

## The Specifications of the GDI Engine

### Supply qty: 1set

#### **1. The Engine**

Gasoline Direct Injection (GDI), two or three cylinders, about onelitre capacity, with turbocharger and variable valve timing mechanism, water or air cooled engine, power rating to be about 120 kW.

#### **2. Open ECU**

Above engine should be connected to an open ECU with complete wiring harness, calibration cable and connectors. The ECU should have a PC based engine control software capable varying: fuel injection pressure, fuel injection timing, and dwell and duration of pulses, number of pulses of fuel injection. The ECU should also have the provisions for calibration and visualization of the varying parameters. The supplier should provide user manual and training for the operation of the open ECU.

#### **3. The Dynamometer with Controller and Drive Shaft**

The supplier should supply a dynamometer suitable for the above engine with a dyno-controller to control the speed, torque and mode of operation with the display of them. They also should provide a suitable drive shaft with a safety cover to connect the engine to the dynamometer.

#### **4. Motoring Provision**

The setup should have a provision to motor the engine at different speeds ranging from about 500 to 5000 rev/min.

#### **5. Engine Mounting**

The supplier should provide a common frame standing on cushioning dampers that can mainly accommodate the engine, dynamometer, and if possible dyno-controller and all the other accessories with a compact design. The whole frame should be possible to mount on the floor without isolated base plate.

#### **6. The Engine Instrumentation and Other Accessories**

1. Cylinder pressure sensor: One uncooled piezoelectric pressure sensor with adapter (fitted to the engine).
2. Charge amplifier.
3. Crank angle encoder: Capable to resolve for 0.1 crank angle degree(fitted to the engine).
4. Two piezo-resistive pressure sensors including adapters and mounting accessories for measurement of absolute pressure in the inlet and exhaust manifolds(fitted to the engine).
5. One fuel line pressure sensor with adapter and mounting accessories(fitted to the engine).
6. Active current clamp for acquisition of fuel injection and ignition signals.

7. Air flow meter along with air drum (fitted to the engine).
8. Fuel flow rate measuring system (fitted to the engine).
9. Lambda sensor in the exhaust line (fitted to the engine).
10. DAQ system for acquiring temperatures and pressures at various engine locations.

**Specific Conditions:**

1. The supplier should supply full system as a whole.
2. The cost of individual items to be given separately. Timeline of manufacturing, testing and installation should be provided in detail. The working of the entire engine set up should be demonstrated at the site before delivery.
3. **Past experience:** The supplier should have past experience in building such systems operating under above operating conditions. A list of customers to whom the supplier has supplied such systems with details such as item description, their value and supply date, customer's addresses, etc. must be provided. Also the committee has the discretion to vouch the capacity of the firm in such installation and arrive at a decision.
4. Method of manufacturing and assembly to be specified in the quote.
5. Performance guarantee of (all components including bolts, nuts, studs, etc.) uniformly one year minimum to be given.
6. Make and models of bought-out items (e.g., sensors and meters, etc.) should be mentioned.
7. Any technical clarifications will be made on or before 5 PM of **22-08-2016** in the office of Dr. J. M. Mallikarjuna, IC Engines Laboratory, Department of Mechanical Engineering.  
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