



INJECTION PRODUCTS



**Test range for direct injection
Diesel or Gasoline**

2016





For over 30 years, EFS has specialized in injection flow measurement, with more than 2500 shot-to-shot flowmeters installed all over the world.

This technique has enabled the development of diesel HDi and TDi motors, injector pumps, unit pumps and common rail equipment.

Some of these devices are used for research and development in laboratory settings and over a thousand others are in use on production lines 24/7 throughout the year.

An EFS test bench can be used for **flow rate measurement** using the IFR, MIQ, EMI2 flowmeters for **direct diesel or gasoline injection** and the LPF for indirect gasoline injection or urea injection; **spray visualization** with the InjetVision system; power driving of all types of injector using the IPoD range of power drivers.

EFS injection testing equipment guarantees **the efficient running of pumps, rails, injectors, ECU** (Engine Control Units) or **MCM** (Motor Control Modules).

EFS also makes **complete injection test benches**, custom-designed to meet our clients' needs.

OUR PRODUCTS

FLOWMETERS

IFR - Injection Flow and rate - 600	EFS 8420
IFR - Injection Flow and rate - 6000	EFS 8535
MIQ - Mono Injector qualifier	EFS 8246
EMI3	EFS 8888

INJECTOR POWER DRIVERS

IPoD Coil	EFS 8532
6-Channel IPoD coil	EFS 8472
IPoD piezo	EFS 8370
6-Channel IPoD piezo	EFS 8478

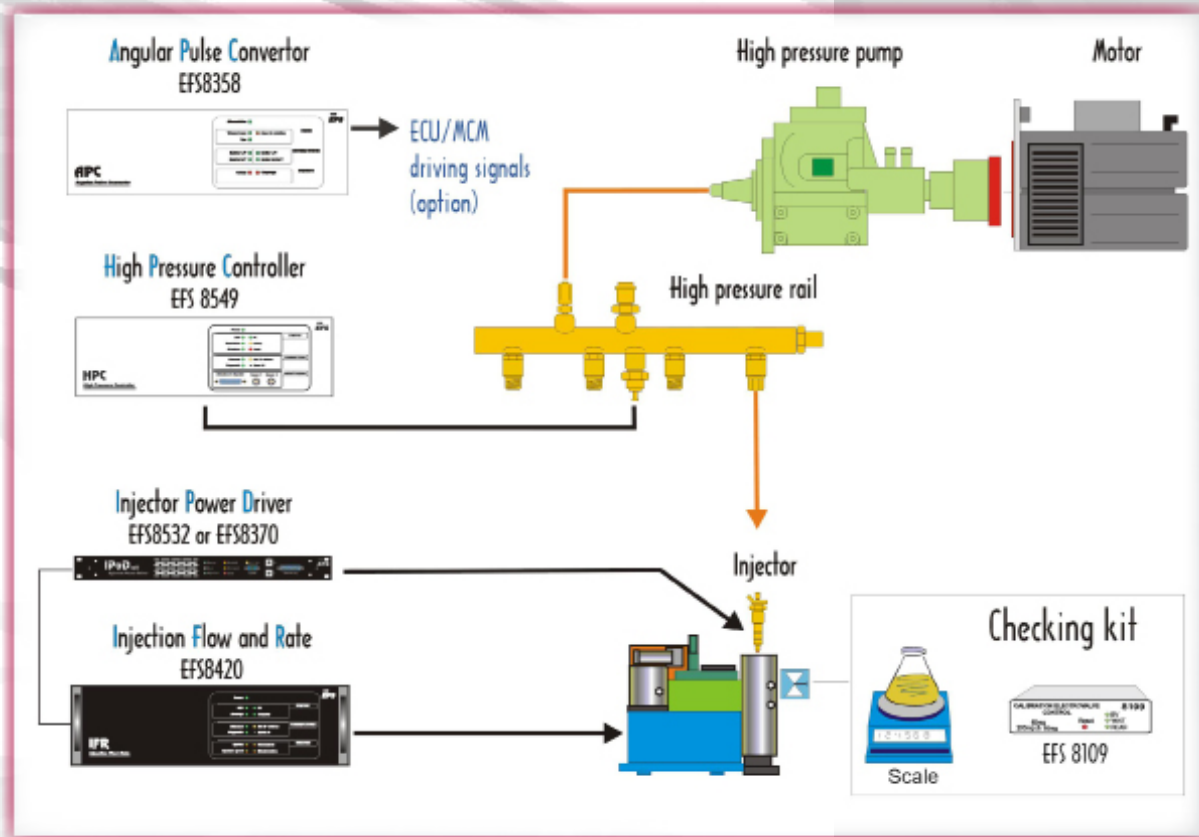
MISCELLANEOUS

HPC - High Pressure Controller	EFS 8549
APC - Angular Pulse Converter	EFS 8358
INJETVISION	EFS 8212
ICU	EFS 8412

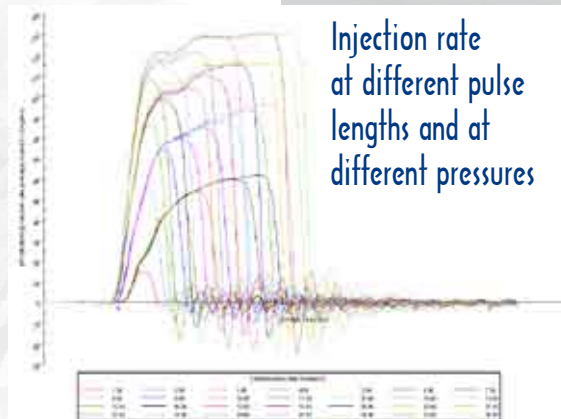
TEST BENCHES

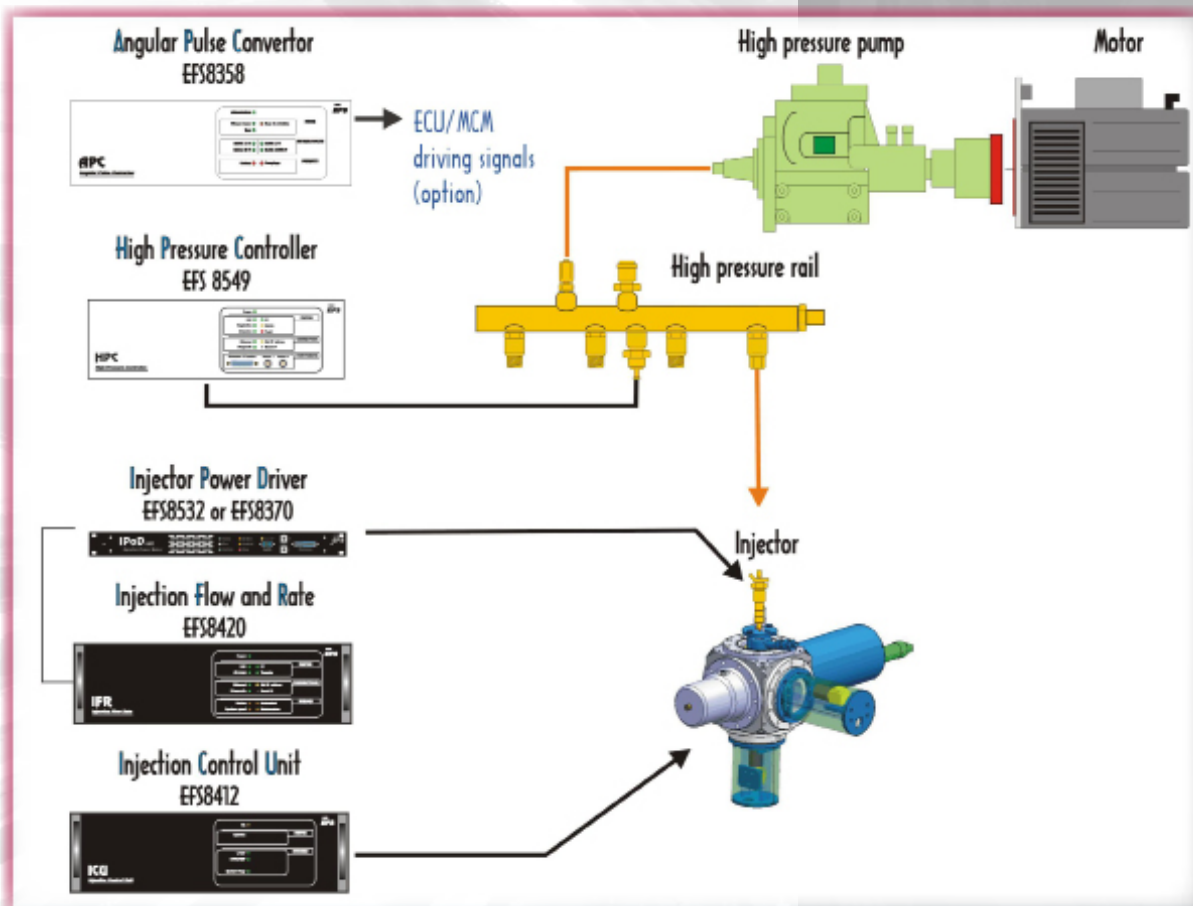
Injection Test Bench	ITB
Production bench for URea injector	PUR
Mono Injection Test Bench	MITB
Injection Test for spray Visualisation	ITV
Production bench for Common Rail injector	PCR
Production Test Bench	PTB
Endurance Test Bench	ETB
Multi Flowmeter Test System	MFTS

FLOW MEASUREMENT & INJECTION RATE

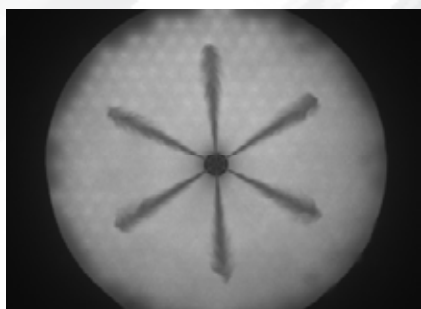


xIFR software or
SiFBench software
(as an option)

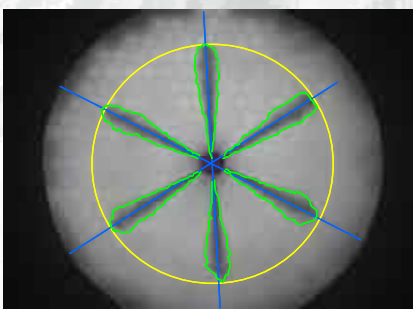




Picture acquired with
SprayAcq

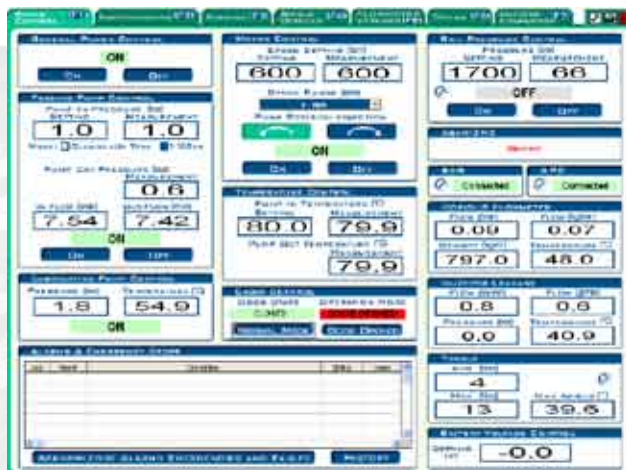
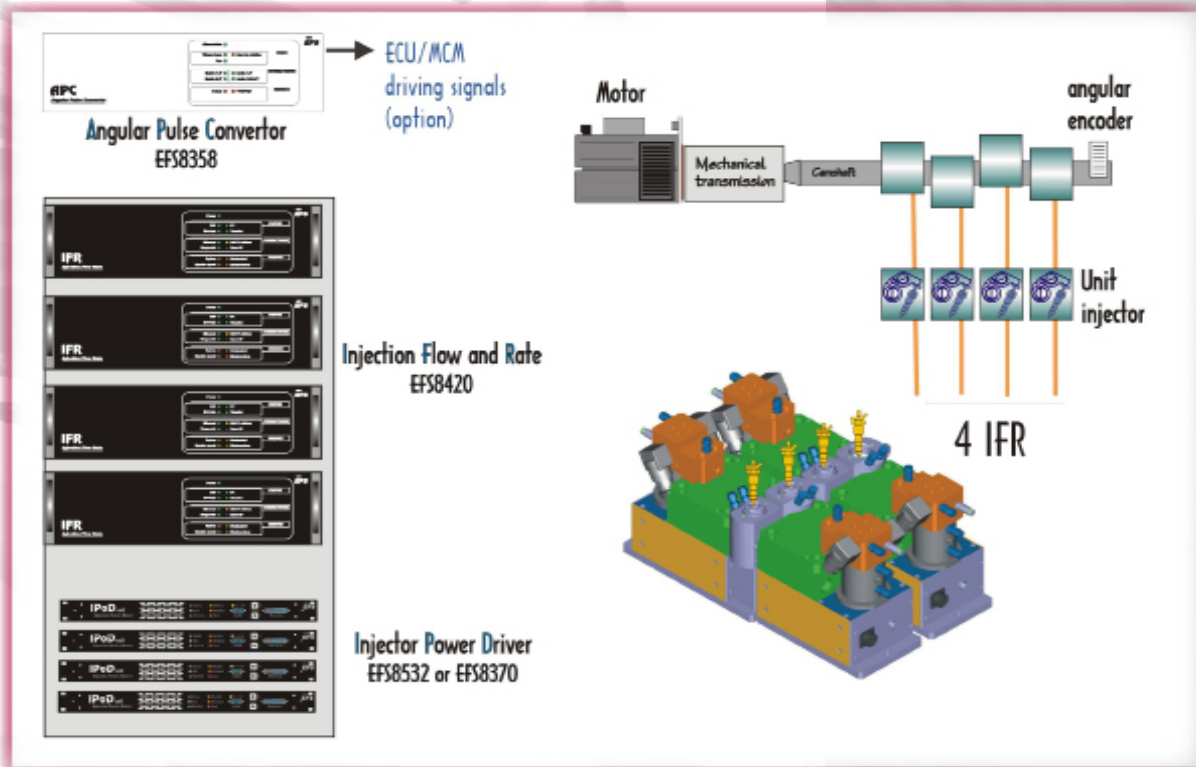


Picture treated with
SprayAnalyser



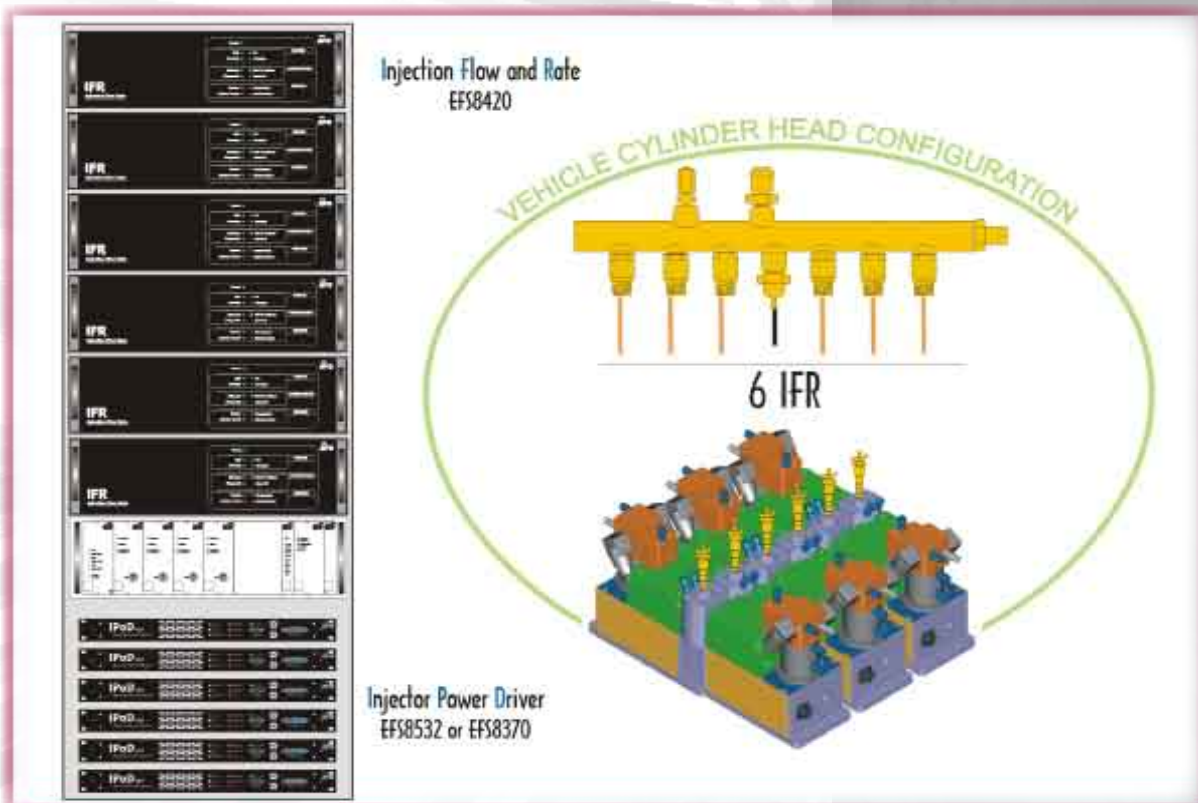
INJECTOR PUMP CYLINDER HEAD TEST

R&D



COMMON RAIL INJECTOR CYLINDER HEAD TEST

R&D

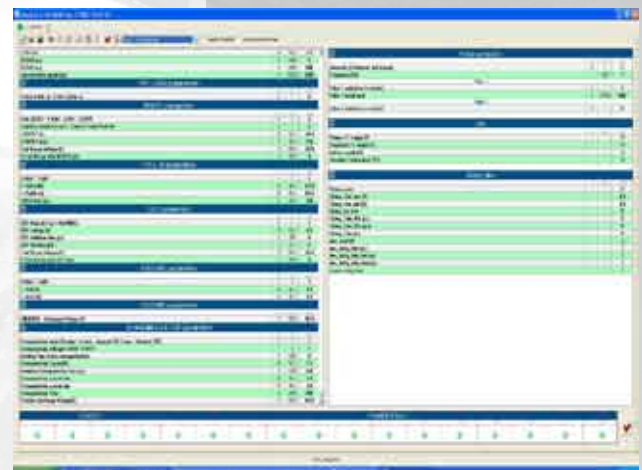
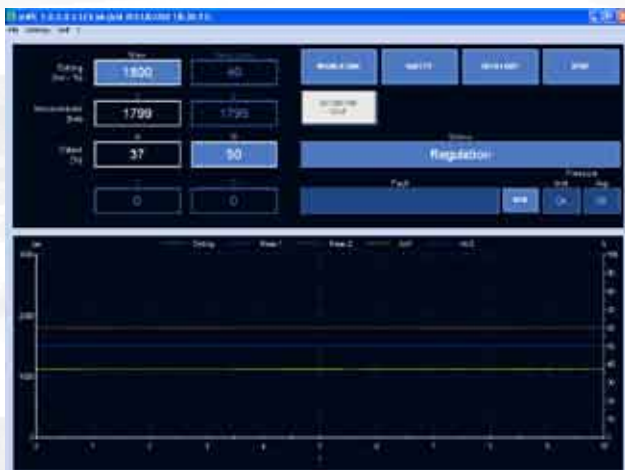
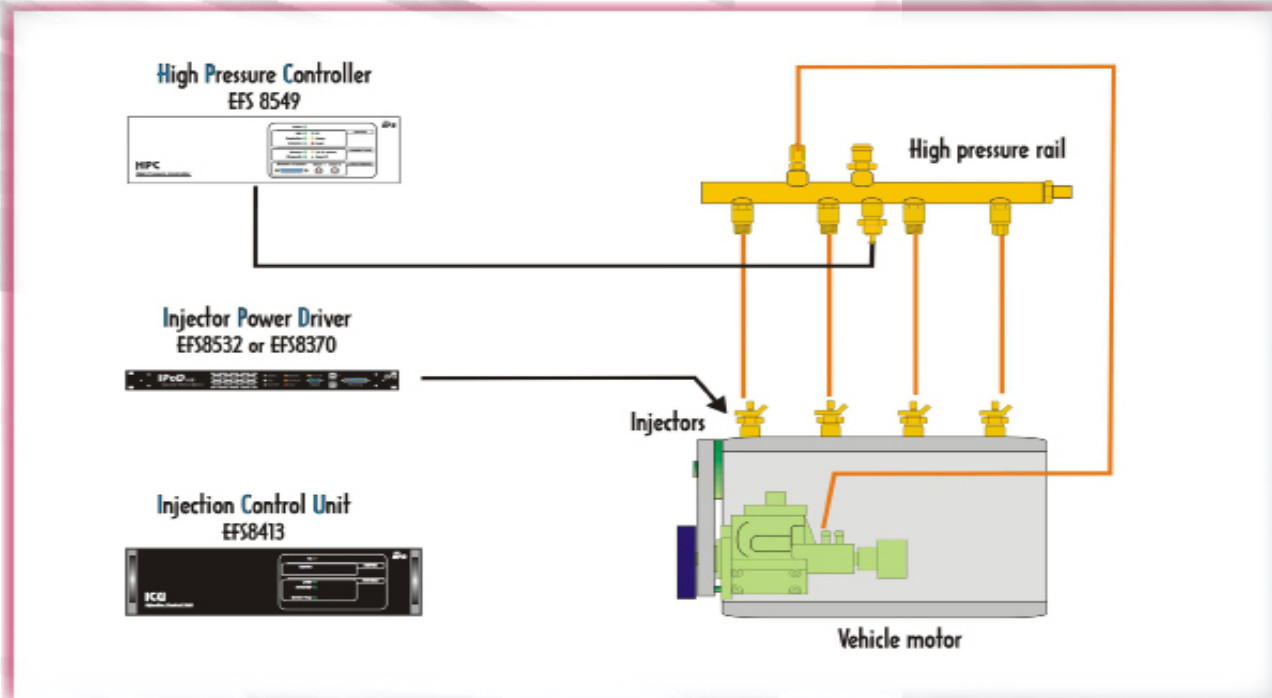


Provided with the bench or MFTS adapted to your existing bench



ACCESSORIES FOR REPLACING AN ECU/MCM ON A MOTOR

R&D



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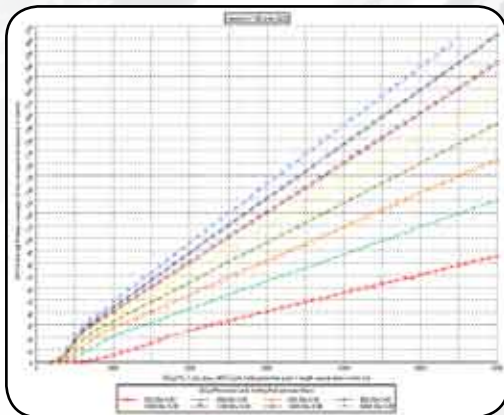
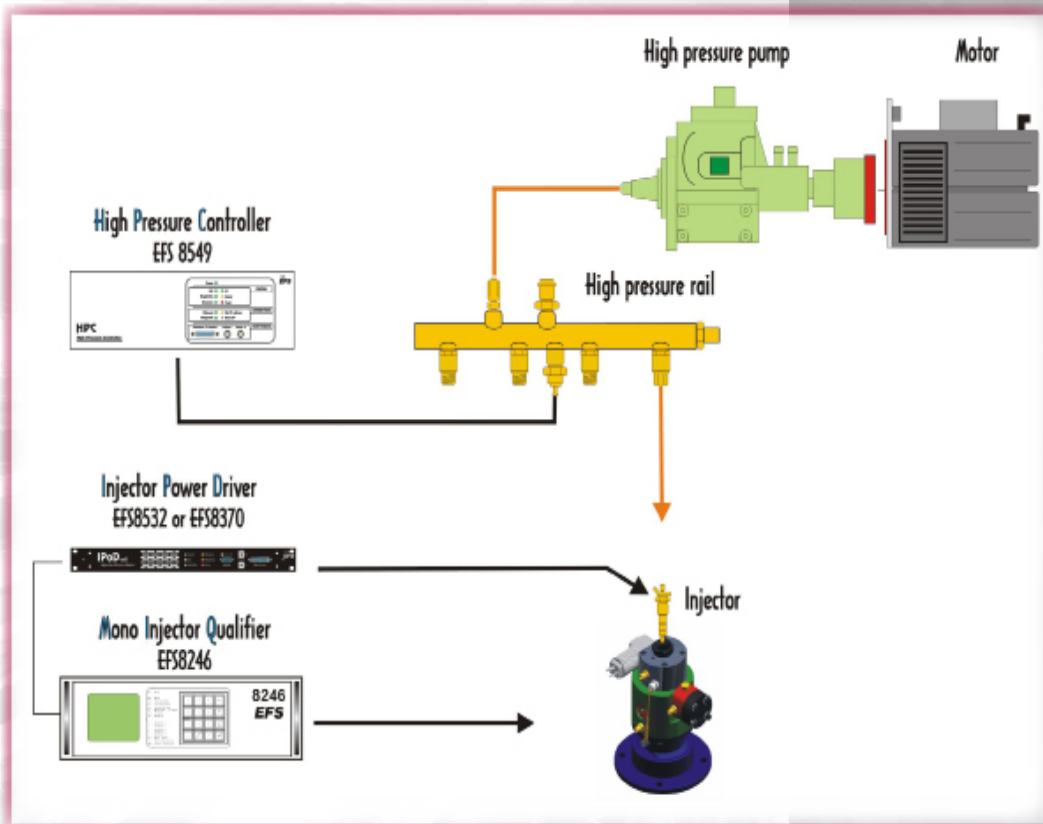
WinHPC software

xIPod software

Synoptics

INJECTOR FLOW VERIFICATION

Maintenance



SiFBench
software

Quantity versus pulse
length at different
pressures

FLOWMETERS

IFR 600-1500

This high performance device for **injection rate treatment and measuring shot-by-shot injection volumes** will enable you to control high-energy systems as featured on modern diesel motors.

It is ideal in a Research & Development context or for injector production applications as it provides a highly detailed analysis of a single injector channel ■



IFR 6000 - 25000

This flowmeter is intended to measure the instantaneous flow of large and very large volume injectors (heavy duty, train, boat motor).

The injected volume can go up to 6000 mm³ per shot ■



MIQ

The MIQ flowmeter responds to the current market demands for diesel injection systems with lower consumption and pollution levels.

Different models are available for use with cars and trucks or with heavy duties, trains and boats ■



EMI3

Latest addition to the lineup, the EMI3 rack is designed to replace the EMI2 and MIQ racks.

It provides the best measurement stability.

The EMI3 flowmeter has been designed to measure with a great accuracy (0.1% FS) the instantaneous flows injected by a diesel, gasoline or urea injector.

For each injection cycle, five injections can be analyzed to determine injected volume and mass, injector opening and closing delay ■



INJECTOR POWER DRIVERS

IPOD COIL

Latest addition to the IPoD range, this IPoD Coil is a power driving module for injectors using **magneto-electric technology**.

It features several different driving modes and its numerous advanced functions mean that it can adapt to most commercially available injectors.

Whatever your application, R & D, Production or Quality Control, the IPoD Coil can work for you. And all this comes at an unbeatable price ■



6-CHANNEL IPOD COIL

This module is able to power and drive up to 6 injectors using **magneto-electric technology** in multiplex mode.

It features several different driving modes and numerous advanced functions enabling it to adapt to most commercially available injectors.

This power driver is ideal for motor development in R&D applications or for after-sales service and endurance tests in Quality Control applications ■



IPOD PIEZO

This is a power driving module for injectors using **piezo-electric technology**.

It features several different driving modes and numerous advanced functions meaning that it can adapt to most commercially available injectors.

Whatever your application, R & D, Production or Quality Control, the IPoD Coil can work for you ■



6-CHANNEL IPOD PIEZO

This module is able to power and drive up to 6 injectors using **piezo-electric technology** in multiplex mode.

It features several different driving modes and numerous advanced functions enabling it to adapt to most commercially available injectors.

This power driver is ideal for motor development in R&D applications or for after-sales service and endurance tests in Quality Control applications ■



MISCELLANEOUS

HPC

The HPC module takes up all functionalities existing on the HPR (High Pressure Regulator) system, with some additional ones:

- The test of the pressure sensor on the client's rail.
- The test of the security valve on the client's rail.
- The test and driving of up to 4 actuators with up to 2 mixed regulations ■



See brochure

APC

The APC rack is designed for **generating the synchronization signals** found on the different components of a motor as well as the signals necessary for the measurement devices of an injection test bench.

All of these signals are fully programmable ■



See leaflet

INJETVISION

This unique jet visualization system enables you to **study and observe jets coming from high-pressure diesel injectors**.

You can measure **jet surface, volume and penetration** as well as the spray cone angle and the jet opening angle.

The intuitive user interface enables you to perform statistical analyses and the fog extraction system guarantees reproducibility ■



ICU VISION

This module is designed for use with the Injetvision test bench which analyzes diesel or gasoline jets automatically by image processing.

It also drives the injector by means of the IPoD power module as well as driving the camera, the fog extraction system and the light sources (laser or stroboscopic) ■



TEST BENCHES

RESEARCH & DEVELOPMENT

ITB

As well as being made-to-measure to your specifications, this test bench will give you the maximum in flexibility for your Research and Development application ■



ITB

This bench is used for testing "common rail" injectors one by one, giving you complete characterization of the injector.

It is an essential tool for injector development ■



PUR

This model is a semi-automatic bench completely dedicated for urea injector production testing.

Simple design and use, it allows very precise characterization of an injector in Research and Development ■



COMPLETE INJETVISION

ITV

This test bench, designed essentially for research and development applications, automatically analyzes gas or diesel injector jets by means of the Injetvision image processing system, giving you the user all the advantages of a high-performance test bench together with the in-depth jet analysis provided by Injetvision.

It can also be used for sample testing in a production application ■



PRODUCTION

PCR

The custom-built EFS Production test benches are designed to allow you a maximum of flexibility in determining the testing cycles that correspond to your application.

What's more, our trademark shot-to-shot flow measurement equipment will give you immediate results, saving you both time and money ■



PTB

The custom-built solution with very small space installation.

Full automatic bench for the injector qualification at the end of the line production ■



ENDURANCE

ETB

The custom-built EFS Endurance test benches will enable your application to operate quickly and economically by providing you with fully programmable cycles and high-performance measurement equipment ■



MULTI FLOWMETER

MFTS

The **MFTS** (Multi Flowmeter Test System), made up of several different flowmeters, will enable you to characterize a complete injection system automatically, on an electrical test bench.

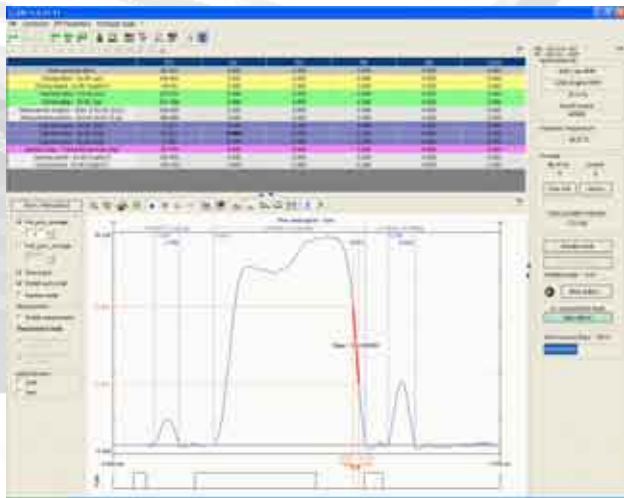
It can be adapted to any existent bench ■



SOFTWARES

SIFBENCH

XIFR



Analysis of the quantity injected and the injection rate



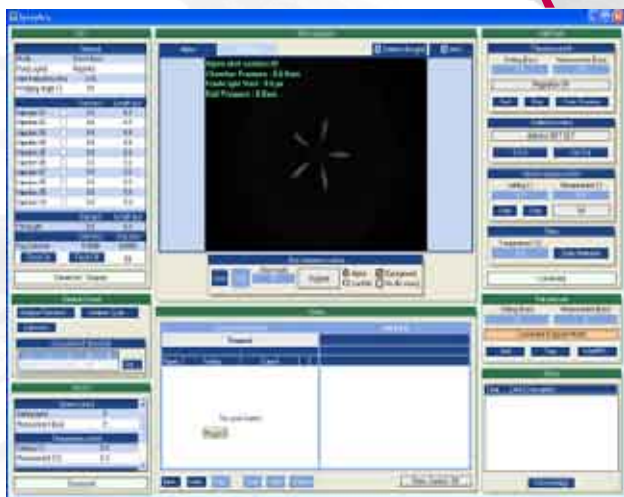
Full injector qualification with cycling tests

MFTS



Analysis of a full common rail system

SPRAYACQ



Acquisition of spray pictures to analyse jets from injectors

XIPOD



Controls all types of injectors with real-time parameter adjustment

REFERENCES

ASIMCO
BMW
BOSCH and subsidiaries
CATERPILLAR
CONTINENTAL
DELPHI
DMC
FAW group
FERRARI
FIAT Powertrain
IVECO
KIA MOTORS
LIEBHERR
MERCEDES
NIIGATA
PEUGEOT- CITROËN
RENAULT
SAIC
STANADYNE
VALEO
VOLKSWAGEN
VOLVO Global Trucks
WÄRTSILÄ



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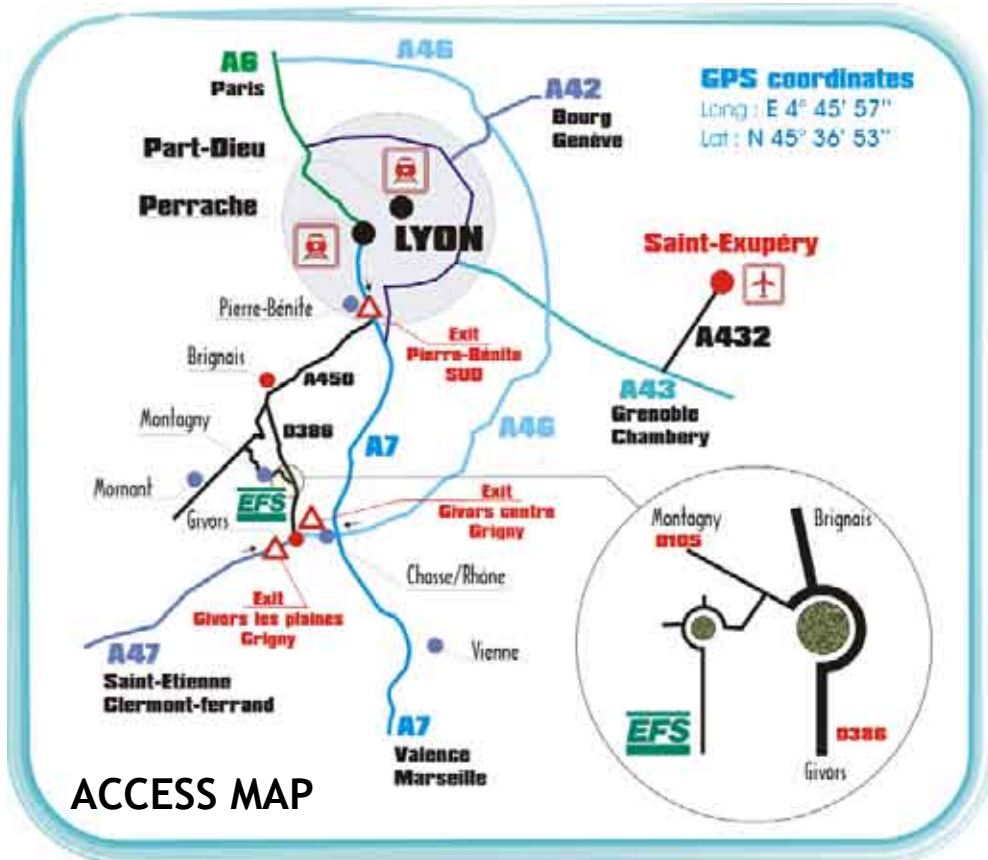
SITE ADDRESS

Parc d'activité du Baconnet

192 Allée des Chênes

MONTAGNY (69700)

FRANCE



SUBSIDIARY IN CHINA

to provide technical support (installation, training, maintenance, calibration).



catalogue injection
V5.0 10-05-2016