SDC *Propellers Ltd*

Sail Drive Composite Hybrid Propellers ***www.sdcprops.co.nz***

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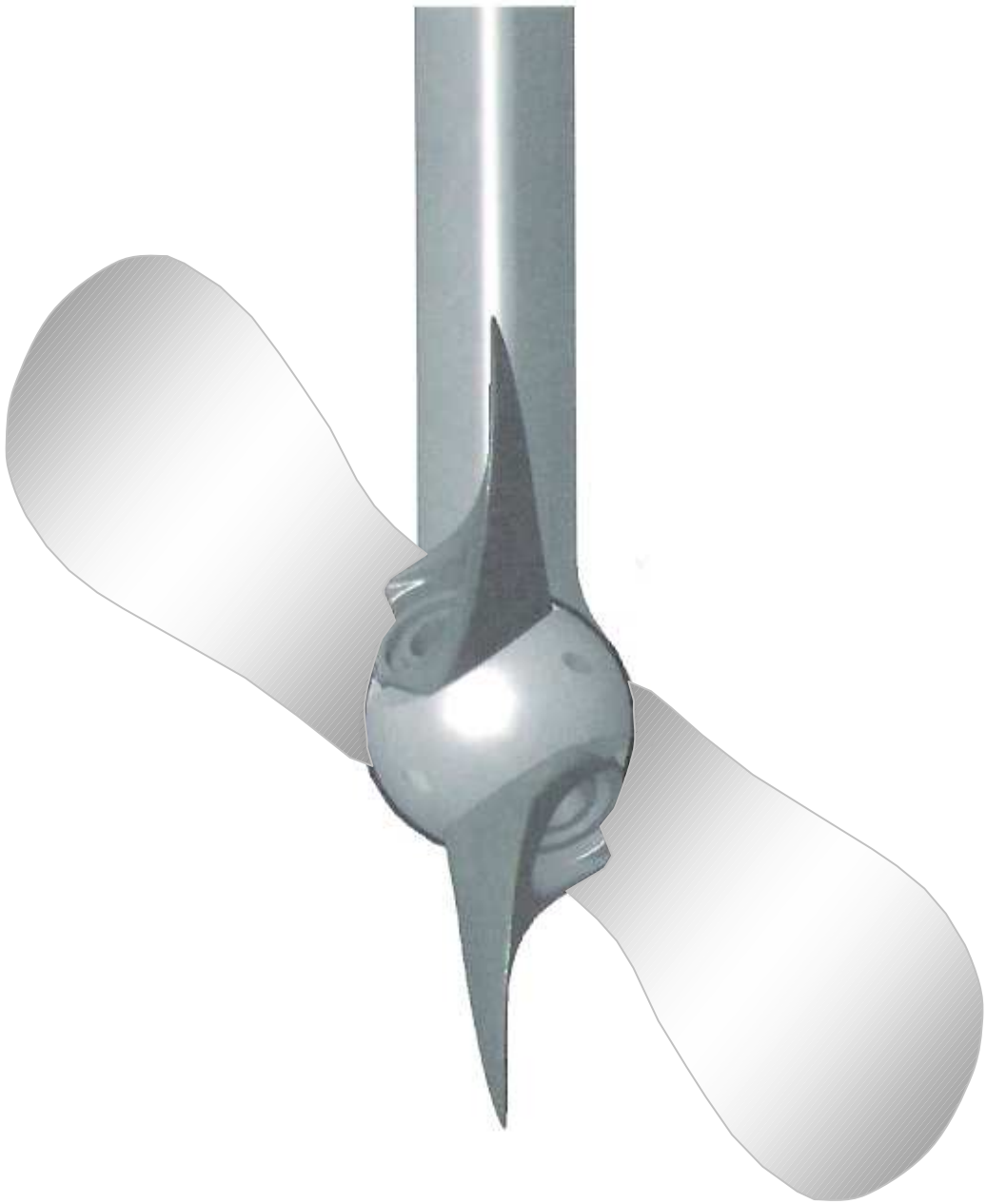
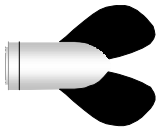
CUSTOMER MANUAL





CONTENTS OF THIS MANUAL

1: INSTALLATION SUMMARY:

The following notes are intended to provide an overview and check list for the installation of a new SDC propeller unit. They do not remove the need to read and understand the detailed installation instructions that follow.

PROCEDURE:

A: **Check you have received the unit undamaged. The mounting nut and SS split pin required later will be found inside the unit post disassembly.**

Place the Saildrive in gear to assist in assembly and mounting later

B: **Unscrew the 3 x locking screws around the forward perimeter of the unit**
Note the torque level that is required – do not exceed this when they are replaced.

C: **By placing a ~ 6 mm screwdriver into a hole on the perimeter of the front nose piece and tapping to start - unscrew the front face of the unit in a normal counter clockwise direction for a right handed thread when facing aft,**

D: **Remove the boss from the body of the unit by sliding it out – keep it clean.**

E: **Remove the attachment nut & split pin from the internal body of the propeller.**

F: **Check that there is 76 mm of Spline exposed from the rear of the collar to the end of the spline. The splined boss is 78 mm long to ensure the nut pulls the boss up laterally. Some less popular installations may require shortening the collar or adding washers to ensure this length is established correctly. Yanmar and Volvo will require no action.**

G: **Grease the area under the front Vectran™ rope path on the nose of the boss.**
Grease the rear of the boss filling the grease retention groove
Grease the inner area of the front threaded nose piece.
Thread the Vectran™ rope into the pathway between the upstand and boss grooves.
The Vectran™ passes 180 ° around the retention groove before exiting the next groove.

Mount the front nose piece over the front of the boss thus retaining the Vectran™.

The photo on the next page show the path of the Vectran™ over the boss.

The photo to the left shows the Vectran coming from aft, passing through the drive groove, and then proceeding around the front of the boss in the retaining groove whereupon it will exit aft through the other drive groove.

The section of Vectran on the left shows the location when rotated under tension.

This loop will not initially be present when the unit is mounted initially. The extra slack will allow the body to be suspended freely for assembly.

Slide the Front Cover, Boss and Vectran™ which is now retaining the body of the unit onto the spline. The body of the unit will be suspended by the Vectran™ at this stage.

Insert the Attachment nut into the recess at the end of the boss and start the thread.

Run the nut down and tighten up with a 25 mm A/F socket set.

USE TORQUE OF ~ 20 ft lbs or 30 N.m

Check around the perimeter to find which of the 9 recesses in the nut is aligned with which of the 8 holes around the perimeter of the boss so as to allow the split pin to be freely inserted and lock the attachment nut using the vernier principle.

H: **Spread the legs of the split pin using a screw driver and or long nosed pliers. Check the head of the pin is below the surface – tap down if necessary.**

I: **Smear clean marine grease over the rear of the boss and the internal thread of the body of the unit.**

J: **Slide the body of the unit over the boss – rotating it slowly in each direction to ensure the Vectran™ does not get caught behind the rear face of the boss and the body of the unit.**

If the grease forms an air tight seal you may have to push against the air pressure. Removal of the grease point Pozidrive screws will assist to relieve excess pressure.

CHECK THE ABOVE HAS ENSURED THE VECTRAN IS NOT JAMMED BEHIND THE BOSS

K: Before final contact with the front nose piece place ~ 40 ml of marine grease each side of the cavity in the body of the unit. This is to lubricate the Vectran™

L: Being very careful to ensure the alignment of the front face piece and thus that the threaded nose piece starts correctly with no cross threading rotate the front nose piece carefully until it starts into the thread in the body of the unit. Carefully tighten up by placing a screwdriver in the holes of the nose piece and rotating gently.

IF ANY STIFFNESS IS ENCOUNTERED THE NOSE IS CROSS THREADED - START AGAIN

At all times ensure the unit is rotated left and right as the thread takes up to ensure there is tension on the Vectran™ to ensure it is not caught behind the boss.

Tap the nose piece home gently with a screw driver in the perimeter holes until the three locking screw holes are accurately aligned as the unit was delivered.

M: Start the locking screws around the perimeter into the thread until just holding.
Apply Loctite™ to the thread of the screws now protruding.
Tighten the screws down until they are flush with the body of the unit.

TIGHTEN THE 4 x CAP SCREWS HOME WITH A TORQUE WRENCH TO 1 N.m = ¾ ft.lbs
OVER TIGHTENING WILL STRIP THE THREADS OR CAUSE INTERFERENCE INTERNALLY

N: Wipe the body of the unit clean with a clean rag to remove any grease and Loctite™
Check the grease hole screws have been replaced if removed.

O: Perform a final checks of the now installed unit by rotating both blades simultaneously with the flat of the hand around the axis of the Saildrive splined shaft to simulate water pressure in ahead and reverse and ensure that in both cases the blades are rotating smoothly around their mounting bolts until they come up against the pitch stops at the blade root.

THE UNIT IS NOW READY FOR USE

WHEN FIRST USED AFTER MOUNTING OR PITCH ADJUSTMENT IT WILL BE NECESSARY TO ENGAGE AHEAD AND ASTERN AT LEAST TWICE PRIOR TO FULL POWER

THIS WILL ENSURE THE INTERNAL DRIVE MECHANISM HAS EQUALISED AND THAT BOTH BLADES ARE OPENING EQUALLY TO THEIR RESPECTIVE FULL PITCH POSITION.

THIS IS REQUIRED TO COMPENSATE FOR ANY SLIGHT PITCH VARIANCES THAT MAY OCCUR BETWEEN THE INDIVIDUAL BLADES.

P: **In the situation where you are fitting a PVC line shield to the unit, the above procedures will need to address this by ensuring the following steps are included:**

- **Ensure the modified Yanmar zinc is mounted prior to mounting the propeller.**
- **Matching the correct pre bored shield to the zinc – slide the PVC shield over the body of the SDC unit before it is mounted on the boss. Ensure the pre drilled holes are forward.**
- **Post mounting the propeller – smear 3M 5200 around the zinc – PVC interface surface. This is to constrain erosion of the zinc mounting surface holding the shield.**
- **Slide the shield over the zinc – rotating to ensure the marks are aligned so that the pre bored holes align with the holes in the zinc.**
- **Tighten the Pozidrive screws holding the PVC shield.**
- **Clean up around the zinc with a turpentine rag.**

The photo to the left shows the PVC shield fitted, prior to the Pozidrive screws being bored and then self tapped into the zinc.

This is a Lombardini unit with a zinc that has been modified with an epoxy casting.

Yanmar's are sized to allow the PVC shield to slide directly onto the zinc that has been turned down to 103 + mm

Continued 2 ……..

2: INSTALLATION:

You are now the proud owner of an original SDC propeller which has been carefully designed and engineered to deliver many years of carefree service on your vessel. There are some very simple recommendations you should be aware of to ensure your SDC unit will continue to deliver trouble free performance in the years ahead.

Refer first to diagram on page 18 below for terminology of the components of the unit…

CAUTION: ***DO NOT FORCE THE BLADES OPEN AGINST THE SPRING AS THE INTERNAL VECTRAN™ MECHANISM IS ONLY DESIGNED TO OPERATE UNDER TENSION FROM NORMAL OPERATION***

PREPARATION FOR MOUNTING:

Before fitting your new propeller first check that the splined shaft is free to rotate and can be spun easily by hand to ensure correct feathering. Wipe all mating surfaces clean and lightly smear with a marine grease. Ensure that the splines are scrupulously clean to avoid potential binding. **Place the Saildrive in gear to prevent the Spline turning during assembly.**

Check that the collar with shield which is supplied with the Saildrive and acts as a seal guard is on the front of the shaft. This is required to ensure the correct length between the end of the spline and the thread which takes the nut and pulls up on the boss. Some propeller models eg earlier GORI that allow access to the nut without removing the blades mount without this collar to obtain the correct length. Where replacing this type of propeller the collar will need to be mounted again to ensure the exposed Spline is the correct length of 76 mm.

Some units such as Lombardini come with collars which must be mounted. All Saildrives require that the distance from the end of the spline to the face taking the thrust is exactly 76 mm. All Saildrive propellers then have bosses which are 78 mm long to ensure they pull up tight on the thrust face before the M16 x 2 nut starts to bind on the end of the spline.
NB: Yanmar SD40 & SD50 Saildrives take an M20 x 2 nut of the same external dimensions

Once the unit has been disassembled simply by unlocking and then unscrewing the front cover face described below it is then ready to be mounted on the Saildrive.

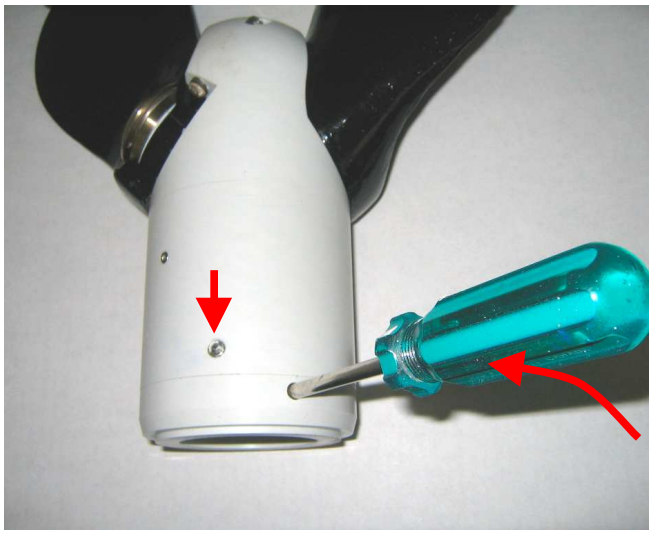
Begin by removing the 3/4 x SS set screws shown below located equidistant around the body of the unit about 1" or 25 mm aft from the front of the propeller unit. You will need a 4 mm Allan or Hex Key to undo these screws. Do not use imperial keys as they will damage the internal faces.

These lock the front face of the unit which is screwed into the main body of the unit.

NB: THE FRONT FACE CANNOT BE UNDONE UNTIL ALL 3 OF THESE HAVE BEEN REMOVED.

You will now need to either hold the body of the unit firmly by placing it on a flat surface that will not mark the exterior or temporarily sliding it over the protruding spline on the Saildrive.

Now insert the end of an Allen Key of about 6 mm diameter or equivalent such as a Pozidrive or Philips head screwdriver into one of the three most accessible 7 mm holes around the perimeter of the front face component of the unit. **From a forward perspective facing aft** tap the lever in a **ANTICLOCKWISE** direction to start unscrewing the front cover relative to the body of the propeller as shown.



Continued 3 ……..

The cover has a normal Right Handed thread and thus needs to be rotated in a Left Handed direction to be unscrewed – when viewed from the front as shown above …..

Unscrew the front cover fully. Now slide the whole body of the propeller aft and off the boss which will remain attached to the body of the unit with the two Vectran™ drive ropes.

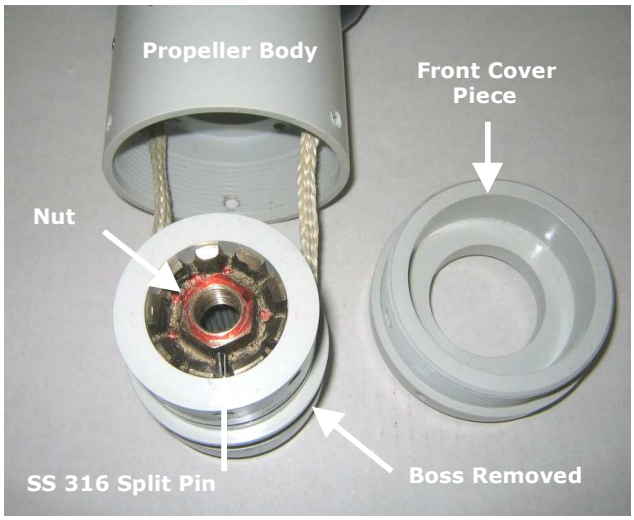
Now lower the body down over the boss so it hangs down at 90 deg and leaves the nut which attaches the boss exposed.

Find the small Stainless Steel split pin locking the nut to the body of the propeller located in one of the 8 recesses around the aft face of the boss and remove it with a pair of pliers. It will be necessary to bend the legs of the split pin into alignment with the hole so it can be easily extracted. Once the head is above the boss – simply placing one end of a set of long nose pliers into the exposed loop will provide a very easy way for removal of the pin.

Remove the large retaining nut from the recess in the boss. Marked red
The hex nut is 25 mm A/F.

Retain the Attachment Nut / SS Split Pin / Locking Screws x 3 in a secure place with the unit.

The unit is now ready for mounting on the spline subject to checking you have the correct face piece to fair the nose of the unit to the zinc on the Saildrive. The internal dimensions of every face piece are identical – only the outer shape changes.



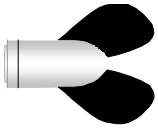
CHECKING NOSE CONE TYPE:

Each unit is supplied with a front mounting face that is unique to the manufacturers Saildrive. Your order will be filled with the appropriate unit which has been designed to ensure it fits neatly against the zinc anode with as little space as possible to allow foreign bodies and lines to enter the gap between the zinc and the propeller unit. These have the potential to damage the seal on the output shaft. The 3 basic models are listed below:

Standard:	**Suitable for Bukh and all Yanmar Saildrive units Will fit Volvo, Nanni, Vetus & Lombardini with poor appearance**
Lombardini:	**Lombardini Saildrives only**
Nanni:	**Nanni & Vetus Saildrives only – Will Fit Volvo also with 4 mm gap**
Volvo:	**Volvo Saildrives only**

In terms of compatibility the standard unit will fit the Volvo Saildrives but leave a gap of about 10 mm between the face of the propeller and the zinc anode. The Volvo unit allows space for a rope cutter with a smaller zinc than industry standard

The standard unit will fit a Lombardini Saildrive but because the Lombardini unit housing is smaller than the other types due to it's lower reduction ratio and thus smaller gear case the front of the unit needs to be faired down to the smaller diameter for appearance and streamline purposes.



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NB: CHECK THE SAILDRIVE UNIT IS IN GEAR TO PREVENT THE SHAFT ROTATING

MOUNTING THE FRONT COVER:

Check all the internal bearing surfaces and threaded portion are scrupulously clean.

Smear a light covering of marine grease over the internal bearing surfaces and thread.
Ensure grease covers the Vectran™ rope path around the front of the boss.

Mount the front face component onto the Saildrive splined shaft, thread facing aft, after checking the collars detailed above are correctly mounted as per the Saildrive manufactures instructions.

It will be loose at this stage but is required to be mounted first so that it can be screwed into the body of the unit later.

Check that the front face piece is not binding on the zinc – see notes below.
OEM zinc's may have different internal dimensions that could interfere with the front face.

MOUNTING THE BOSS:

Smear a light covering of marine grease over the internal splined surfaces of the boss.

Thread the Vectran over the nose (V2) - Slide the boss onto the splined shaft of the Saildrive.

Ensure that the front cover mounted previously now is positioned over the boss and not interfering with the zinc. Ensure it is held over the nose to retain the Vectran during assembly.

Check that the internal face of the boss extends past the end of the spline to ensure the nut will pull the boss up onto the spline correctly.

MOUNTING THE NUT:

With the flat face of the nut facing forward tighten the nut by hand to ensure it starts to track into the recess in the boss which accepts the outer surface of the nut.
You will need to then attach a socket to the nut and tighten it home.

DO NOT OVER TIGHTEN THE NUT which attaches to any standard **25 mm A/F** socket driver. Just nip it up using no more than ~ 20 foot lbs of torque or 30 N.m. This is equivalent to the weight of a two gallon or ten litre can of water suspended on your socket driver one foot or 300 mm from the nut.

CAUTION: Saildrive shafts are heat treated and end bored and can crack off if over tightened.

Check around the perimeter of the nut to find which of the 9 grooves is aligned with or nearly aligned with one of the 8 recesses in the boss which accepts the Stainless Steel Split Pin. Now using the vernier principle it will be possible to ensure a complete alignment with the two closest matching holes and grooves by turning the nut no more than 2 ½ degrees either way.

Insert the Stainless Steel 316 Split Pin supplied into the recess in alignment in the PETP Boss tail first. Using the recess that is now aligned with the nut to provide a clear pathway for the split pin will **ensure that the head is below the surface** in the recess provided. This is required as the body of the unit will slide over the boss when the unit is finally assembled and cannot interfere with the head of the split pin. Punch the head of the split pin down if proud.

Using a small screw driver or pair of long nosed pliers – bend each of the legs of the split pin slightly outwards so the pin can not be removed. **Check again that the head of the split pin is not protruding above the outer surface of the boss where it will prevent final assembly of the unit. Tap it lower with a pin punch if required.**

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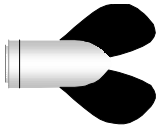


Having the body of the unit cover the head of the split pin makes it virtually impossible for the split pin to come out and thus the attachment nut to come undone leading to the loss of the propeller.

Smear a thin coating of marine grease over the rear of the boss surface which accepts the body of the unit. Do not place an excess of grease here or you will be unable to mount the body fully due to the unit acting like a hydraulic ram stopping further motion over the boss.

Carefully lift the body to now slide over the boss.

Mount the body of the unit over the boss partially leaving access for grease.

At this stage you will need to place ~ 20 ml of clean marine grease into each side of the body of the unit to provide ongoing lubrication of the unit.

Turn it each way to ensure the rope is not caught internally but is free to pass directly to the boss. The boss must click home to contact the inner thrust surfaces and must now be below the front face of the body of the unit to allow the front face to screw home without interfering with and binding on the boss due to the Vectran™ being caught internally.

MOUNTING THE FRONT COVER:

Now thread the front cover into the body of the unit after making sure it is carefully aligned and tighten up by hand until the thread is fully home.

If the thread does not turn very freely by hand it is cross threaded – DO NOT FORCE IT
Back it off and start again ensuring that the body of the unit is correctly aligned with the face

Insert an Allen Key or rod into the 7 mm hole and tapping gently rotate the front cover until the 3/4 x tapped holes align correctly and the 3/4 x locking screws can be inserted into the tapped threads.

Start the three locking screws into their respective threaded holes around the perimeter.
Only then smear Loctite™ onto the protruding threaded sections to ensure these remain locked.

This approach will ensure Loctite™ does not migrate into the internal mechanism of the unit

TIGHTEN THE 4 x CAP SCREWS FLUSH WITH A TORQUE WRENCH TO 1 N.m - NO FURTHER

DO NOT OVERTIGHTEN THESE LOCKING SCREWS: They should only be pulled down to flush with the outer body of the unit. The set screws can cause internal interference with the moving boss. The purpose of these is to provide a shear force against the front cover coming undone only, and the threads can be easily stripped if over tightened with too much force.

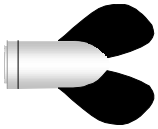
CAUTION: IF TIGHTENED BELOW THE SURFACE THEY WILL BIND ON THE BOSS
THE PROPELLER WILL NOT THEN OPERATE IN FORWARD OR REVERSE

1 N.m = ¾ ft.lbs

Wipe surplus Loctite™ from around the locking screws or in the hex recess using a clean rag.

NB: The unit must now be lubricated as detailed in the LUBRICATION section of this manual by adding additional grease to the 4 grease points to ensure all surfaces are adequately greased.

Continued 6 …….



THE UNIT IS NOW READY FOR NORMAL USE

WHEN FIRST USED AFTER MOUNTING OR PITCH ADJUSTMENT IT WILL BE NECESSARY TO ENGAGE AHEAD AND ASTERN AT LEAST TWICE PRIOR TO FULL POWER

THIS WILL ENSURE THE INTERNAL DRIVE MECHANISM HAS EQUALISED AND THAT BOTH BLADES ARE OPENING TO THEIR RESPECTIVE FULL PITCH POSITION.

THIS IS REQUIRED TO COMPENSATE FOR ANY PITCH VARIANCES THAT MAY OCCUR BETWEEN BLADES.

3: OPERATING INSTRUCTIONS:

To ensure the propeller transitions to a folded position correctly, first throttle down to an idle, and then place the gearbox in neutral before subsequently stopping the engine. The shaft will then slow down as the blades are returned to the feathered position by the torsion springs above each blade.

Coupled to the drag force from the water about the mounting axis the blades will quickly align themselves with the streamlines of the water and thus cause the drive shaft to come to a stop.

The propeller unit will then remain stationary in the folded position without further attention.

LEAVE THE GEARBOX IN NEUTRAL WHEN YOU ARE SAILING

We would generally advise to keep the gearbox in neutral whenever you are sailing.
This allows the blades to adopt a preferred low drag position with one blade behind the Saildrive leg irrespective of on the wind or off the wind conditions when due to leeway and surges off waves the flows around the leg will constantly vary.

You are now ready to enjoy the ongoing benefits from your new SDC Hybrid Propeller.

Continued 7 …….

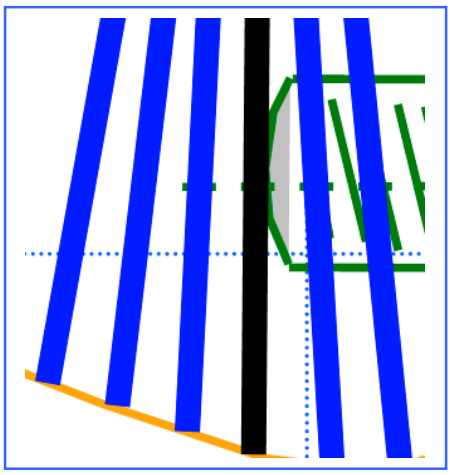
4: PITCH SETTINGS:

The SDC unit will have been set at the recommended pitch for your installation based on the engine model number, the reduction gear fitted and the particular characteristics you supplied of your vessel. You may however wish to take advantage of the simple pitch adjustment feature to accommodate the many variations between individual vessels and operating preferences and obtain the optimal motoring performance for your particular requirements.

One full turn of the 10 mm pitch screw in a clockwise direction to each blade in turn will equate to an additional 2" inch of pitch and substantially increase the power required from the engine and drive train. This will translate to lower engine revs.

We would recommend adjustments be made in no more than exact ½ turn increments to each blade, which will have the effect of varying engine revs by some 200 ~ 300 rpm. Each installation is unique and only experience can deliver the appropriate settings and optimal cruising revs for your vessel.

A pitch setting at the middle or black line on the body of the propeller corresponds to a pitch setting of 12 inches. The required Allen key is 5 mm. No locking of this screw is required as the pitch screws have been cut oversize to ensure a correct interference fit into the PETP TX propeller body which will ensure the screws are self locking.



NB: PITCH ADJUSTMENT

The diagram at the left shows a close up schematic of the pitch screw – Green contacting the face of the blade – Black with the Pitch Settings marked in Blue on the lower surface of the body of the unit

NB: To avoid vibration and loss of performance it is obviously essential to maintain an equal pitch setting on each blade.

Always check to ensure that the pitch stop face on each blade is at the same position relative to the black mark in the body of the unit below the face of the pitch screw – shown here in green.

Adjust the pitch screws until the blades have an identical pitch setting and are located an equal distance from the black line reference line shown above

Continued 8 ……..

5: LUBRICATION:

The unit has been designed to retain sufficient lubricants until your next maintenance haul out. All Saildrive units have a rigorous program for zinc replacements which will provide an opportunity to lubricate the unit.

While there is no need to remove the unit from the Saildrive shaft or the blades for lubrication - if being lubricated at the same time as the zinc is being replaced always remove the unit, change the zinc, replace the unit and then follow the lubrication procedures in that order.

This unit has been carefully engineered to ensure that the lubricants are retained within the unit to the greatest extent possible. Over time however the grease will very slowly be removed from the internals of the unit to lubricate the blade mountings and it will be necessary to add additional lubricants to minimize wear and ensure the successful ongoing operation of the propeller.

Simply remove the four small stainless steel pozidrive # 4 self tapping countersunk set screws located on the body of the unit using a small Pozidrive screwdriver. Insert the nozzle of a needle nosed grease gun into the holes that have been chamfered to accept a standard needle nosed grease point. You will need to remove the outer guard off the needle to expose the needle point. Each of these grease points should then be filled with a high quality marine grease eg Shell™ Nautilus Marine Grease - NLGI No 2. There is no point in filling the unit until excess grease squeezes out the nose of the unit. No more than 5 full strokes of the gun into each grease hole will be adequate.

The two grease points aligned with the blade attachment bolts transfer grease to the internal bearing between the Boss, which is mounted on the spline and the Blade Carrier at the rear of the unit. The two adjacent grease points direct grease through to the front of the unit to lubricate the Vectran rope and the bearing located within the front cover. This bearing locates the front of the unit onto the Boss mounted on the Spline.

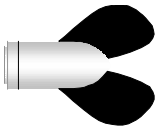
If operating or moored in very muddy environments or very shallow sandy water such that the propeller is continually operating in a sandy or heavily dirt laden environment then this will require additional greasing of the unit on a more regular basis than suggested above.

This will ensure that they moving surfaces maintain a clean bearing environment to minimise wear over time. Any dirt bound in grease will be highly abrasive and will inevitably increase the rate of wear which should be avoided to the greatest extent possible. While the PETP-TX body of the unit is self lubricating to a large degree – additional lubrication will always be beneficial in any extreme environment such as a mud berth or the shallows of Florida river systems. As a general rule - the more regular lubrication the unit receives – the less will be the wear caused by dirt and abrasion. While the body of the unit is manufactured from PETP-TX which is self lubricating and all moving parts are internal and protected from accumulating dirt – the grease serves to further assist in keep the working surfaces clean and thus reduce any potential wear even further.

The red arrow indicates the position of the two small # 4 Pozidrive screws that expose the grease points in front of each blade on either side of the unit.

These require a needle nose point on the grease gun to be inserted into the 4 holes.

Continued 9……..



6: ANTIFOULING:

To maintain the performance of any propeller it is essential to keep both faces, and in particular the tips clean. Barnacles and weed growth will have a serious impact on motoring performance. We recommend painting the whole propeller with a modern ablative antifouling which can be applied directly to the unit. The Zytel™ and PETP require no special undercoats.

When antifouling the unit be careful not to cover the lubrication points as it will be difficult to subsequently remove the screws if paint fills the grooves in the heads. Clean the grooves out with a rag and sharp point while the paint is still wet.

Place the Saildrive unit in gear before painting.

By holding a blade and simply rotating the unit in either direction, or the direction which locks the shaft and allows the blades to be opened – the blades will be forced into the open position.

This will expose the rear internal face of the body of the unit for antifouling.

Ensure that both internal faces normally behind the blade root when the blades are closed are antifouled. This will prevent the growth of marine organisms that could prevent the blades fully closing over time.

Be careful to ensure that paint does not go down onto the flat mounting surface about which the blades rotate, as this could cause subsequent binding of the blades.

While the paint will slowly erode from the tips of the blades over time this approach will still provide the optimal overall cost effective solution to the inevitable fouling of the propeller blades from season to season.

If not using a soft ablative paint that will wear away quickly with any contact from a moving blade, then care must be taken to ensure that there is no interference with the boss from a buildup of antifouling over time which could prevent the blades returning completely to the folded position.

NB: All Saildrives require the use of non copper based paints to avoid serious corrosion with the Aluminium Saildrive housing.

Always use the same antifouling paint that you are using on your Saildrive leg which will be specified by the Saildrive manufacturer to avoid generating an electro potential and subsequent corrosion with the Aluminium Saildrive castings.

7: FISHING LINE FOULING:

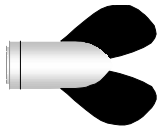
All Saildrives are susceptible to lines and rope becoming caught around the unit and finding their way into the recess between the propeller and the Saildrive housing. Various brands of cutters claim to prevent this, and generally work well particularly on larger diameter rope.

Monofilament Nylon lines present a particular danger to Saildrives, and in general the smaller the diameter, the greater risk they present. They have the ability – often irrespective of a cutter's presence, to find their way into the recess where they can ball up and jam into a mass that will interfere with and may loosen the zinc on it's mountings.

In a worst case they can interfere with and very quickly damage the lower shaft seal and allow salt water into the Saildrive leg which will unfortunately lead to total loss of the drive train.

ANY ENCOUNTER WITH A MONOFILAMENT LINE SHOULD ALWAYS RESULT IN THE IMMEDIATE REMOVAL OF ANY TYPE OF PROPELLER FROM THE SAILDRIVE TO CHECK THE SHAFT SEALS.

Continued 10 ……..



8: REMOVAL OF BLADES:

The only time you should have to remove a blade is when a blade has been broken with the impact of a foreign object or there has been a serious internal failure of the unit which has ceased to operate.

UNDER NO CIRCUMSTANCES REMOVE BLADES - EXCEPT FOR BROKEN BLADE REPLACEMENT

NB: THERE IS NO NEED TO REMOVE THE BLADES FOR NORMAL MAINTENANCE

REMOVE COVER PLATE:

Note the position of the tail of the torsion spring with respect to the blade carrier as when the unit is re-assembled the cover plate will have to be restored to this same position to create the correct torsional pre-load on the blade. Mark with an indelible pen onto the blade where the spring tail is located taking care to ensure the blade is in the fully feathered position before marking.

Insert a screw driver or drift into one of the holes on the outer surface of the cover plate. Strike a sharp hit with a hammer in the direction such as to rotate the cover plate and 10 mm Countersunk machine screw ANTICLOCKWISE. This action, repeated if necessary, will loosen the cover by turning the screw at the same time.

The C/Sunk screw can then be removed with an Allen Key or Hex Driver.

Once the screw has been completely removed, lift off the cover and remove the torsion spring which pre-loads the blades back into the feathered position.

REMOVE LOCKING SCREW:

Removal of the cover plate will have now exposed access to the 5mm locking pin that locks into the PETP base and prevents the bolt holding the blades from turning. It will be necessary to remove this locking pin by levering it out with a set of end blade cutting pliers.

Take the locking pin right out from the bolt. Place with the cover plate.

REMOVE BLADE ATTACHMENT BOLT:

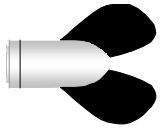
Removal of these bolts may require heat as they have been inserted with Loctite which will lock the bolts securely into the PETP-TX. The following paragraph describes removals.

The Loctite™ we use and recommend is an anaerobic substance that sets in the presence of certain metals and without the presence of oxygen. This causes it to harden and form a very strong bond between the thread of the bolt and the thread tapped into the PETP-TX.

Below are the removal instructions from their web site:

The application of heat is needed to remove a fastener that can't be removed with a hand tool. Temperatures of 325F (= 163 C) and above is needed to break down a standard anaerobic, 500F (260 C) for high temperature Anaerobics. A heat gun or propane torch is commonly used to do this process, and careful disassembly should occur while parts are still hot.

Continued 11……..



Shield the blade surround with Aluminium foil slipped down around the perimeter of the bolt before applying heat from a propane torch or heat gun to the head of the attachment bolt facing the exhaust of the torch or gun so that it is directed away from the composite blade.

Mount a 22 mm Metric Socket over the now exposed octagonal head of the blade attachment bolt. Tap down if necessary to ensure the socket is mounted correctly and that the lower face is in full contact with the upper surface of the bolt.

Holding the Blade Carrier of body of the propeller firmly - Rotate the bolt using a socket driver attached to the 22 mm Socket in an ANTICLOCKWISE direction to undo the bolt.

If too tight or the socket has slipped a cold chisel into the edge of the unit will make an impression that can then de driven round by tapping with a screw driver into the impression formed with a hammer. This should only be used as a last resort.

Remove the bolt entirely which will allow the blade to become free of the propeller body – except for the Vectran rope still attaching the blade to the body of the unit.

Remove the bolt from the blade which will also expose the Teflon 1.50 mm washer. This washer provides lubrication between the upper surface of the blade and the underside of the bolt where there is no access to lubrication from grease in the body of the unit which lubricates the lower surface of the blades from the action of the rope.

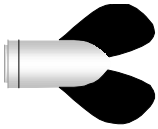
REMOVE VECTRAN™ SPLICE:

Pull the Vectran™ loop free from the groove in the upper blade surface. By compressing the Vectran™ section that holds the tapered tail of the rope which has the effect of expanding the diameter of the rope - the tail of the rope can then be worked free thus undoing the splice.

The Vectran™ rope is thus now without any constrictions.

This then allows the blade to be pulled free over the Vectran™ rope section to which it is attached.

Continued 12 ……..



9: AUTO ROTATION & VIBRATION:

If you detect excessive vibration coming from the unit and or high speed autorotation occurs when sailing judging by the gear noise emanating from the Saildrive first check for freedom of movement of each blade and the presence of foreign objects. Typically this will be caused by fishing lines, pieces of rope, plastic bags etc that have been picked up by the propeller. Remember when diving that a clear plastic bag and nylon monofilament line is very hard to see underwater.

CAUTION: If you detect even a trace of nylon monofilament line around the unit you would be strongly advised to immediately remove the unit and check that the line is not also around the internal seal on the Saildrive. Monofilament line - however small, has the ability to very quickly destroy the lower seal on any Saildrive unit. This then allows salt water into the lubricated drive train where it inevitably destroys the entire Saildrive unit in a very short space of time.

Follow the operating instructions in your Saildrive manual regarding ongoing lubrication and seal and zinc replacement procedures to the letter.

Vibration can be caused by anything around the propeller or caught into the pitch stop and perhaps generating asymmetric pitch on each blade. Excessive vibration can also be caused by damage, particularly to the leading edge of the blades, due to an impact with a large or heavy foreign object.

If the unit turns very slowly when sailing, there is no problem. The blades are still feathered. Each blade has a torsion spring attached to the cover plate to ensure it is forced to return to the feathered position when sailing. Saildrive units are fully lubricated internally and any rotation under near zero load conditions will have no effect on the life of the unit. The water flows around the propeller of any yacht are very complex and turbulent. Lee way and disturbances from the keel and Saildrive leg make specific predictions very difficult.

10: IDLE SPEED:

The unit has been designed and tested to correctly engage the reverse function independently of the type of clutch (dog or clutch pack) in the Saildrive unit or the speed of the engine which may vary due to the differing loads an engine can experience at idle.

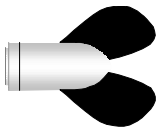
Because the unit locks the blades into the fully open position when reverse is engaged, relative to a typical folding propeller which uses centrifugal force to only partially open the blades in reverse, you will notice the engine is loaded to the same level as in ahead.

This is because the blades have adopted the same pitch setting in reverse as they have in ahead and has been designed to address the design situation where due to the nature of the drive train, all Saildrives have the same reduction ratio in both Ahead and Astern.

Simply follow the instructions of your engine manufacturer.

You may need to allow for any additional refrigeration compressors and alternators that have been fitted to your engine – both of which can draw considerable power even at idle.
This is really only an issue for very low horsepower engines when cold when invariably the alternator is also at full load.

Continued 13 ……..



11: REVERSING FUNCTION:

Your new propeller will automatically go to the same pitch in reverse that the blades have been set to in the ahead position. This is to ensure the propeller will deliver similar thrust in reverse as it does in ahead. There will always be small variations due to the blade shape and the water flow available to the unit in reverse not being symmetric with ahead, but these will be very small. In reverse the propeller has access to clean water unimpeded by the turbulence created by the Saildrive leg.

All Saildrive units, unlike most shaft gearboxes, have the same reduction ratio in ahead as they have in astern thus ensuring similar reversing thrust performance at all engine speeds from the propeller as you will have in ahead.

The effect of this will be that you will notice a substantial increase in reverse thrust over a folding unit and you will need to take care in maneuvering to accommodate this change until used to the very different reverse thrust characteristics of your new propeller.

Take particular care once boat speed increases astern as both tillers and wheels can produce very strong kick back forces once you have way on.

As many Saildrives have dog clutches with no slip it is always sensible to throttle down and allow the boat to slow before engaging ahead to avoid excessive shocks to the whole drive train, internal clutches and propeller unit.

12: REMOVAL OF THE UNIT:

Begin by removing the 3 / 4 Stainless Steel set screws located equidistant around the body of the unit about 1" or 25 mm aft from the front of the propeller unit. You will need a 4 mm Allan or Hex Key to undo these screws. Do not use Imperial type keys - they will damage the internal faces.

These lock the front face of the unit which is screwed into the main body of the unit.

NB: THE FRONT FACE CANNOT BE UN-DONE UNTIL ALL OF THESE HAVE BEEN REMOVED

You will now need to either hold the body of the unit by holding the blades or placing the Saildrive unit into gear and rotating the blades around until they start to open and become firm against the locked drive shaft of the unit.

Now insert the end of an Allen Key of about 6 mm diameter or equivalent such as a Pozidrive screwdriver into one of the three most accessible 7 mm holes around the perimeter of the front face component of the unit.

From an aft perspective facing forward tap the lever in a CLOCKWISE direction to start unscrewing the front cover relative to the body of the propeller.

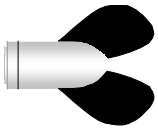
The cover has a normal Right Handed thread and thus needs to be rotated in a left handed direction to be unscrewed – but this is when viewed from the front …..

Unscrew the front cover fully. Now slide the whole body of the propeller aft and off the boss which remains mounted on the Saildrive shaft.

Now lower the body down over the boss so it hangs down at 90 deg and leaves the nut which attaches the boss exposed.

Find the small Stainless Steel split pin locking the nut to the body of the propeller located in one of the 8 recesses around the aft face of the boss and remove it with a pair of pliers. It will be necessary to bend the legs of the split pin into alignment with the hole so it can be easily extracted. Once the head is above the boss – simply placing one end of a set of long nose pliers into the exposed loop will provide a very easy way for removal of the pin.

Continued 14 ……..



Remove the large retaining nut using a socket set. The hex nut is 25 mm A/F. This again is a normal Right Handed thread – so rotate the nut in an ANTICLOCKWISE direction when viewed from astern to remove it. You will need to have engaged the Saildrive into either ahead or astern (depending upon the design of the particular Saildrive model) to lock the shaft and allow the socket to undo the attachment nut.

Once the attachment nut has been completely removed you will now be in a position to remove the propeller. By sliding the boss aft from the splined Saildrive shaft the whole unit will now become free.

Return the boss to the body of the unit by turning the body of the unit back over the boss to ensure the drive ropes lie over the boss and are not caught behind the rear face. Screw the face piece just loosely onto the body of the unit to ensure it stays clean internally.

Place the unit in a location that is clean and under no circumstances allow dirt or dust to penetrate the internal mechanisms of the unit.

Retain the Attachment Nut / SS Split Pin / Locking Screws x 3 in a secure place with the unit.

When ready to mount the unit – typically after zinc replacement simply reverse the above procedure. This is covered in detail starting on page 1 above.

Remember the washer supplied with the Saildrive to protect the shafts seals must be mounted prior to any propeller mounting to ensure the correct length of spline is exposed and thus allow the boss of the unit to be tightened up correctly with the attachment nut.

This will vary in design and length by each manufacturer.

NB: REMEMBER TO MOUNT THE FRONT FACE PIECE ON THE SAILDRIVE FIRST – THREAD AFT

13: NOSE CONE TYPES:

Each unit is supplied with a front mounting face that is unique to the manufacturers Saildrive. Your order will be filled with the appropriate unit which has been designed to ensure it fits neatly against the zinc anode with as little space as possible to allow foreign bodies to enter the gap between the zinc and the propeller unit which has the potential to damage the seal on the output shaft.

There are 3 basic models:

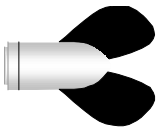
Standard:	**Suitable for Bukh and all Yanmar Saildrive units [Will fit Volvo and Lombardini with poor appearance]**
Nanni:	**Nanni Saildrives only – Will Fit Volvo also with 4 mm gap**
Volvo:	**Volvo Saildrives only**
Lombardini:	**Lombardini Saildrives only**

In terms of compatibility the standard unit will fit the Volvo Saildrives but leave a gap of about 10 mm between the face of the propeller and the zinc anode.

[The Volvo unit allows for a rope cutter with a smaller zinc than industry standard]

The standard unit will fit a Lombardini Saildrive but because the Lombardini unit housing is smaller than the other types due to it's lower reduction ratio and thus smaller gear case the front of the unit needs to be faired down to the smaller diameter for appearance and streamline purposes.

Continued 15 ……..



14: ASSEMBLY OF THE UNIT:

Ensure all the components including the Vectran™ drive rope are clean before commencing any assembly operations. Use mineral turps or an equivalent hydrocarbon cleaner if the unit is being re-assembled and contains lubricants from previous usage.

IT IS CRITICAL THAT ALL INTERNAL AREAS ARE SCRUPULOUSLY CLEAN BEFORE ASSEMBLY.

INSERT ROPE INTO BOSS:

The boss containing the internal spline now requires that the Vectran drive rope be correctly mounted.

Begin by threading the Vectran™ from the rear of the boss unit which holds the nut recess through one recess in the boss and then winding this end ½ turn around the nose of the unit before exiting back down the other recess in the boss which is located diametrically opposite the first.

Ensure that each tail is now the same length – ie the rope is mounted symmetrically on the boss.

When the boss is held up with the nut recess end down you should now have two equal length rope tails hanging free – one end emerging from each hole in the forward end of the boss.

Wind a piece of tape around the perimeter that will hold the rope in place temporarily.

You can if you wish now remove the boss from the rope, as the boss can be clearly free of the Vectran™ until finally mounted in the body of the unit which will ensure the Vectran™ is retained in the recesses.

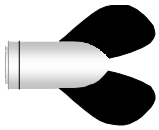
The above will then be required to be repeated at a later stage of assembly.

INSERT ROPE INTO BODY:

The objective now is to thread each of the Vectran™ tails into the holes in the front of the body which carries the blades and have them exit via the rope holes on the inclined faces on which the blades are mounted. Either tail can go into either hole – but there can be no crossing of the ropes. When completed the Vectran™ should be parallel and exit and enter directly between the two matching holes which coincide position wise in the boss and the body of the unit.

If there is any difficulty in getting the Vectran™ to pass through the long section of the body, then this can be made easier by using a skewer or thin rod which is inserted into the end of the rope and by contacting the tapered end which has been melted over quite easily pushed through to exit into the angled face that holds the blades.

Continued 16 ……..



MOUNTING THE BLADES:

Begin by inserting the boss into the body of the unit while at the same time pulling both rope ends through the blade mounting faces so that the boss is pulled up hole into the body of the unit. There is no need to mount the nut at this stage inside the unit.

At this stage it will be essential to mount the unit over a jig held in a vice so that the unit can be easily accessed. An old spline is optimal – but a piece of dowel is also satisfactory. This process can also be performed on the actual Saildrive unit which of course offers the matching spline.

Thread the rope end of the first blade through the base of the blade, again using a small rod if necessary, until it exits on the upper face of the blade. It will now be necessary to form a loop in the end of the rope with a finished dimension of internal diameter 12 to 15 mm and also provide for a tail section to be spliced of length 50 mm.

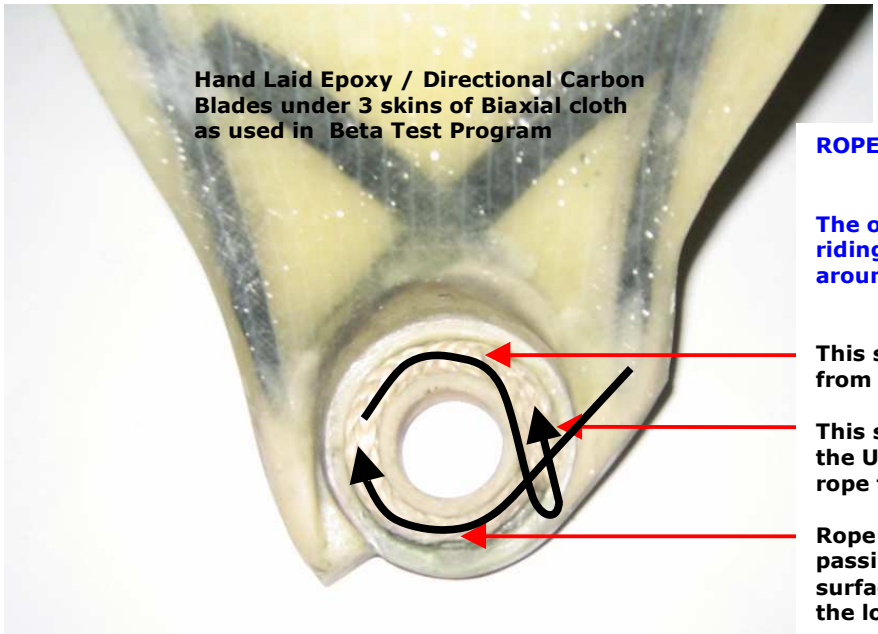
Mark the rope using a marking pen when a tail of 50 mm lies alongside whilst forming a circle of the required diameter. This will be where the rope is to be opened up to accept the tail and also the length of the tail to be inserted,

Open the rope by pushing and compressing a section then using a sharp fid insert the tail which has been tapered by melting when cut into the recess and push it down the full 50 mm to form the splice. It may require some working down – again using a small diameter rod to ensure the tail is fully inserted into the body of the rope where marked to form the splice.

Now force the rope back through the loop just formed and open up a much larger lop which will be required to be inserted into the groove on the upper face. See picture below.

It is critical to ensure that the tail end entering the splice is uppermost as we have effectively created a riding turn to help lock the tail of the rope. It is essential that the rope entering from the underside interferes with the rope forming the loop – not the tail of the loop to provide additional resistance. The rope will be subject to significant tension in operation. It has been tested to many times it's working load in the stated configuration.

NB: UNDER NO CIRCUMSTANCES CONFIGURE THE ROPE IN ANY WAY OTHER THAN AS SHOWN



ROPE DETAIL:

The objective is to create in effect a riding turn to maximize the friction around the internal groove

This shows the tail entering the splice from the upper side

This shows the loop with the tail on the UPPER surface which enters the rope that comes from the underside

Rope entering from underside and passing directly into groove on upper surface of blade after passing through the loop formed with the tail

Continued 17 ……..

Now repeat the above process with the next blade so that when completed there should now be both blades hanging free from the body of the unit suspended on the Vectran drive ropes.

INSERTING THE BOLTS:

First mount a Teflon washer with a smear of grease to hold it in place on the underside of a blade attachment bolt. Now retract the rope to pull the blade down into the correct position by turning the internal boss. This will cause the rope to retract and remove the slack which could interfere with the correct positioning of the blade.

Ensure the rope is inserted into the groove on the underside of the blade which is not standing proud but flush with the surface on the body of the unit.

Smear **Loctite™ 262** over the internal thread of the propeller body taking care to ensure none appears above the hole where it can interfere with the blade and lock that in position.
Do not place the Loctite on the bolt itself as the excess will spread over the upper surface as the bolt is tightened where again it will lock the blade and make for a very stiff motion.
Insert the M16 bolt through the blade and wind into the body of the unit.
Mount a 22 mm socket and complete the insertion of the bolt as it becomes stiffer

Tighten with a torque wrench to exactly 40 ft lbs or 56 N.m. This is to ensure that the locking pin will be aligned with the thread that has been previously put into the body of the unit.

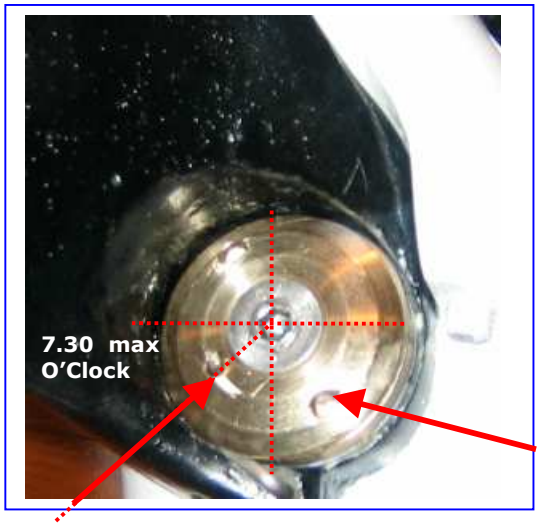
Now insert the 5 mm locking pin down into the body of the attachment bolt. Place Loctite™ on just the upper section of the pin once part way down to assist with locking. Tap down until the upper end of the pin is just below the upper surface of the bolt. This will enable removal at a future date. This will then ensure the attachment bolt is locked into the body of the unit.

Ensure the blade will rotate about the bolt from engaging the pitch stop until in the fully feathered position with the blade root contacting the body in the area parallel to the pitch screw section.

Repeat this process so that both blades are now attached and moving freely about their axis.

MOUNTING THE COVER PLATES: AB2 or PETP

Begin by mounting a torsion spring over the bolt with the tail on the outside of the spring inserted down into the blade section that forms the pitch stop. The inner tail will now be pointing up ready to accept the cover plate. Note that the tail is inserted into the hole between the two opposite holes used to pre-tension the spring. See below



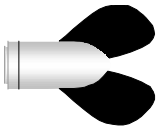
NB: Spring Tail is tensioned to the 7.30 o'clock position with blades closed as shown and the unit mounted vertically

DO NOT EXCEED 7.30 O'CLOCK POSITION

This provides the correct spring tension to ensure the blades fold correctly and does not overload the spring when open

Hole –one of a pair to accept long nosed pliers to turn the cover plate against the spring so plate can be locked down

Continued 18 ……..



Ensure Loctite is spread around the internal thread of the bolt and on the upper contact surface of the bolt prior to mounting the cover plate and M10 mounting screw.

Tighten up the M10 mounting screw that holds the cover plate in position until it is finger tight. Insert a set of long nosed pliers into the two opposite holes and at the same time mount an Allen Key into the hex head of the screw as this will need to be tightened as the cover is turned to pretension the spring.

Turn the pliers to position the tail of the spring into the 8 o'clock position as shown above. This will force the blade back into the folded position.

CAUTION: The screw may tend to tighten the cover plate further as it is finally tightened home.

While maintaining the tension lock the screw done tight to hold the cover and hence the spring in the required position.

Use torque of 20 ft lbs or 27 N.m to tighten this screw.

Repeat for the other blade.

There is now no need for further assembly of the unit as it is at the state required for permanent mounting. The unit is now ready to be mounted on the Saildrive.

Instructions for this are covered in the INSTALLATION section of the manual.

15: ANNUAL MAINTENANCE:

Whenever the boat is hauled provides an opportunity to check the propeller and ensure it receives appropriate care to ensure it will continue to operate correctly into the future.

Check the cover plates and associated torsion springs on each blade are operating correctly.

Ensure the blades are free of barnacles and any marine growth. If the blades have been antifouled as recommended this will minimise growth but with the expected wear near the tips these will over time accumulate growth as the paint is ablated away. Any roughness on the blades will interfere with motoring performance. Sanding with wet and dry paper will restore the blades to their original condition. Antifoul as suggested above.

Sand fair any small nicks and dings on the leading edge from collision with flotsam.
Use a wet and dry abrasive of ~ 80 grit with a small wooden block as backing.

Check that the torsional spring on top of each blade is pre-loaded correctly and returns each blade fully to the feathered position.

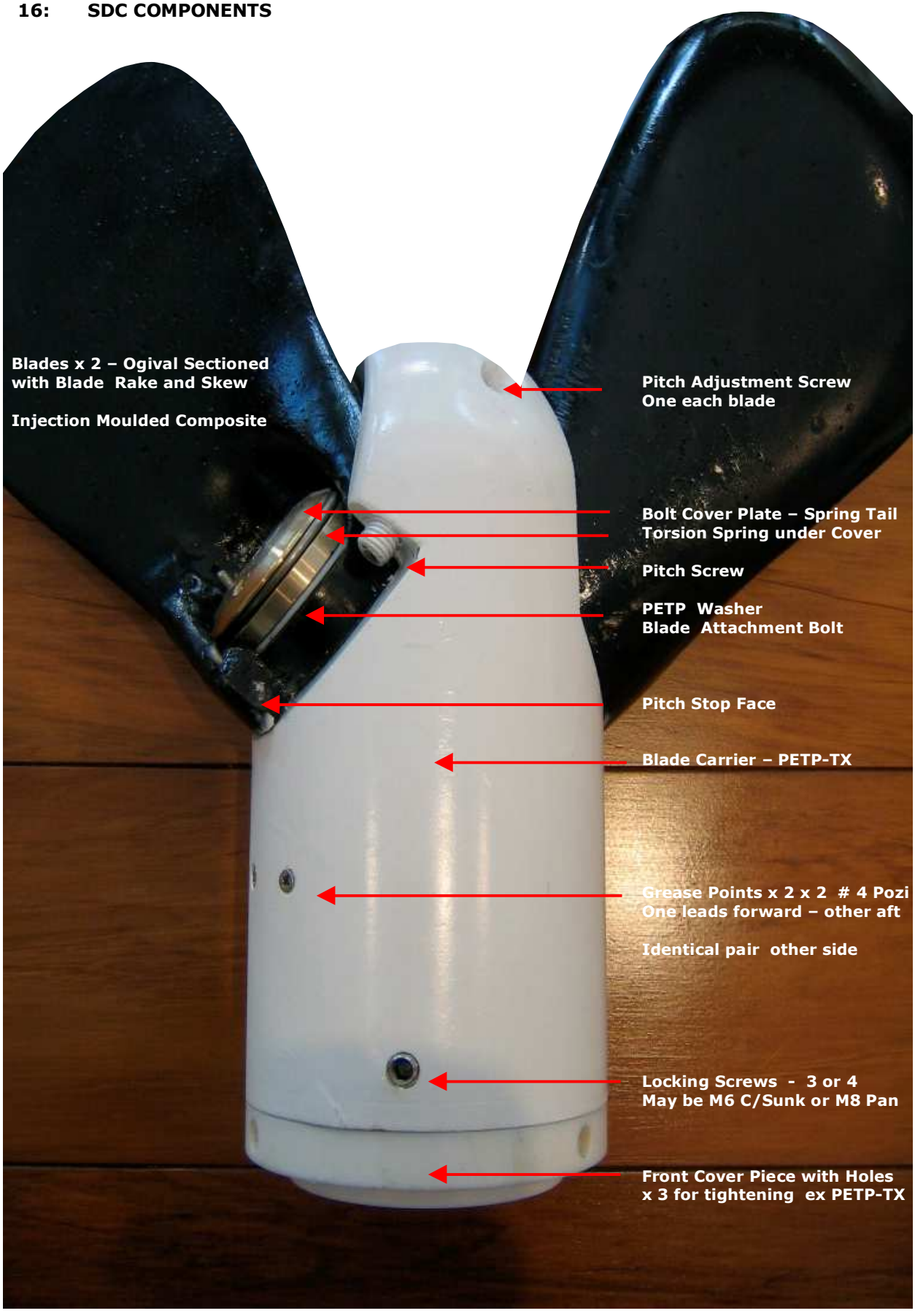
Check that each of the blades is free to turn on it's mounting bolt. Any stiffness here will impact on the overall ability of the unit to feather properly in all conditions.

Ensure the unit is lubricated in accordance with the instruction in the chapter above.

The unit is now ready for continued dependable operation in the season ahead.

Continued 19 ……..

16: SDC COMPONENTS



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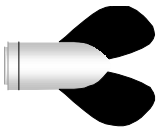


17: TOOLS REQUIRED:

The tools and consumables required to mount and maintain the unit are summarised below: All fastenings on the unit are Metric – DO NOT USE Imperial near equivalents as they will damage the hex recesses and once stripped will not accept even the correct metric tool.

Most ½" socket sets will contain the necessary sockets – you must have a metric Allen Key set. A/F means Across Flats as a way of measuring imperial socket diameters which have different systems from and Metric which is based on the diameter of the thtead.

- **Stainless Steel 316 Split Pins M 3 x 15 mm**
  Head must be compressed to ensure fit — **Supplied with the unit**
  Includes spare split pins
- **End Cut Pliers to pull the 5 mm locking pin** — **Only if removing a blade**
- **Alan Key for locking set screws on front face** — **4.0 mm A/F**
  Includes spare locking screws
- **Alan Key for Pitch Adjustment screws** — **5.0 mm A/F**
- **Alan Key for Attachment Bolt Cover Plate** — **6.0 mm A/F**
  Also used as lever to tighten Front Cover
- **Socket for Attachment of Unit to Spline** — **25 mm A/F**
- **Socket for Blade Attachment Bolts** — **22 mm A/F**
- **Loctite™ 262 or similar**
- **Square Drive Socket Set for mounting the above Sockets**
- **Long Nose Pliers for spreading split pin to lock attachment nut**
  Also used to rotate cover on bolt to pretension blade spring
- **Screwdriver – Flat point for separating split pin**

Clean Rags

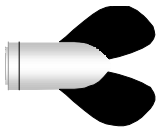
Mineral Turps or equivalent hydrocarbon cleaning fluid

Needle Nose Grease Gun filled with a good quality marine grease
Shell™ Nautilus Marine Grease - NLGI No 2 or equivalent is recommended

WARNING: Customers are strongly advised not to attempt to disassemble the unit by removing the blades unless this becomes absolutely essential. Re-assembly of all the components and maintaining a clean interior whilst at the same time preloading the torsion springs makes for a tricky operation, particularly if no stub shaft is available to hold the unit whilst these operations are completed.

In the absence of a stub shaft to hold the unit during assembly - it may be necessary to mount the unit on the actual Saildrive spline which can then be locked by engaging the gearbox

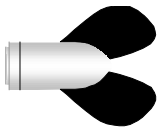
Continued 21……..



18: FINAL CHECK LIST:

Correct Size Blades fitted for Engine / Saildrive Model Ordered	
Nut M16 x 2 is included with order inside unit **NB: M20 x 2 Nut supplied only for Yanmar SD40/50 Saildrive units**	
Split Pins in carton – packed correctly	
Unit is complete with all locking screws in place	
Reverse function tested on stub shaft	
Blades operating equally	
Pitch set as per order / standard	
Serial # noted on unit – updated into register	
Shipping Address as requested with Phone # noted	
Delivery method as requested	
Invoice Register updated	
Manual included into carton with Check List and Warranty	

Continued 22 ……..

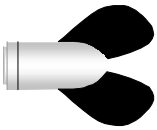


19: CUSTOMER FEEDBACK:

We always appreciate receiving feedback from each and every customer after using their new propeller for a period. In particular data on maximum and cruising rpm with corresponding boat speeds and the relative performance of the unit compared with the previous propeller installation allows us to continuously refine sizing and pitch setting recommendations.

Ease of Installation, Smoothness in operation, Reversing Function, Motoring Speed in various conditions coupled with any improvements you feel could be made to the manuals supplied with the unit that would make for improved clarity and ease of use are always welcome.

These comments can be faxed to the address below or e-mailed to: sdcprops@xtra.co.nz



Contact Address of your SDC Dealer

sdcprops@xtra.co.nz

SDC *Propellers Ltd*
PO Box 25 367
St Heliers Bay
Auckland 1740

Phone: +64 9 5757 975
Fax: +64 9 5757 972
Mobile: +64 21 930 598

SDC ***Propellers Ltd***

Sail Drive Composite Propellers ***www.sdcprops.co.nz***

PO Box 25 367, St Heliers Bay, Auckland 1740, New Zealand
Phone: +64 9 5757 975 Fax: +64 9 5757 972 Mob: +64 21 930 598 **sdcprops@xtra.co.nz**

LIMITED WARRANTY:

SDC ***Propellers Ltd - (SDC)*** ***and its agents offer the following limited warranties with the purchase of every SDC unit:***

If in the first 30 days following initial launching of the unit, the purchaser is for any reason not satisfied with the performance of the unit, then the unit may be returned in an undamaged condition to the point of purchase for a full refund of the purchase price in New Zealand dollars excluding SDC's original actual freight charges.

SDC **and its agents warrant that the propeller unit is free from defects in workmanship and material for a period of 12 months from the date of first use of the unit.**

What we will do to correct problems arising from a valid claim under the limited warranty:

To avoid unnecessary costs and delays please first contact *SDC* quoting the serial # of the unit on the invoice for warranty assessment. *SDC* will then advise an appropriate shipment address.

All costs of transport of the unit to *SDC* or their designated agent including insurance, duty and any taxes applicable will be at the cost of the purchaser.

SDC **may elect at their discretion to replace the entire unit or replace the faulty components to return the unit to it's normal function. There will be no charge to the purchaser for this service.**

***What is not covered under the limited warranty*:**

Neither *SDC* nor it's agents shall be liable for incidental, consequential or special losses or damages, resulting from the use or inability to use the *SDC* unit, whether resulting from breach of warranty or any legal theory.

The limited warranty does not cover propellers that have been improperly installed, misused, neglected or improperly maintained or damage caused by collision or impact with foreign objects which includes fishing lines and ropes. Wear and corrosion are not valid warranty claims.

The loss of the entire propeller is fully covered under the limited warranty except for shaft breakage on the Saildrive causing the loss of the retaining nut and entire propeller.

The limited warranty does not cover the costs of haul out, antifouling or replacement of associated equipment such as rope cutters that have been attached to the propeller.

***Acceptance of this limited warranty*:**

By installing the SDC unit you are accepting the terms and conditions of this limited warranty. If you do not wish to accept these terms and conditions you must not install or use the unit and must return it to the original place of purchase. This limited warranty and the remedy provided herein is exclusive and in lieu of all other expressed warranties and unless stated herein, any statements or representations made by other person or business are void. The duration of any implied warranties of merchantability or fitness for a particular purpose shall be limited to the duration of the express limited warranty.

Your invoice from SDC Propellers Ltd constitutes your receipt and acceptance of the limited warranty - the terms and conditions of which are set out above.