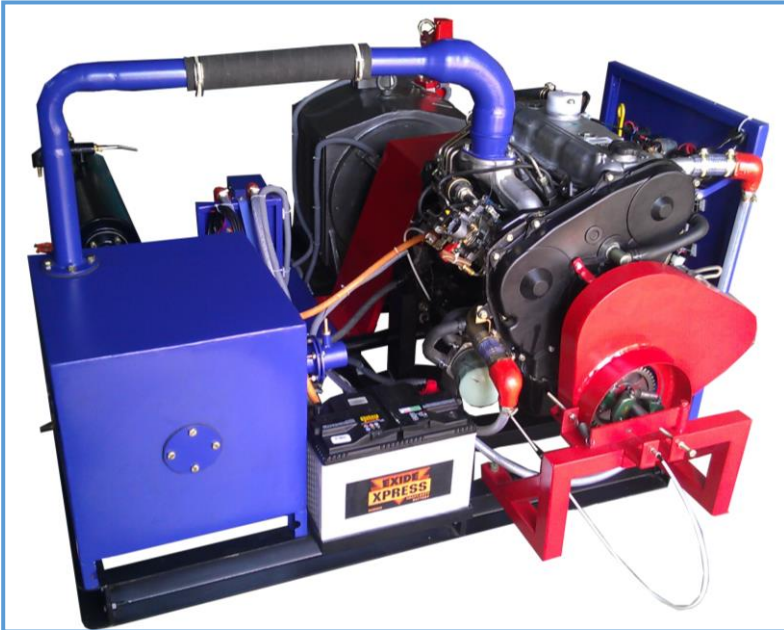




Computerized Four Stroke Four Cylinder Petrol Engine Test Rig with PFI Open ECU and EGR
(Product Code: ICC04-OECU)



Features

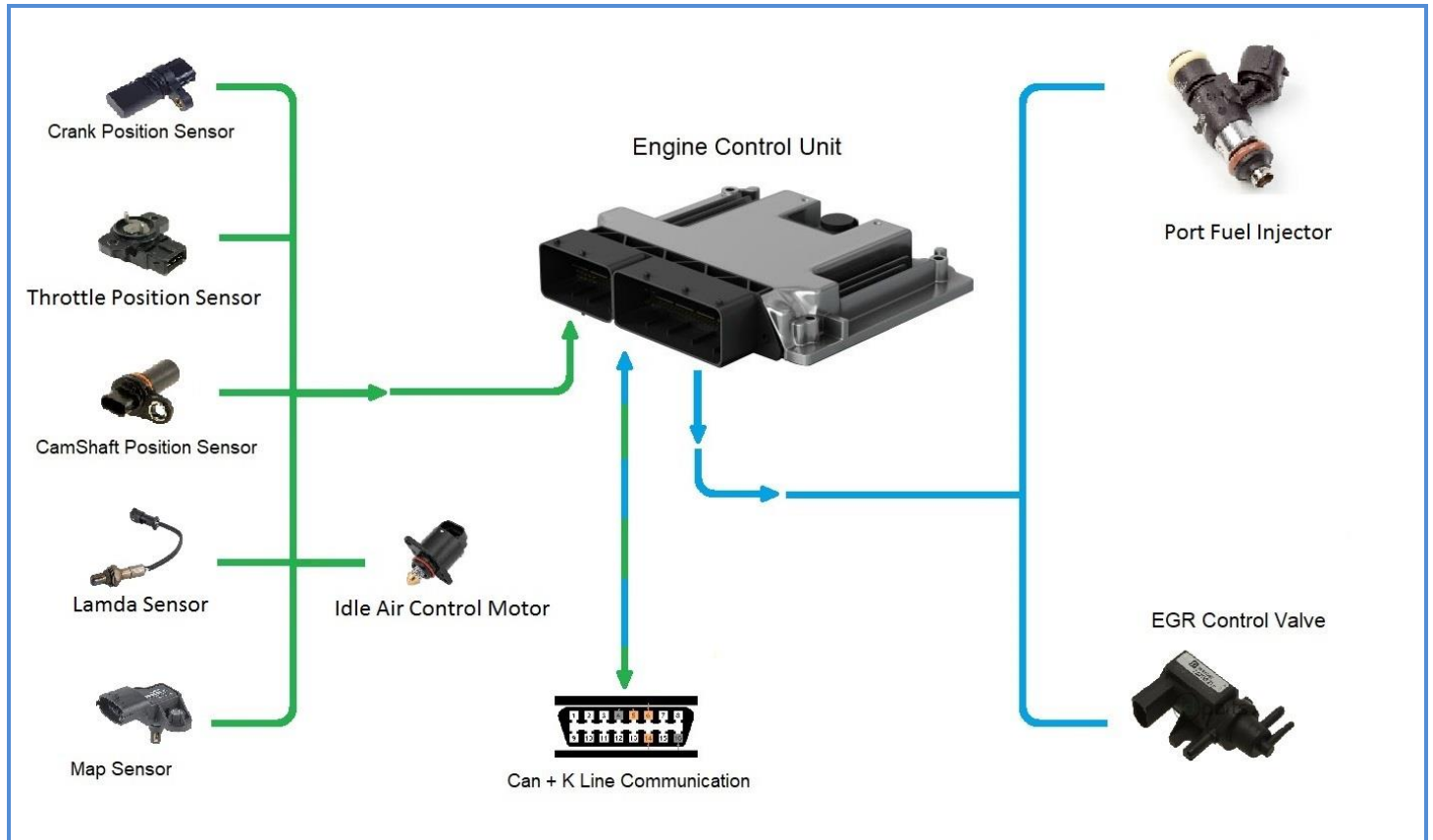
- PFI Open ECU- Engine performance enhancement for petrol and alternative fuels
- Engine performance and combustion studies
- High Quality instrumentation
- Calculates BP, IP, FP, sfc, bsfc, BTE , Volumetric η & mechanical η
- PV and P- θ diagrams
- Mass Fraction Burnt
- Estimated End of Combustion Angle (EEOC)
- Calculates Gross IMEP
- Calculates Maximum Heat Release Rate
- Calculates Start of Combustion
- Calculates Combustion Duration and many more parameters

Product Description

The engine is mounted on Sturdy base frame. The base frame is fabricated with mild steel "C" channel. The engine and the dynamometer are coupled using standard tyre coupling. The air tank is fitted with a differential pressure sensor for measuring the Actual volume of air drawn into the cylinder. The thermocouple and necessary signal conditioner for the measurement of temperature at various points in the calorimeter are suitably provided. Liquid Level Sensor is used to measure the fuel flow consumption of the engine. Rota meter is used to measure the water flow of the engine and exhaust gas calorimeter. The load of the engine is measured using a load cell. The panel is fabricated with suitable SWG CR sheet and as per IS standard; the front portion of the panel is provided with provision for mounting computer, Printer, UPS and all instrumentations and signal conditioner related components. Power and control wiring are suitably marked using ferule for easy troubleshooting. The panel is finished with powder coating.



PFI Open ECU with EGR



Components of PFI Open ECU with EGR

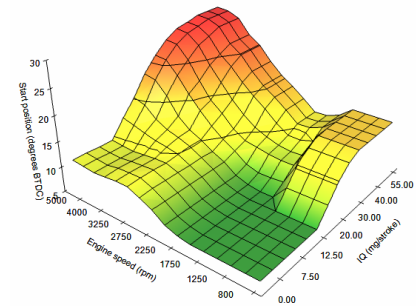
- Crankshaft position sensor (Measures crankshaft position)
- Camshaft position sensor - (Measures camshaft position)
- MAF Sensor - (Measures mass air flow)
- Map sensor - (Measures manifold temperature and pressure)
- Engine Control Unit - (To Measure sensors and control series of actuators on an internal combustion engine and ensure excellent engine performance)
- EGR Valve - (Re-circulates controlled flow of exhaust gas into the intake)
- Can + K line - (For calibration and Troubleshoot)



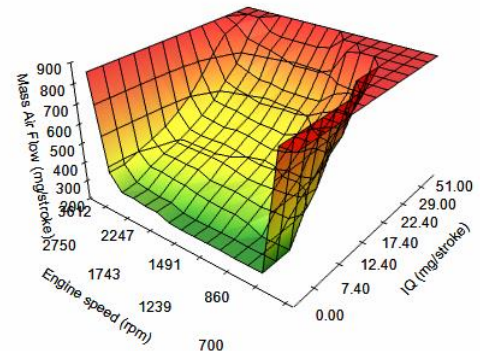
PFI Open ECU with EGR Functionality (Tunable Maps)

- Set idle Speed - (The user can set the required idle speed of the engine)
- Closed loop control for idling - (ECU controls the injection until engine idle)
- End angle of injection - (The user can set the end of injection angle as desired)
- Start angle for spark ignition-(The user can set the spark timing)
- Injection Duration - (The user can set the Injection duration in terms of crank angle as desired)
- Injection pressure - (3bar)
- EGR - (The user can set the EGR flow as desired)
- Calibration charts are provided for Injection Quantity at various pressure

| MG/ST RPM | 0.00 | 5.00 | 7.50 | 10.00 | 12.50 | 15.00 | 20.00 | 25.00 | 30.00 | 35.00 | 40.00 | 45.00 | 55.00 | 60.00 |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 5000 | 13.3° | 13.3° | 13.3° | 13.3° | 16.1° | 16.2° | 17.0° | 22.7° | 23.8° | 27.1° | 27.8° | 28.1° | 28.1° | 28.1° |
| 4500 | 13.1° | 13.1° | 13.1° | 13.1° | 15.1° | 17.5° | 20.3° | 23.4° | 25.5° | 28.3° | 27.3° | 27.0° | 27.0° | 27.0° |
| 4000 | 12.4° | 12.4° | 12.4° | 12.4° | 13.8° | 15.4° | 18.1° | 21.0° | 23.1° | 25.0° | 25.9° | 27.0° | 27.0° | 27.0° |
| 3500 | 11.4° | 11.4° | 11.4° | 11.4° | 12.6° | 13.7° | 15.1° | 18.4° | 19.9° | 21.8° | 23.0° | 24.1° | 24.1° | 24.1° |
| 3250 | 11.0° | 11.0° | 11.0° | 11.0° | 11.8° | 12.8° | 13.3° | 15.9° | 16.9° | 19.0° | 21.1° | 22.3° | 22.5° | 22.5° |
| 3000 | 10.4° | 10.4° | 10.4° | 10.4° | 10.9° | 11.7° | 11.6° | 13.8° | 15.1° | 16.3° | 18.6° | 19.8° | 19.8° | 19.8° |
| 2750 | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 12.0° | 12.7° | 14.0° | 16.3° | 17.6° | 17.6° | 17.6° |
| 2500 | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.5° | 11.2° | 12.2° | 14.7° | 15.9° | 15.9° | 15.9° |
| 2250 | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.8° | 11.1° | 12.5° | 14.0° | 14.0° | 14.0° |
| 2000 | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.4° | 10.9° | 12.0° | 12.0° | 12.0° |
| 1750 | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.1° | 10.8° | 12.1° | 12.1° | 12.1° |
| 1500 | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.0° | 10.1° | 11.5° | 13.0° | 13.0° | 13.0° |
| 1250 | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° |
| 1000 | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° |
| 800 | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° | 12.0° |



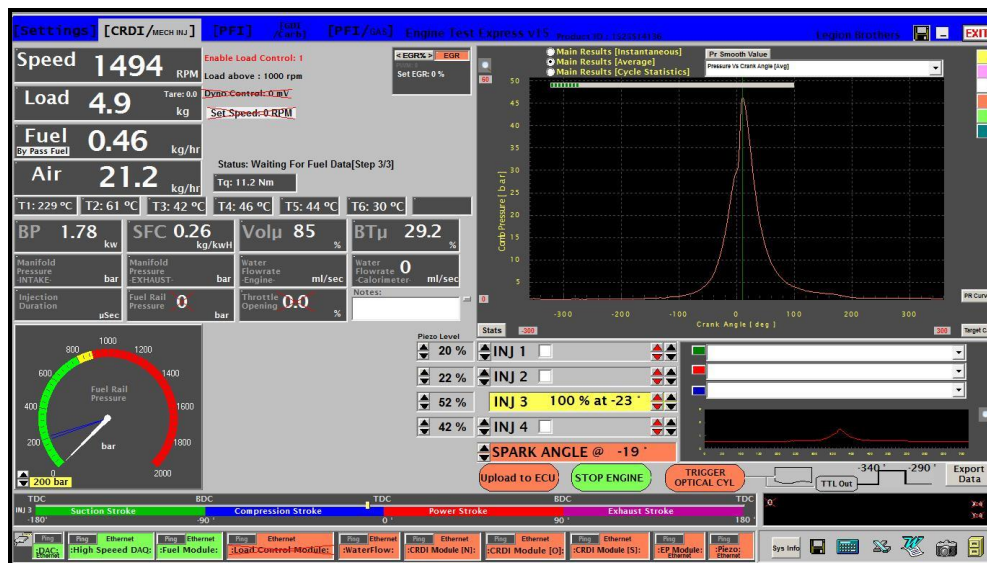
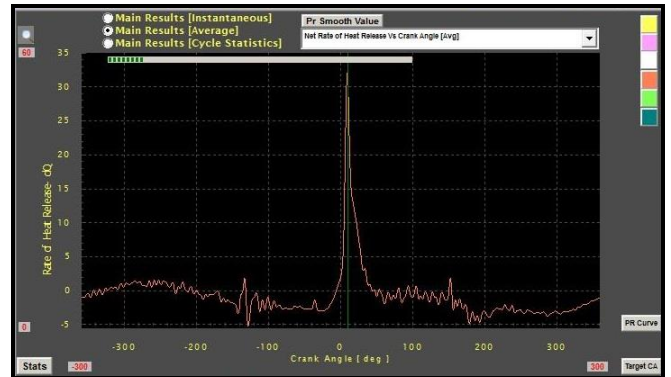
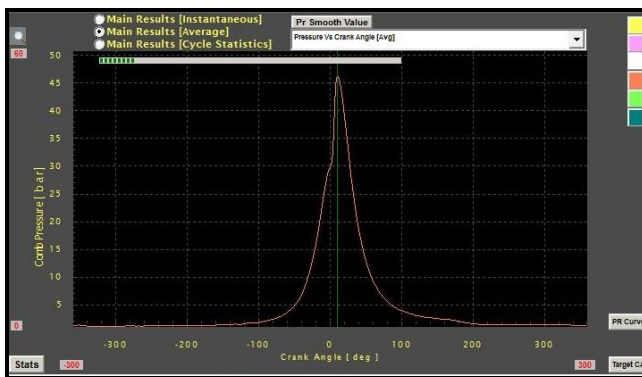
| MG/ST RPM | 0.00 | 3.00 | 7.40 | 10.00 | 12.40 | 15.00 | 17.40 | 20.00 | 22.40 | 25.00 | 29.00 | 33.00 | 51.00 |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 3612 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 |
| 3423 | 365.00 | 365.00 | 395.00 | 420.00 | 450.00 | 495.00 | 550.00 | 630.00 | 720.00 | 795.00 | 820.00 | 850.00 | 850.00 |
| 2750 | 285.00 | 295.00 | 335.00 | 365.00 | 385.00 | 420.00 | 460.00 | 510.00 | 585.00 | 650.00 | 760.00 | 850.00 | 850.00 |
| 2499 | 285.00 | 295.00 | 335.00 | 365.00 | 385.00 | 410.00 | 450.00 | 500.00 | 560.00 | 625.00 | 745.00 | 790.00 | 850.00 |
| 2247 | 275.00 | 275.00 | 325.00 | 360.00 | 385.00 | 410.00 | 440.00 | 495.00 | 545.00 | 600.00 | 730.00 | 775.00 | 850.00 |
| 1995 | 275.00 | 275.00 | 320.00 | 350.00 | 385.00 | 415.00 | 450.00 | 480.00 | 525.00 | 600.00 | 710.00 | 775.00 | 850.00 |
| 1743 | 250.00 | 250.00 | 305.00 | 330.00 | 380.00 | 405.00 | 445.00 | 470.00 | 530.00 | 585.00 | 685.00 | 775.00 | 850.00 |
| 1596 | 245.00 | 245.00 | 295.00 | 330.00 | 365.00 | 390.00 | 430.00 | 470.00 | 535.00 | 585.00 | 690.00 | 775.00 | 850.00 |
| 1491 | 245.00 | 245.00 | 290.00 | 330.00 | 350.00 | 380.00 | 420.00 | 460.00 | 535.00 | 585.00 | 690.00 | 790.00 | 850.00 |
| 1386 | 245.00 | 245.00 | 290.00 | 320.00 | 350.00 | 385.00 | 435.00 | 490.00 | 550.00 | 590.00 | 720.00 | 850.00 | 850.00 |
| 1239 | 245.00 | 245.00 | 275.00 | 310.00 | 355.00 | 410.00 | 460.00 | 540.00 | 590.00 | 650.00 | 835.00 | 850.00 | 850.00 |
| 924 | 240.00 | 240.00 | 240.00 | 315.00 | 360.00 | 405.00 | 510.00 | 575.00 | 620.00 | 680.00 | 850.00 | 850.00 | 850.00 |
| 860 | 240.00 | 240.00 | 240.00 | 315.00 | 375.00 | 425.00 | 515.00 | 600.00 | 620.00 | 680.00 | 850.00 | 850.00 | 850.00 |
| 750 | 240.00 | 240.00 | 240.00 | 370.00 | 450.00 | 574.00 | 622.00 | 690.00 | 690.00 | 690.00 | 850.00 | 850.00 | 850.00 |
| 700 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 |
| 0 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 | 850.00 |





Software (Engine Test Express)

Windows based powerful software for real time data measurement, auto zoom graphs, analog and digital display of data in the computer, store indefinite no of graphs for analysis. Facilities to export data to Microsoft excel. The data acquisition software is developed by legion brothers.





Computerized Four Stroke Four Cylinder Petrol Engine Test Rig with PFI Open ECU and EGR (Product Code: ICC04-OECU)

Product / Component Specification

| | |
|------------------------------|--|
| Product | Computerized four stroke Four Cylinder Petrol engine test rig with PFI open ECU and EGR |
| Product code | ICC04-OECU |
| Engine | Make : Suzuki Swift No of cylinder : Four Cooling : water Speed : 1550-1750 Rpm Power : 10 HP Starting : Electric Start |
| Dynamometer | Type : Eddy Current Cooling : Air cooled Capacity : 10 HP |
| Coupling | Tyre Coupling |
| Calorimeter | Single shell and tube-Mild Steel |
| Air tank | 500mm cubic-Mild steel |
| Panel | Mild steel powder coated with provision for mounting computer, ups, printer and instrumentation |
| Base frame | C channel-Mild steel |
| Combustion pressure sensor | Piezo-electric 0-100 bar |
| Crank angle encoder | 360 ppr, 1 Deg resolution with TDC pulse |
| Air measurement | DP sensor with inline transmitter |
| Fuel measurement | Optical liquid level sensor constant volume, fully automatic |
| Dynamometer load | Strain gauge load cell with inline transmitter |
| Temperature | "k" type with inline signal transmitter |
| Water flow | Rota meter-Acrylic |
| Daq | 200 Ks/s |
| Software | Engine test express for engine combustion analysis and performance software |
| PFI Open ECU with EGR | |
| ECU processor | Infineon |
| Crankshaft position | Crank trigger wheel |
| Camshaft position | Cam trigger wheel |
| Crank position sensor | Variable reluctance sensor |
| Cam position sensor | Hall effect sensor |
| Map | NTC |
| Mass air flow | Hot wire type |
| Software | Engine control system |



Open ECU Capabilities

- Set idle Speed - (The user can set the required idle speed of the engine)
- Closed loop control for idling - (ECU controls the injection until engine idle)
- End angle of injection - (The user can set the end of injection angle as desired)
- Start angle for spark ignition-(The user can set the spark timing)
- Injection Duration - (The user can set the Injection duration in terms of crank angle as desired)
- Injection pressure - (3bar)
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- Calibration charts are provided for Injection Quantity at various pressure