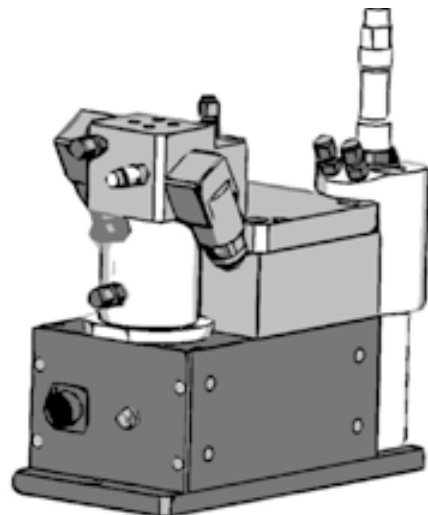


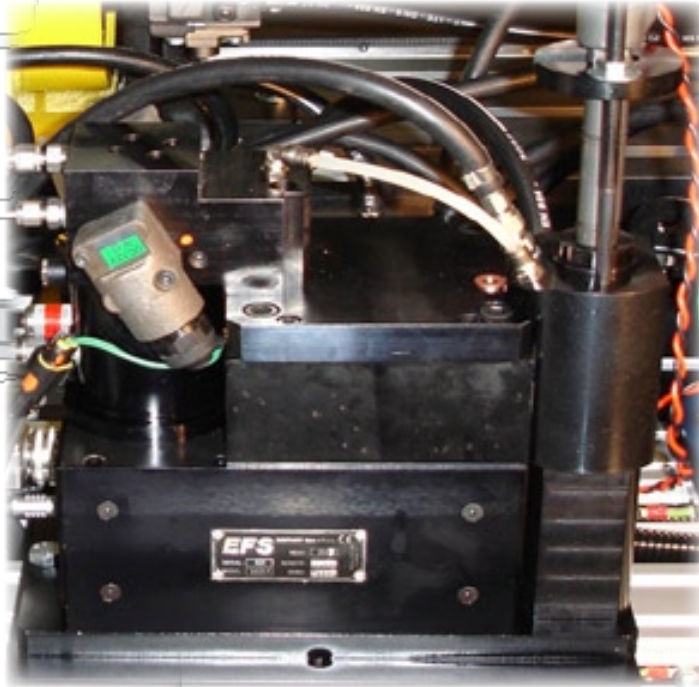
A high-performance device for **measuring shot-by-shot injection volumes**, the **IFR** enables you to **control high-energy multi-shot injection systems**, as featured on modern diesel motors.

IFR

Injection Flow and Rate

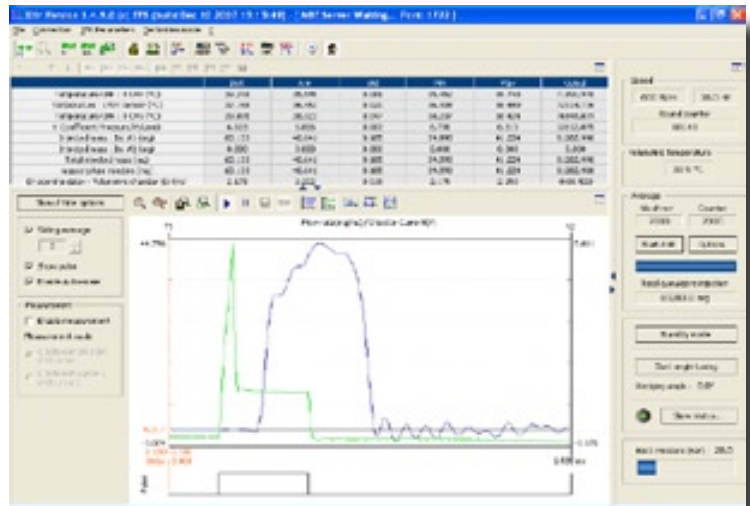


MECHANICS



SOFTWARE

The main screen of the **XIFR** software displays the injection rate in real time, as well as the masses, the response times but also the signal from an analog input.

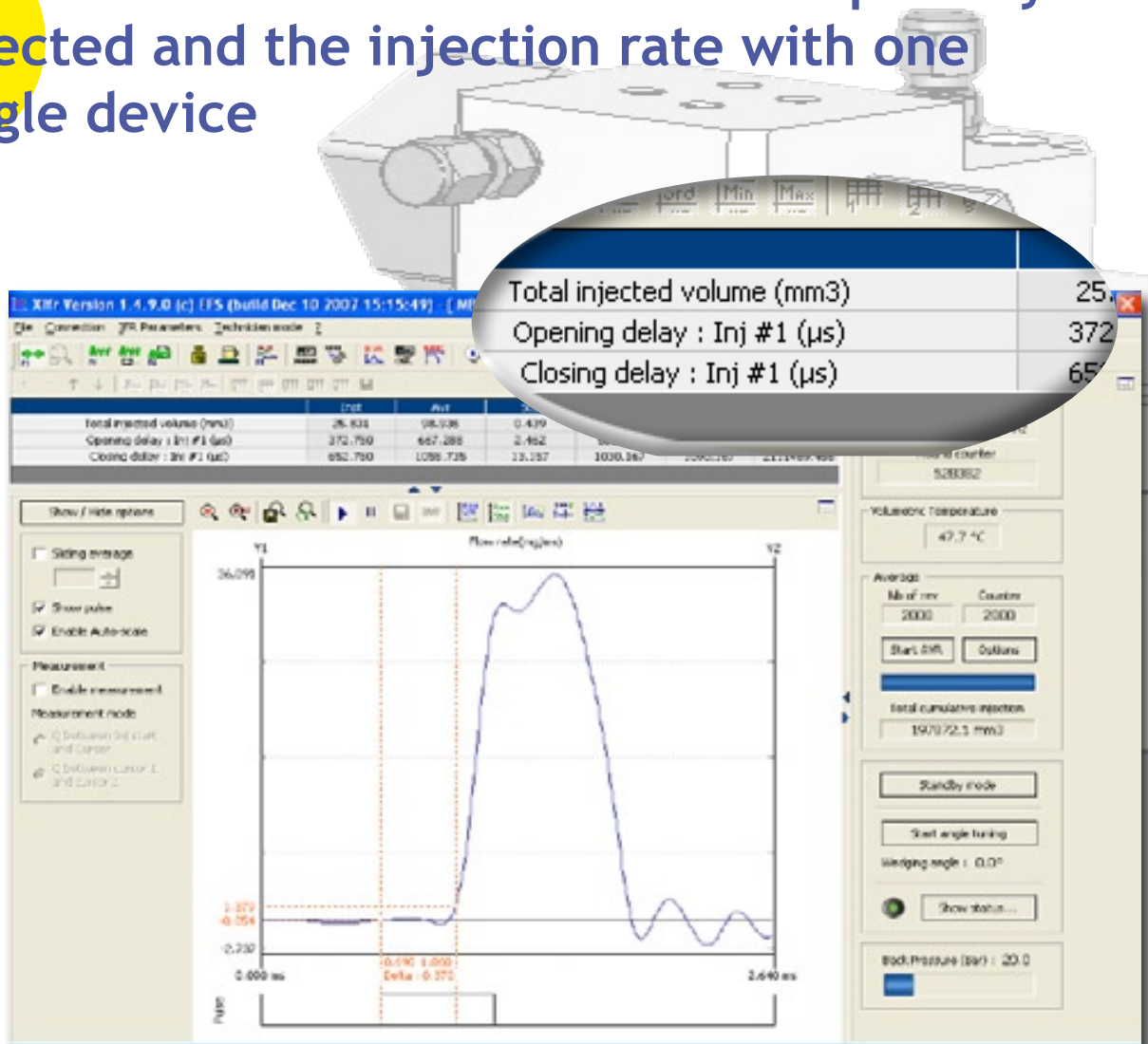


You qualify your injector with precision



TWO IN ONE

- Simultaneous measurement of the quantity injected and the injection rate with one single device

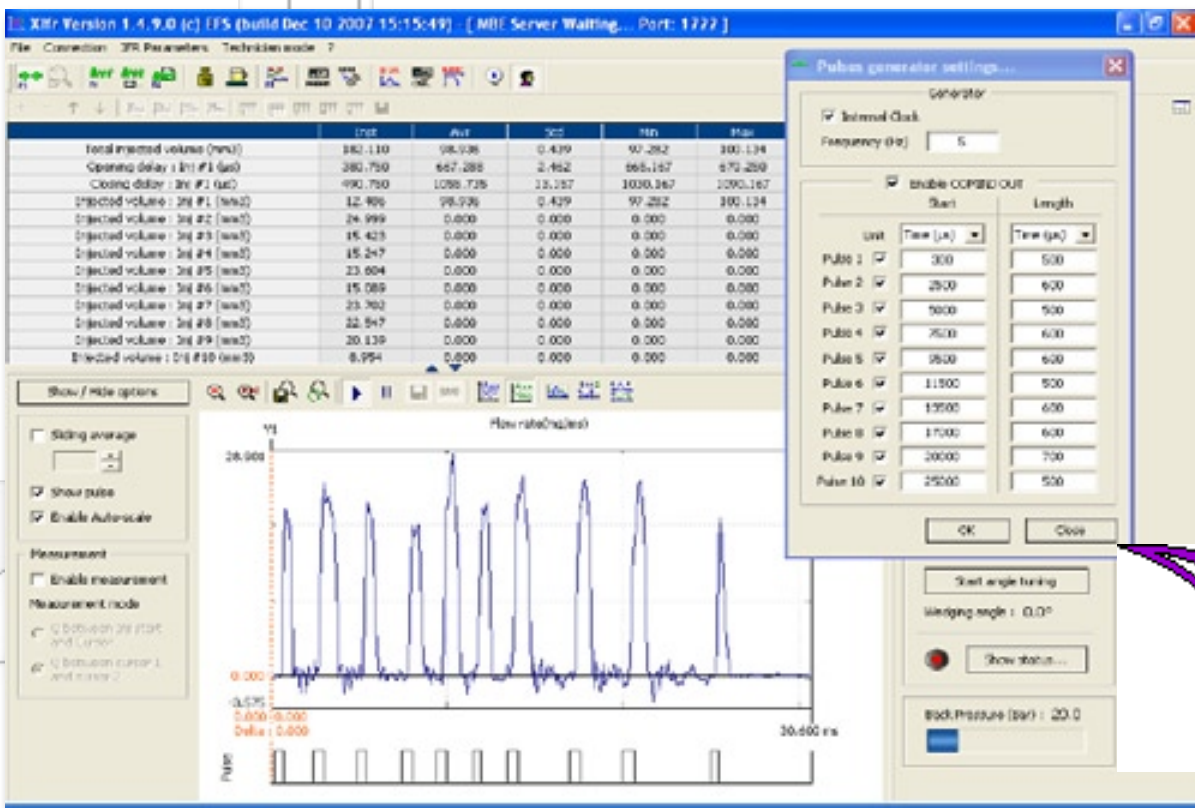


Measurement of the quantity injected in MASS or VOLUME

Accurate to 0.1 mg/shot

4

Key features



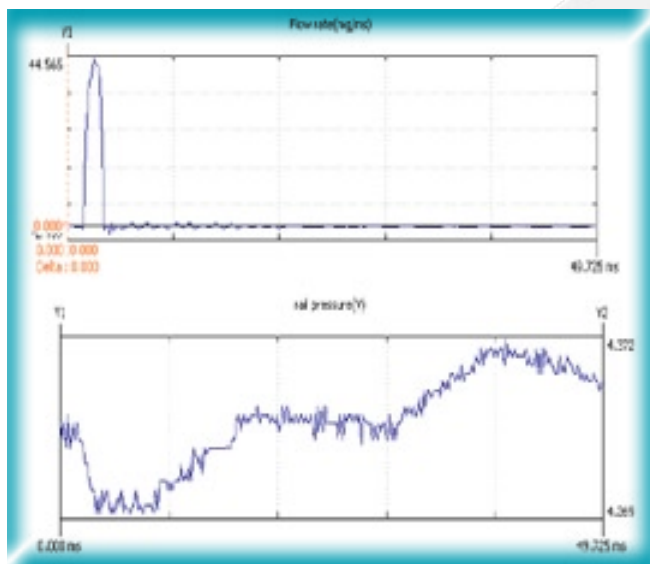
Setting up the pulse generator - simple, quick and in real time.

- Rapid measurements
- Complete qualification of the 10 injections

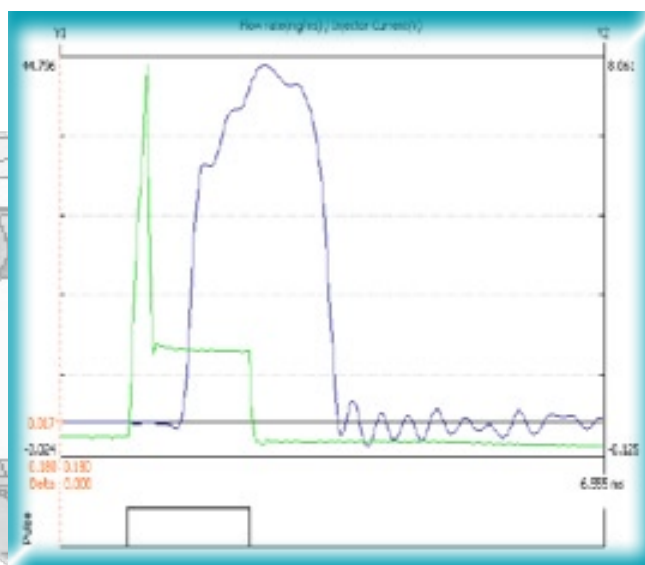


ANALOG INPUT

In the example given below, we have connected the rail pressure on to the analog input. Any analog sensor can be connected to this channel.



Graph with rail pressure



Graph with injector current

Since this input is synchronous with the IFR, the behaviour of another element can be analyzed at the same time as that of the injector.

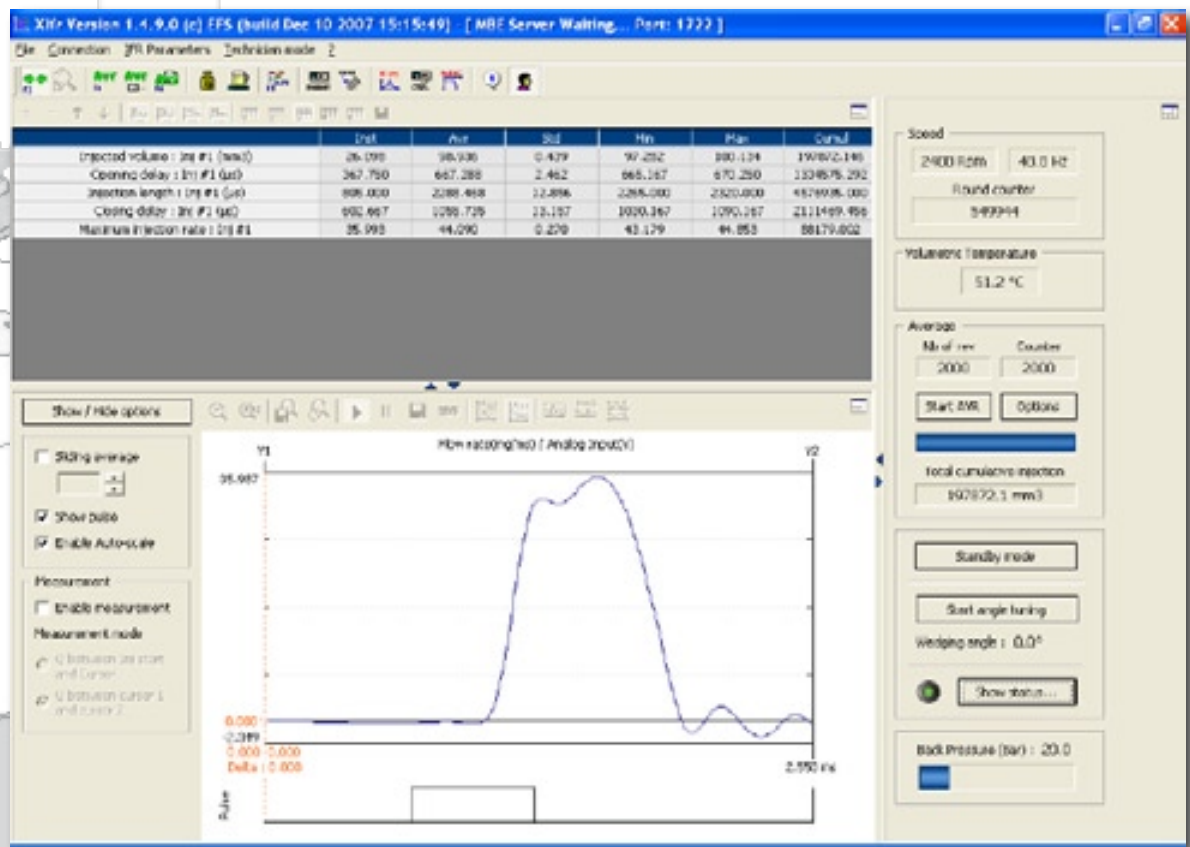
- pressure, temperature, acceleration
- current in the injector
- pressure in the injection tube ...

Correlating the injection with another phenomenon

6

Key features

FULL REPRESENTATION OF THE INJECTION



Instantaneous measurement, minimum, maximum and standard deviation of all the injection parameters needed to develop your injector



QUALITY

The **XIFR** software enables you to save all the measurement data in an Excel file quickly and automatically.

AVR Round	Round count	Injection speed	Back pressure	Hydraulic cut	Maximum sp/rev	Number of p1	Number of p2	Pressure low	Pressure low	Pressure low	Pressure low	Pressure low	Pressure low
CPT	SPEED	MATP	MATL	MAX_NU	NB_COMU	NB_NU	DET	LEVEL_1	LEVEL_2	LEVEL_3	LEVEL_4	LEVEL_5	LEVEL_6
Round	Rpm	Bar	g/m	rpm									
0	435	800.000122	-1.908474	4.075754	0	1	10	36.00195	36.08913	36.414753	36.451684		
1	437	800.000122	-1.908474	4.074338	0	1	10	36.00195	36.739135	36.648057	36.521394		
2	439	800.000122	-1.908474	4.077261	0	1	10	36.00195	36.79381	36.602433	36.714844		
3	439	800.000122	-1.908474	4.080127	0	1	10	36.00195	36.726933	36.487574	36.720097		
4	430	800.000122	-1.908474	4.081961	0	1	10	36.00192	36.363171	36.772842	36.566759		
5	431	800.000122	-1.908474	4.089308	0	1	10	36.00193	36.309591	36.606394	36.535414		
6	432	800.000122	-1.908474	4.086956	0	1	10	34.00228	36.63789	36.690429	36.714337		
7	433	800.000122	-1.908474	4.075754	0	1	10	36.989773	36.767567	36.750031	36.730249		
8	434	800.000122	-1.908474	4.077261	0	1	10	36.00192	36.719618	36.628057	36.732624		
9	435	800.000122	-1.908474	4.084564	0	1	10	36.00197	36.57119	36.439636	36.665753		
Min	435	800.000122	-1.908474	4.084564	0	1	10	34.00228	36.08913	36.414753	36.451684		
Max	435	800.000122	-1.908474	4.086956	0	1	10	36.989773	36.79381	36.602433	36.732624		
Air	404.5	800.000122	-1.908474	4.078574	0	1	10	36.100648	36.963656	36.625245	36.666952		
Spn	2.972281	0.000038	0	0.006356	0	0	0	1.133833	0.223574	0.132457	0.369829		
Cumul	4345	800.000122	-19.364744	4.076741	0	10	100	361.006454	365.639655	365.252445	366.569515	3	

In addition, the injection rate curves can be saved in high or low resolution as required.

Average settings...

Average settings

Nb of rev: Calibration average

Curve file options

Save low resolution curves

Save high resolution curves

OK Cancel

RESEARCH & DEVELOPMENT

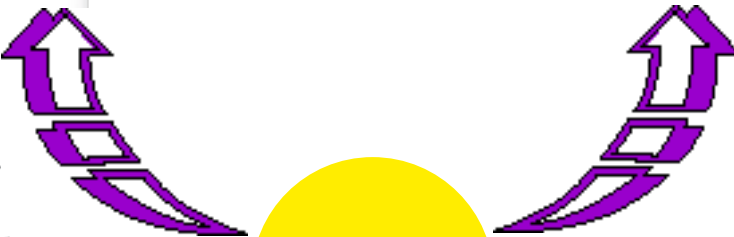
The **IFR** enables you to develop any kind of injector with one single device.

FAST

The adjustment of any one parameter of the injector commands is immediately visible in the injection rate

ACCURATE

0.1 mg per shot over the entire rail pressure range



Injection Flow Rate

REPRODUCIBLE

Measurement variability caused by the IFR never exceeds 0.02 mg per injection.

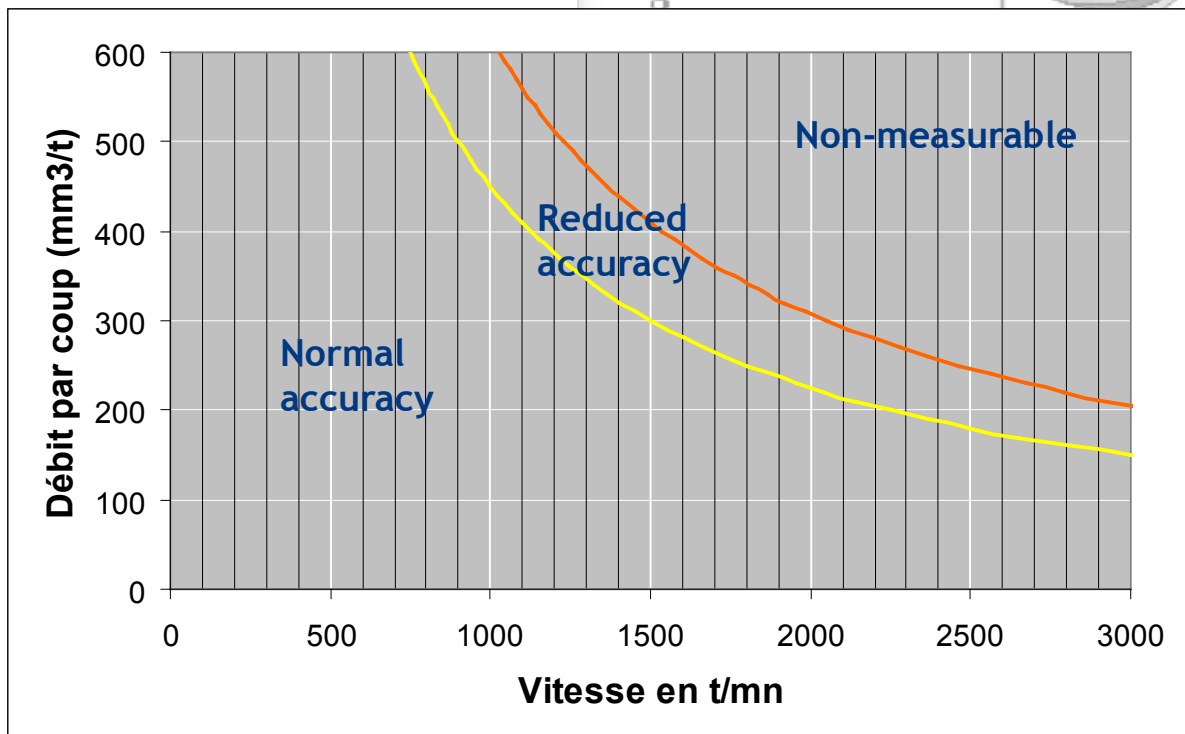


Measurement accuracy:

0.1 mg/shot up to 80 mg

0.2 mg/shot above 80 mg

MEASUREMENT RANGE



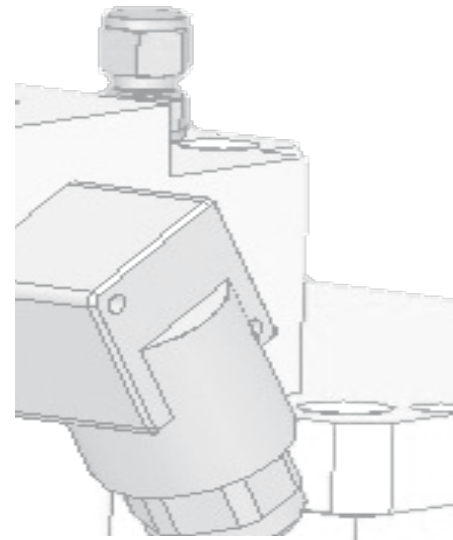
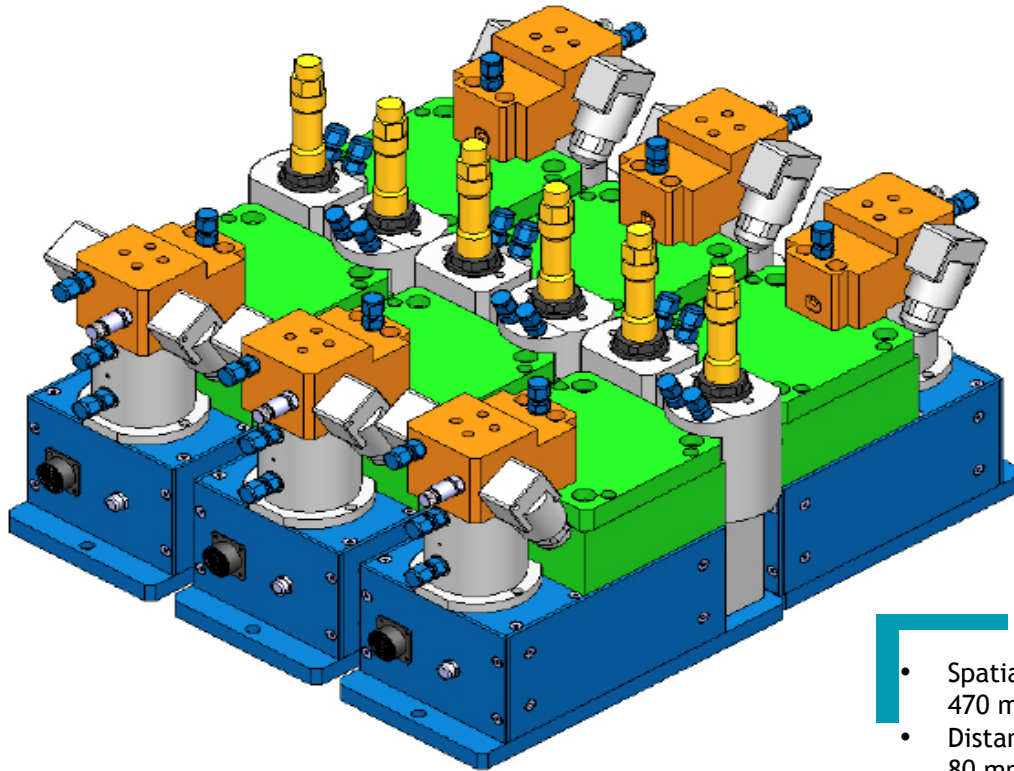
SPECIFICATIONS



Measurement	
Total volume injected per cycle	From 0.5 to 150mm ³ (version 150) or From 0.5 to 600mm ³ (version 600)
Measurement window per cam revolution	180° (360° crank angle)
Injection frequency	From 0.5Hz to 50Hz or 30 to 3000 rev/mn came
Measurement accuracy	0.1 mg/stroke from 0 to 80mg, 0.2mg/stroke above
Timing resolution	5 µs
Timing accuracy	10 µs
Delay between 2 injections	50 µs
Back-pressure	From 5 to 100 bars
Bench Synchronization signals	2 inputs : 1/rev and 3600/rev (accuracy : 0,1°)
Averaged temperature of injected fluid	From -40 to 150 °C (with cooling)
Number of injection pulses per cycle	From 1 to 10
Fluid type	Normafluid BR, Viscor 1487, Exxsol D80 (ISO 4113), (gasoil, gasoline, Exxsol D40 en option)
Cooling circuit flow	2 l/min
Cooling fluid	The same as injected fluid
Assembly	
Injector adaptor	Specific
Injector clamping	Specific
Power	
Power supply	230V/50Hz or 115V/60Hz
Consumption	150VA
Connections	
Mechanical power connection	Jaeger 7-pin female socket
Mechanical measurement connection	Sub-D 37-pin
Monitoring connection	Sub-D 25-pin
Running and synchronization controls	BNC sockets
Ethernet link	100Mbs LAN connection
Rack spatial requirements	
Dimensions (overall)	Rack 3U, 19", depth 376mm (133mm x 449mm x376mm)
Weight (kg)	7
Mechanics spatial requirements	
Dimensions (mm)	Height : 304, width : 307, depth : 149
Weight (kg)	23

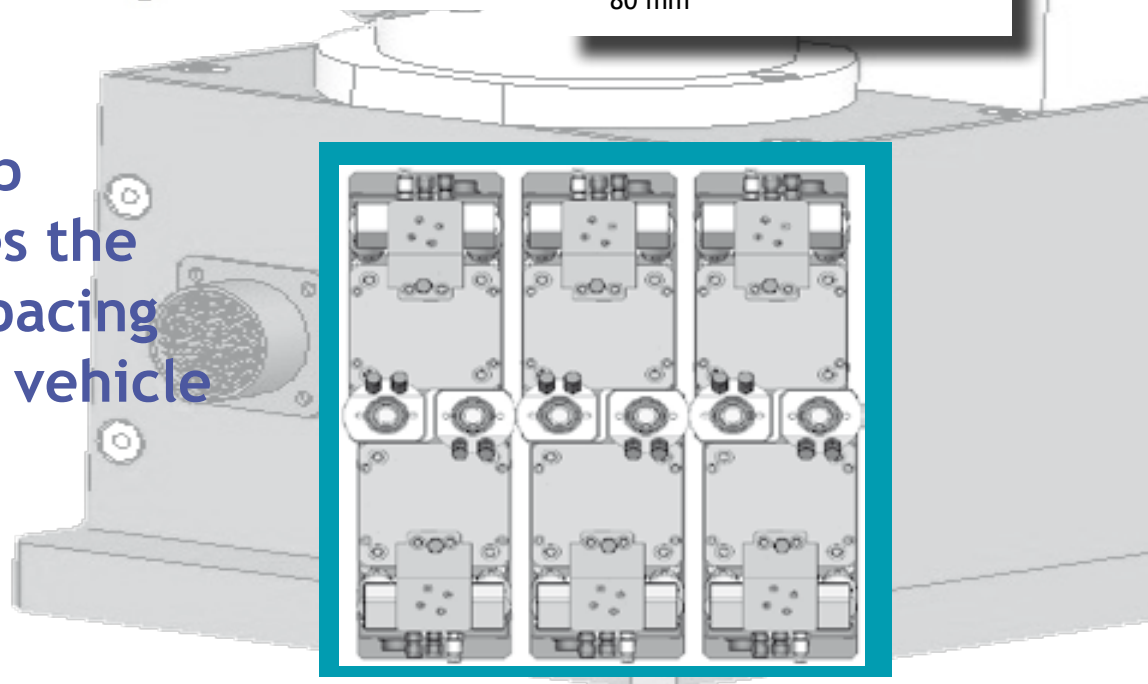


INLINE SET-UP



- Spatial requirements: 470 mm x 533 mm
- Distance between two injectors: 80 mm

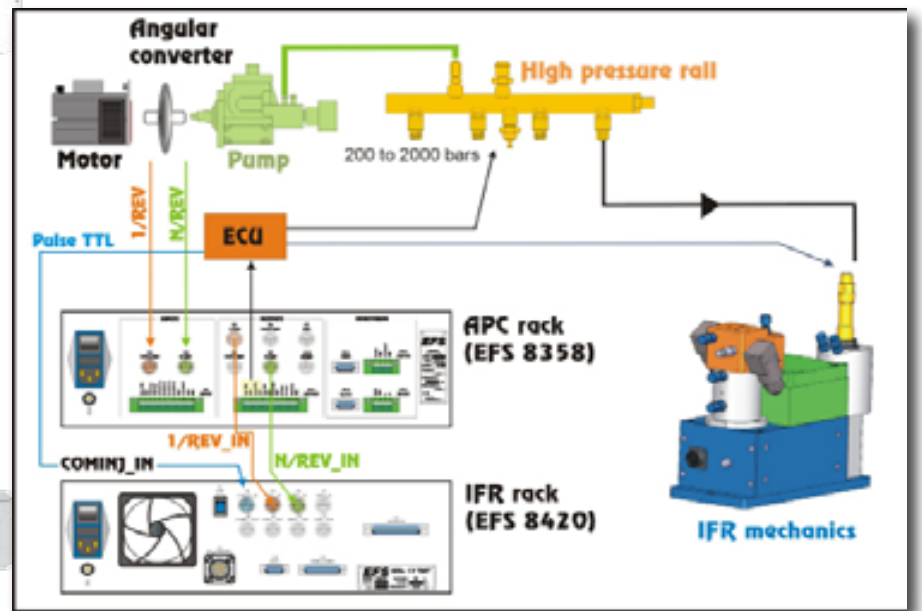
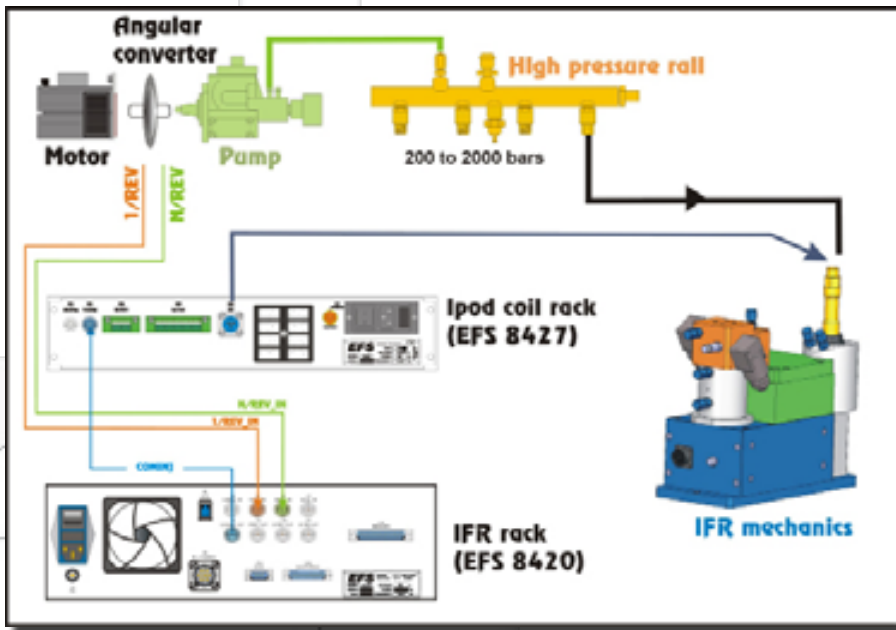
This set-up reproduces the injector spacing found in a vehicle



12

Different set-ups

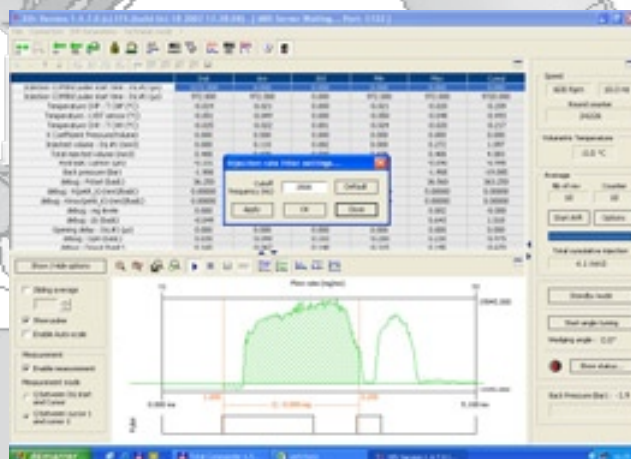
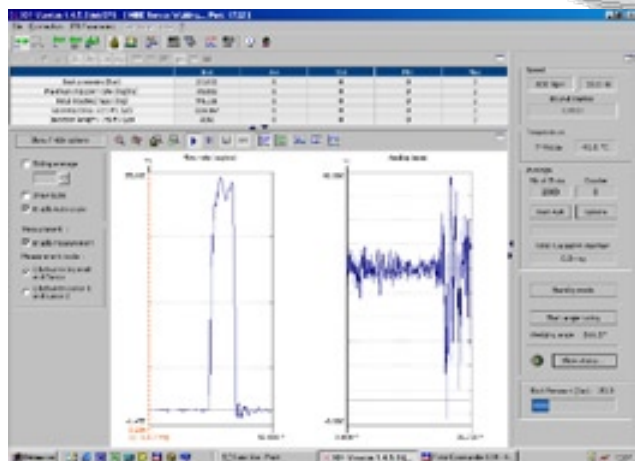
SET-UP EXAMPLES



SOFTWARE

The **XIFR** is the set-up software and user interface of the **IFR**.

2 essential features set it apart: a **simple intuitive display** and an **elaborate set-up interface** enabling numerous functions: multi-injection measurement at each revolution, injection rate and data processing.



This software runs under Windows98®, Windows2000®, WindowsXP® and uses an Ethernet link.

REFERENCES



8420 - 150

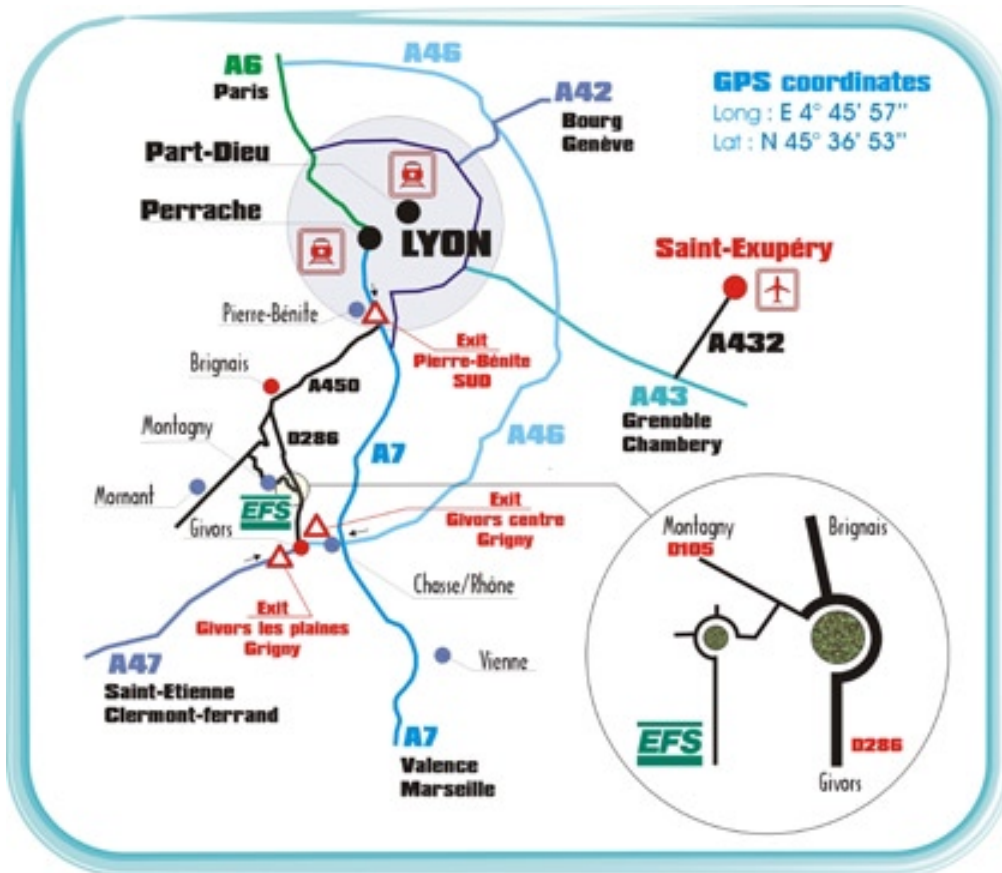
8420 - 600



SITE ADDRESS

Parc d'activité du Baconnet
192, allée des Chênes
MONTAGNY (69700)
FRANCE

ACCESS MAP



SUBSIDIARIES IN CHINA AND THE USA to provide technical support (installation, training, maintenance, calibration).

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