Features allow for high quality measurements of the engine combustion process

- Analyze engine data
- Optimize performance
- Minimize emissions

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Whether to the demanding marine market with harsh conditions on ships or to diesel power plants, the SELCO EngineEye is the best tool for monitoring the engines. The EngineEye allows the engine technician to balance, fine-tune and monitor the main and auxiliary engines. This system is a robust system for performance reporting for all large engines no matter if they are running on HFO* / MDO*, LPG* or natural gas, as long as they are equipped with an indicator cock.

Gain insight into the quality of the combustion process within the engine. The system allows the user to measure parameters such as firing pressure and crankshaft rotation.

**Optimize the heartbeat of your engine with the SELCO EngineEye**

Tuning and balancing the engine to a “most efficient” performance requires the right tool. Benefit from long-time quality measurements of the engine combustion process with a unique handheld high precision indicator of cylinder pressure.

This system developed with experts is the handy, safe and most trusted tool in the engineer toolbox. The system is designed with focus on usability and high performance and provides diagnostics for analysis. SELCO EngineEye provides data for misfiring analysis and cylinder balancing in an higher quality than seen before.

**Segments & Applications**

- For all engines with an indicator cock

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The SELCO EngineEye can provide information about the quality of the burning process, and thereby the efficiency of the engine. The SELCO EngineEye can also help to provide early warning about component failure and need for maintenance, thus minimizing the cost of repair and downtime.

The EngineEye range of instruments makes it easy to find the optimal solution. Together with the EngineEye the crank angle sensors cover all engine types and applications.

* = HFO: Heavy fuel oil, MDO: Marine Diesel Oil, LPG: Liquified Petroleum Gas
EngineEye - a must in the toolbox

A new generation of electronic cylinder pressure analyser
The EngineEye is a reliable and robust tool for engine diagnostics. Operation is intuitive and requires no training. The unit is menu-driven and will be recognized as a mass-storage device on a PC. The EngineEye is designed with ease-of-use in mind.

Due to the strong rugged design of the pressure sensor, it is possible to balance the engine during operation based on Pmax readings.

All EngineEye systems support slow-steaming projects and due to the GaPO4 sensor technology* it can measure over hours on open indicator cocks. All sensors come with integrated, intrinsically safe sealing technology, and stainless-steel coated cables.

The sensor is fully temperature-compensated and can take readings continuously without overheating. The accuracy can be checked on-board by use of standard hydraulic/pneumatic pressure calibrators.

The large LCD colour display guides the user through the measurement process. The system uses rechargeable batteries with no memory effect.

Low follow-up costs due to unmatched sensor technology (both pressure & crank angle sensors).

Features

- Provides data for misfiring analysis and cylinder balancing in a higher quality than seen before
- Unique stability - sensor can measure over hours on open indicator cocks (due to patented crystal)
- Extremely low thermal drift, patented sensor technology
- Automatic sensor recognition
- Powerful software incl. TDC and ISO corrections
- Advanced crank angle technology
- Rugged design with IP54 housing protection
- Insulated grip, high temperature resistant

Benefits

- Easy to operate, reliable and robust tool
- Safe in operation - can be operated with gloves
- Tune engine during operation
- Cost effective solution and preventive maintenance reduce costs
- Calibration check done on-board
- Install sensor-belt easily on all shaft diameters and no maintenance required
- Online data transfer
- Versatile for a large number of engine configurations
- The handy tool to ensure optimal settings of the engine operation parameters

Increase combustion efficiency. Bring emissions down
EngineEye: tool & sensors

Handheld Data Display
The EngineEye handheld unit is robust with a large built-in viewer where data is visualized on graphs, etc. as shown on below examples:

![Main Menu where choice is made whether to make new measurements (MIP, cylinder balancing, misfiring analysis), look at previously recorded data, configure or check of system (connected sensor).](image)

- Pressure curve (p/alpha graph)
- Overview of all connected sensors and their main data including when to calibrate again.

The handheld unit is very easy to get familiar with and to use even with protective gloves.

The menu system is very intuitive. The user is guided on the back-lit colour display and has only few keys to operate.

The data is shown on the display and can be saved and analyzed with the software.

Pressure Sensors
Due to a unique sensor technology based on a GaPO$_4$ crystal with excellent linearity and extremely low thermal drift, the new system allows for long term pressure readings. The sensor may be left measuring on the open indicator cock for hours. This gives the possibility of tuning the engine while measuring continuously.

A patented technology ensures that the sensor will stay sealed even in the unlikely event of a membrane collapse; this allows for un-interrupted operation of the engine, with maximum safety of the operator.

A built-in charge amplifier avoids problems with special plugs and cables. This is very beneficial in the long run.

Crank Angle Sensor Belt
The crank angle can be measured with a special crank angle sensor-belt with high resolution. The unique design is easy to cut and adapt and thus applicable for all shaft diameters. The crank angle sensor-belt installation can easily be made by ships’ crew themselves, reducing installation costs.

Automatic sensor recognition and automatic synchronization with PC software, where all measurements stay read-only in the handheld instrument allows for safe and easy use.

Illustration of a marine engine:

1. Handheld EngineEye has the pressure sensor mounted on an indicator cock (the armoured cables shown in blue).

2. The sensor and crank angle sensor belt mounted. Permanent sensor installation and junction boxes shown in gray.
EngineEye: software

Software for diagnostics
The EngineEye system is delivered with a powerful intuitive software. The charts are the same as on the handheld unit, but displayed in a higher resolution and zoomable with more details.

The software displays the data from the engine ready for analysis and engineer conclusions. The results can be compared with historic results or with other reference values. The results may be stored, printed and can be e-mailed ashore. A major benefit is the possibility to send data values from the ship to the superintendence for comparisons, etc.

The EngineEye is connected (and charged) via USB, and new measurements can be automatically imported into the PC software database as soon as the instrument is connected to the PC. No more fiddling with serial ports – the system is plug-and-play.

The data is kept as a read-only backup in the instrument, and is just copied to the PC, where it is organized after ship and engine. Any measurement may be used as a reference trace on the graph for easy comparison, and the software can thus help detect small changes in the engine performance over time.

TDC & ISO correction
The software includes TDC (top dead center) & ISO correction. It has a selectable semi-automatic TDC correction, where the shape of the pressure curve is used to estimate the angle for the top dead center position. This corrects for crankshaft elastic twist and delay in the indicator cock, and enables more accurate mean indicated pressure calculations.

The software can also provide correction for atmospheric conditions after ISO 3046 and ISO 15550. The user can be prompted to enter the needed atmospheric data on the handheld when measuring on the engine, or they can be edited later. This enables comparisons between data measured in arctic and tropical waters.

No service demand
The new solution is easy to install and demands no maintenance. Downtime costs and can be minimized with the SELCO EngineEye since the engineer is assisted in preventing unplanned downtime.

Further also costly return of the equipment for regular calibration can be avoided for the SELCO EngineEye. Functionality checks can easily be done on board by use of standard tools. Simply check the accuracy on board on your own.

Service is of course offered by SELCO if advise or an upgrade is requested.

All together the SELCO EngineEye is an intuitive system giving the high resolution data required for cost efficient and safe engine operation.

Ensure optimized engine settings and minimize the downtime of your valuable engine. Include the SELCO EngineEye in the engineer toolbox.

Cylinder parade from a 6 cylinder two-stroke engine. The software automatically sorts and aligns the pressure curves according to the engine configuration and angle data, and makes it easy to see differences and alignment problems.

Power diagram from a single cylinder. The software is able to compare different cylinders or different measurements on the same engine, highlighting differences due to wear or adjustment problems.
## Technical Data

<table>
<thead>
<tr>
<th>EngineEye</th>
<th>Basic</th>
<th>Advanced</th>
<th>Professional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product no:</td>
<td>E5000 &amp; E5100</td>
<td>E5000, E5100 &amp; E5200</td>
<td>E5000, E5100, E5200 &amp; E5300</td>
</tr>
</tbody>
</table>

### Features
- **Pressure range**: 0-250 Bar
- **Pressure accuracy (ps)**: 1%
- **Temperature range**: -50 to 320 °C
- **Sensor technology**: GaPO₄, GaPO₄, GaPO₄
- **Speed range**: 30-2000 rpm
- **Temp. compensation**: Yes
- **USB**: Yes
- **Colour LCD**: Yes
- **PC software incl.**: Yes
- **Upgradable**: Yes
- **Calib. check integr.**: Yes
- **Connecting sensor ports**: 1, 2, 5

### Measuring mode
- **Pressure graph**: Yes, Yes, Yes
- **MIP mode**: not incl., Yes, Yes
- **Trending mode**: Yes, Yes, Yes
- **Histogram mode**: Yes, Yes, Yes

### Results
- p₄max: Yes, Yes, Yes
- p₄hmax: Yes, Yes, Yes
- p₄hmax bargraph: Yes, Yes, Yes
- p₄alpha: not incl., not incl., not incl.
- dp/alpha: not incl., not incl., not incl.
- p/V: not incl., not incl., not incl.

### Sensors
- **Pressure sensor**: Yes, Yes, Yes
- **Crank angle**: not incl., not incl., not incl.
- **Vibration, power**: not incl., not incl., not incl.
- **Ignition, MHD**: not incl., not incl., not incl.
- **Fuel pressure, power**: not incl., not incl., not incl.

### Memory
- **Max. engines**: 5, 10, 20
- **Max. cylinders per engine**: 20, 20, 20
- **Max. no. of axioms**: 30, 30, 30

*Possible with a crank angle sensor E5300.

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### About SELCO

Since the origin in 1960, SELCO's technology has provided the electrical power generation market with high-class equipment meeting the major international standards.  
- Generator control, protection & power management  
- Engine control & protection  
- Engine Diagnostics  
- Process alarm monitoring  
- Arc fault protection

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### Main Office:

**SELCO A/S**  
Betonvej 10  
DK-4000 Roskilde  
Denmark  
Tel.: + 45 - 70 26 11 22  
Fax: + 45 - 70 26 25 22  
e-mail: selco.dk@selco.com

**SELCO China Ltd.**  
Room 428  
550 Mincheng Road  
200135 Shanghai Pudong  
China  
Tel.: + 86 - 2150281391  
Fax: + 86 - 2150282025  
e-mail: sales@selco-china.com

**SELCO ME L.L.C**  
P.O. Box 52898  
Dubai  
United Arab Emirates  
Tel.: +971 - 4 3413360  
Fax: +971 - 2 3413770  
e-mail: selco.ae@selco.com

**SELCO SE Asia Pte. Ltd.**  
50, Tuas Lot, Tuas Avenue 11, #3-25  
Singapore 639107  
Singapore  
Tel.: +65 – 6316 2204  
Fax: +65 – 6316 2203  
e-mail: selco.sg@selco.com

www.selco.com