Welcome

Congratulations on the purchase of your new PULSE Barryvox®.

This user manual explains the functionality and use of the PULSE Barryvox®. The PULSE Barryvox® is a revolutionary avalanche transceiver, which you will understand quickly, and which is very easy to use.

A transceiver does not protect you against avalanches!

As a winter outdoor enthusiast, you must consider all possible avalanche prevention measures and plan your trips carefully. Companion rescue – the worst case – must be practiced frequently. Under the stress of an accident, this is the only way you will be able to locate and dig out a companion quickly and efficiently. Despite practice and all the technological advancements, by far not all of the completely buried avalanche victims are rescued! An avalanche burial is always life threatening.

Important information on these topics can be found in the chapters on companion rescue and avalanche theory.

PULSE Barryvox® – Made in Switzerland
Our heritage is compelling. Mammut and Barryvox follow the time-honored tradition of world-class precision products made in Switzerland. From its design to its engineering and production, this device is completely Swiss-made.

This device is compatible with all avalanche transceivers that comply with the EN 300718 standard and operate on a frequency of 457 kHz.

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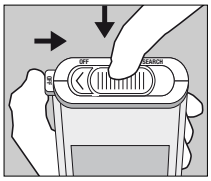
Overview

Operation

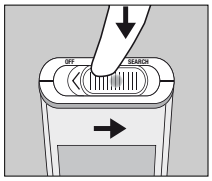
1. Operation

1.1 Main Switch OFF / SEND / SEARCH

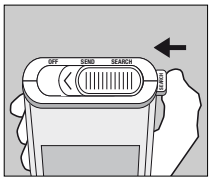
The main switch is located on the top side of the device. It can be moved by pressing down on the button. By applying lateral pressure to the switch, it can be set to SEND at any time. In the left switch position, the transceiver is OFF, in the center position, it is in SEND mode, and in the right position, the SEARCH mode is activated.
To get into the OFF position, an additional safety button must be pressed down, as well.



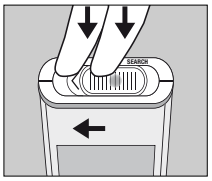
OFF -> SEND



SEND -> SEARCH



SEARCH -> SEND



SEND -> OFF

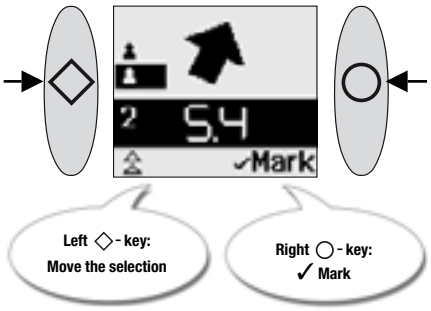
Operation

1.2 Use of Keys

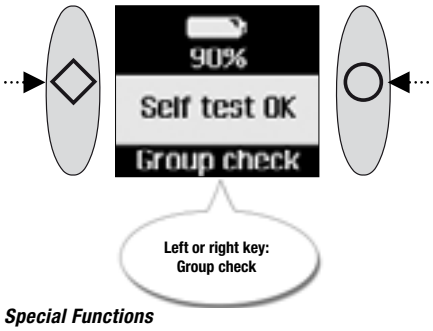
The PULSE Barryvox® clearly excels through its ease of use. The device is operated using the two lateral keys. The current function of the keys is always shown at the bottom of the display. On the left, the function of the left ◇-key is shown; on the right, you will see the function of the right ○-key. If the text is centered, either key can be pressed to activate the function.

Examples:

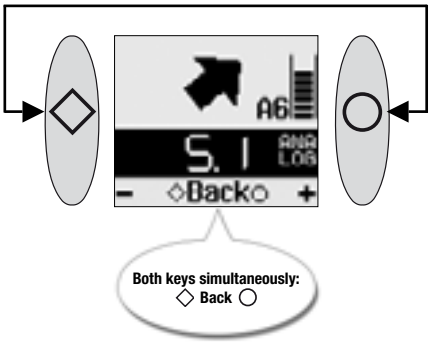
Two Functions



One Function



Special Functions



Setup

2. Setup

2.1 Initial Setup

Before you use the device for the first time, remove the protective foil on the front side and stick the emergency plan on the back of the battery compartment lid.

2.1.1 Insert / Replace Batteries

Only use alkaline LR03/AAA batteries. Always insert 3 new batteries of the same type.
Never use rechargeable batteries and always replace all the batteries at the same time.

Make sure the lid is properly closed and that the device and the batteries stay dry. Periodically inspect the battery compartment. Clean or dry it, if needed, since moisture can cause corrosion. Avoid touching the contacts with your hands.

When storing or not using the transceiver for an extended period of time (in the summer), remove the batteries and leave the battery compartment open. The warranty becomes void if batteries have leaked!

2.1.2 Device Setup

When turning the device on for the first time and switching to SEND, the user language must be selected. Press the ◇-key to change the current selection and confirm by pressing the ○-key.

The compass calibration is performed next. Please follow the instructions on the display and in the chapter «Calibrate Compass».

You can customize your Barryvox with your personal information, such as name, address, and phone number. This way your device is identifiable as yours. Please refer to the instructions in the chapter «Owner.»

Verify if your PULSE Barryvox® is set to the appropriate W-Link region for your country (wireless radio link). Please see chapter «W-Link». For countries without W-Link approval transmit and receive of vital data is not possible. (Chapter «Triage Criteria and Vital Data»).

Adjust the carrying system to your size.

Setup

2.2 Handling the Barryvox

As all transceivers, the Barryvox contains shock-sensitive ferrite antennas. Therefore, you should handle it with utmost care!

Store the device and the carrying system in a dry spot that is protected from extreme cold or heat and direct sunshine.

It is recommended that you have the functionality tested at regular intervals (see chapter «Periodic Checks»).

2.3 Interferences

As a matter of principle, avoid having other electronic devices (e.g. mobile phones, radios, headlamps), metal objects (pocket knives, magnetic buttons), or other transceivers close to your running avalanche transceiver. The PULSE Barryvox® contains a magnetic compass. **You should not wear clothing with magnetic buttons! Users of pacemakers are advised to carry the device on their right side (adjust the length of the carrying straps).** Consult the manufacturer's instructions with regard to the impact on pacemakers.

When searching, hold the device at a minimum of 50 cm away from these objects and turn off any electronic devices, if possible. It is highly recommended to turn off mobile phones!

2.4 Carrying Positions

Regardless of the carrying position, the display should always face your body!

The detection of vital data is only possible if you carry the device in the carrying system. (Chapter «Triage Criteria an Vital Data»)

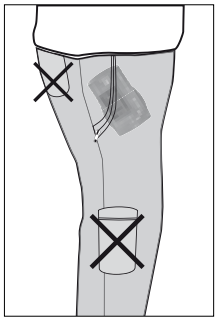
Before you use the device for the first time in the outdoors, or when you decide to carry the transceiver in a different manner, we recommend that you test the vital data sensor (Chapter «Vital Sensor Test»).

2.4.1 Carrying System (Recommended Carrying Position)

The carrying system has to be put on your innermost layer of clothing prior to beginning the trip (see illustration) and has to be worn on your body for the duration of the trip. **The transceiver shall always remain covered by one layer of clothing**. The device itself is inserted into the carrying system according to the illustration. It should always remain anchored to the base plate of the carrying system using the red hook on the wrist loop.

2.4.2 Carrying the Transceiver in a Pocket
(without vital data detection)

If you carry the Barryvox in a pant pocket, the zipper must remain closed for the duration of the trip. Always use a secured pocket (see illustration). If possible, attach the wrist loop to your pants or secure it around your belt.



2.5 Turning the Device On

When the main switch is moved from the OFF to the SEND or SEARCH positions, the transceiver is turned on.
While starting, the device conducts a self-test.
The microprocessor, the antennas, the sensors, and the display are checked. If the battery level is low, the self-test will not run.
If the self-test is completed successfully, the display will show «OK» and the transceiver will beep three times.
The remaining battery level is displayed as a percentage.
If the self-test fails, an error message is displayed for 20 seconds along with an acoustic warning.
The meanings of the different error messages are described in the chapter «Troubleshooting».

Test your Barryvox at home prior to your trip. Turn the transceiver on and monitor the self-test and the battery level. This gives you the opportunity to replace low batteries and have an eventual defect repaired beforehand.

Setup

2.6 Battery Level Indicator

The following table gives you average values for the battery levels.
The remaining battery level can only be displayed correctly if batteries are used according to the chapter «Insert / Replace Batteries» Low temperatures, age, and brand can have a negative impact on the battery life and the accuracy of the battery level indication.

100%:	At least 200 hrs in SEND mode and 1 hr in SEARCH mode.
less than 20% or battery icon displayed:	The batteries must be replaced as soon as possible! Emergency reserve at 20 %: Max. 20 hrs in SEND mode and max. 1 hr in SEARCH mode left.

The transceiver sounds a warning if the battery level is below 20% at startup.

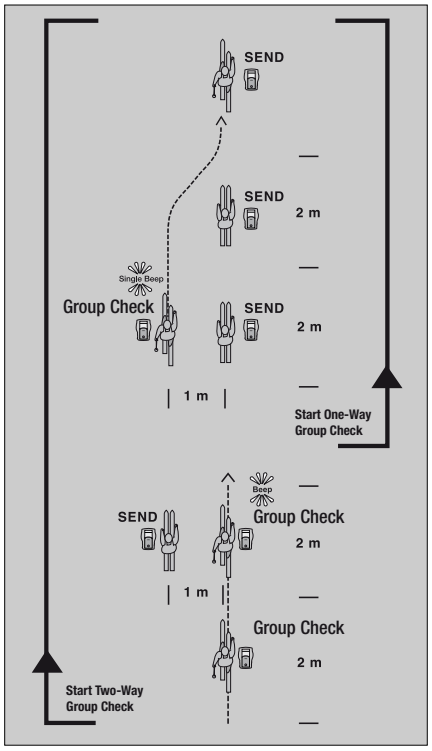
2.7 Group Check

Before a party takes off, the transceivers of all the party members must be checked. To conduct this test, the function group check is activated on a single transceiver within the party. Activate the group check by switching the device from OFF to SEND and pressing either of the keys within the first 5 seconds. After a few seconds, the device will automatically activate the group check. Make sure all the other transceivers of the party are in SEND mode.
The test is successful if all the members of the party can clearly hear beeps within the range indicated on the display. The members of the party must be spread out appropriately to avoid mutual interference. If the individuals are too close to each other, the group check's results become increasingly unreliable.
If no tone is heard within the indicated range, the device may not be used, and the device or its batteries must be inspected further, as needed.

After 5 minutes in the group check, the transceiver automatically switches to the SEND mode. The user is warned ahead of time by an acoustic alarm. This automatic switching can be prevented by pressing any button within 20 seconds. After the group check, the transceiver must be switched to the SEND mode by pressing any button.

Two-Way Group Check

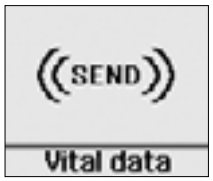
We recommend you perform a two-way group check in which the SEND and the SEARCH functionality are checked individually!
The members of the party activate the group check on their transceivers or set them to a low receive volume. The leader switches his or her transceiver to the SEND mode and ensures that all party members can receive. Subsequently, the party members switch their transceivers to SEND, and the leader activates the group check or sets the transceiver to a low receive volume. The SEND mode of all transceivers is checked, and ultimately the leader switches his or her transceiver to SEND.



SEND Mode

3. SEND Mode

The SEND mode is the normal operating mode outdoors or in all other situations in which there is a risk of avalanches.
Each individual signal pulse is tested. If the test is successful, this is confirmed by a blink of the red SEND-Control LED.
The LCD display is automatically deactivated in the SEND mode, but can be activated any time by pressing either of the keys.



In case of a burial (or whenever the transceiver stops moving), the device records the burial duration and detects vital data. These are displayed on the buried device and transmitted via W-Link to all other transceivers capable of receiving vital data. See chapter «Burial and Vital Duration».

SEARCH Mode

4. SEARCH Mode

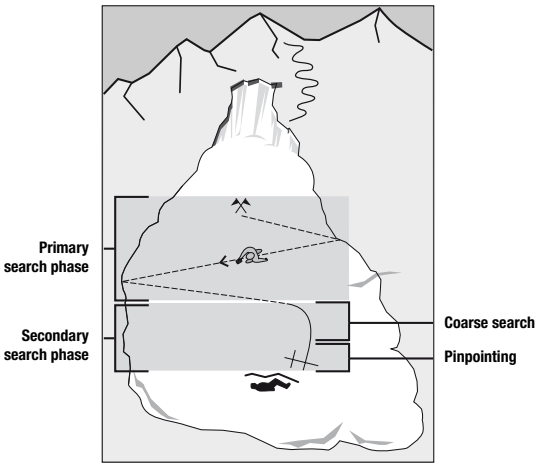
Electronic devices and metal objects can interfere with the search or make it impossible.
See chapter «Interferences».

Although the avalanche transceiver is easy to use, its effective use requires proper training. We recommend that you practice transceiver searches regularly.

4.1 Search Phases

In an avalanche search, the following phases are distinguished:

- Primary search phase
- Secondary search phase

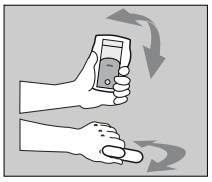


SEARCH Mode

4.1.1 Primary Search Phase

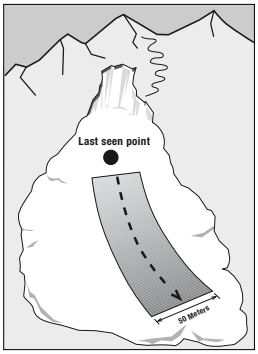
From the start of the search until you clearly hear the first tone, you are in the primary search phase. During the primary search, the avalanche surface is searched systematically until you pick up a signal. The objective of the primary search phase is to detect a signal.
The PULSE Barryvox® uses the symbol as a generic instruction to apply one of the following search patterns for new signals!

To optimize the range, rotate the transceiver around all axes.
Once a signal is received, maintain the device orientation and continue walking until the signal can be heard clearly. The primary search phase is concluded.



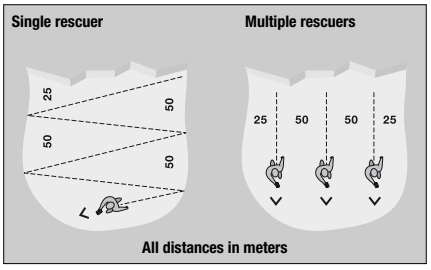
Optimization of the range

Regardless of the operating mode, the following search strategies apply:



Search strategy if the last seen point is known. The primary search strip extends downhill from the last seen point in the direction of the slide.

Search strategy if the last seen point is unknown.



4.1.2 Secondary Search Phase

The basic pattern of the primary search is suspended and the signal is followed to the buried subject.

- **Coarse Search:** From where the signal is first detected to the approximate location of the buried subject.
- **Pinpointing Phase:** Pinpointing occurs in the immediate proximity of the buried subject using the transceiver together with a probe pole.

4.2 Auto-Revert to SEND

Auto-revert to SEND automatically switches the transceiver from the SEARCH mode to the SEND mode if no user interaction or movement occurs during a certain amount of time (default 8 minutes). Prior to reverting, the device will sound an audible alarm. Reverting can be avoided if either of the keys is pressed within 20 seconds of the alarm.
This setting automatically reverts a transceiver, which was unintentionally left in SEARCH mode (after a search or an exercise), back to the SEND mode.
In case rescuers are buried in a second avalanche, this function allows them to be located using transceivers.

4.3 Analog Search Tone

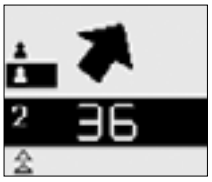
Just as in traditional analog transceivers, the analog tone is just received by one antenna. The change in the distance indication can therefore deviate from the change in tone volume. Depending on the relative orientation of the transmitter to the receiver, the tone volume and the distance indication may both decrease while approaching the buried subject.

4.4 Standard Mode

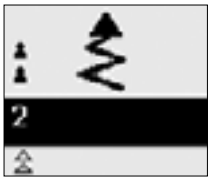
As soon as the device is switched to SEARCH, it is operating in standard mode. This mode **facilitates a rapid location** of a buried subject enormously.

SEARCH Mode

4.4.1 Transceiver Operation



The ◇-key is used to manually select a specific buried subject.



If none of the buried subjects are selected, the device displays the symbol for the primary search phase and advises you to search the avalanche for additional signals.

If you are in close proximity of a buried subject, you can mark that location by pressing the ○-key.

4.4.2 Search for a Single Buried Subject Using the Standard Mode

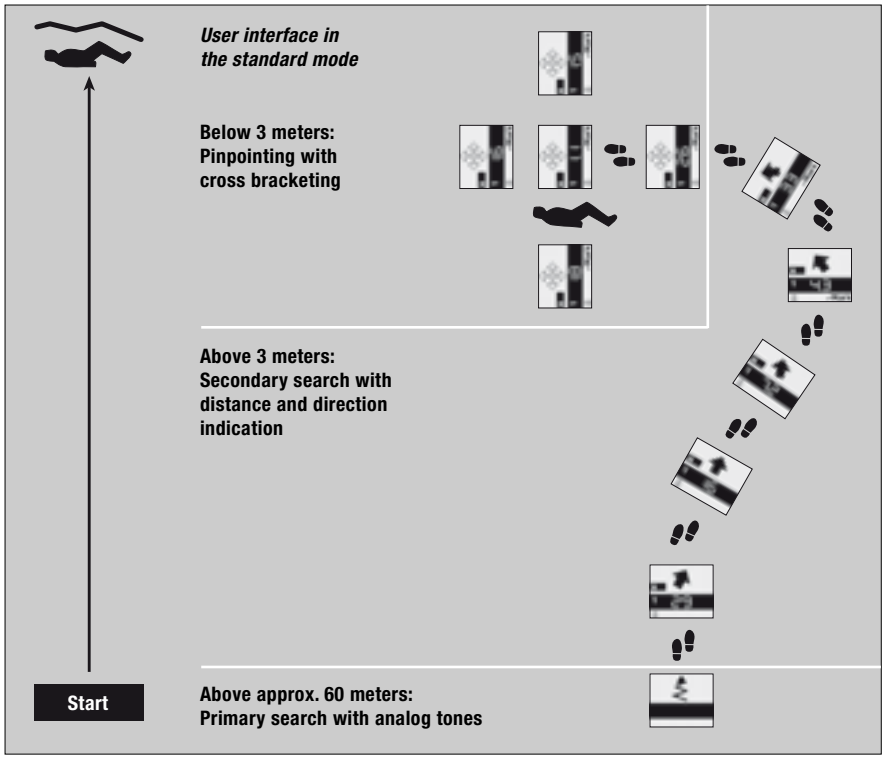
Coarse Search

The analog tone is the first signal that is received at long distance.

If the distance to the buried subject is less than approx. 60 meters, the distance and direction are displayed. The sensitivity (volume) of the receiver is adjusted automatically to optimize the processing of the signal. The distance can never be determined exactly. The numbers must be interpreted as relative distances. Whether the numbers are increasing or decreasing is more important than the absolute numbers. The closer you are to the transmitting device, the preciser the indicated distance is.

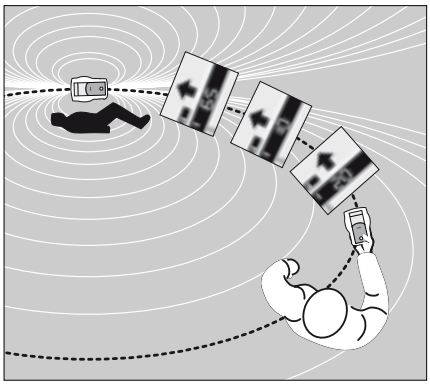
Hold the transceiver horizontally in front of you and proceed in the direction indicated by the arrow. If the distance increases, you are moving away from the victim. Continue the search in the opposite direction. The transceiver will lead you to the buried subject quickly and reliably.

Do not move backwards, otherwise the direction indication will be incorrect.


User interface in the standard mode
Below 3 meters: Pinpointing with cross bracketing
Above 3 meters: Secondary search with distance and direction indication
Start
Above approx. 60 meters: Primary search with analog tones

SEARCH Mode

Start the search at a high speed and reduce this speed as you close in on the buried subject. Operate the transceiver in a quiet and concentrated manner - avoid rapid movements. This way, you will reach the objective in the quickest and easiest manner!



Flux line search

Pinpointing

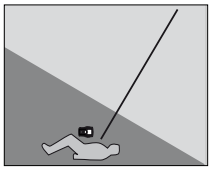
At this point, you must hold the transceiver just above the snow surface and determine the point with the smallest distance reading by bracketing. Within the pinpointing range, i.e. within the immediate proximity of the buried subject (<3 meters), the Barryvox provides you with a digital distance-dependant while pinpointing.

Use the avalanche probe to complete locating the buried subject (See chapter «Companion Rescue»).
A located subject should only be marked using the ✓-Mark function after his or her location has been verified using a probe pole!
Do not place the Barryvox on the snow surface again for this purpose!

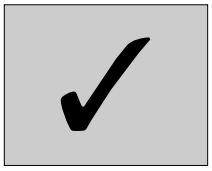
After marking a subject's location, the Barryvox searches for other possible burials, displaying the primary search symbol and advising you to search the rest of the avalanche (See chapter «Primary Search Phase»).

1.

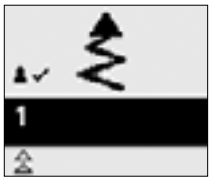
Hold the transceiver directly above the snow surface while pinpointing!

2. 

Exact pinpointing with the avalanche probe

3. 

Don't mark the location of a buried subject until the location has been confirmed using a probe pole! Do not place the Barryvox on the snow surface again for this purpose!

4. 

Search for further buried subjects

Erase Mark

A mark can be removed by selecting the buried subject with the ◇-key and selecting «Erase mark» with the ○-key. You can only remove the mark if you are in the immediate vicinity (<6 m) of the buried subject.

Deep Burials

If a buried subject is marked with a distance reading above 3 m, an additional safety dialog appears asking you to confirm the successful location of the subject. Marking a buried subject in more the 6 meters depth is not possible.

SEARCH Mode

4.4.3 Search for Multiple Buried Subjects Using the Standard Mode

In standard mode, the transceiver attempts to analyze all the detectable signals and to determine the number of buried subjects. This is possible, because all the signals from one transmitter display characteristics, which are distinguishable from the signals from other transmitters. The more unique the signal characteristics are, the more accurately the signals can be distinguished and located (pattern recognition). By automatically associating the signals with their respective sources, multple burial situations can be solved without applying specific search tactics.

List of Buried Subjects

The buried subjects are listed based on the distances.

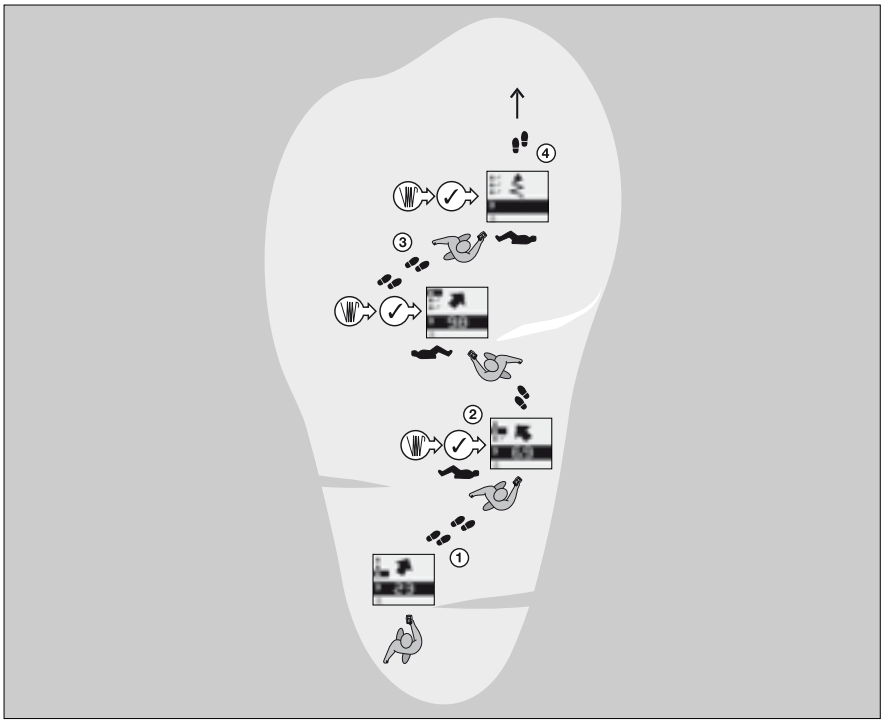
Procedure

1.
The device favors the closest subject first. Locate the various buried subjects using the transceiver and probe pole (Chapter «Search for a Single Buried Subject using the Standard Mode»).

2.
As soon as you mark an individual subject, the transceiver takes you to the nearest, unmarked buried subject.

3.
Continue this procedure until all subjects are located and marked.

4.
The rescuer now searches for additional buried subjects while the display shows the symbol for the primary search phase to indicate that the rest of the avalanche surface must be searched (Chapter «Primary Search Phase»).



Procedure for multiple burials

SEARCH Mode

Vital Data Display

If is not possible to locate and dig out all buried subjects at the same time, the buried subjects with higher chances of survival, indicated by the ♥ -symbol, should be located and excavated first.

You can find more information on triage criteria and vital data in the chapter «Triage Criteria and Vital Data». The actual prioritization of certain buried subjects over others is up to the rescuer.

4.4.4 Limitations

The larger the number of buried subjects is the more difficult and time-consuming the exact analysis of the situation gets, because of overlapping signals. The more signals there are, the longer the signal overlaps can last. The capability to automatically detect and isolate signals from multiple buried subjects is therefore limited.

Number of Burials

The calculated number of burials is displayed below the list of buried subjects. If the transceiver detects more signals than buried subjects in the list, a + sign is added behind the number.

Search Suspension

During the search for multiple subjects, signals may overlap making it impossible to analyze the signal of a single buried subject. If the signal overlap lasts several seconds, the rescuer has to interrupt the process temporarily to avoid deviating from the optimal search path. The PULSE Barryvox® will indicate the necessity to suspend the search by displaying the word «Stop». Stand still, and do not move until the word «Stop» disappears, at which time you can continue to search.

Analog Tone

Outside of the pinpointing range, the Barryvox always provides the analog tone allowing the rescuer to verify the number of signals detected by the device. Counting the number of different tones provides the number of buried subjects.

Backup Mode

If the rescuer detects problems with the analysis of a multiple burial situation, he or she can always switch to the backup mode (see chapter «Backup Mode»). The list of buried subjects is deleted at this time.

If the + sign appears for an extended period of time, this indicates that not all the buried subjects can be located using the standard mode. In this case, it is advised to switch to the backup mode.

4.5 Backup Mode

In the backup mode, the transceiver shows distance and direction to the subject with the strongest signal and provides an analog tone. **The manual mode is mostly used when a clear distinction of multiple burials is no longer possible in standard mode.** Switching from standard mode to backup mode is achieved by pressing both keys at the same time.

In backup mode, the direction indication always points forward, never backwards. Monitor the distance indication to ensure you are approaching the buried subject!

4.5.1 Multiple Buried Subjects in Backup Mode

If multiple burials are detected in backup mode, an icon symbolizing multiple burials is shown on the display . Additionally, you can also hear the analog tones. These are helpful in distinguishing the signals acoustically. The device favors the closest subject. The detection of multiple burials may vary based on the subject's orientation and distance relative to the rescuer.

Turn off the transceivers of the excavated subjects to facilitate the further search. If you don't know the number of buried subjects, you must search the entire avalanche path using the search patterns described in the chapter «Primary Search Phase».

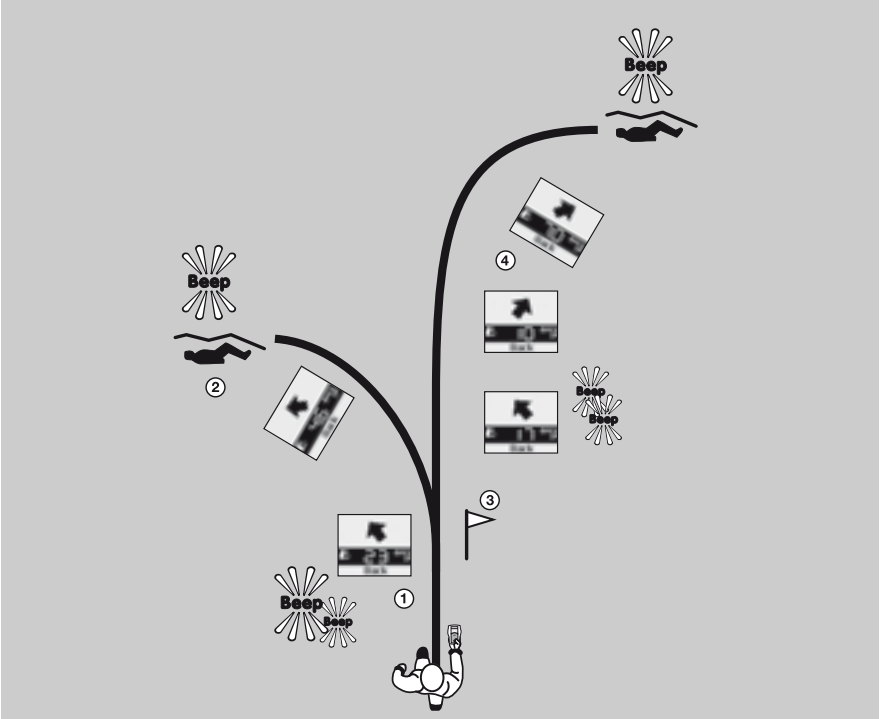
4.5.2 Search Tactics with Multiple, Widely Scattered Burials

1.
Mark the location on the avalanche where the «multiple burial» icon appeared on the display or where you left the primary search pattern.

2.
Search for the first buried subject using the information on the display along with the analog tones. Once this subject is located, you or other rescuers should dig him or her out immediately.

3.
Continue to search for other buried subjects by returning to the previously marked point.

4.
Strictly adhere to the primary search pattern and continue down the avalanche path until you are led to the next subject. Initially, the transceiver will want to take you to the previously located subject, because he or she is still the closest. Ignore these indicators until you notice that the transceiver is pursuing a new subject.



Search tactics with multiple, widely scattered burials in backup mode

4.5.3 Search Tactics with Multiple Burials in Close Proximity

The interpretation of the acoustic signals is extremely important in this situation. These must be interpreted in connection with the distance readings.

Example:
You hear three beeps and the distance reading jumps between 3.5 and 4.8 m. Therefore, three buried subjects can be expected within a radius of 5 m.

Search Using Micro Search Strips

If you have **multiple burials within less than 10 to 15 meters**, you search using **micro search strips**.

1.
Locate and dig out the first buried subject.

2.
Go back 3 meters and search the area in front of you in **parallel search strips**.

3.
As soon as the distance indication reads 15, you have reached the side of the search strip. Advance 2 to 5 meters and return on the next parallel search strip until this search strip ends as well (distance indication > 15).

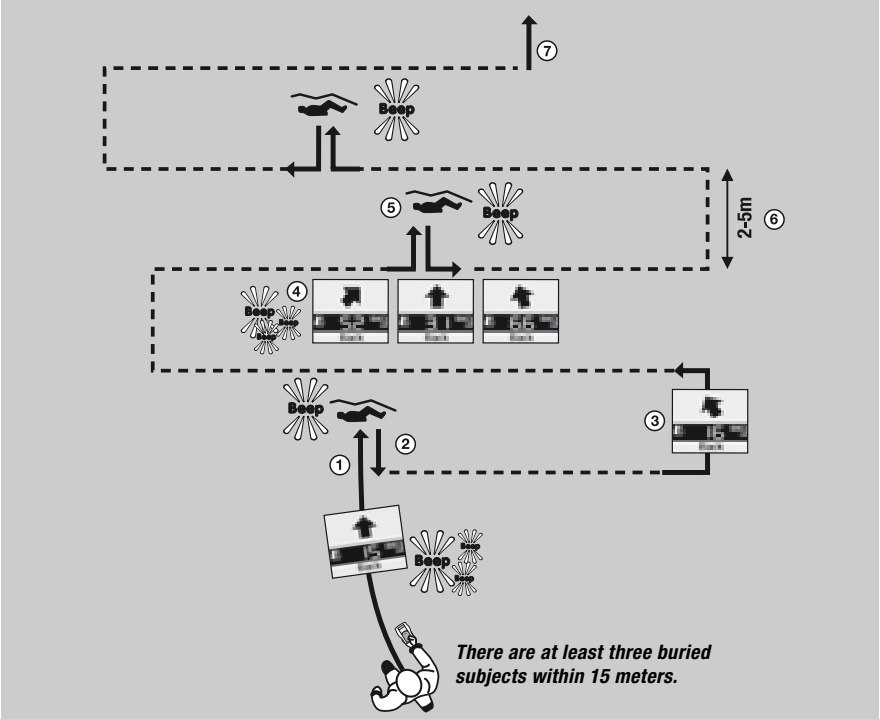
4.
Maintain the orientation of the transceiver during this phase and concentrate on the increase or decrease of the distance indication as well as the volume of the analog tones.

5.
At the point with the lowest distance reading, you leave the micro search strip pattern to pinpoint the buried subject through bracketing. Once the subject is located, you return to the location where you left off in order to continue the pattern.

6.
The more buried subjects there are and the closer these are, the tighter the micro search strip grid on the potential search area should be. As a rule of thumb, the search strip width should be between 2 and 5 meters.

7.
Continue the pattern, until the distance reading in an entire strip never drops below 15. Then revert to the primary search pattern and search the rest of the avalanche.

The avalanche probe is very helpful in locating multiple buried subjects in close proximity.



Search tactics with multiple burials in close proximity in backup mode

4.5.4 Further Search Methods

There are further methods to search for multiple buried subjects in close proximity.
One method uses concentric, circular search strips with radiuses of three, six, and nine meters around the first located subject. As with the micros search strips, the locations with the strongest signal strength are of interest. From there the subjects are located using a traditional bracketing method.

5. Advanced Features

5.1 Analog Mode

In the analog mode, the receiver sensitivity (volume) can be set manually. This makes acoustic searches possible, as conducted with traditional transceivers.

Buried subjects are located based on the acoustic change in intensity of the received signal. The use of this mode requires intensive training.

In analog mode, the direction indication always points forward, never backwards. Monitor the distance indication to ensure you are approaching the buried subject!

In order to be able to switch to the analog mode, you must enable it in the «Settings». **When the device is operated in the analog mode, the display can be disabled manually, in order to significantly increase the range. By pressing the ○ -key for + on volume level 8, the display is deactivated subsequently pressing the ◇ -key for – activates the display again.**
By activating the analog mode, an anlog tone is used for the group check, as well.

Once your Barryvox is configured accordingly, you can toggle between standard and analog mode by briefly pressing both keys at the same time.

Display in analog mode (on the second lowest volume setting)

The sensitivity of the receiver is initially controlled automatically.

The user can manually change the sensitivity by pressing the ○ -key for + and the ◇ -key for –. A1 represents the shortest, A8 the greatest distance to the buried subject.

As soon as the volume is set manually, a border is displayed around the volume bar. The automatic volume control is disabled. If the volume is set too high or too low, the distance and direction indications become unreliable, and a blinking display prompts the user to adjust the volume.

To return to the standard mode, both keys must be pressed simultaneously.

Orthogonal Search System (Secondary Search Phase)

Orthogonal search system with manual selection of the receiver sensitivity:

1.
Maximum tone
Search for the loudest tone on a straight line.

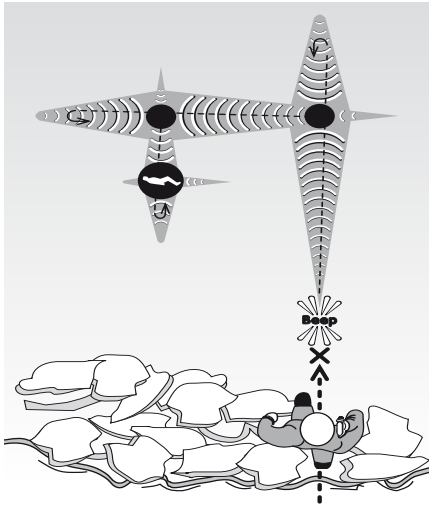
2.
Reduce volume
Reduce volume until the tone is barely audible.

3.
Turn 90°
Search at a 90° angle to the previous direction.

Advanced Features

Remember

- Hold the transceiver vertically.
- Search quickly.
  The volume only changes
  if you are moving.
- Search quietly.
  This way you can detect
  differences in volume easier.

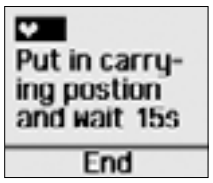


5. 2 Vital Sensor Test

The PULSE Barryvox® uses a highly sensitive motion sensor to detect vital data in buried subjects.

To test the vital sensor, switch the transceiver from OFF to SEND and press any key. The confirmation «activated» appears at the bottom of the screen. Wait until the group check appears. Press the ◇-key once to get to the menu item «Vital Sensor Test». Confirm your selection by pressing the ○-key.

Position the transceiver the way you will be carrying it in the outdoors. (It is imperative to use the same clothing!) Lay yourself on the floor so that your body presses the Barryvox downwards and avoid any intentional movements.

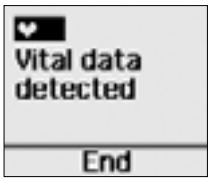


Interpretation of the Test Results:

No tone:
The transceiver cannot detect any vital data.

Slow series of tones:
Vital data are being detected.

Rapid series of tones:
The sensor is detecting extensive motion, as experienced in ascent or descent. Avoid any movement to test the vital data detection reliably!



The current status is constantly displayed during the vital data test.

5.3. Settings

The default settings of the device are configured optimally for normal use. Advanced and professional users have the possibility to activate additional functions and customize the Barryvox to their needs

Most customizable features make the Barryvox a sophisticated device. You should only change the default settings if you have a specific reason to do so.

To access the «Settings», switch the transceiver from OFF to SEND and press any key. The confirmation «activated» appears at the bottom of the screen. Wait until the entry «Group Check» appears. Press the ◇-key, twice to get to the menu item «Settings». Confirm your selection by pressing the ○-key.

See the menu overview on the inside of the cover.

Advanced Features

5.3.1 Language

This setting allows you to select the language of your transceiver's user interface.

5.3.2 Analog Mode

In the analog mode, the receiver sensitivity (volume) can be set manually. By activating the analog mode, an anlog tone is used for the group check, as well.

5.3.3 Audio Support During Pinpointing
(< 3 Meters)

During the pinpointing phase, the search can be supported with an acoustic tone, which leads you in the right direction. Rescuers who prefer always to hear the analog tone can disable this feature.

5.3.4 Pinpoint View (< 3 Meters)

Within pinpointing range, the Barryvox supports you with a cross symbol for bracketing, which allows for user-friendly pinpointing. Users who are very familiar with the flux line pattern in close proximity of the transmitter and prefer to see the direction arrow can disable this feature.

5.3.5 Auto-Revert to SEND

Auto-revert to SEND switches the transceiver from SEARCH mode to SEND mode if there is no user interaction or major motion for a specific amount of time. The default setting of 8 minutes is appropriate for most users. Only change this setting if you have an important reason to do so. The setting is critical for your personal safety! If you disable this setting, you will always see the warning symbol in SEARCH mode.

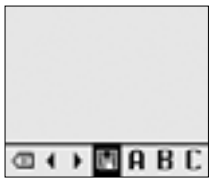
5.3.6 Vital Data

Your PULSE Barryvox® detects your vital data while you are buried and transmits these via the W-Link radio connection to the rescuers (default setting). In SEARCH mode, the Barryvox displays the vital status, provided the sender has enabled the W-Link and the ability to transmit vital data.
If you do not wish to have these data transmitted, you can disable this feature. Only change this setting if you have an important reason to do so. This setting can affect your chances of survival in a complete burial situation as well as those of buried subjects you are searching for.

5.3.7 Owner

The Barryvox allows you to enter your name, address, and other information, such as your phone number or email address. This information is displayed every time the transceiver is turned on, so that the owner can be identified immediately anytime. We recommend that you enter this information.

By pressing the ◇-key briefly, the cursor on the bottom line moves to the right. By pressing the ◇-key longer, the cursor moves to the left. Pressing the ○-key confirms your selection.



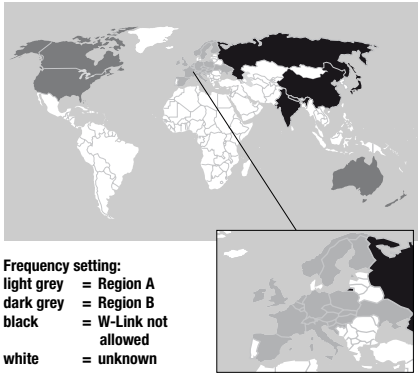
Beware of the meaning of the following icons:

- **New line**
- **Move cursor to the left**
- **Move cursor to the right**
- **Backspace**
- **Save and exit**

Advanced Features

5.3.8 W-Link

The PULSE Barryvox® uses a W-Link radio transmission. Different countries have varying frequency regulations. The following world map shows the frequencies used in the individual countries. **Note that specific frequencies may not be used in certain countries. The frequency is factory set depending on the country of sale. The manufacturer declines all liability in the case of after-sale frequency modifications.**

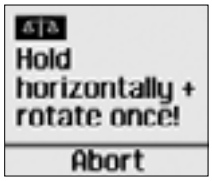


Frequency setting:
light grey = Region A
dark grey = Region B
black = W-Link not allowed
white = unknown

5.3.9 Calibrate Compass

The electronic compass provides a rapid adjustment of the direction indicator and extends the display range to 360 degrees.To function properly, the compass must be calibrated. The need to calibrate the compass is automatically detected when the batteries are replaced. This is, however, not the case if you travel a long distance.

Rotate the horizontal transceiver slowly and with constant speed around its axis until the message «Compass calibrated» appears.



5.3.10 Maintenance

Various pieces of information can be displayed, such as the date of the next check as well as the software (SW) and hardware (HW) version.

5.3.11 Reset Device

The function «Reset device» allows you to restore all the default factory settings. All modified settings as well as owner data are lost.

6. Additional Information

6.1 Tone-only Mode (TOM)

If the display is defect, you have to search using the tone-only mode. Turn the transceiver off. Press both keys while turning the transceiver back on. The sensitivity of the receiver can be manually adjusted by using the ○ -key= + and ◇ -key = –. The analog tone is used to locate buried subjects.

6.2 Earphones

The use of earphones in avalanche rescue is especially advantageous in high-noise environments (wind, helicopters, etc.).
Standard (Walkman) earphones can be used. As soon as earphones are plugged in, the internal speaker is muted so that other rescuers are not disturbed.

Additional Information

6.3 Use in the Dark

If you use the transceiver in the dark, the display is automatically backlit.

6.4 Test and Configuration Adapter

There are various test and configuration adapters available for the PULSE Barryvox®, which allow advanced functions to be configured or restricted. Test, configuration, and update capabilities via the W-Link make the PULSE Barryvox® the ideal choice for fleet use.

6.5 Maintenance and Repair

Barryvox transceivers, which do not function correctly, despite full and properly inserted batteries (e.g. problem listed under troubleshooting, no signal during the group check, mechanical defects) must be sent to a service center listed on the inside of the cover.

6.6 Periodic Checks

To ensure the proper functionality of the transceiver, it is highly recommended that you send your device to a service center listed on the inside of the cover once every three years for a functional test. There is a service charge involved. **This functional test is far more comprehensive than the self-test or group check**. Preferably, you will have the periodic check conducted during the summer months, so that your Barryvox is ready at the beginning of the winter season. The recommended date of the next check can be viewed under «Maintenance».

6.7 Troubleshooting

Error message / failure description	Solution
Transceiver doesn't turn on / No self-test at startup	1. Check and replace batteries. 2. If this doesn't help, the device must be repaired.
Device malfunction!	1. Turn the transceiver off for 1 minute and turn it back on. 2. If this doesn't help, the device must be repaired.
Battery empty! Empty battery icon	The batteries must be replaced as soon as possible. Refer to the instruction in the chapters «Insert / Replace Batteries» and «Battery Level Indicator».
457 SEND failure! SEND LED doesn't blink	1. Make sure that no metal objects or electronic devices are close to the transmitter. 2. Check and replace batteries. 3. If this doesn't help, the device must be repaired.
457 SEARCH failure!	1. Make sure that no metal objects or electronic devices are close to the transmitter. 2. Turn the transceiver off for 1 minute and turn it back on. 3. If this doesn't help, the device must be repaired.
g-sensor failure!	1. Turn the transceiver off for 1 minute and turn it back on. 2. If this doesn't help, the device must be repaired.
W-Link failure!	1. Turn the transceiver off for 1 minute and turn it back on. 2. If this doesn't help, the device must be repaired.
Compass failure!	1. Make sure that no metal objects or electronic devices are close to the transmitter. 2. Turn the transceiver off for 1 minute and turn it back on. 3. If this doesn't help, the device must be repaired.

Additional Information

6.8 Warranty

There is a 5-year warranty on the Barryvox transceiver (excluding the batteries, the carrying system, and the wrist loop) from the date of purchase shown on the purchase receipt. In case of a warranty claim, all parts that can be shown to have material or production defects will be replaced free of charge. Damage that can be traced to incorrect handling or normal wear and tear is excluded. The warranty is voided if the buyer or any non-authorized third party opens the device. This is also the case for devices that have been used with spare parts or accessories, which are not original and are not recommended by the manufacturer. A fee will be charged for the diagnostic test of a transceiver not needing any repair. Warranty repairs do not extend the duration of the warranty. There is a six-month warranty on spare parts. Warranty repairs will only be conducted if the device is sent in along with the receipt. The owner will be charged for the shipping. The manufacturer explicitly excludes any additional warranties or liability for immediate and consequential damage.

6.9 Technical Data

Transmitter frequency	457 kHz (International standard)
W-Link frequency	Region A: 869.8 MHz Region B: 916 – 926 MHz Frequency setting see chapter «5.3.8 W-Link»
Power supply	3 x IEC – LR03 1.5 V Alkaline (AAA)
Initial set of batteries	Duracell Ultra M3 Alkaline
Battery life	min. 200 hr
Maximum range	Normally 60 m in standard mode, 90 m in analog mode
Search strip width	50 m The search strip width has been calculated based on the method Good
Operating temperature range	–20° to +45° C
Dimensions (L x W x H)	113 x 75 x 27 mm
Weight	210 g (incl. batteries)
Earphone jack	for standard Hi-Fi earphones
The PULSE Barryvox® complies with the EN 300718 standard	

6.10 Approval / Conformity (see also chapter «Declarations of Conformity»)

Manufacturer	Ascom (Switzerland) Ltd	Type	PULSE Barryvox®	
Country of origin	Switzerland	Code number	CE0560 ⓘ	N11394

USA/Canada

IC: 6628A-PULSE

FCC ID: UD9PULSE-B-462002

This device complies with part 15 of the FCC Rules and RSS-210 of industry Canada.

Operation is subject to the following conditions:

1. This device may not cause (harmful) interference, and
2. This device must accept any interference received, including interferences that may cause undesired operation of the device.

All information provided without liability. Status July 2006. Technical data and specifications are subject to change without notice in future transceivers.

Companion Rescue

7. Companion Rescue

Companion rescue means that buried subjects are located and excavated by members of their party immediately after the avalanche slide. Avalanche rescue is a race against time! While most buried subjects can be rescued within the first 15 minutes, the chances of survival decrease rapidly afterwards. Companion rescue, therefore, provides the greatest chances of survival for a buried subject.

7.1 If an Avalanche Occurs

As a Victim:

- Escape to the side
- Discard skis, snowboards, and poles
  ➜ anchor effect
- Try to stay on top
- Close your mouth; place your hands in front of your face
  ➜ clear airway when the avalanche stops

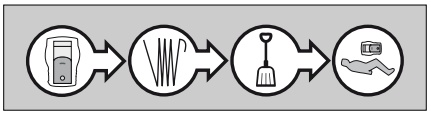
Separate instructions apply for the use of specialized safety equipment, such as the highly efficient avalanche airbag.

As a Witness:

- Memorize the last seen point as well as the direction of the avalanche
  ➜ primary search strip
  (See chapter «Primary Search»).

7.2 Rescue Equipment

Carrying the proper personal safety equipment is critical for effective companion rescue. A transceiver, a shovel, and a probe pole are necessary to localize and excavate a buried subject quickly and efficiently. Mammut offers a variety of suitable probe poles and shovels.



The use of the transceiver precedes the use of the probe pole and the use of the probe pole precedes the use of the shovel.

Carrying a radio or a mobile phone to call for help is highly recommended.

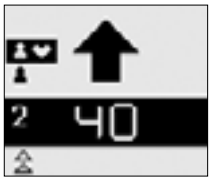
7.3 Emergency Plan

The emergency plan shows the elementary steps for a successful companion rescue.
Depending on the situation at hand, the procedure must be adapted.

7.4 Triage Criteria and Vital Data

7.4.1 Triage

With limited resources (few rescuers) it is not possible to locate and dig out all the buried subjects at the same time. The question arises in which order the buried subjects shall be rescued. **Subjects with higher chances of survival should be located and dug out first.** Besides simple terrain factors, e.g. drop over a cliff, the burial depth and vital data are an important triage criteria.



7.4.2 Vital Data Detection

The PULSE Barryvox® contains highly sensitive sensors (g-sensor) that can detect slight motion of the body, such as a pumping heart or breathing lungs. Any motion within a certain maximum lag time is interpreted as vital data. The buried subject belongs to the category ❤ with high chances of survival. It can be assumed that buried subjects, which have survived the first 35 min, are still able to breathe (air pocket), and therefore have increased chances of survival. At the same time, the detectability of vital data decreases due to hypothermia. Therefore, buried subjects who have transmitted vital data for the first 35 min are considered to belong to the category ❤ with high chances of survival for the rest of their burial duration.

All the buried subjects, whose transcievers are technically not capable of detecting vital data or cannot detect any for whatever reason, belong to the category 👤 with unknown chances of survival.

If you carry the transceiver in a trousers pocket, the detection of vital data is due to the almost inexistent movements not possible.

The data are displayed on the buried subject's transceiver and also sent across the W-Link radio connection to the transceivers of the rescuers. Based on the list of buried subjects, the rescuer decides in which order he or she will locate them and dig them out. Using vital data as a triage criteria shortens the burial duration for those subjects having ❤ higher chances of survival. This improves the overall rescue efficiency.

The vital data do not provide an assessment of the health of the buried subject. They do not substitute an assessment by medically trained personnel (physician).

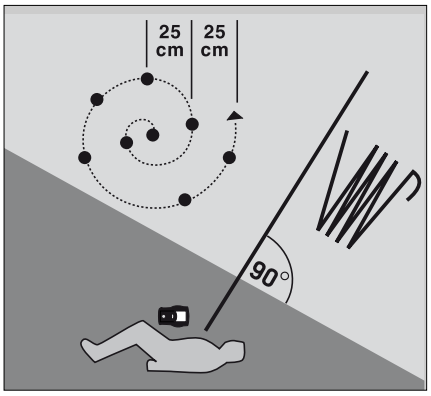
Only rescuers using a transceiver with a W-Link radio connection are able to receive vital data.

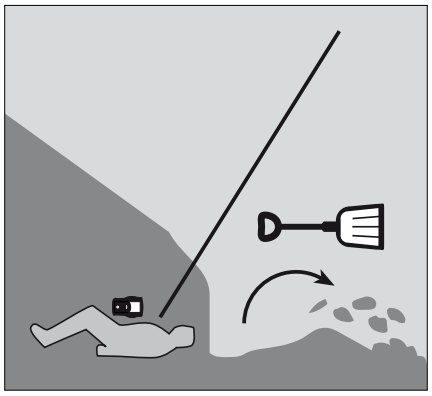
The range of the W-Link depends on terrain and body interference, on the physical characteristics of the avalanche debris as well as on the orientation and distance to the buried subject. **The range of the W-Link is therefore limited.**

7.5 Pinpointing with Transceiver and Probe Pole

Pinpointing the location of a buried subject is not possible with a transceiver alone. The burial depth and the orientation of the subject can be determined easily and quickly with a probe pole. Starting at the point with the lowest distance reading or loudest tone, apply a spiral search pattern. Always probe at a right angle to the snow surface.

If the buried subject is hit with the probe pole, the pole is left in the snow. It serves as a guide while excavating the buried subject.
The burial depth is also a triage criterion. In situations with limited resources deep burials are located later.

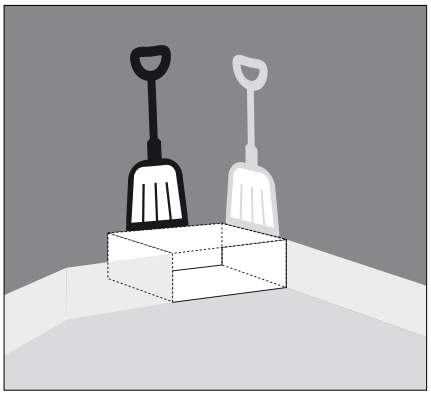


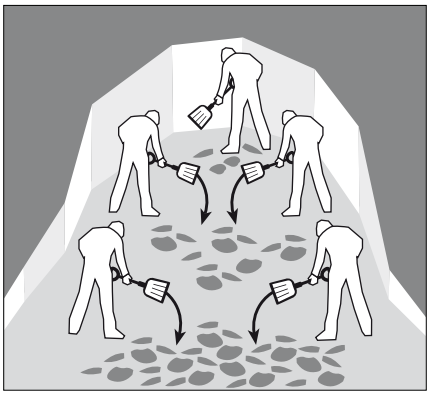


7.6 Rescue – Excavating the Buried Subject

Size the area to be dug out generously. Pay attention to the presence of an air pocket and avoid trampling on top of the buried subject. Access the buried subject laterally. Digging must be practiced as well. It takes by far the most time.

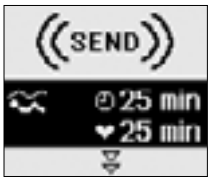
Cut out blocks of snow with the shovel. The lead shoveler of the group should be relieved from time to time. Rotating clockwise at given intervals is easiest.





7.7 Burial and Vital Duration

In case of a burial, the transceiver records the burial duration and detects vital data.



Burial duration: 25 min
Vital data:
entire burial duration

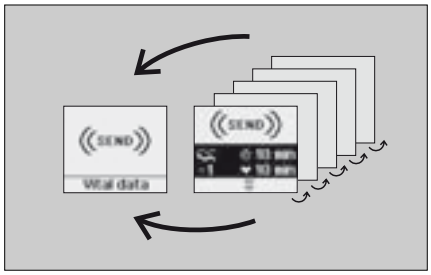
Burial duration: 47 min
Vital data: first 22 min

The Barryvox automatically displays the burial duration as soon as the transceiver stops being moved. The burial duration is displayed in hours and minutes along with the time during which vital data was detected. The display of the burial duration is also activated, if the Barryvox stops moving outside of an avalanche.

By pressing any key in the SEND mode, you can recall the burial data of the five last resting periods of the transceiver. The resting periods are numbered:

-1 most recent resting period
-2 second last resting period
-3 third last resting period
-4 fourth last resting period
-5 oldest resting phase

The current resting phase is not numbered.



In multiple burial situations, the transceiver of a rescued subject should be turned off as soon as possible.

7.8 First Aid

Patient assessment, ABCs, and Basic Life Support

A Airway?
Clear the airway (snow?)
B Breathing?
Perform rescue breathing as necessary
C Circulation
Perform CPR as necessary

Basic Life Support

- Depending on ABCs, continue rescue breaths or CPR on patient.
- Prevent further heat loss.
- If patient is responsive and can control his/her airway, administer warm fluids
- Handle patient very gently.
- Evacuate by helicopter whenever possible.

7.9 Notification

It is not possible to provide a complete list of all mountain and helicopter rescue services in this manual. Please inform yourself prior to your trip about the local rescue services and their phone numbers and radio frequencies.

Message:

Who – is calling?
What – happened?
Where – is the accident site?
When – did it happen?
How many – casualties (nature of injuries) / how many rescuers?
Weather – at the accident site?

Alpine Distress Signal

If you cannot call for help using a radio or phone, you should try to communicate the emergency using the alpine distress signal.
We need help 6x/minute
Help is on the way 3x/minute

In visual contact with a helicopter:

Help!

No help needed!

Introduction to Avalanche Theory

8. Introduction to Avalanche Theory

We would like to provide you with some basics on this complex topic and recommend thorough initial and ongoing advanced avalanche training.

The Slab Avalanche: The Set Trap

Most winter outdoor travelers trigger their own avalanches. The snowpack is fragile. Slab avalanches resemble set traps: If we trigger it, the trap snaps. Remember that a small slab of 100 m^3 weighs about 25 tons!

8.1 Hazard identification

Very critical weather situations

The avalanche danger increases rapidly after storms with new snow, wind, and cold temperatures. Slopes with wind-drifted snow are especially dangerous! Snow can also be moved by wind during nice weather. The first nice day after a snow event is particularly dangerous. Most accidents occur when a cold front with strong winds and snow moves in after days of blue skies and cold temperatures! In this situation, new snow amounts of 10 – 20 cm can constitute a critical situation that can last several days.

Rapid and strong warming (downslope wind, rain) can also cause an increase in avalanche danger, which decreases again with falling temperatures. If the snowpack is uneven and weak, the danger is hard to perceive. This is often the case with shallow snow packs in the beginning of winter or during periods of little precipitation. In spring, the danger usually increases as the day progresses: from low in the morning following a clear night to considerable in the afternoon.

8. 2 Risk Assessment

Critical amounts of new snow
With the following amounts of new snowfall within 1 – 3 days, the danger level is at least CONSIDERABLE:
10–20 cm with adverse conditions
20–30 cm with average conditions
30–50 cm with favorable conditions

Adverse conditions
- Strong wind (> 50 km/h)
- Low temperatures (< -8° C)
- Slope seldom traveled

Favorable conditions
- Light wind
- Temperatures little below 0° C
- Slope traveled frequently

Humans as Trigger of the Trap

The steeper and more shaded the slope is, the greater the likelihood of releasing a slab avalanche. The likelihood increases with large groups without spacing, frequent turns, and especially with falls or jumps over cornices or other shock loading. Remote triggering is possible starting with the danger level CONSIDERABLE, i.e. the person triggering the avalanche can be standing dozens of meters outside of the fracture zone. This is fatal at the bottom of a slope, because the entire slope above can be released!

Note: Light forest (with trees far apart enough to ski or ride through) will not protect you from slab avalanches. Even rock outcroppings will not prevent the release of slab avalanches.

8.3 Precautions

8.3.1 Standard Safety Precautions

The following standard safety precautions should always be taken regardless of the danger level:

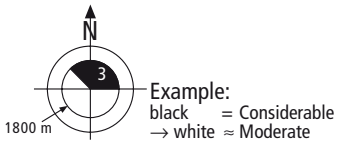
- Avalanche transceiver on SEND, along with a probe pole and shovel
- Avoid fresh wind-deposited snow
- Consider daily fluctuations in temperature, especially in the spring
- Constantly assess the conditions throughout the trip

Introduction to Avalanche Theory

8.3.2 Minimize Stress on the Snowpack

Adequate spacing is an effective method to minimize stress on the snowpack. Ascending, the spacing should be approximately 10 meters; descending approximately 30 – 50 meters, due to the additional stress. Danger zones should be traveled one person at a time. Minimize the stress on the snowpack by making long turns. Avoid jumping!

8.3.3 Renunciation in the Terrain
(Basic Reduction Method, W. Munter)



Danger Level	Skiable/ridable slope angle
2-Moderate	less than 40 degrees
3-Considerable	less than 35 degrees
4-High	less than 30 degrees

- Untracked steep slopes (> 30 degrees):
  ➜ spacing of at least 10 m.
- Outside of the forecasted aspect or altitude ranges:
  ➜ the danger level is generally one level lower.
- At the edge of the forecasted aspect or altitude ranges:
  ➜ Do not approach the limits

8.4 Avalanche Forecast Centers

It is impossible to publish a list of all the avalanche forecast centers in this user manual.

Current information about all the avalanche forecast centers worldwide can be found at the CyberSpace Avalanche Center website at http://www.csac.org

8.5 International Avalanche Danger Scale

Danger Level	Snowpack	Typical Indications	Tours
❶ LOW	Snowpack generally well bonded.	None.	Generally favorable conditions.
❷ MODERATE	On some steep slopes snowpack only moderately bonded.	Difficult to recognize. No alarm signals.	Generally favorable conditions. Careful choice of route on steep slopes of aspect and altitude as given in the avalanche forecast.
❸ CONSIDER-ABLE	On many steep slopes medium to poor snowpack. bonding only.	«Whumphing» noises. Some spontaneous ava-lanches. Remote triggering at the foot of slopes.	Partly unfavorable conditions. Experience in assessing avalanche risk required. Wherever possible avoid steep slopes of aspect and altitude as given in the avalanche forecast.
❹ HIGH	Poor bonding of snowpack on most steep slopes.	Spontaneous avalanches. Remote triggering.	Unfavorable conditions. Tours only in moderately steep terrain < 30°. Be aware of avalanche runout zones.
❺ EXTREME	Generally poor bonding of snowpack, mostly unstable.	Spontaneous avalanches avalanches and remote triggering on a large scale.	Very unfavorable conditions. Refrain from tours.

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Declarations of Conformity

R&TTE Declaration of Conformity

Hereby,

Name of manufacturer:	**Ascom (Switzerland) Ltd**
Address:	**Eichtal**
City:	**CH-8634 Hombrechtikon**
Country	**Switzerland**

declares that this equipment:

Product description:	**Avalanche Beacon**
Type designation(s):	**PULSE *Barryvox* ®**
Trademark:	**Mammut**

is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Date:	**19. Juli 2006**	
City:	**CH-8634 Hombrechtikon**	
Name:	**Peter Bollmann**	**Martin Baumann**
Signature:		i.V. M. Baumann

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.