

S-separator Flex separation



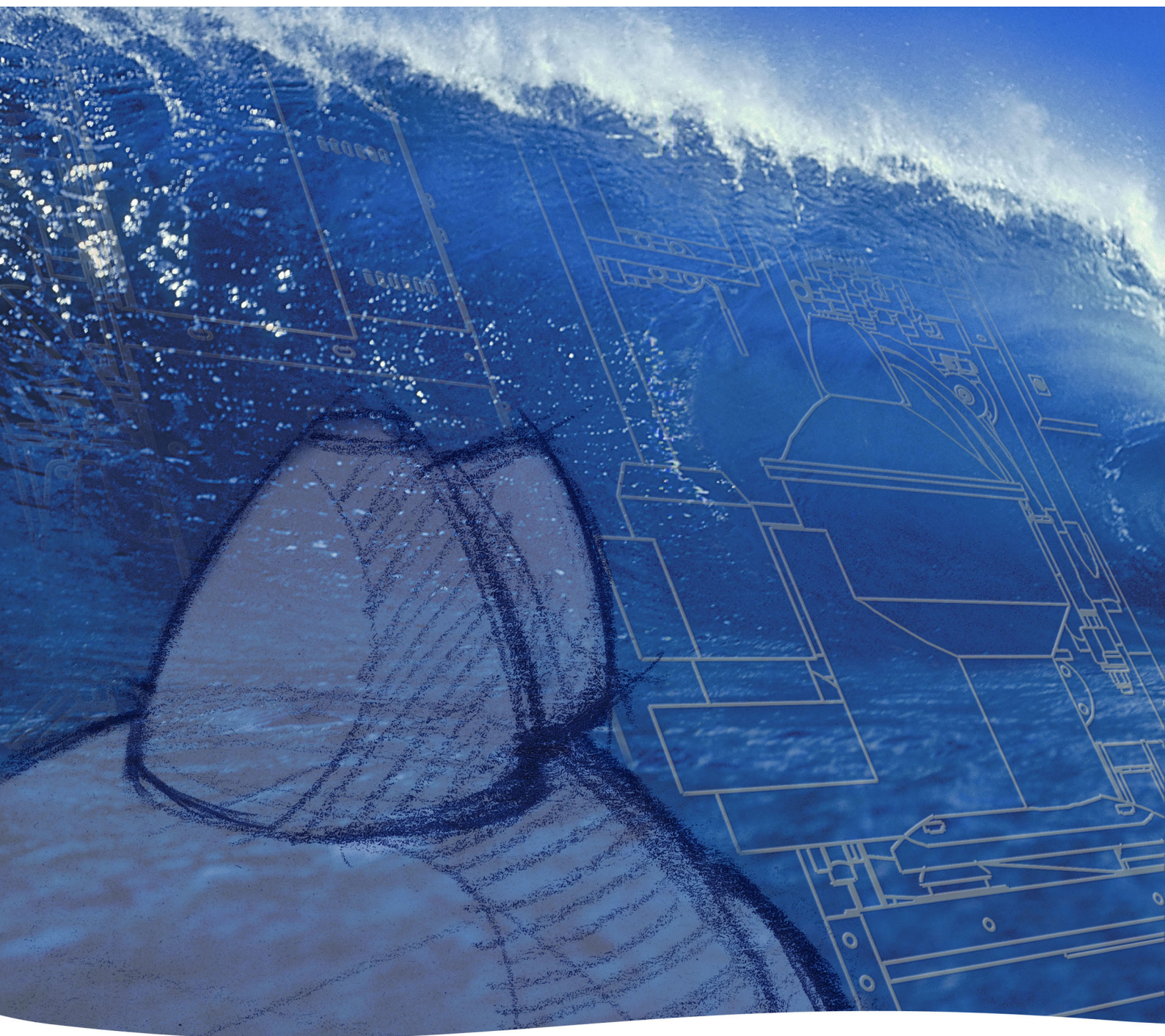
System description

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1 *System Overview*

The S-Type Separation System is designed for cleaning of fuel and lube oils for diesel engines, and fuel oil for gas turbine engines, in marine and power applications.

In the process, heated oil is fed through the separator to clean the oil from solid particles and water.

The basic separation unit comprises:

- A separator.
- Ancillary equipment including control unit.
- Optional equipment such as, butterfly valve, vibration switch, etc.

During the process, the cleaned oil leaves the separator through the oil outlet while separated water and sludge accumulate at the periphery of the rotating separator bowl.

The control unit supervises the entire operation of the separation system, performing monitoring, control, and alarm functions.

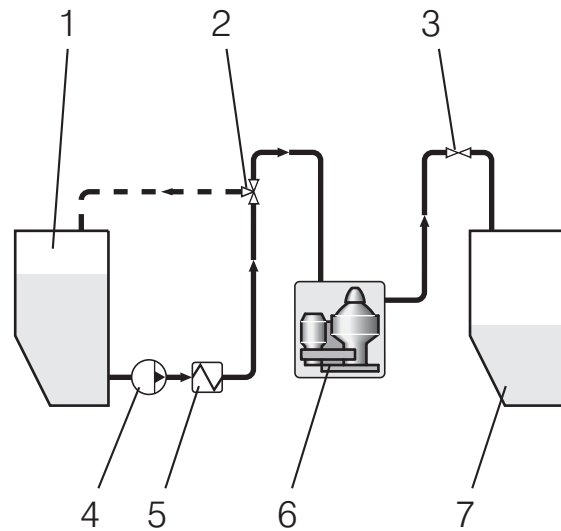
The process adapts automatically to certain changes in conditions, such as increased water content in the unprocessed oil, high or low oil feed temperature, etc.

1.1 Oil Flow

The unprocessed oil is fed through a heater by a feed pump, operating at a constant flow.

A change-over valve directs the oil to the separator. The cleaned oil is pumped from the separator to either the daily service tank (fuel oil), or back to the engine (lube oil).

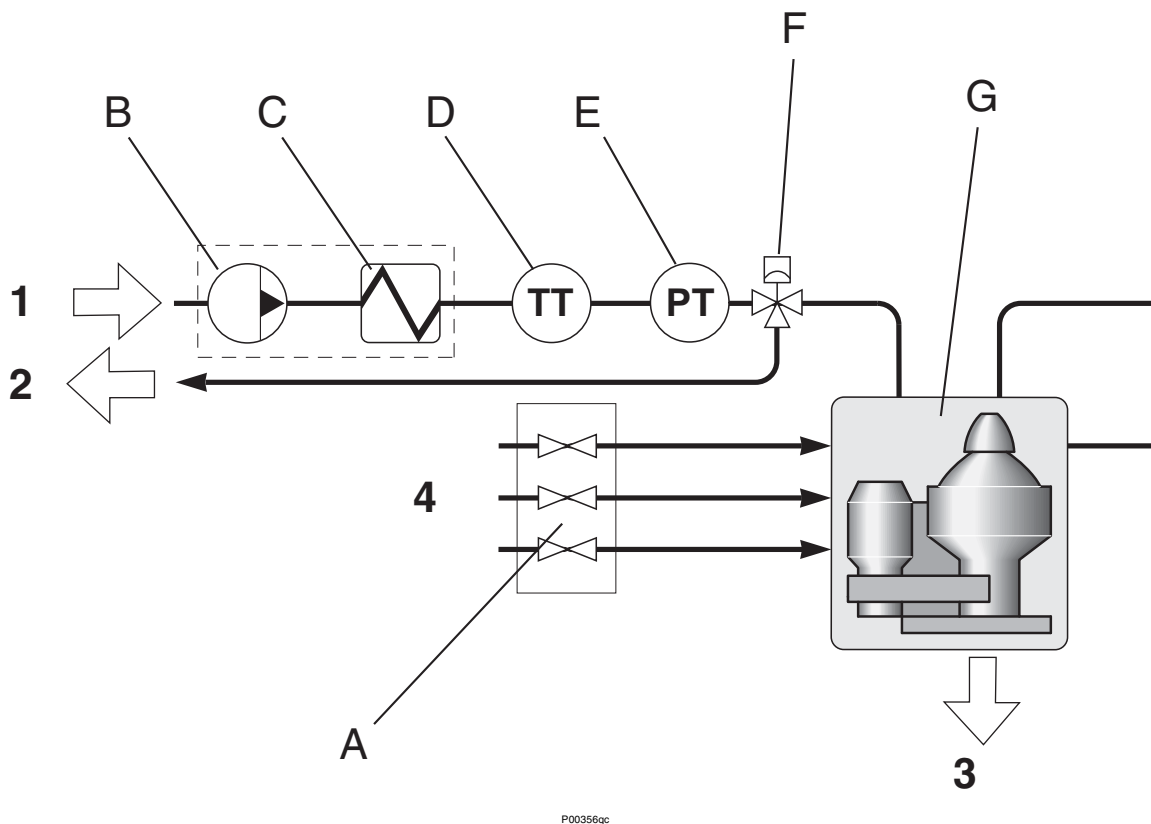
During separator start and stop procedures, during alarm conditions, or if the oil temperature is outside the preset range, the oil is directed by the change-over valve to a return line back to the engine sump or settling tank.



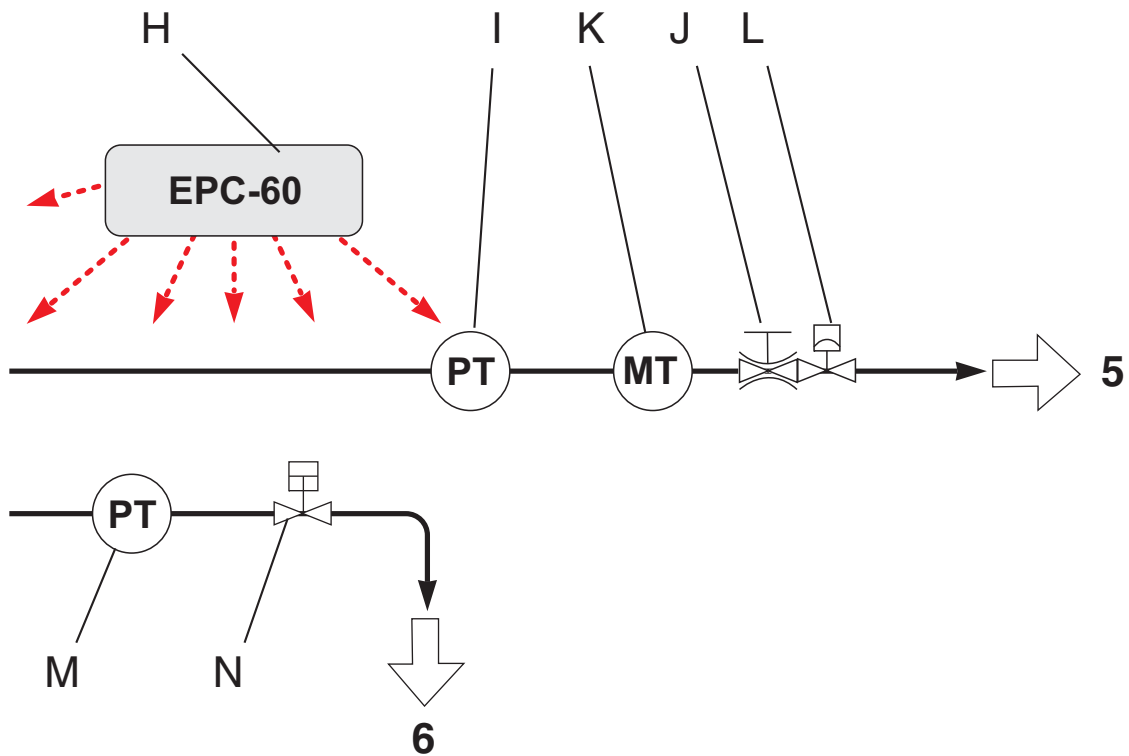
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1. *Settling tank*
2. *Change-over valve*
3. *Backpressure regulating valve*
4. *Pump*
5. *Heater*
6. *Separator*
7. *Daily service tank*

1.2 System Layout



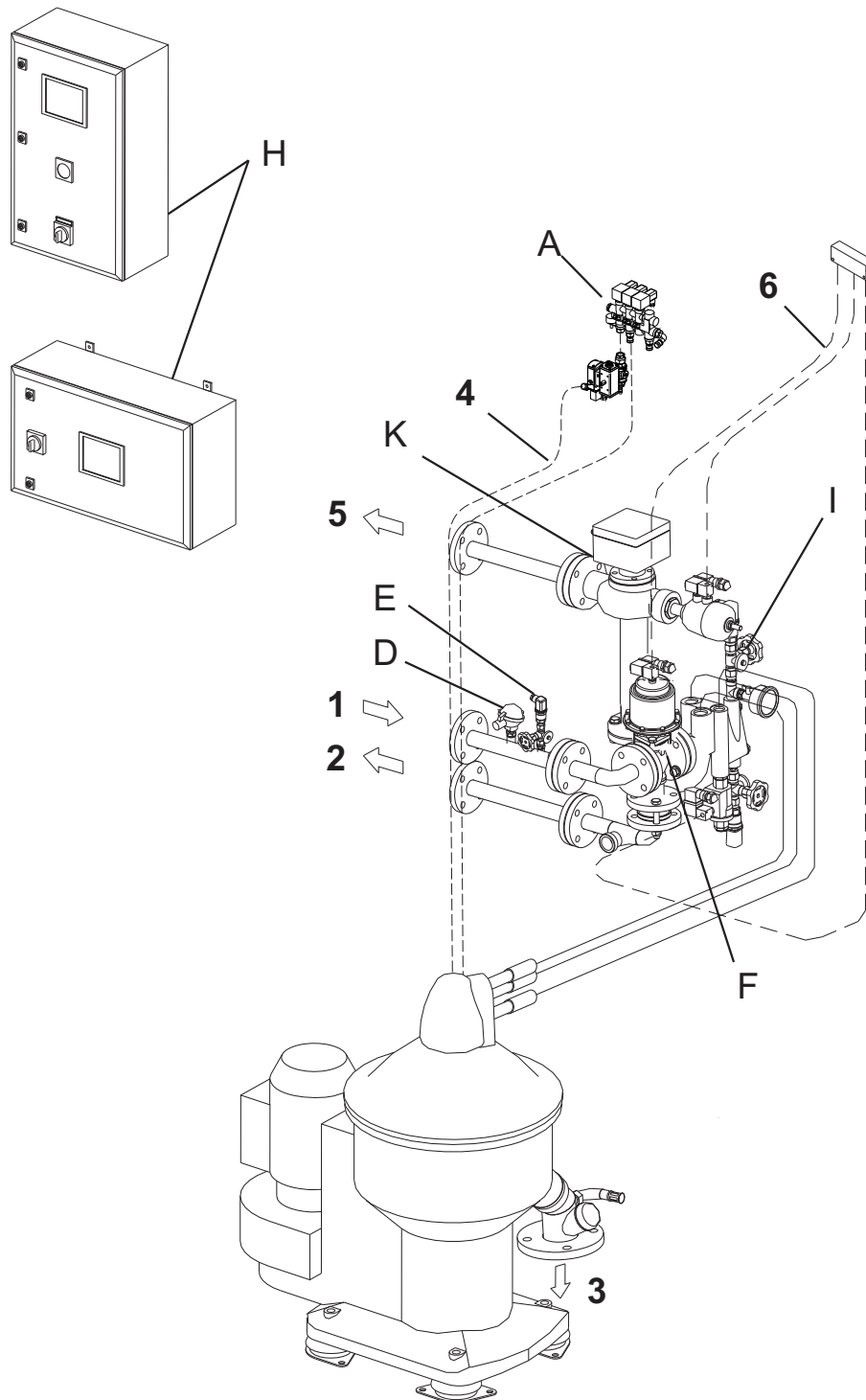
1. Unprocessed oil inlet
 2. Oil return
 3. Sludge outlet
 4. Water inlet
 - A. Solenoid valve block, water : Distributes separator opening/closing water, and conditioning water.
 - B. Feed pump : Feeds unprocessed oil to the separator.
 - C. Heater : Heats unprocessed oil to separation temperature.
 - D. Temperature transmitter (TT1, TT2) : Measures the oil temperature and signals the control unit.
 - E. Pressure transmitter, oil (PT1) : Measures the pressure in the oil inlet, and signals the control unit.
 - F. Pneumatically controlled change-over valve (V1) : Directs the unprocessed oil to the separator, or back to the settling tank (recirculation – fuel oil only).
 - G. Separator : Cleans the oil by removing water and solid particles.
- — —.Optional equipment not part of the basic S Flex Separation System



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- 5. Clean oil outlet to service tank
- 6. Water drain
- H. Control unit : Supervises the separation system.
- I. Pressure transmitter, oil (PT4) : Measures the pressure in the oil outlet, and signals the control unit.
- J. Regulating valve (RV4) : To manually regulate the back-pressure in the clean oil outlet
- K. Water transducer (MT60) : Measures change in water content in the cleaned oil, and signals the control unit.
- L. Pneumatically controlled shut-off valve (V4) : Closes the clean oil outlet.
- M. Pressure transmitter, water (PT5) : Measures the pressure in the water drain outlet, and signals the control unit.
- N. Drain valve (V5) : Opens to drain separated water from the separator.

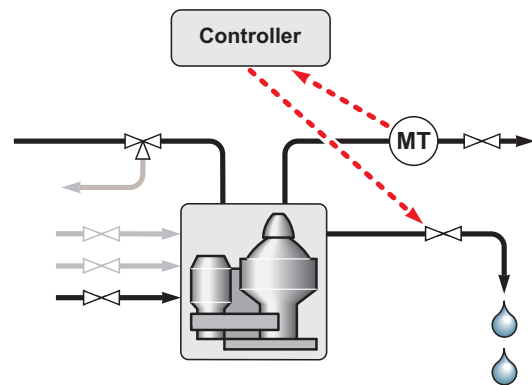
1.3 System Components



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- | | |
|---------------------------------------|-------------------------------|
| 1. Oil inlet | E. Pressure transmitter (PT1) |
| 2. Oil recirculation | F. Change-over valve |
| 3. Sludge and water outlet | H. EPC 60 Control unit |
| 4. Operating water | I. Pressure transmitter (PT4) |
| 5. Clean oil outlet | J. Back pressure valve (RV4) |
| A. Safety valve SV10A (lube oil only) | K. Water transducer (MT60) |
| D. Temp transmitter (TT1, TT2) | |

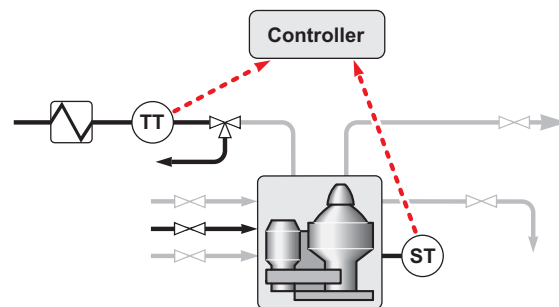
The signal from the water transducer is continuously transmitted to the control unit, in which a reference value is stored. The control unit compares the transducer signal with the reference value. A significant deviation from the reference value will cause draining of water.



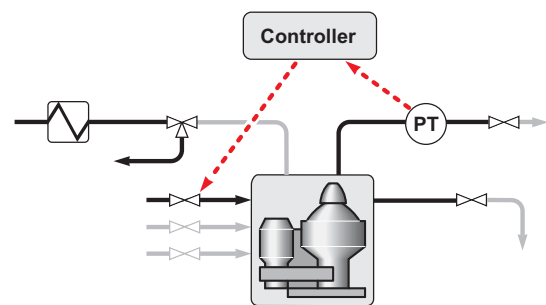
2.2 Process Cycle Start

First the oil pump, separator, and heater are started.

The temperature transmitter (TT) and the speed transmitter (ST) signal the EPC-60 control unit continuously. When the correct separator speed and the correct temperature are reached, a sludge discharge is carried out to ensure the bowl is empty. The control unit then starts the process cycle.

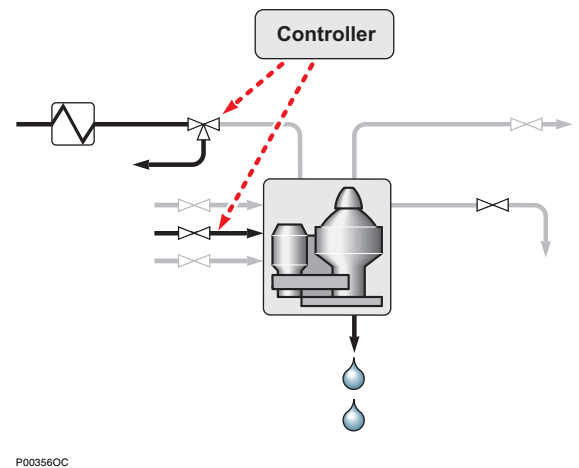


1. The change-over valve directs the oil to the recirculation line. Conditioning water is added to the separator bowl until the pressure sensor in the oil outlet senses pressure and signals the control unit.

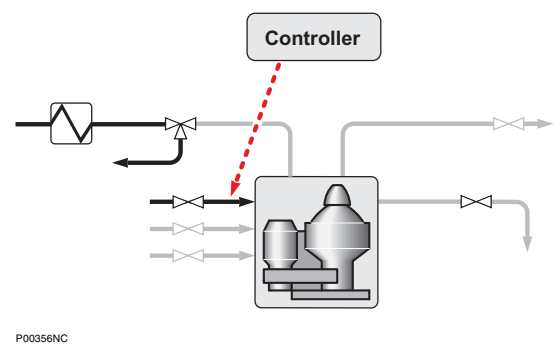


2. The control unit registers the time taken for water addition. This water flow reference value is later used to calculate the correct amount of conditioning water and displacement water to be added.

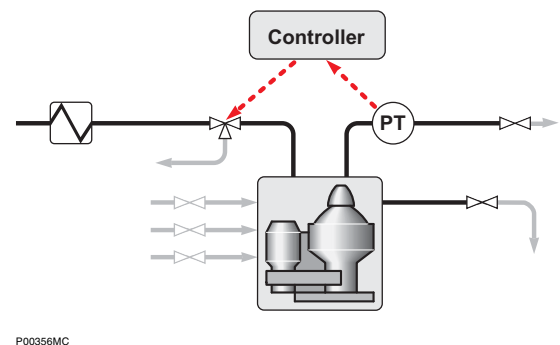
3. The separator discharges.



4. Using the flow rate calculated in paragraph 2 above, the control unit signals the solenoid valve to open so that the correct amount of conditioning water is added to the separator bowl.



5. The change-over valve opens so that oil is directed to the separator bowl. When pressure in the oil outlet is sensed, the pressure sensor (PT) signals the control unit. The control unit calculates and stores the time taken to add oil to the bowl.

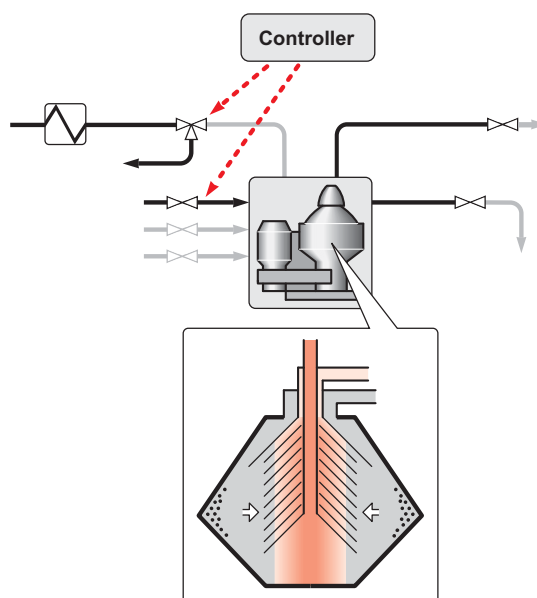


The cleaning process is now running. Unprocessed oil is fed to the separator, and clean oil is pumped from the separator.

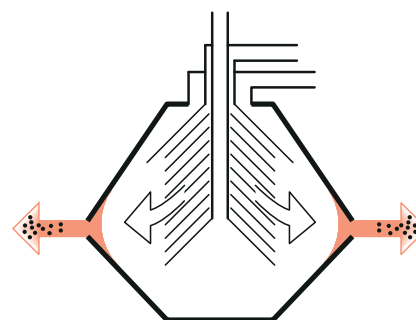
2.3 Discharge

The separator discharges after a preset time has elapsed. The following sequence takes place:

1. The change-over valve changes to oil recirculation.
2. The control unit signals the solenoid valve to open so that displacement water is added to push the oil towards the disc stack.
3. After the time for displacement water addition has elapsed, the separator discharges.
4. Conditioning water is then added, and a new separation cycle begins.



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2.4 Increased Water Content

If the water transducer senses increased water content in the oil, the following takes place:

1. The water drain valve (V5) opens for a number of seconds.
2. The water drain valve closes again, and the transducer signal is evaluated.
3. If there is still an increase in water content, the drain valve opens again. If the water content is still high after the drain valve has opened five times, a discharge is initiated.
4. If the water content has decreased, the separation cycle returns to normal.

