

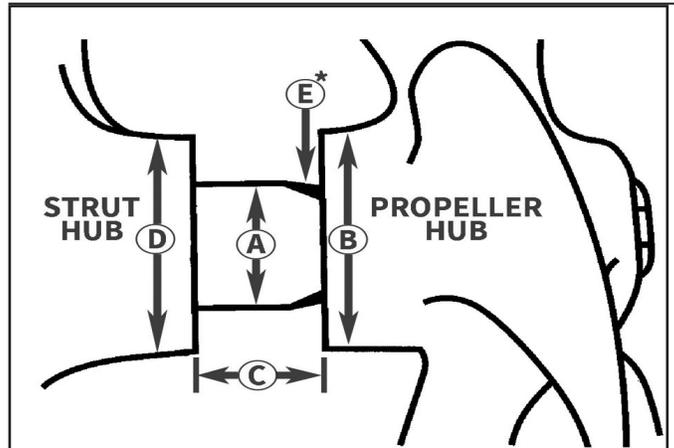
DANGER: SHARP CUTTER BLADES!!!

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SIZING CHART • CUTTER DIMENSIONS (APPROX. WITHIN 1/16") • DECIMALS/METRIC					
MODEL TYPE	SHAFT DIAMETER	CUTTER HUB DIA.	CUTTER OVERALL LENGTH	CUTTER WIDTH	MIN. SPACE TO INSTALL
A	3/4", 7/8", 1", 1-1/8", 1-1/4" 20 mm - 30 mm	2" 51 mm	4" 102 mm	15/16" 24 mm	1-1/8" 30 mm
B	1", 1-1/8", 1-1/4", 1-3/8" 1-1/2" 20 mm - 40 mm	2-5/8" (2.625) 67 mm	5" 123 mm	1-1/16" 27 mm	1-1/4" 32 mm
C	1-1/2", 1-5/8", 1-3/4", 1-7/8", 2" 40 mm - 50 mm	3-3/8" 86 mm	6" 152 mm	1-3/8" 35 mm	1-9/16" 39 mm
D	1-1/2", 1-3/4", 2", 2-1/4", 2-1/2" 40 mm - 60 mm	3-7/8" 98 mm	6-3/4" 171 mm	1-7/16" 36 mm	1-5/8" 41 mm
E	2", 2-1/4", 2-1/2", 2-3/4", 3" 50 mm - 75 mm	4-3/8" 110 mm	7-5/8" 194 mm	1-1/2" 37 mm	1-11/16" 43 mm
F	2-1/4", 2-1/2", 2-3/4", 3", 3-1/2" 60 mm - 90 mm	5-1/2" 140 mm	10" 254 mm	1-9/16" 40 mm	1-3/4" 45 mm
F1	3", 3-1/2", 4", 4-1/2" 75 mm - 115 mm	6-1/2" 165 mm	11" 280 mm	1-3/4" 40 mm	2" 50 mm
F2	3", 3-1/2", 4", 4-1/2", 5", 5-1/2" 75 mm - 140 mm	7-7/8" 200 mm	13-1/2" 343 mm	1-11/16" 43 mm	2" 50 mm
F3	4", 4-1/2", 5", 5-1/2", 6", 6-1/2", 7" 100 mm - 175 mm	9-1/2" 241 mm	15-3/4" 400 mm	1-7/8" 48 mm	2-1/8" 54 mm

\* CUSTOM SIZES AVAILABLE UPON REQUEST.

## MEASUREMENTS NEEDED FOR ORDERING AND INSTALLATION:



(MEASURE WITH CALIPER OR MICROMETER)

A) Shaft Diameter: \_\_\_\_\_

B) Propeller Hub Diameter: \_\_\_\_\_

C) Space Between Prop. & Strut /Stern Brg:

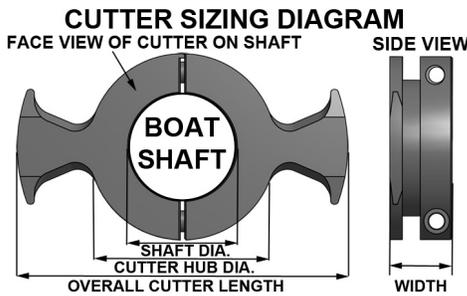
Stbd. \_\_\_\_\_ Port \_\_\_\_\_

D) Stern Tube or Strut Hub Diameter: \_\_\_\_\_

E) Length of Exposed Taper (\*if any)

Stbd. \_\_\_\_\_ Port \_\_\_\_\_

(MEASURE LENGTH OF EXPOSED TAPER FROM PROP FACE)



## INSTALLATION PROCEDURE

### STEP 1



PHOTO #1

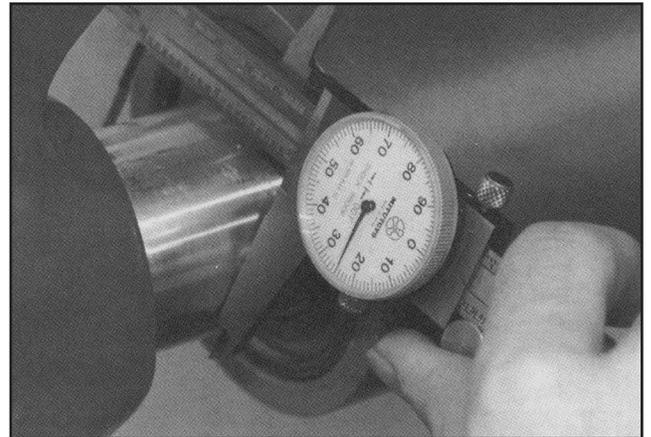


PHOTO #2

- Scrape and clean shaft thoroughly (use emery tape). (PHOTO #1).
- Use a dial caliper to determine where taper (if any) ends from propeller hub. (Cutter cannot be mounted over taper.) **MUST BE CLAMPED ON STRAIGHT SHAFT.** (PHOTO #2) For acceptable installation refer to Diagrams A, B & C on page 3.
- Also check shaft size. Shaft should measure .002 over nominal (PHOTO #2).
- In preparation for installation - disassemble cutter: (1) Loosen stationary blade screws only 1/2 way out (screws #4 on page 10). (2) Remove screws on rotating cutters.

# STEP 2

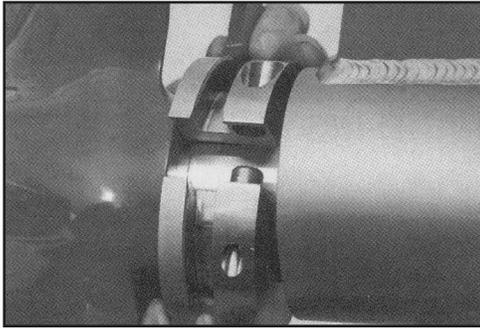


PHOTO #3

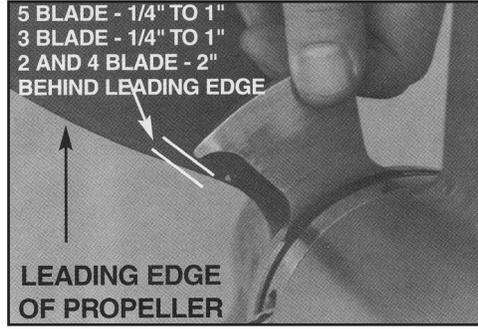


PHOTO #4

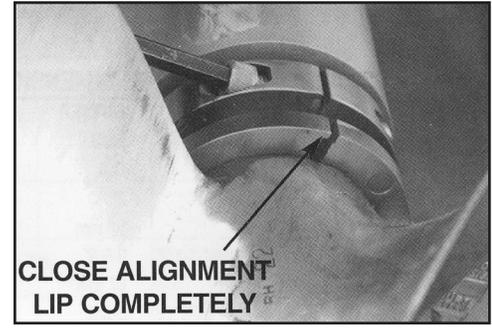


PHOTO #5

- A. Place the two shaft-mounted Rotary Cutter castings **AS CLOSE TO THE PROPELLER** as possible (cutter blade next to propeller hub) **considering exposed shaft taper**. (Photo #3). **(CANNOT CLAMP ON TAPER!!)**
- B. **3 AND 5 BLADE PROPELLER:** Position one cutter blade 1/4"-1" behind the leading edge of propeller blade; the other cutter blade will automatically be in position (Photo #4). **2 AND 4 BLADE PROPELLERS:** Position cutter blade approximately 2" behind leading edge (Photo #4).
- C. **FIRST**, tighten screw on lip side (closing alignment lip completely!) (Photo #5). This automatically aligns groove perpendicular to bore.
- D. **SECOND**, tighten opposite screw (without alignment lip). This clamps rotary cutter to shaft.

**NOTE: Only one side of Rotary Cutter has an alignment lip.** When tightened, this automatically aligns the stationary cutter groove perpendicular to the shaft bore, allowing the stationary cutter assembly to spin freely in groove without binding. **(Rotary cutter castings are paired (DO NOT INTERCHANGE) must remain as a set.)**

# STEP 3

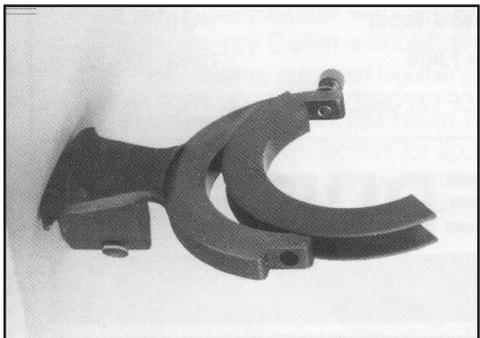


PHOTO #6



PHOTO #7



PHOTO #8

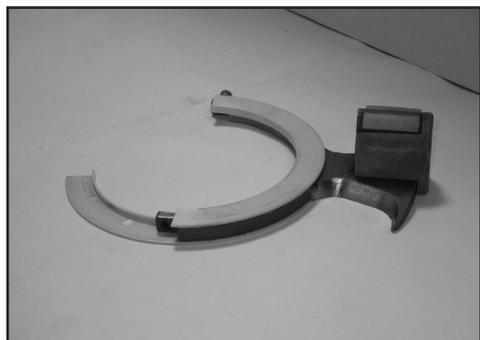


PHOTO #9 - F1, F2, F3 ONLY.

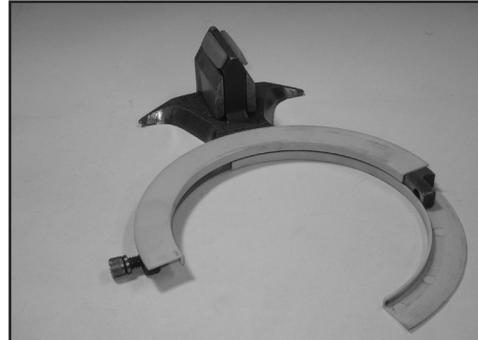


PHOTO #10 - F1, F2, F3 ONLY.



PHOTO #11

- A.
  - 1) **Mold size cutters A, B, C, D, E, F**, insert stationary cutter into U shape bearings. (Photos #6, #7 and #8).
  - 2) Insert stationary cutter with bearing into groove of mounted rotating cutters.
- A1.
  - 1) **Mold size cutters F1, F2, F3**, insert each L-shaped bearing into cutter groove. (Photos #9 and #10).
  - 2) Insert stationary cutter (with 4 side bearings in place) into cutter groove. (No longer a bottom bearing with new L-shape bearing design.)
- B. Tighten socket head cap screw with spacer/lock washer in place (Photo #11). Spacer/lock washer is necessary to keep screw from hitting bottom of bearing.

# STEP 4

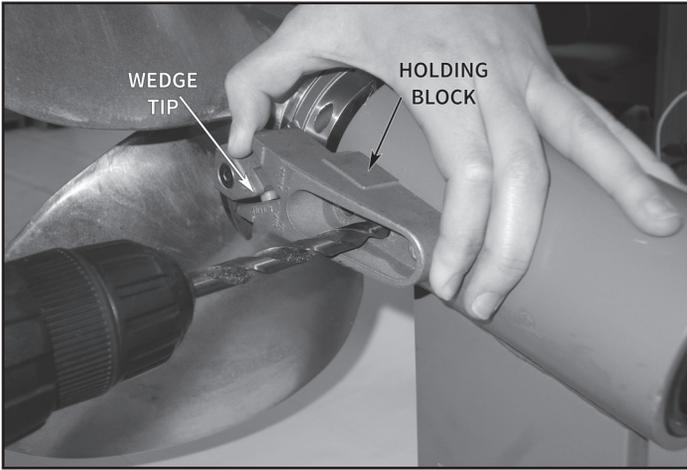


PHOTO #12

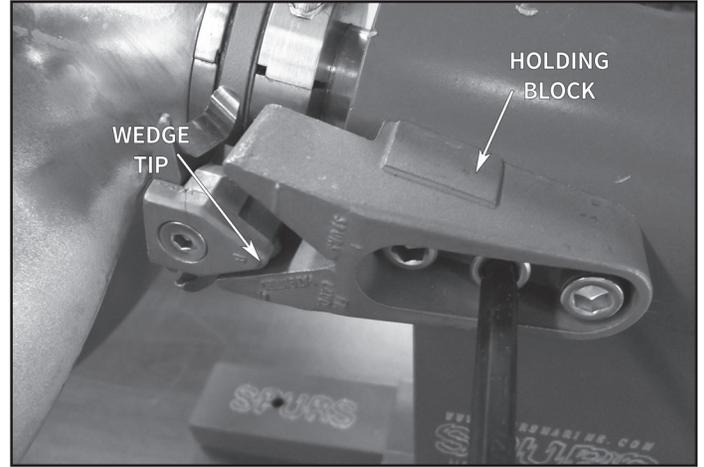
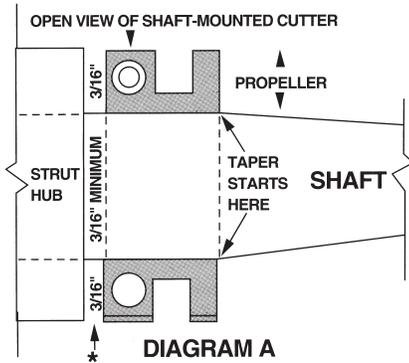


PHOTO #13

**NOTE:** Mount holding block on portside of strut with left-hand propeller and on starboard side of strut with right-hand propeller.

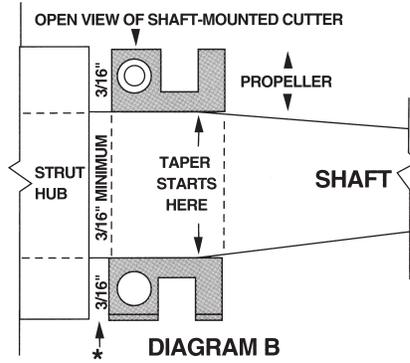
- A) Move holding block into position until wedge tip of stationary cutter is 1/2 way into V of holding block. (**Stop lines are marked on holding block**). This positioning is necessary to take up **forward and aft** shaft **end play** allowing stationary cutter to move forward and aft. (Shafts move slightly forward when vessel goes forward and slightly aft when in reverse). We refer to this as end play. (**Refer to pages 8 and 9 to confirm proper holding block size.**)
- B) **Drill and tap center hole first!** (Photos #12 and #13). Mount holding block with **one screw**. Then drill and tap other 2 holes with holding block in place.
- C) **Holding block #4, #5, #5A**  
**FIRST** - Drill and tap upper hole. **SECOND** - Drill and tap lower hole. **THIRD** - Drill and tap forward hole.

## CONSIDERATIONS WHEN SHAFT TAPER EXTENDS INTO CUTTER MOUNTING AREA



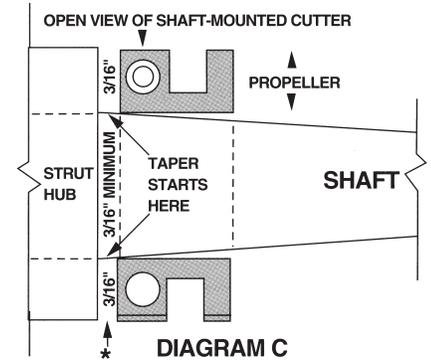
IDEAL INSTALLATION POSITION

Diagram "A" shows a straight shaft under an area where cutter is to be mounted. This will assure full clamping of cutter onto shaft.



ACCEPTABLE INSTALLATION POSITION

Diagram "B" shows part of the shaft taper under the cutter. As you can see, this allows approx. 3/4 of cutter width clamped on straight shaft; however, it gives adequate holding power for cutter.



IMPOSSIBLE INSTALLATION \*\*

Diagram "C" - Do not attempt this installation. Cutter cannot clamp on a full taper. The cutter follows the taper and causes loosening and spinning on the shaft.

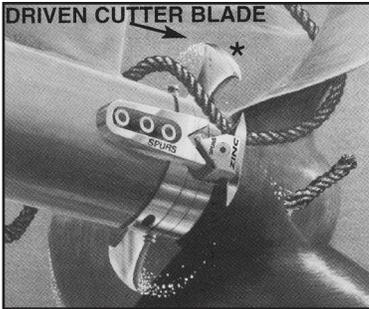
**It is impossible to clamp a cylinder onto a cone and expect it to hold.**

**\*\*NOTE: WHEN A FULL TAPER IS IN THE SPACE WHERE THE CUTTER IS TO BE INSTALLED, THERE ARE OTHER OPTIONS: (1) CUT A RING FROM STRUT BOSS OR (2) INSTALL A "SPURS" SPACER BETWEEN TRANSMISSION AND SHAFT FLANGES. (REFER TO SPECIAL CONDITIONS ON PAGE 5).**

**\* ALLOW MINIMUM OF 3/16" BETWEEN STRUT AND LINE CUTTER FOR END PLAY AND WATER FLOW. (WHEN THERE IS EXCESSIVE END PLAY OR LOOSE MOTOR MOUNTS, ALLOW MORE SPACE ACCORDINGLY.)**

**"F" SERIES CUTTERS - When possible mount block on top of strut.**

# POSITIONING DIAGRAMS OF SPURS CUTTER BLADE IN RELATION TO PROPELLER BLADES

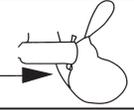


**CUTTER OPERATION**  
The leading edge of the propeller blade draws the line into the cutting blades making positioning of driven cutter blade (\*) important.

## DIRECTIONS:

- 1) Looking aft, position edge of cutter blade slightly behind leading edge of propeller.
- 2) Cutter will cut in any position; however, it becomes more efficient when positioned correctly.
- 3) Positioned correctly, cutter will also be more efficient when reverse cut is made.

**ALL PROPELLERS ARE VIEWED LOOKING AFT**



**CUTTER BLADE POSITIONING** with reference to the **PROPELLER BLADES**

Arrows on propeller blades below point to leading edge of propeller. **VIEWED LOOKING AFT.**

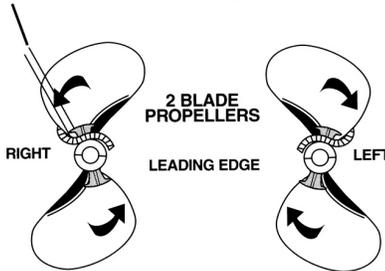
## EXAMPLE OF WRONG CUTTER BLADE LOCATION



**WRONG**

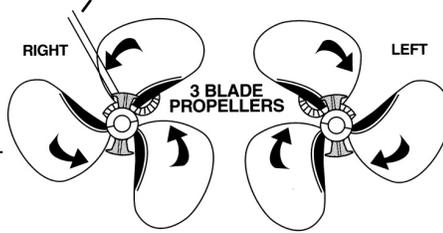
When the cutter blade is forward of propeller blade, the line will lay on top of cutter blade during this revolution of propeller. It will not be cut until next revolution

Position 10 degrees behind leading edge

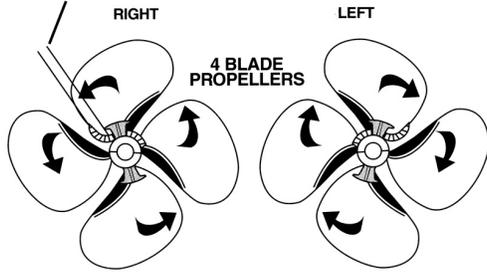


Position cutters as shown.

Position 5-7.5 degrees behind leading edge



Position 10 degrees behind leading edge



Position cutter blades midway between propeller blades.

## 5 BLADE PROPELLERS:

Position (1) cutter blade 1/4" to 1" behind the leading edge of propeller blade; the second cutter blade will fall on the leading edge; however, cutting will not be affected.

## DRILL AND TAP SIZING CHART

Table of drill and tap selections necessary to drill and tap holes for mounting holding block to strut or stern tube.

SCREW SIZE	TAP DRILL SIZE	TAP SIZE
5/16 x 18	17/64 or F or I-.257-.272	5/16 x 18
3/8 x 16	5/16 or P-.312-.323	3/8 x 16

STEP 1: Use regular starter tap.

STEP 2: For shallow holes, use a bottoming tap to complete threads to bottom of drill hole.

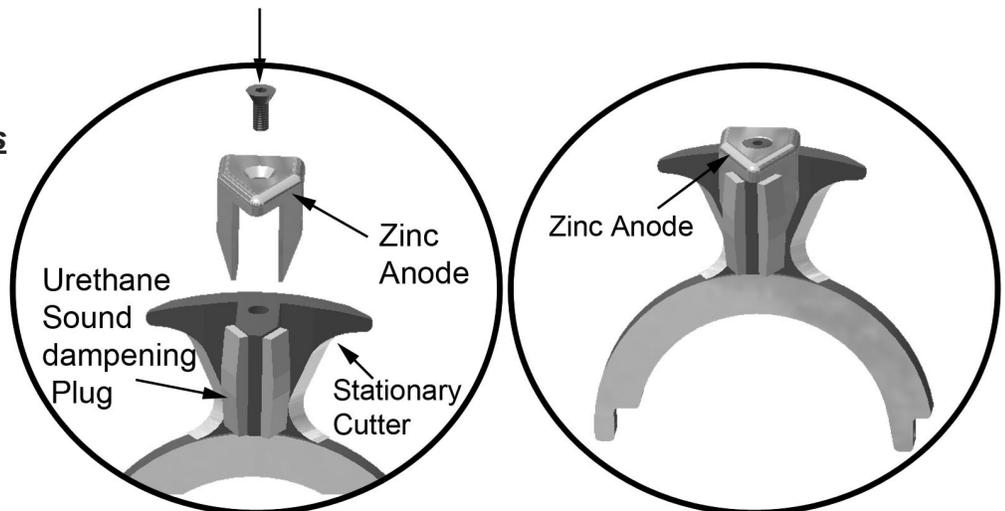
## ELECTROLYSIS PREVENTION AND SOUND DEADENING FOR STATIONARY CUTTER ASSEMBLY.

To prevent electrolysis, a zinc has been installed on the stationary cutter assembly and must be replaced as necessary.

(Stationary cutter is isolated)  
**THE DRIVEN CUTTER PORTION OF THE CUTTER ASSEMBLY IS CLAMPED TO THE SHAFT AND GETS ITS ELECTROLYSIS PROTECTION FROM SHAFT ZINC OR PROP NUT ZINC.**

## ZINC ANODE INSTALLATION

10 X 32 X 1/2 FLAT HEAD SOCKET SCREW      CAP ZINC ANODE IN PLACE



**REINSTALL:** Lower zinc anode over stationary cutter blade and screw down tightly. Use hammer; tap to set zinc, then re-tighten screw.

# INSTALLATION FOR SPECIAL CONDITIONS

PHOTO #14

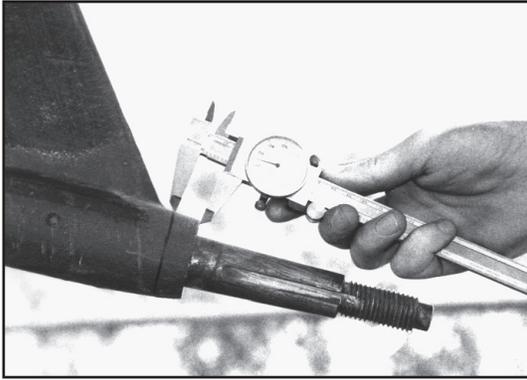


PHOTO #15

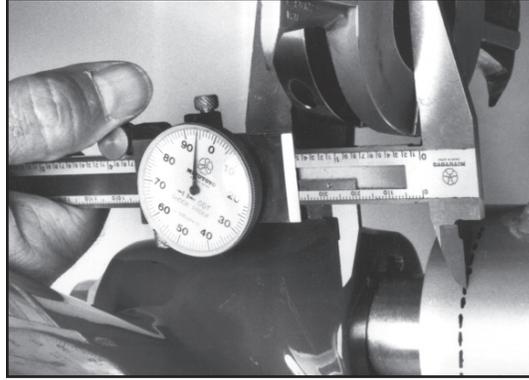


PHOTO #16

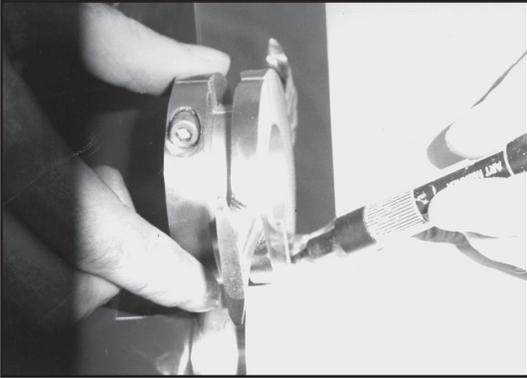
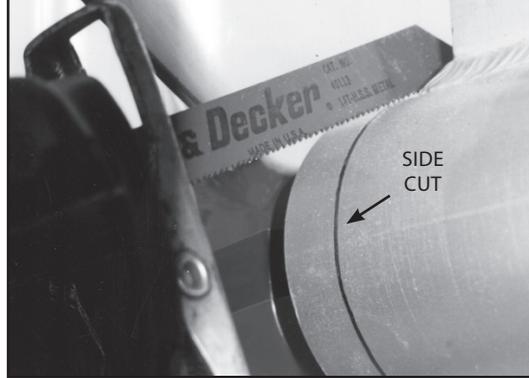


PHOTO #17



## CONDITION 1

### When space between propeller and strut is too narrow to mount cutter:

**OPTION 1:** Removal of a ring from strut boss the width necessary to allow enough space for mounting cutter, including any end play. Procedure is as follows:

- Scribe a ring around strut allowing space for cutter and end play (Photos #14, #15 and #16).
- Cut strut through bearings stopping at rubber; using a knife, cut through rubber and remove ring. Make a side cut before a complete cut when propeller is not removed (Photo #17).
- Remove ring and follow installation instructions.

**OPTION 2:** Install SPURS® Spacer between transmission and shaft flange. A 1" spacer will lengthen shaft allowing an additional 1" for cutter to be installed. (Photo #18).

**SPURS® Spacers are available through Spurs Marine:**

**Contact us for sizing. We will need the Make and Model # of your transmission.**

**SPURS® Spacers are solid steel, machined parallel within .001 and are electroless nickel plated.**

PHOTO #18

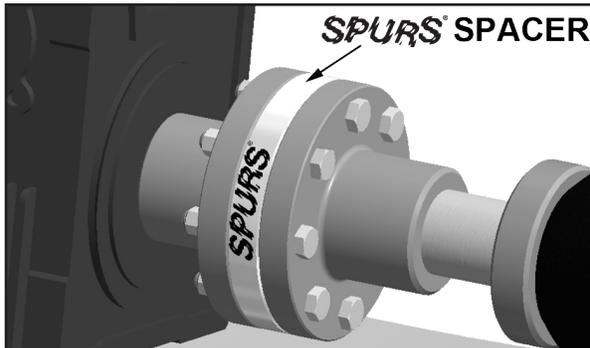
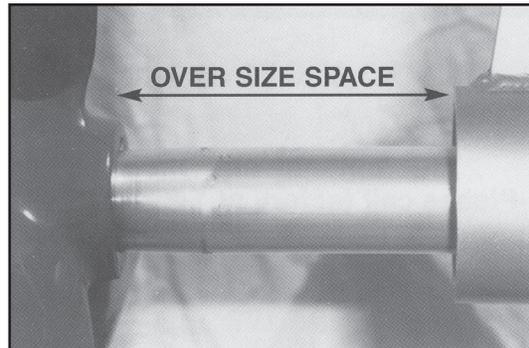


PHOTO #19



## CONDITION 2

### Too much space between propeller and strut or stern tube:

(Photo #19). Contact manufacturer for special instructions. When a vessel with an unusual arrangement is encountered, send drawings for factory installation assistance. A zinc collar between propeller and cutter will act as a filler.

# INSTALLATION REQUIREMENTS FOR FIBERGLAS STRUT!

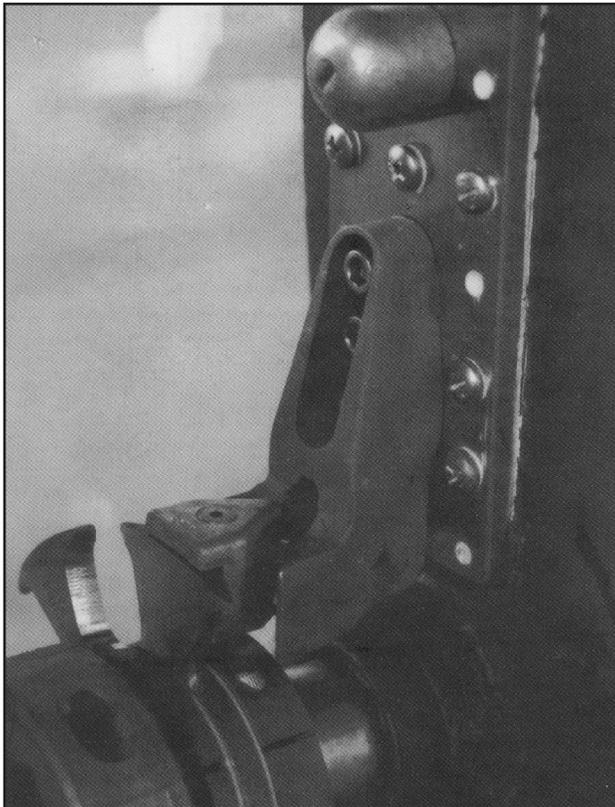
Fiberglas will not support screws drilled and tapped into it. The shearing force of a line cut is too great; therefore, the screws that hold the holding block will pull out.

We recommend when installing the holding block onto fiberglas that a metal plate, approximately 1/4" thick, be embedded into the fiberglas. The plate can be stainless steel or aluminum.

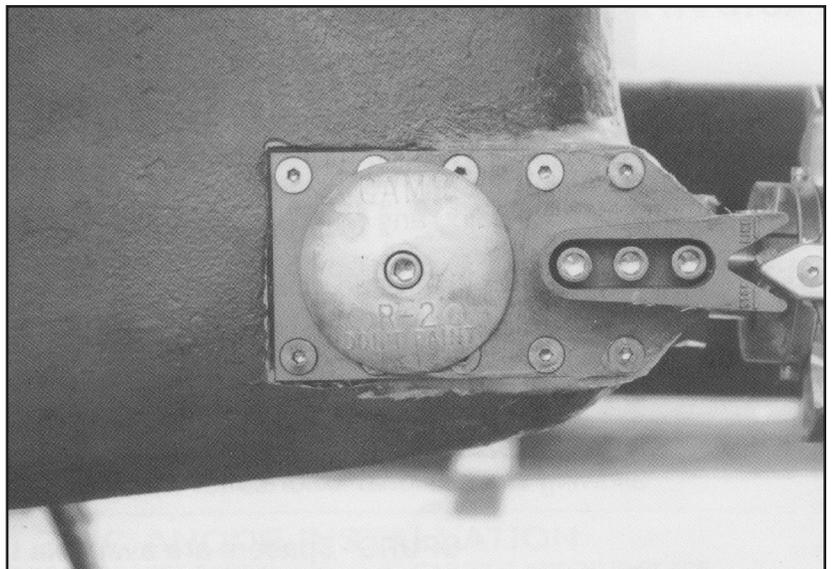
- 1) The installation is achieved by first measuring to determine the depth required, then routing away the glass to receive the plate. Using stainless steel flat head screws and epoxy, mount the plate into the routed area.
- 2) Drill and tap into the plate and mount the holding block.
- 3) Bond the plate and holding block by screwing a small zinc anode onto the plate.

**PHOTOS BELOW ARE EXAMPLES OF A COMPLETED PLATE MOUNTED INTO FIBERGLAS.**

**PHOTO #20**



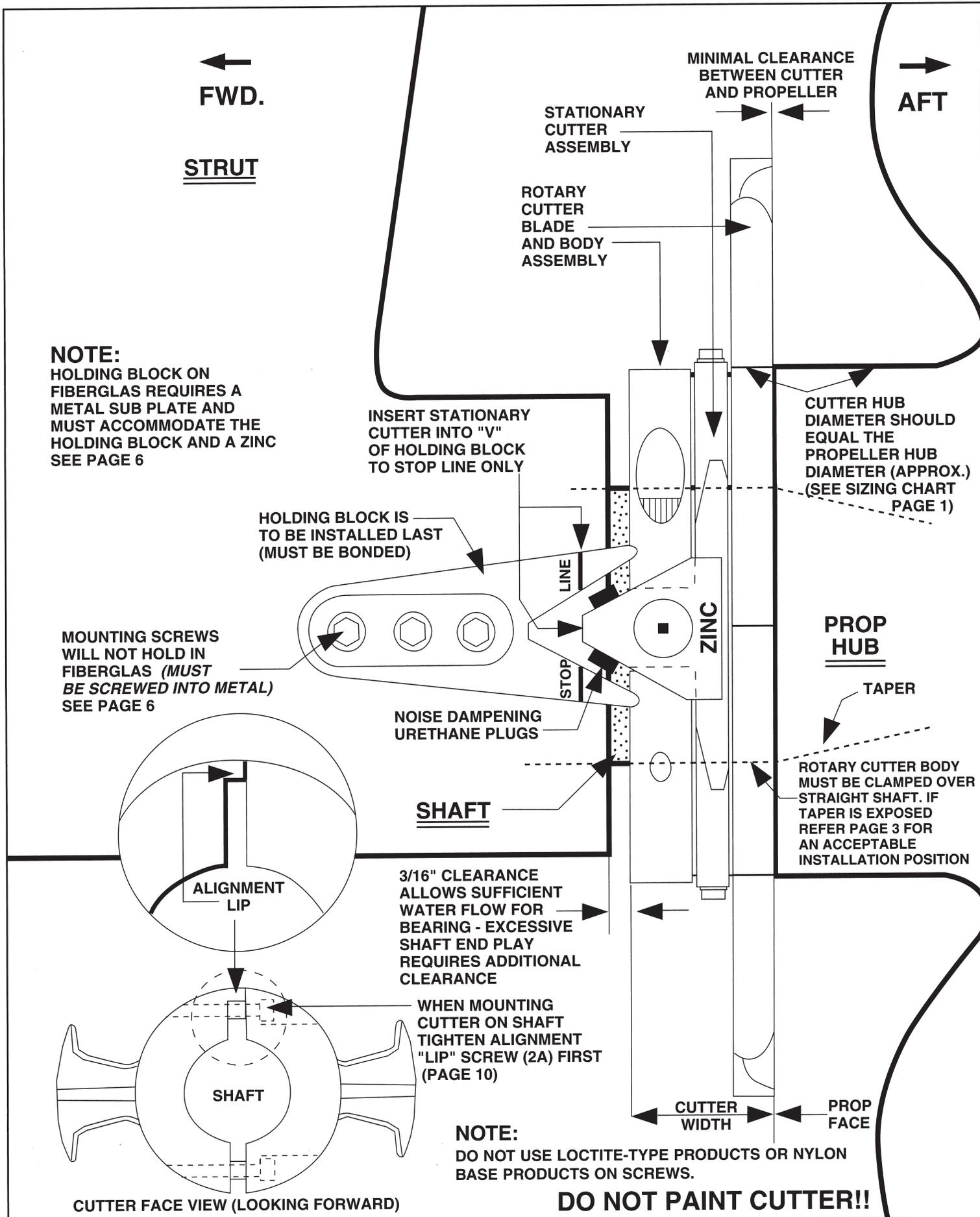
**PHOTO #21**



**PLATES ARE FABRICATED AT BOAT YARD TO SUIT INDIVIDUAL VESSELS**

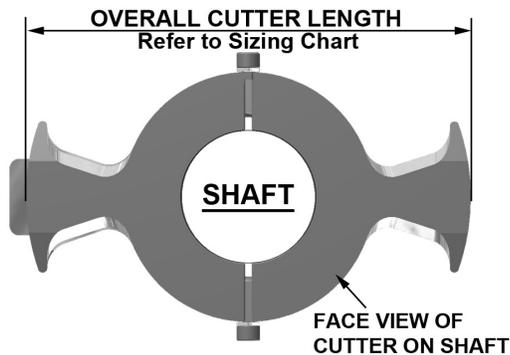
**Custom fabricated holding blocks are available as in Photo #20 (above).  
Dimensional details of vessel are required.**

# COMPLETED INSTALLATION



# HOW TO SELECT THE WEDGE HOLDING BLOCK TO FIT YOUR CUTTER:

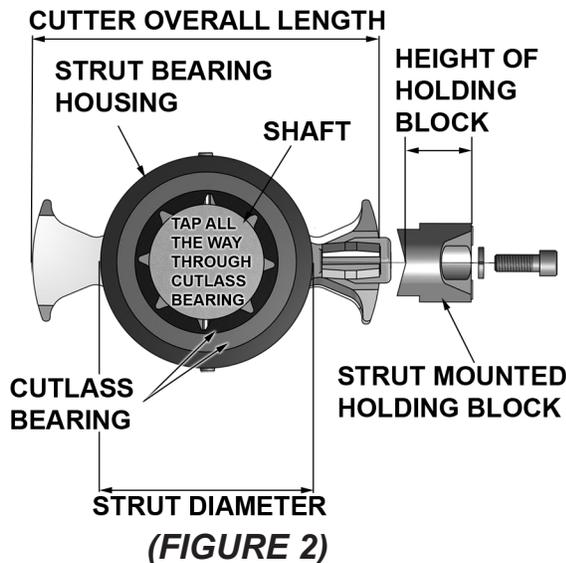
1. The Holding Block (mounted on strut or stern tube) relates to cutter mold type (selected from page 1).
2. Using the cutter mold type, refer to (Fig. 1) for overall cutter length.
3. Subtract the vessel's strut outside diameter from overall cutter length. Then  $\div 2 =$  Holding Block Height.



(FIGURE 1)

MOLD TYPE	OVERALL LENGTH	MOLD TYPE	OVERALL LENGTH
A	4"	F	10"
B	5"	F1	11"
C	6"	F2	13 1/2"
D	6 3/4"	F3	15 3/4"
E	7 5/8"		

4. Using height figure, select Holding Block from chart (Fig. 3).



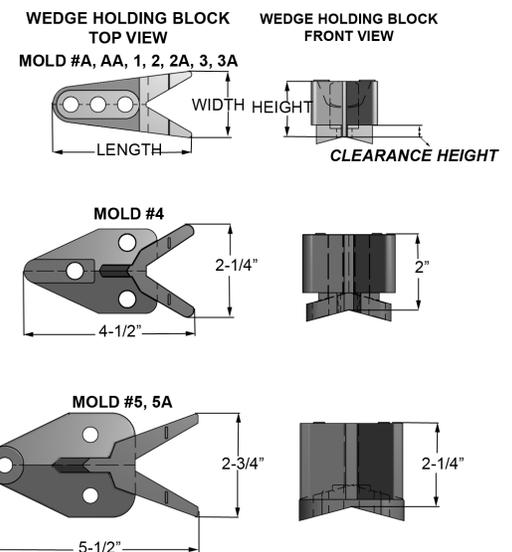
5. **FORMULA TO DETERMINE HOLDING BLOCK:**  
(as seen in Fig. 2)

Cutter overall length \_\_\_\_\_  
 Subtract strut diameter   —   \_\_\_\_\_  $\div$  \_\_\_\_\_  
 Divide by 2                   —   \_\_\_\_\_  
 Holding block height       =   \_\_\_\_\_

After the holding block height has been determined, it is an easy matter to choose the holding block mold type from chart (Fig. 3). Match the height needed to the closest height of holding block available. Use shims if needed!

WEDGE HOLDING BLOCK SIZES AVAILABLE				
MOLD TYPE	HEIGHT	CLEARANCE HEIGHT	WIDTH	LENGTH
#A	13/16"	0"	1 1/4"	3"
#AA	13/16"	1/16"	1 1/4"	3"
#1	1 1/16"	1/4"	1 1/4"	3 1/4"
#2	1 1/4"	5/16"	1 5/8"	3 3/4"
#2A	1 3/8"	1/2"	1 7/16"	3 5/16"
#3	1 1/2"	5/16"	1 11/16"	3 13/16"
#3A	1 7/8"	11/16"	1 13/16"	3 3/4"
#4	2"	7/16"	2 1/4"	4 1/2"
#5	2 1/4"	1/4"	2 3/4"	5 1/2"
#5A	3"	1/4"	2 3/4"	5 1/2"

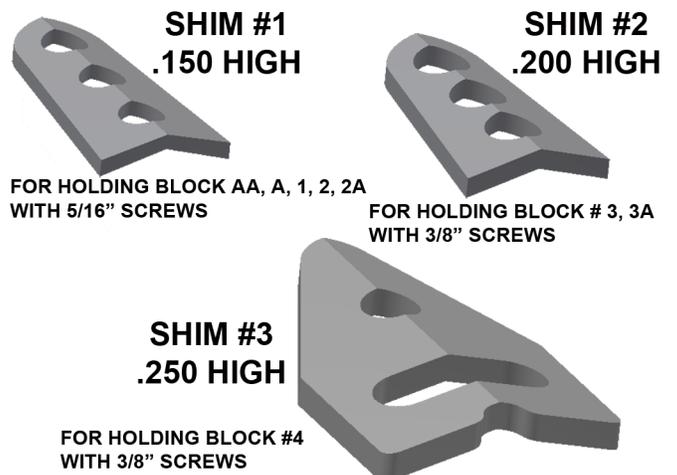
(FIGURE 3)



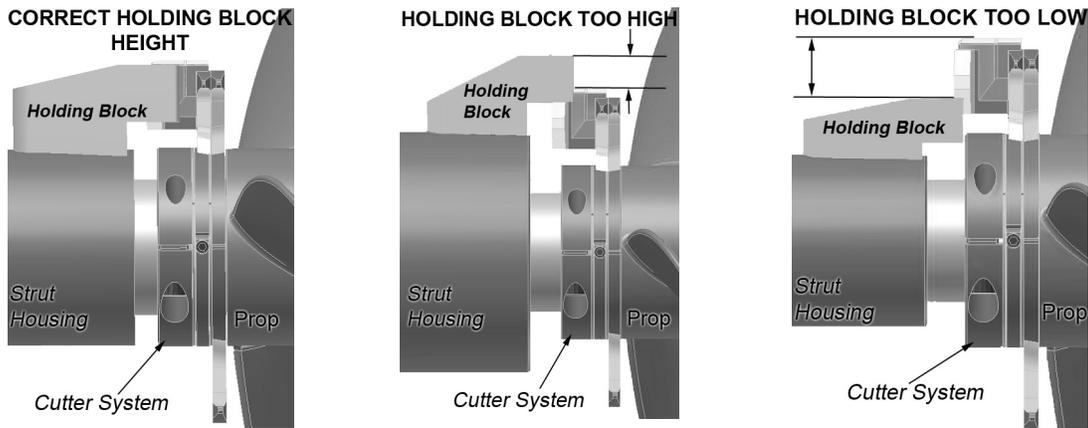
The above are actual diagrams of the wedge holding blocks that are available. In most cases, they are interchangeable with cutter of different mold types. They are selected for the best height match to secure the wedge portion of the stationary cutter.

## SHIMS

Shims are available to raise the holding block to attain a height fit (when needed). Position shim under holding block then drill and tap into place.



# EXAMPLES OF HOLDING BLOCK INSTALLATIONS:

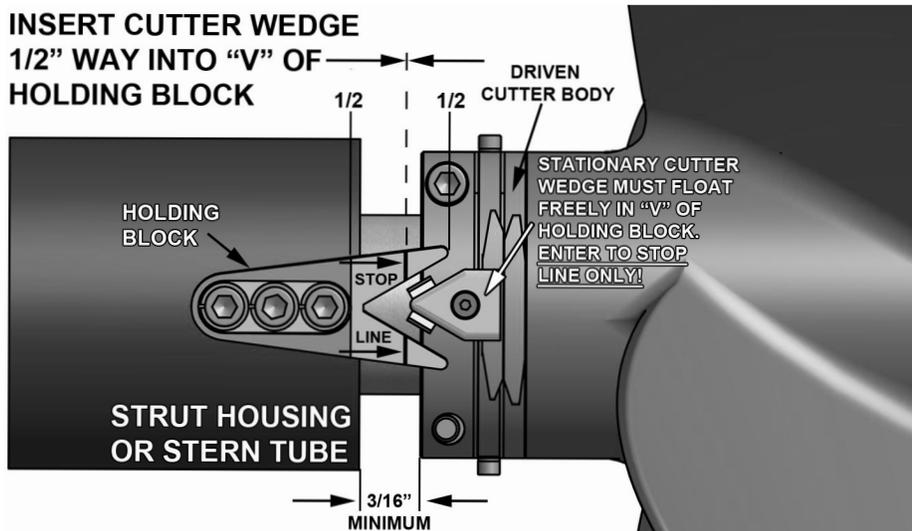


HEIGHT OF HOLDING BLOCK APPROXIMATELY EQUAL TO WEDGE HEIGHT OF STATIONARY CUTTER AFTER MOUNTED ON SHAFT.

## PURPOSE OF WEDGE HOLDING BLOCK

1. The wedge holding block, being firmly attached to the strut, provides the means for holding the corresponding wedge that makes up the forward part of the stationary cutter.
2. When a line is caught between the stationary cutting blade and the rotating cutting blade (attached to shaft), the wedge forces the two blades tightly together, overcoming the resistance of the bearing and instantly cuts the line. Normally the stationary and rotating blades never touch; they are held apart by the teflon bearing which purposely isolates the metals from wear.
3. At the instant of cut, the blades come together.

## MOUNTING THE WEDGE HOLDING BLOCK



1. The wedge holding block is mounted onto the stern bearing tube or strut and held by stainless steel screws (provided with cutter). Holes are to be drilled and tapped to receive these screws. Holding block is to be used as a template in place when all but first screw is drilled and tapped.
2. The wedge holding block is to be mounted on the same side of the strut as the rotation of the propeller.

**EXAMPLE:** If there is a righthand prop, the holding block would be mounted on the starboard side of the strut; on a lefthand prop, it would be mounted on the portside of the strut.

3. Holding block must be positioned to accommodate the stationary cutter wedge, with the stationary cutter wedge entering only one-half way into the V of the holding block. This is important to assure enough clearance to move with shaft and avoid bottoming in holding block V. If the male wedge of the stationary cutter touches the bottom of the female wedge holding block during forward end play, this will force the cutter blades together grinding metal on metal, causing the blades to be destroyed through excessive friction.

## SPURS FACT SHEET

### Spurs Shaft Mounted Line & Net Cutter System

The shaft mounted cutters are available for shaft sizes from ¾” thru 7”, or 20mm-175mm, and will match propeller hub diameters from 2” – 11”.

Spurs cutter systems have been protecting vessels from costly and damaging propeller entanglement since 1981. Worldwide navigating has been made safer for Coast Guards, Navy, commercial fishing and pleasure craft vessels of all types with cutter systems installed. To date, over 100,000 vessels depend on Spurs.

The cutting ability depends on the size of the line or net that is encountered relative cutter size – the larger the cutter, the larger line or net that can be cut. Original development and design of the cutters for various size crafts were predicated on the size of line normally carried on the boat, i.e. dock line, anchor line, etc. The very smallest cutter obviously cannot cut a line larger than the cutter blades. The reports to the contrary in situations where sailboat guy wires after a dismasting encounter, as well as some anchor chains at various time. Note: After this type of encounter, cutters should be sent to the Spurs factory for evaluation.

The rotating and stationary cutter blades are made from specially hardened stainless steel, using three heat processes to develop a hardness of approximately 45 Rockwell C. This is very hard, just under brittle, and the cutters remain stable under saltwater with anode protection. The hardness is extremely essential in severe cutting conditions, as from time to time commercial fishermen will encounter hooks and toggles.

**The holding block** (an essential part of the cutter system) is made of 316L stainless steel and is held on by bolts that are drilled and tapped into the strut, or stern tube, which must be metal, Fiberglas will not provide adequate holding power (see page 6 of installation guide). The holding block must be fastened into the metal of the strut or stern tube. Screws drilled into Fiberglas will pull out when a cut is made.

A stop line is marked on the upper casting to position and center the stationary cutter wedge, and this allows both forward and aft axial shaft movement to be taken up when cruising while the cutter blades remain .005-.010 apart. Excessive shaft end-play must be addressed to revise installation procedures. The wedge, which is an integral part of the holding block, is activated when a line or net is encountered, forcing the stationary cutter blade aft against the rotary cutter blade, achieving an instant cut with each revolution while the line is washed away.

The holding block is held by (3) bolts designed to shear and disengage the cutter system is a larger line, chain or cable, etc., is caught that cannot be cut. The bolts are made of 304 or 18-8 stainless steel and, therefore, rated weaker than the cutter blades hardened stainless steel. Disengaging that cutter at this point protects the vessel's transmission, engine and running gear from possible failure and prevents the cutters from locking up. The sheared bolts must be removed in order to reinstall the block in the same position.

Many prudent boaters drill and tap (2) sets of holes to make this an easy reinstallation underwater. In some instances, a stainless steel clamp will hold the block in place as a temporary measure until the proper reinstallation can be completed. Many commercial fishermen, however, weld the block to the strut or stern tube, intentionally avoiding the disengagement of the cutter system. Their engines are large and, in most cases, can withstand the force created when encountering steel cable, hooks, toggles, etc. The hardness of hooks is approx. 54RC, which is harder than the cutter blades at 45RC. Sometimes the hooks are cut due to the propeller inertia, however, the cutter blades suffer various nicks and gouges on the cutting edges and the bearing of the cutter shows excessive wear.

When installing holding block #4, 5 & 5A, drill upper or lower hole first, then mount the block. Proceed to drill and tap the remaining two holes. If shims are used under blocks, position shim in place first and then drill.

**Zinc anode protection in saltwater environment.** A specifically fitted zinc anode is mounted to the hardened stainless steel stationary cutter blade, and is provided with every cutter system from the factory. Spare zincs are available from Spurs dealer network or direct from the factory with same day shipment for orders placed by 2:00 pm EST. The zincs are designed to protect only the stationary cutter blade in a saltwater environment.

The stationary blade is completely isolated from the vessel due to the fact that it is surrounded by the (non-metallic) bearing and the (non-metallic) sound dampening plugs. Electrolysis will attack the threads and screws that hold the stationary blade and will eventually loosen over time. We chose hardened stainless steel over the soft, but more stable, grade 316 stainless for the cutter blades because there is an enormous cutter advantage. Therefore, it is extremely important to keep the cutter zinc anode in place and check it regularly. The rotary cutter blades are mounted on the shaft of the vessel and will be protected by the shaft zincs.

We recommend the use of Tef-Gel on all screws. Loc-Tite or equivalent is not recommended when used under salt water due to the osmotic properties (absorbs water) resulting in galvanic corrosion on the cutter threads.

Reconditioning and evaluation services are offered by Spurs factory – send the complete cutter and holding blocks for examination. It is important to include your name, address, phone number, vessel name, vessel length and vessel make; we will notify you if the parts are worn and replacement is required.

