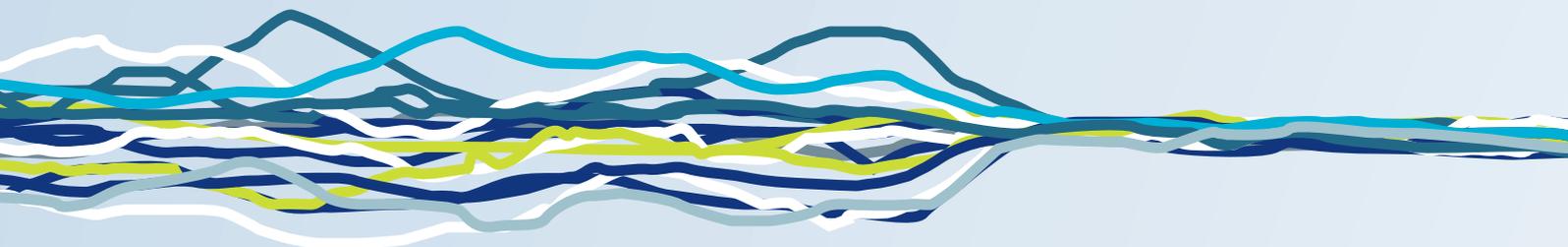


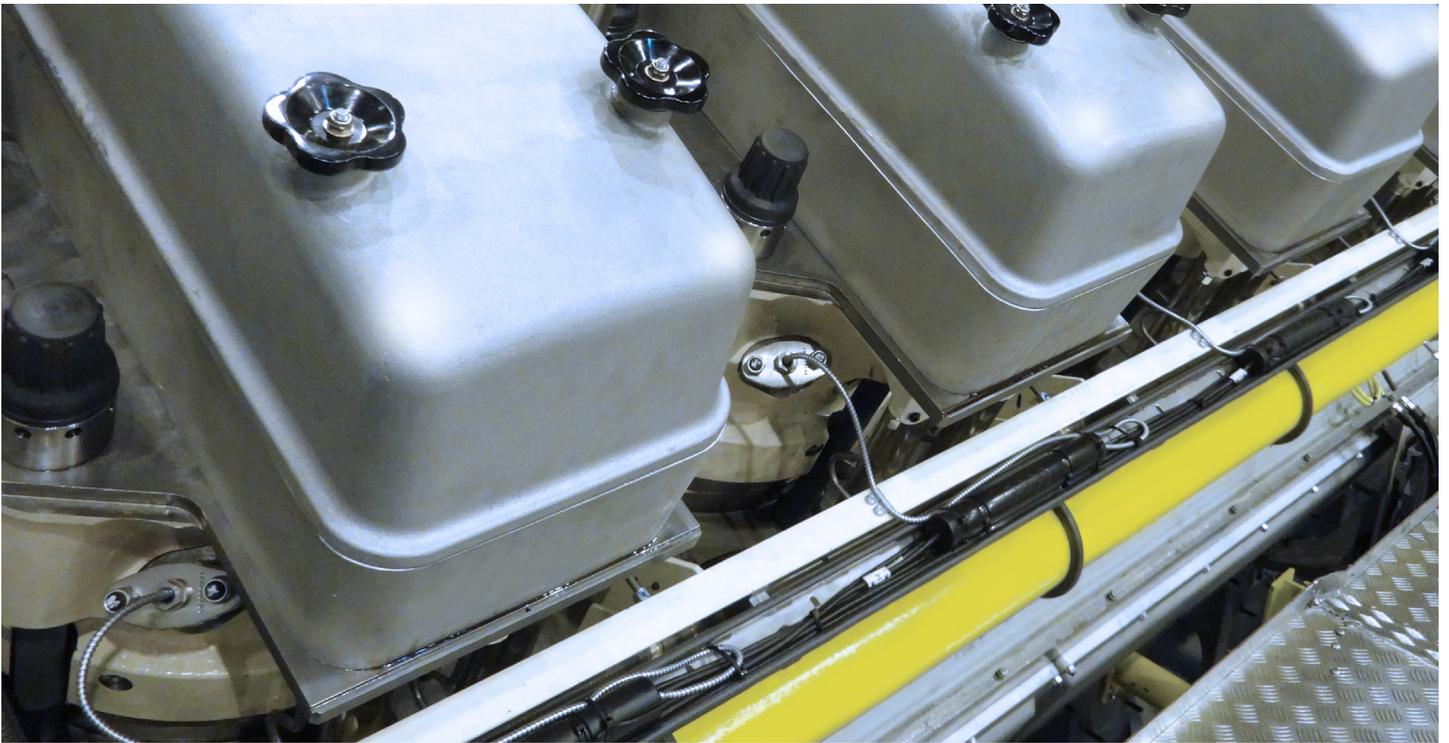


Rolls-Royce

Cylinder Pressure Monitoring (CPM)

For peak performance and improved reliability





Improve equipment reliability by aligning cylinder pressures

Optimizing equipment reliability and lifecycle costs are key requirements for operating a power plant profitably. That's why, in addition to developing new products that meet improved performance targets, we also focus on optimizing the performance of our legacy equipment operating in the field-generator sets that are built to run for decades. For you that means continuous improvements, and genuine confidence that your equipment will always achieve its full potential.

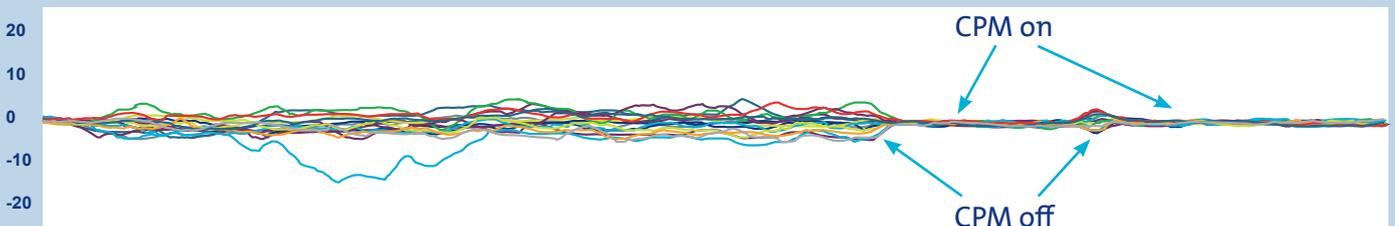
Available for all medium speed gas engines from Rolls-Royce, the continuous cylinder pressure monitoring (CPM) system stabilizes engine performance, significantly improving its reliability while also protecting it from excessive stress.

Protect your equipment and reduce lifecycle costs

The Otto-cycle combustion process used in medium speed gas engines allows for minor variance in firing pressures without any noticeable consequences for the operation. However, optimizing the engine's combustion pressure levels with CPM results in exceptionally smooth and stable operation. This is achieved through continuous alignment of the combustion pressures thanks to an automatic monitoring and adjustment process.

A wide range of real-time combustion data is continuously monitored by sensors installed in each combustion chamber. This data is analysed and used as a basis for optimization, including adjustment of the ignition angle, to ensure automatic alignment of firing pressures across all cylinders. As a result,

Graph showing deviations from nominal pressure



Without CPM, both short and long-term peak pressure values can vary. The stabilization resulting from CPM has proven to be significant.

An intelligent system for smoother engine operation

equipment efficiency and fuel consumption are optimized. Operational experience with CPM has shown a reduction in fuel consumption of up to 2% depending on the current tuning of the engine. Smoother operation increases overall equipment safety and component life. And protecting it from excessive vibrations due to misfiring, knocking and mechanical or thermal overload helps improve its reliability while reducing unscheduled stops.

As a result of the stabilized combustion pressures, emissions are contained at the design level. Emissions and efficiency can be further optimized with an automatic NOx control upgrade (if not already fitted) available for gas engines.

In addition to the peak firing pressure control, CPM also includes the following protection and monitoring functions:

- High pressure detection
- Knock detection
- Misfire detection
- Detection of thermal overload in cylinders
- Condition monitoring of the cylinders

All the above functions are shown on the CPM touch screen with an indication of the affected cylinder(s).

So what increases the spread in combustion pressures?

In addition to normal spread variance in firing pressure, increased instability comes from several other factors. Over time, minor drifting of gas valves, spark plugs, pre-chamber valves and other combustion components may occur.

Additionally, the manual demands of traditional ignition tuning, which implies sequential measurement of cylinder pressure, when combined with any deviation from original factory settings, will affect the engine's performance and stability.

Manual ignition tuning is generally done after every main overhaul, whereas CPM continuously makes the adjustments automatically, in parallel on all cylinders, ensuring a more accurate result.

Operation and maintenance

All CPM system alarms are displayed on the CPM touch screen, and can also be integrated in the plant's SCADA (Supervisory Control And Data Acquisition).

As the CPM is an automated system, special attention is not necessary to keep it functioning properly. To ensure prompt detection of performance issues or other irregularities requiring attention, a simple daily monitoring routine is all that's required.

The intelligent system simplifies daily operation and provides increased visibility into the condition of the systems combustion components, helping you time service activities appropriately and avoid unscheduled stops.

By measuring all cylinder pressures simultaneously, CPM enables the engine tuning process to be completed more quickly after service, reducing plant downtime significantly.

Applicable installations

Engine type	Fuel type
BV20	Gas
BV16	Gas
BV12	Gas
KV18	Gas
KV16	Gas
KV12	Gas



Rolls-Royce

Bergen Engines AS
A Rolls-Royce Power Systems Company
PO Box 329 Sentrum, N-5804 Bergen, Norway

www.rolls-royce.com/bergen
service.bergen@rolls-royce.com

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