

System of diesel Engine Performance Analysis (2 nd)

SEPA II

As per the vessel voyaging for many days, many a minor problem for a long time will cause a serious accident. Therefore in general, engine operators keep taking performance data and analyze it for engine condition diagnosis.

Hitachi Zosen doesn't confine our hugely invested SEPA II in our computer server, but without hesitation allow users to install it in their personal computers. Because of this user-friendly concept, users of the vessel and the shipping company can see the same graphs and images without stress about telecommunication cost.

System specification

required system specification for SEPA II	
Computer	Intel® CeleronM®(2004), 900MHz or upper class
OS	WindowsXP®(SP2 or upper), Vista®, Windows7®
Memory	at least 500MB RAM
Hard disc	at least 100MB space
Display	at least 1,024×768 resolution
required reader(software)	for display of the technical documents Adobe® Acrobat® Reader 5.0 or upper Version
Contents in Package	SEPA II (in English) in installation media
	Documents called by SEPA (in English/Japanese)
	Registered data for ships and shop data
	OPERATION MANUAL (in English)
	OPERATION MANUAL (in Japanese)
	Install Guide (in English/Japanese)

1. Sales Points of SEPA II

1.1 e-mail communication with data file



The capacity of 1 performance data is limited about to 1 KB. By communication with only 1 KB data file, at anywhere of the vessel, the shipping company and Hitachi Zosen, the same graphs and images can be shared to monitor.

1.2 Advanced automatic diagnosis

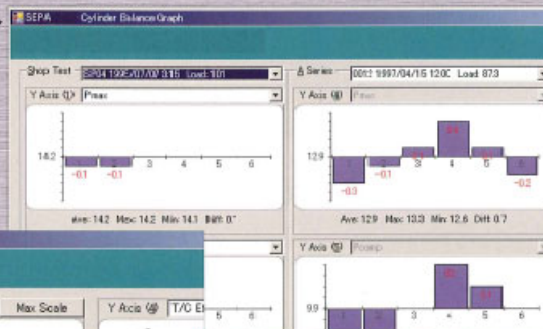
The fault analysis trees drawn from our experience and the threshold values based on the shipping quality standards are integrated in the automatic diagnosis algorithm.

2 Advanced automatic diagnosis

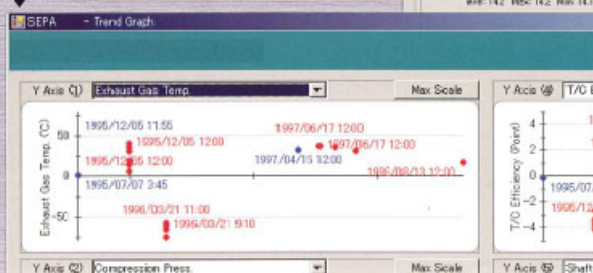
Engine operating data at sea are compared with shop data. In case there are some irregular phenomena out of operating past records, the possible causes can be focused by SEPA II user. Quick remedy is also displayed.

The screenshot shows the 'SEPA Diagnostics Results' window. It features several panels: 'Average Data Judgement' with a list of phenomena like 'Exhaust gas temp. is high' and 'Turbocharging efficiency decrease'; 'Cylinder Data Judgement' with a list of cylinder-specific issues; 'Cause' and 'Factor' sections providing detailed explanations; and a 'Remedy' section with a specific instruction: 'Check pressure difference blower inlet filter. If the difference is large...'. A red text box on the right states: 'In case the user difficultly diagnoses, Hitachi Zosen surely supports the user.'

Ex. Cylinder unbalance



Improved displays
Ex. Deterioration



With using the same graphs, the SEPA II's diagnosis agrees with an engineer's diagnosis.

Engine No. Vessel Data date	Hxxxx "xxxxx xxxxx" 31-Oct-10	
	<p>engineer's hand type report Required hours for reporting some hours(before approve) Report date 4-Nov-2010 Only SEPA II's graphs are referred. Auto diagnosis and its threshold values aren't referred.</p>	<p>SEPA II auto diagnosis Auto diagnosis sec 0.7 milli sec SEPA II's auto diagnosis and its threshold values are referred.</p>
About Engine performance	<p>Deteriorated T/C efficiency or contaminated exhaust gas passage is considered. T/C RPM of the data of Oct. 31, 2010 is higher than the previous data There is a possibility that T/C RPM is different from the actual T/C RPM.</p>	<p>Turbocharging efficiency decrease Large drain quantity from drain separator High temp. and humidity of suction air Water leakage from air cooler Errors of measurement Measurement data at unstable conditions Inadequate Measurement Errors of measurement Measurement data at unstable conditions</p>
	<p>Low Pmax/Pcomp tendency on Cyl. No. 2 is observed As deteriorated sealing condition is considered, it is recommended to check piston ring/cylinder liner condition and wear condition.</p>	<p>Pcomp is low (Cyl. No.2) Wear of piston ring. Report inspection data of piston ring Leakage from piston ring Wear of liner. Report inspection data of liner Wear of cylinder liner Trouble of exhaust valve. Report inspection data of exhaust valve Burn-out/blow-by of exhaust valve Inadequate exh. valve open/close timing Trouble of piston crown. Report inspection data of piston crown Burn-out of piston crown Inadequate Measurement Errors of measurement Measurement data at unstable conditions</p>

Automatic report (total 10 pages) function is also packed.


301000010

SEPA II
System for diesel Engine Performance Analysis (IInd generation)

Engine Performance Report

Contents

1. Performance Graph
2. Load Diagram
3. Cylinder Balance Graph
4. Trend Graph
5. Diagnostics Results - Cause



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SEPA II (SEPA II)
Engine No. 201 (Hitz, 301000010)

Diagnostics Results - Cause

Index Page Cause No.

Diagnostics for Blue Plot Data


Cylinder Data Adjustment

Pmax (Pmax)

Pcomp (Pcomp)

Exhaust Valve (Exh. Val. (Cyl. No.))

SEPA II (SEPA II)
System for diesel Engine Performance Analysis (IInd generation)
(Aut. # 301000010, 301000010)



3010

1.3 Link with manuals

3 Link with manuals

The screenshot shows the SEPA Diagnostics Results window. The 'Average Data Judgement' table lists several phenomena, with 'Turbocharging efficiency decrease' selected. The 'Cause' section lists 'Clog of air flow line' as the primary cause. The 'Bemedy' section provides a remedial action: 'Check pressure difference slower inlet filter. If the difference is large, clean out.' A blue arrow points from the 'Manual' button in the bottom right of the window to a callout box.

The user clicks a button and jumps to manuals & service information about diagnosis results. Quick remedies are displayed.

Click here!!

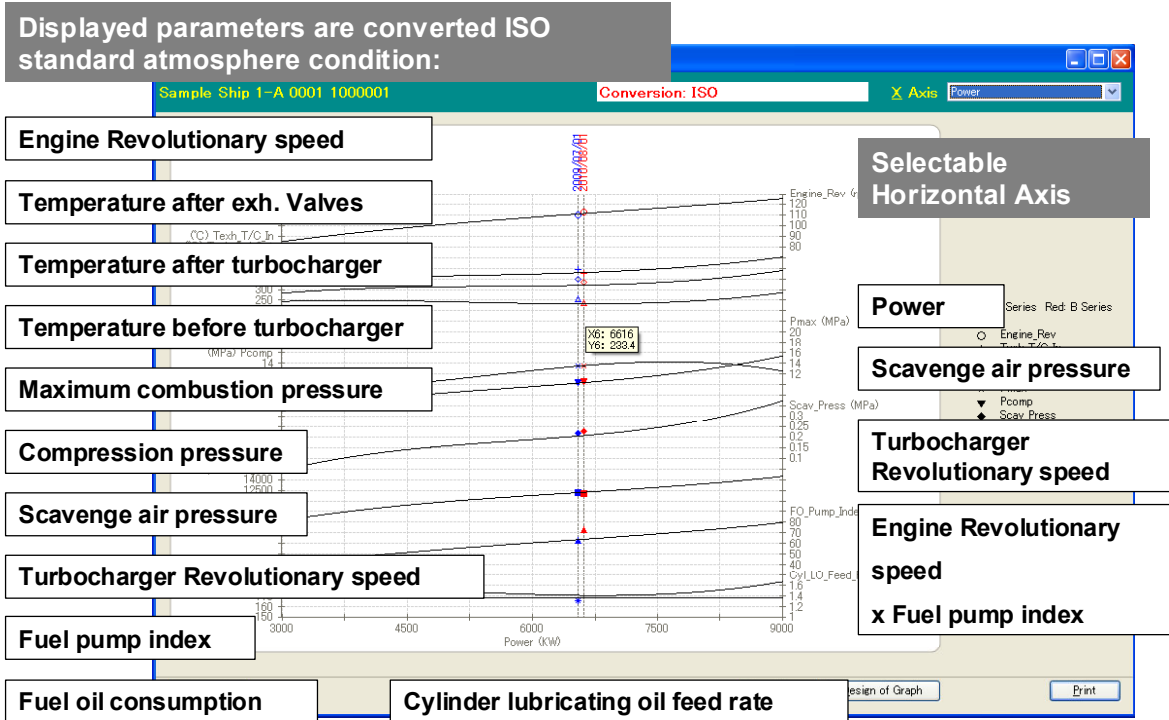
These pages are for the typical engine.
Please refer the instruction manual stored in your engine room with the page numbers.
Check the exact instruction for your engine.

4. Air Cooler Synopsis	4. 空気冷却器の性能
PLATE 70610 (Air cooler synopsis diagrams)	PLATE 70610 (Air cooler synopsis diagrams)
The plate gives model curves for air cooler parameters, which are dependent on the scavenge air pressure (P _{scav}).	本PLATEのモデルカーブは、空気の掃気圧 (P _{scav}) を示す。
<u>Temperature Difference between Air Outlet and Water Inlet</u> (Δt _(air-water))	<u>空気出口と冷却水入口の温度差 (Δt_(air-water))</u>
The model curve shows the temperature difference between the air outlet and the cooling water inlet, as a function of the scavenge air pressure (P _{scav}).	モデルカーブは、Δt _(air-water) と掃気圧 (P _{scav}) との関係を示す。

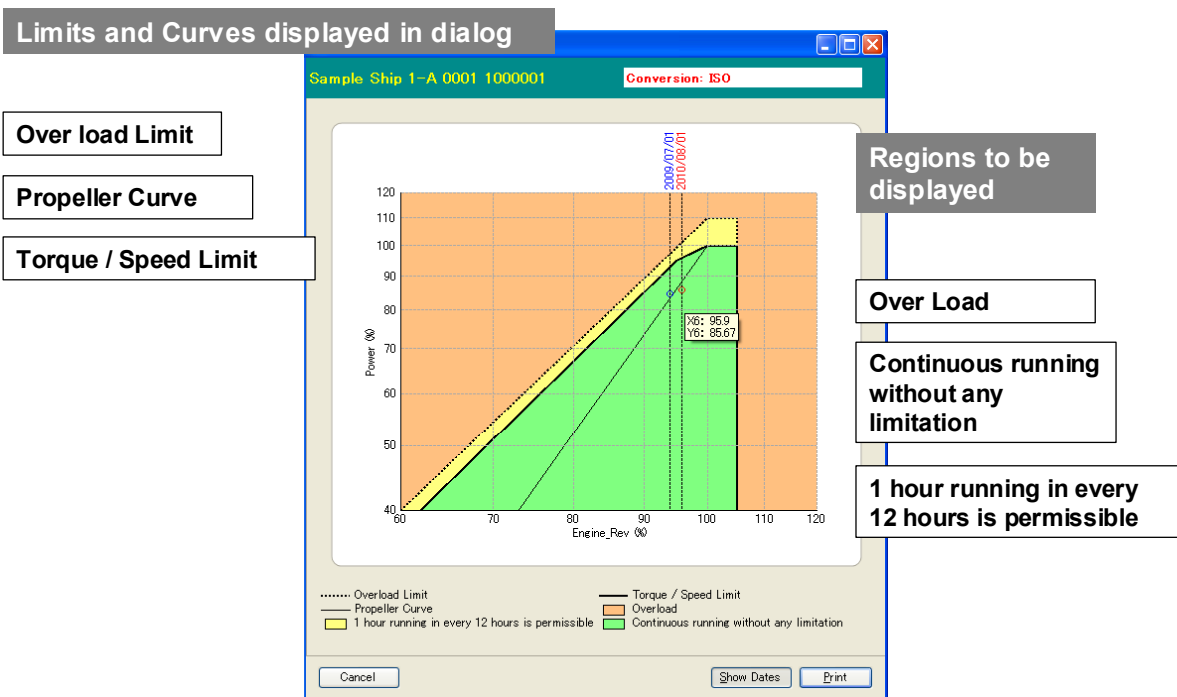
The user can jump to manuals and service information about diagnosis results and remedies. As these images are installed in the user's personal computer, no stress is felt about the communication cost.

2. Four types of Analysis Graphs are served

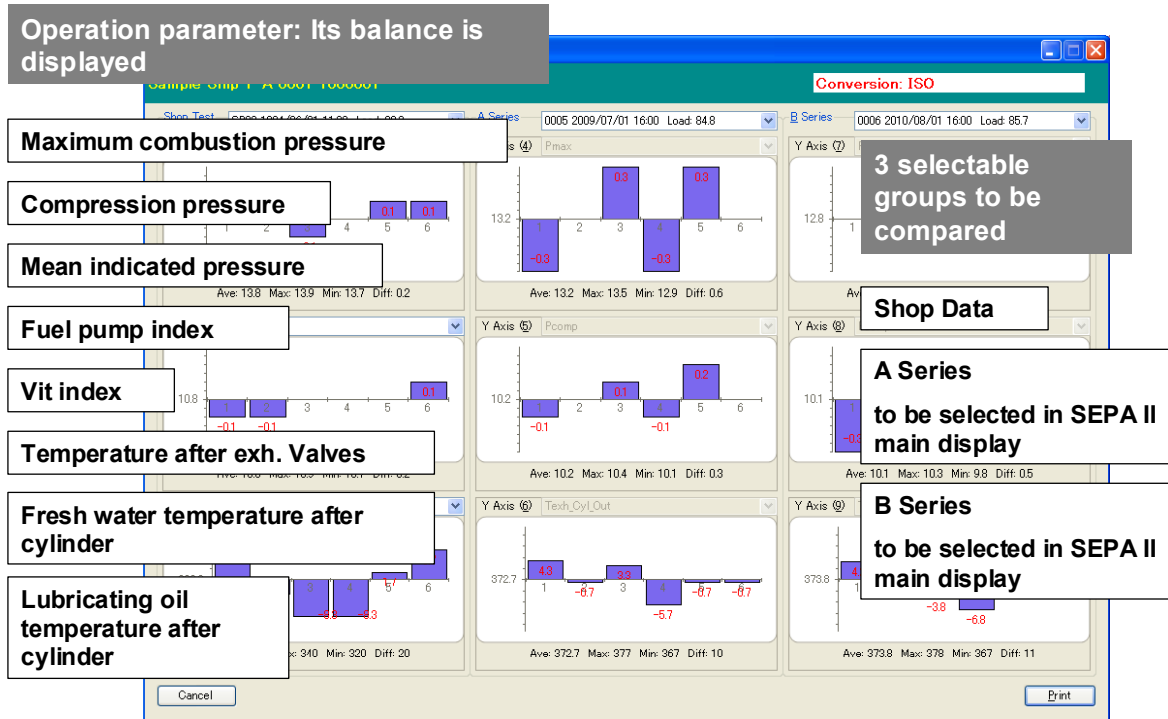
2.1 Performance graph



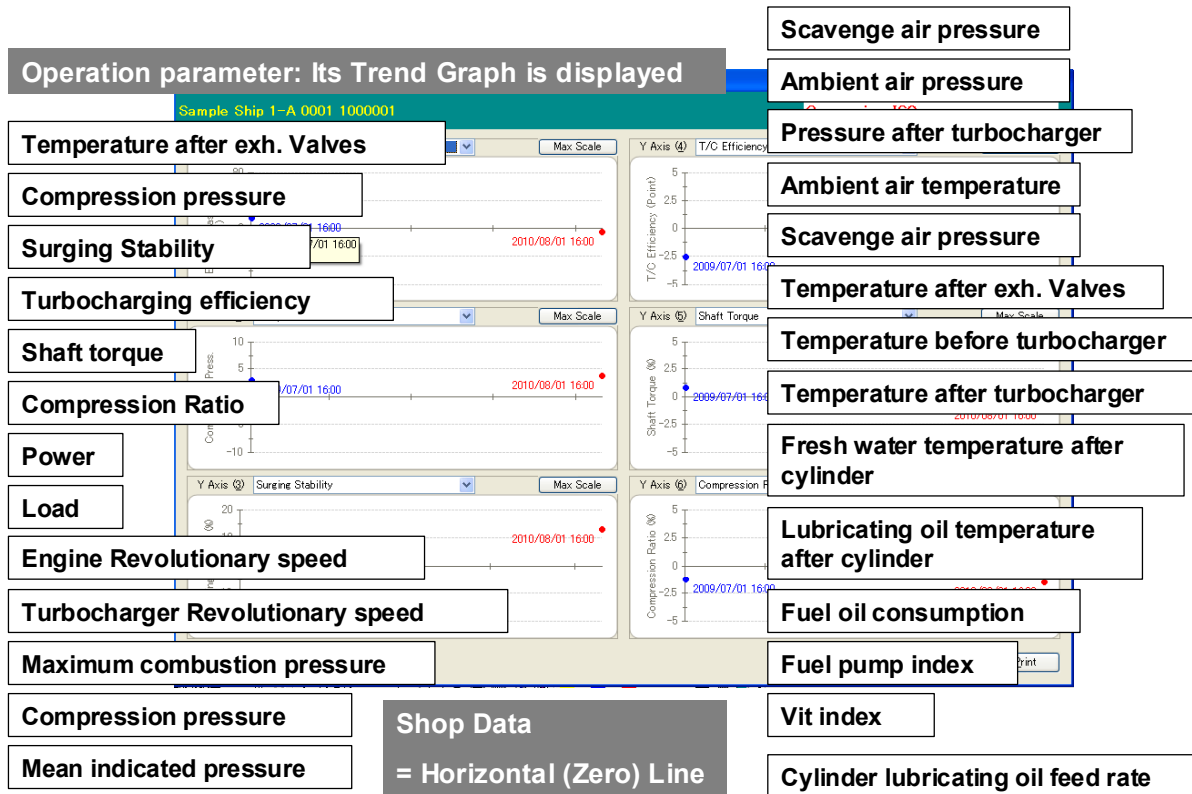
2.2 Load diagram



2.3 Cylinder balance graph



2.4 Trend graph



3. Input Data to be required

Item	Unit	Value
Date	yyyy/MM/dd	2011/03/08
Time	H:mm	10:46
Engine_Rev	rpm	
Power	KW	
Load	%	
Ambient_Press	hPa	
Ambient_Temp	°C	
Scav_Press	MPa	
Scav_Temp	°C	
F.O.C	g/KW/h	
Cyl_LO_Feed_Rate	g/KW/h	
Pmax	MPa	
Pcomp	MPa	
Pi	MPa	
FO_Pump_Index	-	
Vit_Index	-	
Texh_Cyl_Out	°C	
Tfw_Out	°C	
Tlo_Out	°C	
T/C_Rev	rpm	
Texh_T/C_In	°C	
Texh_T/C_Out	°C	

Remarks

Back Save

Only the same input data as main engine performance data sheet is required for the engine performance analysis.

We kindly offer our System of diesel Engine Performance Analysis (2nd) SEPA II for your self analysis.

If your are interested in it, please ask us for the free trial use of SEPA II.

Date	日付	Date
Time	時刻	Time
Engine_Rev	機関回転数	Engine Revolutionary speed
Power	出力	Power
Load	出力比(100%=MCR)	Load(100%=MCR)
Ambient_Press	大気圧	Ambient air pressure
Ambient_Temp	大気温度	Ambient air temperature
Scav_Press	掃気圧	Scavenge air pressure
Scav_Temp	掃気温度	Scavenge air temperature
F.O.C	燃料消費率	Fuel oil consumption
Cyl_LO_Feed_Rate	シリンダ注油率	Cylinder lubricating oil feed rate
Pmax	燃焼最高圧力	Maximum combustion pressure
Pcomp	圧縮圧力	Compression pressure

Pi	平均有効圧	Mean indicated pressure
FO_Pump_Index	燃料ポンプ・インデックス	Fuel pump index
Vit_Index	タイミング・インデックス	Vit index
Texh_Cyl_Out	排気ガス・シリンダ出口温度	Temperature after exh. Valves
Tfw_Out	シリンダ冷却水出口温度	Fresh water temperature after cylinder
Tlo_Out	ピストン冷却油出口温度	Lubricating oil temperature after cylinder
T/C_Rev	ターボ回転数	Turbo charger Revolutionary speed
Texh_T/C_In	排気ガス・タービン入口温度	Temperature before turbocharger
Texh_T/C_Out	排気ガス・タービン出口温度	Temperature after turbocharger
Press_After_T/C	タービン出口圧	Pressure after turbocharger
Remarks	リマーク(コメント)	Remarks