

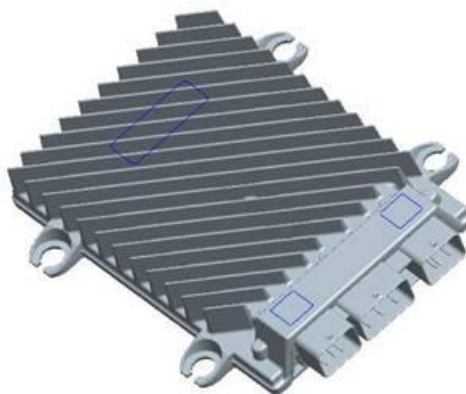
# Small Engine Control Module

## SECM112

### Applications

The SECM112 is part of the engine management system for on-highway applications, which can include 6-cylinder, 4-stroke CNG or LNG inter-city transit engine applications, and 4-cylinder, 4-stroke commercial vehicle engine applications.

The module is capable of full authority digital engine control consisting of fuel, spark, and air delivery to the engine. It can also address adjacent markets such as after-treatment, hybrid and battery electric vehicles, hydraulic control, and other control functions with similar input and output requirements. Additional inputs and outputs are available to control other system functions, as defined by software.



### Description

The SECM112 is part of the MotoHawk® Control Solutions family of products. These products enable rapid development of control systems. The combination of off-the-shelf hardware and MotoHawk software allows developers to focus on the operational specifics of the application without worrying about the design details of the hardware. The result is that the same hardware used in development and prototyping efforts can be used for ongoing production.

This unit provides 112 connector pins with inputs, outputs, and communications interfaces that support a wide variety of applications.

Each controller is available in 'F' (Flash) or 'C' (Calibratable) versions. Flash modules are typically used for production purposes. Calibratable modules are typically for prototyping/development only; they can be calibrated in real time using MotoTune®, ToolKit, or other third-party calibration tools.

### Physical Dimensions

Approximate dimensions: 281 mm x 226 mm x 37 mm (including feet)

### Environmental Capabilities

The following is a summary list of the environmental limits used for design validation.

Operating Voltage	8–32 Vdc
Operating Temperature	–40 to +105 °C / –40 to +221 °F
Storage Temperature	–40 to +105 °C / –40 to +221 °F
Mechanical Vibration	RV3 (22.1 Grms)
Mechanical Shock	50 g, 11 ms, half-sine wave, 4 shocks in each direction (24 total shocks)
EMI/RFI Specification	CISPR 25 (Radiated & Conducted Emissions) ISO 7637-2 (Conducted Transient Testing) ISO 10605 (ESD) ISO 11452-4 (Conducted Immunity) ISO 11452-2 (Radiated Immunity) ISO 7637-3 (Transient Immunity)

To assure that the SECM112 will perform as required, Woodward needs to review and approve the actual production environmental conditions to which it will be exposed.

- 112-pin platform
- Main micro: MPC5642A, 120 MHz
- Auxiliary micro: S12G128, 24 MHz
- Memory: 2M flash, 128K RAM, 32K external serial EE; S12G128, 128K flash, 8K RAM, 4K EE
- Calibratable micro: MPC5644A, 4M flash, 192K RAM
- Operating Voltage: 8–32 Vdc, 36 V (jump start), 5.5 V (crank)
- Operating Temperature: –40 °C to +105 °C

#### Inputs:

- VR or digital crank position sensor
- VR or digital cam position sensor
- Up to 33 analog inputs
- Up to 4 switching oxygen sensors
- Up to 2 wide-range oxygen sensors
- 2 knock sensors
- Up to 6 speed inputs
- Up to 3 switch inputs

#### Outputs:

- Up to 8 injector drivers (6 peak/hold capable)
- Up to 8 ignition coil drivers or spark timer outputs
- 1 tachometer driver
- Up to 19 low-side drivers (1 w/current sense)
- 1 main power relay driver
- 3 H-bridge drivers w/current sense
- 3 sensor supplies (2x 5 V, 1x 12 V)

#### Communications:

- 3 CAN 2.0b buses

Not all population options are available in one single hardware



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