

Your Reliable Total Service Partner

MTS GLOBAL

Technical Solution for Diesel Engines



ISO 9001:2015 / ISO 14001:2015

mtsGlobal



HSD Engine Co., Ltd
6T, Gongdan-ro, Seongsan-gu,
Changwon-si, Gyeongsangnam-do, Korea
www.hsdengine.com

CERTIFICATION for Spare Parts Sales Agency

Certification No. : PTC2020010

MTS GLOBAL CO., LTD.

**28, YEONDEOK-RO 27BEON-GIL, SEONGSAN-GU, CHANGWON-SI,
GYEONGSANGNAM-DO, KOREA**

This is to certify that the above mentioned company has been authorized by
HSD Engine Co., Ltd. as the agency conducting spare parts sales for engines
built by HSD pursuant to the relevant rules and regulations.

Validity : 22nd August 2020 ~ 21st August 2021

Issued Place : Changwon, Republic of Korea

22nd August 2020



Sangmin Lee / General Manager
Part Sales & Technical Service Team

HSD Engine Co., Ltd.



Reference No. : HGS-YG01-SNC20YGD01-0022



This is to certify that
MTS Co., Ltd.
The Republic of KOREA

is appointed
HGS Cooperative Service Partner in KOREA

Two stroke (MAN, WinGD), Four stroke engine, COPT & Thruster, BWTS



Validity for the Certificate until January 22, 2021

June 19, 2020

A handwritten signature in black ink, reading "S. H. Lim".

Shin-Ho Lim, Vice President
Engineering Division
HYUNDAI GLOBAL SERVICE

➤ ***NEW CONCEPT & CONVENTIONAL ENGINES***

- ✓ ME 5Y Maintenance Service
- ✓ ME-B 5Y Maintenance Service
- ✓ GEISLINGER TV Damper 5Y Maintenance Service
- ✓ Alpha Upgrade Service
- ✓ Alpha 5Y Maintenance package
- ✓ Pneumatic 5Y Maintenance package
- ✓ Multi OWACS
- ✓ Dry-dock Supervision Service

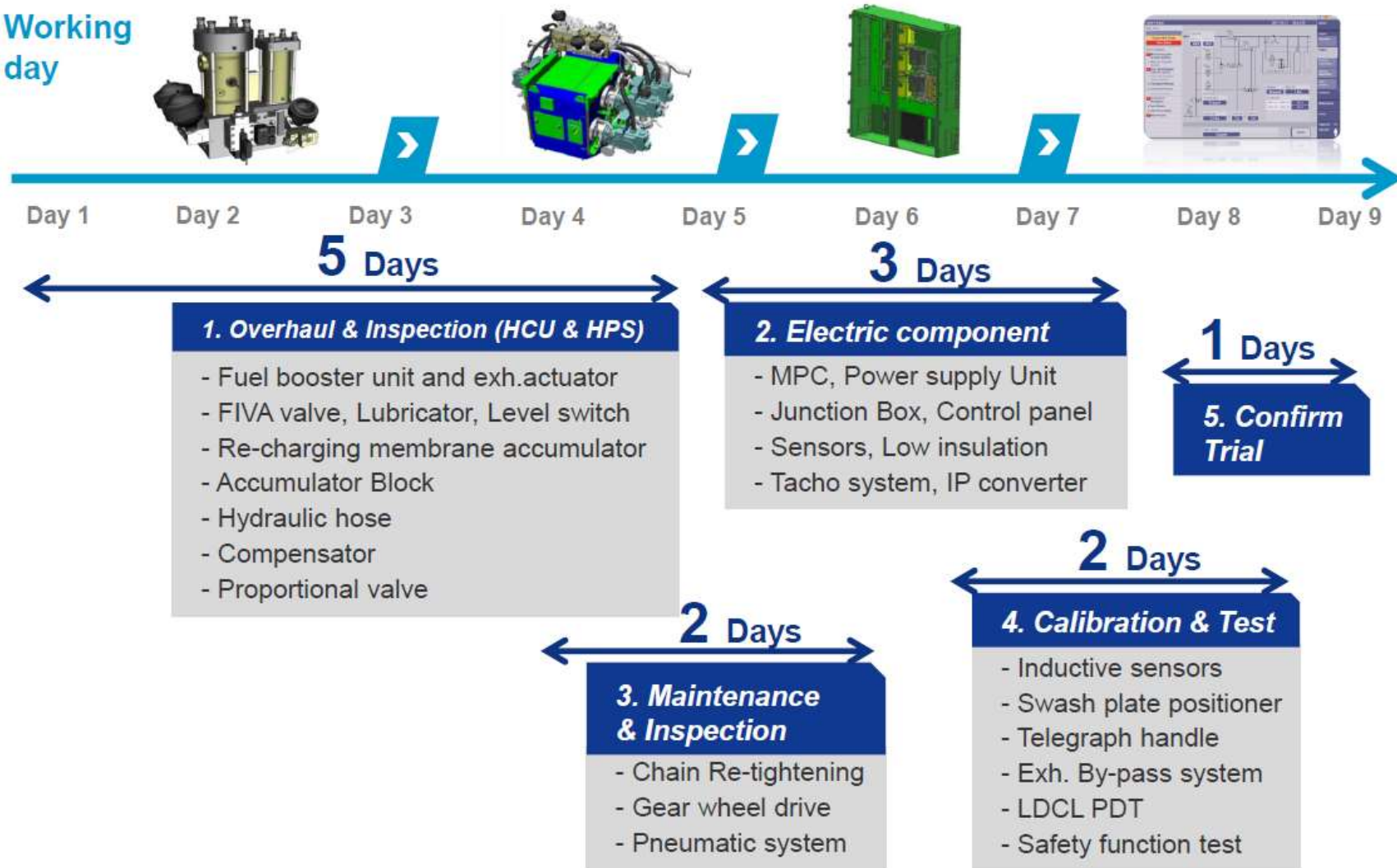
➤ ***EMISSION RELATING SERVICE***

- ✓ DELNOX SCR Service
- ✓ Turbocharger Re-matching Service
- ✓ Rightship GHG Rating Service

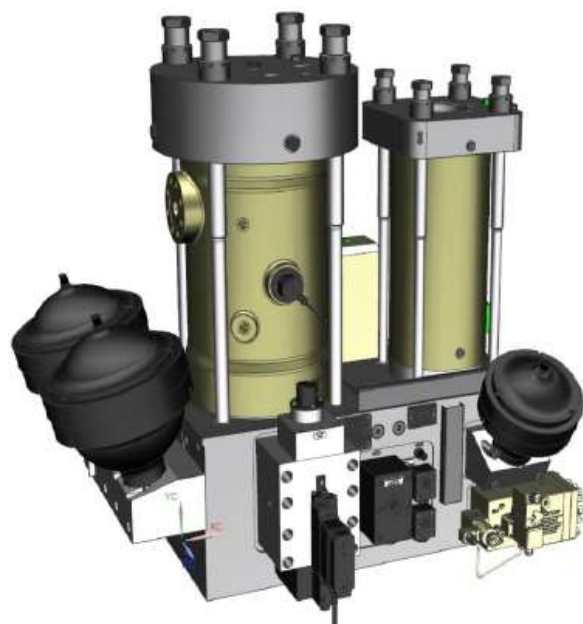
ME 5Y Maintenance Service



Working
day



Main component



Detailed maintenance parts

1. Fuel booster

32,000 R/H



2. exh.valve actuator

32,000 R/H



3. Accumulator

32,000 R/H



4. FIVA valve

32,000 R/H



5. Cylinder lubricator

32,000 R/H

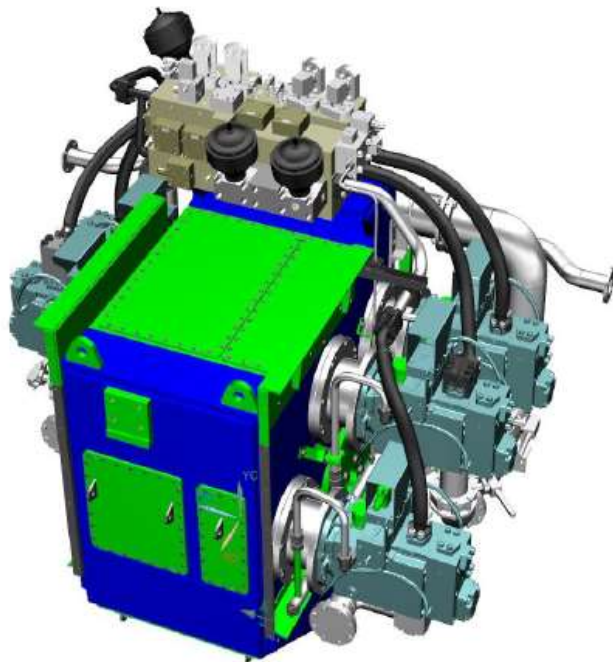


6. Distributor block

32,000 R/H



Main component



Detailed maintenance parts

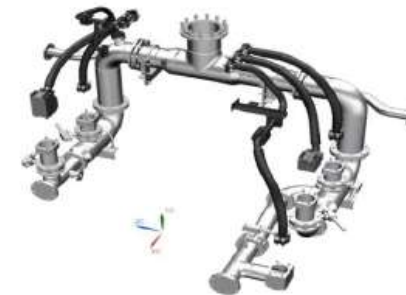
1. Accumulator block

32,000 R/H



2. Hydraulic hose

32,000 R/H



3. Accumulator

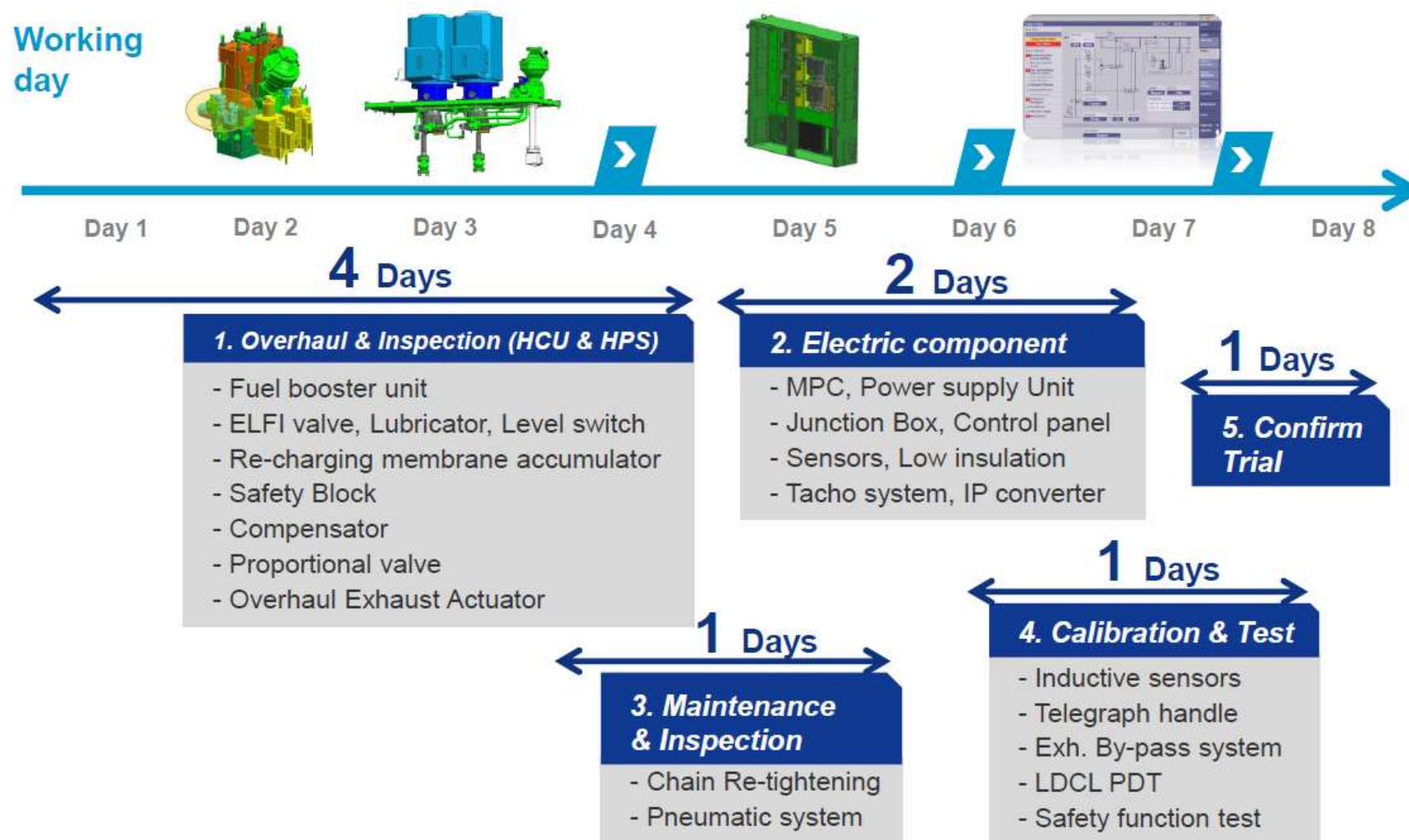
32,000 R/H



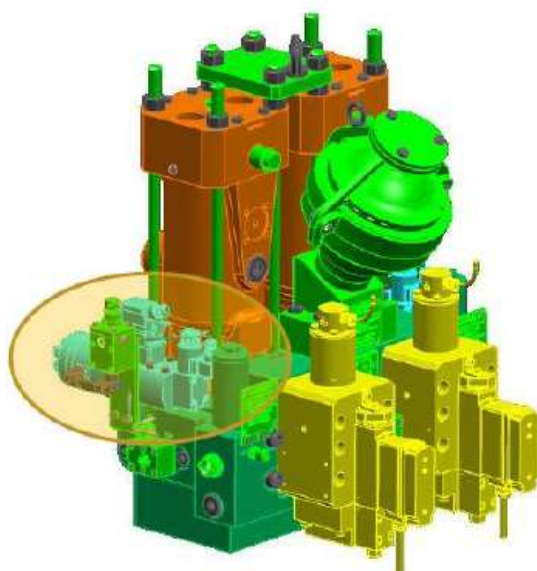
4. Compensator

32,000 R/H





Main component



Detailed maintenance parts

1. Fuel booster
32,000 R/H



2. Exhaust Actuator
32,000 R/H



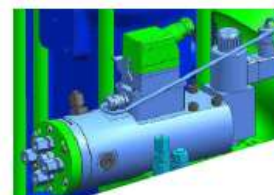
3. Accumulator
32,000 R/H



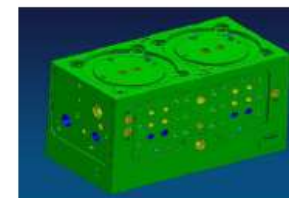
4. ELFI valve
32,000 R/H



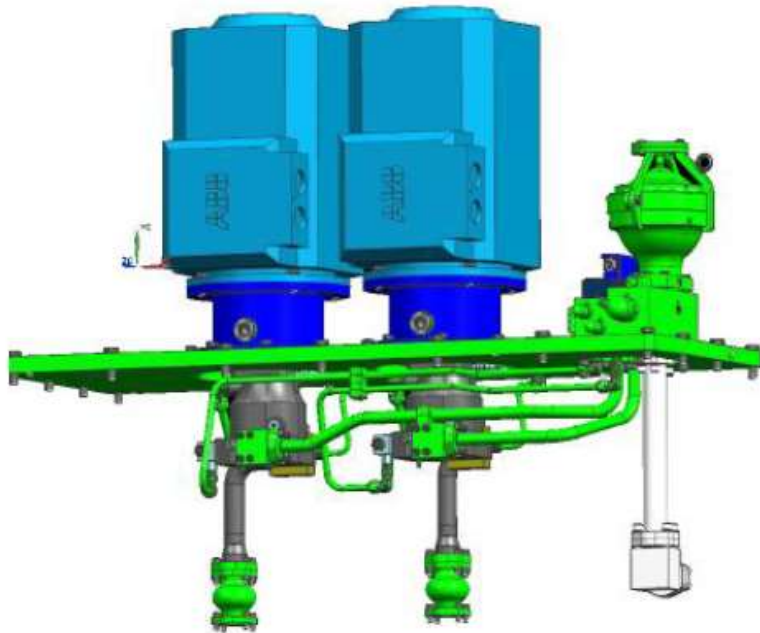
5. Cylinder lubricator
32,000 R/H



6. Distributor block
32,000 R/H

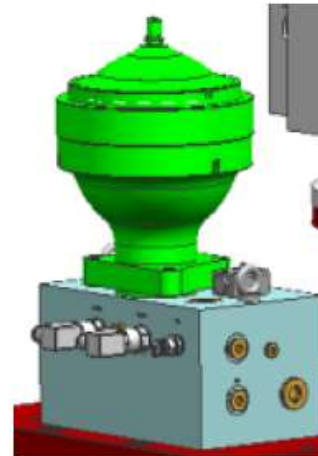


Main component



Detailed maintenance parts

1. Safety block
32,000 R/H



2. Accumulator
32,000 R/H



3. Compensator
32,000 R/H



GEISLINGER TV Damper 5Y Maintenance Service

However “small service” should be carried out 20 ~ 24,000hr, it is very difficult to do so for ship’s crew even open-up fore shield cover. Therefore every 5Y(Dry-dock), we recommend to carry out bellow works by HSD Engine or authorized engineer

* **Also can be done as combination with ME maintenance during dry-dock.**

WORK TO BE PERFORMED	SMALL ALL 20 ~ 24,000 HR	LARGE ALL 40 ~ 48,000 HR
* Visual check of the bearing running surfaces for grinding (fretting), corrosion, oxidation, discolorations as a result of increasing bearing temperature, etc.	X	The “large” Service Should be done by Geisliner SE or authorized service station
* Check permissible wear. Repair worn parts or replace them, if necessary	X	
* Check wear of bearings (15).	X	
* Check wear of middle blades (1).	X	
* Check wear of inner star (9).	X	
* Replace the O-rings (851)	X	
* Replace all removed bolts, screws and nuts with thread size up to and including M20	X	
* Check all removed bolts, screws and nuts with thread size larger than M20.	X	



GEISLINGER TV Damper 5Y Maintenance Service



Day 1 : Preparation



Dismantle accessories and open-up fore shield cover

Day 2 ~ 3 : Inspection



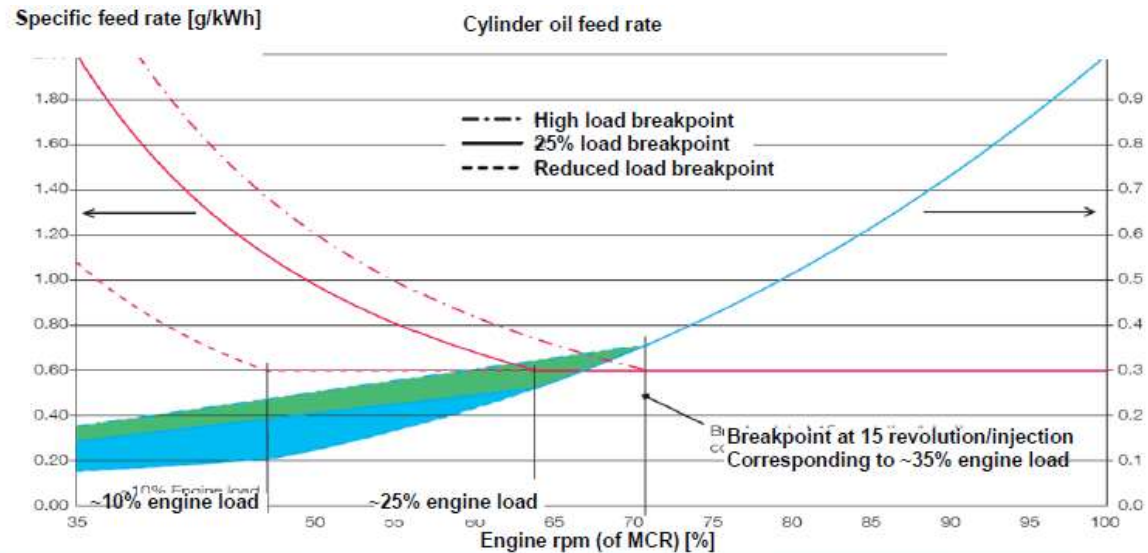
Inspection by GEISLINGER engineer

Day 4 : Assemble



What's Alpha Upgrade?

**Released new
specification at low load
operation**
(Above 70 bore)

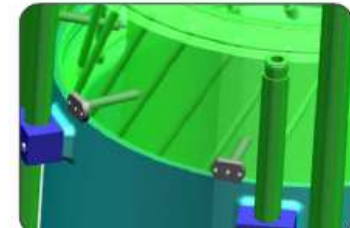


Advantage & Benefit

- Optimizing cylinder lubrication at low load
- Reduction of cylinder lub.oil consumption

Main Component

- Lubricator, MCU, non-return valve



Overhaul Service



Replacement & Overhaul

- . Lubricator with O-Rings & Sealing rings
- . Accumulator of 30bar & 1.5bar
- . Inductive Sensor & Pick-up Sensor
- . Solenoid valve of Lubricator
- . Non-return (5bar) of Lubricator
- . Suction filter & pressure filter of Booster Unit
- . Sealing ring & Mech. Seal of Booster pump
- . Spider coupling of Booster pump

Inspection Service



Inspection & Function Test

- . Angle Encoder
- . Pick-up & Load Transmitter
- . Booster Pump
- . Leakage test of solenoid valves
- . Visual inspection for feed-back sensor
- . Check of alarm condition
- . Injection timing & LCD function
- . UPS battery

Alpha 5Y Maintenance package



Based on our service experience and our guideline, the following parts must be replaced every 5 years or 32,000 R/H to ensure optimal and trouble free operation.

Based Recommendation Items

Category of kits	Description	Interval - 5Y
Service kit for alpha lubricator	Membrane Accumulator (Big)	Replace
	Membrane Accumulator (Small)	Replace
	Solenoid valve on lubricator	Replace
	Inductive sensor in lubricator	Replace
	Lubricator check valve (5bar)	Replace
Maintenance kit for alpha lubricator	Lubricator OVHL. O-ring set	Replace
Lubricator pump station service kit	Spiders of pump for booster pump	Replace
	Seal of pump for booster pump	Replace
	Suction filter element	Replace
	Pressure filter element	Replace
Pick-up for BCU (Back-up Control Unit)	Pick-up sensor for Flywheel side	Replace

Pneumatic 5Y Maintenance package



The pneumatic control system is to be in reliable condition for safe berthing and leaving. That's why we, HSD Engine, recommend periodical maintenance at every 5Y.

Supply & Work Scope

- Repair Kit for
 - All of pneumatic valves
 - All of reversing cylinders
 - All of VIT actuators
- Recommended spare parts List as per engine type

Effect & Benefit

- ✓ Safe Operation
- ✓ Warranty (1 year)

Man Power

Option 1.



2 Days

Option 2.



4 Days

Sea-Trial (If necessary)



1 Day

Repair Kits



OVHL'ed V/Vs



Rev. Cylinder



Multi OWACS



What's Multi-OWACS

Combination of
M/E & G/E OWACS

Advantage & Benefit

Simple Design
High Accuracy
Easy Installation

Main component

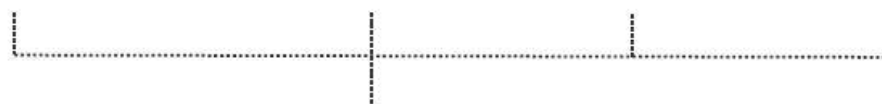
OWACS controller
Junction Box
Monitor in ECR

M/E O-WACS

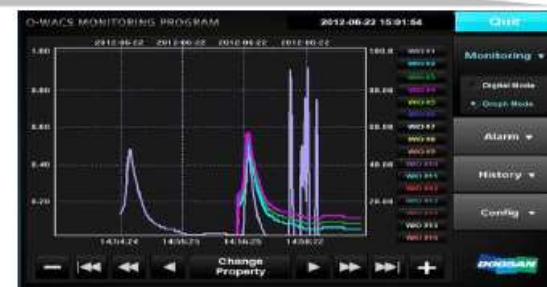


+

G/E O-WACS



in ECR



Supervision Service details

01 Close inspection incl. measuring

- . Piston Component
- . Bearing Condition
- . Cylinder Liner
- . Fuel Pump incl. Timing
- . Exh. Valve
- . HP Pipe
- . Alpha Lubricator System

02 Visual Inspection

- . Crank Case & Chain wheel
- . Gas & Scav. Air Receiver
- . Cam & Cam shaft
- . Top Bracing

03 Instruction & Education for crew

- . Job procedure
- . Emergency Operation
- . Finding root reason and
- . Trouble shooting

Benefit & Output

Safety

- Engine operation
- Work
- Precaution



Improvement of crew's skill



Efficiency on OVHL. work



Detail Service Report





Parts Supply

- Catalyst
- Urea(AUS 40)
- Mech. & elec. parts
- Instrument



Performance Control

- Annual spot check
- Function test
- Remote diagnosis
(Under development)



On-board Services

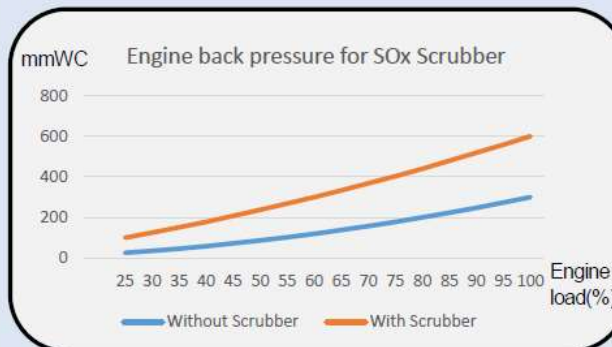
- Commissioning test
- Feedback instruction

Turbocharger re-matching is recommended for the ship with Sox scrubber installation in order to secure fuel oil consumption as before installation of Sox scrubber.



Effect of SOx scrubber installation

1 Increased back pressure → Increased SFOC



2 Increase thermal load on engine

3 Possible problem of turbocharger surging

Solution

HSD Engine offers to conduct turbocharger re-matching for SOx scrubber as well as related re-certification work for the engine modifications carried out and approval with relevant classification societies.

Benefit

- Fuel oil consumption will be as optimal as before installation of a SOx scrubber
- Engine heat load will stay within range of experience

The GHG Rating provides a systematic and transparent framework for comparing the relative efficiency of ships, enabling users to select vessels with a lower CO₂ footprint and fuel bill.



What is Rightship's GHG rating? ¹⁾

RightShip's GHG Emissions Rating was developed in response to the growing trend of global CO₂ emissions and customer demand. It offers a systematic and transparent means of comparing the relative efficiency of the world's shipping fleet.

The GHG Rating compares a ship's theoretical CO₂ emissions relative to peer vessels of a similar size and type using an easy to interpret A – G scale.



Key benefit ! ²⁾

- Ports can reward efficient vessels through port incentive programs – reducing CO₂ emissions and other criteria pollutants in port, and for the vessel's entire journey.
- Charterers can identify more efficient vessels and reduce their bunker bills.
- Financial institutions can reduce their risk by investing in efficient vessels ensuring a greater return on investment over the life of the asset.
- Increases transparency in the shipping industry by ranking ships according to their energy efficiency and GHG emissions.
- Assists the maritime industry to transition to a low carbon economy through informed selection of more efficient ships.
- Provides the ability to benchmark and track emissions per journey and over time, which can aid the development of a baseline of emissions and an overall carbon-emissions target.
- Shipowners can benchmark their vessels against peer vessels to demonstrate the benefits of investing in efficiency.

1), 2) Source : www.rightship.com

▪ PARTS SERVICE

- ◆ Diesel Engine (2/4 Stroke)
Authorized HSD Engine (Ex. Doosan Engine)
- ◆ Generator Sets
- ◆ Turbocharger
- ◆ SCR, SO Scrubber, BWTS
- ◆ E/R Machinery & Equipment
- ◆ Deck Machinery & Equipment
- ◆ General Store



▪ TECHNICAL SERVICES

- ◆ Engine Maintenance & Repair
- ◆ Engine Commission & Trial
- ◆ Engine Trouble Shooting & RCA
- ◆ Reconditioning & Retrofit Service
- ◆ Ship & Machinery Repair
- ◆ Shafting & Rudder Installation & Repair
- ◆ Power Plant O&M Service





- ✓ Generally, suppliers as well as repair companies had provided only one business.
- ✓ Customers had contacted each company in order to find services what they want.
- ✓ MTS Global will provide all-in-one service including spare parts as well as technical services.
- ✓ Customers will save a time and reduce cost in accordance with solving problems as one way, not multi-way.