

MMSP - Multi-Functional Measuring Spark Plug



The new MMSP (Multi-Functional Measuring Spark Plug) combines the merits of the visual combustion analysis with the cylinder pressure measurement in a compact and robust product.

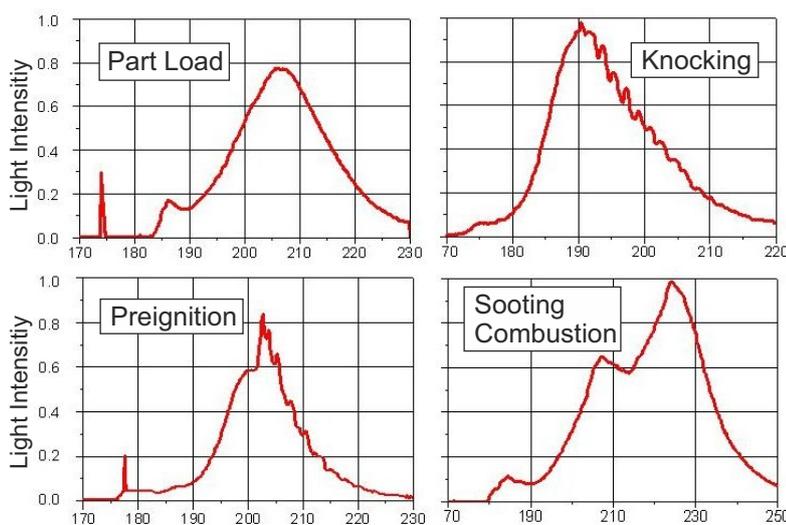
The integration of a pressure transducer in the spark plug has the advantage that no additional bore in the cylinder head is required.

Beside the pressure sensor the MMSP is equipped with up to 8 optical probes. The flame radiation that is produced during combustion in the combustion chamber will be transferred to the combustion analyzer COMBI after it has passed the light amplifiers.

By using appropriate triggers, the combustion cycles of interest can be detected and analyzed.

COMBI displays in a vivid graphic whether the combustion processes occur according to the defined parameters. In this way, analysis of knock can be conducted, and sooty combustion or pre-ignition can be detected. The more probes are used, the more significant is the information about the combustion process in the combustion chamber.

Depending on the customers requirements, the optical probes can be mounted at any angle and position in the combustion chamber.



The figure besides shows different light signals detected with the MMSP. At part load the ignition peak is very significant. After a delay the signal rises again. This is the radiation of the flame emission mainly generated by hydro carbon radicals. The highest peak shows the radiation of all gas components in the exhaust area of the combustion chamber. The main signal is similar to the pressure signal. Also the high frequent waves in the knocking signal are visible. At pre-ignition a signal is already detected before the spark event occurs. A peak in the expansion stroke is typical for sooting combustion. These and much more information can be extracted from the light signals.

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Applications

- Combustion analysis
- Pressure analysis
- Flame kernel development
- Knock detection
- Misfire detection
- Flame propagation
- Pre-Ignition detection
- Soot detection

MMSP connected to the light amplifier

Properties

- Threads: M10, M12, M14
- Type of Spark Plugs: all KISTLER Measuring Spark Plugs
- Number of Probes: 8
- Angle of View: 0°(piston axis) - 90°
- Observation Cone: 7° - 25°
- Optical Transmission: UV-Range - Visible Range
- Photo Detectors: Photomultiplier Tubes (PMT)
- Max. Temperature: 850°C
- Max. Pressure: 250 bar pulsing

MMSP with positions of the pressure sensor and the optical probes

