



# MotoAmerica Technical bulletin

## 01-2019

MotoAmerica approved "Superbike Kit" – Updated 02.01.2023.

The MotoAmerica approved "Superbike Kit" system will be based on MoTeC M1 hardware in either M130 plastic connector or M170 Autosport connector variants. There are no technical advantages between them, it is only a connector change that differentiates the two ECUs. The firmware was designed by MoTeC UK for the MotoAmerica series rules and is the only legal firmware allowed for competition. MoTeC systems will be sold as a complete package including all activation codes, software, ignition drivers, lambda sensor, and color display/logger for a system price. Due to the special pricing and specifications provided by MotoAmerica the ECU will be locked and only MotoAmerica licenses will be available to use with these kit ECUs. The Superbike Kit system is available for purchase at any US MoTeC dealer. Replacement parts are available at normal retail price.

MotoAmerica "M130 Superbike Kit" Item list. May only be purchased as a complete kit.

Line No	Item Number	Unit	Ordered	Shipped	Back Ordered	Price	Amount
1	M130 M M1 MARINE ECU 60 POS PLASTIC		1.0000	0.0000	0.0000	0.00	0.00
2	23024 M130 ACTIVATION		1.0000	0.0000	0.0000	0.00	0.00
3	*MA FIRMWARE		1.0000	0.0000	0.0000	0.00	0.00
7	M IGN4 IGNITION DRIVE UP TO 4 COILS		1.0000	0.0000	0.0000	0.00	0.00
8	M LTC LAMBDA TO CAN		1.0000	0.0000	0.0000	0.00	0.00
9	M C125 USB 18060 COLOR DISPLAY LOGGER USB		1.0000	0.0000	0.0000	0.00	0.00
10	M C125 ENABLE C125 ENABLE CODE SN:		1.0000	0.0000	0.0000	0.00	0.00
11	M 0258 001 SENSOR LAMBDA LSU 4.9  LOCKED TO SERIES, NO OTHER LICENSE IS AVAILABLE ON ECU		1.0000	0.0000	0.0000	0.00	0.00
All claims for errors or damage must be made within 5 days of receipt of goods. A 15% restocking charge will be made when goods are returned to us where no error on our part exists. No returns for any reason after 30 days. Past due amounts subject to a 1.5% per month service charge (18% per annum). All parts related to vehicle emissions or safety are sold for <u>Off Highway</u> racing use in unlicensed vehicles which may never be operated on public roads. See Us at: <a href="http://www.motec.com">http://www.motec.com</a>						Net Order: 6,300.00 Less Discount: 0.00 Freight: 0.00 Sales Tax: 0.00 <b>Order Total: 6,300.00 USD</b>	
<b>All amounts are in U.S. Dollars</b>							



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MotoAmerica "M170 Superbike Kit" Item list. May only be purchased as a complete kit.

Line No	Item Number	Unit	Ordered	Shipped	Back Ordered	Price	Amount
1	M170 M M1 ECU 66 POS AUTOSPORT MARINE		1.0000	0.0000	0.0000	0.00	0.00
2	23030 M170 ACTIVATION		1.0000	0.0000	0.0000	0.00	0.00
3	*MA FIRMWARE		1.0000	0.0000	0.0000	0.00	0.00
4	M IGN4 IGNITION DRIVE UP TO 4 COILS		1.0000	0.0000	0.0000	0.00	0.00
5	M LTC LAMBDA TO CAN		1.0000	0.0000	0.0000	0.00	0.00
6	M C125 USB 18060 COLOR DISPLAY LOGGER USB		1.0000	0.0000	0.0000	0.00	0.00
7	M C125 ENABLE C125 ENABLE CODE SN:		1.0000	0.0000	0.0000	0.00	0.00
8	M 0258 001 SENSOR LAMBDA LSU 4.9  LOCKED TO SERIES, NO OTHER LICENSE IS AVAILABLE ON ECU		1.0000	0.0000	0.0000	0.00	0.00
<p>All claims for errors or damage must be made within 5 days of receipt of goods. A 15% restocking charge will be made when goods are returned to us where no error on our part exists. No returns for any reason after 30 days. Past due amounts subject to a 1.5% per month service charge (18% per annum). All parts related to vehicle emissions or safety are sold for <u>Off Highway</u> racing use in unlicensed vehicles which may never be operated on public roads. See Us at: <a href="http://www.motec.com">http://www.motec.com</a></p>						<p>Net Order: 7,400.00 Less Discount: 0.00 Freight: 0.00 Sales Tax: 0.00 Order Total: 7,400.00 USD</p>	
<p><b>All amounts are in U.S. Dollars</b></p>							

### FIRMWARE SUMMARY

MoTeC's Mid Level Superbike M1 ECU firmwares are based on the 2019 British Superbike Championship firmwares, but with the addition of extra rider aids (traction control, anti-wheelie, launch control and closed loop fueling) and the removal of certain BSB specific limitations (maximum engine speed limit, scrutineer logging, advanced security).

The packages allow for fully flexible operation of most four cylinder port injected motorcycle engines fitted with drive by wire systems. Apart from engine control, the packages also provide various rider aids, in line with the championship rules.

There are specific firmwares for each individual make and model that is entered into the championship. All firmwares are broadly similar, with only small differences from bike to bike according to the base model hardware specification.



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### ► GENERAL FEATURES

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- Operates four cylinder port injected engines with two injectors per cylinder.
- Support for in-line or vee configurations.
- Supports stock engine synchronization methods i.e. cam sensor, intake depression.
- Odd-fire engines supported.

### ► FUEL FEATURES

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- Pulse volume fuel model (n/alpha).
- 3 axis Fuel Volume Main table (Engine Efficiency v Engine Speed v Driver Fuel Volume Main Switch).
- Fuel compensation tables for Coolant Temperature, Airbox Temperature and Airbox Pressure.
- Pulse compensation tables for primary and secondary injector interaction.
- Throttle rate of change transient fuel calculation.
- 2 axis individual cylinder trim tables (Engine Efficiency v Engine Speed).
- Closed loop fuel control based on a single lambda input.

### ► IGNITION FEATURES

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- 3 axis Ignition Timing Main table (Engine Load v Engine Speed v Driver Ignition Timing Main Switch).
- Ignition compensation tables for Coolant Temperature, Airbox Temperature and Gear.
- 2 axis individual cylinder trim tables (Engine Load v Engine Speed).
- Knock control.

### ► CONTROL FEATURES

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- Up to two drive by wire motors with 2 axis grip translation table for each gear (Throttle Grip Sensor v Engine Speed) and minimum positions from engine braking strategy and idle table.
- Support for exhaust servo motors.
- Top level gear shift strategy for upshifts and downshifts.
- Variable intake length control (BMW, Ducati, Yamaha).
- Variable fuel pressure control (BMW).

### ► RACE FEATURES

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- Engine braking control via drive by wire minimum position. Open loop component for each gear (Engine Speed Calculated v Gear) and closed loop component based on target rear wheel slip (P controller).
- Launch control via ignition retard, engine speed limiting and throttle limiting. Activation based on throttle grip threshold and de-activation based on exit gear.
- Traction control via front and rear wheel speed comparison and aim slip. PID controller based on aim slip error. Power reduction by means of ignition cut or ignition retard.
- Anti-wheelie control intrinsic to traction control strategy. Wheelie state is determined using suspension position, state then determines whether to apply additional gain and minimum power reduction tables.
- Anti Spin system aids rider by reducing power when the rear wheel speed acceleration is too high. This is done by means of ignition retard and ignition cut
- Engine Overrun Fuel Trims selectable for individual cylinders.
- Lean angle determination via IMU, GPS or sensor.
- Lap timing via MoTeC BR2, switched input or GPS.
- SLM support.
- Rain light and Head Light support.
- Tilt switch feature.
- Sector based engine acceleration and engine braking control
  - The ability to define eight track sectors with start positions chosen by the teams based on an understanding of the bikes position on the track with respect to the start/finish beacon
  - Track sector behavior can be 'held over' into an oncoming sector if an active strategy is intervening in the rider's inputs as not to suddenly upset the bike. Once the intervention has ended the track sector will increment and new behaviors will be obeyed
  - The sectors are independently defined for acceleration-based controls and engine braking behaviors (total of 16 sector definitions, 8 for accel, 8 for braking)
  - Missed beacon detection is implemented to keep bikes on the correct sector should a problem with lap detection occur



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### ▶ SUPPORTED NON-ENGINE SENSORS

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- Brake Pressure Front/Rear.
- Clutch Position and Pressure.
- GPS via CAN.
- Multiple IMUs (Bosch MM5.10, E Lean, Yamaha R1).
- Steering Damper Position.
- Suspension Position Front/Rear.
- Wheel Speed Front/Rear.

Please contact [technicaldirector@motoamerica.com](mailto:technicaldirector@motoamerica.com) with any questions



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