



Since 2011

# COMPUTERIZED SINGLE CYLINDER GASOLINE DIRECT INJECTION ENGINE SET-UP WITH OPEN ECU SYSTEM

**Make: MMI**  
**Model: MMI RICE 038**  
**ENGINE Specifications :**

- Engine make : HONDA – GX 390 (BRAND NEW)
- Engine type : Four stroke generator type
- No. of cylinder : Single cylinder
- Cooling : Air cooled
- Maximum speed : 4000 RPM
- Power : 8 HP@ 3500 RPM
- Torque : 20 NM @ 2500 RPM
- Compression ratio : 9.5:1
- Fuel injection : Gasoline direct injection (Maximum 110 Bar)
- Throttle : Electronic throttle body (Driven by wire)
- Starting : Electronic start

## EDDY CURRENT DYNAMOMETER :

**Make : POWERMAG,**  
**Model: PM 05**

- Type : Eddy Current
- Cooling system : Air cooled
- Maximum Power Output : 05 @ 3000 rpm
- Maximum RPM : 1500 to 3000 rpm
- Maximum Torque : 23 Nm
- Coupling : Tyre coupling
- Dynamometer load : 0 – 100 Kg strain gauge based load cell with inline transmitter



**Electrical clutch :** Electrical clutch will be attached to engine shaft and dynamometer shaft to reduce to engine shaft load.

**Temperature Measurement system :** 3 No's 'K' Type Thermocouple and to measure the different points of temperature for intake air (PT 100), Engine cylinder body (K type) and Exhaust gas (K type).

**Fuel measurement system :** Burette with digital stop watch will be provided to measure the fuel consumption with tank and 0.1% FS accuracy optical fuel flow encoder will be provided to measure the fuel flow rate digitally in Kg/s or g/s with calibration certificate

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# MICRO MECH INSTRUMENTS

An ISO 9001 : 2015 Certified Company

No. 1, 2nd Cross Street, Thendral Nagar, Karapakkam, Chennai - 600 097, Tamil Nadu, INDIA.

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**Air intake measurement system :** Air intake measure using 'U' Tube manometer and air tank through manual mode, Mass flow rate in g/s, for selected engine using Differential Pressure transmitter with the  $\pm 0.1\%$  FS

**Sensor indicator :** 8 channel MASIBUS controller for sensing pressure, temperature, load, speed for automatic and manual mode.

**Testing panel and Engine frame:** MS powder coated engine testing panel will be provided with attachment of Air tank, Fuel tank, temperature indicator, Load indicator, Speed indicator, CC tube, U tube and PU painted self contained structure frame.

#### DATA ACQUISITION SYSTEM

**Make : NATIONAL INSTRUMENTS**

**Model : NI USB 6210**

Analog Input : 16 Single Ended, 8 Differential  
Analog input resolution : 16 Bits  
Analog Input/output : 4 A/I & 4 A/O  
Analog output : 2 channel  
Ground reference : AI GND For Analog Input  
ADC resolution : 16 bits  
Frequency : 250 KHZ

#### EXHAUST GAS PRESSURE TRANSDUCER

**Make: MEASUREMENT SPECIALTIES**

Pressure range : - 0.5 to 5 BAR  
Input : 24 VDC  
Output : 4 to 20 mA  
Accuracy :  $\pm 0.1\%$  FS with Calibration certificate

#### COMBUSTION ANALYZER SOFTWARE Technical data :

**Make: MMI SOFT 001**

Engine combustion analyzer will be consisting of educational Software for online representation for P-V & P- $\Theta$  diagram and data logging package interfacing with PC for real time data acquisition and it was store EXCEL, PDF format.

The Following Graphs are generated using this Software

- Crank Angle Vs Pressure
- Crank Angle Vs Rate of Pressure Rise
- Volume Vs Pressure
- log (volume) Vs log(pressure)
- Crank Angle Vs Heat Release Rate
- Crank Angle Vs Cumulative Heat Release Rate
- All the Output Result are Stored in one Excel Sheet

#### Experiment to Performance :

Specific fuel consumption, Brake power, Indicated power, BMEP, IMEP, brake thermal efficiency, Indicated thermal efficiency, mechanical efficiency, volumetric efficiency, air/fuel ratio.

#### ROTARY ENCODER WITH MOUNTING ARRANGEMENT

Make : KUBLER Gernmen  
Operating Volt : 10-30VDC  
Revolution : 360PPR With coupling adapter for mounting on Dynamometer Shaft

#### COMBUSTION PRESSURE TRANSDUCER

**Make: KISTLER**

Pressure range : 0 to 100 Bar with integral inline Charge amplifier and mounting Tool, including Connecting cable  $\pm 1\%$  FSO  
Accuracy : 7 to 32 VDC  
Supply voltage :

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**MMI**  
Solution Provider

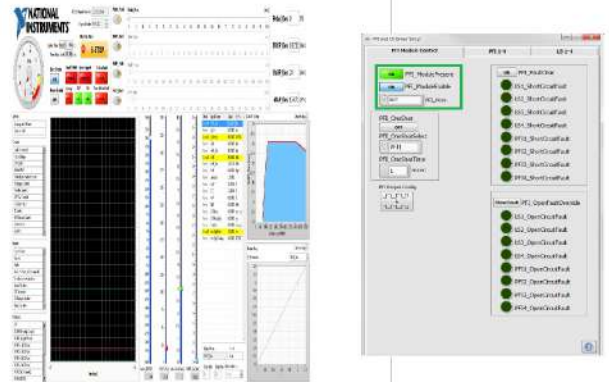
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**OPEN ECU SYSTEM**

**NATIONAL INSTRUMENT/NIRA MAKE OPEN ELECTRONICA CONTROL UNIT FOR CONTROL GASOLINE DIRECT INJECTION SYSTEM**

**GDI OPEN ECU WILL INCLUDES ALL THE REQUIRED ACCESSORIES**

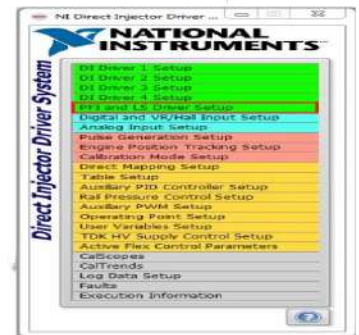
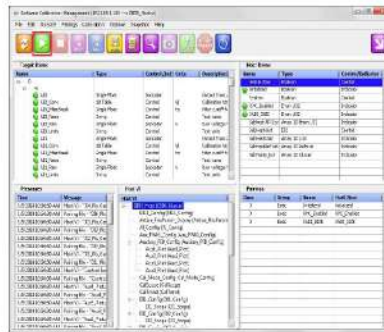
- ECU programming tool
- ECU interacting software
- Complete wiring harness
- Injector quantity calibration table for pressures from (200 - 110 BAR)
- ONBOARD DIAGNOSTIC TOOL (OBD)**
- OBD tool will be provided with the equipment for finding the engine Trouble coded.
- The OBD tool will include all the troubles codes converting cam Position sensor, Crank position sensor, Mass air flow sensor, Coolant Temperature sensor, Injectors, Rail pressure sensor and fuel pressure Regulating valve



**Fuel System:** GDI System, P&H Injector, High-pressure fuel pump (Pressure: up to 140 bar), Low-Pressure Fuel pump.

**GDI OPEN ECU WITH COMPONENTS**

- |                       |                            |
|-----------------------|----------------------------|
| ECU Processor         | NIRA MAKE                  |
| Crankshaft position   | Crank trigger wheel        |
| Camshaft position     | Cam trigger wheel          |
| Crank position sensor | Variable reluctance sensor |
| Cam position sensor   | Hall effect sensor         |
| T-map                 | NTC thermistor             |
| Mass flow rate        | Hot wire type              |
| Software              | Engine control system      |
| Lambda sensor         | Lambda range 0.65 to ∞     |
| Rail pressure sensor  | 0 -150 Bar                 |
| Throttle body         | Electronic drive by wire   |



- Closed loop control for idling
- Injection start angle homogeneous - Variable
- Start angle of the main injection - Variable
- Injection rail pressure - Variable
- Ignition angle - Variable
- Burning Limits (lower Lambda limit and upper lambda limit)
- Lambda drivers request



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