

# Contents



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**A-2) Maintenance of ME-C engine**

**A-3) Trouble of ME/ME-C engine**

### **B) MC engine**

**B-1) Trouble of MC engine**

# Contents



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- 1) Electronic control VIT system**
- 2) Running-in ring package(TN083)**
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### **C-2) Technical information**

- 1) Low Sulphur Fuel oil(SN174, MN082)**

# Contents



## **Lecture items**

### **A) ME engine**

#### **A-1) General outline of ME engine**

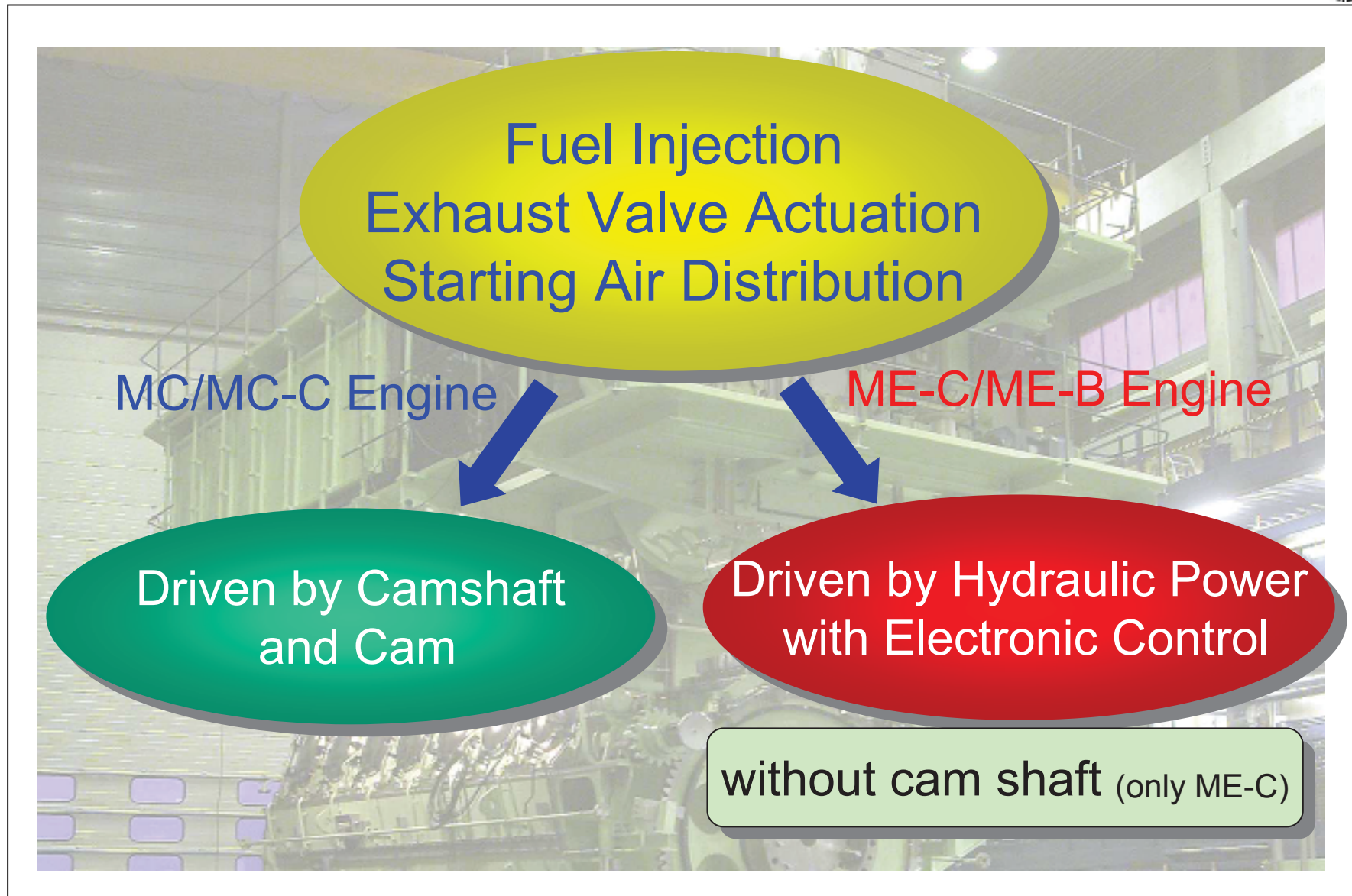
#### A-2) Maintenance of ME-C engine

#### A-3) Trouble of ME/ME-C engine

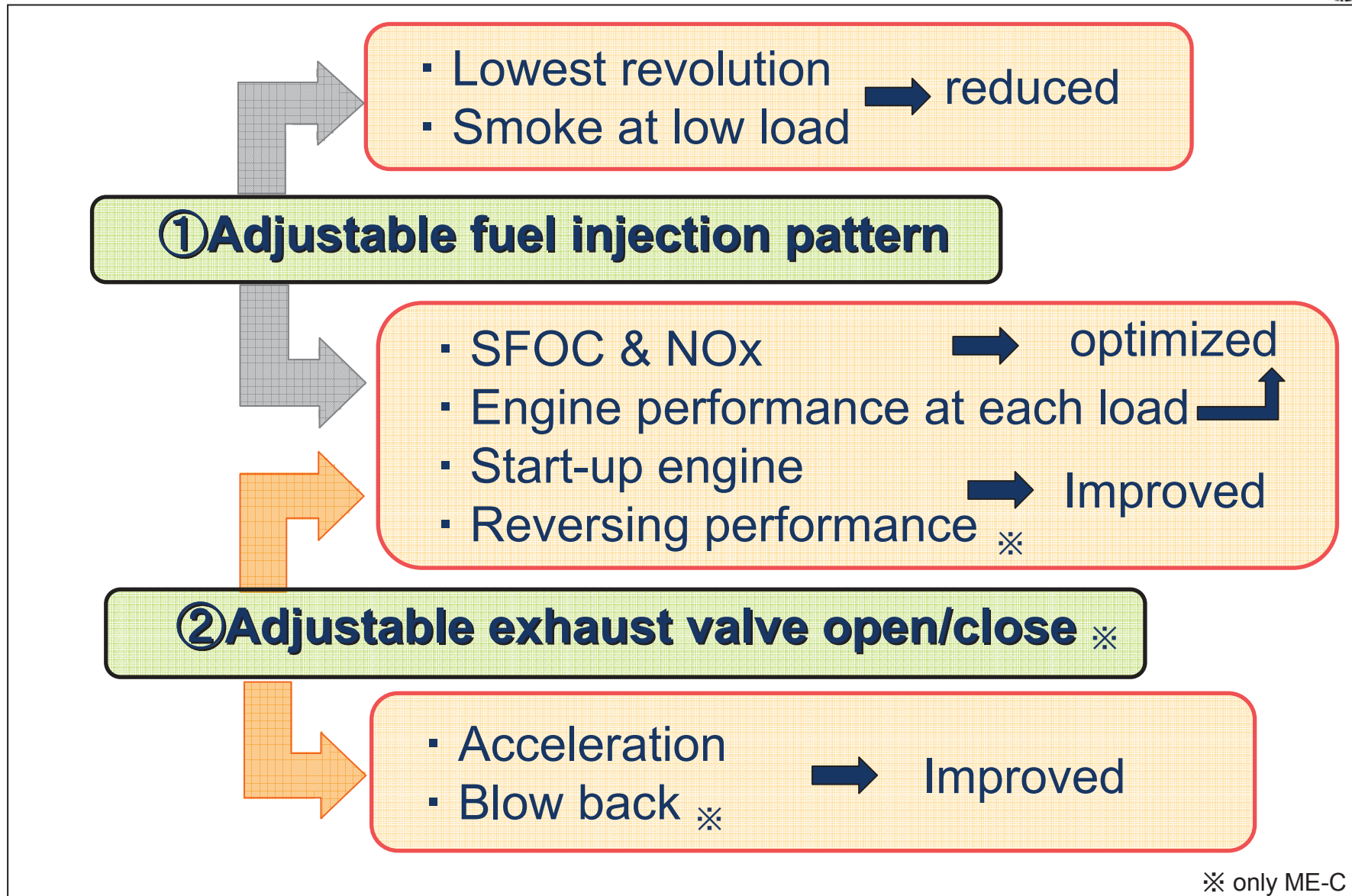
### **B) MC engine**

#### B-1) Trouble of MC engine

## A-1) Feature of ME-C/ME-B Engines



# ME/ME-C Engine's advantages



# ME-C/ME-B Engine's advantages



## ③ Adjustable start air injection timing

Starting acceleration  
& certainty ※ ➡ Improved

## ④ Optimized cylinder oil feeding

- Cylinder oil consumption ➡
- Particulate Matter ➡ reduced
- Cylinder condition ➡ optimized

## ⑤ Easy manipulation & monitoring by MOP (Main Operating Panel)

- Continuous monitoring
- Setting of access level
- Upgrade of software
- Adjustable cylinder deviation, cylinder oil feed rate
- Certainty starting operation
- Error indication, log record
- Setting of operation mode

※ only ME-C

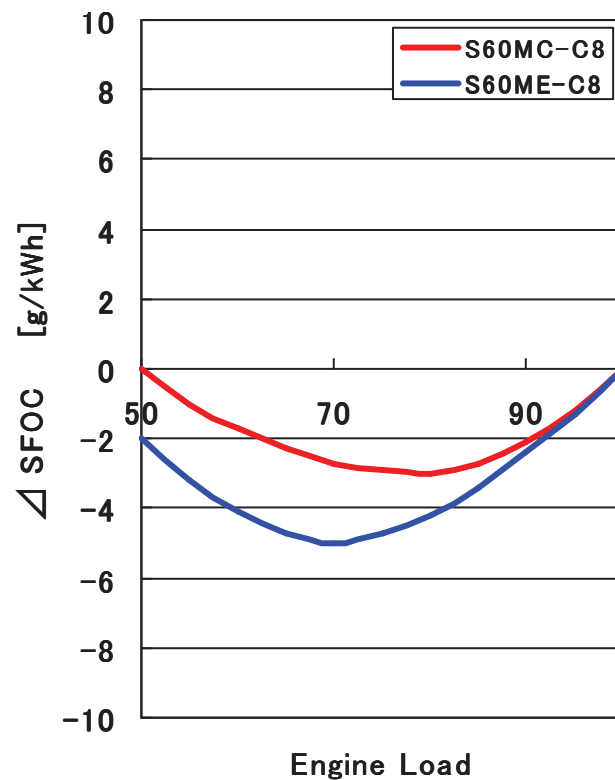
# To reduce the environmental load



- SFOC reduction • CO<sub>2</sub> reduction • EEDI improvement
- Response to NO<sub>x</sub> regulation Improvement at each load

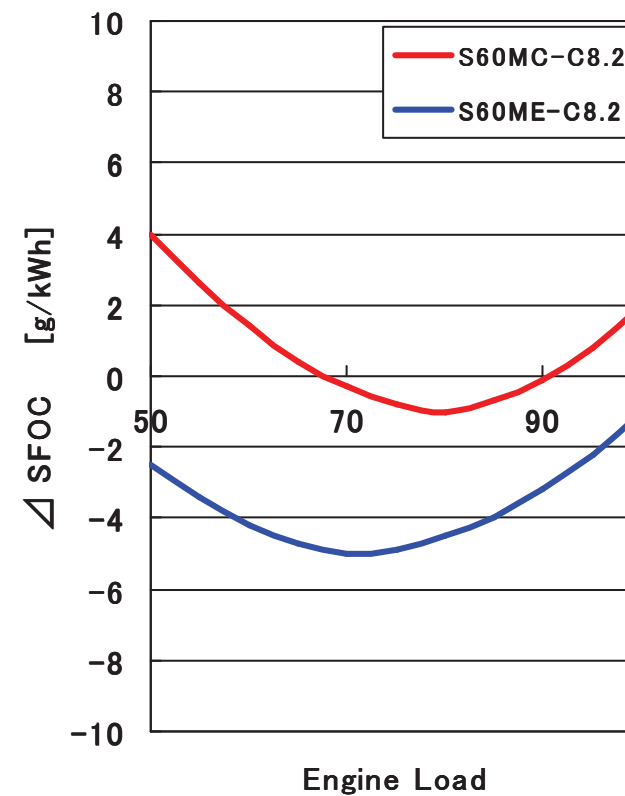
## Tier 1

Improvement at low load



## Tier 2

→ Further improvement by dot 2

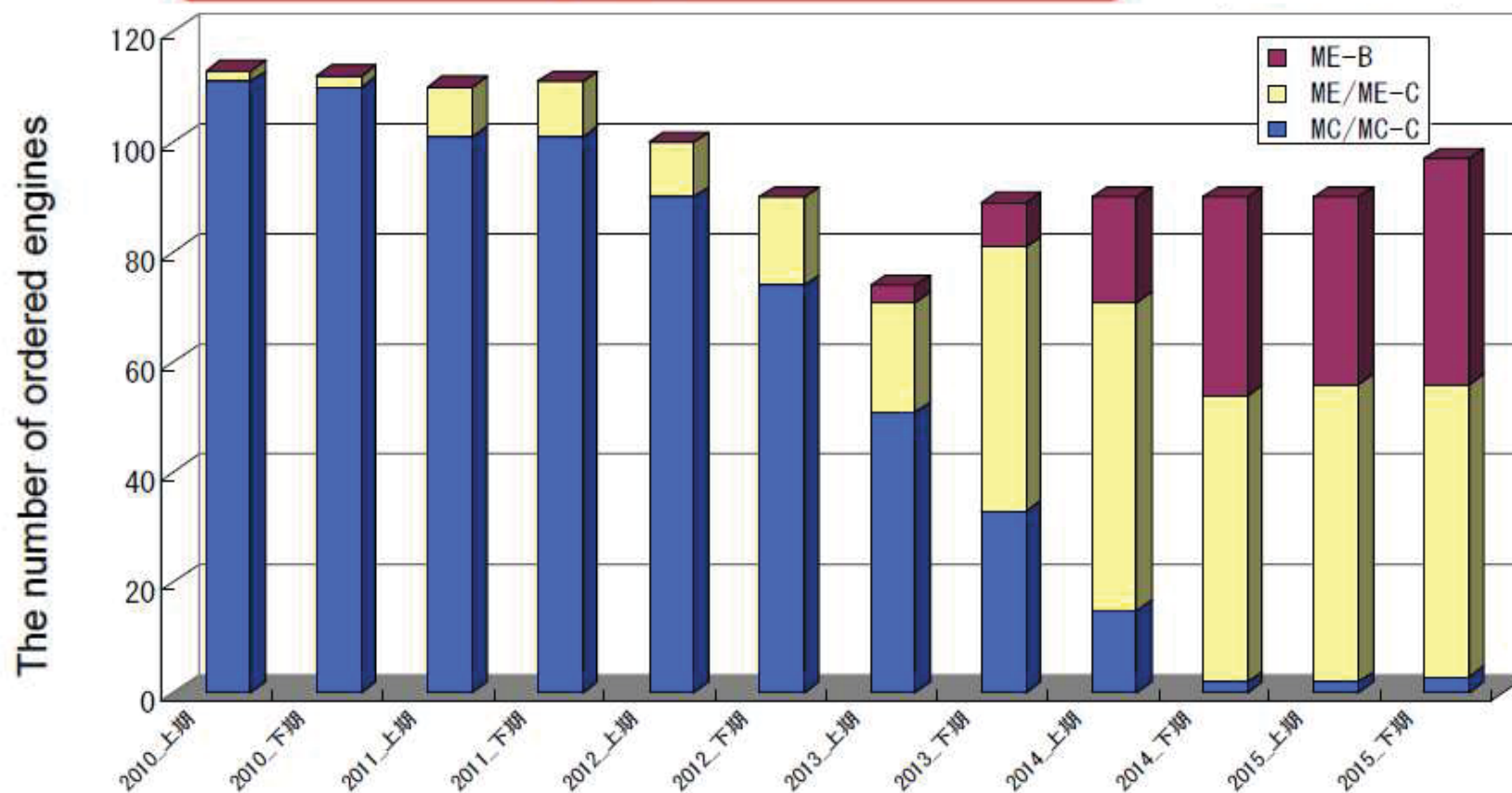


# Accelerating toward ME ~MITSUI-MAN B&W~



Current inquiry is almost ME

※2014 is expectation



95% in the second half of 2014 is ME

# ME Mechanical Design Concept



## Basic Differences

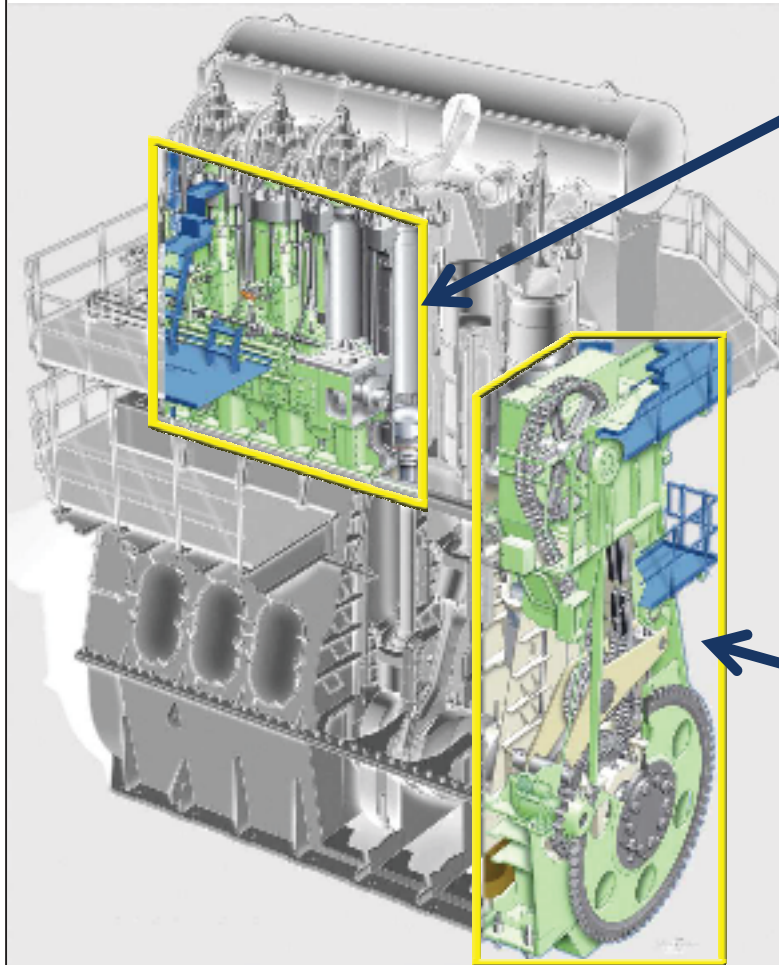
|                                       | MC-C                                       | ME-C                                         | ME-B                                       |
|---------------------------------------|--------------------------------------------|----------------------------------------------|--------------------------------------------|
| Contr. Fuel injection Driver          | Camshaft<br>Chain                          | Electronic (HCU)<br>Chain <sup>※2</sup> /HPS | Electronic (Dual HCU)<br>El. Motors/HPS    |
| Contr. exh. valves Driver             | Camshaft<br>Chain                          | Electronic (HCU)<br>Chain <sup>※2</sup> /HPS | Small camshaft (+Electronic⇒Dot3)<br>Chain |
| Contr. Cylinder oil Lubricator Driver | Camshaft Mechanical <sup>※1</sup><br>Chain | Electronic Alpha<br>Chain <sup>※2</sup> /HPS | Electronic Alpha<br>El. Motors/HPS         |
| Contr. Starting air distributor       | Camshaft (Distributor)                     | Electronic (Solenoid valve)                  | Camshaft (Distributor)                     |

※1 : Alpha is option

※2 : Only S50ME-C is gear-driven

HCU : Hydraulic Cylinder Unit  
HPS : Hydraulic Power Supply

# Parts withdraw from MC Engine



- Fuel injection pumps (conventional)
- Fuel pumps actuating gear, Regulating shaft
- Roller guides (Fuel & exhaust)
- Exhaust valve actuating gear
- Camshaft with fuel cams and exhaust cams

- Mechanical cylinder lubricators
- Chain drive for camshaft
- Engine driven starting air distributor
- Electronic governor with actuator

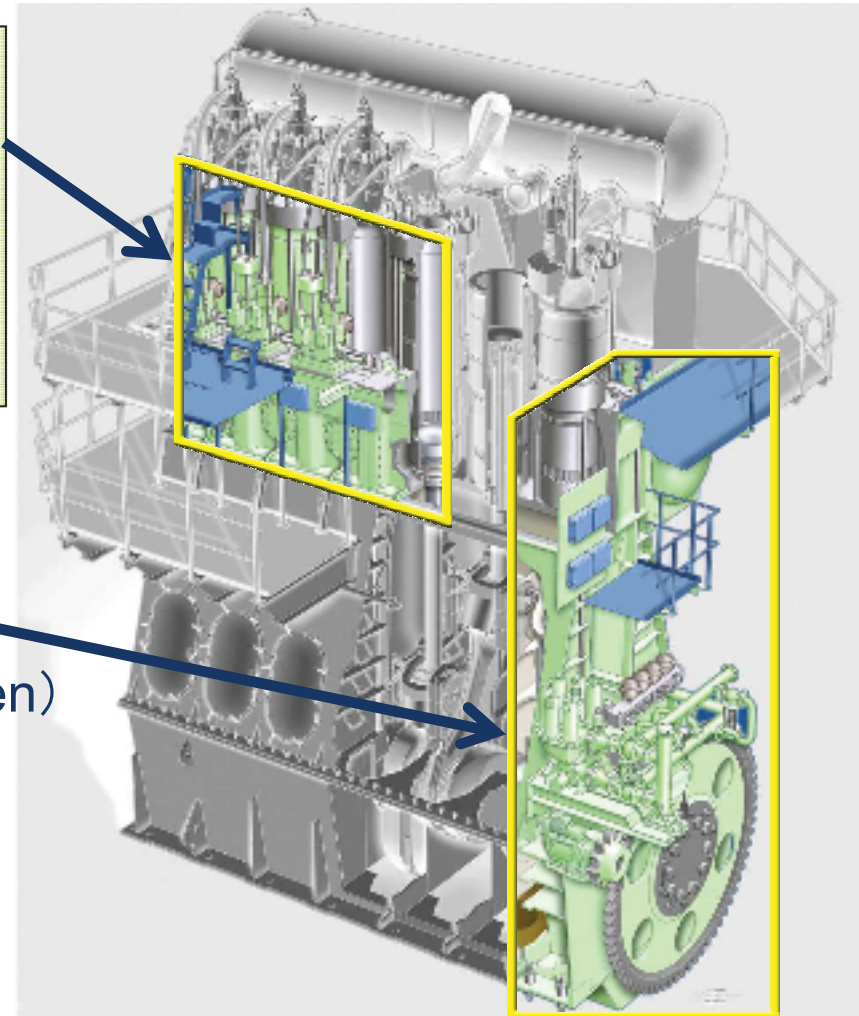
- Engine-side control console

# Parts added to ME Engine



## Hydraulic system

- HCU : Hydraulic Cylinder Unit
  - Fuel pressure booster
  - Exh. V. actuator
  - FIVA valve, cylinder lubricator
  - Accumulator
- HPS : Hydraulic Power Supply
  - Gear box
  - Hydraulic pumps(300bar)
  - Start-up pumps (Electrically driven)
  - Safety and accumulator block
  - Filter unit with back-flushing
  - Oil leak monitoring system

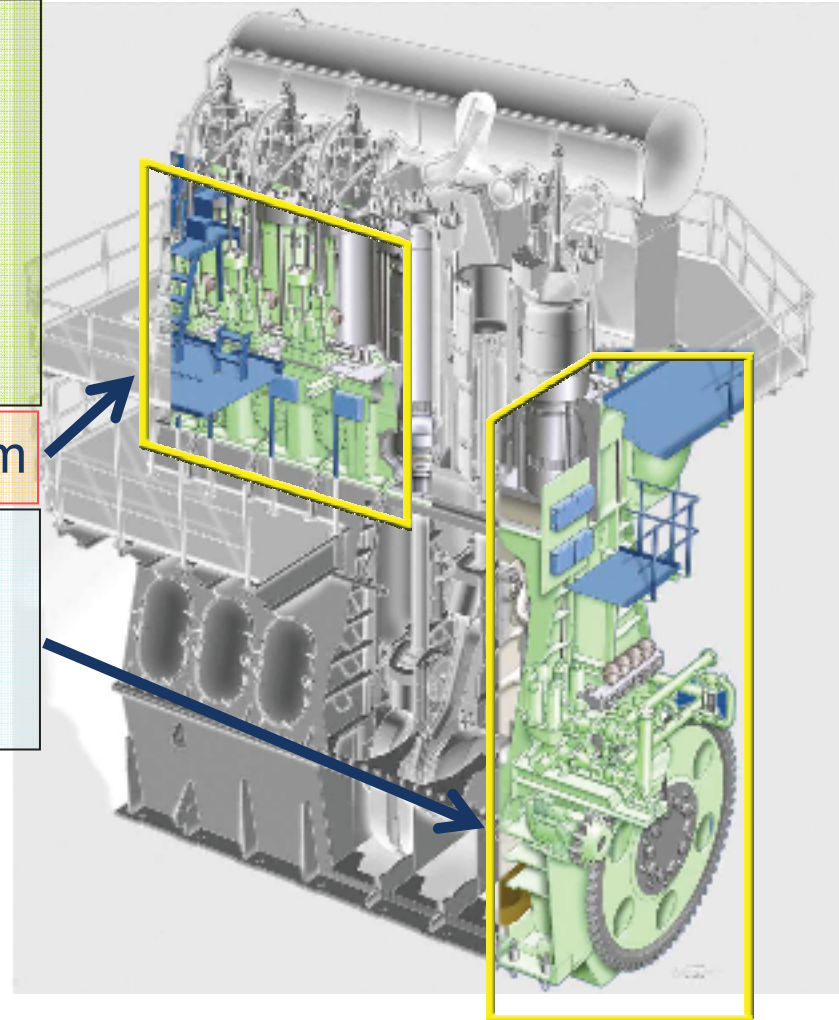


# Parts added to ME Engine



## Control system

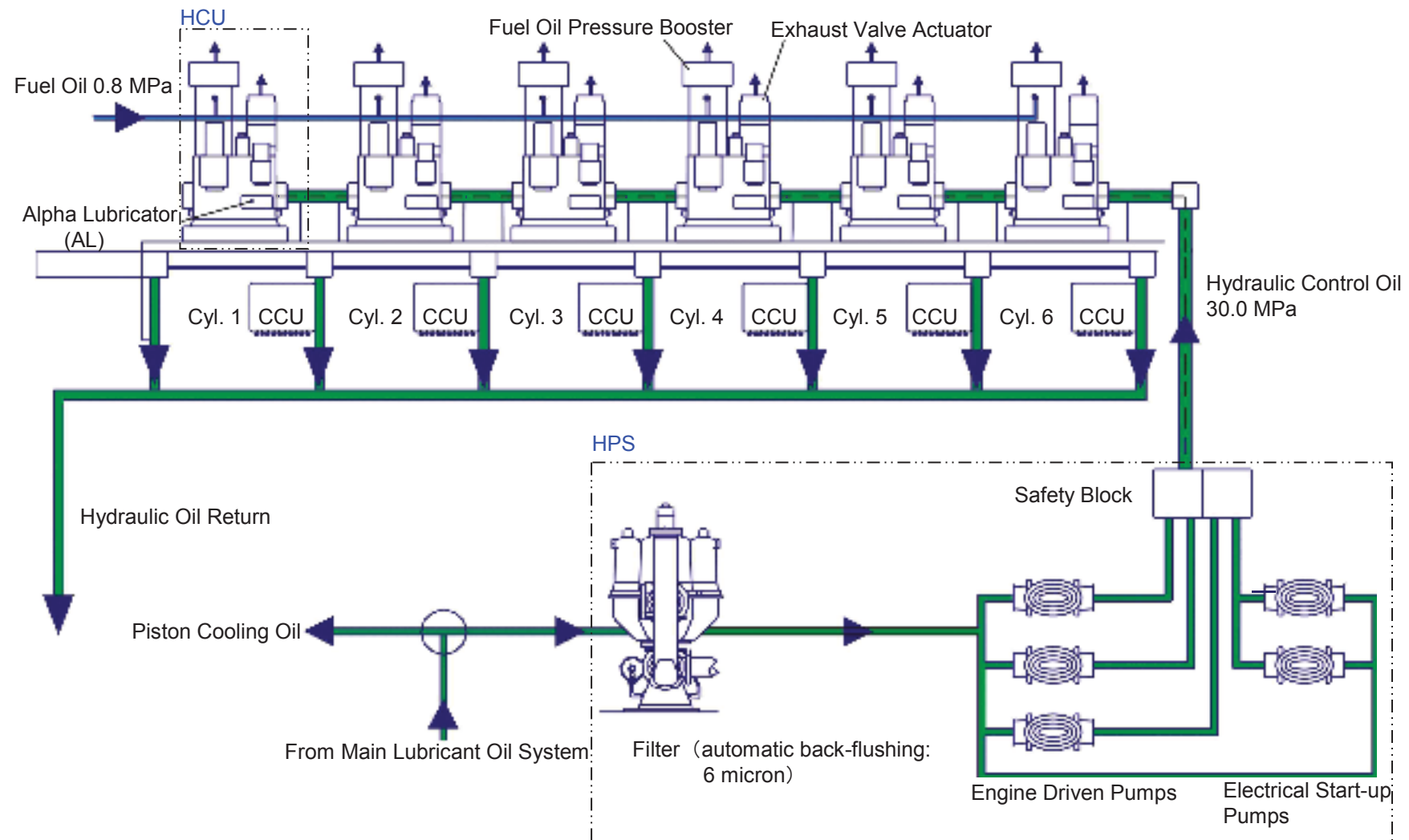
- ME Control System (ME-ECS)  
MPC:Multi Purpose Controller  
(ECU/CCU/ACU/EICU/SCU)  
MOP:Main Operating Panel  
LOP:Local Operation Panel
- Solenoid valves for starting air system
- Tacho system  
Angle encoder  
Reference sensor on turning wheel



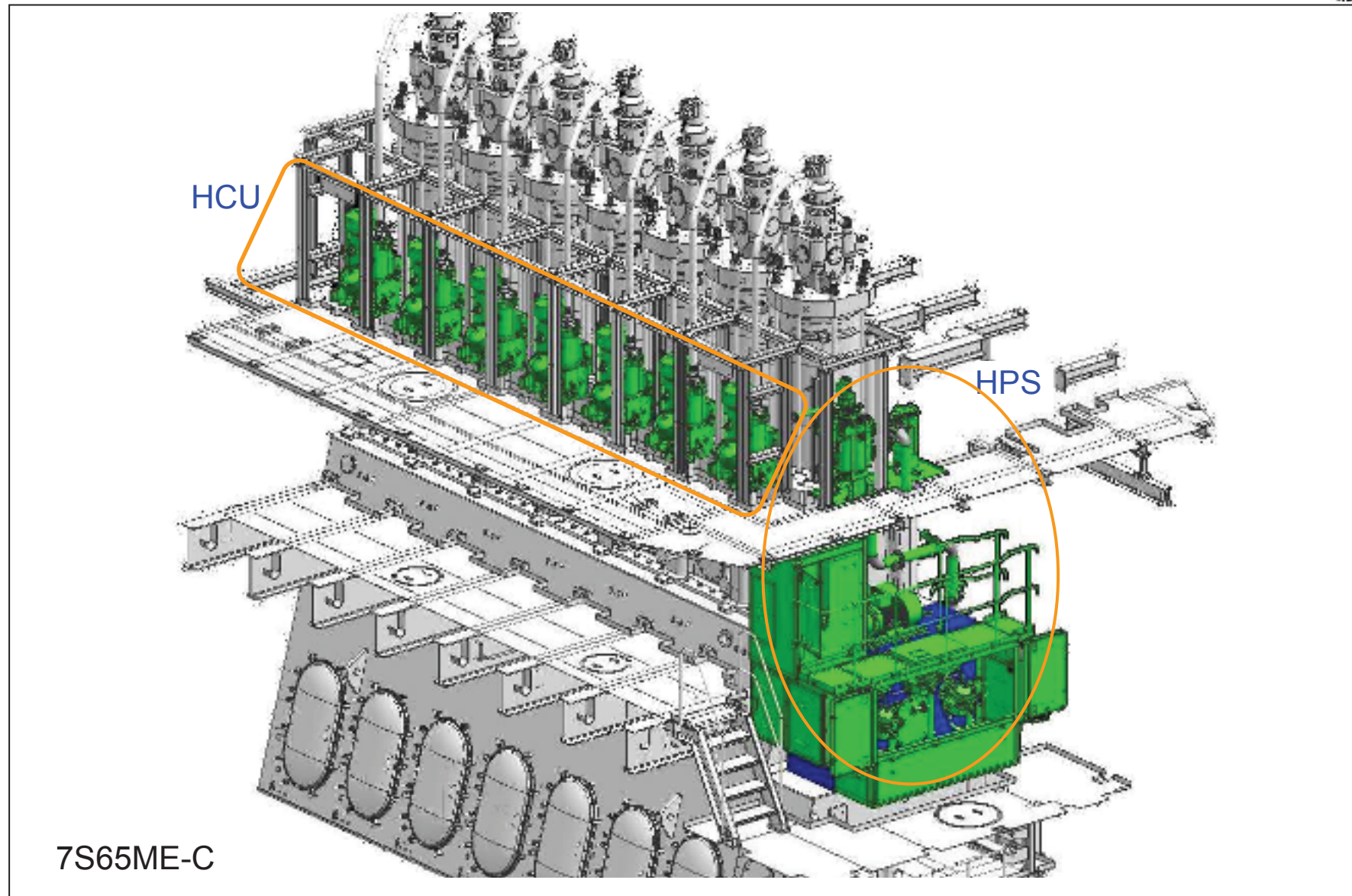
# Hydraulic System (System Oil Flow)



## Common (Integrated) Hydraulic Control Oil System (standard)



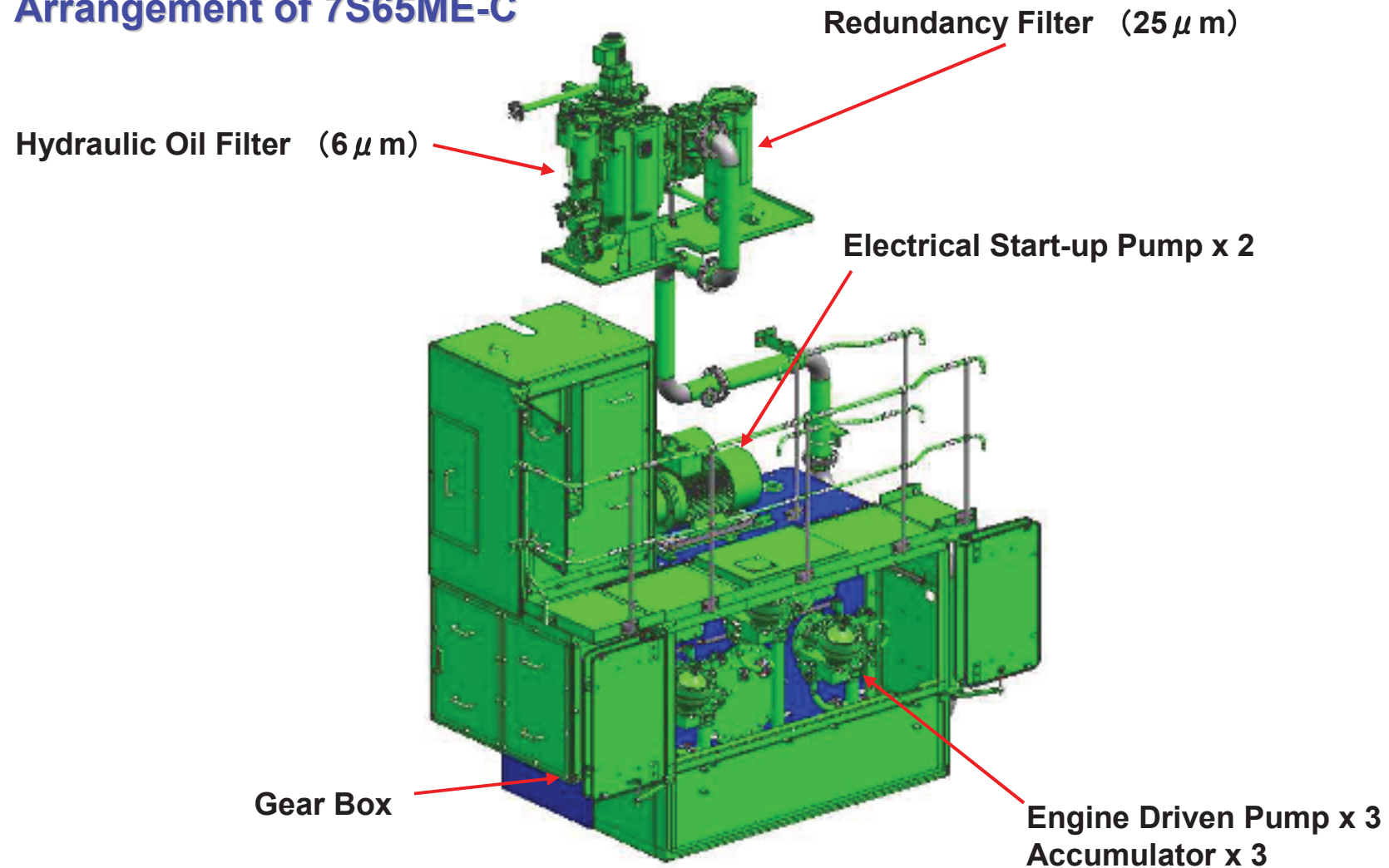
# Arrangement of Hydraulic Components



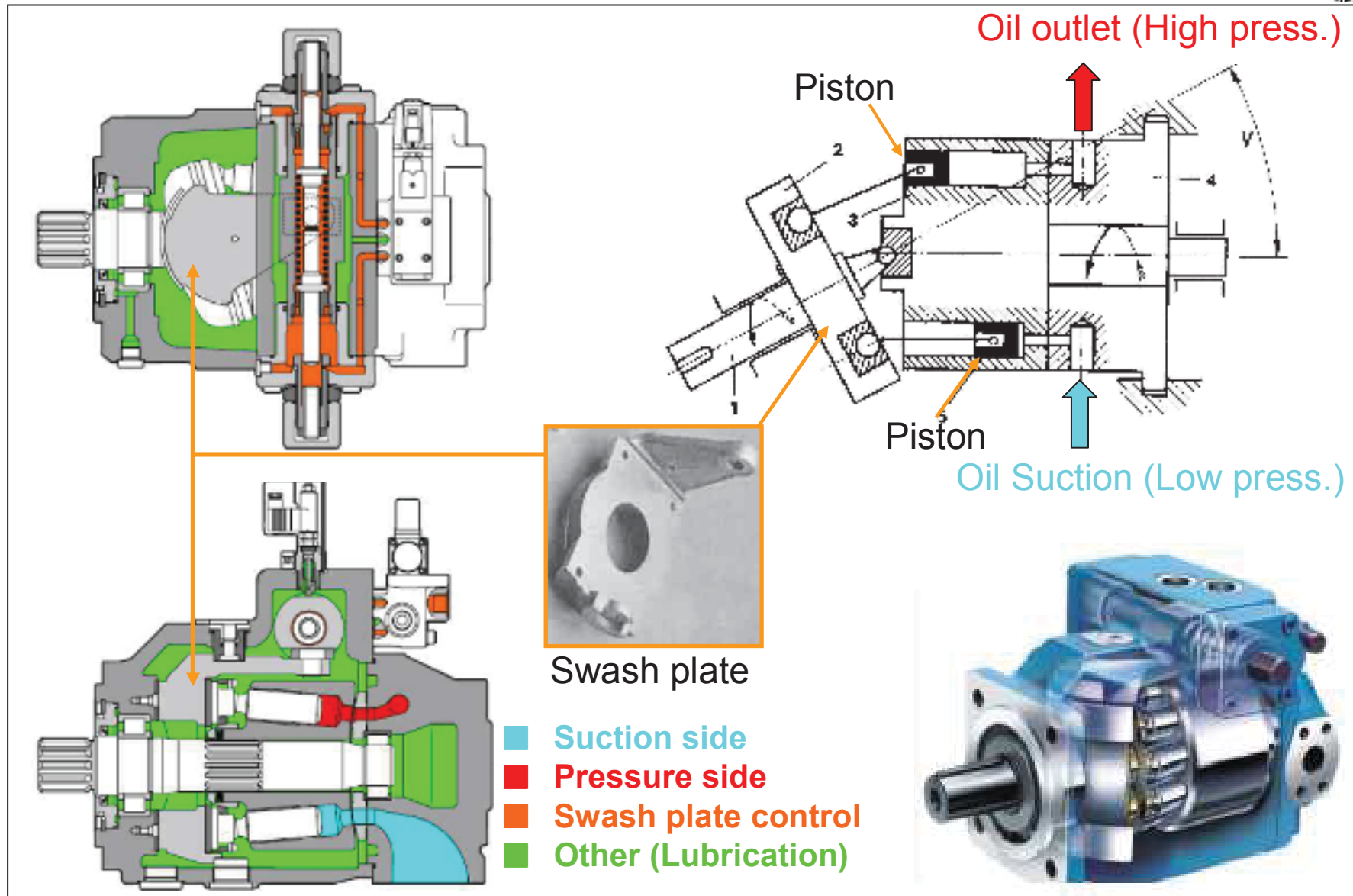
# HPS (with gear box cover )



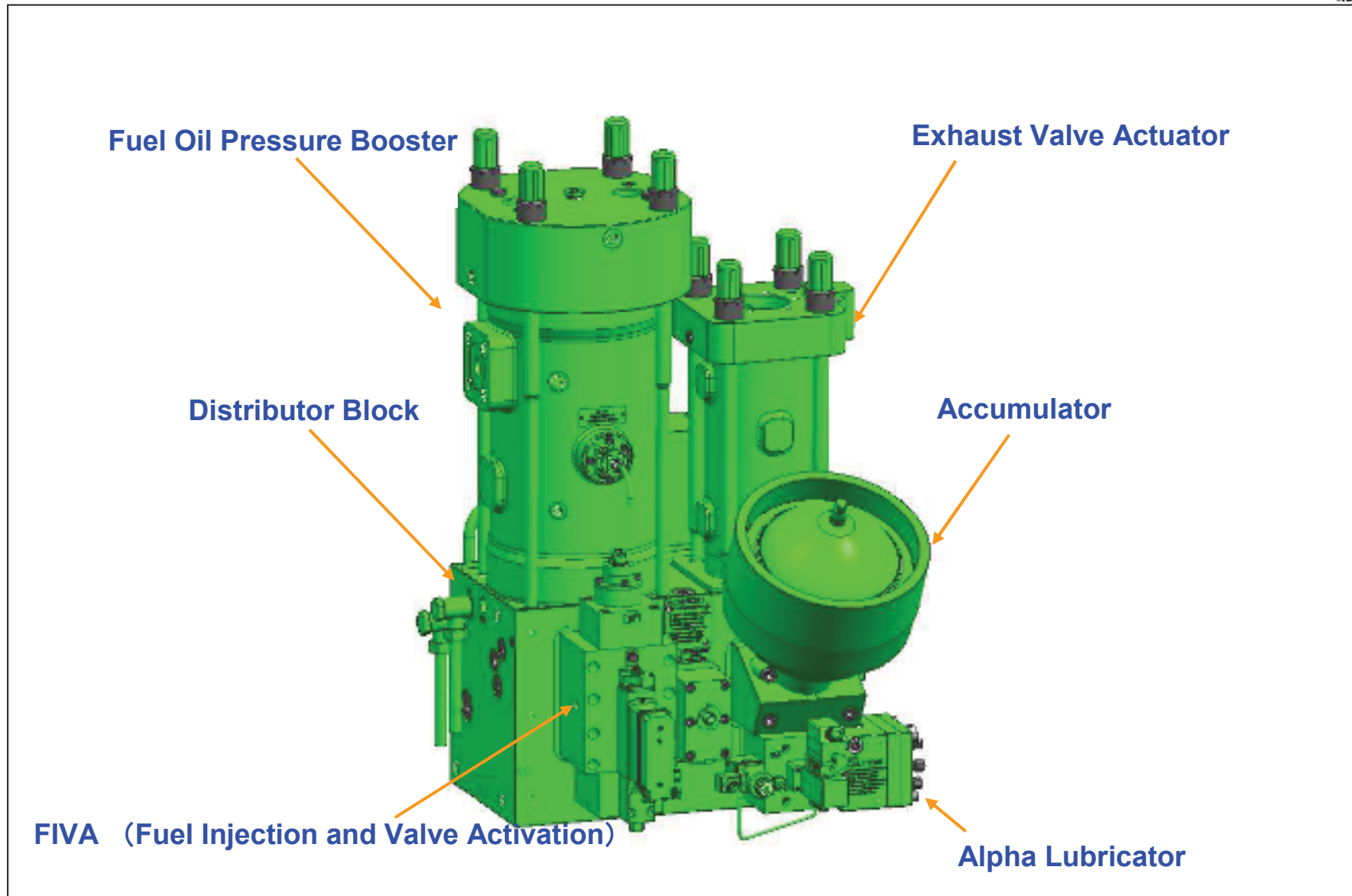
## Arrangement of 7S65ME-C



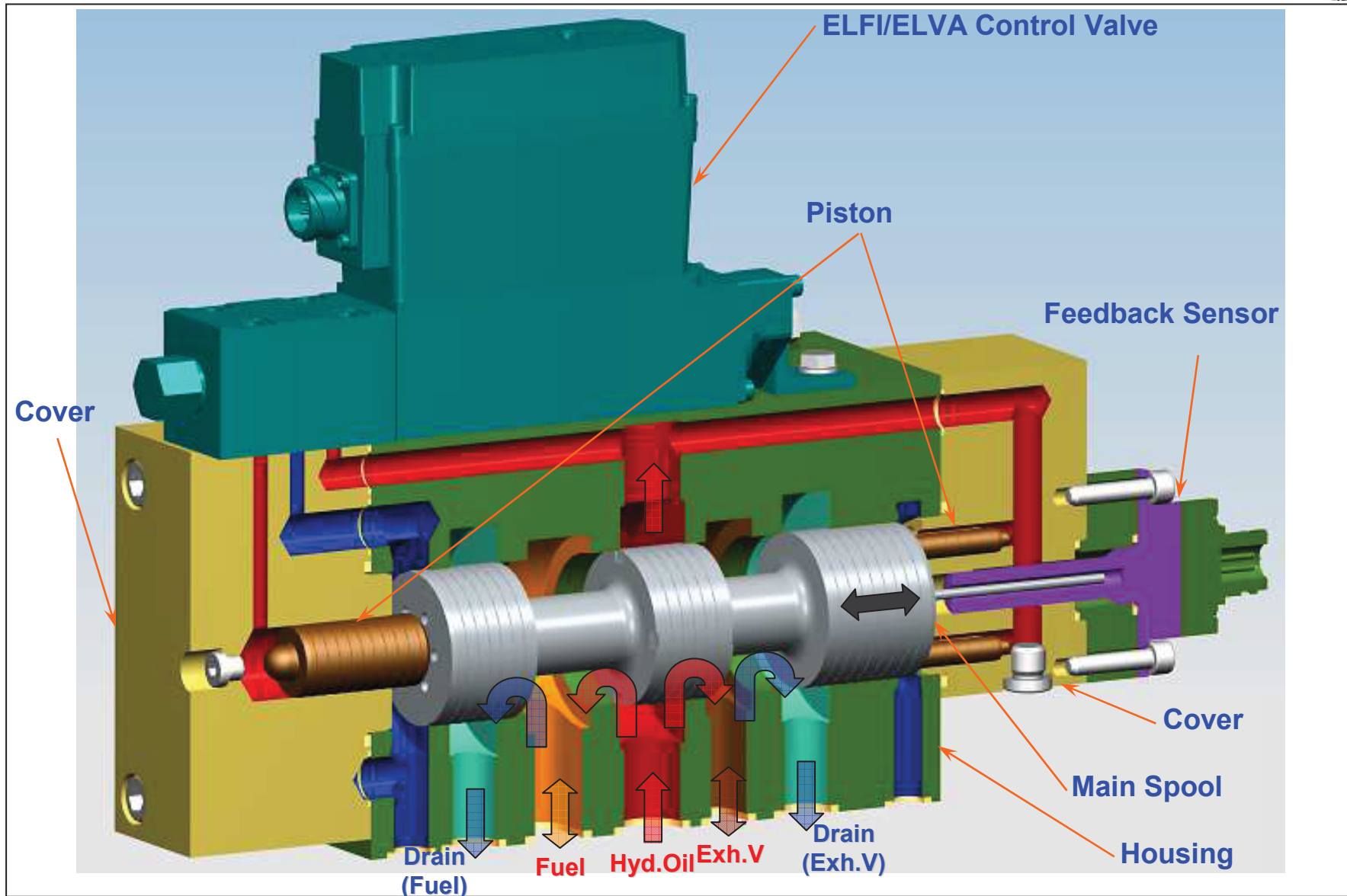
# Engine Driven Pump (Piston pump)



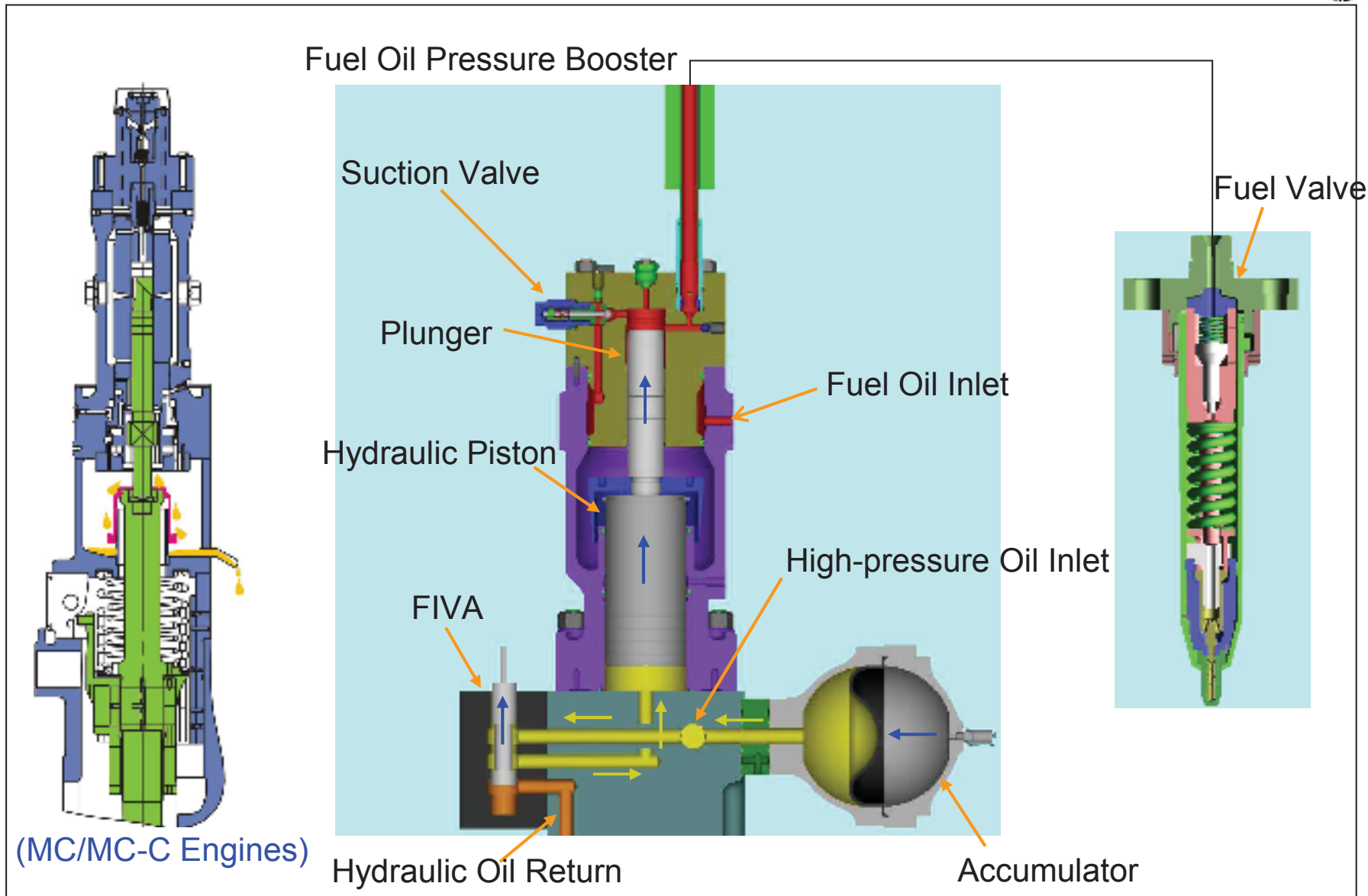
# HCU (Hydraulic Cylinder Unit)



# FIVA (Fuel Injection and Valve Activation)



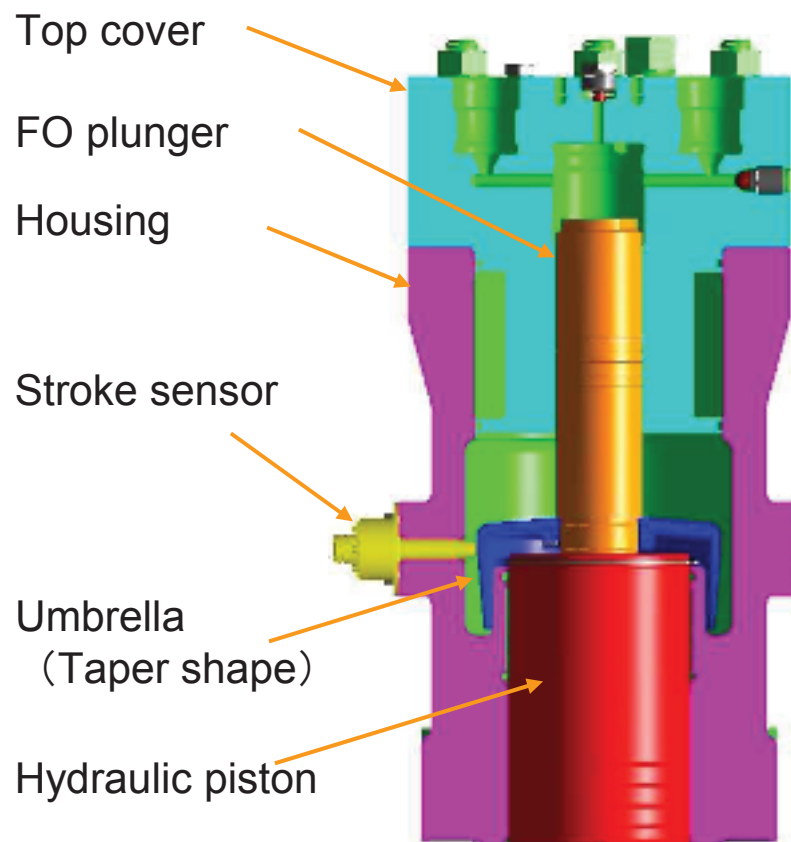
# Fuel Injection System



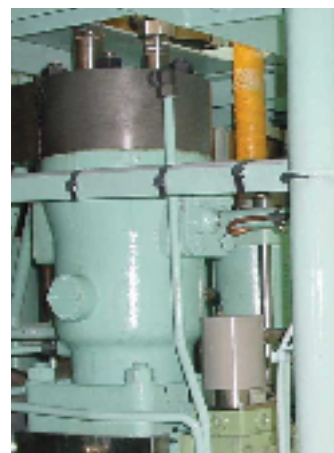
# Fuel Injection System



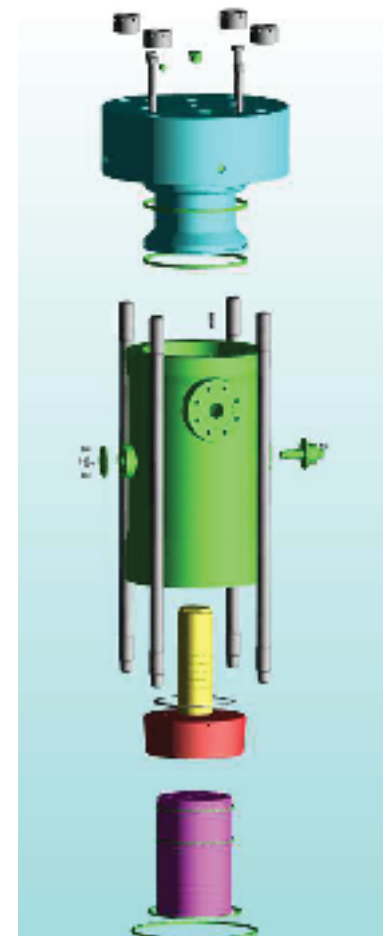
## Fuel oil pressure booster



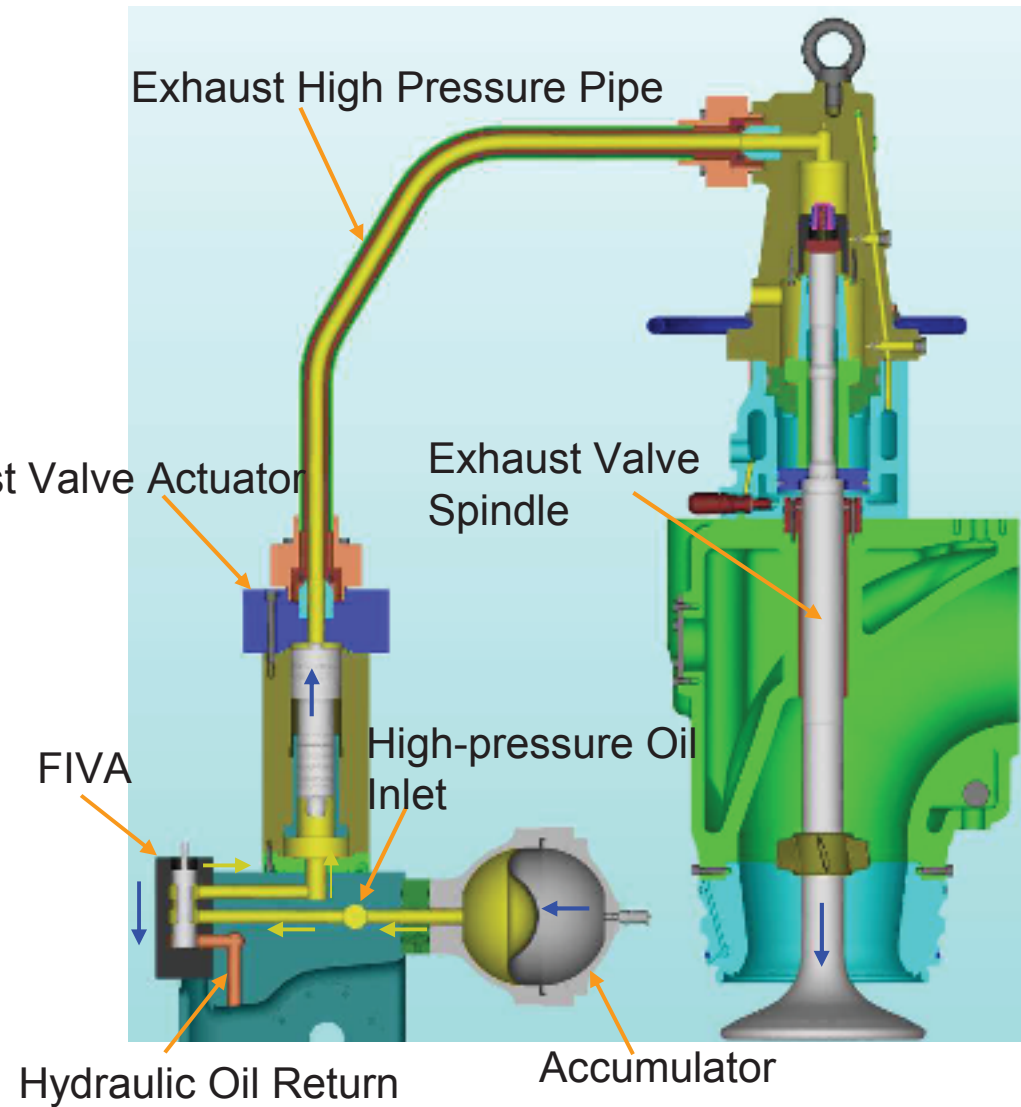
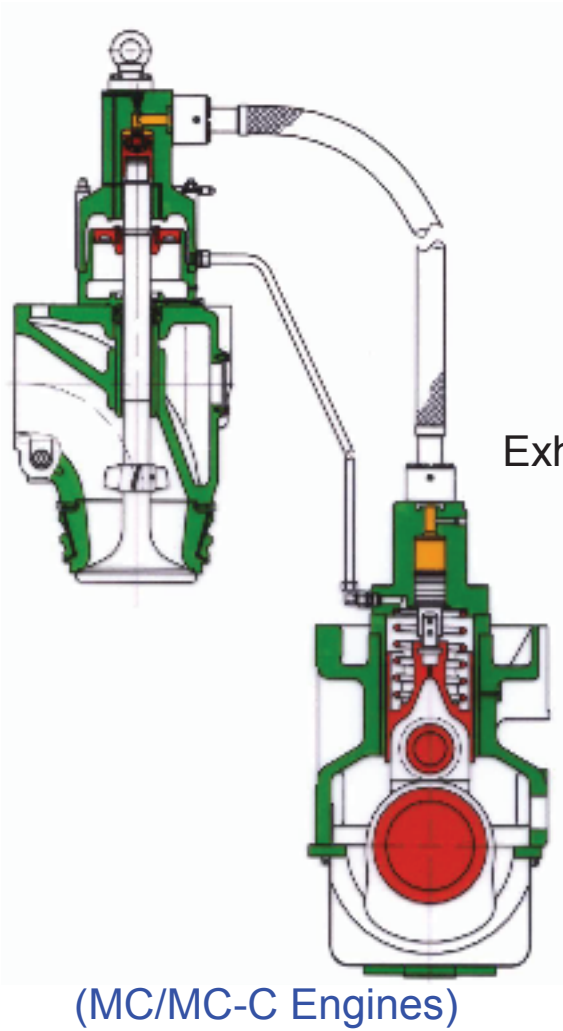
(S70ME-C)



(K98ME/ME-C)



# Exhaust Valve Activation System

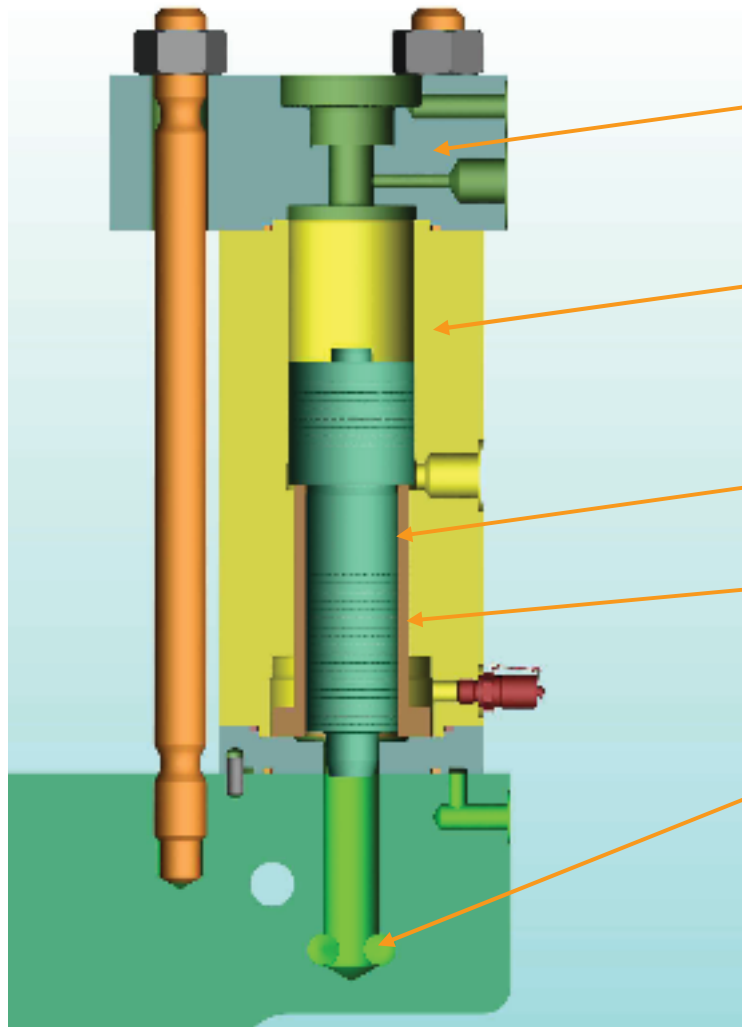


# Exhaust Valve Activation System



## Exhaust valve actuator

(S50ME-C)



Top cover

Hydraulic cylinder

Two step piston:  
Second stage  
(Main piston)

First stage  
(Guide piston)

High-pressure oil Inlet

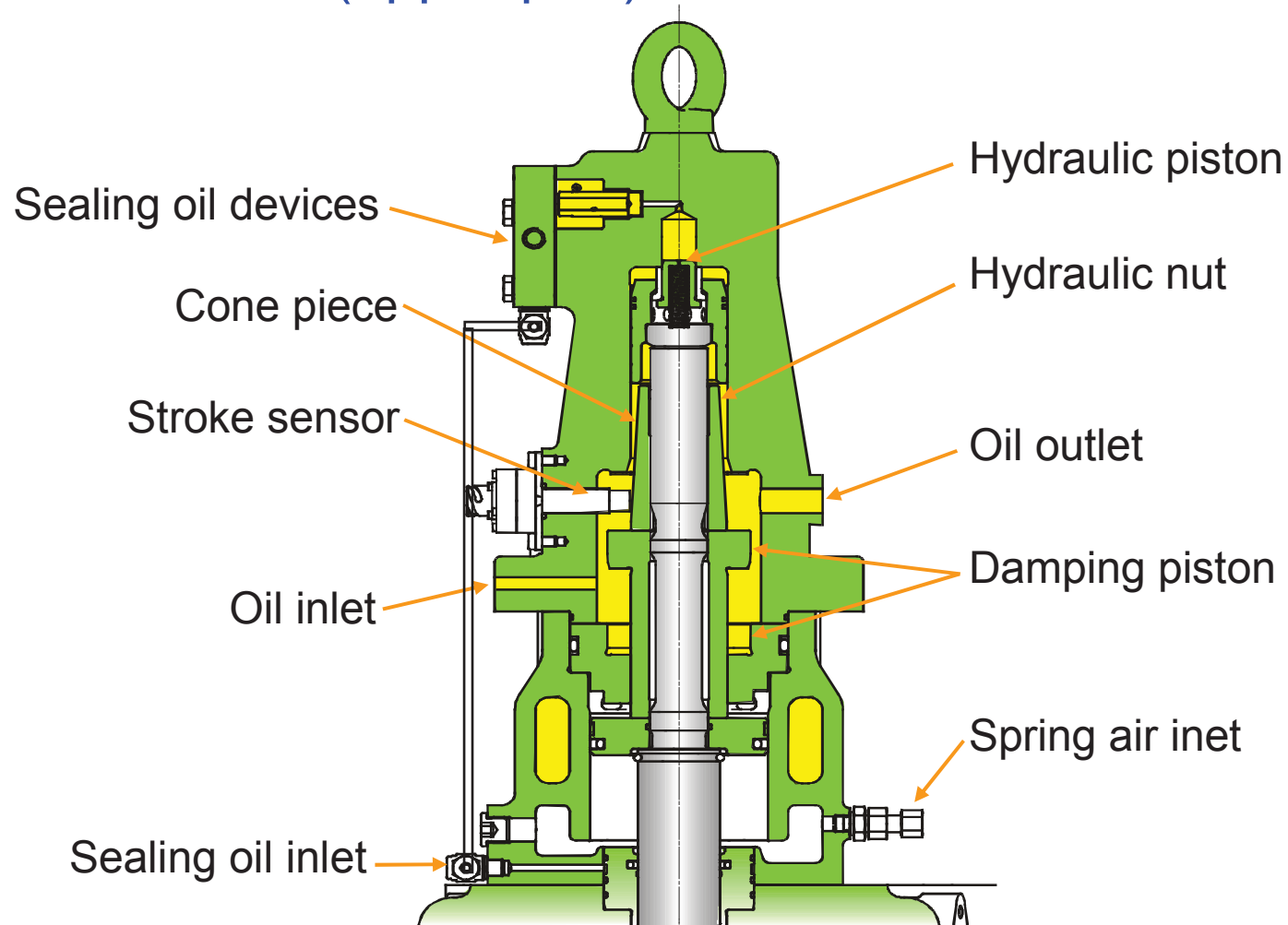
(K98ME/ME-C)



# Exhaust Valve Activation System



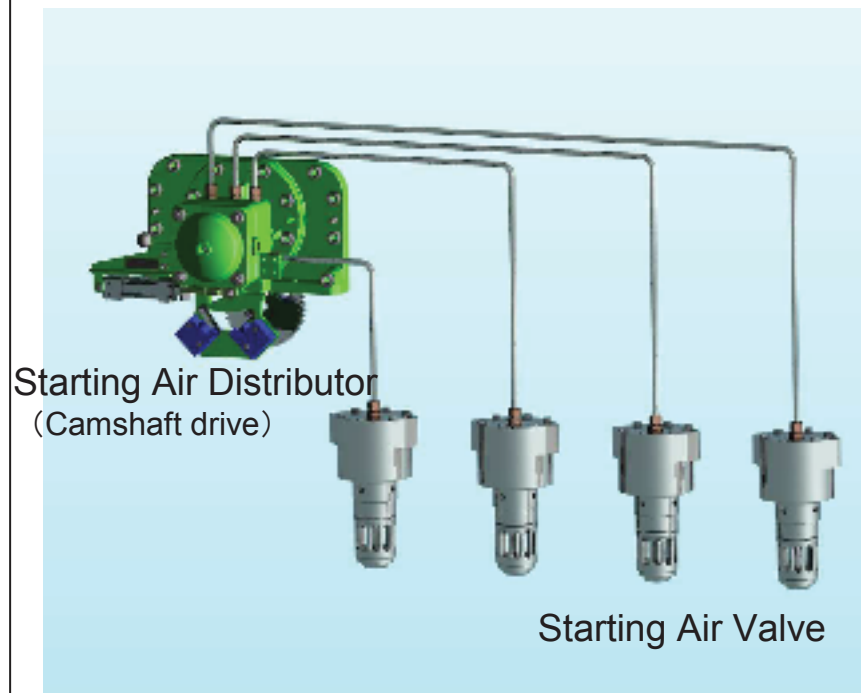
## Exhaust valve (upper part)



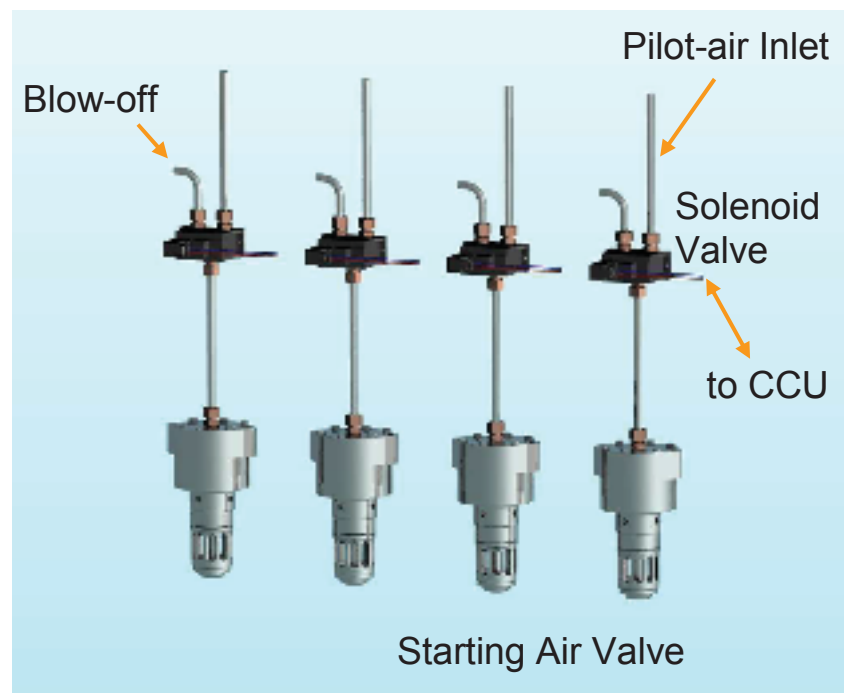
# Starting Air Valve



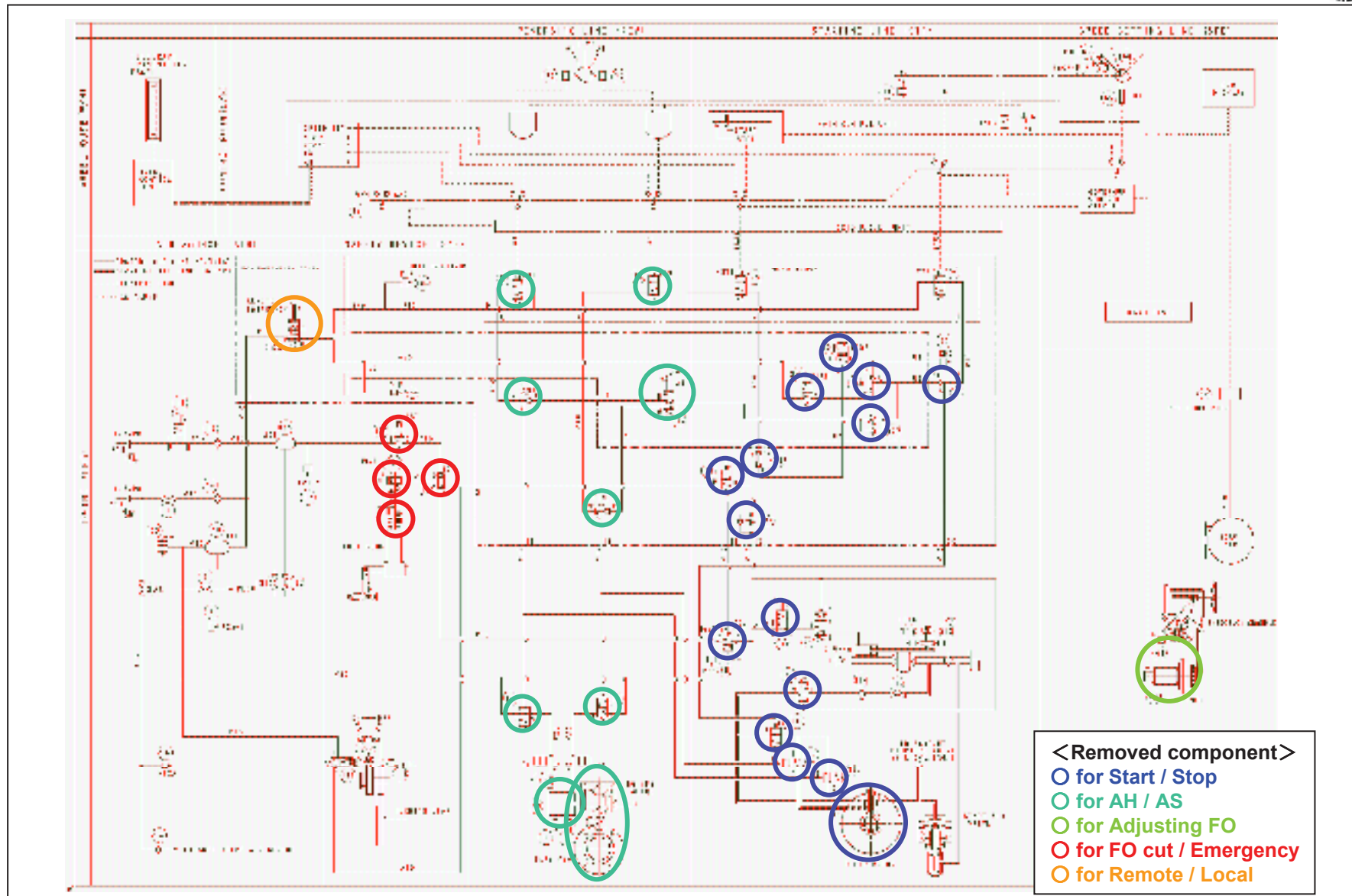
MC/MC-C Engines



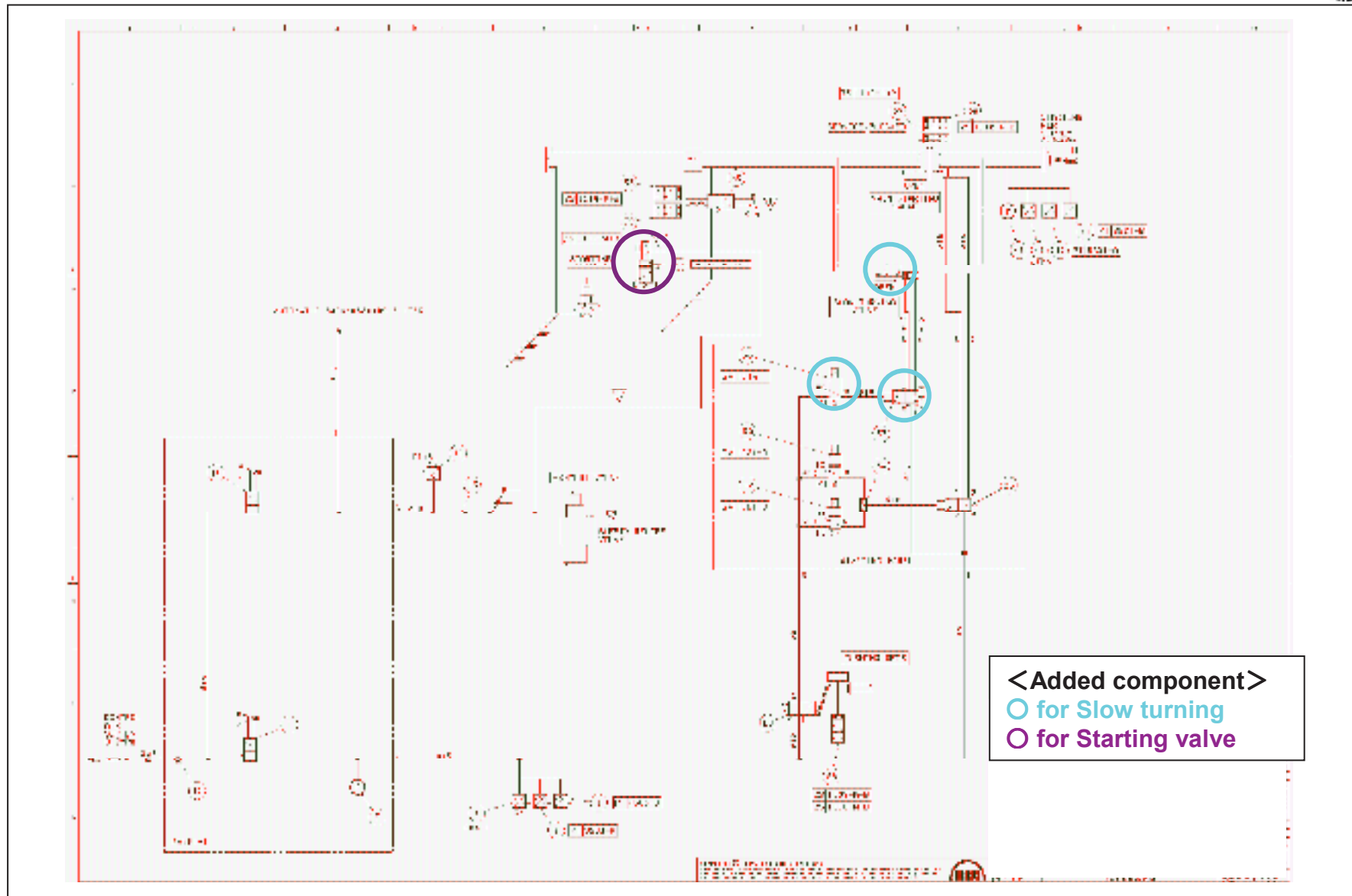
ME/ME-C Engines



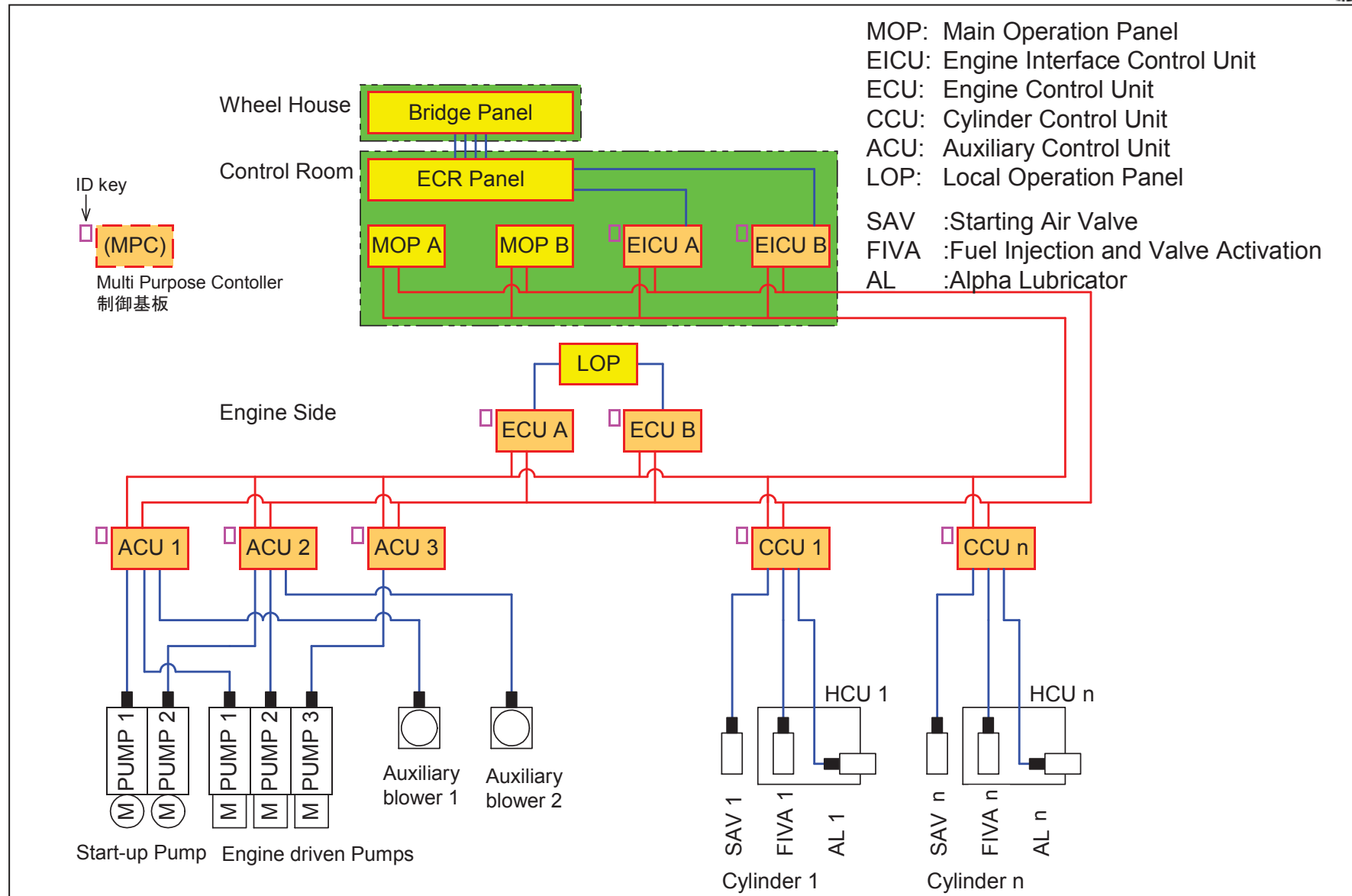
# Pneumatic diagram (MC engine)



# Pneumatic diagram (ME engine)



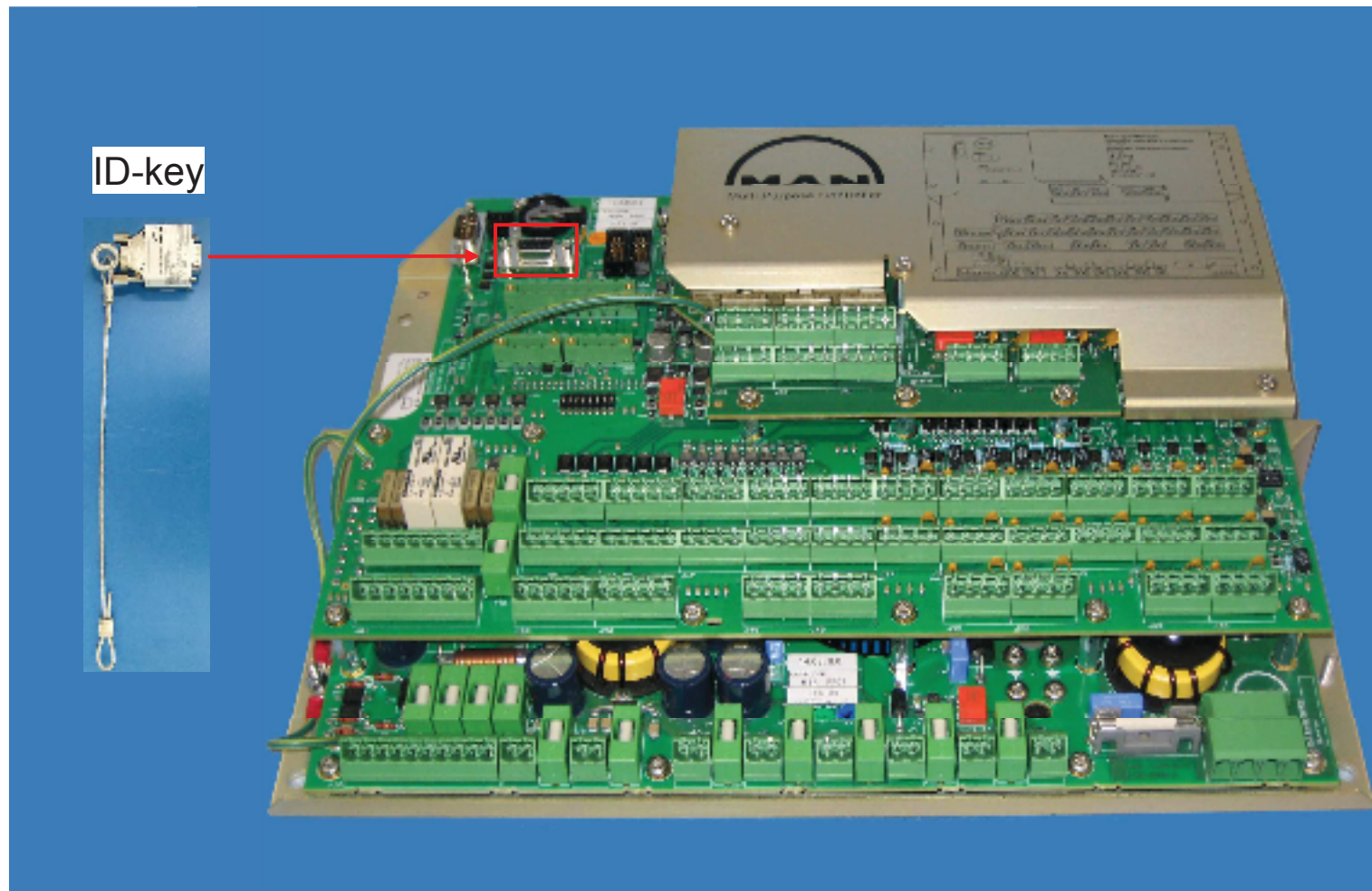
# Outline of ME Operation system



# Multi Purpose Controller



MPC; Multi Purpose Controller



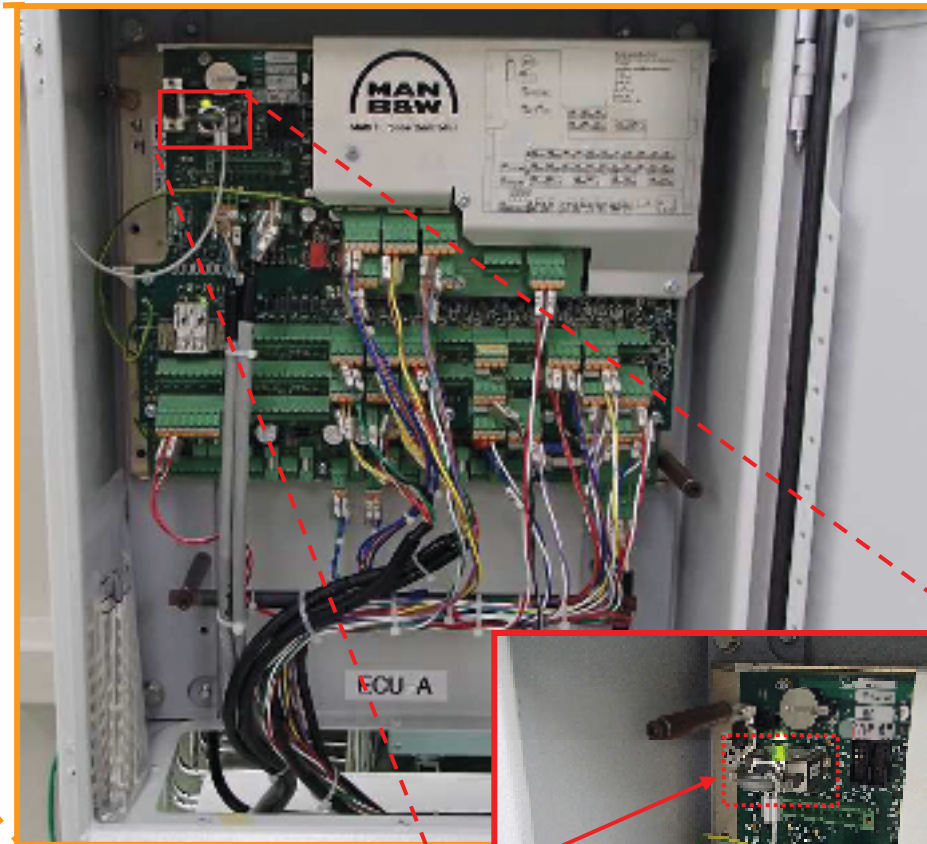
# ME Operation system



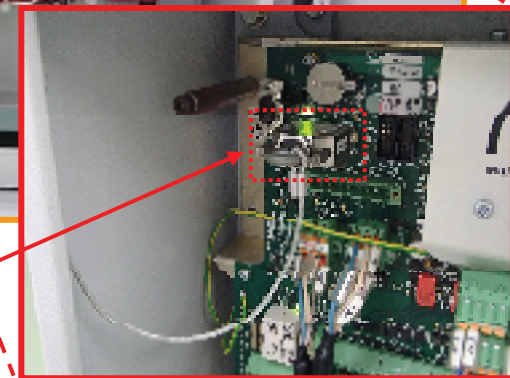
Cabinet for MPC



MPC in the cabinet



ID-key



# Alpha Lubricator



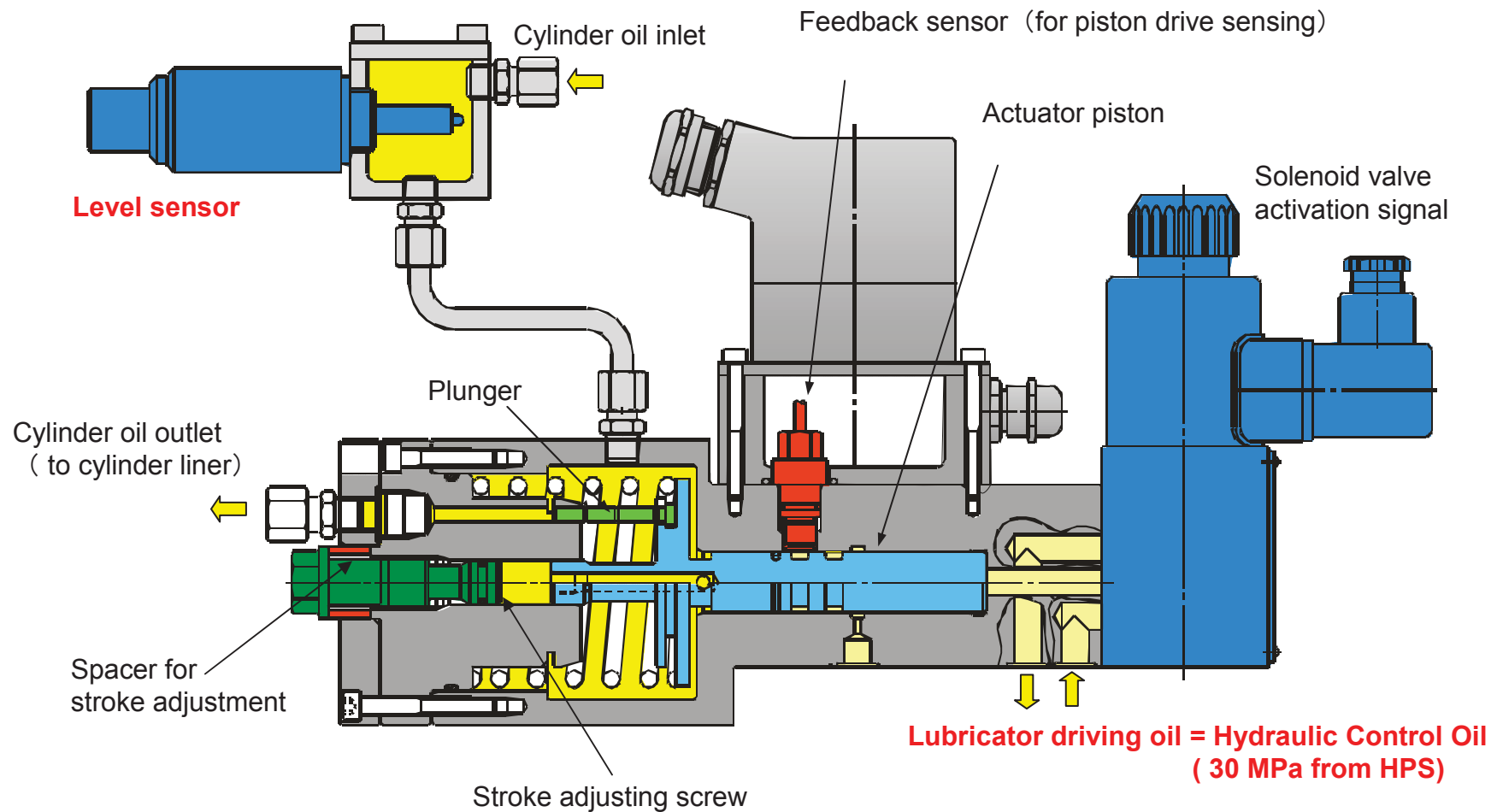
## Differences between MC type and ME type Lubricator

|                                       | For MC engine                                                                   | For ME engine                                        |
|---------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------|
| Actuator                              | At each cylinder<br>Over 65cm bore ; 2 actuators<br>Less 60cm bore ; 1 actuator | At each cylinder<br>1 actuator (without accumulator) |
| Driving oil                           | Cylinder lubricating oil (5.0 MPa)                                              | ME hydraulic control oil (30.0 MPa)<br>(system oil)  |
| Pressurized device<br>for driving oil | Pump station                                                                    | Hydraulic Power Supply                               |
| Control system                        | ALCU<br>(Alpha Lubricator Control Unit)                                         | ME ECS (Engine Control System)                       |
| Operation<br>panel                    | HMI panel<br>(Human Machine Interface)                                          | MOP (Main Operating Panel)                           |
| Tacho system                          | Encoder / Pick up                                                               | ME Tacho system (Encoder)                            |
| Load signal                           | Load transmitter                                                                | ME ECS (Engine Control System)                       |

# Alpha Lubricator (Actuator)



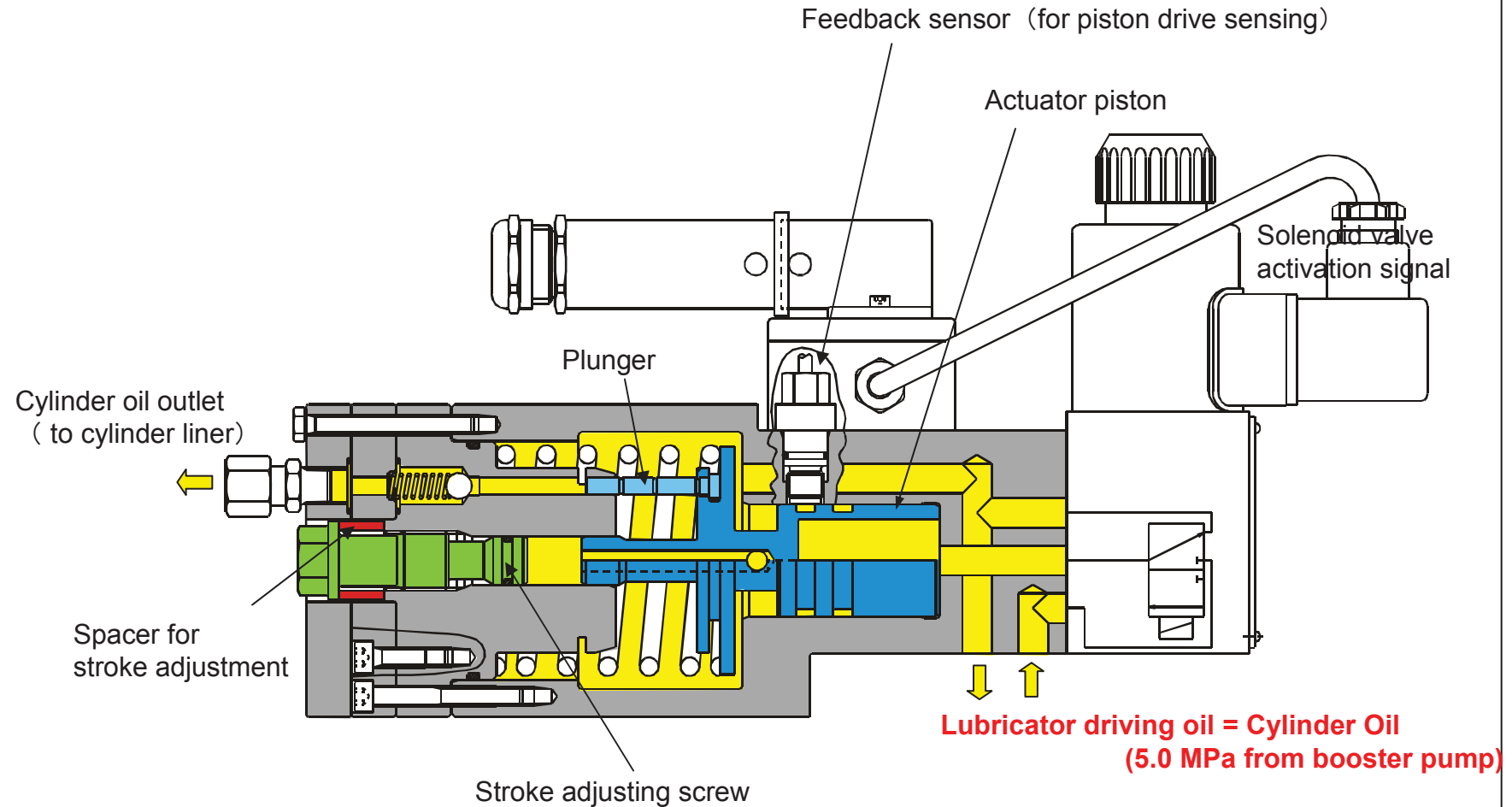
## ME/ME-C/ME-B Engines Lubricator



# Alpha Lubricator (Actuator)

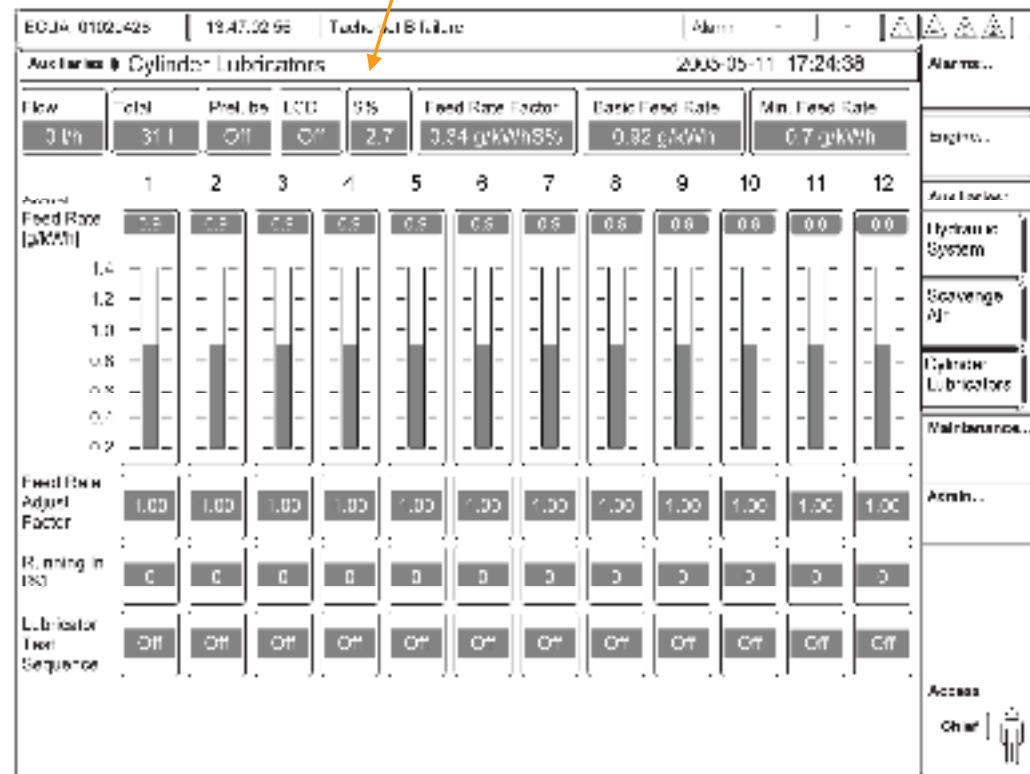


## MC/MC-C Engines Lubricator

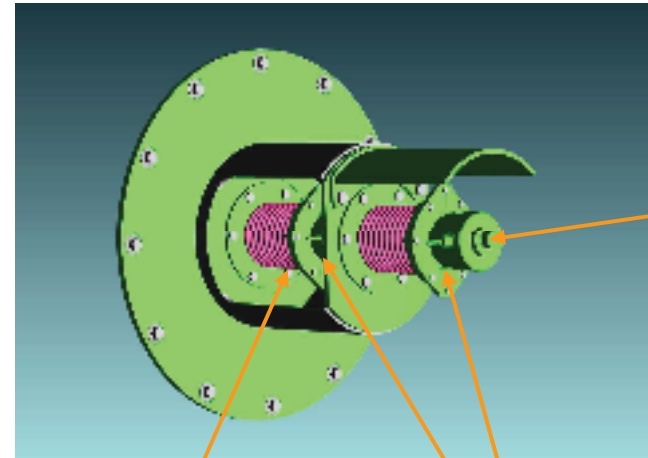
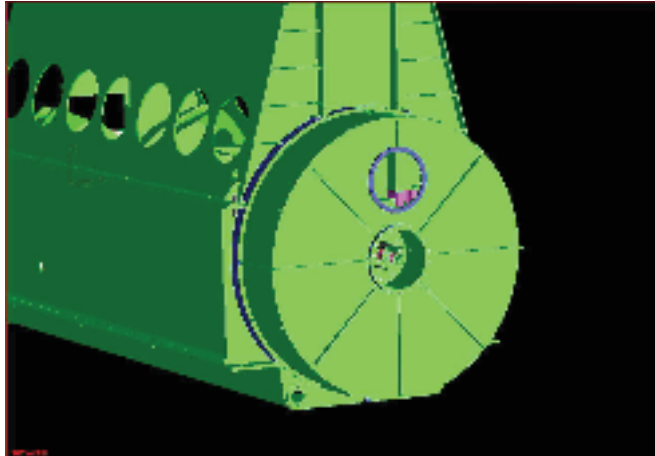




MC Engines; HMI panel      ME engines ; Common interface from MOP



# Tacho System (Rotary Encoder)



Drive shaft

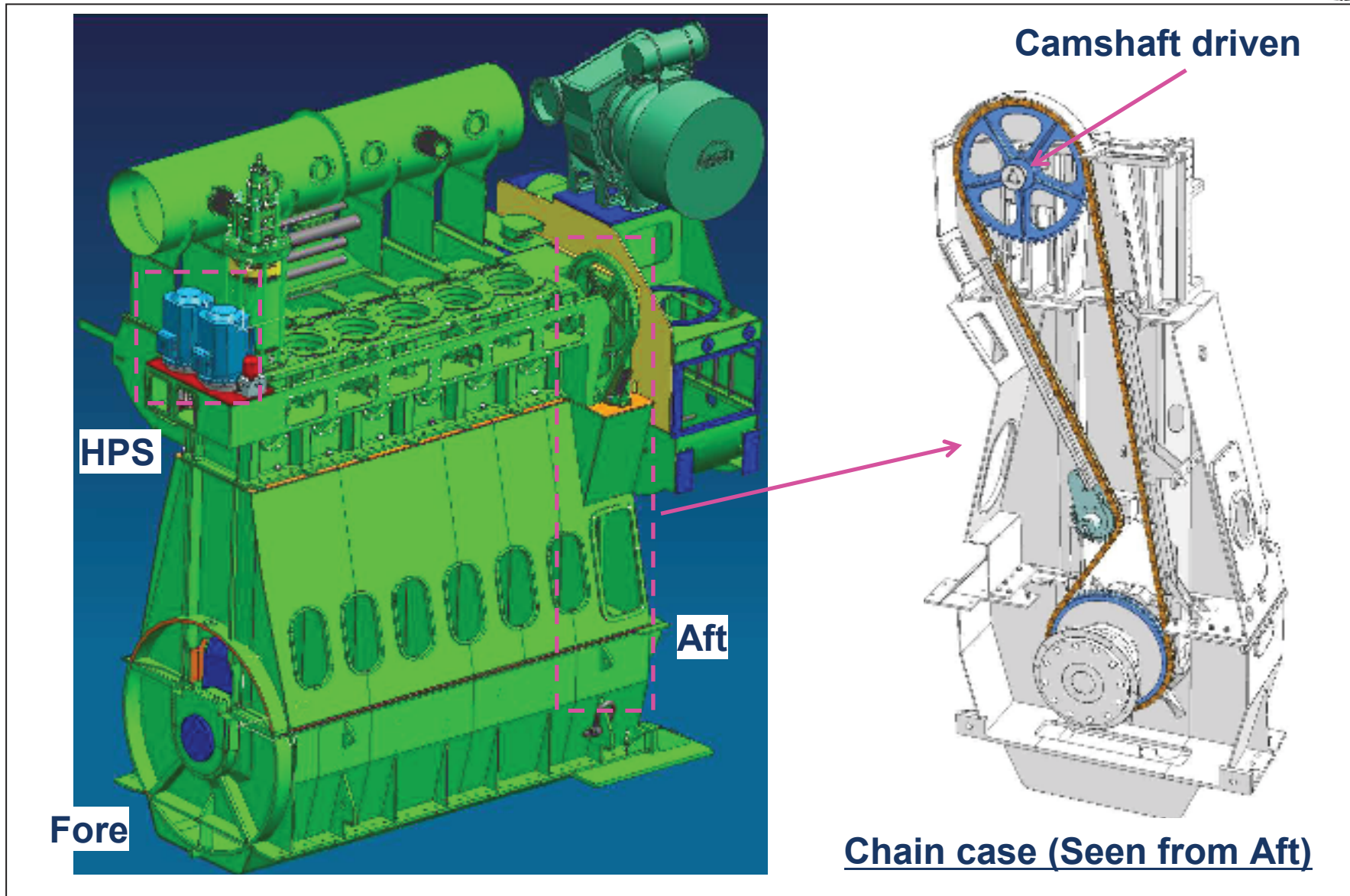
Flexible housing



Two rotary encoders are equipped onto the fore end of crank shaft.

(Each encoders gives independent signal in consideration of the redundancy.)

# ME-B Overview



# HPS and HCU for ME-B

