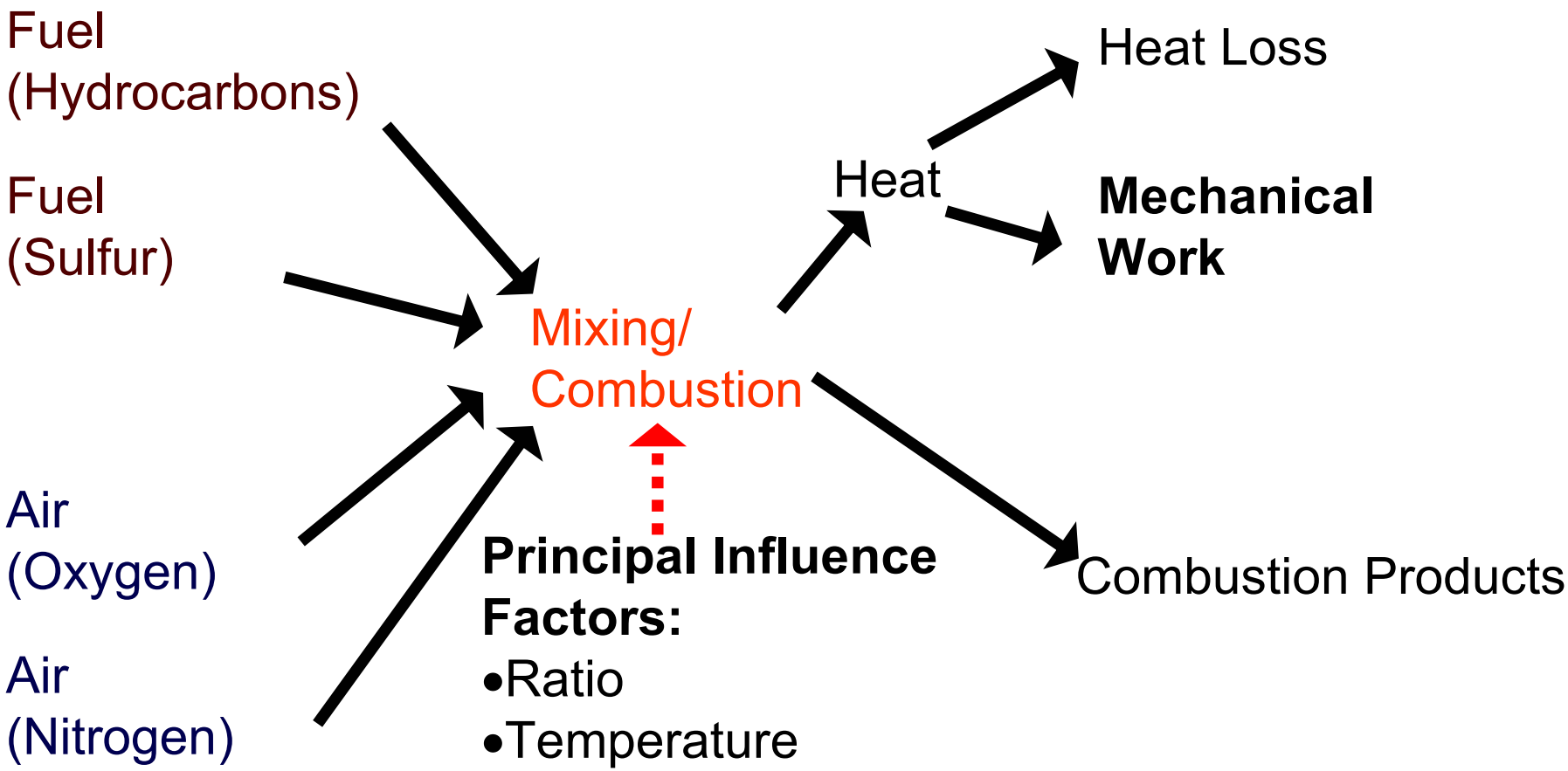
Contents

Combustion Process

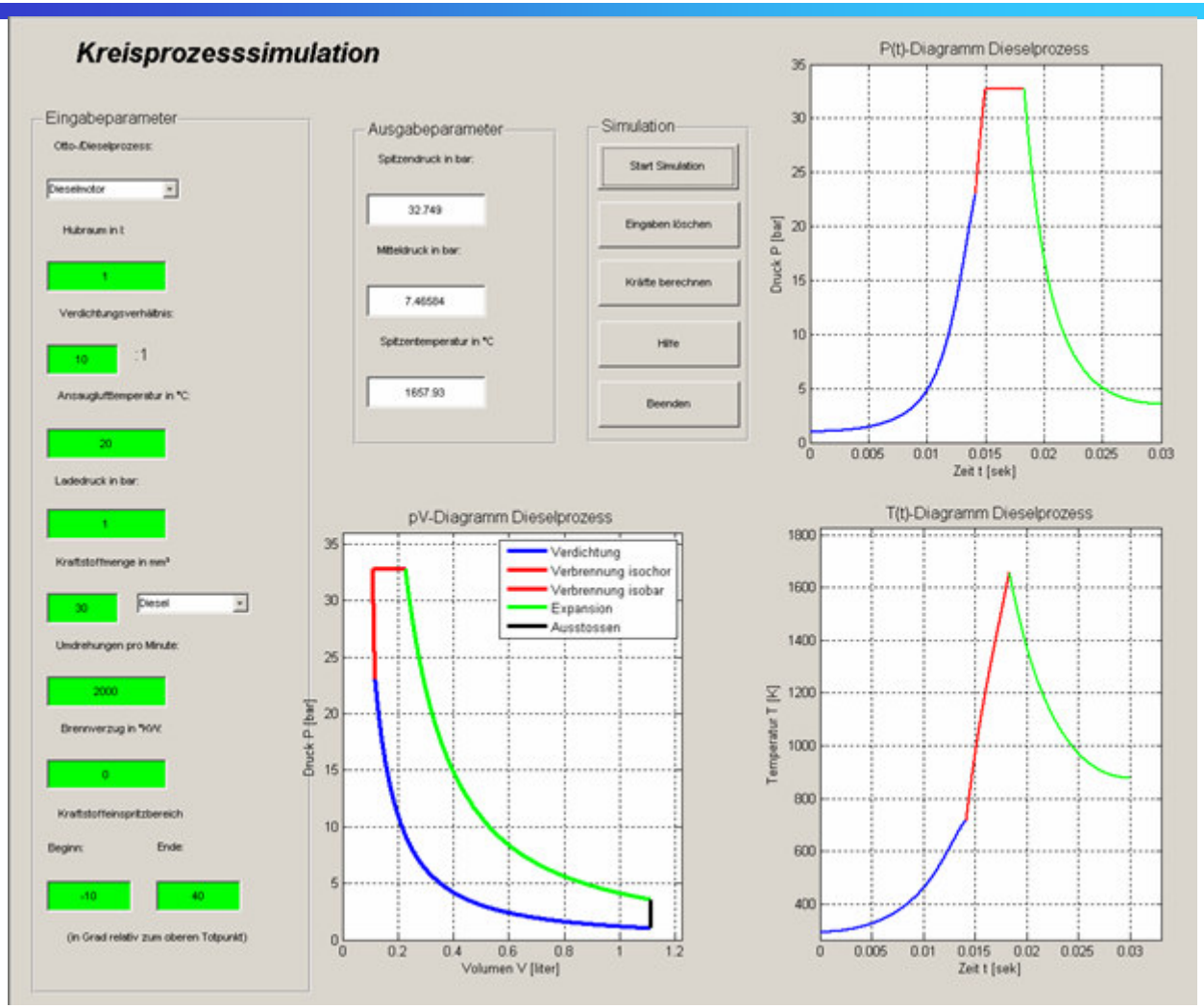


Emissions of Internal Combustion Engines

Emission		Effect
PM	**Soot/ PAH**	Cancer
Carbon Monoxide	CO	Blocking Oxygen Transport of Blood
Carbon Dioxide	CO_2	Greenhouse Gas
Nitrogen Monoxide	NO	similar CO
Nitrogen Dioxide	**NO_2**	Irritation of Respiratory Tract, „Acid rain“, Catalyzing Ozone
Sulphour Oxides	SO_x	„Acid Rain“, Irritation of Respiratory Tract
Aldehydes	**R-COH**	Typical Diesel Exhaust Smell
Water	H_2O	
Noise		Insomnia Cardiac/Circulatory Diseases

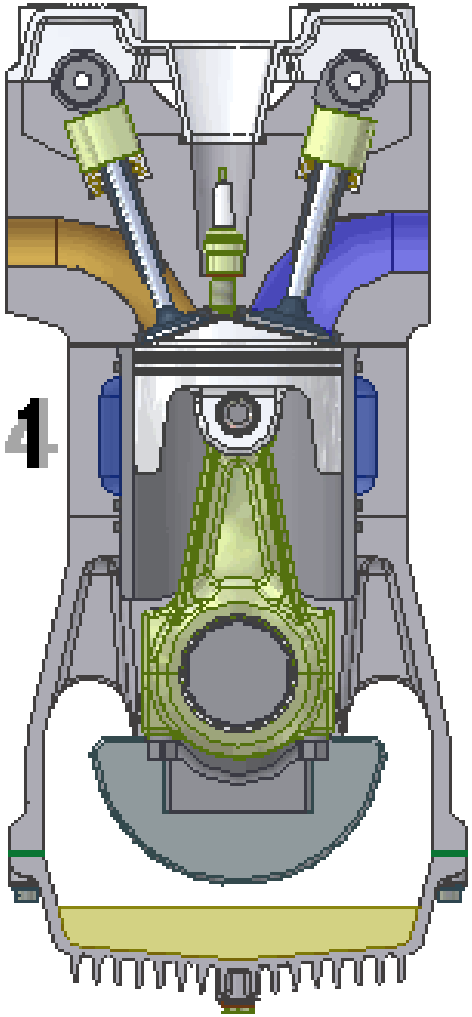
PM: Particulate Matter, PAH: Polycyclic Aromatic Hydrocarbons

Thermodynamic Cycle



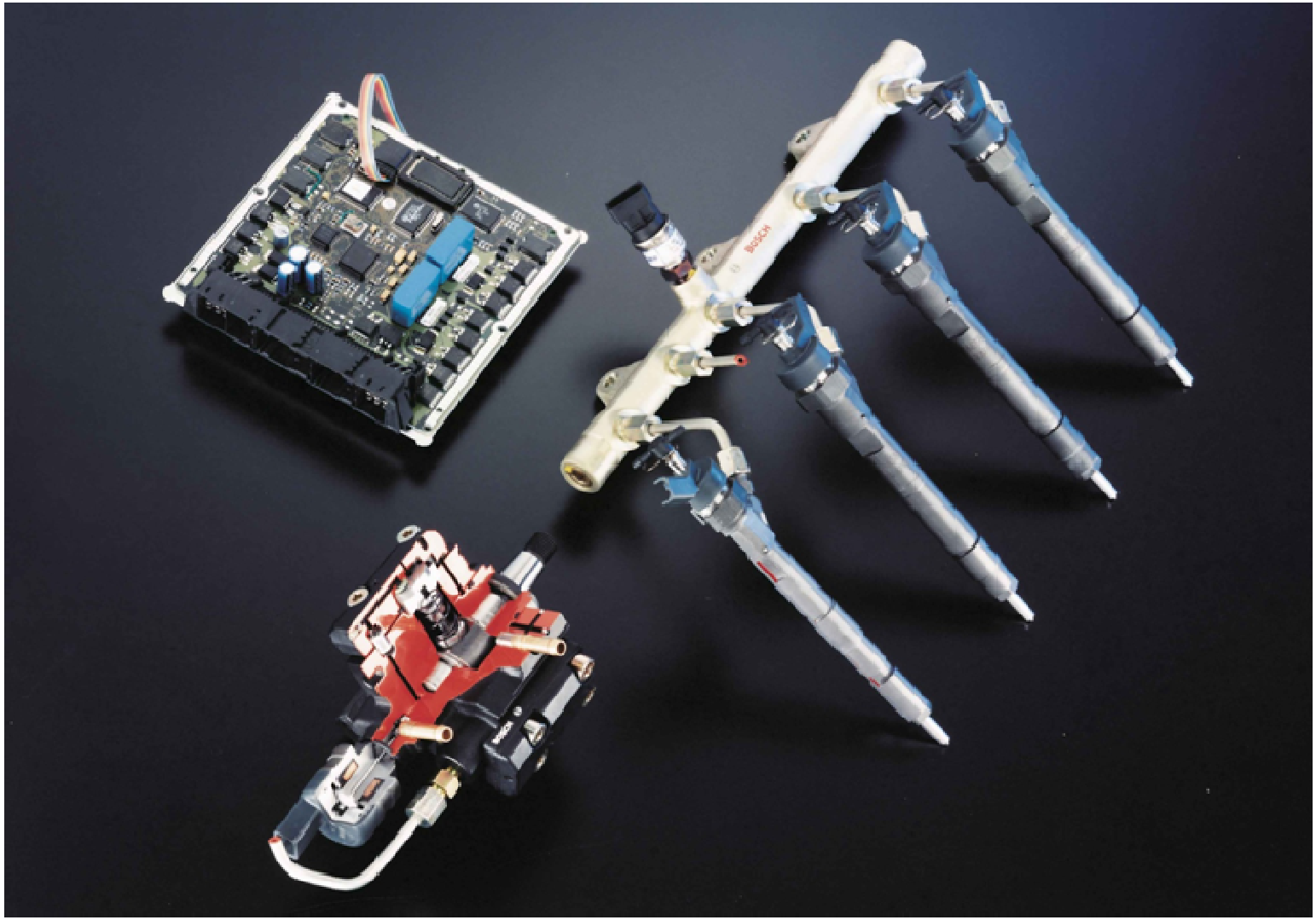
Example: Seiliger Process

Four-Stroke Engine (Principle)



Source: Wikipedia

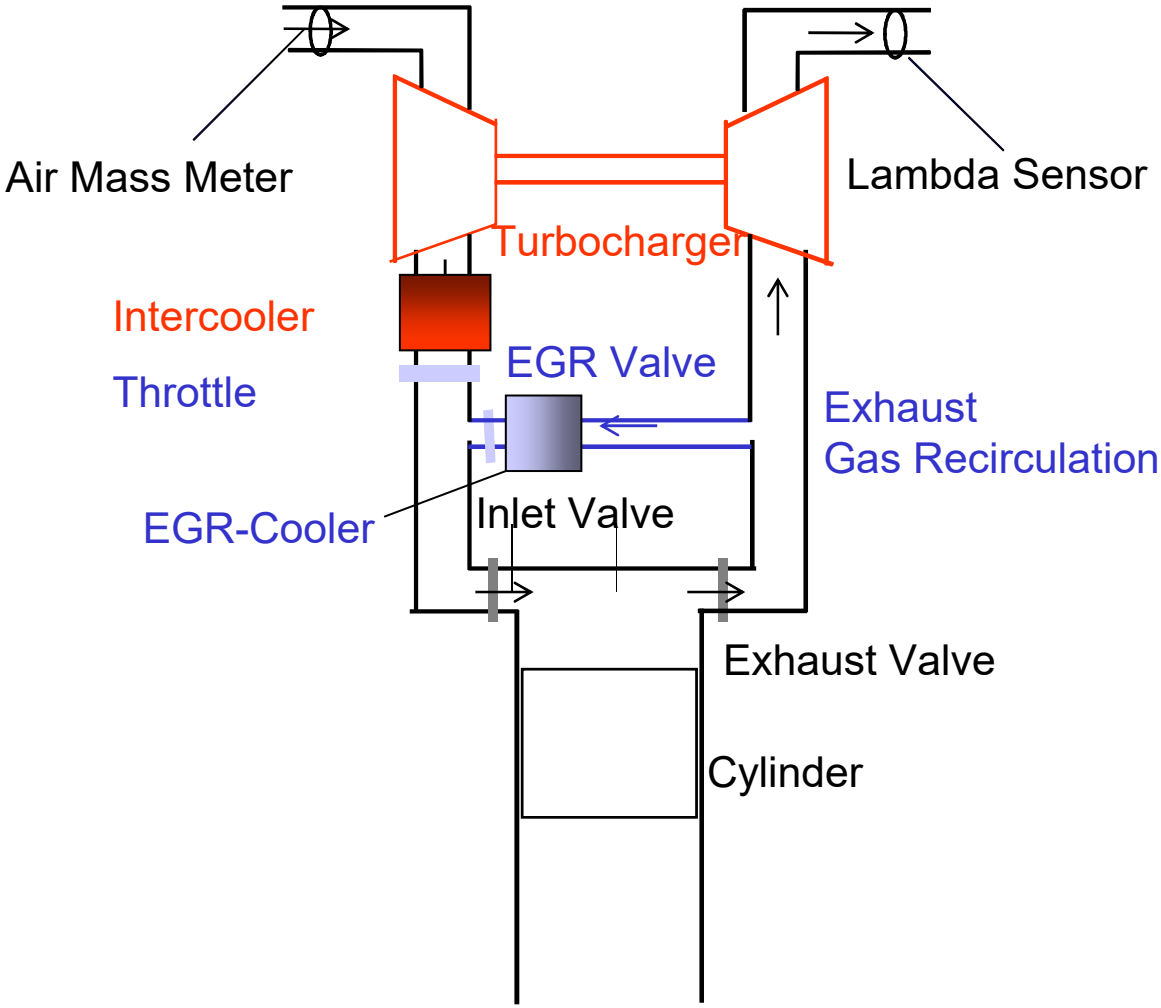
Common Rail Fuel System



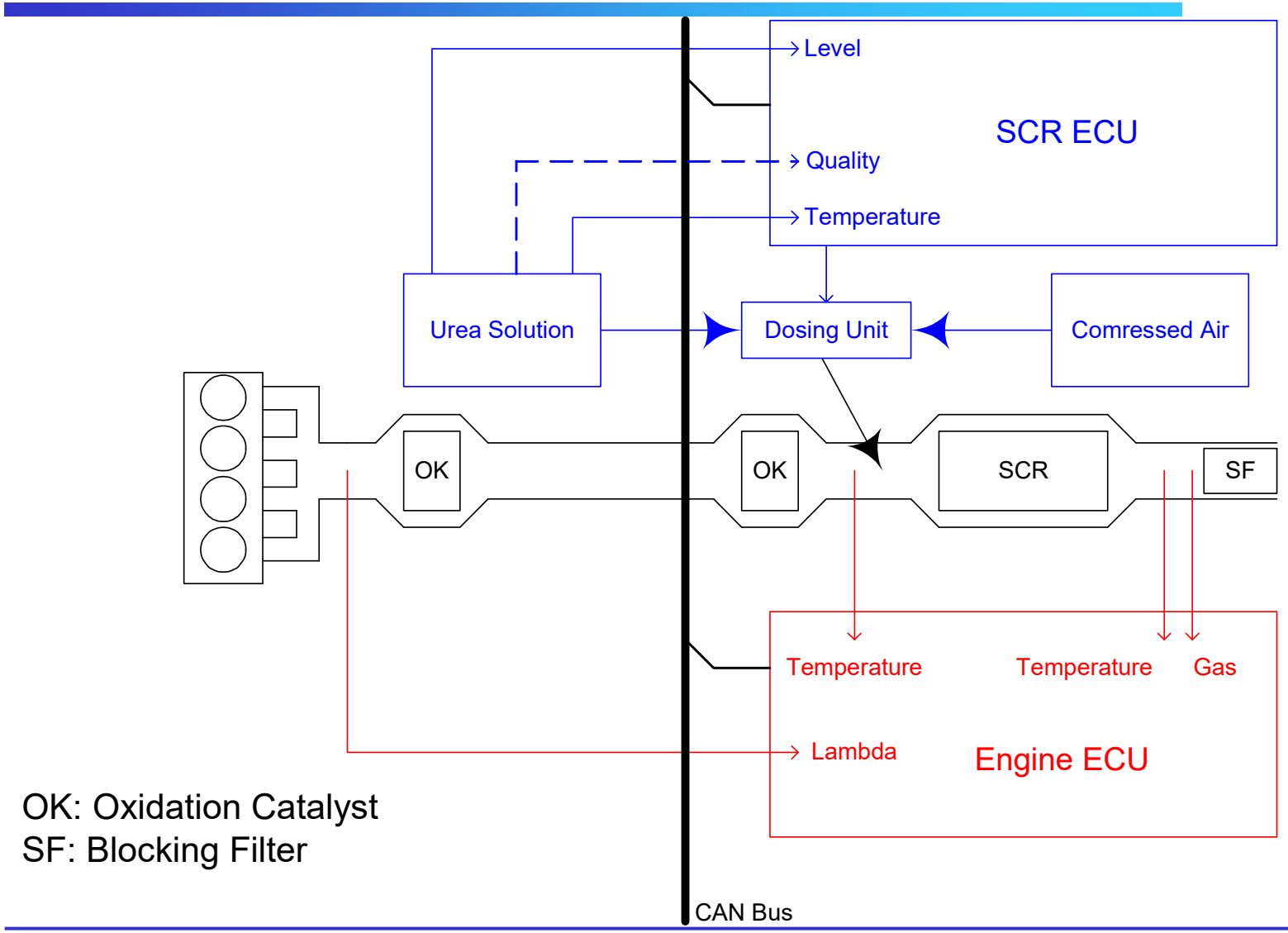
Source:
Robert Bosch
GmbH,
Stuttgart

Complete Air System

EGR:
„Exhaust Gas Recirculation”



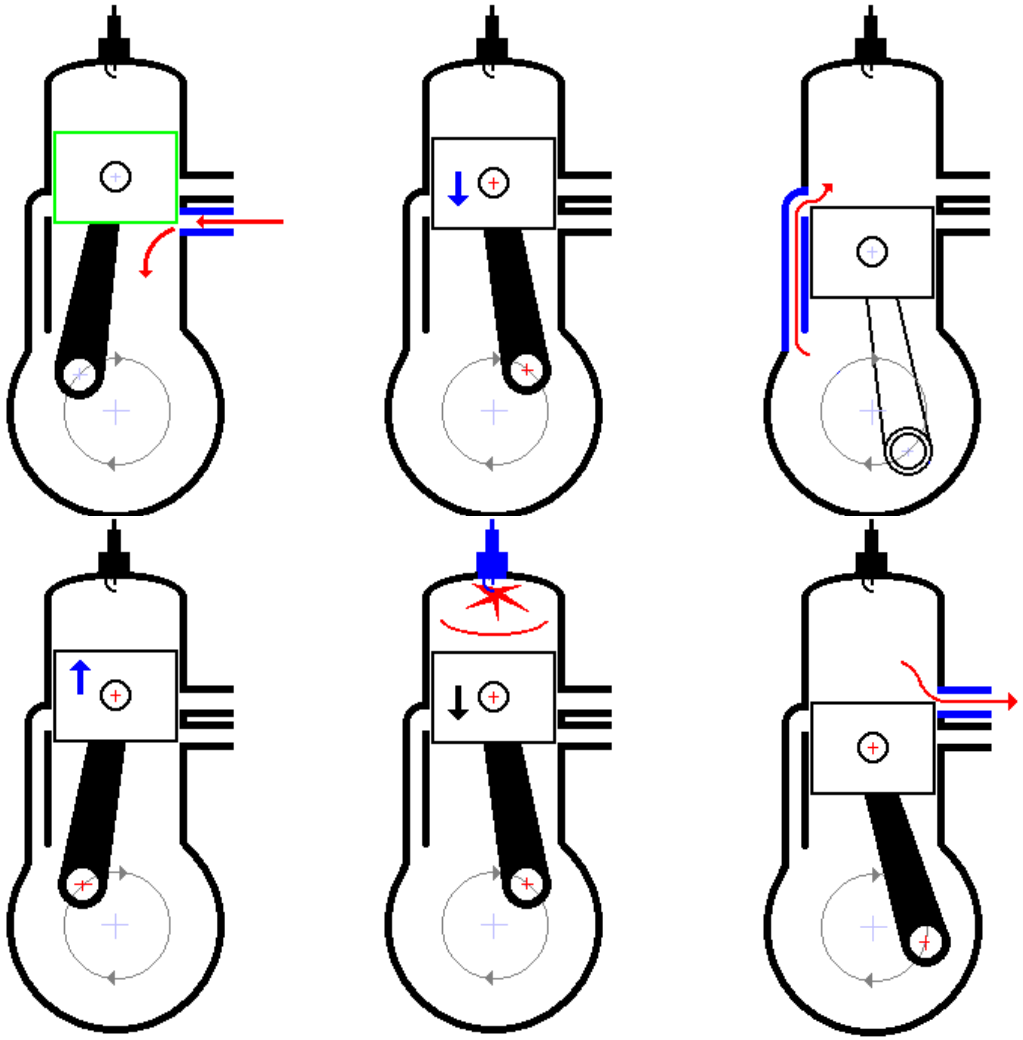
Exhaust Gas Treatment (Example)



OK: Oxidation Catalyst
SF: Blocking Filter

Four-Stroke Engine (Realization)

2 Stroke Engine (Principle, Crank Case Scavenging)



Source:
http://www.motorrad.de

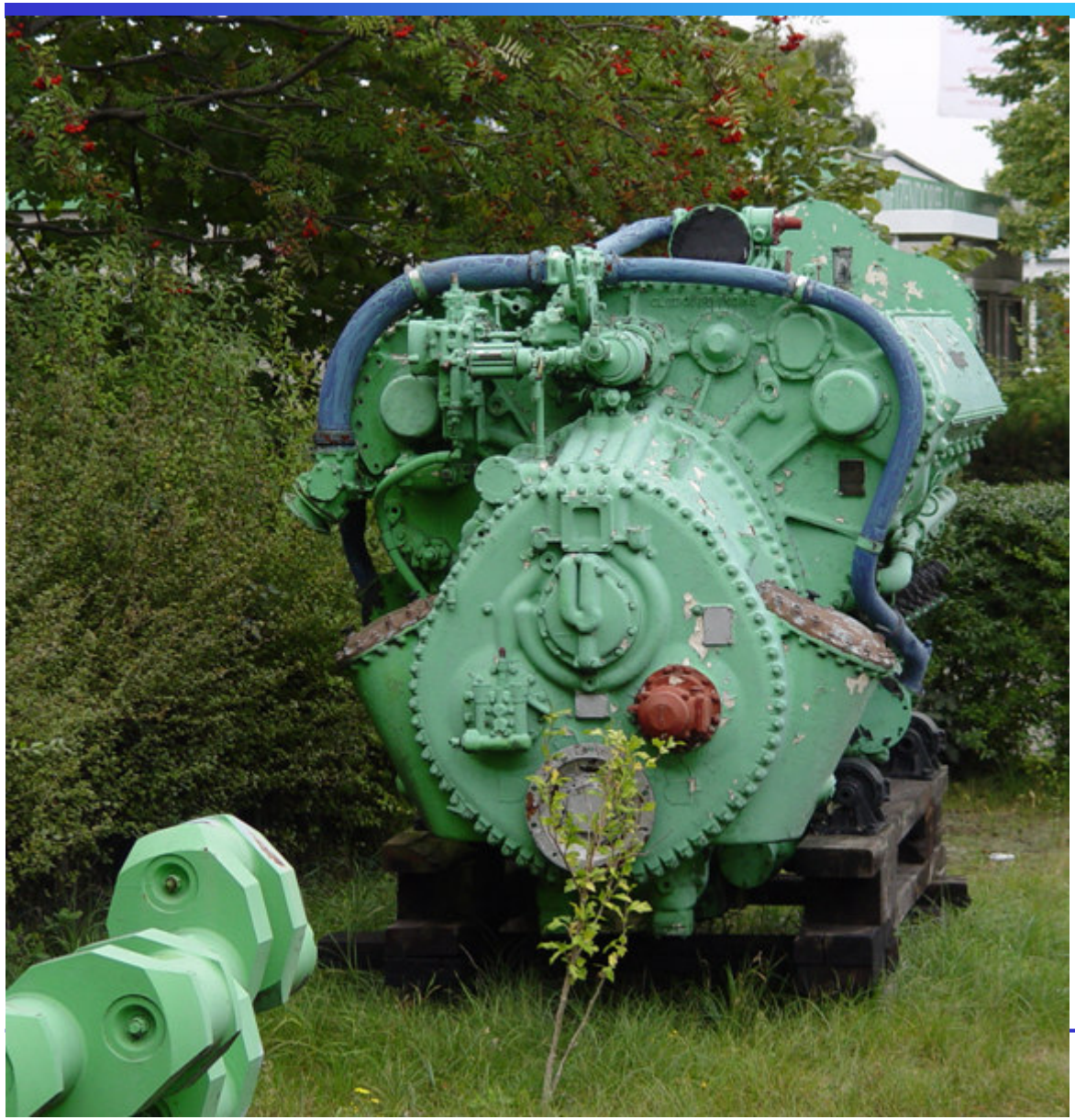
„Dolmette” by Brösel

(24 Chain Saw Engines by Dolmar)

Source:

http://www.dolmette.de

Counter Piston Engine



Napier Deltic

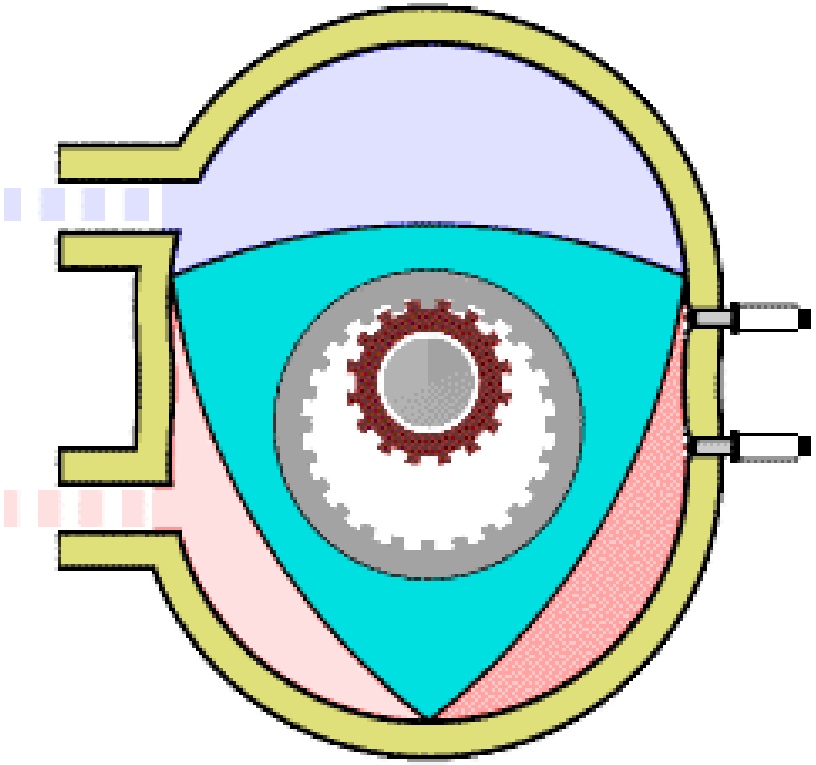
(historic)

Two-Stroke Engine (Uniflow Scavenged)

MAN Diesel SE
12K98MC-C

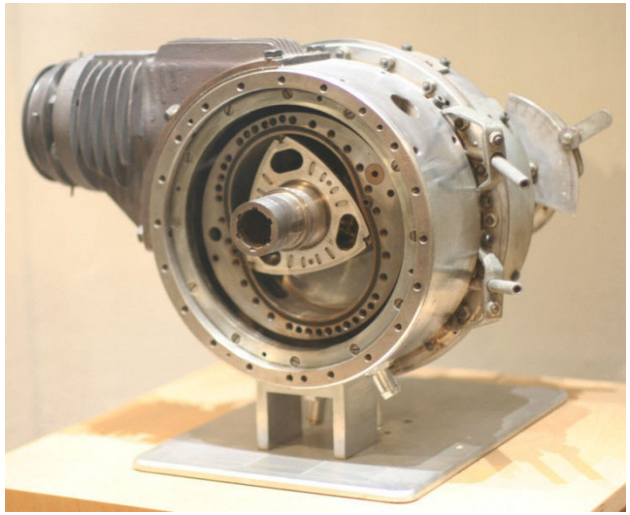
Power:
68400 kW
(nearly 100 000 HP)

Wankel Engine (Principle)



Source: Wikimedia Commons,
User Y_tambe

Wankel Engine (Realizations)



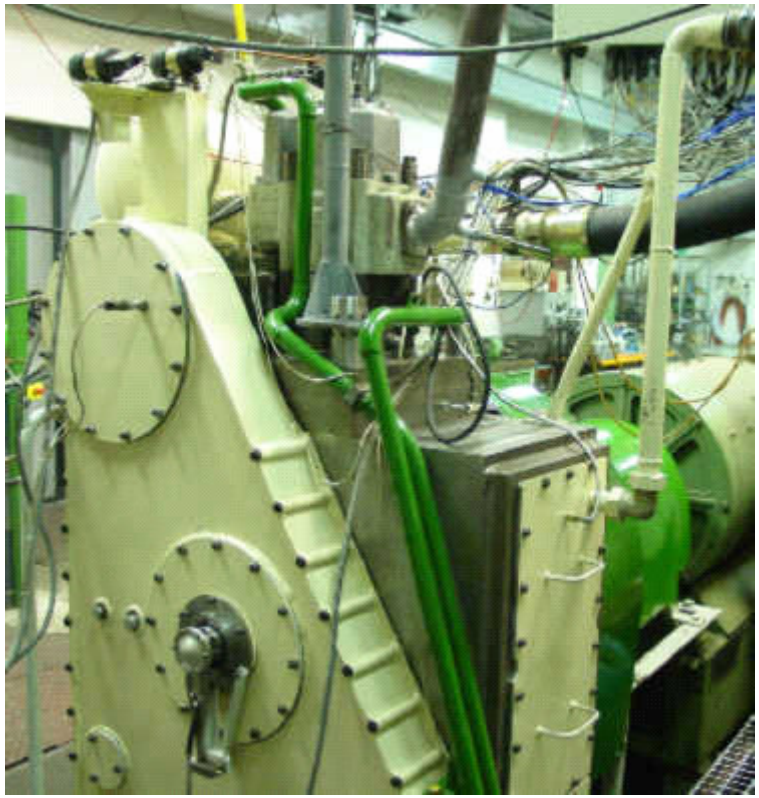
Experimental Engine by Felix Wankel

Source: Wikipedia

Aircraft Engine

Source: Mistral Engines SA

Research Engine



One-Cylinder Research Engine

Source: WTZ Roßlau