Installation Description EB02

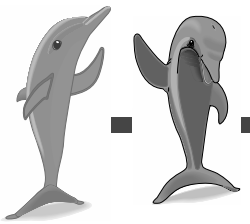
Design and Operation

Boat Engines from Volkswagen Marine

SDI 40-4
SDI 50-4
SDI 60-4

VOLKSWAGEN marine
SUPERIOR TECHNOLOGY

NEW



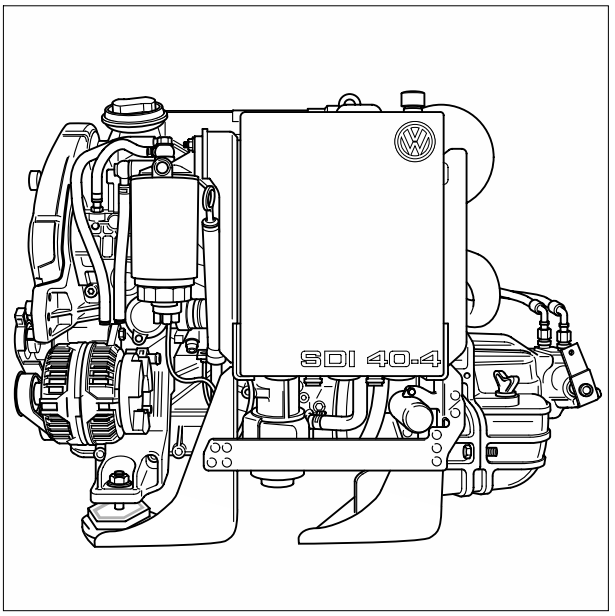
Attention
Note

These installation instructions show the design and operation of new developments!
The contents will not be updated.

For current test, adjustment and repair instructions,
please see the Service literature intended for this purpose.

Foreword

This installation description explains the procedure for the installation of the 4-cyl. SDI Volkswagen Marine boat engines.



Example: 4-Cyl. SDI 40-4 *EB4-0011*

General Information

- The extensive range Volkswagen Marine accessories is contained in the Volkswagen Marine Accessories Catalogue.
- Products that are not listed in these installation instructions or the Volkswagen Marine Accessories Catalogue, however are required, can be purchased exclusively from specialised dealers.

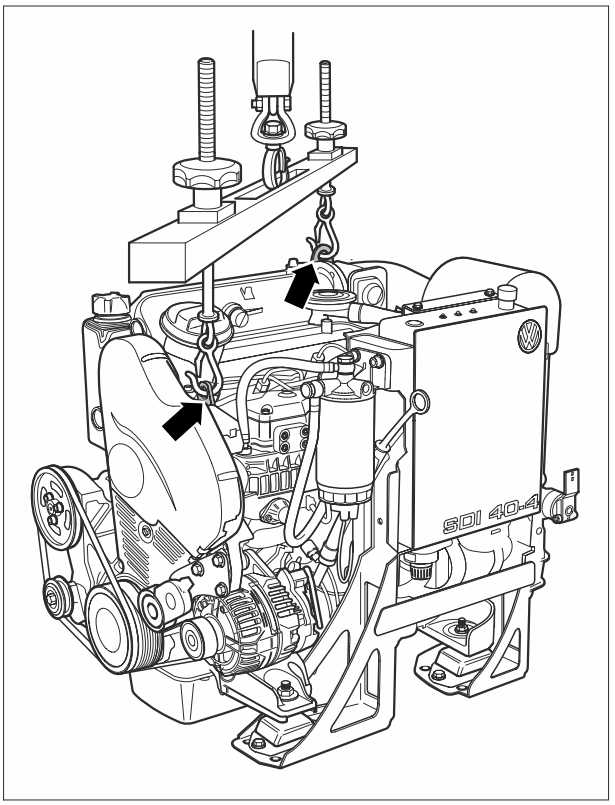
The professional, correct installation of the engine and its attached parts is very important for subsequently ensuring that all components operate together properly.
This work must therefore be carried out with extreme care.

Table of Contents

Installation Instructions

- The two hanging eyes provided on the engine (see arrows in illustration) must be used when installing and removing the Volkswagen Marine boat engine with an engine crane and the suitable lifting tackle.
- The installation location and space for the engine must be selected so that maintenance work on the engine can be carried out without problems.
- Sufficient space must be created for installing and removing the engine.

The qualified experts of the Volkswagen Marine Team are available to answer special questions and provide technical information on all aspects of the installation of the Volkswagen Marine boat engine.



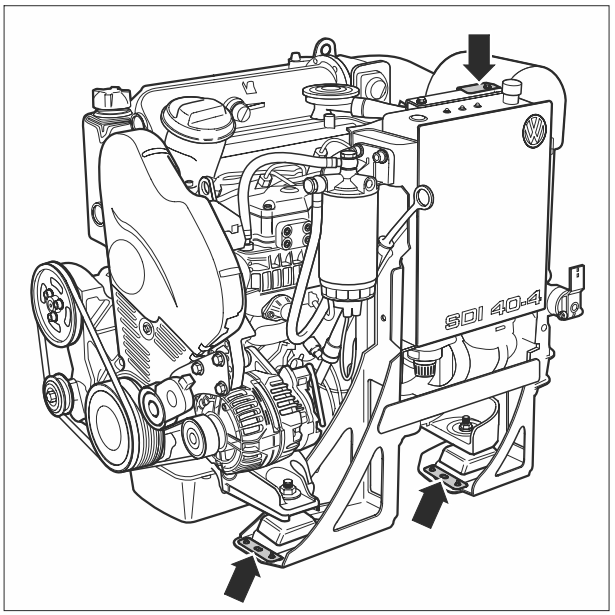
EB4-0018

Transport locks on engine

- Three transport locks are mounted on the engine (see arrows in illustration) for transporting or for installation and removal of the engine.
- Do not remove the transport locks until the engine has reached its final installation position in the boat.

Note

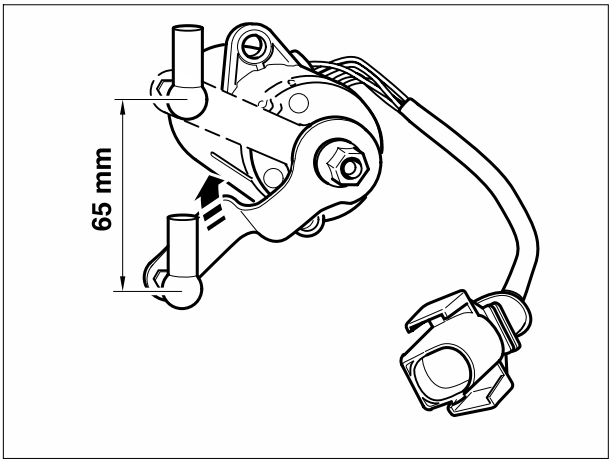
Store transports locks in a safe place for later use!



EB4-0021

Adjusting throttle Bowden cable on throttle-lever position sender

- Adjust the throttle Bowden cable so that a dimension of 65 mm results between the idling position and the full-throttle position (see illustration).
- The sensor dimension must be complied with to achieve the full engine output.



EB4-0025

Later attachment of a reversing gear on Volkswagen Marine boat engine

- When retrofitting the reversing gear, you must observe various things and replace components. Please contact the Volkswagen Marine Team for this purpose.

Engine with reversing gear in operation

- Observe the information on this topic in your operating instructions.

Charging additional batteries

- Operation with battery cut-off diodes is not permissible.
- Exclusively use a battery split-charge relay for this purpose. In case of queries, please contact your nearest Volkswagen Marine dealer.

Individual instrumentation (optional)

- If you require individual instrumentation, please contact your nearest Volkswagen Marine dealer.

Connecting a hot water boiler

- If you require a hot water boiler, please contact your nearest Volkswagen Marine dealer.

Exhaust System

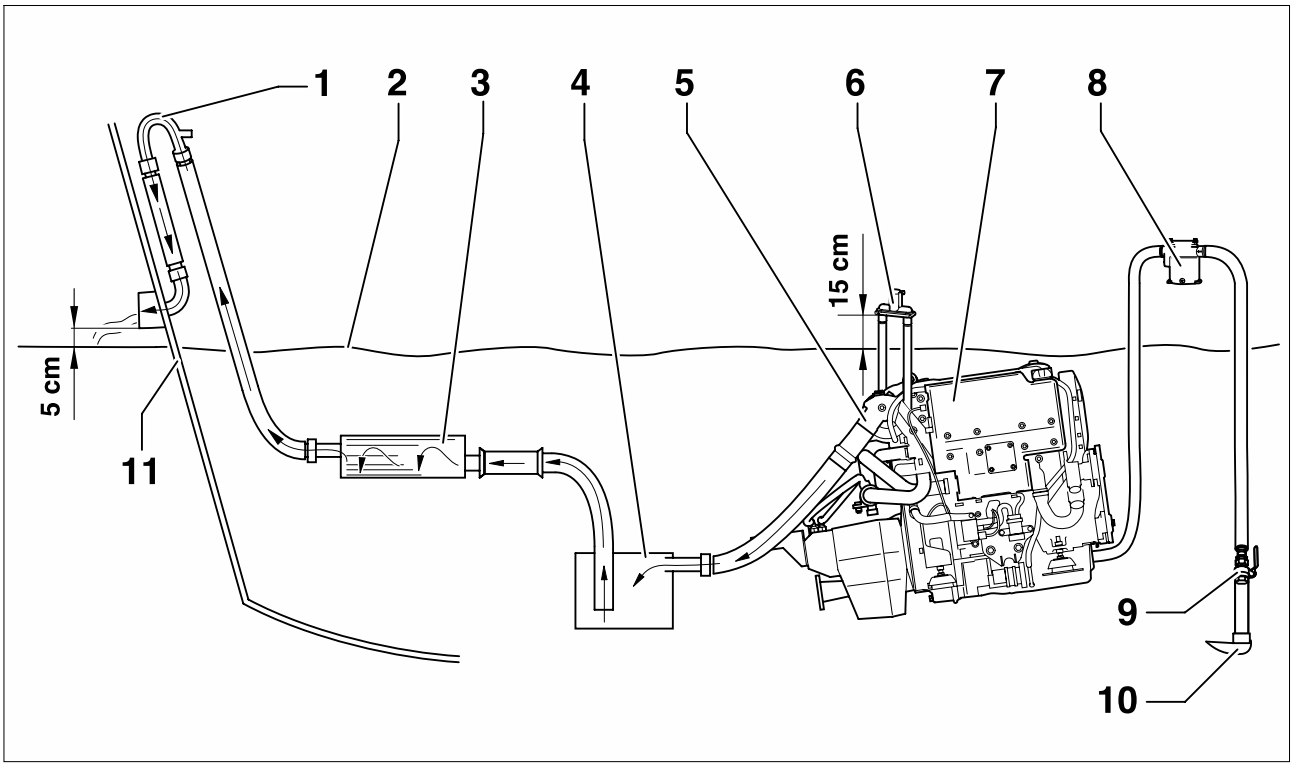
Introduction

Volkswagen Marine boat engines are operated with wet exhaust systems. The wet exhaust system has its name from the introduction of water.

After the exhaust plenum chamber or turbocharger the flow of exhaust gas is deflected through the exhaust-pipe connection piece. In these exhaust-pipe connection pieces the raw water/seawater is injected into the exhaust gas of the engine.

The raw water/seawater mixes with the exhaust gases and greatly cools them down so that rubber connection hoses and PVC parts can be used for the remainder of the exhaust system that must have a temperature stability of at least 200 °C.

Installation overview of exhaust system of an SDI engine with reversing gear



EB4-0001

Legend

1. Goose neck
   (lower edge of exhaust pipe with stern bushing must be at least 5 cm above the waterline)
2. Waterline
3. Silencer
4. Water collector
5. Exhaust pipe
6. Ventilation unit
   (mount at least 15 cm above waterline)
7. Engine
8. Seawater filter
9. Seawater valve
10. Intake fitting
11. Stern bushing

Note

- The water collector should be dimensioned large enough that it can completely hold the seawater flowing back during an engine standstill.

- The entire exhaust system should be installed with as few pipe bends as possible. The line cross-section of 60 mm should not be dropped below in the process. The hose connections must always be secured with double hose clips. The hose connections and rubber muff couplings must be temperature-resistant.

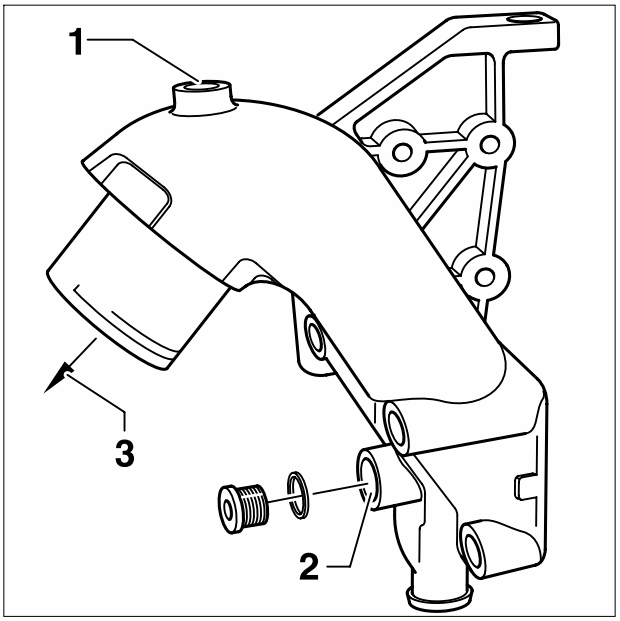
The entire exhaust system may not be designed to long in order not to exceed the correct maximum value for the exhaust gas counter-pressure.

The values for the maximum exhaust gas counter-pressure of the respective engine at nominal output are:

- SDI 40-4 with 29 kW = 75 mbar
- SDI 50-4 with 37 kW = 100 mbar
- SDI 60-4 with 44 kW = 150 mbar

These values may not be exceeded.

Exhaust-gas connection piece on SDI engine



EB4-0002

Legend

1. Sealing plug for exhaust gas extraction
2. Connection for raw-water temperature sensor (optional)
3. Exit of exhaust gas

Unit/Engine Mounting

Notes on installation of unit mountings

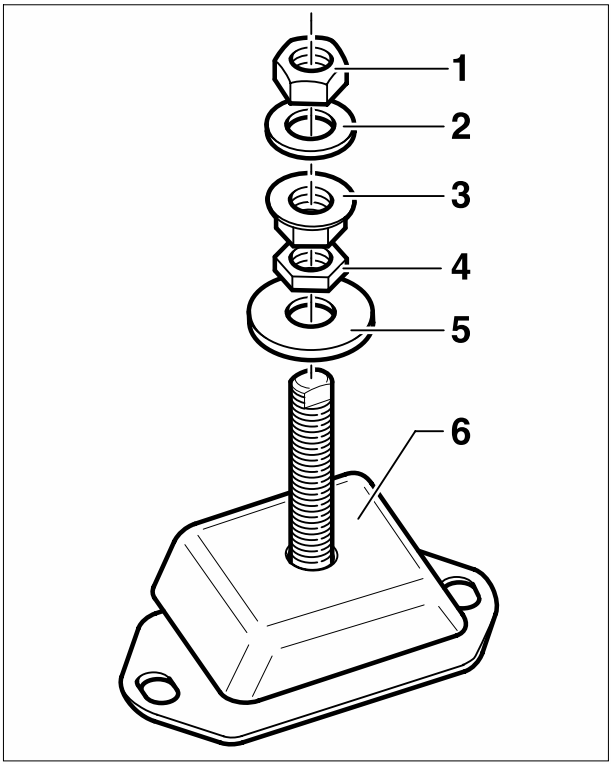
- The unit mountings may not be twisted during installation. Otherwise heavy vibrations and damage can occur.
- Make sure that there is no twisting on the output train and the unit mountings after installing and aligning the engine.
- Use only the original Volkswagen Marine unit mountings.
- The mounting bolts for the unit mountings on the boat hull must be provided with washers (see illustration on Page 11).

Procedure

The unit mountings should be uniformly loaded at all mounting points after installing the engine.

Centre and tilt the engine to the corresponding height with the height adjustment (in the illustration Item **3**) on the unit mounting. Centring in the centre of the height adjustment is ideal.

Following engine alignment (height adjustment) the mounting nut (in the illustration Item **1**) is tightened with a torque of **65 Nm**. When doing so, the collar nut must be braced with a suitable tool (e.g. open-end spanner) (see note on Page 11).



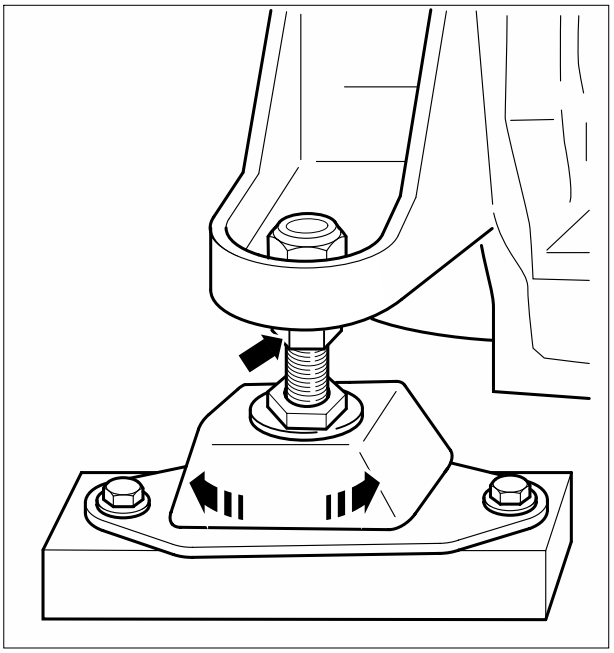
EB4-0013

Legend

1. Mounting nut 65 Nm
2. Washer
3. Collar nut for height adjustment
4. Mounting nut (do not loosen)
5. Washer
6. Unit mounting with base plate

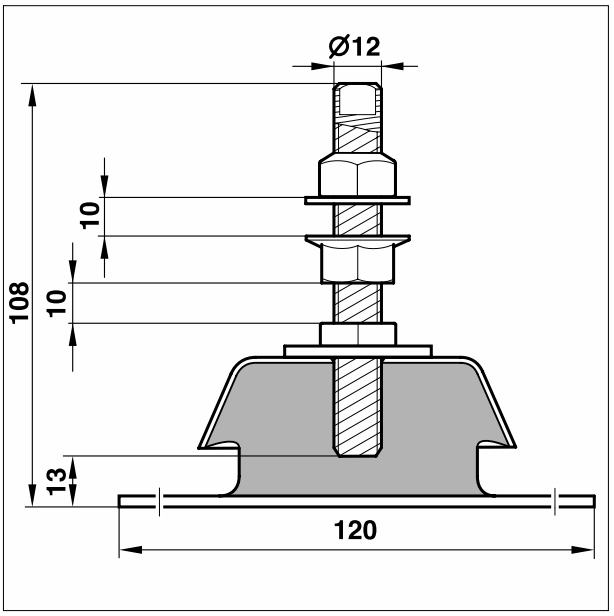
To prevent the unit mountings from twisting to the side when tightening the upper mounting nut, the collar nut for height adjustment -arrow- is locked in place with a suitable tool (e.g. open end spanner).

To mount the base plate on the boat hull, use mounting bolts with a suitable washer.



EB4-0017

Dimensions of unit mounting



EB4-0014

Electrical System

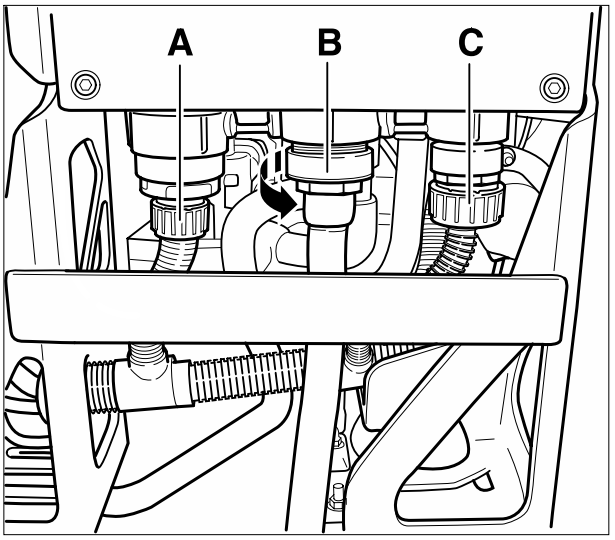
Connections on engine

- The electrical wiring connections with multi-pin connectors to the engine fuse box/relay plate, as well as the main wiring loom with high-voltage connectors are easy and safe to install.
- The multi-pin connectors -**A**-, -**B**- and -**C**- of the engine fuse box/relay plate and the connection unit/relay box must be screwed in -direction of arrow- until the end locking position is reached and felt, and the plug is securely connected.

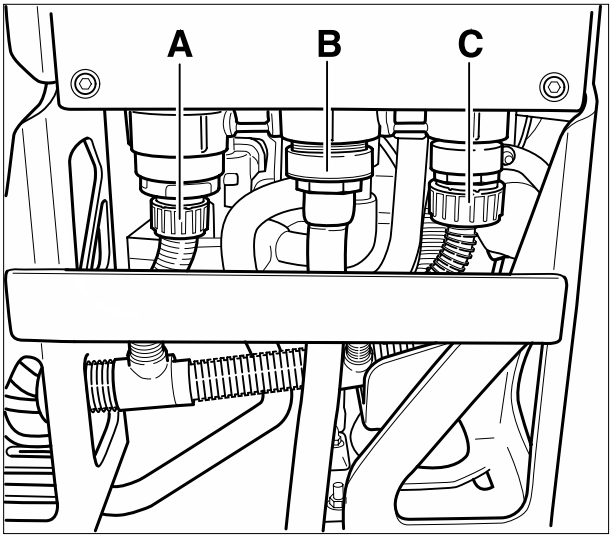
Note

The wiring loom spanners T 01905 and T 01906 must be used to remove and fit the multi-pin connectors.

The multi-pin connectors -A- and -C- are already pre-mounted at the factory. The connector -B- must be mounted after installing the engine.



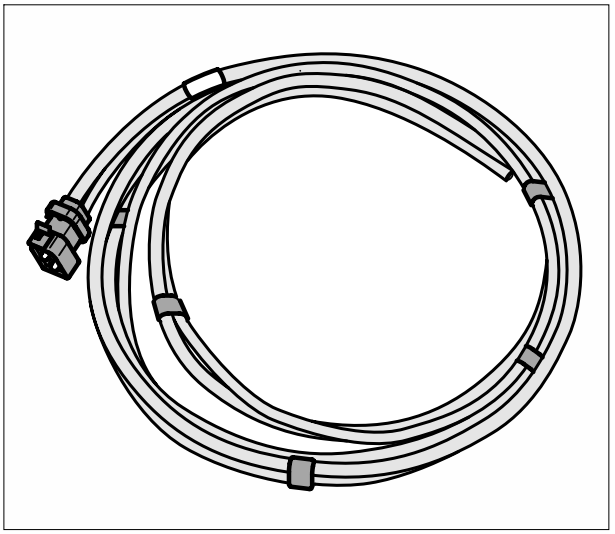
EB4-0023



EB4-0024

Battery connection

The battery connection cable included with the engine is equipped with a special high-voltage plug on the engine end. The other end of the cable must be shortened to the appropriate length and suitable crimp connectors mounted on it.

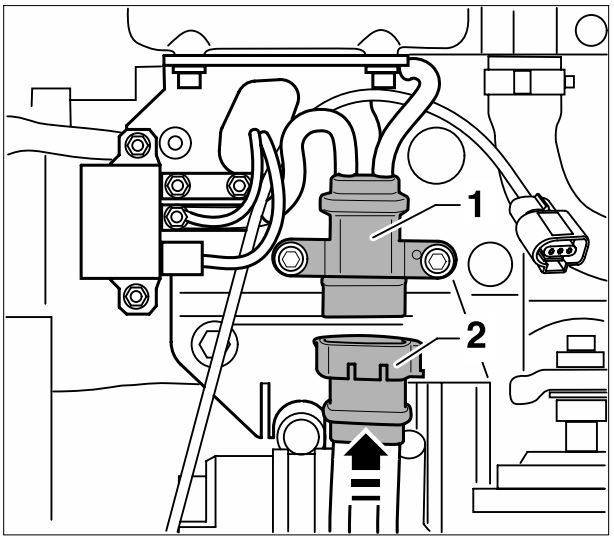


EB5-0041

Connect the high-voltage plug -**2**- of the battery connection cable in -direction of arrow- to the engine connection plug -**1**- on the engine.

Use only high-quality battery terminals for the connection to the battery.

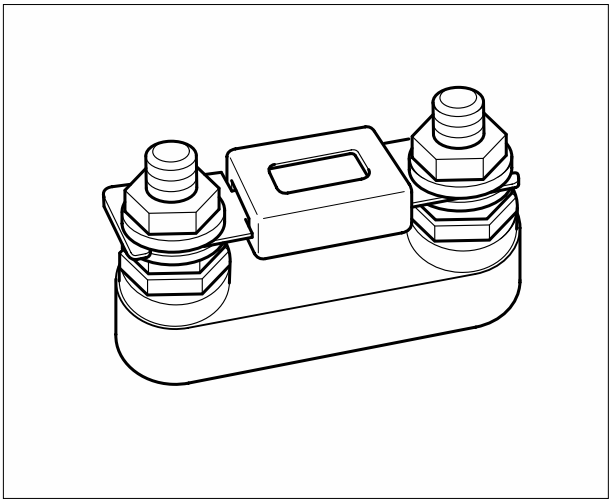
- The black cable (earth) must be connected to the negative terminal of the battery.
- The red cable (positive) must be connected to the positive terminal of the battery.



EB4-0016

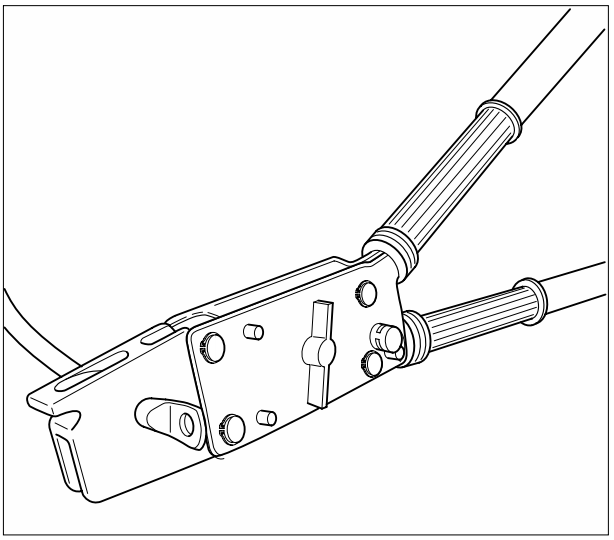
Note

- It is advisable to install a blade-type fuse with 400 A (see illustration) directly before the battery connection.
- Also install a main battery switch in the supply line that immediately opens the main power circuit in case of danger and when working on the engine.



EB5-0012

When mounting the ring cable lug on the cable ends (35 mm^2) of the battery connection cable, a professional installation (see illustration) of the crimped connection must be ensured.



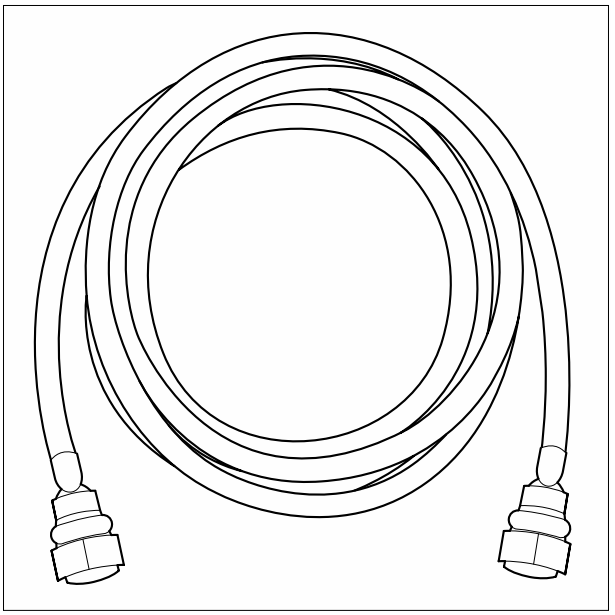
EB5-0013

Electrical System

Main wiring loom (instrumentation)

The connection cables available from Volkswagen Marine in various lengths (see illustration) must be connected with the centre multi-pin connector of the engine fuse box/relay plate (see illustration on Page 17). The other end of the connection cable is connected to the connection unit/relay box.

Various cable lengths are available.



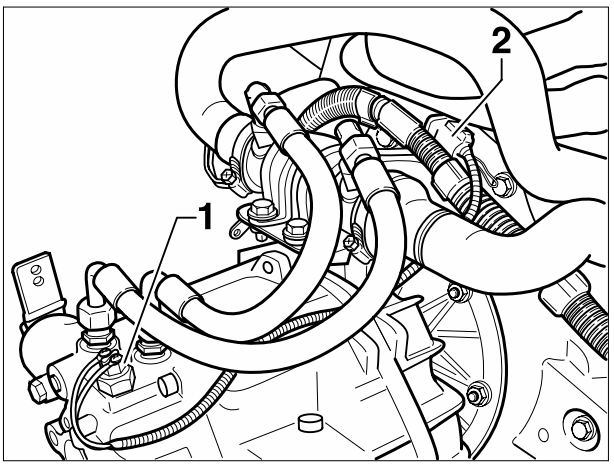
EB5-0014

Connecting a gearbox neutral switch (only engine with reversing gear)

If you have ordered your Volkswagen Marine boat engine complete with a reversing gear, then the connection of the gearbox neutral switch is already pre-mounted at the factory.

Note

If the reversing gear is retrofitted, the connection cable with plug -**2**- (on the rear of the engine) must be connected to the connection cable -**1**- from the neutral switch of the reversing gear.

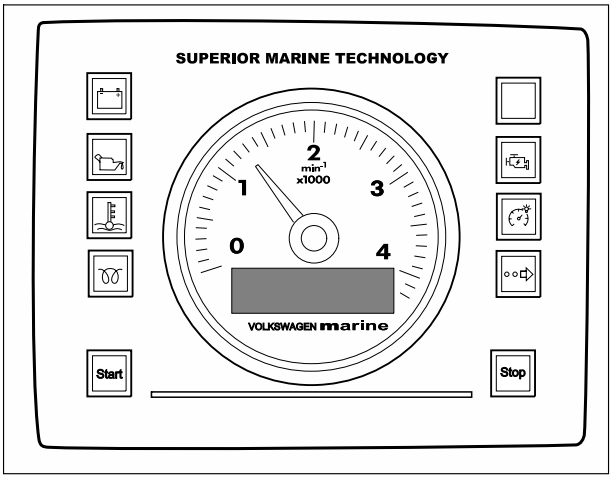


EB4-0026

Instrumentation

Volkswagen Marine offers you two instrumentation options for your boat. You can either use the modern, complete instrumentations from Volkswagen Marine, or you can put together your own individually designed instrumentation yourself (to be ordered as an option). Volkswagen Marine boat engines are designed for use with instruments of the VDO "Ocean Line"™ White.

The extensive functions of the multi-function display are only available when the Volkswagen Marine rev. counter is used.



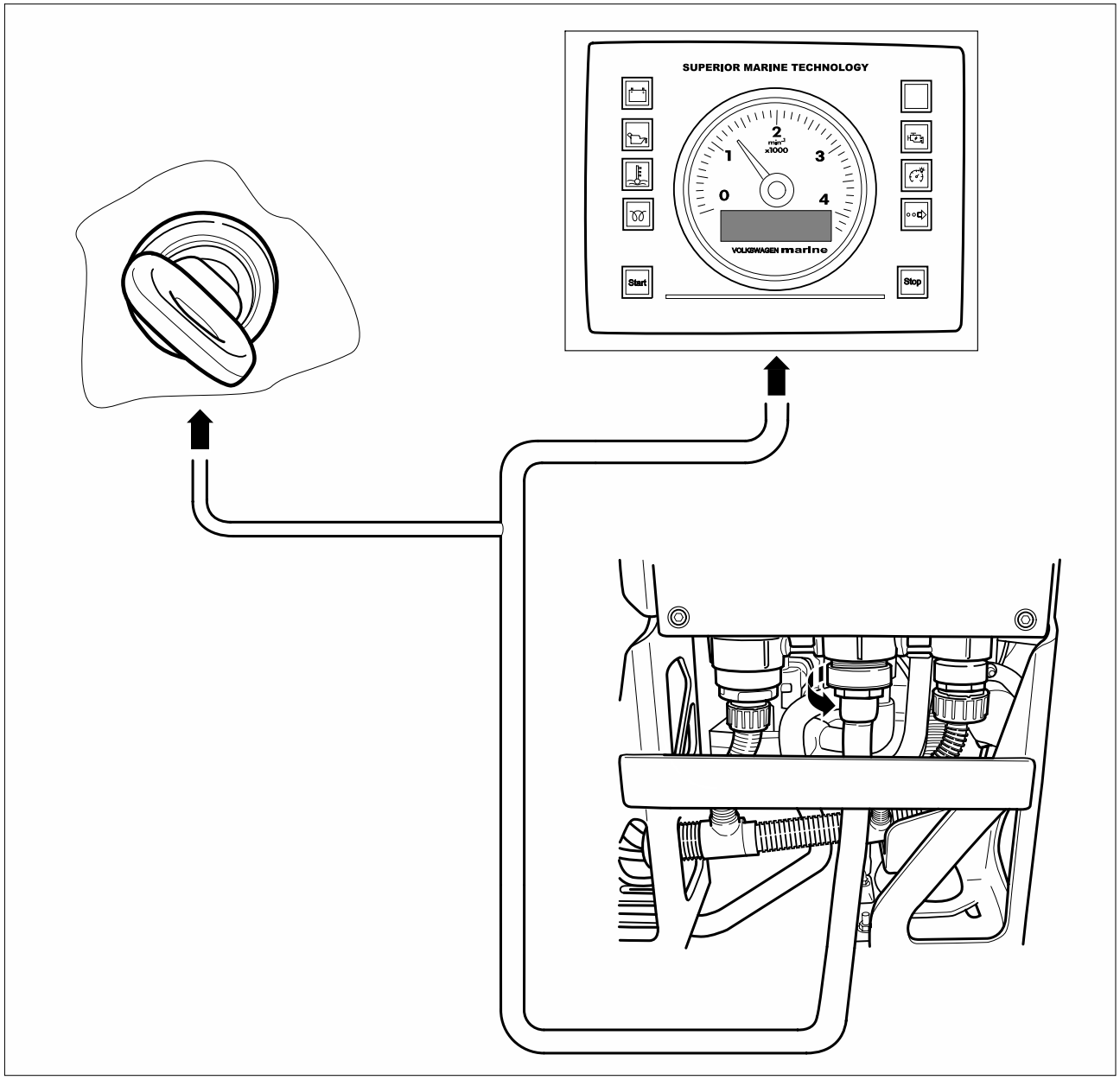
EB5-0037

Electrical System

Installation overview of standard instrumentation

The instrumentation consists of two components, i.e. the instrument panel and the ignition switch.

The installation template for cutting out the instrument panels is provided from Page 44.



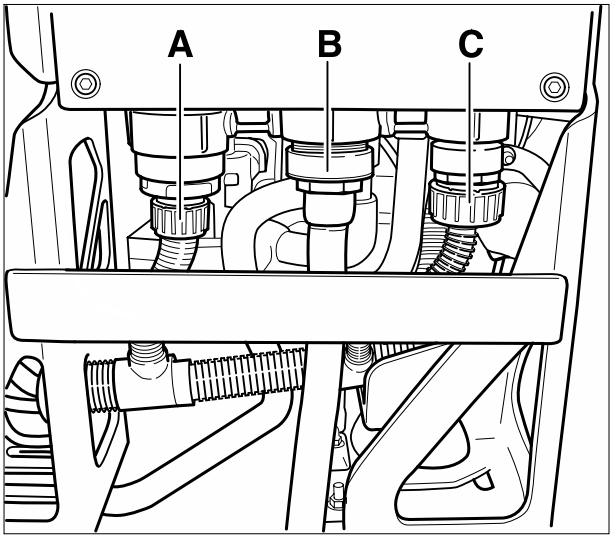
EB4-0022

Connection to engine

Connect the multi-pin connection of the main wiring loom to the fuse box/relay plate (see illustration of connection -**B**-).

Note

The wiring loom spanners T 01905 and T 01906 must be used to remove and fit the multi-pin connectors.



EB4-0024

Installing instrument panel

Connect the ignition switch and the instrumentation to the main wiring loom from the engine as described on Page 16 (installation overview of standard instrumentation).

Note

Installation templates for installing the instrument panels are provided from Page 44.

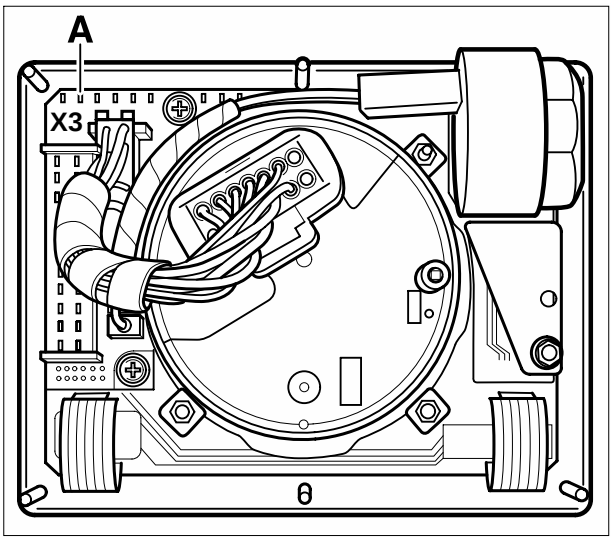
Electrical System

Connecting navigation instruments

To be able to use the full range of extensive functions of the multi-function display, you must connect the instrument panel to a navigation instrument with an NMEA interface (e.g. GPS receiver, LOG etc.).

For this purpose you connect the connection terminal marked with connection "**X3**" (see illustration -**A**-) to the NMEA interface of your navigation instrument:

- Plug connector "**X3**" Terminal "**2**" for connection **NMEA-A**
- Plug connector "**X3**" Terminal "**1**" for connection **NMEA-B**



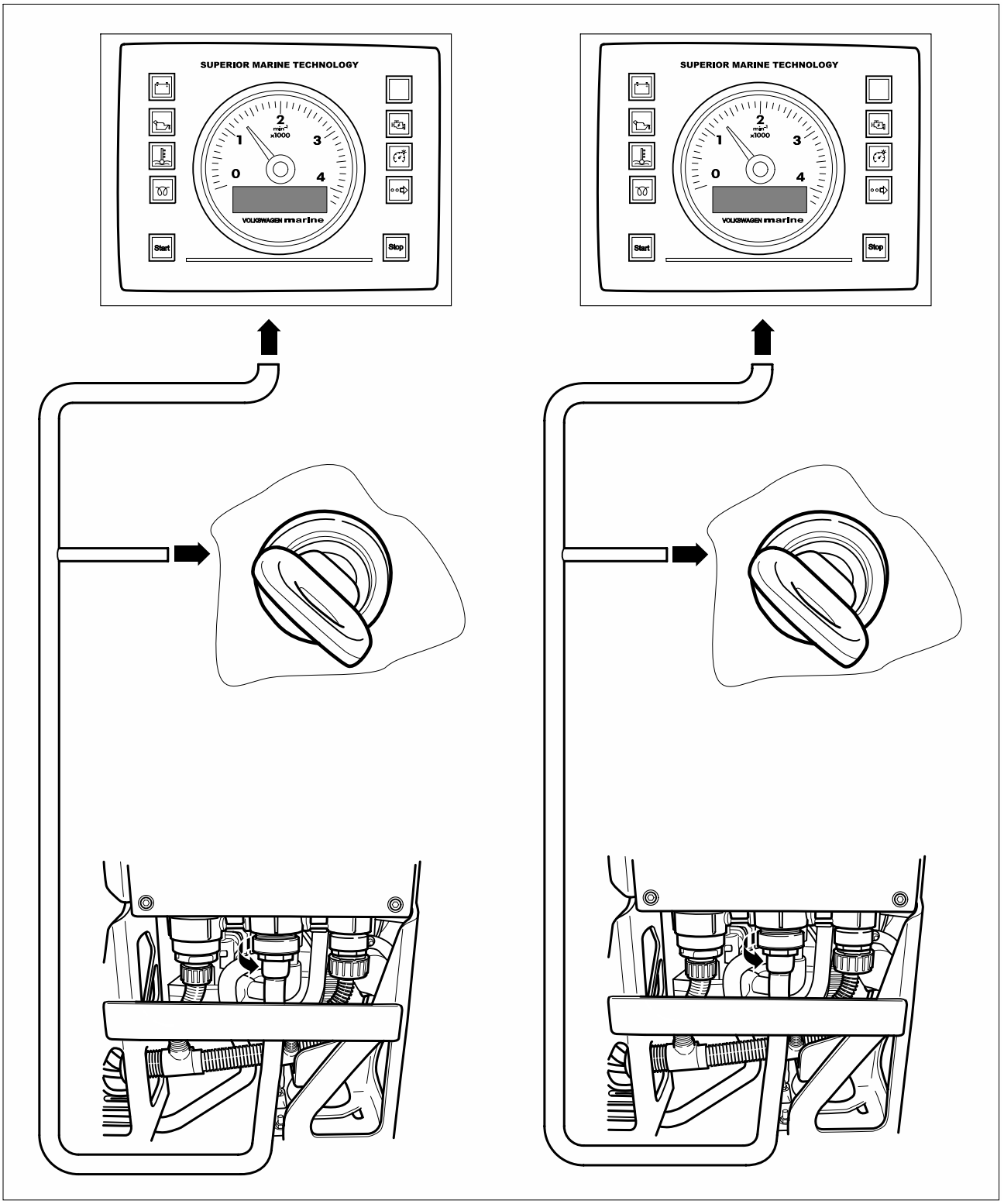
EB4-0004

Note

To configure your multi-function display, please read the additional operating instructions for the multi-function display in your onboard wallet.

Installation overview of instrument panels with dual engines

The installation templates for cutting out the instrument panels is provided from Page 44.



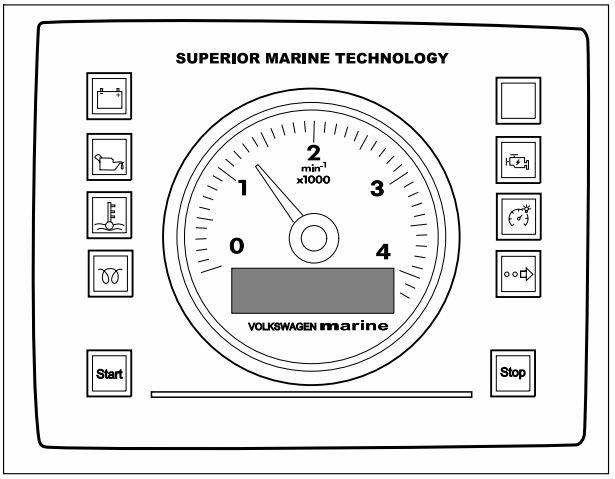
EB4-0028

For the installation you require

1. Two connection cables (one connection from the fuse box/relay plate to the ignition switch and the instrument panel)

2. Two ignition switches

3. Two sets of instrumentation



EB5-0037

Connecting navigation instruments

In order to fully utilise the extensive functions of the multi-function display you must connect the instrument panel to a navigation instrument with an NMEA interface (e.g. GPS receiver, LOG etc.).

To connect the navigation instruments, see Page 18.

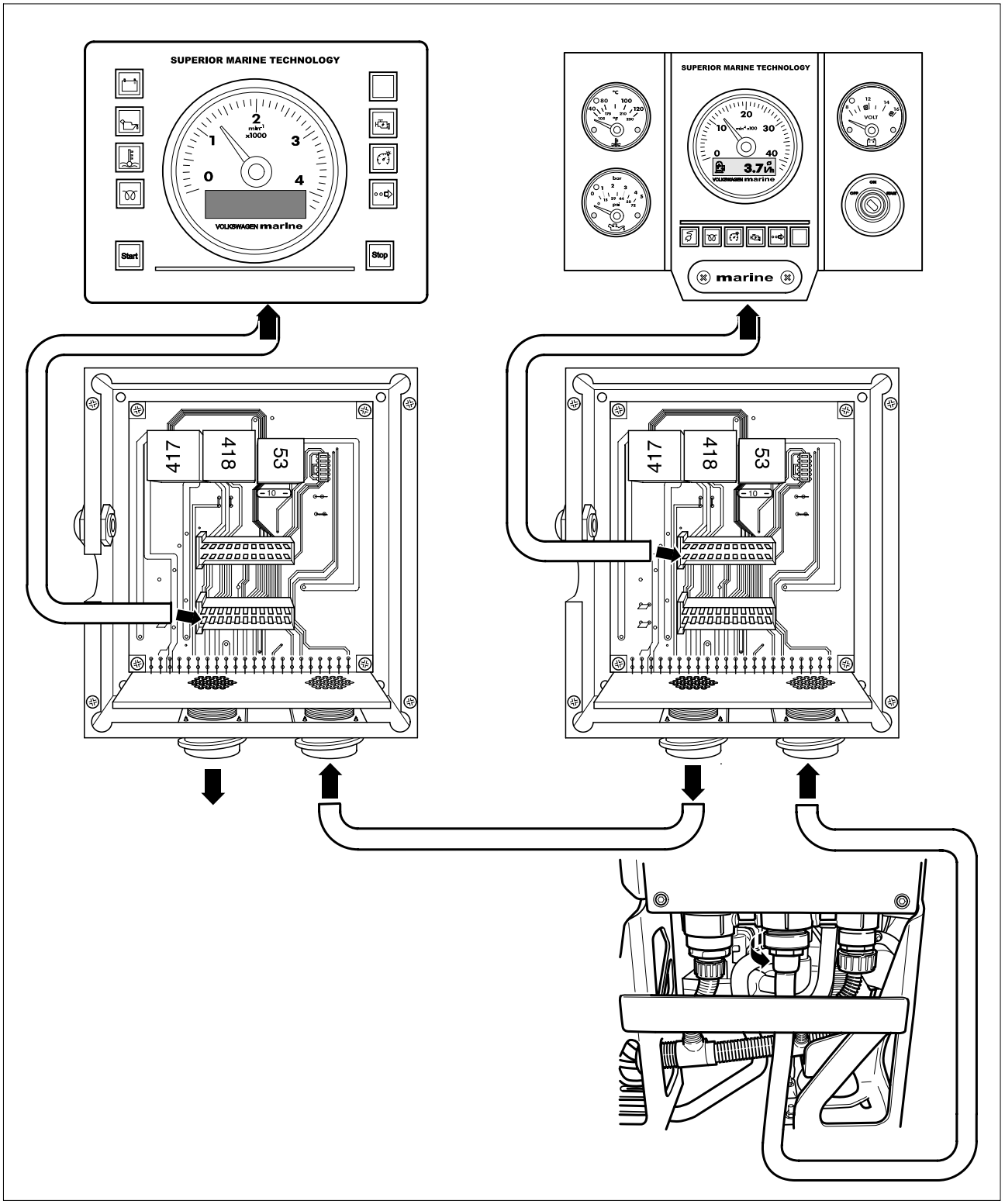
Note

To configure your multi-function display, please read the additional operating instructions for the multi-function display in your onboard wallet.

Electrical System

Installation overview of instrument panels with second control stand

The installation templates for cutting out the instrument panels is provided from Page 44.



EB4-0029

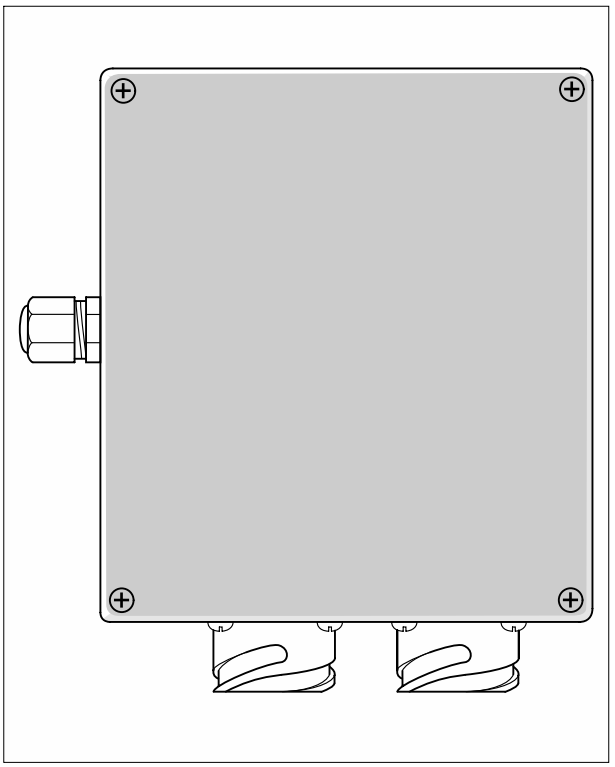
For the installation you require

1. One connection cable (connection from the fuse box/relay plate to the respective connection unit/relay box)
2. Two connection units/relay boxes
3. A connection cable with a length of 1 m
4. On main instrumentation
5. One flybridge instrumentation

Connecting the first control stand (main instrumentation)

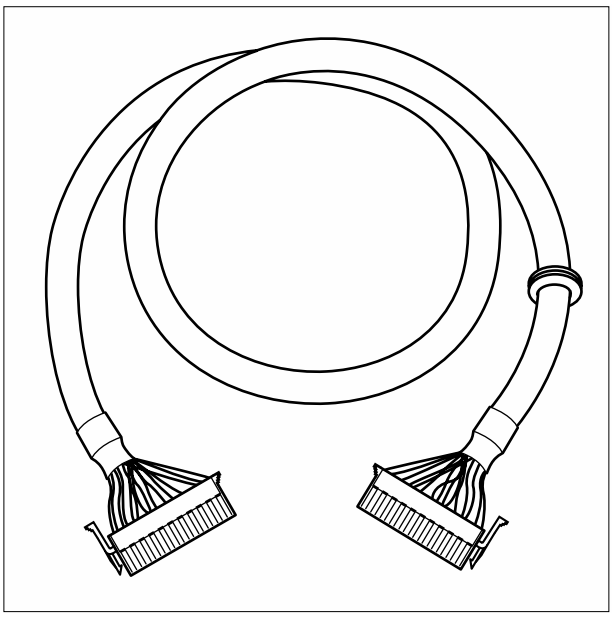
Installation of first connection unit/relay box for main instrumentation

Search for a suitable location below the instrument panel. The distance should not be greater than 1 m, as the connection cable is only supplied in a length of 1 m.



EB5-0040

Connection cable for connecting connection unit/relay box and instrument panel



EB5-0018

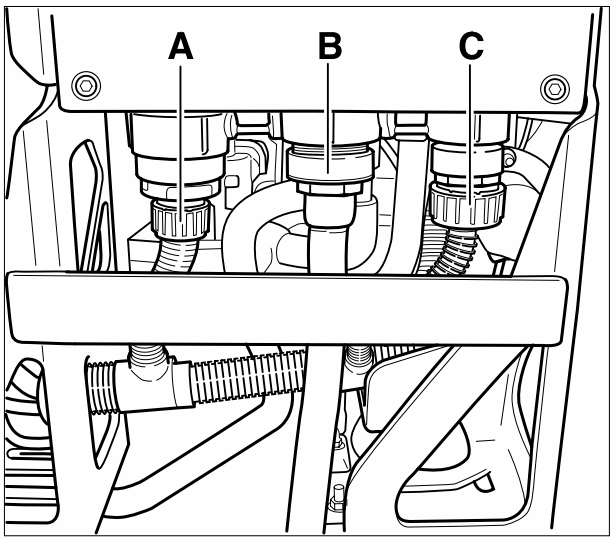
Electrical System

Connection to engine

Connect the multi-pin connection of the main wiring loom to the fuse box/relay plate (see illustration of connection -**B**-).

Note

The wiring loom spanners T 01905 and T 01906 must be used to remove and fit the multi-pin connectors.



EB4-0024

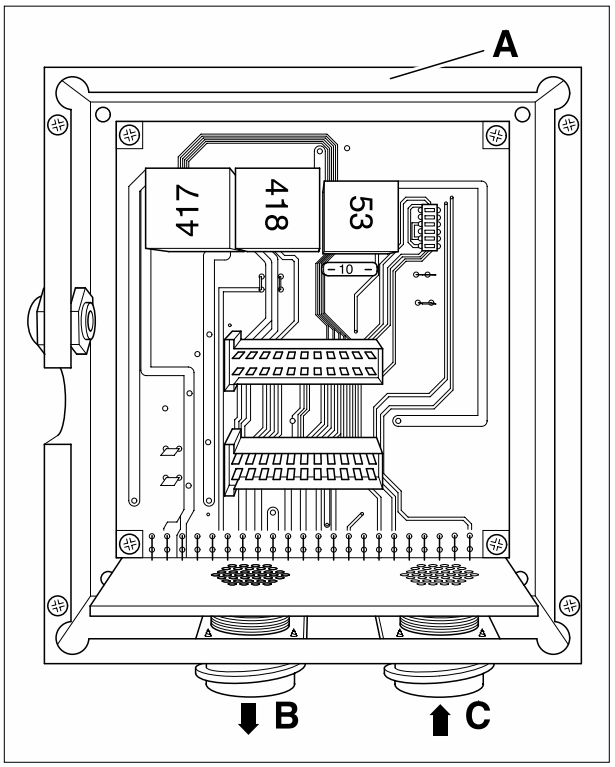
Connection to connection unit/relay box

Connect the other end of the main wiring loom with the multi-pin connection on the connection unit/relay box -**A**- (see illustration on connection -**C**-).

Note

If the main wiring loom is longer than 10 m, an additional power supply is required.

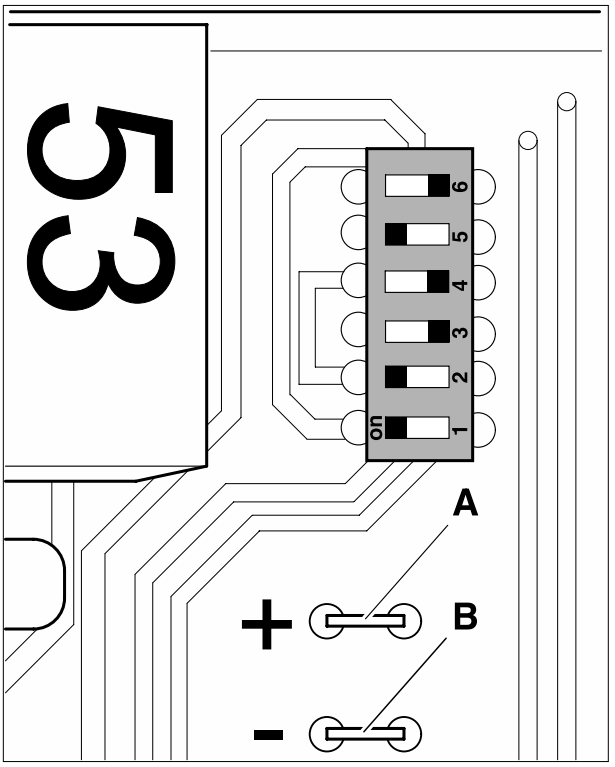
The connection of the additional power supply is described on Page 25.



EB5-0019

Connecting additional power supply

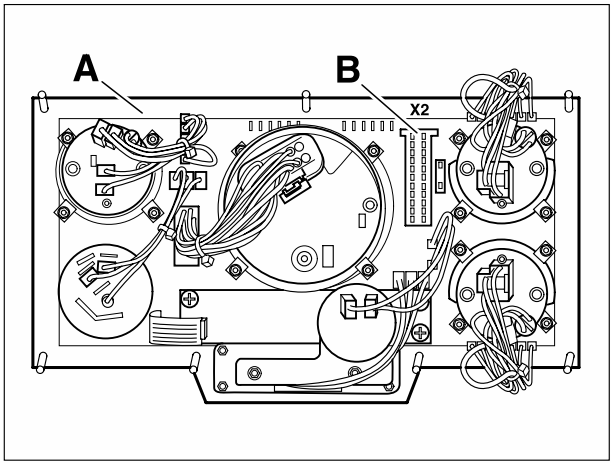
- Connect the tab contact -**A**- in the connection unit/relay box marked with "**+**" to the positive terminal of the starter battery via the battery main switch.
- Connect the tab contact -**B**- marked with "**-**" to the negative terminal of the starter battery.



EB5-0056

Connection to main instrumentation

Connect the tab receptacle marked with "Main Panel" in the connection unit/relay box using the connection cable for the main instrument panel. The plug on the back of the instrument panel -**A**- must be connected to the tab receptable -**B**- (see illustration).

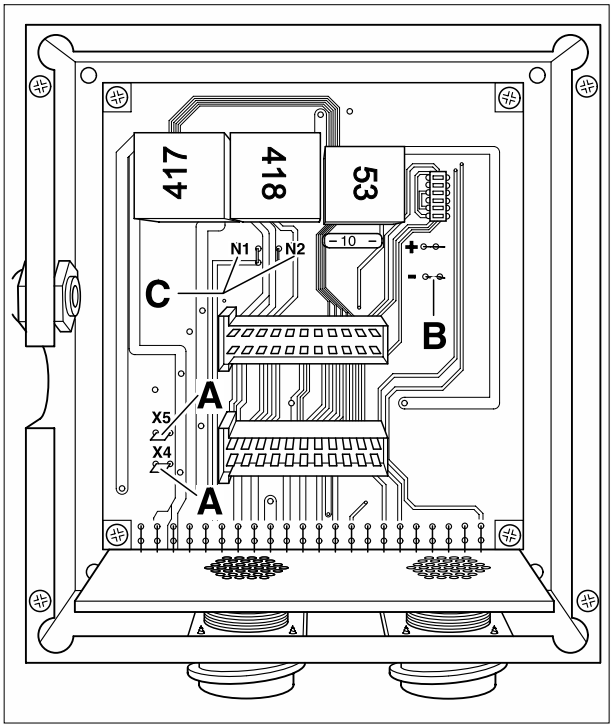


EB5-0039

Electrical System

Connecting throttle-lever neutral position switch

The two connection contacts -**C**- "N1 + N2" in the connection unit/relay box must be connected to the neutral position switch located in the throttle lever.



EB5-0016

If your throttle lever is not equipped with a neutral position switch, then the two contacts -C- "N1 + N2" must be bridged. In this case the neutral position switch on the reversing gear must be connected, see Page 14, Connecting gearbox neutral switch (engines for reversing gear), as otherwise the safety function "Blocking starting with gear engaged" is inoperative.

Should you connect neither a neutral position switch on the gearbox nor a neutral position switch on the throttle lever, then the safety function "Block starting with gear engaged" is inoperative.

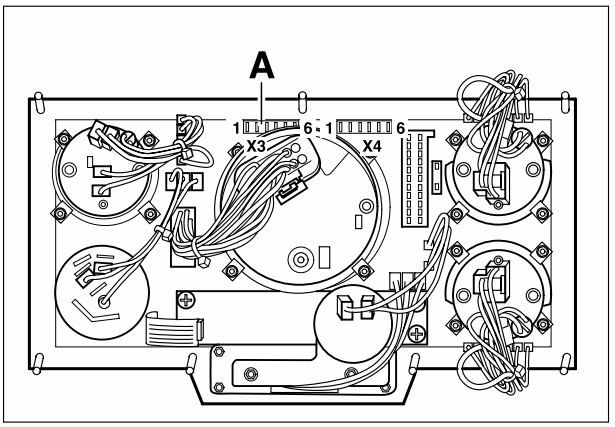
Operation under this condition is prohibited!

Connecting navigation instruments

In order to fully utilise the extensive functions of the multi-function display you must connect the main or flybridge instrument panel to a navigation instrument with an NMEA interface (e.g. GPS receiver, LOG etc.).

For this purpose, connect the connection terminal -**A**- marked with "X3" to the NMEA interface of your navigation instrument:

- Plug connector "X3" Terminal "1" for connection NMEA-B
- Plug connector "X3" Terminal "2" for connection NMEA-A



EB5-0062

Note

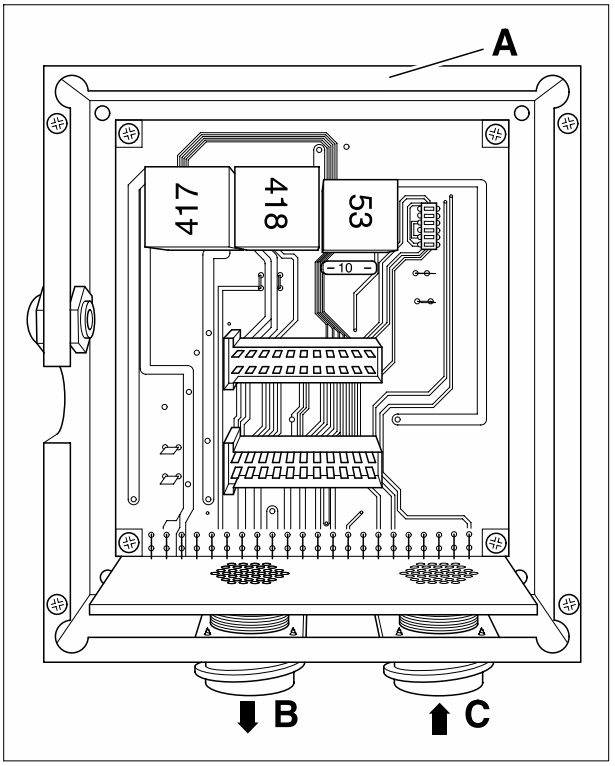
To configure your multi-function display, please read the additional operating instructions for the multi-function display in your operating instructions.

Connecting second control stand (flybridge instrumentation)

Installing second connection unit/relay box

Search for a suitable location below the flybridge instrument panel. The distance should not be greater than 1 m (the connection cable is only 1 m long).

To interconnect the connection units/relay boxes, the connection cable with the multi-pin connector on the first connection unit/relay box must be connected to the connection -**B**- and on the second connection unit/relay box to the connection -**C**-.



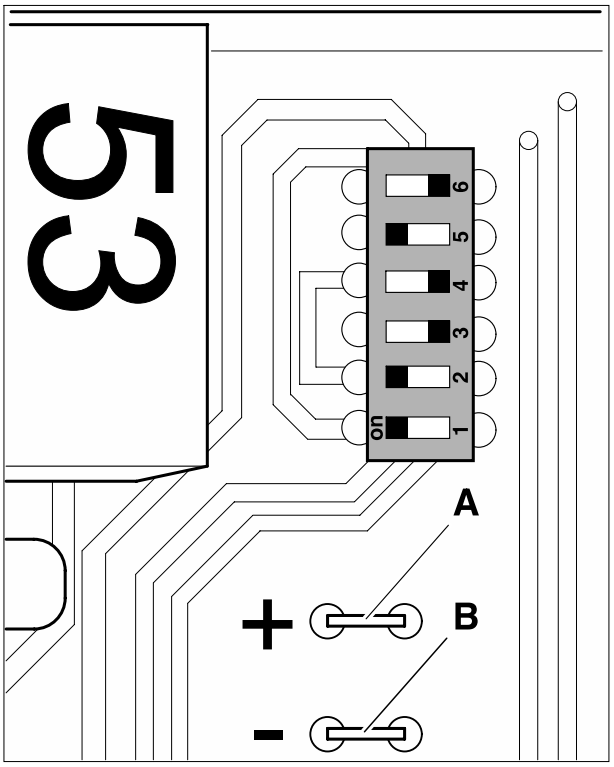
EB5-0019

Electrical System

Connecting additional power supply for second connection unit/relay box

Connect the tab contact marked with "**+**" -**A**- in the connection unit/relay box to the positive terminal of the starter battery via the battery main switch.

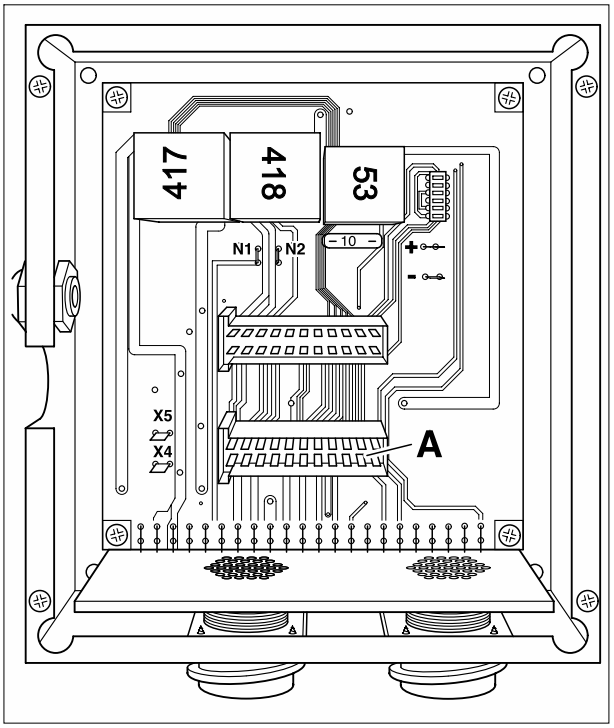
Connect the tab contact marked with "**-**" -**B**- to the negative terminal of the starter battery.



EB5-0056

Connection to flybridge instrument panel

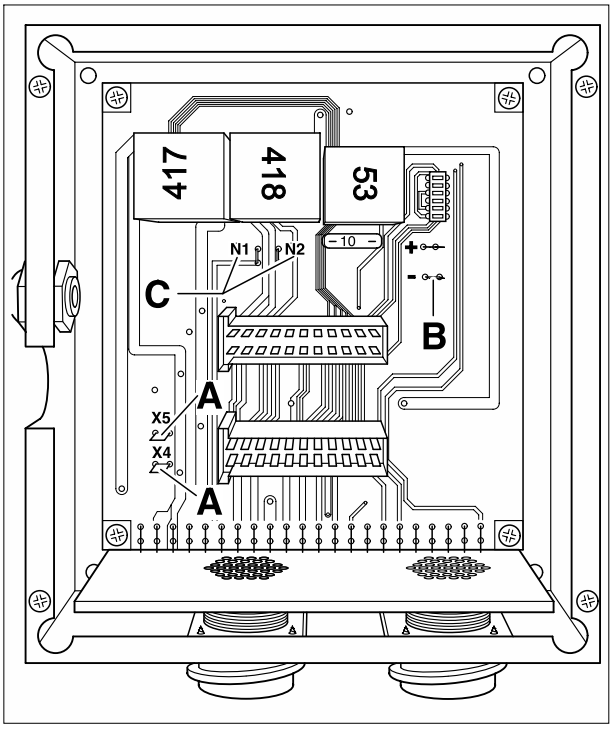
Connect the tab receptacle -**A**- marked with "Flybridge" in the second connection unit/relay box to the corresponding connector on the rear of the flybridge instrument panel with the connection cable.



EB5-0020

Connecting throttle-lever neutral position switch

The two connection contacts -**C**- "N1 + N2" in the connection unit/relay box must be connected to the neutral position switch located in the throttle lever.



EB5-0016

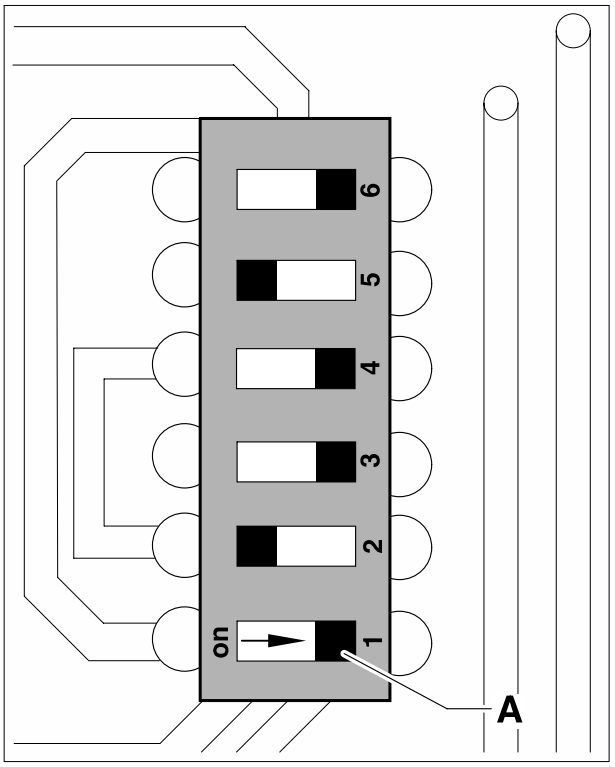
If your throttle lever is not equipped with a neutral position switch, then the two contacts -C- "N1 + N2" must be bridged. In this case the neutral position switch on the reversing gear must be connected, see Page 14, Connecting gearbox neutral switch (engines for reversing gear), as otherwise the safety function "Blocking starting with gear engaged" is inoperative.

Should you connect neither a neutral position switch on the gearbox nor a neutral position switch on the throttle lever, then the safety function "Block starting with gear engaged" is inoperative.

Operation under this condition is prohibited!

Electrical System

Please note that you must switch over the DIP switch in the connection unit/ relay box of the main instrumentation (first control stand) for the connection of the second control stand.



EB5-0050

Setting microswitch in connection unit/ relay box

Switch dip switch -**A**- (Neutral) over to "off" in -direction of arrow-.

The microswitches in the second connection unit/relay box remain unchanged.

Connecting navigation instruments

In order to fully utilise the extensive functions of the multi-function display you must connect the instrument panel to a navigation instrument with an NMEA interface (e.g. GPS receiver, LOG etc.).

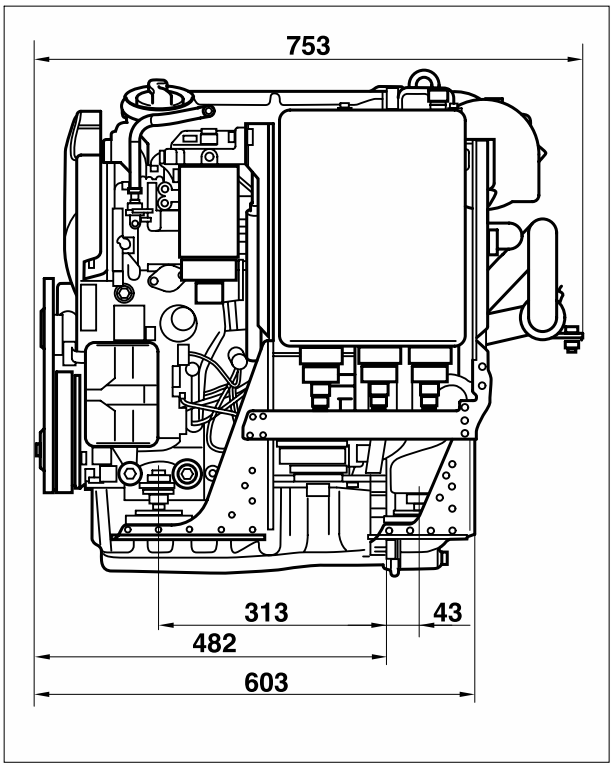
To connect the navigation instruments, see Page 18.

Note

To configure your multi-function display, please read the additional operating instructions for the multi-function display in your onboard wallet.

Installation dimensions for SDI Volkswagen Marine boat engine

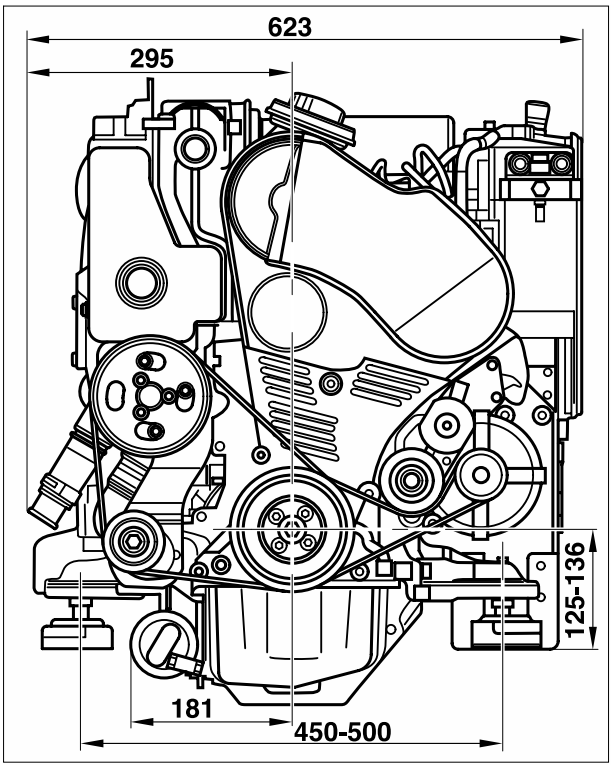
Side view



EB4-0020

SDI engine

Front view



EB4-0005

SDI engine

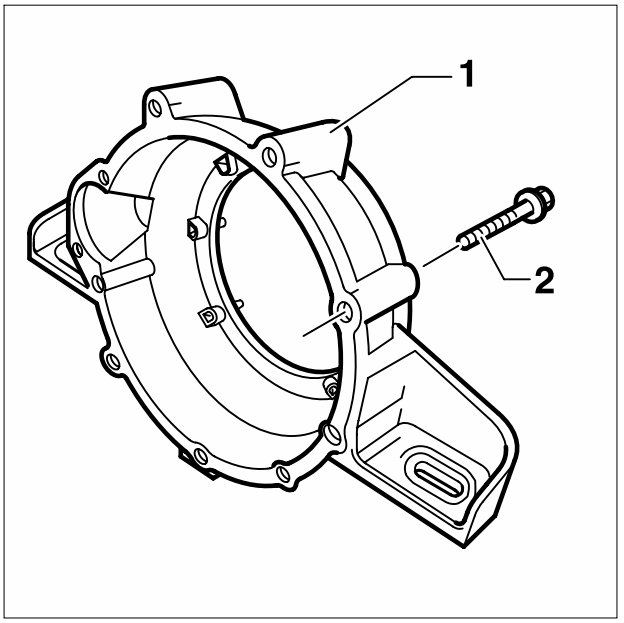
Installation Dimensions, Engine with Reversing Gear

For the Volkswagen Marine boat engines with a reversing gear the following gearbox bell is used:

Gearbox bell for SAE-7 reversing gear

1 - Mounting bolt 60 Nm

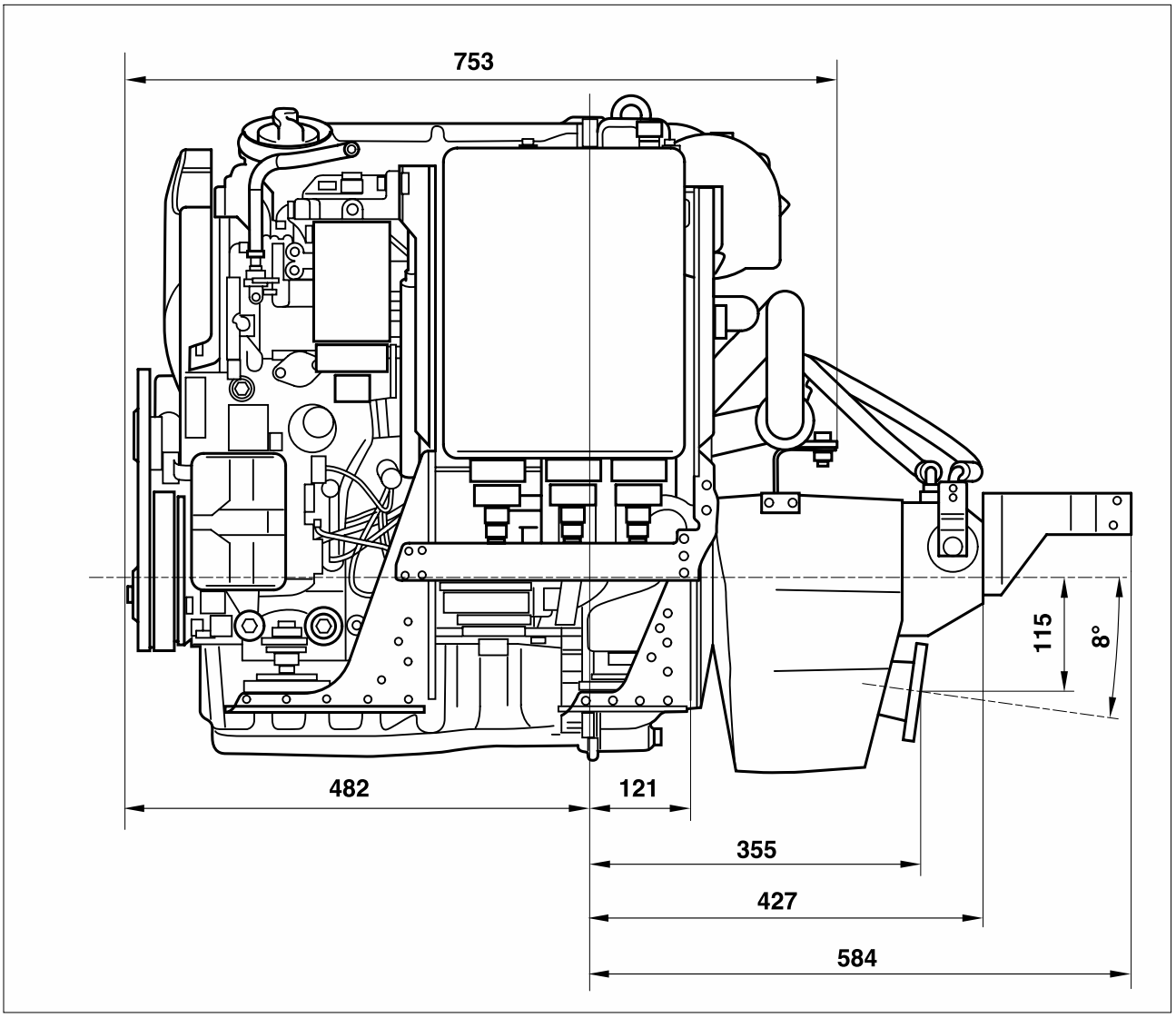
2 - Gearbox bell



EB4-0008

For the Volkswagen Marine boat engines the following reversing gear variants are used:

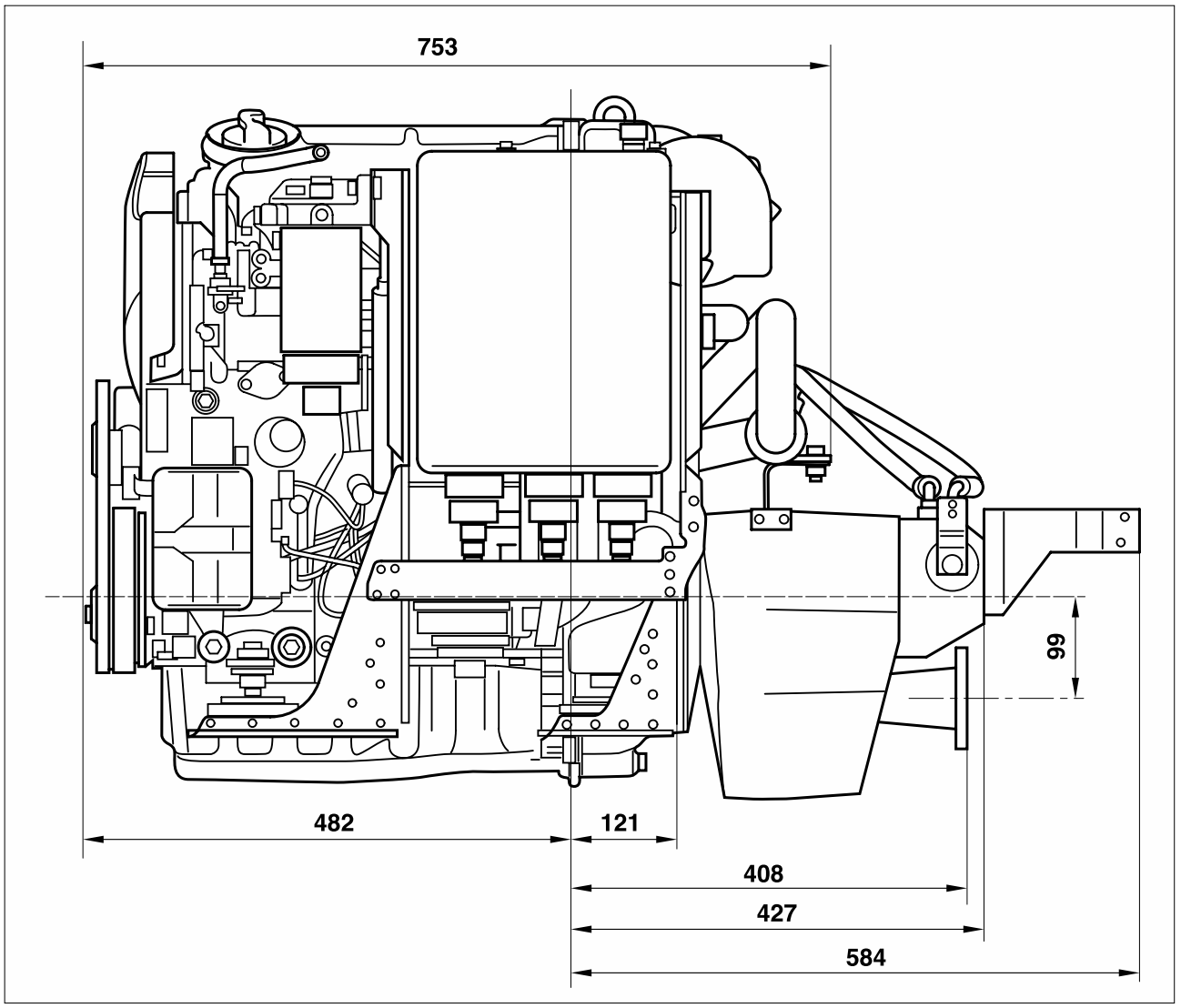
SDI 40-4/50-4/60-4: ZF 25A hydraulic 8°



EB4-0009

SDI 40-4/50-4/60-4

ZF 25 hydraulic inline



EB4-0010

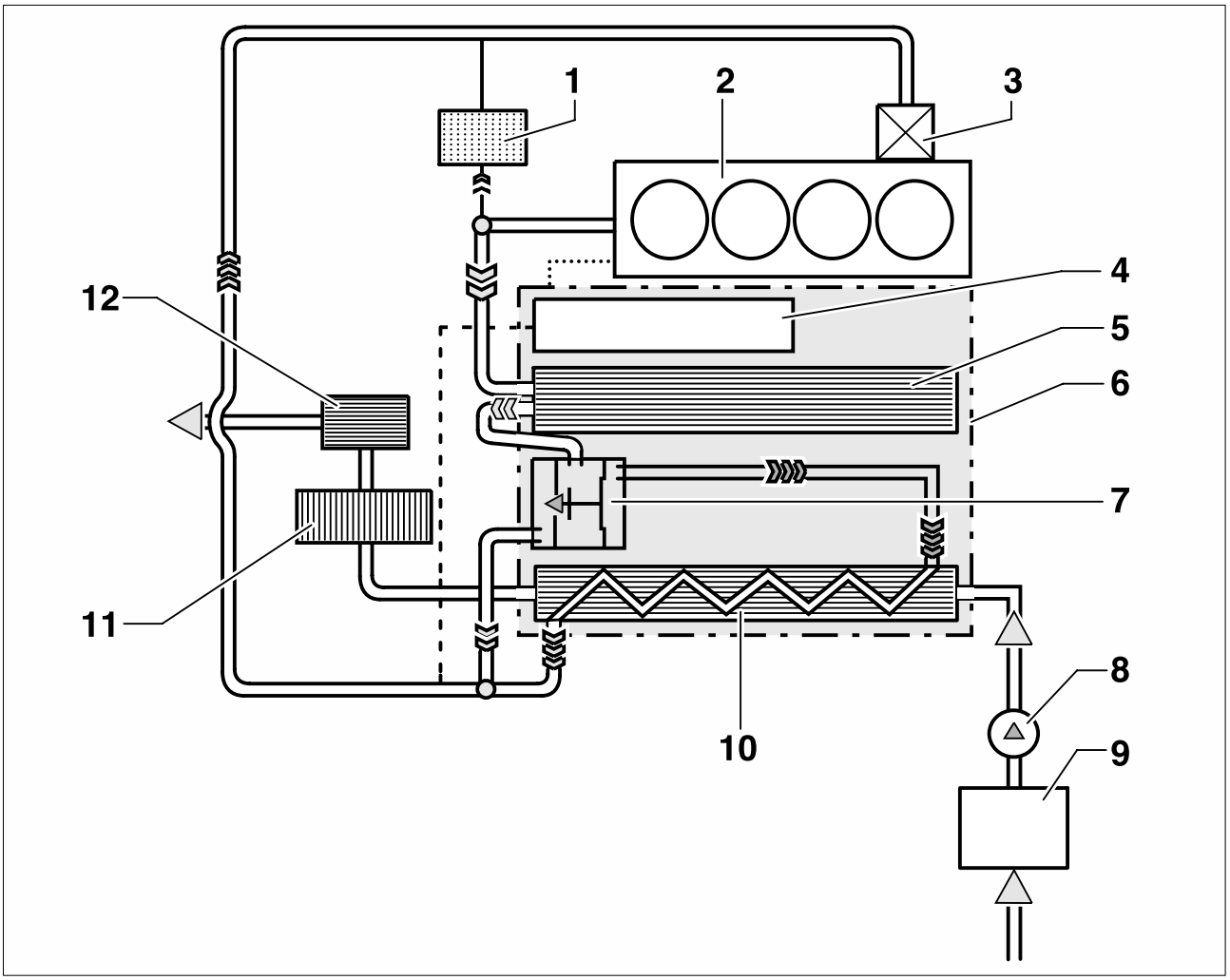
Cooling System

Introduction

To keep the engine free of aggressive media, such as saltwater, the Volkswagen Marine boat engines are equipped with a dual-circuit cooling system.

The seawater circuit (secondary circuit) is an open circuit in which the seawater is sucked in and is routed to the outside again via the exhaust system after it has flowed through the heat exchanger.

Cooling circuit



EB4-0006

Legend

1. Oil cooler
2. Engine
3. Coolant pump
4. Coolant expansion tank
5. Exhaust plenum chamber
6. Housing of radiator package
7. Thermostat
8. Seawater pump
9. Seawater filter
10. Main heat exchanger
11. Gear oil cooler (mounted on reversing gear)
12. Exhaust manifold

Seawater circuit

The seawater enters, sucked in by an intake fitting in the boat hull, with a seawater valve located downstream.
The seawater filter filters the impurities out of the entering seawater.

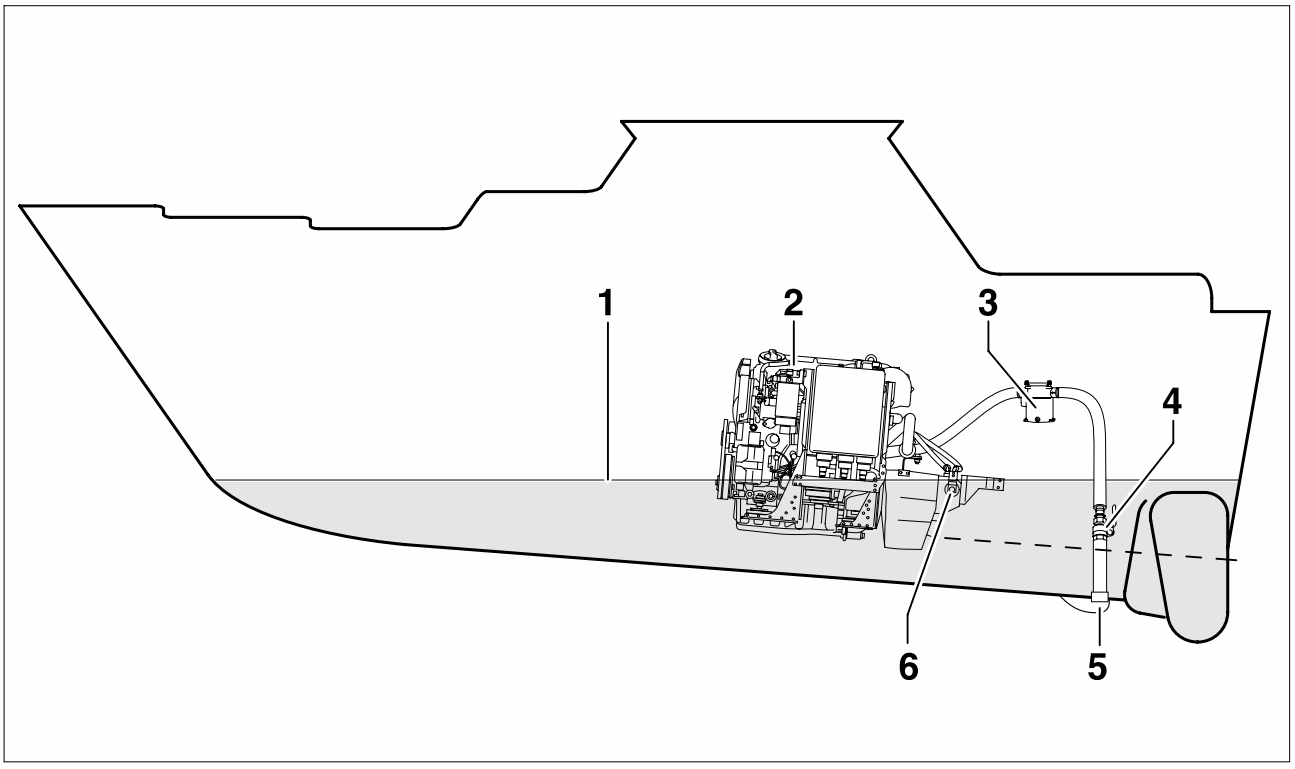
Bleeding seawater circuit using ventilation unit

To prevent seawater from entering the exhaust system via the intake side of the seawater circuit, the use of a ventilation unit is absolutely necessary (see illustration on Page 8; Installation overview of exhaust system).

Note

If the cooling system is below the waterline, then a suction effect that leads to the exhaust system filling with water results in the coolant circuit during longer boat standstills due to the fact that the seawater pump is not 100 % leak-tight and a resulting lifting effect. In this case, close the seawater valve.

Installation overview of seawater cooling



EB4-0007

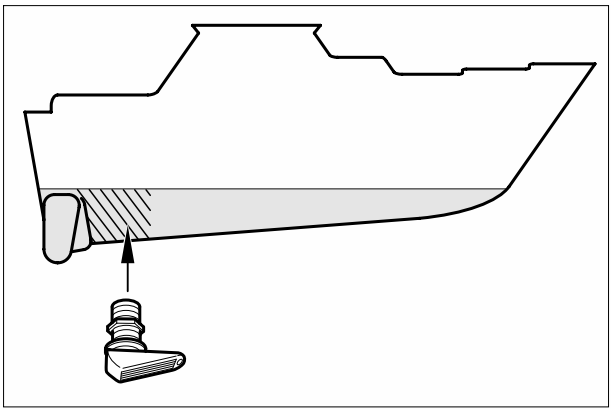
Legend

1. Waterline
2. Engine
3. Seawater filter
4. Seawater valve
5. Intake fitting
6. Gear oil cooler (mounted on reversing gear)

Cooling System

Notes on intake fitting

- The intake fitting is equipped with an intake screen so that coarse dirt cannot be sucked in and the intake line is not clogged.
- On motorboats the angled side of the intake screen must face the front. The installation location of the intake fitting should lie within the shaded area (see arrow in illustration) if possible.
  The speed backs up the water toward the inside in this case.
- The seawater flows through the gear oil cooler after the seawater filter. This is used to cool the gear oil for the reversing gear.
- The suction hose from the seawater filter to the combination radiator must have a diameter of at least 32 mm. The hose should be as short as possible. The use of two hose clips per connection is recommended.
- In the main heat exchanger the seawater absorbs the heat of the coolant circuit, cooling the engine.



EB5-0017

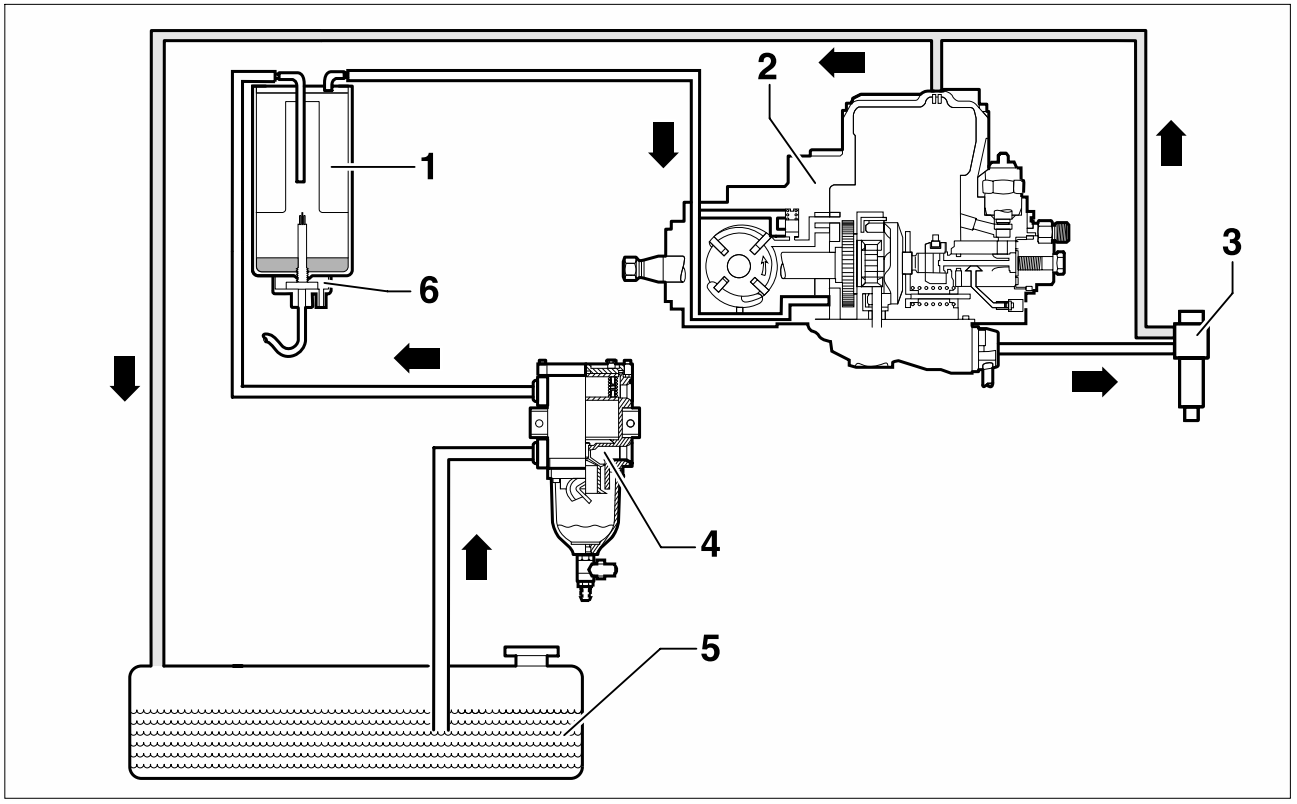
The measures required for storing the Volkswagen Marine boat engine for the winter are described in the operating instructions of the Volkswagen Marine boat engine.

Introduction

The fuel system consists of several components. These components (fuel tank, circulation and fuel inlet filter with water separator etc.) must be installed with extreme care and cleanliness.

Impurities can cause engine malfunctions. The fuel system must be checked for leaks following installation to achieve the greatest possible protection against fire.

Operating description of fuel system



EB4-0015

Legend

1. Fine fuel filter
2. Injection pump
3. Injector
4. Circulation pre-filter with water separator
5. Fuel tank
6. Water warning-device sender

Please refer to the additional information on the following page!

Fuel System

- The space for the fuel system must be sufficiently ventilated. The fuel tanks and the filler necks must be provided with an earth connection to the battery (on steel boats to the boat hull).
- When arranging the components, ensure sufficient space for required maintenance work (and any necessary repair work).
- The fuel supply line must be routed from the fuel tank to the electrical fuel pump via the circulation pre-filter with a water separator via the fine fuel filter. The line cross-section must be at least 8 mm.
- A fuel return line must be routed from the combination radiator to the fuel tank.
  The line cross-section must be at least 8 mm.
- The return line from the injection pump to the gearbox radiator is already mounted at the factory.
- Fuel lines, seals and their connections must be suitable for RME fuel (rape-oil fatty acid methyl ester/bio diesel) (see Technical data on Page 40).

Engine Compartment Ventilation

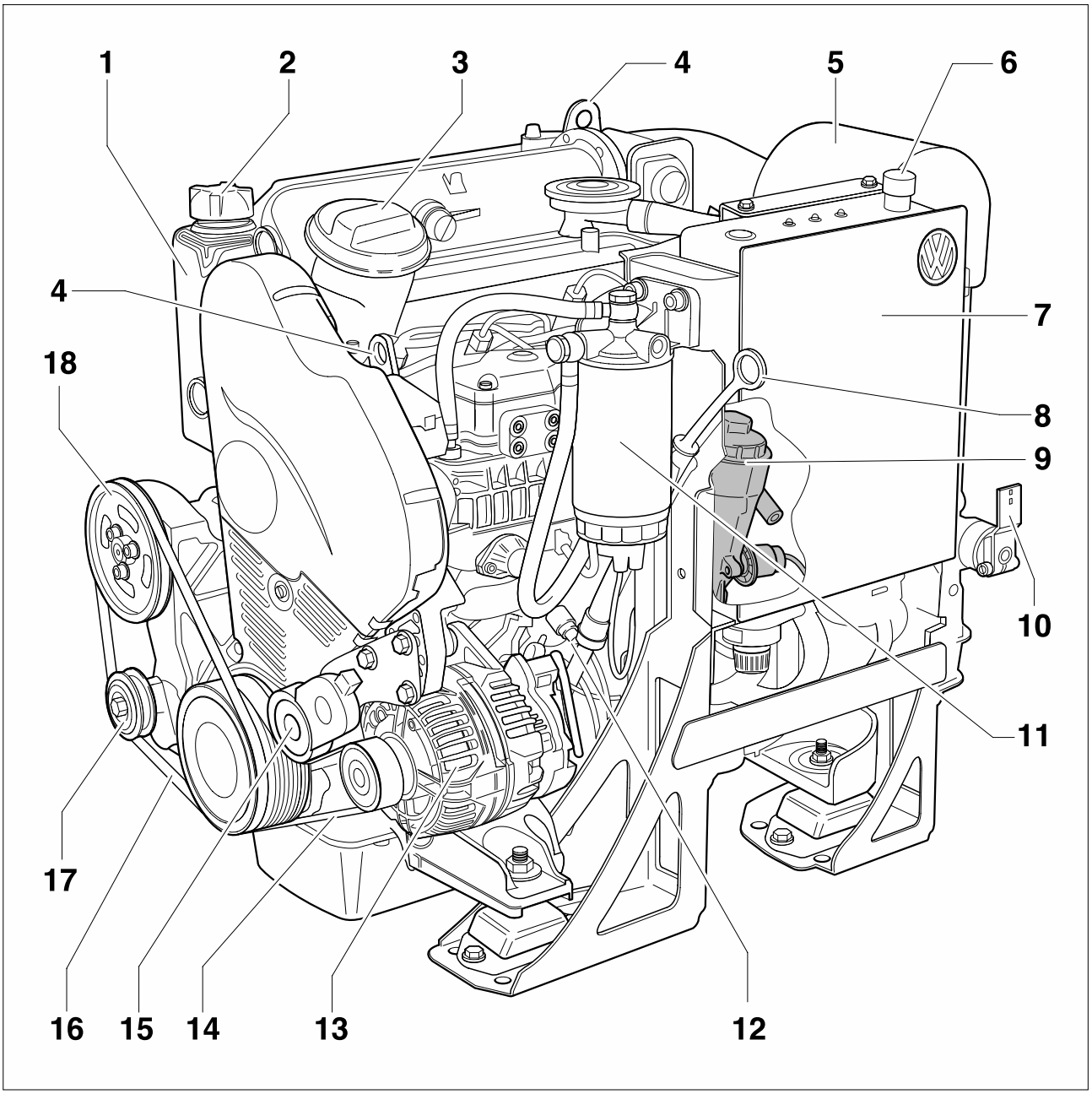
Introduction

Diesel engines require a great deal of air. In the case of an insufficient air intake, increased black smoke can be recognised and the engine output decreases considerably.

- The engine must be supplied with air (oxygen) to ensure optimum fuel combustion.
- The engine compartment must be ventilated so that the engine compartment temperature can be maintained at the lowest possible optimum value ($\Delta T_{max.}$ to outside temperature: 10 °C to 5 °C).

- The air inlet must be mounted where the air sucked in is as pure as possible and the engines own exhaust gases cannot be sucked in to produce optimum engine compartment ventilation.
- Water may not flow into the air inlet and outlet.
- The hydraulic cross-section of the air inlet is to be 80 cm^2.
- If other devices (e.g. an auxiliary heater) are located in the engine compartment which require oxygen for their operation, this must be taken into account during your planning of the air inlet.

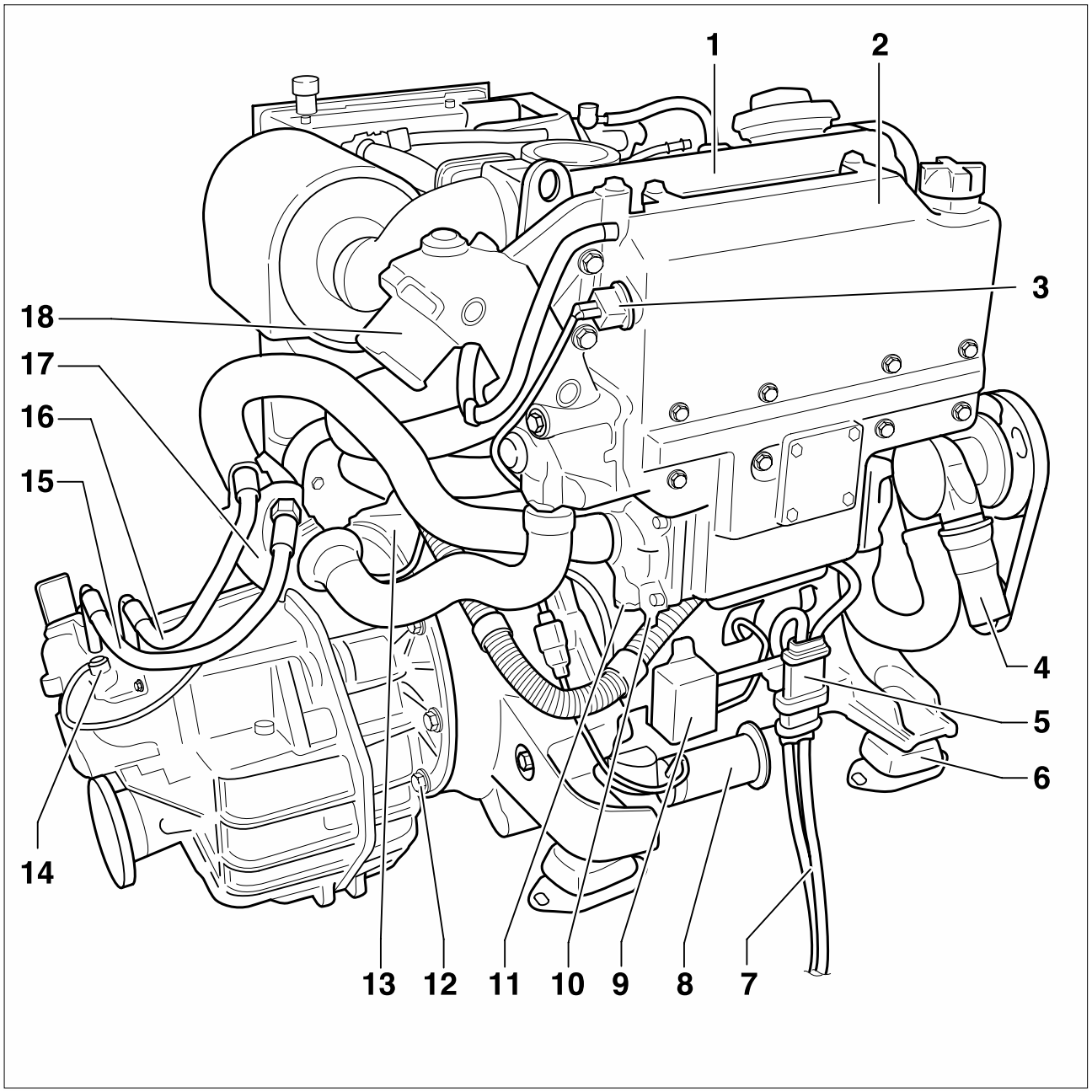
Component Overview



EB4-0019

Legend

1. Housing of radiator package
2. Coolant cap (use coolant G12, colour red)
3. Oil filler neck
4. Hanging eye
5. Air cleaner
6. Stop switch
7. Fuse box/relay plate
8. Oil dip stick
9. Oil filter
10. Gear lever (reversing gear)
11. Fine fuel filter
    (see operating instructions for change intervals)
12. Coolant drain plug
13. Alternator
14. Ribbed V-belt for alternator
15. Tensioner
16. Ribbed V-belt for seawater pump
17. Tensioner
18. Seawater pump



EB4-0027

Legend

1. Intake manifold
2. Housing of radiator package
3. Water level sender
4. Connection hose to seawater filter
5. Engine connection plug
6. Unit/engine mounting
7. Connection cable to high-voltage plug
8. Oil extraction pump
9. Earth cut-off relay
10. Coolant drain plug
11. Reactive anode
12. Mounting for reversing gear
13. Connection plug for gearbox neutral switch/ hot water boiler
14. Gearbox neutral switch
15. Oil return hose (Out)
16. Oil supply hose (In)
17. Gear oil cooler
18. Exhaust-pipe connection piece

Technical Data

Engine description

Displacement	cm^3	1,896
Stroke/Bore	mm	79.5/95.5
Compression ratio		19.5 : 1
Firing order		1-3-4-2

Output
(as per ISO 3046 with marine control unit)

SDI 40-4	at 2600 rpm	kW	29
SDI 50-4	at 3000 rpm	kW	37
SDI 60-4	at 3600 rpm	kW	44

Weight

SDI 40-4	kg	approx. 198
SDI 50-4	kg	approx. 198
SDI 60-4	kg	approx. 198

Maximum operating inclination

∢°	15°	in all directions
	30°	short-term

Permissible engine operating data

Permissible engine oil temperature

max. permissible temperature in oil sump	°C (°F) 130 (266)

Permissible coolant temperature

max. permissible temperature on engine outlet during continuous operation	°C (°F) 105 (221)

Electrical engine equipment

AC alternator, 12 V	A	90
Starter 12 V	kW	1.8
Battery 12 V	A (Ah)	380 (63) Minimum capacity
Sheathed-element glow plugs	V	12

Control unit

Manufacturer Bosch EDC 15 V +

Fault memory present:

Checking with fault reader V.A.G 1552/1551 or the vehicle diagnosis, measuring and information system VAS 5052/5051.

Cooling system

Dual-circuit cooling system (gauge pressure system with separate expansion tank and overpressure valve) and seawater circuit with impeller pump.

Pressure relief valve

Opens at	bar (gauge pressure)	1.3 - 1.5

Thermostat

Start of opening	°C (°F)	80 (189)

Coolant

As antifreeze and anticorrosion, use, 60 % water and 40 % coolant additive G12 in accordance with TL VW 774D.

Fuel

Fuel	**diesel**	**in accordance with DIN EN 590**
required minimum Cetane number		**CN > 49**
	Bio diesel	**as per EN 51 606**

Oil supply

Motor oil quality

Brand-name oils in accordance with oil specifications of operating instructions

Oil pressure

at 2,000 rpm and 80 °C (176 °F) motor oil temperature bar (gauge pressure) at least 2.0

Oil consumption

(max. permissible)	l/10 h	0.05-0.1

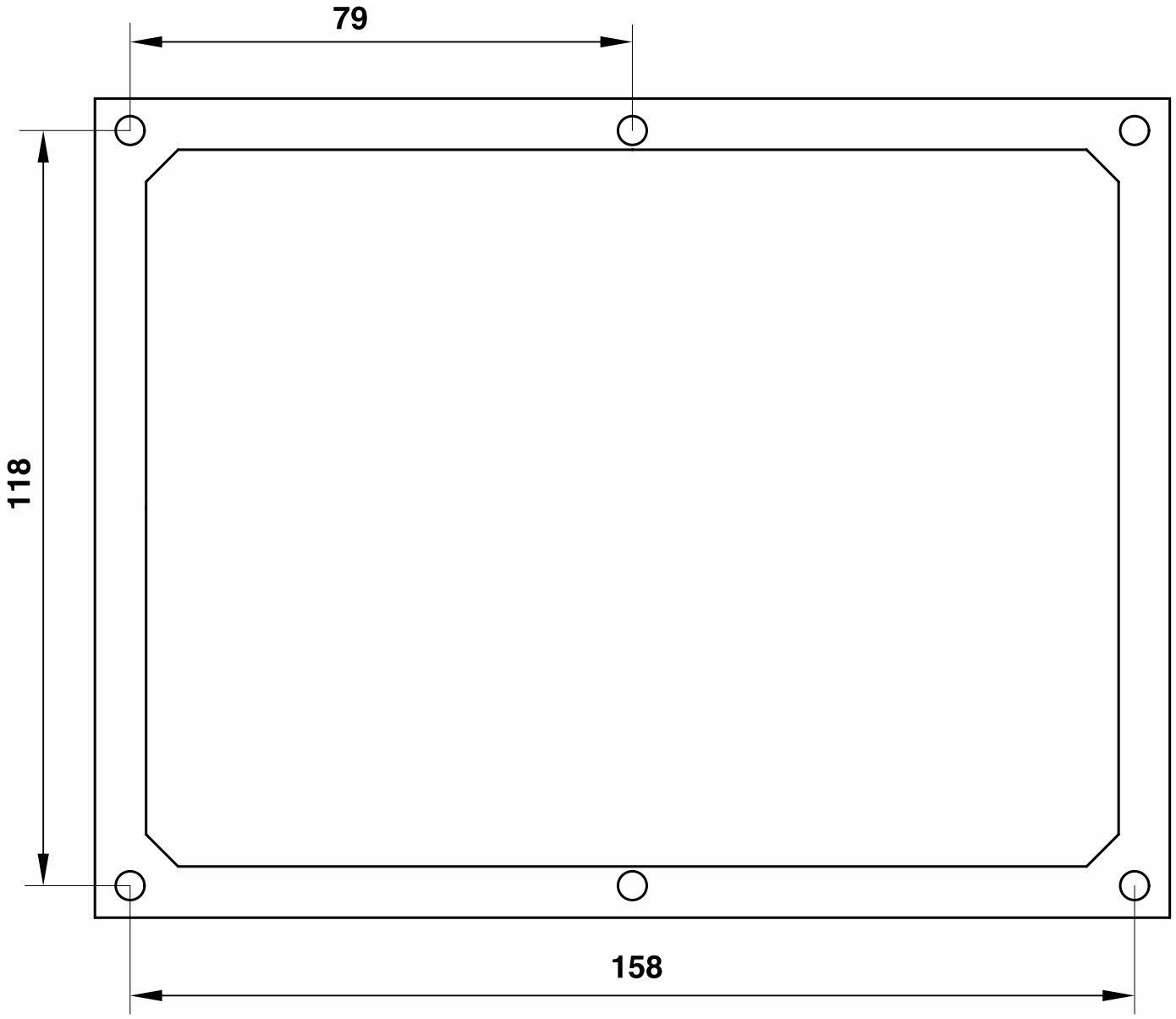
Capacities

Cooling circuit	ltr.	approx. 8

Oil circuit

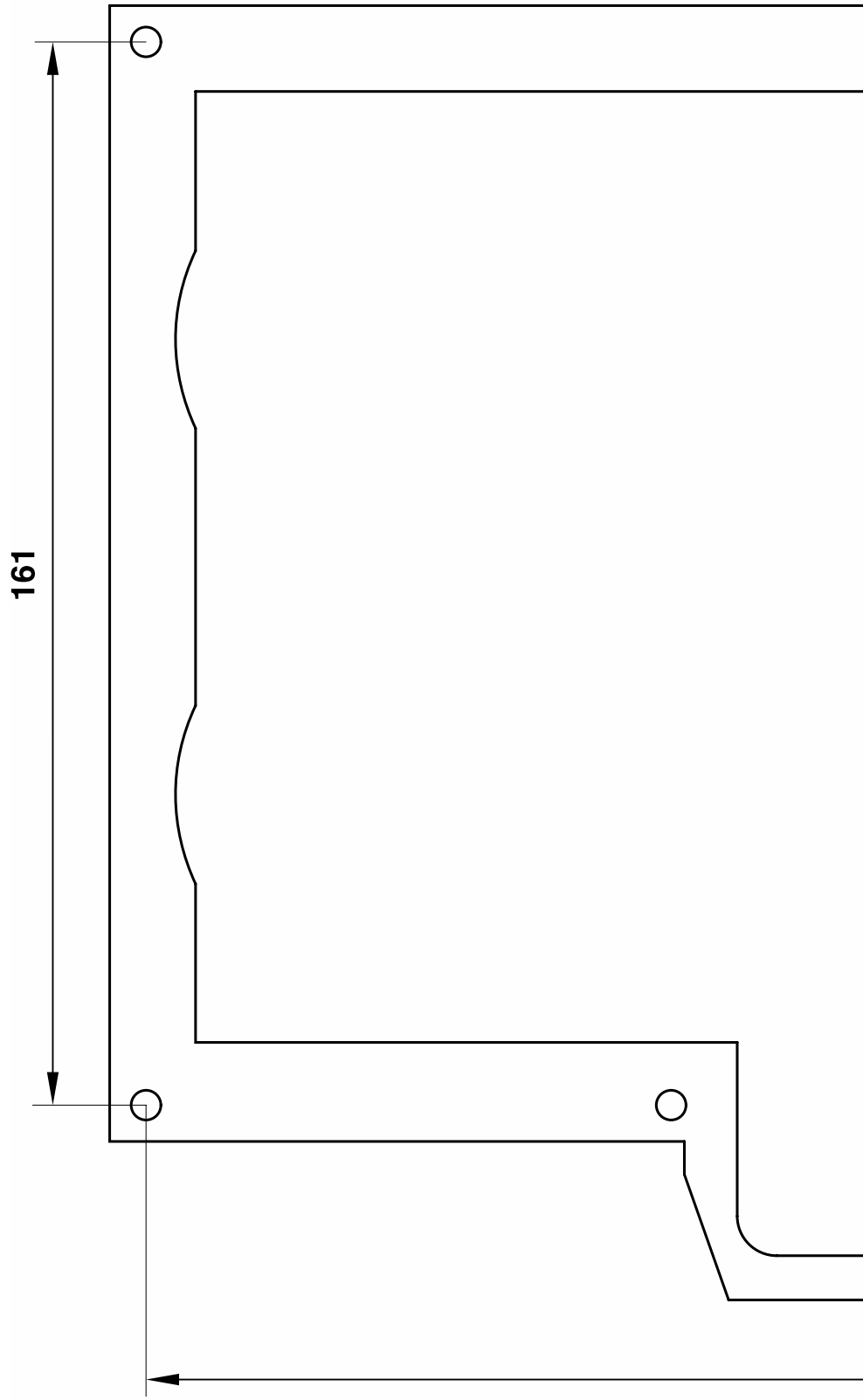
with filter change	ltr.	4.2 - 4-5
Quantity difference between Min. and Max. marking on oil dip stick	ltr.	approx. 1.0

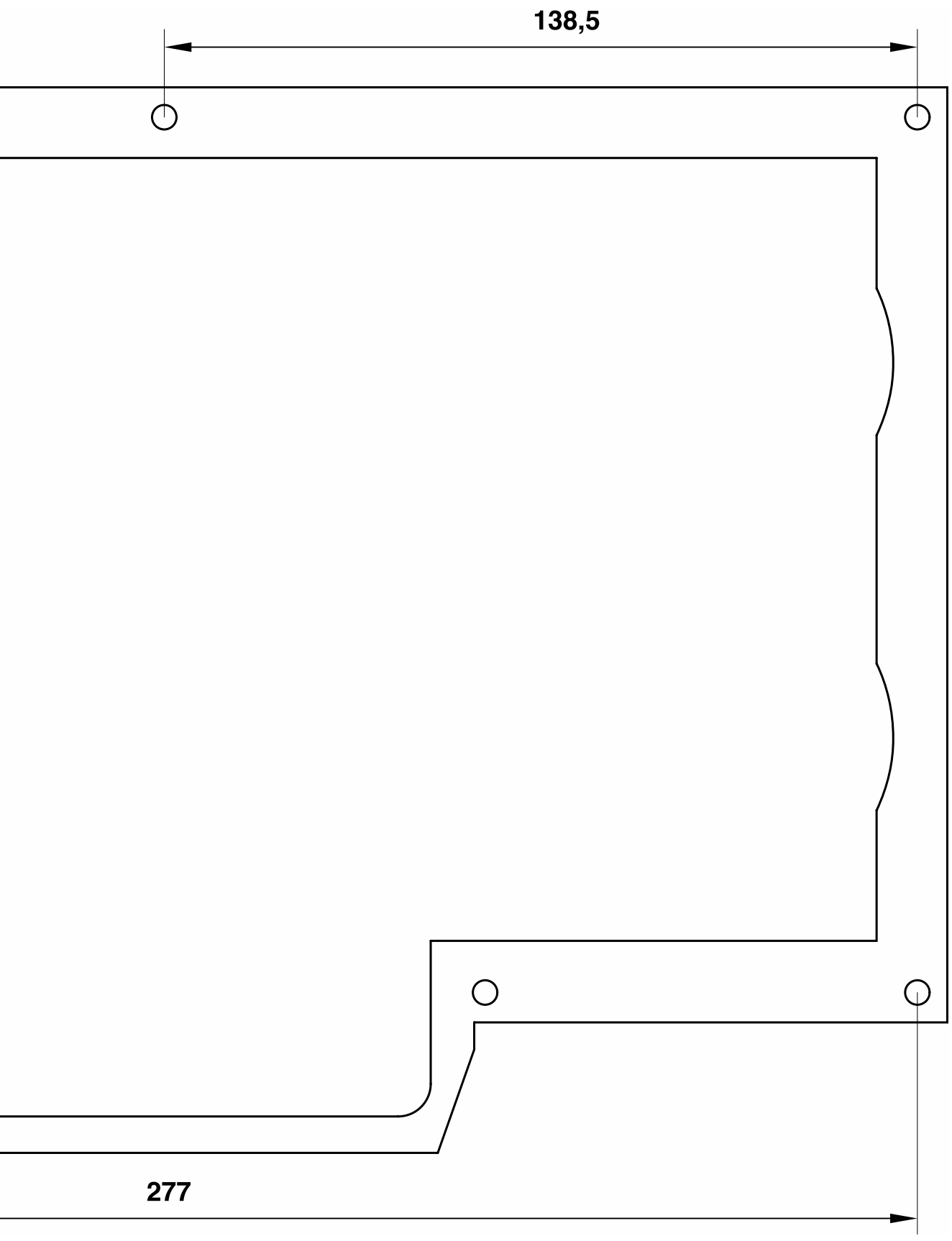
Installation Template for Flybridge Instrument Panel



EB5-0076

Installation Template for Main Instrument Panel





EB5-0075

Installation Template for Main Instrument Panel

- PLEASE FOLD OPEN HERE! -

Installation Description EB02

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