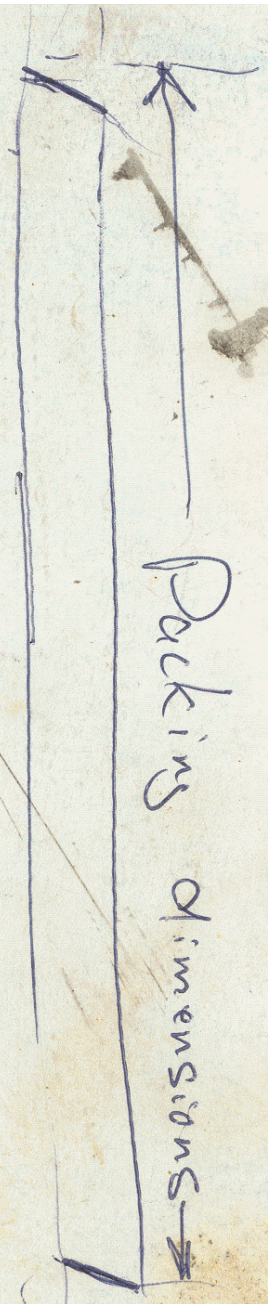


MAX-PROP propeller is manufactured by:

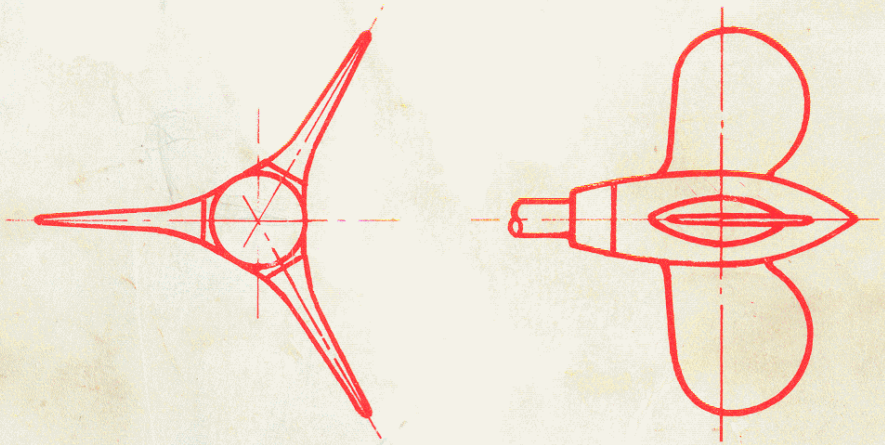
max-prop®

MAXPROP - MILANO - ITALY

PATENTED AUTOMATIC FEATHERING PROPELLER

MAX - PROP®

INSTRUCTION BOOK



THREE BLADE

Exclusively distributed in U.S.A. by:

PYI INC.

P.O. Box 536
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(425)

1) INTRODUCTION

This instruction booklet is designed to answer all your questions on assembly of the Max-Prop. Please read it carefully and assemble the propeller at least once before installing it on your boat.

2) PITCH ADJUSTMENT

This is a critical step, make sure that you know what pitch to set the propeller at, either by your old propeller or by your engine and reduction ratio.

IDEAL FROM PERRY was 21" X 14"

BLADE SETTING ANGLE α	PROPELLER DIAMETER														
	12"	13"	14"	15"	16"	17"	18"	19"	20"	21"	22"	23"	24"	25"	26"
10°	4.0	4.3	4.6	4.9	5.2	5.5	6.0	6.3	6.7	7.1	7.4	7.7	8.0	8.3	8.6
12°	4.8	5.2	5.6	6.0	6.4	6.8	7.2	7.6	8.0	8.4	8.8	9.2	9.6	10.0	10.4
14°	5.6	6.0	6.6	7.1	7.6	8.0	8.4	8.8	9.4	9.8	10.4	10.8	11.2	11.6	12.2
16°	6.4	6.9	7.6	8.1	8.6	9.1	9.8	10.3	10.8	11.3	12.0	12.5	13.0	13.5	14.0
18°	7.2	7.8	8.6	9.2	9.8	10.4	11.0	11.5	12.1	12.8	13.4	14.0	14.6	15.2	16.0
20°	8.2	8.9	9.6	10.3	11.0	11.6	12.4	13.0	13.7	14.5	15.0	15.6	16.4	17.0	17.8
22°	9.2	10.0	10.7	11.4	12.2	12.9	13.6	14.3	15.1	16.0	16.8	17.5	18.2	18.9	19.8
24°	10.0	10.9	11.8	12.5	13.4	14.2	15.0	15.8	16.8	17.6	18.4	19.2	20.2	21.0	21.8
26°	11.0	12.0	12.8	13.8	14.7	15.7	16.6	17.4	18.4	19.3	20.2	21.0	22.0	22.9	23.8
28°	12.0	13.0	13.9	15.0	16.0	17.0	18.0	18.9	20.0	21.0	22.0	23.0	24.0	25.0	26.0
30°	13.0	14.0	15.1	16.2	17.3	18.5	19.6	20.6	21.7	22.8	24.0	25.0	26.2	27.3	28.2

PROPELLER PITCH IN INCHES

OR 1998

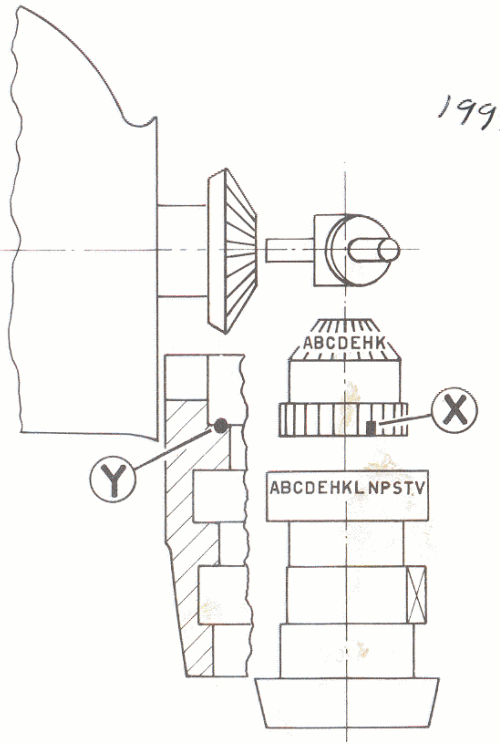
Fig. 1

The pitch is adjustable from 10 to 30 degrees of blade angle.
Figure 1 shows the conversion from inches of pitch to degrees of blade angle.
To properly convert from inches to degrees follow steps A thru C.

A) Determine the diameter of your propeller
B) Go down the column that corresponds to your propeller diameter until you find the desired amount of pitch.
C) Cross reference this pitch in inches to the blade setting angle directly across the chart and you will have the desired blade angle.

The blade angle is set when the hub of the propeller is mounted on the shaft. To set blade angle you must use the letter configuration in figure 2 that corresponds to your desired blade angle and the rotation of your shaft. The same propeller can be used for either right or left hand rotation.
NOTE: The adjustability allows you optimize the performance of the propeller.

Figure 2 shows blade angle not inches of pitch. To convert from inches of pitch to blade angle use figure 1.



1998

α	X (−)	Y (●)
RIGHT ROTATION		
30°	H	H
28°	D	K
26°	V	B
24°	S	C
22°	N	D
20°	K	E
18°	E	H
16°	C	K
14°	T	B
12°	P	C
10°	L	D
0°	K	D
LEFT ROTATION		
10°	H	D
12°	D	E
14°	B	H
16°	S	A
18°	N	B
20°	K	C
22°	E	D
24°	C	E
26°	A	H
28°	P	A
30°	L	B

KNS

Fig. 2

— If the engine does not reach the desired RPM reduce the blade angle.
— If the engine exceeds the desired RPM increase the blade angle.
A two degree change in blade angle will change the engine RPM by 15%, at the same boat speed.

3) THREE BLADE PROPELLER ASSEMBLY

Make sure if you receive more than one propeller that you do not interchange parts. Each propeller is balanced and if interchanged it will be put out of balance.

A) Fit the hub (1) to the shaft of your engine (2). Be sure that the key (3) is the proper dimension and that the hub slides completely onto the shaft. If you are not sure, remove the key and slide the hub on to the shaft making a mark where the hub seats on the shaft. Re-insert the key and slide the hub onto the shaft, if it slides up to your mark it is fine. If not you will need to file down the sides or the top of the key until the hub slides completely onto the shaft.

B) Tighten the nut (4) onto the shaft and secure it with the pin (5) by drilling a hole completely through the nut and shaft (a cobalt drill bit makes this task easier). One thread can be exposed aft of the nut, if more than that are showing it will be necessary to cut off the excess with a hack saw. If too many threads are exposed it will raise the central cone gear (6) and effect the performance of the propeller.

C) On the bottom of the central cone gear (6) there is a groove in one of the teeth, this represents the "X" on the chart in figure 2. Place the tooth with the groove into the corresponding lettered gear on the hub (1).

D) Fill the two halves of the spinner (7) with a sea water grease. From our experience Lubriplate Marine "Lube A" has worked best. Close the two halves around the hub and tighten down the screws.

NOTE: DO NOT USE TEFLON GREASE it will wash out very quickly.

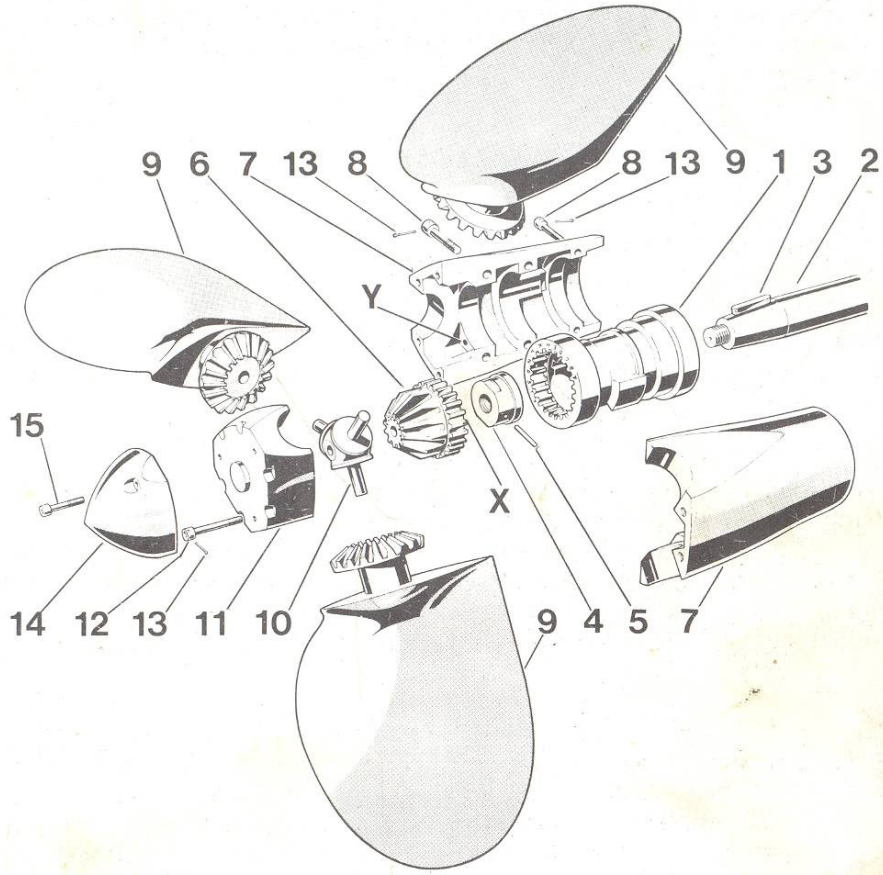


Fig. 3

E) Locate the mark on the top inside of the spinner (a small drill hole). This is the "Y" mark in figure 2. Rotate the spinner until the "Y" mark on the spinner coincides with the correct letter on the top of the central cone gear. This letter is determined from the chart in figure 2. Fill the top of the spinner with grease.

NOTE: It is helpful to make a mark between the spinner and exposed part of the hub or tape them so that any rotation can be noted and corrected. If the spinner is rotated before the blades are attached it will alter the blade angle.

F) Insert the three blades onto the three pins of the spacer (10). Fill the end cap (11) with grease and put the blades into the three seats of the end cap. NOTE: Make sure that the numbers on the blades correspond to the numbers in the spacer and the numbers on the end cap 1 to 1, 2 to 2, and 3 to 3.

G) Move the blades to a feathered position, making sure that the rounded trailing edges of blades are aft as shown in figure 3. Slide the end cap and feathered blades on to the spinner, make sure that the numbers on the blades and spinner match. Next tighten down the end cap with the screws.
NOTE: Check to see that the spinner did not rotate. If it did move pull the blades back 1/4" and then realign the mark between the spinner and hub. Make sure that when the blades go on to the spinnaker that they are fully feathered.

H) To make the blades rotate more freely it is advisable, after tightening all the screws, to give some bedding blows on the spinner and blades with a plastic or wooden mallet.

I) To make sure that the screws will not loosen insert a cotter pin into the head of each screw. Put them on so that if the screw were to loosen it would hit the cotter pin as shown in figure 4 and 5. Cut the cotter pins to a length of 1/4" and put them in. A light tap with a hammer on the head of the pin will spread the ends open, if not use a screw driver to spread them apart.

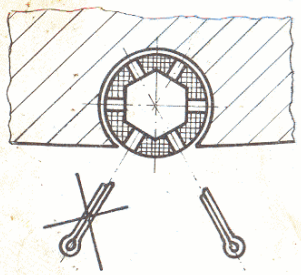


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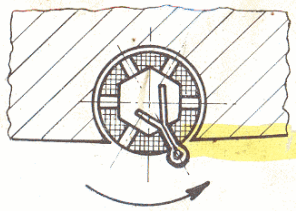
Fig. 4



unscrewing

yes

Fig. 5

J) Make sure that the propeller is protected from electrolytic corrosion by using usual zinc anodes on the motor shaft and on the end cap of the propeller. If the propeller as been assembled properly:

— The blades must rotate freely and stop at the blade angle you selected.
— In the feathered position the blades must line up perfectly as in figure 6.
— The propeller must never rotate as shown in figure 7.

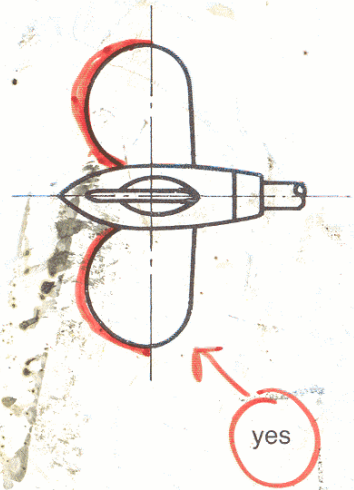
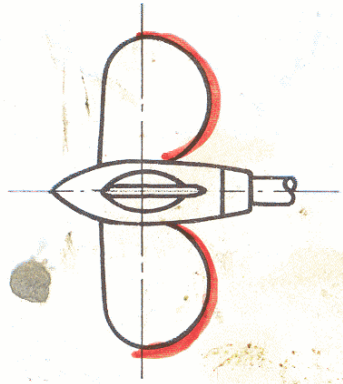


Fig. 6



no!

Fig. 7

4) TROUBLE SHOOTING

If the propeller feels stiff or has a hard spot in the rotation systematically go through the points below.

A) If the propeller does not rotate freely, remove some of the grease from the spinner and reassemble.

B) Sometimes it can happen that a very small burr enters among the gears, or a piece of the propeller has been dinged; in this case the blade movement can become hard. It is necessary then to do as follows, referring to figure 8.

1) Open the propeller and assemble it again after having taken the central cone gear (6) out, so that the blade and the hub rotation are independent. If the hub rotation is hard, remove 0.01 mm from surfaces “A” with an emery cloth. On the contrary if the blades rotation is hard, remove 0.01 mm from surfaces “B” of the spacer using emery cloth wrapped around a filat file. Try until both hub and blades rotate freely.

2) Again mount the central cone gear (6) and reassemble the propeller. If the propeller rotation still has some hard points remove 0.1 mm with a flat file from surface (C) so that central cone gear sits lower and the clearance between conical gears increases.

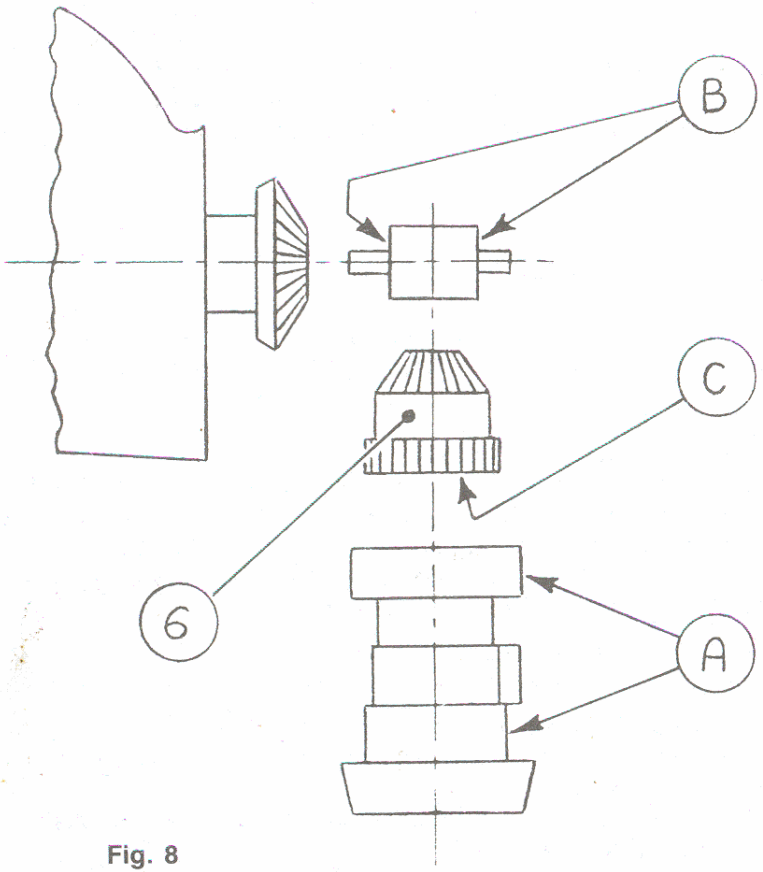


Fig. 8

5) PROPELLER USE

The Max-Prop works automatically. By putting the engine in gear the blades will engage in either forward or reverse.
The best way to feather the propeller is:

— Power at 2 to 3 knots in forward.

— Kill the engine while still engaged in forward

— When the engine has stopped, if the shaft is still spinning engage the transmission in reverse to stop the freewheeling.
You can check to see if the propeller is feathered or not by taking the engine out of gear. If the propeller is not feathered the shaft will freewheel like with a fixed blade propeller.
In that case start the engine again and repeat the three steps. If your propeller has been greased properly it will feather in a fraction of a second as soon as you stop the shaft from freewheeling. Once the prop is feathered, you can either leave the transmission in gear or out of gear, it does not matter.
DO NOT kill the engine while in reverse. In this case the blades will be in the reverse position and will not feather. You can actually use this feature to drive a shaft alternator.

6) PROPELLER MAINTENANCE

The Max-Prop needs to be regreased a minimum of once every two years. If you haul your boat every year grease the propeller when you haul the boat.

There is two type of propellers.

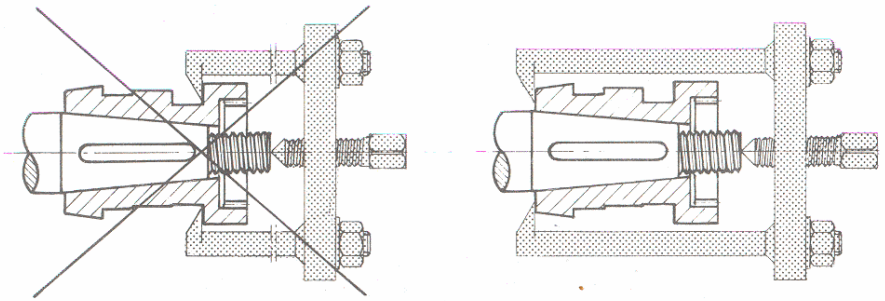
A) Propeller without grease ZIRC fitting.
Before taking apart your Max-Prop to change the grease, make sure that have marked the instruction booklet with the pitch setting. If you can not find a reference of the pitch setting, go through the instructions in reverse, make sure to note the settings for both the “X” and “Y” marks (or give us a call and we can teach you to find your setting while taking the propeller apart).

B) The newer Max-Prop have grease fittings.
In this case just use a grease gun to refill the propeller until the grease oozes out.

Make sure that you always keep the zinc anodes in good condition. They must be replaced each year. The propeller must be protected by a lot of zinc, so also use a zinc on the shaft.
Be sure that the contacts between the zinc and the propeller (or shaft) are clean (sand the contacts if necessary).

7) PROPELLER REMOVAL

In order to remove the propeller you must first remove the spinner and nut. Be sure only to pull from outside the hub (figure 9). If the surfaces on the hub are hit or dinged it can effect the performance of the propeller.



no! yes

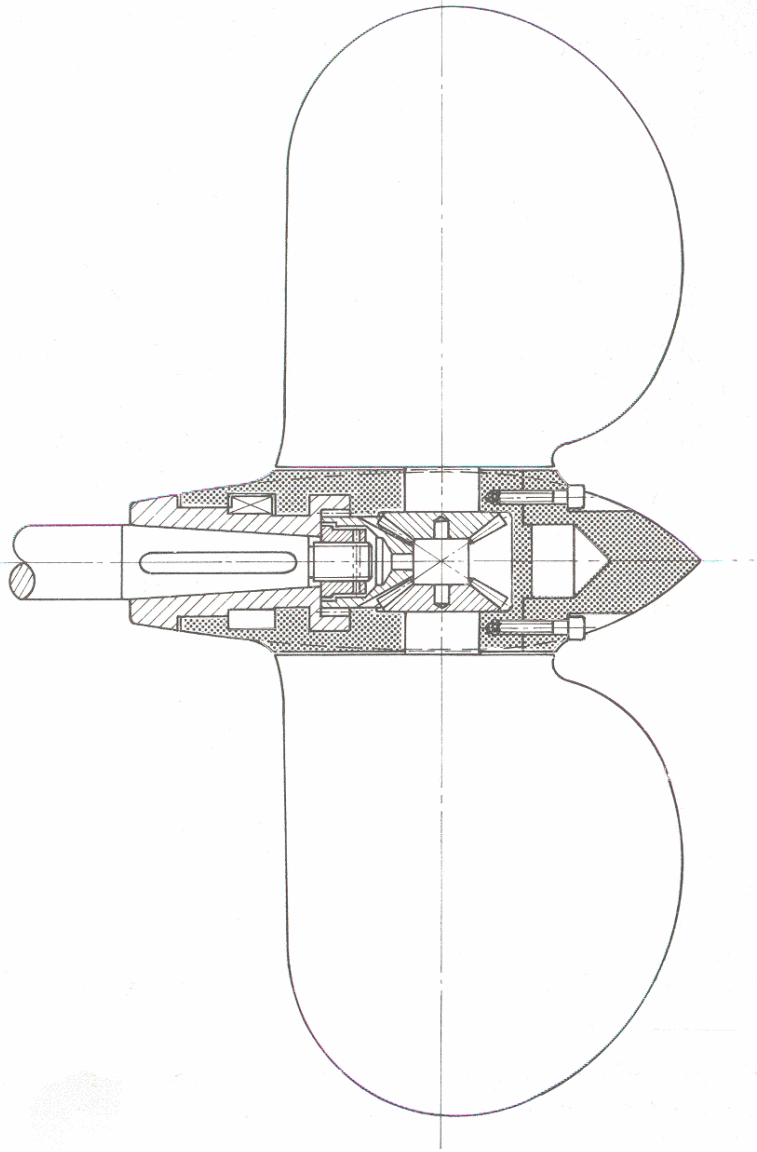
Fig. 9

8) WARNING

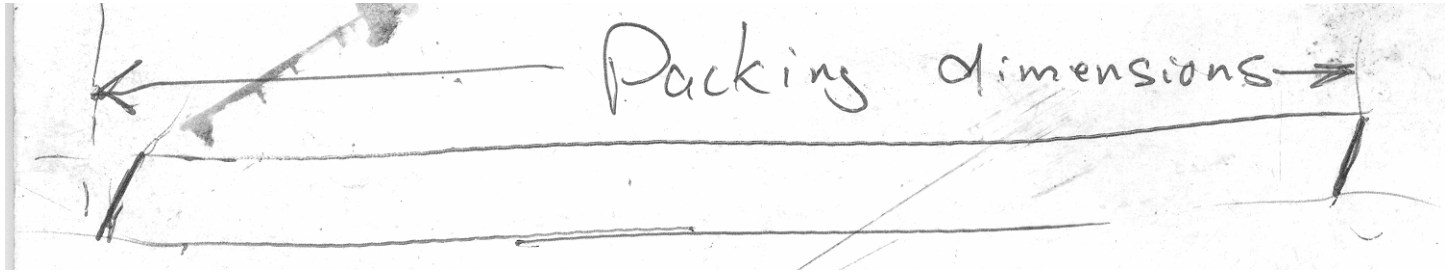
It is important to follow the instructions below carefully so as to avoid a shock to the gears on the blades and cone gear, that could be damaging to the teeth.

1) When going from forward to reverse and the opposite, it is necessary to idle down and shift at low RPM's between the gears.

2) The propeller body must always be completely filled with a very fluid grease. This is so when you reverse direction the rotation will be smooth with no binding. Binding points will produce a shock and could damage the gears.



BRONZE MODEL WITH HARDENED SPINNER



6-7/16” L-S Measured from back of Max Prop Manual sketch

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Max-Prop Automatic Feathering Propeller Maintenance Information

Greasing The Max-Prop: It should be regreased a minimum of every two years. If you haul the boat every winter, grease it annually as a matter of course. PYI recommends using Lubriplate model 130AA grease to lubricate the propeller. The newer propellers are set up to accept a grease zerc fitting, making it simple to regrease the propeller.

Greasing a Max-Prop with a zerc fitting: There are two holes in the spinner (#7 on a 3 Blade and #10 on a two Blade) of the propeller to grease. Remove the set screw from the forward hole with a #3 metric Allen wrench and screw in the zerc tower, attach your grease gun and fill the propeller with grease until the grease starts to come out between the hub (#1) and the spinners (#7 on a 3 Blade and #10 on a two Blade). Replace the set screw and remove the set screw from the more aft hole. Reinstall the zerc tower and attach your grease gun and fill the propeller with grease until the grease starts to come out between the blades and the spinners. Remove the zerc tower and reinsert the set screw into the propeller. Do not leave the zerc tower in the propeller.
**With each pump of the grease gun rotate the propeller from forward to reverse to allow the grease to work through the propeller.
**The numbers above are from Figure 3 in your Max-Prop instruction Manual

Greasing a Max-Prop without zerc fittings: Before you disassemble a Max-Prop to regrease it make sure you know what blade angle setting the propeller is set at. If you do not know this setting, refer to your installation manual to determine the pitch as you disassemble the propeller. Disassemble the propeller fully including the spinners (#7 on a 3 Blade and #10 on a two Blade). as these parts contain the main bearing surfaces and need to be greased. Follow the instructions in your installation manual for greasing and reassembling the propeller.
A zerc installation kit is available and can be purchased for $25.00, or PYI can install zerc fittings in your propeller for the same charge.

Replacing the sacrificial zinc anode on a Three Blade Max-Prop: The zinc at the aft of the 3 Bladed Max-Prop should be replaced regularly or as needed. When replacing it make sure that you clean the contact point between the zinc and propeller. Use a wire brush or fine sandpaper to clean the aft of the end cap (part #11) to give the zinc good contact with the propeller.

Please contact us if you have any questions.
Give us a call or fax us at the numbers above or contact us via e-mail at: pyi@compuserve.com