

# Alfa Laval MMB 304/305

Highly efficient and flexible separation systems and modules for marine applications



## Introduction

In marine and diesel industry, customers struggle with low quality fuels that have high content of particles and water.

Operating on such fuels reduces the efficiency and the lifetime of the engine while increases the risk of repair costs.

The MMB 304/305 System and Module is a complete separation solution from Alfa Laval that improves the reliability of the oil system and protects the engine from serious wear and damages.

## Application

Depending on type of impurities, the MMB304/305 separators can work either as purifier or clarifier. Because of the flexible design, it can be used to clean all the following media:

- Marine gas oil
- Marine diesel oil
- Lubrication oil
- Biofuel

The separators can treat distillate fuels that meet ISO 8217 specifications and comprise FAME or HVO in any blend ratio, so long as:

- FAME at the time of blending meets EN 14214 or ASTM D6751 requirement.
- HVO at the time of blending meets EN 15940 requirement.

Other types of biofuels, such as vegetable oils or blends of FAME and HVO components that fall outside the standards above, should be evaluated on a case-by-case basis. For these types of fuels, please consult your local Alfa Laval office.

## Benefits

- Easy to install and startup
- Easy to operate
- Easy to maintain
- High separation efficiency
- Robust and reliable design
- Low maintenance and spare parts costs

## Design

The MMB 304/305 are belt driven separators and belong to Alfa Laval's family of solid bowl separators. They consist of a solids-retaining bowl which can operate both as a purifier and a clarifier.

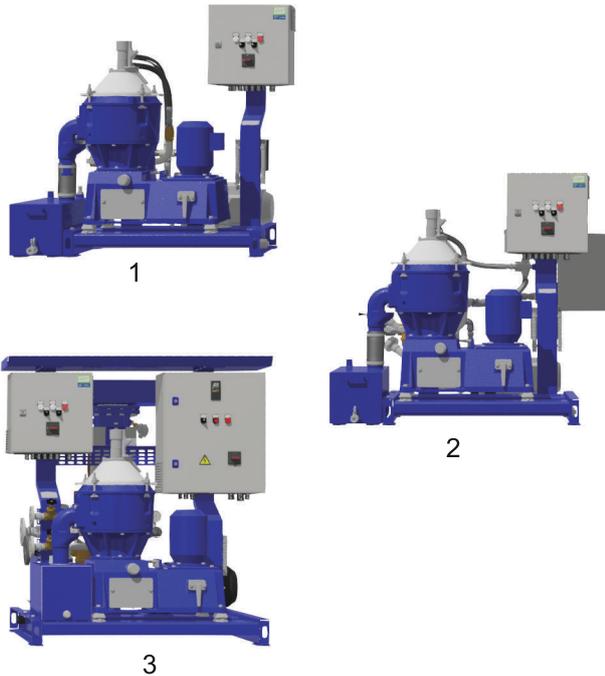
## Scope of supply

The MMB304/305 separator basic equipment consists of the separator with electric motor, the ancillary kit including flexible hoses and valve assembly for water seal, the system manual.

## Separator modules

MMB304/305 separators can be supplied in form of loose system components and in form of modules.

The module is a complete solution including all the system components built on a common skid, ready for plug-and-play installation.



1. Module without heater
2. Module with CBM heater
3. Module with EHM heater

## Options

In addition to the basic equipment the following optional components are available:

- Pump with the inlet block containing strainer and pressure gauge
- Outlet block including pressure switch and regulating valve
- Heater block
- Control cabinet
- Emergency stop box
- Collecting tank
- Flow regulating kit
- Drip tray
- Set of tools
- Service kits

The pump block consists of a positive displacement pump with constant flow and an electric motor. The inlet block is mounted on the pump, and it is delivered with a pressure gauge and strainer to protect the system from large particles.

The outlet block is positioned in the oil outlet of the separator and consists of a pressure switch, a pressure gauge and a

regulating valve to control the back pressure of the system. The pressure switch triggers an alarm if the water seal is lost during operation.

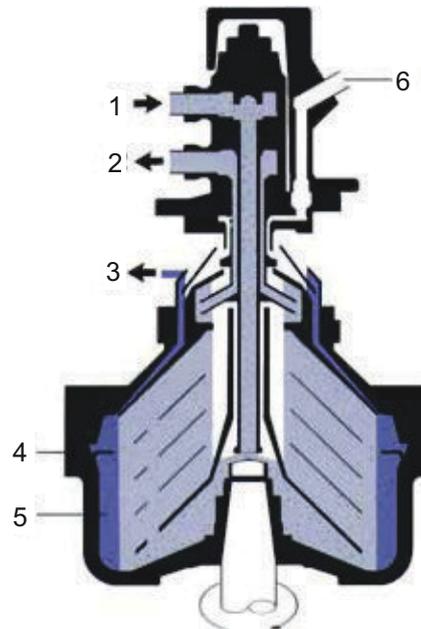
The heater block including an Alfa Laval CBM plate heat exchanger or Alfa Laval EHM electric heaters of 7 to 36 kW depending on the flow and oil type. The heater block is also equipped with a three-way valve and a temperature switch that allow the system to warm up the oil by running in recirculation mode.

A control cabinet is designed for simplicity and ease of use to handle all functions and alarms.

In addition, the following can be offered:

- **Service kits** contain all necessary spare parts for each service and maintenance checkpoint.
- **Documentation** (installation, operation, service & management) in electronic or printed form
- **Commissioning and technical services** including start-ups

## Working principle



Purifier / Clarifier

1. Oil inlet
2. Oil outlet
3. Water outlet
4. Sludge basket
5. Sludge
6. Sealing water inlet

Both when the MMB 304/305 works as a purifier and as a clarifier, the contaminated oil is fed to the separator by a feed pump through the oil inlet and is separated by centrifugal force into its various phases. The heaviest phase, sludge, is forced to and collected in the space at the periphery of the bowl. Sludge is removed periodically by hand using the stainless steel sludge basket. The clean oil is continuously discharged by the built-in paring disc pump.

When operated in purifier mode, a gravity disc must be fitted to obtain the correct interface position (the boundary between

the separated oil and the water seal) in the separator bowl. In the purifier mode, water leaves the bowl via an open outlet.

When operated in the clarifier mode, a clarifier disc is fitted instead of a gravity disc.

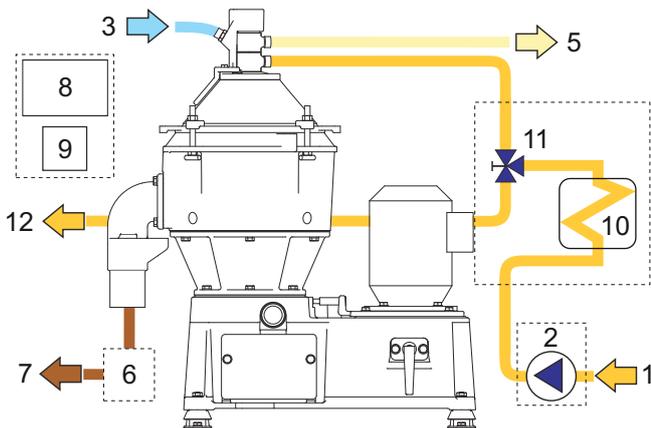
The oil is being transferred directly from the pump to the separator. If it is required to warm up the oil, a heater and a three-way valve are installed between the pump and the separator. The three-way valve runs the oil on recirculation between the sump and the heater until the correct separation temperature is reached.

The separator starts up. When the separator reaches full speed, water is added to establish the appropriate water seal (applicable only for purifier setup). Subsequently, the pump starts up and oil is fed to the separator.

The separation process takes place within the bowl. Due to the centrifugal forces, oil, water and particles are being separated based on their specific gravity. The heavy phases, water and particles, move to the periphery of the bowl while the light phase, oil, moves towards the centre of the bowl.

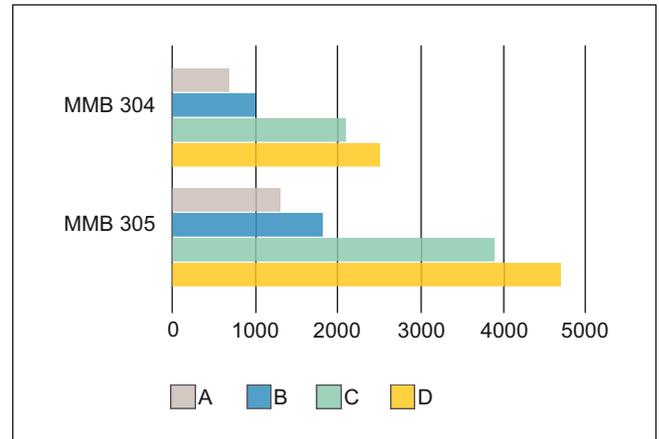
Water is drained automatically to the collecting tank. The separated particles need to be cleaned periodically by hand. The clean oil is pumped by a paring disc out of the separator and from there to the daily service fuel tank or the lube oil sump.

To secure the optimum operation of the separator a pressure switch, a level switch and two temperature switches are installed in the system. All the sensors are connected to the pump which will stop automatically if there is an alarm. In that case, the crew is informed by the alarm lamp on the control cabinet.



1. Feed inlet
2. Pump (optional)
3. Water for water seal (only for purifier)
4. Separator
5. Clean oil outlet
6. Collecting tank (optional)
7. Drain
8. Control cabinet (optional)
9. Emergency stop box (optional)
10. Heater (optional)
11. Three way valve (for module incl. heater)
12. Oil heat up recirculation (for module incl. heater)

## Technical data



Max. recommended capacity l/h

A	LO Trunk oil
B	LO X-head oil
C	MDO
D	GO/HVO

### Performance data

Module	MMB 304	MMB 305
Feed capacities:		
- Gas oil (1,5 – 6 cSt/40°C)	Max. 2500 l/h (42 US gpm)	Max. 4700 l/h (78,3 US gpm)
- Marine diesel oil (13 cSt/40°C)	Max. 2100 l/h (35 US gpm)	Max. 3900 l/h (65 US gpm)
- Lube oil (Trunk/95°C)	Max. 700 l/h (11,6 US gpm)	Max. 1300 l/h (65 US gpm)
Separator motor power consumption	2,2 kW (0,9 HP)	3 kW (4,1 HP)

Pump motor power consumption	0,37 - 4 kW
Feed temperature	Max. 100°C
Bowl speed	9510 rpm
Voltage	220 V, 230 V, 380 V, 400 V, 415 V, 440 V, 460 V, 480 V, 690 V
Frequency	50 - 60 Hz

### Connections

	Module Basic	Module with CBM	Module with EHM
Feed inlet	G1" / G1 1/2"	G1" / G1 1/2"	DN25 / DN40
Clean oil outlet	G3/4"	G3/4"	DN20
Recirculating	N/A	G3/4"	DN25 / DN40
Flow regulating	G3/4"	G3/4"	DN20
Sealing water inlet	G1/2"	G1/2"	G1/2"
Drain	Ø76mm	Ø76mm	Ø76mm
Heating Media Inlet	N/A	G3/4"	N/A
Heating Media Outlet	N/A	G3/4"	N/A

### Material data

Separator frame	Cast iron
Separator bowl	Stainless steel, Brass
Module frame	Cast iron
Gaskets and O-rings	Nitrile rubber

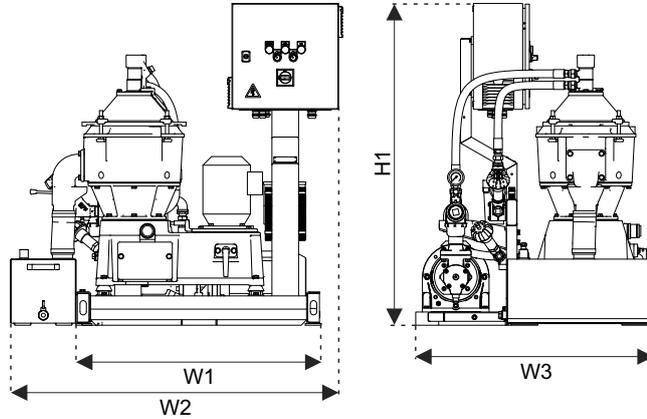
### Weights (approximate)

Module	Module with CBM heater		Module with EHM electric heater	
	MMB	MMB	MMB	MMB
Bowl weight	27 kg (59 lbs)	32 kg (70 lbs)	27 kg (59 lbs)	32 kg (70 lbs)
Separator weight without motor	147 kg (324 lbs)	179 kg (394 lbs)	147 kg (324 lbs)	179 kg (394 lbs)

### Weights (approximate)

Module weight (net/gross)	290 kg (639 lbs)	325 kg (716 lbs)	290 kg (639 lbs)	325 kg (716 lbs)
Module weight (net/gross) with heater	315 kg (694 lbs)	350 kg (771 lbs)	420 kg (926 lbs)	455 kg (1003 lbs)
Volume	1,2 m <sup>3</sup>	1,2 m <sup>3</sup>	1,2 m <sup>3</sup>	1,2 m <sup>3</sup>

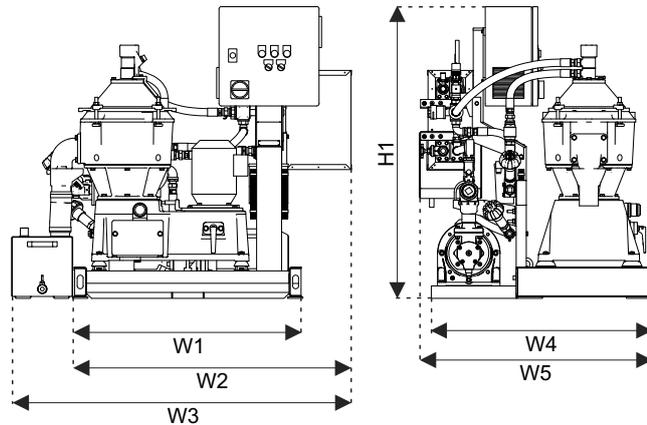
### Dimensional drawing



Module without heater

#### Dimensions – Module without heater

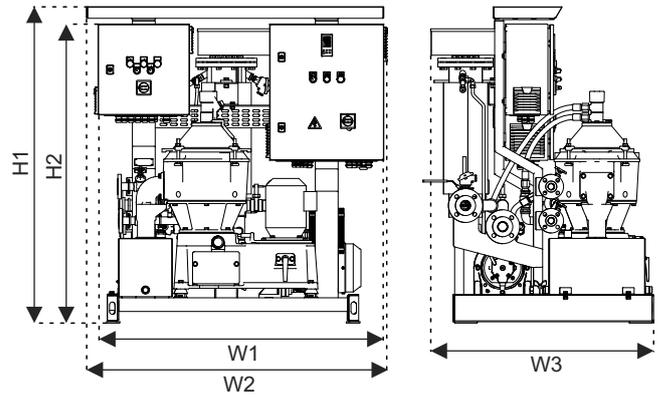
H1	1216 mm
W1	920 mm
W2	1165 mm
W3	865 mm



Module with CBM heater

#### Dimensions – Module with CBM heater

H1	1176 mm
W1	920 mm
W2	1110 mm
W3	1360 mm
W4	865 mm
W5	933 mm



Module with EHM heater

#### Dimensions – Module with EHM heater

H1	1393 mm
H2	1317 mm
W1	1110 mm
W2	1290 mm
W3	975 mm

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