RECCO®
ADVANCED RESCUE TECHNOLOGY

R9

DETECTOR

QUICK GUIDE
RECCO THEORY &
SEARCH METHODS

Be searchable

RECCO THEORY

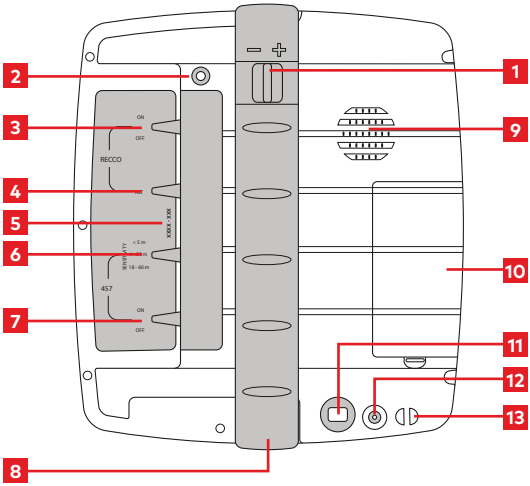
RECCO THEORY **PAGE**

SEARCH METHODS

SEARCH METHODS PAGE

RECCO THEORIE

1. RECCO R9 DETECTOR CONTROLS



1. RECCO power control
2. Blue LED light
3. RECCO on/off
4. ALT (channel) switch
5. Serial number
6. 457 Sensitivity
7. 457 ON/OFF
8. Handle
9. Internal speaker
10. Battery
11. Headphone jack
12. Charging port
13. Security strap holder

2. RECCO R9 DEDECTOR

- Charging time: 2 hours
- Operating time: 2 hours
- Battery life: 5 years / 400 charging cycles
- Battery warning: Short beep = change/recharge battery immediately

2.1 BATTERIES

The R9 Detector uses a lithium-ion battery pack which provides fade free power for its entire run time. This means power from the battery will drop from full to zero once the full charge has been drained. An audible warning alerts the operator when battery needs to be recharged.

Batteries should be checked on a regular basis according to the detector check form.

Additional batteries can be purchased from RECCO AB.

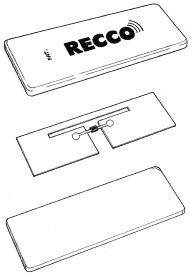
2.2 CHARGING

After every use, plug the R9 Detector back onto its charger. To restart the charging process, flip the RECCO On – Off switch from off to on for about 1 to 2 seconds and then back to off. This ensures the battery accepts a maximum charge.

Charging Status
Red LED light indicates charging mode.
Green LED light indicates charging complete.

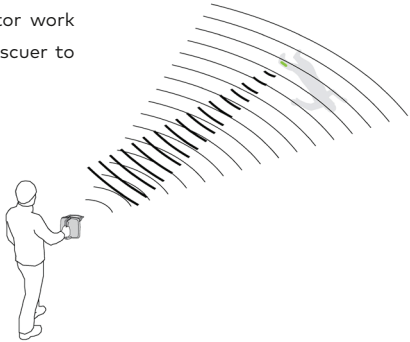
3. RECCO REFLECTOR

- Diode fixed to a copper antenna, molded into plastic.
- Passive — no battery.
- Virtually unlimited lifespan — no maintenance.
- Works with all RECCO detectors.



4. RECCO TECHNOLOGY

The detector's directional antenna uses harmonic radar to generate a directional signal. The detector and reflector work together to direct the rescuer to reflector's exact location.



5. RECCO BASICS

5.1 RANGE

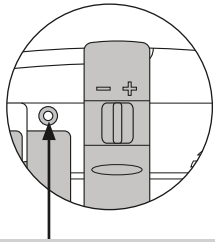
Relative affects on range caused by different mediums.

Air	up to 120 m
Snow - dry	up to 20 m
Snow - wet	up to 10 m
Water	up to 0.2 m

5.2 FACTORS AFFECTING RANGE

POWER

When turning on the detector the default power level is always at full power.



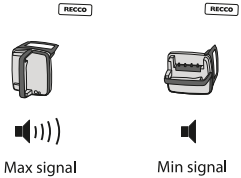
- Steady blue LED indicates full power.
- Click the +/– slider to adjust power level.
- Flashing blue LED at less than full power.

Only the latest version of detectors indicate a low power level by a flashing blue LED.

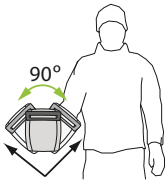
POLARISATION

The RECCO system is polarized to achieve the best signal.

When the antenna is parallel with the reflector the range and signal are at maximum.

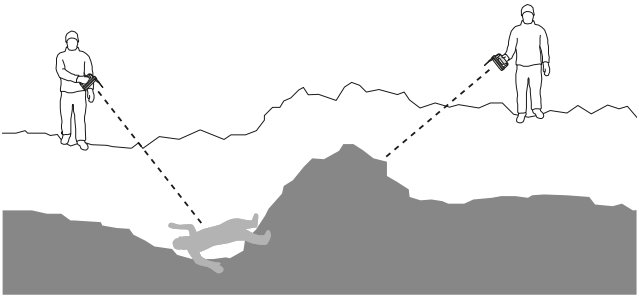


Therefore, rotate the detector slightly from side to side to seek the maximum signal.



TERRAIN AND DEBRIS OBSTACLES

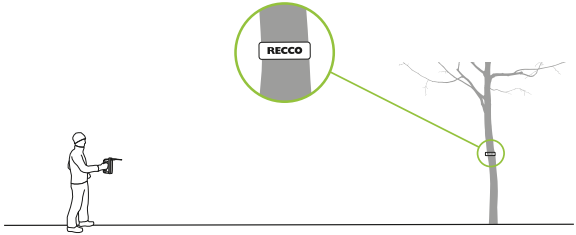
Differences in the buried terrain and the irregular surface of the debris can mean different depths of snow to search through.



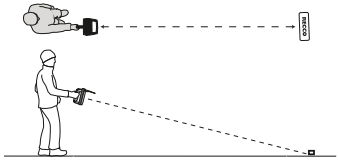
5.3 DETECTOR FUNCTION CHECK

Prior to the start of winter and during the winter, routinely check the detector's range and battery.

RANGE CHECK



80+ m with reflector 1.5 m above the ground



10+ m with reflector on ground

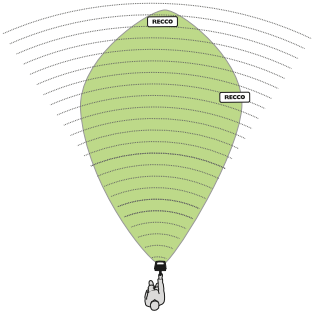
BATTERY CHECK

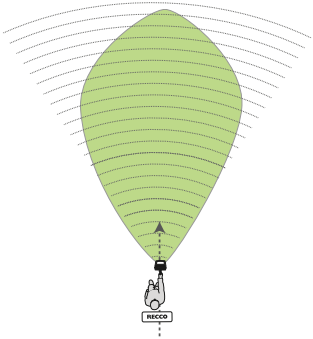
The battery should operate for about 2 hours at temperatures below zero (0°C) before the low battery alert sounds.

Refer to the detector check form.

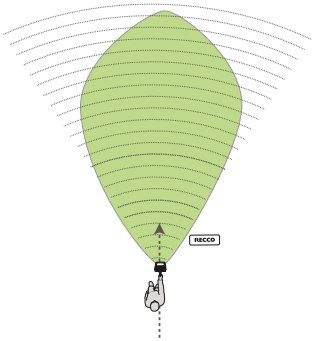
5.4 DETECTION ZONE

The detector's area of best detection is basically a diamond-shaped area. At distance the signal is very directional. Closer to the detector the signal is less directional; a reflector can be off to one side.

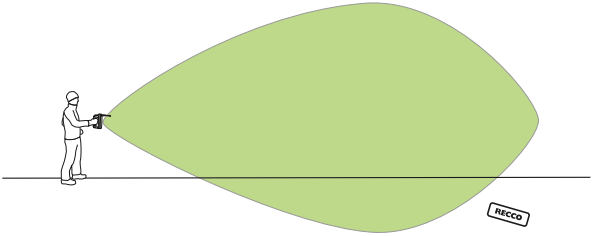




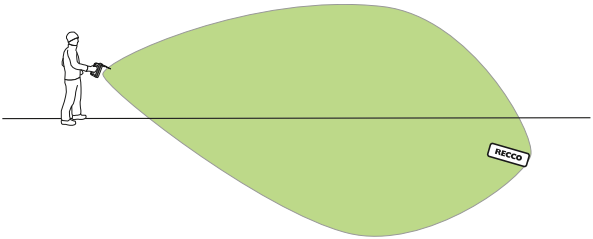
The signal can be lost either because the operator moved past the reflector, or when the signal cone is no longer pointed at the reflector.



The detection zone shape is 3-dimensional, and its vertical shape is similar to its horizontal shape.



Be sure to aim the detector toward the snow to get the best combination of signal range and signal depth.

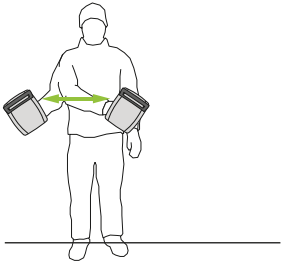


5.5 DETECTING A RECCO SIGNAL

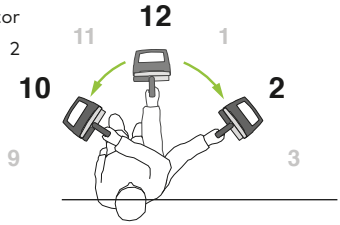
There are three key detector movements that are used to detect and follow the RECCO signal.

SWEEP

The sweep movement is anytime the detector is moved from side to side. The sweep is used to detect the signal and to establish direction.

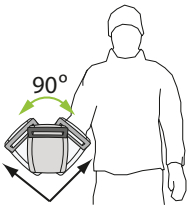


Typically the detector operator sweeps from the 10 to 12 to 2 o'clock positions.



ROTATE

The rotate movement is used to detect the best signal.
Detector orientation is rotated from 45° to the right and then 45° to the left (90° total).

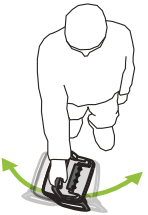


TURN

The turn movement is a slight turn of the wrist

The turn is used to to re-aim the detector's signal cone back to the reflector when the signal has initially been lost.

When the signal has been lost – and power was not changed:
stop, turn only your wrist slightly to point detector to both sides (left and right) and ahead and behind to regain the signal and the final direction to the reflector.



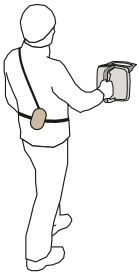
Check to see if the signal is in front or behind you.

5.6 REFLECTORS ON DETECTOR OPERATOR

Reflectors on rescuers provide rescuers with an important back-up rescue system, and detector operators can have reflectors. Some uniforms have removable reflectors.

Moveable reflectors may be removed, or moved to the operator's back. If producing a distracting signal, use a RECCO Shield or Vest.

Fixed reflectors (boots, clothing, helmets, etc.) should be covered by a RECCO Shield.



An avalanche transceiver with an integrated reflector should be worn snuggly against one's back.

6. DISTRACTING SIGNALS

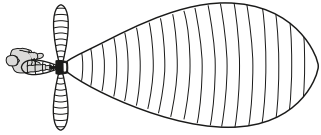
Do not attempt to search if you are immediately receiving a RECCO signal. This signal is likely coming from something on you or from close by rescuers. You need to identify and eliminate distracting signals before searching.

6.1 SOURCES

Weaker signals are also sent out to the rear and sides, which may result in distracting (false) signals from radios, cell phones, GPS units, cameras, transceivers, car keys, and reflectors. Mixed metal objects – locking carabineers, keys, multi-tools, ice screws, boot buckles, etc. may create a weak RECCO signal.

Therefore, the operator should move offending devices and gear to one's back, or shield with RECCO Shields or Vest. Or if not needed, remove and leave behind.

Be alert for nearby rescuers possibly wearing reflectors. Keep these rescuers behind the operator and use your body as a shield, or do not aim the detector toward these rescuers.



Arrive early. The earlier the detector arrives on site, typically the less distracting signals experienced.

With well organized rescuers on the avalanche field a combined search with RECCO detectors and probing team is possible.

6.2 MANAGING DISTRACTING SIGNALS

The following five techniques will minimize distracting RECCO signals in all situations.

- **Manage: Keep rescuers behind the operator.**
- **Aim: Aim the detector downwards into the snow and away from other rescuers.**
- **Position: Keep your body between the detector and rescuers. Wear your transceiver and other electronic devices on your back. The closer and more secure to your back, the better. If interference continues, shield the device.**
- **Shield: If necessary, cover the device or reflector with a RECCO Shield or Vest. These products are made from special electromagnetic shielding fabric that blocks the RECCO signal but does not block the 457kHz transceiver signal.**
- **Train: The more time training in situations that cause interference, the better prepared you will be on real rescues.**

SEARCH METHODS

1.1. BASIC SEARCH

5 SEARCH PHASES:

1.1 PREPARATION

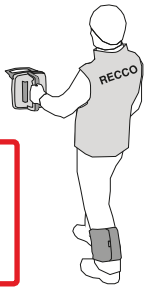
Goal: To identify and manage distracting signals so you are quiet when searching.

Move 10–15m away from others to avoid potential distracting signals.

At full power point the detector towards the sky or toward an open area and you should hear only static. If you hear a RECCO signal, investigate. It is likely a distracting signal on your person.

Self Scan

- Reduce power to lowest level and then increase power 2 steps (clicks.)
- Perform a self scan from head to toe to identify personal sources of distracting signals.
- Eliminate distracting signals by moving devices (transceiver, GPS, radio, etc.) to your back, covering with RECCO shields or vest, or removing and leaving behind.
- When aiming the detector on max power toward a clear horizon and have no distracting signals you are ready to search.

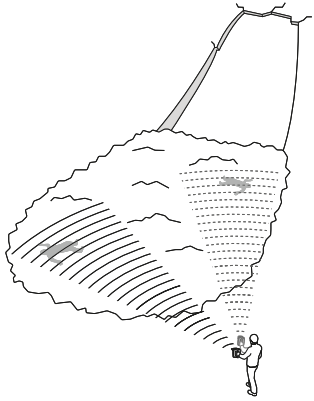


Take time before getting called for a rescue to practice self scans to identify problem gear so you know what causes and how to eliminate distracting signals.

1.2 SIGNAL SEARCH

Goal: To detect a strong signal.

The use of headphones is recommended



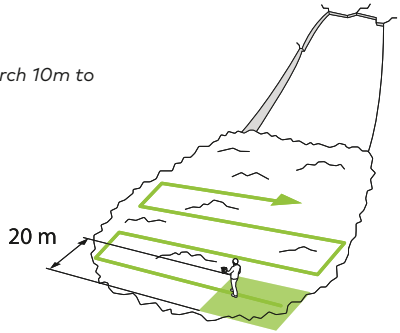
Debris Scan

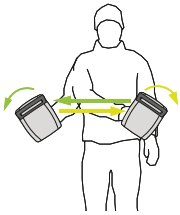
Stand in one place – preferably at top or side of debris – and with the detector scan the debris.

If no signal, start the systematic Signal Search in corridors.

Search Corridors

FIRST PASS: 20 m wide (search 10m to right and 10 m to left).

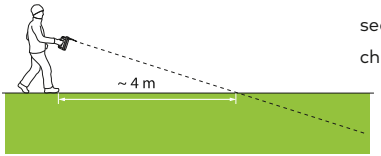




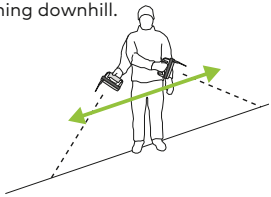
Sweep and Rotate

When searching for a signal combine the sweep and rotate movements. After each sweep across the body rotate the detector.

Aim about 4 m ahead



Remember to keep the detector aimed downwards towards the snow surface, especially when searching across a slope or searching downhill.

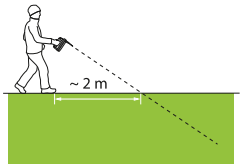


In very irregular debris search around and over mounds and along troughs.

SECOND PASS: 10 m wide search corridors (search 5 m to right and 5 m to left).

If no signal detected on the first pass, a second pass should be performed. Reduce width of search corridors and aim the detector more into the snow.

Aim about 2 m ahead.
Keep your body between detector and other rescuers to avoid distracting signals.



THIRD PASS: When a person is known to be buried – keep searching! Continue searching in micro-strips.

See Searching For Electronic Gear on page 26.

1.3 COARSE SEARCH - when first signal was received

Goal: To establish direction, follow the signal to get close.

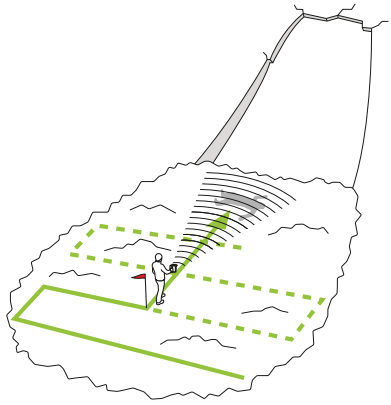
Rotate

- Rotate the detector to the strongest signal. Hold detector in that position.
- Mark you position.

Sweep

- Sweep quickly the detector from side to side – stop at strongest signal – to establish direction.
- Pick a landmark.
- Stop & Go – Check direction once or twice as you approach.
- Reduce power only when signal is strong. Don't lose the signal by reducing power.
- Go until signal is lost.

If the signal ends at an obstacle – mound of snow or trench – continue the search around and over the obstacle to be sure no signal exists on the other side.



When following a signal hold the detector steady. Do not continue to sweep or rotate the detector while moving.

TRANSITION FROM COURSE SEARCH TO FINE SEARCH

Goal: To get the signal back.

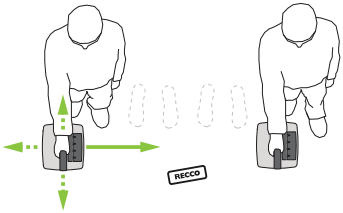
Turn

When the signal has been lost – and power was not changed – stop and turn only your wrist slightly to point detector to both sides (left and right) and ahead and behind to establish the final direction to the reflector.

Checking to see if the signal is in front or behind you.

Once the signal has been re-gained, reduce power if possible and move in that direction until the signal is lost. Keep the detector pointed downward and close to the snow. Slide sideways until the signal is lost.

Now you are ready to start Pinpoint Search.

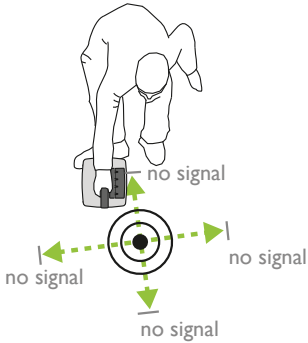


1.4 FINE SEARCH

Goal: To get as close as possible.

Cross Method

- Aim the detector downwards, directly toward the snow surface.
- Turn your wrist to seek optimum polarization, then hold that orientation.
- Reduce power if needed, but do not lose signal.
- Make rapid crisscross movements until signal is lost to each side.



1.5 PINPOINT SEARCH

Goal: To mark and confirm the prezise location.

- Use probe pole to confirm and determine burial depth.

When you have detected a RECCO signal there are 4 variables that will affect the strength of the signal:

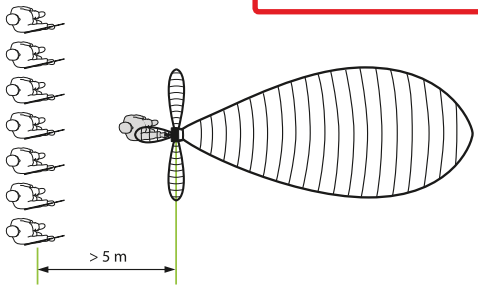
- Power
- Orientation
- Proximity / Distance
- Direction

Therefore when you have a signal in the Coarse, Fine and Pinpoint searches only change one variable at a time.

2.1 SEARCHING AMONGST RESCUERS

Rescuers on site may complicate the RECCO search especially for a novice detector operator. With practice a detector operator can work amongst other rescuers even when rescuers are equipped with reflectors.

Reducing power may reduce distracting signals from close-by rescuers, but reducing power also significantly reduces range.



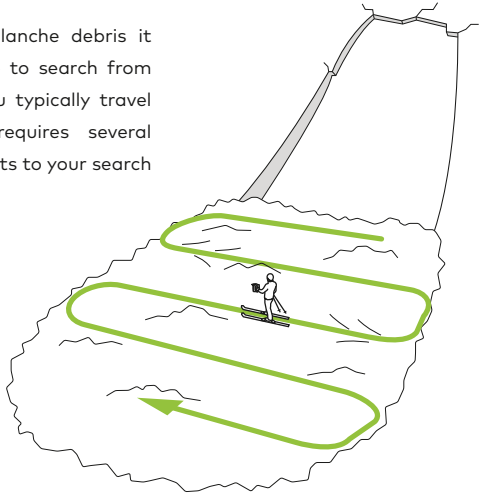
To improve your chances of success the detector operator:

- Ask rescuers, if possible, to learn who might have RECCO Reflectors.
- Ask rescuers to stay behind the operator, if possible minimum 5 m behind.
- Keep your body between the detector and other rescuers.
- Aim the detector into the snow and not at rescuers.

With practice a capable operator can search within several meters of other rescuers.

2.2 SEARCHING ON SKIS

On smooth avalanche debris it may be possible to search from skis. On skis you typically travel faster, which requires several slight adjustments to your search techniques.



- Decrease the width of search corridors. (Do not lose elevation too quickly.)
- Reduce the sideways sweeping of your arm.
- Aim the detector more downward toward the snow.

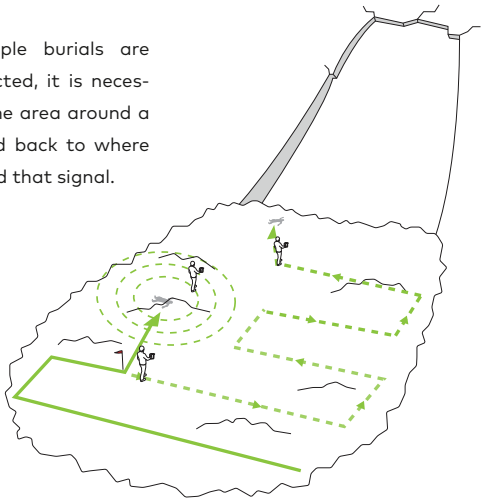
When searching steeper slopes while on skis, you may find it easier and more effective to search along your uphill side rather than in front or below you.

Be alert for distracting signals caused by skis and boot buckles.

2.3 MULTIPLE BURIALS

Three Circle

Any time multiple burials are known or suspected, it is necessary to search the area around a found victim and back to where you first detected that signal.



From the found victim step out 3 steps (~3 meters) and search a circle around the found victim. Keep your body between the detector and the found victim, and keep the detector close to the snow as you search.

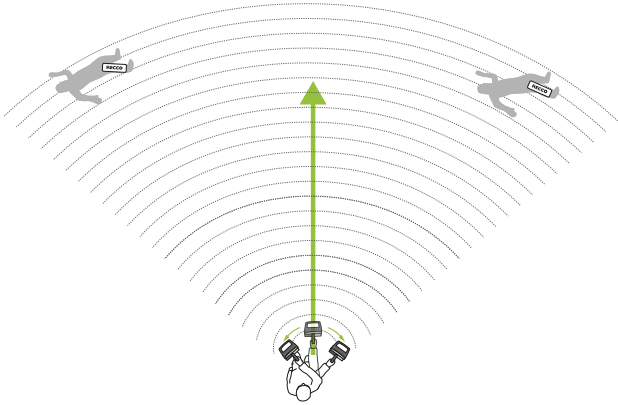
Use just enough power that you can re-detect the found victim.

Repeat two more circles, each 3 meters off the previous circle. Increase the power, if possible with each circle.

Follow your initial tracks and return to your marked point, searching on maximum power. From there continue with your Signal Search pattern to search the rest of the debris.

Tandem Burials

If the detected signal is very wide then 2 victims are buried equidistant from the detector, and the reflectors are similarly aligned. Go in the direction of the middle of the signal until the signal is lost.



When the signal has been lost – and power was not changed – because the signal cone is no longer pointed at the reflector, stop.

Proceed with the Fine Search. Mark the spot and turn only your wrist to point detector to both sides (left and right) and ahead and behind to establish the final directions to both reflectors.

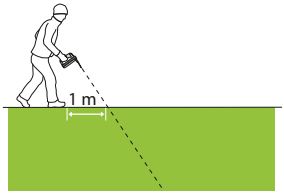
2.4 SEARCHING FOR ELECTRONIC DEVICES

Many electronic devices, including some listed below, may reflect a RECCO signal even when turned off; however, the range will be very short ranging from centimeters to several meters.

- transceivers
- radios
- cell phones
- digital cameras
- gps units
- headlamps

To search for these electronic devices requires a slow and methodical search.

Search with the detector very close to the snow, and direct all energy directly into the snow.
Search corridors should be no wider than 1 to 2 meters.



Be alert for distracting signals from other rescuers and from your own equipment.

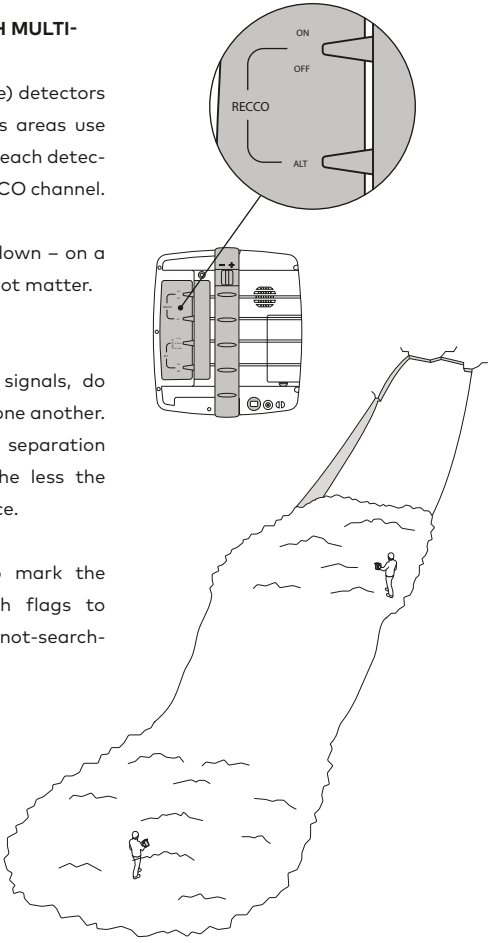
2.5 SEARCHING WITH MULTIPLE DETECTORS

When using 2 (or more) detectors to search large debris areas use the ALT Switch to set each detector to a different RECCO channel.

The position – up or down – on a single detector does not matter.

To avoid distracting signals, do not aim detectors at one another. Also, the greater the separation between detectors the less the chances of interference.

It is also helpful to mark the searched routes with flags to identify searched and not-searched areas.



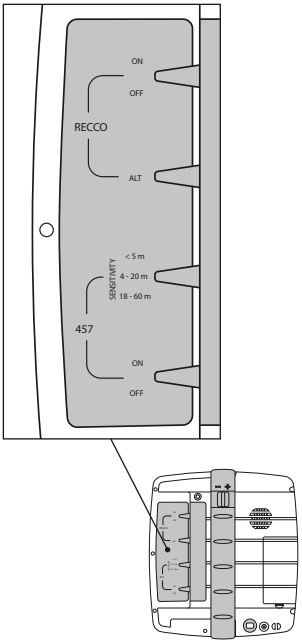
3. SEARCHING FOR 457KHZ TRANSCEIVERS

Any time there is an avalanche transceiver search the RECCO detector operator should also use the 457 kHz function to search for a transmitting avalanche rescue transceiver.

1. RECCO DETECTOR
   - Must be turned “ON”

2. 457 KHz RECEIVER
   - Turn “ON”
   - Set sensitivity to 15–60 m

3. SIMULTANEOUS SEARCH
   - RECCO “chirp”
   - 457 “beep”
   - One rescuer can search for both



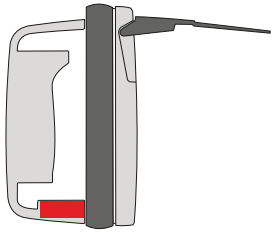
CAUTION: When searching for a 457 signal the operator's and other rescuers' transceivers must be turned off (or set to receive). Always consider the risks to yourself and other rescuers before searching any avalanche area.

ANALOG 457 RECEIVER

Simple, acoustic signal that gets louder – with proper orientation – as the receiver gets closer to the transmitting unit.

457 RECEIVER ANTENNA POSITION

457 kHz antenna is located in the base of the R9 Detector's handle.



DETECTED 457 kHz SIGNAL

Once a signal is detected most operators will find using their personal transceiver easier and faster to locate the transmitting transceiver.

The R9 detector may be used to locate a transceiver. The detector operator uses the R9 like an analog transceiver and locates the signal using either the tangent or bracket search methods.

4. ARE YOU PROFICIENT?

BASIC SKILLS AND ABILITIES

A basic-level detector operator should be able to locate 2 reflectors in 7 minutes in the following setting:

- 50x50 m area
- reflectors/targets (~20x30cm), buried ~0.5m and far apart

ADVANCED SKILLS AND ABILITIES

An advanced-level detector operator should be able to locate 3 reflectors in the presence of distracting signals and identify 1 transceiver signal in 10 minutes in the following setting:

- 50x50 m area
- 2 reflectors/targets (~20x30 cm), buried 50 cm and 3 m apart
- 1 reflector/target far from the other two reflectors
- 1 transmitting transceiver buried 50 cm
- Several reflectors fixed to poles or in packs located in the area to simulate rescuers equipped with reflectors

5. SUMMER STORAGE

For storage longer than 30 days:

- Wipe down the detector with a clean cloth.
- Store the detector in a cool, dry area where the temperature is below 26°C (80°F).
- Store at a full charge. Do not charge the detector while in storage.
- Recharge the detector before the winter season and perform a function check.

6. ADDITIONAL TRAINING INFORMATION

- Available on www.recco.com or by contacting info@recco.com.

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NOTES

Be searchable

RECCO.COM