

E11v2 Series

Fuel and Ignition Control System

E11 System Description

The HALTECH E11 is a powerful "real-time" programmable fuel injection system computer designed for those seeking optimum performance. The E11 has a total of 14 fuel and ignition outputs. Unused fuel and ignition outputs are available as auxiliary outputs. In addition, the E11 has 4 PWM outputs, 7 analogue inputs, 4 digital inputs, closed loop idle control and dedicated outputs for stepper motor idle control.

With a large number of outputs available for controlling fuel and ignition, the E11 is well equipped to run engines with sequential fuel and modern multi-coil ignition systems.

Most OEM coils and ignitors, and most aftermarket coils and ignitors can be controlled by the E11, all configurable via Halwin.

The programming software for the E11 is the latest Halwin software package that is included with the ECU. This software takes advantage of the Windows™ graphical environment to provide a user friendly software package. The Halwin software allows access to adjustment of all settings and calibration maps. In addition the software is capable of displaying live data in the form of graphical gauges for easy viewing whilst connected to the ECU.

User Configurable Outputs:

- | | |
|----------------------------------|---------------------------|
| *Closed loop idle speed | *Closed loop O2 Sensor |
| *Electronic boost control | *Deceleration fuel cut |
| *Thermo-fan | *NOS enable |
| *Shiftlight | *Aux. fuel pump |
| *Stall saver | *Anti-lag |
| *Turbo timer | *VTECH |
| *Rev limiter | *Air con |
| *Load Switch | *Extra Injector |
| *RPM Switch | *TPS Switch |
| *BAC valve (2 wire & 3 wire IAC) | *Engine Control relay |
| | *Intercooler fan |
| | *Tacho (5v,8v,12v) |
| | *Staging signal |
| | *Torque convertor lock up |
| | *Dual intake valve |
| | *Air Conditioner |
| | *Engine Control relay |

(not all functions are available at the same time)

The **E11 System** has adjustable fuel maps each with 32 load bars and 32 RPM ranges. The **E11** will run up to 16000 rpm with better resolution and greater accuracy than ever before.

Typical Applications:

- Conversion from carburetion to fuel injection
- Control of fuel injection/ignition on modified engines
- Race and rally applications of all descriptions
- Design and development purposes
- Educational use by universities and colleges
- Original equipment in cars and motorcycles

E11 Kit Contents:

- Electronic Control Unit (ECU)
- Flying lead wiring loom
- 3 x Power Relays
- Air Temperature Sensor (Extra)
- Coolant Temperature Sensor (Extra)
- MAP Sensor (Extra)
- Throttle Position Sensor (Extra)
- Communication Cable
- Programming Software
- Instruction Manual on CD

System Features:

- Piston Engines: 4, 5, 6, 8, 10 and 12 cylinders
- Rotary Engines: 2, 3 and 4* rotors
- Max Operating RPM: 16000 RPM
- Variable RPM range map points
- Map resolution: 32 RPM ranges by 32 load points for all 3D maps

Trigger Signal Type:

- Hall Effect Sensor
- Optical Sensor
- Inductive Magnetic Reluctor

Trigger Pattern:

- Single Pulse per Cycle
- Multi-tooth
- Nissan Optical
- Bosch Motronic
- Subaru
- Mitsubishi Std

Ignition Configuration:

- Single Distributor
- Twin Distributor
- Direct Fire Wasted Spark
- Direct Fire Coil on plug
- Ignition toggle support for rotary engines

Injector Firing Mode:

- Sequential
- Multi-Point
- Throttle Body (Batch)
- Staged

ECU Inputs:

- Crank Position Sensor
- Cam Position Sensor
- MAP Sensor (1,2 and 3 Bar)
- Throttle Position (potentiometer type)
- Coolant Temperature
- Air Temperature
- Barometric Pressure
- Oxygen Sensor
- Road Speed
- Auxiliary Analog Input (x7)
- Auxiliary Digital Input (x4)

ECU Outputs:

- Injector Drivers: 12
- Up to 12 injector Outputs
- Fuel Pump Relay Control
- PWM outputs (x4)
- Idle air control (IAC)

Accessories:

- Boost/Fuel/Ignition Trim module
- Idle Air Control Motor
- Oxygen Sensor
- Electronic boost control solenoid
- Ignition Modules
- Ignition Coils

Data Storage

- #### Features:
- Map Storage and Retrieval
 - Laptop Data Logging
 - On Board Data Logging

*Available upon special request

E11v2 Series

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E11v2 Specifications

Engine Suitability

Up to 16,000 rpm | 4, 5, 6, 8, 10 | 2 - 3 rotors
Normally aspirated or supercharged up to 200 kPa (30psi). Higher boost pressure MAP sensors available by special arrangement.
Load sensing by throttle position or manifold pressure.
Multipoint, Batch, Staged or Sequential injection patterns.
Distributor ignition systems, or direct fire systems with 1 to 6 coils.

Power Requirements

Power Source: 8.6 to 16.5 Volts DC

Consumption

Haltech ECU: 470 mA at 12 Volts

Injector Load: Dependent on injector type. Approx. proportional to injector duty cycle. (Typically 0.6 Amps per injector)

Physical Specifications

ECU DIMENSIONS: Length: 170 mm, Width: 145 mm, Depth: 42 mm

WEIGHT: ECU: 650g (1.5 lb), Loom: 1.92kg (4.2 lb), Sensors: 500g (1.1 lb)

Input Sensors

MANIFOLD ABSOLUTE PRESSURE (MAP) Sensor (SUPPLIED SEPARATELY AT EXTRACOST)

1 Bar - 100kPa to 0kPa (Naturally Aspirated)

2 Bar - 100kPa to 100kPa (up to 1 Bar or 15 psi boost)

3 Bar - 100kPa to 200kPa (up to 2 Bar or 30 psi boost)

Higher boost pressure MAP sensors available by special arrangement

TEMPERATURE SENSORS (Air and Coolant)

NTC temperature dependent resistor type.

Operating Range

Continuous -40°C to 100°C (-40°F to 212°F)

Intermittent up to 125°C (257°F)

THROTTLE POSITION SENSOR: 10k rotary potentiometer driven from throttle shaft.

INTERNAL BAROMETRIC PRESSURE SENSOR

ENGINE SPEED PICKUP: Compatible with most trigger systems:

5, 8 or 12 volt square wave;

Pull-to-ground (open collector)

Internal retractor adaptor for magnetic (or 'retractor') triggers.

Support for most standard tooth patterns.

(Please contact Haltech or its representatives for further assistance).

ECU Outputs

INJECTOR DRIVER: 12 x 4/1 Amp peak-and-hold current limiting drivers:

Up to twelve low-impedance injectors or Up to twenty four high-impedance injectors. (Expandable using optional Driver Box.)

IGNITION OUTPUT: To optional Haltech Ignition Module, trigger by ECU, for directly firing the coil. (MAY ALSO BE COMPATIBLE WITH OTHER IGNITERS. ASK YOUR HALTECH DEALER.)

PULSE WIDTH MODULATED (PWM) OUTPUT: 4 x Dedicated PWM outputs.

Suitable for controlling turbo wastegate, solenoid valves, shift lights, etc.

SPECIAL PURPOSE DIGITAL OUTPUT: Up to 9 special purpose digital outputs depending upon number of channels required to operate the engine. 12Volt logic outputs suitable for switching fans, shift lights, anti-lag, NOS, PWM style outputs, Extra injector outputs, etc.

FUEL PUMP CONTROL: 20A fused relay, features automatic priming and switch-off.

System Programming Requirements

COMPUTER: IBM-PC or compatible, preferably laptop or notebooks, 233MHz processor (preferably >400MHz), VGA colour display, Windows 95, 98, 2000 or XP, 4Mb of memory, 10 MB of free Disk space.

DISK DRIVE: CD-ROM drive.

SERIAL PORT: Standard RS232C port - 9 pin D connector (25 pin cable available on request), COM1 or COM2 (selectable).

Adjustable Features

BASE FUEL MAP: 32 RPM ranges to 16,000rpm, 32 Load points per range, (with programmable ranges) up to 32ms with 6.4us resolution.

IGNITION MAP: 32 RPM ranges, RPM to 16,000rpm, 32 Load points per range (with programmable ranges), up to 60° advance, with 0.1° resolution

CORRECTION MAPS

FUEL Barometric - 32 points
Cold Start Prime - 32 points
Coolant Temperature Enrichment - (2D - 32 points) (3D - 256 points)
Air Temperature Adjustment - 32 points
Battery Voltage Correction - 32 points
Closed Throttle (selectable) - 32 points
Full Throttle (selectable) - 32 points
Post Start - 32 points
Throttle Pump Enrich - 32 points
Throttle Pump Sustain - 32 points
Throttle Pump Decay - 32 points
Throttle Pump Temp - 32 points
End of injection - 32 points
Staged Injection Angle Split Map - 32 points
Staged Injection Map - 32 points
Individual Cylinder Trimming +/- 12.5%

IGNITION Crank Advance - 32 points
Coolant Temperature Advance/Retard - 32 points
Air Temperature Advance/Retard - (2D - 32 points) (3D - 256 points)
Individual Cylinder Trimming +/- 10°

PROGRAMMABLE REV-LIMIT: selectable as either fuel or ignition

FUEL CUT ON DECELERATION

ACCELERATOR PUMP: Enrichment, sustain and decay parameters.

IDLE SPEED CONTROL: Target Idle Speed, Cold Idle-up RPM, Post-start RPM setting

CLOSED LOOP CONTROL: With both cruise and idle settings

PROGRAMMABLE OUTPUT OPTIONS CLOSED LOOP CONTROL: With both cruise and idle settings

Miscellaneous

LAPTOP DATA LOGGING: Engine data information logged at a nominal rate of 40 logs per second, stored to disk. Limited by disk space.

STORAGE FOR APPROX: 2 minutes at 200 logs per second, 6 channels of data. 40 minutes at 10 logs per second, 6 channels, 7 hours at 1 log per second, 6 channels.

REAL TIME PROGRAMMING: Instant, hesitation free adjustment while engine is running.

RUGGED ALUMINIUM CASING: Black anodised with integral cooling fins and mounting brackets.

Optional

HALTUNER: Inexpensive dash mounted Air-Fuel Ratio Meter.

IGNITION COILS: Available as Single, Dual and six pack.

OPTIONAL IGNITION IGNITER WITHOUT DWELL CONTROL: Available as single, dual and triple igniters. CDI ignition available on request

OPTIONAL MIXTURE / IGNITION / BOOST TRIM MODULE

Provides $\pm 12\frac{1}{2}\%$, $\pm 25\%$ or $\pm 50\%$ injection time adjustment for fast tuning.

Provides $\pm 5^\circ$, $\pm 10^\circ$ and $\pm 12.5^\circ$ ignition advance adjustment for fast tuning

Provides 0 - 100% boost trim adjustment.

Optional Boost Control Solenoid.

Optional Dual Hall Effect Sensor Kit.

Optional Extra Injector Driver Kit.

Optional Four Wire Heated Oxygen Sensor.

Optional Idle Air Control Motor Housing.

Optional Idle Air Control Motor.

Optional Idle Air Control Motor Housing.

Optional Idle Air Control Motor.