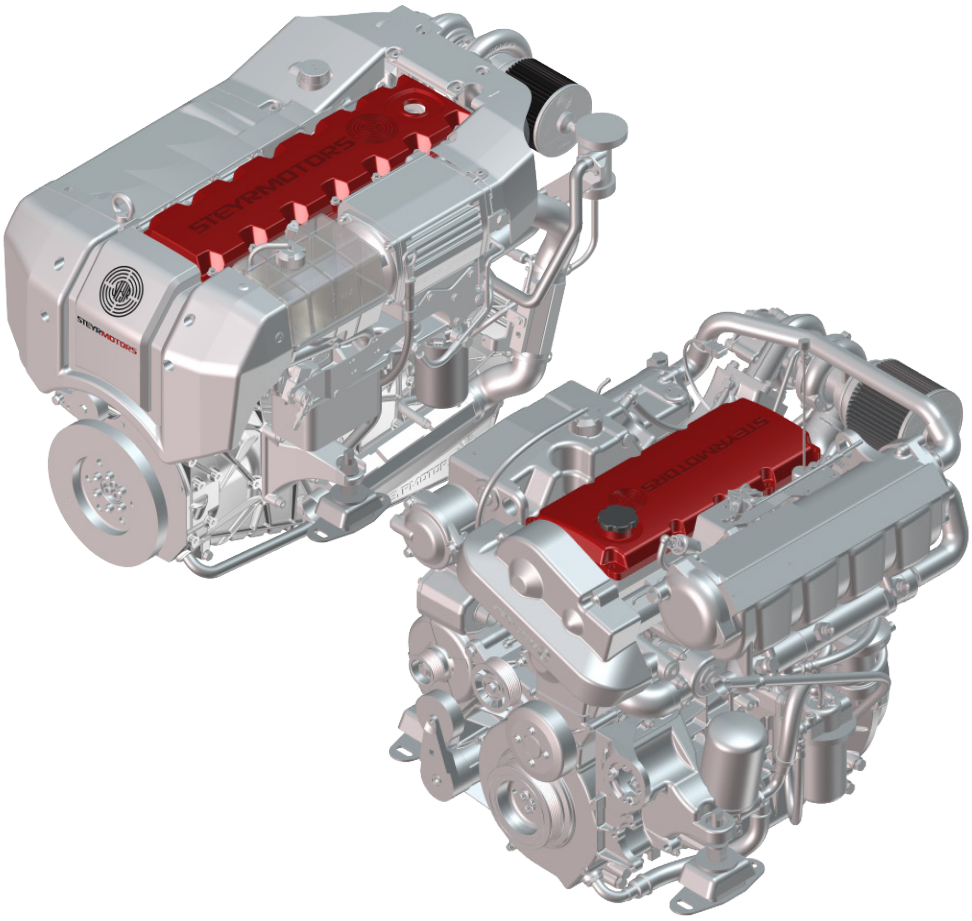
Quick installation guide

SE/MO Marine - Engines



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1. General

1.1 Limited Application (US Only)

Ship-owners or boat builders intending to purchase and install a Steyr Motors marine engine in a vessel which will be used in ECA (Emission Control Areas) and which are not excluded from IMO Tier III in accordance with Annex VI regulation 13.1.2, must contact the EPA and the US Coast Guard to request an exception from IMO Tier III in accordance with Annex VI Regulation 13.5.2.2 using engines with an EPA Tier 3 / IMO MARPOL 73/78 Tier II approval.

1.2 Commissioning

To receive the full benefit of Steyr Motors Warranty, a Commissioning inspection must be performed by a trained Steyr-Motors Agent and reported back to commissioning@steyr-motors.com within 60 days of handover to “End User” and before 30 operating hours have elapsed.

The Commissioning Report is permanently available on the homepage of Steyr Motors http://www.steyr-motors.com/.

1.3 Warranty

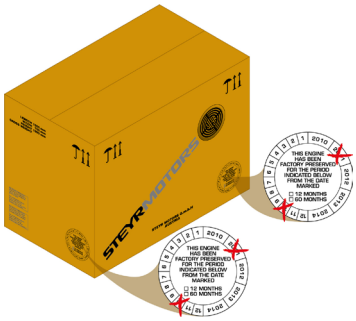
All warrantable failures must be reported to warranty@steyr-motors.com within 30 days of failure to be considered under warranty.

1.4 Storage

All engines are conditioned for a storage period of one year from date of dispatch.

See also the label on the motor box as shown in the figure below.

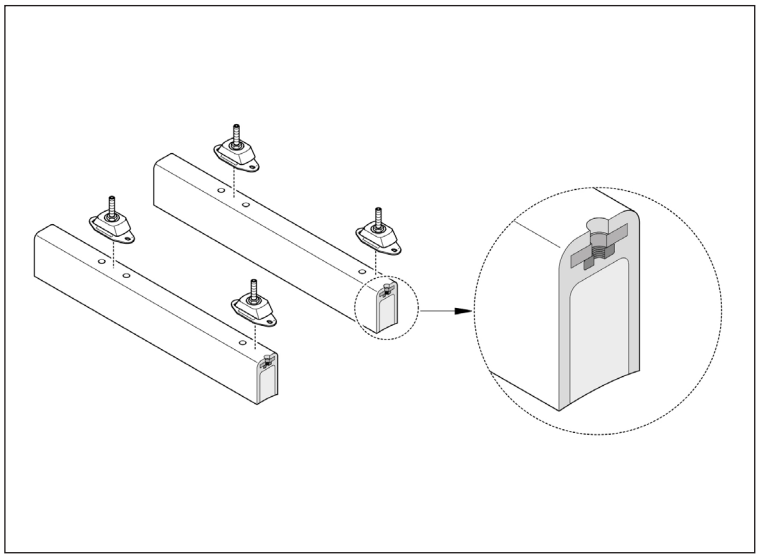
If an engine is to be stored beyond this date a “Preservation “ must be performed as per Service Manual and reported back to: commissioning@steyr-motors.com



1.5 Preservation

A “preservation” extends storage time for one year from date of preservation. Preservation can be done a total of 2 times giving a maximum storage time (before commissioning) of 3 years from date of dispatch from factory. Details on Preservation procedure can be found in Service Manual.

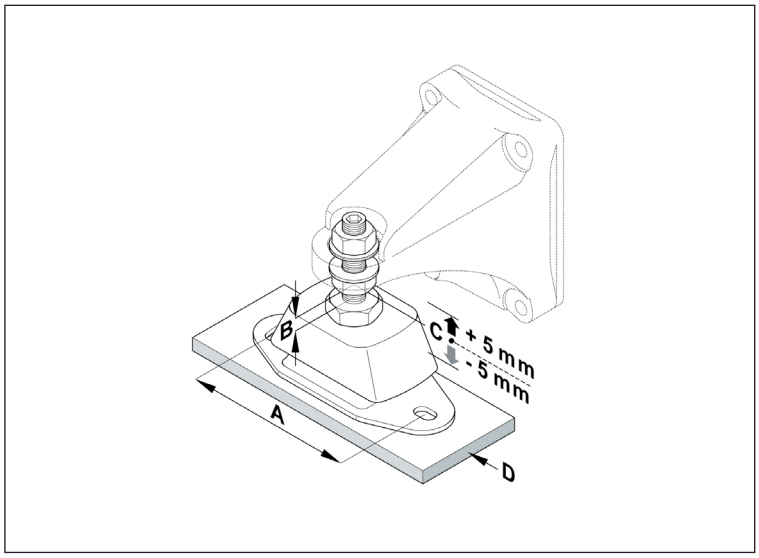
2. Engine Base



Distribute the engine weight, mounting points must be straight and level.

Refer to the installation drawings for mounting distances.

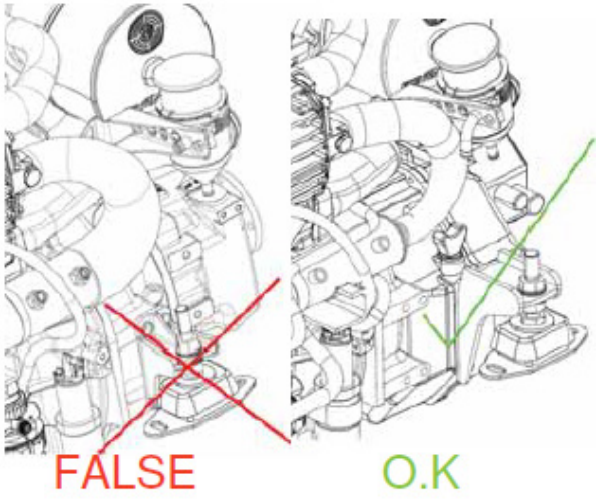
3. Engine Mounts



Let engine sit for 48 hours then check alignment, tighten center nut to 120 Nm.

Item	Designation
A	Bore dim. bearing flange 137.5 mm
B	Position of adjustment nut ~ 5 mm
C	Adjustment space ± 5 mm
D	Spacer plate (if required)

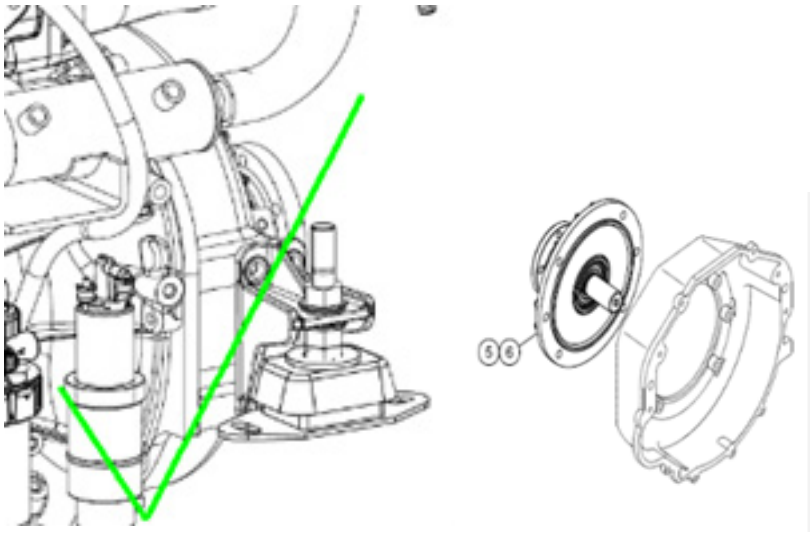
4. Engine Mount Position



If a gearbox in use: Ensure rear engine mounts always mounted on gearbox!

For ZF Gearbox models: ZF25,ZF45-C,ZF63-C,engine mounts can be fitted directly to the flywheel housing if following points are clarified:

- Mass of gearbox and all addional parts to flywheel housing: less than 30 kg
- Drive shaft balancing must fullfill gear box supplier requirement (typical <300 gmm)



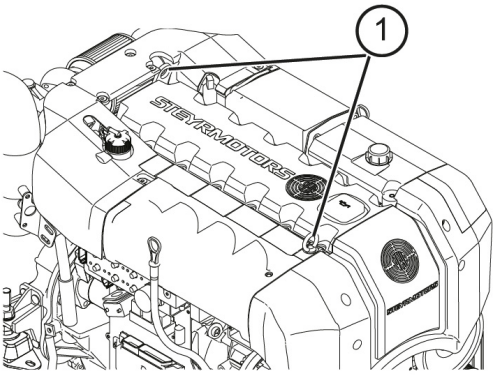
For MO Engines with a 6 hole (Z002098-0) or 8 hole (Z002099-0) Shaft Adapter rear engine mounts should be fitted to the flywheel housing as shown above.

5. Lifting Points

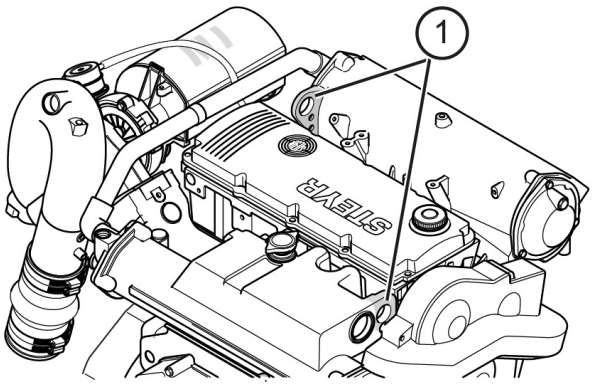
Note:

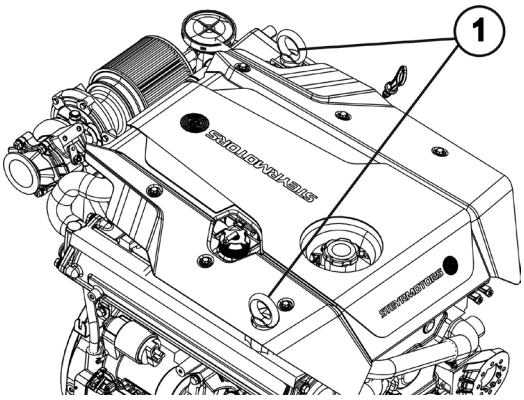
Never put the engine directly on the floor, this will damage the oil sump!

6 Cylinder Engines

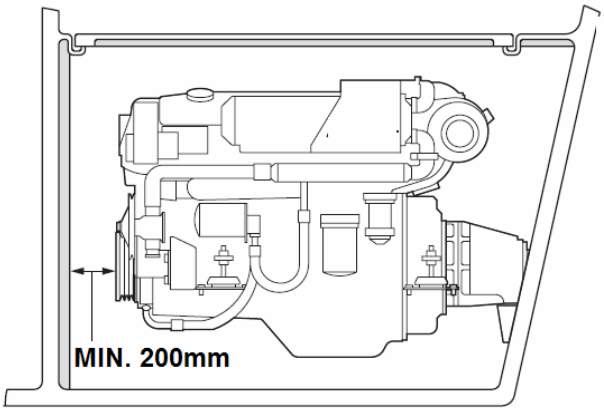


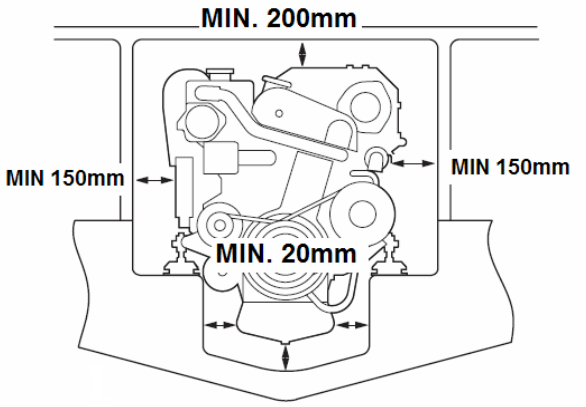
4 Cylinder Engines

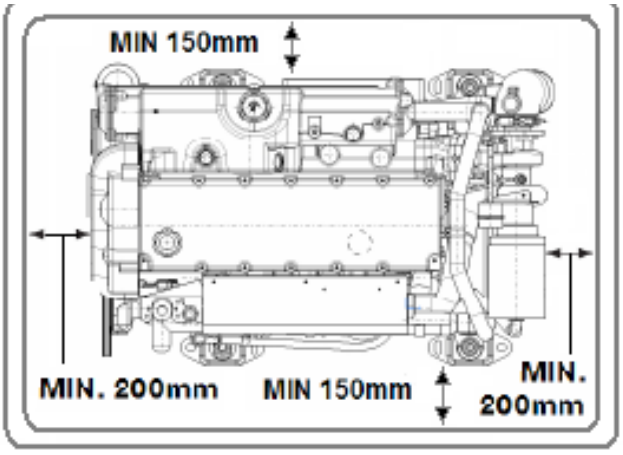




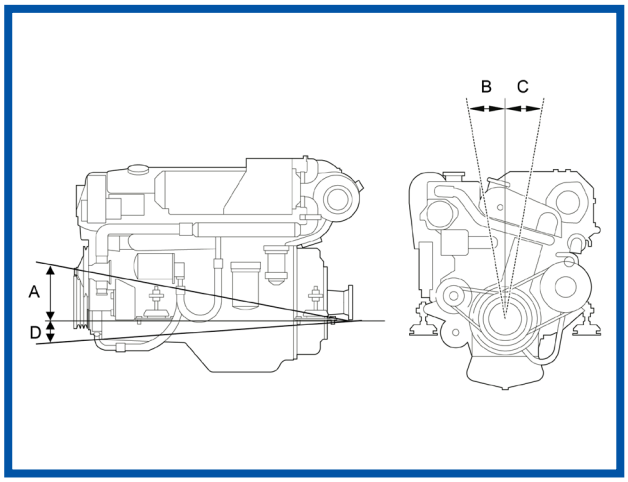
6. Space for Maintenance







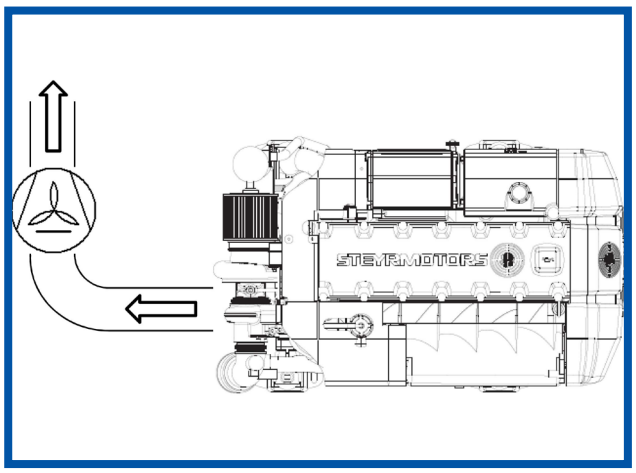
7. Engine Angles

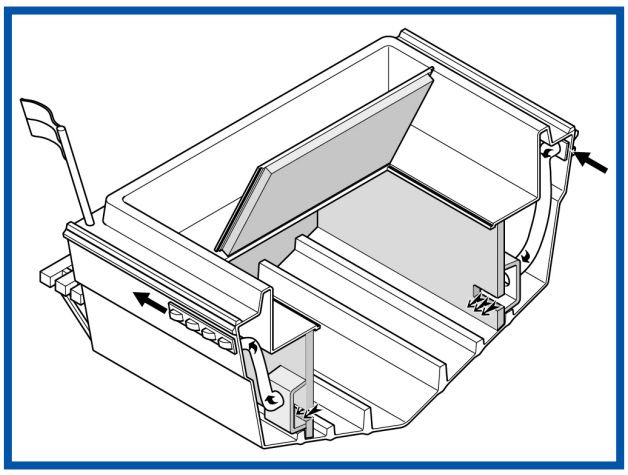


	Max. installation angle	
	SE	MO
A	10°	10°
B	5°	10°
C	5°	10°
D	5°	5°

	Max. tilt angle (in operation)
left	25°
right	25°
front	25°
rear	20°

8. Air





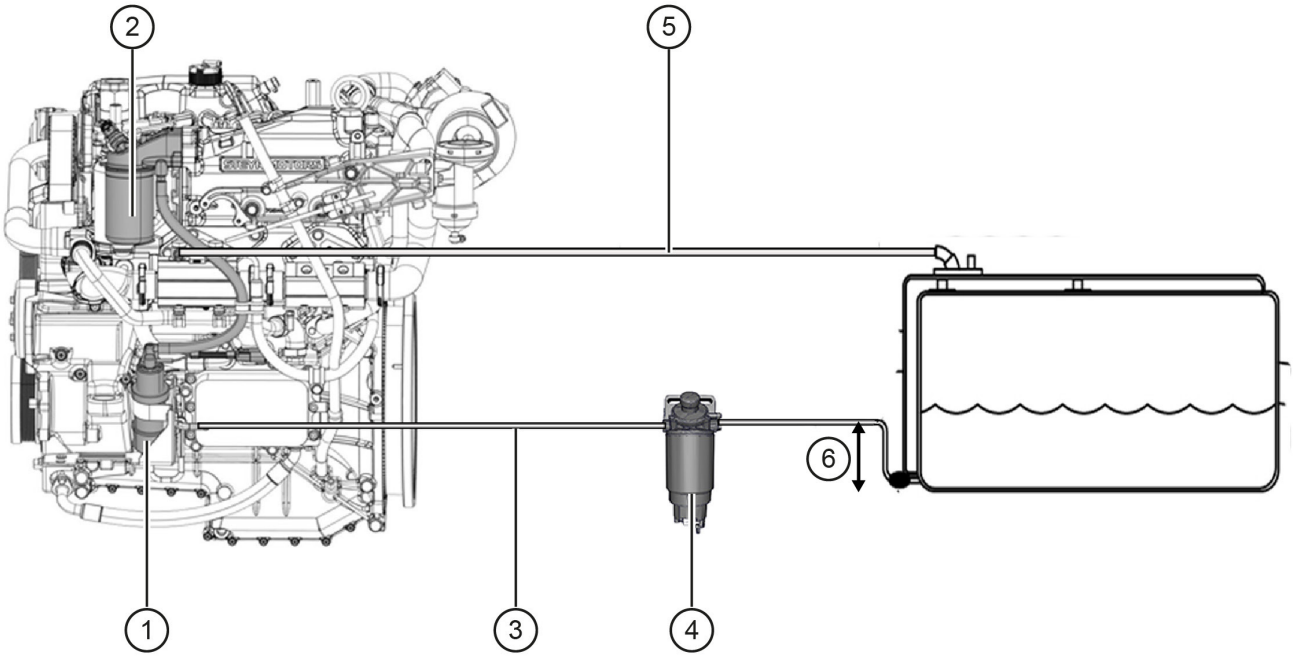
- The engine room must have enough ventilation with inlet and outlet vents. Ventilation capacity = 1.65 x engine power in kW

Example
SE266E40 = 190kW x 1.65 = 313cm^2 or 20 cm diameter

- Inlet and outlet must be at front of engine to allow correct circulation of air over to alternator and in engine room.
- Max. Engine Compartment Temperature: 85°C in areas of electric parts
- For effective ventilation install suction fan in exhaust air duct.
- Forced Ventilation with a Bilge blower is recommended especially for engines with a VTG Turbo charger, Blower must be fitted to outlet vent.

Note: Never install bilge blower in air supply duct!

9. Fuel



Item	Designation
1	Fuel pump
2	Fuel fine filter
3	Supply line
4	Fuel pre-filter incl. water separator
5	Return line
6	Suction height

Minimum requirements fuel system						
Engine range	**Supply (3)** ID [mm]		**Return (5)** ID [mm]	**Min. Filter flow rate (4)** [L/hr]	**Max. Suction height (6)** [m]	**Max. vacuum at fuel pump (1)** [mbar]
	4Cyl	6Cyl		4Cyl / 6Cyl		
SE	10	16	8	220 / 340	0,5	500
MO	8/10*			220**		

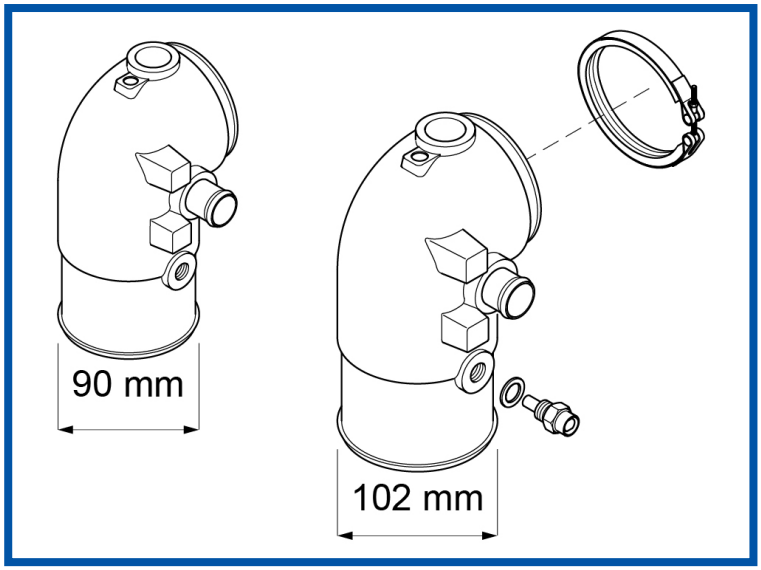
*Greater than 6m in length increase diameter to 10mm

**exempt MO286 and 306 (min filter flow rate: 340l/h)

Note: Copper, lead, tin and zinc should not be allowed in direct contact with fuel.

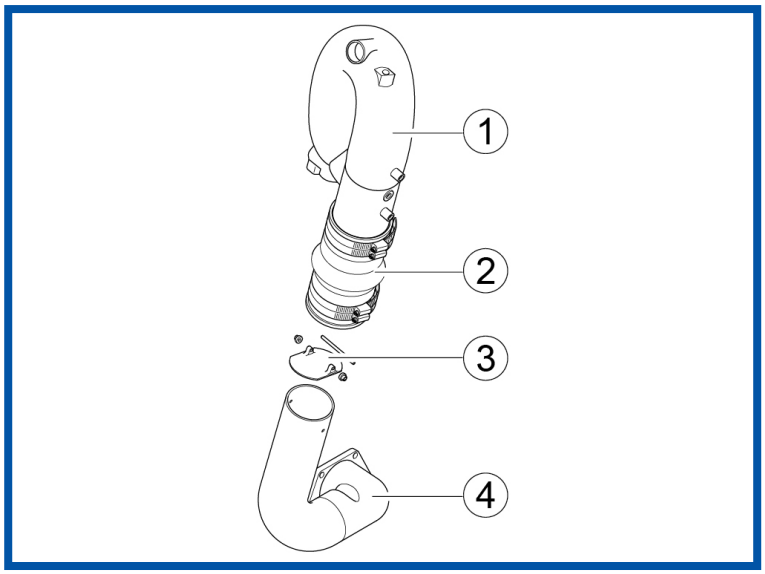
10. Exhaust System

Standard exhaust elbows



Exhaust system hose Diameter	
90 mm	102 mm
3.5 "	4.0 "

Sterndrive exhaust arrangement



Item	Designation
1	High Riser
2	Connecting piece
3	Splash flap
4	Tail pipe with flange

Back pressure

Tolerance values must be ensured!

Find the permitted pressure for your engine in the table below measured at **Wide Open Throttle (WOT).**

After assembly of the exhaust system always check back pressure. This can easily be done by connecting a gauge to the position where the exhaust water temperature sensor is normally mounted on the exhaust elbow / high riser.

Too high back pressure may cause engine damage and power reduction!

Engine		**Back Pressure** [mbar]
MO	MO54NA33	30-80
	MO84K32 MO94K33 MO114K33 MO144V38 MO144M38 MO164M40	50-150
	MO174V40	100-150
SE	all	100-150

The exhaust system should be designed to stop the ingress of water into the engine through the exhaust system.

If water makes it into the engine, total engine failure will likely follow as a result.

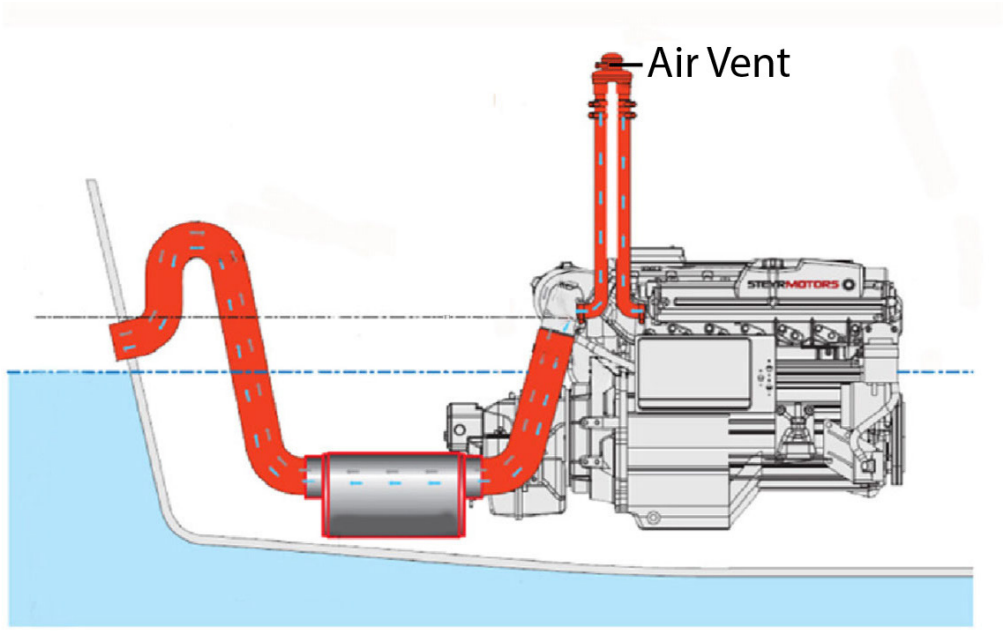
Warranty will not cover failure due to incorrect installation.

For technical queries relating to commissioning please email:

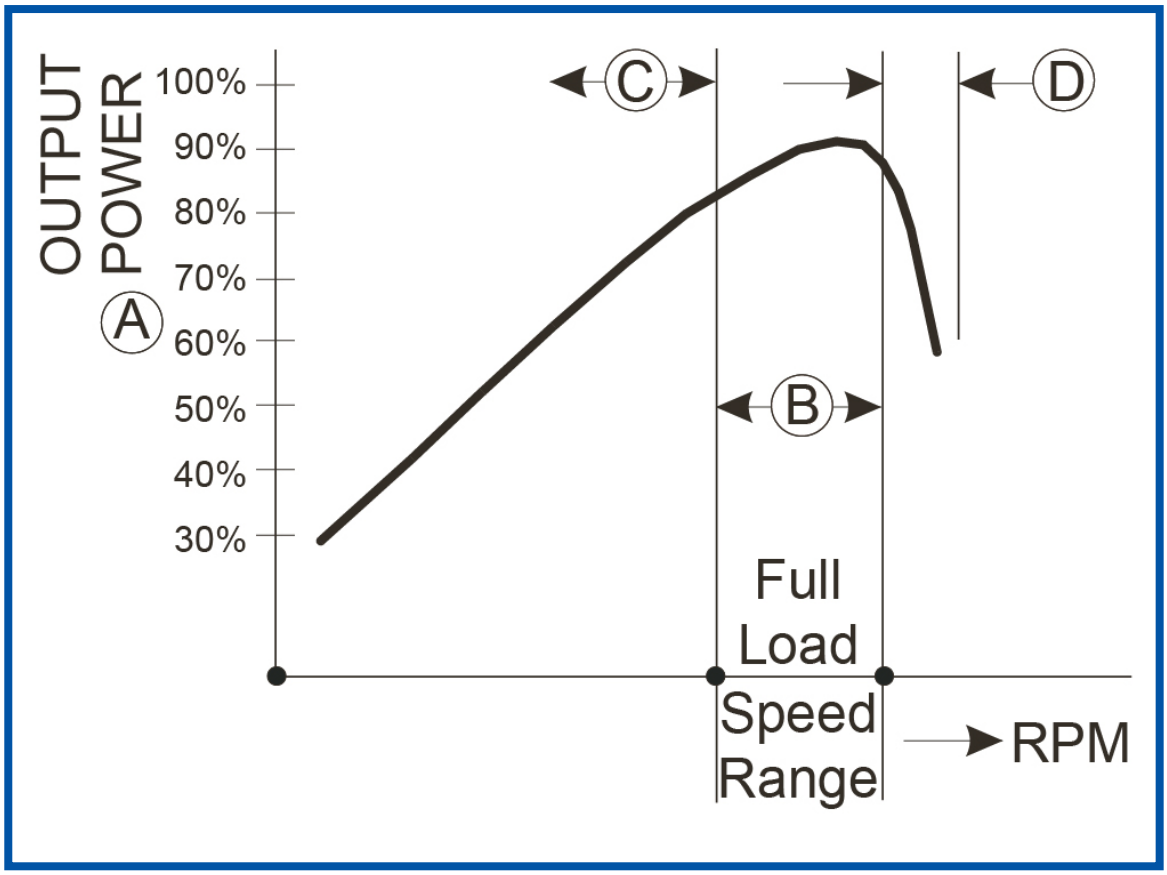
commissioning@steyr-motors.com

If a wet exhaust is fitted and engine is fitted below waterline an Air Vent should be fitted similar to that shown in illustration below.

Exhaust System Installation below Waterline



11. Propeller / Jet - Selection



Note:

Your engine and propeller need to be matched so that the engine at WOT - full throttle operates within the full load speed range **(B)** in diagram above and specified by chart on next page.

Should the engine's full throttle rpm exceed the specified range, the engine rpm and output is limited by governor.

Engine model			Rated Rpm	Propeller selection range "B"	Jet selection range "B"
SE	4 Cyl.	SE144E38	3800	-100 / +100	-500 / +0
		SE164E40	4000	-100 / +100	-450 / +0
	6 Cyl.	SE126E25	2500	-200 / +50	
		SE156E26	2600	-200 / +50	
		SE156E34	3400	-200 / +100	-600 / +100
		SE196E35	3500	-200 / +50	-300 / +50
		SE236E40	4000	-100 / +100	-300 / +100
		SE236S36	3600	-200 / +50	-300 / +50
		SE266E40	4000	-150 / +50	-300 / +50
		SE266S36	3600	-300 / +50	-300 / +50
		SE286E40	4000	-100 / +150	-300 / +50
		SE306J38	3800	-300 / +50	-300 / +50
MO		MO54NA33	3300	+0 / -200	
		MO84K32	3200	+0 / -200	
		MO94K33	3300	+0 / -200	
		MO114K33	3300	+0 / -200	
		MO144V38	3800	+0 / -300	
		MO144M38	3800	+0 / -300	
		MO164M40	4000	+0 / -300	
		MO174V40	4000	+0 / -300	

12. Electrical

Battery Specification

Unit	4 Cyl.	6 Cyl.	
Voltage	12 V	12 V	24 V (2x12 V)
Ampere hour	92 Ah	115 Ah	
CCA*	450 A	650 A	

*Cold Cranking Amps

Cable Length / Cross Section

Cable length in chart refers to **total length** of positive and negative cables together, e. g. 1,5 m negative and 2 m positive would give a total length of 3,5 m, giving a required cross-section of 50 mm^2.

Length [m]		**Cross Section** [mm^2]	**AWG**
4 Cyl. 12V 2kW Starter	6 Cyl. 12V 3kW Starter		
0-4	0-3	50	0
4-5	3 - 4.5	70	00
5-6	4.6 - 5.5	95	000

STEYRMOTORS

Steyr Motors Betriebs GmbH

Im Stadtgut B1 | A-4407 Steyr-Gleink | Austria

www.steyr-motors.com