



The Classic GDI

Injector Diagnostic
Testing & Servicing System

The ASNU Classic GDI

A complete system for the latest generation fuel injection

What is GDI?

GDI is an abbreviation for Gasoline Direct Injection, a process where the fuel is injected directly in to the combustion chamber. There are many variations of this process, with manufacturers preferring their own abbreviation of the system, here are some of the ones currently in use:

FSI = VW Audi (Fuel Stratified Injection)

SCI = Ford (Smart Charge Injection)

IDE = Renault (Injection Direct Essence)

JTS = Alfa Romeo (Jet Thrust Stoichiometric)

SIDI = Holden (Spark Ignition Direct Injection)

HPI = BMW (High Precision Injection)

HPDI = Porsche (High Pressure Direct Injection)

Ecotec = GM, Vauxhall, Opel

CGI = Mercedes Benz (Charged Gasoline Injection)

DISI = Ford/Mazda (Direct-Injection-Spark-Ignition)

GDI = Mitsubishi Peugeot Citroën, Hyundai, Volvo, (Gasoline Direct Injection)



The GDI Combustion Chamber



Bosch GDI Injectors
&
Fuel Pump



On a GDI system, the fuel is injected directly in to the combustion chamber at a much higher pressure than manifold systems, up to 200 bar.

These systems now require fuel pumps and injectors made of stainless steel and must be capable of performing at a much higher specification than ones seen on previous manifold injection systems.

Both designed to deliver very precise quantities of fuel at extremely high pressures and in short periods of time, in some cases for fractions of a milli second.

To control these systems, the ECU is also of a higher specification and required to supply a higher current of up to 90v on some systems.

There are many manufacturers of this type of system, but Robert Bosch are recognised as one of the leaders in the development of the GDI Technology.

The GDI System has two running modes: Stratified & Homogeneous.

Stratified Charge Running Mode.

This mode is the economical combustion cycle, in some systems, the Air to Fuel ratio can be as high as 65 to 1.

In this mode the injector delivers a minimum amount of fuel in to the combustion chamber, just before the piston reaches the top and before the plug fires. This mode is used at idle and light throttle settings when the car is driven slowly.

Homogeneous Running Mode.

This mode is what would be called a normal combustion cycle, with an Air to Fuel ratio of 25 to 1.

In this mode the injector delivers a normal amount of fuel in to the combustion chamber. This gives the engine the required performance as the car goes faster.

The Engine Management System determines when the system needs to switch between the Stratified Charge Mode and the Homogeneous Running Mode.



Stratified Mode

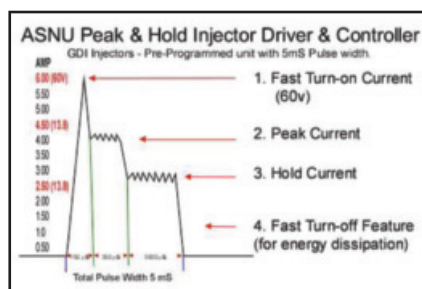
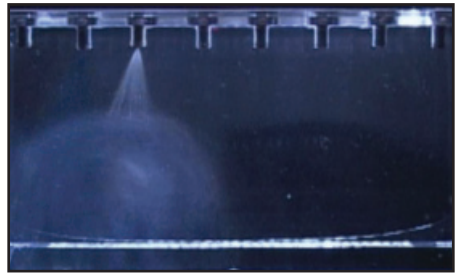


Homogeneous Mode

Spray Pattern & Flow Rate Analysis

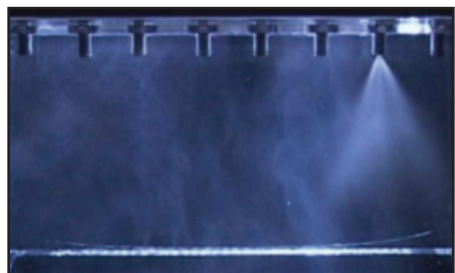
The ASNU system has been designed for comparing injector against injector at a safe operating level and is suitable for use by Apprentice Level Mechanics to Master Level Technicians.

To enable a safe and easy examination of the injector's performance, the ASNU system runs the injectors at a lower and safer operating fuel pressure of up to a maximum of 10 bar. On a vehicle fitted with a GDI system the fuel pressure will operate at a potentially dangerously high level for the inexperienced, reaching anywhere between 75 bar up to 200 bar on some systems.



The Engine Management System of a GDI is designed to open the injectors for short micro second durations, with a maximum opening duration of only 5 milliseconds, any visual analysis of the injectors spray pattern could be both difficult and dangerous. When mounted on the ASNU Classic GDI, the injectors are being supplied with the correct peak and hold currents and firing in sequential mode simulating those of the vehicles ECU.

The ASNU allows the user to safely examine the injectors spray pattern in greater detail for any discrepancies in the fuel distribution and atomisation.



In some operating modes, the ASNU system opens the injectors for a much longer duration, thus exaggerating the spray pattern and making it easier to examine the spray's performance.

GDI Injectors & Fuel Trims

The Distribution and Atomisation on a GDI Injector are critical to maintaining the correct Performance, Fuel Economy and Exhaust Emissions. They are now even more important than the quantity of fuel being delivered by the injector. The latest Adaptive Engine Management Systems have a Short and Long Term Fuel Trim Adjustment, adjusting the fuel delivery as compensation for any discrepancies in the C.O emissions. An adjustment of up to 15% can be made to the fuel delivery of each injector on some systems, but as there are a number of measurements that contribute to the Fuel Trim Adjustment, these measurements cannot adjust or correctly compensate for poor Fuel Distribution and Atomisation.

FUEL TRIM ADJUSTMENTS ARE NOT CORRECTING THE PROBLEM,



NONE OF THE CURRENT ENGINE MANAGEMENT SYSTEMS CAN MEASURE OR COMPENSATE FOR THE INJECTORS FUEL DISTRIBUTION AND ATOMISATION

A selection of GDI Injectors with discrepancies in the Distribution and Atomisation of the spray patterns

The ASNU system allows the user to visually examine the injectors on an individual cycle or in sequential mode, where they can compare the injectors performance under a range of simulated Millisecond & RPM driving cycles already programmed in to the ASNU system. The injectors can be operated at various RPM & Millisecond settings, restricted only by the number of injectors being tested in the sequential testing operation.

The ASNU Classic GDI

Technical Specifications

Weight & Size: UnPacked: 30Klg Size: L55 W45 H70cm / Packed: 48Klg Size: L67 W57 H83cm **Input Voltage:** 96v –265v

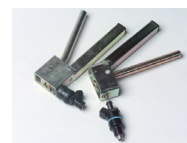
The ASNU Classic Features

- Backlit Viewing Window
- Multi Language Selection
- Digital Operational Display
- Membrane Key Pad
- Wide Range of Functions
- Injector Shot Counter Display
- Injector Shot Timer Display
- Duty Cycle Display
- Lbs per Hour to Milliliters Calculator
- Manual & Automatic Cleaning Cycles
- Suitable for Injected Motorcycles
- Suitable for Injected Marine Engines
- Suitable for LPG Injection
- For use one EVERY type of Manifold Injector
- Easy to Read LCD Screen

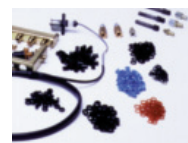
Classic GDI Standard Equipment

- High Pressure Fuel Pump
- High Pressure Fuel Rail
- Built In Ultrasonic Cleaning Bath

Top & Side Feed Service Tools



Pintle cap removal tool
Filter removal tool



Injector replacement
components



Flow rack holder



Mazda block



Navara side feed block



Side feed injector cradle

Additional GDI Features

- Suitable For All Types GDI Injectors
- Sequential and Simultaneous firing option for Standard Manifold Injectors
- Fast injector turn on and turn off circuits giving more repeatable results
- Injector Inductance Test - Checking Injector Electro Magnetic Circuit
- Peak & Hold Current Control with ECU matched current settings
- Single Injector Selection During Multi Injector Operation
- Sequential Injector Firing Operation for GDI injectors
- Simulates on-car Spray Patterns & Flow Rates
- Tests Up To 8 GDI/FSI Injectors at one time
- 18 Various M/S & RPM Test Settings
- Static and Dynamic Operation

Optional Extras

- USB Computer interface with adjustable settings for simulating ECU Peak & Hold Currents, Millisecond Pulse Widths and Engine RPM

GDI Service Tools

