



M130 HAYABUSA/GSX-R1000 PLUG-IN KIT



The M130 plug-in ECU kit is a fully programmable, direct replacement for the factory fitted ECU on a select number of popular models.

No re-wiring is necessary, mounting brackets and wiring loom are supplied. The kit plugs into the factory wiring harness using the original sensors, fuel system and ignition. All essential functions are maintained, with optional factory dash display information available.

► FEATURES

The M130 ECU comes with a range of features as standard. There are several data logging options and analysis options available as upgrades to provide additional functionality, they are activated through a licensing system.

- Small and light magnesium and plastic enclosures
- Latest generation high performance processor
- Flexible tuning software
- Robust and comprehensive security features
- Knock control for racing applications
- Customizable configurations

- Programmable injector drive characteristics
- Additional resources via the Spares Connector such as progressive nitrous, boost control, shift control (including auto shift), gear change cut, shift light, full staged injection, lambda control, data logging.

► KIT CONTENTS

ECU

13130M – M130 ECU

Installation set

- RaceGrade adaptor box (for the relevant generation/model) and harness

⇒ For details on the RaceGrade adaptor box see the specification sheets at <http://www.racegrade.com/>.

- Bosch 4 Channel Ignitor
- LSU 4.9 Lambda sensor
- LTC (Lambda to CAN)
- Power and ground ring terminals

▶ COMPATIBILITY

- Generation I Hayabusa (1999-07)
- Generation II Hayabusa (2008-13)
- Generation I GSXR 1000 (2004-05)
- Generation II GSXR 1000(2006-07)

With wiring modifications, Kawasaki models are compatible.

▶ PLUG-IN MOTORCYCLE CONTROL ARCHITECTURE

Currently, the M130 Plug-In Motorcycle Kits are built primarily around drag racing. As such, they are based on a pass timer that allows the user to add power in the form of boost or nitrous as the timer increments.

The timer is started based on throttle position, two-step switch status and clutch status. A combination of the switches and thresholds must be active for the timer to start. In this way, the timer will always start when the motorcycle leaves the line. Secondly, the timer will pause or reset based on throttle position. If the throttle goes below a certain threshold, the timer will reset. This is a safety precaution to insure that the motorcycle will not ramp to full power if the rider reduces throttle to zero then reapplies.

▶ OPERATIONAL ADVANTAGES

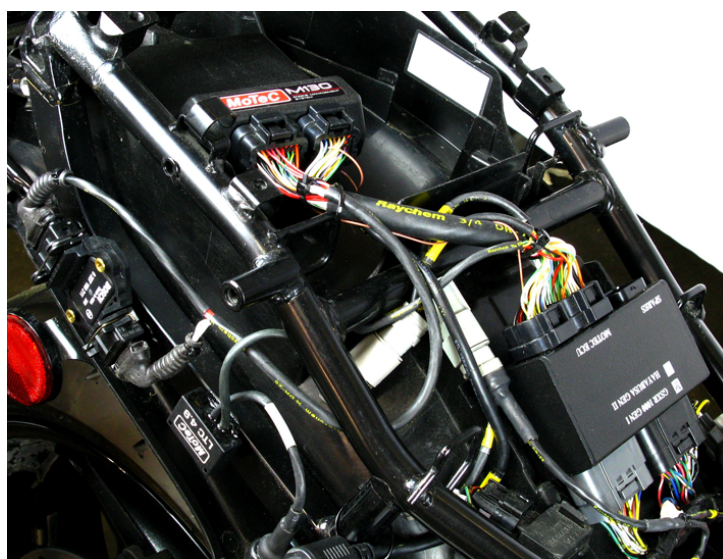
- Tunable fuel/ignition mapping for performance improvements
- Various crank and cam trigger patterns
- Adjustable launch and high rev limits
- Maintain original function of engine temperature, indicator lights and other display information on factory dash using optional Kline to CAN expansion module
- Capable of all modern control functions such as launch control, overrun boost enhancement (anti-lag), boost control, and nitrous injection
- LTC and Bosch LSU 4.9 sensor included for Wideband Lambda control via CAN
- Additional resources available via the spares connector
- Adaptor box fits in the factory ECU location
- Data logging capabilities and i2 Data Analysis software
- MoTeC M130 comes configured with base map for each factory bike model
- Free software and package updates

▶ KIT INSTALLATION

The factory ECU is removed and the adapter box is placed in the under seat position previously used by the factory ECU. The M130 ECU is mounted and positioned as the customer sees fit. A suitable position is under the rear passenger seat and fastened using velcro.

1. Starting with the positive terminal, disconnect the battery from the motorcycle.
2. Attach the Bosch 4 Chanel Ignitor (with heat sink attached) to the mounting location on the rear side of the sub-frame.
3. Plug the factory wiring harness into the adaptor box. Then attach the box to the original factory ECU mounting location using velcro.
4. Route the adapter harness and connect it to the adaptor box.
5. Route and connect the Ignitor leg of the harness. Fasten it to the frame rail to improve heat dissipation.
6. If an oxygen sensor (optional) is added to the system, route and connect the oxygen sensor leg of the harness (zip tie it down in an appropriate location). The Oxygen sensor placement should be on an angle of between 10 and 90 degrees to the vertical, with the tip of the sensor pointing down.
7. Connect the M130 to the adaptor harness.
8. Connect the power leads to the harness.
9. Ensure all supplied devices are connected. That is – the M130, adaptor box and harness, 4 channel ignitor, LTC and LSU 4.9 sensor.
10. Beginning with the negative terminal, connect the battery to the motorcycle.

Kit Mounted and Fitted



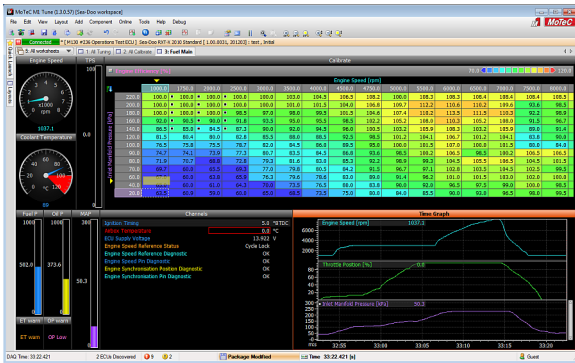
► SOFTWARE REQUIREMENTS

M1 Tune is required to use the package and i2 Analysis software is required to analyse logged data.

This new approach to engine management systems introduces new concepts, terminology and workflows - though much of this will be familiar to experienced Engine tuners. The M1 Tune software is the link between an M1 Packages and an M1 ECU.

M1 Tune has the same look and feel as MoTeC's i2 analysis software and is used for the configuration, analysis and calibration of M1 firmware. The application allows creation of customizable screen layouts that make engine calibration easier and faster. The ability to add and calibrate individual components allows Worksheets to be customised for each application.

► M1 TUNE OVERVIEW



- Microsoft Windows™ based software (XP, Vista, Win7, Win8)
- Fast download via ethernet port
- PC tuning software 'M1 Tune' – used to tune fuel and ignition, calibrate sensors, set up outputs and available functions
- Definable screen layouts
- Customizable table axis sites
- Fully configurable sensor inputs including custom calibrations
- Sensor zeroing
- i2 Data Analysis software (optional upgrade to i2 Pro Analysis)
- Monitor active channels
- Pause/replay time graphs while continuing to record live data
- Engine synchronisation (ref/sync) capture and diagnostics
- Extensive help screens

► DIMENSIONS

Adaptor Box

Dimensions:

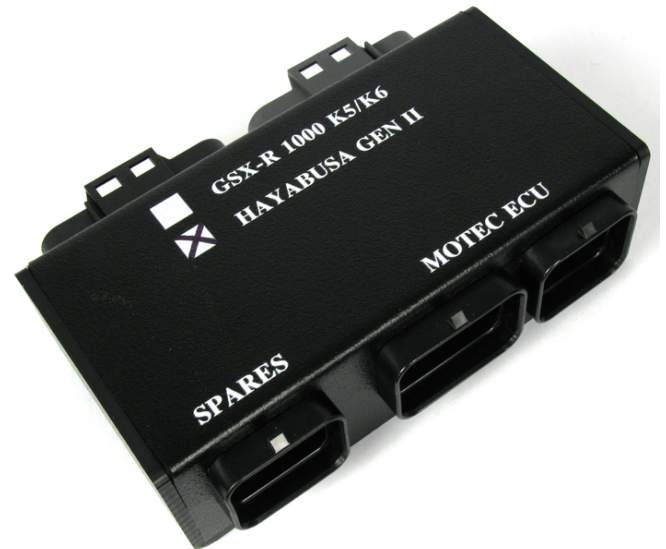
119.4 x 50.1 x 29.0 mm (LWH)

4.70 x 1.97 x 1.14 in (LWH)

Weight:

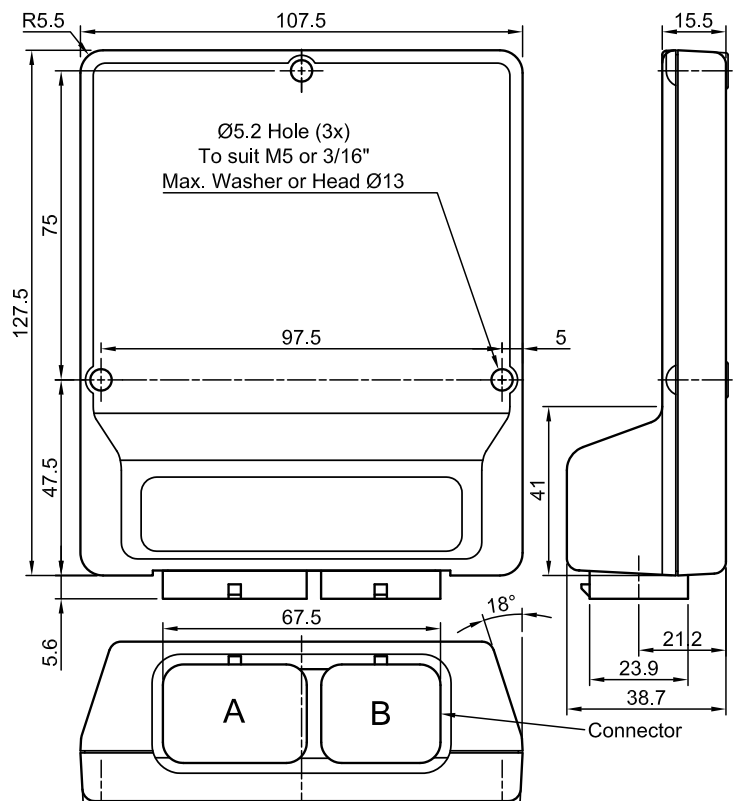
200.5 g

0.44 lbs



ECU

Measurements are in mm.



► M130 PINOUT

For I/O specifications, see the M1 ECU Hardware manual located on the MoTeC Technical Information web page under Tech Notes.

M130 Connector A — 34 way

Mating Connector: Waterproof 34 Position – MoTeC #65044

Pin	Designation	Function
A01	OUT_HB2	Spares
A02	SEN_5V0_A	Sensor 5.0V A
A03	IGN_LS1	Low Side Ignition 1
A04	IGN_LS2	Low Side Ignition 2
A05	IGN_LS3	Low Side Ignition 3
A06	IGN_LS4	Low Side Ignition 4
A07	IGN_LS5	—
A08	IGN_LS6	—
A09	SEN_5V0_B	Sensor 5.0V B
A10	BAT_NEG1	Battery Negative
A11	BAT_NEG2	Battery Negative
A12	IGN_LS7	—
A13	IGN_LS8	—
A14	AV1	TPS
A15	AV2	MAP
A16	AV3	Tip Over Sensor
A17	AV4	AP Sensor
A18	OUT_HB1	Spares
A19	INJ_PH1	Peak Hold Injector 1
A20	INJ_PH2	Peak Hold Injector 2
A21	INJ_PH3	Peak Hold Injector 3
A22	INJ_PH4	Peak Hold Injector 4
A23	INJ_LS1	Tachometer
A24	INJ_LS2	Spares
A25	AV5	Spares
A26	BAT_POS	Battery Positive
A27	INJ_PH5	Peak Hold Injector 5
A28	INJ_PH6	Peak Hold Injector 6
A29	INJ_PH7	Peak Hold Injector 7
A30	INJ_PH8	Peak Hold Injector 8

Pin	Designation	Function
A31	OUT_HB3	Fan
A32	OUT_HB4	Shift Light
A33	OUT_HB5	Fuel Pump
A34	OUT_HB6	Spares

M130 Connector B — 26 way

Mating Connector: Waterproof 26 Position – MoTeC #65045

Pin	Designation	Function
B01	UDIG1	Reference
B02	UDIG2	Synchronisation
B03	AT1	Air Temperature
B04	AT2	Engine Temperature
B05	AT3	Spares
B06	AT4	Spares
B07	KNOCK1	—
B08	UDIG3	Starter Switch
B09	UDIG4	Neutral Switch
B10	UDIG5	Clutch Switch
B11	UDIG6	Spares
B12	BAT_BAK	Spares
B13	KNOCK2	Spares
B14	UDIG7	Spares
B15	SEN_0V_A	Sensor 0V A
B16	SEN_0V_B	Sensor 0V B
B17	CAN_HI	CAN Bus 1 High
B18	CAN_LO	CAN Bus 1 Low
B19	SEN_6V3	Sensor 6.3V
B20	AV6	Spares
B21	AV7	Gear
B22	AV8	Spares
B23	ETH_TX+	Ethernet Transmit+
B24	ETH_TX-	Ethernet Transmit-
B25	ETH_RX+	Ethernet Receive+
B26	ETH_RX-	Ethernet Receive-

▶ SPARES — CONNECTOR C

Mating Connector: Waterproof 26 Position – MoTeC #65045

⇒ Not all M130 ECU channels can be catered for on the factory harness. The spares connector is included to cater for all other ECU resources.

The following factory controls are not available in the kit:

- Secondary Throttle Valve Actuator (STVA) and Secondary Throttle Position (STP) sensor
- PAIR control solenoid
- EVAP system purge control solenoid
- EXhaust Control Valve Actuator (EXCVA)
- Immobilizer indicator and communications
- Idle Stepper Control (ISC)

Pin	Designation	Function
C01	SEN_5V	Sensor 5 V
C02	SEN_5V	Sensor 5 V
C03	OUT_HB2	Half Bridge Out 2
C04	SEN_6V3	Sensor 6.3 V
C05	OUT_HB6	Half Bridge Out 6
C06	SEN_0V	Sensor 0 V
C07	SEN_0V	Sensor 0 V
C08	AV06	Analog Voltage Input 6
C09	AV05	Analog Voltage Input 5
C10	BAT_POS	Battery Positive 12 V
C11	BAT_NEG	Battery Ground
C12	INJ_LS2	Low Side Out 2
C13	OUT_HB1	Half Bridge out 1
C14	UDIG_06	Universal Digital Input 6
C15	UDIG_07	Universal Digital Input 7
C16	BAT_POS	Battery Positive 12 V
C17	BAT_NEG	Battery Ground
C18	KNOCK 2	Knock 2
C19	BAT_BAK	Battery Backup
C20	AT03	Analog Temperature Input 3
C21	AV08	Analog Voltage Input 8
C22	AT04	Analog Temperature Input 4
C23	SEN_6.3V	Sensor 6.3 V
C24	SWITCH/DMS2	DMS2
C25	CAN LO	CAN Bus Low
C26	CAN HI	CAN Bus High

▶ **OPTIONAL UPGRADES**

MoTeC Display/Dash

- Colour (D153 or D175) and standard (CDL3, SDL3, ADL3).
- The ECU communicates with the display/dash via the CAN bus, minimizing wiring while allowing display of ECU data.
- The display/dash has a customizable display that includes an RPM bar graph, gear indicator, and other user definable channels.
- Display/dash expands I/O options for additional sensors.
- Switch inputs can be configured to control display modes and acknowledge driver warnings.



Sensors

Such as:

- EGTs
- Pressure sensors
- Knock sensors
- Ride height sensors
- Shock position sensors
- Wheel speeds
- Tyre temperature
- Boost control solenoids



Shift Light Modules

- Used for shift lights, warning lights or other indicators.
- Connected to the ECU via CAN eliminating the need to use auxiliary outputs.
- SLM provides eight multicolour LED lights. Each LED's colour, purpose and intensity is user definable.
- A set of patterns can be defined with various colour combinations and flashing modes.
- User definable priority order to allow warning lights to override shift lights.

