YOUR SOLUTION FOR OPTICAL MEASUREMENT

X-FEM VISIO V8X2 FOR AVL X-ion™

THE CHALLENGE

Ever more stringent emissions targets force our industry into ever more complex combustion technologies: The combination of electrification and advanced combustion solutions provides key ingredients for clean and efficient propulsion. As this results in increased efforts in power-train development, robust and thorough analysis methods become mandatory.

With these challenges and coupled with a thirst for innovation, AVL has developed AVL X-ion, the new high-speed data acquisition platform dedicated to powertrain development. AVL X-ion is a modular acquisition system that can be easily adapted to different units under test and test environments. It combines AVL's know-how and expertise in several application areas, namely indicating, optical combustion analysis, and e-power analysis.

THE SOLUTION

The X-ion Front-End Modules – or X-FEM – enable smart modularity, and ensure AVL X-ion is a perfect match for each application. They optimally combine high-performance ADCs with premium signal conditioning.

The X-ion base unit can host up to eight single-slot or four double-slot X-FEMs. The modules support hot swapping, meaning that the setup and maintenance efforts of the system are drastically reduced. Every X-FEM can be uniquely identified in the acquisition software. This helps trace the measurement setup and improves data quality.

Most X-FEMs provide additional functionalities:
• Voltage / current supply for easy sensor connection
• Sensor recognition using TEDS and/or AVL SID
• Built-in time-compensated digital filters

AVL X-ion™

THE APPLICATION

The X-FEM VISIO V8X2 is an eight-channel optoelectronic photodiode signal converter module for testbed and in-vehicle operation. Up to ten modules can be combined to an 80 channel system for knock, pre-ignition and particulate emissions applications. It is the ideal solution for the optical measurement of any highly dynamic phenomenon on gasoline engines.
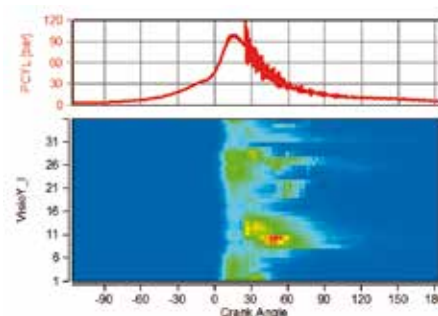
Main application areas are: The crank angle based flame measurements in IC engine cylinders enable the identification of premixed flames versus diffusion flames for the root cause analysis of particulate formation in stationary and transient operation, flame kernel propagation, knock starting locations analysis and the identification of irregular combustion.

The raw data is available online and offline in the acquisition software AVL IndiCom. The Visio application packages allow an analysis of the optical measurements in IndiCom.

High-precision photodiodes combined with 24-bit ADC provide high signal quality. Compact design makes it possible to measure up to 32 light signals per base unit. This allows the use of Visiolution spark plugs with up to 80 channels for the local analysis of light intensity within the cylinder. The light channels are analyzed directly with AVL IndiCom and can be easily combined with cylinder pressure curves. And thanks to the system modularity the combination with the synchronous acquired pressure allows straight forward data interpretation (see picture on the right). Furthermore critical events like knocking can be localized.

X-FEM VISIO V8X2	
Dimensions W × H × D	94 × 44 × 175 mm
Weight	540 g
Power consumption (typical)	9 W
Power supply	Via X-ion base unit
# channels	8
# free X-ion slots required	2
Operating temperature	−30…+60 °C
Sampling rate	500 kHz
Connector fiber optic cable	ST
PHOTODIODE	Broadband UV to IR 200 nm to 1100 nm