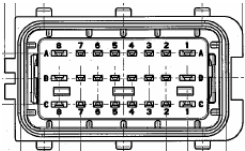


ECU specifications

Actuators control output	
2 x Injector output	Gasoline Low impedance injectors CNG/LPG low impedance injectors
2 x Coil outputs	Inductive Discharge Ignition (IDI)
1 x Auxiliary relay	Fuel pump, injectors, O2 heating and actuators power control
1 x Idle stepper motor control	Idle stepper valve application
+ 5v sensors power supply	Power supply for sensors (+5v)
Sensors input	
1 X Throttle position sensor (TPS)	Analog input for TPS
1 X Manifold air temperature sensor (MAT)	Analog input for MAT
1 X Manifold air pressure sensor (MAP)	Analog input for MAP
1 X Coolant temperature sensor (CLT)	Analog input for CLT
1 X EGO sensor (EGO)	Analog input for EGO sensor (narrow band)
1 X Keyon input	Logic input for keyon information
1 X CAMSHAFT phase sensor (optional)	Logic input for CAM Phase (not needed for single cylinder application)
1 X VR sensor (VR)	Input for Variable reluctance crank wheel sensor
Electrical Data	
Power voltage range	+6V to +16V
Power consumption	up to 20 watts
Mechanical Data	
Dust and waterproof Potting case	
1 connector	
Maximum dimensions with connectors	105 x 80 x 35 mm
Weight	approx.240g
ECU internal temperature range	-40°C ... +85°C
Connectors	
Connector	Sicma 24 ways
Communication interfaces	
1 CAN interface (Optional):	Diag On Can / J1939 / Calibration Control Protocol 250Kbits/s
1 Kline:	Diagnosis/calibration 10,4 Kbits/s

24 ways ECU pinout detail



PIN NUMBER	MNEMONICS	DESCRIPTION	TYPE
1A	+VBATT	Power connection to BATTERY VOLTAGE (DIRECT)	POWER
2A	ISM_A	Command for COIL_A of Idle Stepper Motor	PWM (750mA, 1A peak)
3A	MAT	Temperature Signal from TMAP sensor	Analog Input (pull-up to +5V)
4A	MAP	Pressure Signal from TMAP sensor	Analog Input (pull-up to +5V)
5A	TPS	Signal from Throttle Position Sensor	Analog Input (pull-down to ground)
6A	CLT	Signal from Coolant Temperature Sensor	Analog Input (pull-up to +5V)
7A	KEYON	Digital Signal from KEYON position of the start key	Digital Input (+VBATT)
8A	COIL_1	Output Signal to COIL_1	Low Side (IGBT)
1B	INJ_2	Output Signal to INJECTOR_2	Low Side (1A)
2B	ISM_B	Command for COIL_B of Idle Stepper Motor	PWM (750mA, 1A peak)
3B	+5Vsensors	+5V for sensors power	Power Sensors
4B	KL	Communication Line (K-LINE)	Communication (Digital)
5B	CAN_L	Low Line of CANBUS Communication	Communication (Digital)
6B	CAN_H	High Line of CANBUS Communication	Communication (Digital)
7B	CAM	Signal from CAMSHAFT Hall sensor (optional)	Digital Input (+5V)
8B	COIL_2	Output Signal to COIL_2	Low Side (IGBT)
1C	GND	Power connection to GROUND	POWER GROUND
2C	ISM_D	Command for COIL_D of Idle Stepper Motor	PWM (750mA, 1A peak)
3C	FPR	Fuel Pump Relay Activation	Low Side
4C	VR+	Plus signal from variable reluctance sensor (CRANKSHAFT)	Analog Differential Input
5C	VR-	Minus signal from variable reluctance sensor (CRANKSHAFT)	Analog Differential Input
6C	O2	Signal from Oxygen sensor (narrow band lambda sensor)	Analog Input
7C	ISM_C	Command for COIL_C of Idle Stepper Motor	PWM (750mA, 1A peak)
8C	INJ_1	Output Signal to INJECTOR_1	Low Side (1A)

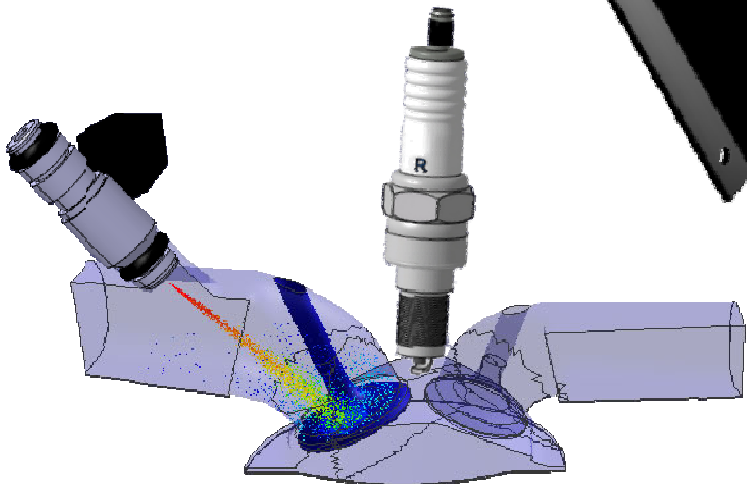
Ordering information

Product	Description	Part Number
ECUONE control unit	ECU hardware	ECUONE001
KID USB K line interface	USB to Kline interface	KID001
CAN USB interface	USB to CAN interface	CANID1
Engine Studio 2K13 Kline	Calibration software Kline version	ESTUDIO2K13K
Engine Studio 2K13 CCP	Calibration software CAN CCP version	ESTUDIO2K13CCP
Engine Data Reader 2013	Kline Diagnosis SCANTOOL	EDR2013

Rev.: 01    Dat.: 19/02/2013



Research & Development



ECUONE Platform  
Single/dual cylinder ECU  
for  
Gasoline/LPG/CNG  
applications

CMD S.p.a

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# ECUONE control unit description

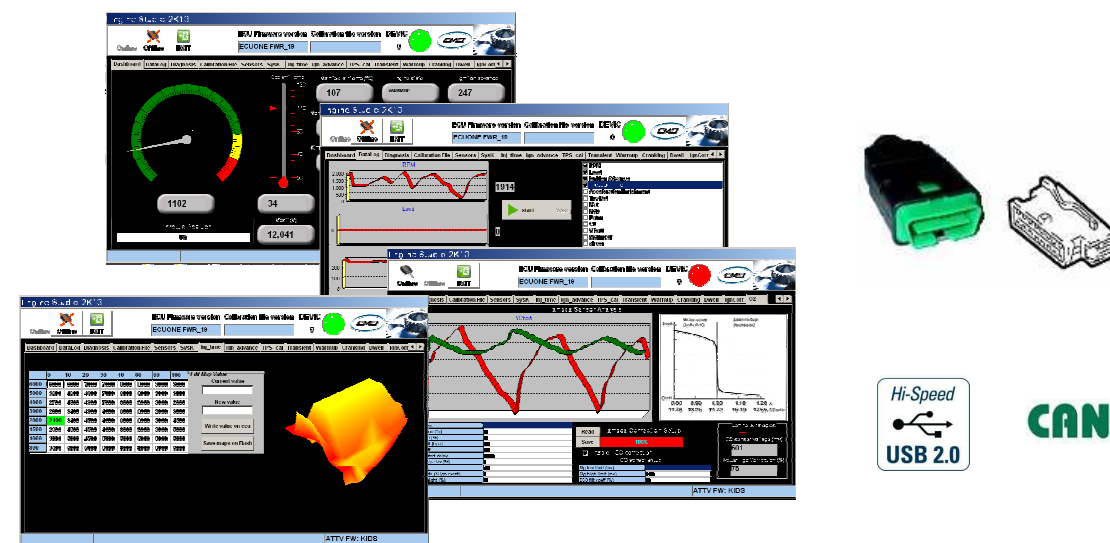
## OVERVIEW

The ECUONE control unit is a system based on Infineon XC2000 family microcontroller. It controls the spark timing, fuel injection and certain other functions of an internal combustion engine electronically, to ensure an optimum operating efficiency. This ECU system is suitable for Gasoline or LPG/CNG port injection. The ECU is designed to control a single or dual cylinder engine, 4 stroke internal combustion engine up to 12000 RPM. An inductive pick up sensor is used to determine the crankshaft position. Various setup of crank wheel patterns are supported.

## COMMUNICATION and TOOLS

The ECU is equipped with a Keyword2000 (Kline) bus and a CANBUS is available on request. The control unit is supported by the following tools provided by CMD:

- Engine Studio 2K13 calibration software based on Kline or CCP. Access is done over CMD KID or CANID USB interface.
- EDR2013 Diagnosis scantool. Access is possible over CMD KID USB gateway.



J1939 protocol is available for CANBUS to allow interfacing the ECU with external devices (E.g.: dashboard, Body Ecu, etc...)

## MEMORY

A flash memory is used to contain the application firmware of the ECU. An EEprom is used to store calibration and configuration data. By doing so, data are retained in the absence of voltage. It is possible to reprogram both ECU firmware and calibration data through Kline or CAN interface.

## POWER SUPPLY

The ECU is powered by the vehicle's normal 12 volts source and is protected against load dump and reverse voltage. When the ECU is turned off, no current will be drawn from vehicle battery.

## CONTROL FUNCTIONS

Speed-density control is used together with EGO closed loop correction. It is possible to activate and calibrate various correction algorithms to best suit the application (Ex: Coasting fuel cut-off, ...). Advanced control features are also available such as phasing using MAP pressure or crank wheel deceleration. The necessary control functions are implemented to enable the vehicle to meet emission standards.

## SENSORS and ACTUATORS

The ECU has two outputs with power driver integrated to drive single or double ended coil modules. Two power drivers are provided also to control two low impedance injectors.

Idle speed is controlled by the ECU using a stepper motor valve.

The ECU uses the following sensors:

- Manifold absolute pressure (MAP),
- Manifold air temperature (MAT),
- Engine coolant temperature (CLT),
- Exhaust gas oxygen sensor (EGO),
- Throttle position sensor (TPS),
- Inductive crank sensor (VR),
- Hall effect phase sensor (optional).

It is possible to drive the following actuators:

- Fuel injectors (2),
- Stepper motor (1),
- coil pack (2),
- Auxiliary relay (1),
- Malfunction indicator Lamp (1).



## FLEXIBILITY

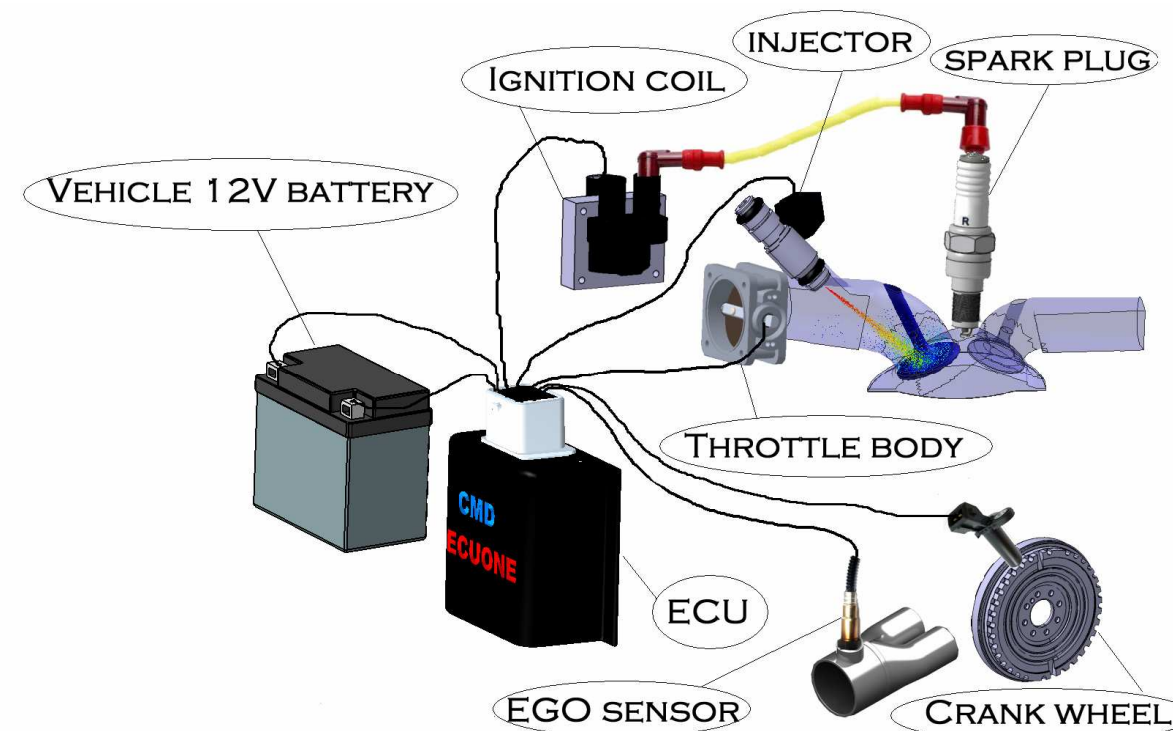
The ECU has the possibility to adapt to a large variety of sensors and actuators. Entering a sensor transfer function is an easy and quick task by using the Engine studio calibration tool. The ECU can be configured in many ways to better suit all single or dual cylinder engine control applications.

# Injection system

## OVERVIEW

The figure hereafter shows the injection system handled by the ECUONE platform:

Please, note that some sensors and actuators are omitted for clarity.



## DESCRIPTION

The ECU reads the sensors fitted on the engine and elaborates the signals to control the actuators thanks to its control algorithms and Maps (Please see supported sensors and actuators list on next page).

The electric injectors injects the fuel quantity calculated by the ECU in the admission manifold (note that fuel can be gasoline, CNG or LPG). The control of both injector and coils can be handled in full-group/wasted spark or sequentially by selecting various phasing modes available (MAP based, Crankshaft deceleration or Camshaft sensor).

The ECU uses an EGO sensor mounted on the exhaust manifold to perform a closed loop control on fuel injection quantity and allow the use of a catalytic converter.