SKIPPER 418 ECHOSOUNDER

OPERATION

INSTALLATION

P 5101 E

AUG.1987

SKIPPER Electronics A/S
Trollåsveien 4, Mastemyr
1410 Kolbotn - Norway

Telephone: 47 2 80 50 50
Telefax: 800307
Telex: 72529 sim n

SKIPPER

SKIPPER
Electronics A/S

--- C O N T E N T S ---

1. INTRODUCTION.

The SKIPPER 418 is a modern general purpose echosounder for fishing. It has been designed with a compact cabinet, with few controls for simple operation and easy maintenance like all SKIPPER products. The controls mounted on the front panel are arranged according to operational logic and marked with easy readable markings.

The operator will find it easy to familiarize himself with the operation method. However,it is necessary to read this manual carefully before operating the sounder,also for the experienced operator. The manual will help the operator to interprete the recordings and be aware of the performance limitations of the equipment. This is also important when detecting the presence of fish and accurately assessing the quantities.

The modern cast aluminium cabinet is plash proof. The precision - machined parts and the IC - controlled scan drive motor system ensures the high quality recording and accurate depth measurement possibilities of the SKIPPER 418. It has been designed to measure the depth in meters or fathoms, selected by the built-in calibration unit selector.

The electronic circuits are built on plug-in type printed circuit boards,reducing service time to a minimum.

The operating voltage can be selected between 11 and 32 vdc,for flexibility when adapting to different power supplies.

During installing, adjusting and operating the SKIPPER 418,the following warning must be kept in mind:

UNDER NO CIRCUMSTANCES MUST THE EQUIPMENT BE SWITCHED ON WITH THE TRANSDUCER IN AIR. THIS MAY CAUSE SERIOUS DAMAGE TO THE TRANSDUCER.

2. TECHNICAL SPECIFICATIONS, SKIPPER 418 ECHOSOUNDER.

-1. Depth ranges.

Scale in meters	A	B	C	D
Basic ranges	0-30	0- 60	0-150	0-300
Phased ranges	20-50	40-100	100-250	200-500
	40-70	80-140	200-350	400-700

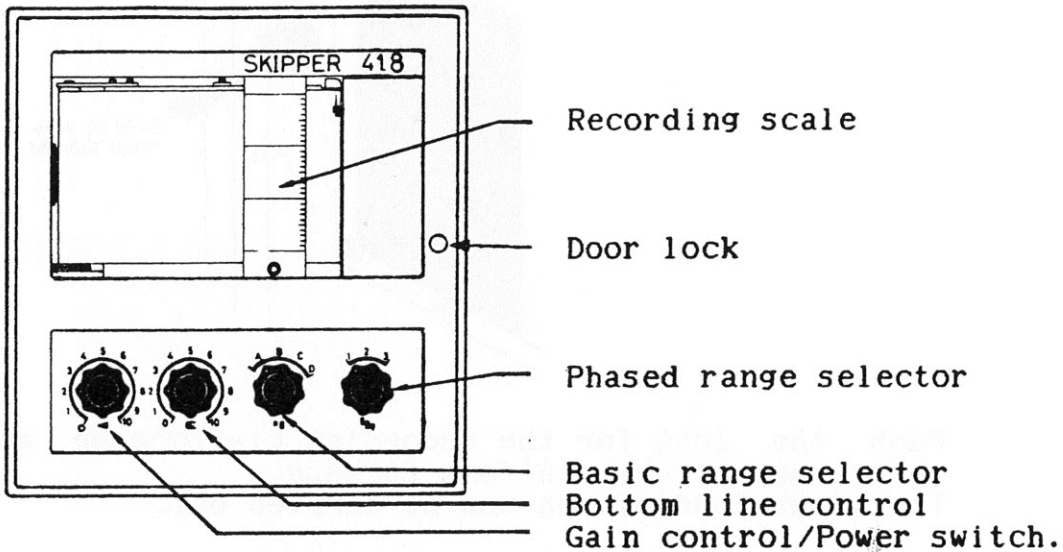
Scale in fathoms	A	B	C	D
Basic ranges	0-15	0-30	0- 75	0-150
Phased ranges	10-25	20-50	50-125	100-250
	20-35	40-70	100-175	200-350

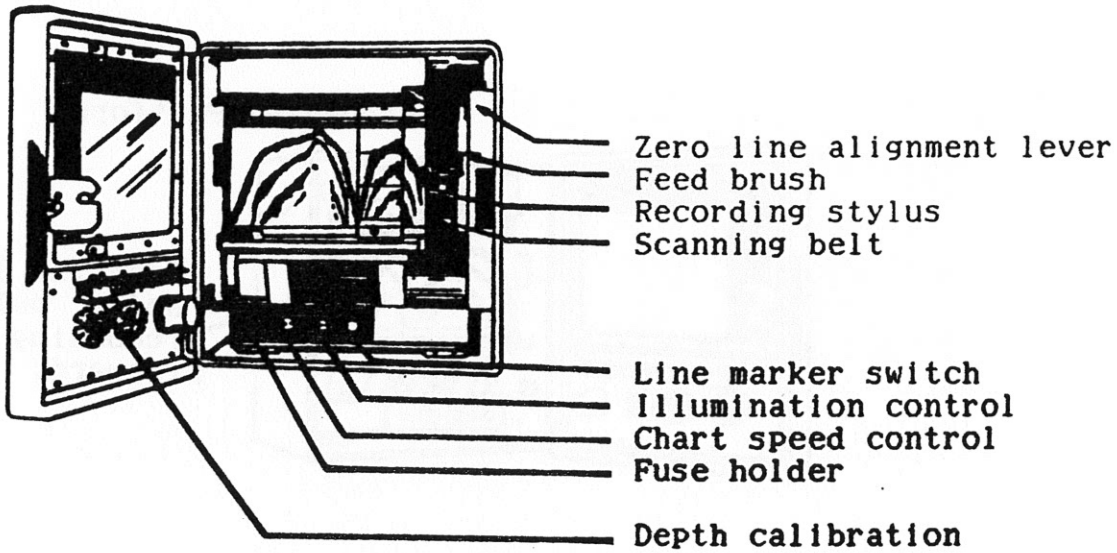
-2. Depth.	Read against plastic scale.
-3. Depth calibration.	Meters or fathoms.
-4. Operating frequency.	50 Khz.
-5. Output power.	200 W.
-6. Pulse lengths.	Range A: 0.3 msec. Range B: 0.6 msec. Range C: 0.8 msec. Range D: 1.5 msec.
-7. Paper speed.	2 - 20 mm per minute.
-8. Recording paper.	Dry,SKIPPER TP - 4. Width: 100 mm,length:15 m/roll.
-9. Operating voltage.	11 - 32 VDC.
-10. Power consumption.	12 W.
-11. Transducer.	Ceramic,circular 33 degrees.
-12. Cabinet dimensions.	Height: 300 mm. Width: 274 mm. Depth: 155 mm.
-13. Weights.	Cabinet: 7,4 kg. Transducer: 2,5 kg.

3. OPERATING INSTRUCTIONS.

SKIPPER 418 EXTERIOR AND INTERIOR.

Fig.3.1

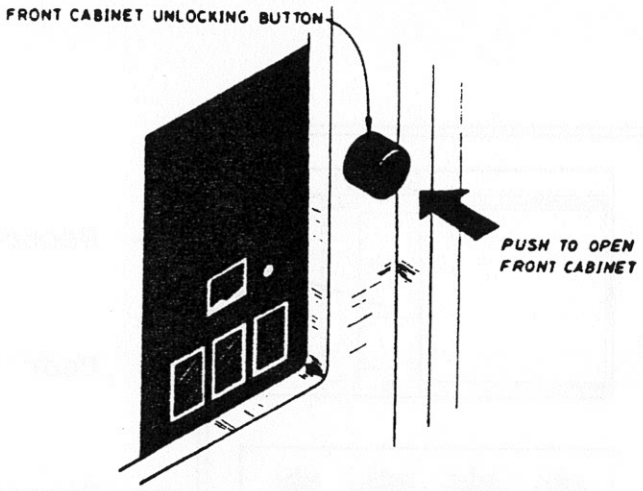




-1. Gaining access to the interior.

Push the black button located on the front of the cabinet, and pull open the front door. See fig. 3-2.

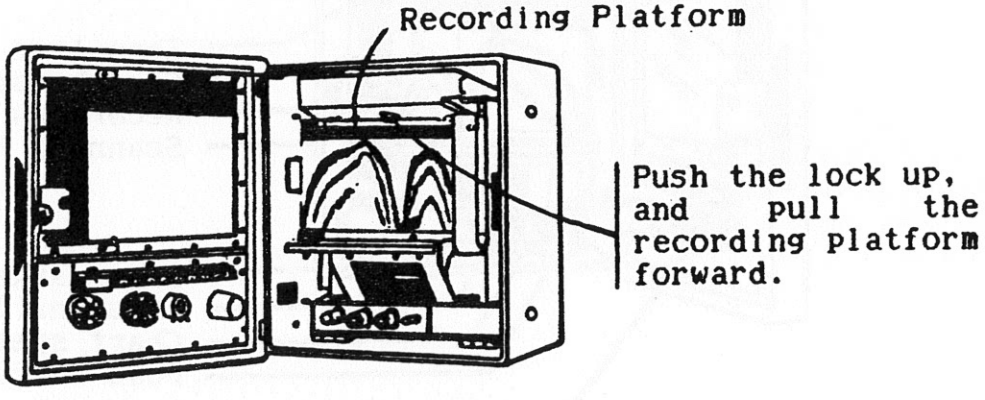
Fig. 3-2. Opening the cabinet door.



Push the lock for the recording platform up, and pull the upper edge of the platform forward.
The paper loading can now be carried out.

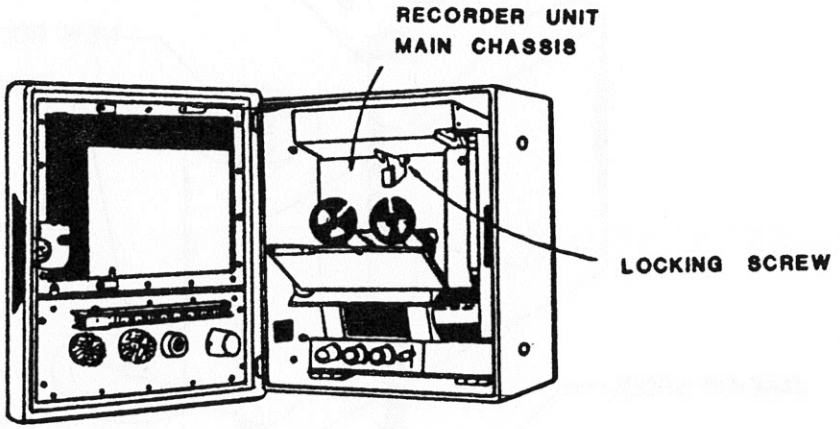
W A R N I N G
Before pulling the platform forward, make sure that the stylus is off the recording platform.

Fig. 3-3. Unlocking the recording platform.



To gain access to the rear of the cabinet it is necessary to unscrew the recorder unit locking screw and tilt the recorder unit forward.
Now the cabinet installation and electrical connections can be carried out.
W A R N I N G.
Before the recorder is tilted forward, the recording platform should be closed.

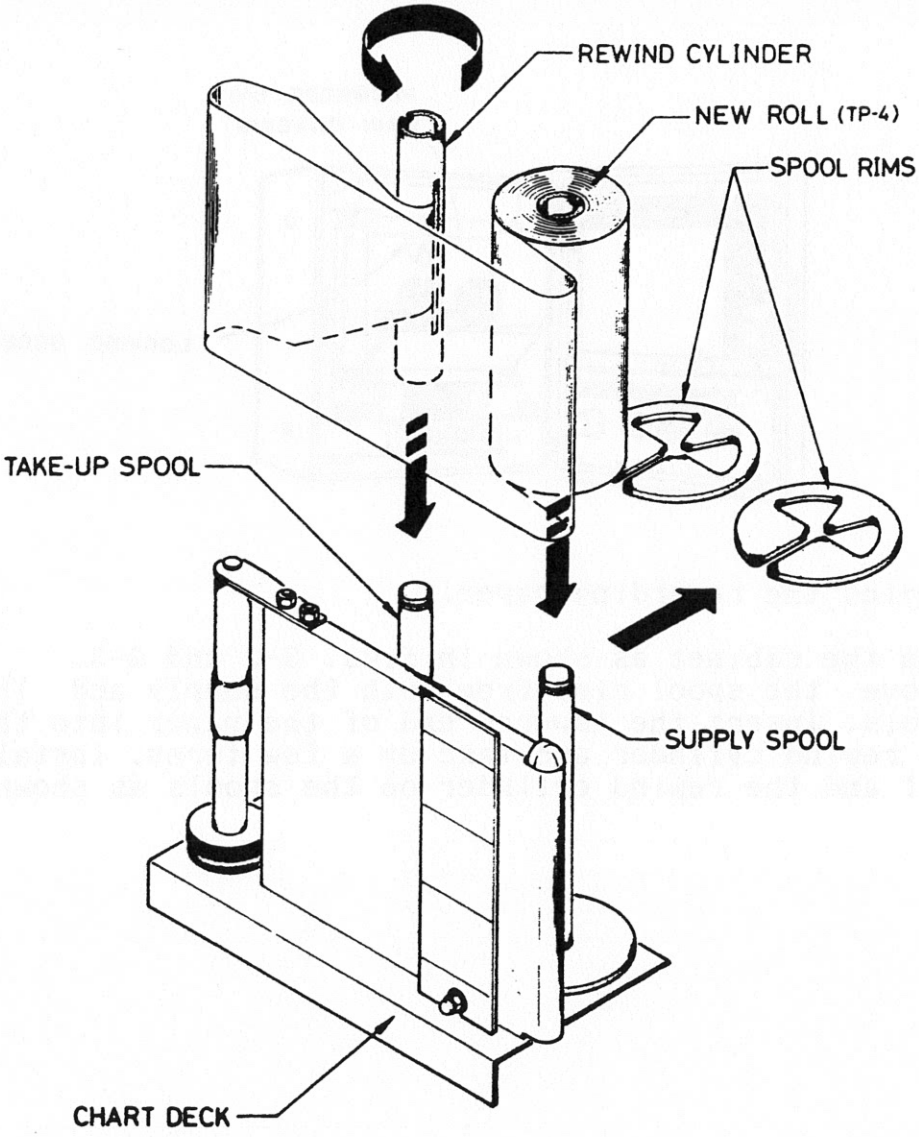
Fig. 3-4. Tilting the recorder unit forward.



-2. Loading the recording paper.

Open the cabinet as shown in figs. 3-2 and 3-3.
Remove the spool rims from both the supply and the take-up spools. Insert the tapered end of the paper into the slot on the rewind cylinder and take up a few turns. Install the new roll and the rewind cylinder on the spools as shown.

Fig. 3-5. Loading the recording paper.



To tighten up the recording paper along the recording platform, turn the transport roller drive pulley as shown in fig. 3-6.

Fig. 3-6. Tightening the recorder paper.

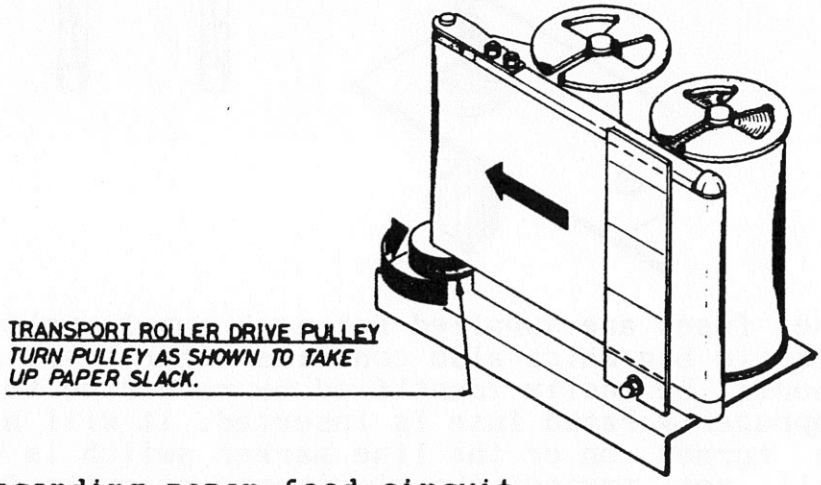
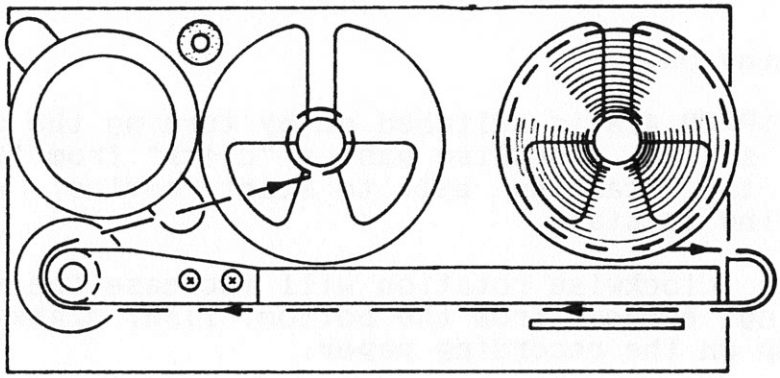


Fig. 3-7. Recording paper feed circuit.



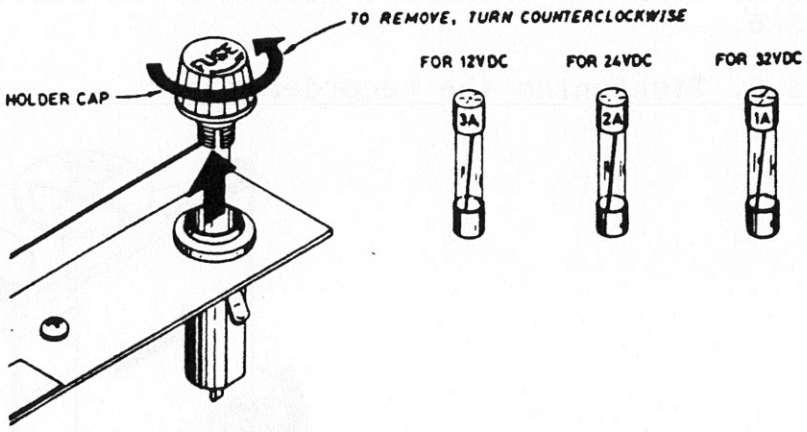
-3. Fuse installation.

The fuse should be selected according to the operating voltage as follows.

3 amperes (marked 3 A) for 12 volt DC operation.
2 amperes (marked 2 A) for 24 volt DC operation.
1 ampere (marked 1 A) for 32 volt DC operation.

When the SKIPPER 418 is delivered, the fuse is normally not installed, in order to prevent incorrect operation.After the electrical connections have been made, remove the fuseholder cap, insert the fuse and replace the cap.

Fig. 3-8. Fuse installation.



The fuses are supplied for each supply voltage packed in a plastic bag which also contains other spare parts. The fuses should be easily identified by referring to fig. 3-8. If an improperly rated fuse is inserted, it will blow when the set is turned on or the line marker switch is operated, or it will not protect the electronic circuits in the event of trouble.

-4. Switching on.

The SKIPPER 418 is switched on by turning the Gain control / Power switch clockwise past a "click" from "0". This will cause the scanning belt to start moving, enabling depth measuring to start.

Further clockwise rotation will increase the receiver gain, allowing echoes from the bottom, fish, plankton, etc., to show up on the recording paper.

-5. Selecting Depth Calibration.

The SKIPPER 418 has two units of depth calibration built-in.

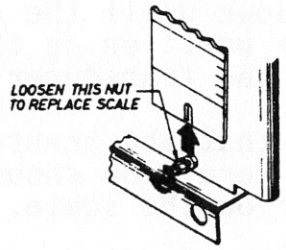
Position METERS: Metric calibration.
Position FATHOMS: Fathom calibration.

Fig. 3-9. Depth Calibration Selector.

-6. Replacing the Recording Scale.

When delivered, the SKIPPER 418 normally is fitted with the metric recording scale, the calibration selector is also set to the "METERS" position. If fathoms calibration is wanted, the selector must be set to position "FATHOMS", and the existing meter scale must be removed, and the fathoms scale installed.

Fig. 3-10. Replacing Recording Scale.



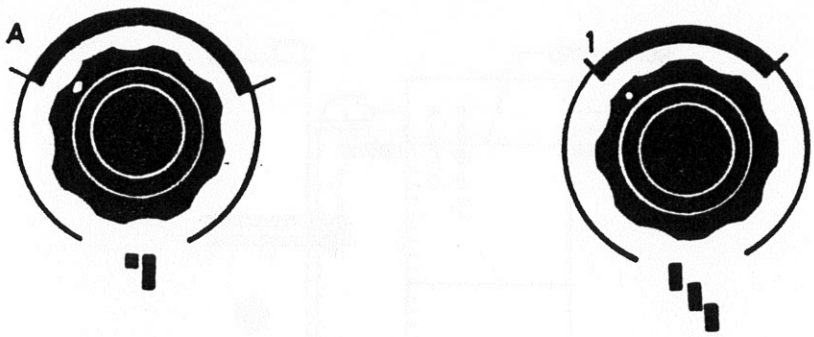
-7. Zero Line Alignment.

Before using the SKIPPER 418 for exact depth measurements, it will be necessary to determine the exact point from which the depth will be read. This is because the depth is always measured from the transducer face, which normally is at some vertical distance from the surface of the water.

On the recording paper, the upper edge of the zero line corresponds to the transducer face. The zero line adjustment is to set the position of the zero line on the scale. The alignment procedure is as follows:

A: Select basic range "A", and phased range "1".

Fig. 3-11. Settings for Zero Line Alignment.



B: Refer to Fig. 3-12, locating the zero line alignment lever.

C: Turn the SKIPPER 418 " ON ". After some time, the zero line should appear near the scale " 0 ".

D: To read depth from the transducer face, move the zero line alignment lever up or down until the upper edge of the zero line coincides with the scale " 0 ", as in fig. 3-13.

E: To read depth from the water surface, move the zero line alignment lever up or down until the upper edge of the zero line coincides with the position on the scale corresponding to the actual depth of the transducer face, see fig. 3-14.

As an example, assume that the transducer face is 1 meter below the surface. The zero line should be set so that it's upper edge reads 1 meter on the scale.

Fig. 3-12. Zero Line Adjustment Lever.

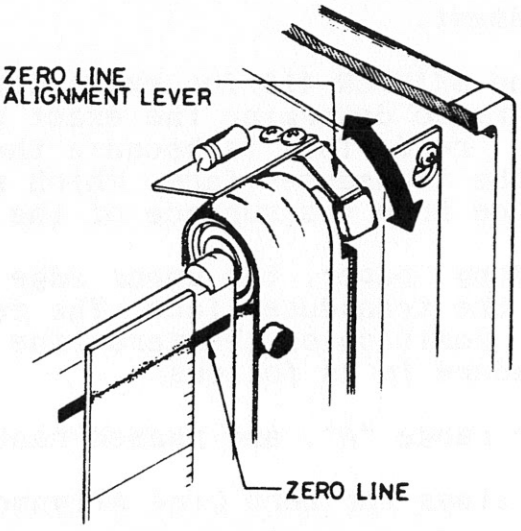


Fig. 3-13. Zero Line Position.
For depth measurement from transducer face.

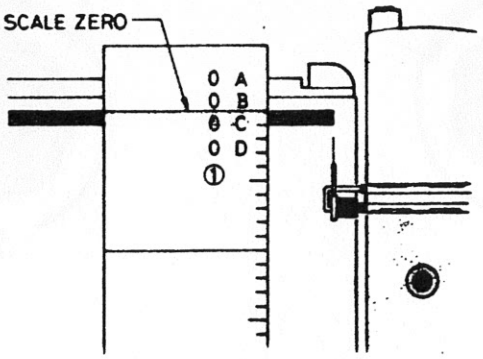
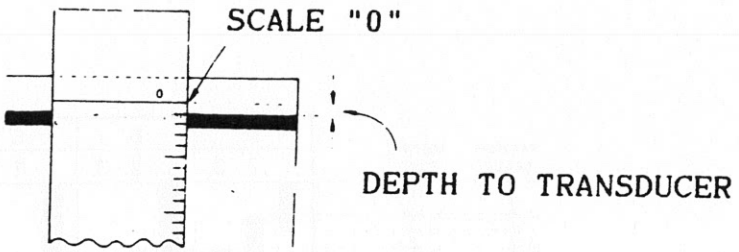


Fig. 3-14. Zero Line Position.
For depth measurements from the water surface.



The zero line is produced by a small portion of the transmitter pulse leaking into the receiver. It's presence, in addition to identifying basic range, or phased range no.1, indicates that both transmitter and receiver are working consistently.

-8. Range Selection.

The SKIPPER 418 has four basic ranges A, B, C & D, which are selected by the Basic Range Selector. See fig. 3-16. Each basic range is divided into three phased ranges 1, 2 & 3, selected by the Phased Range Selector. See fig. 3-16.

A total of 12 different ranges are available by combining the positions of these two selectors, as shown in fig. 3-15.

A certain amount of overlap exists between these ranges as can be seen from fig. 3-15. This range overlapping has been provided to eliminate the need for continually changing the selected ranges in order to keep the bottom contour under surveillance when the depth is varying around the maximum mark of the selected scale.

-9. Scale Selection.

Fig. 3-16 shows which section of the recording scale should be used to read depth when a particular depth range is selected. In the example on fig. 3-16, the depth range B 2 has been selected. (Basic range B, phased range no.2.) Therefore, section ② of scale range B should be used. This reads:

40 to 100 meters on metric scale.
20 to 50 fathoms on fathoms scale.

Fig. 3-15. SKIPPER 418 DEPTH RANGES.

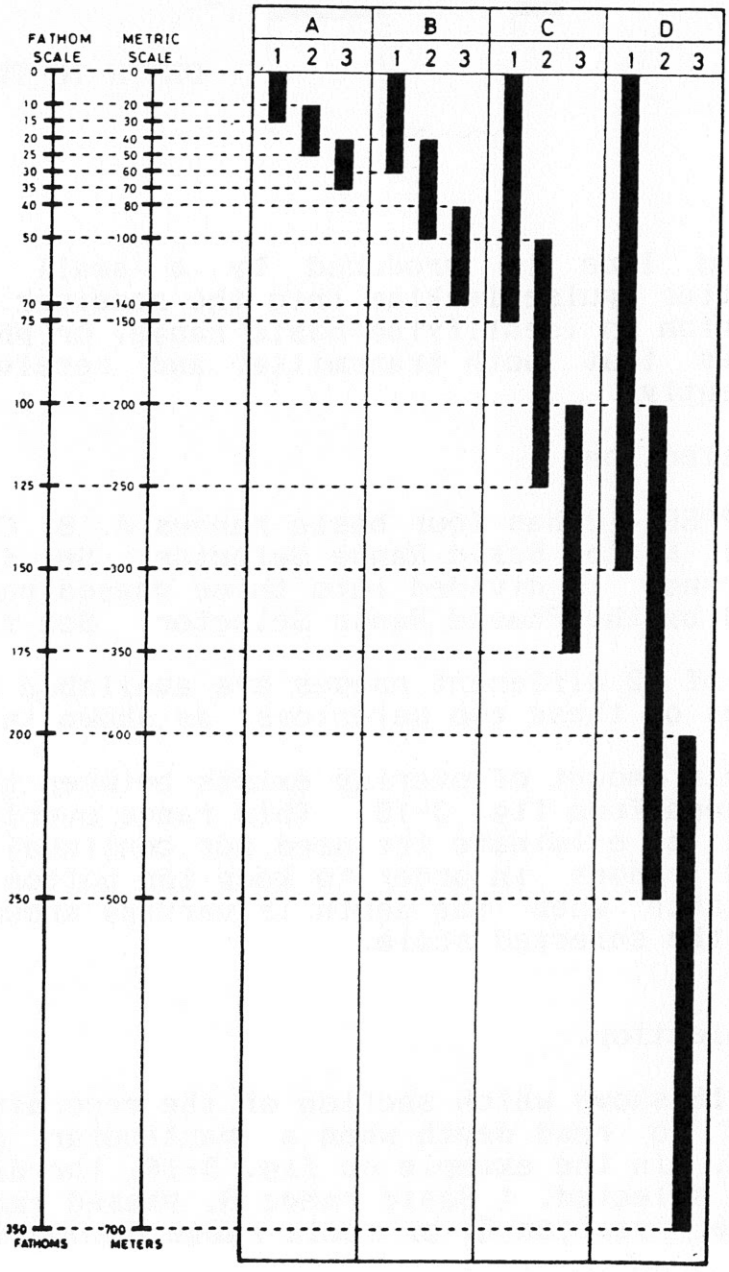
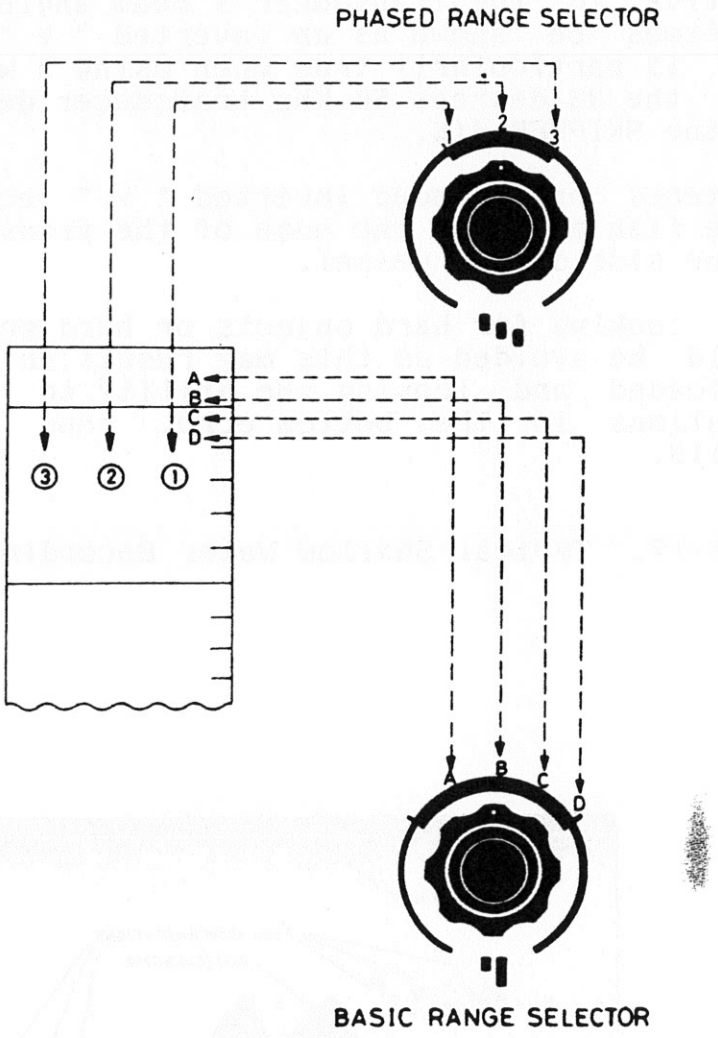


Fig. 3-16. Recording Scale Selection.



-10. Effect of gain on recording.

Clockwise rotation of the gain control will increase the receiver sensitivity. To locate fish schools, fairly high sensitivity has to be used, even in shallow waters. The recording will then become darker, especially near the surface, as a result of reflections from plankton concentrations, air bubbles, temperature layers etc. Once a fish school has been found, reducing the gain will result in a clearer recording.

A solid echo, similar to the bottom echo, may appear at twice the depth, as shown in fig. 3-17. This is the transmitted signal being reflected from the bottom to the surface, back again to the bottom, and once more to the transducer. This kind of multiple echoes normally occur when travelling over hard bottom.

Fish echoes will show up in various forms, depending on the type of species, size, density, recording paper speed, vessel's speed, and also on where the fish is located relative to the transducer's beam angle. Large fish will sometimes be shown as an inverted " V ", as in fig. 3-18. This is particularly true when using a wide-beam transducer like the 33 degrees 50 Khz transducer delivered as standard for the SKIPPER 418.

Flattened or rounded inverted " V " echoes indicate that those fish are near the edge of the transducer beam, that is, to the side of the vessel.

When looking for hard objects or hard ground, too high gain should be avoided as this may result in the receiver being overloaded and loosing the ability to detect the smaller variations in the bottom echo, thus loosing interesting details.

Fig.3-17. Typical Shallow Water Recording.

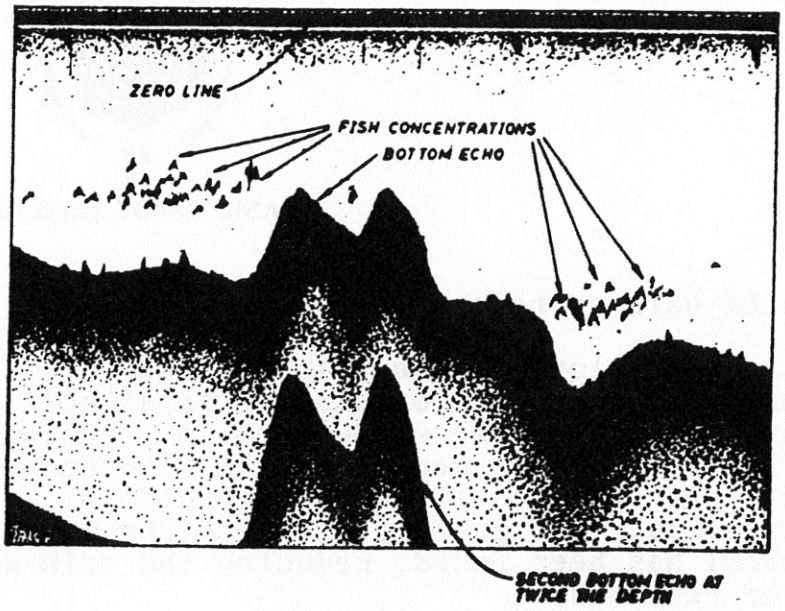
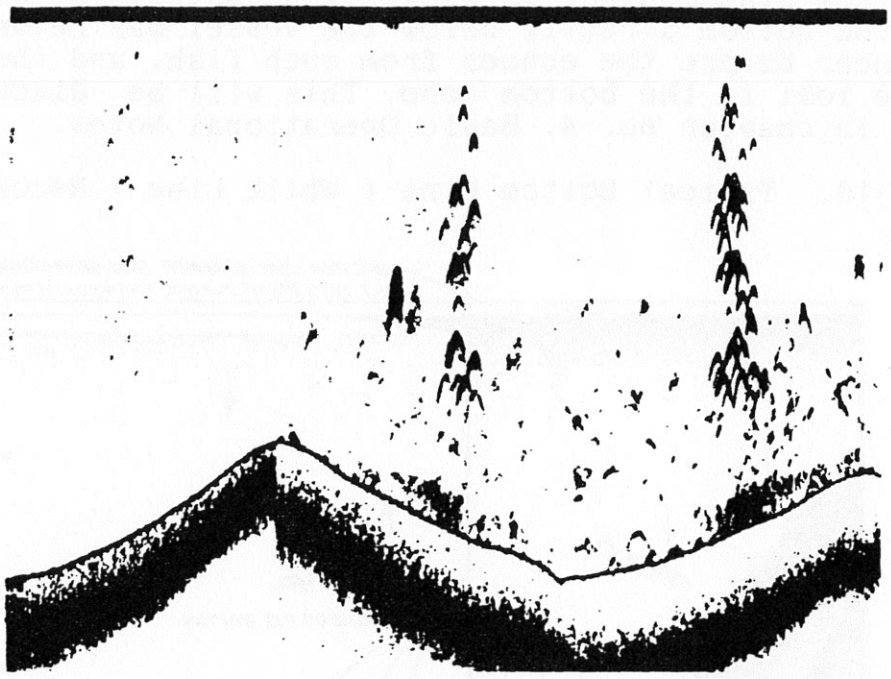


Fig. 3-18. Typical Recording of Large Fish.



-11. Bottom Line (White Line) Recording.

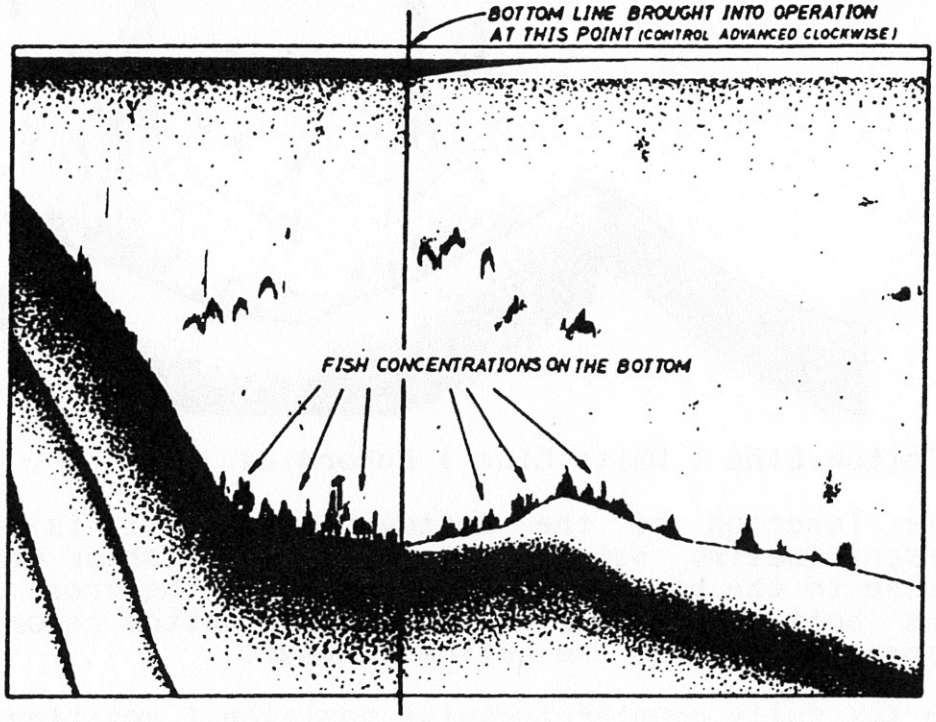
The function of the Bottom Line Control is to help in discriminating between the bottom and fish or other objects close to the bottom, which, because of the great strenght of the bottom echo, may be lost in the bottom recording or may appear as part of the bottom contour.

In its fully counterclockwise position,(position " 0 "), the Bottom Line Control is disabled, having no effect on the bottom recording. Turning the control clockwise, will turn the bottom marking into a thin line with a white space immediately following. Fish lying close to the bottom will show up like black spots or patches on tha thin bottom contour line, and can be easily identified. Fig. 3-19 shows a typical bottom line recording. The jagged bottom contour is due to the vessel's heavy pitching and rolling.

Since the bottom line effect is activated by any strong signal from the bottom, it is possible to obtain some amount of information on the nature of the bottom from the way the effect shows up on the recording. A very soft bottom, for instance, will absorb most of the transmitted energy so that it will not produce a clearly defined white space, but a dark, wide recording. On the other hand, if huge rocks or other hard objects are on the bottom, the white space will sometimes be visible even on the second "bottom" echo.

N O T E: Bottom feeding fish which are off to one side of the vessel may not be separated from the bottom contour even if the Bottom Line Control is properly adjusted. The strong echo from the bottom directly below the vessel may return to the transducer before the echoes from such fish, and these echoes may be lost in the bottom echo. This will be discussed in detail in chapter no. 4, Basic Operational Notes.

Fig. 3-19. Typical Bottom Line (White Line) Recording.



-12. Paper Speed Control.

The Paper Speed Control will vary the speed of the recording paper within a range from 2 to 20 millimeters per minute. Clockwise rotation will increase the paper speed. Lower speeds will be adequate when using the SKIPPER 418 as a navigation sounder to record depths only and will save paper. Higher speeds will be preferrable when looking for fish or in situations where detailed information is wanted.

For fish finding purposes, low to medium speeds will be used, particularly on ranges " C " and " D ", where,due to greater depth ranges to be covered,the rate of receiving the underwater information is relatively slow. High speed on the deep ranges will cause the recording to become coarse, making it difficult to read the recording.

-13. Line Marker Switch.

Depressing the Line Marker Switch will cause the recording stylus to draw a vertical line across the paper.These vertical marker lines may be used to mark events, where a particular interesting echo was found, or where the fishing gear was set.

This switch may also be used to check the operation of the stylus, after being adjusted or replaced. If the stylus has been properly adjusted, it should draw a continious, vertical line across the entire width of the paper.

-14. Illumination Control.

The illumination control will adjust the intensity of the illumination over the recording paper and scale plate for operation in darkness.

Clockwise rotation past a "click" will turn illumination on and increase the intensity until proper operating conditions are obtained. If not needed, turn the illumination off.

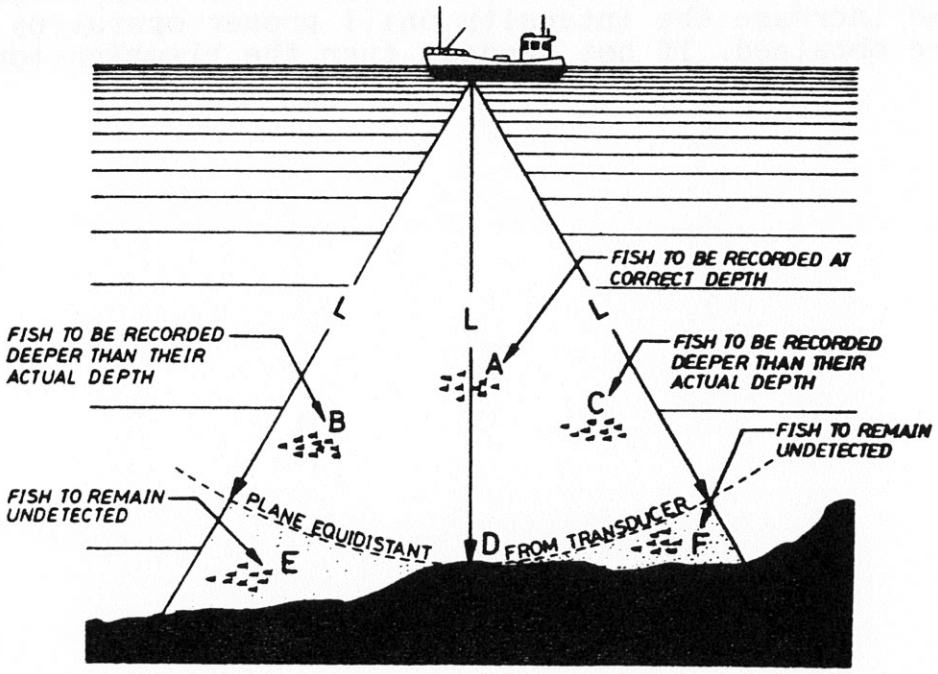
4. BASIC OPERATIONAL NOTES.

The following notes will help the operator in interpreting the recordings and understanding the performance limitations of the SKIPPER 418 so that he may locate the presence of fish more efficiently and estimate the quantities more accurately.

-1. Effects of Transducer Beam Width on Recording.

The sound energy is transmitted into the water in a cone-shaped beam. Therefore the horizontal area to be covered by the beam increases with depth. Since all objects inside the beam produce echoes, it must be understood that all the recorded objects are not always in the center of the beam, i.e. not always directly below the vessel.

Fig. 4-1. Transducer Beam Width and it's Effect on Horizontal Discrimination and Bottom Fish Detecting Ability.



Referring to fig. 4-1 above, in this situation, fish schools "B" and "C" which are off the beam center, as well as school "A" directly below, will be recorded.

Another important factor to be remembered is that fish off the center will be recorded slightly deeper than they actually are and that those near the beam center, ("A" in this example) will show up at the correct depth.

Undetected Bottom Fish.

The effect of the transducer beam will also limit the ability of the Bottom Line Control to discriminate between the bottom and fish lying on the bottom. When detecting the presence of fish on or close to the bottom, the operator should keep in mind that only those near the beam center will be recorded as separate fish echoes, and that fish distant from the beam center will remain undetected, even by correct use of the Bottom Line Control. Refer to fig. 4-1.

Fish schools "A", "B" and "C" will be recorded earlier than the bottom and will show up separated from the bottom, also on the recording paper. Note that objects in the plane equidistant from the transducer will be recorded at the same depth. Fish "E" and "F" are below the equidistant plane in which the shallowest point "D" of the bottom inside the beam is located. Therefore the bottom echo from point "D" will reach the transducer before the echoes from fish "E" and "F", thereby hiding the echoes from those fish in the strong bottom echo.

-2. Vertical Discrimination.

The length (or duration) of the transmitted sound pulse will affect the ability of the echosounder to discriminate between vertically separated fish. The shorter the pulse length, the better the discrimination.

Four pulse lengths are provided, selected by the Basic Range Selector, as follows.

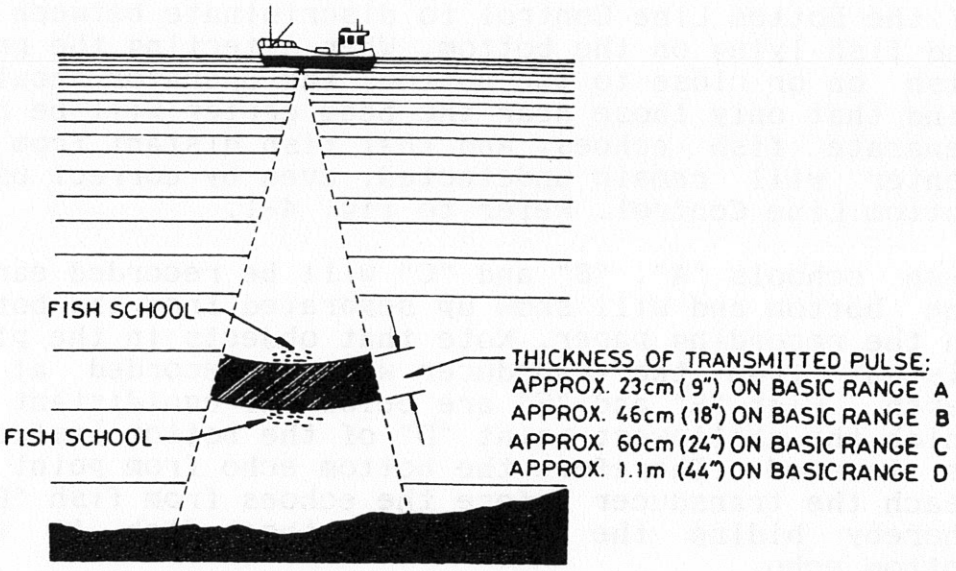
0,3 milliseconds in Range "A".
0,6 milliseconds in Range "B".
0,8 milliseconds in Range "C".
1,5 milliseconds in Range "D".

Based on 1500 meters per second standard,(Sound Speed in water),two fish must,theoretically,be separated vertically by more than the following distances to be recorded as two separate echoes:

23 centimeters in Range "A".
45 centimeters in Range "B".
60 centimeters in Range "C".
110 centimeters in Range "D".

If a school of fish is within the above distance from the bottom on the range selected, it's echo will merge with the bottom echo. In this case, however, the proper use of the Bottom Line Control will make it possible to detect them allowing the fish echoes to stand out.

Fig. 4-2. Pulse Length affecting Vertical Discrimination.



-3. Echo Disappearance.

During some operating conditions, fish echoes and even the bottom may disappear even if they are at otherwise detectable depths. This is mainly caused by air bubbles, turbulent water or strong undercurrents.

When, for instance, the vessel is going astern or has suddenly stopped, air bubbles created by the propeller are driven across the transducer face, preventing the transmitted energy from getting through into water and also preventing the echoes from coming back to the transducer. A similar situation will occur when travelling through areas with heavy traffic, through wakes from other vessels or close to estuaries. In such areas, the bottom echo may be recorded very weak or not at all even with high Receiver Gain settings because of the presence of air bubbles or turbulent water, even if the surface looks calm.

-4. Hard And Soft Bottom Recording.

From the way the bottom echo is recorded, it is possible to obtain information on a number of characteristics of the bottom itself. This information is of vital importance to some fishermen, as fish tend to gather on or close to the edges of hard ground.

The difference in echo length very often indicate the characteristics of the bottom. The echoes from soft ground are weaker and therefore produce a shorter and lighter trace than the stronger echoes from hard ground. For this reason, hard or rocky areas on the bottom will normally show up with longer tails and increased intensity when compared with the other areas of the bottom.

The hardness of the bottom is also indicated by the presence of second and third bottom echoes, especially in shallow waters.

Widening of the white space below the bottom contour line during bottom line operation, also indicate the presence of hard areas on the bottom. If the white line effect is noticeable even on the second echo, that particular part of the bottom may be assumed to be very hard.

5. USER'S MAINTENANCE.

In order to keep the equipment in proper condition, the following maintenance should be carried out by the user at regular intervals.

-1. Cleaning the Recorder Unit.

After some time of use, there will be a certain amount of carbon dust inside the recorder cabinet. If not removed on a regular basis, it will become the source of a problem.
A small, soft paint brush may be used. A vacuum cleaner is an ideal tool for removing carbon dust from switches and printed circuit boards. Do not use chemicals, as they will damage the plastic parts and may start corrosion.

-2. Transducer Maintenance.

Marine growth on the face of the transducer will result in a gradual decrease in sensitivity. Each time the vessel is dry-docked, barnacles and other weeds should be removed carefully using a piece of wood or sandpaper, taking care not to damage the face. The housing of the transducer should be painted with anti-fouling paint. A very thin stroke of anti-fouling may be applied to the transducer face.

-3. Checking Electrical Connections.

The most common source of trouble is the connections to the echosounder. At least once a year, check the external connection terminals to be sure that all the leads are securely fastened to their respective terminals and that there is no sign of corrosion. The connections to the battery terminals should also be regularly inspected.

-4. Adjusting the Recording Stylus.

After some time of recording, the stylus wire may be worn down to such an extent that it does not make proper contact with the recording paper, and may need adjusting.
The stylus may be removed as shown in fig. 5-1.

The spare stylus wire is coiled around the frame, and may be pulled out with a pair of pliers as shown in fig. 5-2.
Carefully pull the wire out to a length of 10 - 12 millimeters, and push the stylus back into it's holder on the stylus belt.

Fig. 5-1. Removing the Recording Stylus.

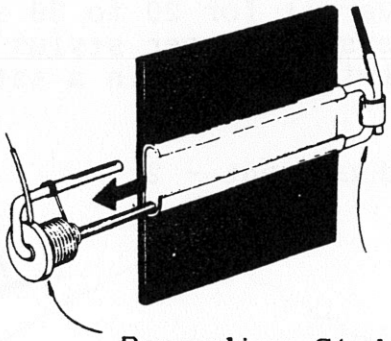
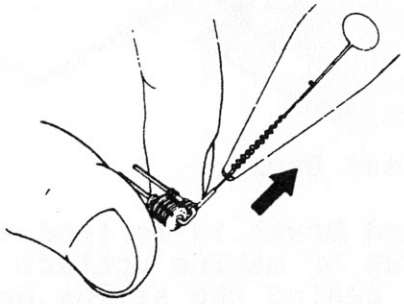


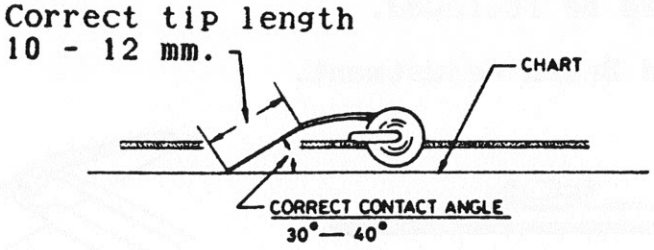
Fig. 5-2. Pulling out Stylus Wire.



NOTE.
The stylus adjustment will make it necessary to readjust the zero line position. Refer to Paragraph 3-7.

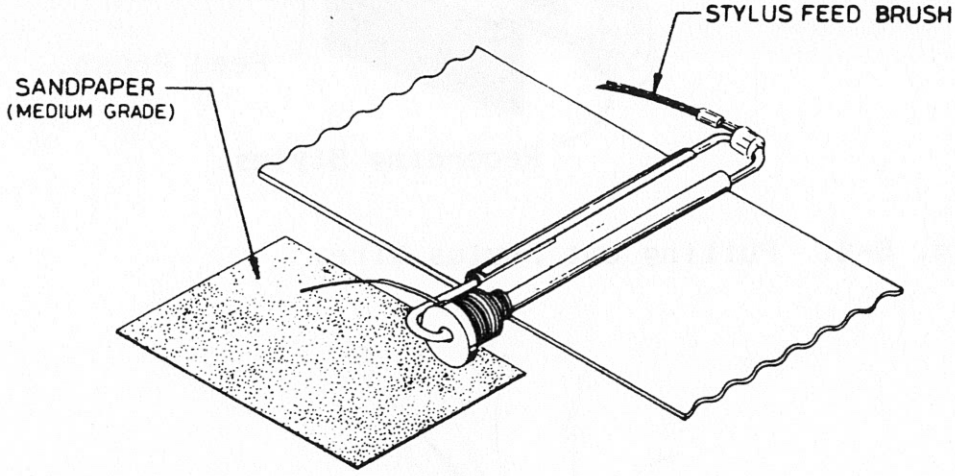
Make sure that the wire is contacting the recording paper at an angle of 30 to 45 degrees, as shown in fig. 5-3. If necessary, the wire may be bent gently.

Fig. 5-3. Stylus Adjustment - 1.



After stylus adjustment, or when a new stylus has been installed, it is recommended that a piece of medium grade sandpaper is placed on the recording paper and allow the stylus to be run over it for 20 to 30 seconds in a shallow range. This will ensure proper stylus action against the recording paper, helping to obtain a satisfactory recording.

Fig. 5-4. Stylus Adjustment - 2.



-5. Adjusting the Stylus Feed Brush.

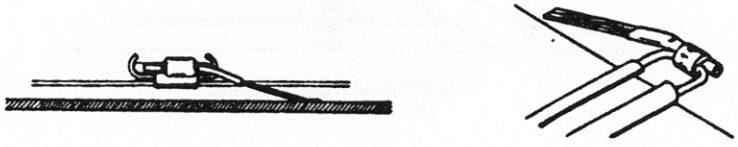
The function of the Feed Brush is to feed the receiver output to the recording stylus by making contact with the receiver output feed plate just behind the stylus belt. Faulty contact with the feed plate will cause intermittent recordings and failure to record weak signals.

By turning the stylus belt by hand, it can be checked that most of the brush wires are touching the feed plate while the recording stylus is on the paper. If the brush has been worn out to the extent that only some of the wires are touching the plate, the feed brush must be adjusted or changed.

Remove the worn brush from the belt, and carefully bend the metallic sleeve that binds the wires, using a pair of pliers so that most of the wires are again touching the feed plate.

When a new feed brush is installed, the same adjustment procedure should be followed.

Fig. 5-5. Feed Brush Adjustment.



-6. Lubricating the Moving Parts.

In order to ensure trouble-free recorder performance, some of the moving mechanical parts should be lubricated at regular intervals, using high quality oil specified for use in precision instruments. Sewing machine oil or Three-In-One oil may be used.

Refer to fig. 5-6. A single drop of oil every 2 to 3 months will be sufficient. Oil overflow on the rubber roller must be wiped off.

Refer to fig. 5-7. These parts should be lubricated every 4 to 5 months with either oil or grease, to prevent possible corrosion as well as to ensure smooth action.

Fig. 5-6. Lubrication of Moving Parts - 1.

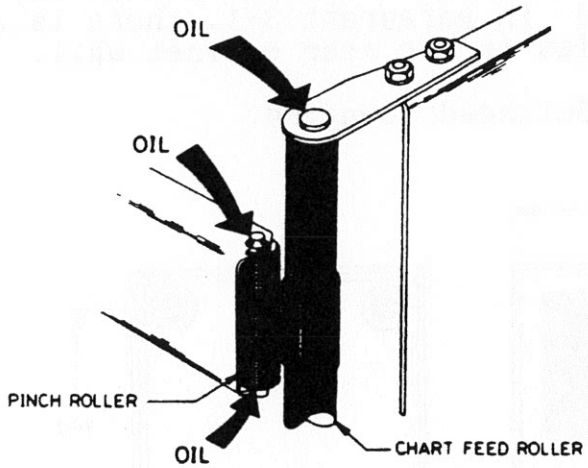
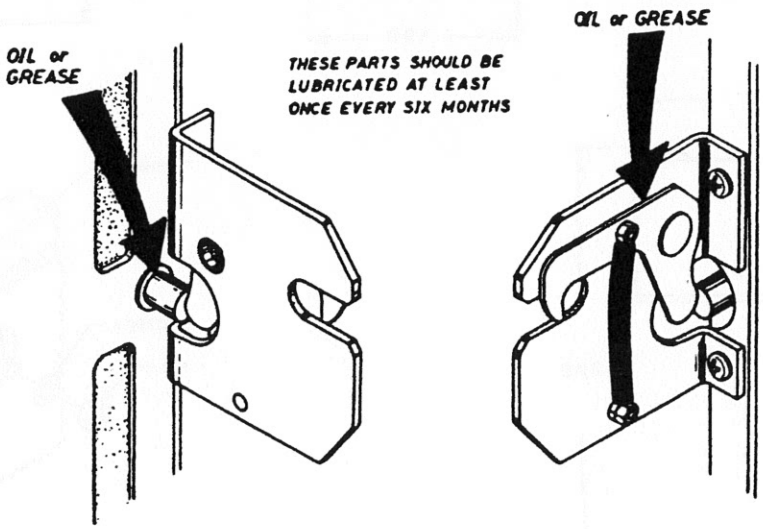


Fig. 5-7. Lubrication of Moving Parts - 2.



6. INSTALLATION INSTRUCTIONS.

-1. Recorder Installation.

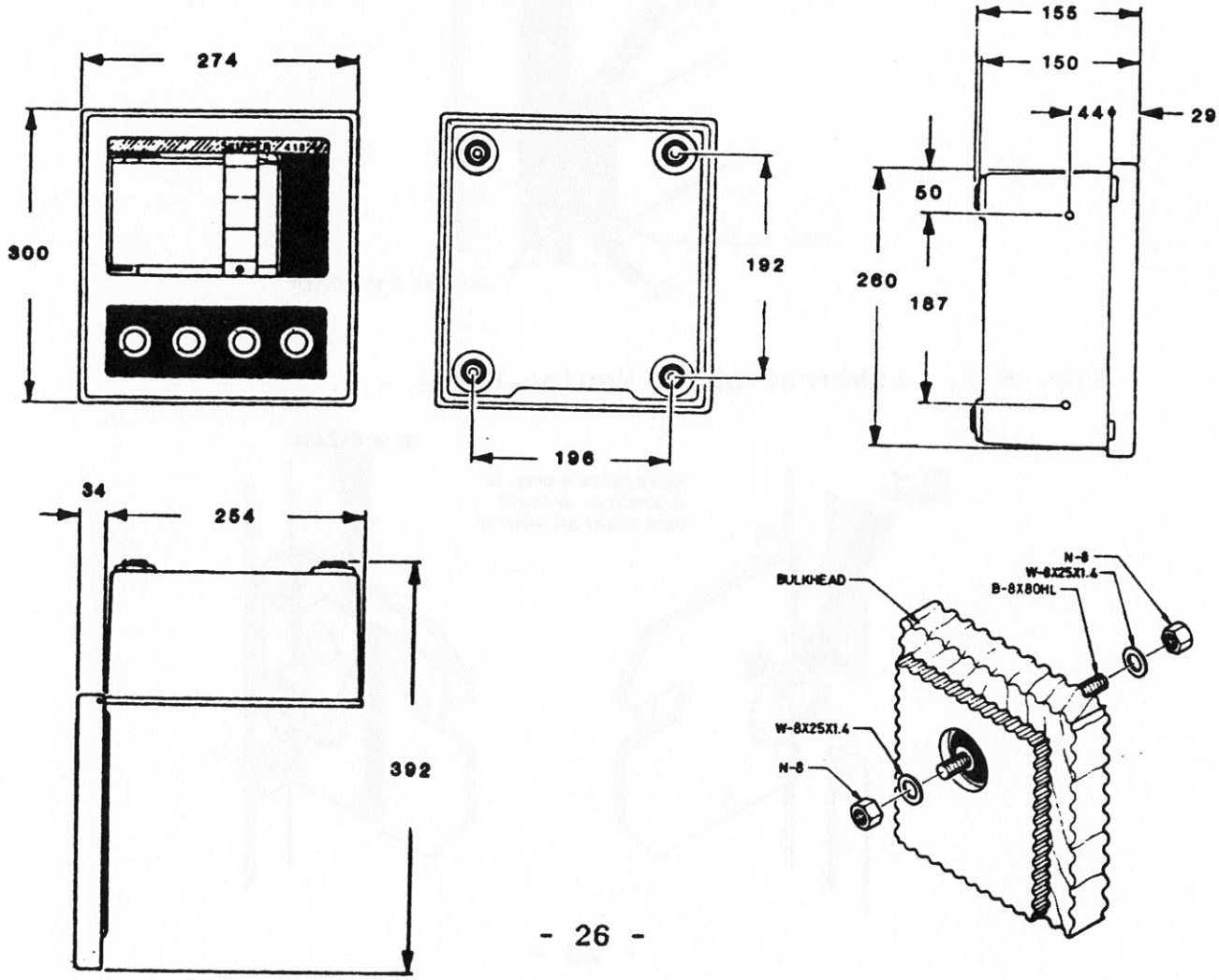
The SKIPPER 418 Recorder unit should be installed in a position where it is easy to observe. The room should be dry and ventilated. Areas where heavy shocks or vibrations are present or where extremely high temperatures may occur must be avoided.

The recorder unit can be installed in two ways.

A: Bulkhead Mounting.

The SKIPPER 418 is supplied with a bulkhead mounting kit as standard equipment. The kit contains four threaded studs, eight nuts and flat washers. When the cabinet has been opened, and the recorder main chassis has been tilted forward as descibed in paragraph 3-1, there is access to the four mounting holes in the rear cabinet wall.

Fig. 6-1. Bulkhead Mounting.



B: Panel Mounting.

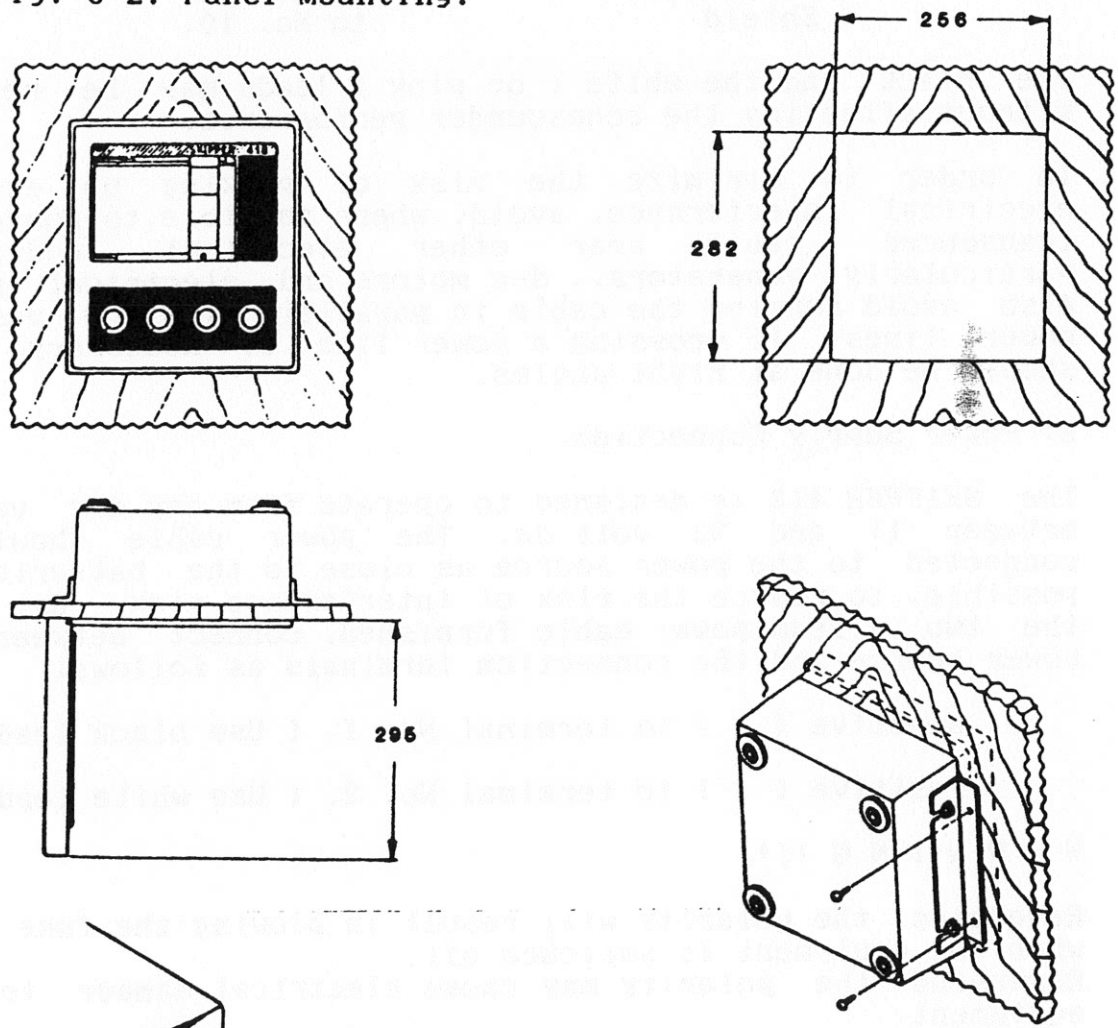
For panel mounting, find the four holes located on the sides of the cabinet, and remove the plastic plugs. Referring to fig. 6-2, cut a suitable hole in the panel, and install cabinet using a panel mounting kit consisting of two brackets as shown on fig. 6-2. Screws, nuts and washers must be obtained from the shipyard.

The following factors should be considered:

The thickness of the bulkhead and the cabinet's weight.

The strength of the panel for supporting the cabinet under the conditions of vibration or shock which will occur during operation of the vessel.

Fig. 6-2. Panel Mounting.



-2. Electrical Connections.

Electrical connections to the SKIPPER 418 must be made at the connection terminals located just above the cable entry grommets. The transducer cable enters through the right hand grommet, and the power cable through the left hand grommet. The center grommet is to be used for grounding cable or for optional connections. Fig. 6-3 shows the SKIPPER 418 wiring instructions.

A: Transducer Connections.

For connection of the transducer use terminals no.10, 11 and 12. Using the screws provided, securely connect the cable leads and shield to the terminals as follows.

White (or pink) lead to No. 11.
Black lead to No. 12.
Shield to No. 10.

The black and the white (or pink) leads may be reversed without affecting the echosounder performance.

In order to minimize the risk of picking up external electrical interference, avoid, where possible, to route the transducer cable near other electrical equipment, particularly generators, d-c motors and electrical pumps. Also avoid running the cable in parallell with the vessel's power lines. If crossing a power line is necessary, this should be done at right angles.

B: Power Supply Connection.

The SKIPPER 418 is designed to operate from any d-c voltage between 11 and 32 volt dc. The power cable should be connected to the power source as close to the batteries as possible, to reduce the risk of interference pick - up. Using the two - lead power cable furnished, connect between the power source and the connection terminals as follows:

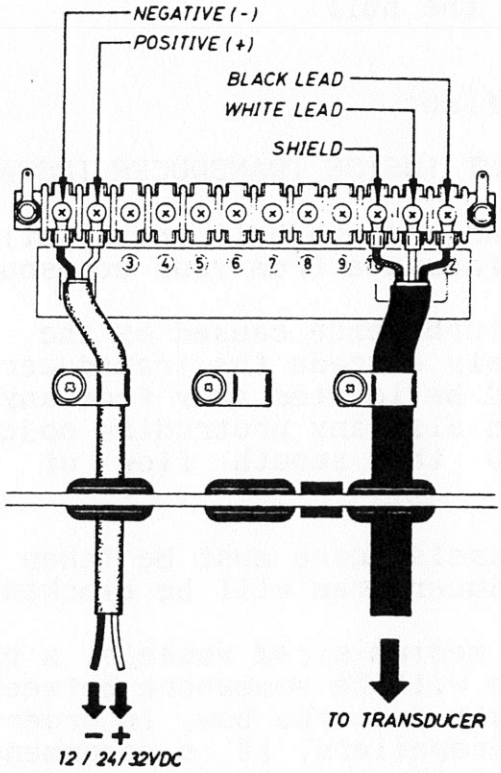
Negative (-) to terminal No. 1. (Use black lead).

Positive (+) to terminal No. 2. (Use white lead).

W A R N I N G !!!!

Reversing the polarity will result in blowing the fuse even when the equipment is switched off.
Reversing the polarity may cause electrical damage to the equipment.
The ground line of the electronic circuits is insulated from the recorder cabinet at DC level. Thus the echosounder may be powered by both positive and negative ground supply systems.

Fig. 6-3. Electrical Connections.



C: Ground Requirements.

The SKIPPER 418 has been designed to operate without grounding of the cabinet, providing the a.m. cable routing precautions have been taken. However, in some cases, interference will be evident at high gain settings, and it may be necessary to ground the cabinet to the vessel's ground line to correct the problem. In such cases, connect terminal No. 10 to the nearest grounding point in the vessel, using as heavy and short wire as possible.

NOTE: Terminal no. 10 is directly connected to the cabinet, and is insulated from the equipment's negative line.

-3. Transducer Installation.

No matter how sophisticated the equipment may be, the performance of the SKIPPER 418 will largely depend on the location of the transducer and how it has been installed. Careful consideration should be given to selecting the mounting location and deciding the type of installation most suitable for just this vessel.

On some types of vessels it is possible to mount the transducer in a "well" inside the hull, if the echosounder will be used for navigation purposes only. One must, however, consider a massive signal loss when transmitting and receiving through the hull.

When looking for fish:

FORGET ABOUT INSIDE TRANSDUCER INSTALLATION!!!!!

We always recommend through hull installation if you want the best possible performance from your echosounder.

Air bubbles and turbulence caused by the vessel's movement may most seriously degrade the transducer efficiency. The transducer should be located away from any water intake or discharge line and also any protruding objects along the hull that may disturb the smooth flow of water across the transducer face.

On deep-keeled vessels, care must be taken to ensure that no part of the transducer beam will be blocked by the keel.

On most small and medium-sized vessels, a practical choice of mounting location will be somewhere between 1/2 and 1/3 of the vessel's length from the bow. In order to minimize the noise from the propellers, it is recommended to mount the transducer so that the transducer face is inclined forward approximately 5 degrees to the vertical. Levelling blocks should be designed to meet this requirement. Fig. 6-4 shows the recommended mounting location and transducer inclination.

Fig. 6-4. Recommended Transducer Location.

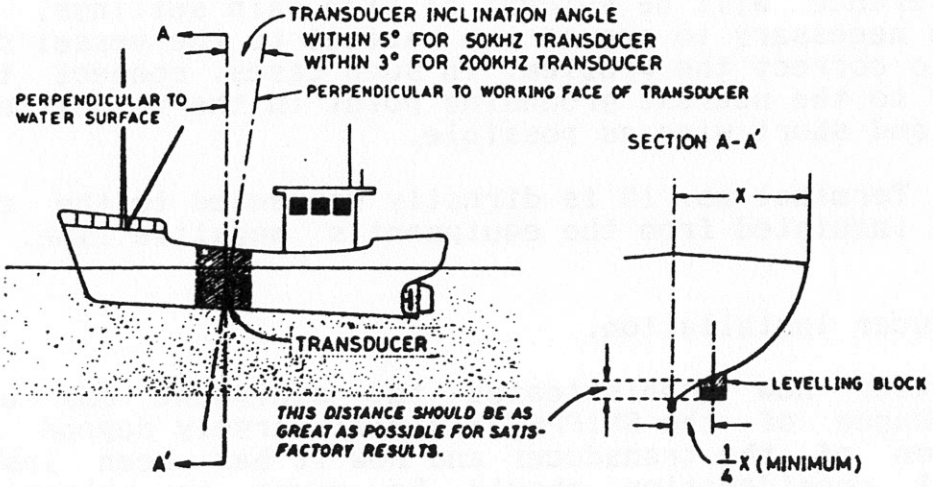


Fig. 6-5. Transducer Dimensions.

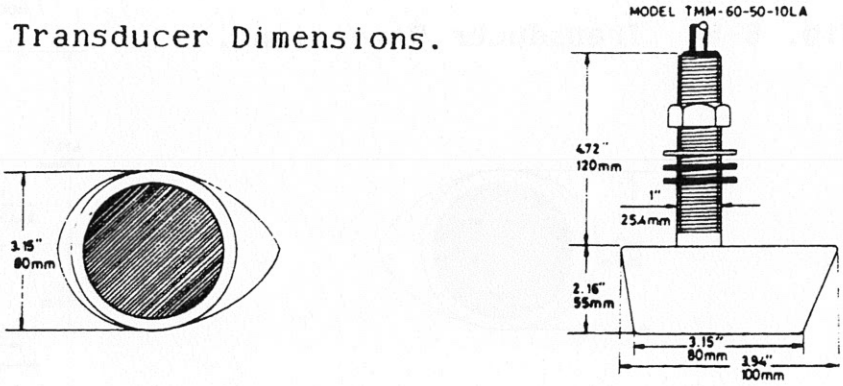
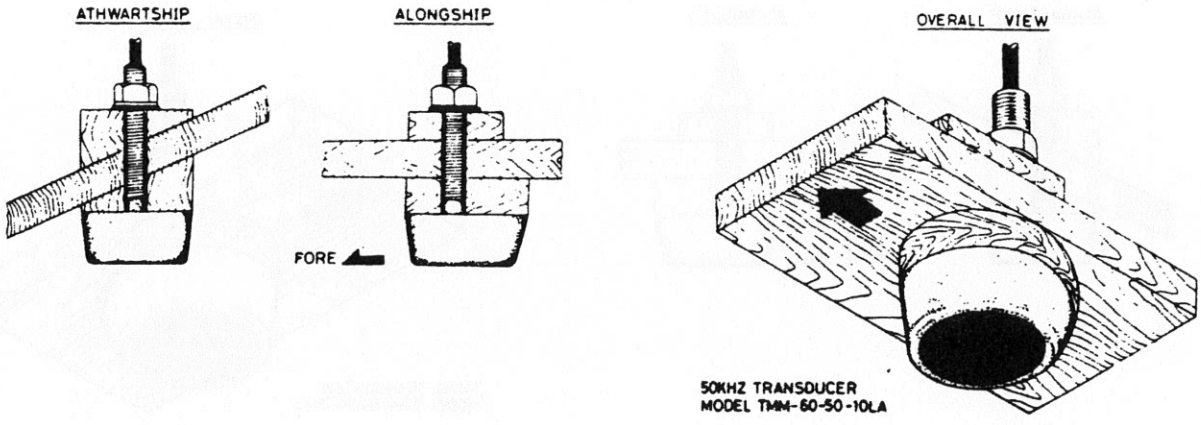


Fig. 6-6 shows a typical through - hull installation in a wooden vessel. The levelling blocks are normally prepared by the shipyard. Any gaps between the block and the hull or transducer should be filled in with mastic, and the entire surface be made as smooth as possible to ensure an undisturbed flow of water over the transducer face.

Experience shows that the transducer performs best when it protrudes the most possible from the hull. Normally a protrusion of 60 to 100 millimeters will be possible.

Fig. 6-6. Typical Through-hull Installation on Wooden Vessel.



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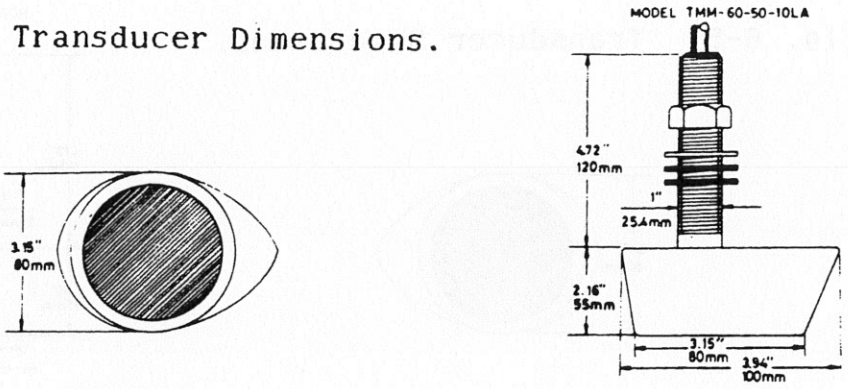

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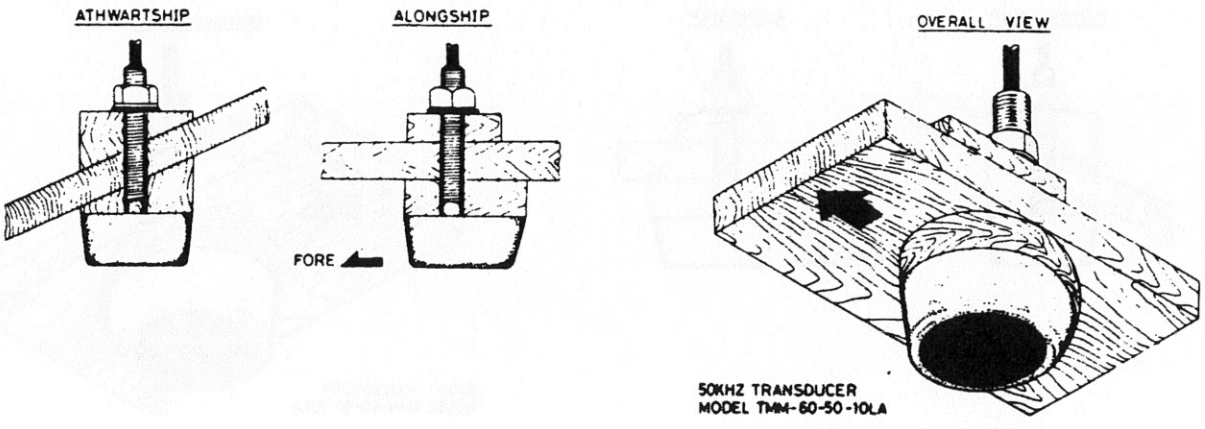

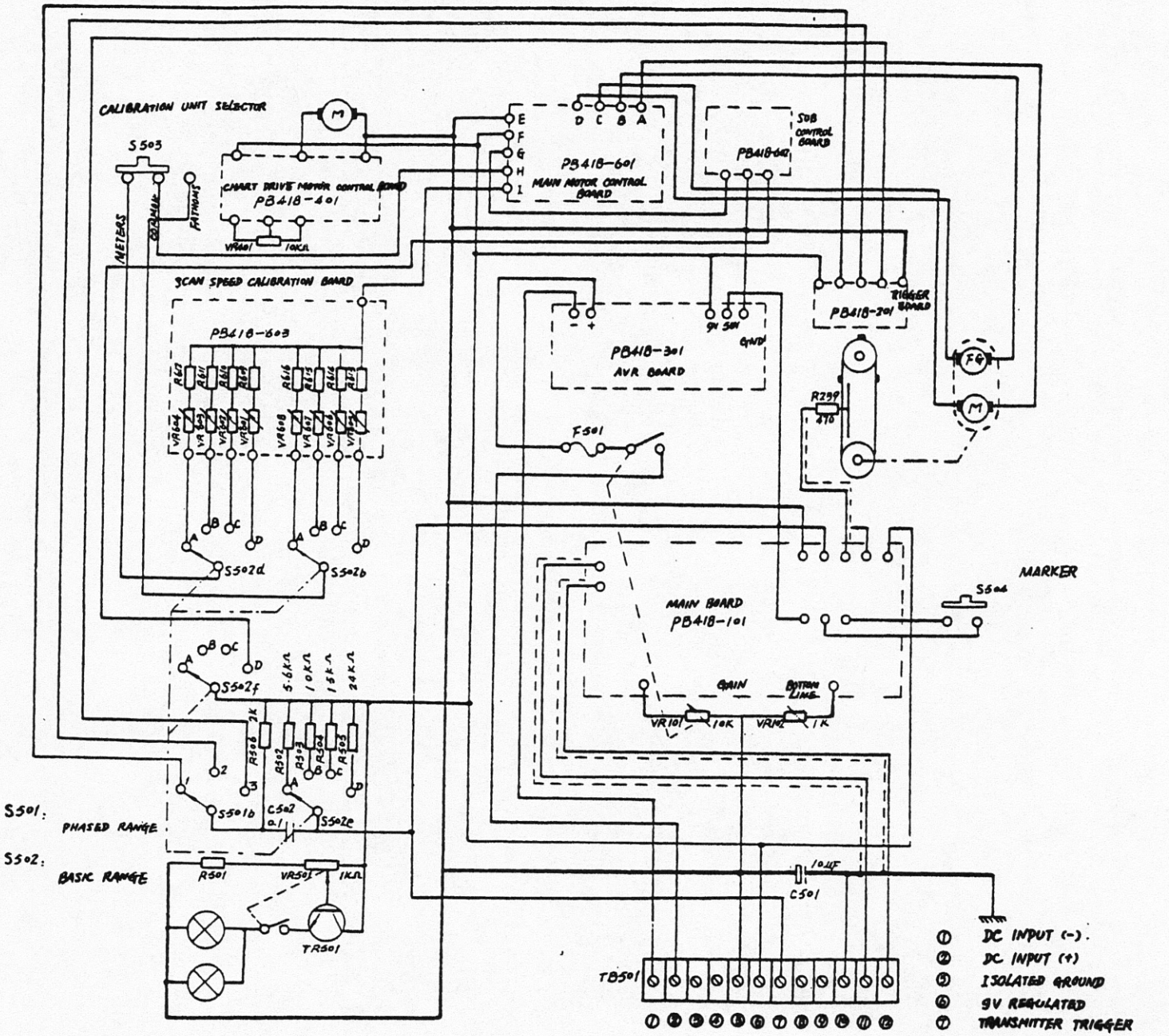

SKIPPER 418 MAIN CONNECTION DIAGRAM