

A Reliable Main Engine

Regular performance evaluations enable many problems to be detected and solved before they become critical.

- The indicated pressure (p_i) and the engine speed (rpm) can be used to calculate the actual load and to find out if the propeller is 'heavy'.
- The indicated pressure (p_i), the maximum pressure (p_{max}), the compression pressure (p_{comp}) and the exhaust temperature level can be used to judge the individual cylinder condition.
- The fuel pump index, together with the actual engine load, can be used

to judge the condition of the fuel pump plungers/ barrels and suction valves.

- The turbine back pressure and the pressure drop across the air cooler(s) and turbocharger intake filter(s) reveal if measures should be taken in regard to the air/gas ways.
- The scavenge air pressure (p_{scav}), the compression pressure (p_{comp}), the turbocharger rpm, and the temperature before and after the turbine enable the condition of the turbocharger to be judged.

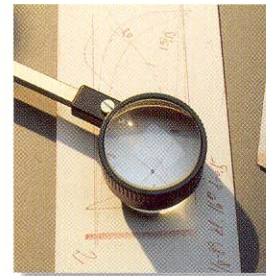
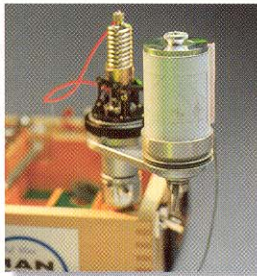
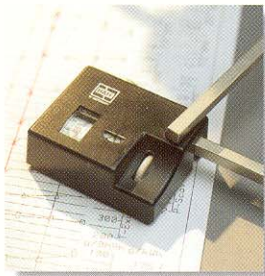
The above are just a few examples of problems that can be detected and corrected

before they become critical. However, it is important to take *all* measurements into consideration if a reliable evaluation of the engine performance is to be made.

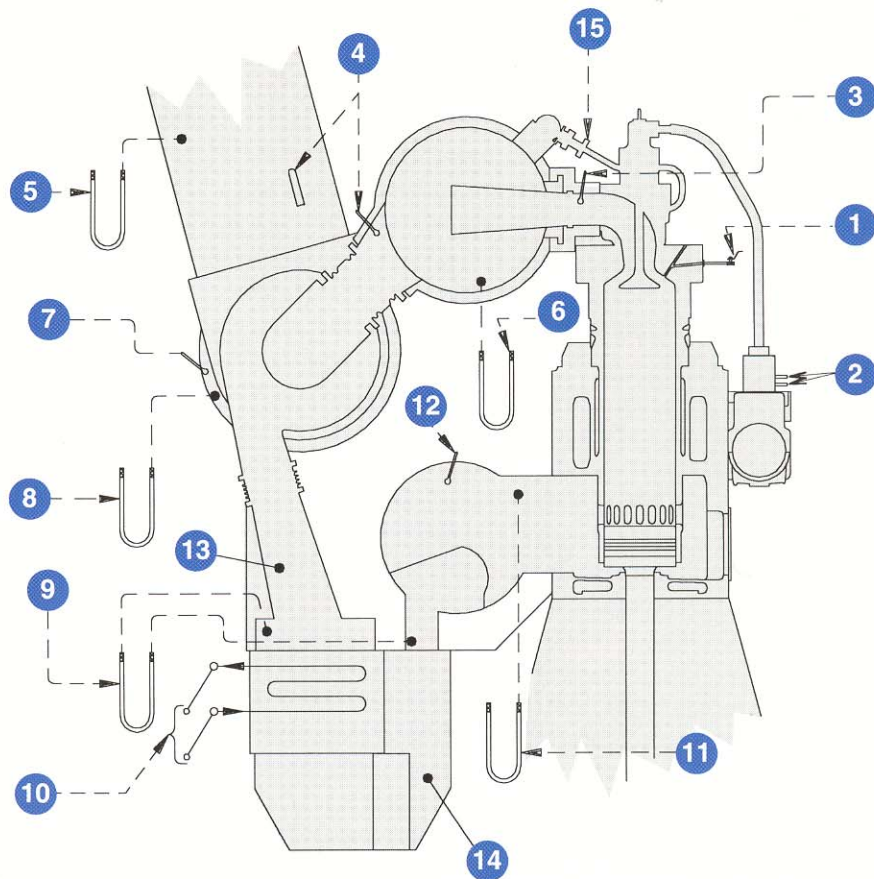
Further information on performance evaluation is available in the instruction book on board. *Please refer to Volume 1, Operation.*

The diagram below illustrates the most common operational problems and their causes.

However, it is important to be aware that if low-standard, non-original spare parts are installed, the information in the diagram cannot be relied upon.



Check points	Causes						
	Worn fuel pumps + suction valves	Heavy propeller	Low T/C efficiency	Exhaust valves, damaged seats	Piston rings broken or collapsed	Increased press. drop across air cooler/filter	Increased back-pressure after turbocharger
Fuel pump index	↗	↗	—	—	—	—	—
Exhaust temperature	↗	↗	↗	↗	↗	↗	↗
p_i	—	↗	—	—	—	—	—
p_{comp}	—	—	↘	↘	↘	↘	↘
p_{max}	↘	—	↘	↘	↘	—	—
p_{scav}	—	—	↘	—	—	↘	↘
Engine rpm	—	↘	—	—	—	—	—
Overhauling intervals	↘	↘	↘	↘	↘	↘	↘
Mechanical conditions						Restriction in air/gas ways	



Measurements on engine		Units
1	p_i , p_{max} and p_{comp}	bar
2	Fuel pump index and p_{max} adjustment index	mm
3	Exhaust temperature	C°
4	Exhaust temperature before and after turbocharger(s)	C°
5	Turbine back pressure	mmHg
6	Exhaust gas receiver pressure	mmHg or bar
7	Turbocharger inlet temperature at inlet filter	C°
8	Pressure drop across inlet filter	mmHg
9	Pressure drop across air cooler	mmHg
10	Air cooler water inlet and outlet temperature	C°
11	Scavenge air pressure (p_{scav})	mmHg or bar
12	Scavenge air temperature	C°
13	Scavenge air temperature before air cooler	C°
14	Scavenge air temperature after air cooler	C°
15	Fresh cooling water outlet temperature from main engine	C°

Measurements in engine room	Units
Turbocharger and engine revolutions	rpm
Fuel oil pressure before and after filter	bar
Fuel oil temperature before engine	C°
Fresh cooling water inlet temperature, main engine	C°
Barometric pressure	millibar