yellow tracer showing the sensor's maximum response

Sensor response

Selection keys to refine the sensor listening mode settings

MONO mode audible sensor indication (sound in both ears)

There is a second listening mode on the seismic menu: STEREO mode. It is used to concentrate listening to the sensors using the left or right ear. This second mode can be accessed by pressing the **"Toggle"** key. Once this mode has been selected, the user can listen to each sensor in the left or right headset earpiece using the keyboard keys located beneath each sensor (or all the sensors at the same time). This listening direction is shown by an arrow pointing left when listening in the left earpiece, and pointing right for the right earpiece.

Sensor being listened to in the left earpiece

Sensor not being listened to

Sensor being listened to in the right earpiece

4.3.2 FONCTIONS SELECTION

The menu button is used to access the different menus.
Up to five icons can then appear.The "▲" and "▼" browser keys are used to select the required menu. Once the menu has been selected, pressing the validation key gives access to the menu. Pressing the menu key again is used to exit the menu and return to the main screen.
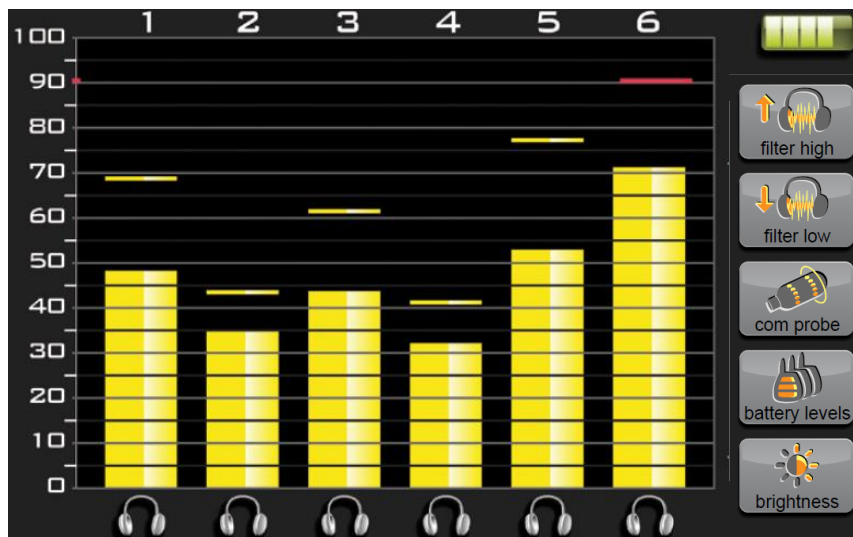
The **"filter high"** function gives access to low-pass filter settings and is used to remove sharp noises. Its cut-off power is used to remove all frequencies above its setting threshold (Setting threshold: 600Hz to 3000Hz).

The **"filter low"** function gives access to high-pass filter settings and is used to remove bass noises. Its cut-off power is used to remove all frequencies below its setting threshold (Setting threshold: 20 Hz to 300Hz).

The **"com probe"** function gives access to audio sensor use and its settings. The icon is only displayed if the audio sensor is connected to the **LEADER SEARCH.**

The **"battery levels"** icon gives access to the battery levels on the connected wireless sensors. The icon is only displayed if at least one wireless sensor is connected to the **LEADER SEARCH.**

The **"brightness"** function is used to set screen brightness.

4.3.3 Filter control function

The **LEADER Search** is equipped with two filters that are used to remove surrounding noise, a **"low-filter"** and a **"high-filter".** The seismic sensors can detect vibrations from 20 to 3000Hz.

The filters are used to remove parasite noise that is inevitable during an intervention or caused by the weather.

By default the filters are not activated. The settings bar at the right of the screen is at the minimum. The "▲" and "▼" navigation keys are used to increase or reduce the selected filter's cut-off frequency.
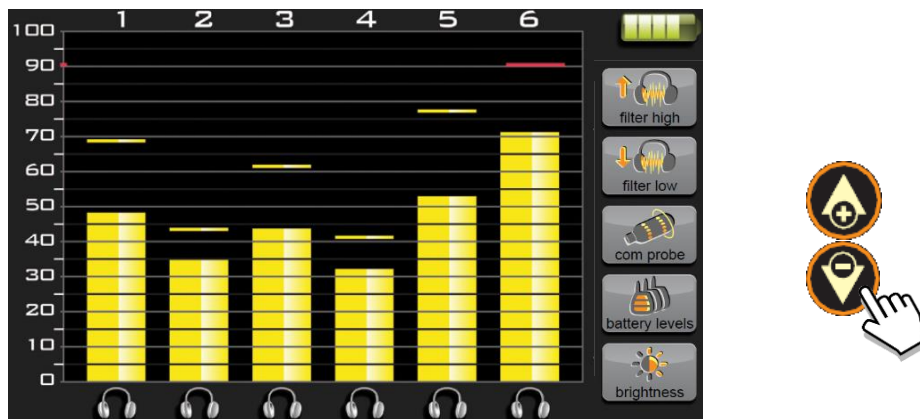

Filter use:

To eliminate parasite noise, increase the low filter cut-off frequency until the noise disappears from the headset. If the noise can still be heard, reset the low filter to zero and repeat the operation using the high filter. To exit filter settings, press the menu key.

4.3.4 Sensor battery level function

Once selected, the **"battery level"** battery function is used to view the **"battery level"** for each connected wireless sensor. A six level scale clearly shows sensor autonomy. To exit the battery menu, press the menu key.
Wireless sensor autonomy is about 8 hours and varies depending on the type of batteries used (3 AAA batteries). The screen below shows 3 connected sensors.
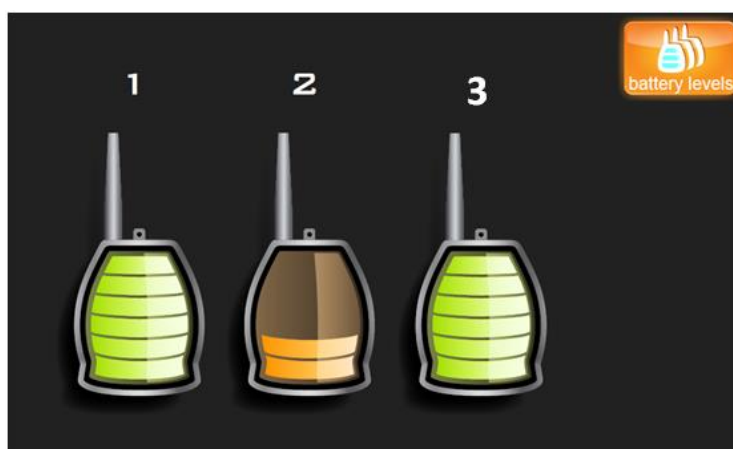
Wireless connectivity

Wireless devices are subject to environmental constraints which affect their use.
A wireless desk telephone, for example, can have connection/reception difficulties. However it is not less useful than a wired telephone!
Indeed, in some cases linked to the location itself, interferences can prevent the signal from being displayed on searching device for a few seconds. It returns in a reasonable period to continue searching.

To make it right; Adopt the attitude of someone who is aware that the wireless equipment has certain usage constraints and apply the following advice to your victim search equipment:
- Place the sensors in view of the control box: Avoid placing them in holes.
- Position yourself up high with the control box.
- Leave as much free space as possible between the control box and the sensors: Nobody between the box and sensors; the human body creates a natural barrier; do not show your back to the sensors.
- Consider the weather: depending on humidity/electricity in the air/sun, wireless will work better or worse (eg: A radio can emit further in good weather).

Despite these constraints, wireless technology unquestionably has operational advantages which overcome them:
- Rapidity of movements in rubble (no trapped wires).
- Safety of sensor holder during moves (no imbalance due to trapped wire).
- Efficiency of the search operations (larger zone covered).
- Freedom of movement.
- 30m range on average, much broader than the length of wired sensors (8m in general).

Low battery display

A battery icon [2] displays above the corresponding graph bar when the batteries of a sensor become low (20% remaining power).
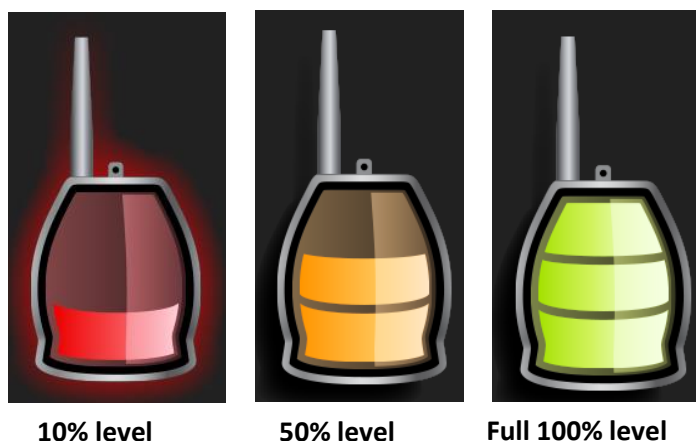With a low battery level, it increases the risk of disconnections and reconnections. It is therefore recommended that you replace the batteries with new ones.

Here, the 3 sensor batteries are low.   [1]   [2]   [3]
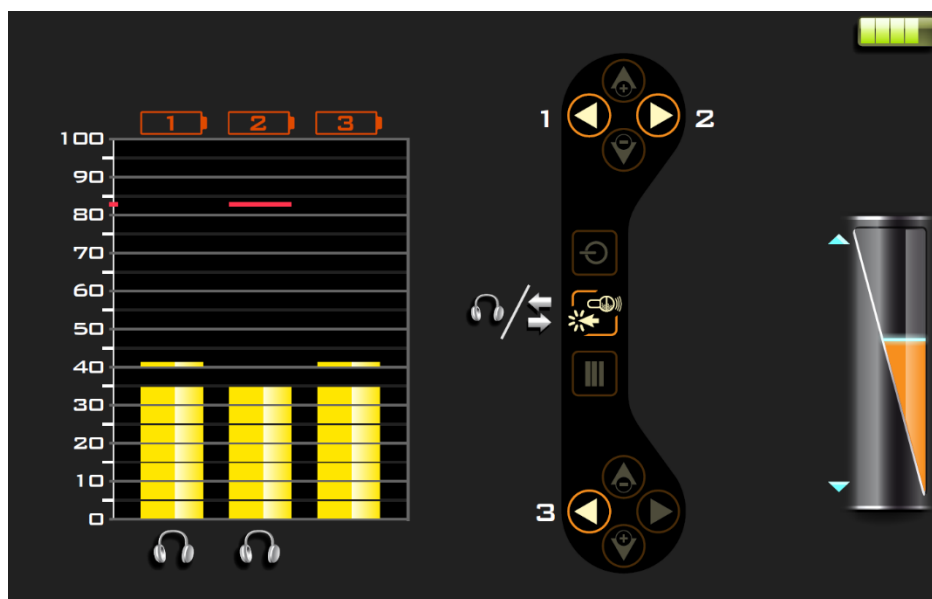
It is also possible to view the battery charge level by selecting **"sensor battery"** in the menu.

Battery level - "Sensor battery" function

| 10% level | 50% level | Full 100% level |

However there are still 8 hours of battery life.

From the moment the battery indicates 10%, there will not have sufficient power to ensure a perfect wireless connection between sensor and control box.

The device will continue to work but there is a risk of disconnections and reconnections.

It is therefore recommended to replace the batteries with new ones.

4.3.5 Function to set screen brightness

The **"brightness"** function is used to vary the screen brightness to adapt to surrounding light conditions.
Reducing the brightness also saves battery power during the intervention and increases the equipment's autonomy.

By default, brightness is set to 50% of its power.

The device memorises the brightness setting. The user can therefore switch from search camera mode to seismic sensor mode (and vice versa) without the setting being impacted.
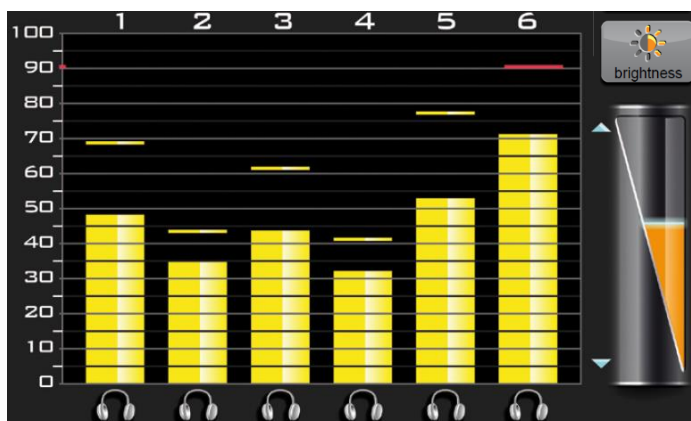
4.3.6 Audio probe function

On the control box, the audio probe connector is the same as that for the wire seismic sensor.
This means that either the audio probe, or the wired seismic sensor, can be connected.

By default, listening to the victim has priority **(see figure 1).** Transmission from the rescuer to the victim
is established by keeping the Push-to-talk key pressed down.
Transmission to the victim does not allow the victim to be listened to while the Push-to-talk button
is being pressed **(see figure 2).** A second headset can be connected. The second headset has
the same functions as the first. If the Push-to-Talk button is not pressed, both headsets communicate
with each other without the victim being able to hear.

Figure 1

Headset volume setting

Micro volume setting (audio probe)
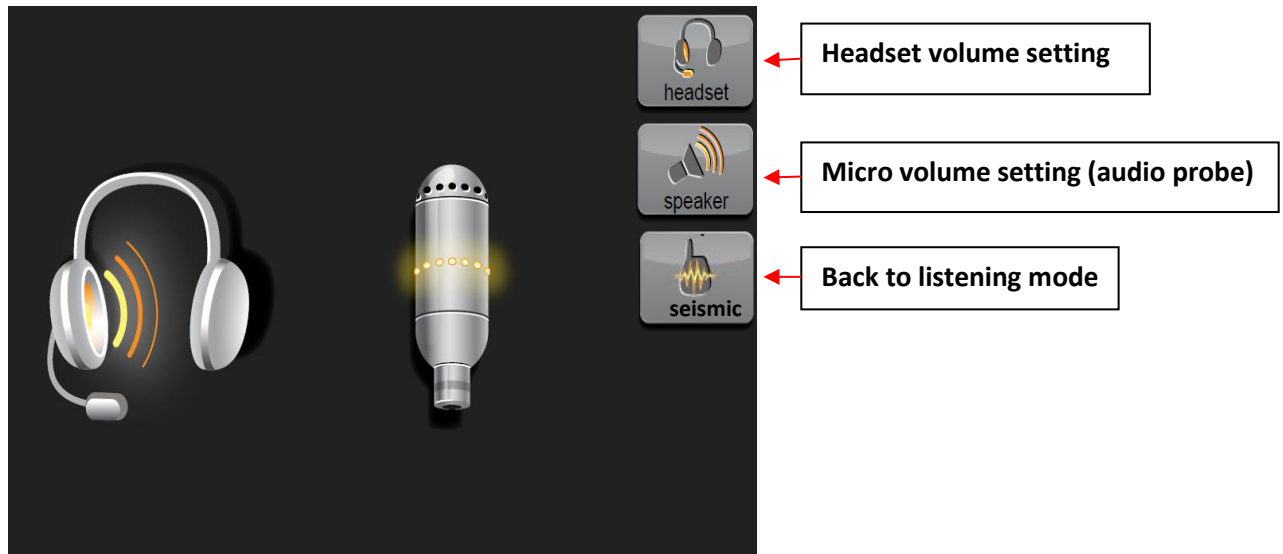
Back to listening mode

Figure 2

By default the headset sound and speaker volume are pre-set to 50%. To change the volume,
select the headset or the speaker using the "▲" and "▼" keys then validate using the validation key.
To exit the "audio sensor" function, use keys "▲" and "▼" to select the icon showing the wireless
seismic sensors and validate

5 TROUBLESHOOTING

Problem	What to do
The control box won't start	• Check that the battery is charged. • Check that the battery pack is connected. • Check that the battery is not charging when connected to the control box.
Wired seismic sensor not detected	• Check that the sensor cable (orange) is not damaged. • Check that the sensor connector is connected properly.
Audio sensor not detected	• Check that the sensor cable (orange) is not damaged. • Check that the sensor connector is connected properly.
Wireless seismic sensor not detected	• Check that the batteries are not flat. • Check that the batteries are properly connected. • Check that the sensor is correctly paired to the control box. • Check that the wireless sensor is not out of range.
Little or no sound in the headset	• Check that the audio volume has not been reduced. • Check that the headset is properly connected.

6 WARRANTY

LEADER SAS guarantees the original purchaser of the **LEADER Search** that the equipment is free of equipment and labour defects for two (2) years from the purchase date for the control box, the boom and the sensors, and one (1) year for the rechargeable battery. This limited warranty is only applicable to the original buyer and not for third parties to whom the equipment may have been resold.

LEADER SAS's duties under this warranty are specifically limited to the replacement or repair of the equipment (or its parts) after it has been inspected by **LEADER** and considered by **LEADER** to be defective. To be able to benefit from this limited warranty, the claimant must send the equipment to **LEADER SAS** within a reasonable time of having discovered the said defect. **LEADER** will inspect the equipment. If **LEADER** determines that it is liable for the defect, the company will resolve the problem in a reasonable time. If the equipment is covered by this limited warranty, **LEADER** will pay the costs of the repairs.

In the situation where any defect for which **LEADER** is liable under this limited warranty could not be reasonably resolved by a repair or a replacement, **LEADER** may then choose to refund the purchase price of the equipment, from which a reasonable depreciation value will be deducted, in order to fulfil its duties under this limited warranty. If **LEADER** decides to do this, the claimant must send **LEADER** the equipment free of charge and free of any liabilities or constraints.

This warranty is limited. The original purchaser, any person to whom it may be transferred, and any person who is the intended beneficiary of the equipment or not, cannot claim the payment of any damages from **LEADER** in the event of injuries and/or material damage due to any defective equipment manufactured or assembled by **LEADER**. Some countries do not allow the exclusion or limitation of damages: the above section may or may not be applicable depending on the country. **LEADER** cannot be held liable under this limited warranty if the equipment has been used inappropriately or negligently (including the absence of reasonable maintenance), or if it has suffered accidents or been repaired or modified by a third party.

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LEADER

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ISO 9001
AB CERTIFICATION

www.leader-group.eu

www.LeaderNorthAmerica.com

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PLEASE RECYCLE

Code Notice:
Search.00.ZN8.19.EN.2