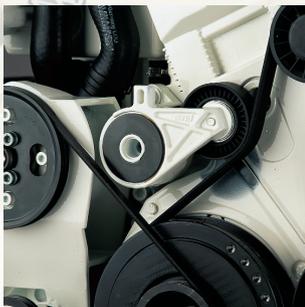


Operating Manual



5-Cyl. SDI and TDI

**Volkswagen Marine
Boat Engines**



**You have decided on a
Volkswagen Marine Boat Engine
- Thank you for putting your trust in us.**

Volkswagen Marine boat engines have been developed for the special requirements in boats.

Volkswagen Marine offers a broad range of variants to meet any specific requirements.

Volkswagen Marine boat engines are characterised by many advantages:

- *Compact design and low weight create the conditions for universal installation.*
- *A long life and low fuel consumption ensure economy and environmental friendliness.*

You have decided on a Volkswagen Marine boat engine that is advanced in every regard. Your boat engine has been developed to put the least possible strain on the environment.

VW Marine Service Partners are available for support:

The VW Marine Service Partner

The VW Marine Service Partner works at low cost and professionally according to factory specifications. It also guarantees that everything on your Volkswagen Marine boat engine is in proper working order. In addition, VW Marine Service Partners offer an extensive package of warranties and services.

VW Marine Service Partners will be happy to provide details on the services and any processing in individual countries.

Volkswagen Marine

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What you should know before you read this manual

This manual

contains important information on using your Volkswagen Marine engine. You should read this manual carefully before putting the engine into operation to quickly familiarise yourself with the engine and to know how it is correctly operated and treated.

In addition to regular care and maintenance, the proper treatment of the Volkswagen Marine engine helps preserve its value and is in many cases also one of the conditions for warranty claims.

Additional information on the warranty are contained in the service schedule.

For safety reasons, please also be sure to observe the safety precautions on page 22 and the information on changes and parts replacement on page 25.

Equipment scope

The largest possible equipment scope available at the time of printing is described here. Some of the equipment may not be available until a later time.



Equipment marked with a star are not part of the standard equipment of the marine engines.

Environmental protection information



Texts in italics marked with this symbol provide important information on environmental protection.

Table of contents

On the first pages you will find a table of contents that shows all topics described in this manual in the order of their occurrence.

Index

At the end of the manual an extensive, alphabetical index is provided. With search terms you can specifically find the desired information.

Warnings

Important

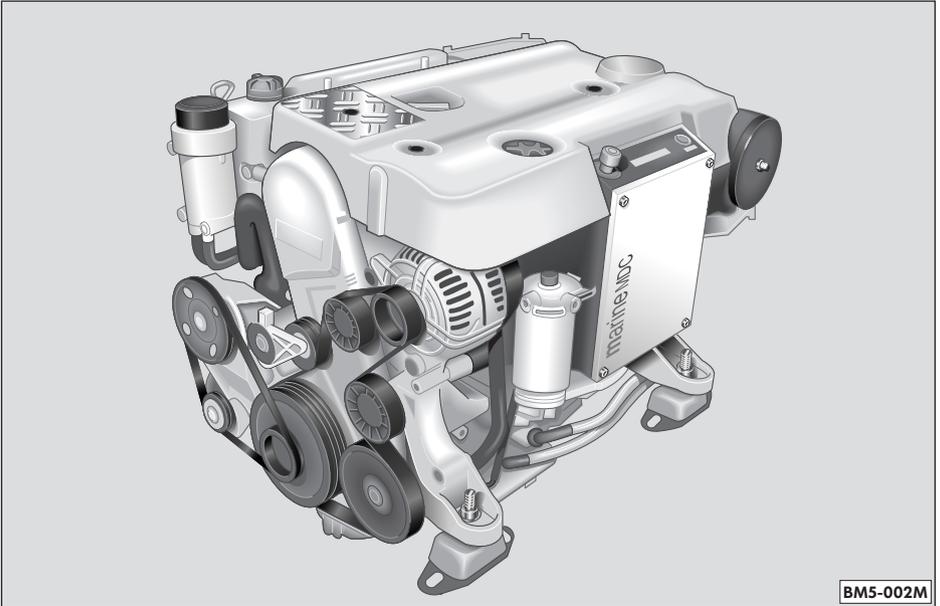
Texts written in this bold print and on this shaded background indicate the possible danger of accidents and injuries.

Texts in this bold print indicate either dangers that can lead to the marine engine being damaged or they contain particularly important information on the proper use of your engine.

And finally, we have a request:

When selling your boat or your Volkswagen marine boat engine, please give this manual to the new owner, as the literature is part of the Volkswagen Marine boat engine.

General view of engines



Description of engines SDI 55-5 and SDI 75-5

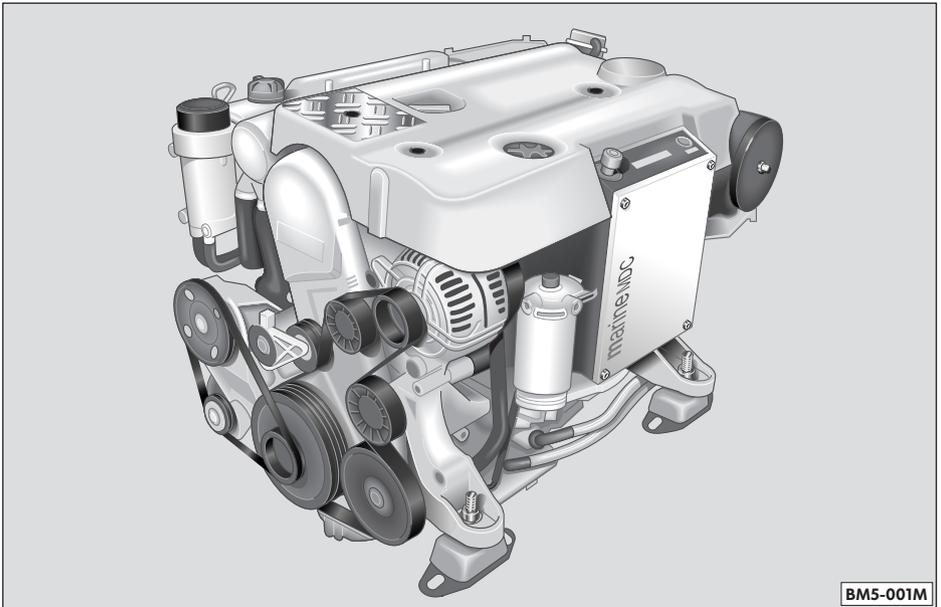
- Four-stroke diesel engine
- 5-cylinder in-line
- 2.5 litre displacement
- Crankshaft mounted on 6 bearings
- Valve control by toothed belt and over-head cam
- Hydraulically adjusted bucket tappets
- Engine lubrication as pressure circulation lubrication with geared oil pump and replaceable oil filter in main flow
- Dry air filter

The engine has two separate cooling circuits.

- 1 - The open seawater circuit runs via the combination radiator, which cools the fuel flowing back and the hydraulic oil, the main heat exchanger and the exhaust manifold.
- 2 - The coolant circuit runs as a closed pressurised system through the engine block, oil cooler, exhaust collector and, after reaching the operating temperature, via the main heat exchanger.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.



Description of engines TDI 100-5, TDI 120-5, TDI 150-5 D¹⁾ and TDI 150-5

- Four-stroke diesel engine
- 5-cylinder in-line
- Crankshaft mounted on 6 bearings
- Valve control by toothed belt and over-head cam
- Hydraulically adjusted bucket tappets
- Engine lubrication as pressure circulation lubrication with geared oil pump and replaceable oil filter in main flow
- 2.5 litre displacement
- Dry air filter

¹⁾ Version for dual engine systems as per BSO II

The engine has two separate cooling circuits.

- 1 - The open seawater circuit runs via the combination radiator, which cools the returning fuel and the hydraulic oil, the main heat exchanger, the exhaust manifold and the intercooler on the 150-5 and 150-5 D version.
- 2 - The coolant circuit runs as a closed pressurised system through the engine block, oil cooler, exhaust collector and, after reaching the operating temperature, via the main heat exchanger and the turbocharger.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Starting engine

Important

● **There is a danger of poisoning when the engine is run in closed rooms!**

The engine exhaust gases contain carbon monoxide, which is colourless and odourless. Inhaling these gases can be damaging to your health.

● **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

● **Never start the engine when the driving lever(s) has/have been removed.**

Accident danger!

- When the driving lever is correctly installed, the engine cannot be started when the lever is not in the Neutral position. This is indicated accordingly in the display of your rev. counter.
- Before starting the engine, check the motor oil, coolant and hydraulic oil levels, the fuel supply and the seawater filter, and make sure that the seawater valve for the seawater cooling circuit is open.
- As soon as the engine starts, release the ignition key immediately, as the starter may not continue to run with the engine.

- When restarting the engine, restarting is not possible until the key has been turned back completely. The restarting lock prevents the starter from engaging with the engine running, as this can damage the starter.
- Avoid high engine speeds and full throttle until the engine has reached its operating temperature.
- After starting the cold engine increased running noises may occur for a brief period, as oil pressure must first build up in the hydraulic valve clearance compensation. This is normal, and therefore not a cause for concern.

Switching off engine

Following longer periods at high engine loads, do not switch off the engine immediately, but instead allow it to run at idle for approx. 2 minutes to prevent heat accumulation.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Instruments



BM5-003M

The illustration shows the instruments of the navigating stand panel.

Item	Page
1 - Coolant temperature gauge	8
2 - Rev. counter	9
3 - Voltmeter	9
4 - Multi-function indicator	10
5 - Engine oil pressure gauge	12
A - Warning lamp	

1 - Coolant temperature gauge



The gauge operates with the ignition switched on. When the ignition is switched on, the warning lamp **A** lights up for a few seconds as an operating check.

Note

Avoid high engine speeds and do not subject the engine to heavy loads while the coolant temperature is still below 40 °C.

The needle is to settle in the middle area of the scale during normal driving.

At heavy engine loads and high outside temperatures, the needle may also move far into the upper range.

This is not a cause for concern as long as the warning lamp A does not light up and the acoustic signal does not sound.

A - Warning lamp

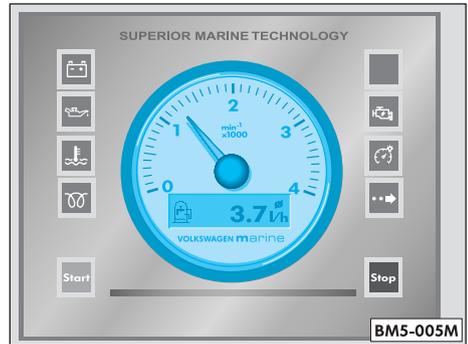
If the lamp lights up during driving, first check the coolant temperature gauge.

If the gauge is in the normal range, coolant must be added as soon as possible.

If the needle is above 110 °C, the coolant temperature is too high. **Stop the engine** and determine the cause of the fault - see page 14.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.



The illustration shows the rev. counter of the flying bridge panel.

2 - Rev. counter

Never run the cold engine at high speeds - either at idle or during driving.

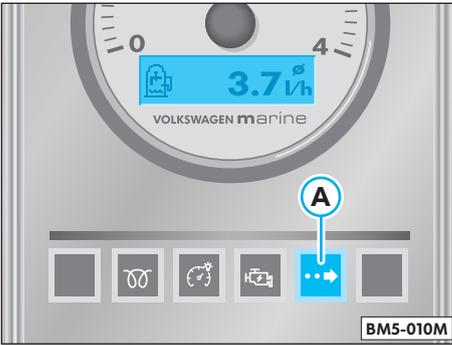
If the needle of the rev. counter goes above 4,000 rpm, you should cut back on the throttle to prevent engine damage.

3 - Voltmeter



The voltmeter indicates the voltage in the on-board electrical system. Normal value: between 12 and 16 volts. If the gauge drops below 12 volts with the engine running, have the power supply (battery and alternator) checked by a VW-Marine Service Partner.

During starting the voltage gauge may drop below 8 volts.



4 - Multi-function indicator

The multi-function indicator (MFI) provides a great deal of information:

- Operating hours
- Distance travelled
- Fuel consumption
- Fuel consumption
- Range
- Speed
- Gearbox in Neutral position

Units of measure of indicator

The MFI can display different units of measure:

Distance travelled:

- Kilometres (km)¹⁾
- Nautical miles (nm)¹⁾
- Miles (m)¹⁾

Fuel quantity:

- Litres (l)
- Gallons (g)

¹⁾ When connected to navigation devices as per NMEA.

Fuel consumption:

- Litres per hour (l/h)
- Litres per kilometre (l/km)¹⁾
- Litres per nautical mile (l/nm)¹⁾
- Litres per mile (l/m)¹⁾
- Gallons per hour (g/h)
- Gallons per kilometre (g/km)¹⁾
- Gallons per nautical mile (g/nm)¹⁾
- Gallons per mile (l/m)¹⁾

Range:

- Kilometres per litre (km/l)¹⁾
- Nautical miles per litre (nm/l)¹⁾
- Miles per litre (m/l)¹⁾
- Kilometres per gallon (km/g)¹⁾
- Nautical miles per gallon (nm/g)¹⁾
- Miles per gallon (m/g)¹⁾

Speed:

- Knots (kn)¹⁾
- Kilometres per hour (km/h)¹⁾
- Miles per hour (m/h)¹⁾

This results in a large number of possibilities. For the sake of simplicity, we will only write the following descriptions in nautical miles for distances, litres for consumption and knots for speed.

The memory

The system is equipped with an automatic memory.

The memory collects the driving data of any desired number of individual trips up to a total of 9,999.9 operating hours, a distance of 9,999 nm and 9,999 litres of consumed fuel. The driving data are used to calculate the average consumption and speed values achieved during all individual trips.

If one of the values named is exceeded, the memory is cleared and the calculation begins again.

To display the data, the memory is selected with the switch **A** in the instrument panel:

The following data can be called from the memory:

- Operating hours
- Trip recorder
- Distance travelled¹⁾
- Fuel consumption
- Fuel consumption
- Range¹⁾
- Speed¹⁾

Clearing the memory

The memory can be cleared with the ignition switched on by pressing the switch **A** for longer than five seconds.

If the battery of the on-board electrical system is disconnected, the memory is cleared.

The displays

Operating hours

The memory shows the total engine operating hours that cannot be cleared.

The maximum display value is 9,999.9 operating hours. If this value is exceeded, the display starts again at zero.

Trip recorder

The memory shows the daily operating hours of the engine since the memory was last cleared.

Distance travelled

Here the description for "Operating hours" also applies to the "Distance travelled". The maximum distance displayed is, for example, 9,999 nm.

Fuel consumption

Here the description for "Operating hours" also applies to the "Fuel consumption" since the memory was last cleared.

¹⁾ When connected to navigation devices as per NMEA.

Current fuel consumption

The current consumption is indicated, e.g. in l/h.

With this display you can adjust your driving to obtain the desired consumption.

Average fuel consumption

The average consumption is indicated, e.g. in l/h.

Current speed

The current speed is displayed.

Average speed

Here the description of "Average fuel consumption" applies.

5 - Engine oil pressure gauge

The engine oil pressure gauge only functions with the engine running and indicates the existing engine oil pressure.

During driving the engine oil pressure is between approx. 1 and 5 bar.

At an engine oil pressure below 1 bar the engine oil-pressure warning lamp can light up and an acoustic signal can sound.

If the engine oil-pressure warning lamp lights up (see page 16) and the acoustic signal sounds:

Switch off engine. Check the oil level - see page 40.

The engine oil pressure gauge is not an engine oil level indicator! Therefore, check the engine oil level at regular intervals, preferably before each trip.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Warning lamps

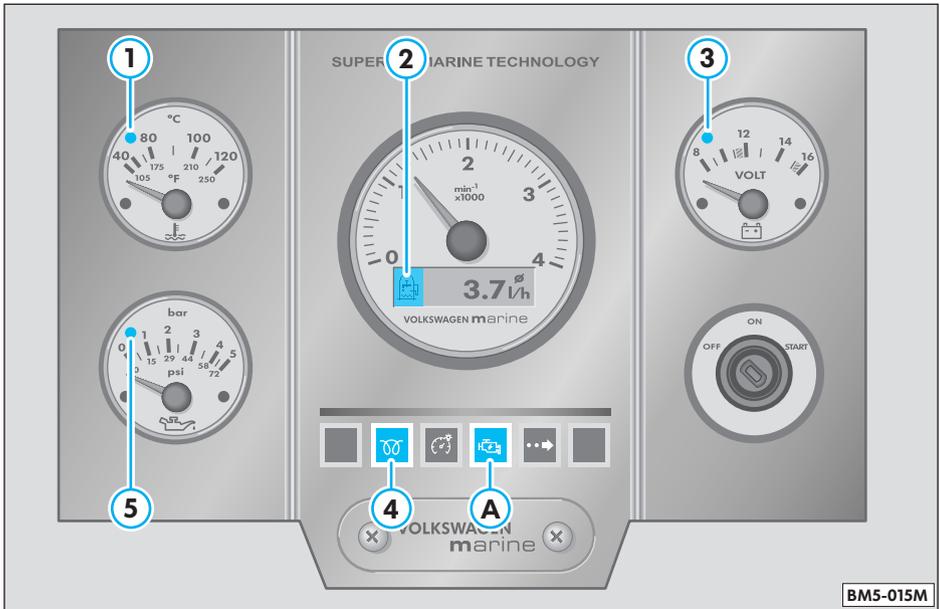


Illustration shows the main panel

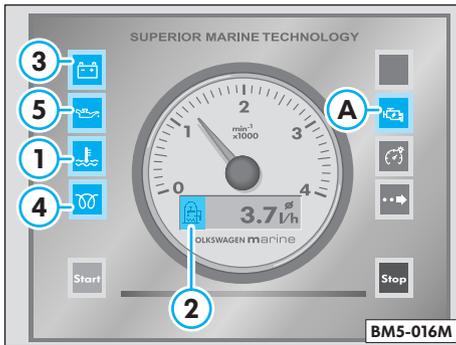


Illustration shows the flying bridge panel

Item	Page
1 - Coolant temperature/ coolant level	14
2 - Display for multi-function indicator	15
3 - Alternator	15
4 - Glow plug system and engine fault	16
5 - Engine-oil pressure	16
A - Switch	

1 - Coolant temperature

The warning lamp lights up when the coolant temperature is too high.

As a additional warning, an acoustic signal sounds at the same time, which can be switched off with the switch **A**.

Should the fault not be eliminated, the acoustic signal sounds again after a short time.

In this case, switch off the engine immediately and check whether ...

- the seawater filter is clogged.
- the sea valve is open.
- sufficient coolant is present. Check the cooling system for leaks.
- The ribbed V-belt of the seawater pump is OK.
- The impeller of the seawater pump is OK
- see page 55.

Important

● **Exercise caution when opening the coolant cap! When the engine is hot, the cooling system is pressurised - danger of scalding! Therefore, allow the engine to cool before unscrewing the cap.**

● **When working in the engine compartment, particular caution should be exercised!**

● **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

If the fault cannot be eliminated, please contact the nearest VW Marine Service Partner.

2 - Multi-function indicator

The following faults may be indicated in the left-hand area of the MFI:

Coolant level



If a fault occurs in the closed cooling system while driving, this is indicated by a flashing symbol in the left-hand area of the multi-function indicator.

In this case, switch off the engine immediately and check whether ...

- sufficient coolant is present.
- the coolant system is leaky.

Important

● **Exercise caution when opening the coolant cap! When the engine is hot, the cooling system is pressurised - danger of scalding! Therefore, allow the engine to cool before unscrewing the cap.**

● **When working in the engine compartment, particular caution should be exercised!**

● **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

If the fault cannot be eliminated, consult the nearest VW Marine Service Partner.

Water separator



This symbol appears when water has collected in the fuel filter on the engine.

In this case, switch off the engine and drain the water from the fuel filter - see page 47.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

3 - Alternator



The warning lamp lights up when the ignition is switched on. It must go out after the engine starts.

If the alternator warning lamp lights up during operation:

- Switch off the engine immediately and check the ribbed V-belt.

If the ribbed V-belt is OK, the fault is probably in the alternator or the regulating switch. If the damage cannot be repaired, please contact the nearest VW Marine Service Partner.

Note

The engine must not:

- **be operated with the battery disconnected, as otherwise the alternator will be damaged.**
- **operated without the alternator ribbed V-belt, as otherwise the front vibration damper will be damaged.**

4 - Glow plug system and engine fault



Glow plug system

When the engine is **cold**, the warning lamp lights up when the driving position is activated (ignition on).

Should the warning lamp fail to light up, a fault is present in the glow plug system - please obtain professional help.

Start the engine immediately after the lamp goes out - see page 6.

The engine can also be started immediately **without** preheating, however then a slightly poorer starting behaviour must be expected.

When the engine is at **operating temperature**, the preheating warning lamp **does not** light up - the engine can be started immediately.

Engine fault

If a fault occurs in the engine control system during driving, this is indicated by the warning lamp flashing - the engine should be checked immediately by a VW-Marine Service Partner.

5 - Engine oil pressure



The warning lamp lights up when the ignition is switched on. The lamp must go out after the engine starts.

If the engine oil-pressure warning lamp lights up or flickers during operation:

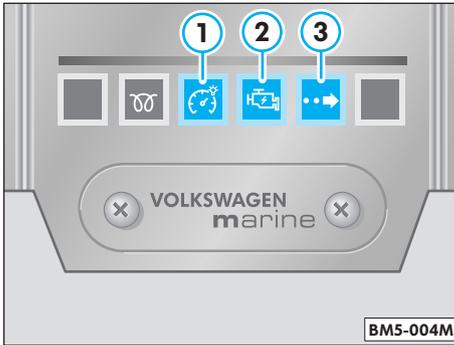
- 1 - Switch off the engine immediately, as the engine lubrication may be interrupted.
- 2 - Then check the engine oil level (see page 40).
If the oil level is OK, please contact the nearest VW Marine Service Partner.

As an additional warning, an acoustic signal sounds at the same time, which can be switched off with the switch **A**. Should the fault not be eliminated, the acoustic signal sounds again after a short time.

On the other hand, occasional flickering of the warning lamp at idle when the engine is warm is meaningless if the lamp goes out again when the engine speed is increased.

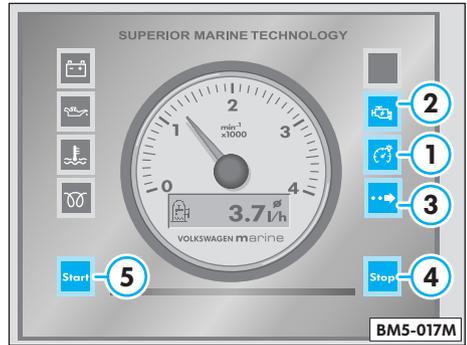
The oil-pressure warning lamp is not an oil level display! Therefore, the oil level should be checked at regular intervals, preferably before each trip.

Switches



The illustration shows the switches of the navigating stand panel.

Item	Page
1 - Instrument lighting / dimmer	18
2 - Acknowledgement button for acoustic signal	18
3 - Buttons for multi-function indicator	18



The illustration shows the switches of the flying bridge panel.

Item	Page
1 - Instrument lighting / dimmer	18
2 - Acknowledgement button for acoustic signal	18
3 - Button for multi-function indicator	18
4 - Stop engine	18
5 - Start engine	18

Stop switch

1 - Instrument lighting



The brightness of the instrument lighting can be adjusted by pressing the button.

2 - Acknowledgement button for acoustic signal

The acoustic signal of a fault message can be acknowledged with this button.

3 - Button for MFI

The MFI is operated with this button. Each time the button is pressed, the display in the MFI is advanced.

4 - Stop engine

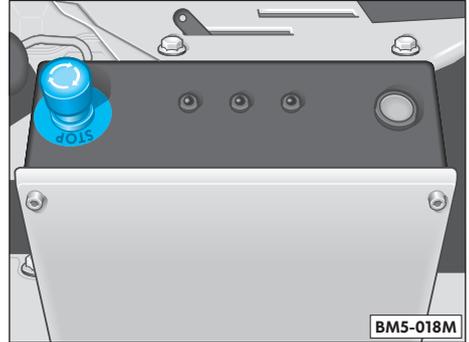
To stop the engine from the flying bridge, press the Stop button.

5 - Start engine

When the ignition key is inserted and the ignition is switched on in the navigation stand panel, you can start the engine by pressing the Start button.

Important

Always remove the ignition key if you leave the boat - even for a short time. This is particularly important when children remain on the boat. Otherwise they could start the engine or operate the electrical equipment. Accident danger!



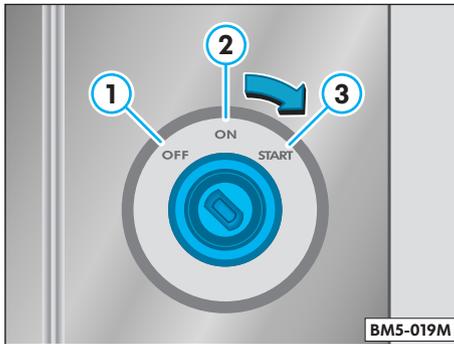
Stop switch

You can stop the engine in case of danger with the Stop switch on the fuse box/relay plate.

After the Stop switch is actuated it must be released again, as otherwise the engine cannot be started.

To release the Stop switch, turn it in the direction of the arrow shown on the switch.

Ignition switch

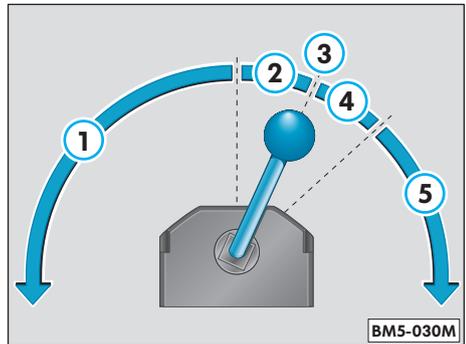


- 1 - Fuel supply interrupted, engine off**
- 2 - Preheating and driving position**
As long as the engine is being preheated, no major consumers should be switched on - otherwise this will place an unnecessary load on the battery of the on-board electrical system.
- 3 - Starting engine**

Important

Always remove the ignition key if you leave the boat - even for a short time. This is particularly important when children remain on the boat. Otherwise they could start the engine or operate the electrical equipment. Accident danger!

Driving lever

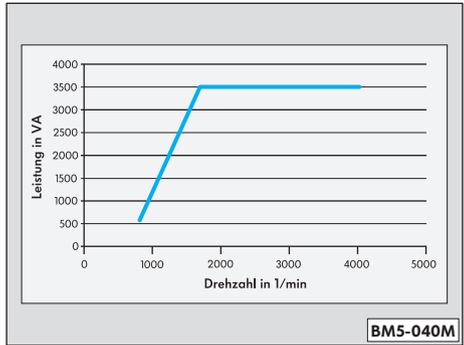
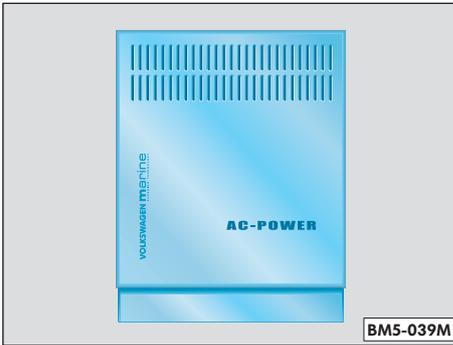


The illustration shows the pattern of the driving lever.

- 1 - Forward driving**
- 2 - Shifting during forward driving**
- 3 - Neutral**
- 4 - Shifting during reverse driving**
- 5 - Reverse driving**

Always make sure that the driving lever is in the Neutral position **3** before starting the engine.

230 V alternator system*



The 230 V alternator system* consists of a special alternator* and related electronics* - see illustration.

The 230 V alternator* is permanently connected to the Volkswagen Marine boat engine and provides a continuous supply of 230 V alternating current with an output of up to 16 A while the engine is running.

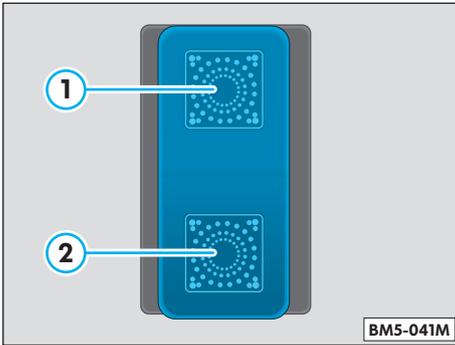
Important

- **Never conduct fault finding with the engine running - danger to life and limb!**
- **The voltage present in the power system is 230 V with the engine running. Therefore, never touch live parts - danger to life and limb!**
- **We urgently recommend having all work and repairs conducted on the 230 V alternator system carried out by a VW Marine Service Partner or an electrician.**

● **If work on or repairs to the electrical system are not carried out properly or professionally, other areas in the on-board electrical system may also be damaged - accident and fire danger!**

● **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

Please see the power graph in the illustration for the respectively available power dependent on the engine speed.



Starting up the 230 V alternator system*

The 230 V alternator system* is switched on by pressing the green button* with the engine running.

To be switched on the alternator requires a speed of 2,700 rpm, which corresponds to an engine speed of 850 rpm.

The maximum current draw of 16 A¹⁾ (equivalent to 3.5 kVA) is possible at an engine speed of 1,700 rpm. At engine idling speed approx. 4 A¹⁾ (equivalent to 0.9 kVA) is available.

The green indicator lamp **1** in the switch* lights up when the system is ready for operation.

¹⁾ Amperes

During operation

After the 230 V alternator system* is switched on you can connect your 230 V devices.

Should the power draw be too high for the current engine speed, then the red indicator lamp in the On/Off switch* lights up and the system is switched off.

In this operating state you can now either increase the engine speed to remove more power, or you must switch off a few consumers to limit the power draw. Then the 230 V alternator system must be restarted.

Should no power be available during operation and the red indicator lamp **2** in the On/Off switch* lights up, then there is a fault in the 230 V power system or in the 230 V alternator system*.

In this case, see the chapter Self-Help from page 30.

Safety precautions for working in engine compartment

When performing any work on the engine or in the engine compartment, e. g. checking and topping up the operating fluids, there may be a danger of scalding, injuries, accidents and fire.

Important

Exercise particular caution during all work on the engine or in the engine compartment.

Protect yourself with suitable work clothing, e.g. gloves, eye protection etc.

- Never open the engine compartment cover or perform work on the engine when you notice that water vapour or coolant is escaping - danger of scalding!

Wait until water vapour or coolant no longer escapes and the engine has cooled down.

- Stop the engine, remove the ignition key and press the Stop button.

- Move the driving lever into the Neutral position.

- Allow the engine to cool.

- Keep children away from the engine compartment.

- Do not open the cap of the coolant reservoir while the engine is still at operating temperature, as the cooling system is pressurised.

- Never pour liquids over the hot engine. The liquids could ignite.

If work on the 230 V alternator system or on the electrical system is required:

- Never conduct fault finding with the engine running - danger to life and limb!

- The voltage present in the power system is 230 V with the engine running. Therefore, never touch live parts - danger to life and limb!

- We urgently recommend having all work and repairs conducted on the 230 V alternator system carried out by a VW Marine Service Partner or an electrician.

- If work on or repairs to the electrical system are not carried out properly or professionally, other areas in the on-board electrical system may also be damaged - accident and fire danger!

- Avoid short circuits in the electrical system, and in particular at the battery.

- If maintenance, testing, repairs or adjustments must be carried out with the engine running, there is an additional danger from rotating parts, e.g. ribbed V-belt, alternator and the 230 V power system - danger to life and limb!

Please also observe the warnings on the following page.

● **If work on the fuel system or the electrical system is required:**

- Always disconnect the battery from the engine.
- Do not smoke.
- Never work near an open flame.
- Always keep a fire extinguisher at hand.

Avoid contact with operating materials. Should operating materials get into the eyes, flush the eyes immediately with clean water and see a doctor at once. Take along the original container to the doctor in these cases. You should be particularly aware of the following when you want to carry out work on open water:

- Swells may put you off balance.
- The danger of spilling operating materials is increased by swells.
- If you require a doctor in an emergency, there will be a delay.

The warnings in this manual and the generally applicable safety rules must be observed.

When topping up fluids, make sure that they are not confused, as otherwise serious malfunctions and engine damage will result.

✿ To ensure that leaks are detected in due time, the bilge under the engine should be kept clean and should be checked regularly. If soiling by oil or other operating fluids can be seen there, the engine should be checked by a VW Marine Service Partner.

Important note

Of course, coolant additives and motor oil are constantly being further developed. Therefore, the information can only reflect the status at the time of printing. The VW Marine Service Partner will be always be kept up to date on any changes by the factory. Therefore, it is best to have operating materials changed by a VW Marine Service Partner.

Diesel

The diesel fuel must comply with the standard DIN EN¹⁾ 590 .

CN²⁾ not lower than 49.

RME-fuel (biodiesel)

in accordance with DIN 51 606.

Volkswagen Marine boat engines can also be operated with **RME fuel** (rape-oil fatty acids **methylester**).

Important

It must be ensured that the fuel tank and the fuel hoses to the engine are also suitable for RME fuel.

Special features of RME

- RME is produced from vegetable oil (primarily rape oil) in a chemical process, whereby the vegetable oil is converted to RME with methanol by means of a catalyst.
- RME is virtually sulphur-free. Therefore, virtually no sulphuric oxide (SO₂) is released when RME is burned.
- The exhaust gas contains less
 - carbon monoxide,
 - hydrocarbons and
 - particles (e.g. soot)

than in operation with ordinary diesel fuel.

All exhaust values are lower than the legal regulations require.

1) **Euro-Standard**

2) **C-tane-Number**. Measure of the ignitability of diesel fuel.

- The RME fuel is highly biodegradable.
- Driving performance may be slightly lower.
- Fuel consumption may be slightly higher.
- RME is suitable for use in winter down to approx. -10 °C.
- At outside temperatures below approx. -10° C diesel fuel must be added to prevent the RME fuel from flocculating. The mixing ratio of diesel to RME fuel should be approx. 50 : 50.

If the RME percentage is higher than 50 %, more smoke may be produced.

- RME can be mixed with diesel fuel in any desired ratio during the warm season..

Winter operation

When using summer diesel, malfunctions may occur at outside temperatures below 0 °C, as the fuel also becomes too thick due to paraffin precipitation.

Therefore, "winter" diesel fuel is available in Germany at roadside petrol stations during the cold season which - depending on the fuel brand - is also safe for operation at approximately -15 °C to -22 °C.

In countries with other climatic conditions, diesel fuels with a different temperature behaviour are offered.

Changes and parts replacement

The state of the Volkswagen Marine boat engines when shipped from the factory may not be changed without careful consideration. Therefore, if technical changes are made to the engine, or if parts must be renewed later, the following instructions must be observed:

● **Before** purchasing parts and before making technical changes, a consultation by a VW Marine Service Partner should always take place, as the VW Marine Service Partner is particularly competent in this area due to its close co-operation with us.

● Original Volkswagen Marine parts are available from a VW Marine Service Partner. Of course, proper fitting is also carried out there.

● Should technical changes be made, our guidelines must be observed. This ensures that no damage to the engine occurs, the operating safety is maintained and the changes are permissible. A VW Marine Service Partner will also carry out this work properly or refer you to a specialised workshop in special cases.

Important

● **In your own interest we recommend using only original Volkswagen Marine parts for your Volkswagen Marine boat engine. The reliability, safety and suitability of these parts especially for the boat engine is ensured.**

● **Other products can have a negative influence on the service life of your Volkswagen Marine boat engine.**

● **Despite ongoing observation of the market, we cannot evaluate or provide any form of guarantee for other products, even if in isolated cases an approval by an officially recognised technical testing and monitoring association or a government approval has been granted.**

Self-help

The broad network of VW Marine Service Partners with trained professionals, modern equipment and all required special tools is available to you for the care and service of your Volkswagen Marine boat engine. Here you will receive professional advice and find fast, effective help.

If, for example, the engine should fail to start or idling faults occur, faults and their remedies are described in detail in the following chapter. Should the individual remedies not solve the problem, your VW Marine Service Partner will be happy to provide additional assistance.

If repairs must be made, the engine should be brought to a VW Marine Service Partner. It is in good hands there.

Important

- **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**
- **Work and repairs on the 230 V on-board electrical system may only be carried out by experts.**

Fault	
Engine does not start	
Starter does not turn	
Cause	Remedy
Driving lever is not in neutral position	Move driving lever into Neutral position
Neutral switch in driving lever does not output signal (only with Z drive)	Check operation of neutral switch
Neutral switch in gearbox does not output signal (only with ZF reversing gearbox)	Check operation of neutral switch
STOP button pressed	Release Stop button
Ignition switched off	Switch on ignition
Battery discharged or defective	Check battery and charge; renew if necessary
Connections on starter loose or corroded	Check connections and clean or renew if necessary
Connections on earthing relay loose or corroded	Check connections and clean or renew if necessary
Connections on ignition/starter switch loose or corroded	Check connections and clean or renew if necessary
“Fuel pump” LED lights up	
Fuse defective	Renew fuse
“Glow plug system” LED lights up	
Fuse defective	Renew fuse
“MDC” LED lights up	
Fuse defective	Renew fuse

Should the individual remedies not solve the problem, your VW Marine Service Partner will be happy to provide additional assistance.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Fault	
No or insufficient fuel supply	
Cause	Remedy
Fuel cock closed	Open fuel cock
No fuel in tank	Fill tank
Tank dirty	Clean
Fuel lines clogged	Check lines and clean if necessary
Water level in circulation filter too high	Drain water from circulation filter
Circulation filter clogged	Clean circulation filter and renew if necessary
Water level in fuel filter too high	Drain water from fuel supply filter
Fuel supply filter clogged	Renew fuel supply filter
Electric fuel pump does not run	Check connections and clean or renew if necessary or Check electric fuel pump and renew if necessary
"Fuel pump" LED lights up	Check fuse and renew if necessary
Engine shakes	
See section on fuel supply	
Engine dies	
See section on fuel supply	

Should the individual remedies not solve the problem, your VW Marine Service Partner will be happy to provide additional assistance.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Fault	
Engine becomes too hot	
Cause	Remedy
Seawater valve closed	Open seawater valve
Seawater filter is clogged	Close seawater valve and clean seawater filter.
Seawater pump aspirates air	Check cover of seawater filter for proper seating and leaks and check suction hose
Combination radiator (gear oil/power steering fluid and fuel) clogged	Check combination radiator and clean if necessary
Ribbed V-belt for seawater pump loose or defective	Renew ribbed V-belt and tensioning element if necessary
Impeller of seawater pump defective	Renew impeller
Insufficient coolant in cooling system - engine circuit	Add coolant (pure water in an emergency). Check cooling system for leaks and seal off if necessary.
Coolant pump for engine circuit defective	This fault should always be checked and eliminated by a VW Marine Service Partner, as special tools are required.

Should the individual remedies not solve the problem, your VW Marine Service Partner will be happy to provide additional assistance.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Fault	
No 230 V power supply with green warning indicator	
Cause	Remedy
FI switch* has popped out	Check and eliminate the cause and switch on the FI switch* again.
Fuse* defective or popped out	Check and eliminate the cause and renew the fuse* or switch on the fuse* again.
Disconnecting switch* between land connection and alternator not in correct position	Set the disconnecting switch* to the correct position.
No 230 V power supply with red warning indicator	
On/Off switch* defective	Actuate the On/Off switch to reset the 230 V alternator system*. If the red warning indicator* continues to light up afterward, please check the On/Off switch* - see page 32.
230 V alternator* defective	This fault should always be checked and eliminated by a VW Marine Service Partner.
230 V electronics* defective	This fault should always be checked and eliminated by a VW Marine Service Partner.

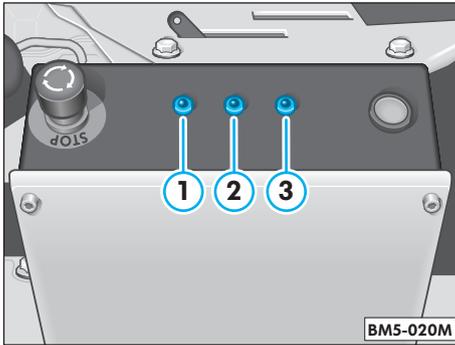
Should the individual remedies not solve the problem, your VW Marine Service Partner will be happy to provide additional assistance.

Important

● **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

● **Never carry out fault finding with the engine running, as it is a 230 V system that may only be checked by an electrician - danger to life and limb!**

Fuses



The individual circuits are protected with fusible links.

It is advisable to always carry a few replacement fuses available from VW Marine Service Partners.

Important

Never "repair" fuses or replace with fuses of a higher amperage, as this may result in damage at another point in the electrical system. It may even cause a fire.

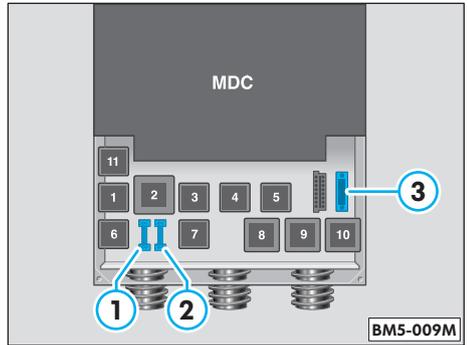
Note

If a recently fitted fuse blows again after a short time, the electrical system must be checked as soon as possible by a VW Marine Service Partner.

Replacing fuse

The failure of a fuse is indicated by the respective LED on the fuse box/relay plate lighting up.

- 1 - Fuel pump
- 2 - Permanent positive (Terminal 30)
- 3 - Glow plug system



The fuses are located in the fuse box/relay plate behind the cover.

- Switch off the ignition and the affected consumer.
- Press down the Stop switch on the fuse box/relay plate.
- Unscrew the screws and remove the cover from the fuse box/relay plate.
- Determine which fuse belongs to the failed consumer using the fuse table.

Fuse assignment

No.	Consumer	A ¹⁾
1	Fuel pump	15
2	Permanent positive (Terminal 30)	15
3	Glow plug system	50

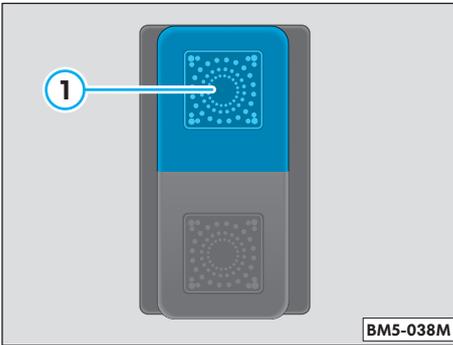
Colour marking of fuses:

blue: 15 amperes

- Pull out corresponding fuse.
- Renew blown fuse (recognisable from melted metal strip) with a new fuse **of the same** amperage.
- Secure the cover of the fuse box/relay plate again with the screws.
- Release the Stop switch.

¹⁾ Amperes

Check the On/Off switch of the 230 V system*



- Pull the On/Off switch* out of its bracket.
- Disconnect the connector.
- Use the acoustic or optical continuity tester to check the continuity between contacts 2 and 3.
- Press the green button* **1** of the switch.

If the switch* functions properly, an acoustic or optical signal must now be output.

If no signal is output, the switch* is defective. Renew the switch*.

The On/Off switch is installed in the reverse order.

Important

- **Never conduct fault finding with the engine running, as with the engine running a voltage of 230 V is present in the live parts - danger to life and limb!**
- **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

To test the On/Off switch* you require an acoustic or optical continuity tester.

- Switch off the engine and press the Stop switch.

Service and care

The broad network of VW Marine Service Partners with trained professionals, modern equipment and all required special tools is available to you for the care and service of your Volkswagen Marine boat engine.

If an inspection service is required, all checking and adjustment to be carried out in this context are described in detail in the following chapter.

Some of the work must be carried out before each start.

Other work are not required until the end of a year, at the end of the season or after 200 operating hours.

The work described here are used to maintain your Volkswagen Marine boat engine.

The specified service intervals are matched to normal operating conditions.

Under **more extreme conditions** it is necessary to have some work carried out before the next service is due or between the specified service intervals. This applies above all to the cleaning the air filter insert in case of operation under very dusty conditions.

Daily checks

Visual inspection before going out

Before going out you should subject the engine to a check and visual inspection.

Scope of work	page
Visual inspection for leaks and damage	
Check engine oil level	40
Check circulation filter* (Bowlé) and drain off water if necessary	44
Check coolant level and top up if necessary	52
Check seawater filter* and clean if necessary	49
Check hydraulic oil level* with Z drive	59

Note

Maintenance must be performed on the reversing gearbox or the Z drive in accordance with the specifications of the respective manufacturer.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

End of season

Work at end of season

At the end of the season you should subject the engine to a check and visual inspection. You should have the service work on your Volkswagen Marine boat engine conducted by your VW Marine Service Partner, as the work requires specialised knowledge and special tools.

Important

- **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**
- **Please be sure to observe the working sequences and information on engine preservation from page 67.**

Scope of work	page
Visual inspection for leaks and damage	
Interrogate fault memory of engine electronics	
Change motor oil and oil filter	67
Renew fuel filter	48
Check air filter and clean if necessary	50
Check seawater filter* and clean if necessary	49
Check coolant level and top up if necessary	52
Seawater pump: Check impeller and renew if necessary	55
Check reactive anode and renew if necessary	57
Clean and preserve engine	67
Seawater circuit: flush and drain	68
Fill fuel tank until full	

Note

Maintenance must be performed on the reversing gearbox or the Z drive in accordance with the specifications of the respective manufacturer.

Start of season

Work at start of season

At the start of the season you should subject the engine to a check and visual inspection. You should have the service work on your Volkswagen Marine boat engine conducted by your VW Marine Service Partner, as the work requires specialised knowledge and special tools.

Scope of work	page
Check condition of ribbed V-belt for seawater pump	60
Check condition of ribbed V-belt for alternator, power steering pump* etc.	60
Check condition of toothed belt for camshaft drive	
Check condition of toothed belt for injection pump	
Check operation of seawater valve*	
Check battery voltage and charge battery* if necessary	61

Note

Maintenance must be performed on the reversing gearbox or the Z drive in accordance with the specifications of the respective manufacturer.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Service scope once a year or every 200 operating hours

Your Volkswagen Marine boat engine must be serviced once a year at the end of the season or every 200 operating hours.

You should have the service work on your Volkswagen Marine boat engine conducted by your VW Marine Service Partner, as the work requires specialised knowledge and special tools.

The following table shows the scope of service.

Scope of work	page
Visual inspection for leaks from above and below	
Interrogate fault memory	
Change motor oil	41
Renew oil filter insert	43
Renew circulation filter insert*	45
Renew fuel filter	48
Check power-steering hydraulic oil level* with Z drive	59
Check coolant level	53
Check air filter and clean if necessary	50
Check condition of ribbed V-belt for seawater pump	60
Check condition of ribbed V-belt for alternator, power steering pump* etc.	60
Check condition of toothed belt for camshaft drive	
Check condition of toothed belt for injection pump	
Clean seawater filter*	49
Renew seawater pump impeller	55
Check reactive anode and renew if necessary	57

Note

Maintenance must be performed on the reversing gearbox or the Z drive in accordance with the specifications of the respective manufacturer.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Additional work every 5 years or every 1,000 operating hours

This additional work on your Volkswagen Marine boat engine must be carried out every 5 years or every 1,000 operating hours.

You should have the additional work on your Volkswagen Marine boat engine conducted by your VW Marine Service Partner, as the work requires specialised knowledge and special tools.

The following table shows the scope of the additional work.

Scope of work	page
Clean air filter	50
Renew toothed belt for camshaft drive	
Renew toothed belt for injection pump	
Check pipe bundles of heat exchanger; remove and clean if necessary	

Note

Maintenance must be performed on the reversing gearbox or the Z drive in accordance with the specifications of the respective manufacturer.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Motor oil

Specifications

A special VW Marine Longlife oil that can be ran as an all-year oil is used in the engine at the factory.

It has special corrosion protection properties to protect the engine in an aggressive environment such as salty sea air. It also protects the engine from inner corrosion during long downtimes, e.g. winter storage.

The container must be labelled with the specifications on this page must.

Important note

Of course, motor oils are also constantly being improved. Therefore, the information in this manual can only reflect the status at the time of printing.

VW Marine Service Partners will be always be kept up to date on any changes by the factory. Therefore, it is best to have the oil change carried out by a VW Marine Service Partner.

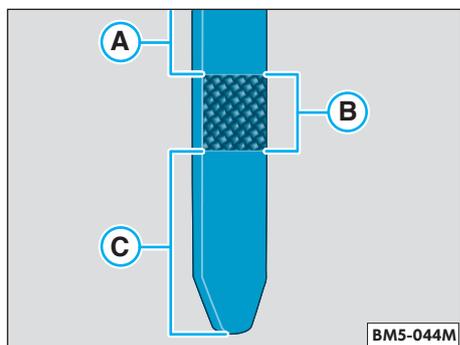
Multigrade light running oil:

Specification VW Marine Longlife
VW 506 00 (0W30)

Important notes

- **The motor oil named above is a condition for the specified maintenance intervals. Only this oil should be used for topping up.**
- **Avoid mixing with other oils, as otherwise the condition for the maintenance intervals specified in the service schedule will no longer be met.**
- **If the special VW Marine Longlife oil is not available, at least a commercially available oil in accordance with VW 506 00 (0W30) should be used.**

Check engine oil level



Check engine oil level

It is normal for the engine to consume oil. Therefore, the engine oil level must be checked at regular intervals.

The boat must be at rest when measuring the oil level. Wait a few minutes after switching off the engine so that the oil can flow back into the oil sump.

Then pull out the oil dipstick, wipe it with a clean cloth and push in the dipstick again as far as possible.

Then pull out the dipstick again and read off the oil level:

A - If the oil level is within the range **A**, **no** oil may be added.

B - If the oil level is within the range **B**, oil **may** be added.

When doing so, the oil level may then be within the range **A**.

C - If the oil level is within the range **C** or below, oil **must** be added. It is sufficient when the oil level is then within the range **B**.

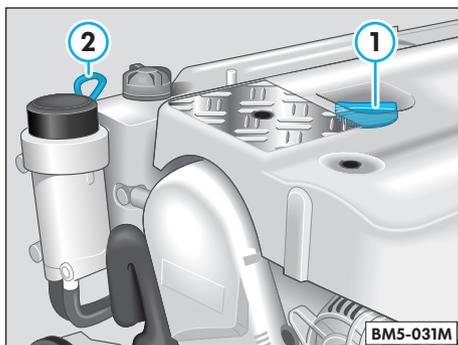
However, the oil level may never be above the range A.

In the case of heavy engine loading, such as during longer engine operation (10 - 12 hours), the oil level should at least lie in the middle of the two markings (min/max).

The quantity difference between the min. and max. mark is 1.0 litre.

Change motor oil

Changing motor oil



Topping up motor oil

Unscrew the cap **1** of the oil filler opening in the cylinder head cover and add oil in small portions, checking the oil level with the oil dipstick **2** in the process.

The oil level may never be above the range A. Otherwise oil may be aspirated via the crankcase ventilation.

Important

When adding oil, no oil may get onto hot engine parts - fire danger.

Carefully close the cap **2** of the filler opening and push in the oil dipstick **1** as far as possible. Otherwise, oil could escape with the engine running.

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

The properties of VW Marine Longlife oil not only worsen due to loading during operation, but also due to ageing. The oil change date is therefore dependent on both the mileage and the running time.

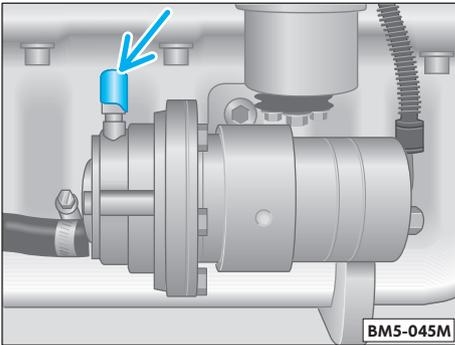
If the engine is constantly operated under extreme operating conditions, the motor oil should be changed at shorter intervals.

The motor oil must be changed at the intervals specified on page 35 and 37. Have the oil change by a VW Marine Service Partner.

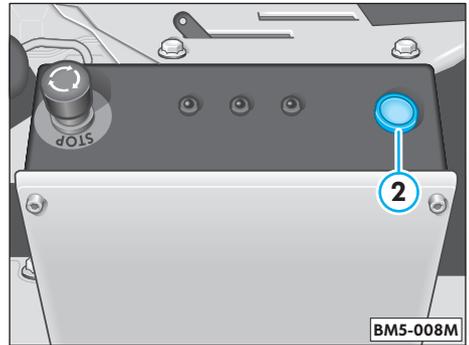
Important

If you want to change the motor oil yourself, then please be sure to observe the following points:

- **To prevent the danger of burns from hot motor oil, allow the engine to cool first.**
- **Use a suitable container of a sufficient size to hold the oil filling quantity of your engine when draining the oil.**
- **Wear eye protection.**
- **If your hands come into contact with motor oil, they must then be washed thoroughly.**
- **Used oil must be stored in a safe place away from children until its proper disposal.**



- Remove the cover of the oil filter so that the return valve opens and the used oil can flow back into the oil sump.
- Remove the protective cap - arrow - and fit the oil change hose provided on the connection of the oil change pump.
- Route the other end of the hose into the container intended for the oil change.



- Press and hold the button **2** on the fuse box/relay plate with the ignition switched on until the motor oil is completely pumped out.
- After completing draining, remove the hose from the oil change pump again and refit the protective cap.
- Tighten the oil filter cover with a tightening torque of 25 Nm.

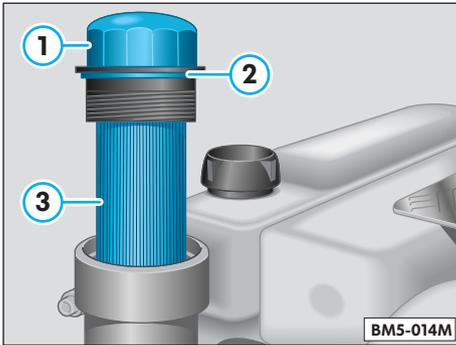
Oil must never get into waterways, the sewer system or the ground.

Due to the disposal problem, it is best to have the motor oil and filter change carried out by a VW Marine Service Partner.

Motor oil additives

No lubricant additives are to be added to the motor oil.

Damage that result from additives of this type are excluded from the warranty.



Renewing oil filter insert

- Uncrew the cover **1**.
- Separate the filter insert **3** from the cover.
- Clean the cover with a clean cleaning cloth.
- Renew the sealing ring **2**.
- Moisten the new sealing ring with oil
- Fit the new filter insert in the cover.
- Tighten the cover with a tightening torque of 25 Nm.

Pouring in motor oil

For filling quantities see the chapter "Technical data".

Check the oil level with the oil dipstick - also see page 40.

The oil level must be between the two markings and may never be above the max. mark.

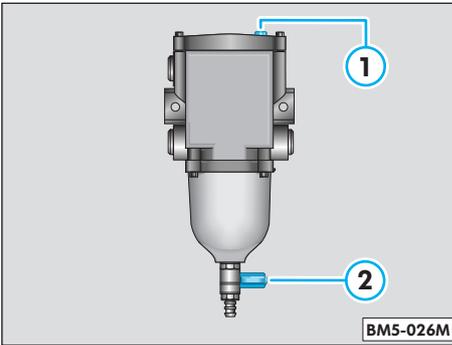
Important

Used oil must be stored in a safe place away from children until its proper disposal.

** Oil must never get into waterways, the sewer system or the ground.*

Due to the disposal problem, it is best to have the the motor oil and filter change carried out by a VW Marine Service Partner.

Circulation filter*



Draining water from circulation filter*

The circulation filter* can be cleaned simply by backflushing; this increases the life of the filter element.

Important

If you want to drain the water from the circulation filter yourself, then please be sure to observe the following points:

- **Close the cut-off valve if present. If the engine is equipped with a single filter, switch off the engine. With a double filter it is sufficient to switch over to the other filter.**

- **Please make sure that no diesel fuel gets onto the hoses. Clean the hoses with water immediately if necessary.**
- **Wear eye protection.**
- **If your hands come into contact with diesel fuel, they must then be washed thoroughly.**
- **Used fuel must be stored in a safe place away from children until its proper disposal.**
- **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

Backflushing

- Switch off the engine (single filter) or switch over to the second filter (double filter).
- Unscrew the bleeder screw **1**.
- Open the drain valve **2** below the bowl and catch fuel with a suitable container until the entire dirt is flushed out of the bowl.
- Close the drain valve **2**.
- Pour clean fuel into the filter via the bleeding hole.
- Screw in the bleeder screw **1** again.

- Start the engine and conduct a visual inspection of the fuel systems for leaks.

Notes

- After draining the fuel it is not necessary to bleed the fuel system.
- Should a power drop or excessively high intake resistance not be eliminated by back-flushing, the filter element must be renewed.

 ***Diesle fuel must never get into waterways, the sewer system or the ground.***

Due to the disposal problem, it is best to have the filter change carried out by a VW Marine Service Partner.

Renewing circulation filter*

Important

If you want to change the circulation filter insert* yourself, then please be sure to observe the following points:

- **Close the cut-off valve if present. If the engine is equipped with a single filter, switch off the engine. With a double filter it is sufficient to switch over to the other filter.**
- **Please make sure that no diesel fuel gets onto the hoses. Clean hoses immediately if necessary.**
- **Wear eye protection.**
- **If your hands come into contact with diesel fuel, they must then be washed thoroughly.**
- **The used fuel filter insert must be stored in a safe place away from children until its proper disposal.**
- **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

Renewing the filter element

- Switch off the engine (single filter) or switch over to the second filter (double filter).
- Unscrew the 4 cover screws and take off the cover.
- Remove the filter cartridge.
- Take out the filter insert by the hoop.
- Lay in the new filter element.
- Lay the filter cartridge on the filter element.
- Check the cover gasket for damage and correct seating in the cover.

Note

Should the gasket be damaged, it must be replaced.

- Fit the cover with the gasket and tighten the screws diagonally.

Note

After renewing the filter element it is not necessary to bleed the fuel system.

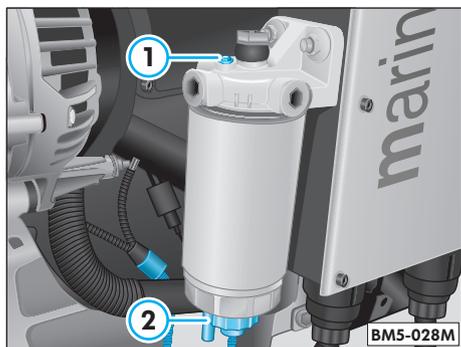
- Turn the ignition key to position 2 (ON) - see page 19 - and leave it in this position for approx. 1 minute. This causes the electric fuel pump to operate and the fuel system is filled with diesel.
- Start the engine and conduct a visual inspection of the fuel systems for leaks.



Diesle fuel must never get into waterways, the sewer system or the ground.

Due to the disposal problem, it is best to have the filter change carried out by a VW Marine Service Partner.

Fuel supply filter



Draining water from fuel supply filter

Important

If you want to drain the water from the fuel supply filter yourself, then please be sure to observe the following points:

- Please make sure that no diesel fuel gets onto the coolant hoses. Clean hoses immediately if necessary.
- Wear eye protection.
- If your hands come into contact with diesel fuel, they must then be washed thoroughly.
- Used fuel must be stored in a safe place away from children until its proper disposal.
- Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

- Unscrew the bleeder screw **1**.
- Open the drain screw **2** by a few turns and catch approx. 100 cm³ of fuel with a suitable container.
- Screw in the drain screw **2** again.
- Screw in the bleeder screw **1** again.

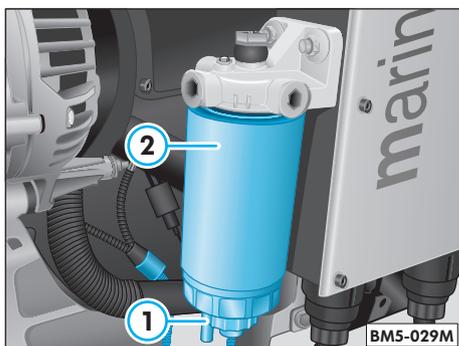
Note

After renewing the filter element it is not necessary to bleed the fuel system.

- Turn the ignition key to position 2 (ON) - see page 19 - and leave it in this position for approx. 1 minute. This causes the electric fuel pump to operate and the fuel system is filled with diesel.
- Start the engine and conduct a visual inspection of the fuel systems for leaks.

 ***Diesel fuel must never get into waterways, the sewer system or the ground.***

Due to the disposal problem, it is best to have the filter change carried out by a VW Marine Service Partner.



Renewing fuel supply filter

Important

If you want to renew the fuel filter yourself, then please be sure to observe the following points:

- Please make sure that no diesel fuel gets onto the coolant hoses. Clean hoses immediately if necessary.
- Wear eye protection.
- If your hands come into contact with diesel fuel, they must then be washed thoroughly.
- The used fuel filter must be stored in a safe place away from children until its proper disposal.
- Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

- Disconnect the connector **1** on the cable below the fuel supply filter.
- Screw out the old fuel supply filter **2** and clean the sealing surface of the holder.
- Drain the fuel supply filter into a suitable container and screw out the drain screw.
- Remove the drain screw on the new fuel supply filter and replace it with the drain screw from the old fuel supply filter.
- Moisten the rubber ring of the new filter with diesel fuel.
- Fill the fuel supply filter with clean diesel fuel. This enables the engine to be started more quickly.
- Screw in the filter and tighten it hand-tight.
- Connect the connector **1** on the cable below the fuel filter.

Note

After renewing the filter element it is not necessary to bleed the fuel system.

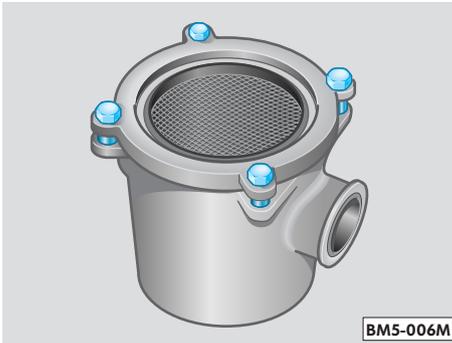
- Turn the ignition key to position 2 (ON) - see page 19 - and leave it in this position for approx. 1 minute. This causes the electric fuel pump to operate and the fuel system is filled with diesel.
- Start the engine and conduct a visual inspection of the fuel systems for leaks.



Diesel fuel must never get into waterways, the sewer system or the ground.

Due to the disposal problem, it is best to have the filter change carried out by a VW Marine Service Partner.

Seawater filter*



If you determine soiling, proceed as follows:

- Close the seawater valve.
- Unscrew the screws - see left illustration - and remove the cover.
- Remove the filter element, flush it thoroughly with clean water and refit it.
- Before screwing on the filter cover, the sealing ring should be lubricated, e.g. with silicone oil or Teflon spray.
- Check the cover and the gasket for correct seating.

Cleaning seawater filter*

Important

- **Never open the filter housing with the seawater valve open to prevent water from entering.**
- **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

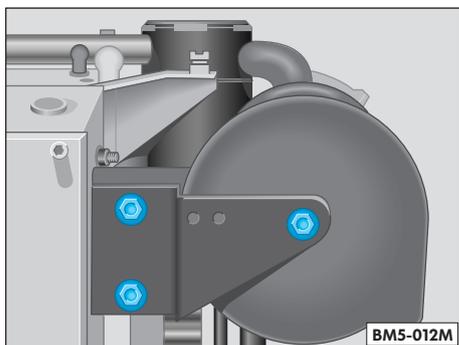
As the degree of soiling of the seawater filter is depending on the water the engine is operated in, you should check the filter for soiling each time before starting the engine. As the cover of the filter housing is transparent, you do not need to open the cover.

Important

If a cover is not seated correctly, air can also be aspirated, causing the engine to overheat.

- Open the seawater valve again.
- Start the engine and conduct a visual inspection of the seawater filter* for leaks.

Cleaning air filter insert



Cleaning air filter insert

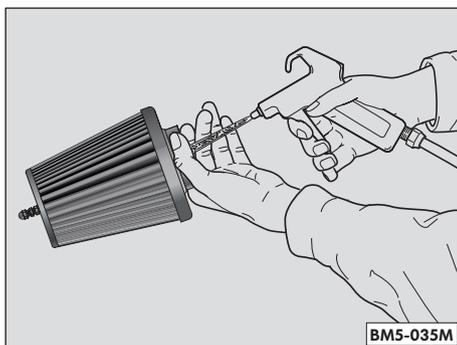
Wash out and oil the filter insert as specified in the service schedule.

A dirty air filter insert can be recognised from the fact that it has lost its red colour or the dust deposit has reached 3 mm.

If the engine is operated in very dusty areas, clean the filter insert more frequently.

Removing air filter insert

- Unscrew the three screws - see illustration - and remove the air filter housing.
- Loosen the clip **1** - see illustration on page 51.
- Detach the air filter from the intake manifold.



Cleaning air filter insert

- Blow out the filter insert from the inside outward with **max. 2.0 bar compressed air**.

Important

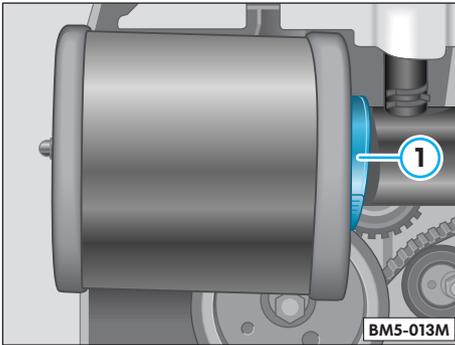
- **Wear protective goggles when blowing out the filter insert. Flying dirt particles can get into the eyes - danger of injury.**
- **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

- Clean the filter insert as described in the instructions on the special cleaning and service kit available from a VW Marine Service Partner.

Note

Never use petrol, thinner or other agents for cleaning. There is a danger of the filter insert being destroyed.

- Wipe out the air filter housing thoroughly.



Installing air filter insert

- Push the air filter insert over the intake manifold again.
- Tighten the clip **1**.
- Guide the air filter housing over the air filter insert.
- Secure the air filter housing with the 3 screws again - see left-hand illustration on page 50.

Cooling system

The cooling system must be filled with a mixture of water and a 33 % share of our coolant additive G 12 A8D (antifreeze on a glycol basis with corrosion protection additives).

This mixture not only offers the necessary frost protection down to -25 °C, it also primarily protects the alloy parts in the cooling system against corrosion. In addition, it prevents lime deposits and considerably increases the coolant boiling point.

Therefore, the coolant concentration may not be reduced by adding water even in the warm season or in warm countries. **The percentage of coolant additive must be at least 33 %.**

If for climatic reasons greater frost protection is required, the percentage of G 12 A8D can be increased, however only up to 60 % (frost protection down to approximately -40 °C), as otherwise the frost protection is decreased again and the cooling effect worsens.

Coolant losses

Coolant loss mainly indicates leaks. In this case the cooling system should be checked immediately by a VW Marine Service Partner. It is not sufficient to just add coolant.

If the system is free of leaks, losses can only occur when the coolant boils due to overheating and is forced out of the cooling system.

Coolant additive

Only our G 12 A8D coolant additive (antifreeze on a glycol basis with corrosion protection additives) or an additive with the specification TL-VW 774 D (see contain label) may be used. The coolant additive is available from VW Marine Service Partners.

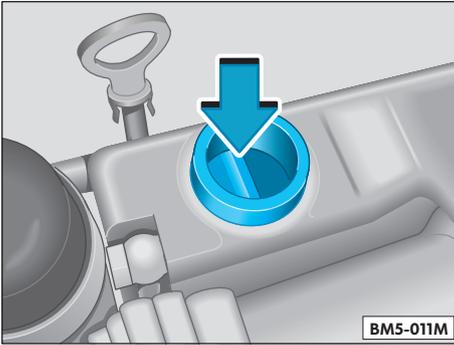
Other coolant additives can lead to a considerable reduction in corrosion protection.

The resulting corrosion damage can lead to coolant loss and subsequently to major engine damage.

Important

The coolant additive and the coolant present a health hazard! The coolant additive must therefore be stored in a particularly safe place out of reach of children. If the coolant must be drained, it must be caught and also stored in a safe place.

 **Drained coolant should normally not be reused; it must be disposed of under observance of the applicable environmental protection regulations.**



Checking coolant level

Important

- **Never open the engine compartment cover when you see water vapour or coolant escaping from the engine compartment - danger of scalding! Wait until water vapour or coolant no longer escapes.**

- **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

The coolant level can only be checked properly with the engine stopped.

The right coolant level is important for the proper operation of the cooling system. Therefore, the coolant level should be checked regularly.

With the engine cold, the coolant must be above the min mark and below the max mark - arrow -.

Note

A low coolant level is measured with a sensor and an insufficient coolant level is shown in the display of the multi-function indicator, and an acoustic warning sounds.

Visual inspection

Check the coolant hoses for leaks and porosity.

When operating the engine in the tropics, the notes on page 72 must also be observed!

Adding coolant

Important

- **Never open the engine compartment cover when you see water vapour or coolant escaping from the engine compartment - danger of scalding! Wait until water vapour or coolant no longer escapes.**
- **Do not open the cooling system cap while the engine is not - danger of scalding: The coolant system is pressurised!**
- **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

Use only new coolant for topping up.

First stop the engine and allow it to cool. Then cover the cap with a cloth and carefully unscrew the cap anti-clockwise.

If no G 12 A8D or an additive with the specification TL-VW 774 D (see container label) is available, no other coolant additive should ever be used. In this case only use water and restore the proper mixing ratio with the specified coolant additive (see page 52) immediately.

In case of a major loss of coolant, only add coolant with the engine cooled down to prevent engine damage.

Never fill the system above the max. mark.

Excess coolant is forced out of the cooling system when it heats up by the overpressure valve in the cap.

Screw on the cap firmly.

Important note

Please observe the following when topping off:

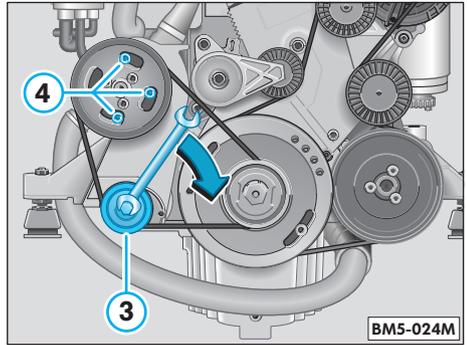
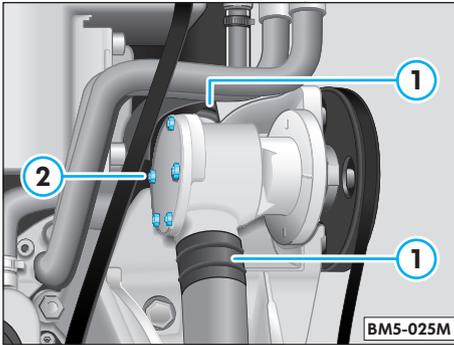
G 12 may never be mixed with other coolant additives (including with G 11).

You can recognise the G 12 from its red colour. If the liquid is brown, G 12 has been mixed with another coolant!

In this case the coolant must be changed immediately!

Otherwise serious malfunctions or engine damage may occur!

Seawater pump



Checking impeller of seawater pump and renewing if necessary

In accordance with the specifications in the service schedule, the impeller must be checked and renewed if necessary.

Note

The impeller can only be checked with the seawater pump removed.

- Close the seawater valve
- Disconnect the two coolant hoses **1** by pulling back the retaining clip from the seawater pump.
- Mark the running direction of the ribbed V-belt.
- Tension the tensioner **3** in direction of arrow - right-hand illustration - with a suitable spanner and remove the ribbed V-belt from the rollers.

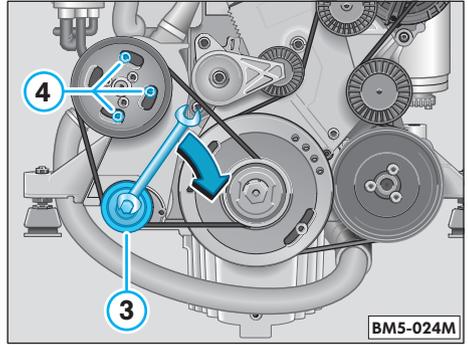
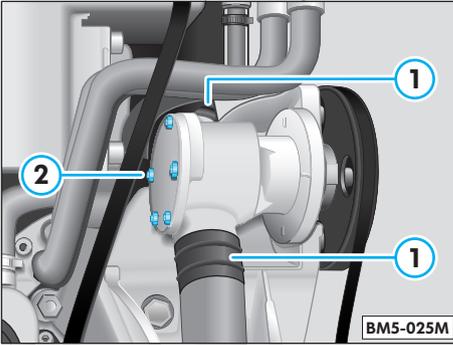
Important

- **Slowly guide the tensioner back into the relaxed position with the spanner - danger of injury!**
- **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

- Unscrew the screws **4**.
- Pull the seawater pump out of the bracket to the side.
- Remove the screws **2** - left-hand illustration - on the back of the Seawater pump from the housing and take off the cover.
- Mark the running direction of the impeller and remove the rubber gasket in the middle of the impeller.
- Pull the impeller off the shaft with a suitable puller.
- Check the impeller for damage.

Notes

- The impeller must always be renewed, even in the case of minor damage.
- Make sure you always have a reserve impeller on board.



- Before reinstalling the impeller, grease it with silicone spray or glycerin.
- Push the impeller onto the shaft and press the rubber protection cap into the impeller.
- Screw on the cover again with the screws **2**. Always use a new sealing ring when mounting the cover.

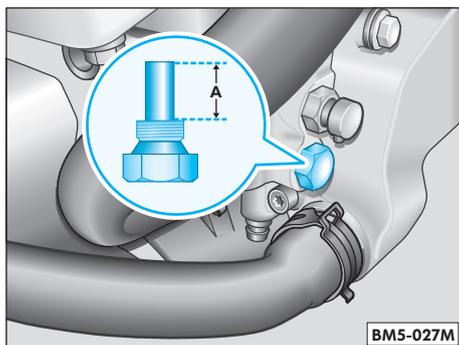
- Insert the seawater pump in the bracket and secure it with the screws **4** on the bracket.
- Press in the retaining clips again and push the two coolant hoses **1** - left-hand illustration - onto the seawater pump until they engage.
- Tension the tensioner **3** with a suitable spanner and lay the ribbed V-belt on the rollers in the running direction.

Important

Slowly guide back the tensioner with the spanner - danger of injury!

- Open the seawater valve.
- Start the engine and check the cooling system for leaks.

Reactive anode



Checking reactive anode of coolant system and renewing if necessary

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

The reactive anode in the cooling system must be checked in accordance with the specifications in the service schedule and renewed if necessary.

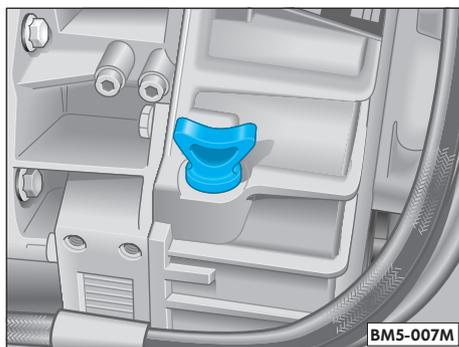
Check the reactive anode, as it protects the engine from galvanic corrosion.

A new reactive anode has a length of dimension A = 20 millimeters - see illustration.

The anode must be replaced with a new one when more than 50 % (10 millimeters) of it has been used.

Use only original Volkswagen Marine parts, as an incorrect composition of the anode can result in serious corrosion damage in the engine.

Reversing-gearbox oil level



Check reversing-gearbox oil level

Attention

Observe the safety precautions provided in the Owner's Manual before performing any work on the engine or in the engine compartment.

The oil level must be checked, in contrast to the instructions described in the operating manual.

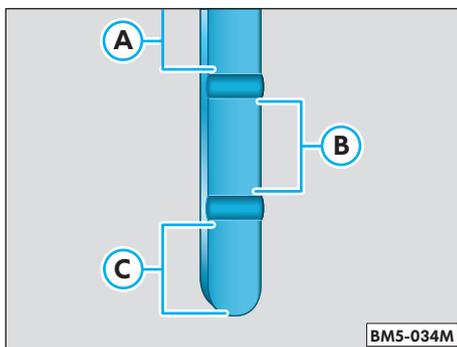
The reversing-gearbox oil level must be checked at regular intervals.

The boat must be at rest when measuring the oil level. Wait a few minutes after switching off the engine so that the oil can flow back.

Then screw out the oil dipstick, wipe it with a clean cloth and guide the oil dipstick into the opening again.

Note

The oil dipstick may not be screwed in again, as then an incorrect oil level would be indicated.



Then pull out the oil dipstick again and read off the oil level:

A - If the oil level is within the range **A**, **no** oil may be added.

B - If the oil level is within the range **B**, **oil may** be added.

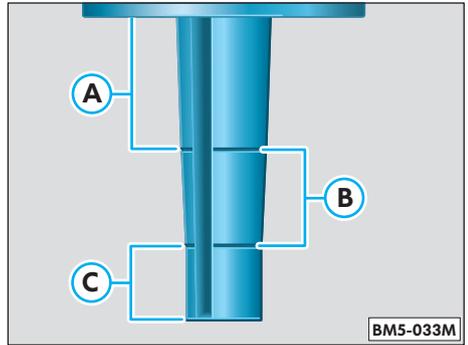
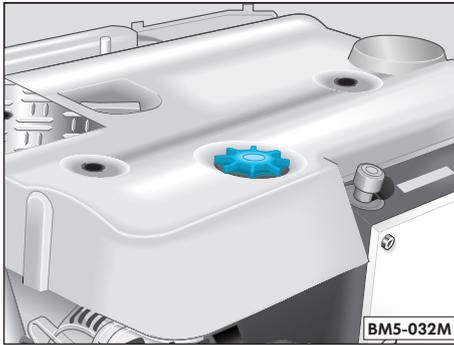
When doing so, the oil level may then be within the range **A**.

C - If the oil level is within the range **C** or below, **oil must** be added. It is sufficient when the oil level is then somewhere within the range **B**.

However, the oil level must never be above range A.

In the case of especially heavy gearbox loading, such as during longer engine operation (10 - 12 hours), the oil level should at least lie in the middle of the two markings (min/max).

Checking power-steering hydraulic oil level (only with Z drive)



Checking power-steering hydraulic oil level

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

You should not leave the steering wheel at lock for longer than 15 seconds with the engine running. The hydraulic oil heats up considerably when the wheel is continually at lock.

This can result in damage to the power steering system.

Noise also indicates the fact that the wheel is in the steering lock position while the boat is stationary, as the servo pump is heavily loaded in the process. In addition, the engine idling speed is briefly decreased.

The power-steering hydraulic oil level must be checked at regular intervals.

This test must be conducted with the engine running and the rudder in the straight-ahead position.

Screw out the oil dipstick - left-hand illustration, wipe it with a clean cloth and screw in the dipstick again as far as possible.

Then screw out the dipstick again and read off the oil level:

A - If the oil level is within the range **A**, **no** oil may be added.

B - If the oil level is within the range **B**, oil **may** be added.

When doing so, the oil level may then be within the range **A**.

C - If the oil level is within the range **C** or below, oil **must** be added. It is sufficient when the oil level is then within the range **B**.

In the case of heavy steering loading, such as during longer operation (10 - 12 hours), the oil level should at least lie in the middle of the two markings (min/max).

Changing power-steering hydraulic oil

The power-steering hydraulic oil must be changed in accordance with the specifications of the respective manufacturer.

Ribbed V-belt

Checking ribbed V-belt

Important

- **The ribbed V-belt may only be checked or renewed with the engine stopped - danger of injury!**
- **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

Check the ribbed V-belt for wear, separations and cracks.

Ribbed V-belts in poor condition must be replaced.

Should you not be sure whether the ribbed V-belt is damaged, please contact a VW Marine Service Partner.

Note

It is always advisable to keep replacement ribbed V-belts on board.

Battery*

Important

The following warnings and safety precautions must be observed when working on the battery.



Wear eye protection. Do not allow acidic or lead particles to get into the eyes, on the skin or clothing.



Battery acid is extremely caustic. Wear protective gloves and eye protection. Do not tilt battery, as acid can escape from the vent openings.

Flush the eyes with clean water for several minutes if acid splashes into them. Then see a doctor immediately. Neutralise acid splashed onto the skin or clothing immediately with a soap solution and rinse with plenty of water. If acid is swallowed, see a doctor immediately.



A highly explosive electrolytic gas mixture results when charging batteries.



Fire, sparks, open flame and smoking are prohibited. Avoid the formation of sparks when handling cables and electrical devices. Prevent short circuits. Never short circuit battery terminals. Danger of injury from high-energy sparks.



Keep acid and battery out of reach of children.

- Always switch off the engine, the ignition and all electrical consumers and press the Stop button before working on the electrical system. The negative cable must be disconnected at the battery.

- When disconnecting the battery from the on-board electrical system, the negative cable must be disconnected first and then the positive cable.

The battery may not be disconnected with the engine running or with the ignition switched on, as otherwise the electrical system (electronic components) will be damaged.

- When reconnecting the battery, first connect the positive cable and then the negative cable. The connection cables must never be interchanged - danger of wiring fire!

The battery may not be disconnected with the ignition switched on or with the engine running, as otherwise the electrical system (electronic components) can be damaged.

To protect the housing from UV rays, do not expose the battery to direct sunlight.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Acid level

Check the acid level and add distilled waer if necessary up to the acid level marking or 5 mm above the separators.

Charging state

Determine the battery charging state by checking the acid density or the battery voltage.

Acid density (specific weight)
 charged = 1.285,
 discharged = 1.12

Total voltage

Determine the total voltage only when the battery is loaded with a voltage tester:

- test duration: 5 to 10 seconds
- nominal voltage 12 volts
- discharged 9.6 volts.

Battery terminals

Clean and grease terminals and note external condition of battery, e.g. raised plates, cracked housing.

Observe the instructions on page 61.

Checking acid level

Please observe the warnings on the previous page.

The battery is virtually maintenance-free under normal operating conditions. However, at high outside temperatures or during long, daily operating hours it is advisable to check the acid level from time to time. The acid level must also be checked after each charging process.

Battery without magic eye

The acid level is always to be at the **max.** mark on the long side. Never fill above the **max.** mark and do not allow the acid level to drop below the **min.** mark.

The concerned battery cells must be filled up to the **max.** mark at the latest when the acid level reaches the **min.** mark.

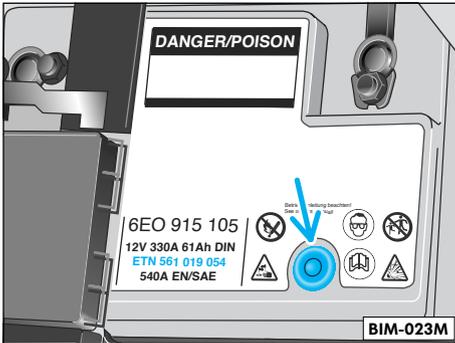
Do not overfill the battery cells, as otherwise the battery acid will escape via the vent opening. This can lead to parts and corrosion damage.

After filling the battery cells concerned must be sealed tightly with the battery plugs.

We recommend having the acid level checked and corrected by a VW Marine Service Partner.

Note

The use of gel batteries on board is recommended.



Removing battery

Before removing the battery, switch off the ignition and all current consumers.

To remove the battery, first disconnect the negative cable (usually black or brown) and then the positive cable (usually red). Then unscrew the battery mounting.

Battery with magic eye*

A round inspection window (see arrow) is provided on top of the battery. This "magic eye" changes its colour depending on the charging state and acid level of the battery. The colour display serves VW Marine Service Partner as a diagnosis aid.

Air bubbles can falsify the colour display. Carefully tap the magic eye.

If the display in the inspection window is **colourless or light yellow**, the battery acid level is too low. Distilled water must be added. With batteries older than 5 years we recommend replacement.

We recommend having the acid level checked and corrected by a VW Marine Service Partner.



Connecting battery

Before connecting the battery, switch off the ignition and all current consumers.

Place the battery in the installation location provided and secure the battery with the battery bracket.

To connect the battery, first connect the positive cable (usually red) and then the negative cable (usually black or brown).

Renewing battery

If the battery is renewed, the new battery must have the same voltage (12 V), design and safety characteristics such as central venting and an O-ring seal for the battery plugs.

The amperage and capacity should match. VW Marine Service Partner offer a range of suitable batteries.

When installing the battery, make sure that the ignition and all current consumers are switched off.

**** Due to the disposal problem regarding used batteries, it is best to have a battery renewed by a VW Marine Service Partner. Batteries contain sulphuric acid, lead etc and may never be disposed of in household refuse.***

Charging battery

Important

Observe the warnings on page 61 and the information on the charger manufacturer.

Note

To charge the battery of the on-board electrical system, the use of special boat chargers that prevent gassing.

Switch off the ignition and all current consumers before charging.

When charging at low amperages (e.g. with a small charger), the connection cables normally do not need to be removed. However, the specifications of the charger manufacturer must always be observed.

However, prior to **quick charging**, i. e. charging at high amperages, both connection cables must be removed.

The following instructions must be followed:

Important

● **Keep children away from the battery, battery acid and the charger.**

● **Only charge the battery in well-ventilated rooms. Do not smoke and keep away open flames and electric sparks, as a highly-explosive electrolytic gas mixture results when charging batteries.**

● **Protect your eyes and face. Do not bend over the battery.**

● **Flush acid splashes in the eyes or on the skin with clean water for several minutes. Then you should see a doctor immediately.**

● **Quick charging of a battery is dangerous and should only be carried out by a VW Maring Service Partner, as special chargers and knowledge are required.**

● **Never charge a frozen battery - danger of explosion! A discharged battery can already freeze at temperatures of under 0 °C. A frozen battery must always be thawed before charging.**

We do not advise the continued use of thawed batteries, as the battery housing can be cracked by the formation of ice and battery acid can leak out as a result.

● The battery plugs should not be open during charging.

● The mains cable of the charger may not be connected until the terminal clamps of the charger have been properly clamped to the battery terminals.

red = positive
black or brown = negative.

● After charging, first switch off the charger before reconnecting the battery properly.

Engine test run

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Warning lamps

Check the warning lamps for the coolant, the alternator and the engine oil pressure. The warning lamps light up when the engine is shifted into the operating position and must go out again after the engine is started.

Starting the engine

Check the starting behaviour of the engine when doing so.

Leaks

Check the cylinder head cover, oil filter, fuel system and cooling system for leaks.

Exhaust system

Check the exhaust system for leaks and damage.

Preserving engine

Preparing engine for winter

Depending on the operating conditions, Volkswagen Marine boat engines must be protected against possible corrosion damage.

It is not necessary to use special corrosion protection oils (see motor oil specifications on page 39).

Change the motor oil and the oil filter insert

For units you shut down for longer periods - e.g. after the end of the season - please carry out conservation in the specified order:

- 1 - Thoroughly clean all parts to be preserved.
- 2 - Allow the engine to warm up.
- 3 - After switching off the engine, renew the oil filter insert and pump off the motor oil - see page 43 and 41.
- 4 - Add 6.0 litres of motor oil and run the engine for approximately 30 seconds at increased idling speed.
- 5 - Switch the engine off.

6 - Plug all openings (e.g. exhaust pipe, air filter) to prevent the penetration of dirt or moist air.

7 - Spray the engine with an anti-corrosion agent from the outside.

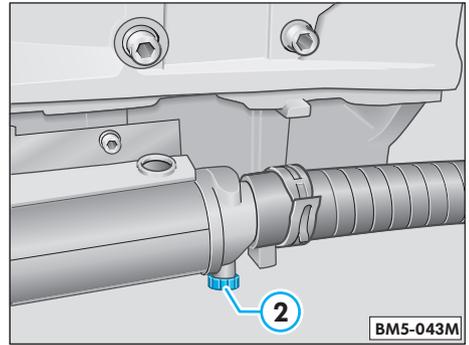
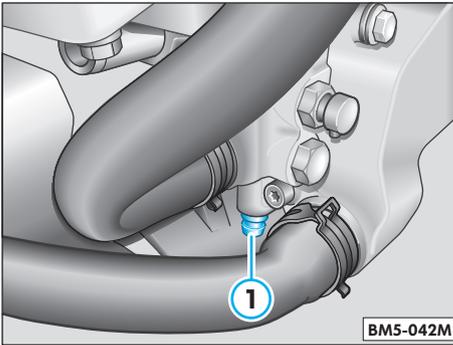
A corresponding anti-corrosion agent is available from VW Marine Service Partners.

Note

On engines that run at least 20 minutes under load every two weeks, no corrosion protection is required. However, the oil must be changed at the intervals specified in the service schedule.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.



Flushing and draining seawater cooling system

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Flushing and subsequent draining of the seawater cooling system with fresh water is very important for preventing corrosion and frost damage.

The flushing process should be carried out together with the motor oil change.

Conduct flushing in the specified order:

- 1 - Close the seawater valve.
- 2 - Open and clean the seawater filter - see page 49.
- 3 - Fill the seawater filter with fresh water and run the engine at idle.

Make sure that the seawater filter is always filled with fresh water so that the seawater pump does not run dry. This would result in the pump becoming defective.

It is important that the engine runs for a while so that all sludge and salt residues are flushed away that could otherwise promote corrosion.

- 4 - Switch off the engine again.
- 5 - Screw on the cover of the seawater filter.
- 6 - Fit a suitable hose on the connection - see Fig. BM5-042M - of the drain screw **1**.
- 7 - Open the drain screw **1** - see Fig. BM5-042M - and catch the water with a suitable container.
- 8 - Open the drain screw **2** - see Fig. BM5-043M - and catch the water with a suitable container.
- 9 - After draining is completed, pull the hose off the drain screw **1** again and close the two drain screws **1** and **2** again.

Fuel system

The fuel system also requires an inspection and care at the end of the season.

Please observe the following:

- To prevent condensation water in the tank, completely fill the tank before the end of the season.
- Check the fuel system for leaks.
- Drain the water from the circulation filter - see page 44.
- Renew the fuel filter - see page 48.

Important

There is fire danger with a leaky fuel system.

If you want to drain the water from the circulation filter and renew the fuel supply filter yourself, then please be sure to observe the following points:

- **Please make sure that no diesel fuel gets onto the coolant hoses. Clean hoses immediately if necessary.**
- **Wear eye protection.**
- **If your hands come into contact with diesel fuel, they must then be washed thoroughly.**
- **The used fuel and the fuel filter must be stored in a safe place away from children until their proper disposal.**
- **Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.**

Winter operation

An inspection service should always be conducted on the Volkswagen Marine boat engine before the start of the cold season. In addition, please observe the following instructions when operating the Volkswagen Marine boat engine at extremely low temperatures.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Battery

The battery capacity decreases as the temperature drops. This is due to its chemical and physical properties. This is why an extremely cold battery, which is also not well charged, only has a fraction of the starting power it has at normal temperatures.

We recommend recharging the battery every 6 to 8 weeks in the winter. The acid level and density must be checked. The voltage of the cells must be measured with the battery loaded.

It is best to have this work conducted by a VW Marine Service Partner.

If the engine is not used for several weeks at extremely low sub-zero temperatures, the battery should be removed and stored in a frost-proof room to prevent it from freezing and being destroyed.

Cable connections

Check and clean all cable connections, as oxidised connections lead to voltage drops and starting difficulties.

Cooling system

The coolant consists of 67 % water and a 33 % share of our coolant additive **G 12 A8D** (antifreeze on a glycol basis with corrosion protection additives).

It is advisable to use an antifreeze effective down to -25 °C.

At temperatures down to -30 °C a mixture in a ratio of 55 % to 45 %, and down to -35 °C one of 50 % to 50 % should be used.

If for climatic reasons greater frost protection is required, the percentage of G 12 A8D can be increased, however only up to 60 % (frost protection down to approximately -40 °C), as otherwise the frost protection is decreased again and the cooling effect worsens.

Only our **G 12 A8D** or an additive with the **specification TL-VW 774 D** (observe container label) may be used as a coolant additive. These additives are available from VW Marine Service Partners.

Other coolant additives can lead to a considerable reduction in corrosion protection.

The resulting corrosion damage can lead to coolant loss and subsequently to major engine damage.

Important note

Please observe the following when topping off:

G 12 may never be mixed with other coolant additives (including with G 11).

You can recognise the G 12 from its red colour. If the liquid is brown, G 12 has been mixed with another coolant!

In this case the coolant must be changed immediately!

Otherwise serious malfunctions or engine damage may occur!

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Tropical operation

To protect the engine against heat, dust and corrosion, the following measures are required:

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

Engine

If the unit is not operated for a longer period, the engine should be protected against possible corrosion damage.

See the chapter "Preserving engine".

Battery

Check the battery acid level above the upper edge of the plates weekly. It is approx. 5 mm or can be read off at the existing acid level marks. In case of losses due to evaporation, only distilled water may be added.

Observe the instructions on pages 61.

Air filter

If the engine is to be operated in very dusty areas, check the filter insert more frequently.

Observe the instructions on page 50 for this purpose.

Cooling system

The coolant level must be checked daily. If a coolant loss is determined, the cooling system must be checked for leaks, as normally coolant losses hardly occur in the closed cooling system.

Observe the instructions on the pages 14, 52 and 53.

Fuel filter

Drain the water from the filter weekly.

The fuel filter should be changed earlier than specified in the service schedule if necessary.

Observe the instructions on the pages 44 and 47.

SDI 55-5 Diesel Engine

Engine data	
Output	<i>at rpm</i> 40 kW (55 bhp) / 2500
Maximum torque	<i>in Nm at rpm</i> 155 / 2250
No. of cylinders, displacement	5 cylinders, 2461 cm ³
Compression ratio	19.0
Bore/stroke in mm	81,0 / 95,5
Weight in kg ¹⁾	260
Diesel fuel	at least CN 49 as per DIN EN 590 or bio-diesel as per DIN 51606
Complies with the following emission legislation Certificate No. as per BSO 2	Lake Constance Shipping Code Level 2/ M 1 03 3 00 05
Fuel consumption	
Min. specific	<i>in g/kWh</i> 233
Filling capacities	
Coolant	<i>in litres</i> approx. 12.0 G12
Hydraulic oil	
Power steering	<i>in litres</i> approx. 1.0 ATF
Depending on reversing gearbox type	<i>in litres</i> approx. 2.5 - 3.5
Motor oil ²⁾ with filter change The oil level must be checked when topping up. Do not overfill!	<i>in litres</i> 6,0
VW Marine Longlife oil	<i>Specification</i> VW 506 00 (0W30)

1) The weight corresponds to a dry engine, with ancillary units, cooling system and clutch flange.

2) For additional information see "Motor oil" on page 39.

SDI 75-5 Diesel Engine

Engine data	
Output	<i>at rpm</i> 55 kW (75 bhp) / 3600
Maximum torque	<i>in Nm at rpm</i> 155 / 2250
No. of cylinders, displacement	5 cylinders, 2461 cm ³
Compression ratio	19,0
Bore/stroke in mm	81,0 / 95,5
Weight in kg ¹⁾	260
Diesel fuel	at least CN 49 as per DIN EN 590 or bio-diesel as per DIN 51606
Complies with the following emission legislation Certificate No. as per BSO 2	Lake Constance Shipping Code Level 2/ M 1 03 3 00 05
Fuel consumption	
Min. specific	<i>in g/kWh</i> 233
Filling capacities	
Coolant	<i>in litres</i> approx. 12.0 G12
Hydraulic oil	
Power steering	<i>in litres</i> approx. 1.0 ATF
Depending on reversing gearbox type	<i>in litres</i> approx. 2.5 - 3.5
Motor oil ²⁾ with filter change The oil level must be checked when topping up.	<i>in litres</i> 6,0
Do not overfill!	
VW Marine Longlife oil	<i>Specification</i> VW 506 00 (0W/30)

1) The weight corresponds to a dry engine, with ancillary units, cooling system and clutch flange.

2) For additional information see "Motor oil" on page 39.

TDI 100-5 Diesel Engine

Engine data	
Output	<i>at rpm</i> 74 kW (100 bhp) / 2600
Maximum torque	<i>in Nm at rpm</i> 275 / 2500
No. of cylinders, displacement	5 cylinders, 2461 cm ³
Compression ratio	19,0
Bore/stroke in mm	81,0 / 95,5
Turbocharging	Exhaust-gas turbocharger VTG ²⁾
Weight in kg ¹⁾	275
Diesel fuel	at least CN 49 as per DIN EN 590 or bio-diesel as per DIN 51606
Complies with the following emission legislation Certificate No. as per BSO 2	Lake Constance Shipping Code Level 2/ M 1 03 3 00 06
Fuel consumption	
Min. specific	<i>in g/kWh</i> 217
Filling capacities	
Coolant	<i>in litres</i> approx. 12.0 G12
Hydraulic oil	
Power steering	<i>in litres</i> approx. 1.0 ATF
Depending on reversing gearbox type	<i>in litres</i> approx. 2.5 - 3.5
Motor oil ³⁾ with filter change The oil level must be checked when topping up.	<i>in litres</i> 6,0
Do not overfill!	
VW Marine Longlife oil	<i>Specification</i> VW 506 00 (0W30)

1) The weight corresponds to a dry engine, with ancillary units, cooling system and clutch flange.

2) Turbocharger with variable turbine geometry

3) For additional information see "Motor oil" on page 39.

TDI 120-5 Diesel Engine

Engine data	
Output	<i>at rpm</i> 88 kW (120 bhp) / 3250
Maximum torque	<i>in Nm at rpm</i> 275 / 2500
No. of cylinders, displacement	5 cylinders, 2461 cm ³
Compression ratio	19,0
Bore/stroke in mm	81,0 / 95,5
Turbocharging	Exhaust-gas turbocharger VTG ²⁾
Weight in kg ¹⁾	275
Diesel fuel	at least CN 49 as per DIN EN 590 or bio-diesel as per DIN 51606
Complies with the following emission legislation Certificate No. as per BSO 2	Lake Constance Shipping Code Level 2/ M 1 03 3 00 06
Fuel consumption	
Min. specific	<i>in g/kWh</i> 217
Filling capacities	
Coolant	<i>in litres</i> approx. 12.0 G12
Hydraulic oil	
Power steering	<i>in litres</i> approx. 1.0 ATF
Depending on reversing gearbox type	<i>in litres</i> approx. 2.5 - 3.5
Motor oil ³⁾ with filter change The oil level must be checked when topping up.	<i>in litres</i> 6,0
Do not overfill!	
VW Marine Longlife oil	<i>Specification</i> VW 506 00 (0W30)

¹⁾ The weight corresponds to a dry engine, with ancillary units, cooling system and clutch flange.

²⁾ Turbocharger with variable turbine geometry

³⁾ For additional information see "Motor oil" on page 39.

TDI 150-5 D⁴) Diesel Engine

Engine data		
Output	<i>at rpm</i>	108 kW (147 bhp) / 4000
Maximum torque	<i>in Nm at rpm</i>	310 / 1900
No. of cylinders, displacement		5 cylinders, 2461 cm ³
Compression ratio		19,0
Bore/stroke in mm		81,0 / 95,5
Turbocharging		Exhaust-gas turbocharger VTG ²⁾
Charge-air cooling		Seawater pipe-bundle heat exchanger
Weight in kg ¹⁾		280
Diesel fuel		At least CN 49 as per DIN EN 590 or bio-diesel as per DIN 51606
Complies with the following emission legislation Certificate No. as per BSO 2		Lake Constance Shipping Code Level 2/ M 1 03 3 00 07
Fuel consumption		
Min. specific	<i>in g/kWh</i>	203
Filling capacities		
Coolant	<i>in litres</i>	approx. 12.0 G12
Hydraulic oil		
Power steering	<i>in litres</i>	approx. 1.0 ATF
Depending on reversing gearbox type	<i>in litres</i>	approx. 2.5 - 3.5
Motor oil ³⁾ with filter change The oil level must be checked when topping up. Do not overfill!	<i>in litres</i>	6,0
VW Marine Longlife oil	<i>Specification</i>	VW 506 00 (0W30)

1) The weight corresponds to a dry engine, with ancillary units, cooling system and clutch flange.

2) Turbocharger with variable turbine geometry

3) For additional information see "Motor oil" on page 39.

4) Version for dual engine systems as per BSO II

TDI 150-5 Diesel Engine

Engine data		
Output	<i>at rpm</i>	111 kW (150 bhp) / 4000
Maximum torque	<i>in Nm at rpm</i>	310 / 1900
No. of cylinders, displacement		5 cylinders, 2461 cm ³
Compression ratio		19,0
Bore/stroke in mm		81,0 / 95,5
Turbocharging		Exhaust-gas turbocharger VTG ²⁾
Charge-air cooling		Seawater pipe-bundle heat exchanger
Weight in kg ¹⁾		280
Diesel fuel		at least CN 49 as per DIN EN 590 or bio-diesel as per DIN 51606
Complies with the following emission legislation Certificate No. as per BSO 2		Lake Constance Shipping Code Level 2/ M 1 03 3 00 07
Fuel consumption		
Min. specific	<i>in g/kWh</i>	207
Filling capacities		
Coolant	<i>in litres</i>	approx. 12.0 G12
Hydraulic oil		
Power steering	<i>in litres</i>	approx. 1.0 ATF
Depending on reversing gearbox type	<i>in litres</i>	approx. 2.5 - 3.5
Motor oil ³⁾ with filter change The oil level must be checked when topping up. Do not overfill!	<i>in litres</i>	6,0
VW Marine Longlife oil	<i>Specification</i>	VW 506 00 (0W30)

1) The weight corresponds to a dry engine, with ancillary units, cooling system and clutch flange.

2) Turbocharger with variable turbine geometry

3) For additional information see "Motor oil" on page 39.

Engine characteristic data

Important note

Please always specify the model with the engine number or the engine code when making all queries, any complaints and when ordering spare parts.

This will prevent misunderstanding when processing your query.

Before you read of the characteristic data, stop the engine and allow it to cool down.

Important

Observe the safety precautions beginning on page 22 before performing any work on the engine or in the engine compartment.

The identification plate

The identification plate is located in the front on the toothed belt guard.

Engine code/Engine number

The engine code and the engine number are stamped on the left-hand side of the cylinder block next to the fuel pump. In addition, they can also be found on the identification plate.

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