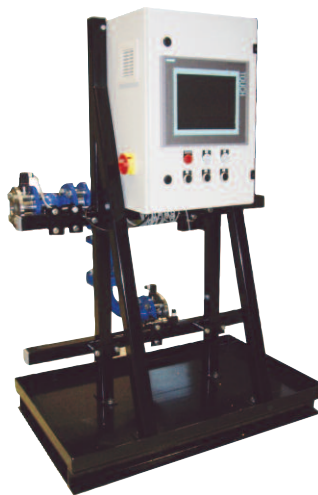


Diesel Switch MKII and Homogenizer

Application

Safety controlled CHANGE OVER SYSTEM from HFO to distillate fuels (e.g. MDO, MGO) and back.

First type approved system



Features

- Automatic fuel change-over or blending
- Simplest and universal design / turn key product
- Optimised control algorithm of fuel temperatures
- Correct pressure ratio of MDO and HFO
- Data storage on SD / MMC card, optional print out
- Fuel record book (blend or change over)

Benefits

- Complies with MARPOL regulations
- Easy installation / short downtime
- Prevent thermal damage on engine
- Blending oil saves expensive diesel fuel
- Just-in-time-change saves diesel fuel

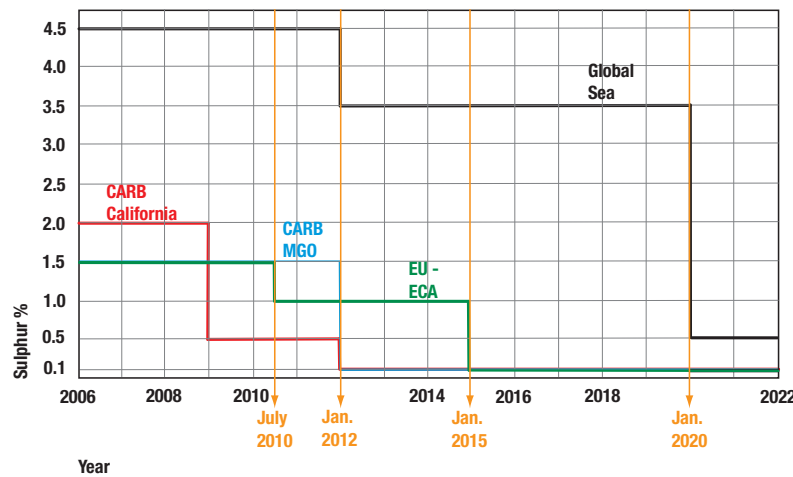
Worldwide emission control areas (ECA)



Planned ECA's with different fuel quality:

- Coast of USA incl. Hawaii and Alaska
- Canada
- Great Lakes USA
- Mediterranean Sea
- Coasts of Mexico
- Tokyo Bay
- Singapore
- Hong Kong
- Korea
- Australia
- Black Sea

Timeline for sulphur limitations in fuel oil

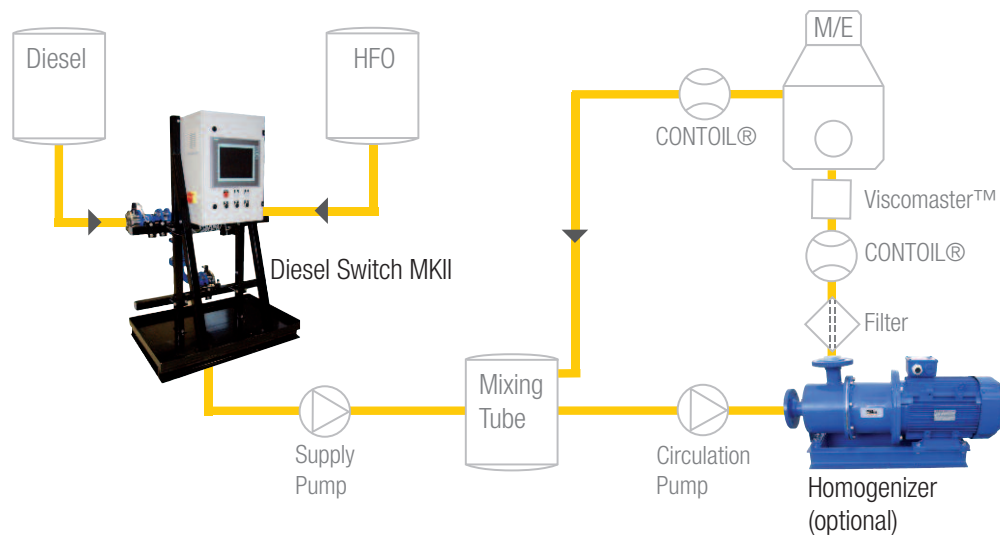


MARPOL ANNEX VI Regulation 14 and Regulation 18

EU Directive 1999/32/EC and 2005/33/EC for Baltic and North Sea ECA

CARB - California Air Resources Board - Regulation 13 CCR §2299.2(e) and 17 CCR § 93118.2(e)

Schema

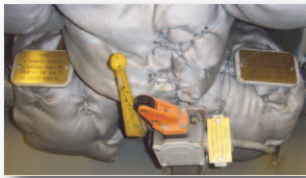


Diesel Switch MKII Technical options

Manual change over valve

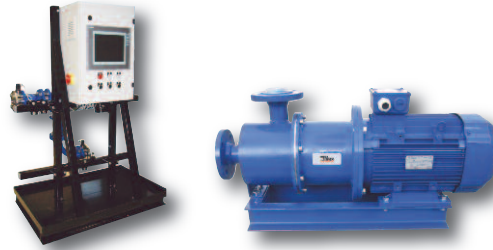
- ! risk of incidents due to uncontrolled change over
- ! risk of damages in fuel system due to temperature shocks

- ! risk and consequences for ship operator and owner
- ! requires highly skilled engine crew



Diesel Switch MKII & Homogenizer

- ✓ automatic and safe change over unit with safety functions
- ✓ no risk of incidents, where frequent fuel changes are necessary due decrease to vessel's trading pattern
- ✓ no risk of damages in fuel system or engine stop
- ✓ effective change over or blending procedure
- ✓ simple and universal design - easy installation
- ✓ no extra pump necessary



Saving potentials considering fuel oil blending

Example

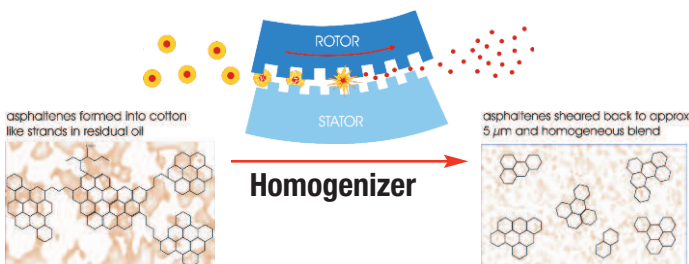
- Sulphur-limit of 1 % in ECA
- Price of MDO EURO 750.-/mt, price of HFO EURO 480.-/mt
- 3 % Sulphur in HFO, 0.3 % Sulphur in MDO
- Price of blend oil EURO 680.-/mt (Ratio = 26:74 = HFO:MDO)

Engine consumption	Savings (time in ECA Zone)			
	per hour	per day	per 10 days	per 20 days
2 t/hr	140.- €	3'360.- €	33'600.- €	67'200.- €
4 t/hr	280.- €	6'720.- €	67'200.- €	134'400.- €
6 t/hr	420.- €	10'080.- €	100'800.- €	201'600.- €

ROI will be between 3...12 months!

Homogenizer (optional)

The JOWA Homogenizer operates on the principles of mechanical shearing and ultrasonic forces. It utilises a special conical shaped milling gear, to generate high hydrodynamic power consisting of shearing, friction and acceleration forces with pressure waves of high frequency. The high molecular asphaltenes, the existing cat-fines, remaining water etc. are homogenized into heavy fuel oil with droplet sizes between 1 - 5 µm.



Features:

- Continuous HFO homogenizing on board by shearing of asphaltene clusters
- Pure mechanical and no chemical treatment
- Free adjustable clearance between rotor and stator

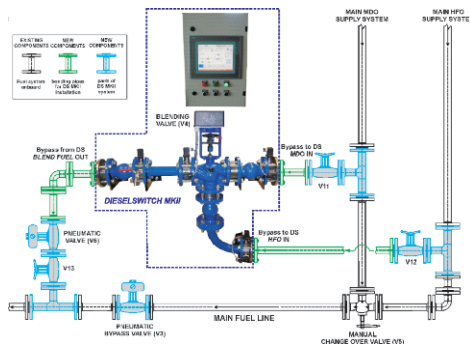
Benefits:

- Reduced operational costs due to
 - improved combustion process
 - reduced exhaust emissions
 - reduction of sludge
 - less wear and tear on engine components

Specifications and ordering information

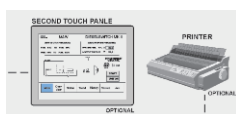
Diesel Switch MKII

Size / Type	Art. No.
DN 32	94716
DN 40	94717
DN 50	94718
DN 65	94619
DN 80	94720
DN 100	94955



Diesel Switch MKII Options

Size / Type	Art. No.
Fuel oil compatibility test kit (ASTM)	94721
Fuel change over record book	94722
Diesel Switch 2nd display	94728
Diesel Switch printer	94729



Homogenizer Technical data

Power supply	400/460 V; 50/60 Hz		
Working pressure	max. 15 bar		
Working temperature	max. 150 °C		
Size / Type	Capacity sample IF0380	Flange (in- /out-let)	Art. No.
	at 100 °C (~36cSt)	at 130 °C (~15cSt)	
	[m³/h]	[m³/h]	
H 5.0	5.0	10.3	94709
H 8.0	8.0	17.8	94710
H 12.0	12.0	25.0	94711
H 25.0	25.0	44.0	94735

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