

# FFB-R2012 Pipeline Locating Receiver Manual

Welcome to use the pipeline locating device. The operation frequency of the FB-R2012 receiver is 512HZ along with the 512HZ transmitter (not included) to form the pipeline locating system. The receiving coil captures the 512HZ signal, digitizes it and displays the signal strength on the LCD. The adjustable connecting rod keeps the receiving plate close to the ground to increase the locating sensitivity. Please read this manual carefully before your first outdoor use to ensure full understanding of how the whole system operates.

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## Specification

Frequency 512HZ

Power Supply 6 x AA alkaline batteries

Static Current <55 mA

Operation Mode NORM/NOISE CONTROL. The boot preset is NOISE COTROL.

Sensitivity Grade NEAR/FAR. The boot preset is NEAR.

Sensitivity Adjustment Continuous adjustable

Signal Strength Indicator LCD display 15 levels. The 11<sup>th</sup> level is set to "0"  
Speaker or headphone (not included)

Two Tones 400Hz frequency sent out when no signal is received  
800Hz frequency sent out when signal is received

Low Voltage Prompt 7.2V

Size 100cm x10cmx10cm

Weight about 1000g

Operation Temperature -10°C—+ 50°C

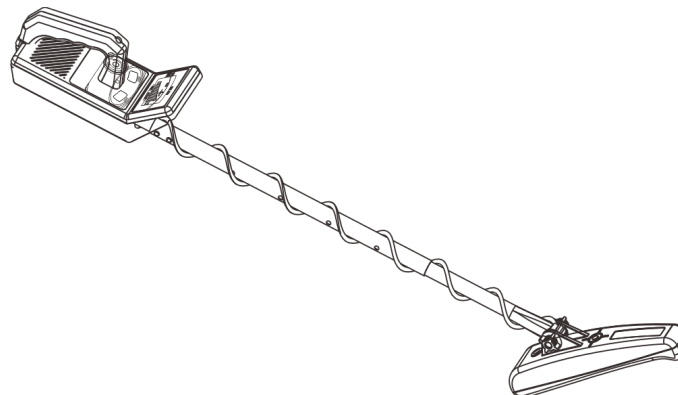


Fig.1

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## Assembly

No special tools

needed for assembling FB-R2012.

1) Open the packing box(See Fig.2)

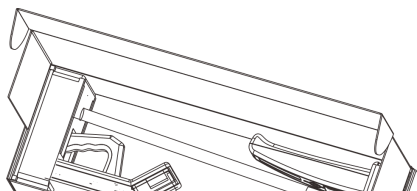


Fig2

- 2) Press the silver button on the lower stem and insert it to the upper stem (See Fig.3).

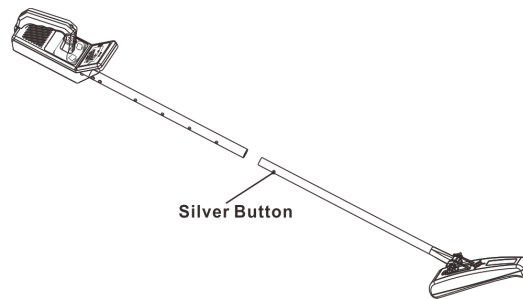


Fig3

- 3) Wind the cable line of the search coil around the aluminum stem to suitable and average tightness so that the cable line does not sway. Insert the plug of the cable line to the socket on the bottom right of the Controller (See Fig.4), and lock it. Note: when plugging and unplugging, please unplug the plug instead of unplugging the cable line.

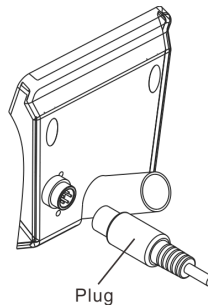


Fig4

- 4) Adjust the length of the stem by selecting the suitable hole on the upper stem so that you can extend your arm comfortably while doing detection. (See Fig5)

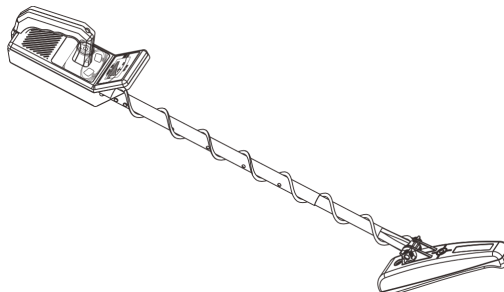


Fig.5

## Battery

Please use 6 AA alkaline batteries

- 1) Press the “OPEN” on the battery cover and pull it out in the direction of the arrow. Insert the 6AA batteries into the compartment as indicated by the polarity symbols marked inside the compartment. (See Fig.6)

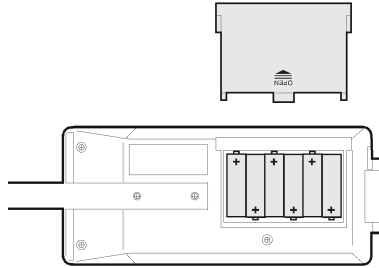


Fig6

- 2) Cover the battery cover and a “Ka-Ta” tone can be heard.
- 3) 6 AA alkaline batteries can operate the unit for about/more than 30 hours. If you do not plan to use the unit for an extended period time, please remove the batteries from the battery box.

**Caution: Please don't mixed use new and old batteries.**

## Receiving plate, Panel controller and LCD (See Fig7, Fig8)

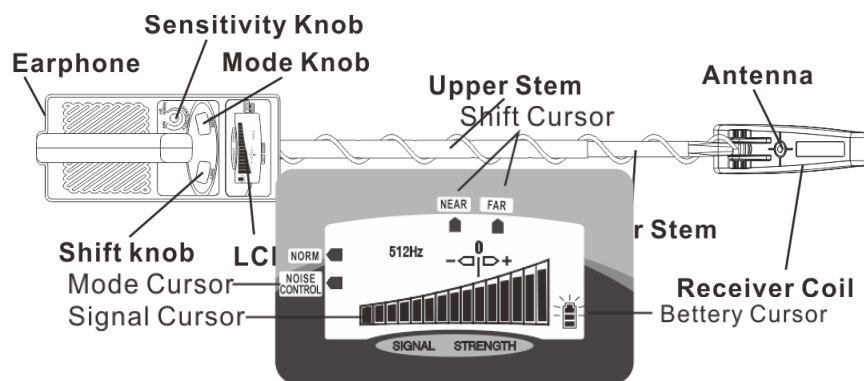


Fig7, Fig8

- 1) Receiving plate

The antenna is wrapped around the magnetic rod and installed inside the receiving plate. As a key component of the unit, it is used to receive the 512HZ signal and indicate the direction. The center of the antenna is on the receiving plate, marked with the symbol



- 2) Power switch/sensitivity adjustment knob

The power switch is also used to adjust the sensitivity. It can work with the “SHIFT” button to adjust the sensitivity of the receiver. Rotate counterclockwise all the way to power off. Rotate clockwise all the way to reach the highest sensitivity of the amplifier. In the process of the locating, you should often adjust the sensitivity potentiometer to make sure that the signal strength on the LCD maintains in the position of “0”.

3) The MODE button

It is the operation mode controlling button. The receiver has two operation modes, namely “NORM” and “NOISE COTROL”. On the LCD screen, it is displayed as the operation mode cursor. In the place where there is interference, you should choose “NOISE CONTROL”. Please note that in most urban places there will be different certain degree of interference. The sensitivity is the highest in the “NORM” mode but the anti-interference is poor.

4) The SHIFT button

On the LCD screen, the “NEAR” and “FAR” option button, is displayed as the sensitivity grades cursor. In the process of locating, when the receiver is far away from the transmitter (the signal is weak), you should choose “FAR” to improve the sensitivity. And when the receiver is close to the transmitter (the signal is stronger), you should choose “NEAR”.

Generally, you should choose “FAR” in the beginning to locate the signal. As you are getting closer to the transmitter, the signal will get stronger. If the signal is so strong that the LCD intensity cursor can no longer be adjusted to the position of “0”, you should switch to “NEAR”.

5) Operation mode cursor

It is controlled by the “MODE” button, divided into “NORM” and “NOISE CONTROL”. The boot norm is “NOISE CONTROL”. In the place where there is interference, you should choose “NOISE CONTROL”.

6) Sensitivity grades cursor

It is controlled by the “SHIFT” button, divided into “NEAR” and “FAR”. The boot norm is the “NEAR”.

7) Signal strength cursor

It indicates the relative strength of the received signal, divided into 15 levels. Higher level corresponds to stronger signal, with the 11th level identified as “0”. In the process of locating, according to the strength of the signal, choose the “SHIFT” button accordingly and adjust the sensitivity button. Try to keep the signal strength indicator stay in the position of “0”. In this position, it is most favorable to observe the change of the signal strength.

8) Low battery prompt

It indicates the battery power, which is divided into 3 levels. When the battery power decreases to 7.2V, the cursor will show level 1. You should change the batteries when the battery power cursor starts blinking.

## Quick-start

Prepare a 512HZ transmitter. Find a large room so that you can test and operate the unit by walking around in the room. You can also find an open space outdoor to practice.

**Note: when the receiver is turned on, it should be kept 1 meter away from the transmitter. Otherwise the receiver will decrease the sensitivity automatically as the signal is too strong.**

- 1) Let the receiver “know” the transmitter.

Equip the transmitter with the battery and lie it on the ground. Turn on the receiver, walk close to the transmitter, rotate the direction of the receiving plate and you will receive the signal. The speaker will then sound tones and there will be indicators of the LCD strength signal. In order to distinguish whether the received signal is an interference signal, you can take out the battery from the transmitter. If the signal of the receiver disappears, this means the signal you received earlier is from the transmitter. (Your receiver has found the transmitter)

If the signal still displays after you took out the transmitter battery, you should change the operation mode to the “NOISE CONTROL”. If at this time the signal disappears, there is interference signal nearby.

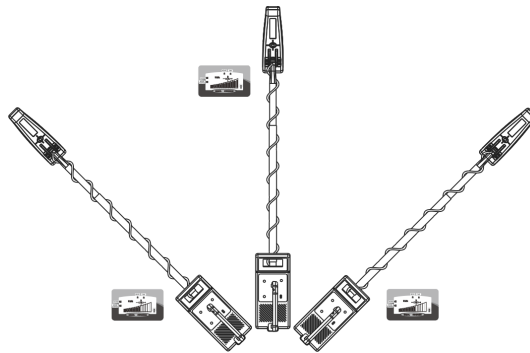


Fig9

- 2) Looking for zero and peak signal

Equip the transmitter with the battery and lie it on the ground. Turn on the receiver, hold it at waist level and let the antenna be parallel with the ground. Place it directly above the transmitter and rotate the direction.

When the receiver antenna is parallel with the long axis of the transmitter, the speaker sound will be louder and the signal strength on LCD will increase. If you move the antenna away from this position and the signal strength always becomes weaker, this is the peak signal. When the antenna of the receiver is vertical with the long axis of the transmitter, the signal strength on the LCD will drop suddenly and there is no signal at all. This is the zero signal.

In fact, you can find the zero signal in many positions. Generally, the zero

position is more accurate while the peak position is more blurred. In the process of locating, you often need to look for zero signal and peak signal. You need to practice this repeatedly to get more comfortable.

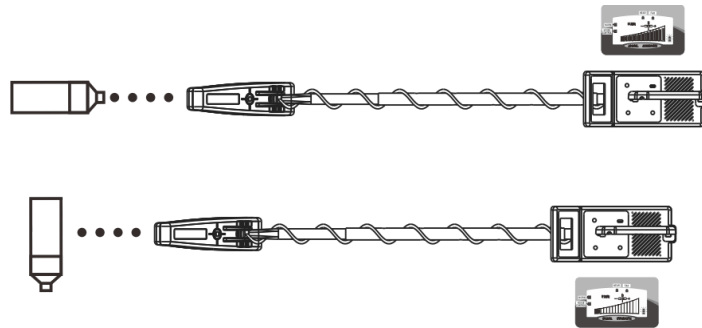


Fig10

Now, we walk a 1.5 meters circle around the transmitter to look for the zero signal and the peak signal locations. Hold the receiver at the waist level and let the antenna be parallel with the ground. In the process of circling around the transmitter, you will find two zero points and two peak points. When the antenna is vertical with the long axis of the transmitter, it will show the zero signal. When the antenna is parallel with the long axis of the transmitter, it will show the peak signal. The intersection of the peak locations and the zero locations is the position of the transmitter. The line connecting the zero points is the direction of the long axis of the transmitter.

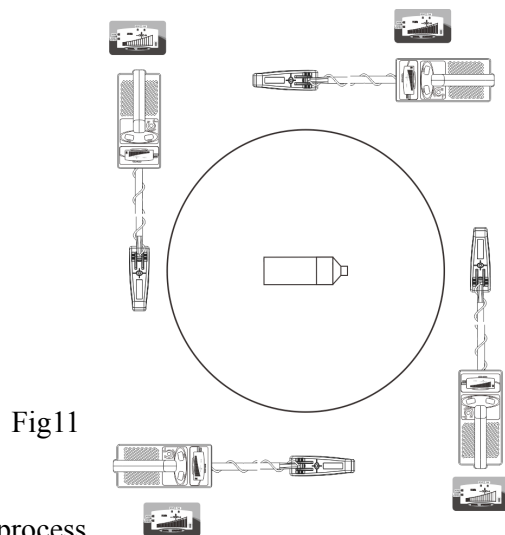


Fig11

In the process of locating, these are the two very important operation steps.

### 3) The maximum receiving distance

Equip the transmitter with the battery and lie it on the ground. Turn on the receiver at a certain distance away from the transmitter. Set the MODE button to NOISE CONTROL and SHIFT button to NEAR. Hold the receiver at the waist level and let the antenna of the receiver be parallel with the long axis of the

transmitter. Adjust the sensitivity knob then and the signal of the LCD will be very strong (it may be full). Adjust the knob to drop the sensitivity so that the signal strength on the LCD stays in the position of “0”. With the receiver on hand, slowly move away from the transmitter along the long axis of the transmitter. The signal strength on the LCD will drop. Adjust the sensitivity knob and let the signal strength still stay in the position of “0”.

When it is far away enough from the transmitter, adjusting the sensitivity knob only can no longer keep the signal strength stay in the position of “0”. You can now press the “SHIFT” button to make it stay in the state of “FAR” to raise the receiving sensitivity. Try to keep the signal strength stay in the position of “0”. When the sensitivity knob has been adjusted to the highest, the LCD signal strength has dropped to show level 1 only and the sound frequency turns low, the distance away from the transmitter now is the maximum receiving distance in open air.

You can also operate by reversing the direction. Walk closer to the transmitter slowly and observe the receiving distance. Adjust the “SHIFT” and sensitivity knob and keep it stay in the position of “0” until the signal strength reaches the strongest. The center of the antenna of the receiver is roughly above the transmitter.

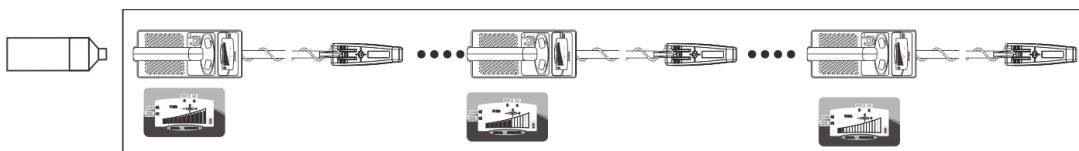


Fig12

#### 4) Locating

Equip the transmitter with the battery and lie it on the ground. Cover the receiver with a piece of paper or a board. You can't see it to some extent. Turn on the receiver, and hold it at waist level. Set the switch to “FAR” and it should receive the signal. Walk back and forth to find the direction that makes the signal stronger. Adjust the sensitivity and keep the signal strength stay in the position of “0”. Continue to move the unit towards the direction where the signal turns stronger. When you feel that you have already reached the position where the signal is the strongest, and when you move towards any other direction away from the position, the signal all turns weak. The transmitter location is then under the central antenna mast.

Move the transmitter to another location, look for the peak point once again and observe whether it will return to the same location.

#### 5) Front Null and Back Null

Walk from the peak point position along the zero point line to the maximum receiving distance. Hold the receiver at waist, set it to the “FAR” grade, rotate the sensitivity to the highest and walk to the peak point slowly while adjusting the sensitivity so that the signal strength indicator is in position of “0”. Switch to “NEAR” grade when necessary. At a certain point before the peak point, you will find the signal strength suddenly drops, and then suddenly rises as you continually move forward. This is called “Front Null”. Record the location of Front Null and repeat the

process to confirm.

Go on walking across the peak point, you will find the peak signal. Keep moving in the same direction and you will find another point at which the signal suddenly drops. It is called “Back Null”. Similarly, record the location of the Back Null and repeat the process to confirm. Roughly the distance between “Front Null” and peak point is the same as that between “Back Null” and the peak point. The distance is then the approximate height of the receiver.

It is very important to determine “Front Null” and “Back Null” to locate the depth of the transmitter.

## **Field operation**

Before field operation, you need to do some preparation work.

First of all, determine whether there is interference signal source. Don’t turn on the transmitter (or camera with built-in transmitter). First turn on the receiver instead. Set the SHIFT button to “FAR” and turn up the sensitivity knob. Set the mode to NORM and walk back and forth in the operation area. Observe whether the receiver can receive any signal. If there is interference source in the operation area, switch the MODE button to “NOISE CONTROL”. If the interference signal disappears, you should keep using the “NOISE CONTROL” mode for the whole process of operation. If the interference signal can’t be eliminated, you should remember the location of the interference source and the signal feature, in order not to misjudge the interference signal as the transmitter signal.

Secondly, the power of the transmitter battery must be adequate. The working current of the transmitter is usually large. You may want to change to new battery even after using the transmitter for just once. It is difficult to change the battery when the transmitter has been pushed in the pipe. It is the best practice to use new batteries so as not to bring some unnecessary trouble to the locating operation.

### **1) Locating**

Put the transmitter into the pipeline. Let the receiving plate of the receiver be parallel and close to the ground. Set the SHIFT button to “FAR” and turn up the sensitivity. Move the unit back and forth in the area where you expect the transmitter is and rotate the direction of the receiving plate. Pay attention to the change of the signal strength and move the receiver towards the direction where the signal turns stronger. If the signal gets very strong, you should turn down the sensitivity and set the SHIFT button to “NEAR”. Try to adjust the sensitivity so that the signal strength stays in the position of “0” all the time until you reach the location where the signal is the strongest. That is, every time you move the receiver, you will get a lower signal. Please mark the location then.

Repeat the location steps in the other direction. If you always return to the same location, this is the rough location of the transmitter in the pipeline.

### **2) Determine the direction of the pipeline**

Upon completion of the first step, the peak position has been found out. You can walk a radius of about 1.5 meters (5 feet) circle around the peak and find the two zero points. The connection between the two zero points is the direction of the pipeline.

Push the transmitter further for 2 to 3 meters (7-10 feet). In the same way, you



could determine the next pipeline section direction.

3) Determine the depth

After completing the previous operations, you have determined the peak position and located both the two zero points and the direction of the pipeline. Now you are ready to determine the depth.

Walk from the peak position along the connection of the zero point to the largest receiving distance. Keep the receiver plate parallel and be close to the ground. Set the unit to "FAR", shift and adjust the sensitivity to the highest and walk towards the peak point slowly. The signal will be received. Walk on. Adjust the sensitivity when walking to keep the signal strength stay in the position of "0". Switch to "NEAR" when necessary. At a certain distance before reaching the peak point, the signal strength will drop suddenly. When you continue to move forward, the signal will go up suddenly. The point is called "Front Null". Mark the location of the Front Null, repeat if necessary to confirm.

Walk on through the peak point along the same direction, there will be another point where the signal drop suddenly, known as the "Back Null". Mark down the location of the Back Null and repeat if necessary to confirm. The distance between "Front Null" and the peak point is roughly the same as that between "Back Null" and the peak point. This distance is the approximate depth of the transmitter.



Fig13

The underground condition in the city is very complicated. The soil condition underground also varies. There may be all kinds of cables and conductors around. The pipe material is also different. In addition, there may be multiple interference signal sources. All these factors will influence the locating accuracy. Only through repeated practice and accumulating experience, accurate results could be obtained for locating operation.