

## Introduction

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You have purchased one of the most powerful metal detectors available at the time. The GOLD FISH 2 metal detector was especially developed for detecting and locating large objects (all metals) buried depth. It incorporates a one-meter by one-meter (40 inches by 40 inches) search coil as standard equipment. Different size and shape coils are available as well.

The GOLD FISH 2 is the result of a consistent development of the pulse induction principal. Latest high tech components and circuit design has been used to achieve high performance and reliability and to introduce some important improvements. This concerns a very simple operation as well as extraordinary detection depth.

The GOLD FISH 2 can be operated effectively in highly mineralized soil areas, beaches, salt water, and areas where conditions are unfavorable using other metal detectors.

We offer various accessories such as different search coils, a cigarette lighter adapter for charging the GOLD FISH 2 from an automobile, boat or truck, and a solar panel, so that you are always perfectly equipped for any kind of job.

Please read this manual attentively and completely. Even if you are not interested in the function of the GOLD FISH 2, you should not leave out chapter 1 (Function). You will find important information about the unit's response to different metals and other features which are helpful to know while searching.

### Standard equipment of the GOLD FISH 2

- Electronic unit and built-in accumulator 12V@2,3Ah Panasonic
- Charger (230 or 120 V available)
- Operating manual (English version)
- Detachable one meter by one meter search coil with carrying straps, bag with adjustable shoulder belt, large enough to store additional accessory coils.

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Fig. 1



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We wish all owners of the GOLD FISH 2 metal detector great success! We would appreciate hearing from any of you personally on your experience and recoveries made. If you have any problems, please do not hesitate to give us a call.

## 1. Function

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The GOLD FISH 2 is a PULSE-INDUCTION (PI) system which incorporates a large search coil (one-meter by one-meter as standard equipment) for the main purpose of finding large objects at great depths. These detection depths can almost be compared with those of magnetometers, which can detect nothing but ferromagnetic objects. Another great advantage of using the GOLD FISH 2 together with the large search coil is being able to cover a large area in a short period of time. The actual search coil is encased in a square plastic frame (PVC tubing) and can be carried by one or two persons.

Using the PI-principle offers some decisive advantages. First, the search coil is not part of a resonant circuit as it is the case with VLF detectors and can, therefore, be of almost any size and shape. This is absolutely necessary in order to increase the location depth considerably. In the second place there is a timely decoupling between the transmitting and the receiving phase which makes it possible to work with far greater transmission power.

A further advantage is that small objects like bottle caps, pull tabs, pieces of aluminum foil, but also single coins are naturally rejected while using the large search coils.

But still the GOLD FISH 2 is an easy-to-operate metal detector: you only have to deal with four simple controls, of which you need just one while normal operation.

Objects are simultaneously indicated by a meter and by an audio signal which increases in frequency while approaching the object. The audio response has a very wide frequency range in order to avoid signal saturation when the search coil approaches a very close object. This makes it easy to pinpoint the exact location.

The function of the GOLD FISH 2 is divided into two time intervals:

## Transmission Phase

A strong duty current is flowing through the search coil about 600 times per second. The linearly increasing current builds up a primary magnetic field which radiates as shown in Fig. 2. The current is abruptly cut off after a certain time, so that the primary magnetic field collapses quickly causing so-called eddy currents in the metal object. Strength and duration of these eddy currents depend on the electrical conductivity, size and shape of the object. After a short time delay the search coil is connected to the receiver input.

## Receiving phase

The decay of the eddy currents in the object produces a secondary magnetic field, which is radiated by the object (Fig. 3). This secondary magnetic field has its effect also on the coil and here induces very low voltages, which are amplified and displayed by a meter and an audio signal. Obviously the detection range has physical limits, because these voltages are extremely weak and can be obscured by external magnetic fields.

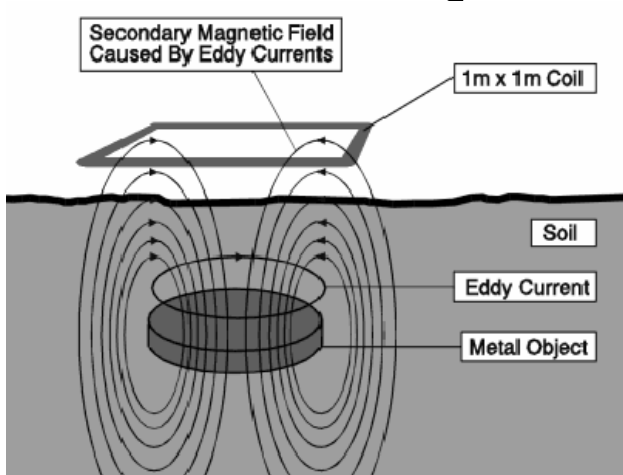


Fig. 3: Receiving Phase

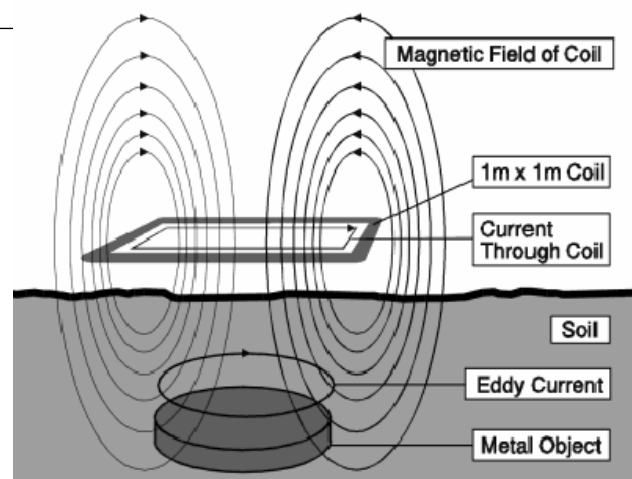


Fig. 2: Transmitting Phase

In general, the possible detection range will increase quickly with increasing target size. This is especially true for the PI-principle. But the electrical conductivity and the shape of the object are also important factors.

Related to this, ferromagnetic metals take a special position. If these metals are exposed to the magnetic fields of a PI-detector, they will be momentarily magnetized. Although the electrical conductivity of these metals is poor and, therefore, the decay of the eddy currents is very short, the strength and the slow decay of the magnetization causes a strong signal. This is why PI-detectors are very sensitive to even small ferrous objects. The GOLD FISH 2 offers you the possibility of reducing the sensitivity to these objects (some smaller ferrous objects can even be completely rejected), while still being sensitive to most non-ferrous metals.

**Brief summary of the advantages and capabilities of the GOLD FISH 2 metal detector:**

- The PI-principle allows to enlarge the search coils and to use a high transmission power in order to achieve extraordinary detecting capabilities.
- Using large search coils will allow the operator a fast search covering larger areas.
- Many different coils (various sizes and shapes) can be connected to the GOLD FISH 2 (1m x 1m is standard equipment):
- The 25cm (10 inches) search coil is very effective for exact location and can also be successfully used in overgrown and bushy areas.
- The 2m x 2m (80 inches x 80 inches) search coil covers four times as much ground as the standard coil and achieves even 30 to 40 percent more depth on large objects. However, sensitivity to smaller objects will be reduced.
- All search coils are waterproof and can, therefore, be used in shallow water.
- Operation is very simple and the internal adjustments are performed automatically each time the GOLD FISH 2 is turned on.
- Retuning during operation requires nothing more than pressing a switch.

## 2 Controls and Connectors

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### VOLUME

With this control knob you can power on the metal detector and adjust a comfortable sound level. Usually for normal operation you must set to 7.

### TUNE

With the TUNE knob the initial ticking-rate can be controlled. Turn clockwise until you can hear ticking-rate in speaker. Usually set to position 7. For normal operation most of the users prefer 1-2 clicks per second.

### DELAY

Operating the GOLD FISH 2 in the normal mode with SIGNAL (SAMPLING DELAY) control knob in position 4-6 (when the green LED change his status from flashing to lighting) will give you the greatest sensitivity of any object detected. In positions 1-3 the sensitivity to ferrous objects and thin foils are greatly reduced. Smaller iron objects as well as foils can be completely eliminated. In chapter 3 (Detection Depths) an illustration is given showing how the position of SAMPLING DELAY influences the detection depth of different objects. Additionally, you can minimize the effects due to highly mineralized soils when using a lower SAMPLING DELAY position.

### POWER

Manual adjustment of transmit power and receiver sensitivity. In position **MAX** – metal detector work with extra power (high transmitter power and high receiver gain). We advice beginner user to use position **MIN** and after some training to use full opportunity of device at position **MAX**. Position **MIN** is useful if you have heavy ground, hot rocks, etc.

### INTENSITY METER

The **INTENSITY METER** indication will increase as you pass over any buried object.

## Description of Connectors and Indicators on Rear Panel

### COIL/CHARGER

Different size coils can be connected to this jack. Push the connector plug in all the way before turning the sleeve on the plug. Locking the plug will keep the connector from pulling out. Furthermore, the built-in battery can be recharged via this jack.

### CHARGING

The red LED on charger light indicates that the battery is charging.

### BATT. FULL

Red LED on charger turn off and indicates the battery has been fully charged. The charging will automatically be stopped and the charging electronic changes to holding state. However, it is recommended to disconnect the charger when the red LED turns off.

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## 3 Detection Depths

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When verifying detection depths reached with the GOLD FISH 2, you can use the examples below which have been tested as references. These objects are easily available for confirming the depth capabilities of your GOLD FISH 2 metal detector. The conditions while testing and recording the below objects were as follows: The SAMPLING DELAY was in higher available position when the green LED change his status from flashing to lighting and a one meter by one meter coil was used. A clear increase of the ticking-noise had to be noticed. The largest surface of each object was measured.

### Object Detection Range in Inches (Air Tested)

Object	Detection range
Soft Drink Can (0.33 l)	Approx. 59" (145 cm.)
Iron Sheet 9" x 9" x 1/50"	Approx. 78" (200 cm.)
Fuel Tank 20 Liters (Iron)	Approx. 95" (240 cm.)

Maximum detection range – 235" (600 cm)

These depths can be far exceeded when detecting larger objects.

It is interesting to note that with the SAMPLING DELAY control knob at position when the green LED change his status from flashing to lighting - the iron sheet can be detected at very good depth, while at lower position 1 or 3 a clear drop is shown. Many metal container lids and other small objects (made of aluminum or lead alloys) as well as even large aluminum foils can be completely rejected at these positions. With objects made of (highly) conductive non-ferrous metals like copper and especially precious metals like gold or silver, you will lose much less detection depth (depending on size of object). The reason for this is that the decay of the eddy currents in these metals takes a lot more time. So if you are looking for large non-ferrous objects (especially precious metals) in an area which is scattered with small pieces of trash, it is advisable to

operate in SAMPLING DELAY control knob 5 or 7 (when the green LED change his status from flashing to lighting). But remember that the sensitivity to the wanted object may be reduced as well, depending on its size, shape, and conductivity (which can be clearly lower with alloys than with pure metals !).

All mentioned detection depths may differ either positively or negatively when using reference objects of the same size, but possibly made of different alloys.

## 4 Operating Procedures

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Now you are familiar with the controls and capabilities of the GOLD FISH 2. In this and the following chapter you will learn how to operate the unit in actual practice. To ease transportation and storage, the one meter by one meter search coil is constructed detachable.

With a few simple steps, your search coil is ready for use:

- Unfold all four PVC tube sections.
- Align all corners.
- Ensure that the cable is pushed inside the tube.
- Secure each corner with a slight nudge with palm of hand. All four corners must fit snugly so as not to come apart while searching.

### Coil disassembly:

To disassemble the one meter by one meter search coil, pull on each corner without twisting or bending each tube to prevent warping it. If you have any difficulties disconnecting any corner, then slightly hit inside the corner with your hand. Before packing and storing the search coil, make sure that the connector plug is clean, dry, and free of dirt. The plug should always be closed with the dust cap. The search coil should be cleaned and dried as well before it is stored. Please avoid sharp pulls on the connecting cable of the coil.

### Start-up and Adjustment of the Tick-rate

Connect the search coil connector plug to the **COIL/CHARGER** outlet. Turn the sleeve on the plug clockwise until it is securely fastened. Make sure connector plug is pushed in as far as it can go before rotating the sleeve.

The leather case, which contains the GOLD FISH 2 electronic unit, has an adjustable shoulder strap and belt loop for easy carrying.

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In order to avoid interference of the metal parts of the electronic unit, be sure to carry the GOLD FISH 2 on the side of your body that is away from the coil.

Lift the coil with a partner by the connected adjustable straps. The search coil should be held approximately 8 to 10 inches from the ground while searching. Do not allow one end of the coil to be higher than the other.

Make sure that no large metal objects are close to the coil for initial adjustment. Also check your shoes or boots since most of them contain metal parts and you would receive a signal response any time you step near to the coil.

Turn on the GOLD FISH 2 by rotating the **VOLUME** switch clockwise from the **OFF** position. Set output audio level (**VOLUME**) to 7 and turn **SAMPLING DELAY** control knob (**DELAY**) 5 or 7 (when the green LED change his status from flashing to lighting).

Next, adjust the threshold of the GOLD FISH 2 until you can hear several ticks per second by turning of the **TUNE** knob.

We advice beginner users or by working on heavy grounds, hot rocks to use **MIN POWER** (low power mode). If you change position from **MIN** to **MAX POWER** you must perform tuning of **TUNE** and **DELAY** again.

The GOLD FISH 2 is now ready to use.

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## 5 Search Procedures

Searching with the GOLD FISH 2 is particularly easy when the 1m coil is carried by two people. Before beginning to search, select the desired switch position of SAMPLING DELAY (SIGNAL). You should grid large areas with poles and strings (strips approximately 36 inches wide). If using a two meter by two meter coil then grid off areas approximately 72 inches wide. It is also important that the grid areas are overlapping while searching because the search coil has its highest sensitivity in its center.

Walk on the grid areas at a slow walking pace. Should the surface allow it, hold the search coil at a constant height of about four to eight inches from the ground. Should the tick-rate change due to magnetic soil (for example caused by large concentrations of iron oxides), check status of green LED – he must always flashing. If LED is lighting – it means that you need to change SAMLING DELAY to lower position, and if necessary change TUNE control knob to get several clicks per seconds.

We would like to remind you (again) that both persons should have no metal on their shoes or boots. The person carrying the GOLD FISH 2 should place it on the side of the body away from the coil.

When first receiving a signal, it is advisable to obtain more information about the object detected. You can learn, with experience, if the buried object is large and possibly how deep it may be buried. The strength and duration of the signal will give you this information. For example, a small object buried only a few inches deep, will give two signals as each edge of the coil passes (see Fig. 4). By moving the search coil higher, the small object will disappear. With the help of the 10 inch coil you can also identify small objects shallowly buried. An object of the size of a soft drink can (for example), buried approximately 20 inches deep, will give a very clear signal (see Fig. 5). On a large object buried deep, you will receive a longer signal indication (see Fig. 6). To determine the exact location of a buried object, walk slowly further in the direction of the strongest response. When you feel that the exact spot has been reached, place a marker on the ground, then change directions. Approach the buried object at right angles (90° to the right and left) of the original path to obtain a further optimum signal.

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**IMPORTANT:** Do not forget to turn off the GOLD FISH 2 after each search! Otherwise, the battery will be completely discharged and may lose some capacity to recharge. Total damage may also occur.

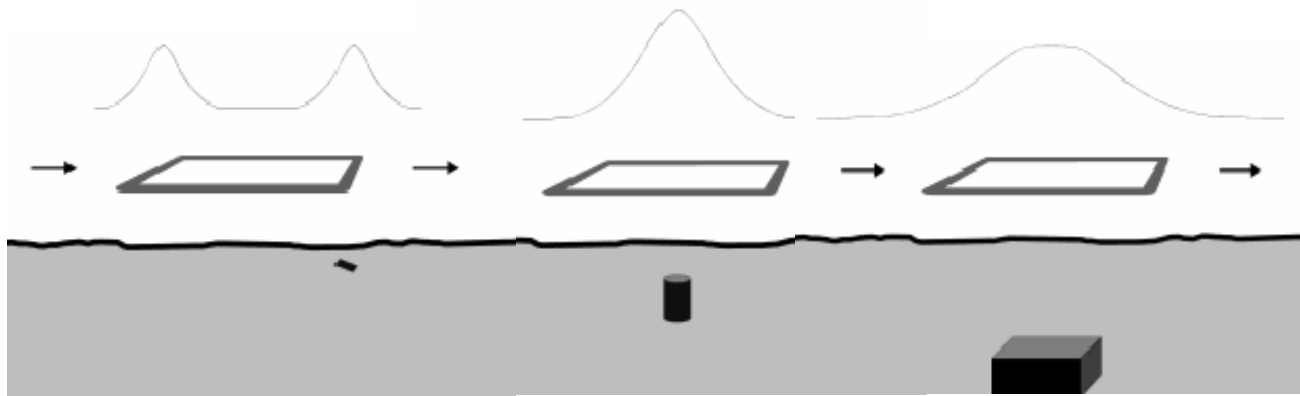


Fig. 4

Fig. 5

Fig. 6

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## 6 Technical Data

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### Electrical Data

Power Source Built-in Lead/Acid Battery 12 volts, 2.3 amp hours

Power Consumption approx. 120mA (without audio signal)

Usage Time approx. 18 hours

Battery Charging Built-in quick-charging electronic, universal charging possibilities: AC adapter (120/230 volts), Car Cigarette Adapter

Recharge Time max. 5 hours on empty battery

Recommend Operating Temperature Range 0 ... +55° Celsius (32 ... 131° Fahrenheit)

### Dimensions

Electronic Unit in Leather Case 165 x 70 x 190 mm (6.5" x 2.7" x 7.5")

One Meter Coil in Case approx. 1100 x 200 x 200 mm (41" x 8" x 8")

### Weight of Equipment

Electronic Unit in Case approx. 1.6 kg (4 lbs.)

One Meter Coil approx. 1.8 kg (4 lbs.)

### Construction of the GOLD FISH 2

The GOLD FISH 2 is built practically service free. All critical parts are designed to align themselves to avoid problems due to changing temperatures. If any problems occur please contact us or your dealer who has all spare parts on stock to guarantee a quick service.

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## 7 Important Information Important! Must be read!

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With the GOLD FISH 2 you have acquired an efficient metal detector which enables you to detect any metallic object buried. However, please take into consideration that you could possibly meet with war material which is dangerous even now. Ammunition often contains ogives of projectiles or cartridge cases made of brass and, therefore, it can be indicated as non-ferrous metal. In case that the detected object is very large, special caution is advisable: it is possible that you met a bomb. On principle, you should not try to dig out the object in case of doubt. If you still intend to do it, you should never approach to object directly with the digging implement from above, but carefully from the side. If there is any suspicion about the existence of a bomb, shell or munition, immediately call the police or the bomb disposal unit. The digging place or dangerous objects already dug out may not to be left without supervision, because they could be located by children. Digging out and the salvage of a find is completely at your own risk. Manufacturer and seller are not liable for damages. In any case, the use of metal detectors by children must be supervised by adults. Only adult persons are allowed to dig. By all means, observe the existing statutes and decrees. Also the search of archeological objects is generally subject to authorization or, in several countries, strictly forbidden. Please also consider that discovered objects do not automatically belong to you but are subject to the find right of the respective country. The GOLD FISH 2 produces intensively pulsed magnetic fields. For reasons of safety, persons with an implanted pacemaker should not stay in the direct near of the search coil during operation.

In the following some practical advice:

## Cold

In case that the GOLD FISH 2 has been exposed to low temperatures, you should absolutely avoid an abrupt warming. The condensation humidity can provoke a disturbance of function.

## Tube connections of the 1m-Searchcoil

If the coil should twist during operation or in case of loosening of the tube connection, the plug connections can simply be made closer:

1. Dismount the coil.
2. Warm up one of the slack connection sleeves with a hot-air apparatus for a short time (as long as the sleeve is compressible with your fingers).  
**ATTENTION: Do not overheat the sleeve and the coil cable!**
3. Stick the sleeve immediately over the tube belonging to it and wait until all has cooled down. Now, the plug connection should be closer.

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