User manual
LAK901

Table of contents

Warning and safety instructions:

- The battery in this product complies with the relevant IEC safety standards for batteries.

- Please read the safety instructions on the power supply before use.

- The power supply unit must meet the relevant IEC safety standards.

- When replacing the power supply unit, original or/and approved units must be used.

- The battery must not be replaced, and the product must be sent for repair.

- Please read the intended use before putting it into service.

- The product is not water-resistant unless noted in product specification.

Contraindications

In general, the product cannot be used if:

- The disabled client/patient is mentally ill.
- The disabled client/patient is critically ill.
- The client/patient is unable to use the transmitters.

Lifetime after mounting of the device

The battery, if applies, must be replaced when the battery replacement information appears on the display and according to the user manual.

Lifetime is evaluated in relation to the pressure button. This is made according to the supplier's specification.

Lifetime battery (products using battery, only)

KNOP calculates the life of the batteries. See specification in the user manual.

Intended use

In general, the different variants of the medical device (transmitters/receiver system from KNOP Elektronik) are made as assistive aid for impaired/disabled patients to be able to call for assistance.

The various variants of the medical equipment consist of a combination of products (transmitter and receiver) designed to call for help to impaired/disabled patients; The transmitter-receiver system can be activated in different ways:

- For example, patients who actively do this and are aware that they are calling for help, such as e.g., people with walking difficulties who need help going to the toilet.
- Or disabled patients who are not aware that they are inadvertently putting pressure on the sendere.g. during a seizure.

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- Or patients with intellectual and cognitive deficits who are not aware that a receiver is receiving a signal from their transmitter when they leave a house or room.

The system is not designed for critically or mentally ill persons.

General product description

The products manufactured by KNOP elektronik consist of several variants of transmitters and receivers that can be combined with each other. In addition, these products are used in combination with positioning and repeater systems.

These products are medical devices intended to call for assistance and are used for disabled/mobile people, such as those with walking difficulties who need help going to the toilet. The transmitters are activated, for example, by a sound or by pressure (e.g. by pressure with a finger or a breath through the mouth). The recipient is supervised by health care personnel or lay people in private homes.

The system is not designed for critically or mentally ill people.

Part of product	Function in the product system
Transmitter	The transmitter can send the signal obtained from the patient to the receiver monitored by the healthcare personnel or lay person. The transmitter products can be activated by button, sound, blow or movements.
Receiver	The transmitters can be coded into all the receivers and to several receivers at the same time. Some receivers also have a summon button for calling assistance from their coworkers.
Repeatersystem	If it is needed to cover a more comprehensive and larger area a repeater system is used. The repeater system also gives an increased functionality as e.g. that an alarm automatically is received at first at the healthcare person closest to the client.
Positionsystem	If a sender is equipped with a position receiver it can be used in connection with a Position system. Not all product variants include position receivers. Typically, it is seen in connection with nursing homes and security for patients with dementia. The receivers can be portable or stationary.

Product description

LAK901 is designed to work with KNOP 90X series wireless devices.

The transmission takes place when LAK901 detects a sound at a certain level. Pay attention to the range as described in the section "Checking the coverage area".

LAK901 is designed to assist clients in situations where the client cannot activate a normal paging system but can make an audio callout.

LAK901 is equipped with a position reader, so the current position of the product can be used in KNOP's positioning system.

With LAK901 it is possible to make an emergency call to another colleague with a single press of the KNOP logo.

Operation is menu-driven in a graphical display and controlled via the keyboard.

LAK901 has a rechargeable battery and can be charged with a micro-USB cable.

It is possible to connect an external microphone and an external monitor with speakers. Both are available as accessories.

Commissioning

It is recommended that LAK901 be charged to 100% or permanently connected to a power supply before use.

LAK901 is connected to the charger. When you connect the charger, the product will turn on automatically if it is switched off, otherwise, press `Ent` and the product will turn on.

When the product is switched on for the first time, the desired language must be selected.

Press ⬆️ ⬇️ to change the setting.

`ENTER` Press `Ent` to accept the new language.

`OFF` Press `Esc` to turn off the product.

The LED

The LED indicates:

Green: Send telegram.
Flashing green: Telegram received.
Flashing red: Telegram not answered.
Short red flashing: Low battery, charge the battery.
Short green flashing: The product is in sleep mode (but not if the light function is switched off).

Connections

There are four contacts in the product.

1. External relay output and external power supply
2. Connection to LAK901M, external audio monitor.
3. External KNOP microphone.
4. Charging connector, MicroUSB.

8   1
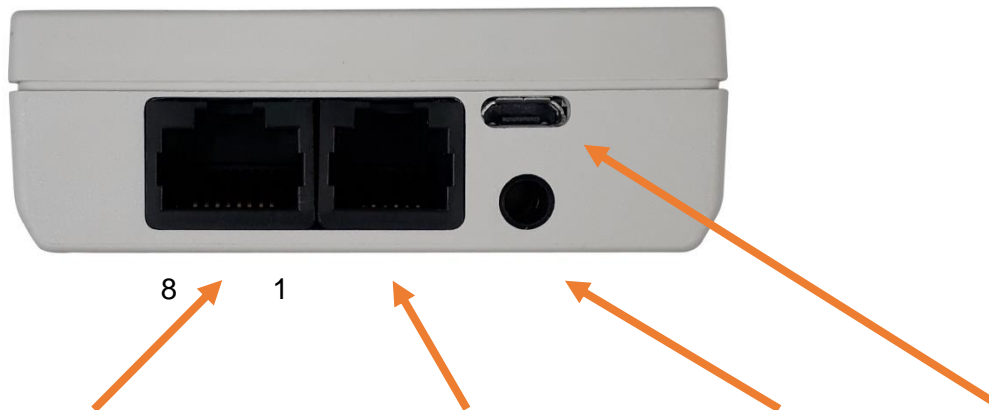
External output/power supply. Plug for LAK901M   External microphone. MicroUSB charger.

1. Minus
2.
3. 8-15V @100mA
4.
5.
6.
7. Relay (NO)
8. Relay (COM)

Home screen

When the device is switched on for the first time after it has been unpacked, the charger must be connected.

The screen will automatically turn off after about 15 seconds after the last operation.
Pressing any key turns the display on and shows the clock, date, and status.
The user's name is shown at the top if coded.
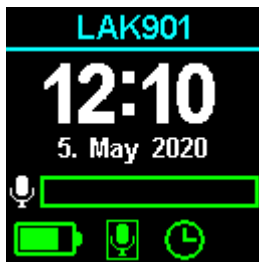
Home screen options:

 For example, the name of a product or a location can be changed to the desired name.

 The current time and date are displayed in white text.

 The clock must be set.

 Microphone status and activation.

 The microphone is activated, and the time recording has started.

 Timekeeping has started and an alarm has been sent.

 Locking activated, microphone alarm not possible.

 The charger is connected.
The battery is charged.
Charging is recommended.
The battery is next used and needs charging soon.
Unknown battery status, please wait.

 The internal microphone is on.
The internal microphone is off.
The external microphone is on.
The external microphone is off.

 The timer is activated and is **within** the active period.
The timer is activated and is **outside** the active period.
The timer is deactivated.

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Alarm call

It is possible to make either an emergency call or an alarm call from the product to e.g. staff to indicate "I need help" with a client or as an assault alarm.

The call must be acknowledged by a receiver, after which "OK" is displayed. If this does not happen, "FAILED" is displayed. If the call fails, the call is automatically repeated twice.

See "Main Menu - Settings - Wireless" to set up the call.

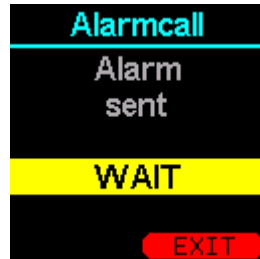The call is activated by pressing the logo button.

Panic call

Call sent.	Call failed.	Call received.

Alarm call

Call sent.	Please wait	Call failed.	Call received.
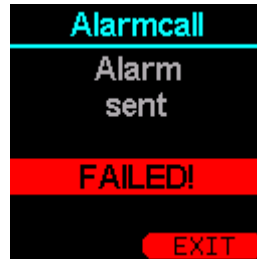
Battery alarm

The battery is charged.
Charging is recommended. The battery is running low and needs charging.
If the symbol changes to red, connect the charger immediately.

At the same time, a pair of short beeps sounds about every five minutes, indicating low battery, while the screen below appears:
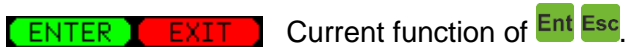
LAK901
12:10
LOW BATTERY!

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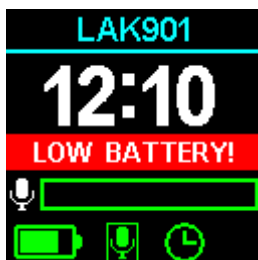
Main menu

By pressing and ⬇ holding ⬆ for 1 second, either when the screen is off or on the home screen, the main menu is displayed. However, the product must be switched on.

General information about the menu

  Current function of **Ent** **Esc**.

In this example, **Ent** is the **ENTER** function of the button (accept) and **Esc** is the **EXIT** function of the button (cancel/exit menu) are

  The green arrow shows which menu item can be selected by pressing **Ent**

Press ⬆ ⬇ to move the green arrow up/down or right/left in the menu.

NOTE: After about 30 seconds of inactivity, the menu will automatically exit.

Main menu - Hibernate (sleep)

ENTER   Select the **Hibernate (Sleep)** menu item and press `Ent`.

EXIT   Press `Esc` to exit the menu.

YES   Press `Ent` to accept.

EXIT   Press `Esc` to exit the menu.

The product is switched on again by pressing `Ent`.

If you want to turn the receiver off completely, you can do so in the menu item "Settings ➜ Turn off".

Sleep mode can be used if you do not want to receive calls from the product for a certain period. Sleep mode consumes more power than "off-mode".
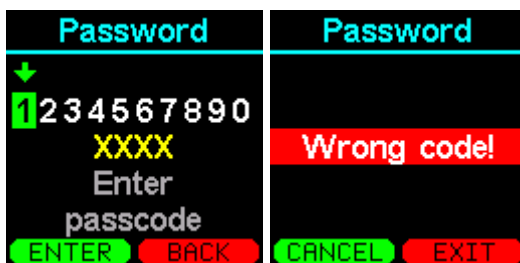
Main menu - Settings

ENTER   Select **Settings** and press **Ent**.

EXIT   Press **Esc** to exit the menu.

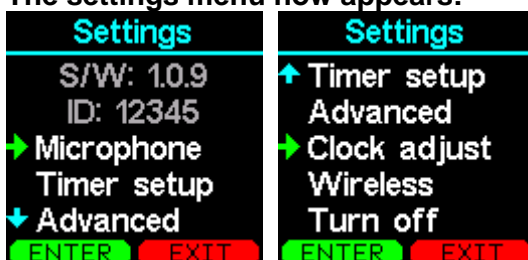If a password has been programmed, it must now be entered.

Press ⬆ ⬇ to change the value (0 to 9).

ENTER   Press **Ent** to select a number.

BACK   Press **Esc** to delete the last digit or return to the main menu.

With the wrong code:

CANCEL   Press **Ent** to try again.

EXIT   Press **Esc** to exit the menu.

The settings menu now appears:

The software version and product ID are displayed on the first two lines and cannot be changed.

S/W: 1.0.0   Software version.

ID: 12345   Product ID and serial number.

ENTER   Select a menu item and press **Ent**.

EXIT   Press **Esc** to exit the menu.

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Main menu - Settings - Sensitivity

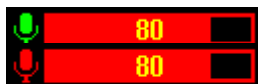Set the microphone sensitivity and activation time.

ENTER   Select **Sensitivity** and press `Ent`

EXIT   Press `Esc` to exit the menu.

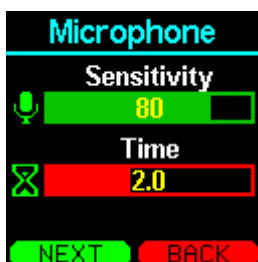The sensitivity can be set between 0 and 100 % and the activation time between 0 and 5.0 seconds.

     The microphone *can't* hear anything.
The microphone hears something.

    Press ⬆️ ⬇️ to change the sensitivity of the microphone.

NEXT   Press `Ent` to change the activation time.

EXIT   Press `Esc` to leave the menu unchanged.

     The activation time can be set between 0 and 5.0 seconds.

    Press ⬆️ ⬇️ to change the sensitivity of the microphone.

NEXT   Press `Ent` to test the settings.

BACK   Press `Esc` to go back to the sensitivity adjustment.

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Activate the microphone with the desired sound. The microphone icon is red ⬛ when something is heard. As soon as something is heard, the activation time starts, something must be heard all the time during the set time, otherwise, the time starts again. If something is heard during the whole period, the hourglass turns red ⬛ corresponding to an activated alarm.

SAVE   Press **Ent** to save the settings.

BACK   Press **Esc** to go back to the activation time adjustment.

Microphone frequency filter

Frequency filters are used to attenuate unwanted sounds or noise. Depending on the sound the client wants, the filters can be adjusted to optimize this. For example, it is only possible to say sounds like O and B. If these sounds are in the 500 Hz range, it is a good idea to set the filters at 250 Hz (bass filter) and 1000 Hz (treble filter) so that these particular sounds dominate. On the other hand, whispering sounds such as S and T, 2000 Hz (bass filter), and 6000 Hz (treble filter) are better.
By default, the files are set to 250 Hz (bass filter) and 4000 Hz (treble filter), which covers the normal speech range.

Example:

- Whistles or flutes are usually loud i.e., in the treble, and the filters can be set to 2000 Hz in the bass filter and 6000 Hz in the treble filter.
- If the client mainly have buzzing sounds, they are usually in the bass range and the filters can be set to 250 Hz in the bass filter and 1000 Hz in the treble filter.
- If the client can use the speech range for both men and women, the default setting is 250 Hz in the bass filter and 4000 Hz in the treble filter.

ENTER   Select the **Advanced** menu item and press **Ent**.

EXIT   Press **Esc** to exit the menu.
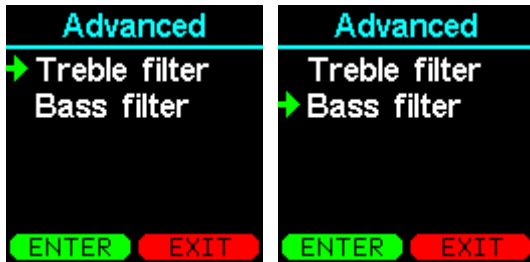
ENTER   Select the **Bass filter** or **Treble filter** menu item and press ^Ent

EXIT   Press ^Esc to exit the menu.

ENTER   Select the desired frequency and press ^Ent.

EXIT   Press ^Esc to leave the menu unchanged.

Blocking time

After the microphone has been activated and an alarm has been sent, a blocking time can be selected. During the lock time, the product cannot send an audible alarm until the time has expired. It is possible to turn off the lock time.
The function reduces the number of repeated alarms in the same activation. By default, the product is set to 90 seconds.
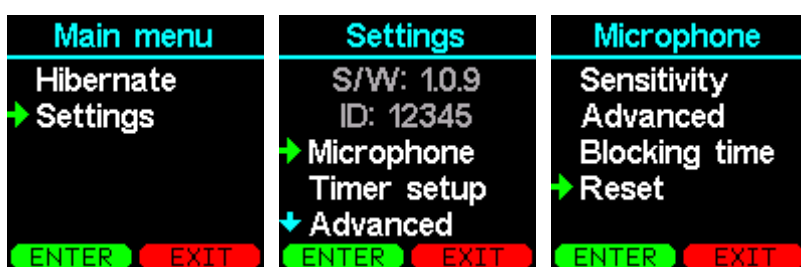

ENTER   Select the **Blocking time** menu item and press ^Ent.

EXIT   Press ^Esc to exit the menu.

Blockeringstid

0 sekunder
30 sekunder
60 sekunder
→ 90 sekunder
5 minuter

ENTER   EXIT

ENTER   Select the desired time and press Ent.
EXIT   Press Esc to leave the menu unchanged.

Reset microphone settings

Main menu

Hibernate
→ Settings

ENTER   EXIT

Settings

S/W: 1.0.9
ID: 12345
→ Microphone
Timer setup
↓ Advanced

ENTER   EXIT

Microphone

Sensitivity
Advanced
Blocking time
→ Reset

ENTER   EXIT

ENTER   Select the menu item **Reset** and press Ent.
EXIT   Press Esc to exit the menu.

Reset

Sensitivity
defaults?

Confirm

YES   EXIT

YES   Press Ent to reset the microphone settings to factory defaults.
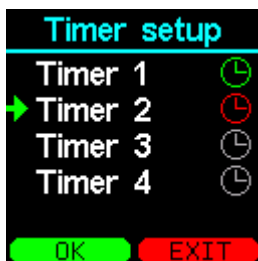EXIT   Press Esc to leave the menu unchanged.

Main menu - Settings - Time management

The product has four timers that can turn the microphone on and off throughout the day and week.
IMPORTANT: If the clock is not set, the timer automatically turns off and the microphone is therefore always active.

Main menu	Settings	Settings
Hibernate	S/W: 1.0.9	ID: 1.0.9
→ Settings	ID: 12345	Microphone
	→ Microphone	→ Timer setup
	Timer setup	Advanced
	↓ Advanced	↓ Clock adjust
ENTER EXIT	ENTER EXIT	ENTER EXIT

ENTER — Select the **Time management** menu item and press Ent

EXIT — Press Esc to exit the menu.

Timer setup	
Timer 1	🕐
→ Timer 2	🕐
Timer 3	🕐
Timer 4	🕐
OK	EXIT

🕐 The timer is programmed but is not within the programmed time.
🕐 The timer is programmed and is within the programmed time.
🕐 The timer have not programmed.

ENTER — Select the desired timer and press Ent.

EXIT — Press Esc to exit the menu.

Timer 1	
→ Activated:	Yes
Start:	8:00
Stop:	16:00
M T W T F S S	
Save?	
FLIP	EXIT

→ Activated: Yes — The timer is on.
→ Activated: No — The timer is NOT on.

Start: 8:00 — Start time
Stop: 16:00 — Stop time

M T W T F S S — The timer is on during these days of the week. The green marking is on during the day.

Save? — Save the timer setting.

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Activation

FLIP	Press ^{Ent} to switch between yes and no.
EXIT	Press ^{Esc} to leave the menu unchanged.

Start/stop time

Press ⬆️ ⬇️ to change hours/minutes.
NEXT Press Ent switch to the next setting.
BACK Press Esc to go back to the menu.

Press ⬇️ ⬆️ to change the day.
FLIP Press Ent to switch between deselecting (red) and selecting (green).
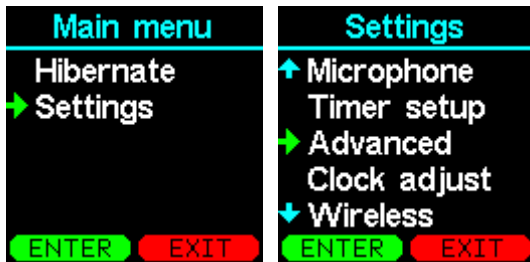**BACK** Press Esc to go back to the menu.

Save!

Press **Ent** to save the settings.

Press **Esc** to leave the menu unchanged.

Main menu - Settings - Advanced

ENTER Select the **Advanced** menu item and press `Ent`.

EXIT Press `Esc` to leave the menu.

Light & Sound
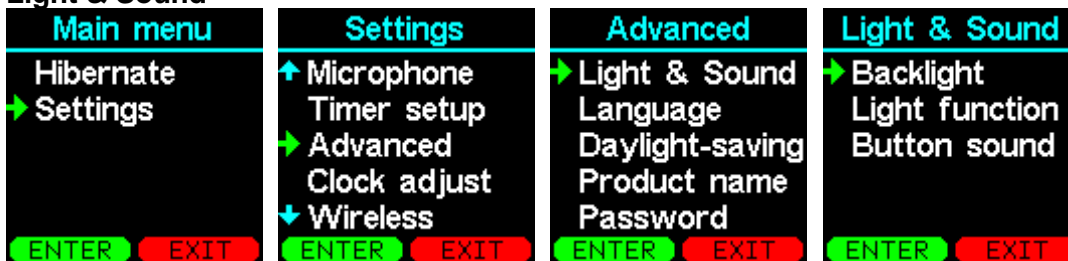
ENTER Select the desired menu and press `Ent`.

EXIT Press `Esc` to leave the menu.

Backlight:	The brightness of the screen.
Light function:	Off, the display turns on when in use.
	Activity, the display is on for sounds and alarms (dimmed).
	Auto/Down, the display is normally off in battery mode, otherwise, it is dimmed.
Important sounds:	The volume of a keystroke.

SAVE Press `Ent` to save the settings.

EXIT Press `Esc` to leave the menu unchanged.

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Language

Main menu	Settings	Advanced
Hibernate	↑ Microphone	Light & Sound
→ Settings	Timer setup	→ Language
	→ Advanced	Daylight-saving
	Clock adjust	Product name
	↓ Wireless	Password
ENTER EXIT	ENTER EXIT	ENTER EXIT

ENTER Select the **Language** menu item and press Ent.

EXIT Press Esc to exit the menu.

Language	Language
↑ Svenska	↑ Norsk
Norsk	Suomi
Suomi	→ English
→ English	Deutsch
Deutsch	Español
OK EXIT	OK EXIT

Set the desired language in the product.

Press ⇧, ⇩ to change the setting.

ENTER Press Ent to accept the new language.

EXIT Press Esc to exit the menu.

Daylight-saving

It is possible to turn on or off the automatic summer/wintertime. Normally it is set to automatic.

| Main menu	Settings	Advanced
Hibernate	↑ Microphone	Light & Sound
→ Settings	Timer setup	Language
	→ Advanced	→ Daylight-saving
	Clock adjust	Product name
	↓ Wireless	Password
ENTER EXIT	ENTER EXIT	ENTER EXIT

ENTER Select the **Daylightsaving** menu item and press Ent.

EXIT Press Esc to exit the menu.

Manually:	Unchanged.
Automatically:	Automatically changed twice a year.
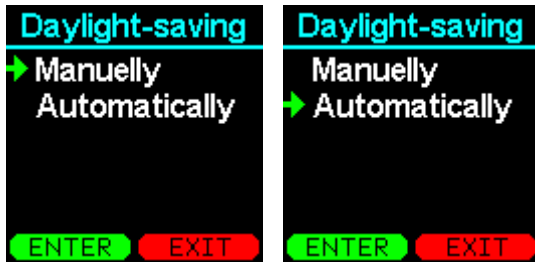
ENTER	Press **Ent** to save the settings.
EXIT	Press **Esc** to leave the menu unchanged.

Product name

The name of this LAK901 can be changed to a more meaningful name e.g., "Peterson", which in this example is the client of this product. This is an optional feature that can be used. By default, LAK901 is displayed.

ENTER	Select the menu item **Product name** and press **Ent**.
EXIT	Press **Esc** to leave the menu.
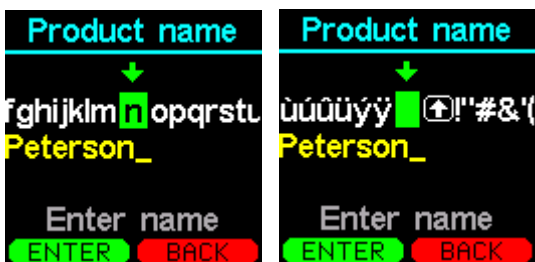
	Press ⬇ ⬆ to change the letter.
ENTER	Press **Ent** to select a letter.
BACK	Press **Esc** to delete the last letter.

ENTER	Press **Ent** for about 1 second to switch between lowercase and uppercase letters.
ENTER	Press **Ent** for about 3 seconds to jump to the save icon.
BACK	Press **Esc** for about 3 seconds to exit the menu.

Press 🔴 to switch between regular and special letters.

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ENTER To save the name, select the symbol 💾 and press `Ent` .

EXIT Press `Esc` för att lämna menyn oförändrad.

Password

To avoid accidental changes to the settings, the menu can be protected with a password. The password is a four-digit code.

The code "0000" means that there is no code!

Once a password has been created, you must enter it before you can access the settings menu.
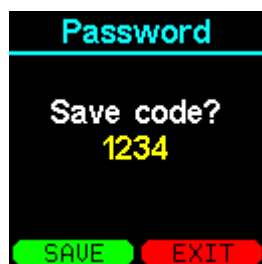
If you want to delete a password, enter "0000"!

ENTER Select the **Password** menu item and press `Ent`.

EXIT Press `Esc` to exit the menu.

Press ⬆ ⬇ to change the value (0 to 9).

ENTER Press `Ent` to select a number.

BACK Press `Esc` to delete the last digit.

BACK Press `Esc` and press and hold for 2 seconds to exit the menu.

SAVE   Press **Ent** to save the code.

EXIT   Press **Esc** to leave the menu unchanged.
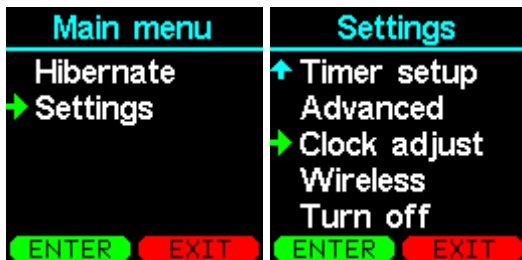
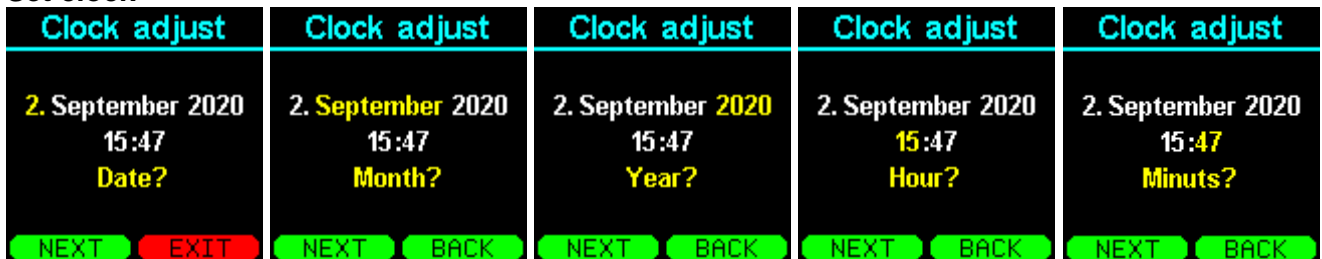*NOTE:* Saving can only be done when all four digits are selected.

Main menu - Settings - Set the clock

It is important that the time and date are set correctly for the time controls to work properly.
If the clock is not set, it is not possible to activate the time control.

Main menu	Settings
Hibernate	↑ Timer setup
→ Settings	Advanced
	→ Clock adjust
	Wireless
	Turn off
ENTER EXIT	ENTER EXIT

ENTER   Select the **Set clock** menu item and press **Ent**.
EXIT   Press **Esc** to leave the menu.

Set clock

Clock adjust	Clock adjust	Clock adjust	Clock adjust	Clock adjust
2. September 2020	2. September 2020	2. September 2020	2. September 2020	2. September 2020
15:47	15:47	15:47	15:47	15:47
Date?	Month?	Year?	Hour?	Minuts?
NEXT EXIT	NEXT BACK	NEXT BACK	NEXT BACK	NEXT BACK

Press ⬆ ⬇ to change the setting.

NEXT   Press **Ent** to go to the next one.
BACK   Press **Esc** to go back or exit the menu.

Save new clock

| Clock adjust |
|---|
| 2. September 2020 |
| 15:47 |
| Confirm? |
| SAVE   BACK |

SAVE   Press **Ent** to save the settings.
BACK   Press **Esc** to leave the menu unchanged.

NOTE: If a KNOP system (MR902/RP902/USB901) is used, the clock is updated automatically.
Alternatively, the product tries to keep the clock updated with other products that have a more
recent setting.

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Main menu - Settings - Wireless
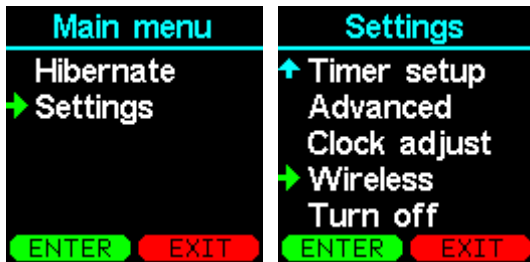
| ENTER | Select the **Wireless** menu item and press `Ent`. |
| EXIT | Press `Esc` to exit the menu. |

KNOP logo

| ENTER | Select the **KNOP logo** menu item and press `Ent`. |
| EXIT | Press `Esc` to exit the menu. |

The KNOP logo on the product can be used to call others if this is programmed into their receiver. The button can either send a normal alarm call, an emergency call or be cancelled.

Deactivated: KNOP button does not send anything.
Panic alarm: KNOP button an emergency call to all recipients who can receive the call.
Normal alarm: KNOP button sends a call to the receiver where this are encoded.

| ENTER | Press `Ent` to save the settings. |
| EXIT | Press `Esc` to leave the menu unchanged. |

Radio

It is possible to turn the wireless transmitter on or off in the product. It is advisable to switch off the transmitter only if the relay output of the product is used so that the product does not transmit signals unnecessarily and the battery life is extended.
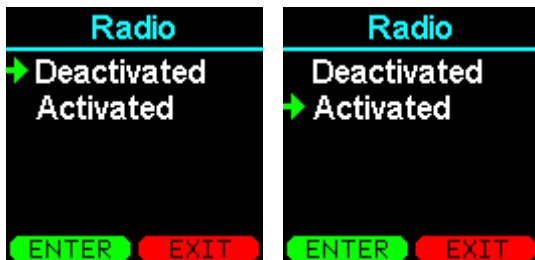
Main menu	Settings	Wireless
Hibernate	↑ Timer setup	Knop logo
→ Settings	Advanced	→ Radio
	Clock adjust	
	→ Wireless	
	Turn off	
ENTER EXIT	ENTER EXIT	ENTER EXIT

ENTER   Select the **Radio** menu item and press Ent.

EXIT   Press Esc to exit the menu.

No audible alarms are sent when it is disconnected.

Connected sends audible alarms.

If the KNOP logo is set to send an alarm, it works in both cases.

Radio	Radio
→ Deactivated	Deactivated
Activated	→ Activated
ENTER EXIT	ENTER EXIT

ENTER   Press Ent to save the settings.

EXIT   Press Esc to leave the menu unchanged.

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Main menu - Settings - Turn off

Turns the product off completely and can only be turned back on by pressing `Ent`.

| `ENTER` | Select the **Language** menu item and press `Ent`. |
| `EXIT` | Press `Esc` to exit the menu. |

| `YES` | Press `Ent` to accept. |
| `EXIT` | Press `Esc` to exit the menu. |

If you simply want to put the product to sleep, you can do so in the "Settings ➡ Hibernate" menu.

Note: The clock and date are reset.

Maintenance

Update of LAK901
It is possible to update the software of LAK901, as well as to download and transfer settings with KNOPtool. For further information at our homepage www.knop.dk

Resetting the product

Switch off the product completely and remember to remove the adapter or external power supply before doing so.

Immediately afterward, press and hold `Ent` `Esc` for about 1 second, release `Ent`, and continue pressing `Esc` while the LED flashes red.

Press and hold the button until the LED turns green.

Then release the `Esc` button.

The product can then be switched on again by pressing `Ent`.

Restart the product

Hold `Esc` for about 30 seconds until the product restarts. Then release the `Esc` button.
The product can then be switched on again by pressing `Ent`.

Battery failure and replacement

The product displays "BATTERY ERROR" when the battery needs to be replaced.

The battery may only be replaced with an original KNOP Elektronik battery.
See the instructions supplied with the new battery.
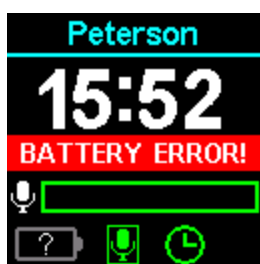
Cleaning

The product can be cleaned with a moist cloth or a wet wipe.

Check the coverage area

One person activates the product at short intervals, while another person systematically walks around the area and marks on a sketch the building and the area where there is coverage. The map is placed in the office so that anyone who needs to use the system can see where there is coverage. Outside the coverage area, alarms cannot be received.
The coverage area can be extended using the KNOP repeater system.
Contact your retailer for more information.

Spare parts and accessories

Spare parts and accessories can be ordered from Knop Elektronik A/S at www.knop.dk.

Technical data

Frequency HF:	869.2125 MHz
Range:	Up to 1500 m between LAK901 and RX901B [1]
Battery:	Lithium battery, LP853048 3.7V 1200mA
Battery time:	Approximately 14 days with 10 alarm calls per day depending on settings.
Charge:	230VAC adapter USB 5VDC/1,0A
Charging time:	90 minutes.
Display:	Graphic LCD
Menu languages:	Danish, Norwegian, Swedish, Finnish, German, English, and Spanish.
Surrounding environment:	Indoor use. ≤ 90% non-condensing
Ambient temperature:	0 °C to +40 °C
Cabinet type:	Colour: RAL9001 ABS
Cabinet dimensions:	W: 65mm, H: 120mm, D: 20mm.
Density:	IP20
Weight:	100g

The right to make changes is reserved.

[1] Measured outdoors with a free view between transmitter and receiver. In buildings, the range is reduced.

Explanation of symbols and approvals

CE	**This product complies with:** Directive 2017/745/EU MDR Directive 1907/2006/EU REACH Directive 2011/65/EU RoHS Directive 2012/19/EU WEEE ISO 14971:2019 Risk Management for Medical devices EN 301 498-1 V2.2.3 Electro Magnetic Compatibility EN 301 489-3 V3.1.1 Electro Magnetic Compatibility EN 50130-4:2011 + 2014 Immunity alarm systems EN 300 220-1 V3.1.1 Short Range Devices EN 300 220-2 V3.1.1 Short Range Devices EN 300 220-3 V2.1.1 Short Range Devices EN 60601-1-2:2014 + 2015 Electromagnetic compatibility (Medical) EN 62368-1:2020 Electrical safety EN 50581:2012 Hazardous substances
(package damaged symbol)	The product must not be used if the packaging is damaged.
MD	**Medical Device** Class 1, rule 1
(manufacturer symbol)	**Manufacturer** KNOP Elektronik A/S, Fabriksvej 20, DK-7600 Struer, Denmark
(manual symbol)	Read the manual(s) before installation and commissioning at www.knop.dk.
(((•)))	Interference may occur in an environment with equipment marked with this symbol.
(umbrella symbol)	Must be protected against liquids.
(temperature symbol)	0 °C to +40 °C, temperature limit for transport/storage and use.
(WEEE bin symbol)	The product must not be disposed of with normal household waste.
SRN	**Single Registration Number** DK-MF-000025631
UDI	**Unique Device Identifier** LAK901: 05744002850465 MI901: 05744002853466
REF	**Product reference** LAK901: Sound alarm MI901: External microphone
SN	**Serial number** Placed on the product
IP	**Ingress Protection Code** IP20