automotive engineering

IAV Cross – Injection Analyzer for Large Engine Applications

The measuring system that covers large engines

Recent years have seen a growing need for measuring systems capable of measuring injections of 8,000 mg as a result of higher demands on large engines and, following from this, on their injection systems. We have developed devices for applications of this type on the basis of our tried and proven shot-to-shot measuring system that has been tested in the field over a long period of time. Today, these devices are used by many customers both at development and production level.

The requirements on large engine applications not only differ in terms of injected fuel mass but also in relation to the maximum injection rate, durability and robustness of the system. One such requirement on large engine applications is the use of return parts from the engine. The Injection Analyzer is the ideal device for meeting these requirements as it contains no actuators of any kind.

Retaining our basic design and operating principle, we were able to leave the entire electrical system unchanged and only modify the hydraulics. This means we have kept all of the system's advantages. In addition to the current and injection rate signal, for example, the electrical system records up to three freely parametrizable channels at the high-precision sampling rate of 200 kHz per channel. This permits rapid and detailed analysis of the injector. The hydraulic unit's special design makes it possible to use the Injection Analyzer for all kinds of fuels, from test fluids, such as test oil, to real fuels like diesel as well as highly aggressive fuels in the form of bio-diesel for example. The Injection Analyzer is also designed without any actuators or moving parts, giving it an extremely high level of durability in the field.

Advantages

- *Extremely detailed rate signals for perfect analysis*
- *Highly reproducible and accurate injection mass*
- *Extensive measurements of additional signals for extremely fast differential analysis*
- *Measurement of transient and realworld driving cycles without stops*
- *Capability of measuring first shots*
- *High level of resistance to nearly all fluids*
- *No moving parts, keeping maintenance very low*
- *High-performance electrical system for acquiring all data*
- *Simple and extensive software for measurements and analysis*

Product by IAV

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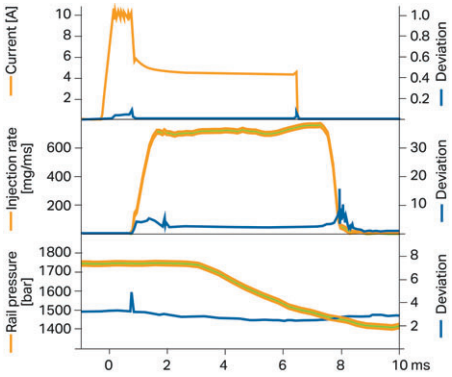
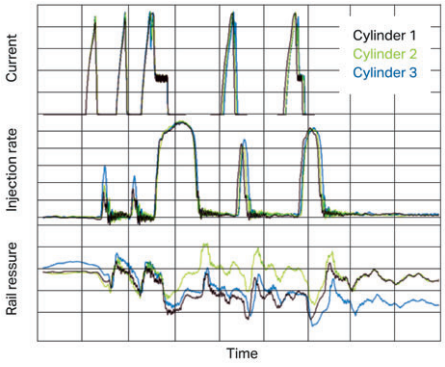
Technical Details

The complete IAV Cross – Injection Anaylzer family for all kinds of applications

High-performance electrical unit for acquiring and processing all data



Very detailed measurement and analysis of large injections



Multi-device functionality for measuring a complete injection system

System	Type R-080-095	Type R-080-155
Measurement range (mg/stroke)	5 – 4000	20 – 8000
Max. injection rate (mg/ms)	500	820
Injection frequency (Hz)	0 – 16*	0 – 16*
Repeatability (mg/shot)	< 0.5 for 5 – 100 < 0.5 % of the value for 100 – 4000	< 0.5 for 5 – 100 < 0.5 % of the value for 100 – 8000
Sampling rate (kHz)	200	200
Events per cycle	14	14
Number of cycles recorded	1 – 10,000	1 – 10,000
Adjustable backpressure (bar)	5 – 180	5 – 180
Temperature range (°C)	Fluid -40 to +190** Ambient -40 to +140**	Fluid -40 to +190** Ambient -40 to +140**
Usable fluids	Diesel fluids (test oil, diesel, bio-diesel)	
Analog input channels	5 analog input channels (+/- 10V) with 200kHz sampling rate per channel	
Injection timings	Measurement of the injection timings and delays according to customers preferences	
Remote use	.dll interface for simple external use of the software	
First shot measurement	Possible with pre-filling of the device	

Multi-device capability

IAV has developed a new and unique system for conducting measurements on a complete injection system. Injection Analyzer software provides the capability of using up to eight (!) devices with only one control computer. This allows our customers to analyze a complete injection system with several injectors at once, allowing for all in-car influences occurring in the real world under all boundary conditions.

Transient measurements

The Injection Analyzer allows the user to measure highly transient cycles without stopping the system or adjusting any properties. Stable system pressure provided by nitrogen makes it possible to record the injection cycle while it is being changed. This means that in addition to real-world driving cycles, gain curves with minimum and maximum masses are not a problem.

* Other frequency ranges possible

** Suitable device for your application will be defined