



Tesoro
"The Name That Means Treasure"

Sand Shark

SAND SHARK OPERATOR INSTRUCTION MANUAL

CONGRATULATIONS!

Your new TESORO metal detector was designed to provide you with many happy hours of enjoyment in the most rewarding hobby I can think of—treasure hunting. Ahead of you lie fascinating and exciting experiences as you step into the past, uncovering artifacts lost by past generations. I wish we could share these experiences with you, and we wish you the best of success.

Your Tesoro metal detector is capable of meeting your needs in a wide range of treasure hunting situations. As with any detector, operator skill and familiarity is probably the limiting factor in determining how successful you will be. We recommend that you read and understand this manual fully before attempting to use the instrument in the field. Then, as you practice and become familiar with your detector, your rate of success will increase dramatically.

Your TESORO metal detector is a precision electronic instrument, which will last for years if properly cared for. Treat it right and it won't let you down.

Good Hunting! Jack Gifford

GENERAL DESCRIPTION

The Sand Shark is the first Pulse Induction metal detector that is controlled by microprocessor technology. It combines new technology with Tesoro's time-proven PI circuits and interchangeable Spiral Printed coils. While simple to operate, the Sand Shark offers a wide variety of user definable controls that allow for precise fine-tuning of the detector. Don't be fooled by its simplicity, the Sand Shark is capable of delivering peak performance by eliminating troublesome adjustments and complicated features creating an extremely simple to operate lightweight detector. The Sand Shark is packaged in a waterproof housing making it ideal for wet weather use, beach hunting, or diving in fresh or salt water. It is convertible to body/belt mount and requires no special tools.

As a Pulse Induction instrument the Sand Shark will provide mineral free operation in virtually all ground mineral or salt water environments. Equipped with auto tuning the Sand Shark is a motion- based "all metal" detector. Though the searchcoil must be moving when pinpointing, due to the auto tuning, the amount of motion is so slight that pinpointing is easily accomplished.

Designed as an all-purpose detector, the Sand Shark requires no special ground adjustments or complicated set-up. A variety of optional searchcoils provide the operator greater versatility and a wider range of site selection. A guide to selecting the proper optional coil is included in the section for "Selecting the Right Searchcoil."

Be sure to complete and mail the warranty registration card in order to validate your warranty.

UNPACKING THE BOX

Your Sand Shark was shipped with these parts:

1 Upper Pole Assembly

Fully assembled, including upper pole stem with handle grip, padded arm bracket, pole lock and control housing.

1 Middle Pole Assembly With Pole Lock

1 Lower Pole Assembly

Fully assembled with 2 washers and nylon nut and bolt.

1 8" round printed spiral searchcoil with 8' cable

1 8-cell battery pack with 8 AA batteries installed

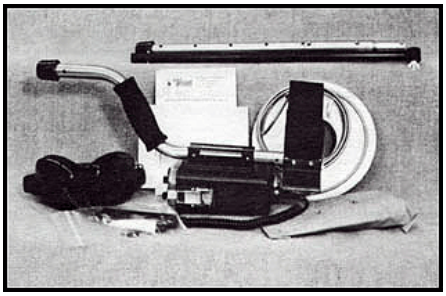
1 Tube of Dow Corning #4 silicone

2 Velcro cable straps

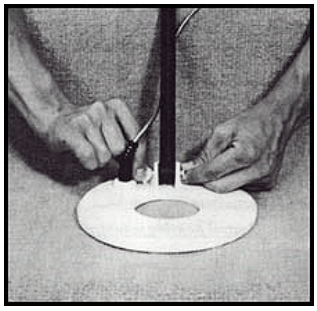
1 Operator Instruction Manual

1 Tesoro Warranty Card

If any of these items are missing, contact the Tesoro Authorized Dealer where you purchased your detector *immediately.*



ASSEMBLING YOUR DETECTOR



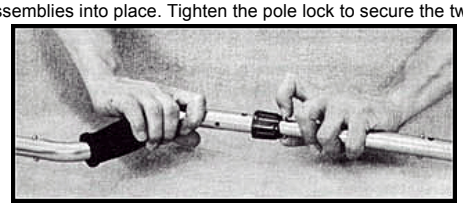
1. On the lower pole assembly, remove the mounting screw and thumb nut from the pole tip.
2. Insert the pole tip between the mounting ears of the searchcoil and align the holes of the pole tip and washers with those of the mounting ears.

Note: The pole tip should fit very snugly into the mounting ears.

3. Insert the mounting screw through the holes in the mounting ears and pole tip—entering from the side opposite the cable connection.
4. Install the thumb nut on the mounting screw and tighten by hand.

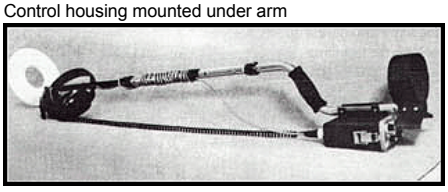
Note: Do not overtighten the thumb nut. It should be snug but not too difficult to loosen up.

5. On the middle pole assembly, depress the two spring buttons and slide the middle pole assembly into the upper pole assembly until the spring buttons click into the holes—locking the two assemblies into place. Tighten the pole lock to secure the two assemblies together.

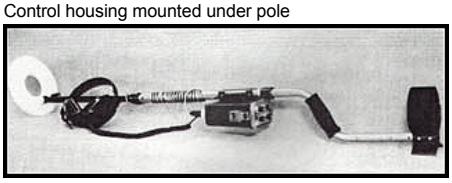


6. Slide lower pole into middle pole until spring buttons click into the first set of adjustment holes. Turn pole lock to tighten—locking the assembly into place.
7. The Sand Shark can be assembled in several different configurations. Take a look at the pictures below to find out the best configuration for you:

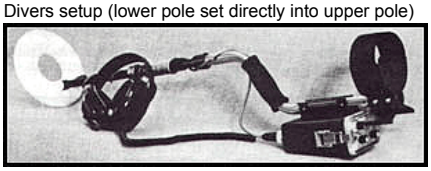
Control housing mounted under arm



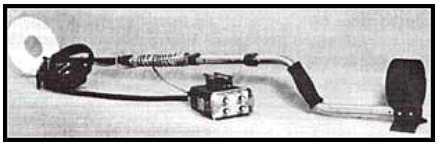
Control housing mounted under pole



Divers setup (lower pole set directly into upper pole)



Body Mount



Converting the Sand Shark from pole mount to body/belt mount is simply a matter of removing the control box from the upper pole and unwinding the cable. To remove the control box from the pole, depress the four spring buttons that hold the mounting bracket and control box to the pole, and lift. It is easiest to release one set of spring buttons at a time.

8. Once you have decided on a pole mount configuration, wrap the cable around the pole leaving enough slack near the searchcoil to permit searchcoil adjustment.

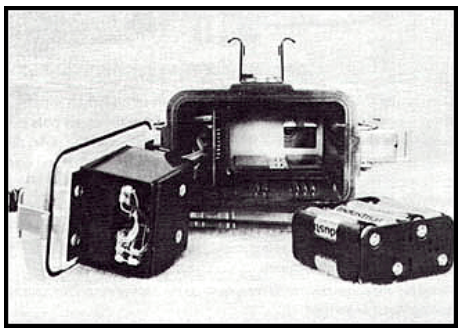
Install the coil connector into its receptacle on the back of the control housing and tighten it fingertight.



Note: Do not use pliers to tighten the coil connector. Do not allow the cable to flop loosely over the searchcoil. Since the detector is sensitive enough to "see" the tiny wires in the cable, a floppy cable can cause false signals as the searchcoil senses the moving wires.

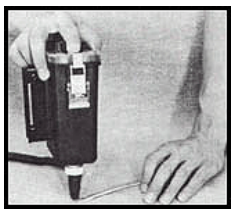
BATTERY INSTALLATION / REPLACEMENT

The Sand Shark has been equipped with a drop-in battery pack. To install or replace the batteries, make sure the detector housing is dry, then release the two draw bolts securing the faceplate to the housing. Gently pull the control panel free being careful not to twist or strain the ribbon cable connecting the faceplate panel to the printed circuit board. The Sand Shark takes 8 AA size alkaline batteries. Also, make certain that you follow the polarity indicators on both the battery holder as well as the batteries themselves. Then check the polarity of the pack as it goes into the housing. Look inside the housing for the two spring clips and slide the pack so that the battery terminals meet the spring clips. There is only one correct way to put the battery pack in. If the batteries are put in wrong, the detector will not work. Replace the faceplate and use the drawbolts to clamp the faceplate back onto the housing.



Do not rest the unit on the coil connector while clamping the faceplate. This can cause excess wear and damage to the connector.

IMPORTANT NOTE: Always make sure the instrument is dry before opening. Water, if allowed to make contact with the circuit board, may damage it. Always make sure the O-ring is clean and free of dirt or sand. It is recommended that you wipe the O-ring with a dry cloth and look for damage and apply a new coat of diver's silicone grease before replacing it. Failure to maintain the O-ring will result in extensive damage and will not be covered under warranty.



ADJUSTMENT

The searchcoil angle and stem length should be adjusted so that the unit does not become uncomfortable or tiring to hold after long periods of use. The detector should rest in your hand with arm relaxed allowing it to swing back and forth without having to lift with the elbow or shoulder while keeping the searchcoil as close as possible to the ground without touching. The pole length is adjusted by depressing the spring buttons and extending or shortening the lower stem until they click into the set of holes that give you the most comfortable setting. The searchcoil should rest about one inch above the ground while standing erect. Adjust the angle of the searchcoil so that it is parallel to the ground. Tighten the searchcoil thumbnut by hand so that the searchcoil will maintain this setting.



QUICKSTART TEST AND TUNING PROCEDURES

The Quickstart is designed to teach you how to use your new Sand Shark. It provides a quick and easy means of learning all of the functions of your detector and the concepts behind the functions.

You will need the following items:

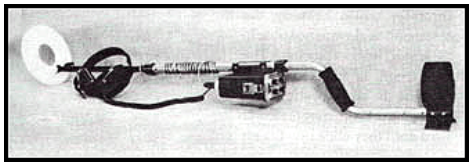
1. Your fully assembled Sand Shark metal detector.
2. Several targets for air test.
3. A nonmetal table or counter surface.

Here's what you will do:

1. Set the THRESHOLD and VOLUME.
2. Perform an Audio Battery Test.
3. Perform an Air Test in the VCO Mode.
4. Set the Audio Frequency for the NORMAL Mode.
5. Perform an Air Test in the NORMAL Mode.
6. Set the Pulse Width.

Prepare for the Quickstart

Place your assembled Sand Shark on the nonmetal surface as shown in the photo. Make sure there are no metal objects near the coil and remove any jewelry from your hands and wrists.



Start with the controls like this:

1. PULSE WIDTH in center position.
2. VOLUME & THRESHOLD in the 1 o'clock position.
3. Mode Switch in OFF position.

Set the Threshold and Volume

The Mode Switch controls all of the tuning functions on your Sand Shark. As we go through the other tuning steps, we will be resetting the Mode switch to the other functions.

We will start by turning the Mode Switch from off to VCO. At this time you will hear a humming tone in the headphones. This sound is the threshold. Its purpose is to give you a reference point to judge targets by. Some targets may be small enough or deep enough that they will not be able to generate an audio tone by themselves. By monitoring a threshold, you already have a signal so changes in that signal are easier to hear. However if the threshold is set too loud, the small changes will not be noticed. Therefore, a low steady threshold setting is ideal. You can change the threshold with the Threshold adjust knob. Try turning it up and down to find the best possible setting for the machine.

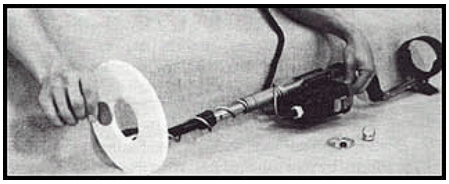
Once the threshold has been set, you should adjust the volume control to a comfortable level. Please remember that the sound level will be affected by your surroundings. What may be just right in one location may be too high or low in another. The volume can be changed with the VOLUME adjust knob. Take a moment and find the level that is best for you now.

Perform an Audio Battery Test

With the threshold and volume set, we will now check the batteries. Turn the THRESHOLD adjust knob all the way counterclockwise until you feel a click. You should hear a number of beeps. If the batteries are fully charged, you will hear 6 or 7 beeps. As the batteries drain, you will hear fewer and fewer beeps. When you hear no beeps or only one, it will be time to replace your batteries. Please remember that you will have to reset your threshold when you are done with the battery test. Try your battery test and reset your threshold before moving to the next step.

Perform an Air Test in the VCO mode

You are now ready to perform an air test in the VCO Mode. VCO stands for Voltage Controlled Oscillator. The VCO mode has a very distinct sound that makes it very easy to work with. As a target gets close to the coil, the rise in signal voltage causes the oscillator to change frequency and amplitude causing the audio part of the signal to become higher in pitch and louder in volume. These changes will leave no doubt in your mind that you are close to a target. Try waving your targets in front of the coil. Start from a distance of 10 to 12 inches away from the coil and work your way towards the coil. Now try starting from 6 inches to the left or right side of the coil and working your way to the center of the coil. Notice how the audio signal changes. Your strongest signal will always be closest to the center of the coil, but additional information can also be learned by the signal strength. A deep or small target will give a smaller change in the threshold than a larger or shallower target will give. Take some time to try a number of different targets at different depths to find out how your detector sounds.



Set the Audio Frequency for the Normal Mode

In the NORMAL tuning mode you will be able to preset the frequency of the audio tone that you will hear in the headphones. The adjustment is made by going into the “F” SET Mode on the Mode switch. Notice that the “F” SET is highlighted in this mode and that “F” ADJUST written in the same highlighting is found beneath the THRESHOLD adjust knob. When the mode switch is in “F” SET, the THRESHOLD adjust knob now sets the audio tone. Try turning the “F” ADJUST knob up and down to find the audio frequency that you like best. *While you are in the “F” SET mode, your Sand Shark will not respond to targets.* When you are ready, turn the Mode switch to NORMAL. Please remember that once the frequency is set, you must reset your threshold to a low steady hum.

Perform an Air Test in the Normal Mode

You are now operating in the NORMAL Mode. In this mode only, one frequency at a time will be heard and the volume of the audio signal will determine signal strength. Try waving your targets in front of the coil. Start from a distance of 10 to 12 inches away from the coil and work your way towards the coil. Now try starting from 6 inches to the left or right side of the coil and working your way to the center of the coil. Notice the difference from what you heard in the air test in the VCO Mode. Your strongest signal is still closest to the center of the coil, but there was no change in audio frequency. Take some time to try a number of different targets at different depths to find out how your detector sounds.

Set the Pulse Width

The PULSE WIDTH setting controls the amount of signal that the Sand Shark will transmit into the ground. A pulse induction detector works by transmitting a signal and then reading the residual eddy currents that are left on metal items. All of this takes place at approximately 600 pulses per second. Increasing the pulse width allows the detector to transmit longer and create more eddy currents on a metal target. These extra currents are more easily picked up during the receive phase and will therefore increase depth and sensitivity. However, more transmitted signal means more power used in the transmit phase, limiting the battery life. We have marked the best balance of battery life and depth and sensitivity on the faceplate at the mid-position on the PULSE WIDTH adjust knob. You will be able to increase or decease the PULSE WIDTH by turning the Pulse width adjust knob. Start with the detector in the factory recommended position and wave a few targets in front of the coil. Try turning the knob and see what effects it has on depth and sensitivity.

CONGRATULATIONS

You have completed the Sand Shark Quickstart Test and Tuning Procedures and in the process have learned quite a lot about your new Sand Shark. But experience is the best teacher. I would recommend that you get out and practice with your detector as much as possible. For your convenience, you may want to create a test garden in your lawn or work a local park. Any time spent using your detector will give you valuable experience.

SELECTING THE RIGHT SEARCHCOIL

Selecting the right searchcoil for the type of detecting you’re doing will add greatly to your success. The Sand Shark comes with a standard 8 inch Printed Spiral coil, which is a new and revolutionary design developed by Tesoro specifically for the Sand Shark. This is an excellent overall coil since most people who operate PI instruments are usually searching large sandy beach areas where targets are easy to dig and there is usually not an over abundance of trash. This coil will detect very tiny targets for its size and provides excellent target separation while giving more ground coverage. However, it is not always the right coil for the job. Therefore, Tesoro has made it possible to interchange coils and has developed a variety of its unique Printed Spiral searchcoil in a selection of sizes.

In addition to the standard 8 inch open center searchcoil, three optional coil sizes are available for the Sand Shark. The 10 1/2 inch open center coil is designed for areas where digging is easier and where junk targets may not be too numerous. The 7 inch coil will be particularly useful when searching for smaller targets, such as gold nuggets. The 10 inch elliptical allows a widescan sweep pattern while keeping a good sensitivity to small targets.

PINPOINTING

Move the searchcoil slowly across the target from side to side and then from front to back at 90 degree angles. Raise the coil slightly, slow the sweep speed, and shorten the sweep to narrow the detection area enough to make it easy to tell where the coil center is at the instant of sound as you crisscross the target.

DETECTOR PROTECTION CHECKLIST

Congratulations, you have just purchased a new metal detector, and we wish to thank you for choosing Tesoro.

So many people are disappointed when their new "state-of-the-art" detector becomes less and less exciting to use and doesn't seem to go as deep anymore. There is something that you can do to keep your new detector working as good as when it was new.

The most important thing is simply to remember that your detector is an electronic instrument and to treat it as such. You wouldn't expect your TV set to operate properly if you stored it in the trunk of your car, would you?

We have generated the following list to help you take care of your detector and to help ensure that you do not void its warranty. If you will follow its guidelines, you will find your detector will not let you down.

1. Operate your detector exactly as recommended in this Operator Instruction Manual.
2. Do not attempt to modify or repair the detector's electronics.
3. Cable is hard-wired into searchcoil. Do not attempt removal of the spring retainer on the searchcoil housing.
4. Use only high quality carbon-zinc, alkaline, or nicad batteries. Remove batteries during long term storage. Never substitute batteries of other voltages. Brands should not be mixed. Do not attempt to modify the power supply system.
5. Never spray lubricants such as WD-40 or any types of cleaners, sealants or other chemical preparation on or into the detector.
6. Avoid banging the searchcoil against rocks or foundation walls.
7. Always protect the searchcoil with a properly designed scuff cover.
8. Remove and clean out scuff covers periodically to avoid buildup of mineralized or metallic particles.
9. After use, clean the detector with a soft cloth to remove any dust, moisture, or other contaminants.
10. Do not transport or store your detector in the trunk of your car.
11. Keep cables properly wound to stem and protected. Floppy or pinched cables may short causing erratic noises or unnecessary replacement of searchcoils.
12. Protect the detector from dust, moisture, and extreme temperatures during storage. Avoid storing it in places such as attics, basements or garages. When shipping the detector, use the original factory carton or a similar heavy-duty container. A one inch minimum clearance of padding around the detector must be provided when shipping.
13. Treat your detector as you would any sensitive electronic instrument. Although ruggedly constructed and designed to withstand the demands of normal treasure hunting applications, it is not intended to be improperly operated or abused.

SPECIFICATIONS

Operating Frequency	600 pps
Searchcoil Type	Printed Spiral
Searchcoil Size	8 inch Diameter
Audio Frequency	Approx. 220-450 Hz
Audio Output	Stereo Piezo Headphones
Weight (may vary slightly)	Less than 4½ lbs.
Battery Requirement	(8) AA DC (alkaline)
Battery Life (typical)	10 to 20 hours
Optimum Temperature Range	30° to 100° F
Optimum Humidity	0 to 75% R.H.
Operating Modes	VCO Motion All Metal
	Adjustable Audio Frequency All Metal
Maximum Depth Rating	200 ft.

RECOMMENDED RECOVERY METHODS

WARRANTY SERVICE

Your Tesoro metal detector is covered by a Limited Lifetime Warranty, the terms of which are listed below. If your metal detector should require service, you may return it to the Tesoro factory at the address below.

LIMITED LIFETIME WARRANTY

This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

This instrument is warranted to be free of defects in material and workmanship as long as it is owned by the original consumer purchaser. This warranty is not transferable and is valid only if the warranty registration card has been completed and mailed within 10 days of purchase.

TESORO will, at its option, repair or replace any instrument covered by this warranty, without charge, except for transportation charges, at its factory in Prescott, Arizona.

This warranty excludes batteries, damage caused by leaky batteries, cable breakage due to flexing on body mount units, and wear of the searchcoil housing. Also excluded are instruments which have been abused, altered, or repaired by an unauthorized party.

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