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**OXE300**  
**USER MANUAL**

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# 1 OVERVIEW

## 1.1 ABOUT THIS MANUAL

This manual provides you with the information you need to know about starting, operating and maintaining your OXE Diesel engine.

Read this manual carefully and learn how to operate your outboard engine correctly. Always contact your dealer if you have any questions.

Operating and attending the engine properly will preserve its qualities for a long operating life. Follow the instructions in this manual for operating this engine and carry out inspections as described on a regular basis.

## 1.2 SAFETY INFORMATION

Safety and operating information that is practiced, along with good common sense, can help prevent personal injury and product damage.

### 1.2.1 SYMBOLS AND SIGNS



#### **DANGER**

This indicates a hazardous situation, which if not avoided, will result in death or serious injury.



#### **WARNING**

This indicates a hazardous situation, which if not avoided, could result in death or serious injury.



#### **CAUTION**

This indicates a hazardous situation, which if not avoided, could result in minor or moderate injury.



#### **NOTE**

Important information.

### 1.2.2 ROTATING PARTS



#### **DANGER**

Rotating parts can cause cuts, mutilation or strangulation.

Hands, feet, hair, jewelry, clothing, PFD-straps, etc. can become entangled with internal rotating parts of the engine or exposed moving parts.

Do not remove or replace the top cover with the engine running.

### 1.2.3 HOT PARTS



#### **DANGER**

During and after operation, engine parts could be hot enough to cause burns. Do not touch any parts under the top cover until the engine has cooled off.

### 1.2.4 ELECTRIC PARTS



#### **DANGER**

Do not touch any electrical parts while starting the engine. They can cause shock or electrocution.

## 1.2.5 ENGINE SHUT-OFF SWITCH AND KILL-CORD



### **DANGER**

The purpose of a lanyard stop switch is to stop the engine when the operator moves far enough away from the operator's position to activate the cut-off switch.

Attach the engine kill-cord so that the engine stops if the operator falls overboard or leaves the helm.

When activating the engine shut-off switch the engine will stop immediately, but the boat will continue to coast for some distance depending on velocity and degree of any turn at shut down.

## 1.2.6 ENGINE EXHAUST EMISSIONS



### **WARNING**

Inhaling engine exhaust gases can result in carbon monoxide poisoning, which can lead to unconsciousness, brain damages, or death. Avoid exposure to carbon monoxide gas.

Stay clear from exhaust areas when the engine is running. Keep the boat well ventilated.

## 1.3 MODIFICATIONS



### **WARNING**

Do not attempt to modify the outboard. Modifications may reduce safety and reliability, and render the outboard unsafe or illegal to use.

### 1.3.1 ACCESSORIES

Genuine OXE Diesel parts and accessories have been specifically designed and tested for OXE outboards.

Some accessories, not manufactured or sold by OXE Diesel, may not be designed to be safely used with OXE outboards or OXE outboard operating systems. Obtain and read the Installation, Operation, Maintenance and Accessories manuals for all selected accessories.

## 1.4 SAFE BOATING

### 1.4.1 BOATER'S RESPONSIBILITIES

It is always the operator (driver) that is responsible for the correct and safe operation of the boat and the safety of its occupants and general public. We strongly recommended that each operator reads and understands the entire manual before operating the outboard.

Be sure that at least one additional person onboard is instructed in the basics of starting and operating the outboard engine, and boat handling, in case the driver is unable to operate the boat.

### 1.4.2 BOAT HORSE POWER CAPACITY

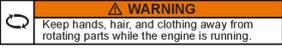
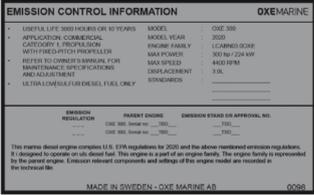
Exceeding the boat's maximum power rating can cause serious injury or death. Any overpowering of the boat can affect boat control and flotation characteristics or break the transom.

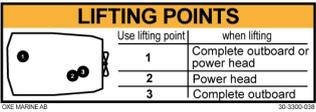
Do not install an outboard that exceeds the boat's maximum power and weight rating.

### 1.4.3 BOAT PERFORMANCE CAPACITY

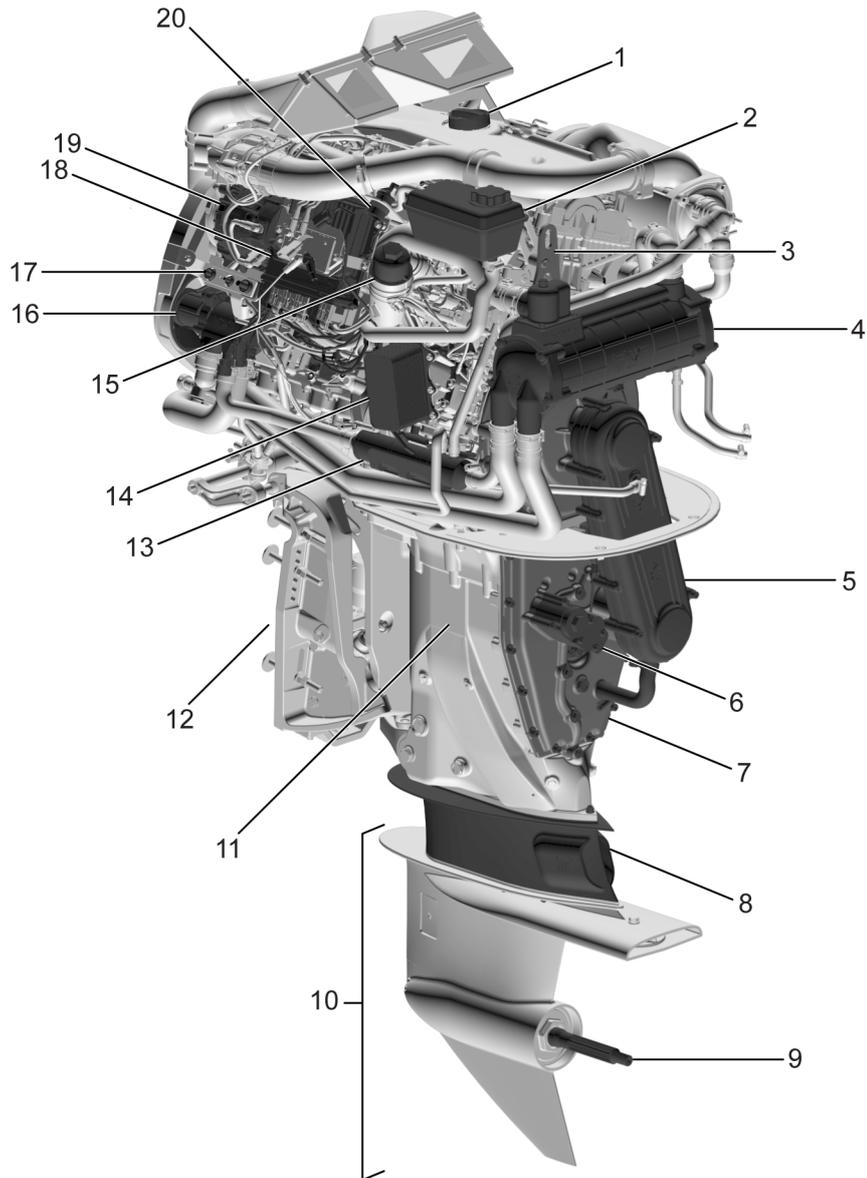
Do not overpower or overload your boat. Most boats will carry a required capacity plate indicating the maximum acceptable power and load as determined by the manufacturer. If in doubt, contact your dealer or the boat manufacturer.

# 1.5 WARNING AND INFORMATION LABELS

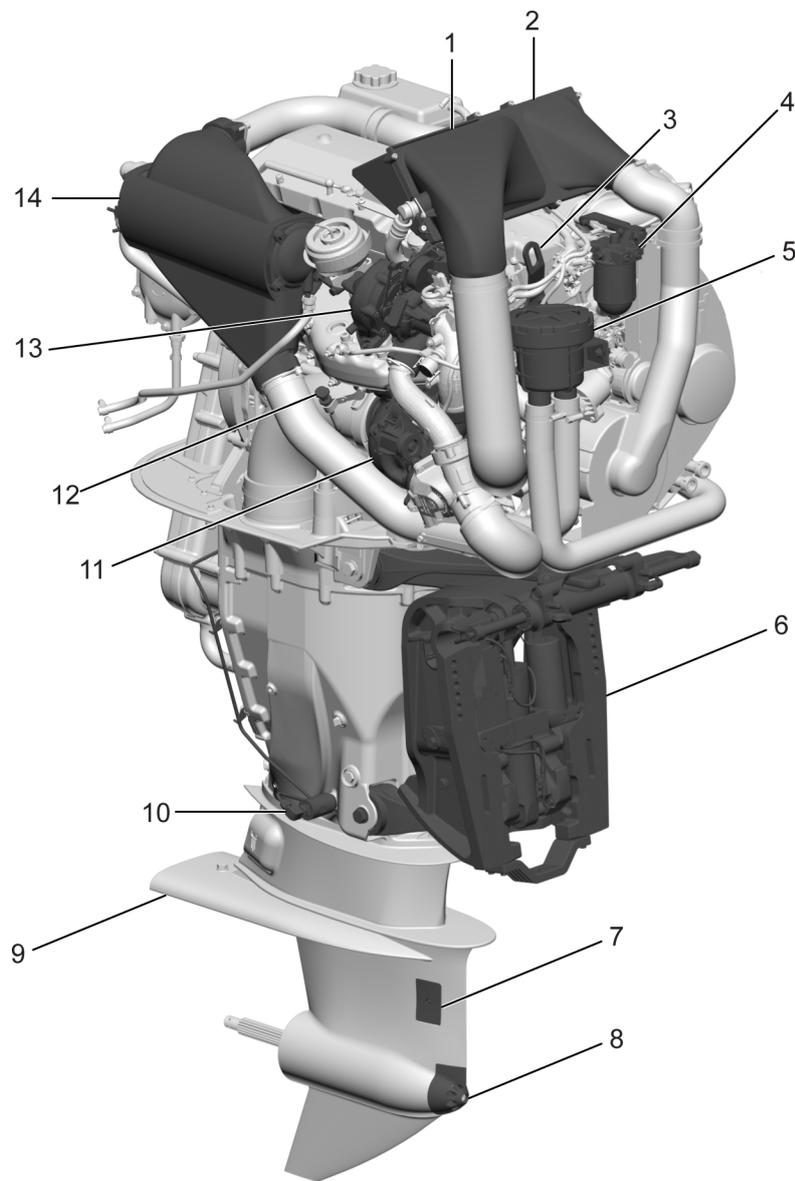
Label	Information	Location
<b>Heat warning label</b> 	Warning for hot surfaces, which could result in burns	<ol style="list-style-type: none"> <li>1. Placed on the turbo pressure pipe</li> <li>2. Placed on the lower part of the intercooler, near the primary transmission assembly</li> </ol>
<b>Rotation warning label</b> 	Warning for rotating parts	<ol style="list-style-type: none"> <li>1. Placed on the lower timing belt cover, on engine front</li> <li>2. Placed next to the primary transmission assembly</li> </ol>
<b>Electrical warning label</b> 	Warning for electrical hazards	Placed on the ECU-bracket
<b>Read manual small label</b> 	A reminder of the importance to read manuals prior to the initial use of equipment or machinery. The manual contains information needed for proper operation, maintenance and care.	Placed on the upper cowling, next to the trim and tilt button
<b>Read manual hang tag</b> 	A reminder of the importance to read manuals prior to the initial use of equipment or machinery. The manual contains information needed for proper operation, maintenance and care.	Hanging underneath the cowl, near the engine connector
<b>Identification label</b> 		<ol style="list-style-type: none"> <li>1. Placed on the starboard side of the engine, just below the middle cowling</li> <li>2. Placed on page 2 in the Service Book</li> </ol>
<b>Emission label</b> 		Placed on the main engine air intake on the starboard side of the engine

Label	Information	Location								
<p><b>Lifting points label</b></p>  <table border="1" data-bbox="161 257 477 369"> <thead> <tr> <th>Use lifting point</th> <th>when lifting</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Complete outboard or power head</td> </tr> <tr> <td>2</td> <td>Power head</td> </tr> <tr> <td>3</td> <td>Complete outboard</td> </tr> </tbody> </table>	Use lifting point	when lifting	1	Complete outboard or power head	2	Power head	3	Complete outboard	<p>Information about the position and purpose of the three lifting points on the outboard</p>	
Use lifting point	when lifting									
1	Complete outboard or power head									
2	Power head									
3	Complete outboard									
<p><b>Lifting point 1 label</b></p> 	<p>Position of lifting point 1</p>	<p>Placed by lifting point 1, located at the prow of the powerhead just behind the seawater strainer</p>								
<p><b>Lifting point 2 label</b></p> 	<p>Position of lifting point 2</p>	<p>Placed by lifting point 2, located in the bracket for the expansion tank</p>								
<p><b>Lifting point 3 label</b></p> 	<p>Position of lifting point 3</p>	<p>Placed by lifting point 3, located by the stern of the powerhead close to the thermostat</p>								

## 1.6 MAIN COMPONENTS



- |                                 |                                 |
|---------------------------------|---------------------------------|
| 1 Engine oil filler cap         | 11 Upper housing                |
| 2 Expansion tank                | 12 Transom mount                |
| 3 Lifting eye                   | 13 Dual cooler (heat exchanger) |
| 4 Main cooler (heat exchanger)  | 14 Engine oil cooler            |
| 5 Primary transmission assembly | 15 Engine oil filter            |
| 6 Gearbox oil pump and filter   | 16 Seawater pump                |
| 7 Gearbox                       | 17 Battery connectors           |
| 8 Adapter 25 in.                | 18 Engine Control Unit (ECU)    |
| 9 Propeller shaft               | 19 Alternator                   |
| 10 Lower housing                | 20 Engine connector             |



- |   |                         |
|---|-------------------------|
| 1 Intake air filter                             | 8 Lower water intake    |
| 2 Ventilation air filter                        | 9 Anti cavitation plate |
| 3 Lifting eye                                   | 10 Lower belt tensioner |
| 4 Fuel filter                                   | 11 Lower turbo charger  |
| 5 Seawater strainer                             | 12 Engine oil dip stick |
| 6 Transom mount with tilt and trim cylinders    | 13 Upper turbo charger  |
| 7 Upper water intakes (starboard and port side) | 14 Intercooler          |

## 1.7 INSTRUMENTATION

For instruments and gauges, refer to the corresponding display manual.

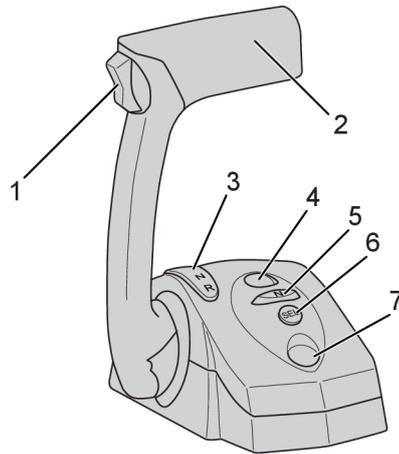
## 1.8 SINGLE LEVER CONTROL HEAD

The control head engages both gear shifting and acceleration. Depending on single installation or multi installation of outboards, the boat is equipped with a single or dual lever control head.



### NOTE

If the outboard is started with the lever in either forward position or reverse position, the gearbox will remain inactive. To activate the gearbox, the lever must first be placed in **neutral** position and thereafter into gear.



- |                            |                          |
|----------------------------|--------------------------|
| 1 Engine trim control      | 5 Neutral button         |
| 2 Control lever            | 6 SEL button             |
| 3 Lever position indicator | 7 Neutral indicator lamp |
| 4 Control lamp             |                          |

## 1.9 CONTROL HEAD OPERATION



### WARNING

Be very cautious when first engaging the gears to establish that FORWARD is truly forward and REVERSE is truly reverse. A quick in-and-out of the gear test is recommended. Ensure that the boat is clear of all obstacles around the boat before conducting this test.

### 1.9.1 CONTROL LAMP

On the single control head, the control lamp (see item (4) in Section 1.8 "Single lever control head", [page 11](#)), has a solid green light indicating that the control head is active.



### WARNING

A fast flashing light indicates a non-critical fault, which may cause the boat speed to be reduced. The system will continue to operate.

### 1.9.2 INDICATOR DIMMING FEATURE

When the control head is active, pressing the SEL button (see item (6) in Section 1.8 "Single lever control head", [page 11](#)) repeatedly will cycle through the available indicator brightness levels.

### 1.9.3 NEUTRAL INDICATOR LAMP

The neutral indicator lamp (see item (7) in Section 1.8 "Single lever control head", [page 11](#)) has four states:

- Fast flashing in combination with lamp (see item (4) in Section 1.8 "Single lever control head", [page 11](#)) indicates a critical fault, which may result in limited or no system performance.

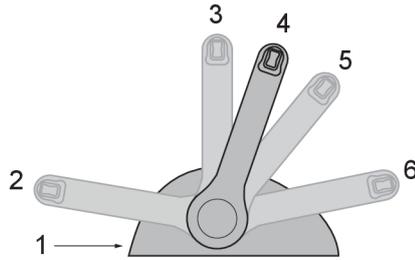


### DANGER

Call for assistance or use another controlling device in an emergency.

- Steady light: engine is in neutral
- Slow flashing (0.5 s on, 0.5 s off): Neutral Throttle Warmup is engaged.
- Very slow flashing (1 s on, 1 s off): Trolling mode is engaged.

## 1.9.4 CONTROL HEAD RANGE



- |   |                      |
|---|----------------------|
| 1 Control arm friction adjusting screws | 4 Neutral            |
| 2 Full speed forward                    | 5 Reverse idle       |
| 3 Forward idle                          | 6 Full speed reverse |

Forward	idle to 100% of max engine rpm
Reverse	idle to 50% of max engine rpm
NTW (Neutral Throttle Warmup)	idle to 50% of max engine rpm
TM forward	idle to 20% of max engine speed
TM reverse	idle to 20% of max engine rpm
LSC forward	idle rpm
LSC reverse	idle rpm

## 1.9.5 NEUTRAL THROTTLE WARMUP

Neutral Throttle Warmup (NTW) allows control of the engine throttle without gear engagement, in order to warm up the engine at a higher rpm.



### NOTE

Maximum rpm is limited to 2400 rpm.

A slow flashing neutral indicator lamp (see item (7) in Section 1.8 "Single lever control head", page 11) shows that NTW is engaged.

### Engaging NTW

1. Move the control lever (see item (2) in Section 1.8 "Single lever control head", page 11) to the neutral position. The neutral indicator lamp ( (7) ) will have a steady light.
2. Press the N button (see item (5) in Section 1.8 "Single lever control head", page 11). The neutral indicator lamp (see item (7) in Section 1.8 "Single lever control head", page 11) flashes to indicate that NTW is engaged.

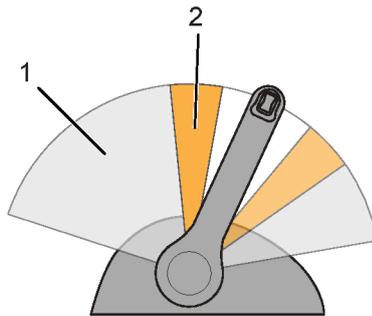
It is now possible to increase throttle and the engine will stay in neutral.

### Disengaging NTW

1. Return the lever (see item (2) in Section 1.8 "Single lever control head", page 11) to the neutral position.
2. Press the N button (see item (5) in Section 1.8 "Single lever control head", page 11). The lamp (see item (7) in Section 1.8 "Single lever control head", page 11) will have a steady light.

The engine and transmission will now respond normally to lever commands.

## 1.9.6 LOW SPEED CONTROL



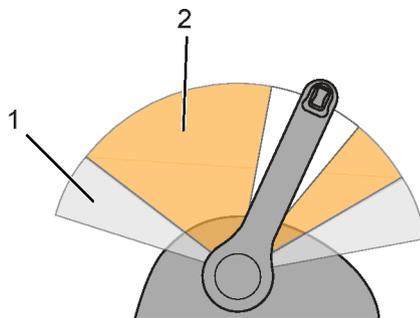
- 1 Normal propeller rpm range: idle to max rpm      2 LSC propeller rpm range: 0 to idle rpm

Low Speed Control (LSC) enables unprecedented control while mooring and low speed maneuvering. LSC incorporates an electro-hydraulically operated clutch that ensures smooth shifting between neutral, forward and reverse.

The sensor controlled propeller speed allows for seamless control from zero to maximum rpm. The boat is fully operable even below 3-4 knots.

## 1.9.7 TROLLING MODE

When engaging Trolling Mode (TM) the full throttle range represents 20% of normal throttle range. This enables a higher resolution of the throttle maneuvering thus giving the operator a more precise control in demanding situations.



- 1 Full engagement propeller rpm range idle to 20% of max rpm      2 Trolling propeller rpm range: Zero to idle rpm

A very slow flashing (one second on, one second off) neutral indicator lamp (see item (7) in Section 1.8 "Single lever control head", page 11) indicates that TM is engaged.

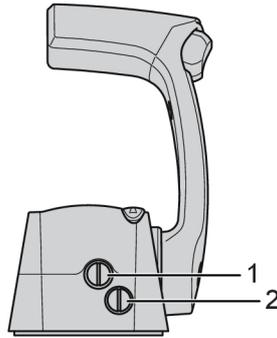
### Engaging Trolling Mode

1. Move the control lever (see item (2) in Section 1.8 "Single lever control head", page 11) to forward idle or reverse idle positions.
2. Press the N button (see item (5) in Section 1.8 "Single lever control head", page 11). The lamp (see item (7) in Section 1.8 "Single lever control head", page 11) will flash slowly to indicate that TM is engaged.

### Disengaging Trolling Mode

1. Move the control lever (see item (2) in Section 1.8 "Single lever control head", page 11) to forward idle or reverse idle position.
2. Press the N button (see item (5) in Section 1.8 "Single lever control head", page 11). The flashing lamp (see item (7) in Section 1.8 "Single lever control head", page 11) will go out to indicate that TM is disengaged.

## 1.9.8 ADJUSTABLE LEVER FEEL



1 Shift detent

2 Throttle friction

The friction drag on the lever and the force required to move in and out of the shift detents can be set according to operator preference.

- Turn the throttle friction screw clockwise to increase the friction on the lever.
- Turn the throttle friction screw counter-clockwise to reduce the friction on the lever.

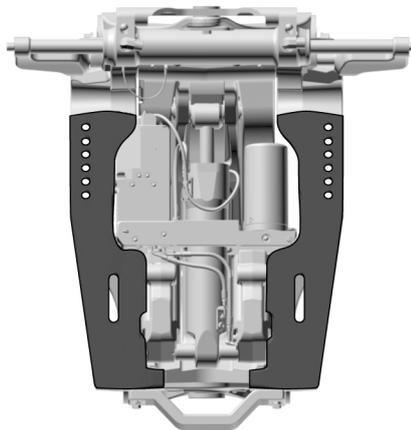
The shift detents are meant to prevent accidental gear engagement. Bear that in mind when you make adjustments.

- Turn the shift detent screw clockwise to increase the force.
- Turn the shift detent screw counter-clockwise to decrease the force.

## 1.10 OUTBOARD INSTALLATION

The information presented in this section is intended as reference only. For more detailed information, refer to the Installation Manual.

Safe and proper mounting depends on experience and the specific boat and outboard combination. Therefore we strongly recommend that your local dealer install the outboard and related accessories to ensure proper installation and good performance.



Transom mount bolt pattern



### WARNING

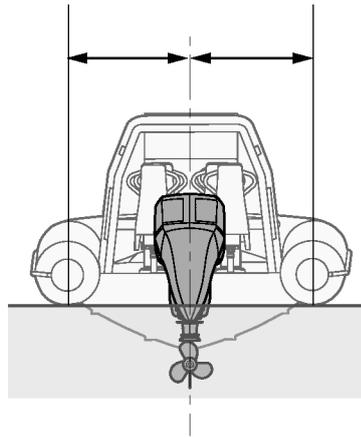
Exceeding the boat's maximum power rating can cause serious injury or death. Overpowering the boat can affect boat control and flotation characteristics or break the transom. Do not install an outboard that exceeds the boat's maximum power rating.

Improper mounting of the outboard can result in hazardous conditions such as poor handling or loss of control. Your dealer or other person experienced in professional rigging should mount the outboard.

Use mounting hardware to secure only the outboard to the boat. Do not use outboard mounting hardware to attach accessories.

## 1.11 MOUNTING THE OUTBOARD

The outboard should be mounted in such a way that the boat is well balanced. Otherwise it could be difficult to steer. Mount the outboard on the centerline (keel line) of the boat.

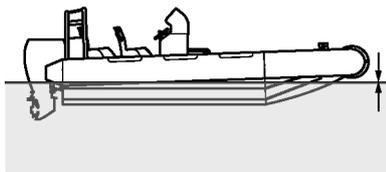


### 1.11.1 MOUNTING HEIGHT

The mounting height of the outboard affects its efficiency and reliability. A mounting that is too high might lead to propeller ventilation, which will reduce propulsion due to excessive propeller slip. There is also a risk of overheating the outboard due to the water intakes of the cooling system may not get enough water supply.

If the outboard mounting is too low, the water resistance will increase and thereby reduce the efficiency and performance of the outboard. In general, the outboard should be mounted so that the anti-cavitation plate is in alignment with the bottom of the boat.

The optimum mounting height is determined by the boat/outboard combination in addition to the required use. Test runs at different heights can be beneficial when choosing the optimum mounting height. For further information, please contact the manufacturer.





### CAUTION

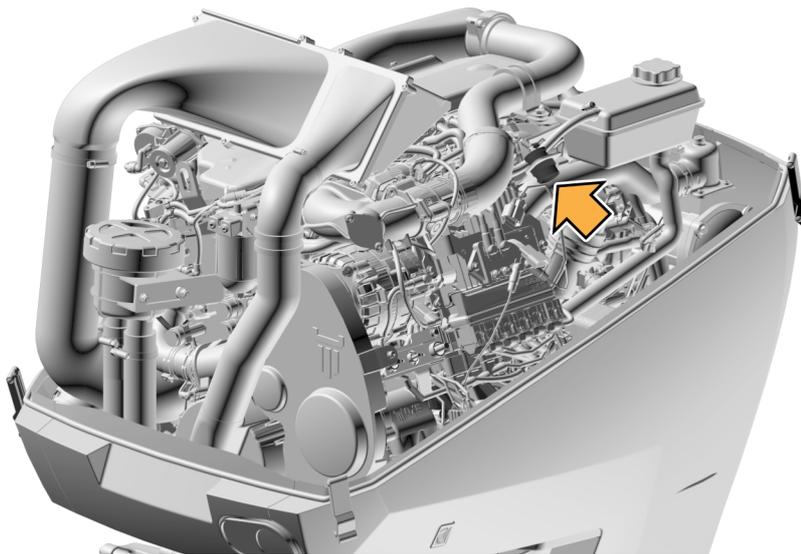
Check the carrying capacity of the boat, at rest and with maximum load, and during water testing.

Check that the static water level on the outboard rig is low enough to prevent water from entering the powerhead when water is rising due to waves when the outboard is stationary.

Incorrect engine height can create air born water spray while the boat is cruising. If the outboard is operated continuously with the presence of airborne water spray, water could enter the engine through the intake opening on the cowling and cause severe engine damage. Eliminate the cause of airborne water spray.

## 1.11.2 ENGINE CONNECTOR

Connect the helm harness to the engine connector. Refer to Installation Manual.



## 1.11.3 CONNECTING THE BATTERY

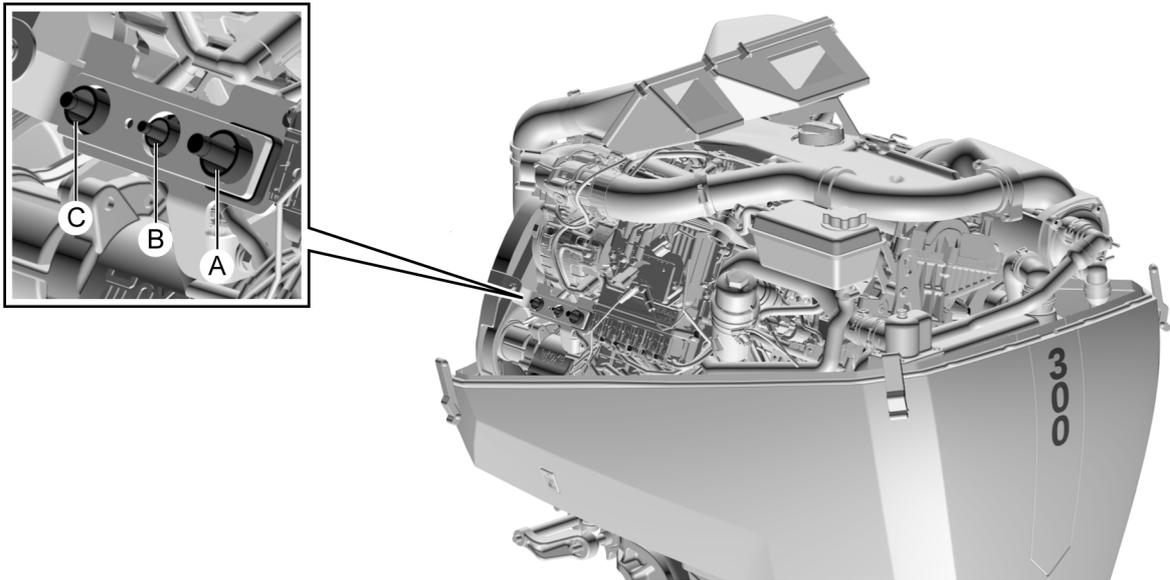


### CAUTION

Make sure the battery main switch is OFF before working on the battery connections.

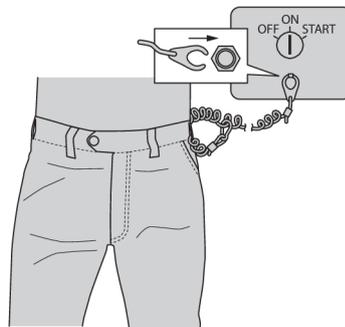
- 1 Connect the largest cable (black connector) to the rightmost pin connector (A). Make sure it "clicks"!
- 2 Connect the smaller red cable (red connector) to the center pin connector (B). Make sure it "clicks"!

- 3 Connect the larger red cable (red connector) to the leftmost pin connector (C). Make sure it "clicks"!



Also read the Installation Manual, section "12 V electrical power connection" to learn more details about connecting power to the outboard.

#### 1.11.4 ENGINE KILL-CORD



One clip must be attached to the engine shut-off switch, the other to a secure place on the operator's floating device or wrist. If the operator falls overboard or moves far enough away from the operator's position the kill-cord will stop the engine, preventing the boat from running away under power.

#### 1.12 BREAKING IN THE ENGINE

The OXE Diesel outboard, as well as all new engines, require a period of breaking in. This is to allow mating surfaces of moving parts to wear in evenly. Correct break-in will help to ensure proper performance and a prolonged engine life. Most diesel engines notice an increase in performance and reduction in fuel consumption after approximately 150 hours of breaking in time.



##### CAUTION

Failure in following the break-in procedure can result in severe engine damage, reduced engine life or may effect engine warranty.



##### NOTE

Run the outboard in water and in gear with a propeller installed as follows.

### 1.12.1 BREAK IN PROCEDURE

The OXE Diesel outboard requires break-in time before being operating to its full potential. This is due to the design characteristics of the unit.

Follow the recommendations below:

**0–5 hours:** Use varied load and rpm but do not load the engine above 50% throttle and keep maximum rpm below 2500. Do not stay at one load and rpm configuration for more than 30 minutes at a time.

The gear should be shifted a minimum of ten (10) times during the first five (5) hours.

**5–10 hours:** Use varied load and rpm but do not load the engine above 60% throttle and keep maximum rpm below 3000. Do not stay at one load and rpm configuration for more than 30 minutes at a time.

The gear should be shifted a minimum of ten (10) times during the additional five (5) hours.

**10–15 hours:** Use varied load and rpm but do not load the engine above 80% throttle and keep maximum rpm below 3000. Do not stay at one load and rpm configuration for more than 30 minutes at a time.

The gear should be shifted a minimum of twenty (20) times during the additional five (5) hours.

**15–50 hours:** Use varied load and rpm, the engine can be used up to 100% throttle and full rpm. Do not stay at one load and rpm configuration for more than 30 minutes at a time.

Perform an oil and filter change after the first 50 hours of operation (see Section 3.8.8 "Draining engine oil", [page 54](#) and Section 3.8.9 "Engine oil filter removal", [page 55](#)).

Use oil and filter as specified in the Service and Workshop Manual.



#### NOTE

When the initial oil change is done, small metal particles may be found in the break-in oil. Do not be alarmed. This is typical during break-in and will decrease as you run the outboard.

## 2 OPERATING

### 2.1 BEFORE START-UP



#### WARNING

Risk of accidents! Items in the pre-operation checks not working correctly, should always be inspected and repaired before operating the outboard.

#### 2.1.1 CHECKING THE FUEL LEVEL

- Check the fuel level. Fill up if necessary.
- Ensure that there are no fuel leaks or fumes.
- Check the fuel line connections to ensure they are tight.
- Check the water in the fuel filter. Drain off the water if necessary.

#### 2.1.2 FILLING FUEL

- 1 Remove the fuel tank cap.
- 2 Carefully fill the fuel tank with diesel.
- 3 Securely close the cap after filling the tank. Wipe up any spilled fuel.
- 4 If needed, evacuate air from the fuel system (see Section 3.7.8 "Bleeding the fuel system", [page 41](#)).

#### 2.1.3 CONTROLS

- Check the throttle, shift and steering for proper operation before starting the engine.
- The controls should work smoothly, without binding or unusual free play.
- Look for loose or damaged connections.
- Check that the main cable and the connector are in good condition.
- Check that the gear is in neutral.

#### 2.1.4 OUTBOARD

- Check the outboard and the outboard mounting.
- Check for loose or damaged fasteners.
- Check the propeller blades for damage.
- Check that the battery cables and connections are in good condition.
- Check fitting of the top cowling.



#### NOTE

Check the water surrounding the boat for leakage of engine or hydraulic oil!

#### 2.1.5 CHECKING ENGINE OIL, GEARBOX OIL AND BELT OIL



#### CAUTION

Ensure that the outboard is in **vertical position** when checking engine oil, gearbox oil and belt oil levels!

### 2.1.5.1 CHECKING THE ENGINE OIL

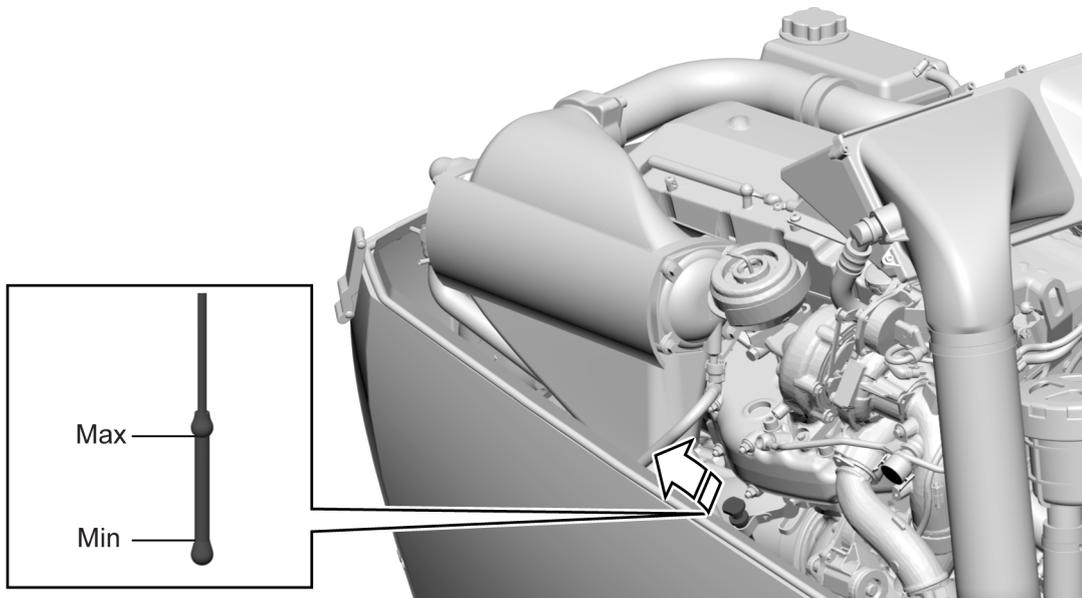
- 1 Remove the engine oil dipstick and wipe it clean.
- 2 Completely insert the dipstick and remove it again.



#### NOTE

Be sure to completely insert the dipstick into the dipstick guide.

- 3 Check that the engine oil level is between the upper and the lower mark on the dipstick. If below the lower mark, fill up with engine oil (see Section 3.8.11 "Filling up engine oil", [page 56](#)).



- 4 After topping up, wait a few minutes until the oil has drained down. If the oil level is above the dipstick upper mark, drain appropriate amount of oil (see Section 3.8.8 "Draining engine oil", [page 54](#)). Excess oil level can cause reduced performance and oil leakage.
- 5 Check for oil leaks.

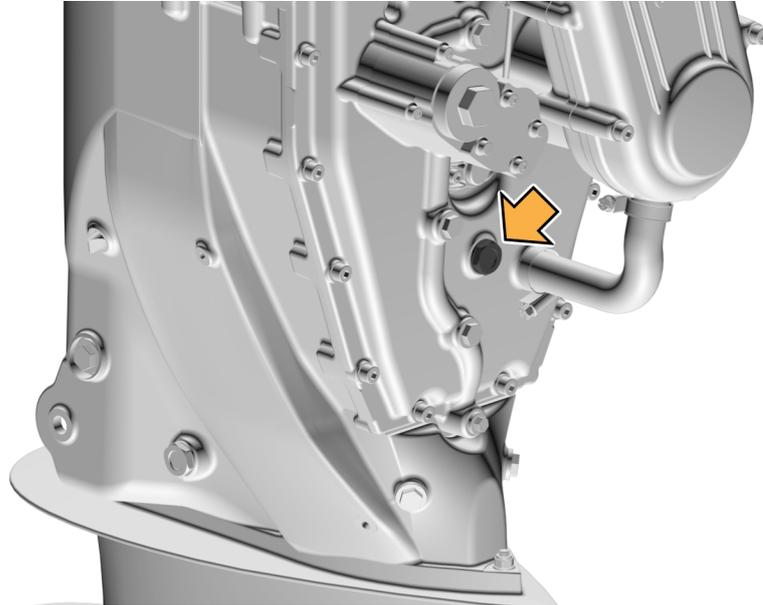
### 2.1.5.2 CHECKING THE GEARBOX OIL

- 1 Visually check the gearbox oil quality. If the oil looks milky and foamy, water has entered the housing. Check for leakage and replace the oil if necessary.
- 2 Check that the gearbox oil is in level with the sight glass.



#### NOTE

An accurate gearbox oil level can be checked when the engine has stopped and the cooler has drained completely. Allow approximately seven (7) minutes between engine stop and gearbox oil level check.



- 3 Fill up gearbox oil if necessary (see Section 3.8.5 "Refilling gearbox oil", page 50).

### 2.1.5.3 CHECKING THE LOWER UNIT OIL QUALITY

- 1 Visually check the oil quality through the sight glass. If the oil looks milky and foamy, water has entered the lower housing.



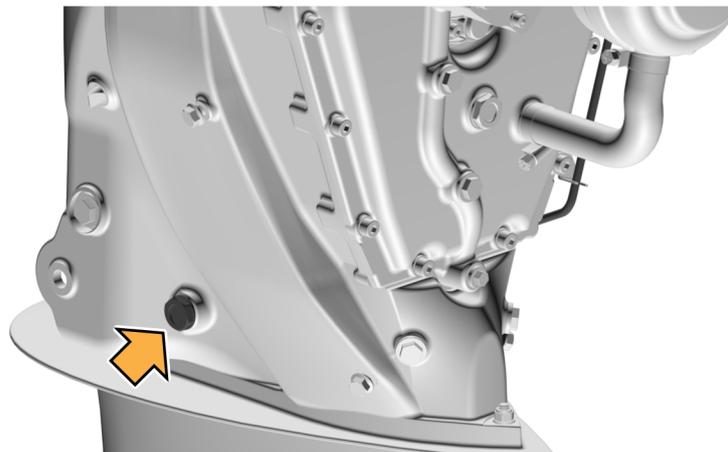
#### NOTE

If that is the case, contact your local OXE dealer or OXE service center immediately.



#### NOTE

The sight glass is located on the opposite side of the leg from the lower belt tensioner.



## 2.1.6 CHECKING THE FLUID LEVEL IN THE POWER TRIM AND TILT UNIT

- 1 Tilt up the outboard completely and support the tilt cylinder with a transom saver.



### WARNING

Make sure to support the outboard with a transom tilt saver. Otherwise the outboard can fall down accidentally if the power tilt and trim unit loses pressure.

- 2 Ensure that the trim and tilt rods are fully extended.



### WARNING

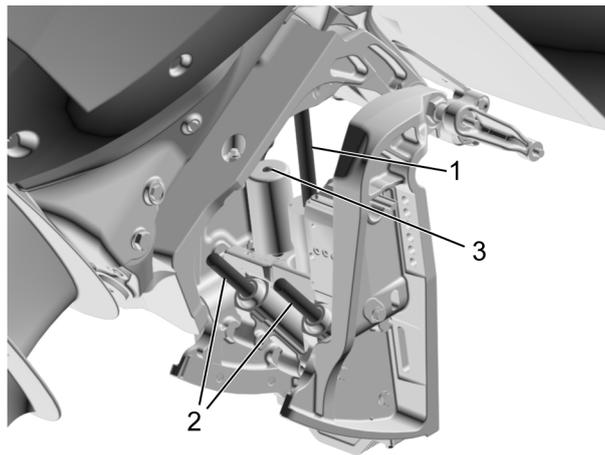
If the trim and tilt rods are not fully extended when the filling plug is removed, the fluid can spray from the reservoir due to internal pressure!

- 3 Remove the filling plug and check the fluid level in the reservoir.



### NOTE

If the fluid is correctly levelled, only a small amount of fluid should come out of the filling hole when the plug is removed.



- 4 If necessary, fill up with recommended fluid type until it comes out of the filling hole.
- 5 Refit the filling plug.

## 2.2 STARTING AND STOPPING THE OUTBOARD

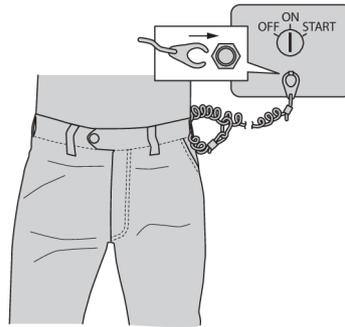


### WARNING

Before starting the engine, make sure that the boat is tightly moored and that you can steer clear of any obstructions. Be sure that there are no obstacles in the water near the boat.

## 2.2.1 STARTING THE ENGINE

- 1 Attach the engine kill-cord to your clothes/floating device or to your wrist. Install the other clip on the engine ignition switch.



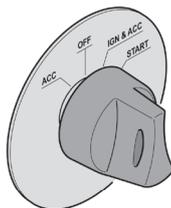
### WARNING

Attach the engine kill-cord in a secure way to your clothes/ floating device or wrist while operating the boat.

Prevent the kill-cord from entangling with nearby objects and do not attach the cord to clothing that could tear loose.

Avoid accidental or unintended activation of the ignition switch. Unexpected loss of forward motion can cause people and obstacles to be thrown forward. Loss of power also leads to poor directional control.

- 2 Turn the ignition key to IGN & ACC.



- 3 Turn the key to START and hold it there for a maximum of 5 seconds. In cold weather below +10 Celsius degrees, let the ignition be on for 5 seconds before turning to start to allow the glow plugs sequence warm time.
- 4 Immediately after the engine starts, release the key in order to return to the IGN&ACC position.



### CAUTION

Never turn the ignition key to start while the engine is running.

Do not let the starter turn for more than 5 seconds. If the starter is turned continuously for more than 5 seconds, the battery may be discharged and the engine will not start again. There is also a risk of damaging the starter motor. If the engine does not start after 5 seconds of cranking, return the key to ON and wait for 10 seconds before cranking the engine again.

Ensure there is a new battery fitted before starting. If the engine does not start, ensure there is enough voltage in the battery. Voltage should not drop below 10 V when cranking.

## 2.2.2 START-UP CHECKS

Perform the following checks immediately after the engine has started:

- Check that the engine ignition switch stops the engine.

- Confirm that removing the clip from the engine shut-off switch stops the engine.
- Confirm that the engine cannot be started with the clip removed from the engine ignition switch.

### 2.2.3 WARMING UP THE ENGINE

- 1 Allow the engine to idle for 3 minutes to warm up, otherwise there is a risk of shortening the engines life.
- 2 Ensure that no oil-pressure warning appears on the engine display after the engine has started.

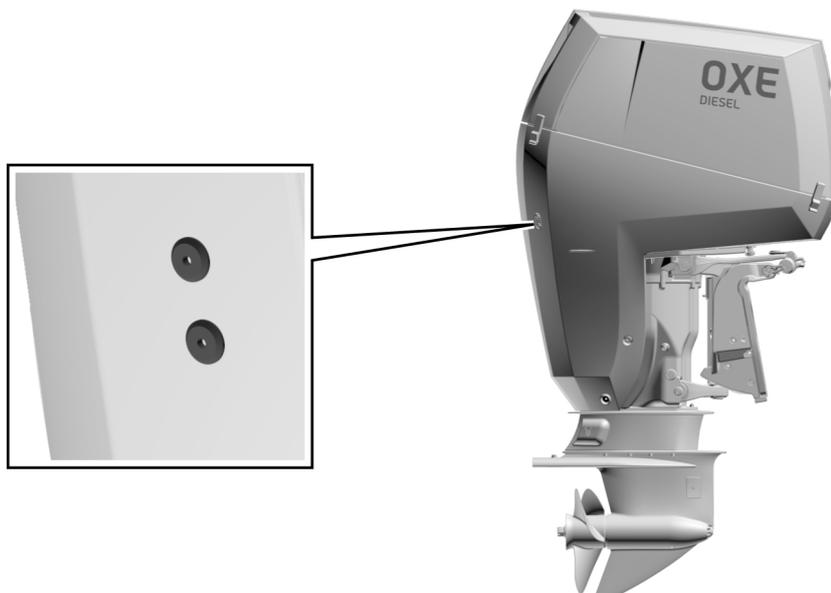


#### WARNING

**Stop the engine immediately if an oil-pressure warning appears on the engine display and the buzzer sounds. Risk for severe engine damage! Check the oil level and fill up if necessary. If no cause for the low oil pressure warning can be found, contact your dealer or the manufacturer.**

- 3 Check for a steady flow of water from the tell-tale.

When the engine is running, a continuous flow of water from the tell-tale shows that the seawater pump is pumping water through the cooling passages.



#### Tell-tale



#### NOTE

It takes approximately 10–30 seconds after start of the engine for the water to start flowing from the tell-tales. The seawater pump has two impellers and two separate cooling circuits.



#### WARNING

**Stop the engine immediately if no water is flowing from the tell-tale. Risk for overheating or serious damage to the engine!**

After having stopped the engine, **in case no water is flowing from the tell-tale**, try to find the cause of the failure as described below:

- Check if the seawater inlet or outlet is blocked. Clean if necessary.
- Check the seawater strainer and clean if necessary (see Section 3.8.6 "Cleaning the seawater strainer", [page 52](#)).
- Restart the engine.

If the fault **still remains** it may indicate a water pump failure or a blockage in the cooling system.

- Check the seawater pump impeller and change if broken or worn. This may cause the engine to overheat.



#### NOTE

If the impeller in the water pump is damaged due to running without water, the impeller has to be replaced!

**WARNING**

If the failure still remains, have the outboard checked by an authorized technician! Operating the engine while overheated will cause engine damage!

## 2.2.4 SHIFTING

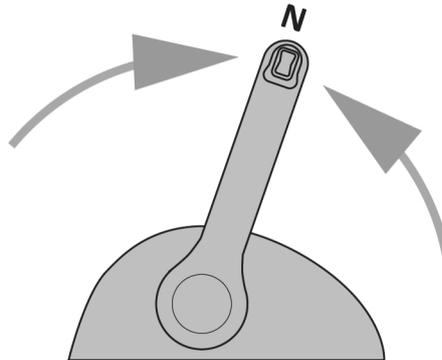
**WARNING**

Before shifting, make sure that there are no obstacles near the boat.

**CAUTION**

Warm up the engine before shifting gear.

- 1 Place the control lever in N (neutral) in order to activate shifting and traction. Refer to the corresponding control head manual.



## 2.2.5 STOPPING THE ENGINE

- 1 Let the engine cool off for a few minutes at idle or low speed before stopping the engine.

**NOTE**

Stopping the engine immediately after operating at high speed is not recommended.

- 2 Turn the key to OFF position.
- 3 Remove the key if leaving the boat unattended.

**NOTE**

The engine can also be stopped by pulling the cord and removing the clip from the engine shut-off switch, then turning the ignition key to OFF position.

## 2.3 POWER TRIM OPERATION

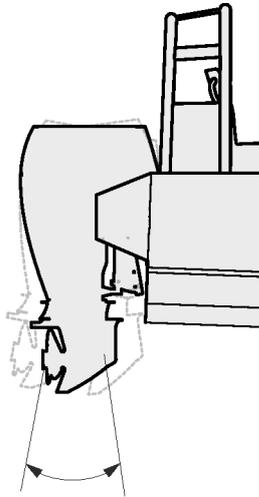
The OXE Diesel outboard is equipped with a hydraulic trim system, with which you can change the angle of the drive in relation to the transom. The trim angle of the outboard is part of the determination of the boat's bow position. A correct trim angle improves fuel economy and reduce engine strain. The trim angle depends on a combination of boat, engine and propeller. The trim angle is also affected by other variables such as the load in the boat, sea conditions and running speed.

With most boats, operating around the middle of the trim range will give satisfactory results. In order to take full advantage of the trimming capability there maybe times when you choose to trim the outboard all the way in (down) or out (up).



### **DANGER**

Avoid over-trimming (trim-up or trim-down) the drive system as this can affect the steering of the boat severely. Each boat has its own unique characteristics and will be affected in different ways by the factors involved, only general advice is given here on how to get the best trimming angle for your boat. Get to know the power trim, make test runs at slower speeds and at various trim positions to see the effect of trimming. Note the time it takes for the boat to plane, watch the speed readings and the ride action of the boat.



#### Trim operating angle



### **CAUTION**

If the boat begins to feel unstable or is harder to steer, slow down and/or readjust the trim angle.

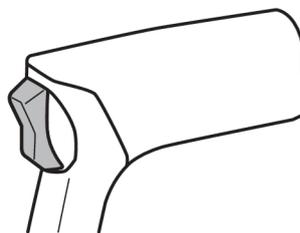
## 2.3.1 ADJUSTING THE TRIM ANGLE



### **WARNING**

Make sure that the boat's occupants are clear of the outboard when adjusting the trim angle. Body parts can be crushed between the outboard and the clamp bracket when the outboard is trimmed or tilted.

1. Adjust the outboard trim angle using the power trim and tilt switch.



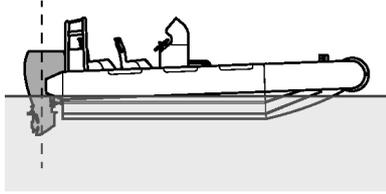
#### Power trim and tilt switch on single lever

- To raise the bow (trim-out), press the switch UP (up).
- To lower the bow (trim-in), press the switch DN (down).

2. Make test runs with the trim set in different angles.

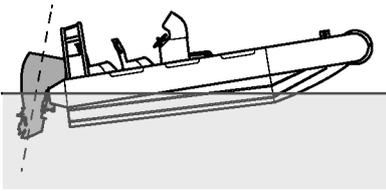
When the boat feels well-balanced, easy to steer and pleasant to operate, the optimal trim angle for the boat is achieved.

## 2.3.2 ADJUSTING THE BOAT TRIM



A bow-up setting results in less drag and greater stability and efficiency when the boat is on plane. With the bow up, the boat can have a tendency to steer to one side or the other on a single installation, requiring compensational steering adjustments. To help offset this effect, the trim tabs can be adjusted if fitted. It is easier to accelerate from a standing start onto plane when the bow of the boat is down.

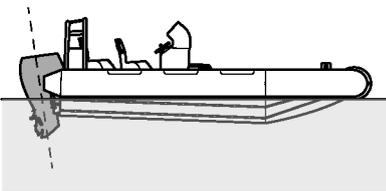
## 2.3.3 BOW UP



Too much trim-out or up can:

- Lift the bow higher out of the water.
- Generally increase top speed.
- Increase clearance over submerged objects or a shallow bottom.
- In excess, can cause boat porpoising (bouncing) or propeller ventilation.
- Cause engine overheating if any cooling water intake is above the waterline.

## 2.3.4 BOW DOWN



Too much trim-in or down can:

- Lower the bow.
- Result in quicker planing off, especially with a heavy load or a stern heavy boat.
- In excess, can lower the bow of some boats to a point where they begin to plow with their bow in the water while on plane. This can result in an unexpected turn in either direction (called bow steering or oversteering) if any turn is attempted, or if a significant wave is encountered.



### NOTE

Depending on type of boat, the outboard trim angle might have little effect on the trim of the boat during operation.

## 2.4 POWER TILT OPERATION

If the outboard is shut off for a longer period or if the boat is moored in shallow water, the outboard should be tilted up. This is to protect the propeller and lower housing from damage by collision with obstructions, and also to reduce salt water corrosion.



### WARNING

Make sure that the boat's occupants are clear of the outboard when adjusting the tilt angle. Body parts can be crushed between the outboard and the clamp bracket when the outboard is trimmed or tilted.



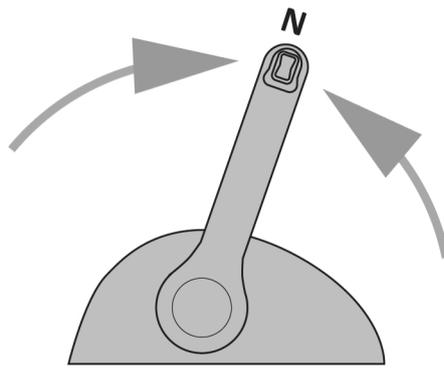
### CAUTION

Never tilt the outboard while the engine is running. This could result in severe damage to the engine and to the Power Trim and Tilt unit (PTT unit).

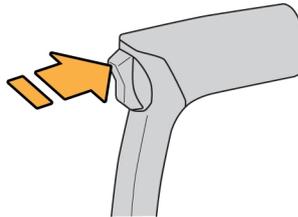
Make sure all the water intake inlets stay submerged at all times. Risk for severe damage from overheating!

### 2.4.1 PROCEDURE FOR TILTING UP

- 1 Place the control head lever in neutral position.

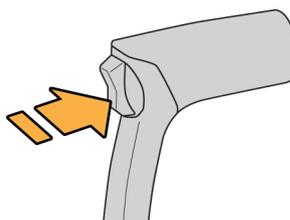


- 2 Press the power trim and tilt switch **UP** until the outboard has tilted up completely.



### 2.4.2 PROCEDURE FOR TILTING DOWN

- 1 With the control head lever in neutral position, press the power trim and tilt switch **DOWN** to lower the outboard to the desired position.



## 2.4.3 POWER TRIM AND TILT SWITCH ON ENGINE COWLING



### Trim and tilt switch on cowling

The power trim and tilt switch is located on the port side of the bottom engine cowling. Pressing the switch UP trims the outboard up to a level where the tilts function continues. Pressing the switch DOWN tilts the outboard DOWN to a level where the trim continues. When the switch is released the outboard will stop and stay in its current position.



#### **WARNING**

**Only use the power trim and tilt switch located on the engine cowling when the boat is at complete stop with the engine shut off. (The ignition must be switched ON to be able to operate the trim and tilt switch.)**

**Attempting to use the switch while the boat is moving increase the risk of falling overboard, distracting the operator or collision with other boats or obstacles.**

## 3 MAINTENANCE

Two warranties apply for your OXE Diesel engine:

1. The Emission Control System Warranty Statement (see Section 5.1 "Emission Control System Warranty Statement", [page 80](#))
2. The Global Warranty Policy

### 3.1 OUTBOARD CARE

It is important that your outboard receives the periodic inspections and maintenance listed in the maintenance schedules at the end of this manual, in order to keep the outboard in best condition.



#### NOTE

If periodic inspections and maintenance are not followed as described, the manufacturer's Global Warranty Policy will not apply.

### 3.2 OWNERS RESPONSIBILITY

The owner is required to have routine engine maintenance performed to maintain emission levels within prescribed standards.

The owner is not to modify the engine in any manner that would alter the power output or allow emissions levels to exceed their predetermined factory specifications.

### 3.3 TRANSPORTING THE OUTBOARD



#### DANGER

**Never get under the lowered outboard while it's tilted, even if a support bar is used. Severe injury could occur if the outboard accidentally falls down.**

When transporting the boat on a trailer, the outboard should be positioned in normal running position. If the road clearance is insufficient in this position, the outboard may be transported in tilt position using a support device such as a transom saver bar. Consult your dealer for further details.

Additional clearance may be required for railroad crossings, driveways and trailer bouncing. Refer to your local dealer for recommendations.



#### CAUTION

Do not rely on the power trim/tilt system to maintain proper ground clearance for transportation with a trailer. The power trim/tilt system is not intended to support the outboard under these conditions.

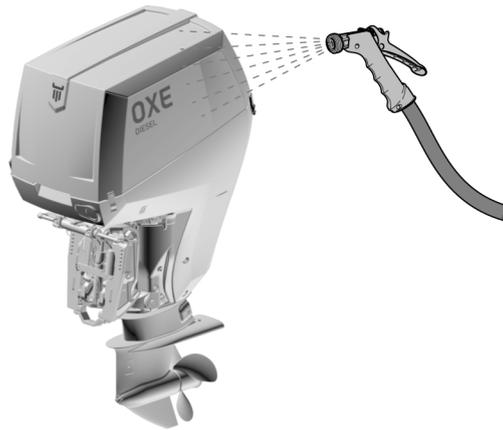
### 3.4 CLEANING THE OUTBOARD

After operating in demanding conditions, flush the cooling seawater passages with fresh water to prevent them from becoming corroded or blocked by build-up of salt (refer to Section 3.4.2 "Flushing the power unit", [page 32](#)).

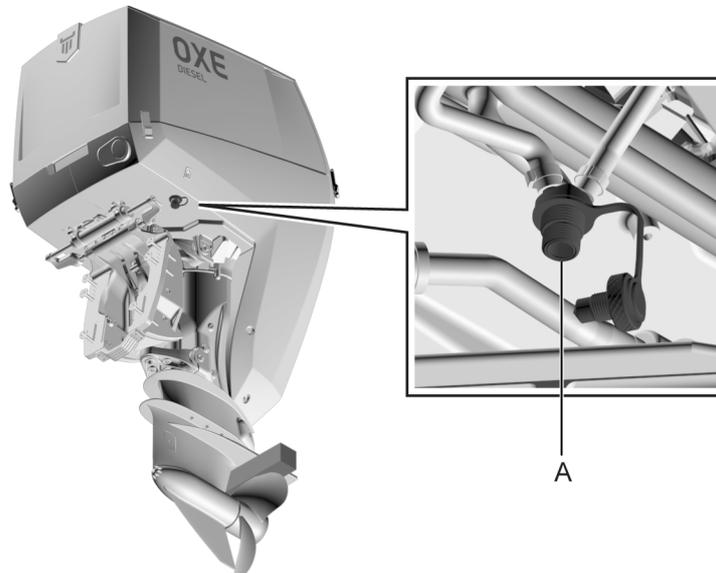
We also strongly recommend to increase cleaning intervals of seawater strainer and water intake when operating in muddy or turbid water.

### 3.4.1 GENERAL CLEANING

- 1 Flush the outside of the outboard with fresh water.



- 2 Place a container beneath the three-way seawater drain nipple (A).
- 3 Open the three-way seawater drain nipple (A) and drain the seawater system.

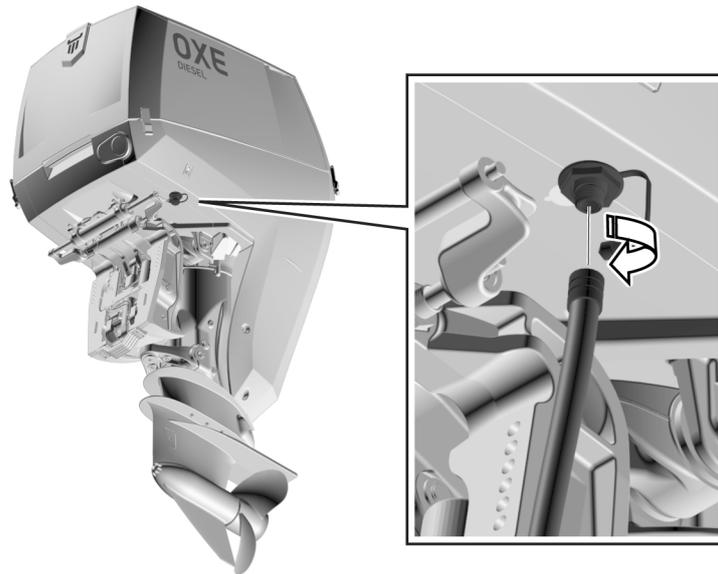


### 3.4.2 FLUSHING THE POWER UNIT

Perform this procedure right after operation to achieve the best result.

- 1 After shutting down the engine, unscrew the cap from the three-way seawater drain nipple on the bottom cowling.

- 2 Screw a ½" garden hose adapter onto a garden hose, which is connected to a fresh water supply. Then connect it to the three-way seawater drain nipple.



#### Three-way seawater drain nipple on bottom cowling

- 3 With the engine off, turn on the water flush through the cooling passages for about 15 minutes. Turn off the water and disconnect the garden hose adapter from the garden hose connector.

Since the flushing procedure also feeds the seawater pump, the engine can be started and allowed to **idle in neutral gear only**.



#### NOTE

When performing this procedure with the garden hose adapter connected to the three-way seawater drain nipple, make sure to keep the engine in a secured straight position! Turning the engine in either port or starboard direction with the adapter connected may cause damage to the flush valve or surrounding parts!

- 4 Remove the adapter from the seawater drain nipple. Replace the cap and tighten securely.



#### WARNING

**Do not leave the garden hose connector on the seawater drain nipple or let the hose hang free during normal operation. Water will leak out of the connector instead of cooling the engine, which can cause serious overheating. Replace the cap after flushing the engine.**



#### NOTE

When flushing the engine with the boat in the water, tilting the outboard until it is completely out of the water will achieve better results.

## 3.5 REMOVAL AND INSTALLATION OF TOP COWLING

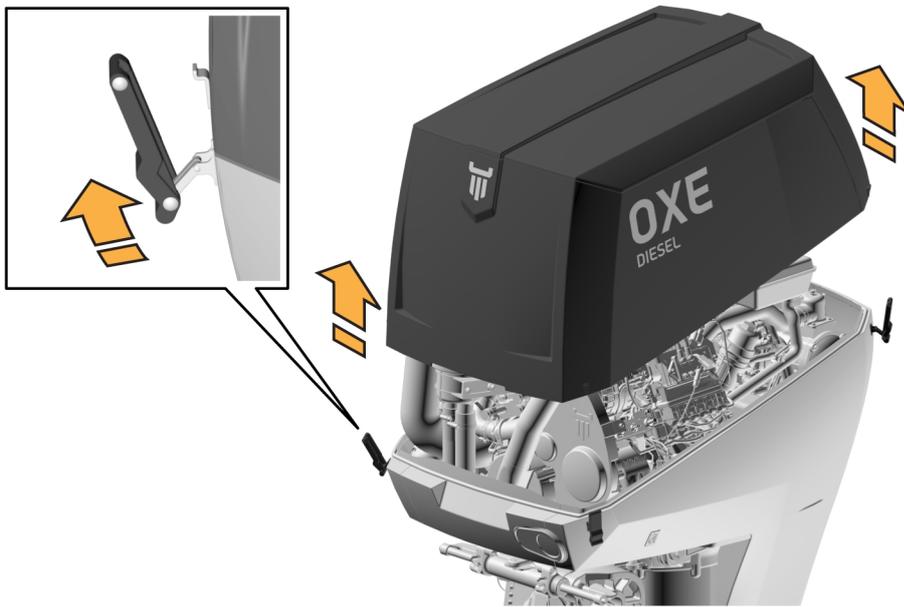


#### WARNING

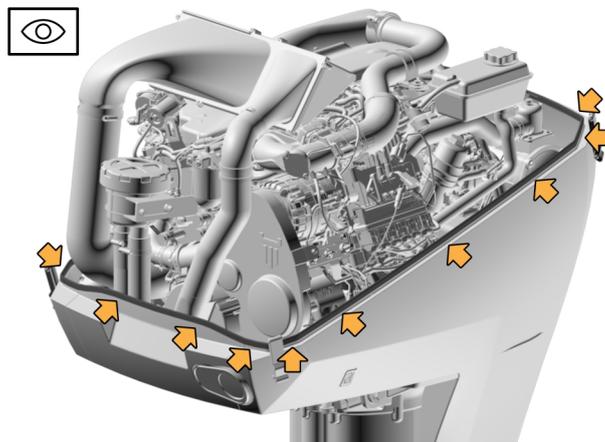
**Always disconnect the engine before commencing removal of the cowling or any other service work!**

1. To remove the top cowling, undo the four hatches and lift the cowling upwards while avoiding contact with engine components.

Place the cowling out of the way on a soft surface in order to minimize cowling damage and work obstructions.



2. Before reinstalling the top cowling, check that the sealing is not dry, broken or worn, as this will allow water to enter the engine.



3. Lower the cowling carefully into place.



**NOTE**

Ensure that the hatches are folded outwards.

4. Close the hatches.
5. Check the fitting of the top cowling. Make sure that the cowling is securely closed and that there are no gaps. A loose or improperly fitted cowling could allow water to enter the engine. Reinstall the cowling if it is not correctly fitted.

### 3.6 STORING THE OUTBOARD



**CAUTION**

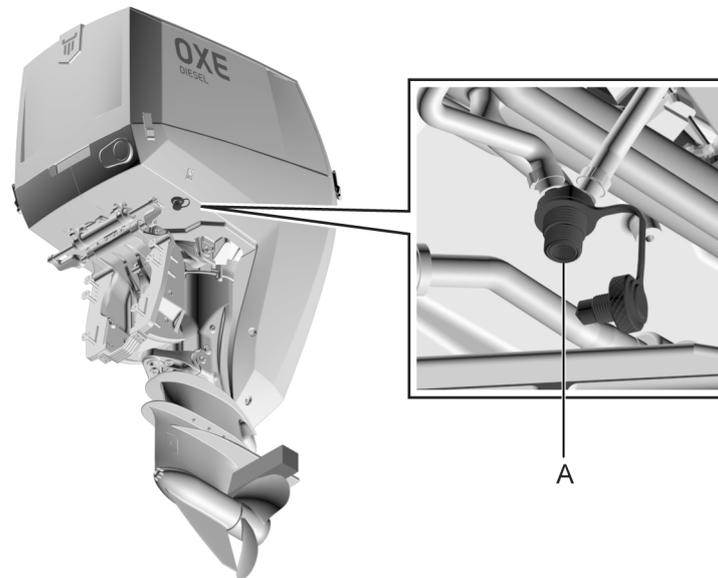
To prevent engine oil from the sump entering a cylinder, keep the outboard in upright position when transporting and during storage. Do not store or transport the outboard in horizontal position unless the engine oil is completely drained first.

To prevent freezing damage, the seawater system must be drained and the freshwater system coolant must have sufficient antifreeze protection (see section "Recommended fluids and grease").

When storing the outboard in sub-zero temperatures, some actions always have to be taken to prevent freezing damage! In the sub-sections below you can find instructions for both short-term and long-term storage.

### 3.6.1 SHORT-TERM STORAGE

- 1 Place a container beneath the three-way seawater drain nipple.
- 2 Open the three-way seawater drain nipple and drain the seawater system.



### 3.6.2 LONG-TERM STORAGE – WINTERIZATION OF THE OUTBOARD

When storing your OXE Diesel outboard for a longer period of time (two months or more) or in sub-zero temperatures, an important antifreeze preservation of the seawater system procedure must be carried out in order to prevent excessive damage.



#### NOTE

We strongly recommend to have the outboard serviced and winterized by your authorized dealer before storing.



#### CAUTION

To prevent any damage such as corrosion build-up, which could lead to permanent engine failure, it is required to apply fogging oil (engine conservation oil) in the tail-pipe of the turbo charger to prevent the vanes inside the turbo charger from sticking.

Store the outboard in a dry, well-ventilated place, protected from sunlight.

- 1 Place a container beneath the three-way seawater drain nipple (A).
- 2 Open the three-way seawater drain nipple (A) and drain the seawater system into the container.
- 3 Close the three-way seawater drain nipple (A) when the system is completely drained.
- 4 Remove all necessary engine components to get satisfactory access for applying fogging oil on the vanes inside the turbocharger by spraying through the turbine wings in a circular motion. After successfully applying fogging oil in the turbo vanes, reassemble the engine components in reverse order.
- 5 Place the outboard in a container and fill the container with an antifreeze mixture of sufficient grade, until the coolant fluid level is above the side water intakes (B).

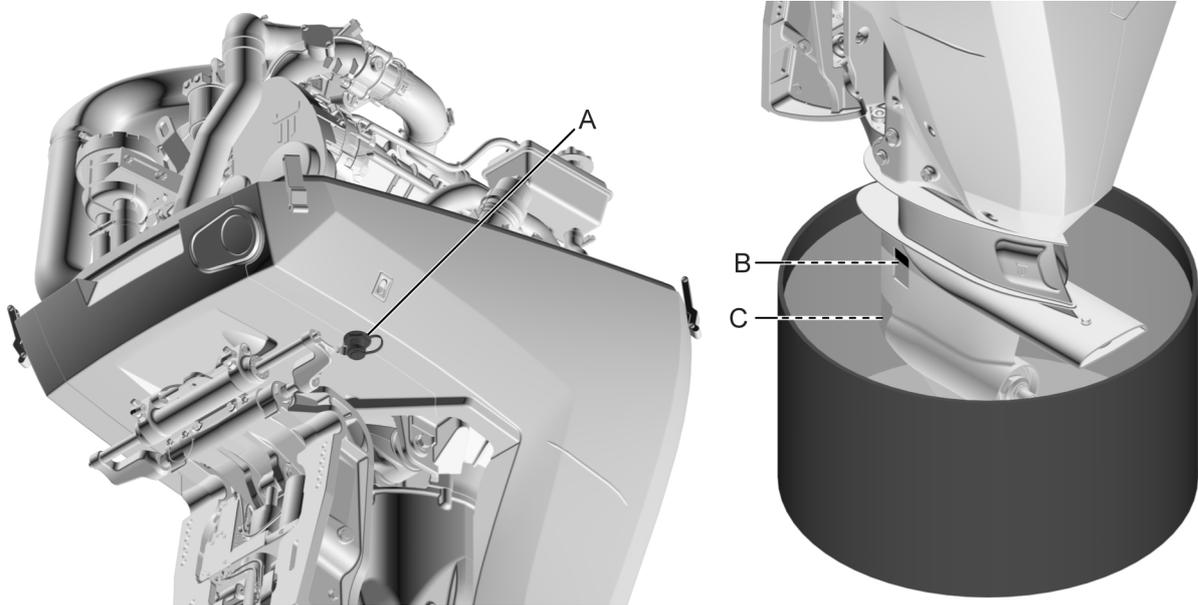
6 Start the outboard and run the engine **while observing the coolant fluid level in the container carefully.**



**NOTE**

- If the nosecone water intake (C) is open and the side water intakes (B) are blocked, **make sure the coolant fluid level in the container remains above the nosecone water intake (C) during the procedure!** If needed, add coolant fluid.
- If the side water intakes (B) are open and the nosecone water intake (C) is blocked, **make sure the coolant fluid level in the container remains above the side water intakes (B) during the procedure!** If needed, add coolant fluid.

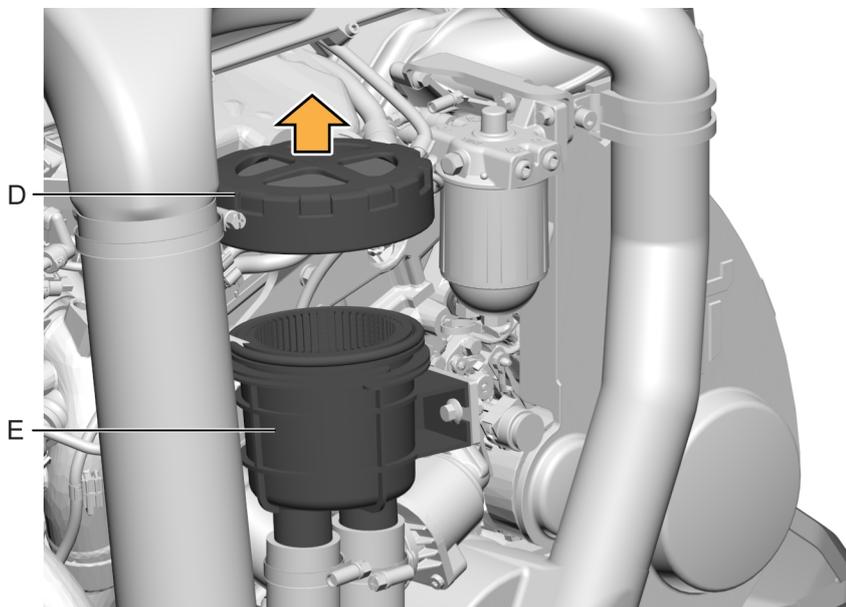
Failure to observe these instructions may result in air entering into the system and impeller damage!



7 Stop the engine when coolant fluid comes out of the outboard exhaust outlet.  
Now the seawater system will be filled with coolant fluid.

### Alternative method for winterization

1. Perform the actions according to steps 1–4 in the first part of Section 3.6.2 "Long-term storage – winterization of the outboard", [page 35](#) above.
2. Remove the cap (D) from the seawater strainer (E).
3. Start the outboard.
4. Fill up with coolant fluid mixture (approximately 5 liters) through the seawater strainer (E).
5. When the seawater system is filled with coolant fluid, stop the outboard and close the seawater strainer cap (D).



### Third alternative method for winterization, especially used if it is not possible to start the engine

If it is **not** possible to start the engine, prepare your outboard for long-term storage as follows:

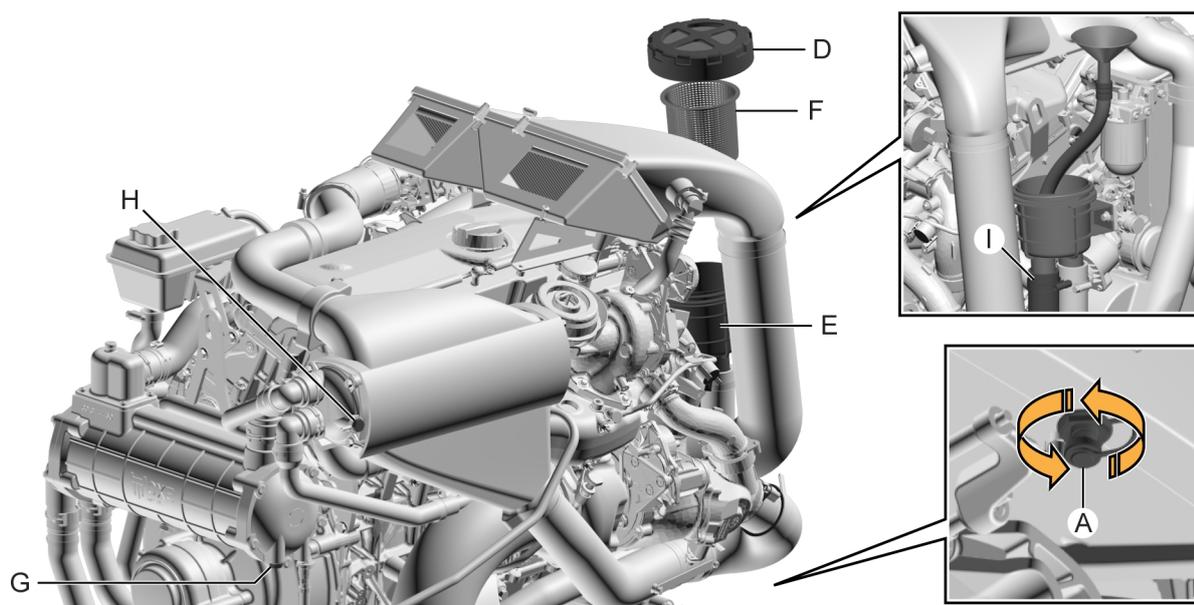
1. Perform the actions according to steps 1–4 in the first part of Section 3.6.2 "Long-term storage – winterization of the outboard", page 35 above.
2. Make sure the side cowlings are removed (refer to the Service and Workshop Manual).
3. Make sure the engine is tilted down to vertical position!
4. Open the three-way seawater drain nipple (A), by **turning the cap 3–4 revolutions from fully screwed down**.



#### NOTE

Opening the three-way seawater drain nipple 3–4 revolutions, will ensure that coolant fluid can bypass the pump and effectively fill the main cooler and the intercooler lines.

5. Remove the cap (D) and the strainer element (F) from the seawater strainer (E).
6. Remove the sacrificial anode (G) positioned on the main cooler.
7. Put a hose into the seawater strainer (E) and further down **into the starboard side strainer outlet (I)**.
8. Fill up with coolant fluid mixture (approximately 3 liters) through the hose and the seawater strainer (E) and down through the strainer outlet (I).
9. When coolant fluid is coming out from the hole where the sacrificial anode (G) was positioned, reinstall the sacrificial anode (G).
10. Remove the filling hose and reattach the seawater strainer element (F) and the strainer cap (D).
11. Remove the sacrificial anode (H) positioned on the intercooler.
12. Fill up with coolant fluid mixture (approximately 2 liters) through the hole where the intercooler sacrificial anode (H) was positioned.
13. Reinstall the sacrificial anode (H) on the intercooler.
14. Close the three-way seawater drain nipple (A) completely.



#### WARNING

When taking the outboard out of storage, make sure to drain the seawater system from coolant fluid and to dispose the coolant according to local environmental legislation, prior to launching to the water!

## **3.7 CHECKING AND OTHER MAINTENANCE**

### **3.7.1 CHECKING THE AIR INTAKE SYSTEM**

It is of great importance that the intake system is intact. Broken and leaking pipes can drastically shorten the life of the engine.

Check the system regularly.

- Check hoses for cracks and damage. Replace, if necessary.
- Ensure that all hose clips and clamps are tightened and fit easily.
- Check the air filter.
- Check the filter insert for holes or cracks.
- Check for dampness.
- If damaged or otherwise blocked, replace the air filter.

### **3.7.2 CHECKING THE AIR FILTER**

- Check tubes and hoses for leaks and replace if necessary.
- Check joints and clamps.
- Check exhaust manifold.
- Start the outboard and check for exhaust leaks. Make sure the seawater pump is not running dry.

### **3.7.3 CHECKING THE ENGINE FOR OIL LEAKAGE**

- Check seals and gaskets.
- Check engine oil filter.

### **3.7.4 CHECKING DRIVE BELTS**

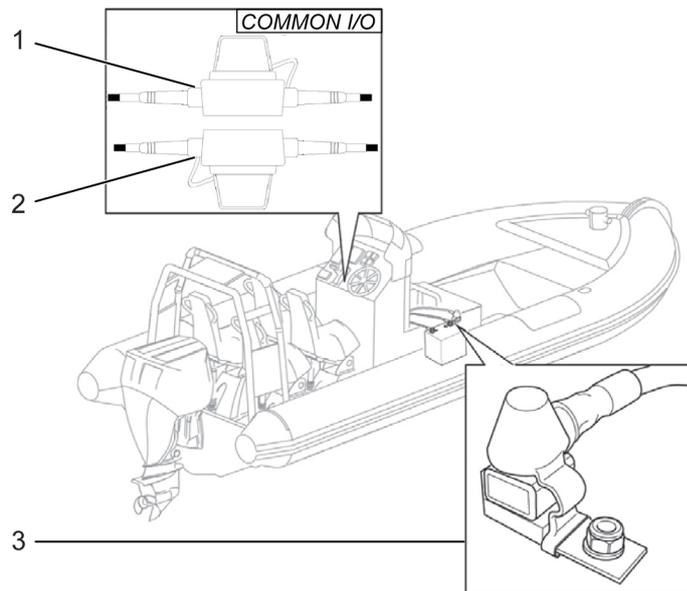
- Check alternator drive belt for wear or damage.
- Check function of alternator drive belt tensioner.

### **3.7.5 CHECKING THE BATTERY**

- Remove corrosion from the battery terminals and connectors, and check that the cable connections are tightened.
- Lubricate the battery terminals with grease.

### **3.7.6 CHECKING THE ELECTRIC SYSTEM**

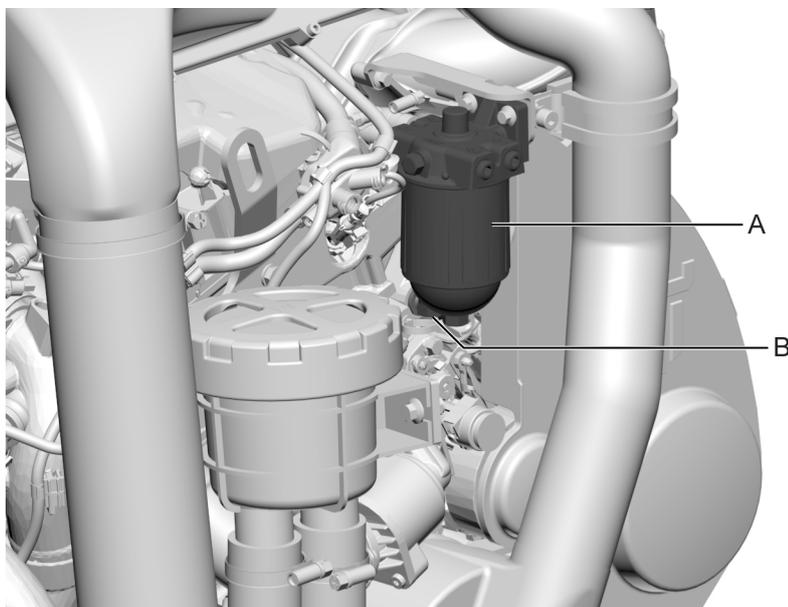
- Check connections on the outboard.
- Remove corrosion from access points, contacts and fuses. Lubricate with grease.
- Check fuses. Ensure that there are spare fuses aboard.



1. **INTERNAL NMEA2000, 1 A FUSE**, This fuse will NOT be premounted, but supplied with the COMMON I/O harness. The NMEA2000, 1 A fuse is powering the INTERNAL NMEA2000 network. The internal NMEA fuse it NOT to be installed if the CAN-bus is POWER supplied by another source, e.g. via Seastar PCM.
2. **USER IGNITION SIGNAL, 1 A FUSE**, This fuse will be premounted and supplied with the COMMON I/O harness. The "User ignition signal, 1 A" is designed to only drive low power applications that require an ignition signal, e.g. relays (NOT power supply). Therefore a separate fused relay must be used to supply currents greater than 0.75 A. If a relay is used, the relay signal ground and power supply must be connected directly to the battery. Fuse size: 1 A
3. Use a **100 A fuse** on the power supply (thin red cable). Use a **350 A fuse** on the starter motor power supply (thick red cable). For further information, refer to the Installation Manual.

**i** **NOTE**  
There should be no fuse on the common power supply!

### 3.7.7 CHECKING THE FUEL SYSTEM



Fuel filter and water separator

A Fuel filter

B Draining screw

**WARNING**

Discard oil and fluids according to local environmental legislation.

- Check the fuel filter water separator functionality. Drain if necessary, refer to Section 3.8.2 "Draining the fuel filter", page 48.
- Bleed the fuel system and check hoses and connectors for leakage.

**WARNING**

Turn off the engine immediately in case of leakage.

### 3.7.8 BLEEDING THE FUEL SYSTEM

**NOTE**

In order for the diesel fuel system to work properly, the fuel lines must be full of fuel and free from air. It is necessary to bleed the fuel system and evacuate the air from the system before operating the outboard.

Air could enter the fuel system in any of the following ways:

- The outboard has just been installed.
- The engine ran out of fuel.
- The fuel lines have been damaged and or leaking joints.
- The fuel filter was removed for service or replacement.
- The fuel lines were removed or disconnected for servicing.
- The fuel lines are poorly connected.
- The fuel pump was removed for servicing.
- The fuel filter water drain cock was opened while the engine was running.

If one or more of the above occurs, and air has entered the fuel system, you have to evacuate the air from the system as described below, prior to operating the OXE outboard.

#### 3.7.8.1 BLEEDING PROCEDURE

- 1 Turn the ignition key **ON**. The fuel pump will run for 20 seconds.

**NOTE**

Do **not** turn the ignition key to **START**. This could damage the injection pump.

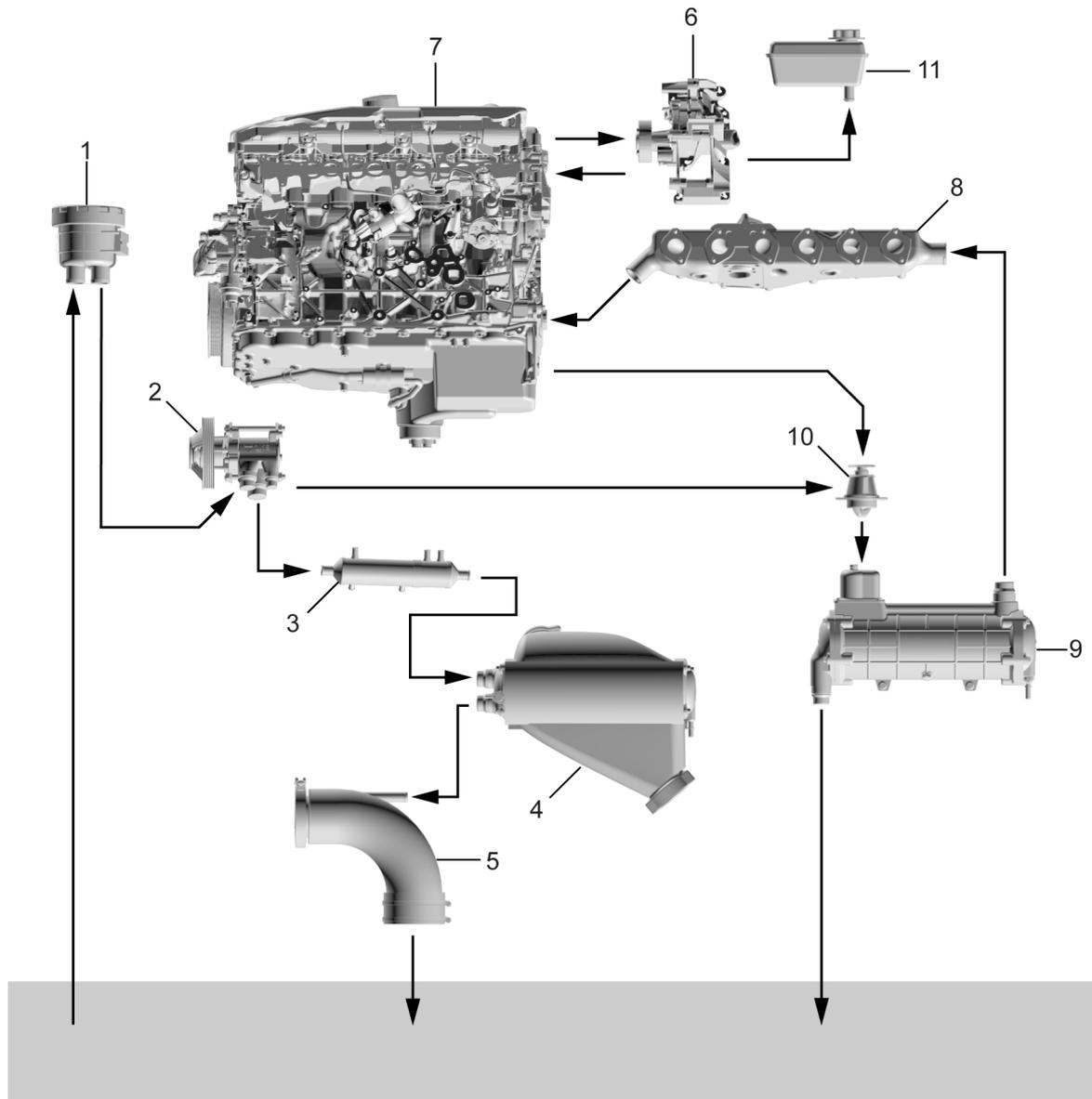
- 2 Switch off the ignition key and wait for 25 seconds.
- 3 Turn the ignition key **ON**. The fuel pump will run for 20 seconds.
- 4 Turn the ignition key to **START**. Run for 15 seconds.

**NOTE**

If the outboard does not start, switch off the ignition key and wait for 25 seconds. Repeat steps 1–4 three times until the pump is filled with fuel and no more air is left.

If the outboard does **not** start after three attempts, go through the list of reasons for air entering the system above, before making any further attempts to start the outboard! Failure to observe this recommendation may lead to damage to the injector pump!

### 3.7.9 CHECKING THE COOLING SYSTEM



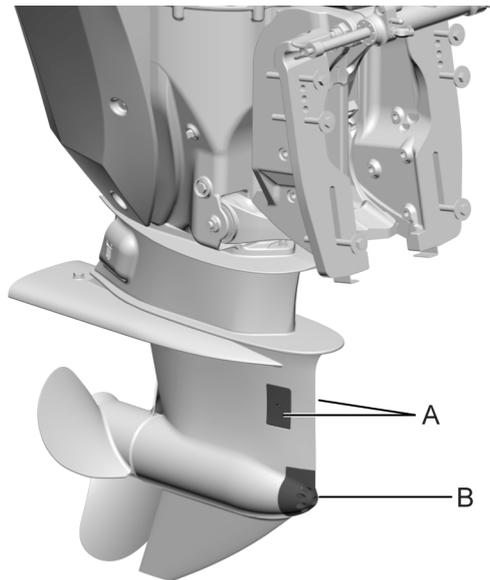
Schematic diagram of the cooling system

- |                                 |                    |
|---------------------------------|--------------------|
| 1 Seawater strainer             | 7 Engine           |
| 2 Seawater pump                 | 8 Exhaust manifold |
| 3 Dual cooler (heat exchanger)  | 9 Main cooler      |
| 4 Intercooler                   | 10 Thermostat      |
| 5 Exhaust pipe                  | 11 Expansion tank  |
| 6 Engine water circulation pump |                    |

Check the system regularly.

- Check hoses for cracks and damage. Replace if necessary.
- Check that the water intakes are not blocked. Clean if necessary.
- Check the seawater strainer. Clean if necessary.
- Check the coolant level and mixture. Fill up if necessary.
- Check that the tell-tales are not blocked. Clean daily with a pipe cleaner or similar.

### 3.7.10 CHECKING THE WATER INTAKES



A Upper water intakes (starboard and port side)

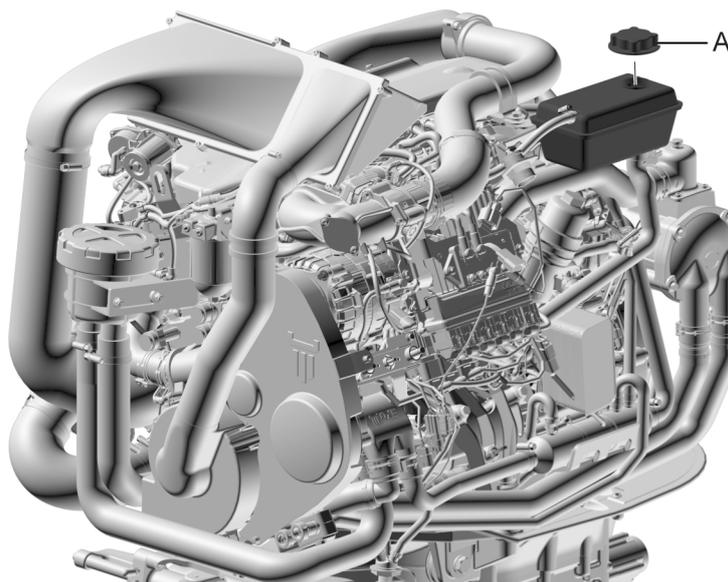
B Lower water intake

- Make sure that the seawater intakes are not clogged by seaweed or obstacles. Clean if necessary.

### 3.7.11 CHECKING THE COOLANT LEVEL AND MIXTURE

1. Check the cooling level.

The cooling level should be between the max and min indications on the expansion tank.



Coolant expansion tank

A Filler cap

The cooling system of the engine is to be filled with a mixture of distilled water and antifreeze based on ethylene glycol and/or anticorrosion additive, see Section 4.2 "Recommended fluids and grease", [page 78](#).



#### NOTE

Coolant must be added **at the expansion tank filler neck** only.

Ensure that the mixing ratio "water-antifreeze" is preserved.

**WARNING**

Do not add cold coolant to a warm engine.

### 3.7.12 CHECKING THE POWER TRIM AND TILT SYSTEM FUNCTIONALITY

**WARNING**

Never get under the lower unit while it is tilted. Risk for severe injury if the outboard accidentally falls!

Make sure no person is under the outboard before performing this test. Risk of crushing injuries between outboard and clamp bracket if the outboard is trimmed or tilted.

- 1 Check the power trim and tilt unit for any signs of oil leaks.
- 2 Operate each of the power trim and tilt switches on the remote control and the lower cowling to check that all switches work.

**NOTE**

The ignition key must be in IGN & ACC position.



#### Trim and tilt switch on cowling

- 3 Tilt up the outboard and check that the tilt rod and trim rods are extended completely.
- 4 Check that the tilt rod and trim rods are free from corrosion or damage.
- 5 Activate the tilt-down switch until the rods have retracted completely into the cylinders.
- 6 Activate the trim-up switch until the tilt rod is fully extended.
- 7 Tilt the outboard down. Check that the tilt rod and trim rods operate smoothly.

Repeat steps 6–7 above a couple of times and check that the system operates smoothly. Also check the hydraulic fluid, wear of pistons and joints and occurrence of abnormal sounds from the power tilt and trim motors.

**NOTE**

Consult your dealer if any operation is abnormal.

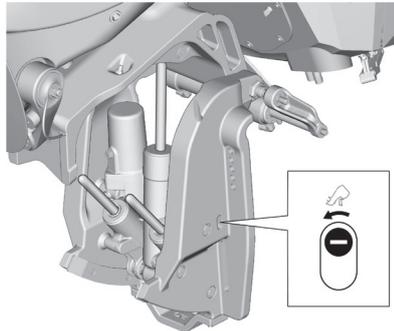
The upper tilt position angle can be limited by setting an upper limit value in the engine settings.



### CAUTION

The outboard can be lowered by carefully turning the manual release valve. This can be useful if the engine's battery is not connected.

Ensure that the manual release valve is tightened before starting the outboard!



Tilt and trim rods, manual valve

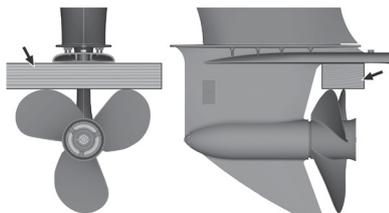
## 3.7.13 CHECKING THE PROPELLER



### WARNING

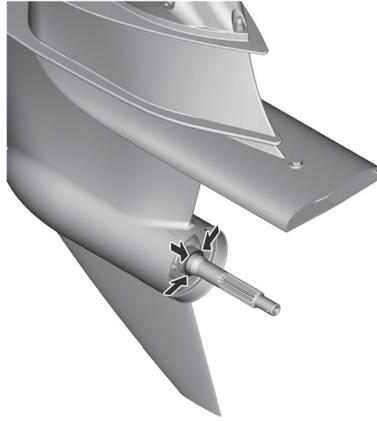
Serious injury could occur if the engine accidentally starts when you are near the propeller. Before inspecting, removing, or installing the propeller, place the shift control in neutral, turn the key to OFF and remove the key. Remove the clip from the engine shut-off switch. Disconnect the battery main switch.

Do not use your hand to hold the propeller when loosening or tightening the propeller nut. Place a wooden block between the anticavitation plate and the propeller to prevent the propeller from turning.



### Propeller checkpoints

- Check each of the propeller blades for erosion or other damage.
- Check the propeller shaft for damage.
- Check the splines for wear or damage.
- Check for obstacles tangled around the propeller shaft.
- Check the propeller shaft oil seals for leakage. Replace if necessary.



Propeller shaft oil seals

### 3.7.14 CHECKING THE TOP COWLING



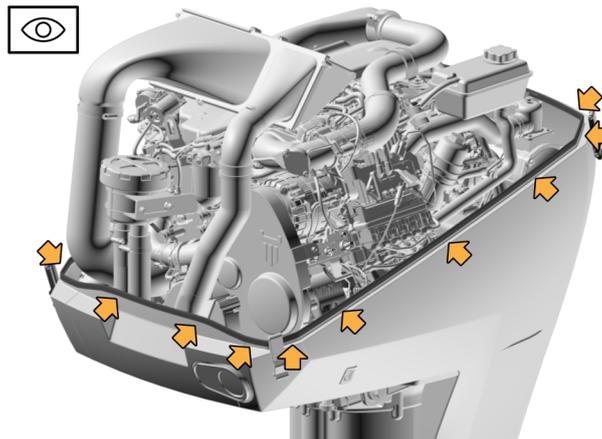
#### CAUTION

Make sure the top cowling is securely closed and that there are no gaps. A loose or improperly fitted cover could allow water to enter the engine compartment.

- Check the fitting of the top cowling. Reinstall the cowling if it is not correctly fitted (see Section 3.5 "Removal and installation of top cowling", [page 33](#)). Contact your dealer or manufacturer if the cowling cannot be fitted correctly.

### 3.7.15 CHECKING THE COWLING SEALING

- Check that the sealing is not dry, broken or worn, as this will allow water to enter the engine.



### 3.7.16 CHECKING PAINTED SURFACES

- Check the outboard for scratches, nicks or flaking paint. Areas with damaged paint surfaces could possibly corrode. Clean and paint the areas if necessary.

### 3.7.17 INSPECTING ANODES

The OXE diesel outboard is protected from corrosion by sacrificial anodes.

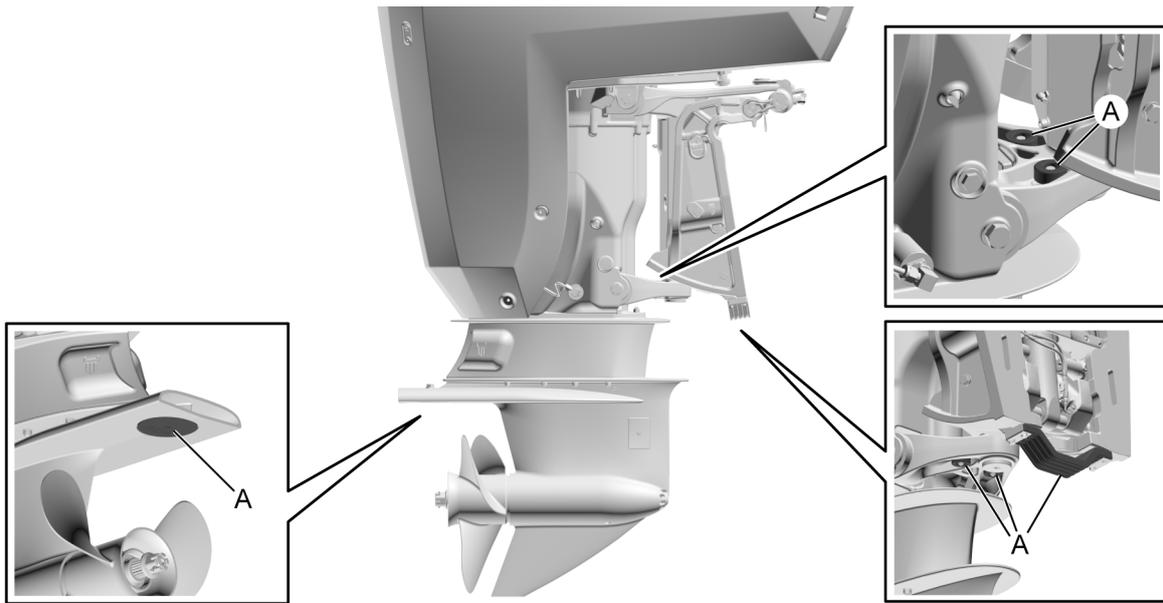


#### CAUTION

Do not apply paint over the anodes as this would make them ineffective.

### Anodes on the PTT (Power Trim and Tilt) and lower units

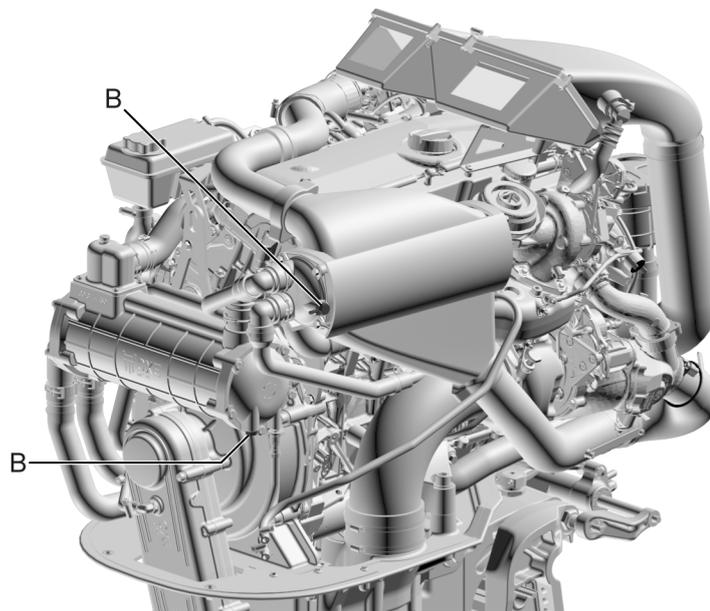
- Inspect the external anodes (A) periodically and remove scale from the surface. Replace at service intervals or when anodes are reduced to 2/3 of their original size.



### Anodes under the cowling

The main cooler and the intercooler are located under the cowling. These units are equipped with sacrificial anodes to protect from corrosion.

- Inspect the anodes (B) periodically and remove scale from the surface. Replace at service intervals or when anodes are reduced to 2/3 of their original size.



#### CAUTION

Ensure that anodes and threads are clean before remounting.

## 3.8 CHANGING FLUIDS AND FILTERS

### 3.8.1 PREVENTION OF ENVIRONMENTAL DAMAGE

#### Engine, gearbox and belt oil, filter elements/cartridges, fuel/fuel filter

Dispose of used oil according to local environmental legislation.

Take strict precautions to ensure that no oil or diesel fuel contaminate soil or drainages.



#### CAUTION

Risk of contamination of drinking water!

Filter elements are classed as dangerous waste and must be treated as such.

#### Coolant

Treat undiluted corrosion protection agents and/or antifreeze as hazardous waste.

**When disposing of used coolant, the environmental legislation issued by the relevant local authorities must be adhered to.**

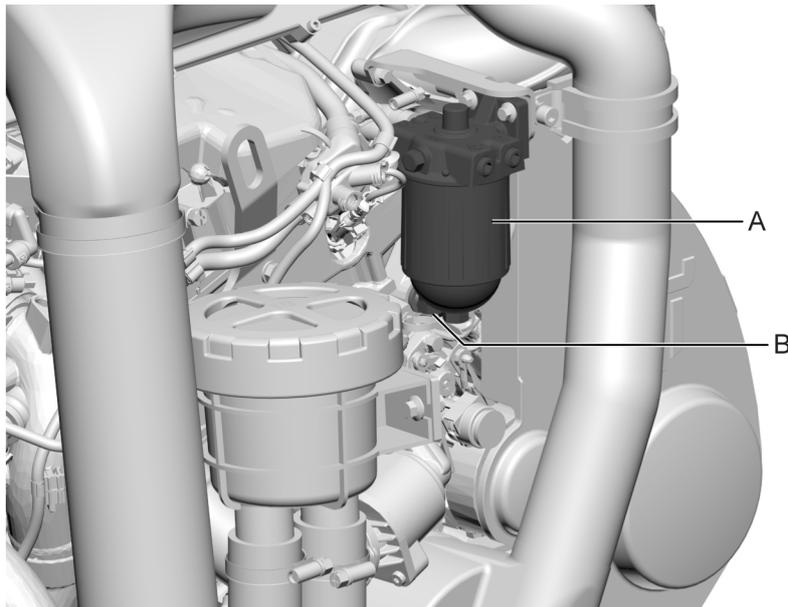
### 3.8.2 DRAINING THE FUEL FILTER



#### CAUTION

Risk of contamination of drinking water. Dispose of the fuel-water mixture according to local environmental legislation.

- 1 Use a suitable container to collect the fuel-water mixture that drains from the fuel filter (A).
- 2 Loosen the draining screw (B) and release the fuel-water mixture into the container. Tighten the draining screw.



#### NOTE

Also drain the fuel **prefilter** installed in the boat.

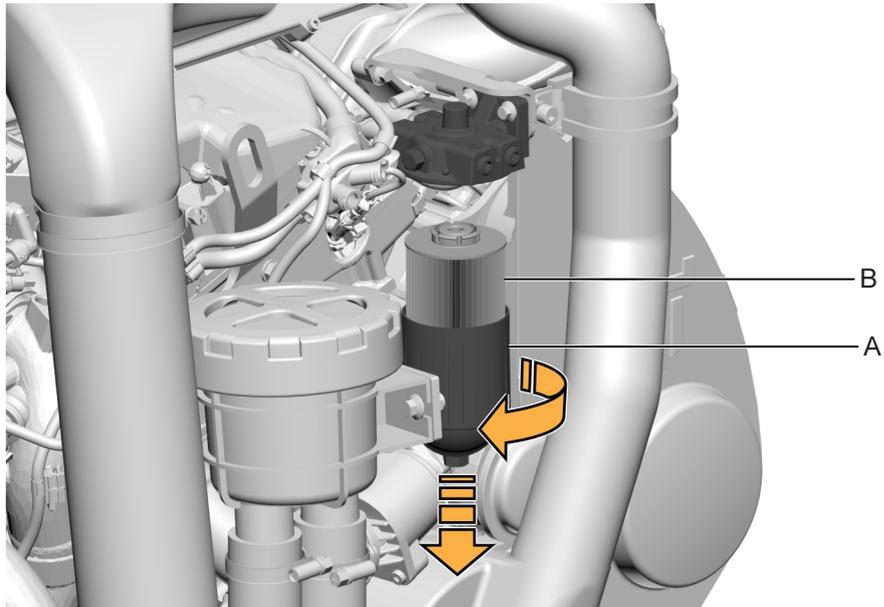
### 3.8.3 REPLACING FUEL FILTER ELEMENT



#### CAUTION

Risk of contamination of drinking water. Dispose of the fuel-water mixture according to local environmental legislation.

- 1 Use a suitable container to collect the fuel-water mixture that drains from the fuel filter.
- 2 Unscrew the fuel filter bowl (A).
- 3 Remove the filter element (B) and discard according to local environmental legislation.



- 4 Insert a new 2 micron filter element (B) and reinstall the fuel filter bowl (A). Tighten by hand.



**NOTE**

Also replace the fuel **pre**filter element installed in the boat.

### 3.8.4 DRAINING GEARBOX OIL AND REPLACEMENT OF FILTER



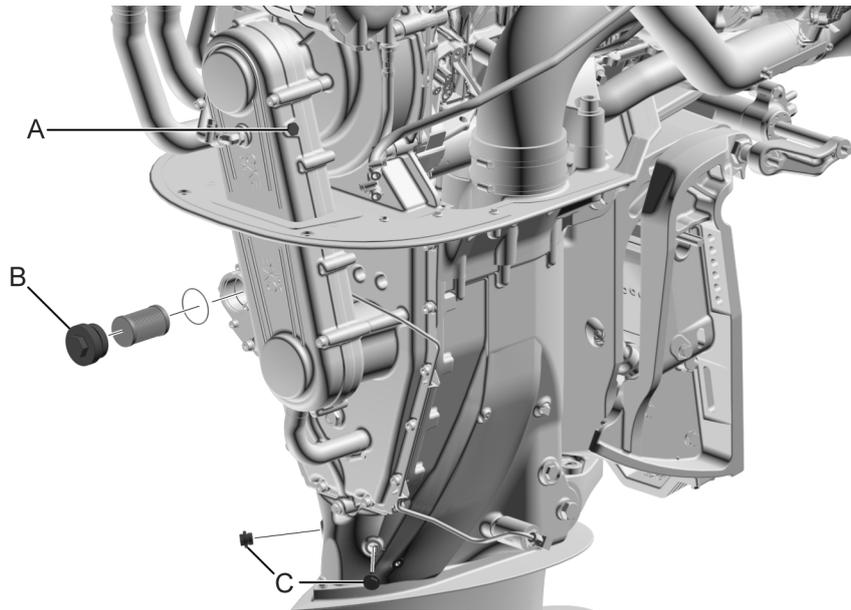
**WARNING**

**The gearbox oil filter is pressurised. The pressure must be released before removing.**

There is a common lubricating system for the gearbox and the primary transmission.

- 1 Turn the ignition ON and shift gear a couple of times from forward to backward.
- 2 Tilt the outboard in order to minimize any oil spill.
- 3 Remove the magnetic gearbox oil filling plug (A) on the primary transmission.
- 4 Remove the M16 oil plugs (C).
- 5 Drain the gearbox oil into a suitable container.
- 6 Carefully clean the area around the gearbox oil filter using pressurised air.

- 7 Remove the filter cap (B). Have a cloth nearby to collect the gearbox oil in the filter.



- 8 Reinstall the M16 oil plugs (C) and tighten to a torque of 9 Nm (6.6 lb-ft).
- 9 Install a new filter and reinstall the filter cap (B). Tighten the filter cap to a tightening torque of 70 Nm (51.6 lb-ft).
- 10 Clean and reinstall the magnetic oil plug (A) using a **new** washer. Tighten the oil plug to a tightening torque of 9 Nm (6.6 lb-ft).

### 3.8.5 REFILLING GEARBOX OIL

There is a common lubricating system for the gearbox and the primary transmission.

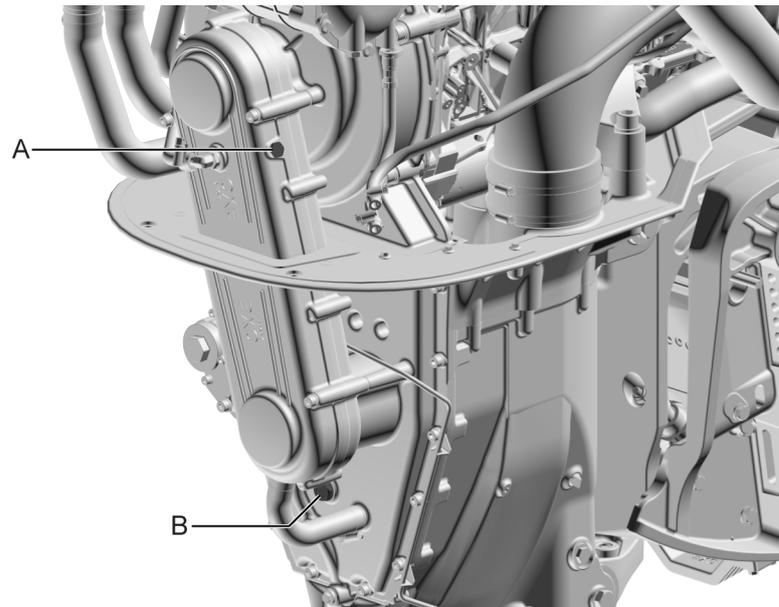
- 1 Unscrew the magnetic gearbox oil-filling plug (A) on the primary transmission and fill up gearbox oil through the inlet. Refer to Section 4.2 "Recommended fluids and grease", [page 78](#).
- 2 Wipe clean.

- 3 Check the gearbox oil level through the sight glass (B) and fill up gearbox oil if necessary.



**NOTE**

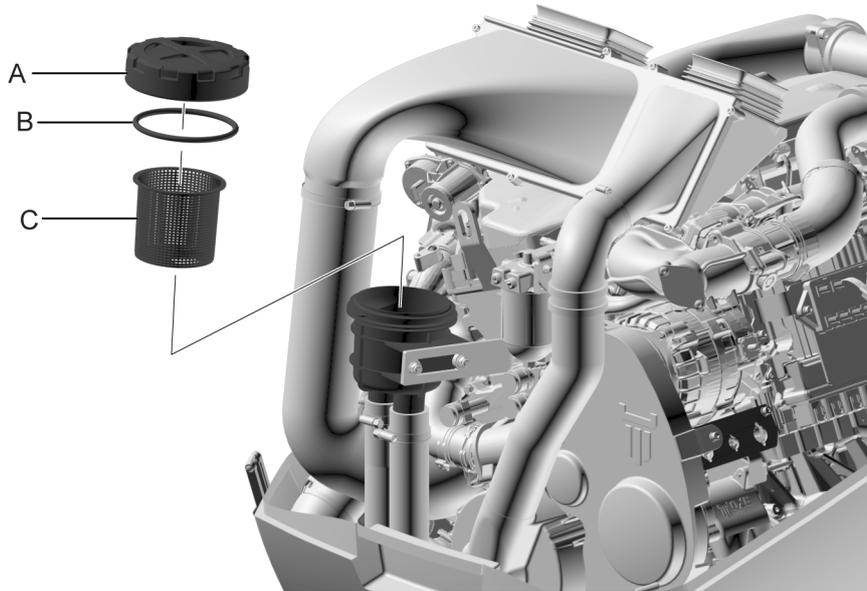
An accurate gearbox oil level can be checked when the engine has stopped and the cooler has drained completely. Allow approximately seven (7) minutes between engine stop and gearbox oil level check.



- 4 Clean the magnetic oil plug (A) and install a **new** washer.
- 5 Tighten the magnetic oil plug (A) to a tightening torque of 9 Nm (6.6 lb-ft).

### 3.8.6 CLEANING THE SEAWATER STRAINER

- 1 Remove the strainer lid (A) and the sealing (B).
- 2 Pull out the filter element (C).
- 3 Clean the filter element.



- 4 Reinstall in the reverse order and close the strainer lid.



#### NOTE

Make sure the sealing (B) and the strainer lid (A) are sealed properly.

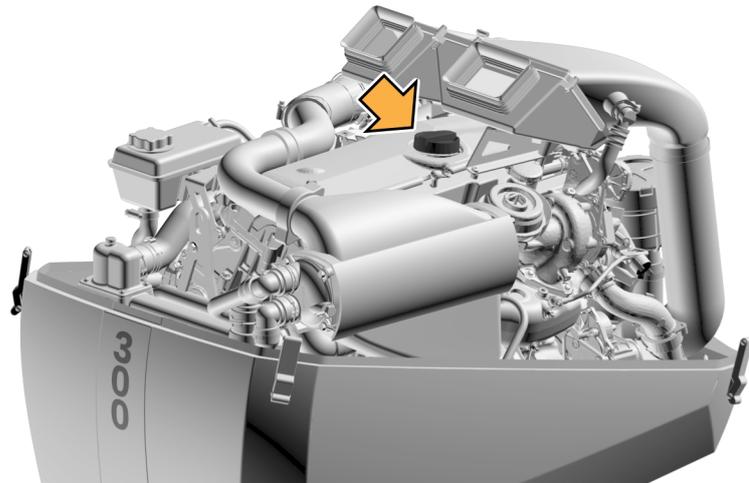
### 3.8.7 AIR FILTER REPLACEMENT

- 1 Remove the hose clamps (B) and loosen the hoses (A) from the intake and ventilation air filter housing.
- 2 Loosen and remove the crosshead screw (F) and the connection bracket (G) and then detach the ventilation tube (H).
- 3 Loosen the eight screws (D) and remove the upper part of the intake and ventilation air filter housing (C).

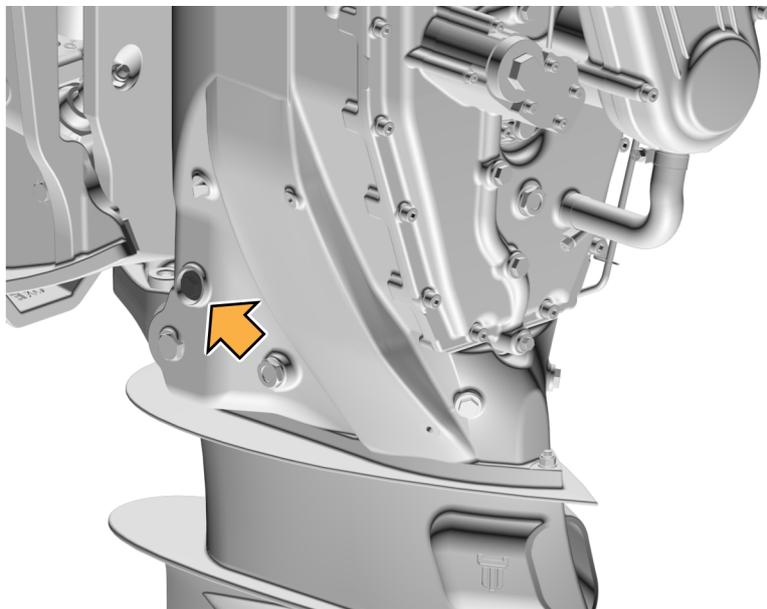


### 3.8.8 DRAINING ENGINE OIL

- 1 Open the engine oil filler cap.



- 2 Remove the engine oil draining plug.



- 3 Drain the engine oil into a suitable container.



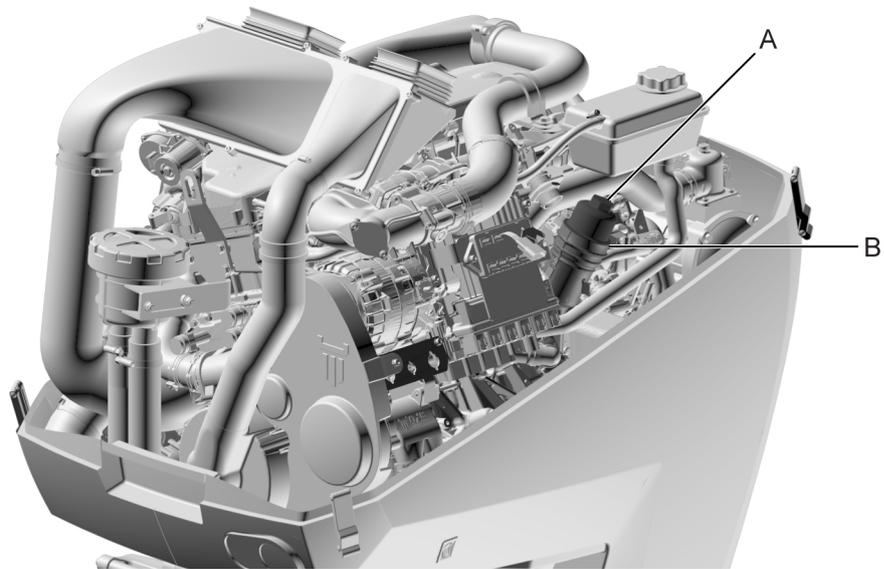
**CAUTION**

Risk of contamination of drinking water. Dispose of used oil according to local environmental legislation!

- 4 Fit a new washer and tighten the oil draining plug to 12 Nm (8.9 lb-ft).

### 3.8.9 ENGINE OIL FILTER REMOVAL

- 1 Place a suitable container below the oil filter.
- 2 Remove the oil filter cap (A), using a 25 mm 6 point socket.
- 3 Remove and discard the oil filter cartridge.
- 4 Remove the seal ring (B).



### 3.8.10 ENGINE OIL FILTER INSTALLATION

- 1 Lubricate the threads (C) of the oil filter cap (A).



#### NOTE

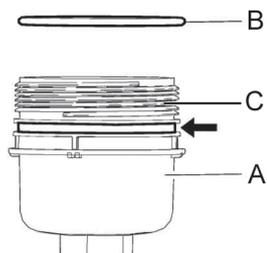
Failure to lubricate the oil filter cap threads prior to installation, can hinder later removal and cause possible oil filter cap damage!

- 2 Install the new seal ring (B) with clean engine oil to the oil filter cap (A).



#### NOTE

Make sure the seal ring (B) is located in the correct groove, marked with an arrow in the graphic below.



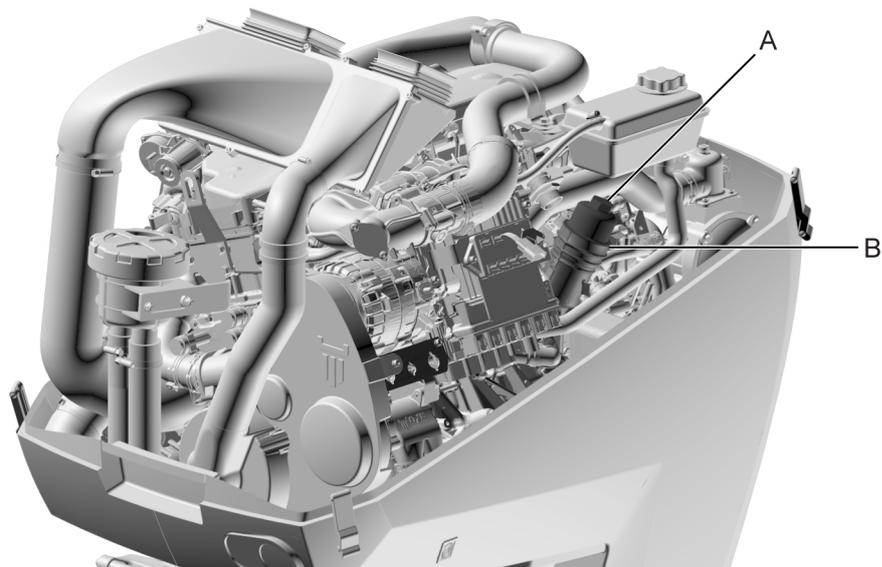
- 3 Install the new oil filter cartridge.

- 4 Install the oil filter cap (A) and tighten to 25 Nm (18 lb-ft).



**NOTE**

Failure to tighten the oil filter cap to the correct tightening torque can hinder later removal and cause possible oil filter cap damage!



- 5 Fill the engine with the appropriate oil type and quantity (according to Section 3.8.11 "Filling up engine oil", [page 56](#)).

### 3.8.11 FILLING UP ENGINE OIL



**CAUTION**

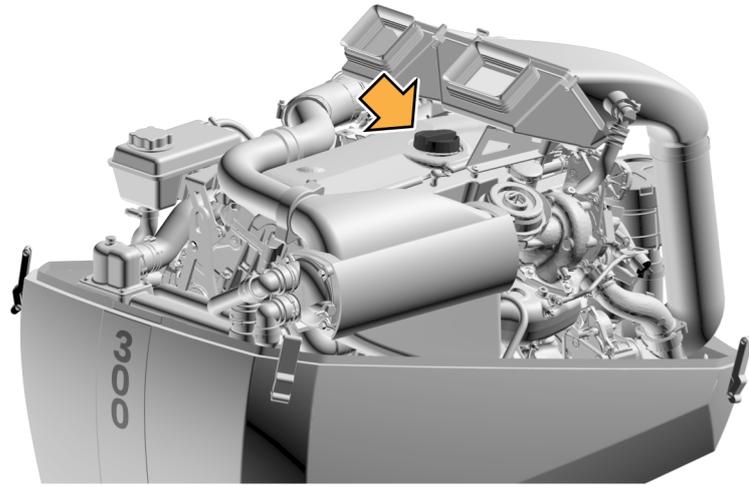
Ensure the outboard is trimmed down in a vertical position.



**NOTE**

Make sure the oil draining plugs (see Section 3.8.8 "Draining engine oil", [page 54](#)) are re-installed and tightened before filling oil into the engine!

- 1 Open the oil filler cap and refill with fresh engine oil through the oil filler neck. Refer to Section 4.2 "Recommended fluids and grease", [page 78](#).



- 2 Check the engine oil level according to Section 2.1.5.1 "Checking the engine oil", [page 21](#).



**WARNING**

Do not fill engine oil beyond the maximum notch on the dipstick. Overfilling oil may cause damage to the engine.

- 3 Close the filling cap and wipe clean.
- 4 Start the engine and let it run for a few minutes at low speed.



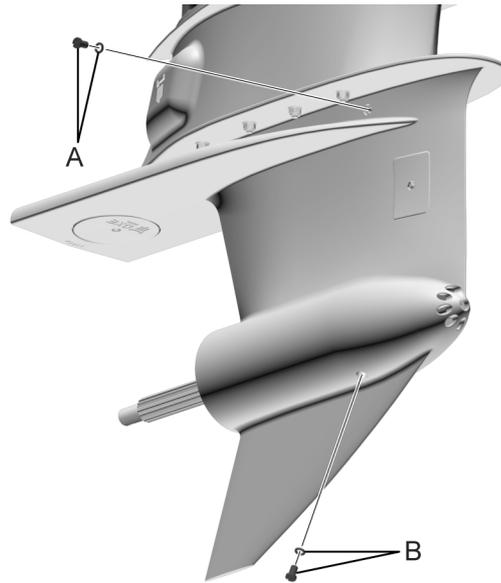
**CAUTION**

If no oil pressure builds up after approx. 10 seconds switch off the engine immediately.

- 5 Check oil pressure and leaks.
- 6 Then shut down the engine. After about 20 minutes, check the oil level again.  
The oil level should be between the two notches in the dipstick and must never fall below the lower notch.
- 7 Top up oil as necessary. Do not overfill.

### 3.8.12 CHANGING LOWER UNIT OIL

- 1 Remove the magnetic oil drain plug and the washer (A) above the anticavitation plate.
- 2 Remove the magnetic oil drain plug and the washer (B) below the propeller shaft housing.



- 3 Drain the belt oil into a suitable container.

- 4 Check the quality of the drained oil.

The belt oil should be red to dark red color.

If the belt oil looks milky and foamy, water has entered the lower housing. Check for leakage!



**NOTE**

Clean the magnetic oil plugs and install new seals.

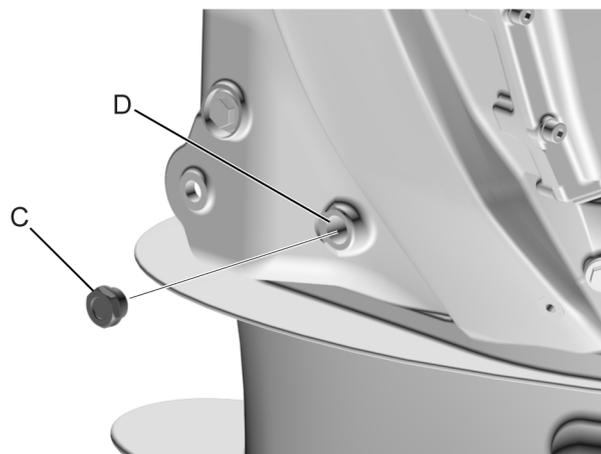


**NOTE**

When the lower unit oil is changed for the first time, the oil may be purple or blue colored, due to color pigments coming from the belt. This is completely normal.

- 5 Reinstall and tighten oil plug (B) to 9 Nm (6.6 lb-ft).

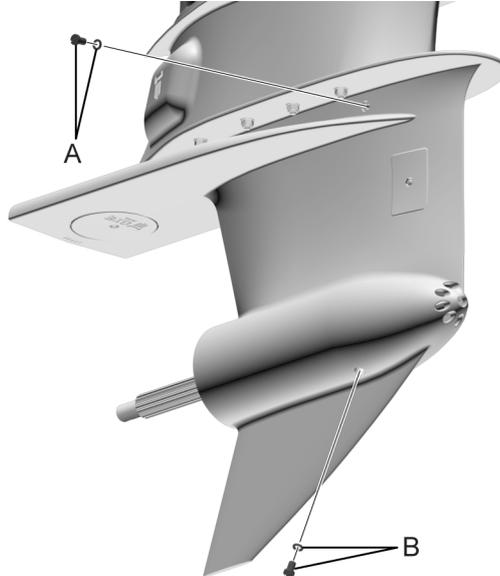
- 6 Remove the M20 sight glass (C). Fill up with belt oil through the sight glass inlet (D), until oil comes out at the upper oil plug (A). Refer to Section 4.2 "Recommended fluids and grease", [page 78](#).



- 7 Reinstall and tighten oil plug (A) to 9 Nm (6.6 lb-ft).
- 8 Clean the sight glass. Install a new seal. Tighten the M20 sight glass (C) to 12 Nm (8.9 lb-ft).

#### Alternative method to refill lower unit oil

1. Use a marine industry standard oil filling device to fill up the lower unit oil through the lower oil drain plug (B) hole until oil comes out through the upper oil plug (A) hole.



#### NOTE

Clean the magnetic oil plugs and install new seals.

2. Once oil comes out through the upper oil plug hole, refit the upper oil plug (A) to the upper oil plug hole, using a new seal.
3. Remove the oil filling device and reinstall the lower oil drain plug (B) using a new seal.
4. Tighten both oil plugs (A) and (B) to 9 Nm (6.6 lb-ft).

### 3.8.13 CHANGING COOLANT

- 1 Place a suitable container under the engine to collect coolant/water mixture.
- 2 Remove the coolant drain plug (A) located on the main cooler and use a funnel (B) and a hose (C) to drain the coolant/water mixture into the container.



#### CAUTION

Risk of contamination of drinking water. Dispose of used coolant/watermixture according to local legislation.

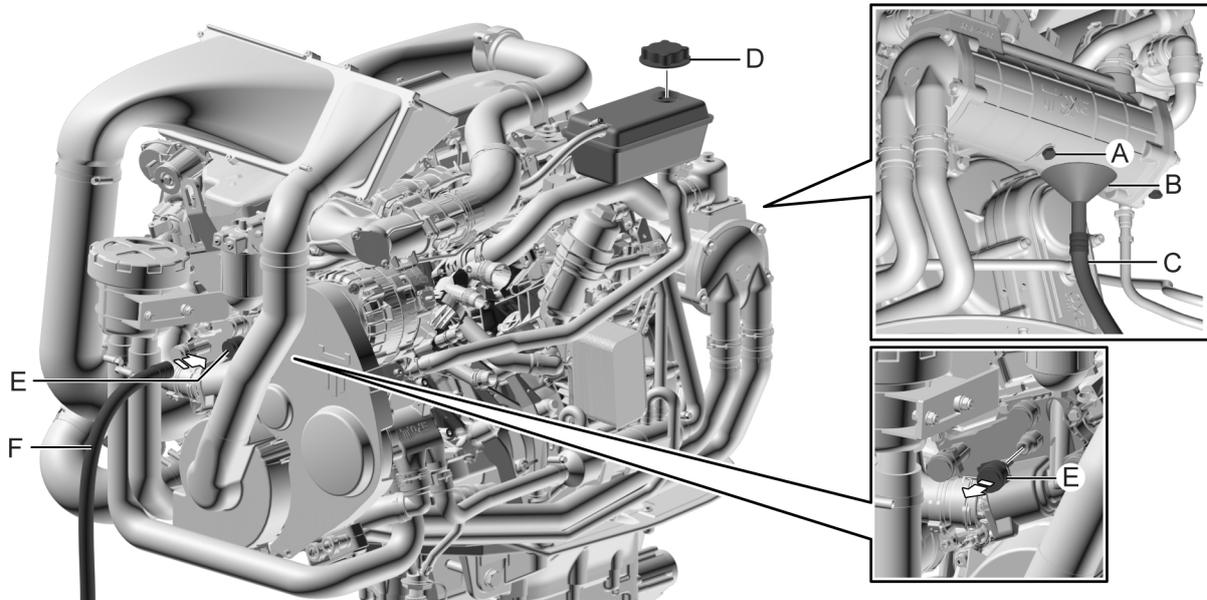
- 3 Remove the cap (D) of the expansion tank.

- 4 Remove the blind cap (E) on the cooling outlet on the front of the engine, attach a 15 mm diameter hose (F) and drain the remaining coolant/water mixture into the container.



**NOTE**

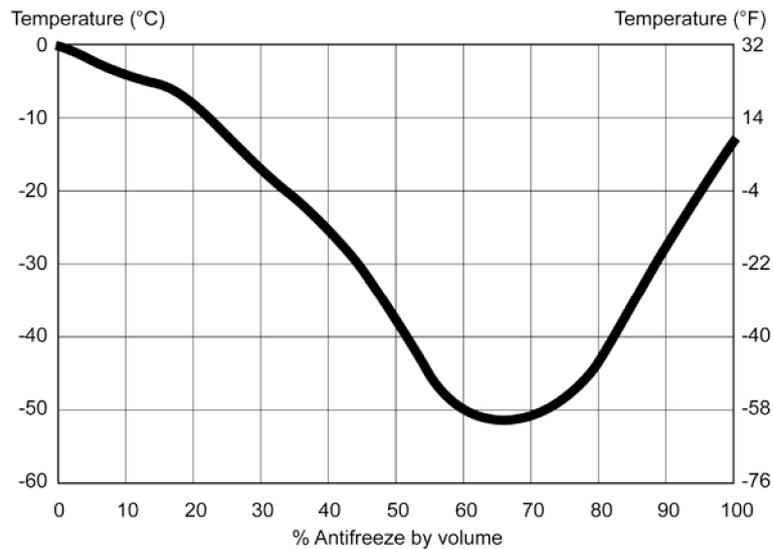
To drain the approximately 10 liters of coolant the engine must be tilted!



- 5 Check the condition of the seal for the blind cap (E) and replace the seal if needed.
- 6 Refit the coolant drain plug (A) on the main cooler and the blind cap (E) on the front cooling outlet.

- 7 Fill up the expansion tank with coolant at to approximately 4 cm below the filling neck. Refer to Section 4.2 "Recommended fluids and grease", page 78.

The cooling system of the engine is to be filled with a mixture of approximately 30% distilled water and 70% antifreeze based on ethylene glycol and/or anticorrosion additive (see diagram below).



**WARNING**

Use only approved fluids, lubricants etc. (see the "Recommended fluids and grease" section). Otherwise, the manufacturer's Global Warranty Policy will become null and void.

Coolant must be added at the filler cap only.



**WARNING**

Do not add cold coolant to a warm engine.

Ensure that the mixing ratio "water-antifreeze" is preserved.

- 8 Slowly fill up with coolant at the filler neck on the expansion tank. The cooling level should be between the max and min indications on the expansion tank.

Refit the cap (D) to the expansion tank.

- 9 Let the engine run at a speed of 2000 rpm for approximately 5–15 minutes, until the liquid level is stable.

- 10 Switch off the engine and carefully turn the expansion tank cap to relieve pressure.



**DANGER**

Do not open the cap until pressure is released. Risk of scalding and burning injuries!

- 11 Top up coolant to between the max and min indications on the expansion tank if necessary.

- 12 Before the next engine cold start, check the coolant level and top up if necessary.

Repeat this procedure until no more coolant needs to be added and all air has been removed from the system.



**DANGER**

If, in an exceptional case, the coolant level has to be checked in an engine that has reached operating temperature, first carefully turn the expansion tank cap with the safety valve to the first stop. Then let off pressure and finally open carefully!



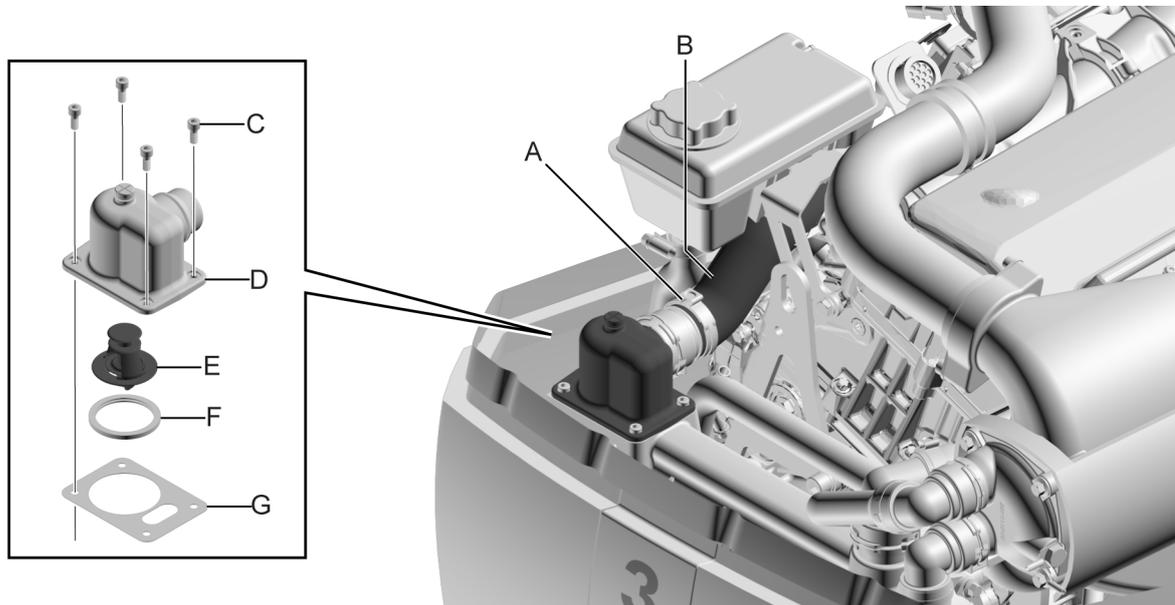
**NOTE**

Do not open the cooling system when the engine is at operating temperature. This causes a pressure loss in the cooling system.

If the cooling system has been opened while the engine was at operating temperature, and the engine is put into operation, this may lead to a "**pressure in the expansion tank**" alarm being indicated and to a reduction in the engine output. The cooling system must therefore only be filled up or checked **when the engine is cold**.

### 3.8.14 THERMOSTAT REPLACEMENT

- 1 Drain the coolant (see Section 3.8.13 "Changing coolant", [page 59](#)).
- 2 Remove the clamp (A) and loosen the pressure pipe (B).
- 3 Remove the four screws (C) and lift off the thermostat housing (D).
- 4 Remove the thermostat (E), the sealing ring (F) and the gasket (G).



- 5 Clean the thermostat housing (D).
  - 6 Install a new thermostat (E) with a new sealing ring (F), and a new gasket (G).
- i** | **NOTE**  
Always exchange the gasket when replacing the thermostat.
- 7 Reattach the thermostat housing (D) and tighten the four screws (C) to a tightening torque of 8 Nm (6 lb-ft).
  - 8 Reinstall the pressure pipe (B) and the clamp (A). Tighten the clamp (A) to a torque of 5 Nm (3.7 lb-ft).
  - 9 Fill up coolant according to Section 3.8.13 "Changing coolant", [page 59](#).

## 3.9 PROPELLER REPLACEMENT

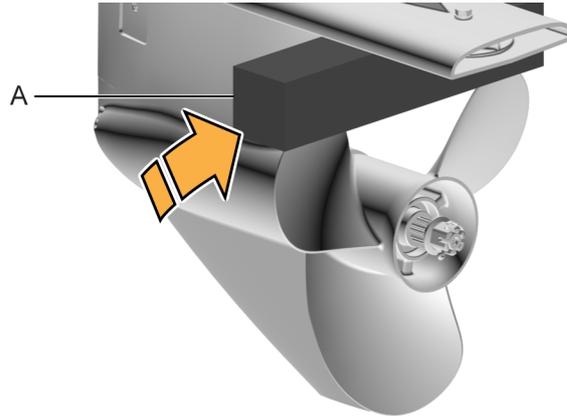
### 3.9.1 PROPELLER REMOVAL



#### **WARNING**

Rotating propellers can cause serious injury or death. Never operate the OXE Diesel engine out of the water with a propeller installed. Before installing or removing a propeller, place the drive unit in neutral and engage the kill cord stop switch to prevent the engine from starting.

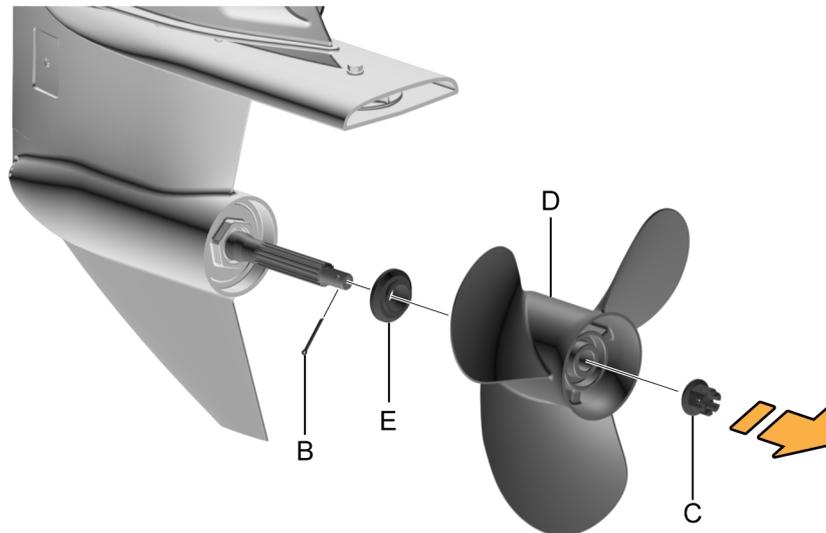
- 1 Prevent the propeller from rotating, for instance by locking the propeller using a wooden block (A).



**WARNING**

Do not use any body parts to hold the propeller when loosening or tightening the propeller nut.

- 2 Straighten the cotter pin (B) and pull it out using a pair of pliers.
- 3 Remove the propeller nut (C).
- 4 Remove the propeller (D) and the propeller washer (E).



### 3.9.2 PROPELLER INSTALLATION



**WARNING**

Rotating propellers can cause serious injury or death. Never operate the OXE Diesel engine out of the water with a propeller installed. Before installing or removing a propeller, place the drive unit in neutral and engage the kill cord stop switch to prevent the engine from starting.



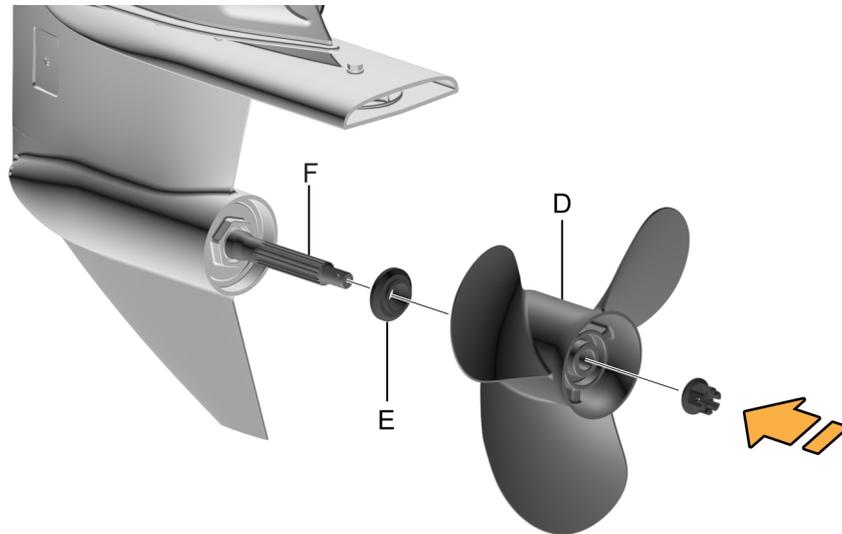
**NOTE**

Always use a new hub kit when installing a propeller. Please refer to your OXE Diesel dealer or propeller manufacturer for suitable hub kit and propeller parts.

**NOTE**

In twin, or more installations, one propeller should be for right-hand rotation and the other one should be for left-hand rotation. Both should be of the same brand, diameter and have the same pitch.

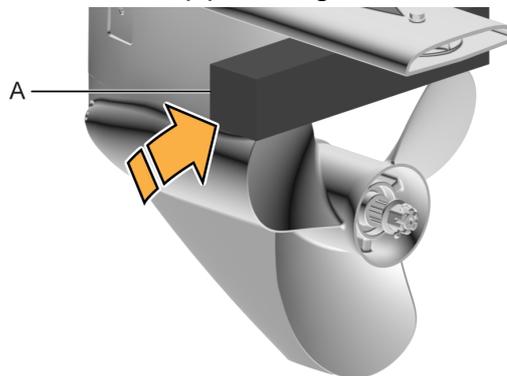
- 1 Apply marine grease (according to Section 4.2 "Recommended fluids and grease", [page 78](#)) to the propeller shaft (F) before installing the propeller. This aids future removal and corrosion resistance.
- 2 Install the propeller washer (E) and the propeller (D) on the propeller shaft (F).

**NOTE**

Be sure to install the propeller washer (E) before installing the propeller, otherwise the lower case and propeller boss could be damaged.

**3****WARNING**

**Do not use your hand to hold the propeller when loosening or tightening the propeller nut. Secure the propeller with a wooden block (A) according to the illustration below.**



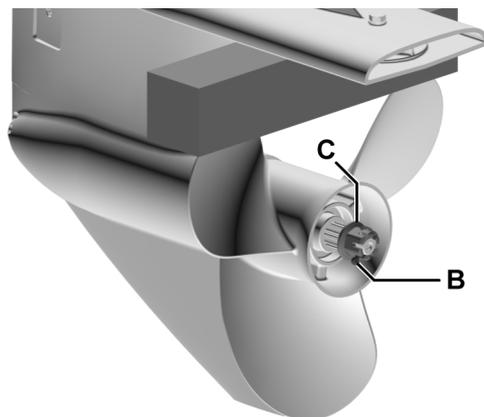
Tighten the propeller nut (C) to a tightening torque of 120 Nm (88.5 lb-ft).

- 4 Align the propeller nut with the propeller shaft hole. Insert a new cotter pin (B) in the hole and bend the cotter pin ends.



**CAUTION**

Be sure to use a new cotter pin and bend the ends over securely! Otherwise the propeller could come off during operation!



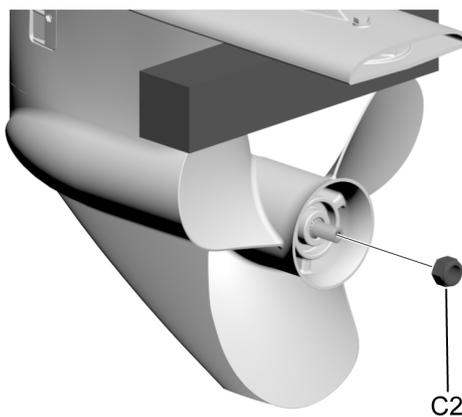
**NOTE**

If the propeller nut does not align with the propeller shaft cotter pin hole after tightening to the specified torque, tighten the nut further to align it with the hole.



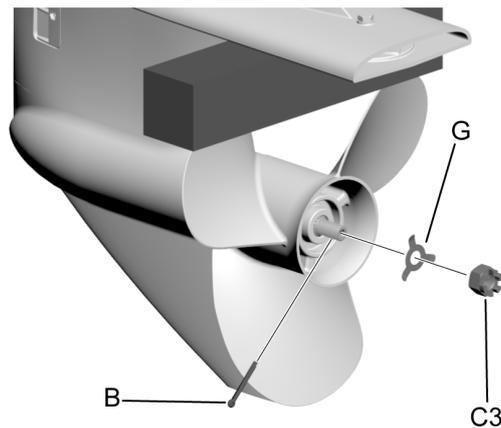
**NOTE**

Some outboards are equipped with a Nyloc locking nut (C2) and do not have a cotter pin. Do **not reuse** a Nyloc locking nut!



**NOTE**

Some models use a retainer (G) and a castellated nut (C3) combined with a cotter pin (B).



After having attached all parts and fastened the propeller nut to the correct tightening torque:

- Loosen the wooden block.
- Ensure that the propeller is undamaged and rotates freely of the lower housing.

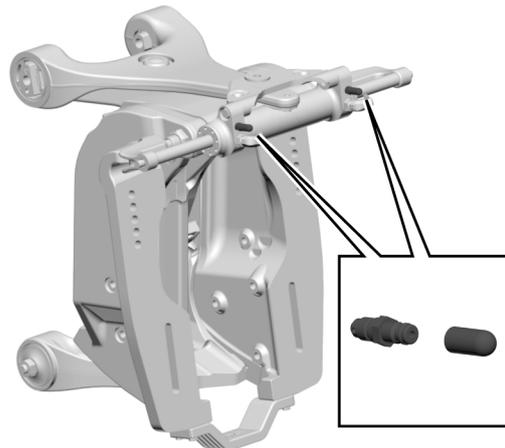
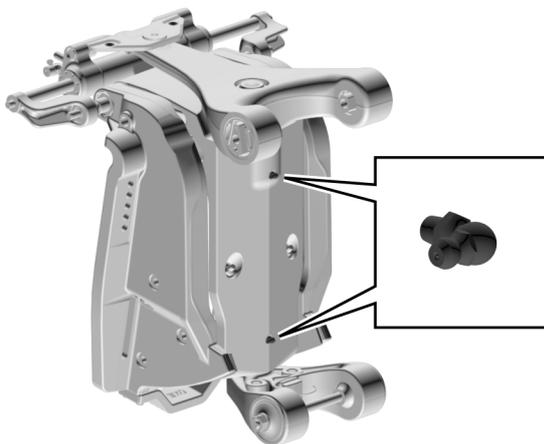
**NOTE**

Always have an extra propeller including necessary tools on board.

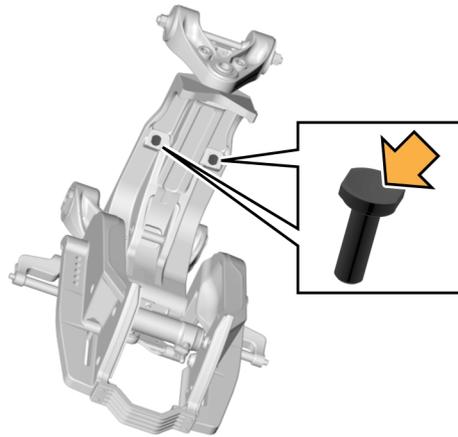
## 3.10 LUBRICATING AND GREASING

### 3.10.1 LUBRICATING AND GREASING THE POWER TRIM AND TILT UNIT

- 1 Use a grease gun and fill up with recommended grease until the grease comes out at the joints or ends of the shafts. Use grease according to Section 4.2 "Recommended fluids and grease", [page 78](#).



- 2 Fill the seatings with grease for smoother tilt operation, by applying a thin (approximately 1 mm) even coat of grease. Use grease according to Section 4.2 "Recommended fluids and grease", page 78.



## 3.11 MAINTENANCE SCHEDULE

### 3.11.1 DAILY CHECK-UP

Checklist							
Check daily	Check	Drain	Fill up if necessary	Clean	Clean if necessary	Change/replace	Refer to
<b>Before start-up:</b>							
Seawater strainer	X				X		
Engine oil dip stick	X		X				
Water separator, engine fuel filter		X					
<b>Start engine:</b>							
Alternator loading	X						Display Manual
Tell-tales not blocked, Clean using pipe-cleaner.	X			X			

### 3.11.2 INSPECTION PRIOR TO EACH SERVICE EVENT

Checklist					
	Check	Fill up	Clean	Change/ replace	Refer to
<b>Starting and warming up engine</b> – Water/oil/fuel leakage – Power trim, function and leakage – No DTCs are triggered (diagnostic tool) – Unusual engine/transmission sounds	X				
<b>Stop engine</b> – Engine oil and filter				X	User Manual
<b>Restart engine</b> – Oil pressure – Oil leakage	X				Display Manual

### 3.11.3 SERVICE AT 50 HOURS

Checklist						
After 50 h	Check	Fill up/ lubricate	Clean	Change/ replace	Replace if necessary	Refer to
Condition of rubber hoses, pipes, connections and clamps (leakage, wear, aging)						
– Coolant hoses	X				X	
– Hydraulic hoses	X				X	
– Fuel hoses	X				X	
– Exhaust hose	X				X	
Cables, connectors, cable glands (wear, aging)	X		X		X	
Display/ gauges (function, wear, aging)	X				X	Display Manual
Controlhead (function, wear, aging)	X				X	Controlhead Manual
Emergency stop switch (function)	X				X	
Fasteners (nuts, bolts, zip-ties, etc.)	X				X	
Side water pick up/ Nose cone (Debris)	X		X		X	
Seawater strainer, pipes, connections and clamps (leakage, wear, aging)	X		X		X	
Seawater pump (leakage, wear)	X				X	
– Impellers	X				X	
Alternator drive belt (wear, aging)	X				X	
Alternator belt tensioner (function, wear, condition)	X				X	

Checklist						
After 50 h	Check	Fill up/ lubricate	Clean	Change/ replace	Replace if necessary	Refer to
Coolant level and mixture	X	X			X	
Thermostat function	X				X	
Intercooler (wear, condition)	X		X		X	
– Sacrificial anode	X				X	
Power trim and tilt unit PTT (leakage, function, wear, aging)	X				X	
Engine oil and filter		X		X		
Fuel filter - on engine	X				X	
Fuel filter - in vessel	X				X	
Air filter	X		X		X	
Turbo charger (function, wear, condition)	X		X		X	
Main cooler (wear, condition)	X		X		X	
– Sacrificial anode	X				X	
Crank case ventilation and hose (wear, condition)	X		X		X	
Upper transmission seal (leakage)	X					
Gearbox						Service and Workshop Manual
– Gearbox oil and filter		X		X		
– O-ring, filter housing				X		
– Magnetic oil plug			X		X	
– Magnetic oil plug seal				X		
Lower unit oil		X		X		Service and Workshop Manual
– Magnetic oil plug			X		X	
– Magnetic oil plug seal				X		
Lower housing (wear and condition)						Service and Workshop Manual
– Bearings	X				X	Service and Workshop Manual
– Gaskets and seals	X				X	
– Skeg	X				X	
Propeller shaft oil seal (leakage, wear, condition)	X				X	Service and Workshop Manual

Checklist						
After 50 h	Check	Fill up/ lubricate	Clean	Change/ replace	Replace if necessary	Refer to
Sacrificial anodes (wear, condition)	X				X	
Paint and cowling (wear, condition)	X		X			

### 3.11.4 SERVICE AT 200 HOURS

Checklist						
After 200 h or once a year	Check	Fill up/ lubricate	Clean	Change/ replace	Replace if necessary	Refer to
Condition of rubber hoses, pipes, connections and clamps (leakage, wear, aging)						
– Coolant hoses	X				X	
– Hydraulic hoses	X				X	
– Fuel hoses	X				X	
– Exhaust hose	X				X	
Cables, connectors, cable glands (wear, aging)	X		X		X	
Display/ gauges (function, wear, aging)	X				X	Display Manual
Controlhead (function, wear, aging)	X				X	Controlhead Manual
Emergency stop switch (function)	X				X	
Fasteners (nuts, bolts, zip-ties, etc.)	X				X	
Side water pick up/ Nose cone (Debris)	X		X		X	
Seawater strainer, pipes, connections and clamps (leakage, wear, aging)	X		X		X	
Seawater pump (leakage, wear)	X				X	
– Impellers	X			X		
Alternator drive belt (wear, aging)	X				X	
Alternator belt tensioner (function, wear, condition)	X				X	
Coolant level and mixture	X	X			X	
Thermostat function	X				X	
Intercooler (wear, condition)	X		X		X	
– Sacrificial anode	X				X	
Power trim and tilt unit PTT (leakage, function, wear, aging)	X				X	
Engine oil and filter		X		X		
Fuel filter - on engine	X			X		

Checklist						
After 200 h or once a year	Check	Fill up/ lubricate	Clean	Change/ replace	Replace if necessary	Refer to
Fuel filter - in vessel	X			X		
Air filter	X		X		X	
Turbo charger (function, wear, condition)	X		X		X	
Main cooler (wear, condition)	X		X		X	
– Sacrificial anode				X		
Crank case ventilation and hose (wear, condition)	X		X		X	
Upper transmission seal (leakage)	X					Service and Workshop Manual
Gearbox						Service and Workshop Manual
– Gearbox oil and filter		X		X		
– O-ring, filter housing				X		
– Magnetic oil plug			X		X	
– Magnetic oil plug seal				X		
Lower unit oil				X		Service and Workshop Manual
– Magnetic oil plug			X		X	
– Magnetic oil plug seal				X		
Lower housing (wear and condition)						Service and Workshop Manual
– Bearings	X				X	Service and Workshop Manual
– Gaskets and seals	X				X	
– Skeg	X				X	
Propeller shaft oil seal (leakage, wear, condition)	X				X	Service and Workshop Manual
Sacrificial anodes (wear, condition)	X				X	
Paint and cowling (wear, condition)	X		X			

### 3.11.5 SERVICE AT 800 HOURS

Checklist						
After 800 h or once every 3rd year minimum	Check	Fill up/ lubricate	Clean	Change/ replace	Replace if necessary	Refer to
Condition of rubber hoses, pipes, connections and clamps (leakage, wear, aging)						
– Coolant hoses	X		X		X	
– Hydraulic hoses	X		X		X	
– Fuel hoses	X		X		X	
– Exhaust hose	X		X		X	
Cables, connectors, cable glands (wear, aging)	X		X		X	
Display/ gauges (function, wear, aging)	X				X	Display Manual
Controlhead (function, wear, aging)	X				X	Controlhead Manual
Emergency stop switch (function)	X				X	
Fasteners (nuts, bolts, zip-ties, etc.)	X				X	
Side water pick up/ Nose cone (Debris)	X		X		X	
Seawater strainer, pipes, connections and clamps (leakage, wear, aging)	X		X		X	
Seawater pump (leakage, wear)	X				X	
– Impellers					X	
– Mechanical gasket					X	
Alternator drive belt (wear, aging)				X		
Coolant level and mixture	X	X		X		
Thermostat function	X				X	
– Seal					X	
Intercooler (wear, condition)	X		X		X	
– Sacrificial anode	X				X	
Power trim and tilt unit PTT (leakage, function, wear, aging)	X				X	
Engine oil and filter		X		X		
Fuel filter - on engine				X		
Fuel filter - in vessel				X		
Air filter				X		
Turbo charger (function, wear, condition)	X		X		X	
Main cooler (wear, condition)	X		X		X	

Checklist						
After 800 h or once every 3rd year minimum	Check	Fill up/ lubricate	Clean	Change/ replace	Replace if necessary	Refer to
– Sacrificial anode				X		
Crank case ventilation and hose (wear, condition)	X		X		X	
Flex coupling, rubber rollers	X			X	X	Service and Workshop Manual
Upper transmission seal (leakage)	X					Service and Workshop Manual
Gearbox housing (wear, condition)	X				X	Service and Workshop Manual
– Gears	X		X		X	
– Pulleys	X		X		X	
– Bearings	X		X		X	
– Gaskets and seals	X		X		X	
– Spline	X		X		X	
Gearbox						Service and Workshop Manual
– Gearbox oil and filter		X		X		
– O-ring, filter housing				X		
– Magnetic oil plug			X		X	
– Magnetic oil plug seal				X		
– Spline	X	X	X		X	
Lower unit oil		X		X		Service and Workshop Manual
– Magnetic oil plug			X		X	
– Magnetic oil plug seal				X		
Lower housing (wear and condition)						Service and Workshop Manual
– Gears	X		X		X	
– Bearings	X		X		X	
– Gaskets and seals	X		X		X	
– Spline	X		X		X	
– Skeg	X		X		X	

Checklist						
After 800 h or once every 3rd year minimum	Check	Fill up/ lubricate	Clean	Change/ replace	Replace if necessary	Refer to
Propeller shaft (play, wear, condition)	X				X	Service and Workshop Manual
– Bearings	X				X	
– Gaskets and seals	X				X	
– Skeg	X		X		X	
Propeller shaft oil seal (leakage, wear, condition)	X				X	Service and Workshop Manual
Lower belt				X		Service and Workshop Manual
Lower belt tension	X					Service and Workshop Manual
Sacrificial anodes (wear, condition)				X		
Paint and cowling (wear, condition)	X		X			

## 3.12 FAULT CODES

### 3.12.1 OXE ENGINE FAULT CODE LIST

Column 1 shows the Suspect Parameter Number (SPN).

Column 2 shows the Failure Mode Identifier (FMI).

Column 3 gives a short description of the fault.

SPN	FMI	Description
97	31	Water in fuel is detected.
100	31	Engine Oil Pressure Fault
110	0	Engine Coolant Temperature Too High
127	0	Gearbox Oil Pressure too high
127	1	Gearbox Oil Pressure too low
127	3	Gearbox Oil Pressure sensor, Voltage too high
127	4	Gearbox Oil Pressure sensor, Voltage too low
190	0	Engine, self acceleration fault, CAN RPM diagnosis
191	0	Gearbox, RPM sensor, RPM too high
191	1	Gearbox, RPM sensor, RPM too low
970	31	Mechanical kill-cord, engine shut-off triggered by kill-cord
521104	31	J1939-CAN, bus-off
521106	6	PSU Trim Hydraulic Pump Fuse current too high
521107	31	Feedback message from any Center engine timeout
521108	31	Engine RPM fault
521109	14	Gear position error Fwd or Rev

SPN	FMI	Description
521110	31	Gearbox, Neutral Gear Fault
521119	6	PSU Starter Solenoid Fuse current too high
521120	31	Engine has stalled
521130	31	Fuel Pump Error
521132	0	Trim position, maximum position with engine running reached
521132	3	Trim Position Sensor, Voltage too high
521132	4	Trim Position Sensor, Voltage too low
521133	31	Engine Glow Plug Module Fault
521728	31	Engine ECU Fault
521729	31	Engine ECU Immobilizer Fault
521730	31	Engine ECU Power Supply Fault
521731	31	Engine Communication Fault
521732	31	Engine Fuel System Fault
521733	31	Engine Injection System Fault
521734	31	Engine Throttle Fault
521736	31	Engine Starter Fault
521737	31	Turbocharger Fault
521738	31	Alternator Fault
521739	31	PDM fault
521740	31	FA-CAN, bus-off
521741	31	LP-CAN, bus-off
521742	5	Oil Evacuation Pump, Current too high or shorted to ground
521742	6	Oil Evacuation Pump, Current too low or not running

### 3.12.2 OXE CONTROLS FAULT CODE LIST

Column 1 shows the Suspect Parameter Number (SPN).

Column 2 shows the Failure Mode Identifier (FMI).

Column 3 gives a short description of the fault.

SPN	FMI	Description
521344	2	Control head 0 port lever pot failure
521345	2	Control head 1 port lever pot failure
521360	2	Control head 0 port lever pot mismatch
521361	2	Control head 1 port lever pot mismatch
521440	2	Control head 0 stbd lever pot failure
521441	2	Control head 1 stbd lever pot failure
521456	2	Control head 0 stbd lever pot mismatch
521457	2	Control head 1 stbd lever pot mismatch
521504	13	Control head 0 invalid configuration

<b>SPN</b>	<b>FMI</b>	<b>Description</b>
521505	13	Control head 1 invalid configuration
521520	13	Control head 0 invalid calibration
521521	13	Control head 1 invalid calibration
521536	31	Control head 0 duplicate instance
521537	31	Control head 1 duplicate instance
521552	31	Control head 0 take command button fault
521553	31	Control head 1 take command button fault
521568	31	Control head 0 sync button fault
521569	31	Control head 1 sync button fault
521584	31	Control head 0 port neutral button fault
521585	31	Control head 1 port neutral button fault
521600	31	Control head 0 stbd neutral button fault
521601	31	Control head 1 stbd neutral button fault
521616	31	Control head 0 multiple controllers selected
521617	31	Control head 1 multiple controllers selected

### **3.13 TROUBLE SHOOTING**

Refer to the Service and Workshop Manual.

## 4 SPECIFICATIONS

### 4.1 TECHNICAL DATA

	Specification	
	Metric	US units
Engine type	In-line 6-cylinder, Diesel	
Displacement	2993 cc	182.6 cu in
Intake	Bi VGT turbocharged, intercooled	
Maximum power at engine speed 4000–4200 rpm	224 kW	300 HP
Maximum engine torque at engine speed 1750 rpm	680 Nm	502 lb-ft
Fuel	Diesel	
Dry weight	410 kg	904 lb
Alternator output	180 A	
Rig length	25" or 33"	
Cooling	Closed cooling circuit, heat exchanger/seawater	
Starting	Electric	
Steering	Customisable, recommended electronic power steering	
Shift	CAN bus, Electro-hydraulic	
Clutch	Hydraulic multi-friction plate	
Gear ratio	1.39:1	
Dimensions, L×H×W:		
25" leg	1150×2090×703 mm	45.3×82.3×27.7 in
33" leg	1150×2293×703 mm	45.3×90.3×27.7 in
Bore	84 mm	3.3 in
Stroke	90 mm	3.5 in
Compression Ratio	16.5:1	
Idle Speed	720 ±50 rpm	
Firing Order	1-5-3-6-2-4	
Engine height – oil pan to air intake assembly	821 mm	32.2 in
Engine length – seawater filter to heat exchanger	1003 mm	39.4 in

## 4.2 RECOMMENDED FLUIDS AND GREASE

Fluid	Quality	Quantity	
		Metric	US units
Fuel	EN 590 (with national environmental and cold weather standards) ASTM D 975 No. 1 and No. 2 JIS KK 2204 NATO Code F54 and F75	—	—
Engine oil	OXE Engine Oil (300) or BMW Longlife -04/API SL, API SM <sup>1)</sup> or BMW Longlife -01 <sup>1)</sup> or BMW Longlife -98 <sup>1)</sup>	8 liters	8.5 quarts
Gearbox and primary transmission oil <sup>2)</sup>	OXE Gearbox Oil or Fully Synthetic Dual Clutch Transmission Fluid - DCT	2.5 liters	2.6 quarts
Coolant	OXE Coolant or Frostox - HT12	10.0 liters approx.	10.6 quarts approx.
Grease	OXE Grease or DIN 51502:KP2.5K-20 ISO 6743: ISO-L-XBCEB2.5	—	—
PTT (Power Trim and Tilt unit) oil	OXE PTT Oil or FORD WSS-M2C204-A	0.5-0.7 liters	0.5-0.7 quarts
Lower unit oil	OXE Belt Oil or Fully Synthetic Transmission Fluid - ATF	2.0 liters	2.1 quarts

<sup>1)</sup> For cold climate, select viscosity according to Section 4.5 "Engine oil viscosity", [page 79](#).

<sup>2)</sup> The lubrication system is combined for the gearbox and the primary transmission.



### NOTE

The fuel must meet national and international standards.



### NOTE

Only use fuel, lubricants etc. in accordance with OXE Marine AB regulations. Otherwise the manufacturer's liability for defects will not apply!

## 4.3 DIESEL FUELS

The composition of the fuel is vital for operation of the OXE outboard, its service life and emissions. To meet the performance specified and to run the boat cleanly and quietly, it is important that fuel as recommended in Section 4.2 "Recommended fluids and grease", [page 78](#) is used.

If national emission regulations permit, OXE Diesel engines can be operated on commercially available diesel fuels with **less** than 0.05% sulfur content.

Fuel sulfur content	≤0.05% (≤500 ppm)	>0.05%–0.5% (>500–5000 ppm <sup>2)</sup> )
Engine oil change intervals	200 h or one year	100 h or one year <sup>1)</sup>

- 1) If the sulfur content is higher than 0.05%, the intervals between engine oil changes should be halved or determined by frequent oil sampling.
- 2) If the sulfur content is higher than 0.1%, an engine lubrication oil with suitable TBN (Total Base Number) shall be used.



**NOTE**

Do not use fuel with more than 0.5% sulfur content! Using fuel with high sulfur content will increase the outboard's emission levels and cause excessive wear and shorter lifetime.

Large differences in composition occur in local fuel specification. This can result in higher fuel consumption, higher emissions and less power output.

## 4.4 AVOIDING FUEL FLOW RESTRICTIONS



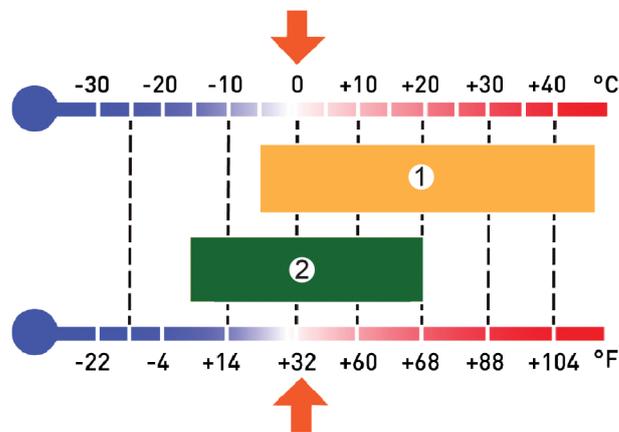
**WARNING**

Adding additional components to the fuel supply system such as filters, valves, fittings etc. may restrict the fuel flow. This could cause engine stalling at low speed, and/or a lean fuel condition at high rpm, that could cause engine damage.

## 4.5 ENGINE OIL VISCOSITY

Select viscosity according to the following graphic.

The temperature values refer to stable ambient temperatures.



1 Engine oil 5W/30

2 Engine oil 0W/30

# 5 APPENDIX

## 5.1 EMISSION CONTROL SYSTEM WARRANTY STATEMENT

### 5.1.1 MARINE ENGINES

This Emission Control System Warranty Statement applies only to engines sold for use in USA that are in conformity with US EPA Model Year 2021 regulations.

#### General statement

To retain the dependability, noise and exhaust emission control originally built into all OXE Outboard engines, it is essential that the engines are installed according to the OXE – OXE Marine AB installation instructions and receive periodic maintenance according to the maintenance instructions.

#### Manufacturer's warranty coverage

OXE Marine AB warrants to the original owner, and to each subsequent owner, of a new diesel engine that the emission control system of your engine:

1. Was designed, built and equipped so as to conform at the time of sale with all applicable regulations of the U.S. Environmental Protection Agency.
2. Is free from defects in material and workmanship which will cause such engine to fail to conform with applicable regulations for a warranty period in hours and years of engine operation listed below, whichever occurs first.
3. OXE Diesel, marine compression ignited engine, categorized as commercial engines: 10 years or 3000 hours of engine operation.

#### The warranty period shall begin:

1. On the date the machine or vessel first is delivered to the first retail purchaser or:
2. If the machine or vessel is placed in service for demonstration purposes prior to sale at retail, on the date the engine is first placed in service. Maximum demonstration period 50h.

The emission control systems of your new OXE Diesel engine were designed, built and tested using genuine parts, and the engine is certified as being in conformity with US Federal emission control regulations. Accordingly, it is recommended that any replacement parts used for maintenance, repair or replacement of emission control systems be OXE – OXE Marine parts. The owner may elect to have maintenance, replacement or repair of the emission control components and systems certified by US Environmental Protection agency performed by any repair establishment or individual and may elect to use parts other than OXE – OXE Marine parts for such maintenance, replacement or repair without invalidating this warranty: the cost of such services or parts, however, will not be covered under the warranty.

Use of replacement parts which are not of equivalent quality may impair the effectiveness of emission control systems. If other than OXE – OXE Marine parts are used for maintenance, the owner should obtain assurance that such parts are warranted by their manufacturer to be equivalent too genuine OXE – OXE Marine AB parts. However, the use of other than OXE – OXE Marine AB replacement parts does not invalidate the warranty on other components unless such parts cause damage to warranted parts.

Repairs and service covered by the warranty will be performed by an authorized OXE Diesel distributor or dealer with no charge for parts or labor, including diagnosis, using OXE-OXE Marine AB parts for any part of the emission control system covered by the warranty and found defective.

The emissions control parts covered by this Emission Control System Warranty are listed under "What is Covered by The Emission Warranty". You are responsible for the performance of all scheduled maintenance or repairs on your new OXE Diesel Outboard.

OXE – OXE Marine AB may deny a warranty claim if your failure to perform maintenance resulted in the failure of a warranted part. Receipts covering the performance of regular maintenance should be retained in the event questions arise concerning maintenance. The receipts should be transferred to each subsequent owner of the machine or vessel with the emission warranted engine.

For OXE Diesel Outboard engines in accordance with United States Environmental Protection Agency 40 CFR parts 1042.

### What is not covered by the emission control system warranty

This warranty does not cover:

1. Malfunctions in any part caused by any of the following: misuse, abuse, improper adjustments, modifications, alteration, tampering, disconnection, improper or inadequate maintenance, improper installation and/or rigging or use of fuels not recommended for the engine as described in the User's Manual (Publication No. ODM1005).
2. Damage resulting from accident, acts of nature or other events beyond the control of OXE Marine AB.
3. The replacement of expendable maintenance items such as exhaust system, filters, hoses, belts, oil, thermostat, and coolant made in connection with scheduled maintenance services once these parts have been replaced.
4. Add on parts or modified items which are not OXE approved by OXE Marine AB.
5. Consequential damage as loss of time, inconvenience, loss of use of machine or vessel, engine or commercial loss.
6. Any machine or vessel on which the hour record has been altered so the actual usage cannot be readily determined.
7. Damage resulting from rust or corrosion.
8. Damage caused from cooling system blockage by foreign material or from sand or debris deterioration of water pump.
9. Cosmetic or paint changes due to exposure to the elements.
10. Product is or has been used for racing at any point, even by a prior owner.
11. Marine engines operated outside the United States or Canada.

### What is covered by the emission control system warranty

The following is a list of items that are considered a part of the Emission Control Systems and are covered by the Emission Warranty when installed as original equipment by OXE – OXE Marine AB on engines which were built to conform to Environmental Protection Agency regulations.



#### NOTE

This may not include expendable maintenance items. Emission related parts requiring scheduled maintenance are warranted until their first scheduled replacement point for that part.

1. Fuel Metering System
  - Fuel injection system
2. Air Induction System
  - Intake manifold
  - Turbocharger/Supercharger
3. Closed Crankcase Ventilation System
  - Oil mist separator/filter
4. Miscellaneous Items Used in Above Systems
  - Vacuum, temperature, and time sensitive valves and switches
  - Electronic control units, sensors, solenoids, and wiring harnesses
  - Hoses, belts, connectors, assemblies, clamps, fittings, tubing, sealing gaskets or devices, and mounting hardware
  - Pulleys, belts and idlers
  - Emission Control Information Labels

### Customer assistance

OXE Marine AB wishes to help assure that the Emission Control Systems Warranty is properly administered. In the event that you do not receive the warranty service to which you believe you are entitled under the Emission Control

Systems Warranty, you should contact OXE Marine AB at the address below for assistance. If you need additional assistance or information concerning the Emission Control System Warranty, contact:

**OXE Marine AB**

After Sales support

Hortensigatan 6

SE-256 68 Helsingborg

Sweden

Email: [info@oxemarine.com](mailto:info@oxemarine.com)





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