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HUNTING IN MINERALIZED GROUND WITH THE V3i

Rx Gain Sensitivity: This sensitivity control will influence both all-metal/pinpoint modes and the discrimination modes for the instrument. The setting for the Rx is determined by how much trash/iron is in the ground and the ground mineralization strength. The Rx gain being set too high can create problems with nails by making them chirp and sound off like a good target. Reducing the gain some at this type of site seems to help. Also, when the ground is really wet it seems to make the nails and iron targets sound off and chirp. The Rx gain and type of loop will react to the ground differently; this will also be true of bottle caps/iron.

All Metal Sensitivity: This sensitivity setting is for the all-metal/pinpoint modes and has no influence on the discrimination mode. This sensitivity will influence the mix mode operation. Usually I start out at 65 and go up as needed to get the desired sensitivity; having this set to low will make pinpointing a deep target harder and having it set high will make surface targets blare out and harder to pinpoint.

Disc Sensitivity: This sensitivity control only applies to the discrimination modes. This sensitivity provides the most sensitivity to targets in the discrimination mode, therefore set it high as possible while keeping the detector stable as I usually run mine from 85 to 92. The VDI and Spectragraph on the display is also controlled by this setting so if using the detector in an all-metal mode the display reporting can be controlled by adjusting this setting.

TX Boost: This sensitivity control will influence both all-metal/pinpoint modes and the discrimination modes for the instrument and will also have an influence on the ground mineralization. When used Tx Boost will reduce battery life of the instrument with the frequency of 2.5 kHz being the worse offender and 22.5 kHz being more efficient. Tx Boost also will help some in EMI areas, as the other sensitivities on the detector can be reduced which will reduce the influence of the EMI on the signals received.

Sensitivity Probe: The Sensitivity Probe was for trying to give a suggested gain on the Rx Gain but it was inaccurate and set too low so when the V3i came out the suggested gain was take taken out. The idea was to keep the ground signal around 10% but this proved out to be to low. The signal it is measuring is coming off the preamp or the first stage so try to keep it around 20% and not approach the 100% as this will cause an overload. The can also measure noise level for the area and then it might give the user an idea if a frequency offset or even a different frequency is needed.

With that being said I usually do not use or look at this information as the information that I check is the ground probe and then make adjustments on the fly. As far as the Noise level goes if emi is a problem I just put the detector in the pinpoint mode and see if the audio is pulsating. If it is, I will use the frequency offset to find the least influenced set of frequencies or frequency. Most the time I just start hunting and make adjustments on the fly using the Live Control Bar.

S.A.T.: S.A.T. stands for Self Adjusting Threshold. S.A.T. can be used to help minimize or smooth out the ground noise in the all-metal modes, S.A.T. requires loop motion as you stop over a target and the target will disappear as the audio will return to the audio threshold. The SAT speed is for the all-metal mode and has no influence on the discrimination mode operations or pinpointing of targets. When hunting in all-metal or mixed mode I usually set this to from 5 to 10. Lowering the number on the adjustment the longer it takes for the audio to return to threshold and the higher the number the quicker it will return to audio threshold. Having the S.A.T. set to deal with nasty ground is very useful when hunting for gold nuggets in mineralized ground, as a small nugget will be easier to hear if set correctly not too fast or too slow. The same can be said for targets while hunting for coins or relics in all-metal modes or mix modes with detector.

3-Frequency: Uses all three frequencies to report data and audio information. This selection will be the best on target data reliability reported as it is using all three frequencies to classify the target. In mineralized ground this can be very useful as targets respond differently on signal strength at each of the different frequencies so that there is a better probability of calculating the correct VDI of the target. Not as sensitive as when using a single frequency but with turning the sensitivity gains up it can be almost as good as in mineralized ground, the ground usually will be the determination of how deep the detector will go. However, using single frequency of 22.5 kHz will do better on small targets (gold chains) than the 3 frequency mode and the 22.5 kHz will also make the small foil sound better as this is the trade off.

Best Data: Best Data is for three frequency mode and reports the VDI that comes from the strongest signal receive and with the strongest frequency showing up on the spectragraph corresponding to the strongest VDI bar. The other two frequencies may or may not line up to the correct VDI bar with the strongest frequency bar. The audio will follow the strongest frequency received so it is possible for example to have the 22.5kHz respond as a good target while the other two frequencies (2.5kHz and 7.5kHz) will come in as a rejected VDI bar or even skewed on the spectragraph.

Correlate/Span Limit/Wrap: Correlate mode is for the three frequency mode and reports the VDI when two of the three frequencies agree on the VDI of the target. The VDI can be set with the span limit on how far apart the VDI must be in order to report the VDI. The spectragraph will still show where the target is being reported at on that particular frequency and all the data that is being received not just correlated data. The correlate mode helps on iron chirps and seems to do better in the mineralized ground as the audio will give off a better beep on targets. As both correlate mode and best data looks at the VDI /phase of the target and then processes the audio information according to the setting of the machine such as discrimination, recovery delay, tones and the list goes on.

Salt Compensate: Salt Compensate mode does a salt subtraction in simplistic terms to remove the salt signal and still be able to ground balance to the ground. This operation mode has less sensitivity than the other frequency modes as it is more like the DFX which was always in the salt compensate mode. Ground balance is automatically defaulted to salt (soil type); therefore it is not necessary to change soil type setting in soil type. This mode may not be as sensitivity to small targets (low conductivity targets) that come in the area of salt due to the subtraction for salt.

Single Frequency: The use of single frequency will give the best sensitivity as all the energy is being put into the single frequency and not spread out among the three frequencies. Each frequency will respond better to a group of targets low conductors 22.5 kHz (0 to 24 VDI), medium conductors 7.5 kHz (24 to 74 VDI), and high conductors 2.5 kHz (75 to 95 VDI). The VDI numbers are just an approximate range of where they change from one frequency to the next frequency. The 22.5 kHz will respond better to smaller targets such as gold, silver chains and small coins, but the down side is it will also respond better to the foil but this is where the these items usually show up on the VDI unless there are big. The 7.5 kHz responds better to that horrible zinc penny and to lead bullets that the relic hunters like find. And finally the 2.5 kHz will respond better to the quarters, silver dollars and nice size silver rings.

Loctrac/Autotrac: Usually set to Loctrac and then the instrument is manually ground balanced. Once the instrument is balanced I double check the ground balance in the pinpoint mode by raising and lowering the coil to the ground for little or no change in threshold. This very critical to have the detector properly ground balance. Remember if you are using a ground balance offset then the threshold will reflective this as the loop is lowered and raised to the ground. Once the instrument is ground balanced I will just rebalance as required when hunting. The Autotrac can change the ground balance point on deep weak signals and thus change the audio response of the target and to me this is undesirable. Also, if running the instrument a little hot and the instrument is set down on the ground and the detector starts chattering, then ground balance point will change and then the instrument will need to be reground balanced once the target is

recovered searching for a new target begins. If a in line probe is used this to can change the ground point if autotrac is enable as it is hooking up another coil to the detector and the instrument will start tracking to a new ground balance point.

Trac Offset: This will alter the ground balance point of the detector by either providing a positive or negative offset to the ground balance. Most people like to a slightly positive ground balance so a setting of +1. This will enhance some of the signals received and may make the sound come in a little stronger. This will also enhance the edge of iron effect and the nails may chirp more. By using no offset or a negative offset for the ground balance this can be minimized but the enhancing of other target signals may not happen.

Autotrac Inhibit: When using Autotrac as this will only delay the detector from changing the ground balance on a rock/soil that falls in the ground balance range as it will take more readings from the ground to change the ground balance point. In other words, Autotrac inhibit will not allow the ground balance point to change instantly from a rock or target that happens to be in the range of ground balance range. It will require more than one or two hits before the ground balance point will change. With Autotrac inhibit setting off; the change of the ground balance point will start changing quickly if targets (rock/soil) are encountered in the ground that fall into the ground balance range. Hunting in mineralized ground that has rocks at different ground balance point than the dirt can play havoc with the ground balance point so Loctrac is a better choice just for this reason. Track inhibit does not have stop the instrument to tracking to a target that is out of the ground balance range as is done automatically by software.

Soil Type Normal/Salt Range: This control is for allowing the detector to either balance in the range of normal ground or all the way up to salt when hunting in single frequency or 3 frequency mode. (This should not be confused with salt compensate mode as salt compensate mode will do a salt subtraction in simple terms and defaults the soil type to salt range regardless of where the soil type is set.) If the instrument is ground balancing correctly in the normal soil type range then there is no reason to switch to the salt range on soil type, If the instrument does not ground balance in the normal soil setting and is always going positive (threshold gets louder as the loop approaches the ground) then switching to salt range should allow the detector to ground balance to the appropriate spot. In Salt mode it is possible to ground balance to iron such as nails but it will allow the detector to ground balance to the salt beach, the setting of Soil Type to salt will not have the salt compensate mode benefit found under Frequency.

Stereo Mix Mode/Mix Mode: This provides the all metal audio and disc audio of the target. Mix mod will provide the all metal signal and then when an accepted disc response is encountered it the discrimination audio will take over. With Stereo Mix mode headphones are required that have stereo capability as in one ear you will hear the all metal audio and then in the other ear it will be the disc response so the full audio is always heard unlike the mix mode where disc audio takes over the all metal audio. The all metal audio can give indication of being out of ground balance with the detector if the loop is lifted up a little on the end of the swing with the threshold of the all metal going louder or quieter. The disc audio can start to become chattier or seems too false if the machine out of ground balance. This would be true if just hunting in all metal or just in disc modes and these symptoms are that of a detector out of ground balance,

Disc Setting off/ Tone Settings: These setting can reject targets with either using the Disc setting rejection (Discrimination) or by turning the tones of the VDI number to 0 (under custom tones) or even a combination of both. Some people like to turn Discriminator off completely and then just set the VDI numbers to 0 or even with a tone setting of 5 for the rejected VDI numbers. The tones of the VDI number can be set in blocks or groups to indicate targets of a certain type or even for targets to ignore but still wanted to be heard.

Recovery Delay: The delay setting is set to anywhere from 40 to 110 with 40 being used for a really trashy area and 110 for very little trash. Usually start off around 65 to 85 and adjust from that point for the amount of trash in the ground. A longer delay setting will give the deeper targets

a longer sound but it will make them easier to hear. The recovery delay is for the discrimination mode only. Recovery delay does pretty much what is being heard except as the signal received from the target decays on its slope if a stronger signal is received before the end of the original target signal, the stronger signal will take over and sound off. This would be for all targets regardless of being a higher conductive target or a lower conductor target. If the new target/signal goes above the signal threshold of the older target/signal, then the new one will respond before the old signal is finished. The down side is if then new signal is weaker than the one being processed it will not be heard until the recovery delay is finish or until a stronger signal is detected.

Bottle Cap Rejection: Bottle cap rejection will try and have an audio break up for bottle caps (iron); for the most part this is turned off in mineralized ground. If bottle caps are encountered then usually set bottle cap rejection to a setting of 1 to 4 as going much higher can cause a desirable target to break up in audio. By using the pinpoint mode (Meter/signal strength) it is easy to tell a bottle cap by comparing what the VDI was to the strongest frequency when pinpointed. Bottle caps a lot of time will VDI at 83 (quarter) but when pinpointed the 22.5 kHz will be the strongest on signal strength where as if it was a quarter the dominate frequency would 2.5 kHz. Should be noted that bottle caps can come in anywhere as it is the mixture of the metal that they are made with and different companies there is many different types and alloy mixtures. DD loops like bottle caps more so than the concentric coils but, with a DD loop if the bottle cap is gone over with the very front part of the loop the will break up more than being swept directly in the center of the loop.

Hot Rock: A hot rock for the V3 is considered iron or target below the phase/VDI number of the ground balance after balancing to the ground. These targets are to be considered cold rocks in the Gold prospecting world and hot rocks are above the ground balance point. On the V3 a hot rock/target below the ground balance point and these can include targets that wrap around the corner to the -95, -94 regions on the Spectrograph. This is one reason for the for the wrap function in the correlate mode.

Also I have not seen a lot of targets wrap around the corner when using Best Data, as usually the strongest signal of the three frequencies should be fairly close for that particular target. However, the other two frequencies that were weaker wrap around the corner. As far as single frequency goes, the targets may wrap corner.

Another way to deal with this is to accept the 95, -94 area and how many of these negative numbers a person can accept will be dependent on where the ground phase/VDI comes in at.

Usually Hot Rock is set to off, as the real VDI of the target will be reported and just not thrown into the VDI of +95 as these targets will come in below the ground balance point. Hot rock is only active for the discrimination mode and the settings between 10 and +10 provides different amounts of decrementing or incrementing for the audio response of +95 signals

Something to keep in mind is that iron can show up as +95 response as it is very dependent on where the ground balance point is coming in phase/VDI and if the dirt is mineralized and skewing the response of the iron to the region of being a Hot Rock

The Hot Rock Accept control (Off, -10..0..+10) is as follows:

OFF: When off the part of the software that does Hot Rock Accept is bypassed and not even used so the phase/VDI number is reported and displayed as to where they normally come in at usually a VDI reading of 95 to 90 or at least in my area that's where hot rocks come in at.
-10: When set to 10 the target/Hot Rock will be thrown into +95 and the audio has been decremented for this target. +95 VDI should be displayed.

0: When set to 0 display reports +95; however the audio is a do nothing state by not

decrementing or incrementing the target audio and not sounding off for this target. Originally this was set up this way so the audio would not decrement or increment when the target signal was being analyzed and a target had multiple VDI reading. This way the target audio response should not suffer due to the +95 hot rock responses.

+10: When set to +10 the target/Hot Rock will be thrown into +95 and the audio has be incremented for this target. +95 VDI should be displayed.

VCO: This setting is will be found All-metal, Mix Mode, Stereo Mix Mode and Pinpoint. Has no influence on the discrimination modes. Basically the audio threshold goes up in volume and pitch as the target gets closer to the loop with the highest audio pitch and loudest being in the center of the coil. The VCO can bet set for a different starting pitch to give the VCO more range when going up in pitch.

Modulation: Can be a preference on the setting as some like to hear the audio at full audio when a target is detected while others like the audio to be modulated which will make it softer in sound on deeper targets or targets that are fairly small. This Audio modulation is only for the discrimination (Disc) mode as when in the all metal/pinpoint mode the audio is already being modulated. When Modulation is under Mix mode or Stereo Mix mode it is referring to the discrimination audio. Personally I like to use the detector with no modulation so I can hear the target easier but the down side is a nail can be chirpier with the modulation off.

Visual Disc Reject: Off is a good idea, this way when hunting in mixed mode or stereo mix mode a VDI number will come up and may be valuable information. Nails may come in at a certain VDI while other targets will come in at another negative VDI number. However if Discrimination is turn off then all VDI numbers will show up on the display regardless if this is turned on or off as the VDI and spectragraph is done with the signal used for discrimination.

Filter selection: These filters will only be for the discrimination mode and not the all-metal/pinpoint modes. Usually at 5Hz band pass or 5Hz high pass due the slow sweep required to hunt in mineralized ground. The loop needs to be swept way slower for mineralized ground otherwise the targets may sound like chirps and can be easily confused with the sound of a nail chirp or may have no sound at all. It is a good idea that when the audio sounds off at all, to sweep the loop directly over the target to get the best audio response from target that is possible. If in doubt where the center of the target is, one can always pinpoint the target and then sweep over it. Again cant say it enough slow down on sweeping the loop in mineralized ground as the targets are harder to detect.
As far as selecting another filter it would be good to find a deep target or somewhat deep target and then adjust your sense levels the target is just barely picked. Then change your filter setting and see which filter works best for the sweep speed that you prefer. Varying the sweep speed of the coil to see the speed that needs to be swept for that particular filter is a good idea just to see the speed of the coil needs to travel. Some people like to bury a coin to do this but I prefer to use a target in the ground that has not been disturbed by digging.

The band pass filters are more sensitive to sweep speed of the coil than opposed to the High pass filters. If the emi (external noise) is not to bad using the 5Hz band pass filter will help out on cutting down on some of the noise as this has worked for me in a few places.

The High-pass filters are not so sensitive to the sweeping speed of the coil, but can pick up more EMI. The higher the filter the better the detector may deal with ground noise and maybe some chatter from iron but, with mineralized ground it requires a slower sweep so it is a mixed bag at best. I usually just use the 5 Hz filter unless there is a ton of iron in the ground then switching to the 10 Hz filters may help some on the chatter from iron.

Ground Probe: By highlighting the Ground Tracking box on the Live Control Bar and then pressing the zoom key to bring up the ground probe screen, raise the coil in the air (but must be

free of EMI) Highlight zero if not highlighted and press enter. Then put the loop on the ground in an area free of trash or targets and then read the screen as it will show the VDI of the ground, signal strength of the ground at each freq if you are in the 3 frequencies and the phase in degrees of the ground. This should give you idea of how strong the ground is and the VDI of the ground. The Rx Gain and Tx Boost, which coil is being used, and three frequencies or single frequency will have influence on the ground strength. A signal strength of the ground as follows 0 to 10% weak, 10% to 20% Moderate and 20% and up to be strong. So what do these strength readings tell me? When the ground is strong, lowering the Rx gain to around 5 or 6 is a good starting point or if the reading is weak to moderate strength, starting around 10 to 11, and then make adjustments while hunting, as this is just a starting point for the Rx gain. Also the amount or trash in the ground or if it is a tot lot how close can the loop get to the metal poles will have a big influence on where to set the gains/sensitivities of the instrument.

This is just of a rule of thumb to start out with and if not familiar with the ground conditions of the area. Then use the Live Control Bar to make adjustments on the fly to adjust for the ground conditions as all areas are a little different.

LOOPS: Double D loops will work better in the mineralized ground as opposed to concentric type coil; however the concentric type loops will do better in weak to moderate ground. I prefer to use dd coils as most the ground that I hunt in is moderate to strong in mineralization and sizing the targets are easier with a DD loop. One of the down sides to the DD coils is that sometimes pinpointing the target can be a little off especially if the coin is on edge or the target shape is irregularly like a piece of trash (can slaw). The size of loop being used can be a mixed bag as the loops need to be small enough to get around in trashy areas but still need to be big enough to give the depth for picking out the deeper targets.

GROUND INFLUENCE ON TARGETS: Effects of ground on targets can create an inaccurate VDI number especially when the target is deep. This may be in the form of the VDI wrapping around the corner or even going lower than it would when the target is swept in front of the coil in the air. It can also cause a good target to break up in audio even though the target is a good target. Therefore, it is very important to dig all non-ferrous targets in mineralized ground. But greedy as I am leaving a gold ring or gold chain in the ground and then have my hunting partner come behind and dig it up, as this is not a good feeling to experience.

Burying coins in mineralized ground for testing can be a mixed bag as the coin once it reaches a certain depth will not register the correct on the VDI scale in discrimination modes. This is caused by the instrument being overwhelmed by the changes in ground due to the hole that was dug to put the coin in. However, it still should be able to be picked up in the all-metal mode/or pinpoint mode as long as the all-metal sensitivity is high enough to detect the target. With a low gain setting in the all-metal mode a native target such as a thin silver dime may be hard to pick up as I have seen this happen myself and I would dig another inch or so and the dime appeared even though the pinpoint mode was not picking up the target. This is why I never check the hole for more targets in the discrimination mode and always use the all metal/pinpoint mode to check the hole. With the plug being opened up and checking in discrimination mode the VDI of a target maybe way different from it normally is so it is best just to pinpoint the target and dig it up.

PINPOINT: When pinpointing the target it is a good idea to size target as this will tell how big the target is and maybe a decision can be made on whether to dig it up or not can be made. When doing this try different angles to the target to get an idea of the shape and see if a double beep/hump occurs on the target as nails will sometimes give a louder response on the end of the nail while nulling in the center of the nail. When pinpointing the target with signal strength each frequency in three frequency mode will respond differently, low conductors 22.5 kHz (0 to 24 VDI), medium conductors 7.5 kHz (24 to 74 VDI), and high conductors 2.5 kHz (75 to 95 VDI). The VDI numbers are just an approximate range of where the change from one frequency to the next frequency and only non ferrous targets are listed. If a VDI is reported such as 92 and the strongest in pinpoint is the 22.5 kHz then a good assumption would be that something is not quit

right with the target. Still might be a good idea to dig the target up and see what it is and with experience a good estimate can be made when this happens on the target but nothing is fool proof.

POLAR PLOT: The polar plot is very useful for bottle-caps that are shallow (5 to 6 inches up depending on the ground. The vectors that are being shown are not the normalized vectors. Another way to think about this is for the un-normalized VDI numbers in polar plot form. Hence with the 22.5kHz the high conductive targets (quarter) will be shown toward the X axis as in un-normalized with a VDI of 90-91, while 7.5kHz will above this with the 22.5kHz line with a VDI of 83 and finally with 2.5kHz the line will be above both 22.kHz and the 7.5kHz line and the un-normalized for the 2.5kHz should be around a VDI would 67.

Iron has a tendency to show a loop from the 2nd quadrant (top left square of graph) to the first quadrant (top right square of graph) when iron is swept over by the coil, hence, the loops shown on the graph. And this is what I use the polar plot. The loops on the graph shows the phase angle or VDI number changing as the coil is swept over the target as this is typical on some iron targets.

If you think in terms of VDI numbers instead of phase angle of the target then the top middle edge of the screen would a VDI of 0, far right middle edge of the screen would be +95 and then far left middle edge of the screen would be -95 (these would be on the lines or the axis that is formed on the screen.. The rest of the numbers would form a semi circle to complete the VDI numbers on top and then the lines would point to the VDI number.

I might only use this a couple times to help verify a bottle cap that is a little hard to tell from the signal strength of the 3 frequencies in pinpoint.