

ENGINE PERFORMANCE & OPTIMIZATION SYSTEM



KONSGBERG

Kongsberg is in cooperation with AVL List GmbH offering an engine performance monitoring system that enables continuous monitoring of the engine condition and performance.

The AVL EPOS™ (Engine Performance & Optimization System) is a scalable monitoring system for large-bore engines. It enables a permanent online monitoring and diagnosis of the propulsion and auxiliary engines, for both 2- and 4-stroke. Continuous data evaluation with expert algorithms and upstream fault diagnosis results in accessible information and valuable warnings for optimum engine performance.

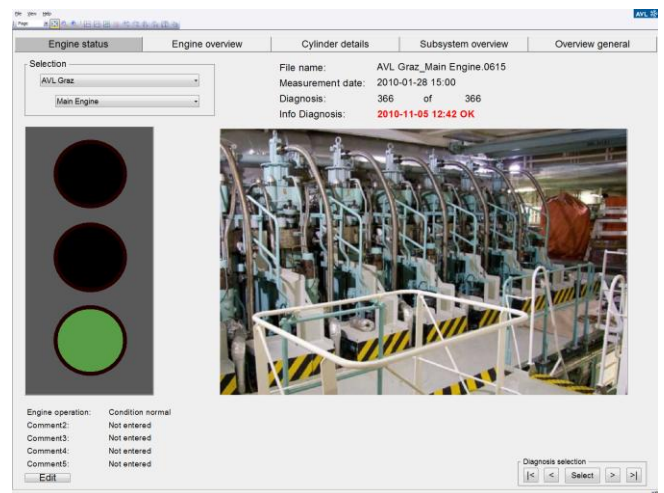
Features

- Continuous evaluation and permanent analysis of fuel injection and combustion process
- Failure detection by expert algorithms regarding fuel injection system and combustion chamber area
- Trend analysis (chronological, characteristic plot vs. engine load or speed) and trend prediction
- Integration of external monitoring devices

General description

The AVL EPOS™ achieves optimum thermodynamical and mechanical engine behaviour, leading to low operating costs and high life cycle quality.

AVL EPOS™ is a software tool based on the extensive engine knowledge and experience from



AVL List GmbH. As an integrated part of Kongsberg's K-Chief 600 automation system this system covers all requirements for an advanced engine performance system.

The software is engineered with an open platform concept allowing the integration of all kind of measurement systems e. g. shaft torque, bearing clearances and temperatures. This gives you a flexible and extensible platform for engine performance systems. As an example the AVL EPOS™ can be extended to include turbo charger monitoring, NO_x, SO_x and CO₂ calculations, providing a complete picture of the performance of the engine and its auxiliaries.

Warranty of cylinder pressure sensor

Warranty of cylinder pressure sensor is 3 years or 16000 running hours for both portable and fixed sensors.

System components

Computer:

The user interface is a computer. Either as an integrated application in K-Chief 600 automation system, or stand alone application on a 13.3" touch screen.



Cabinets with processing units:

Kongsberg's standard cabinets containing processing units and a LED push button as user interface will give easy installation and operation of the system for the operator.

Signal processing unit:

The new signal processing unit (SIUxe) allows communication on Kongsberg standard CANopen protocol. The integration into K-Chief 600 automation system is seamless. The SIUxe have 4 input channels for cylinder pressure sensors. More technical data can be found on the SIUxe datasheet, KM doc. 350497

Pressure sensors:

GT-26 offline pressure sensor: The sensors are mounted on top of the indicator cock.



GT-27 online pressure sensor: The sensor are mounted between the indicator cock and cylinder head. For gas engines it is recommended to install the sensor directly in the combustion chamber.



For technical data of the sensors see datasheet "Cylinder Pressure Sensors" doc. 364260

Crank angle and TDC detection sensor

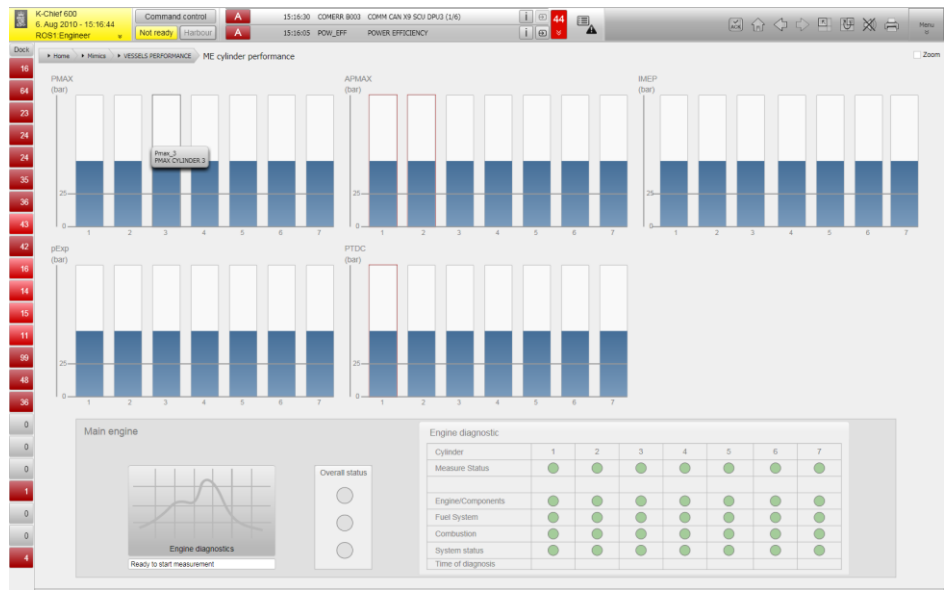
As part of the overall system you need accurate detection of TDC and crank angle of the main engine. With a combination of the new GF-135 TDC and crank angle pick up and SW procedure we have a resolution of 0.5 degree crank angle. For auxiliary and medium speed engines only a TDC sensor are required.



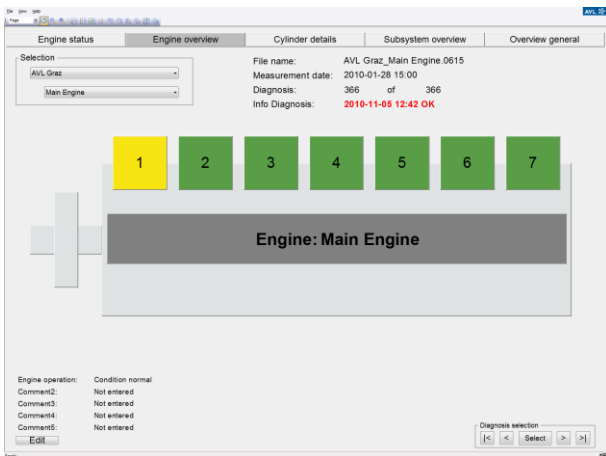
HMI

The overview engine performance MIMIC picture containing:

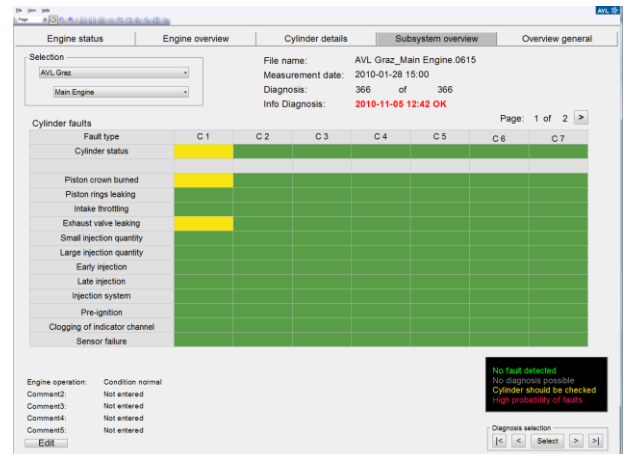
- Start stop of measurement
- Most important results from the measurement
- Instant feedback with regards to the health state of the engine (Traffic lights)



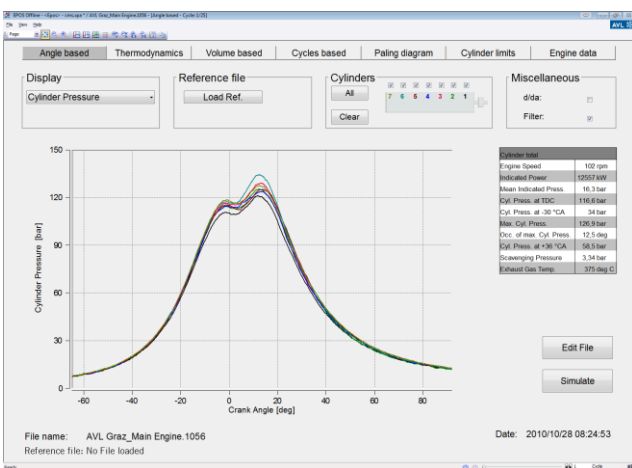
The system allows analyzing the data from the measurements in detail, as shown in the following illustrations:



Engine diagnostic



Engine subsystem diagnostic



Angle based



Paling diagram

System Layout

Integrated AVL EPOS™ solution for K-Chief 600 consists of:

- MIMIC picture available on all operator stations.
- GT-26 movable pressure sensor for offline solution and auxiliary engine monitoring.
- GT-27 fixed installed pressure sensor for online solution.
- Engine room cabinet with processing units. (1 SIUxe for 4 online cylinder pressure sensors)
- GF-135 TDC and crank angle pick up system mounted on the propeller shaft
- TDC pick up for auxiliary engines
- MetaPower shaft torque meter (Optional)
- Fuel flowmeter (Optional)

Note: The optional measurement points will add to the functionality of the AVL EPOS™ system. Some of the subsystems may require additional input points.

