1 HFO SYSTEM.

1.0FUEL TREATMENT SYSTEM DESCRIPTION

After the fuel is supplied to the HFO settling tank the fuel must be cleaned by a centrifugal fuel purifier. The HFO separator unit consists out of one (1) separator.. The HFO separator supply pumps sucks the fuel from the settling tank via a pre filter and pumps it to the separator over a fuel heater and a 3-way separator by-pass selection valve. If the fuel is send over the separator the fuel will be cleaned from water and other impurities and the cleaned fuel will be feed to the service tank. If the separator is by-passed the fuel will be feed back to the settling tank.
Sludge and water from the separators will be lead into a sludge tank being part of the total unit. An air driven pump will pump the sludge and water mixture to the sludge storage tank based on the sludge tank level.

Technical data :	Fuel –HFO : 380cSt at 50°C
HFO temperature settling tank :	70°C
HFO temperature service tank :	90°C
HFO separation temperature :	98°C
HFO heating :	Saturated steam of 7 bar(g).
Voltage/frequency :	400VAC/3P/N/50Hz
Installation :	Inside house
Ambient conditions :	40°C – RH 85%

1.1 HFO Double SEPARATOR UNIT. **Optional on request**

Comprising:
2x Feed pump, complete with coupling, E-motor, mounting feet and emergency pressure relief valve:
- pump Capacity : 3,200 L/h.
- Pump head : 4.0 Bar.
- E-motor : 1.5 kW, IP55, ISO-F, 1.450 rpm.

2x Pump suction filter, size 250 micron.
2x HFO heater, steam heated, complete with pressure relief valve and vent/drain connections.
- Capacity : 55 kW (T = 30°C).

2x Steam control valve.
2x Self cleaning separator type : Purifier total discharging (HFO).
- Capacity : 3,350 L/h with IF380cSt at 50°C.
- E-motor : 7,5 kW, IP55, ISO-F, 2.900 rpm

2x 3-way change-over valve.
All necessary pneumatic and water control devices for partial/total discharge type of operation
All components listed above will built on one (1) common base frame together with all necessary supports for equipment and pipes, instruments, valves, piping, flanges, bends, gaskets, tracing and insulation.
Coating, total 120micron (2 layers of primer and one layer of topcoat).

1.2 Booster Unit

The booster unit is for pressurising, cleaning, conditioning and feeding the fuel from the service tanks to the engines. The booster part of the oil treatment unit must be designed to fullfil the diesel engine suppliers requirements concerning the fuel circulation capacity, supply pressure, viscosity/temperature and filtration fineness.These values are varying from supplier to supplier and must be given by the diesel engine supplier. The return fuel from the engine is generally equipped with a back pressure regulator, where after the fuel is feed back to the booster part of the oil treatment unit. For availability reasons it might sometimes be necessary to install a stand-by pump and/or stand-by heater on the oil treatment unit.

Comprising:

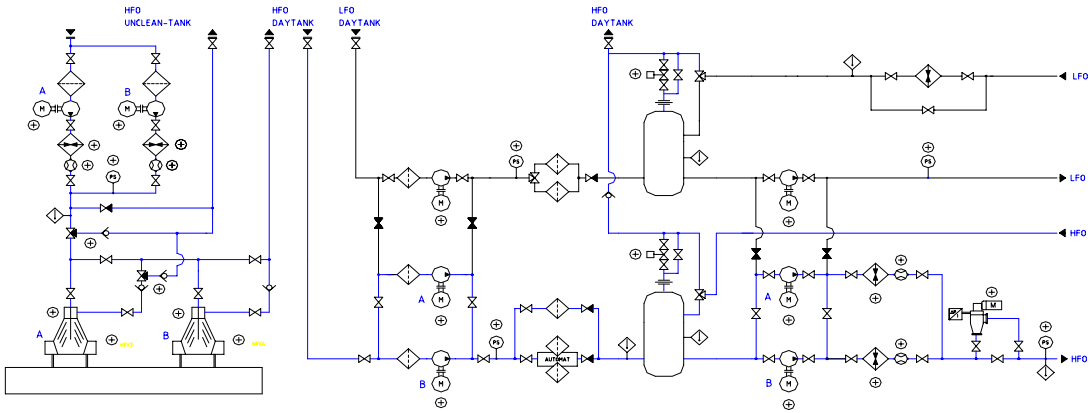
3 x Pump	cap. Each 3,5 m³/h - 8 bar(g) e-motor 2,2 kW - ISO F, 1.450 rpm
1 x Automatik-Filter	25 my abs.
1 x Bypass-Filter	34 my abs.
1 x Double LFO-Filter	34 my abs.
2 x Mixing tank	volume 180 liter, cpl. w. safety valve - adj. At 12 bar, blow-off-line cpl. w. gas - tight blow off valve temperature and pressure indicator.
2 x Fuel steam heater	cap. 90 kW - Δt = 30 K incl. Motor regulating valve
1 x Visco Sensor	0 – 50 cSt. 4 – 20 mA
2 x Flowmeter	Totallizer
3 x Pump	cap. each 15 m³/h - 8 bar(g) e-motor 5,5 kW - ISO F
1 x LFO cooler	appr. Δt = 15 K
1 x Control cabinet	for controlling of Viscosity and temperature Temp.- range ....200°C , graphic plc

All components listed above will built on one (1) common base frame together with all necessary
supports for equipment and pipes, instruments, valves, piping, flanges, bends, gaskets and insulation.
Coating, total 120micron (2 layers of primer and one layer of topcoat).
One Control cabinet with a graphic plc and all necessary control buttons.

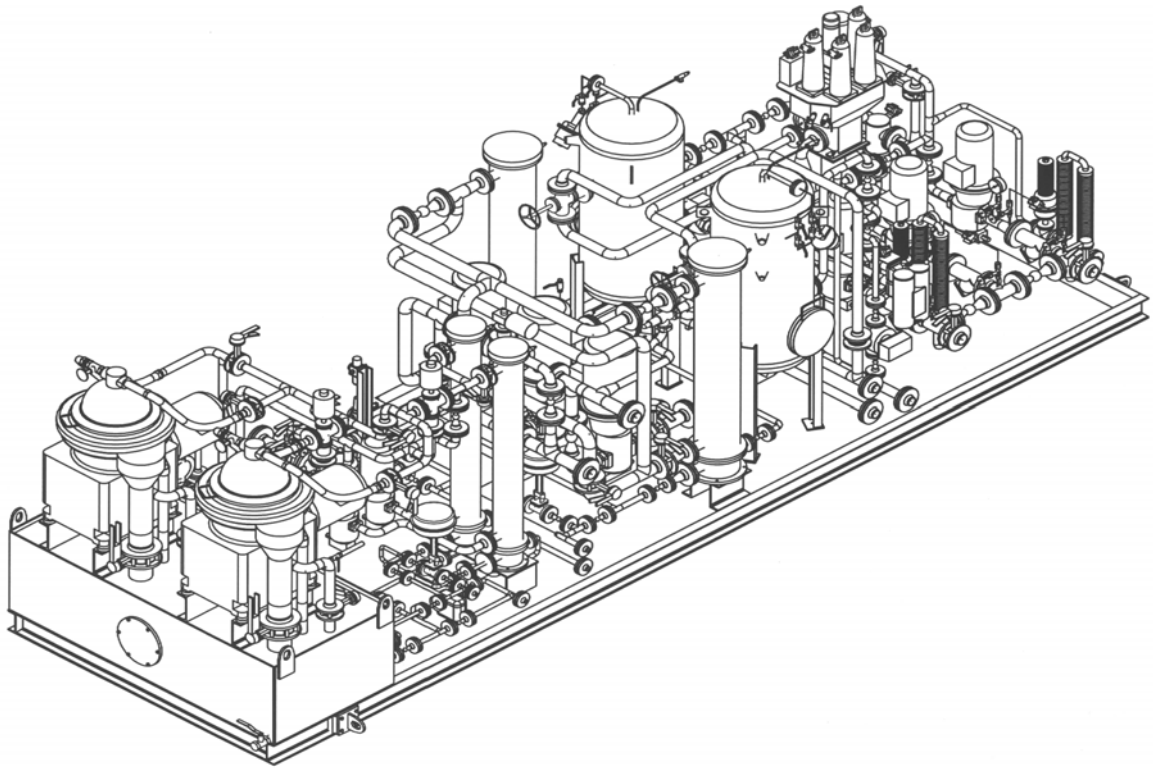
1.3 Treatment Module **Optional on request**

Includes the components for the HFO Separator and the Booster Unit

For the Treatment Module we have a common Control cabinet with a graphic plc and a Aluminium panell with Flow chart and control buttons.



System R&I for Booster and Separator Module



Here is shown one treatment module consist of the Booster Module (part of our quotation) and an double separator unit (optional on request).

For information Only

2 LO SYSTEM

2.0 LO SYSTEM DESCRIPTION — Optional on request

The LO in the engine sumptank is pumped from the engine sump tank by the separator feed pump with suction filter over a heater in which the oil will be heated up and a 3-way by-pass valve into the separator.
In the separator the LO is purified from water and other impurities. After the purifying process the purified LO will be feed back to the engine sump tank. The LO separator unit will be executed with one (1) LO separator.
Sludge and water from the separator will be lead into a sludge tank being part of the total unit.

Technical data :	LO – SAE40 : 146cSt at 40°C
LO sumptank temperature :	60-65°C
LO separation temperature :	95°C
LO heating :	Saturated steam of 6 bar(g).
Voltage/frequency :	400VAC/3P/N/50Hz
Installation :	Inside house
Ambient conditions :	40°C – RH 85%

2.1 LO SEPARATOR UNIT.

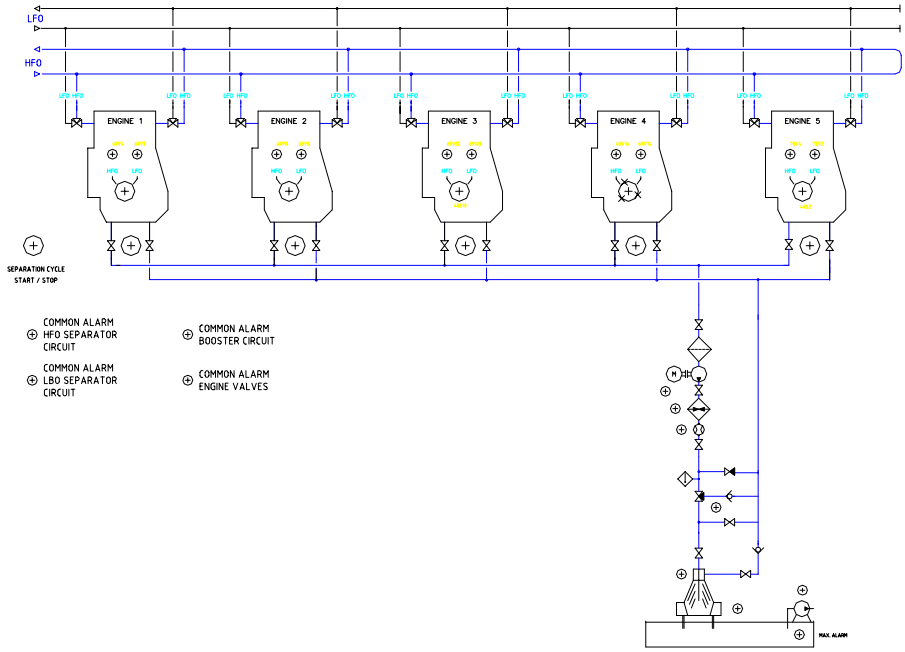
Comprising:
1x Feed pump, complete with coupling, E-motor, mounting feet and emergency pressure relief valve:
- Capacity : 1,100 L/h.
- Pump head : 4.0 Bar.
- E-motor : 0.5 kW, IP55, ISO-F, 1.450 rpm.

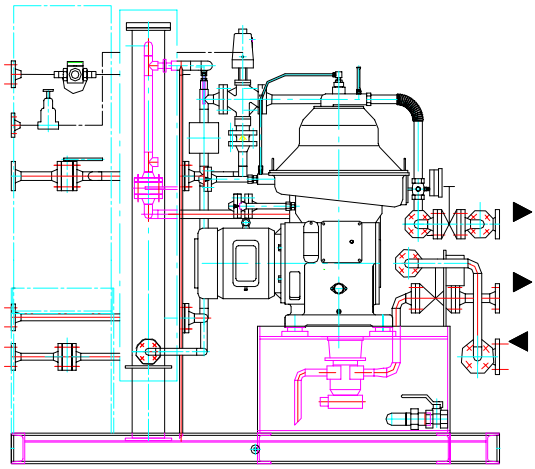
1x Pump suction filter, size 250 micron.
1x LO heater, steam heated, complete with pressure relief valve and vent/drain connections.
- Capacity : 25 kW (T = 35°C).

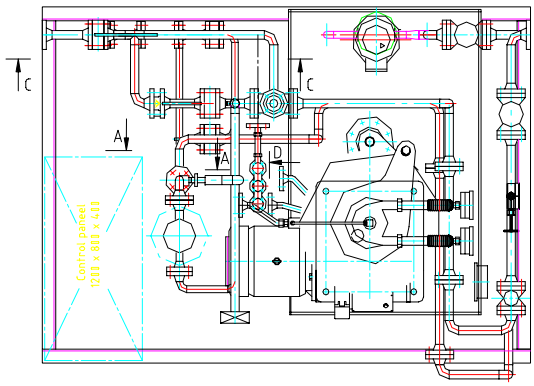
1x Steam control valve.
1x Self cleaning separator type : Purifier total discharging (LO).
- Capacity : 1,100 L/h with SAE40, 146cSt at 40°C.
- E-motor : 3.7 kW, IP55, ISO-F, 2.900 rpm

1x 3-way change-over valve.

All necessary pneumatic and water control devices for total discharge type of operation
All components listed above will built on one (1) common base frame together with all necessary
supports for equipment and pipes, instruments, valves, piping, flanges, bends, gaskets and insulation.
Coating, total 120micron (2 layers of primer and one layer of topcoat).







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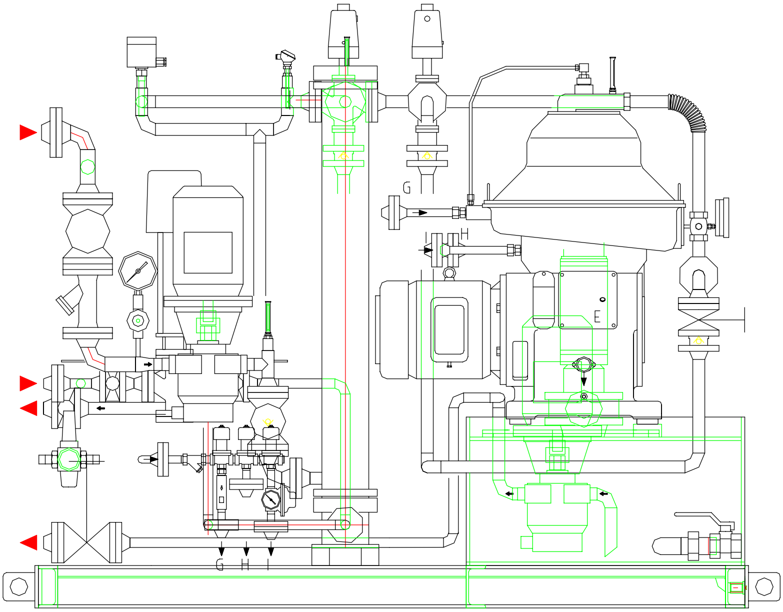
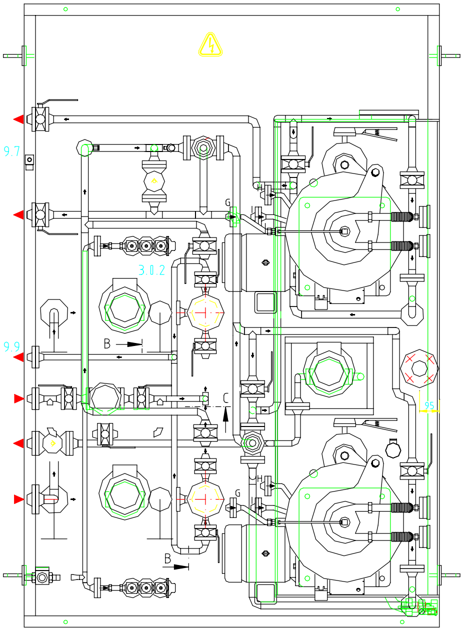
HFO Double Separator Unit as an alternativ

Here is shown a double separator Modul.





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