MoTeC

MOTEC USA MOTORCYCLE DRAG

MoTeC USA Motorcycle Drag is a highly specialized platform focused on providing a complete solution for motorcycles utilized in drag racing. This solution offers an immense level of versatility that handles various applications from simple naturally aspirated engines to forced induction engines with individual throttle bodies.

Included are several ancillary features commonly found on race vehicles such as rolling launch, driver switches, gearbox control, launch control, traction control, and nitrous control.

User definable outputs are also provided for with user definable axis for systems that do not fall within MoTeC USA Motorcycle Drag standard functionality.

The product fully integrates with other MoTeC devices, providing pre-defined CAN messaging for all current Displays/Loggers, LTC's, E888, GPS and SLMs.

If combined with a RaceGrade KTC module, stock dash functionality is also supported for specific model motorcycles. Contact your MoTeC dealer for more information regarding this feature.

▶ DRAG SPECIFIC FEATURES

- Rear wheel speed control allowing for ignition timing adjustments based on a user-defined run curve.
- Four stage mass flow based nitrous control with user-defined activate/reset parameters and ramp-in/ramp-out parameters for ignition/fuel compensations.

- Rolling launch functionality allows for turbo spool-up in a rolling launch scenario through use of variable boost aim and ignition timing adjustments.
- Ride height control allowing for ignition timing adjustments based on a user-defined maximum allowable ride height.
- Engine speed rate of change control allowing for ignition timing adjustments based on a user-defined maximum allowable engine speed rate of change.
- Auto up-shift control based on gear and engine speed.
- Auxiliary outputs with X & Y user-selectable axis of relevant package channels.
- Generic input user-defined channels for use with output functions that allow axis selection.
- Wastegate CO_2 control with main target and scramble target functionality.
- Launch control with ignition timing adjustment functionality, engine speed limiting, and spool mode to aid in build-up of turbo speed on the launch limiter.
- Race Time channel for use of time-based functions/compensations following the launch.
- Engine efficiency compensation system for exhaust back pressure.
- Increased calculation rate and resolution for race specific functions.
- Selectable Engine Efficiency table load axis allowing for native AlphaN functionality to simplify ITB and turbo over trumpets tuning.
- General purpose fuel trim and ignition trim tables that allow user selection of X & Y axis of relevant package channels.
- Throttle limit control based on time or launch state for motorcycles equipped with electronic throttle bodies.

▶ STANDARD FEATURES

- Applicable to port injected engines from 1 to 4 cylinders
- Configurable engine synchronisation modes for many common engine types.
- Configurable top dead centre for each cylinder allows for odd- fire engines
- Configurable ignition output pin for each cylinder allows for coil-on-plug or wasted spark and distributor ignition systems.
- Configurable on-board knock for each cylinder with up to 4 assignable knock sensors (hardware dependent)
- Physical settings for engine displacement, fuel density, molar mass, stoichiometric ratio, and injector characteristics allow for simplified engine start up prior to tuning.
- Dual bank lambda control supported; requires optional LTCD with Bosch LSU4.9 sensor or LTCD NTK with NTK sensor
- Configurable camshaft control from 1 to 4 cams, plus 1 switched camshaft
- Engine efficiency load based on either manifold pressure, throttle position, or a ratio of manifold pressure and ambient pressure
- Engine load modelling based on inlet manifold pressure and inlet manifold temperature or throttle position
- Control of 2 port injectors (peak and hold or saturated) per cylinder with tuneable contribution table
- Tuneable delay of the secondary injection system
- Built-in calibrations for common automotive sensors/actuators
- Transient fuelling compensations using a throttle rate of change-based calculation
- Entry/exit parameters for closed loop against transient events
- Turbocharger boost pressure control using standard pneumatic valves
- Control of 2 PWM Fans with parameters for independent and combined control of each fan
- Coolant pump control with after-run functionality
- Engine speed limiting with ignition and/or fuel cut
- Multiple fuel pump switched outputs
- Closed loop PWM fuel pressure control
- Gear position detection via sensor or engine speed/wheel speed estimate
- Gear shift request switch for actuator driven gear shifts
- GPS acquisition and logging via CAN or RS232
- Intercooler temperature and spray control based on differential temperature with dedicated temperature sensor and switched pump output
- Differential oil temperature control with dedicated temperature sensor and switch pump output
- Engine Charge Temperature calculation to compensate for heat soak and cooling due to injection events
- Closed loop Idle control using ignition, drive by wire actuation, or an idle solenoid
- ECU internal G-Force – longitudinal, lateral, vertical

- Flex Fuel support for use with an ethanol composition sensor to vary fuel properties, ignition timing, and boost levels with ethanol content.
- Closed loop charging system control
- ECU CAN Receive for various MoTeC and RaceGrade devices such as E8xx expanders, LTC lambda modules, TC8 thermo couple amplifiers, and RaceGrade IMU (inertial measurement unit).
- ECU CAN Transmits most of the common channels using standard MoTeC CAN templates
- Eight configurable switches and eight rotary switches (wired or CAN input) as well as CAN keypad functionality all mappable to race functions such as rolling launch, traction control, and launch control
- Configurable security for multiple users
- Dual bank Drive by Wire throttle servo control
- Throttle Pedal sensor with translation table
- Vehicle speed measurement using wheel speed sensors, estimation, or GPS
- Configurable warning system with physical light and CAN output control

▶ MOTORCYCLE MODEL SUPPORT

Motorcycle Drag 1.4 suits most current and late model motorcycle trigger patterns. Because there are so many variants and versions of motorcycle engine, we cannot list every one that is compatible. Below is a list of common drag race motorcycles that have run this package with great success. If you need to verify compatibility with your engine if it is not listed here, please consult your local Authorized MoTeC Dealer for assistance.

- Suzuki Hayabusa 1999-2007 X, K1-K7
- Suzuki Hayabusa 2008-2019 K8, K9, L0-L9
- Suzuki GSXR1000 2001-2004 K1-K4
- Suzuki GSXR1000 2005-2008 K5-K8
- Suzuki GSXR1000 2009-2011 K9, L0-L1
- Suzuki GSXR1000 2012-2016 L2-L6
- Suzuki GSXR1000 2017-2019 L7-L9
- Kawasaki ZX-14 2006-2011
- Kawasaki ZX-14 2012-2015
- Harley Davidson Twin Cam 1999-2017

▶ M130 EXAMPLE PINOUT

M130 Connector A – 34 Way

A1	HB2	Half Bridge Output 2	THROTTLE SERVO POSITIVE
A2	SEN_5V_A	Sensor 5.0V A	SENSOR 5V A
A3	IGN1	Low Side Ignition 1	IGNITION COIL 1
A4	IGN2	Low Side Ignition 2	IGNITION COIL 2
A5	IGN3	Low Side Ignition 3	IGNITION COIL 3
A6	IGN4	Low Side Ignition 4	IGNITION COIL 4
A7	IGN5	Low Side Ignition 5	FUEL PUMP RELAY CONTROL
A8	IGN6	Low Side Ignition 6	NITROUS BOTTLE HEATER CONTROL
A9	SEN_5V_B	Sensor 5.0V B	SENSOR 5V B
A10	NEG1	Battery Negative	GROUND
A11	NEG2	Battery Negative	GROUND
A12	IGN7	Low Side Ignition 7	GEAR SHIFT ACTUATOR CONTROL
A13	IGN8	Low Side Ignition 8	GEAR REQUEST SWITCH
A14	AV1	Analogue Voltage Input 1	THROTTLE SERVO POSITION TRACKING
A15	AV2	Analogue Voltage Input 2	THROTTLE SERVO POSITION MAIN
A16	AV3	Analogue Voltage Input 3	FRONT LASER RIDE HEIGHT
A17	AV4	Analogue Voltage Input 4	FRONT SUSPENSION POSITION
A18	HB1	Half Bridge Output 1	THROTTLE SERVO NEGATIVE
A19	PH1	Peak Hold Injector 1	PRIMARY INJECTOR CYL 1
A20	PH2	Peak Hold Injector 2	PRIMARY INJECTOR CYL 2
A21	PH3	Peak Hold Injector 3	PRIMARY INJECTOR CYL 3
A22	PH4	Peak Hold Injector 4	PRIMARY INJECTOR CYL 4
A23	INJ_LS1	Low Side Injector 1	USER DEFINED OUTPUT 1
A24	INJ_LS2	Low Side Injector 2	USER DEFINED OUTPUT 2
A25	AV5	Analogue Voltage Input 5	FRONT SUSPENSION POSITION
A26	BAT_POS	Battery Positive	BATTERY POSITIVE
A27	PH5	Peak Hold Injector 5	SECONDARY INJECTOR CYL 1
A28	PH6	Peak Hold Injector 6	SECONDARY INJECTOR CYL 2
A29	PH7	Peak Hold Injector 7	SECONDARY INJECTOR CYL 3
A30	PH8	Peak Hold Injector 8	SECONDARY INJECTOR CYL 4
A31	HB3	Half Bridge Output 3	NITROUS STAGE 1 CONTROL
A32	HB4	Half Bridge Output 4	NITROUS STAGE 2 CONTROL
A33	HB5	Half Bridge Output 5	NITROUS STAGE 3 CONTROL
A34	HB6	Half Bridge Output 6	NITROUS STAGE 4 CONTROL

▶ M130 EXAMPLE PINOUT

M130 Connector B – 26 Way

B1	UDIG1	Universal Digital Input 1	CRANKSHAFT POSITION	
B2	UDIG2	Universal Digital Input 2	CAMSHAFT POSITION	
B3	AT1	Analogue Temperature Input 1	INLET AIR TEMPERATURE	
B4	AT2	Analogue Temperature Input 2	COOLANT TEMPERATURE	
B5	AT3	Analogue Temperature Input 3	TIRE TEMPERATURE	
B6	AT4	Analogue Temperature Input 4	TRACK TEMPERATURE	
B7	KNOCK1	Knock Input 1	KNOCK BANK 1	
B8	UDIG3	Universal Digital Input 3	REAR WHEEL SPEED	
B9	UDIG4	Universal Digital Input 4	FRONT WHEEL SPEED	
B10	UDIG5	Universal Digital Input 5	CLUTCH SPEED	
B11	UDIG6	Universal Digital Input 6	NITROUS ARM SWITCH	
B12	BAT_BAK	Battery Backup	NOT REQUIRED	
B13	KNOCK2	Knock Input 2	REAR SUSPENSION POSITION	
B14	UDIG7	Universal Digital Input 7	NITROUS OVERRIDE SWITCH	
B15	SEN_0V_A	Sensor 0V A	SENSOR 0V A	
B16	SEN_0V_B	Sensor 0V B	SENSOR 0V B	
B17	CAN_HI	CAN Bus 1 High	CAN 1 HI	
B18	CAN_LO	CAN Bus 1 Low	CAN 1 LO	
B19	SEN_6V3	Sensor 6.3V	SENSOR 6.3V	
B20	AV6	Analogue Voltage Input 6	THROTTLE GRIP MAIN	
B21	AV7	Analogue Voltage Input 7	THROTTLE GRIP TRACKING	
B22	AV8	Analogue Voltage Input 8	NITROUS BOTTLE PRESSURE	
B23	ETH_TX+	Ethernet Transmit+	WHITE/ORANGE	
B24	ETH_TX-	Ethernet Transmit-	ORANGE	
B25	ETH_RX+	Ethernet Receive+	WHITE/GREEN	
B26	ETH_RX-	Ethernet Receive-	GREEN	