Flex separation systems, P-separators 605/615

Cleaning systems for lubricating and lighter fuel oils*

S and P Flex separation systems
Alfa Laval’s S and P Flex separation systems combine the high efficiency, low sludge output and low operating cost of Alfa Laval centrifugal separators with a flexible scope of supply. Extensive possibilities for the separation system layout and assembly make it possible to suit any engine room and any oil separation application.

In addition, S and P Flex separation systems feature the new EPC 60 controller, which enables the intuitive navigation of menus, parameters and alarms. The EPC 60 controller also has a modular construction for easy I/O board addition and replacement.

The S and P Flex separation concept includes the complete S- and P-separator range. These can be combined in mixed ship sets, even within a single customer-specified module.

Application P-separators
P-separators are based on purifier technology, which means that the oil/water interphase is manually adjusted by means of a gravity disc. Because the separators do not automatically adjust to varying oil density, they are most suitable for economical cleaning of the following:
- Lubricating oils
- Distillates
- Lighter diesel oils

If the oil is well defined and does not vary in density, P-separators can also be manually adjusted to clean heavy fuel oils with densities up to 991 kg/m³ and viscosities up to 600 cSt/50°C.

P-separators are designed for automatic operation in periodically unmanned engine rooms at sea and in automated power stations ashore.

*P-separators 605/615 can also be used to clean heavier oils with well-defined densities.
Scope of supply
The S and P Flex separation concept provides a wide range of alternatives for P-separators. Depending on the need, a P-separator can be supplied as a separator and ancillaries, as a customer-specified module, or as part of a comprehensive package including services and order-specific documentation.

Flex system
A P-separator with ancillaries in the form of optimized block components provides full say over the use of space. This allows for local modularization or do-it-yourself assembly.

Flex modules
A compact P-separator module can be built to a customer-specified configuration from a wide range of modular skids and machine blocks. Multi-modules are possible, as well as mixed modules including one or more S-separators and/or P-separators for the simultaneous treatment of different types of mineral oils. All Flex modules are factory tested to ensure faster start-up and commissioning.

Features and benefits
- Small footprint, high flexibility
  The small separator and the modular nature of the surrounding components allow easy installation and flexible positioning in the engine room.
- Simple installation
  No tank is needed to supply operating water and no pipe is needed to discharge it, which further simplifies installation.
- Separate feed pump
  A separate feed pump reduces pipe-work to and from the preheater.
- High separation efficiency
  An optimized design ensures the best possible separation efficiency from the bowl and disc stack.
- Low oil loss
  The separator’s highly efficient displacement ensures that virtually no oil is lost.
- Efficient discharge
  Separated sludge and water are efficiently removed from the system.

Easy operation and service
The new PLC based EPC 60 controller is designed for “one-button” starts and stops, as well as intuitive menu navigation. Information about parameters and alarms can be easily accessed, which simplifies both operation and troubleshooting. The EPC 60 also has a modular construction that enables faster troubleshooting and I/O board replacement.

Remote monitoring
Using either Ethernet or Bus communication, Flex systems and modules based on P-separators 605/615 can be supervised remotely from the control room. A variety of alarm functions are available as standard, and extra I/O boards can be added to the EPC 60 controller in order to enhance its monitoring capabilities.
**Operating principle**

A Flex separation system based on a P-separator 605/615 is operated automatically by the EPC 60 controller, apart from the starting of the separator. Untreated oil, heated to the correct temperature, is fed continuously to the separator, which is driven by an electric motor via a friction clutch and belt.

The separator bowl is fixed at the top of a spindle, which is supported by bearings and special composite springs. This bowl can be arranged as a purifier or as a clarifier. Both configurations remove sludge, which accumulates at the bowl periphery and is intermittently discharged.

In a purifier configuration, both sludge and water are separated from the oil, which means that water is continuously discharged from the bowl. The EPC 60 controller automatically controls the admission of water for the water seal and the displacement of oil prior to sludge discharge, but a gravity disc is needed to establish the correct interphase position in the separator bowl, i.e. the boundary between the oil and the water seal. The size of the gravity disc must be matched to the oil's density, viscosity/temperature and feed rate to the separator.

In a clarifier configuration, a clarifier disc is fitted instead of a gravity disc. The water outlet is blocked, which means that the separator’s water-handling capacity is limited and that water accumulates like sludge.

During normal operation, vital process parameters are monitored. These parameters, as well as alarms, are indicated by easy-to-understand text messages on the LCD display of the EPC 60 controller.

The EPC 60 controller provides many alarm functions, including alarms for low oil pressure, high sludge tank level (if the optional sludge removal kit is included) and power failure. Additional functions are available for a vibration alarm when the optional vibration switch is fitted.

**Optional equipment**

Flex separation systems based on P-separators 605/615 can be complemented with the following equipment:

- Starter (included in module versions)
- Heater
- Space heating
- Additional thermometers
- Vibration switch
- Feed pump (see feed pump delivery options below)
- Strainer
- Flow regulating system
- Sludge removal kit
- Sludge outlet butterfly valve kit
- Steam shut off valve kit
- Air pressure reducer valve
- Pipe arrangement for multiple modules, including heater cross connection
- Emergency safety shutdown
- Remote monitoring

**Feed pump options**

- Pump delivered loose
- Pump mounted on skid
- Pump module, 3 skids mounted together

**System layout**

1. Feed pump
2. Heater
3. Pneumatically controlled change-over valve
4. Pressure transmitter
5. Control unit
6. Regulating valve
7. Solenoid valve block, water
Operations
A preventive maintenance programme using Alfa Laval Service Kits ensures safe and easy maintenance.

- Recommended maintenance intervals:
  - Intermediate Service every 2,000 hours or 3 months
  - Major Service every 8,000 hours or 12 months

- Service kits contain all necessary spare parts for each service and tips for maintenance at regular intervals:
  - Intermediate Service Kit with O-rings and seals for separator bowl, inlet and outlet
  - Major Service Kit with parts for drive system, belt, bearings and friction pads

- The System Manual includes detailed information in electronic or printed form:
  - Installation instructions
  - Operating instructions
  - Alarms and troubleshooting
  - Service and spare parts

- Commissioning and technical services, including startup assistance and advice on operation and maintenance, are available from all Alfa Laval offices

- Training in all aspects of oil treatment, freshwater generation and heat transfer is available

- All services can be incorporated into specially tailored Nonstop Performance packages. Details are available from local Alfa Laval offices

Max. Recommended Capacity, l/h on lubricating oils for trunk piston engines

TECHNICAL DATA
Main supply voltage 3-phase, 220 V up to 690 V
Control voltage 1-phase, 100/110/115/230 V
Frequency 50 or 60 Hz
Control air Min 5 bar, max 8 bar
Operating water pressure Min 2 bar, max 8 bar

FLEX SYSTEM

<table>
<thead>
<tr>
<th>SIZE (HEIGHT X WIDTH X LENGTH)</th>
<th>NET WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 605</td>
<td>888 x 750 x 1035</td>
</tr>
<tr>
<td>P 615</td>
<td>888 x 750 x 1035</td>
</tr>
</tbody>
</table>

FLEX MODULE

<table>
<thead>
<tr>
<th>SIZE (HEIGHT X WIDTH X LENGTH)</th>
<th>NET WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 605</td>
<td>1750 x 750 x 1075</td>
</tr>
<tr>
<td>P 615</td>
<td>1750 x 750 x 1075</td>
</tr>
</tbody>
</table>

* Dimensions and weights for Flex systems do not include control cabinet.

** Dimensions and weights for Flex modules do not include pump and heater.

Conformity
The mark of conformity confirms that the equipment complies with European Economics Area (EEA) directives.

EMD00231EN 1008
Alfa Laval reserves the right to change specifications without prior notification.

How to contact Alfa Laval
Contact details for all countries are continually updated on our website. Please visit www.alfalaval.com to access the information directly.

CentriLock, CentriShoot and REMIND are trademarks owned by Alfa Laval Corporate AB. ALFA LAVAL is a trademark registered and owned by Alfa Laval Corporate AB.

Conformity
The mark of conformity confirms that the equipment complies with European Economics Area (EEA) directives.
### S and P Flex separation systems

Alfa Laval’s S and P Flex separation systems combine the high efficiency, low sludge output and low operating cost of Alfa Laval centrifugal separators with a flexible scope of supply. Extensive possibilities for the separation system layout and assembly make it possible to suit any engine room and any oil separation application.

In addition, S and P Flex separation systems feature the new EPC 60 controller, which enables the intuitive navigation of menus, parameters and alarms. The EPC 60 controller also has a modular construction for easy I/O board addition and replacement.

The S and P Flex separation concept includes the complete S- and P-separator range. These can be combined in mixed ship sets, even within a single customer-specified module.

### Application P-separators

P-separators are based on purifier technology, which means that the oil/water interphase is manually adjusted by means of a gravity disc. Because the separators do not automatically adjust to varying oil density, they are most suitable for economical cleaning of the following:

- Lubricating oils
- Distillates
- Lighter diesel oils

If the oil is well defined and does not vary in density, P-separators can also be manually adjusted to clean heavy fuel oils with densities up to 991 kg/m³ and viscosities up to 600 cSt/50°C.

P-separators are designed for automatic operation in periodically unmanned engine rooms at sea and in automated power stations ashore.
**Scope of supply**
The S and P Flex separation concept provides a wide range of alternatives for P-separators. Depending on the need, a P-separator can be supplied as a separator and ancillaries, as a customer-specified module, or as part of a comprehensive package including services and order-specific documentation.

**Flex system**
A P-separator with ancillaries in the form of optimized block components provides full say over the use of space. This allows for local modularization or do-it-yourself assembly.

**Flex modules**
A compact P-separator module can be built to a customer-specified configuration from a wide range of modular skids and machine blocks. Multi-modules are possible, as well as mixed modules including one or more S-separators and/or P-separators for the simultaneous treatment of different types of mineral oils. All Flex modules are factory tested to ensure faster start-up and commissioning.

**Features and benefits**
- **Small footprint, high flexibility**
  The small separator and the modular nature of the surrounding components allow easy installation and flexible positioning in the engine room.
- **No water tank**
  No tank is needed to supply operating water, which further simplifies installation.
- **High separation efficiency**
  An optimized design ensures the best possible separation efficiency from the bowl and disc stack.
- **CentriShoot**
  The CentriShoot discharge system greatly reduces sludge volumes. Its fixed discharge slide flexes gently to expose the discharge ports, thereby eliminating metal-to-metal wear.
- **CentriLock**
  The CentriLock bowl-locking system uses a lightweight, non-threaded snap ring. This prevents wear by allowing easy removal without a sledgehammer.
- **Long service intervals**
  Wear-preventing features like CentriShoot and CentriLock reduce the consumption of spare parts and allow planned maintenance to be performed less often. This reduces operating costs.

**Easy operation and service**
The new PLC based EPC 60 controller is designed for “one-button” starts and stops, as well as intuitive menu navigation. Information about parameters and alarms can be easily accessed, which simplifies both operation and troubleshooting. The EPC 60 also has a modular construction that enables faster troubleshooting and I/O board replacement.

**Remote control and monitoring**
Using Ethernet or Bus communication, Flex systems and modules based on P-separators 626/636 can be operated and supervised remotely from the control room. A variety of alarm functions are available as standard, and extra I/O boards can be added to the EPC 60 controller in order to enhance its operating and monitoring capabilities.
Optional equipment
Flex separation systems based on P-separators 626/636 can be complemented with the following equipment:

- Starter (included in module versions)
- Heater
- Space heating
- Additional thermometers
- Vibration sensor kit
- Feed pump
  - Supplied loose
  - Mounted on a separate skid
  - Incorporated into a module
  - As a pump module (multiple pump skids mounted together)
- Flow regulating system
- Sludge removal kit
- Sludge outlet butterfly valve kit
- Steam shut-off valve kit
- Air pressure reducer valve
- Pipe arrangement for multiple modules, including heater cross-connection
- Emergency safety shutdown
- Remote monitoring and control
- Separator lifting tool

Feed pump options

Schematic diagram

1. Feed pump
2. Heater
3. Temperature transmitter
4. Safety valve
5. Change-over valve
6. Process controller
7. Pressure transmitter – oil
8. Complete regulating valve
9. Regulating valve – oil
10. Pneumatic shut-off valve
11. Valve block water
12. Separator
13. Pressure transmitter – water
14. Drain valve
15. Sludge removal kit
16. Regulating valve
Operating principle

A Flex separation system based on a P-separator 626/636 is operated automatically by the EPC 60 controller. Untreated oil, heated to the correct temperature, is fed continuously to the separator, which is driven by an electric motor via a friction clutch and belt.

The separator bowl is fixed at the top of a spindle, which is supported by bearings and special composite springs. This bowl can be arranged as a purifier or as a clarifier. Both configurations remove sludge, which accumulates at the bowl periphery and is intermittently discharged by the high-precision CentriShoot discharge system.

In a purifier configuration, both sludge and water are separated from the oil, which means that water is continuously discharged from the bowl. The EPC 60 controller automatically controls the admission of water for the water seal and the displacement of oil prior to sludge discharge, but a gravity disc is needed to establish the correct interphase position in the separator bowl, i.e. the boundary between the oil and the water seal. The size of the gravity disc must be matched to the oil’s density, viscosity/temperature and feed rate to the separator.

In a clarifier configuration, a clarifier disc is fitted instead of a gravity disc. The water outlet is blocked, which means that the separator’s water-handling capacity is limited and that water accumulates like sludge.

During normal operation, vital process parameters are monitored. These parameters, as well as alarms, are indicated by easy-to-understand text messages on the LCD display of the EPC 60 controller.

The EPC 60 controller provides many alarm functions, including alarms for low oil pressure, high sludge tank level (if the optional sludge removal kit is included) and power failure. Additional functions are available for a vibration alarm when the optional vibration sensor is fitted.
**CentriShoot**
Instead of a sliding bowl bottom, the CentriShoot discharge system features a fixed discharge slide that flexes at its edge. This increases discharge accuracy and does away with metal-to-metal wear.

**CentriLock**
Conventional lock rings are threaded and must be removed with a sledgehammer. Over time, the metal-to-metal wear between bowl and lock ring can lead to expensive bowl repair or replacement.

**STEP ONE:**
The CentriShoot discharge slide is fixed at the centre. During separation, the slide covers the discharge ports.

**STEP TWO:**
During sludge discharge, the edge of the slide flexes downward, exposing the discharge ports.

**STEP THREE:**
After discharge, the slide moves gently back into position to close the ports. This is done hydraulically, without any springs.

An Allen key is the only tool needed to work with CentriLock. No sledgehammer is necessary.

The CentriLock snap ring lifts out and snaps in easily – without any threads to wear.

Instead of a conventional lock ring, the CentriLock bowl-locking system features a non-threaded snap ring. This lightweight ring snaps quickly into place and is easily removed with only an Allen key.
Operations
Preventive maintenance procedures are handled quickly and simply with the help of a compression tool. The snap ring of the patented CentriLock bowl-locking system is non-threaded and requires only an Allen key to remove.

Maintenance intervals:
- Inspection Service every 4000 h or 6 months
- Overhaul Service every 12000 h or 18 months

Service spares kits contain all necessary spare parts for each service and tips for maintenance in checkpoints:
- Inspection Kit with O-rings and seals for separator bowl
- Overhaul Kit with parts for drive system, belt, bearings and pads, also containing an Inspection Kit
- Support Kit with strategic spares for operation and maintenance backup

The System Manual includes detailed information in electronic or printed form:
- Installation instructions
- Operating instructions
- Alarms and troubleshooting
- Service and spare parts

Commissioning and technical services are available from all Alfa Laval offices, including start-up assistance and advice on operation and maintenance

Training in all aspects of oil treatment, freshwater generation and heat transfer is available

All services can be incorporated into specially tailored Nonstop Performance packages. Details are available from local Alfa Laval offices

Conformity
The mark of conformity confirms that the equipment complies with European Economics Area (EEA) directives.

Max. Recommended Capacity, l/h on lubricating oils for trunk piston engines

<table>
<thead>
<tr>
<th>System</th>
<th>Size (Height x Width x Length)</th>
<th>Net Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 626</td>
<td>895 x 750 x 1075</td>
<td>389 kg</td>
</tr>
<tr>
<td>P 636</td>
<td>975 x 750 x 1195</td>
<td>443 kg</td>
</tr>
</tbody>
</table>

* Dimensions and weights for Flex systems do not include control cabinet.

** Dimensions and weights for Flex modules do not include pump and heater.

How to contact Alfa Laval
Contact details for all countries are continually updated on our web site. Please visit www.alfalaval.com to access the information directly.