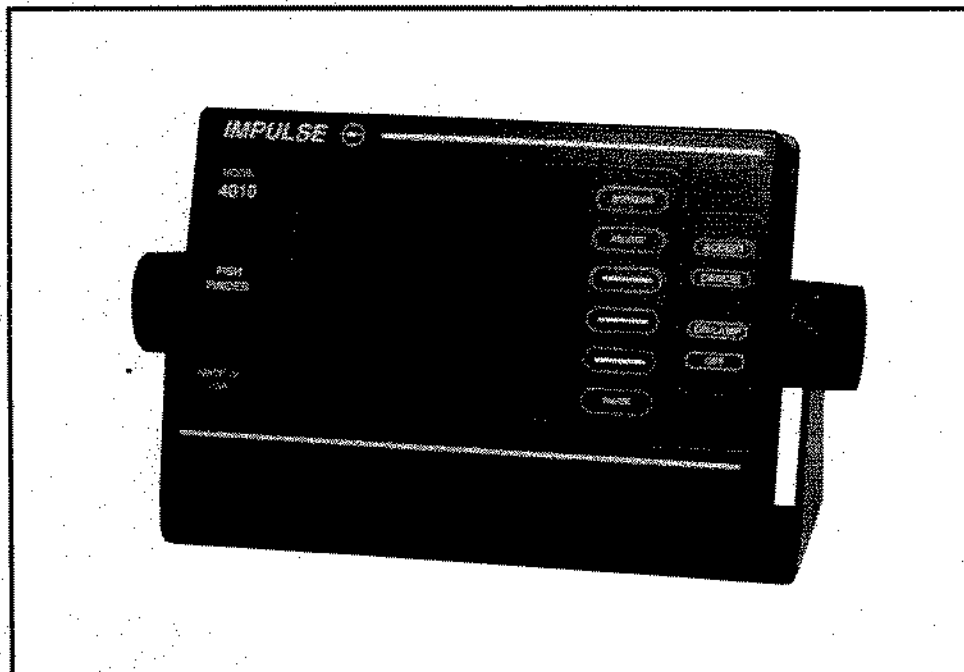


IMPULSE

Model 4010 Fish Finder Owner's Manual Installation and Operation Guide



IMPULSE

MODEL 4010

TO OUR CUSTOMER:

We would like to extend our thanks to you for purchasing the IMPULSE 4010 Fish Finder.

It is very important that you review this manual carefully and thoroughly prior to using your instrument. Each instrument contains a built-in simulator which will be helpful in showing you the operations of the Fish Finder. We suggest that you use this simulator to thoroughly familiarize yourself with the product prior to actual usage.

CAUTION: Your IMPULSE 4010 is an aid to navigation and does not reduce the need for caution or judgment. No electronic navigation system is absolutely reliable; outputs may occasionally be incorrect. The careful navigator should never rely solely on one device, to the extent of endangering life or property. We recommend that you use this system in combination with marine charts, and knowledge of the area where you are boating. Any time a reading flashes on and off, outputs may be in error and should not be used for navigation.

Again, we want to thank you for purchasing an Impulse product and are confident of your satisfaction.

Sincerely,

IMPULSE TECHNOLOGY

IMPULSE TECHNOLOGY
329 Railroad Ave. Pittsburg CA 94565 USA
Phone: 510-439-2072

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BACKGROUND

DEPTH SOUNDER TRANSDUCERS

UNDERSTANDING SONAR

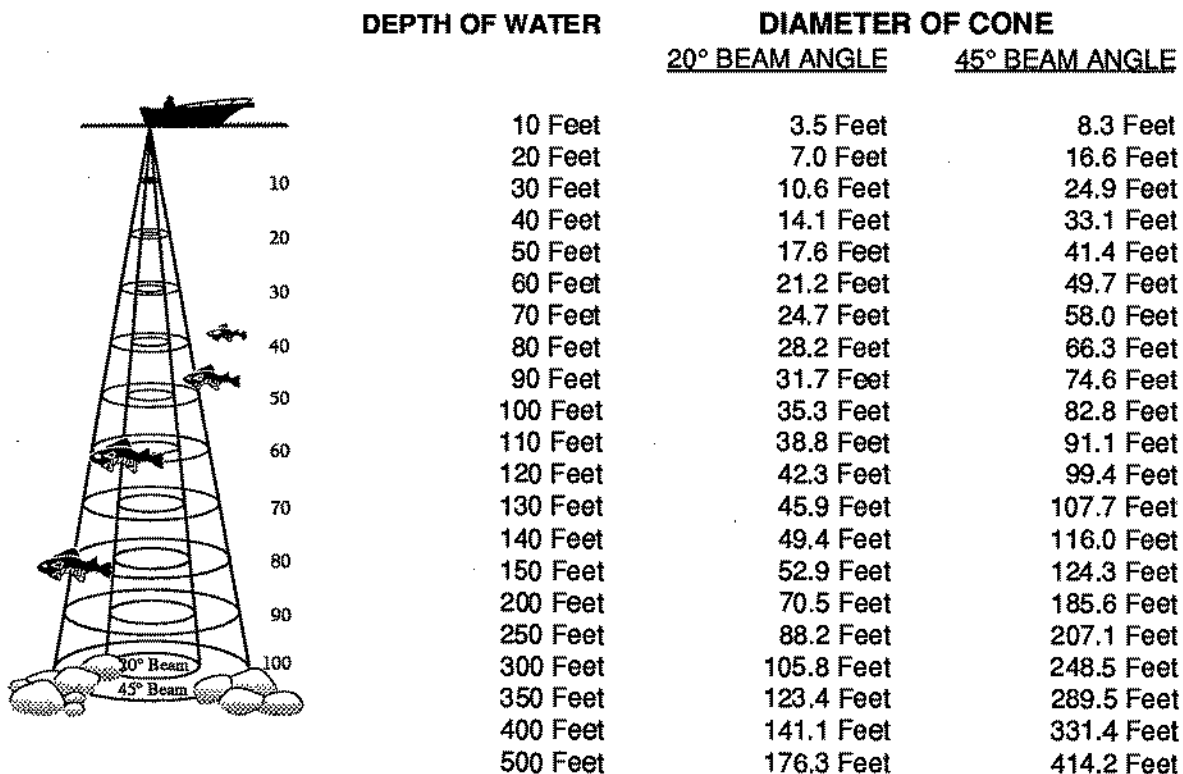
All depth sounders emit Ultrasonic Sound signals from the transducer into the water located under your boat. These sound signals travel through the water at a rate of approximately 4,800 feet per second (1500 meters per second). The depth sounder transmits a signal and receives a returning echo. The unit calculates the amount of time in microseconds that elapsed while the signal traveled down to the bottom and returned back to the transducer. This time is then converted to depth and displayed on the screen.

It may help to understand these sound signals travelling between the transducer and the bottom by imagining a ball bouncing up and down from the floor. The closer the ball is to the floor, the less time it takes for it to return. The higher the ball is bounced, the longer it takes to return. Bouncing the ball off of a hard surface, such as cement, is similar to bouncing a signal off of a sandy or hard bottom. Bouncing this same ball off of carpeting creates a totally different effect because the ball returns with less force. The same applies to an echo bouncing off of a muddy or grassy bottom which causes the echoes to be weaker.

BEAM ANGLES

There are two different 120 KHz beam angles available: 20° and 45°. The 45° beam angle transducer will go to a maximum depth of 480 feet (150 Meters) in fresh water when the bottom is hard and reflects echoes strongly. The 20° beam angle should be used for deeper water applications. With a strong reflective bottom, it should be able to read to a maximum depth of 960 feet (300 Meters) in fresh water. (Maximum depth read in salt water is less than 960 feet).

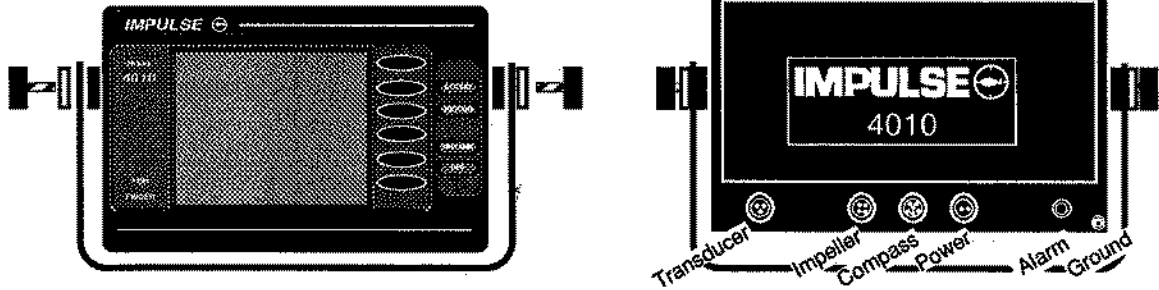
As can be seen from the diagram below, the diameter of the cone becomes larger as the depth becomes greater. As the depth of water increases, the strength of the echo diminishes. The GAIN (Sensitivity) of the Instrument can be increased to compensate for this loss of echo strength.



AIR ECHOES

Air echoes can be caused by excessive turbulence under the face of the transducer. Ultra sonic signals from a transducer will not penetrate air. They react to air in the same manner as they react to a hard bottom described above. Therefore, if your transducer is not mounted properly and you are getting turbulence (air bubbles) under your transducer you may get false readings simply because signals are being returned by the turbulence and never reaching the bottom.

Modifying the Shallow Water (TVG) setting can reduce this problem. Adjusting the transducer location can also help prevent these false readings.



CORRECT PLACEMENT AND VIEWING ANGLE

Mount your 4010 in a location where you can easily monitor and operate the unit. It should be sheltered from the elements as much as possible to ensure system longevity and ease of operation under adverse conditions.

Use the following guidelines when installing your 4010:

1. Install it where it will capture as much light as possible.
2. Keep at LEAST 3" clearance for the connectors.
3. Always check for correct voltage and polarity **before** external grounding. Improper voltage and polarity may cause permanent damage to your unit.
4. Use only with Negative ground systems; set will not operate if polarity is reversed.
5. Keep the unit as far as possible from compasses or radio(s) to reduce interference. Check for compass accuracy before permanently installing the 4010.
6. Route all associated cables away from other electrical cables and equipment which may radiate electronic interference.

MOUNTING OPTIONS

GIMBAL MOUNTING BRACKET

To mount the main unit, remove the bracket that is attached to the main unit by loosening the two large knobs. Then mount the bracket at the desired location using the appropriate hardware. You may want to place a small piece of neoprene (gasket material) between the bracket and the dash panel to reduce vibrations. Reinstall the main unit in its mounting bracket and connect the transducer, and remaining cables to the unit's rear plugs.

SWIVEL MOUNTING BRACKET

The optional 360° swivel mount makes removal of the instrument easy without having to remove the side thumbscrew knobs and washers each time the instrument is removed from the boat.

POWER SOURCE

SELECTION OF POWER SOURCE

Do not use a power source shared by a high current load or radio, since power disturbances and transmissions may feed back into the power circuit and create Interference. Ensure that regulation of the power source remains within +11.5 volts to +16 volts under loaded conditions. You should never have any electronic device turned on when starting an engine as the voltage drop and surge can damage the sensitive electronic components in the set.

BATTERY CONNECTION/POWER REQUIREMENT

1. Route the power cable away from other possible sources of electrical interference such as engine wiring, VHF radios, bilge pumps, refrigerators, etc.
2. Connect the main unit to a 12 volt battery using the power cable supplied with your unit. You may extend this cable, but you must observe proper polarity (i.e., red is positive, black is negative)
3. Connect the BLACK wire to the negative (-) battery terminal.
4. Connect the RED wire to the positive (+) battery terminal.
5. Make sure the connections are clean and tight so they do not vibrate loose during the boat's operation. Occasionally clean any accumulated corrosion from the battery terminals.
6. If for some reason the fuse is blown, replace with a **2 amp fuse, normal blow**.

DO NOT OVER FUSE! Because the 4010 consumes approximately 1 amp of current when it is on, you will want to keep your battery fully charged.

The three most popular transducer styles are:

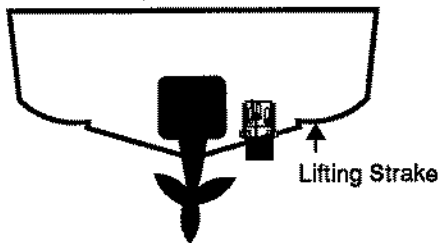
- **TRANSOM MOUNT:** Ideal on boats with outboard engines, or on I/O driven boats.
- **THROUGH-THE-HULL:** Ideal for boats with Inboard engine(s)
- **INSIDE-THE-HULL:** Often called Shoot Through Transducer; can be used effectively if procedures for installation are followed carefully. (Only available in narrow beam angle.)

TRANSOM MOUNT TRANSDUCERS

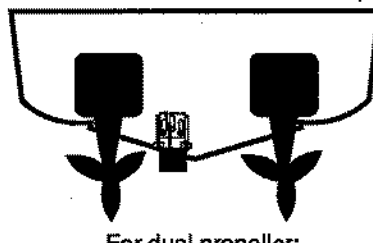
SELECT AN INSTALLATION LOCATION

Mount the transducer fairly close to the centerline (keel) of the boat, which will ensure minimum potential aeration over the acoustic window of the transducer. On twin drive installations, install the transducer between the drives.

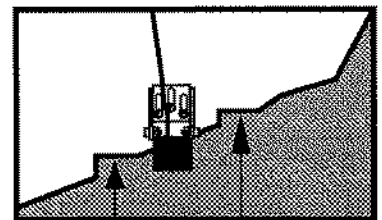
On single drive installations, the transducer bracket should be mounted on the side of the boat where the propeller blade is rotating downwards. This is usually the right (starboard) side. If possible, the transducer should not be mounted directly behind any strakes, ribs, intakes and outlets for live wells and/or engine cooling water, or any protrusion which may cause turbulence or cavitation. On slower, heavier displacement boats, good results can be achieved further from the keel.



For single propeller:
18" to 24" outboard from the centerline, but not behind a lifting strake



For dual propeller:
Best location for transducer within 6" of centerline



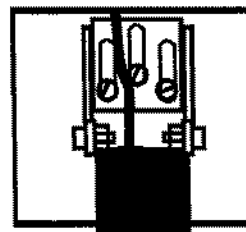
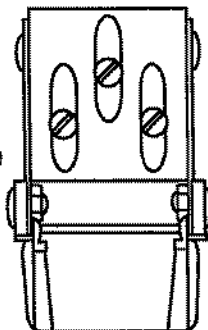
Do NOT mount on or behind lifting strake

DO NOT INSTALL YOUR TRANSDUCER UNDERNEATH A GASOLINE OVERFLOW AS THIS WILL DESTROY THE PLASTIC MATERIAL OF THE TRANSDUCER AND THE BRACKET. THIS DAMAGE IS NOT COVERED UNDER WARRANTY. Also, do not use **LOKTTITE** or any other solvents on the mounting hardware or transducer, as these materials may destroy the transducer.

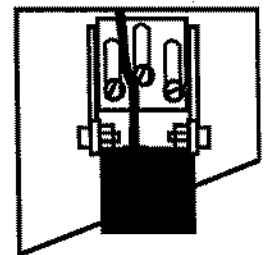
MOUNT THE TRANSDUCER

The transducer and bracket assembly should be oriented vertically with respect to the water to yield a vertically directed acoustic beam.

1. Attach the transducer to the bracket as shown.
2. Place transducer and bracket at the selected location on the boat transom. Align the bracket so that the bottom surface of the transducer is even with the underside of the boat.

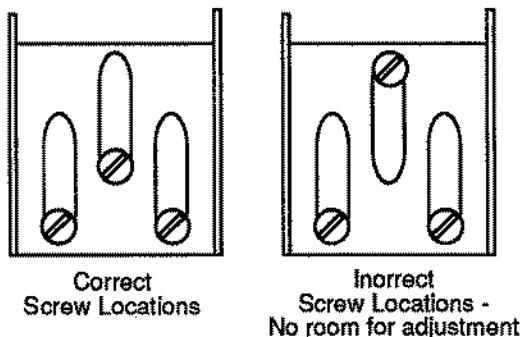


Flat Hull



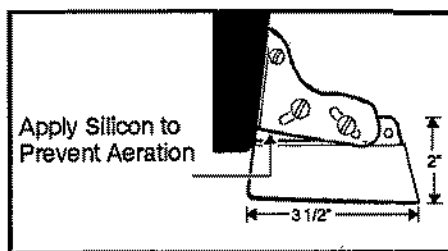
Vee Hull

3. Mark the outline of each slot on the hull. Mark the screw locations 1/8" from the *bottom* of each slot, and drill three holes, 3/4" deep with a 9/64" drill. The slots in the bracket allow 1" of vertical adjustment, which can be utilized to lower the transducer further into the water to achieve optimal performance.



4. Using the sheet metal screws provided, attach and tighten the bracket to the hull so that the transducer projects 1/8" below the underside of the hull. A marine sealant such as RTV should be applied to the threads of the screws to prevent water seepage into the transom. Align the transducer so that the rear is 1/16 to 1/8" lower than the forward point (bow). Tighten all bolts and screws.
5. Route the cable to the 4010, being careful not to tear the cable jacket, and keeping the cable separated from ignition, tachometer, alternator, or other electrical wiring. Do not remove the connector or splice or shorten the cable, as this voids the transducer warranty.
6. Just before launching your boat, thoroughly wipe the face of the transducer with a detergent type liquid soap to clean the thin layer of film coating the face of the transducer. This reduces the amount of time required for the transducer to establish good contact with the water.
7. Once the transducer has been connected to the 4010, perform a preliminary test of the installation. Verify that the following factors are not degrading transducer performance:

Engine Noise: Activate the FISH FINDER screen on the 4010. Use the ADJUST FISH FINDER screen to turn FISH ID off. With the boat out of gear, rev the engine(s) to cruising RPM and verify that the fish finder display is clean and shows a recognizable bottom. The presence of "black snow" on the Fish Finder indicates that engine noise is interfering with the performance of the transducer. If engine noise is creating interference, a MARLINE Alternator Filter will most likely improve performance. (MARLINE phone number is 213-595-6521)



Aeration: After becoming familiar with the 4020's performance at a speed of 5-6 knots, gradually increase the boat speed. As the speed increases, there may be a gradual degradation of transducer performance because flow of water over the transducer generates acoustic noise. (Acoustic noise is seen as black spots on the Fish Finder screen). Proper installation location and alignment will minimize the chance of this aeration. If this occurs, observe boat speed at the onset of degradation, reduce boat speed and then gradually increase speed again while making a moderate turn toward the side where the transducer is mounted. If performance improves, the transducer is probably aerated. Move the transducer down approximately 1/4", which will place the transducer further into the water flow under the hull where aeration usually is less pronounced. Repeat this preliminary test, and re-adjust the transducer if necessary. The transducer should be placed no more than 1" below the bottom of the hull.

If you have a Flat Bottom boat, transducer aeration can be reduced by installing the transducer so that it is pointing backwards, as a smooth extension of the hull. A backwards mounted transducer must be mounted flush with the bottom of the hull, and cannot extend below the hull.

SALTWATER MAINTENANCE

If your vessel is kept in saltwater, sea growth will build up on the transducer housing and bracket. Therefore, it is recommended that the entire transducer and the bracket be coated with an antifouling paint. Use only mineral spirits based paints, such as Glochester (RULE) Durapoxy. Do NOT use ketone based antifouling paint since ketones attack plastic and can fracture the housing. If fouling does occur, use a stiff brush or putty knife to remove growth. Wet sanding of fouled surfaces is permissible with #220 or finer grade wet or dry paper.

TRANSDUCER REPLACEMENT/IDENTIFICATION

On most transducers manufactured since 1987, the operating frequency and part number is stamped on the cable or is printed on a mylar tag near the connector end. Do not abrade the marking or remove the tag since this identifies the transducer should you need a replacement.

THROUGH THE HULL TRANSDUCERS

The two most popular styles of Through-the-Hull transducers produced are **Low Profile** types, which typically are 1-3/4" or 2" in diameter, or **Stem type** transducers, which typically have a 3/4" pipe thread and require a fairing block to level. The two most popular materials used are nylon and bronze.

- **WOODEN BOATS** require the use of a bronze transducer or bronze fittings due to the fact that when the boat is out of the water, the wood will dry out. When the fitting is installed and the boat returned to the water, the wood will swell and possibly crack a nylon type of transducer. Therefore, bronze is recommended for all wooden boat applications.
- Manufacturer's of **LARGER FIBERGLASS BOATS** often request bronze transducers and fittings due to the size of the boat and the total number of fittings used in the installation. However, nylon transducers are better suited for this application because of their ease of installation, lower cost, and more complete seal to the fiberglass hull.

SELECT AN INSTALLATION LOCATION

The mounting location must provide for a smooth flow of water over the face of the transmitting surface of the transducer. Bubbles will cause the instrument to read improperly and cause erroneous readings. The mounting location should have reasonable access from inside the vessel since the transducer will require tightening from inside the hull.

On *sailboats*, the transducer should be mounted where the acoustic beam will not be shaded by the keel. A spot forward of a fin keel, with a minimum deadrise angle, is preferred.

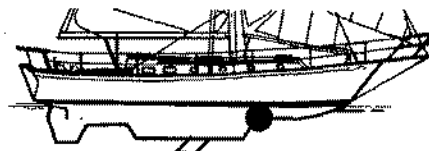
On *planing powerboats*, the transducer should be located off centerline, 6"-12" and before the first lifting strake (flat area). Do not install it on a lifting strake since this is the area where air bubbles travel from the bow to the stern in order to provide a smooth ride.

On *displacement power boats (trawlers)*, the transducer should be mounted well aft and close to the centerline.

On *I/O's*, mount the transducer close to the engine(s).

On *inboards*, always mount the transducer well ahead of the propeller(s), and shafts.

Never mount a transducer in direct line or within 4 feet behind another through hull fitting, the keel or rudder, zinc anodes, or other projections that would cause turbulence around the transducer when the boat is under way.

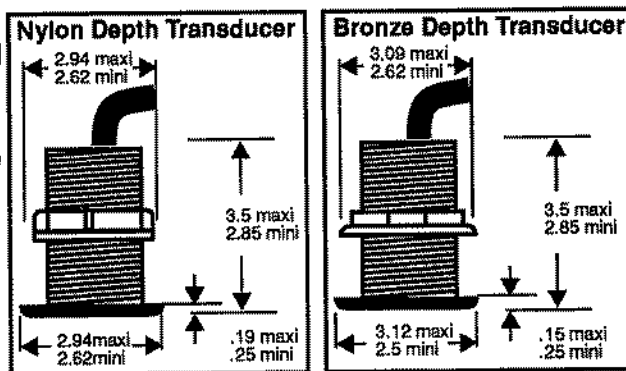
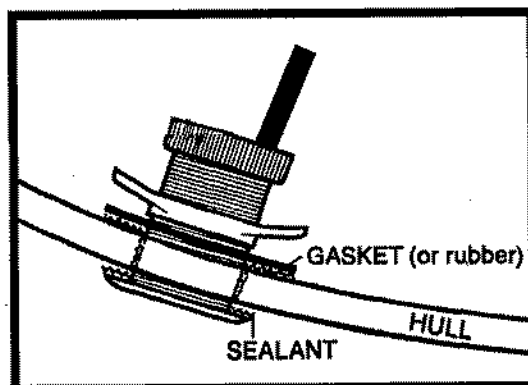


LOW PROFILE TRANSDUCERS

The Low Profile style of transducer is ideal for high speed sport boats and sailboats, this style of transducer is designed to be mounted flush against the hull without a fairing or leveling block. The hull deadrise angle must not exceed 20° in order to use this transducer fitting.

MOUNT THE TRANSDUCER

1. Drill an 1/8" pilot hole in the preferred transducer location.
2. Drill a 1 3/4" or 2" hole through the hull using the pilot hole as a guide.
3. Have some type of soft backing plate or thin piece of plywood (3-1/2" x 3-1/2" x 1/4" thick) available to strengthen the inside of the hull around where the hole was drilled. This serves the dual purpose of allowing the transducer to conform to the inside of the hull, while preventing the transducer locknut from unwinding. If you have a plastic housing, do not use wood shim, rather use a fiberglass, plastic, or brass washer.
4. Route the transducer cable through the hole in the hull. Do not pull on the cable as this may cause internal damage to the transducer by causing an internal wiring short.
5. Apply a 1/8" thick layer of sealant around the lip of the plastic or bronze housing. A thin layer should also be applied up the sidewalls to a height of 1/4" greater than the hull thickness. This will ensure there is sealant material in the threads to seal them and hold the housing nut securely in place.
6. From the outside of the hull, push the housing (with sealant applied) into the drilled hole. Apply a twisting motion to the housing to squeeze out excess sealant.
7. Put the nut on the transducer from the inside of the hull. If nylon, hand tighten only.
8. Clean off any excess sealant from around the transducer.

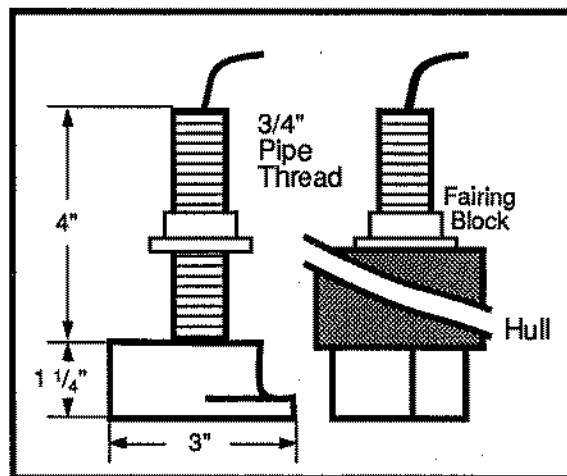


STEM TYPE (POWERBOAT BRONZE) TRANSDUCERS

The Stem type transducer is popular as a replacement transducer since it was the primary style used on older boats and the stem will fit the same size hole as a previously defective or obsolete transducer. Also, if your hull has a steep dead rise, the stem type transducer will be best suited for your application. However, because of the smaller diameter shaft going through the hull, a fairing block should be used so that the transducer can be oriented straight up and down. Fairing blocks are best made out of hard wood such as oak. The shape of the block will be determined by the shape of your hull and the style of transducer you choose.

MOUNT THE TRANSDUCER

1. Drill a 1/8" pilot hole in the preferred transducer location. Reference previous section on determining the best location for your type of boat.
2. Drill a hole "slightly" larger than the stem of the transducer. Be careful not to make it too large as you will run the risk of water leaking into the hull.
3. Cut the fairing block to the shape of your hull and insert the cable and stem of the transducer through 1/2 of the fairing block.
4. Apply a good grade of underwater marine sealant (polysulphide compound) to the flange on the transducer and to the surface of the leveling block where the block touches the outside of the hull. Apply enough sealant so that it beads out around the transducer as you tighten the transducer nut.
5. Put the remaining 1/2 of the fairing block on the inside, over the transducer along with sealant next to the hull. Tighten lightly with a wrench.
6. Clean off the excess sealant from around the transducer.



IMPORTANT: AFTER LAUNCHING THE BOAT, BE CERTAIN TO CHECK THE TRANSDUCER LOCATION FOR LEAKS.

INSIDE-THE-HULL TRANSDUCERS

This type of transducer does not require the drilling of a hole as does the Through-the-Hull transducer. However, since the sound waves transmitted and received by the in-hull transducer must pass through the hull, transducer performance will be reduced. The success of Inside-the-Hull installation is greatly dependent upon the purity of the hull directly below the transducer and the type of hull. Inside-the-Hull mounting should not be used on aluminum hulls, balsa core hulls, wooden hulls, or hulls where the deadrise angle is more than 15°.

To reduce sound transmission losses, the adhesive used to bond the transducer to the hull should conduct sound at speeds close to that of the plastic or epoxy face of the transducer and the polyester resin of the hull. Epoxy adhesives, as opposed to silicone, are recommended.

When performing an Inside-the-Hull installation, you must use a special INSIDE-THE-HULL transducer since it contains a transducer crystal which is wider in diameter, and is designed to transmit the pulse through the hull. Do not attempt to use a transom mount transducer, as the crystal is too small to insure optimum instrument results.

SELECT AN INSTALLATION LOCATION

The transducer should be located where the hull laminate is dense and has no entrapped air. Generally, best operation is obtained by mounting the in-hull transducer on the centerline of the hull, as it allows a flat, horizontal mounting area for vertical orientation of the sonic beam. Do not choose an area above a lifting strake, as air travels underneath the hull here and could cause erroneous readings.

On *sailboats*, mount the transducer near the centerline and forward of the leading edge of the keel.

On *power boats*, mount the transducer as far aft as practical.

On *I/O's*, mount in a spot near the engine.

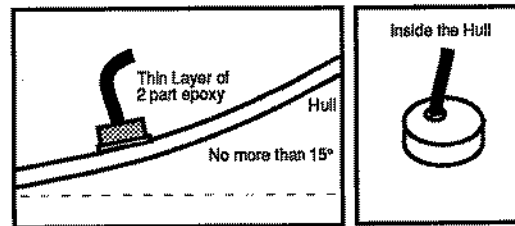
On *inboards*, locate the transducer forward of the prop(s), where it will not be shaded by prop shafts.

Use one of the following methods to determine if your chosen location is satisfactory:

1. Place the transducer in a plastic bag filled 1/2 to 3/4 full of water. Tie or tape the bag tightly around the transducer cable. Wet the selected location and place the bag against the hull, pressing the transducer face against the hull. If the hull is void free at this point, the depth sounder should now operate.
2. Coat the face of the transducer with silicone grease or petroleum jelly, then press with a twisting motion against the hull. If the hull is void free at this point, the depth sounder should now operate.

MOUNT THE TRANSDUCER

1. If the interior surface of the hull at the selected spot has a rough pattern, grind it with a disc sander until smooth. Any grease or oil on the surface must be removed.
2. **MIX THE TWO PART EPOXY SUPPLIED WITH THE TRANSDUCER FOR AT LEAST 3 MINUTES.** If this is not done, proper bonding of the transducer to the hull will not occur and false readings can occur. The working time of the epoxy is 5 minutes. The hull temperature must be 60° or higher for the epoxy to bond sufficiently.
3. Apply the mixture to the clean location on the hull and to the face of the transducer in a small amount.
4. Press the face of the transducer into the spot of epoxy and slowly rotate it in one direction only to remove any air bubbles and until the transducer is physically against the hull or within 1/4" of the hull.



When the epoxy has cured, it should be permanently bonded to the hull and hard to the touch. Test the epoxy which extends out of the underside of the transducer with a screwdriver to ensure that it can't be dented and is completely hard. Epoxy which is not hardened will eventually cause improper readings.

SPEED/TEMPERATURE IMPELLER INSTALLATION

IMPULSE provides only two kinds of speed/temperature impellers - Transom Mount or Through-the-Hull. The materials are generally either nylon or bronze and the type you install is dependent upon the style of boat, and personal preferences.

- **TRANSOM MOUNT** Speed/Temperature Impellers are ideal for boats with I/O or outboard engine(s) and are installed on the stem of the boat. They can be installed as follows:
 - Clip the impeller onto a wedge shaped Transom Mount transducer
 - Use a separate mounting bracket installed "In line" with the deadrise angle of the hull so that only the impeller blades extend below the hull
- **THROUGH-THE-HULL** Speed/Temperature Impellers are ideal for boats with Inboard engine(s). They can be removed and a "dummy plug" inserted for ease of cleaning.

TRANSOM MOUNT IMPELLERS

The following guidelines should be considered when installing a transom mount impeller:

- The impeller should be mounted in a location on the hull where it will always remain under water and where the flow of water is not turbulent.
- Do NOT locate this fitting immediately behind any protrusions or other fittings which could cause turbulence.
- Do NOT install your impeller near a close-by through hull fitting that discharges water, as this will cause inaccurate readings of the surface water temperature.

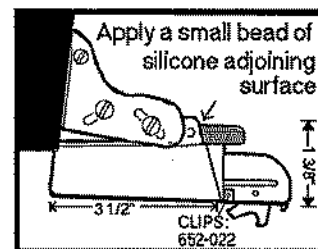
There are two types of transom mount speed/temperature impellers available:

A) CLIP-ON STYLE IMPELLERS

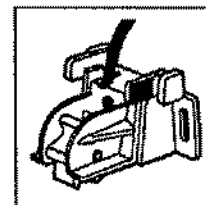
The Clip-On style Impeller is used with the wedge shaped transom mount transducer. There are two methods for installing this style impeller:

- Clip the impeller to the rear of the transducer:
 1. Apply a small bead of silicone to the adjoining surfaces.
 2. Simply slide the bottom of the impeller into the slides of the rear of the transducer and snap securely in place.
 3. Make sure that the Clip On Impeller is at least 3° to 5° lower than the front of the wedge of the transducer. Adjust this level by using the slides in the mounting brackets.
- Use a separate mounting bracket. For flat bottom hulls where the Transom Mount wedge-shaped transducer is mounted backwards, a separate Impeller Clip-On Bracket (P/N 652-015) can be used to clip the impeller directly to the transducer. Using this bracket, the impeller should be installed on the opposite side of the hull "in line" with the deadrise angle of the hull so that just the blades are below the hull.

Transom Mount Wedge Transducer
With Clip On Impeller

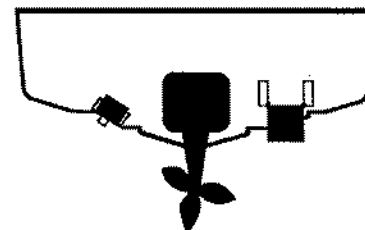


Clip On Bracket:
652-015



B) BRONZE HIGH SPEED IMPELLERS

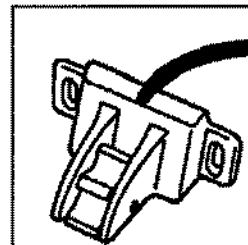
This bronze style impeller is generally used for boats which have speed applications in excess of 45 MPH. (The Clip-On impeller is not recommended for these conditions due to the excessive stress placed on the transducer at high speeds, which could damage both the transducer and the Clip-On impeller). It is suggested that the optional Bronze Impeller housing (P/N: 653-0904) be installed on the opposite side of the hull from the depth sounder transducer.



Follow these steps to install your Bronze High Speed Impeller:

Bronze Impeller:
653-0904

1. Install the impeller in a location on the transom with the deadrise angle of the hull. Be sure that it is not on a lifting strake. Only the impeller blades should be extended below the underbody of the hull.
2. Secure the impeller to the hull using high quality screws and then seal with silicone to ensure that water does not enter in these locations.

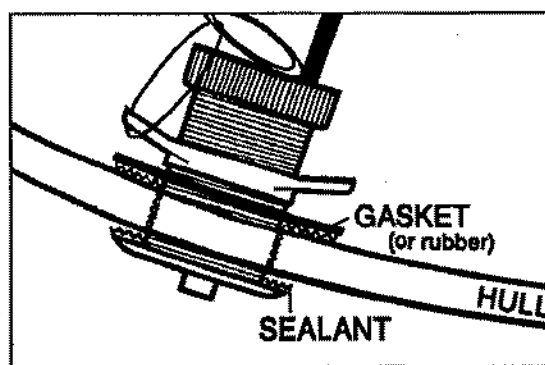


THROUGH-THE-HULL IMPELLERS

This type of fitting is low in profile and only has a small flange extending out of the hull. The paddle wheel assembly is designed so that it can easily be removed from the fitting housing for easy cleaning. It is important, therefore, to choose an area which permits convenient access from inside the boat.

HOW TO INSTALL THROUGH-THE-HULL SPEED/TEMPERATURE IMPELLER:

1. Mark the desired location on the boat's hull and check inside and outside of the hull for clearance.
2. Drill a pilot hole and then a 1 3/4" or 2" hole for the through hull fitting. Locate the arrow imprinted into the flange of the unit and point it towards the bow. This notch aligns with an arrow on the top of the impeller assembly and will aid you in aligning the impeller correctly.
3. Apply a marine sealant (polysulphide compound) around the hole and to the flange of the fitting. Mount the fitting in the hole and hand tighten the nut to the inside of the hull.



4. Gently insert the impeller assembly and carefully pull up on the cable so as not to cause internal damage to the wiring internal to the assembly.
5. Line up the notch and the arrow of the impeller assembly and then tighten the nut securely so that water cannot enter the bilge.
6. Secure the Stainless Steel Ring to the Wing Nut by using either the stainless steel wire to link the two together or passing the locking pin (new style) through the assembly.

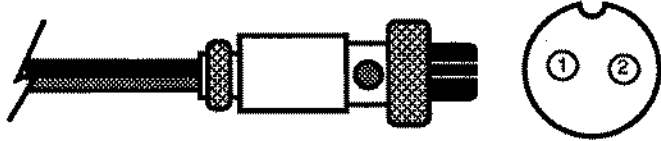
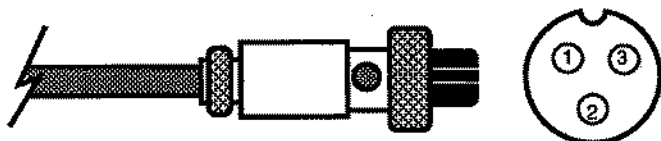
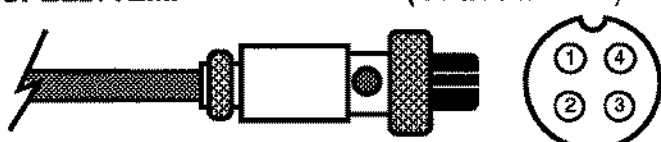
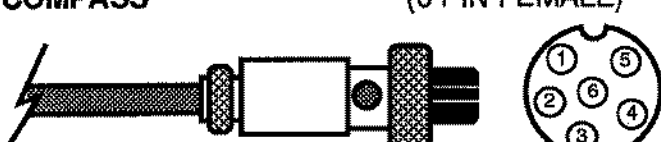
THROUGH HULL ASSEMBLY CLEANING PROCEDURE:

1. First locate the DUMMY PLUG which should have been provided with your unit. Without this, do not perform the cleaning procedure.
2. Loosen the nut of the through hull fitting. Quickly pull up on the ring at the top of the impeller assembly. Immediately pull it out of the fitting and push the dummy plug into place, aligning the notch on the plug with the notch on the through hull fitting. Tighten the nut in place. Typically, you can expect between 1 to 2 pints of water to flow into the bilge before the dummy plug is tightly in place.

CONNECTOR WIRING

All connector wiring diagrams, part descriptions, and part numbers are outlined below.

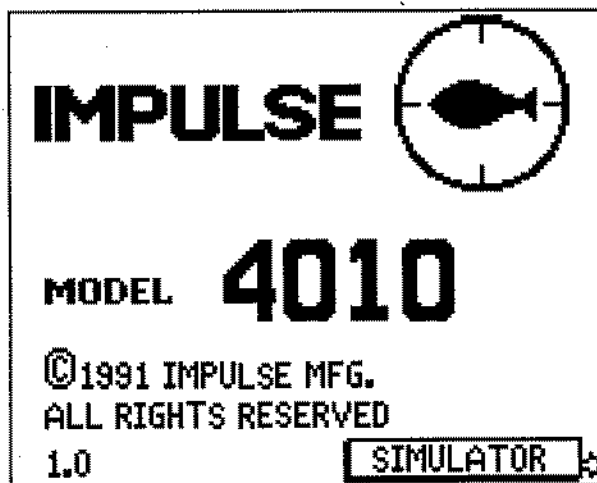
Pin numbers refer to SOLDER VIEW and are in counter clockwise direction with Pin 1 = upper left.

<u>CONNECTOR</u>	<u>DESCRIPTION</u>	<u>PART #</u>	<u>COLOR</u> <u>SOLDER VIEW</u>	
POWER	(2 PIN FEMALE)	703-021	Black	= Pin 1
			Red	= Pin 2
TRANSDUCER	(3 PIN FEMALE)	703-002	Black or Green	= Pin 1
			Shield	= Pin 2
			Blue	= Pin 3
SPEED/TEMP	(4 PIN FEMALE)	703-007	Black and Shield	= Pin 1
			Green	= Pin 2
			Red	= Pin 3
			White	= Pin 4
COMPASS	(6 PIN FEMALE)	703-034	Brown/Braid	= Pin 1
			N.C.	= Pin 2
			Yellow	= Pin 3
			Green	= Pin 4
			Black	= Pin 5
			Gray	= Pin 6

SIMULATOR

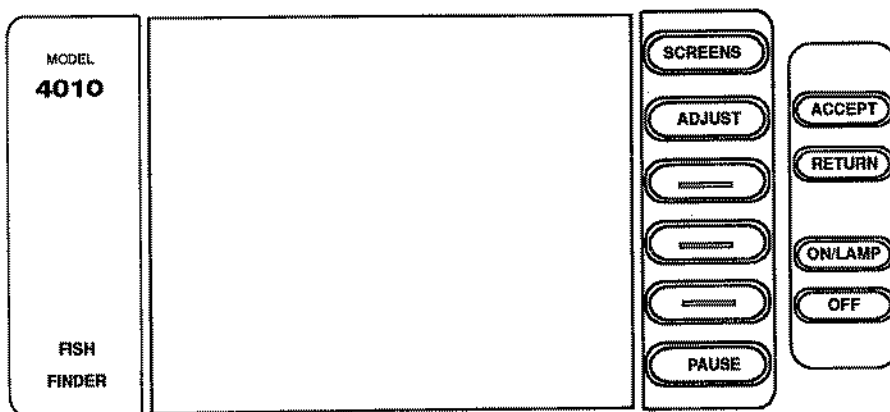
The simulator is designed to help the user become familiar with the functions of the 4010 before putting it into actual usage. Any of the entries, changes, or set up operations made while you are in the Simulator Mode are not held in permanent memory and will be erased when you turn the unit OFF. Although the simulator allows you to operate the majority of features on the 4010, it does not simulate each function in its entirety.

To enter the simulator, turn the unit on and press the key pointed to by the SIMULATOR arrow. To bypass the simulator, do not press the key after first turning on the unit.



WARNING: DO NOT USE THE SIMULATOR IN "REAL WORLD CONDITIONS". IT IS FOR DEMONSTRATION AND EDUCATIONAL PURPOSES ONLY.

KEYPAD OPERATION



The 4010 Keypad functions are as follows:

ON/LAMP turns the unit on and allows you to select the CCT backlight setting.

OFF turns the 4010 off.

SCREENS brings up the MAIN MENU SELECTION screen, where you may choose a combination of any two functions to be displayed on the 4010 split screen.

ADJUST accesses the ADJUSTMENT SELECTION screen, where you may adjust all 4010 functions.

PAUSE will freeze the FISH FINDER and ZOOM screens. When in Pause mode, the Fish Finder is not displaying updated transducer information on the screen. After you disable Pause mode by touching Pause a second time, a dashed vertical line is drawn on the screen to remind you that the image at the left of the screen is outdated and should not be relied upon. The current, updated image is displayed to the right of the vertical line.

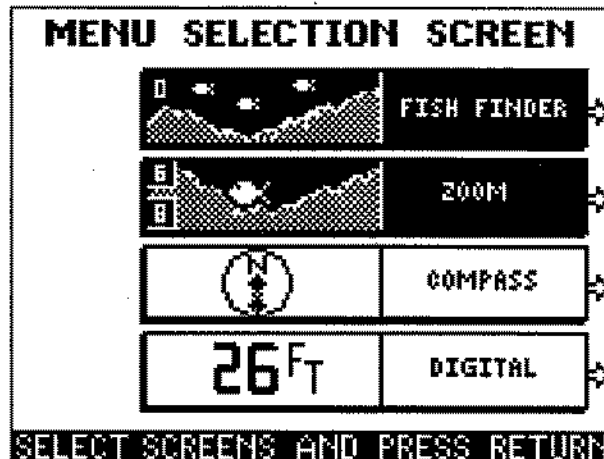
ACCEPT is used to confirm changes to the unit settings that you make in adjustment menus.

RETURN is used to return back to the top level split screen from various adjustment menus.

MAIN MENU SELECTION SCREEN

The "SCREENS" button on the keypad accesses the MENU SELECTION screen shown here. There are four top-level screens: FISH FINDER, ZOOM, COMPASS (active with the optional Impulse COM-430 compass sensor), and DIGITAL.

To select a function, press the key pointed to by the icon. The icon will be displayed in inverse (white on black) to indicate your current selections. You may select either one or two functions to be displayed simultaneously. If you select one function, it will occupy the full display when you return to the top level. If you select two functions, you will view two abbreviated, half-screen versions of each screen upon return to the top level.



If you attempt to select a third function, you will be prompted to "Deselect an Active Function". Press the key next to an icon already selected in order to deselect it. Press "RETURN" to exit to the top level screen, where your screen selections will be activated.

ADJUSTMENT SELECTION SCREENS

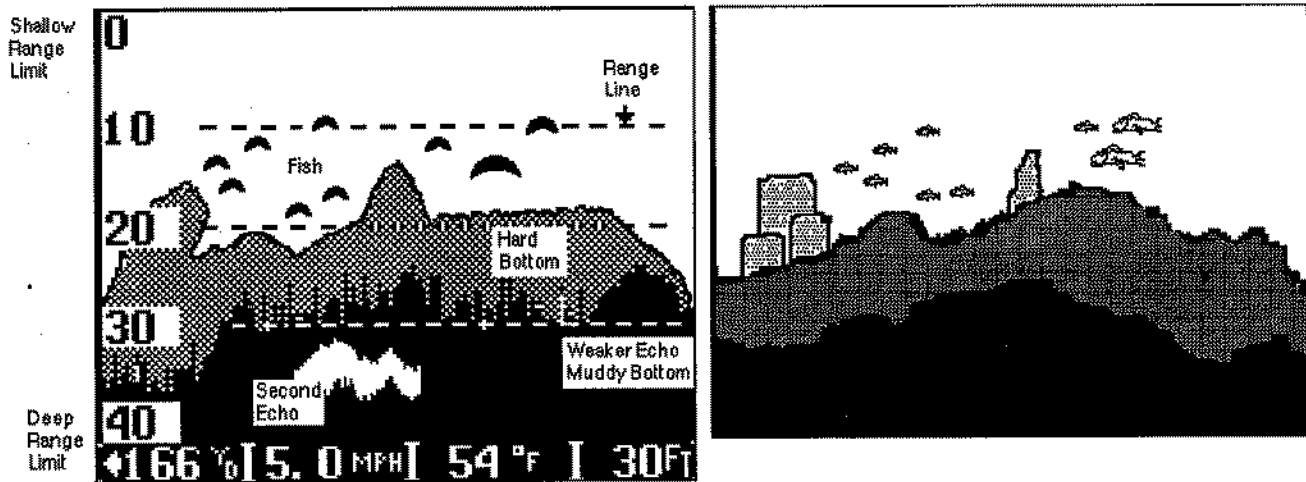


The "ADJUST" button on the keypad accesses the menus for choosing Adjustment options. The "MORE OPTIONS" or "PREVIOUS OPTIONS" keys toggle between the two menus. Each of the four top-level screens has a corresponding ADJUSTMENT screen, as shown in the figures above. In addition, the ADJUSTMENT MENUS allow you to select your DATA LINE preference, adjust the CONTRAST of the display, and set the DEPTH ALARM.

To adjust a function, press the key pointed to by the icon. The corresponding screen will immediately appear. To return from any ADJUSTMENT function back to the top-level screen, press the "RETURN" key.

In this manual, each top-level function will be described, followed by a description of its corresponding ADJUSTMENT function. Other ADJUSTMENT functions will be explained in the order they appear on the ADJUSTMENT menu.

FISH FINDER SCREEN



READING A FISH FINDER SCREEN

The 4010 displays transducer information on the LCD screen as follows:

- **Muddy bottoms** are displayed in dark shades.
- **Hard bottoms** are seen as a checkerboard pattern of light and dark pixels.
- **Fish** are identified as suspended matter off of the bottom contour and often appear in the shape of arches. This is greatly dependent upon the speed of the boat when travelling over the fish, the beam angle of the transducer, and the location of the fish in the beam angle. Wider angle transducers are more likely to display fish in the arch shaped format. Narrow angle transducer display fish in more vertical or blocked format.
- **Second Echoes** generally occur when the bottom is very hard and reflective in nature. Under this condition, the original echo (traveling upward) can bounce off the water surface, travel back down to the bottom, and be reflected to the transducer a second time. Second Echoes will appear as a "second bottom", located under the actual bottom on the FISH FINDER screen. Note that the Digital Depth accuracy is not affected by Second Echoes.
- **Bait Fish/Schools of Fish** are displayed in tightly packed groups on the screen and appear as "clouds going across the screen".
- **Grass/kelp** growing on the bottom is displayed as dark images.
- **Rip Tide** is shown as a very faint bottom.

The most current sonar image is displayed on the right edge of the LCD. Therefore, targets on the right edge of the display are directly below the transducer. As new information is displayed, it scrolls the older information to the left until fish and bottom contour information is displayed across the entire screen.

The oldest information, displayed at the left edge of the image, will be a certain distance behind your boat. This distance is given in the "Distance Behind the Boat" entry in the DATA LINE at the bottom of the LCD. The faster your boat is traveling, the greater the distance you will be covering, and the higher the value in the "Distance Behind the Boat" entry. When you are trolling, you will be covering less distance, and the value will be smaller. This distance proves useful when judging how far back a given target is behind you.

RANGE LINES

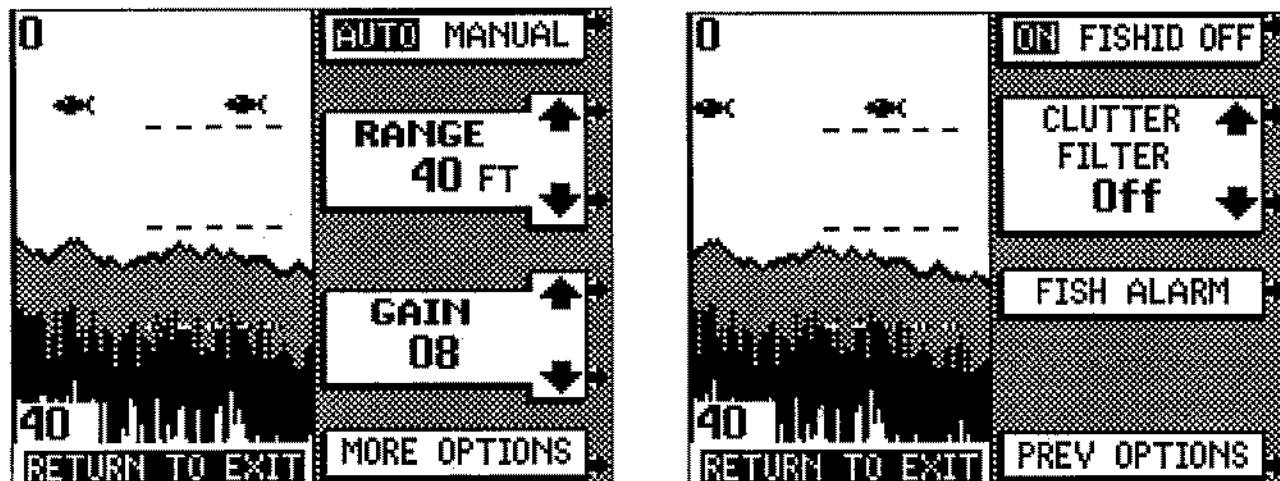
The FISH FINDER screen is divided into four equal sections, each separated by a horizontal dashed line. These Range Lines are helpful in determining the location of fish and depth of the bottom in relation to the Fish Finder range selected.

PAUSE

The "PAUSE" key on the 4010 keypad will freeze the Fish Finder image. When in Pause mode, the Fish Finder is not displaying updated transducer information on the screen. After you disable Pause mode by pressing " PAUSE" a second time, a dashed vertical line is drawn on the screen to remind you that the image to the left of the line is outdated, while the image to the right of the line is current.

ADJUST FISH FINDER SCREENS

There are two selection menus for choosing Fish Finder adjustment options. The "MORE OPTIONS" or "PREVIOUS OPTIONS" keys toggle between the two menus.



There are six ADJUST FISH FINDER functions:

- AUTO/MANUAL RANGE SELECTION
- RANGE ADJUSTMENT
- GAIN ADJUSTMENT
- FISH ID SELECTION
- CLUTTER FILTER ADJUSTMENT
- FISH ALARM

AUTO/MANUAL RANGE SELECTION

Select AUTO range mode to instruct the Fish Finder to change depth range automatically as the bottom contour changes. Select MANUAL range mode when you wish to make all range adjustments manually.

RANGE ADJUSTMENT

Using the keys pointed to by the Range arrows, you may adjust the Fish Finder range to any of the following settings:

DEPTH RANGES IN FEET:

0-20', 0-40', 0-60', 0-80', 0-120', 0-200', 0-320', 0-400', 0-640', 0-960'.

The 4010 will automatically be put in MANUAL range mode after making a manual range change.

GAIN ADJUSTMENT

GAIN refers to the amount of sensitivity which is required in order to display fish finder data clearly on the display. Typically, less Gain is required when the water is shallow and clear and more Gain when the water is deeper and the pulse must be projected further.

Using the keys pointed to by the Gain arrows, you may adjust the Gain setting between 1 and 14. The Gain control does not affect the Digital Depth reading of the instrument.

For optimal use, adjust the gain at a high enough setting to pick up fish, but not so high as to detect interference or clutter. If, after a heavy rain, you find tiny dots throughout the display (air bubbles caused by the rain), reduce the Gain setting of the instrument to make the screen clearer and easier to interpret.

FISH ID SELECTION

Select Fish ID **ON** to program the instrument to display fish in the actual shape of fish. Six different fish sizes are used to display various target sizes. Fish ID **OFF** will specify that fish should be displayed in the traditional shape(s) such as arches, blocks, or marks on the screen.

CLUTTER FILTER

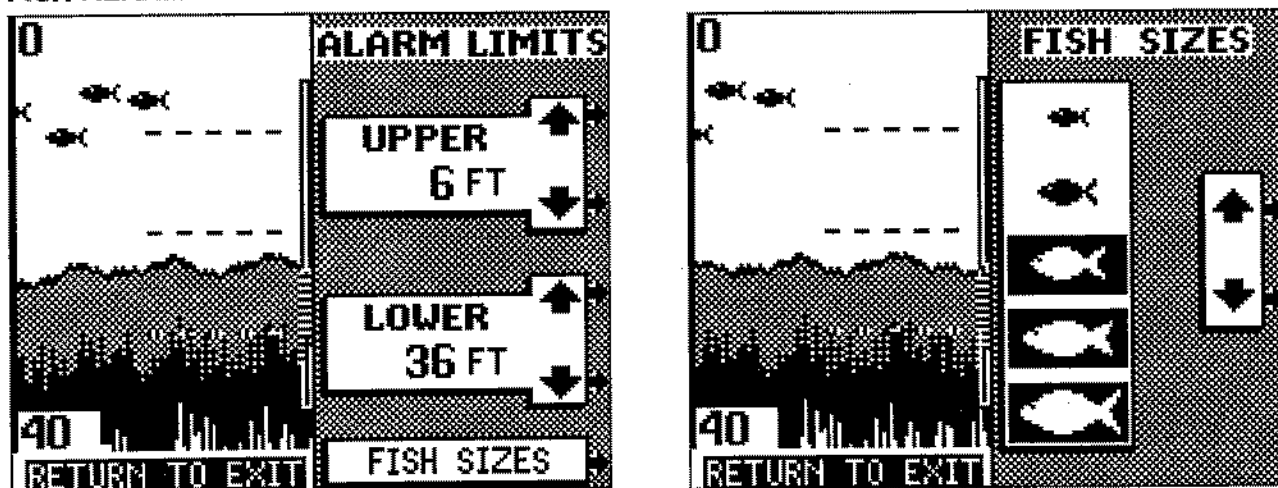
The Clutter Filter adjustment is a sensitivity control for the Fish Finder in shallow water. The first ten feet or so of water under your boat typically contain numerous air bubbles caused by propeller action, choppy waves, etc. A fish finder will detect this "surface clutter" and display it as black pixels scattered near the top of the screen.

To reduce the amount of surface clutter on the screen, press the key pointed to by the **UP** arrow to increase the amount of filtering. This will attenuate (decrease) the receiver's sensitivity to echoes in shallow water.

The Clutter Filter setting ranges from OFF to 7. If the setting is OFF, no echoes are being filtered, so this setting is appropriate only in minimum surface clutter conditions. The Clutter Filter should be adjusted to the lowest setting which produces a relatively clear Fish Finder image. This setting may need to change to accommodate different water conditions.

Note: Do not try to adjust out the straight band located at the top of the display. This band is the transmitter pulse, and will represent an area equal to approximately 1.5 feet of depth.

FISH ALARM



The Fish Alarm will alert you when fish enter a region (or zone) you select. You can select the minimum fish size you wish to trigger the alarm, thereby preventing the alarm from sounding on bait fish or other small species. The Fish Alarm in the 4010 distinguishes between five different fish sizes, and is triggered when Fish ID detects a fish of the size selected. The Fish Alarm will function even if the Fish ID feature is disabled.

When the 4010 is first turned on, the Fish Alarm will be disabled. To enable the Fish Alarm, press a key pointed to by the Upper or Lower Limit arrows, or a Fish Size arrow. This will enable the full depth range as the selected Fish Alarm zone. The alarm zone is represented by a vertical open bar

displayed on the right edge of the FISH FINDER or ZOOM screens. The alarm zone may be changed as follows:

To decrease the depth of the **UPPER LIMIT**, press the key pointed to by the **DOWN** arrow in the Upper Limit box. The top of the vertical bar on the right side of the FISH FINDER screen will also move downwards, graphically indicating change in the zone. To adjust the Upper Limit to a shallower depth, press the key pointed to by the **UP** arrow in the Upper Limit box.

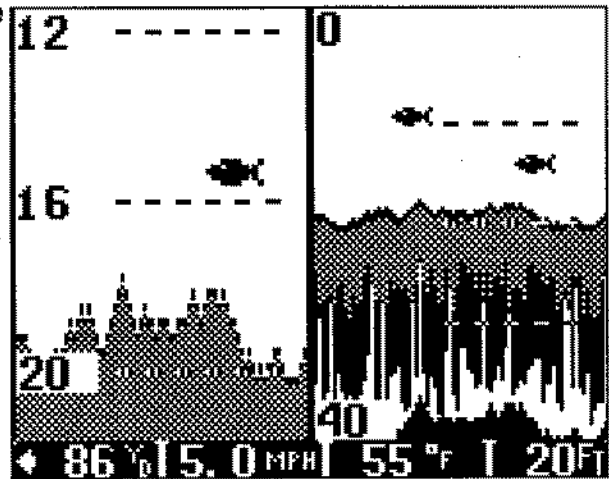
To decrease the depth of the **LOWER LIMIT**, press the key pointed to by the **UP** arrow in the Upper Limit box. To adjust the Lower Limit to a deeper depth, press the key pointed to by the **DOWN** arrow in the Upper Limit box.

At deeper depth ranges, the adjustment increments of the Fish Alarm Upper and Lower Limits are proportionally greater.

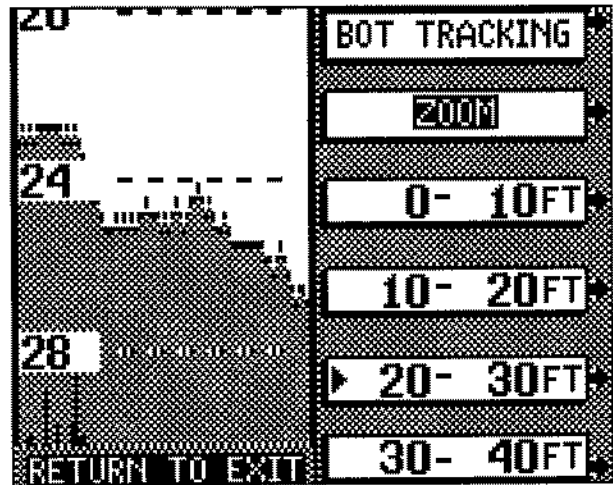
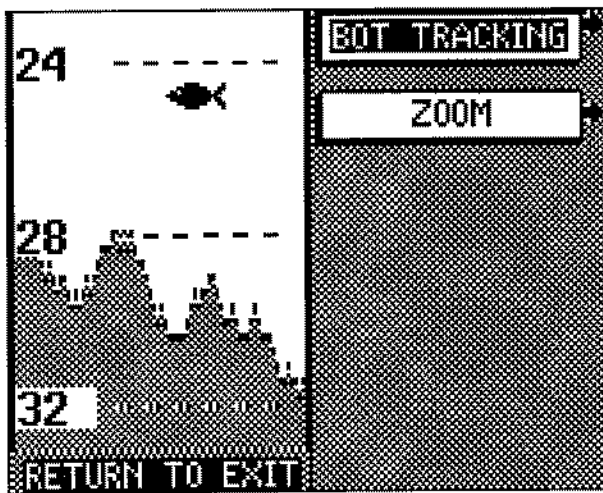
To set the **FISH SIZE** for the Fish Alarm, press the keys pointed to by either the **UP** or **DOWN** arrows in the FISH SIZE box to highlight the size of fish you wish to trigger the alarm. If no fish are selected, the Fish Alarm is disabled. Any fish of the sizes you have selected entering the zone you have established will sound the alarm with a short "beep-beep."

ZOOM SCREEN

The ZOOM screen displays a magnified section of the Fish Finder range you have selected. This magnified portion is equal to one fourth (1/4) of the full range scale, or can be thought of as 4X magnification.



ADJUST ZOOM SCREEN



Two Zoom modes can be selected through the ADJUST ZOOM screen.

BOTTOM TRACKING

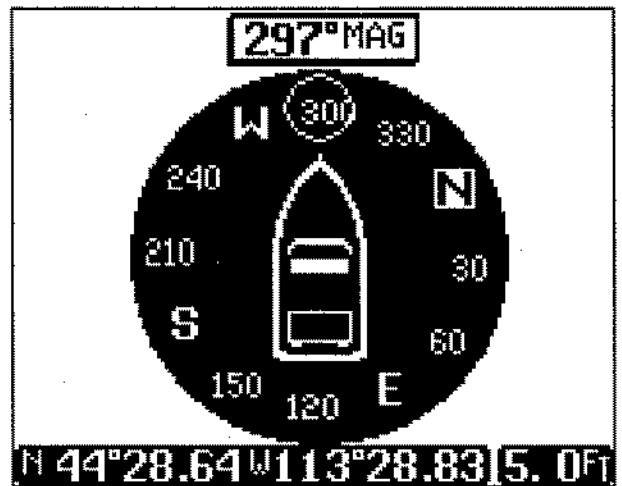
Bottom Tracking mode is helpful when you are looking for objects or fish off of the bottom or when you are navigating and want to keep the bottom contour on the screen at all times.

ZOOM

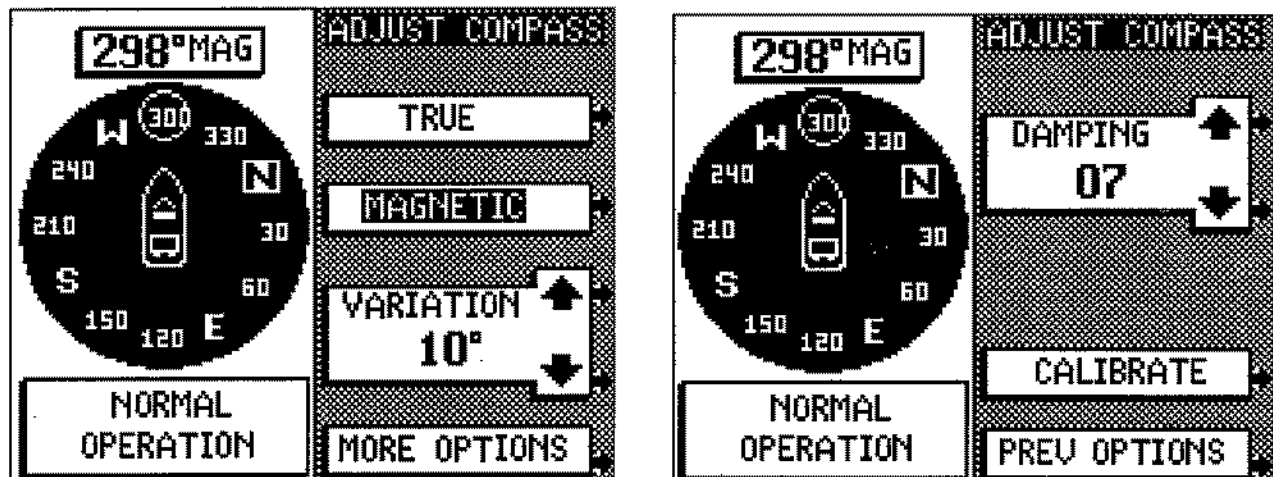
Zoom mode is used to magnify a specific section of the full display. This mode is preferable when looking for a species of fish that inhabit a particular depth of water, and when watching the bottom is not necessary. When you select Zoom mode, the four available zoom ranges appear. Press the key pointed to by the desired range button to zoom in on that particular range.

COMPASS SCREEN

The COMPASS screen is active only if you have installed the optional Impulse COM - 430 flux-gate compass sensor. The COMPASS screen displays a compass card, separated into 30° increments, which rotates as your vessel's heading changes. A digital readout of your compass heading is printed above, confirming the analog display, and "MAG" or "TRU" is printed, indicating whether your heading is with respect to Magnetic North or True North.



ADJUST COMPASS SCREENS



There are two selection menus for choosing Compass adjust options. The "MORE OPTIONS" or the "PREV OPTIONS" keys toggle between the two menus. A status box appears under the 1/2 screen compass to inform you of compass status as you perform adjustments. The following messages may be output:

- **Not Connected** - there is a connection problem between the 4010 and the remote compass sensor.
- **Normal Operation** - no errors are detected in the operation of the compass sensor.
- **Faulty Memory** - the 4010 has detected a compass value in memory which is out of range. In this case, it will change all settings to their default values as follows:

Orientation = 0

Compass Mode = Magnetic Mode

Gain = 3

Variation = 0

Damping = 7

All Calibration Values = 0

There are four ADJUST COMPASS functions:

- MAGNETIC VS. TRUE SETTING
- VARIATION
- DAMPING
- CALIBRATE

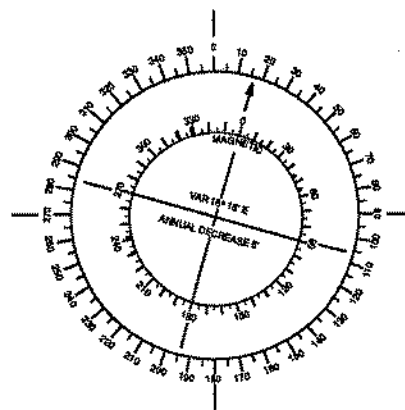
MAGNETIC/TRUE SETTING

The **Magnetic/True** setting specifies whether or not the Variation (set below) will be applied to the compass heading displayed. If Magnetic mode is chosen, the variation will NOT be applied; the True mode will adjust the compass heading to include variation.

VARIATION

The Variation adjustment allows you to compensate for the angular difference between True North and the Magnetic North Pole for your particular location. (Reference the COM 430 Compass Manual for a complete discussion of Variation).

To determine the variation for your area, refer to the Compass Rose printed on a chart of your location. A sample Compass Rose is shown here, in which the variation is approximately 16 degrees East. (Since you are instructing the COM - 430 Sensor to convert from a Magnetic to a True course, you would add easterly variations and subtract westerly variations.) In this case, the **UP** arrow should be used to set the variation to +16 degrees. (If the variation was 16 degrees West, the **DOWN** arrow would be used to set the variation to -16 degrees.) The variation setting can range from -30 degrees to +30 degrees.



DAMPING

The Damping feature allows you to specify an amount of time over which the compass headings will be averaged. The Damping adjustment is provided to prevent excessive fluctuation in current heading readings due to adverse sea conditions. Press the keys pointed to by the **UP** or **DOWN** arrows to select a suitable setting for your unit, given the averaging times below:

1: .031 sec	6: 1 sec	11: 32 sec
2: .062 sec	7: 2 sec	12: 64 sec
3: .125 sec	8: 4 sec	13: 2 min
4: .250 sec	9: 8 sec	14: 4 min
5: .500 sec	10: 16 sec	15: 8 min

The correct Damping setting to use is as small a number as possible (given sea conditions) for quicker response to your vessel's movement. Settings from 5 to 10 will be suitable for most cases. The setting you select will be stored in Permanent Memory, so it is retained when power is removed.

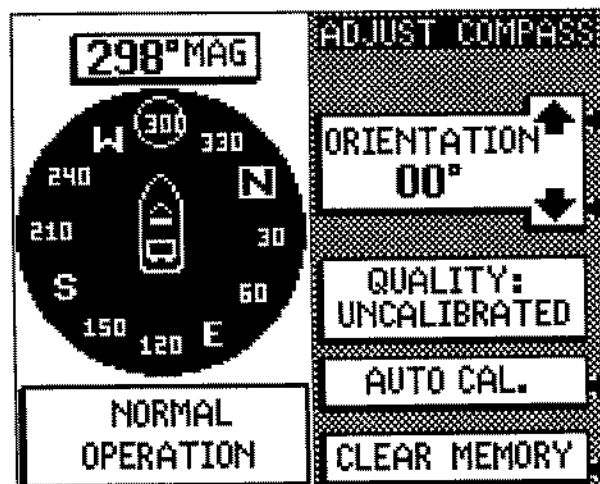
CALIBRATE

The CALIBRATE selection accesses the CALIBRATION SCREEN, which contains three adjustment features.

- ORIENTATION
- AUTO CALIBRATION
- CLEAR MEMORY

ORIENTATION (HOUSING ERROR)

The ORIENTATION selection enables you to compensate for installation positional errors. (i.e. if the lubberline of the compass is not exactly parallel to the fore-and-aft keel line of your boat). Using the UP and DOWN arrows, a correction factor of up to +15 or -15 degrees can be applied.



AUTO CALIBRATION

The AUTO-CALIBRATE procedure allows you to compensate for deviation on your particular vessel based on a starboard turn of 360 degrees at a constant rate of speed. **Maintaining a constant turn rate is essential for good results, as are reasonably calm conditions.** Tide will not affect the results, but wind, current, waves, and wakes can cause large errors.

The AUTO-CALIBRATE procedure cannot be aborted. If you press the AUTO CAL button by mistake, you must wait approximately 4 minutes for the calibration procedure to time out before you can begin a 2nd calibration attempt. However, you may exit the compass adjust screen at any time during the calibration procedure. After 4 minutes have elapsed, either a "Turn About Too Long", or "Deviation Too Large" message will be displayed and no calibration data will be stored. You may re-try compass calibration once this message is displayed.

Follow the steps below to auto-calibrate your compass:

1. Turn your steering wheel full starboard, so as to turn the tightest clockwise circle possible. Note that the compass display will rotate counter-clockwise if your boat is turning clockwise.
2. Put your boat in gear at idle speed to maintain the slowest possible speed throughout the auto calibration procedure.
3. Face your boat approximately South. Make one complete circle to stabilize your speed. When making a second circle, press the **AUTO CAL** button after passing South, but before passing North. The STATUS box will inform you that it is "Performing Calibration".
4. Maintaining the same speed, pass North 3 more times, for a total of 3 1/2 complete circles. This step must be completed in less than 4 minutes.
5. Upon completion of the auto-calibration, the STATUS box will display one of three messages:
 - **Deviation Too Large** - For the calibration procedure to be successful, the two circles of Step 4 must be turned at the same speed. This message is printed when there is too great a speed difference between the second and third circles. Restart the calibration procedure.
 - **Turn About Too Long** - For the calibration procedure to be successful, both circles of Step 4 must be completed in under 4 minutes. This message is printed when the duration of the auto-calibration is greater than 4 minutes. Increase your speed and restart the calibration procedure.
 - **Normal Operation** - The calibration procedure was successful. In this case, reference the CALIBRATION box to determine whether the Calibration Quality was GOOD or FAIR. If the Calibration Quality is GOOD, no further action needs to be taken. (However, you may wish to follow the procedure below to double check the accuracy of the auto-calibration.)

If the Quality is FAIR, the deviation values obtained are not inaccurate enough to cause failure, but they are somewhat erroneous. If you obtain a FAIR quality, you may choose to perform the auto-calibration procedure again. Otherwise, you may choose to manually determine your deviation using the procedure outlined in the BACKGROUND section of the COM - 430 manual. Follow the steps below to evaluate the auto-calibration:

- a) Use your navigational charts to find two range markers which can be used as a reference for determining your direction.

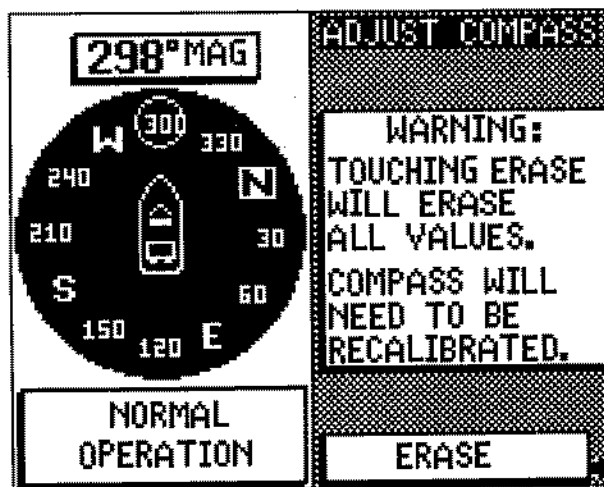
- b) Use an instrument such as a chart plotter or protractor to determine the True heading along the straight path from a starting point to the point at which the markers line up with each other. (Do not adjust the reading for variation.)
- c) Enter the proper variation adjustment into the 4010 and set the MAGNETIC/TRUE setting of the 4010 to TRUE. This will instruct the 4010 to automatically adjust the compass reading for variation. Therefore, if the auto-calibration procedure was successful, the Compass reading on the 4010 will closely match the True heading obtained off the chart in Step b.
- d) Set your boat at the starting point, in the direction of the two markers. Compare the True heading found in Step b with the reading shown on the 4010, and determine if the values obtained through auto-calibration are accurate enough for your particular application.
- e) Follow Steps a-d for various headings to make a complete evaluation of the auto-calibration procedure.

If you encounter difficulty with the auto-calibration procedure, such as a repeatedly "FAIR" calibration quality or calibration values which give an erroneous deviation correction, then it is suggested that you clear the calibration memory and rely on a manual deviation chart to correct your compass for deviation.

CLEAR MEMORY

This selection allows you to clear all CALIBRATION values from permanent memory. Non-calibration values such as variation, orientation, etc will not be affected. It will be necessary to re-calibrate the compass if the Clear Memory procedure is executed.

To clear memory, press the key marked "ERASE". If you wish to exit this screen without clearing calibration memory, press "RETURN".



DIGITAL SCREEN

The DIGITAL screen displays the following information in an easy to read format:

DIGITAL DEPTH: Digital Depth is displayed from 2.5 to 10.0 feet in tenths, and in whole numbers down to a maximum depth of 480 feet with the 120 KHz wide angle transducer (dependent upon the reflective nature of the bottom). The narrow beam transducer will read to 960 feet with a good bottom.

SPEED OF THE BOAT: Digital speed of the vessel is determined by counting the pulses from the rotation of the impeller blades. Therefore, speeds are greatly dependent upon the installation of the impeller. The impeller is rated at a minimum speed of 1.0 knot (1.15 MPH) and maximum speed of approximately 50 knots (57.5 MPH). However, your 4010 is able to measure speeds of up to 80 knots (92 MPH), though this is unlikely since the impeller blades will probably cavitate at these higher speeds.

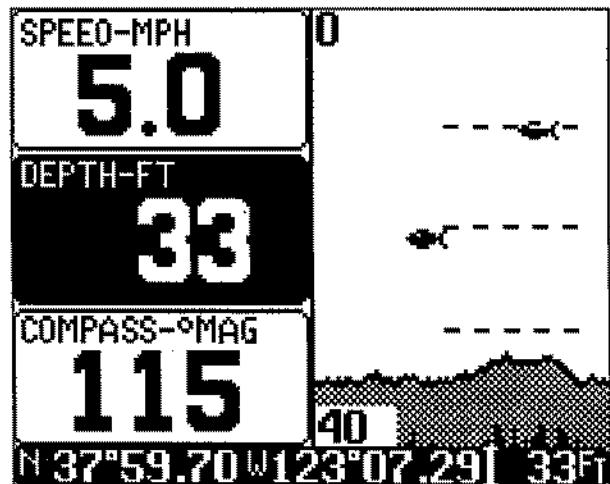
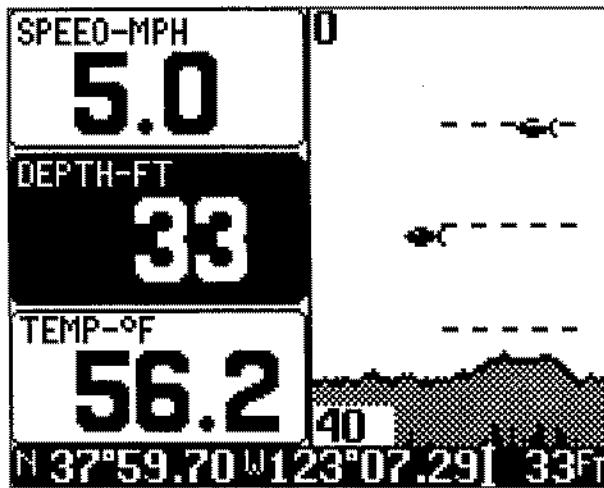
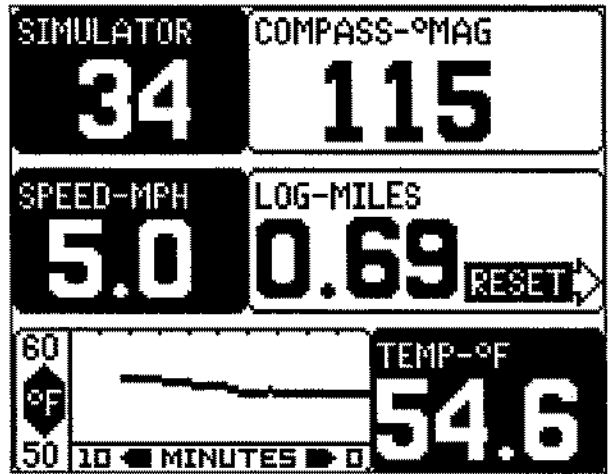
DISTANCE LOG: This entry displays the distance traveled (as derived from the impeller) since power was applied to the unit. It will read up to 999 miles, but is cleared when power is turned off. Press the key pointed to by "Reset" to manually reset the distance log.

TEMPERATURE: Surface water temperature is derived from from a thermistor sensor located in the speed/temperature impeller.

TEMPERATURE GRAPH: The temperature graph tracks temperature within a ten degree (10°) range over a ten minute period of time. This feature is helpful when looking for changes in the surface temperature of the water.

COMPASS HEADING: The compass heading is determined from the optional IMPULSE flux-gate compass. It is in degrees with respect to Magnetic North or True North, depending on your selection in the COMPASS ADJUST screens.

If any of the numbers on the DIGITAL screen begin flashing on and off, do not rely on them for accuracy.



The half screen version of the DIGITAL screen will display Speed, Depth and Water Temperature or Speed, Depth and Compass Heading, depending on your selection in the DIGITAL ADJUST screen.

ADJUST DIGITAL SCREEN

There are three ADJUST DIGITAL functions:

- DIGITAL DEPTH TVG ADJUSTMENT
- MUSIC ALARM SELECTION
- COMPASS HEADING VS. TEMPERATURE

DIGITAL DEPTH TVG (TIME VARIED GAIN)

The TVG adjustment is a sensitivity control for the Digital Depth in shallow water. The first ten feet of water contain numerous air bubbles caused by propeller action, etc. This "surface clutter" may cause a false shallow echo which may be interpreted by the Digital Depth as a bottom reading.

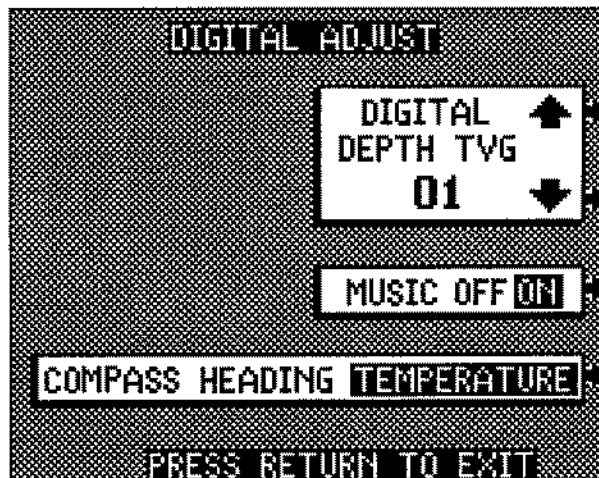
The TVG setting ranges from 1 to 7. The TVG circuitry attenuates (decreases) the received echo in shallow water. A TVG setting of 1 is minimum attenuation, while a TVG setting of 7 is maximum. To correctly adjust the TVG setting:

1. Take your boat to a shallow area of water. A depth measuring 4-6 feet is suggested.
2. Set the Fish Finder Range to 20 feet.
3. Using the **UP** arrow, set the TVG value to 7. Using the **DOWN** arrow, decrease the TVG setting one step at a time until you get a correct and consistent Digital Depth reading on the data line at the bottom of the LCD. Each time you change the TVG setting, wait approximately one minute before changing it again so that you will have adequate time to observe and evaluate the behavior of the digital depth.

Once you have completed the TVG adjustment, it should not be necessary to perform it again unless your boating location changes, or if your Permanent Memory is erased.

MUSIC ALARM SELECTION allows you to turn the music alarm on or off. If the music alarm is turned off, key presses will sound as monotone beeps.

COMPASS HEADING VS. TEMPERATURE SELECTION allows you to select whether you would like to have the compass heading or the temperature displayed on the half screen DIGITAL screen.

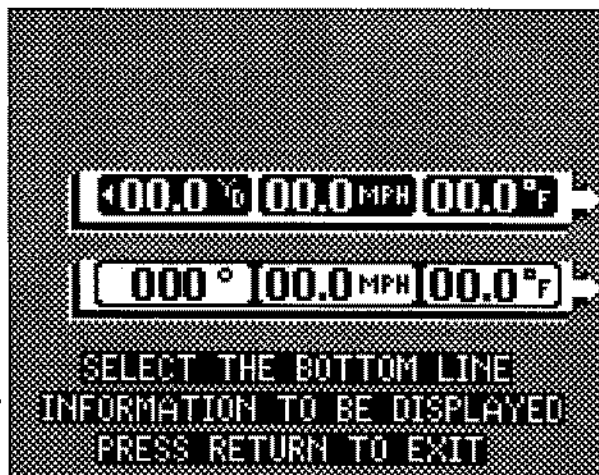


ADJUST DATA LINE

This function allows you to select the data you wish to display on the bottom line of the top level screen. To choose data line information, press the key pointed to by your desired selection. The data to be displayed will be highlighted. Press "RETURN" to exit back to the top level screen.

The line of data located at the bottom of the screen displays pertinent Fish Finder Information. It is displayed on all top level screens but the DIGITAL screen. When any of the information is blinking on and off, it cannot be relied upon as correct information.

There are two options for data line information:



OPTION #1: Distance Behind the Boat, Speed, Temperature, and Depth



1. **DISTANCE BEHIND THE BOAT: "YARDS OR STATUTE MILES"**

The Distance Behind the Boat is the distance measured from the right edge of the LCD screen to the left edge of the Fish Finder image. It is helpful in determining how far behind the boat various targets are located. The distance displayed will be proportional to the speed of your boat. The slower your boat is traveling, the less the distance you will be covering and, therefore, the smaller the value displayed. The faster your boat, the higher the value. The Distance Behind the Boat value is cleared when going from one screen to another, or when entering/exiting Pause mode. This number increases in value as information is scrolled to the left of the screen until the entire screen is filled. An Arrow is printed to the left of the number to indicate that the Distance reading reflects the distance between the right and left edges of the Fish Finder display. Since the Distance Behind the Boat measurement is applicable only to Fish Finder and Zoom displays, this reading will be blank if neither of these screens are selected.

2. **SPEED OF THE BOAT: "MPH"**

This data refers to your current speed, and is derived from the installed speed impeller.

3. **TEMPERATURE: "FAHRENHEIT"**

This data refers to the temperature of the water at the surface.

4. **DIGITAL DEPTH: "FEET"**

The rightmost entry displays the digital reading of the depth of the water. Digital Depth is displayed on the top level screen at all times.

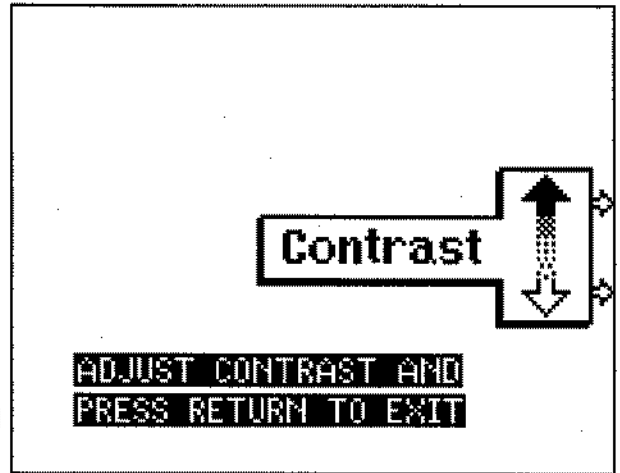


5. **COMPASS HEADING: "DEGREES"**
The compass heading is determined from the optional IMPULSE flux-gate compass. It is in degrees with respect to Magnetic North or True North, depending on what you have selected in the COMPASS ADJUST screens.

ADJUST CONTRAST

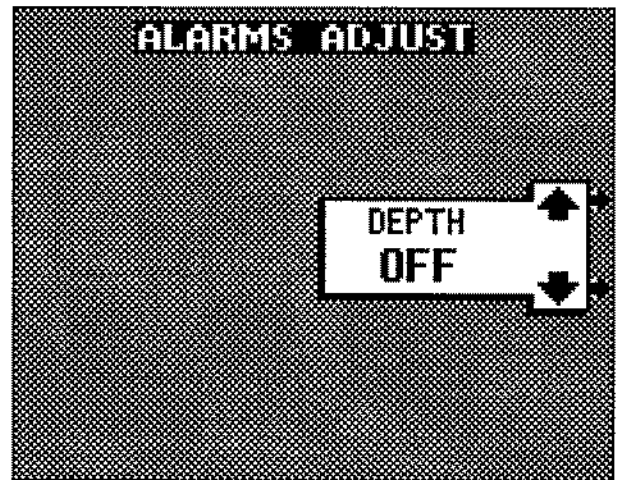
Your 4010 unit contains a Liquid Crystal Display (LCD), whose contrast is affected by changes in temperature. At high temperatures, the LCD will be darker; likewise at lower temperatures, it will be lighter. The 4010 automatically detects and compensates for these temperature variations by adjusting the voltage applied to the LCD to provide a fairly constant contrast level.

However, should you prefer to adjust the contrast yourself, press the keys corresponding to the arrows in the contrast box. The UP arrow will increase the contrast and darken the screen, the DOWN arrow will lighten the screen. Your contrast setting will be stored in Permanent Memory, and will be applied the next time you turn the unit on.



ADJUST DEPTH ALARM SCREEN

A shallow water alarm can be set to audibly alert the user when the depth of water becomes shallower than the present alarm setting. Alarm settings can range from 3 to 30 feet, and can be set to OFF so that no alarm is programmed.



PERMANENT MEMORY

The 4010 contains internal memory which retains its data even when the unit has been turned off and disconnected from its power cable. We refer to this memory as "Permanent Memory."

The following information is stored in this memory:

- FISH ID setting
- Digital Depth TVG setting
- Contrast setting
- Surface Clutter Filter setting
- Music ON/OFF setting
- Compass vs. Temperature Graph setting
- Bottom Line Selection setting

When your 4010 is shipped from the factory, the Permanent Memory is erased, which sets the above parameters to their default settings.

To erase all permanent memory settings, do the following:

- Turn the instrument off using the OFF key.
- Press and hold the PAUSE key and the key directly above PAUSE key simultaneously, and before releasing the keys, press and release the ON/Lamp key to turn the unit on.
- A pop up menu will appear asking you to press "ACCEPT" to confirm the erase memory procedure. Press "ACCEPT" to erase permanent memory.

SPECIFICATIONS

GENERAL FEATURES

Pixel Resolution: 160 X 128 square pixels
LCD Window Size: 4" Wide x 3-1/2" High
Physical Dimensions: 7.8" Wide x 5.25" High x 2" Deep

FISH FINDER FEATURES

Depth Ranges		<u>Minimum Range</u>	<u>Maximum Range</u>
Feet:	45° beam	0-20 feet	0-480 feet
	20° beam	0-20 feet	0-960 feet
Alarms:	Shallow Water, Fish Alarm		
Transducer Frequency:	120 KHz		
Transducer Beam Angle:	Standard beam is 45 degrees Optional beam is 20 degrees		
Transmit Power:	800 Watts Peak to Peak 100 Watts RMS		
Power Requirements:	11.5 - 16 volts DC, Draws 1 amp Max		
Speed:	Standard is Miles Per Hour		
Speed Range:	Instrument: 1.0 knot to 80 knots Impeller: 1.0 knot to 40 knots *Manufacturer's specification rates Impeller accuracy at +/-3%		
Trip Log:	0-999 Miles, able to reset Resets to 0 when power turned off.		

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT PRIOR NOTICE

GENERAL OPERATION

1. **SYMPTOM:** Unit does not turn on at all. No beep, no display.
CHECK: Make sure the unit is actually receiving power. Check the inline fuse, and the circuit breaker panel on the boat. Make certain the unit is receiving 11.5 to 16 volts of CLEAN DC. Make sure the DC polarity has not been reversed. Check for corrosion on the power connector, and clean if necessary. Sometimes gently spreading the two pins on the male power connector with a small knife will help make a better contact.
2. **SYMPTOM:** Unit Beeps, but no display
CHECK: Disconnect the 4 Pin speed/temperature connector from the back of the instrument. If the display returns, replace the speed/temperature impeller.
3. **SYMPTOM:** Unit always operates in Simulator Mode, fishing image repeats over and over again regardless of the boat's movement.
CHECK: After turning the unit on, do not press the SIMULATOR key.

FISH FINDER

1. **SYMPTOM:** FISH FINDER screen not showing the bottom, fish, etc.
CHECK: Ensure that the transducer is plugged into the three pin connector. With the engine(s) shut down, locate the boat in water 10 - 30 feet deep. Check the contrast level of the LCD display to make sure it is not turned down too low. Use the ADJUST FISH FINDER screen to ensure that the GAIN and Clutter Filter settings are not turned too low. Ensure that FISHID is off. With the boat out of gear, rev the engine(s) to cruising RPM and verify that the display is "clean", with a recognizable bottom. "Black snow" on the screen indicates that noise from the engine(s) is getting into the system.
 - Suggested solution for engine noise is to order Alternator Filter from MAR LINE.
(Phone (213) 595-6521 in U.S.A.)
2. **SYMPTOM:** Under way at high speeds, FISH FINDER screen does not show bottom or fish.
CHECK: Stop the boat and ensure that the Fish Finder shows a clean display with a recognizable bottom while standing still. Then, gradually increase speed while making a moderate turn toward the side where the transducer is mounted. If performance improves, the transducer is probably aerated. Move the transducer down approximately 1/4", which will place the transducer further into the water flow under the hull where aeration usually is less pronounced. Repeat this preliminary test, and re-adjust the transducer if necessary. The transducer should be placed no more than 1" below the bottom of the hull.

If you have a Flat Bottom boat, transducer aeration can be reduced by installing the transducer so that it is pointing backwards, as a smooth extension of the hull. A backwards mounted transducer must be mounted flush with the bottom of the hull, and cannot extend below the hull.
3. **SYMPTOM:** Fish Finder sonar reception is very poor and does not always show the bottom.
CHECK: Check the frequency of the transducer to make sure that it matches the frequency of your instrument. The 4010 is 120 KHz. Check the mylar tag located approximately 12" from the connector end of the transducer cable to make sure that it is 120 KHz as well. IMPULSE transducer part numbers begin with the prefix "650"-XXXX and IMPULSE speed/temperature impellers begin with the prefix "653"-XXXX. In the back of this manual is a listing of spare and replacement parts.
4. **SYMPTOM:** Surface Clutter appears at the top of the screen when using the Fish Finder.
CHECK: Use the Clutter Filter adjustment on the ADJUST FISH FINDER screen to adjust the filtering of the receiver. The Clutter Filter should be adjusted to the lowest setting which produces a relatively clear Fish Finder image.
5. **SYMPTOM:** Digital depth in lower right corner jumps around but fish finder update information looks OK.
CHECK: Use the Digital Depth - TVG adjustment on the ADJUST DIGITAL screen to perform the following procedure:
 - Take the boat to a shallow area of water. (We suggest 4-6 feet deep.)
 - Set the Fish Finder Range to 20 feet.

- Using the Digital Depth TVG **UP** arrow, set the TVG value to 7. Using the Digital Depth TVG **DOWN** arrow, decrease the TVG setting one step at a time until you get a correct and consistent Digital Depth reading on the data line at the bottom of the LCD. Each time you change the TVG setting, wait approximately one minute before changing it again so that you will have adequate time to observe and evaluate the behavior of the digital depth.
- It should not be necessary to use the TVG adjustment again unless your boating location or unusual circumstances occur.

CARE AND MAINTENANCE

4010

Your 4010 itself requires no maintenance. However, if you will not be using your boat for several days, we suggest you cover the unit or remove it for storage. This will extend the life of your 4010 for years to come. If necessary, you may clean your unit with a damp cloth and a mild detergent dish soap. Never spray directly with a hose or otherwise submerge your unit. Never use harsh cleaners or solvents (gasoline, window cleaner etc.) to clean your instrument.

TRANSDUCER

If your vessel is kept in saltwater, sea growth will build up on the transducer housing and bracket. Therefore, it is recommended that the entire transducer and the bracket be coated with an antifouling paint. Use only mineral spirits based paints, such as Glochester (RULE) Durapoxy. Do NOT use ketone based antifouling paint since ketones attack plastic and can fracture the housing. If fouling does occur, use a stiff brush or putty knife to remove growth. Wet sanding of fouled surfaces is permissible with #220, or finer grade, wet or dry sandpaper.

IMPELLER

If you are in a region where there is high marine growth, your IMPELLER should be cleaned once every 3 months.

If you have a TRANSOM MOUNT IMPELLER, it does not have to be removed before cleaning, however, if you have a THROUGH HULL IMPELLER it may be removed by the following steps:

- Locate the DUMMY PLUG which should have been provided with your unit. WITHOUT THIS, DO NOT PERFORM THE CLEANING PROCEDURE.
- Loosen the nut of the through hull fitting. Quickly pull up on the ring at the top of the impeller assembly. Immediately pull it out of the fitting and push the dummy plug into place, aligning the notch on the plug with the notch on the through hull fitting. Tighten the nut in place. Typically, you can expect between 1 to 2 pints of water to flow into the bilge before the dummy plug is tightly in place.

Either the THROUGH HULL or TRANSOM MOUNT IMPELLER may be cleaned by simply using a stiff brush or #220 or finer grade wet or dry sandpaper to remove the growth.

SPARE PARTS LIST

• Gimbal Mounting Bracket	950-044C	
• Knobs - Side Thumbscrew type (each)	410-004	
• Neoprene (rubber) Washer (against knob)	208-006	
• Knob Detent - Plastic (Against Bkt.)	208-053	
• Knob Screws (4 each black anodized)	201-003	
• Power Cord with 2 amp fuse	719-031	
• 360° Swivel Mounting Bracket	950-012	(option)
• 2 Pin Female Connector (Power)	703-021	
• 3 Pin Female Connector (Transducer)	703-002	
• 4 Pin Female Connector (Speed/Temperature)	703-007	
• 6 Pin Female Connector (Compass)	703-034	
• Stainless Steel Kick Up Bracket	652-013	(option)
• Clip On Bracket for Speed/Temperature	652-015	(option)
• Replacement Clips for Transom Impellers	652-022	
• Switch Box - 2 Units to 1 Transducer	652-024	(option)
• Switch Box - 1 Unit to 2 Transducers	652-023	(option)

REPLACEMENT TRANSDUCERS FOR FISH FINDER - 120 KHz

• Transom Mount 45° Beam Angle	650-3303
• Transom Mount 20° Beam Angle	650-3403
• Low Profile NYLON 45° Beam Angle	650-5003
• Low Profile NYLON 20° Beam Angle	850-5103
• Low Profile BRONZE 45° Beam Angle	650-5203
• Low Profile BRONZE 20° Beam Angle	850-5303
• Inside the Hull 20° Beam Angle	650-3703
• Tri-ducer, Bronze 20° Beam Angle	653-1008
• Power Boat Bronze 45° Beam Angle	650-3903
• Power Boat Bronze 20° Beam Angle	650-4003

REPLACEMENT SPEED/TEMPERATURE IMPELLERS

• Transom Mount, (Clips On to 650-3303, 650-3403)	653-0704
• Transom Mount, HIGH SPEED BRONZE	653-0904
• Low Profile NYLON	653-1104
• Low Profile BRONZE	653-1204

TRANSDUCER AND IMPELLER CABLE EXTENSIONS

(Transducer and Speed Impeller options are available at *additional charge*)

<u>TRANSDUCER</u>	<u>SPEED/TEMPERATURE</u>
10'.....P/N 720-001	10'.....P/N 720-005
20'.....P/N 720-002	20'.....P/N 720-006
30'.....P/N 720-003	30'.....P/N 720-007

Note: We do not recommend that the transducer cable be extended to more than a total of 50 feet. (Transducers are supplied with approximately 20' of cable. An additional 30' of cable may be purchased if 50' of total cable length is desired.

IMPULSE ONE YEAR LIMITED WARRANTY

WARRANTOR: Impulse Manufacturing, Inc. ("Impulse")

ELEMENTS OF WARRANTY: Impulse warrants, to the original retail purchaser, for a period of one (1) year from the date of purchase or within eighteen (18) months from the end of the month in which the product was shipped from Impulse, Impulse products (hereinafter referred to as the Product) to be free from defects in material and workmanship with only the limitations or exclusions set out below.

WARRANTY DURATION: This warranty shall terminate and be of no further effect one (1) year from the date of purchase or eighteen (18) months from the end of the month in which the product was shipped from Impulse, or at the time the product is (a) damaged or abused, (b) not maintained as reasonable or necessary, (c) modified by unauthorized personnel, (d) improperly programmed, (e) repaired by someone other than warrantor for a defect or malfunction covered by this warranty, or (f) used in a manner or environmental condition for which the product was not intended.

STATEMENT OF REMEDY: In the event that the Product does not conform to this warranty at any time while this warranty is in effect, warrantor will repair or recondition the defect and return it to you without charge for parts, service, or any other cost incurred by the warrantor in connection with the performance of this warranty. Any Costs incurred with transducer or impeller replacement other than the cost of the transducer or impeller, itself, is specifically excluded from this warranty. THE ONE (1) YEAR LIMITED WARRANTY SET FORTH ABOVE IS SOLE AND EXCLUSIVE WARRANTY PERTAINING TO THE PRODUCT AND IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES OF ANY NATURE WHATSOEVER, WHETHER EXPRESS, IMPLIED OR ARISING BY OPERATION OF LAW, INCLUDING, BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THIS WARRANTY DOES NOT COVER OR PROVIDE FOR THE REIMBURSEMENT OR PAYMENT OF INCIDENTAL OR CONSEQUENTIAL DAMAGES. Some states do not allow this exclusion or limitation on incidental or consequential damages, so the above limitation or exclusion may not apply to you.

WARRANTY REGISTRATION CARD: In order to facilitate the servicing of this warranty by warrantor, the Warranty Registration Card should be returned by the Warrantor. However, return of the Warranty Registration Card is not a precondition of this Warranty, and this Warranty will be observed by the Warrantor whether or not the Warranty Registration Card is returned, provided that other satisfactory evidence of the date of purchase is provided.

LEGAL REMEDIES: This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. This warranty is void outside of the United States of America.

IMPULSE CUSTOMER SERVICE CENTER: If you are certain that the Product is defective, pack the Product carefully (preferably in its original packaging) and include a note describing the specific defect that has caused you to return it. For your protection, it is advisable to insure the parcel against loss or damage. The Product (with evidence of original purchase) should be shipped or delivered (by UPS or insured parcel post), freight prepaid, to warrantor at:

IMPULSE MANUFACTURING, INC.
695 RAILROAD AVENUE
PITTSBURG CA 94565 U.S.A.
Telephone: (510) 439-2072

OUT OF WARRANTY - FLAT RATE CHARGE

IMPULSE, for a Flat Rate Fee, will repair and/or recondition the instrument to its original operational standards. Upon completion of repair, IMPULSE offers its original Limited Warranty to the instrument for a period of 90 days after the date of repair.

Services performed by IMPULSE for Instruments Out of Warranty will be charged at a Fixed Rate established at the beginning of each calendar year.

- The Flat Rate Charge for 1992 for the Impulse 4010 is \$69.00 which will be charged for each repair incident occurring in the year.

The Flat Rate Charges are subject to change without prior written notice.

The following items are specifically excluded from the Flat Rate Charge and the owner shall be responsible for any additional charges for the repair or replacement of the following items:

1. Replacement of the Liquid Crystal Display (LCD).
2. Cases, front panels, knobs, brackets, and hardware associated with the assembly of the instrument.
3. Transducers, impellers, couplers, and power cords.

This program does not cover defects or damages caused by unauthorized service, nor damages through accident, misuse, or abuse. The owner is responsible for providing reasonable and necessary maintenance in accordance with instructions provided in this Owner's Manual and for using common sense regarding storage in extreme weather conditions.

Software Updates for the Product may be available in the future at a nominal rate.

For your protection, it is advisable to insure the parcel against loss or damage. The product should be returned "freight prepaid" to the following address:

**IMPULSE TECHNOLOGY
695 Railroad Avenue
Pittsburg CA 94565 USA**

**PHONE: 510-439-2072, Main Number
FAX: 510-427-1920, Main Office**

**Checking on Status of Returns
Phone: 510-427-2570 or 510-427-2590**

WARRANTY REGISTRATION CARD

To validate warranty, fill out card and return to IMPULSE within 10 days of purchase.

Model _____ Date Purchased _____

Serial No. _____

Name _____

Street _____

City _____ State _____ Zip _____

Phone Number _____

Dealer's Name _____

Address _____

City _____ State _____ Zip _____

Phone Number _____

**PLACE
STAMP
HERE**

**IMPULSE TECHNOLOGY
329 Railroad Avenue
Pittsburg, CA 94565**

Impulse Technology

Corporate Offices:

329 Railroad Avenue
Pittsburg CA 94565
Telephone: 510-439-2072
Facsimile: 510-427-1920

Service and Manufacturing Facility:

695 Railroad Avenue
Pittsburg CA 94565
Facsimile: 510-427-4459