



SD-10 Description and OWNERS Manual



Sept, 2011



Owners Manual SD-10

Section

- I Introduction
- II Gear Identification
- III Brief description
- IV Operation
- V Maintenance
- VI Corrosion protection

I Introduction

Customer's Responsibility

The Customer/Operator is responsible to perform the necessary safety checks to ensure that lubrication, cooling, maintenance and recommended practices are strictly followed for safe, enjoyable operation.

All Transmission units are covered by a limited warranty.

Therefore: In respect to the handling of the transmission units the instructions stated in this manual are to be strictly followed.

Maintenance programs described below are valid for the SD-10 transmission unit, ***not the engine***. For the intervals and procedures for maintenance of the engine, refer to the operation manual and maintenance of the engine.

CAUTION

The manufacturer is not liable for any damages or losses caused by faulty installation, wrong handling of the equipment and/or deficient maintenance. The Customer has to make sure, that any external forces, as well as vibration caused by torsion and bending, are avoided. The interaction between engine, shaft and propeller may lead to torsional vibration, producing a hammering noise of gears and might damage the engine and/or transmission. The Supplier is not liable for such torsional vibration inherent to the installation.

I Introduction

This manual includes, among other things, the following four main chapters:

III Description

This part briefly describes function, operation and design of the SD 10 types.

IV Operation

This part describes the procedures for operation and all necessary safety measures.

V Maintenance

This part contains all maintenance and service tasks to be performed by the operator. Important information related to technical reliability and operational safety are highlighted by the identifying words as follows:

WARNING

Any procedure, practice, condition, statement etc., which is not strictly followed, could result in injury or death of personnel.

VI Corrosion Protection

This part contains information on corrosion protection.

II Gear Identification

Name Plate:

The name plate is fixed onto the transmission

MODEL SD 10 Transmission Type

$i_A = 2,16$ Transmission ratio propeller rotation opposite engine rotation

$i_B = 2,16$ Transmission ratio propeller rotation same to a engine rotation

SER. N. XXXXXXXX Transmission serial number

P/N. 3321 005 011 Transmission part number



III Brief Description

The ZF SD-10 Sail Drive is a reliable and well designed piece of machinery.

They are of sturdy construction and utmost reliability.

Nevertheless the user should make a point of observing the following instructions for installation, operation and maintenance.

Failure to do so, or unauthorized changes in the transmission, will preclude all and any warranty claims.

A Service Manual is available from the manufacturer.

IV Operation

1. General

All SD 10 transmissions have been submitted to a test run before shipment. During normal operation, the transmission should only be shifted with the engine at idle speed. In emergency cases it is also admissible to shift at higher speeds. Visual checks for leakage should be made from time to time.

WARNING. Work on the transmission must only be performed with the engine and propeller at standstill.

CAUTION. Before the first startup, the transmission must be filled with transmission fluid. Start the engine only when the transmission is in neutral position.

CAUTION. Using the transmission with an insufficient oil level will damage the gears. An excessive oil level may cause leakage at the shaft seals and the transmission breather, and raise the operating temperature considerably.

IV Operation

2. Sailing:

Boat sailing, moving in tow or anchoring. When the engine is off and the boat sails, moves in tow or is anchored, the propeller may turn with the water current.

CAUTION. When the boat sails with engine switched off the shift position of the gearbox can be:

- 1) in neutral position and in this case the propeller is free to rotate.
- 2) in the opposite position of the travel direction to lock the propeller.

Note: do not put the shifting lever of the gearbox in forward position, otherwise the transmission could be damaged!

WARNING. Do not work on the transmission when being towed, or anchoring in a river because the propeller may rotate.

WARNING. When the engine runs idle, but the propeller shaft should not be driven (such as when charging the battery with the generator), the shifting lever (see Fig. 2) must be held in the neutral position (N) to prevent the boat from moving.

IV Operation

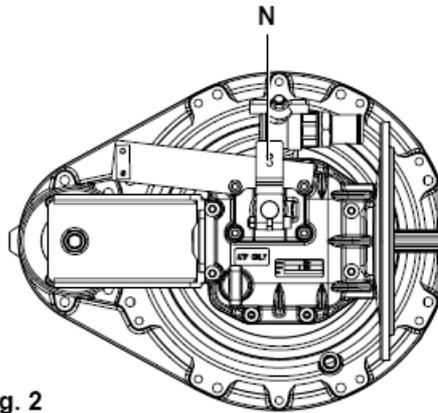
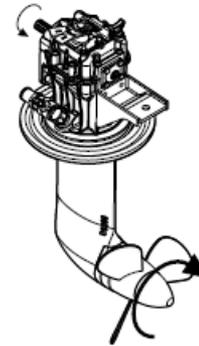
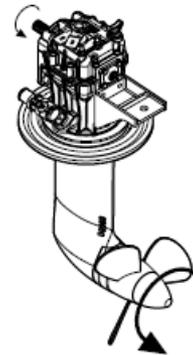


Fig. 2



IV Operation

3. Gear shift operation

CAUTION. Make certain that control rod or cable is easily movable.

3.1 Lever travel: see Fig. 3

Minimum travel of gear shift lever (O-A=O-B) must be 35 mm (1.3/8") for outer pivot point and 30 mm (1.3/16") for inner pivot point.

3.2 Lever position:

In neutral position perpendicular to control rod or cable. Gear shift lever can be fixed in any position by means of clamping screw. Minimum distance between gear shift lever and cover 0.5 mm (0.02"). Opening or loosening of cover requires renewed adjustment (by specialized personnel only).

3.3 Regular checks

are required to ensure the strict observance of item 3.1 and 3.2.

IV Operation

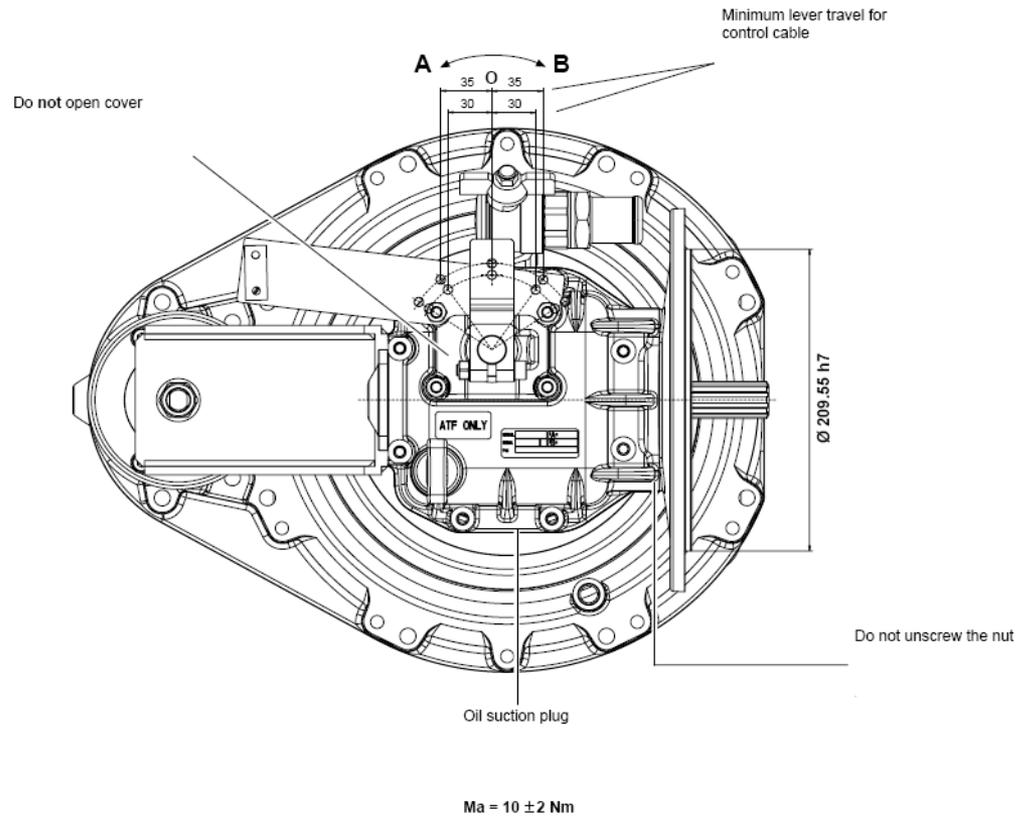


Fig. 3



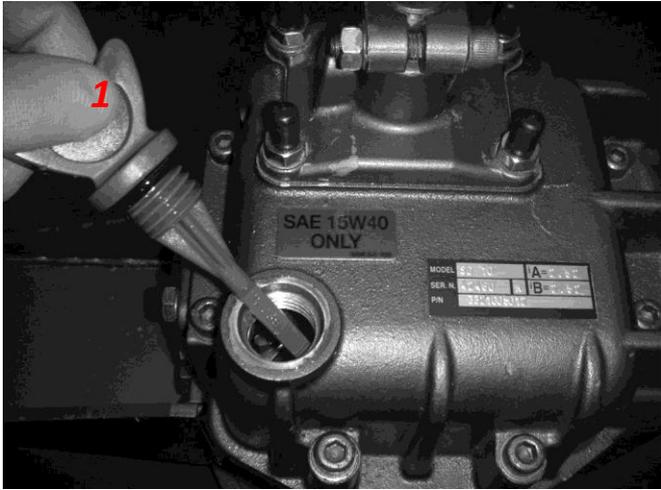
V MAINTENANCE

Maintenance programs described below are valid for the SD-10 transmission unit, not the engine. For the intervals and procedures for maintenance of the engine, refer to the operation manual and maintenance of the engine.

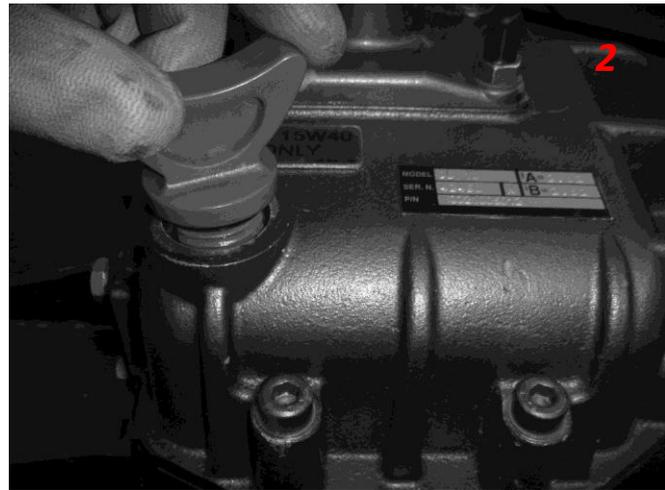
ROUTINE MAINTENANCE

MAINTENANCE SCHEDULE	MAINTENANCE TO BE PERFORMED
At the beginning of the day and when you refuel	Check the transmission oil (fluid) level.
Every two months of operation	Check the battery connections and acid level.
	Check the antifouling condition and, if necessary, apply it to the foot.
	Ensure that the clamps and the wiring connections are secure. Clean the clamps (every two operating months or every 50 hours, according to the interval that occurs first. In case of use in saltwater, the interval is reduced to every 25 hours or 30 days of operation, according to the interval that occurs first).

V OIL LEVEL CHECK

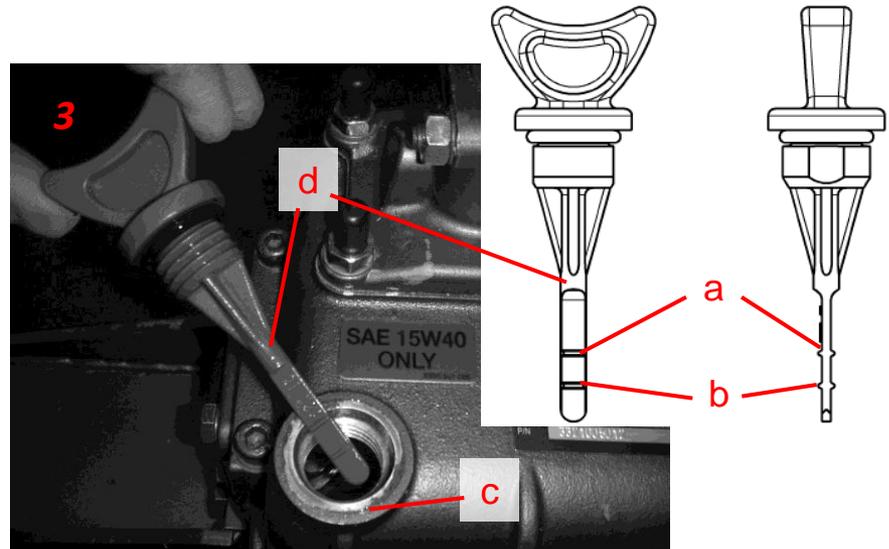


1. Check the oil level by removing the dipstick.
Wipe the dipstick with a clean, lint-free cloth.



2. Insert the dipstick so that it rests on top of the threads into the case.
Remove the dipstick and check the fluid level on the dipstick. The fluid level must be between the marks of minimum and maximum on the dipstick. Add oil as necessary.

3. a = Maximum, b = Minimum, c = Upper edge of threaded hole
d = Rod

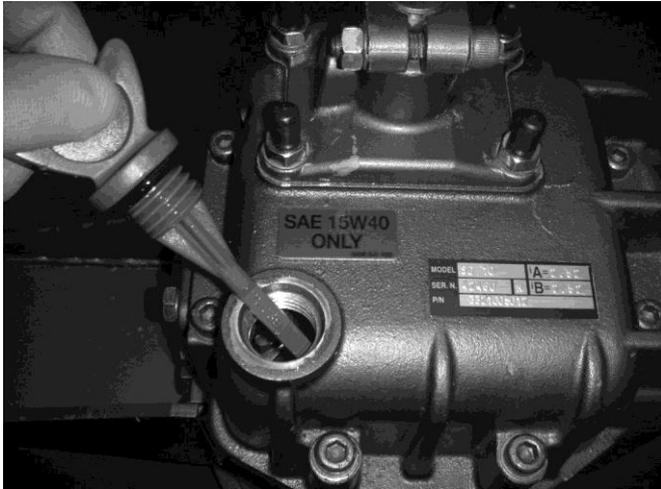


V MAINTENANCE

SCHEDULED MAINTENANCE

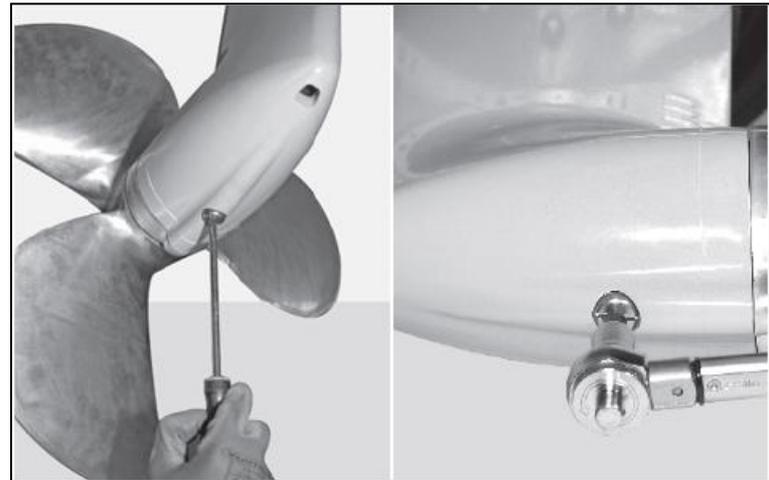
INTERVAL	MAINTENANCE TO BE PERFORMED
After the first 25 hours and not more than 30 hours	Change the oil.
Every 250 hours of operation or once a year, according to the interval that occurs first.	Change the oil.
	Lubricate and check that the sea chest opens and closes freely.
Every 500 hours or once a year, according to the interval that occurs first.	Lubricate the propeller shaft splines and tighten the propeller nuts.
	Check that pipe fittings are properly tight.
	Check that in the grounding circuit (continuity) are not loose or damaged connections.
	Ensure that the electrical system fasteners are not loose, damaged or corroded. Make sure that there are not any loose, damaged or corroded wires and connectors.
	Check that the hose clamps on flexible pipes are properly tight.
	Apply an antifouling
Each year	Check the the foot sealing membrane not present cracks or water seepage
Replace every 7 years	Replace the foot sealing membrane.

V OIL CHANGE

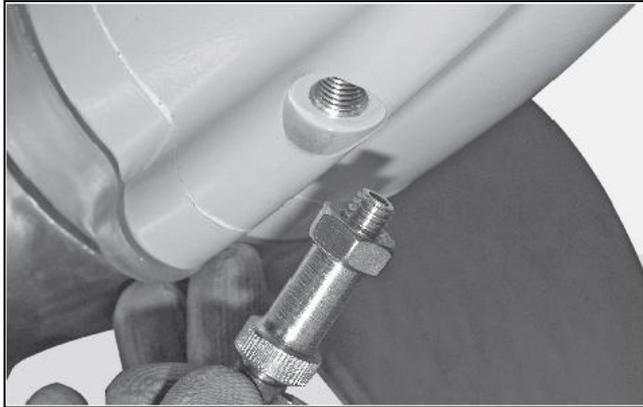


Un-screw the oil dipstick.

*Prepare a suitable container to collect the fluid.
Remove the lower plug and drain the oil.
Dispose of used oil properly.*

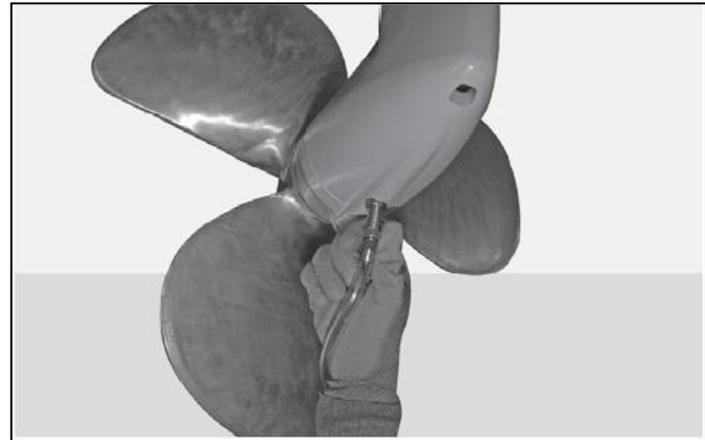


V OIL CHANGE



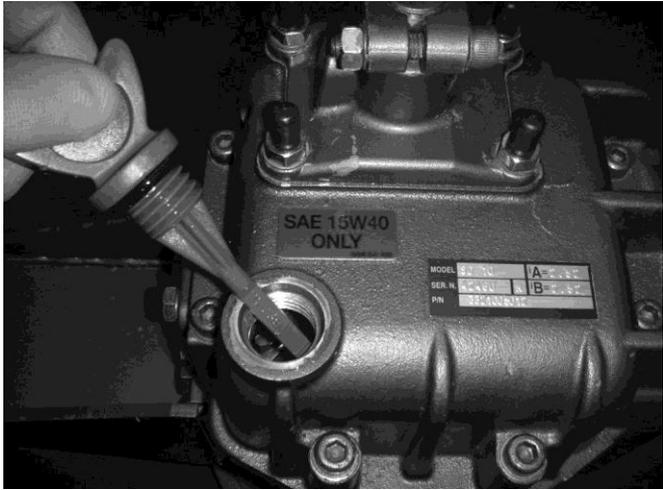
Connect a hand oil pump onto the fitting of the oil drain hole in the SD-10 drive. Be careful not to damage the thread of the drain hole.

*Using low pressure pump, add oil.
3L -SAE 15W-40*



Replace the O-rings on the oil cap Sail drive, lubricate it and prepare to reassemble it.

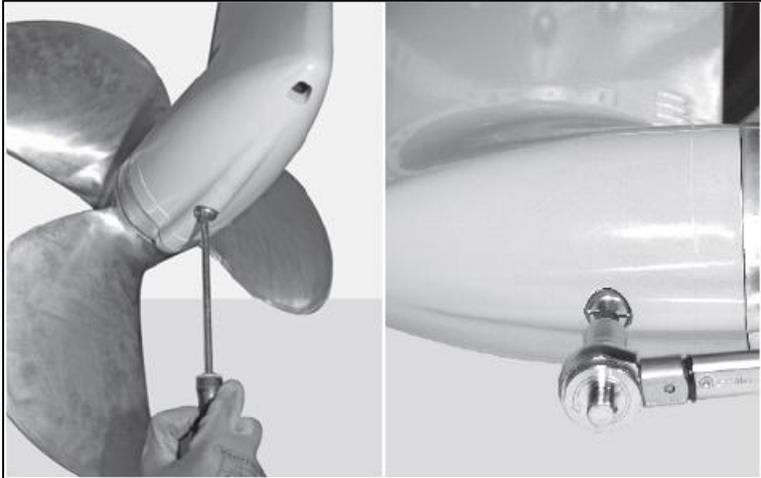
V OIL CHANGE



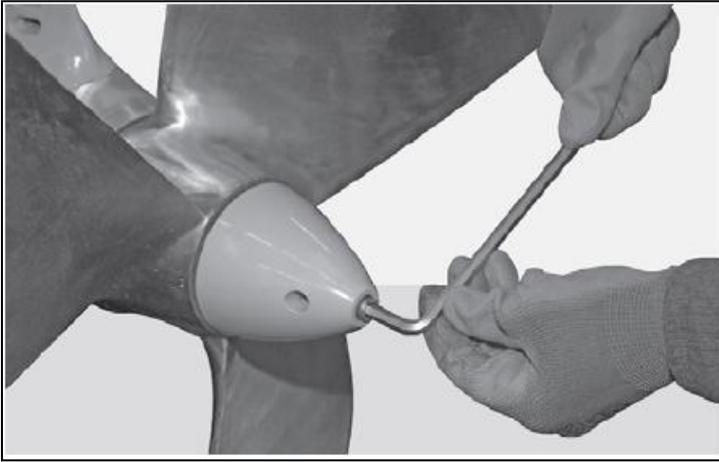
Screw in the oil dipstick.

Remove the oil pump fitting and quickly install the oil plug. Torque 10Nm.

Add oil at the dipstick hole to reach the proper level as indicated on the dipstick.



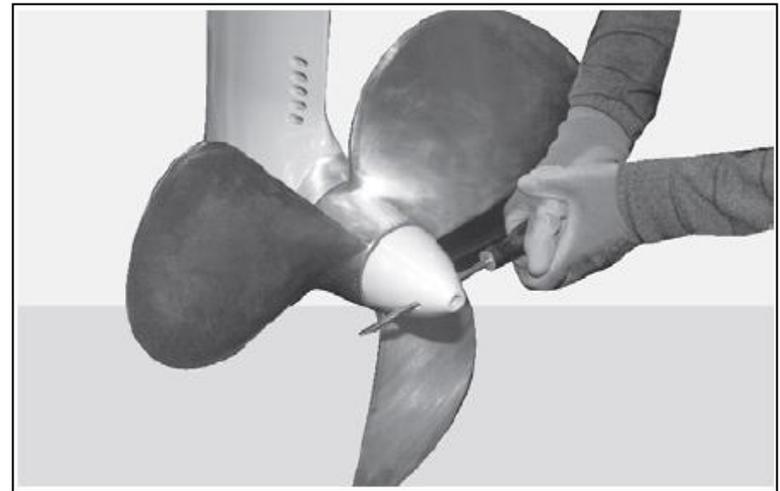
V REMOVING PROPELLER



Place a block of wood between the propeller blade and the hull.

Using a 6mm Allen wrench, loosen and remove the locking screw of the bullet.

*Insert a suitable tool into the hole.
Loosen and remove the propeller spinner nut.*



V REMOVING PROPELLER

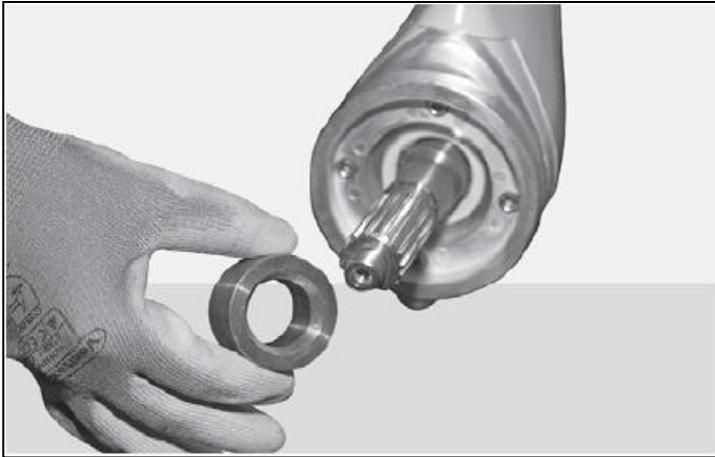


*Remove the wooden block.
Remove the propeller.
If necessary, use a plastic hammer and gently tap to remove.*

Remove the propeller sleeve.

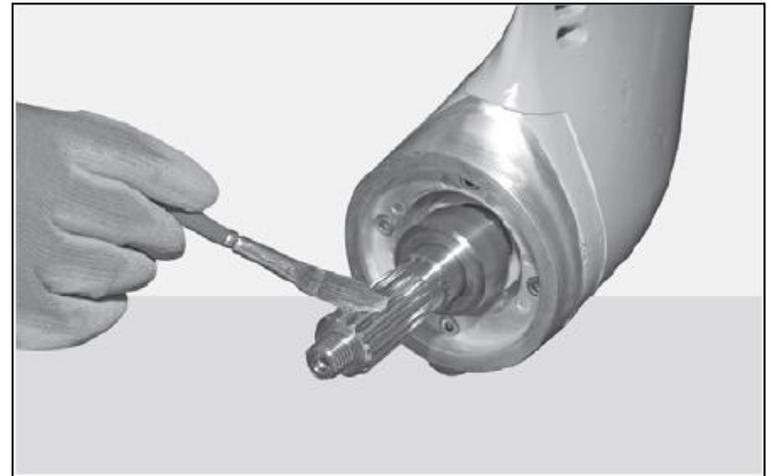


V INSTALLING PROPELLER



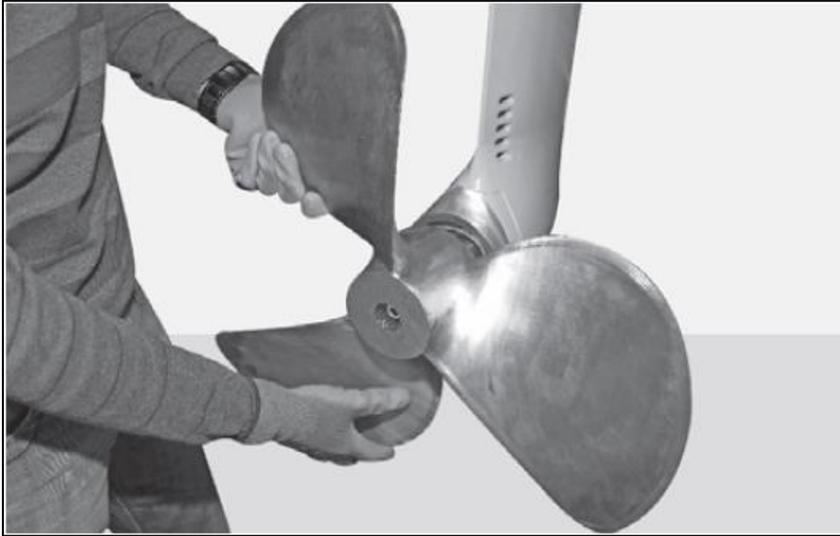
Assemble the propeller shaft thrust bearing sleeve. Install chamfered side away from propeller.

Put some anti-corrosion grease on the grooves of the propeller shaft.



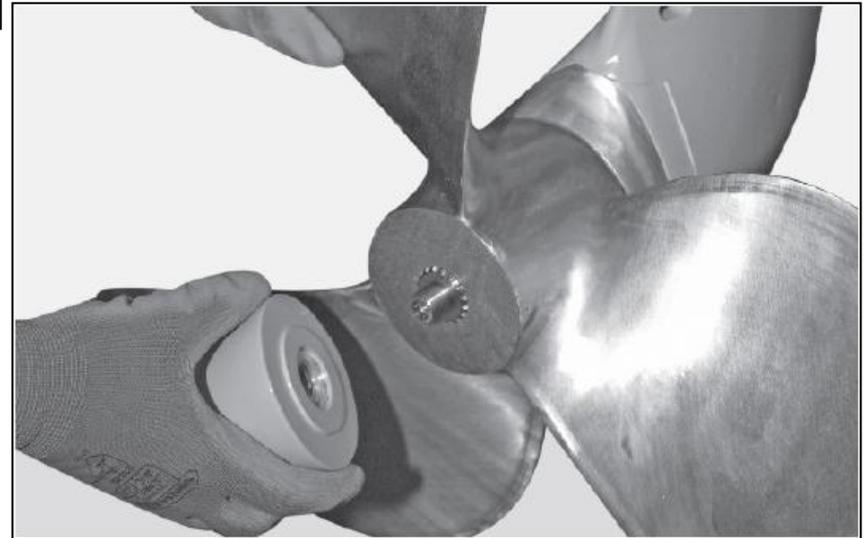
DESCRIPTION	EMPLOYMENT
Antifouling grease	Propeller shaft splines
Special lubricant	Propeller shaft splines
Marine lubricant with teflon	Propeller shaft splines

V INSTALLING PROPELLER

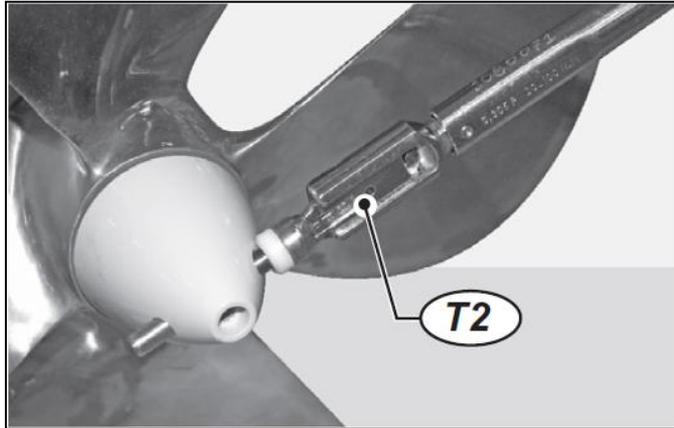


*Align the splines and insert the propeller on the propeller shaft.
The propeller shaft must fit evenly on the splines.*

*Wipe off excess grease.
Install the propeller shaft nut.*



V INSTALLING PROPELLER

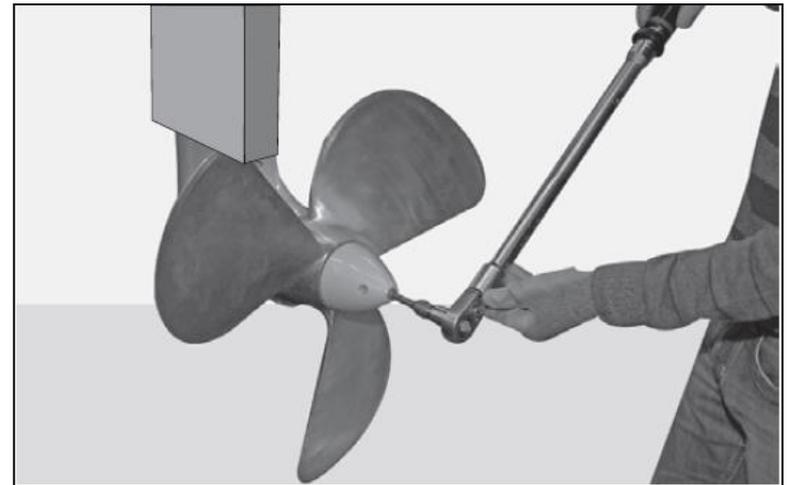


Place a block of wood between one of the propeller blades and the hull.

Mount the special insert T2 on a suitable torque wrench and insert into the hole in the propeller nut and tighten to a torque of 125 Nm.

Install the locking screw in the center.

Tighten the locking screw to a torque of 23 Nm.



VI CORROSION PROTECTION

The SD-10 is equipped with a replaceable sacrificial anode on the lower leg of the drive. This anode is designed to dissolve in response to electrical current generated while in sea water.

This anode is not designed to accommodate other hardware or other excessive electrical currents related to additional components or changes to the electrical AC and DC systems on board the vessel.

The ZF SD-10 will be mechanically connected to the powering engine. The design of the electrical system of the engine will impact the selection of a proper galvanic protection system.

Isolated systems:

If the engine alternator and starting motor uses an isolated circuit (having both a battery + and – connection terminal) then the system can be treated as an “isolated” system.

Non-Isolated systems:

If either the starter motor or the alternator uses a single battery + and uses the body or case as a ground through the engine, then the system of the SD-10 and the engine must be considered as “grounded” to the battery negative and not isolated.

VI CORROSION PROTECTION

Suggested actions:

For information on this topic, review the published guidelines as contained in ABYC guidebook, Section E-2.

Upon final delivery of the vessel a review of the electrical bonding system should be conducted. An expert in the field of electrical bonding should be called upon to review the completed vessel. This review should determine if there is an appropriate amount or sizing of sacrificial anodes installed in order to protect the mechanical components (engine and SD-10) from damage from galvanic corrosion.

Please keep in mind, changes made to the vessels AC and DC systems may impact the protection of the installed anode system.

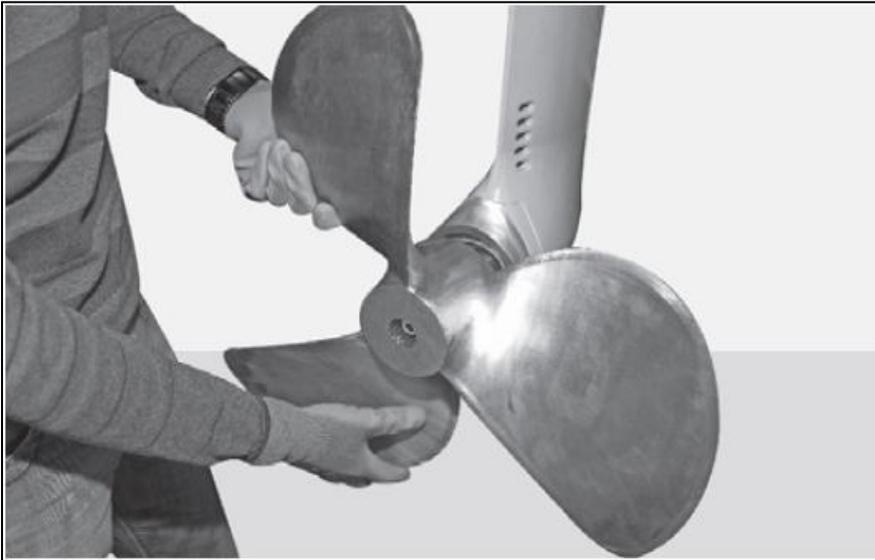
Damage to the SD-10 as a result of failure to maintain a good balanced galvanic protection system is not the responsibility of ZF Marine.

VI ANODE REPLACEMENT

To minimize galvanic corrosion, the SD-10 system has a sacrificial anode placed on the foot of the sail drive.

However, in particularly adverse conditions we recommend the use of additional anti-corrosion anode kit, to be installed separately.

The anodes provide protection against corrosion under normal use.



Remove propeller.

VI ANODE REPLACEMENT

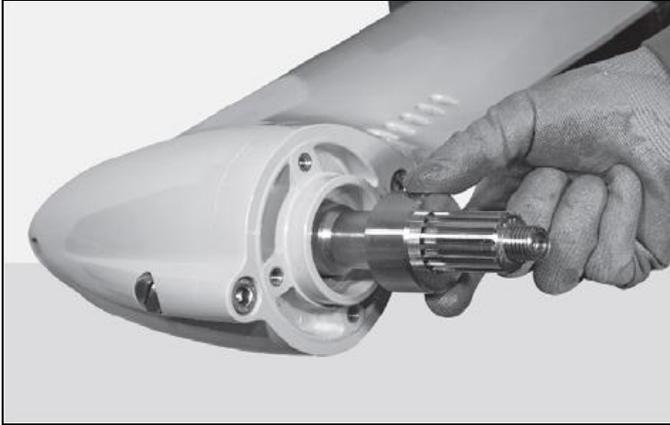


Using a 6mm "Allen" key, remove the screws of the anode.

*Remove the anode of the foot.
If necessary, remove using a plastic mallet.*



VI ANODE REPLACEMENT



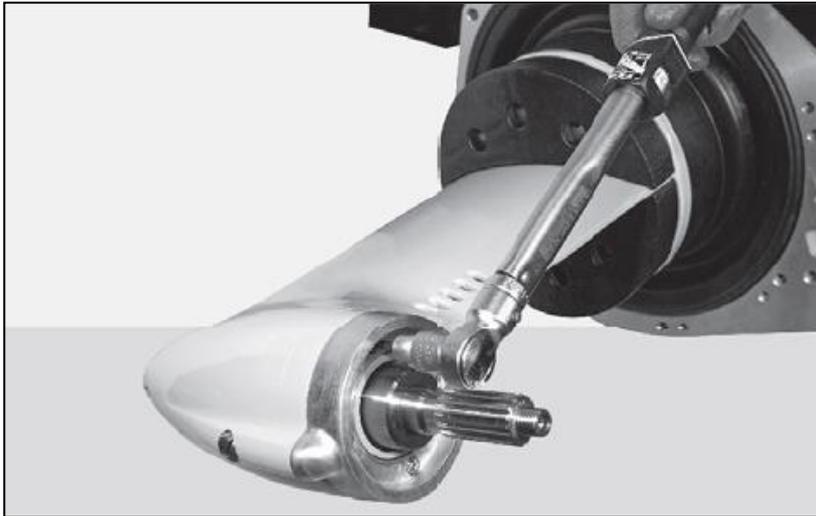
Remove the spacer sleeve and clean any scale.

Apply to the propeller shaft splines a thick layer of lubricant and/or corrosion protection material. Insert the propeller thrust sleeve onto the shaft.

Place a new anode on the foot.



VI ANODE REPLACEMENT



*Tighten to a torque of 12 Nm
with the cross method.*

Install propeller.

