ELECTRO-MECHANICAL ASSOCIATES, INC

Engine and Powertrain Products, Services, and Research
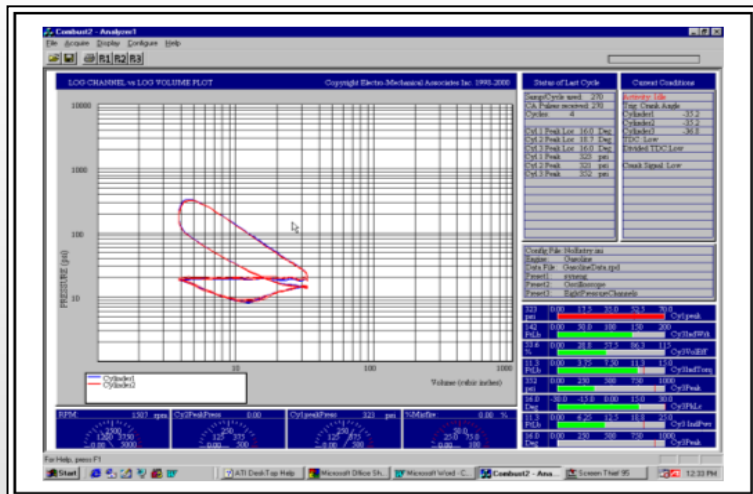
Combustion Analyzer and High Speed Data Acquisition

- Up to 16 analog input channels for measuring cylinder pressure or engine conditions
- Peak pressure & angle
- Calculations and graphs include: P-V, Log P-V, IMEP, Mass fraction burned
- User friendly and cost effective
- Four analog output channels

Diesel Particulate Meter

- Full exhaust (Not CVS diluted and time delayed)
- Real time response
- Particulate Concentration and Size
- Optical-laser based
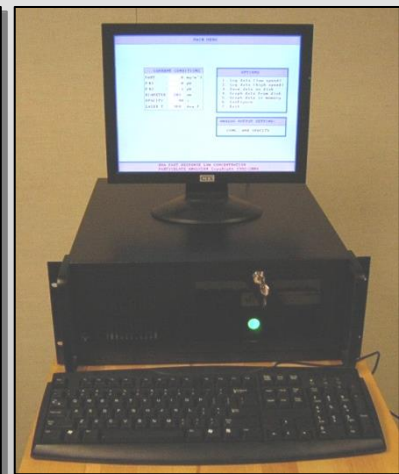
Custom Engine Controller (ECU)

- Used for research type engine testing
- Gasoline, Diesel, or other engines
- Control of fuel injection timing and pulse width
- Control of Spark Ignition timing
- Manual or automatic air fuel ratio control
- Control of EGR and other engine conditions is possible

Absorbing and Motoring Small Engine Dynamometers

- Suited for a research environment
- Up to 80 Horsepower
- Up to 5000 RPM
- Low inertia
- Transient capability
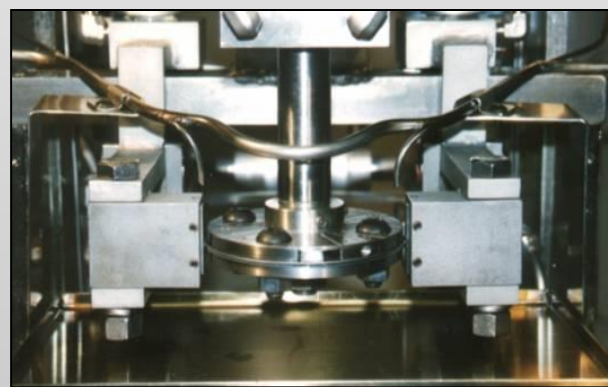- Self contained
- Mounted on castor wheels for easy relocation

Control console   *Dyno stand*

Piston Ring Wear and Friction Tester

- Reciprocating piston or ring on cylinder
- Includes: heated chamber, variable oil flow, wear, friction, and scuff measurement, variable speed, variable load
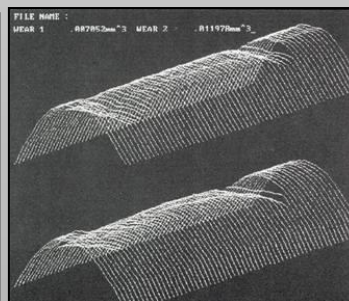- Oil property tolerant
- Patented design

Reciprocating piston ring

Piston Ring Wear Tracer
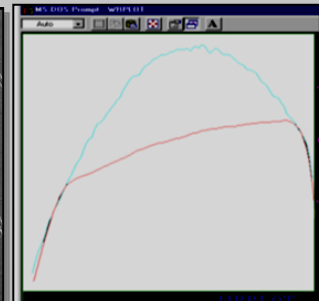
- Provides ring wear and 3-D image of ring surface
- Automated tracing
- Stylus type sensor
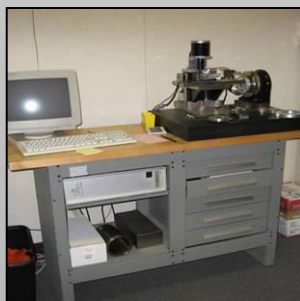
Complete system   *Wear scars from EMA-LS9 wear tester*   *Top = unworn profile Bottom = worn profile*
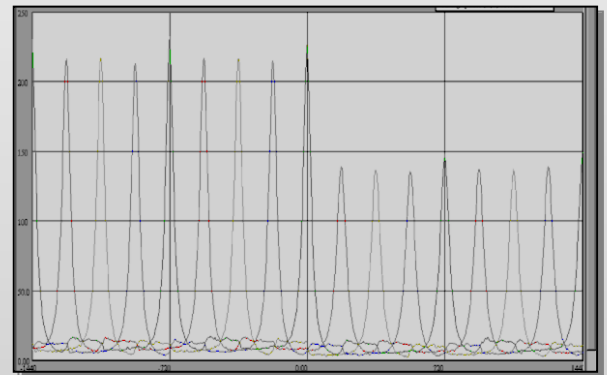
Smart Variable Valve Timing

- Up to 30% reduction in fuel consumption particularly at light loads
- Project is focused on Diesel / JP-8 engines


Variable Compression Ratio

- Research project for a major automotive manufacturer as a means to boost gasoline engine fuel economy at light to moderate loads by varying the compression ratio
- Compression ratio is electronically selected while the engine is running

Graph shows rapid change of cylinder pressure (and compression ratio) on a 4 cylinder engine.

Electronic Valve Actuation

- Research project for infinitely variable valve timing
- Applies electromagnetically operated solenoids to engine valves.
- Allows reduced fuel consumption and increased engine power.
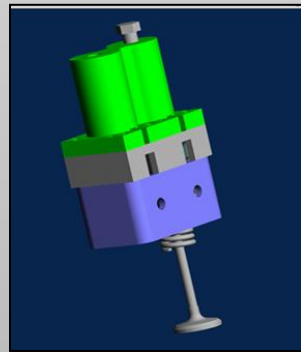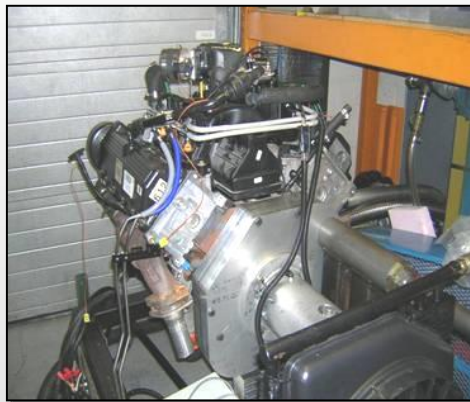

Model of electronic valve
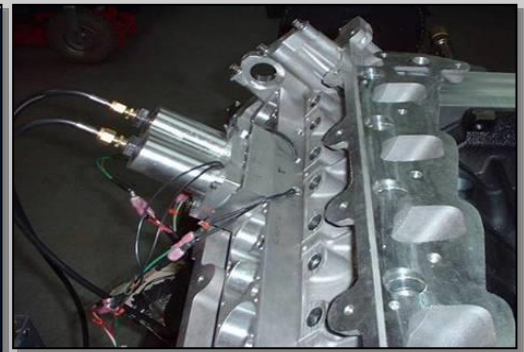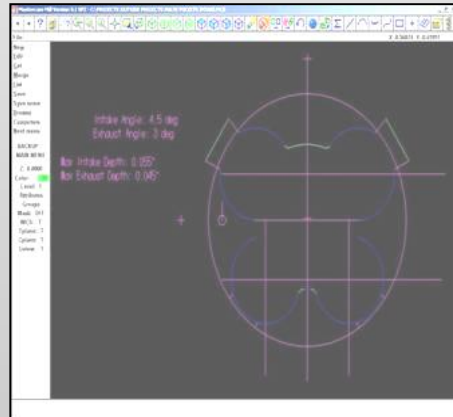
Prototype electronic valves

Engine Dynamometer Testing

Small engine dynamometer, controls, and instrumentation including emissions and cylinder pressure measurement
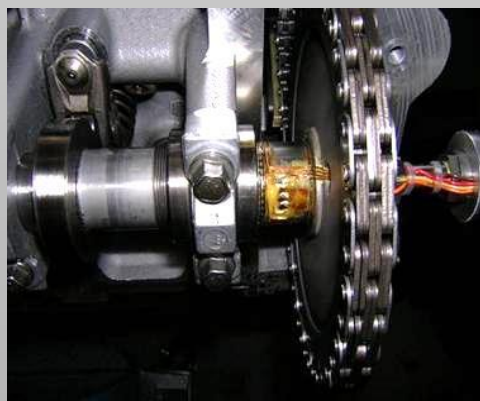

Machining

CAD / CAM and CNC machining and prototyping

Mechatronics

- Mechanical + electrical + computer control
- Engine controls
- Engine instrumentation
- Small engine testing

History

Established in 1988, EMA is a small dedicated team of engineers and technicians providing contracted services to government, industry, and universities throughout the country. We are committed to providing high quality confidential service.

Mission

EMA's mission is to provide innovative, early concept stage solutions for customers with challenging mechanical, electrical and computer design, testing and equipment needs; specializing in spark-ignition and Diesel engine programs.

Expertise

Design
Build-up
Prototyping
Measurement
Instrumentation
In-house testing
Training programs
Software development

3900 sq-ft facility in Ann Arbor Michigan includes electronics area, work shop, and conference room, with capabilities for fabrication, instrumentation, and measurement

Summary

Integrate your electrical and mechanical systems and components efficiently.

Obtain creative and innovative solutions within demanding constraints.

Realize leading edge technical advances in spark-ignition and Diesel engines.

Contact

For more information, contact:
Electro-Mechanical Associates, Inc.
Kevin Morrison, Dr. Donald Patterson, George Schwartz
Address: 745 Phoenix Drive, Ann Arbor, Michigan 48108
Phone: 734-995-2455
FAX: 734-995-3313
Website: www.electro-mechanical.net