VORTEX™

CSI

User Manual

CRIME SCENE INVESTIGATION METAL DETECTOR

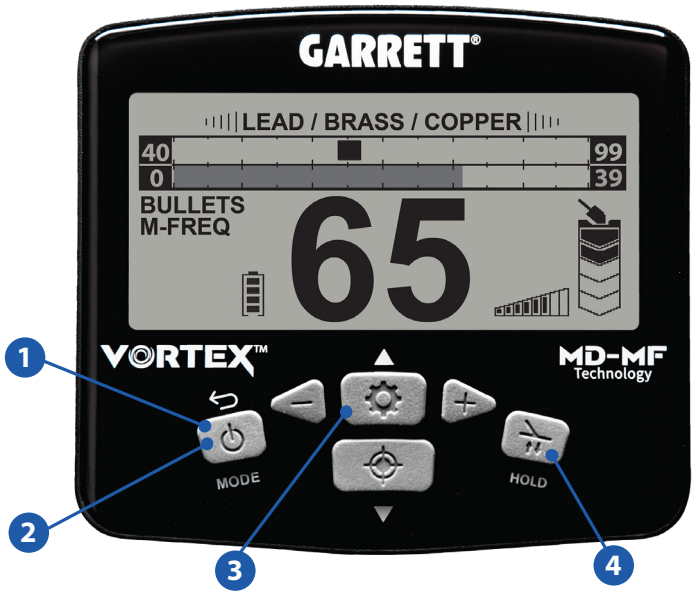
Powered by
MD-MF
MULTI-DIMENSIONAL – MULTI-FREQUENCY
Technology

Contents

Quick Start Steps

1 Power On

Press the Mode/Power button for 1 second and release. The *Vortex™ CSI* powers on in the last mode used and is ready to search.



2 Select Mode

Tap the Mode button to select a different detection mode, if desired. Scroll through the Mode choices using the ▲ and ▼ arrows. Plus (+) and Minus (-) buttons enable right and left navigation in this context. Tap Mode again to exit, or wait 20 seconds.

3 Adjust Settings

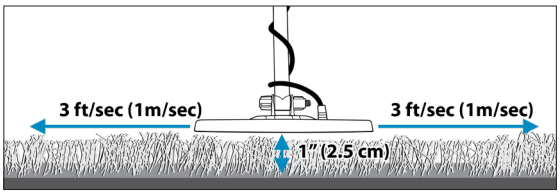
Press the Menu button to access all the settings. Scroll up and down using the ▲ and ▼ arrows. Tap the Plus (+) or Minus (-) button to adjust the selected setting.

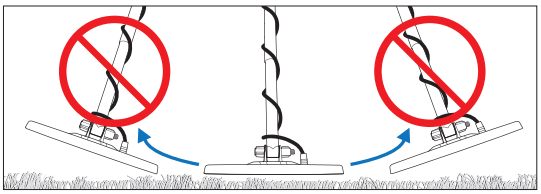
4 Ground Balance *(if necessary)*

Press and hold the Ground Balance button while bouncing coil above the ground until the ground response disappears or becomes as small as possible.

5 Start Scanning

Lower the searchcoil to about 1 inch (2.5 centimeters) above the ground, and scan the coil left and right at approximately 3 feet/second (1 meter/second). The coil must be in motion for target detection, but can remain stationary during Pinpoint. Keep the coil parallel to the ground for best results.





Carton Contents

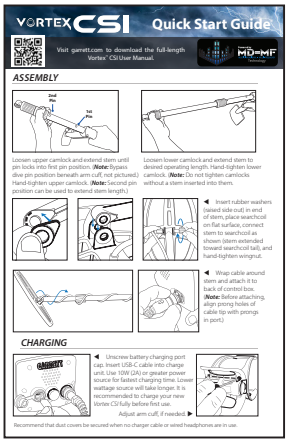
The *Vortex CSI* is packaged with the following parts, some of which are partially assembled. If any part is missing, please contact Garrett Customer Service.

Arm Cuff With Strap

Straight Stem Assembly With Mounted Control Box

Upper and Lower Stem (Connected)

USB-C Charging Cable



Quick Start Guide

Vortex 6"x 11" DD Viper Searchcoil With Coil Cover Installed

Mounting Washers, Nut, Bolt

ClearSound Easy Stow Headphones – 1/8-Inch Jack

CS-3 Z-Lynk Wireless Headphones

Included headphones vary by Vortex CSI part number/kit.

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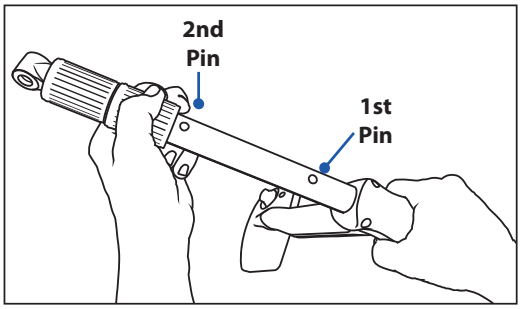
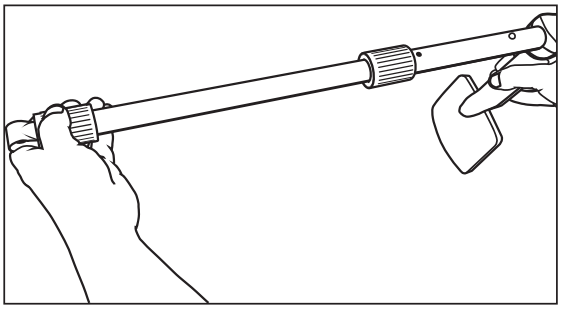
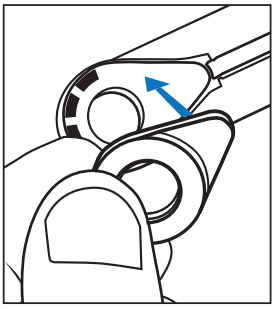
Assembly

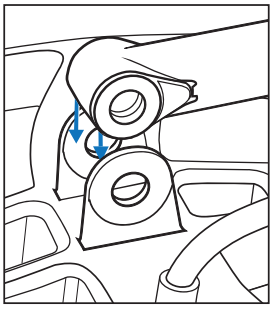


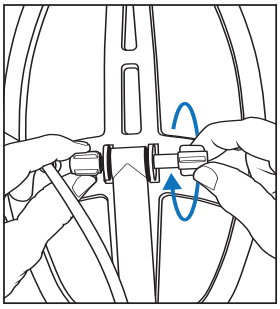
Loosen upper camlock and extend stem until pin locks into first pin position. (***Note:*** Bypass dive pin position beneath arm cuff, not pictured.) Hand-tighten upper camlock. (***Note:*** Second pin position can be used to extend stem length.)



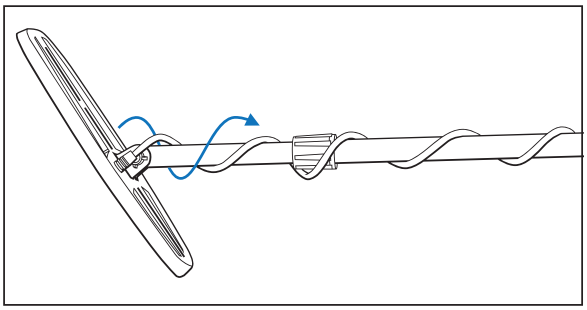
Loosen lower camlock and extend stem to desired operating length. Hand-tighten lower camlock. (***Note:*** Do not tighten camlocks without a stem inserted into them.)

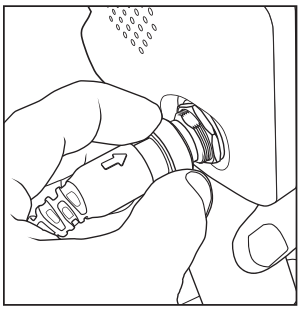






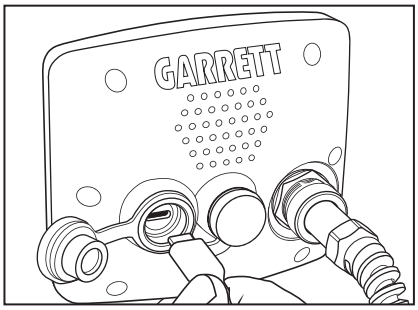
◀ Insert rubber washers (raised side out) in end of stem, place searchcoil on flat surface, connect stem to searchcoil as shown (stem extended toward searchcoil tail), and hand-tighten wingnut.





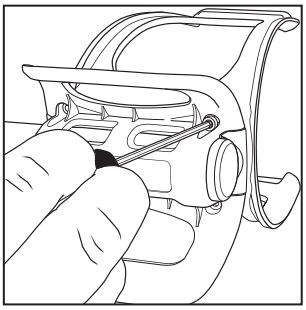
◀ Wrap cable around stem and attach it to back of control box. (***Note:*** Before attaching, align prong holes of cable tip with prongs in port.)

CHARGING



◀ Unscrew battery charging port cap. Insert USB-C cable to charge unit. Use 10W (2A) or greater power source for fastest charging time. Lower wattage source will take longer. It is recommended to charge your new *Vortex CSI* fully before first use.

Adjust arm cuff, if needed. ▶



Recommend that dust covers be secured when no charger cable or wired headphones are in use.

Assembled Detector

Battery Information

Basic Information

Battery Type:	Internal Lithium-ion
Battery Life:	15 hours typical, depending on settings
Battery Scale:	25% per pixel, bottom pixel flashes at 5% remaining
Recharge Time:	Use 10W (2A) or greater power source for fastest charging time. Charging is faster with detector off, longer if on. Lower wattage source will take longer.
Charging Status:	Battery pixels blink while charging, solid when charged
Battery Life Cycle:	Batteries will last for many years. Recharge at least once a year.
Charging Note:	Detector should be switched off during charging to speed the charging process.

Detecting With a Power Bank

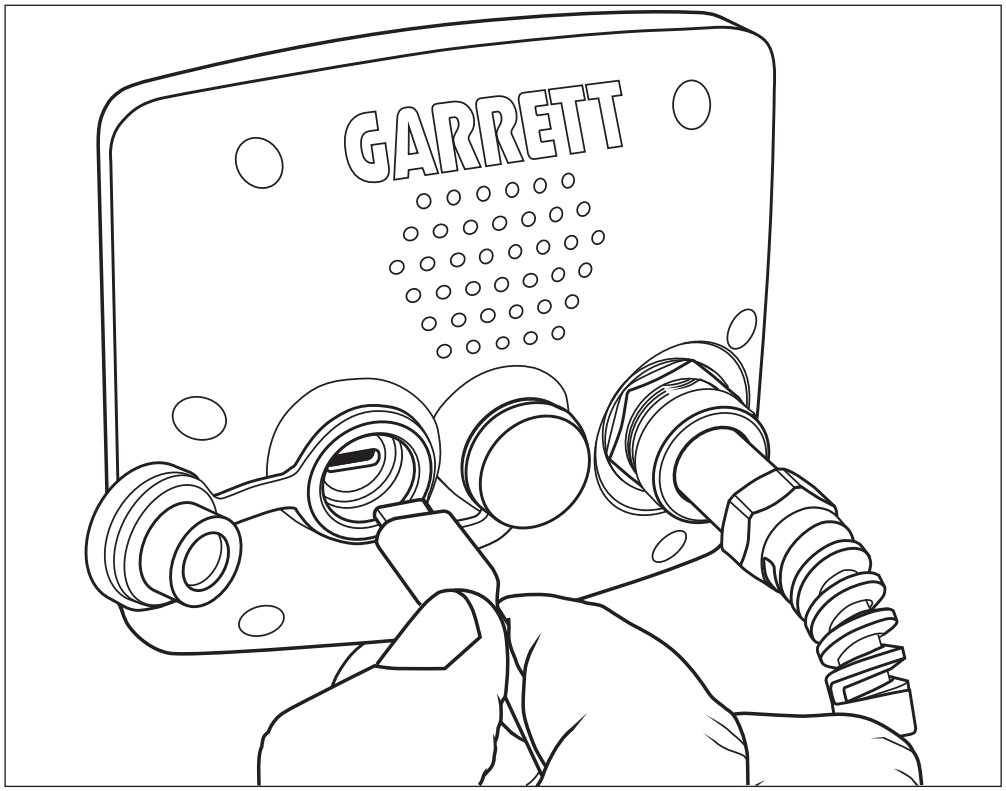
In the event of a depleted battery in the field, *Vortex CSI* can be operated while plugged into any external 5V USB power pack via USB cable. Recommend attaching power pack to arm cuff.

Note on Battery Life

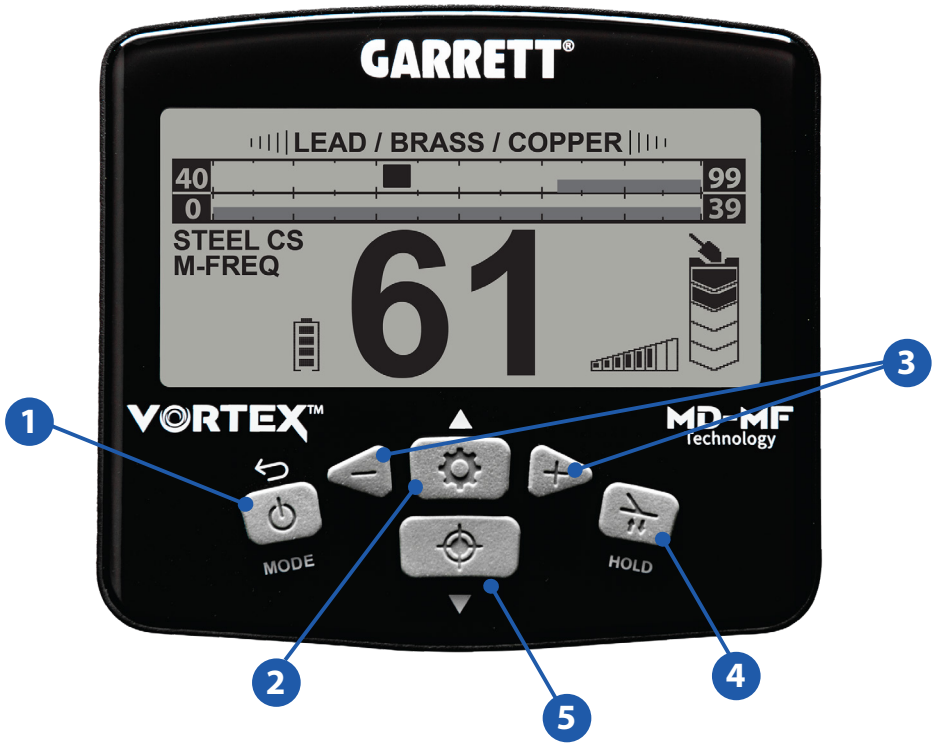
To extend the life of your detector's internal battery, it should be charged prior to storage for extended periods and recharged at least once per year. It is not necessary to fully discharge the *Vortex CSI* battery prior to charging.

Caution: After use in any body of water, ensure that your *Vortex CSI* connectors are thoroughly dry before connecting to a power source for charging.

USB-C charging port is located behind a protective cap on back of *Vortex CSI* control box.



Controls



1 **Power, Mode, Exit, Factory Reset**—

- Press for 1 second and release for Power On or Off. If within the Menu and desired operation is Off, press once to return to the Operate screen. Then, press for 1 second and release.
- Quick-press to change Mode, using ▲ and ▼ arrows. Plus (+) and Minus (-) buttons enable right and left navigation in this context.
- Quick-press to exit Menu settings, or simply wait twenty seconds for auto-exit.
- Press and hold for 5 seconds to restore default Factory Settings.

2 **Menu/Settings**—Press once to enter Menu items. Use ▲ and ▼ arrows to scroll up and down through different settings. Use the Plus (+) or Minus (-) buttons to change setting. *(See Menu Settings section on next page for details on each Vortex CSI setting.)*

3 **Sensitivity**—Adjusts via Plus (+) and Minus (-) buttons. Also adjustable via Menu.

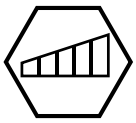
4 **Ground Balance**—Hold down while bouncing the searchcoil above the ground until the ground response disappears or becomes as small as possible *(see Ground Balance section for more details)*. This button is also used for Notch Discrimination adjustments.

5 **Pinpoint**—Hold for pinpointing function to precisely locate targets.

Vortex CSI features and specifications subject to change without notice.
Go to garrett.com/sport/vortex to check for the latest software updates.

Menu Settings

Press the Menu button once to enter the Menu item selection area. Then use the ▲ and ▼ arrows to scroll up and down through the different settings. Use the Plus (+) or Minus (-) buttons to change the setting or turn the feature on or off.



Sensitivity

Eight levels. Use increased sensitivity when searching for very small or very deep targets. Use lower sensitivity levels when the detector is behaving erratically (due to excessive metallic trash, highly mineralized soils, electrical interference or the presence of other metal detectors), and the erratic operation cannot be resolved with ground balance, discrimination or by changing the Channel or Frequency. Also adjustable outside the Menu via the Plus (+) and Minus (-) buttons.

Volume

Eight levels. This is an overall volume control for both the built-in speaker and headphones.

Iron Volume

Eight levels. Iron Volume allows you to decrease the volume of ferrous targets, while the volume of non-ferrous targets remains at normal level. Experienced users often want to hear **all** targets, with the advantages of the decreasing volume of undesired targets.

Frequency

Multi-Frequency, Multi-Salt, and 13 kHz

See Frequency Options section for more details.

Channel (EMI Elimination)

Eight Channels, or independent Frequency shifts, are available for each single- and multi-frequency. Adjust the Channel to eliminate interference from other nearby detectors or to overcome other electromagnetic interference (EMI).

Backlight

Four variable settings and Off for reduced battery life. Use the Plus (+) or Minus (-) buttons to switch the LCD backlight on or off, whether searching at night or in low-light areas. (***Note:*** As a convenience, the backlight will automatically activate when scrolling through the menu, regardless of the backlight setting. It will return to its selected setting once the menu is exited.)

Menu Settings

Wireless Headphones

Use the Plus (+) or Minus (-) buttons to switch on or off the built-in Z-Lynk wireless operation. Press Plus (+) to pair Garrett Z-Lynk enabled wireless headphones, and press Minus (-) to unpair headphones. This icon flashes when the detector is attempting to pair with headphones, and shows as solid when properly paired. Absence of the icon indicates that *Vortex CSI's* wireless transmitter is switched off.

Pairing: To pair with a new set of headphones/receiver, simply switch on the headphone/receiver first, hold within 2 feet (0.6 meters) of the *Vortex CSI*. Next, power on *Vortex CSI*. Repeatedly press the Menu button until the wireless icon is highlighted. Press the Plus (+) button to pair the headphones.

Once paired, if the headphone/receiver is switched off or moved out of range, *Vortex CSI* will search and attempt to reconnect to the receiver for 5 minutes, indicated by a flashing icon. If the connection is not reestablished during this time, *Vortex CSI* will switch off its wireless transmitter. To reconnect, simply switch the *Vortex CSI* off and then on again. To unpair (forget) a set of headphones, simply press the Menu button to select the wireless icon, and then use the Minus (-) button to un-pair.

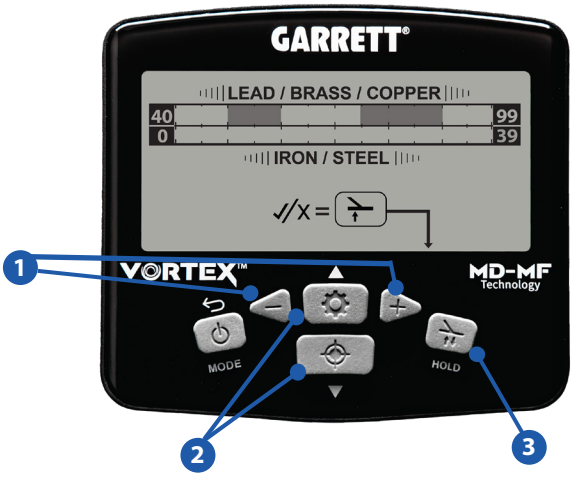
Use of optional wired headphones: *Vortex CSI* can also be operated with any wired headphones that have a 1/8" (3 mm) plug. For headphones with a 1/4" plug, an optional adapter is available from Garrett.

Button Lock

Use to lock buttons for diving below 6 feet (2 meters). Simultaneously press Plus (+) and Minus (-) buttons 3 times, quickly. This can be done from the Button Lock menu item, or from the normal operating screen. Repeat this process to unlock buttons. This icon appears on the LCD when the *Vortex CSI* buttons are locked.

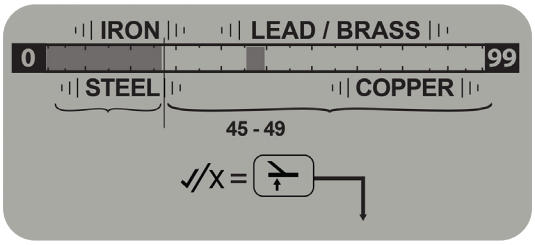
Menu Settings

Notch Discrimination
Use to eliminate targets from audible detection. In Multi-Frequency operation where two Target ID scales are present, use ▲ and ▼ arrows to move between Target ID scales. Use the Plus (+) and Minus (-) buttons to move cursor left and right along the Target ID scale. Tap the Ground Balance button to accept or reject a notch.



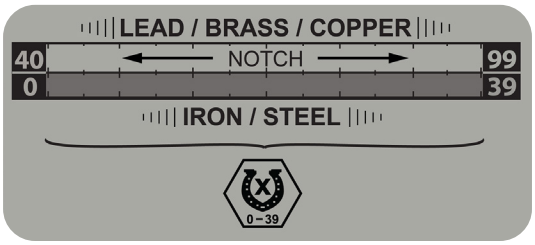
Notch Discrimination in Multi-Frequency Operation

1. **Use Plus (+) or Minus (-) button**— to move cursor along the Target ID scale.
2. **Use ▲ Menu or ▼ Pinpoint button**— to move cursor between Target ID scales when multiple scales are present.
3. **Ground Balance**—Tap this button to accept or reject a notch.



Single-Frequency Notch Discrimination

Single-Frequency and Beach Mode Operation: *Vortex CSI* has 20 notches of discrimination, shown along a single Target ID scale. The first eight notches of iron resolution are controlled with High-Resolution Iron Discrimination settings. In the Notch Discrimination menu, use the Plus (+) or Minus (-) buttons to move the cursor along the 12 available notches; tap the Ground Balance button to accept or reject a notch.



Notch Discrimination in Multi-Frequency Operation

Multi-Frequency Operation: The lower ferrous scale is controlled with High-Resolution Iron Discrimination settings. In Notch Discrim menu, use the Plus (+) or Minus (-) buttons to move the cursor along the available notches; tap the Ground Balance button to accept or reject a notch. Use the ▲ and ▼ arrows to move between the two Target ID scales.

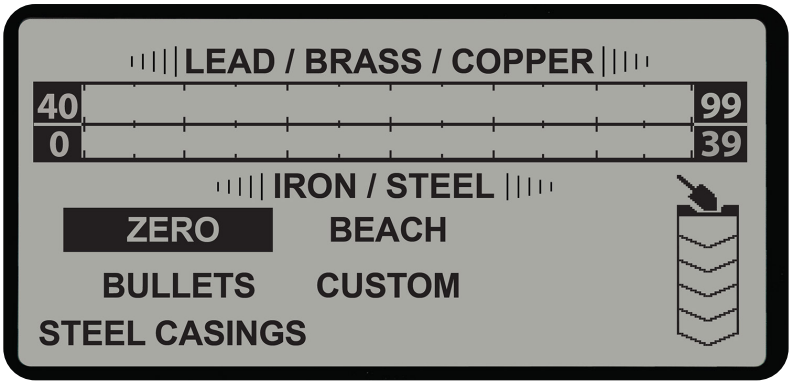
Menu Settings

High-Resolution Iron Discrimination
Use Plus (+) or Minus (-) buttons to increase or decrease the amount of iron (ferrous) discrimination that is applied. The discrimination level can be adjusted from 0 (no iron discrimination) to 39 (maximum iron discrimination).

FACTORY DEFAULT SETTINGS

Mode	Zero	Backlight:	Off
Sensitivity	6	Wireless	Off
Volume	8	Button Lock	Off
Iron Volume	4	Notch Discrimination	None
Frequency	Multi-Frequency	High-Res Iron Discrim.	0
Channel	4		

Search Modes



This illustration depicts Mode choices on the Vortex CSI while operating in Multi-Frequency.

The *Vortex CSI* includes preset search modes, each designed for specific search environments. Select the mode that is most appropriate, or choose Custom Mode to create and save your defined settings.

Simply tap the Mode button and scroll through the Mode options, using the ▲ and ▼ arrows and the Plus (+) or Minus (-) buttons. Tap Mode again to exit, or wait 20 seconds. You can further refine your detecting experience by selecting from different Frequency settings within each of the optional Modes.

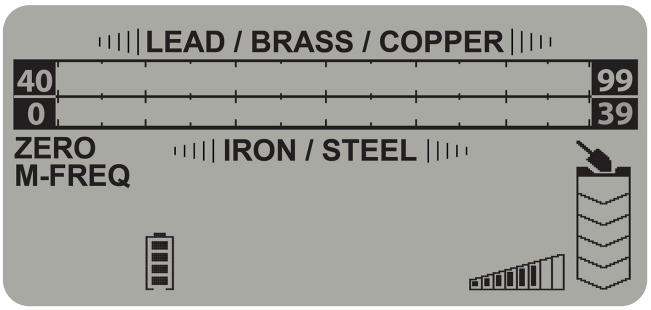
Each Mode is detailed in the sections that follow.

Zero

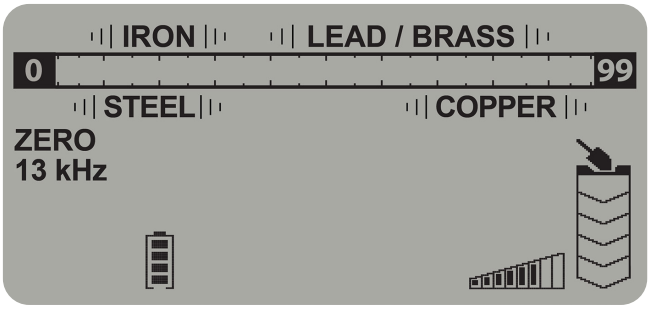
Detects every type of metal (zero discrimination). All discrimination pixels are switched off. No targets have been notched out (eliminated or shown on the LCD as a darkened pixel).

Zero Mode is available in any Frequency. Use this Mode to find all metal items, or when the desired object material is unknown, or to aid in locating a target when its signal is inconsistent. Such signals could mean a trash target is close to a good target.

Operators may refine this "no discrimination" setting with the use of High-Resolution Iron Discrimination or Notch Discrimination (*see those sections for more details)*.



Zero Mode as it appears on a *Vortex CSI* with two-tier Target ID scales in Multi-Frequency operation.



Zero Mode as it appears on a *Vortex CSI* with single-tier Target ID scales in 13 kHz operation.

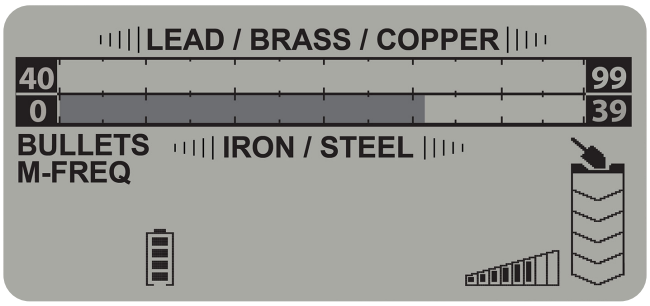
Note: The Multi-Salt Frequency option also displays a single-tier Target ID scale like this.

Search Modes

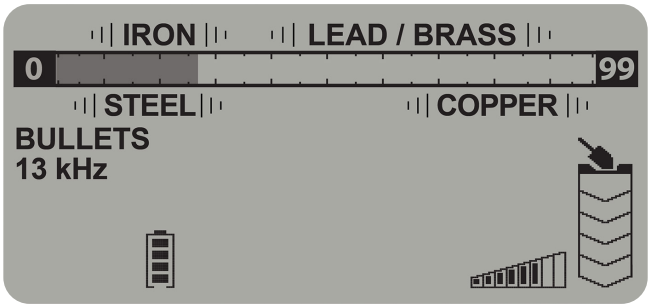
Bullets

This Mode is ideal for use at a crime scene to recover lead bullets and non-ferrous bullet casings (e.g., brass or copper).

Bullets Mode is available with any of the Frequency options. Iron Discrimination is preset to 27, eliminating most ferrous items from audible detection. For this reason, Bullets Mode is not recommended for detecting guns, knives, or other ferrous/steel items.



Bullets Mode as it appears on a *Vortex CSI* with a two-tier Target ID scale in Multi-Frequency operation.



Bullets Mode as it appears on a *Vortex CSI* with a single-tier Target ID scale in 13 kHz or Multi-Salt operation.

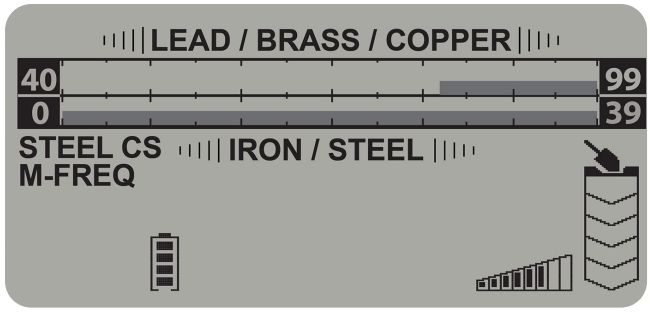
Steel Casings

This Mode is designed specifically to help identify tricky ferrous bullet casings and/or casings made with a combination of steel and non-ferrous plating, such as nickel- or copper-plated steel casings.

Steel Casings (Steel CS) Mode uses special discrimination and iron filters to classify steel casings as "good", and certain iron trash items and high conductors as "bad." Be aware that in order to classify steel casings as "good," some steel or iron trash items will also be classified as "good." This is an unavoidable reality when searching for steel casings.

"Good" or "accepted" targets produce a high tone, whereas "bad" or "rejected" targets produce a fainter low tone. This allows the operator to hear all targets while focusing primarily on those of highest interest.

The ID range for the "rejected" targets is indicated on the two-tier ID scale with half-height bars. To make adjustments to the upper tier's rejection range, use the Notch Discrimination control.



Steel Casings Mode operates only in Multi-Frequency. All lower-tier ferrous targets are "rejected" and produce a fainter low-tone audio. Targets in the "accepted" range on the upper-tier produce a high-tone audio response.

Note: Due to its special setup, Steel Casings Mode operates only in Multi-Frequency. *(See Page 21 for more details on Steel Casings Mode.)*

Search Modes

Steel Casings *(cont.)*

Most steel casings will already fall within the "good" range, producing a high tone. Note that ferrous objects produce different Target ID numbers when the searchcoil passes over them from different directions. It is always important to swing over a questionable target from multiple directions in order to best judge whether it is desired or not.

When using Steel Casings Mode, it may be possible to further narrow the accepted or "good" target range. For example, if you are searching for a nickel-plated steel 9mm casing that produces a Target ID anywhere between 52 and 62 (when scanned from all orientations), you might wish to further narrow your accepted or "good" target range (items producing a high tone). This would be possible by eliminating the Target ID numbers from 40 to 51 and 64 to 81.

To do so, push the Menu button and scroll to the Notch Discrimination item. Use the Plus (+) or Minus (-) buttons to navigate to the pixels you wish to convert to the low iron tone ("bad"). Tap the Ground Balance button for each pixel you wish to toggle from "good" to "bad," and your accepted target search range will now be narrowed. *(For more on the use of Notch Discrimination, see Page 11.)*

All discriminated pixels are shown at half-height to indicate they are discriminated but still audible (*see Figure 3*). Use of the Iron Volume adjustment applies to all discriminated targets.

Figure 1: Normal discrimination pattern for Steel Casings Mode. Half-height areas produce low tone.

Figure 2: Tap Menu and navigate to Notch Discrimination controls if you wish to further narrow the accepted or "good" target range.

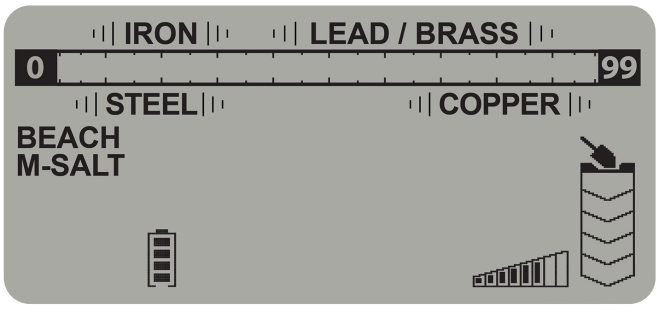
Figure 3: The normal "good" range of the Steel Casings Mode has been modified to find a particular nickel-plated steel 9mm casing that reads between 52 and 62 from different orientations. Segments for Target IDs 40 to 51 and 64 to 81 have now been converted to low tone, creating a tighter "good" search window.

Search Modes

Beach

By default, the *Vortex CSI* Beach Mode operates only in the Multi-Salt Frequency setting and is specifically designed for wet saltwater beaches or other grounds with high salt content. Iron Discrimination is set to 0, allowing both ferrous and non-ferrous targets to be reported.

Targets in Beach Mode are displayed on a single-tier Target ID scale. ***Note:*** Other Frequencies, such as Multi-Frequency, can be used to search dry or freshwater beaches simply by selecting a different Search Mode.



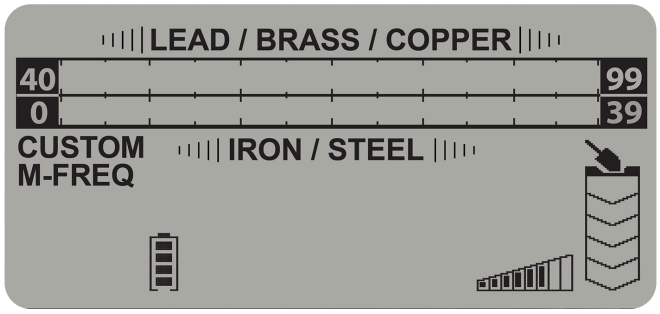
Beach Mode, displaying a single-tier Target ID scale and operating in Multi-Salt Frequency.

Custom

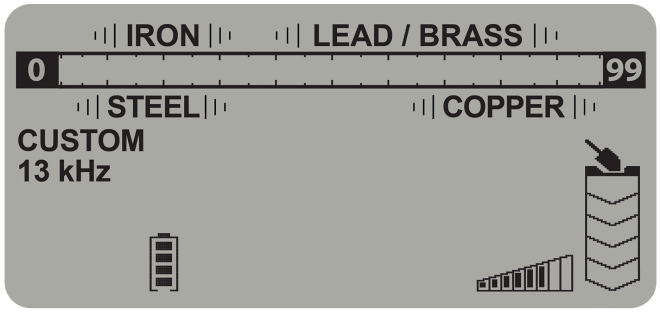
This Mode can be programmed by the operator, and the *Vortex CSI* will retain any changes made even after being powered off. The factory preset for Custom Mode is the same as Zero Mode.

Begin with this setup, make desired alterations to Frequency, Volume, Iron Volume, High-Resolution Iron Discrimination, and Notch Discrimination, and they will be saved.

Note: A full Factory Reset of the detector will remove any Custom Mode settings.



Custom Mode on the *Vortex CSI* has a factory default that is the same as Zero Mode, which utilizes Multi-Frequency. Program your setting changes, and they will be retained.



Single-tier Target ID scale will be seen in Custom Mode if 13 kHz or Multi-Salt is selected.

Frequency Options

Detecting Versatility

Each *Vortex CSI* offers both single-frequency and multi-frequency detection options. The advantages of each option are described in this section.

Options: Multi-Frequency, Multi-Salt, and 13kHz

Single-Frequency Operation

With a versatile single Frequency (13 kHz), all of the detector's transmitter power is focused. This Frequency provides optimal detection on a wide range of targets, including brass, copper, steel, coins, relics, jewelry, and other targets of all metal compositions.

In some detecting situations, using a single Frequency may offer a slight advantage over the use of one of *Vortex CSI*'s multi-frequency Modes. Single-frequency operation may also offer quieter operation than multi-frequency in some noisy environments with high electromagnetic interference.

Powered by MD-MF
MULTI-DIMENSIONAL – MULTI-FREQUENCY Technology

Multi-Dimensional Multi-Frequency (MD-MF)

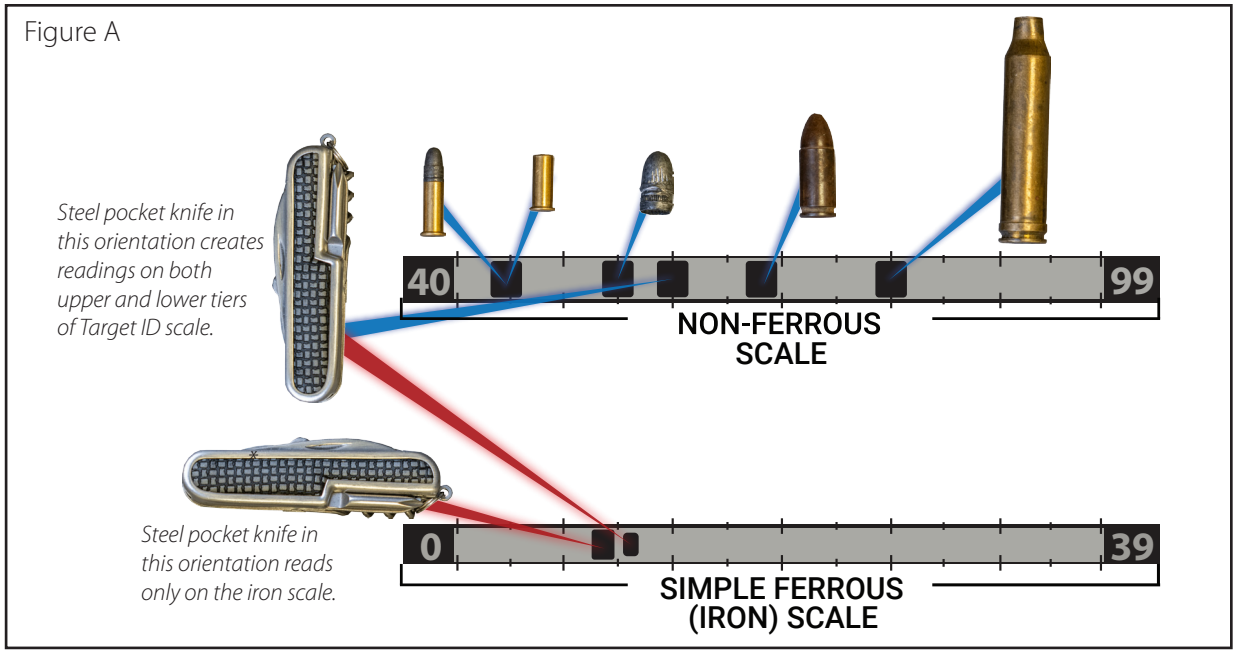
In general, multi-frequency detection technologies blend a variety of detection frequencies together for improved detection on targets of all types in all types of soil. Garrett's exclusive Multi-Dimensional Multi-Frequency (MD-MF) technology also analyzes targets and their surrounding soil matrix, utilizing multiple dimensions of conductivity and ferrous content.

The addition of this advanced multi-dimensional technology provides a more comprehensive analysis to formulate a more accurate Target ID, and at even greater depths in areas with increased ground minerals.

This advanced MD-MF analysis is shown on the LCD of the *Vortex CSI* with a multi-axis Target ID with two distinct scales *(see Figure A)*. This two-tiered system includes a non-ferrous Target ID scale and a ferrous scale.

The upper scale primarily indicates non-ferrous items. Small, thin targets that are non-ferrous (e.g., lead bullets, foil, and small brass, such as a .22 casing) will indicate toward the left side of the scale. High conductivity items, such as larger brass and copper bullets, will indicate toward the right side of this scale.

Figure A



Frequency Options

The lower scale indicates ferrous (iron) objects – items that stick to a magnet. Common ferrous items such as nails, small screws, or wire will indicate at various points on this lower scale. It is important to understand that ferrous items can present different Target ID numbers based on their orientation in the ground and the direction in which the searchcoil passes over them.

Flat-shaped ferrous items (such as steel bottle caps and washers) create complex signals that can trick some detectors into thinking they are coins. Such tricky ferrous objects may appear simultaneously on both the upper non-ferrous scale and the lower ferrous scale.

(Refer to "Target ID and Tone Information" section for more details on how various targets register and sound on the Vortex CSI.)

Multi-Frequency Operation

The standard MD-MF Multi-Frequency (shown as Multi-Freq. in the Frequency selection area of the Menu) employs a blend of frequencies that provides maximum target detection on all types and sizes of targets, while also minimizing ground noise.

Multi-Frequency is the default Frequency on all search Modes except Beach Mode.

Multi-Salt Mode on the *Vortex CSI* helps provides stable operation on most saltwater beaches and in areas of heavy salinity, such as this dry salt lake bed.

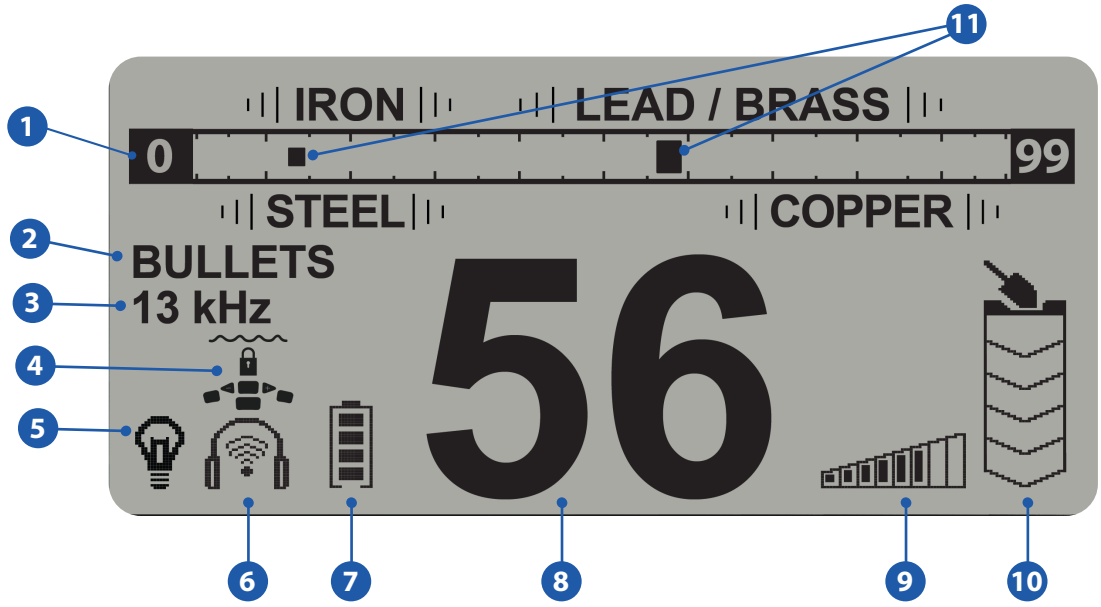
Multi-Frequency Salt Operation

Vortex CSI's multi-frequency option for use in salt environments is shown as "Multi-Salt" in the Frequency selection area of the Menu.

Multi-Salt utilizes a blend of frequencies to help overcome the negative effects of saltwater beaches. As you move from the dry sand to wet sand and to shallow water, increasing levels of salt minerals may cause your detector to become unstable. Switch to Multi-Salt Beach Mode to achieve maximum stability and target detection.

Ground balance your detector if needed. In saltwater areas with more highly mineralized ferrous sands (also known as "black sand"), you may choose to reduce Sensitivity to achieve maximum stability. Be aware that some coastal and inland soils can contain significant amounts of salts (e.g., fields that were once ancient sea beds, dry salt lakes, etc.). When moisture is present in the ground, these salty soils essentially become saltwater environments and may require Multi-Salt Mode for best *Vortex CSI* operation.

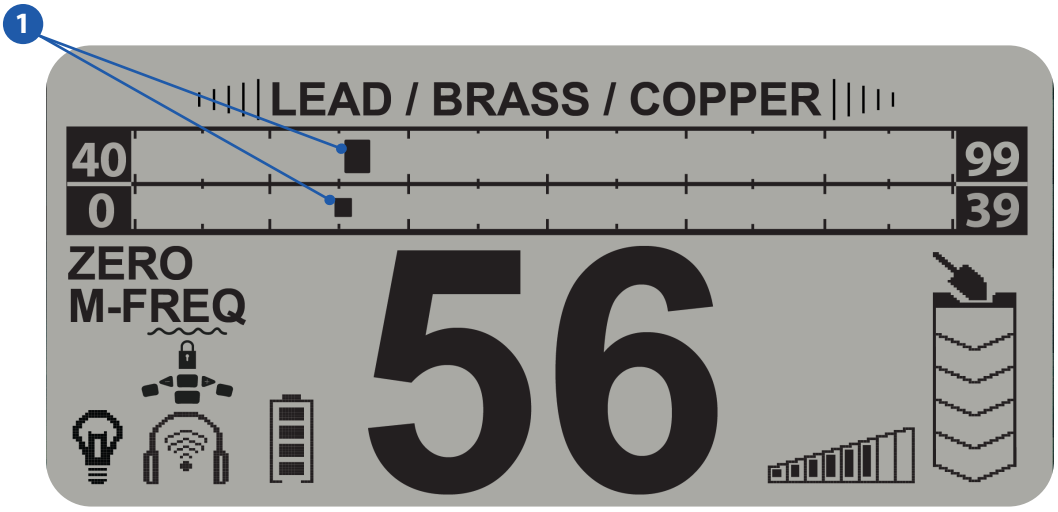
LCD Elements



SINGLE-FREQUENCY and BEACH MODE OPERATION

1. **Single-Tier Target ID Scale**—Indicates both ferrous targets and non-ferrous targets, with ferrous targets indicating toward the left, low conductivity targets in the middle, and high conductivity targets toward the right.
2. **Search Mode**—Displays the current Search Mode (i.e., Zero, Bullets, Steel Casings, Beach, Custom)
3. **Frequency**—Displays the current Frequency setting (i.e., Multi-Frequency, Multi-Salt, 13 kHz)
4. **Button Lock**—Locks buttons, useful for diving below 6 ft (2 m)
5. **Backlight**—Indicates LCD backlight feature is in use when displayed.
6. **Wireless Headphones**—Flashes while attempting to pair headphones, shows as solid when unit is paired with headphones
7. **Battery Level**—Shows status of battery life (25% per segment).
8. **Digital Target ID**—Provides a value from 0 to 99 to identify targets more precisely.
9. **Sensitivity**—Indicates current Sensitivity setting.
10. **Target Depth**—Shows depth of coin-sized target in 2" (5 cm) increments. Targets larger than a coin may display shallower than actual depth. Targets smaller than a coin may display deeper than actual depth.
11. **Target ID Cursor**—Indicates Target ID of detected targets. Complex targets may register more than one Target ID cursor. For adjacent targets, *Vortex CSI* is capable of presenting more than one Target ID on the display simultaneously.

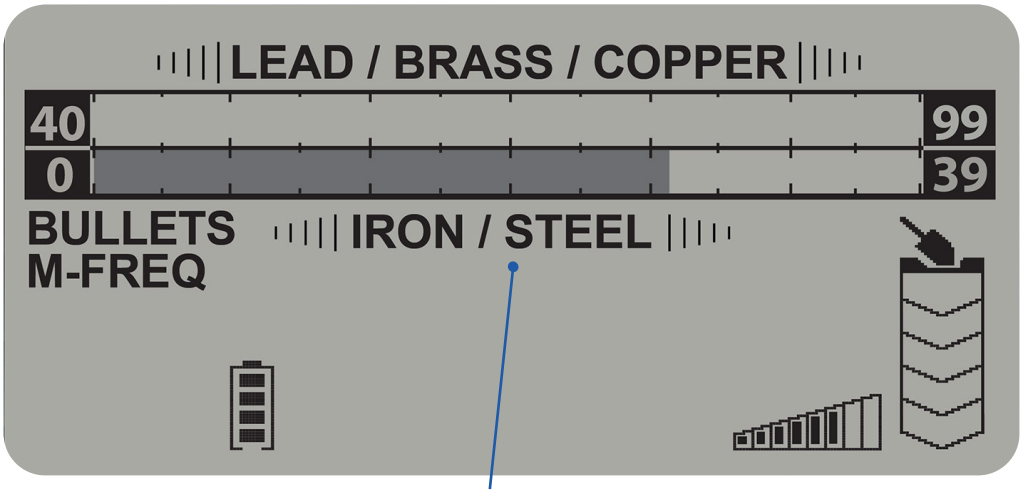
LCD Elements



MULTI-FREQUENCY OPERATION

1 **Two-Tier Target ID Scale**—Indicates different metal types. The top scale indicates non-ferrous (conductive) targets. The lower scale indicates ferrous targets (poor conductors). A complex target, such as a nickel-plated steel casing, may present multiple cursor IDs simultaneously (as depicted above).

The single-frequency and multi-frequency operations are identical, except for the two-tier Target ID scale. See the Single-Frequency and Beach Mode Operation key for the remaining information.



Note: When a Target ID number is present, the "IRON/STEEL" legend element will disappear.

Target ID and Tone Information

Digital Target ID

The large Digital Target ID numeral on the *Vortex CSI* LCD provides a value from 0 to 99 to help identify targets more precisely.

It is important to understand that Target ID can vary widely based on the target's size and thickness. Small, thin pieces of metal do not conduct electrical current as well as thicker pieces of metal. For example, a small .22 caliber casing may ID in the 50s, whereas a large brass cartridge could ID in the 70s. In addition, mineralized soils can cause Target ID errors, especially for small and/or deep targets.

Tip: Target ID is most reliable when the target is centered under the searchcoil, and the coil is swept flat and at a consistent height above the ground.

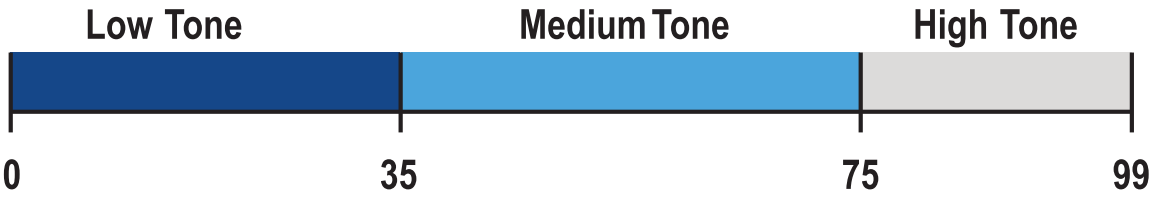
Number of Tones

The *Vortex CSI* model operates with three fixed audio tones in most Modes, while the Steel Casings Mode operates in a special 2-tone setting.

In 3-Tone operation, the tone breaks are shown in the depiction below. Some iron items or discriminated items may be silenced, depending upon which preset discrimination Mode you have selected. For example, the Bullets Mode has high preset levels of discrimination set in the iron range; these discrimination areas will produce no audio.

Audio Target ID: 3-Tone

In most Modes, the tone breaks are as shown below. *(See Pages 14 and 15 for use of a special 2-Tone setup that is available only when operating in Steel Casings Mode.)*



Ground Balance

Detector performance can be negatively affected by ground mineralization. *Vortex CSI* can be ground balanced automatically to cancel unwanted ground signals and obtain maximum stability and target detection.

Note: Always locate an area of soil free of metal before attempting to ground balance the detector. *Vortex CSI* includes High-Resolution Ground Balance, with 175 points of resolution, ranging from conductive soil, such as saltwater beaches, to ferrous mineralized ground. During the Ground Balance function, the words "GND BAL" appear on the display, and the Ground Balance value is indicated on the LCD.

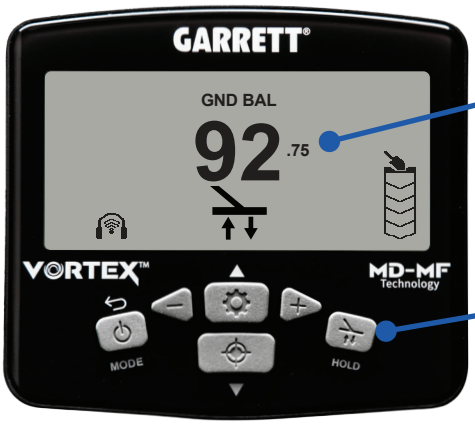
Ground Balance Procedure

Press and hold the GND BAL button while continually "bouncing" or "pumping" the searchcoil from 1 to 8 inches (2 to 20 centimeters) above the ground until there is minimal to no audio response from the ground. Then release the button and begin hunting. While ground balancing, the value will indicate on the LCD. A low Ground Balance value indicates conductive soil, such as saltwater beaches; high Ground Balance values indicate ferrous soil.

Ground Balance values from 0 to 75 are indicated with whole numerals. Ground balance values from 75 to 99 represent hot ground, and, at this point, the *Vortex CSI* utilizes High-Resolution Ground Balance.

Beginning at 75, the Ground Balance value begins increasing in quarter-point steps. This is represented by a whole numeral and smaller quarter-point numerals *(see illustration showing GND BAL value of 92.75)*.

Note: If the Ground Balance setting does not change during the auto ground balancing process, one of three issues likely exists: the detector is either sufficiently ground balanced already, the current ground exhibits such neutral mineralization that the settings will not change, or there is a metal object beneath the coil, preventing the detector from ground balancing.



Ground Balance reading of 92.75 indicates highly ferrous soil content.

Ground Balance Button (Hold while bouncing coil above soil).

Typical Ground Balance Ranges:

80-99: Highly ferrous (magnetite, ferrous oxide minerals, black sands, hot rocks, terra cotta)

50-80: Moderately mineralized soils (red clay, brown clay, iron-bearing clay minerals, etc.)

30-50: Likely an iron object or moist, salty soil

0-30: Highly conductive, non-ferrous minerals such as saltwater

Underwater Operation

Your *Vortex CSI* can be used for searching shallow bodies of water, such as shorelines, creeks, rivers, and swimming areas. Since radio signals do not transmit through water, wired headphones must be utilized. (Garrett offers an optional, fully-submersible set of *Vortex* underwater headphones.)

Button Lock for Diving

Vortex CSI is engineered for submersible operation down to 16 feet (5 meters). At these depths, the increased water pressure can cause the buttons to depress.

To prevent unintentional button presses, activate the Button Lock feature if you plan to submerge below 6 feet (2 meters). Simultaneously press the Plus (+) and Minus (-) buttons 3 times, quickly. This can be done from the Button Lock Menu screen or from the normal operating screen. Repeat this process to unlock buttons.

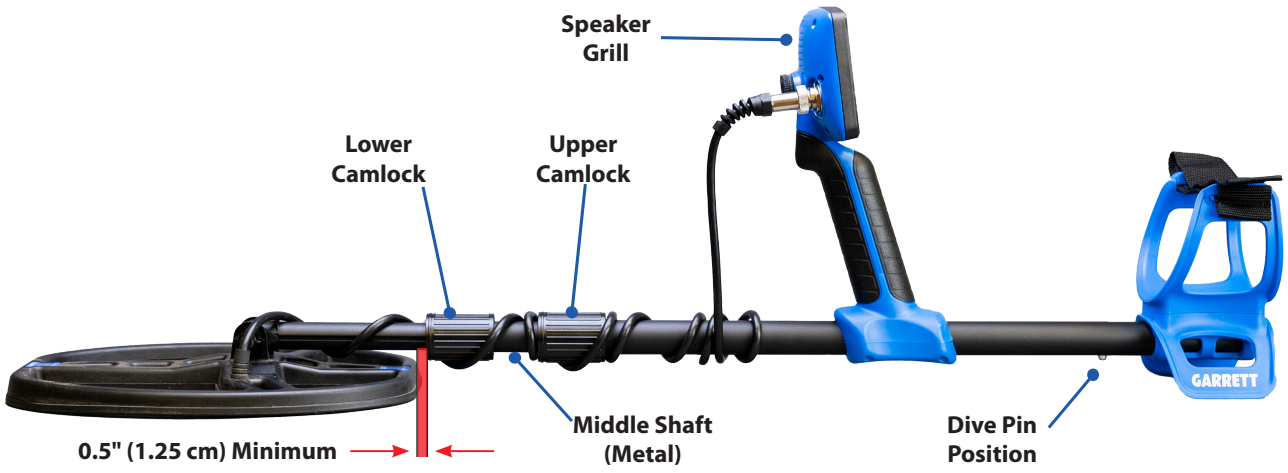
For submerged (diving) use, your *Vortex CSI* can be collapsed as shown below. Loosen the upper camlock and collapse the middle shaft until the pin locks into the position closest to the arm cuff.

To reduce detection of the middle metal shaft, make sure the searchcoil is properly adjusted. With the searchcoil folded flat (*as shown below*), allow at least one-half inch (1.25 cm) between the tail of the coil and the lower camlock.

After using *Vortex CSI* in any body of water, it is very important to properly rinse the detector with fresh water to remove the sand or sediment before collapsing the stems. Ensure the connectors are fully dried before attempting to recharge the detector's battery.

If the *Vortex CSI* external audio speaker sounds muffled after submerged use, shake out any water remaining in the speaker grill (on the back of the control box).

To activate Button Lock for submerged use below 6 ft (2m), simultaneously press the Plus (+) and Minus (-) buttons 3 times, quickly.



Detecting Techniques and Tips

If you are new to metal detecting, start searching in areas with sandy and loose soil to make it easier to learn how to use your metal detector, how to pinpoint a target, and how to recover it.

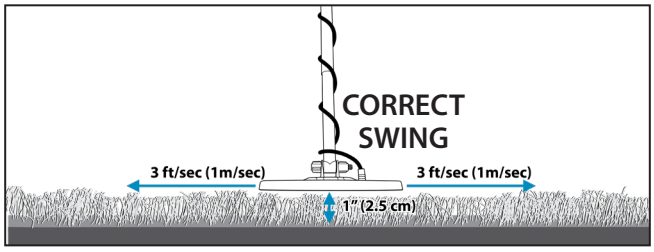
Adjust Detector Shaft and Coil Angle

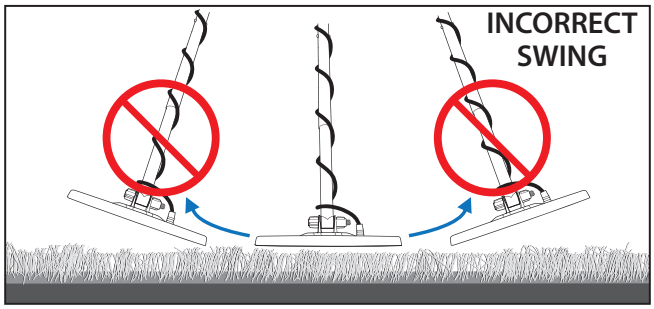
Loosen the *Vortex CSI* shaft camlocks and adjust the stem to an appropriate length. When your detector is properly adjusted, you should be able to swing the coil over the ground without stretching or stooping.

Your searchcoil should remain parallel to the ground as you sweep it. The coil's wingnut should not be overtightened. When properly tightened, the coil should remain in a stable position when scanning, but loose enough so that the coil's angle can be easily adjusted by pressing against the tip or tail of the coil.

Proper Coil Swinging

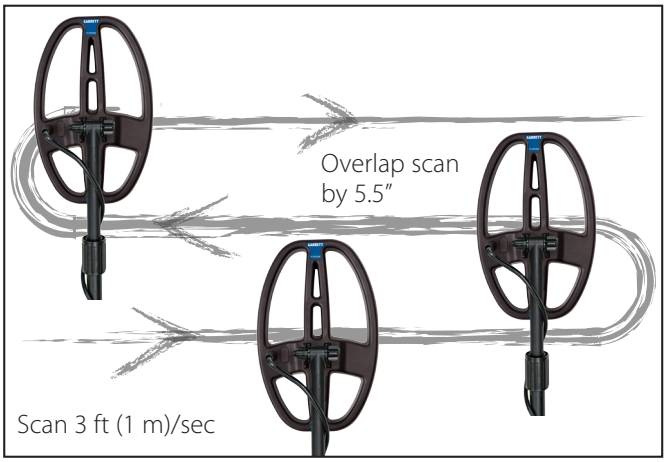
Keep your searchcoil height about 1 inch (2.5 centimeters) above and parallel to the ground at all times for the best detection results.





In uneven areas, scan your searchcoil parallel to plowlines and the water's edge. This will minimize the negative effects caused by uneven ground in plowed fields and varying amounts of moisture near the water. Do not swing the searchcoil perpendicular to plowlines and the water's edge, as this may produce abrupt changes in ground response that can reduce the detector's performance.

Walk slowly as you scan your searchcoil in a straight line from side to side at a speed of about 3 feet (1 meter) per second. Advance the searchcoil about half the length of the searchcoil at the end of each sweep.



Electrical Interference and Ground Noise

Detector performance can be affected at times by electromagnetic interference (EMI), which can create false signals or an inaccurate Target ID. Some common EMIs are electric fences, power lines, phone towers, and other detectors operating nearby.

To reduce or eliminate the effects of EMI, press the Menu button and scroll to Channel. Use the Plus (+) or Minus (-) buttons to find a Channel, or minor Frequency shift, that results in more stable detector performance.

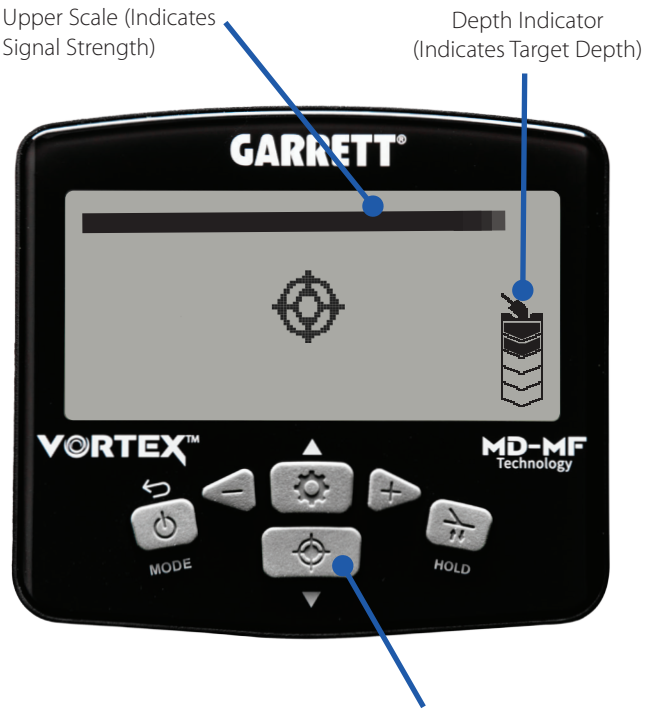
Ground noise, or ground interference, may be experienced in environments where high levels of ground mineralization are present, as is often found in gold fields. To eliminate or reduce the effects of ground noise, ground balance your *Vortex CSI (see Ground Balance section for full details)*.

Pinpoint

Accurate pinpointing enables fast recovery with the smallest hole possible. To use Pinpoint:

- Position the searchcoil to the side of the target's suspected location at a fixed height above the ground.
- Press and hold the Pinpoint button and slowly sweep the searchcoil over the target area while maintaining a fixed height above the ground (approximately 1 inch).
- Sweep the searchcoil side to side and front to back in a crosshairs pattern to locate the peak signal, indicated by the loudest audio and the greatest number of segments on the upper scale.
- The Pinpoint symbol displays on the LCD while pinpointing, and the depth of a coin-sized target is indicated.

It is recommended to practice pinpointing in a test plot.



For the best pinpointing results, maintain a fixed height above the ground (approximately 1 inch).

Indicates pinpointing center of the *Vortex* 6" x 11" DD Viper Searchcoil.

Note: Alternative pinpointing methods using a DD searchcoil are demonstrated in the *Vortex CSI* training video, which can be found on garrett.com.

Firmware Updates

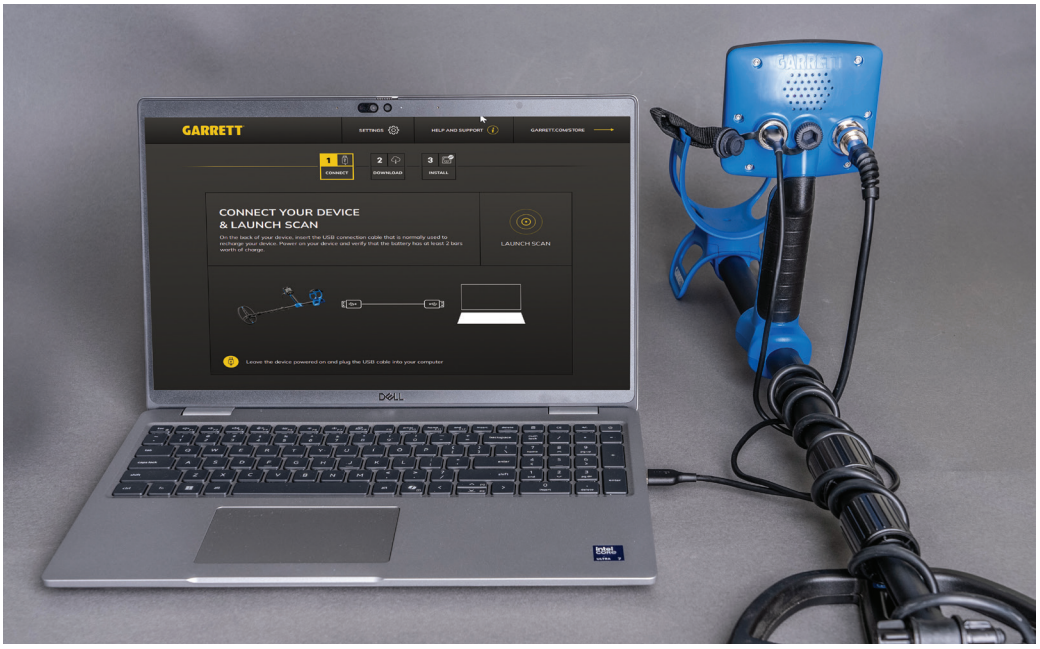
Any firmware updates made after the *Vortex CSI* released will be announced on the product's web page, along with instructions. Basic firmware updates are free for *Vortex CSI* owners.

To update your Garrett detector, a PC running Windows 10 or newer or an Apple running macOS 10.13 or newer is required. You will need to be connected to the internet to perform your update.

Note: To access updates, you must be a registered user on the garrett.com website.

Please visit this site for complete details on how to: locate and install the Garrett Installer software, connect your *Vortex CSI* to your computer via the USB-C port on its control box, and complete the update.

Note: Your *Vortex CSI* must be adequately charged (at least two bars of battery indicated) in order to complete an update.



◀ Connect to internet, launch Garrett Installer, and connect USB-C charging cable to *Vortex CSI* USB-C port. ***Note:*** Only use Garrett-provided charging cable.

General Advice

Bench Tests

You should conduct bench tests to become more familiar with the *Vortex CSI*'s operation, including the use of the special Bullets and Steel Casings Modes. Suggested test items should include:

- Bullets and casings of various compositions, including brass, copper, and steel
- Iron nails
- Conductive non-ferrous targets (coin or gold ring)
- Bottle caps or steel washers

To conduct a bench test, place the searchcoil on a flat, non-metallic surface that is several feet from other metallic objects. Testing is recommended in an outdoor environment to avoid the challenges of electrical interference indoors that might require reduced sensitivity settings.

To reduce electromagnetic interference (EMI), particularly when testing a metal detector indoors, lower the searchcoil level to the ground or table surface where you are testing *(see image below)*.

Begin by testing in Zero Mode. Pass the test items individually across the searchcoil at a distance of 3 to 4 inches (8 to 10 centimeters. Observe the Digital Target ID for each item and the proportional audio characteristics. Use both large and small test pieces at varying distances from the searchcoil to observe the levels of their responses and the audio tones that each item creates.

For bench testing, place the searchcoil on a flat, stable, and non-metallic surface that is several feet from other metallic objects.

Discrimination Bench Test

Using the same method described above, pass the iron nail across the searchcoil. Note that ferrous (iron) objects can create different Target ID numbers when passed in front of the coil in different orientations.

With the factory preset level of 0 Iron Discrimination, the nail produces a low tone. If the iron nail registers up to a 26 on the Digital Target ID (based on multiple swing orientations), press the Menu button and scroll to the High-Resolution Iron Discrimination menu setting. Use the Plus (+) and Minus (-) buttons to move the Iron Discrimination setting up to 26. Pass the iron nail across the searchcoil again to verify that it has been eliminated from audible detection.

If not, raise the Iron Discrimination setting a little higher using the Plus (+) button until the iron target no longer produces an audible response.

Record the results of your bench tests and refer to them when working in the field. Knowledge of the audio characteristics and discrimination features of your *Vortex CSI* can reduce the amount of uncovered trash targets.

Create a Crime Scene Test Plot

Learn your *Vortex CSI* further by creating an outdoor target test plot. Scan it thoroughly to remove all metal from the ground. Next, select various bullets, casings, a dummy pistol, a knife, a bottle cap, a nail, pull tabs, and other targets. Place the targets at varying depths, and create a legend for your test garden.

Listen to the tone of each target while scanning over your test plot. With experience, you will begin to recognize the different tones the *Vortex CSI* makes when it encounters metallic items. Practice with the use of various modes and discrimination settings to avoid digging undesired items.

General Advice

Crime scene investigators in Florida practice identifying and recovering evidence items in a test plot environment. Including natural obstacles and various metallic trash items in your test garden can help prepare operators for real-life scenarios.

Some law enforcement training facility test plots may simulate realistic recovery situations, such as embedding a bullet in a fallen log. Another scenario could involve placing a desired target in close proximity to scattered iron trash items to test the detector operator's ability to separate a good target from nearby trash targets.

Caring for Your Vortex CSI

Your Garrett detector is rugged, designed for outdoor use. However, as with all electronic equipment, there are some simple ways you can care for your detector to maintain its high performance:

- Avoid extreme temperatures as much as possible, such as storing the unit in a vehicle trunk during the summer or outdoors in subfreezing weather.
- Keep your detector clean. Disassemble the stem and wipe it, the control housing, and the searchcoil with a damp cloth when necessary.
- Recharge the detector's battery at least once a year if you are not using it regularly.
- Hand-tighten caps on the back of the control box when charging cables or wired headphones are not in use.

Troubleshooting

SYMPTOM	SOLUTION
No Power	1. Connect to the charger and verify the battery icon is blinking (indicating charge is in progress). 2. Check the charging cable and charger.
Erratic Sounds or Target ID Cursor Movement	1. Ensure the coil connector is secure and the coil cable is snugly wound around the stem. 2. Perform a factory reset to clear all settings by holding down the Power button for 5 seconds. 3. If using the detector indoors, be aware that excessive amounts of electrical interference exist, plus excessive amounts of metal found in floors and walls. Move outdoors to test the unit in area of ground clear of excessive metal, buried or overhead power lines, etc. 4. Determine if erratic noise is caused by electrical interference or something else. Hold the coil perfectly stationary on the ground away from any target. a. If noise continues, then it is likely caused by electrical interference: i. While keeping the coil stationary, step through all Channels to find the quietest. If needed, change Frequency and again step through all Channels. ii. Reduce sensitivity, if needed. b. If noise stops when coil is stationary, it is likely due to ground or metal detection: i. Ensure *Vortex CSI* is properly ground balanced. ii. If Ground Balance is below 50, use Multi-Salt Frequency. iii. Investigate remaining responses, like deep/faint signals that are marginally detectable. iv. Reduce sensitivity, if needed.
Intermittent Signals	Intermittent signals typically mean you have found a deeply buried target or one that is positioned at a difficult angle for your detector to read. Scan from different directions to help define the signal, or try selecting a different Frequency to possibly enhance the target's response and scan again. In the case of multiple targets, switch to Zero Mode or press the Pinpoint button to precisely locate all targets. ***Note:*** Iron targets may cause intermittent signals. You can identify iron targets in Zero Mode.
Unable to Find Specific Targets	Ensure you are using the correct mode for the type of hunting you are doing. If specifically hunting for brass casings, Bullets Mode is your best choice to eliminate other undesirable targets. You may also use Zero Mode, which detects all metal targets to ensure desired targets are present.
Inconsistent Target ID	If your Target ID changes erratically, chances are you've found a trash target. However, Target ID may bounce if a desired target (such as a casing) is not parallel to the searchcoil (e.g., on edge). It may also bounce if there is one or multiple trash targets lying next to the good target. Scan from different directions until your Target ID becomes more stable. Higher ground mineralization may also cause the Target ID to be unstable. ***Note:*** Large, flat pieces of iron – depending on their orientation in the ground – can read as a good target or can cause erratic Target ID cursor movement.

Warranty Information

Your *Vortex CSI* detector is warranted for 36 months, limited parts and labor, but does not cover damage caused by alteration, modification, neglect, accident or misuse.

In the event you encounter problems with your *Vortex CSI* detector, please read through this User Manual carefully to ensure the detector is not inoperable due to manual adjustments. Press and hold the Power button for 5 seconds to return to the recommended factory settings.

You should also make certain you have:

1. Checked your battery charge and connections. A low battery is the most common cause of detector "failure."
2. Contacted your dealer for help, particularly if you are not familiar with the *Vortex CSI* detector.

In the event that repairs or warranty service are necessary for your *Vortex CSI*, contact the retail outlet where your detector was purchased. To avoid excessive shipping and import charges, do not attempt to return a Garrett product to the factory in the United States.

Information on international warranty/repair needs can be found on the Garrett website: **www.garrett.com**. Click on the **Countermine & CSI** division and then the **Support & Training** menu for more details.

Regulatory Information

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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Ce produit est conforme aux normes RSS exemptes de licence d'Industry Canada. Son fonctionnement est soumis aux deux conditions suivantes : (1) ce dispositif ne peut pas provoquer d'interférences et (2) ce dispositif doit accepter toute interférence, y compris celles pouvant entraîner un dysfonctionnement.

Z-Lynk Specifications

Audio Delay:	17 ms
Audio Bandwidth:	30-18,000 Hz
Operating Frequency:	2406-2474 MHz
Transmit Power:	9 dBm EIRP
Certifications:	FCC, CE, UK, CA, IC, AS/NZ

Detector Specifications

Operating Frequency:	5-25 kHz
Transmit Power:	41 dBuA/m at 10 m
Certifications:	FCC, CE, UK, CA, IC, AS/NZ

Technical Specifications

Specification	VORTEX CSI
MD-MF Target ID Scale	2-Tier Target ID Scales
Frequencies	Multi-Freq., Multi-Salt, 13 kHz
Search Modes	Zero, Bullets, Steel Casings, Beach, Custom
Notch Discrimination	☑
High-Resolution Iron Discrimination	☑
Sensitivity Settings	8
Z-Lynk Wireless	☑
Channel (EMI Elimination)	☑
Auto Ground Balance	☑
Number of Tones	2-Tone, 3-Tone
Volume Control	☑
Iron Volume	☑
Button Lock (Dive Mode)	☑
Pinpoint	☑
LCD Backlight	☑
Battery Condition Indicator	☑
Length (Adjustable)	24.75" to 56.75" (62.86 cm to 144.14 cm)
Total Weight (With 6"x 11" Coil)	2.95 lbs (1.34 kg)
Full Submersibility	16 ft (5 m)
Warranty	3 Years, Limited Parts/Labor