

# Test bench *DIT31*

For diesel injectors

MECHANIC CONVENTIONAL

MECHANIC TWO STAGES

COMMON RAIL ELECTROMAGNETIC

COMMON RAIL PIEZOELECTRIC

**In any industry!**  
**For any technology!**

RAIL ROAD

AUTOMOTIVE



MARINE

INDUSTRIAL



**DETEQ**  
Diesel & Electrical Test Equipment



**AUTOMOTIVE**  
Motor cars, Vans.



**INDUSTRIAL**  
Trucks, Bulldozer.



**MARINE**  
Ships, Nautical.



**RAIL ROAD**  
Rail transport.

# In any field and for any technology!

## MECHANIC CONVENTIONAL

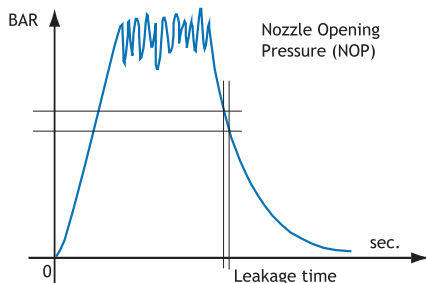
**DIT31** is the test bench for diesel injectors in compliance with norm ISO 8984-1, which identifies the minimum requirements for the following tests:  
**Nozzle opening pressure (NOP), chatter, seat leakage and return.**

### INJECTOR FLUSHING AND FLOW ADJUSTMENT

For both the **CONVENTIONAL and TWO-STAGE MECHANICAL** technologies the proper function allowing the fast filling that is a trick to flush the injector. The flow control is via the **ADJUST** command, allowing to simulate even the most critical operating conditions.

### TESTING METHOD

After having selected the **program 1**, press the **START** button to start the pumping unit. The **DRAIN** command allows to quickly fill the pipe and the injector. Adjust the flow of the liquid with the **ADJUST** control to obtain any operating condition, while **DIT31** automatically repeats the test cycle. For each chatter **DIT31** shows the nozzle opening pressure.



The cycle stops by pressing the **STOP** command. **DIT31** calculates the leakage time as evidence of the nozzle seat leakage. The test report can be printed.

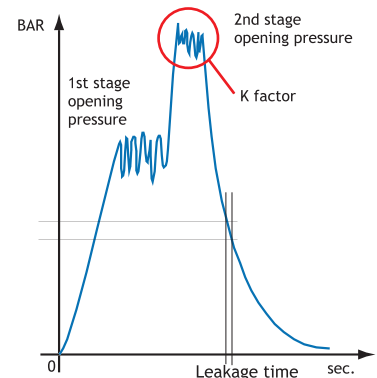


## MECHANIC TWO STAGES

**DIT31** is extremely suitable for testing the 2-stage injectors: automatically it detects the opening pressure of the first and second spring. **DIT31** also provides a benchmark index of the flow (**K factor**).

### TEST METHOD

After having selected the **program 2**, the test of the **first stage** is equivalent to the test of a traditional mechanical injector. The **second stage** is activated only when the proper **2 SPRING** button is pressed:



from that moment the test cycle **automatically** alternates the chatters at the first and second pressure stage. **DIT31** display these values with the parameters **P1** and **P2**. For each chatter, **DIT31** also calculates the **K factor** as a reference of the flow.

## PUMPING UNIT

The hydraulic pressure of the test liquid is obtained through the use of a pumping unit **powered by compressed air** (8 - 10 BAR). This unit can be tailored for the specific scope (Automotive, Industrial, Marine, Rail Road) to obtain the requested levels in terms of pressure and flow.



From STANDARD 1450 BAR to HP 1600 BAR



HP 1600 BAR



XL 1000 BAR



From STANDARD 1450 BAR to XL 1000 BAR

## SPRAY CHAMBER / LIGHT / FUME EXTRACTOR

By means of the spray chamber, the quality of the spray and the action of the injection holes can be verified with confidence and reliability. Inside the spraying chamber the visibility of the phenomena is significantly enhanced through the **integrated fume extraction** and the **12 volts halogen light**.



# Test bench **DIT31**

For diesel injectors

## COMMON RAIL ELECTROMAGNETIC

In common rail systems the generation of the pressure and the fuel injection are independent of each other.

### TRIGGERING THE ELECTRIC ACTUATOR

The control of the electromagnetic actuator is assigned to **TC38** the external unit that, properly synchronized to **DIT31**, generates the triggering command through smartcards.

### CABLE AND SMARTCARD

Depending on the application each manufacturer uses special connectors and controls the injector in different ways to achieve the required performances. Specific cables and triggering card may be required.



### TESTING METHOD

With programs 3 and 4, **DIT31** and **TC38** is a complete, reliable and fast system to test each injector individually and analyze the 5 basic parameters:

① **Leakage:** with the injector pressurized, the pump is stopped and the pressure drops gradually, depending on the return. Known the acceptable leakage time, any lower value indicates a too high back leakage.

② **Minimum pressure:** activated the automatic triggering cycle, it is easy to find the minimum pressure which allows the chatter.



③ **Opening delay:** is the time to translate the electrical command into a mechanical movement.

④ **Injection time:** is the time elapsed between the opening and closing of the nozzle. It is essential to determine the flow.

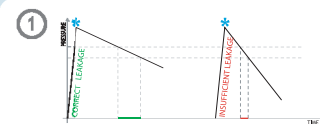
## COMMON RAIL PIEZOELECTRIC

The test of common rail injectors with piezoelectric actuator meets the new demands of resolution and precision.

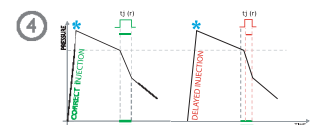
### TRIGGERING THE ELECTRIC ACTUATOR

**Piezoelectric** actuator control requires the additional **CRP module** to the external unit **TC38**.

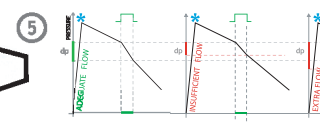
The connection and testing mode keep unchanged from the test of an Electromagnetic common rail injector.



The injector on the left has an acceptable quantity of return; the other one on the right has an extra internal leakage.



On the left an injector that pulverizes exactly on time, on the right and injector that responds with a delay.



On the left the injector injects the correct amount. The injector in the center has at least one of the nozzle holes with a reduced diameter by dirt or oxide while the nozzle holes of the injector on the right are expanded by wear.

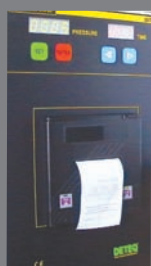
⑤ **Flow:** for each chatter, at constant pressure **DIT31** calculates the difference between the level of pressure on opening and closing of the nozzle.

This parameter, together with the injection time, determines the amount of the injected fluid.

### PRINTER / DISPLAY

The test results can be viewed at any time on the display.

However, the **built-in printer** releases the test report, which can be customized with the company details, including date and time.



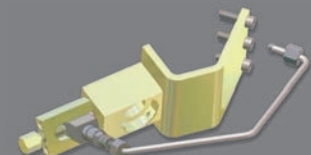
### HYDRAULIC INTERFACE

On the M14x1,5 outlet any **high pressure pipe** can be connected to, according the thread on the injector inlet and its position.



### MECHANICAL INTERFACE

**DIT31** has a pneumatic clamp to **lock the injector**. Depending on dimensions and features of the injector, specific solutions can be applied on request.



# Test bench **DIT31**

For diesel injectors

List of DIT31 system components for each injection technology.

	MECHANIC CONVENTIONAL	MECHANIC TWO STAGES	COMMON RAIL ELECTROMAGNETIC	COMMON RAIL PIEZOELECTRIC
DIT31	 ✓	 ✓	 ✓	 ✓
	+	+	+	+
TC38	 ✗	 ✗	 ✓	 ✓
	+	+	+	+
CRP Module	CRP ✗	CRP ✗	CRP ✗	CRP ✓
	+	+	+	+
Cable and Smartcard	 ✗	 ✗	 ✓	 ✓
	+	+	+	+
Hydraulic Int.	 ✓	 ✓	 ✓	 ✓
	+	+	+	+
Mechanical Int.	 ✓	 ✓	 ✓	 ✓
	+	+	+	+

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