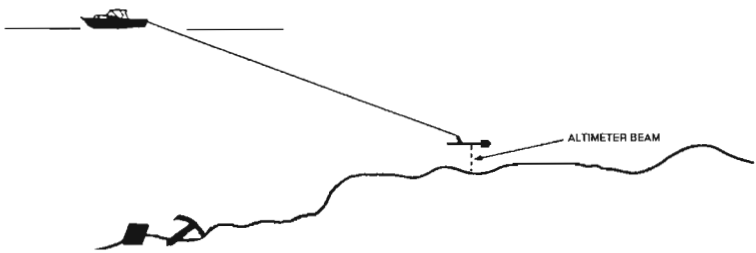
UA-2

PRECISION UNDERWATER ALTIMETER

OPERATION MANUAL



CAUTION

- **When disconnecting the cable from the transducer be sure the O-Ring does not fall out of transducer connector**

P1250-1/P4/OPER MAN-NEW

J.W. FISHERS MFG INC
1953 COUNTY STREET
E. TAUNTON, MA 02718

INTRODUCTION

The Fishers UA-2 Precision Underwater Altimeter System consists of a control box mounted on the surface vessel and a transducer mounted on a towed fish or other device suspended from the surface vessel. The system allows an operator on board the surface vessel to accurately measure the distance between the submerged device and the bottom terrain over which it is suspended or being towed.

Water is an excellent media for the transmission of acoustic energy or what might commonly be referred to as sounds. When sounds, such as the hitting together of two pieces of metal, are generated underwater the sound travels a long distance in all directions. If the sound hits against an object in the water such as the hull of a ship, rocks, or the ocean bottom, it is reflected back towards the point where it first originated. Since acoustic energy travels through the water at about 4800 feet (1477 M) per second, it is possible, by measuring the time that elapses between the sound being generated and hearing the return echo, to accurately determine how far the reflecting surface is from the sound source. This is the principal on which all sonar operate.

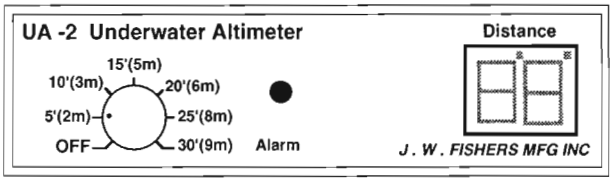
Rather than banging together two pieces of metal, the Fishers Altimeter uses a piezoceramic crystal to generate a pulse which is precise in both frequency and duration. The crystal is mounted in a specially designed housing which insulates it electrically and provides mechanical impedance coupling/matching to the water. The housing also contains a transformer which matches the impedance of the crystal electrically to the impedance of the cable connecting it to the surface mounted controller. This entire underwater assembly is called a transducer.

The sound wave emitted from the bottom of the transducer is a beam (30 degrees) and is directed straight downward. The frequency of the sound is 200KHz so it cannot be heard. The maximun range or depth that the altimeter will operate is dependent on the hardness of the bottom.

CONTROL BOX

The Control Box provides a number of different functions for the system. It generated the times the transducer sends the pulses into the water. It "listens" to the transducer to detect reflected signals. It measures the time signals take to make the round trip from the transducer and back. It adjusts the gain of the receiving amplifier to compensate for signal attenuation in the water. It provides an audible alarm signal if the target is closer than the operator desires. Finally, it tells the operator what the distance is three times every second.

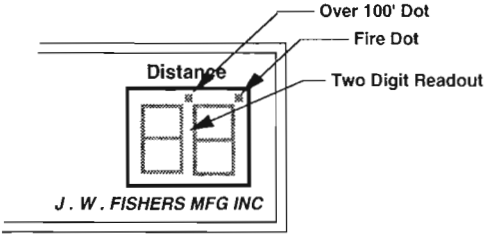
The Control Box front panel contains the necessary controls and indicators for operation of the unit.



The single control knob is used to turn the unit on and to set the alarm fire point. The alarm fire point setting determines at what point the alarm fires. If the knob points to six foot, then the alarm will go off if the transducer gets closer than six feet from the bottom. The printed foot/meter marks (5'-30') are approximate.

Just to the right of the control knob is the alarm. It sounds off anytime the transducer is closer than the indicated setting of the alarm knob.

To the right of the alarm is the LCD readout.



The LCD readout has three indicators:

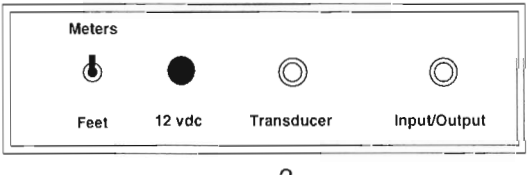
- Fire Dot - blinks each time the transducer sends out a pulse, which is approximately three times per second.

- Over 100 ft. (M) Dot - if the distance is over 100, then this dot will stay lit. If the distance was127 feet (M), then this dot would stay on and 27 would be displayed in the readout. Ranges in excess of 50 to 60 feet cannot occur with soft bottom conditions.

- Two Digit Readout - displays the distance between the transducer and the bottom. It can display from 01 to 99. If the distance is over 99 then the over 100 dot will light and the amount over 100 will be displayed.

If the transducer does not receive a return pulse because the distance is too far for bottom conditions (soft bottom returns a weak signal) then the readout will go blank (the fire dot will continue to blink).

The rear panel of the UA-2 contains the power cord which is connected to 12 volts, and a small toggal switch which allows the operator to select either meters or feet for the display. The back panel also contains an input/output jack which allows output to a PC, nd recieves a sync pulse when used with a JW Fishers Proton 4 mgnetometer.



OPERATION

The UA-2 will not work in air, it must be in a liquid. The operation of the UA-2 is very straight forward.

1. Connect the power leads to a 12v battery. Red clip goes on positive terminal (+).
   Note: The UA-2 should be on its own 12v battery. If it is not, it may cause interference if connected to a Pulse 10, Pulse 12 and Proton 3.

2. Connect transducer cable to rear of UA-2 control box (align connector and carefully push in place).

3. Turn control knob clockwise to turn unit on.

4. Set the pointer (white dot) at the depth you want the alarm to go off.

   Example: If you set the pointer at 5' then the alarm will sound off continuosly if the transducer gets 5' or closer to the bottom. The printed foot marks (5' to 30') are approximate.

When the transducer is put in the water and pointed straight down it will immediately display the distance to the bottom. The system will only work when the flat face of the transducer is facing the bottom.

If the readout is blank, but the fire dot blinks, this indicates that there is no return signal. If this occurs wipe the bottom of the transducer off with your hand while the transducer is in the water. The problem is most likely due to small air bubbles on the surface of the transducer face.

As the transducer is lowered to the bottom, the readout will change in one foot increments. If the readout shows 07 the distance is 7 to 8 foot (M). If the distance drops below 7 foot (6' 11") the readout will display 06. At less than two foot (M) the readout will indicate 01 and will not indicate any lower number.

The transducer is mounted to the bottom of towed equipment, and is connected to the cable by an underwater cable connector. The underwater connector should only be disconnected if it becomes necessary to replace the transducer.

SPECIFICATIONS

DIMENSIONS:

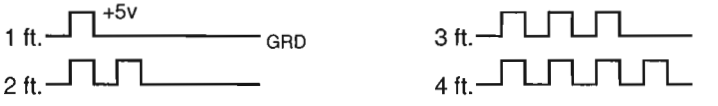
- Control Box ..... 1 1/2"x5"x5 1/2"
- Transducer ..... 1 1/2"x 4"
- Cable type ..... four cond. 22 awg cable
- Cable length ..... up to 1000'

PERFORMANCE:

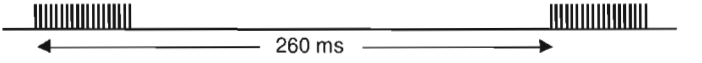
- Frequency 200KHz
- Beam angle ..... 30 degrees
- Range (hard bottom) ..... 150 ft.(46 M)

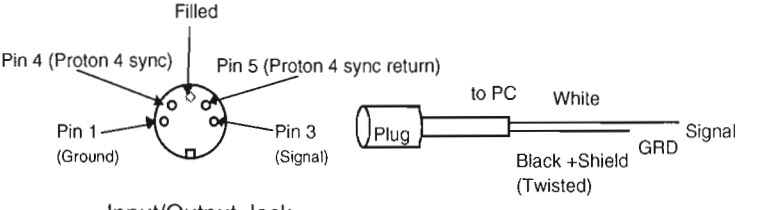
OPTIONS

The UA-2 is available with an output plug that makes the information available for a computer input. An analog input port of the computer must be used. The output is a series of 0-5v pulses. Each pulse represents 1ft. See samples below:



The pulses occur at a 2400Hz rate. Each pulse is high for 208 micro-seconds. If there are two or more pulses then the time between pulses (signal at ground) is also 208 micro-seconds. The sequence is repeated (new reading) approximatetly three times a second (every 260 ms).





Input/Output Jack
on Control Box

WARRANTY

Your unit underwent constant inspection during assembly to insure many years of trouble-free performance. The Precision Underwater Altimeter is warrantied for TWO FULL YEARS from the date of purchase. During this period, your unit will be repaired free of charge should a failure occur due to materials or workmanship. The warranty does not cover damage due to droppage or general misuse of the unit.