

BATTERY SELECTION

The PULSE 10 draws approximately .45 amp at 24v. Two 12v auto or marine batteries will last for several days of continuous use. For good portability, two 12v motorcycle type batteries can be used, with a minimum of 8 hours between charges. Battery status can be checked at any time by switching the Selection switch to BATT position and observing the meter. For proper operation reading of .7 to 1 is necessary.

MAINTENANCE

Your Pulse 10 was designed to be maintenance free. It is constructed of corrosive resistant materials. It is recommended the fish and coil be rinsed in fresh water after use and stored in a cool dry place. Keep coil connector dry and clean by wrapping a plastic bag around it. The control box contains vent holes to help dissipate heat generated by the electronics. It is recommended the box be kept out of direct sunlight and away from moisture. Please write/phone the factory at (508) 822-7330 if any problems.

LIMITED WARRANTY

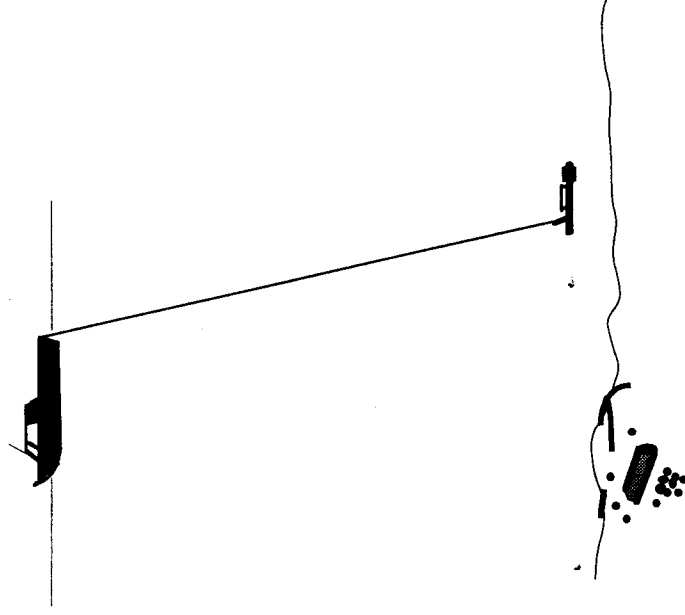
Your detector underwent constant inspection during assembly to insure many years of trouble free performance. The PULSE 10 has a TWO FULL YEAR warranty from the date of purchase. During this period, your detector will be repaired free of charge should a failure occur due to materials or workmanship. The Warranty does not cover broken cables or coils, or damage due to dropping or general misuse.

Should service be required, write/phone us explaining the nature of the problem, and we will supply shipping instructions. All repairs are made at our factory. Repairs by unauthorized persons may void the Warranty.

PULSE 10

BOAT TOWED PULSE DETECTOR

OPERATION MANUAL



If a GPS or Loran C is not being used, or if the GPS or Loran C message is not being properly received by the Pulse 10 the message will be as follows:

@ NO POSITION AVAILABLE ,Fish=,3270,mv <cr> <lf>.

When using the Pulse 10 with a Loran C or GPS receiver the following connection and power-up sequence must be followed for proper operation.

1. Cable up entire system including GPS/Loran C to Pulse 10, Pulse 10 to the computer (RS232 interface), and Pulse 10 to fish to Pulse 10 control box. Also connect all components to their proper power sources.
2. Power-up GPS/Loran C and obtain current position fix.
3. Power-up computer.
4. Power-up Pulse 10
5. Initiate data collection program on computer.

If the Pulse 10 is powered up before the GPS has obtained the current position or the GPS interface cable is disconnected, the RS232 interface will default to the "No Position Available" message shown above.

If the GPS/Loran C loses its position fix during operation, the Pulse 10 will default to the "No Position Available" message".

If either of these conditions occur correct the fault (re-initialize the GPS, check connections, check battery condition). Once the GPS/Loran C is again functioning properly, power down the Pulse 10, wait five seconds and power up the Pulse 10. The position information should now be present.

SPECIFICATIONS

SENSITIVITY (sw selectable):

Sensitivity:	Low	Hi
• Piece of eight.....	10 in	12 in.
• 25 lb. lead ingot.....	20 in	27 in.
• One gallon can.....	3 ft.	4 ft.
• Automobile.....	6 ft.	10 ft.
• Ship (max. range).....	7 ft.	11 ft.

PERFORMANCE/DESCRIPTION:

- Detection area..... 11 ft. deep, 17 ft. wide
- Tow speed..... 1-3 mph
- Input voltage..... 24 vdc
- Power consumption..... 7 w
- Readout..... Meter and Audio

DIMENSIONS/WEIGHT:

- Coil..... 18" Dia..... 10 lbs
- Fish..... 4' Lx6"Dia..... 20 lbs
- Control Box..... 13"Lx13"Wx6"H..... 5 lbs
- Cable..... .5"Dx150'/300'..... 30/60 lbs
- Shipping Boxes -fish..... 53"Lx15"Dx13"H..... 50 lbs
- coil,cable,CB..... 18"Wx10"Dx24"L..... 35 lbs

MATERIALS/COLOR:

- Fish..... High impact PVC, stainless/yellow
- Control Box... High impact Underwater Kinetics case, PVC/black
- Cable..... R8B coax/black
- Coil..... High impact epoxy/black

OPTIONS

- 300 ft. cable
- Altimeter
- RS232 computer interface

INTRODUCTION

The PULSE 10 is a boat-towed pulse induction metal detector. Pulse detectors have had a major impact on the salvage business. Their major claim to fame is that they are very sensitive and do not detect minerals (extreme concentrations of iron ore may give a modest reading). This lack of mineral detection is an answered prayer for salt water divers who have to contend with heavy mineralized deposits on the ocean floor which produce false readings on conventional detectors. Pulse detectors ignore these mineral deposits and respond only to metal targets (ferrous and non-ferrous metal).

HOW PULSE DETECTORS WORK

Pulse detectors operate by transmitting a continuous stream of high energy magnetic pulses (one hundred per second), from the Coil. After each pulse is transmitted, the unit then "listens" using the Coil as the receiving antenna.

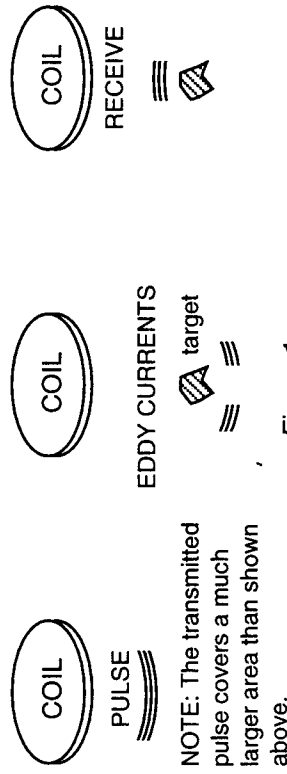


Figure 1

When a transmitted pulse hits a metal object, a magnetic field is induced in the object. This causes eddy currents to flow in the metal, which in turn generates a second magnetic field. This field is picked up by the Coil, amplified, and then displayed by the meter and heard in the speaker/earphone.

RS232 /GPS/ANALOG OPTION

With the RS232 option the Pulse 10 can be connected to any computer or data recorder equipped with an RS232 input. The specification of the interface is as follows: 8 bit, 4800 baud rate, 1 stop bit, and no parity bit.

The GPS/Loran C interface allows the ships position information to be input into the Pulse 10. The Pulse 10 then reformats the information, combines it with the signal strength readings from the towfish, and sends it to an external computer via the RS232 interface.

Any GPS or Loran C receiver equipped with a NMEA 0183 output can be used with the Pulse 10. If you are not sure if your receiver has NMEA 0183 output, check its manual or call the manufacturer. You may find that you have to tell your GPS receiver to send out the 0183 information (refer to your GPS manual). If given a choice, select 0183A or 0183C format. Both versions include the latitude/longitude message format called GLL. The Pulse 10 can also receive the message format called GGA, if the message GLL is not available. The Pulse 10 automatically checks for the presence of either message on power-up.

The sample message sent on the RS232 interface is as follows:
@Position,4151.745353,N,07102.394576,w,Fish=,3270,mv <cr>
<lf>

Where the position is the latitude and longitude coordinates from the GPS or Loran C receiver and "Fish" is the detection signal strengths expressed from 0 to 5,000 millivolts (0 to 5.000 volts). <cr> is ASCII carriage return and <lf> is ASCII line feed. The complete message is repeated once per second.

ALTIMETER

Altimeters attach to the bottom of a Fish and measure the distance to the bottom. If you did not purchase the Altimeter, then the tow rope should be marked every five ft. and used in conjunction with your boat depth finder to control Fish depth.

Shallow water (2 to 6 ft.) searching is accomplished by tying a float to the fish (see Figure 8a) so that it can be towed behind the boat without the Fish running into the bottom.

Deepwater searches (over 75 ft.) require a downrigger (see Figure 8b) to insure maximum depth of the Fish. The downrigger can be of any weight. A 25 pound ingot of lead does a good job at low speed (2-4 MPH). The faster or deeper you tow, the heavier the weight must be for the Fish to stay directly below the boat to enable accurate depth control.

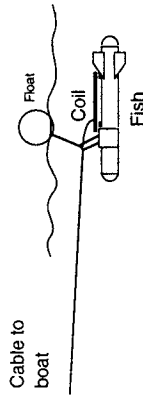


Figure 8a

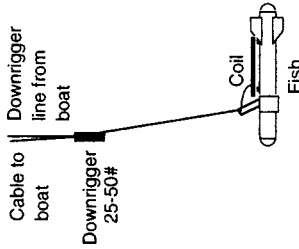


Figure 8b

If your target is small (anchor, motor, etc.), a slow tow speed is recommended. If the target passes too quickly below the Coil, you may get a weak reading on the meter. Experiment by passing a one gallon can past the Coil while on land. It is recommended that you use a 1/4" rope between the boat and the downrigger. The downrigger should be connected to the boat on its own line, so not to put excessive strain on the Cable. The cable is taped, or wire wrap tied, to the rope every foot or so.

PULSE 10 DESCRIPTION

The PULSE 10 is a boat-towed pulse detector consisting of a 18" diameter coil, a towable fish (removable for land use), a 150' coax cable (optional 300' cable available), and a control box.

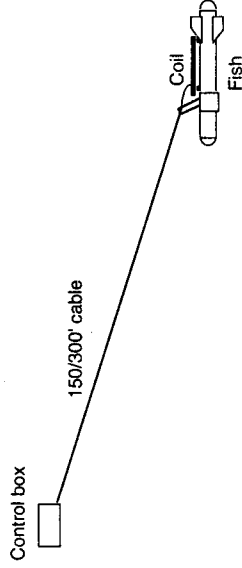


Figure 3a

For underwater use, the coil is mounted on the fish and towed behind a downrigger (a 25-50 pound weight) at any depth down to 150/300 feet. The fish sails through the water at a depth determined by the depth of the downrigger.

For pinpointing, or for very small search areas, the coil can be disconnected from the fish and suspended over the side of the boat. A simple three point harness, made out of rope, insures that the coil remains flat (see Figure 3b).

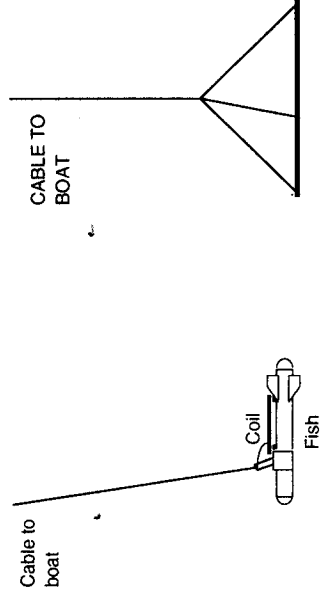


Figure 3b

PULSE 10 SENSITIVITY

The sensitivity of the Pulse 10 is switch selectable. If operating in LOW sensitivity you can expect detection ranges as indicated under **LOW** in the chart below. When operating in HI sensitivity, you can expect detection ranges as indicated under **HI** in the chart below. You can expect these detection ranges whether the target is buried under mud, coral, sand, or rocks.

Sensitivity:	Low	Hi
• Piece of eight	10 in	12 in.
• 25 lb. lead ingot	20 in	27 in.
• One gallon can	3 ft	4 ft.
• Automobile	6 ft	10 ft.
• Ship (max. range)	7 ft	11 ft.

PULSE 10 DETECTION ENVELOPE

The detection envelope for the PULSE 10 is very large - much larger than the coil width/length. Figures 4a,b shows the HI and LOW detection envelopes for a one gallon can and for the maximum detection envelope (a very large object). Though it is not shown, the envelope extends above the coil as well as below.

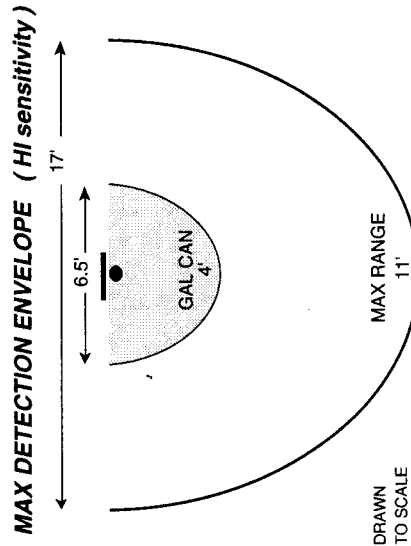


Figure 4a

- Turn the Selection Switch to CAL. and turn the CAL. ADJUST knob until meter reads approximately .3.
- Turn the Selection Switch to LOW or HI sensitivity position and turn the ZERO ADJUST knob for a meter for a meter reading of approximately .1.
- The system is ready to go. Periodic adjustment of the Zero Adjust knob may be necessary. Each time you turn on the Control Box, the Cal. should be rechecked for a reading of approximately .2.

DETECTING METAL

As metal passes near the Coil, the needle swings up. At about a .2 meter reading the audio sounds off and increases in pitch (frequency) as the needle swings higher. Maximum meter swings occur when the target is directly below the center of the Coil. As you go past the target, the needle returns to zero and the audio stops. Run some tests out of the water with a metal target (gal can is fine) to get the feel of the Pulse 10. There is no need to move the coil, simply move the target around, above or below the Coil.

TOWING

The Fish tows flat and directly behind the boat. When searching in water 6 to 50 ft. deep this works quite well. The objective is to get the coil as close to the bottom as possible so the target will not be missed. The ideal tool to do this with is the JW Fishers UA-2

The LOW sensitivity detection envelope is somewhat smaller than the HI sensitivity detection envelope.

MAX DETECTION ENVELOPE (LO sensitivity)

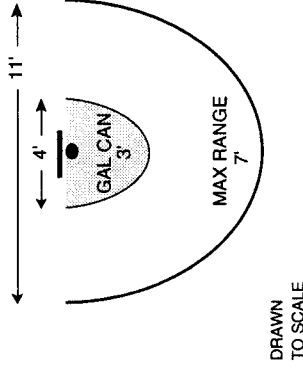


Figure 4b

PULSE 10 ASSEMBLY

The tow arm is bolted to the fish using two 1/4 - 20 x 1 1/2" stainless steel bolts and nuts - tighten securely - be sure arm points forward. The fish is towed by connecting a rope to the shackle at the top of the tow arm.

The coil mounts to the fish with four 8 -32 x 2" screws with an equal number of wing nuts. Screws enter top of coil with wing nuts on bottom of coil supports. All hardware must be stainless steel. Be sure to mount coil so that the cable is close to the tow arm (front of fish).

- CAL. Adjust This adjustment is used to calibrate the system (when the selection switch is in CAL. position). This control is adjusted until the meter reads .2.
- Zero Adjust This adjustment is used to adjust the position of the needle on the meter scale.

OPERATION/CHECKOUT

- Position the coil outside and 5-6' away from any metal.
- Plug the cable from the coil into the control box and tighten the connector (just snug).
- Connect the power cord to 24 vdc (two 12v car/motorcycle batteries in series) and observe polarity.

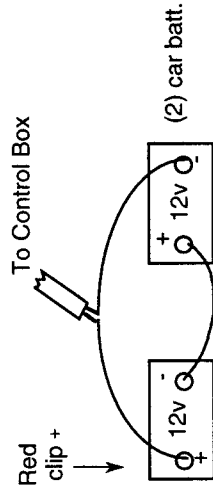


Figure 7

- Turn the Power Switch on and note that the POWER ON LED is illuminated.
- Turn the Selection Switch to BATT. position and note that the meter swings to .7 or above.

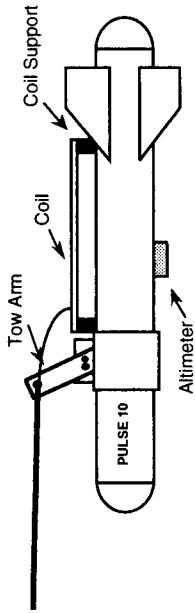


Figure 5

PULSE 10 CONTROL BOX

The heart of the system is the control box which contains all controls and indicators for the system:

Control Box

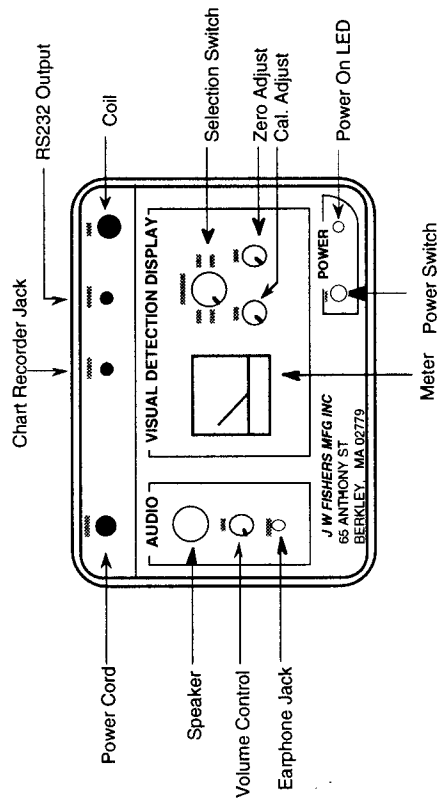


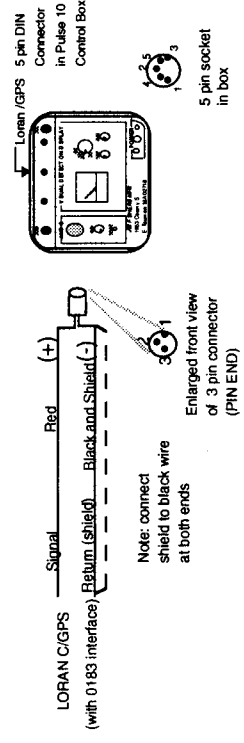
Figure 6

- Meter

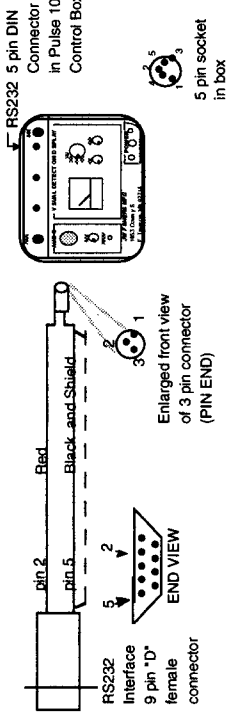
Indicates the presence of metal by swinging to the right. The closer the metal is to the coil, the further it will go to the right. Also used to indicate battery condition.

- Speaker When the meter moves past .2 , the speaker sounds off. The higher the meter goes, the higher the pitch (frequency) out of the speaker.
- Volume Control Adjusts the volume out of the speaker.
- Earphone Jack Accepts a standard 1/4" earphone plug (stereo or mono). Speaker output is silenced when earphones are plugged in.
- Chart Recorder Jack Accepts a standard 1/8" plug and provides an output signal for a 0 -1 MA chart recorder.
- RS232 Output With this option the P10 can be connected to any computer or data recorder with a RS232 input.
- Cable Jack The 150/300 ft. coax cable from the coil plugs into this jack.
- On/Off Switch Turns power (24vdc) on in the system.
- Power on LED Lights when power is on.
- Selection Switch A four position switch which selects the mode of operation:
- Cal. Pos. In this position, the unit is calibrated by adjusting the CAL. control until the meter reads .2.
- Batt. Pos. Meter indicates the condition of the battery (meter should read above .7).
- Low Pos. The unit is operating in LOW sensitivity (about 1/2 of HI).
- Hi Pos. The unit is operating on HI sensitivity (normal operating mode).

LORAN C / GPS WIRING



RS232 WIRING



ANALOG OUTPUT OPTION

The analog output option allows the Pulse 10 to be connected to an external device such as a strip chart recorder or data logger. The analog output is 0 to +4.00vdc. The voltage is a representation of the detection signal strength.

The analog output uses 2 wires and is wired to a 5 pin DIN connector on the Pulse 10 as Follows:

ANALOG OUTPUT WIRING

