

Accessory for Test benches
Injection Quantity Indicator

EMI21



MOEHWALD GmbH
Michelinstr. 21
D- 66424 Homburg/ Saar

Tel.: +49(0)6841-707-0
Fax: +49(0)6841-79108
EMail: sales@moehwald.de
Internet: www.moehwald.de

Special Features:

- Use in the Gasoline and Diesel field possible
- Large measuring range up to 600 mm³/ injection
- Very high accuracy :¹⁾ +/- 0,05 mm³ at Q = 0,5 – 50 mm³
 +/- 0,1% o.R. at Q = 50 – 600 mm³
- Up to 5 injection events can be measured (extendable to 10)
- Resolution of the injection distance after the preinjection 250 μs
- Low thermal settling time ≤ 20 sec.
- Simple operation
- Easy adaptation of different test samples
- Compact setup
- Control electronics as 19 “ rack module
- High reliability
- Suited for the use in rough production environment

General

The EMI 21 is used as an optimal measuring device for investigations of new injection systems with multiple injection. The requirement to optimize the combustion process, and hence exhaust emissions values, by means of ever more precise fuel metering in the engine at ever shorter intervals is the challenge for new fuel injection systems. This necessitates world class measuring systems right from the basic development stage through to subsequent testing.

Based on these requirements the EMI 21 was developed to recognize and exactly measure at each injection, including very short injection distances, the individual injection events.

Measuring Principle

The quantity which should be measured is injected in a measuring chamber. The chamber is locked by a solenoid valve and a displacement piston, whereby the piston is connected to a highly accurate electronic displacement measuring system. Under the pressure of the fluid the piston is moved down whereby the volume is calculated using the cross-section of the piston and the measured travel distance. With the additional acquisition of pressure and temperature, the exact injection quantity is determined by means of a compensation algorithm. After completion of the injection, the chamber is drained through the solenoid valve.

Setup



EMI 21 Measuring head

- Measuring chamber with piston
- Solenoid valve
- Draining throttle
- Pressure sensor
- Temperature sensor
- LVDT-travel sensor

EMI 21 Electronics:



- Amplifier of the travel sensor
- ADC Travel sensor

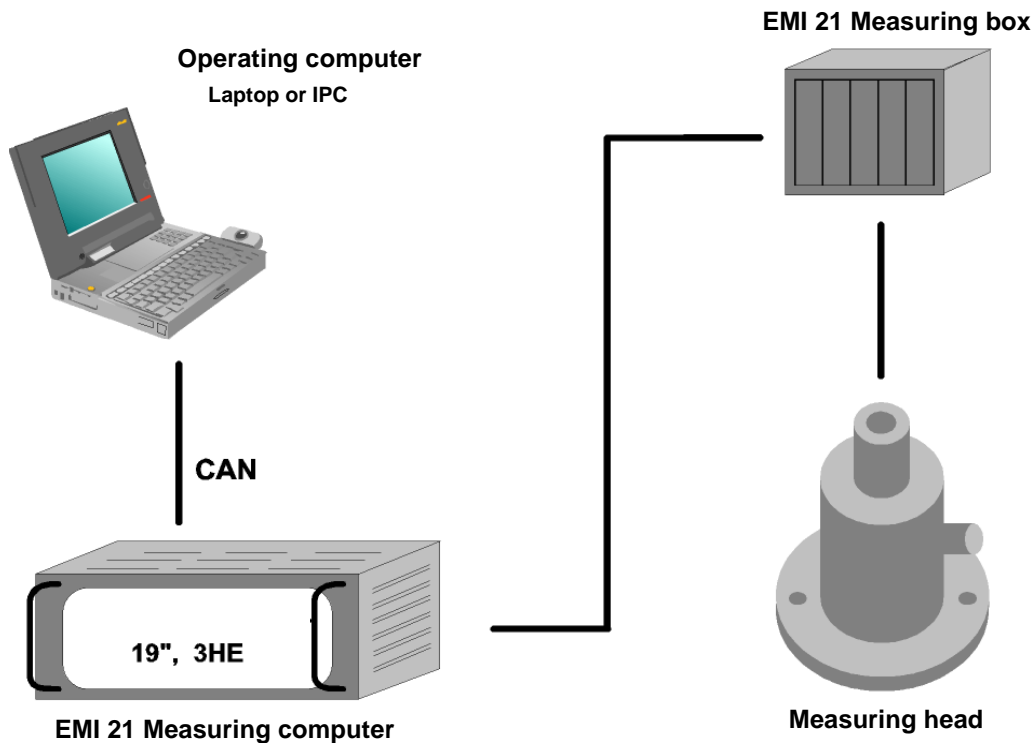
EMI 21 Measuring computer :



- Power stages
- Amplifiers for pressure sensor and temperature sensors
- 4 channel ADC
- Signal preconditioning
- External trigger for zero pulse
- Measuring processor

¹⁾ Reproducibility against scale, averaged over 1000 injections (measured with calibration fluid Shell 1404)

Measuring Setup:



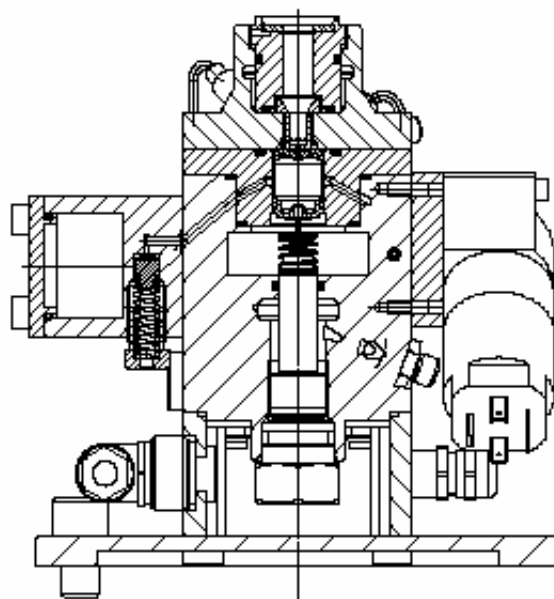
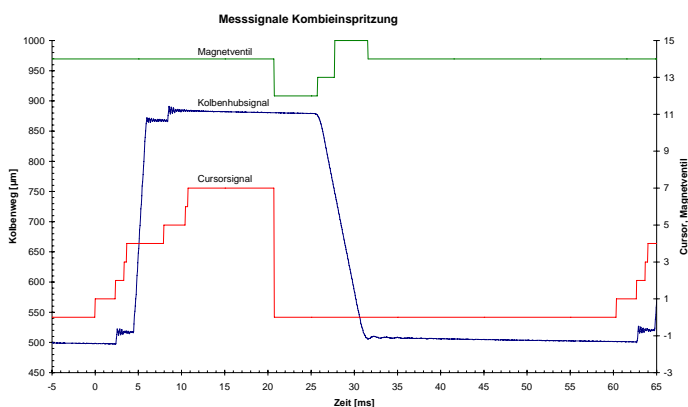
Operating Software:

The EMI21 is connected to the operating computer via CAN- Bus. The software is used for operation, measuring data acquisition and error diagnosis. The measuring data acquisition can be done in various operation modes (single value, average mode, floating average value). The recorded measuring values are stored in the operating computer for evaluation. Various display modes allow e.g. a table display as well as a graphical display of the piston lift. With a programming interface (DLL) the EMI 21 can be easily implemented in a test bench environment. In the single value mode measuring values are available 5 ms after detection.



Technical Data:

Measuring range (per injection)	from 0,2 – 600mm ³ (maximum quantity is speed depending)
Reproducibility against scale, averaged over 1000 injections <i>(measured with calibration fluid Shell 1404)</i>	range 0,5 - 50mm ³ /injection: ±0,05 mm ³ range 50 - 600mm ³ /injection: ±0,1% of Reading
Resolution	0,008mm ³
Number of measurable injection events	5 (to 10 events extendable)
Injection distance preinjection to main injection	min. 250 µs
Counterpressure	8 – 100bar
Maximum calibration fluid temperature in the measuring chamber of the EMI21	130°C
Operating speed	til 3000 injections/min
Rotary encoder	3600 Pulses/revolution, RS422-Pegel
Diagnosis outputs	Configurable: 0 – 10V
Operating temperatures	Function: -40°C til +130°C Measuring accuracy : +40°C til +130°C
Electric supply	230 V, 50/60Hz
Power consumption	0,6A
Dimensions: Measuring computer	19"- enclosure 3 HE / 480mm x 400mm x 140mm;
Electronic box	¼ 19"-enclosure 3 HE / 280mm x 190mm x 150mm
Mechanics	Height 178mm x Ø 170mm



Contact:
MOEHWALD GmbH
Michelinstr. 21
D- 66424 Homburg/ Saar

Tel.: +49(0)6841-707-0
Fax: +49(0)6841-79108
E-Mail: sales@moehwald.de
Internet: www.moehwald.de