Metal Detector

Users Manual

Read this manual thoroughly before use

TS156D

INTRODUCTION

This instrument is a high-sensitivity metal detector designed to detect various kinds of underground metal objects.

Main Features:

- Two kinds of detection modes - Discrimination mode and Pinpoint mode
- Adjustable sensitivity
- Adjustable alarm sound volume
- Modifiable discrimination pattern
- Auto ground balance
- Target ID cursor helps operator determine the probable metal type of the target
- 3 kinds of alarm tones
- Target depth indication
- Battery level indication
- 3.5mm earphone jack

TECHNICAL SPECIFICATION

Maximum Detection Distance: About 8 inches for a US 25-cent coin

Operating Environment: Temperature: 0°C ~ 50°C

Relative Humidity: ≤ 85%

Storage Environment: Temperature: -20°C ~ 50°C

Relative Humidity: ≤ 85%

Battery: 1.5V alkaline battery, AA or equivalent, 6 pieces

Weight: About 1.2kg (including battery)

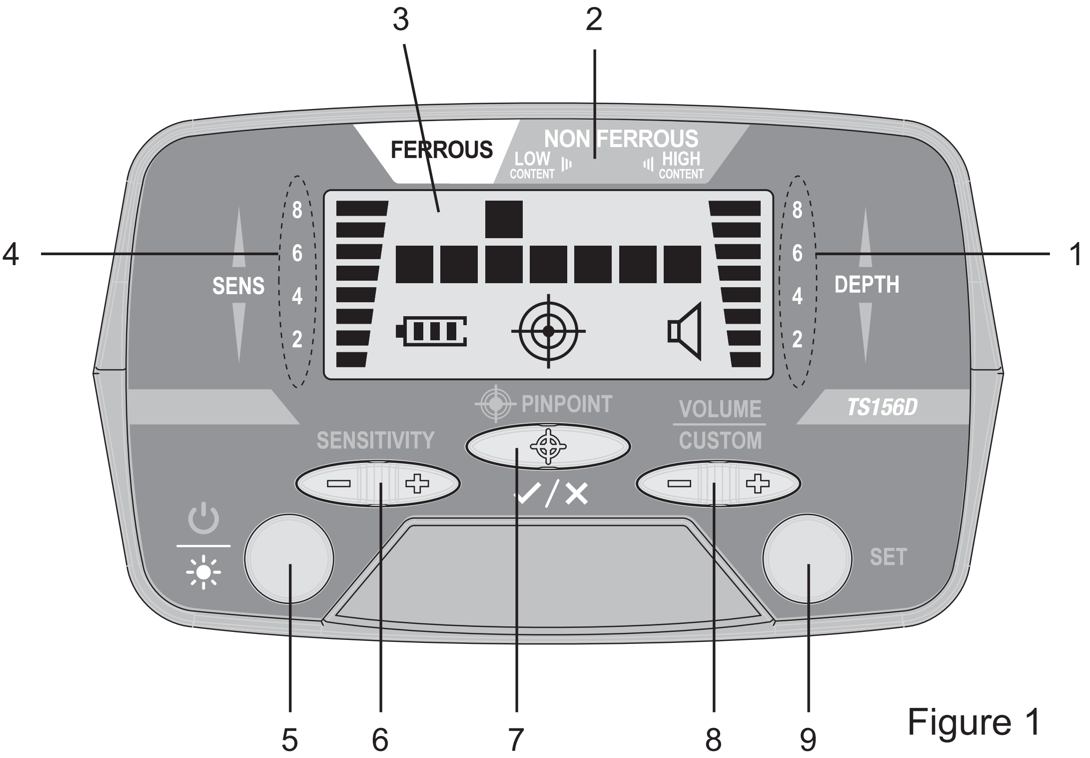

Figure 1

1. Depth Scale

   This depth scale is to be used in conjunction with the displayed target depth indicator bar for target depth prediction.

2. Target ID Legend

   Works with the Target ID Cursor to indicate the probable metal type of the detected metallic object.

3. Display

4. Sensitivity Scale

   This sensitivity scale is to be used in conjunction with the displayed sensitivity indicator bars graph to indicate the present sensitivity degree of the detector.

5. " ⏻/☀ " Button

   Press this " ⏻/☀ " button to turn on the detector. To turn off the detector, press and hold down this button for about 2 secs.

When the metal detector is on, briefly press this button to turn on or off the backlight.

6. " SENSITIVITY " Button

   Used to adjust the detector's sensitivity.

7. " PINPOINT " Button

   Except when the detector is in the Discrimination Pattern Setting mode, you can press this " PINPOINT " button to switch between Discrimination mode and Pinpoint mode.

   In the Discrimination Pattern Setting mode, this button is used to eliminate or activate the pixel located on the horizontal scale, directly below the Target ID Cursor.

8. " VOLUME/CUSTOM " Button

   This " VOLUME/CUSTOM " button can be used to:

   1. Adjust the volume of alarm sound.
   2. Move the target ID cursor to a desired position in order to create a desired discrimination pattern when the detector is in the Discrimination Pattern Setting mode.

9. " SET " Button

   Used to enter or exit the Discrimination Pattern Setting mode.

UNDERSTANDING THE DISPLAY

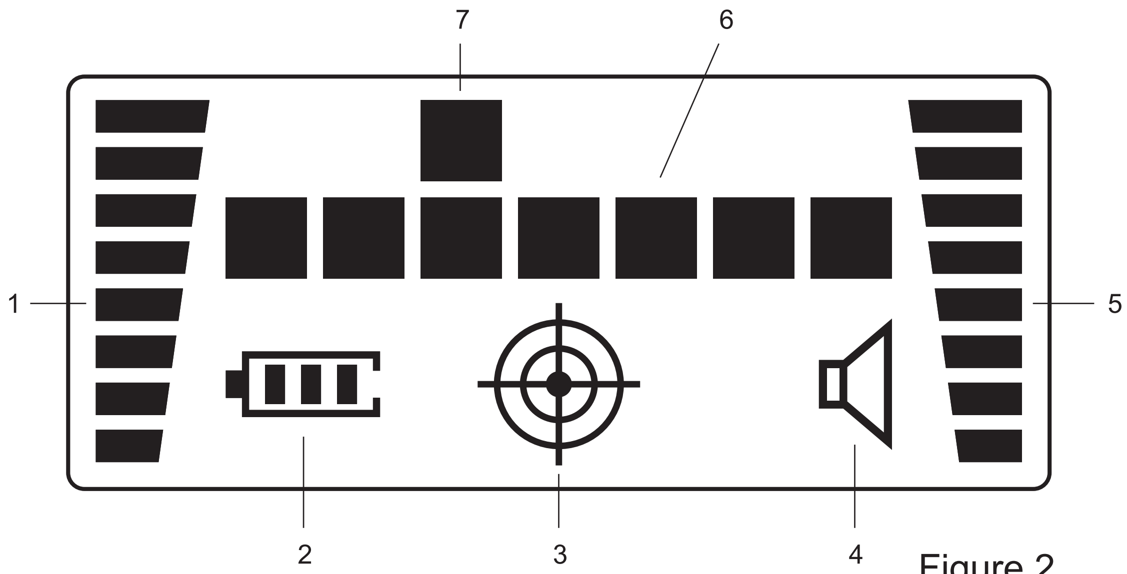

Figure 2

Explanations:

1.  ...... Sensitivity indicator bars

2.  ...... Battery level indicator

3.  ...... The metal detector is in Pinpoint mode.

4.  ...... The detector is in the alarm sound volume setting mode.

5.  ...... Target depth indicator bars or alarm sound volume indicator bars

6.  ...... Horizontal scale that shows the current discrimination pattern, with lighted pixels indicating accepted targets and blank pixels indicating rejected targets.

7.  ...... Target ID cursor

Overall Structure

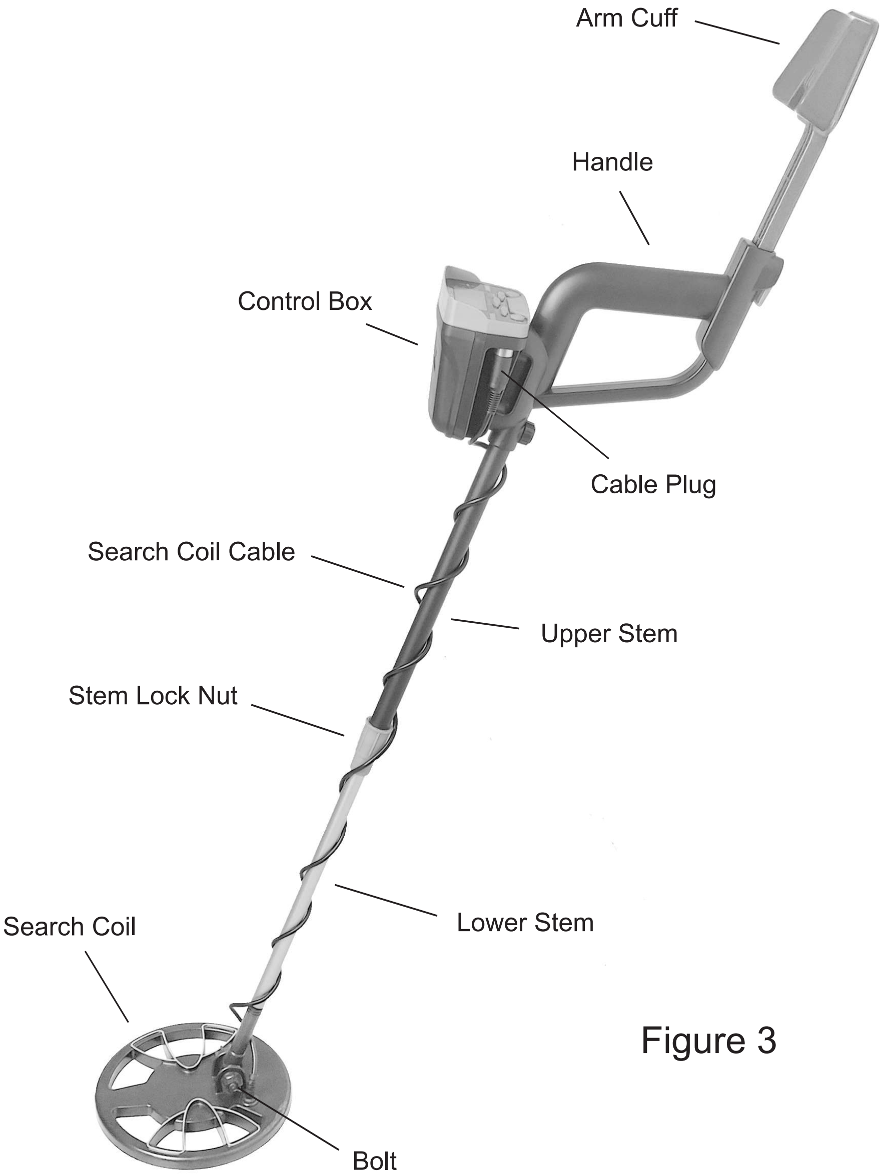

Figure 3

Upper Part Structure:

Tip:

You can slide the battery cover downwards to remove it.

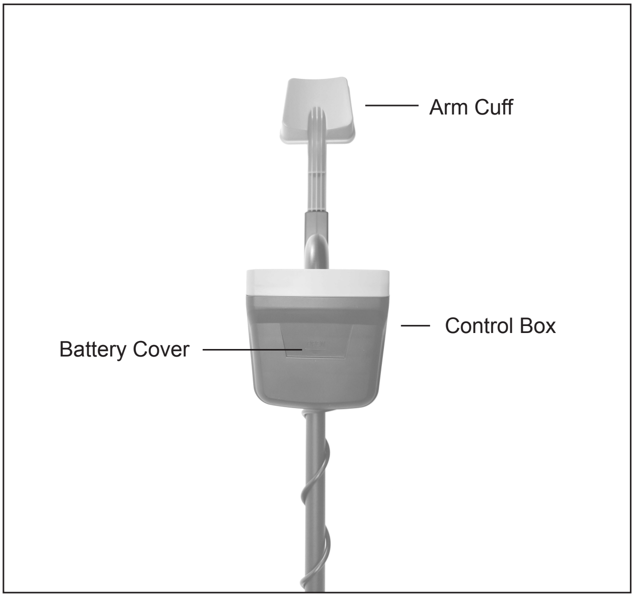

Figure 4. Front View of the Upper Part of the Detector

Tip:

After you gently pull up the end of the arm cuff lock by 90°, you can adjust the height of the arm cuff. After you finish the adjustment, pull down the end of the arm cuff lock to lock the arm cuff.

To remove the control box from the upper stem, counterclockwise turn the bolt that holds the control box to remove the bolt. Then move the control box upwards to remove it from the upper stem.

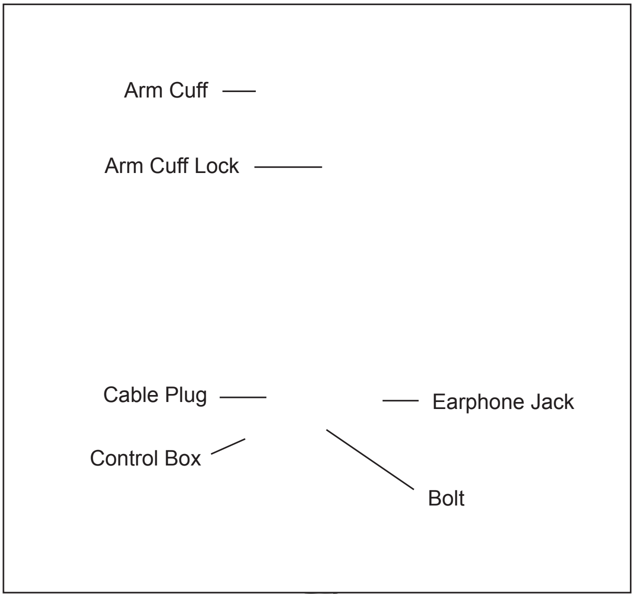

Figure 5. Back View of the Upper Part of the Detector

Assembly Drawing

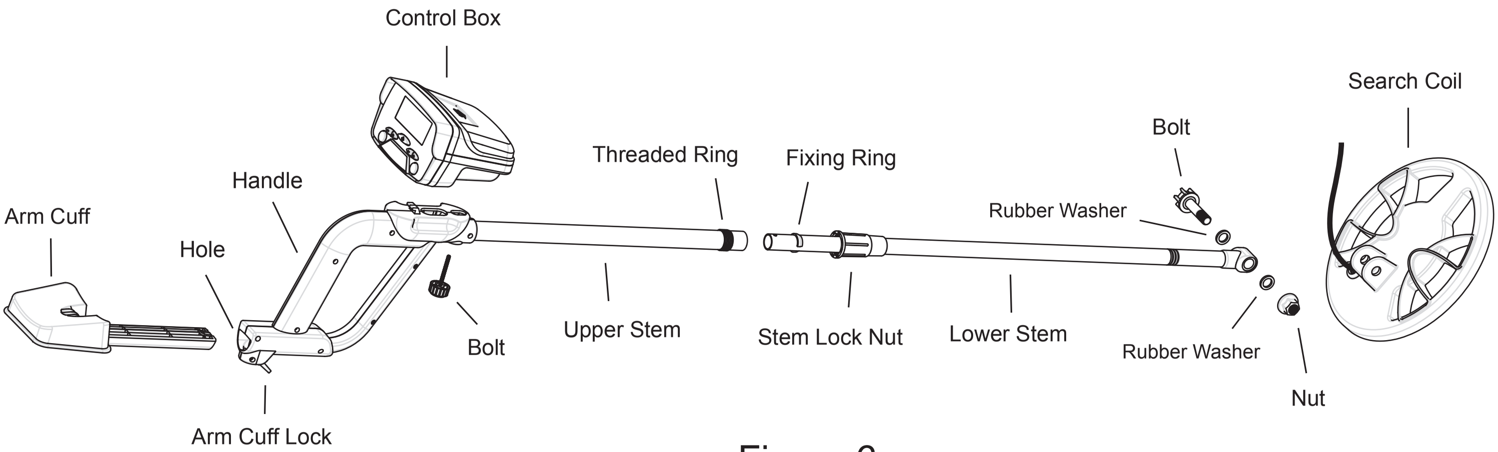

Figure 6

Note:

1. See the above figure, the fixing ring is placed around the lower stem, and its flat side faces the upper stem.
2. The two protrusions on the inner surface of the threaded ring must be fit into the two holes near the lower end of the upper stem.
3. If you want to use the arm cuff, insert it into the corresponding hole beside the handle to a desired depth and then pull down the end of the arm cuff lock to lock the arm cuff. Once inserted, the arm cuff can not be disconnected from the upper stem.
4. The two rubber washers are to be placed in the two circular slots at the two sides of the end of the lower stem before slipping the search coil onto the end of the lower stem.
5. To avoid damage, do not pull the search coil cable with force. When connecting the cable to the socket on the rear of the control box or disconnecting the cable from the socket, hold the cable plug instead of the cable.

How to adjust the length of the detector:

1. Gently and counterclockwise turn the stem lock nut until it loosens.
2. Adjust the lower stem's position relative to the upper stem by pushing in or pulling out the lower stem by a desired distance.
3. Turn the stem lock nut clockwise until the lower stem is secured.

Note:
Before adjusting the length of the detector, make sure that the plug of the search coil cable has been disconnected from the corresponding socket on the rear of the control box. Remember to reconnect the plug of the search coil cable to the socket after you finish adjustment of the detector length.

TARGET INFORMATION

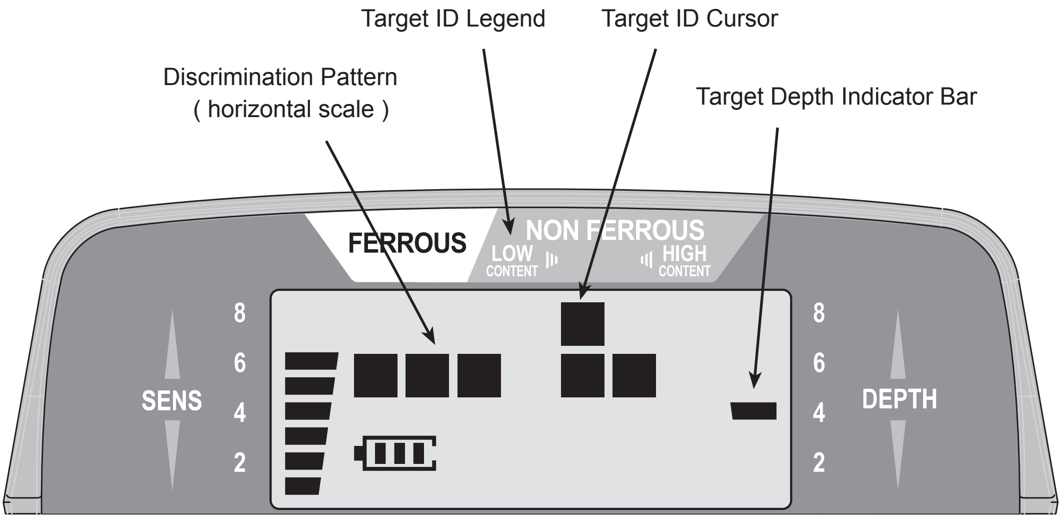

Figure 7

Target ID Legend

The Target ID Legend functions with the Target ID Cursor to indicate the probable metal type of the target, with ferrous (iron) targets at the left, non-ferrous targets which are thin or have low conductivity in the middle, and thick or high conductivity targets at the right.

Horizontal Scale

The horizontal scale shows the present discrimination pattern, with lighted pixels indicating accepted targets and blank pixels indicating rejected targets.

Target ID Cursor

In Discrimination mode, when the detector detects a target, a Target ID Cursor will display for this target if the metal signal is strong enough; but the detector will produce audible signal only for targets accepted on the horizontal scale and will probably not produce audible signal for objects rejected on the horizontal scale.

Category Value

Iron	Foil	Nickel	Pull Tab	Small Cap	Zinc	Dime	Quarter
Ferrous metal-nails, bolts, stainless steel, cast iron	Aluminum, tin foil	US 5¢ coin, newer pull tabs	Older pull tabs	Bottle screw cap	US pennies, Canadian $1 & $2	US 10¢ coin, older copper pennies	US 25¢ coin, US silver dollar, US half-dollar

Figure 8

Note:
Silver and Gold can be in multiple spectrums.
The above table lists the metal objects sequentially based on their conductivities. Do not relate these metal objects to the pixels on the horizontal scale directly.

In Discrimination mode, when the detected metal signal is strong enough, a target ID cursor will appear in a certain position to indicate the probable metal type (or category) of the detected metallic object. According to the position of the target ID cursor, you can predict the probable metal type (or category) of the detected object by referring to Figure 8 and the Target ID Legend (see Figure 7) above the target ID cursor. Figure 8 is essentially similar to the Target ID Legend but the information contained in Figure 8 is expressed using words and is far more detailed than the information contained on the Target ID Legend. You can use Figure 8 in conjunction with the target ID cursor like you use the Target ID Legend.

Coins will most likely have a similar value with each pass with the search coil due to their round shape. Gold and silver can actually be detected in various category values due to their metallic qualities. Smaller gold or silver objects will have a value different from that of a larger gold or silver object. Trash objects can give off a different value each time the search coil passes over it. The angle of the detector can also affect the identification of an object. If you decide to test the detector by passing a coin across the search coil, pass it with its flat side parallel to the search coil; this position is how you will find most buried coins.

Figure 9 shows an example display shown when the metal detector detects a US 25-cent coin buried about 3cm below ground surface.

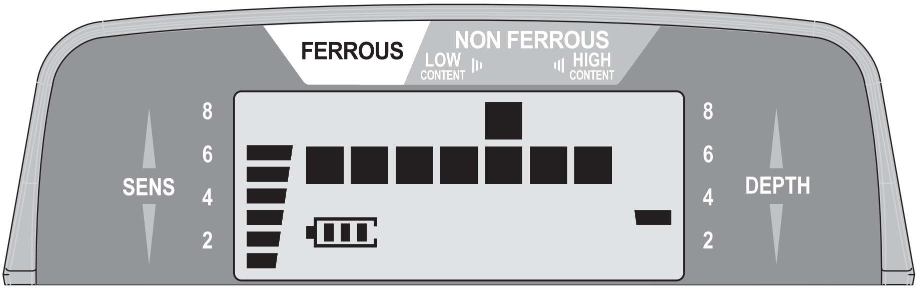

Figure 9

BASIC OPERATIONS

Turning on/off the Detector

To turn on the detector, just press the " ⏻/☀ " button. To turn off the metal detector, press and hold down this button for about 2 secs.

Turning on/off the Backlight

When the detector is on, briefly press the " ⏻/☀ " button to turn on or off the backlight.

Adjusting the Sensitivity

The detector has 8 sensitivity degrees. The detector's sensitivity is adjusted via the SENSITIVITY (+) button or the SENSITIVITY (−) button. The number of the displayed sensitivity indicator bars graphically indicates the present sensitivity: The higher the sensitivity of the detector, the larger the number of the displayed sensitivity indicator bars.

You can press the SENSITIVITY (+) button to increase the sensitivity or the SENSITIVITY (−) button to decrease the sensitivity.

Adjusting the Volume of Alarm Sound

The detector has 8 alarm sound volume degrees. You can press the " + " side of the " VOLUME/CUSTOM " button to increase alarm sound volume or press the " − " side of the " VOLUME/CUSTOM " button to decrease alarm sound volume.

When you adjust the alarm sound volume, the symbol " " will appear on the display automatically to indicate that the detector is in the alarm sound volume setting mode and meanwhile the display shows alarm sound volume indicator bars to graphically indicate the present alarm sound volume setting: The higher the alarm sound volume, the larger the number of the displayed alarm sound volume indicator bars.

Modifying the Discrimination Pattern

In Discrimination mode, the detector has 7 pixels or " notches " of discrimination, shown on the horizontal scale. You can modify the present discrimination pattern freely and create a desired discrimination pattern. To do it, make sure that the search coil of the detector is far away from any metallic object and inference source. Then press the " SET " button once to enter the Discrimination Pattern Setting mode, the Target ID Cursor will flash as an indication. Press the " + " or " − " side of the " VOLUME/CUSTOM " button to move the Target ID Cursor to the right or left until it is in the desired position. And then press the " PINPOINT " button to eliminate or activate the pixel located on the horizontal scale, directly below the Target ID Cursor. (See Figures 10 and 11.)

After you finish modifying the discrimination pattern or creating a desired discrimination pattern, press the " SET " button again to exit the Discrimination Pattern Setting mode.

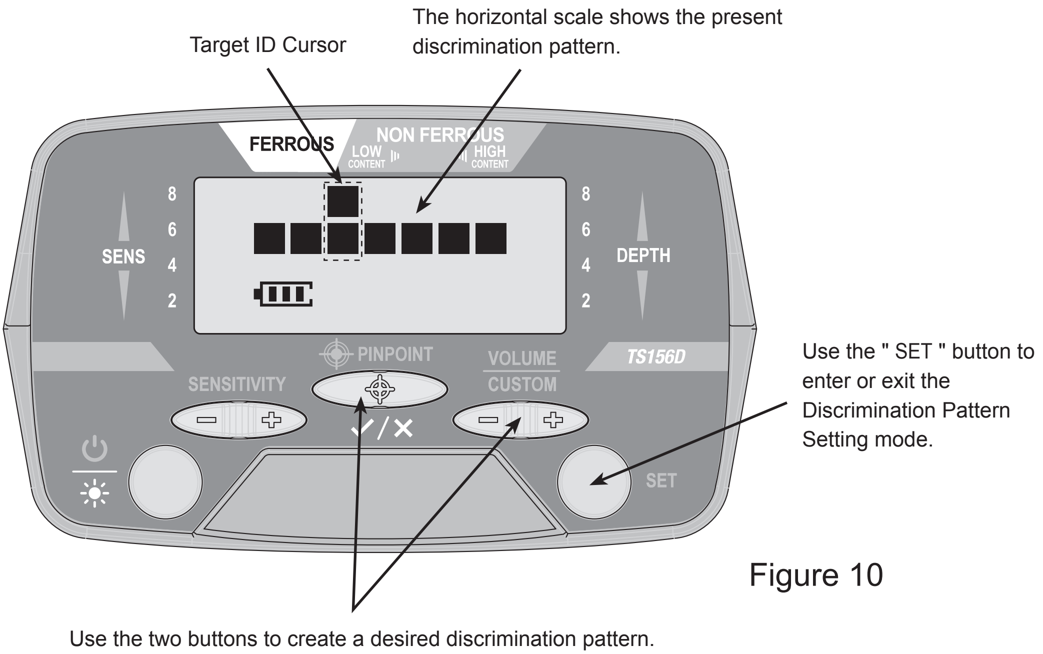

Figure 10

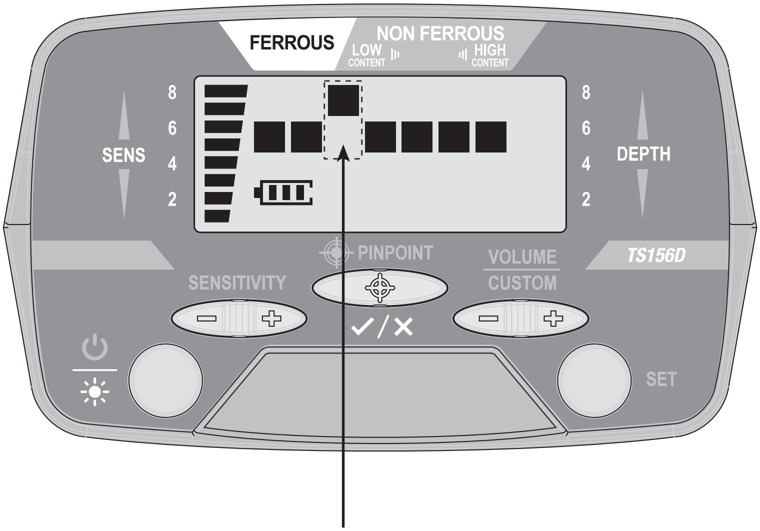

Figure 11

The pixel which is on the horizontal scale and directly below the Target ID Cursor has been eliminated.

Using the Pinpoint Mode

You can use the Pinpoint mode to detect and pinpoint any type of metal. To do it, first press the " PINPOINT " button once to enter the Pinpoint mode. The symbol " ⌖ " appears on the display as a Pinpoint mode indicator, and the detector emits a faint sound continuously.

In the Pinpoint mode, whenever the detector detects a metallic object, the sound from the detector will increase obviously. Move the search coil around the detected object while slowly moving the search coil toward the object according to the sound volume of the detector (the sound volume of the detector increases as the search coil approaches a metallic object). During the pinpointing process, the detector adjusts its sensitivity automatically, and in the end, the detected object can be pinpointed.

To exit the Pinpoint mode, just press the " PINPOINT " button again. The symbol " ⌖ " disappears from the display.

Note:

1. In Pinpoint mode, the detector does not have discrimination capability, thus all types of metal can be detected in Pinpoint mode.
2. In Pinpoint mode, your sensitivity and alarm sound volume settings are ineffective, the detector will use factory sensitivity and alarm sound volume settings.

Preparation Prior to Metal Detection

Before beginning an outside search, test the detector with the following metal samples:

- An iron nail
- A five-cent coin (nickel)
- A one-cent penny (zinc coin, after 1982)
- A 25-cent silver quarter

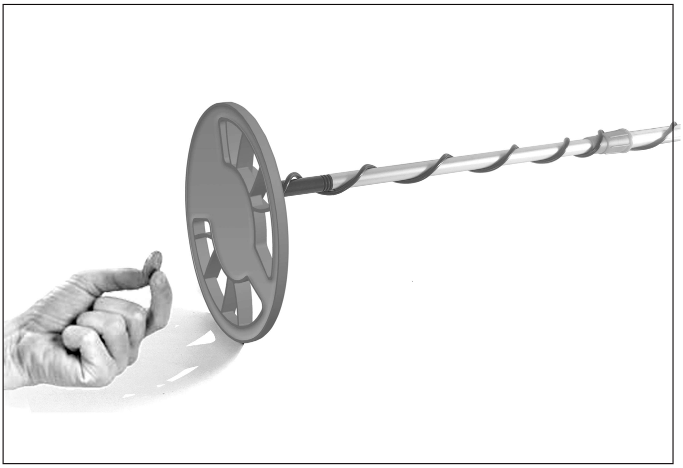

Figure 12

Place the detector on a wooden or plastic table with the search coil roughly perpendicular to the table surface (see Figure 12). Make sure the table is far away from TVs, computers, or any device that can cause electromagnetic interference.

Note: To avoid interference, remove any watches, rings, or other metal objects on your fingers and hands.

1. Press the " ⏻/☀ " button to turn on the detector. The detector sounds 3 different alarm tones, and the display shows all segments briefly and then shows the present discrimination pattern, the present detector sensitivity, and the battery level. The detector defaults to Discrimination mode.
2. Press the SENSITIVITY (+) button to increase the sensitivity or the SENSITIVITY (−) button to decrease the sensitivity until the detector's sensitivity meets your detection need. The display indicates the present sensitivity through the sensitivity indicator bars graph being displayed .

3. Press the " + " side of the " VOLUME/CUSTOM " button to increase alarm sound volume or press the " − " side of the " VOLUME/CUSTOM " button to decrease alarm sound volume until the alarm sound volume meets your need. During the adjustment, the symbol " " is shown on the display, and the display shows the alarm sound volume indicator bars graph to indicate the present alarm sound volume setting.
4. Refer to Figure 12, respectively pass the metal samples (the iron nail and 3 coins) across the search coil at a distance of 5cm to 8cm. When any of the metal samples passes across the search coil, a target ID cursor will appear in a certain position to indicate the probable metal type of the object being detected, and at the same time, if the target is accepted by a lighted pixel on the horizontal scale, the detector will sound a certain tone depending on the type of the detected metallic object. (The detector can sound three kinds of alarm tones in total, they are low-frequency audio signal, medium-frequency audio signal, and high-frequency audio signal, respectively.)

Through the above tests, you can quickly know the performance of the detector and know how to use the detector.

Tip: During test, the metal sample which you are using must be in motion.

Detecting Metallic Objects

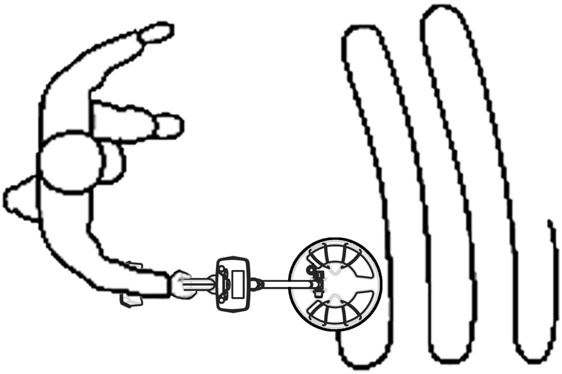

Figure 13

1. Press the " " button to turn on the detector. The detector defaults to the Discrimination mode.
2. Make sure that the displayed discrimination pattern meets your detection need. Modify the discrimination pattern if necessary.
3. Make sure that the detector's sensitivity and alarm sound volume settings meet your detection need. Adjust the sensitivity or alarm sound volume setting if necessary.
4. Scan for metallic object or target. During scanning, keep the search coil height approximately 5cm to 10cm above and parallel to the ground at all times for best detection results, walk slowly as you scan slowly the search coil in a straight line from side to side. When the detector detects a metallic object, a target ID cursor will appear in a certain position to indicate the probable metal type of the object being detected, and if the target is accepted by a lighted pixel on the horizontal scale, the detector will sound beep(s).

Because many factors (degree of oxidation of metallic object, metal impurities in soil, soil moisture content, size and metal content of the object, depth, etc) can affect the target ID cursor indication, the target ID cursor indication is not accurate and is not guaranteed to be correct. The target ID cursor indication is only for non-critical reference.

When the detected metal signal is strong enough, the display will show a target depth indicator bar, which is to be used in conjunction with the depth scale for you to predict the distance between the detected object and the search coil. Because many factors can affect the indication of target depth indicator bar, the indication of the target depth indicator bar is not accurate and is not guaranteed to be correct. It is only for non-critical reference.

5. After you detect a metallic object, you can use the Pinpoint function to pinpoint this object. Precisely pinpointing a object allows you to quickly recover the ground because of smallest digging hole possible.

   To pinpoint the detected object, press the " PINPOINT " button once to enter the Pinpoint mode. The symbol " ⌖ " appears on the display as an indicator. Then move the search coil around the detected object while slowly moving the search coil toward the object according to the volume of the sound of the detector (the sound volume of the detector increases as the search coil approaches detected object). During this pinpointing process, the detector adjusts its sensitivity automatically, and in the end, the detected object can be pinpointed.

Note:
When you scan the search coil for a metallic object or pinpoint a detected object, the search coil must be in motion. If the search coil is still or motionless, the detector can not detect metal normally.

3-FREQUENCY AUDIO ALARM FUNCTION

In Discrimination mode, the detector can produce 3 kinds of alarm tones for different types of metal objects, which is intended to help operator identify the probable metal type of the detected object. For a specific detected object which is accepted by a lighted pixel on the horizontal scale, the detector will produce a specific tone.

USING THE EARPHONE

The detector can work with the earphone (optional). To use the earphone, just insert the plug of the earphone into the earphone jack on the rear of the control box, the loudspeaker in the control box will be disabled automatically.

Note:
For safety, do not use earphone (or headphone) near traffic.
To avoid hearing loss, do not use earphone (or headphone) if using it makes you feel uncomfortable.

TROUBLESHOOTING

SYMPTOM	SOLUTION
The detector can not be turned on.	1. Make sure that the batteries are installed in correct orientation. 2. Replace the old batteries with new ones of the same type.
Erratic sounds or target ID cursor movement	1. Ensure that the search coil is securely connected and that the search coil cable is snugly wound around the stem. 2. When using the detector indoors, be aware that excessive electrical interference is present and that floors and walls may contain reinforcing steel rods or other metallic objects. 3. Make certain whether the search coil is near other metal detector or other metallic object (such as electrical power line, wire fence, etc). 4. Reduce the detector's sensitivity.
Intermittent Signals	Intermittent signals typically mean that the detector have detected a deeply buried metal object or one that is positioned at an angle difficult for the detector to read. Scan from different directions to help define the signal. In the case of multiple targets, use the Pinpoint mode to precisely locate all targets. Note: Iron objects may cause intermittent signals. You can identify iron objects in the Discrimination mode.
The detector is incapable of finding specific targets	Ensure that you are using a suitable discrimination pattern (the horizontal scale). Modify the discrimination pattern if necessary. You can also use the Pinpoint mode, which detects all types of metal to ensure that desired targets can be detected.
Target ID Cursor bounces	If Target ID Cursor bounces erratically, the detector may have detected a junk object or the metal signal is too weak. However, Target ID Cursor may bounce if a good target (such as a coin) is not parallel to the search coil or the target is below the edge of the search coil. Target ID Cursor may also bounce if there is one or several junk objects existing beside the good target. Move the search coil from different directions until Target ID Cursor becomes more stable. Note: Large iron plates, depending on their orientation in the soil, can read as a good target or cause Target ID Cursor to move erratically.

BATTERY REPLACEMENT

The battery level indicator on the display indicates the present level of the batteries. Three bars ( ) indicates that the batteries are high. To avoid performance decrease or abnormal operation, replace the batteries immediately when the battery level indicator becomes " " (there is no bar on the indicator).

To replace the batteries, turn off the detector first. Then slide down the battery cover, which is on the front of the control box (refer to Figure 4), to remove the battery cover. Replace the old batteries with new ones of the same type, make sure that the polarity connections are correct (see the polarity indications at the bottom of the battery compartment). Reinstall the battery cover.

NOTE

- Turn off the detector when not in use.
- If the detector operates abnormally, a possible cause is that the batteries are exhausted. Replace the batteries if necessary.
- Protect the plug of the search coil cable from damp; otherwise the detector may lose its detecting ability. Dry the plug as needed.
- The control box is not waterproof. Protect the control box from water, and do not use the detector in rain.
- Do not place the detector in any high temperature environment.
- Handle the detector carefully. Do not bump, drop or abuse the detector.
- Do not tamper with circuit of the detector.

WARNING

Any metal detector may discover underground power lines, explosives or other items which when struck could cause personal injury. When searching for metal objects, adhere to the following guidelines:

- Do not search in an area where you believe there may be buried underground electric line or pipe.
- Do not strike any line known to be or suspected to be carrying electrical power.
- Do not disturb any pipeline, particularly if it could be carrying flammable gas or liquid.
- Use reasonable caution when digging toward any object, particularly in areas where you are uncertain of underground condition.
- For safety, do not go to mine field or military zone.
- Observe all national, state and local laws while detecting.

ACCESSORIES

Manual: 1 piece
Earphone: Optional

DECLARATION

1. This manual is subject to change without notice.
2. Our company will not take the other responsibilities for any loss.
3. The contents of this manual can not be used as the reason to use the detector for any special application.

DISPOSAL OF THIS ARTICLE

Dear Customer,
If you at some point intend to dispose of this article, then please keep in mind that many of its components consist of valuable materials, which can be recycled.

Please do not discharge it in the garbage bin, but check with your local council for recycling facilities in your area.