MoTeC

M190 ECU

MoTeC's M1 ECU range begins a new era in engine control. The M1's unique technology redefines the meaning of customisation, delivering total control without compromise. Highly advanced security strategies make these ECUs ideal for both category managed and unrestricted applications.

▶ FEATURES

- Small and light in robust magnesium enclosure

- Port injection injector type

- Large logging memory

- Latest generation high performance processor

- Suitable for modern engines with DBW, Cam Control and multiple CAN buses

- Advanced logging features, high speed, multiple logs (with access logins)

- I/O expansion using E816, E888 expanders

- Flexible tuning software

- Robust and comprehensive security features

- Programmable injector drive characteristics

- Programmable digital input system for Ref/Sync, wheel speeds etc.

- Programmable trigger levels, diagnostics

- All Low Side and Half Bridge outputs have PWM capability

▶ CONFIGURATION

The M1 series ECUs come with three configuration options.

Locked Configuration

A locked configuration is appropriate when an ECU contains specific firmware to suit the application. The user can tune the engine in the normal way but the ECU cannot be re-configured for another application.

Standard Configuration

The standard configuration allows the user to load a selection of firmware packages available from MoTeC. They incorporate different levels of functionality and the user can choose one to suit their requirements. Additional packages can be loaded into the ECU as and when requirements change.

Open Configuration

The open configuration provides a fully flexible ECU solution that can be precisely tailored to individual requirements. Third party developers can be trained to use MoTeC M1 Build software to develop their own control strategies.

Intellectual property is protected by the M1 ECU's security system and remains with the ECU owner.

▶ SECURITY

The M1's advanced security system is based on public-key cryptography, the cornerstone of secure internet transactions, so it is virtually impossible to change the ECU function without authorised permission.

Security is enforced by the ECU and protected by a microprocessor with integrated measures to prevent tampering.

A password feature grants different levels of access for different users e.g. an engine tuner, a drive train tuner, and a data analysis engineer.

This is also suitable for Control ECUs. Scrutineering teams can have access to extra information and are able to lock down selected parts of the ECU, while other team members can access selected tuning parameters.

▶ CATEGORY MANAGEMENT

The combination of an advanced security strategy, configurable firmware and a high performance processor make the M1 ECU an ideal choice for categories with restrictions in place for either performance parity or cost containment. Firmware can be written specifically for the category, limiting the functionality to the class requirements.

Multiple data logging sets are available, which can be partitioned with restricted access to allow generation of both judicial (scrutineering) and team data from the same device. The M1 ECU's security system prevents unauthorised access to data and implementation of unspecified functionality.

▶ UPGRADES

- Various Logging Options are available.

   The logging licence determines the number of channels and the sample rates available, there are 3 levels available:

   – Logging Level 1 Licence

      Comes standard with the product. This diagnostic logging includes a fixed log set and rate.

   – Logging Level 2 Licence

      Is an optional upgrade which includes one fixed log set, 200 channels (including diagnostics) and a maximum 200 Hz sample rate.

   – Logging Level 3 Licence

      Is an optional upgrade which includes eight fixed log sets, 2000 channels and a maximum 1000 Hz sample rate.

- Configuration:

   – Locked Configuration

   – Standard Configuration

   – Open Configuration

▶ SOFTWARE

- Microsoft Windows™ based software

- PC Tuning software 'Tune' - Used to tune fuel and ignition, set up sensors, outputs and available functions

- PC Software 'Build'- Used to create a custom software package with user specific functions

▶ BASIC SPECIFICATIONS

Injector

- Peak and Hold Injector Outputs: 12

- Low Side Injector Outputs: 12

Ignition

- Outputs: 12

Auxiliary Outputs

- Half Bridge: 10

- Low Side Outputs: 6

Inputs

- Universal Digital: 12

- Digital: 4

- Analogue Voltage: 17

- Analogue Temperature: 6

- Knock: 4

- Lambda (narrow band): 2
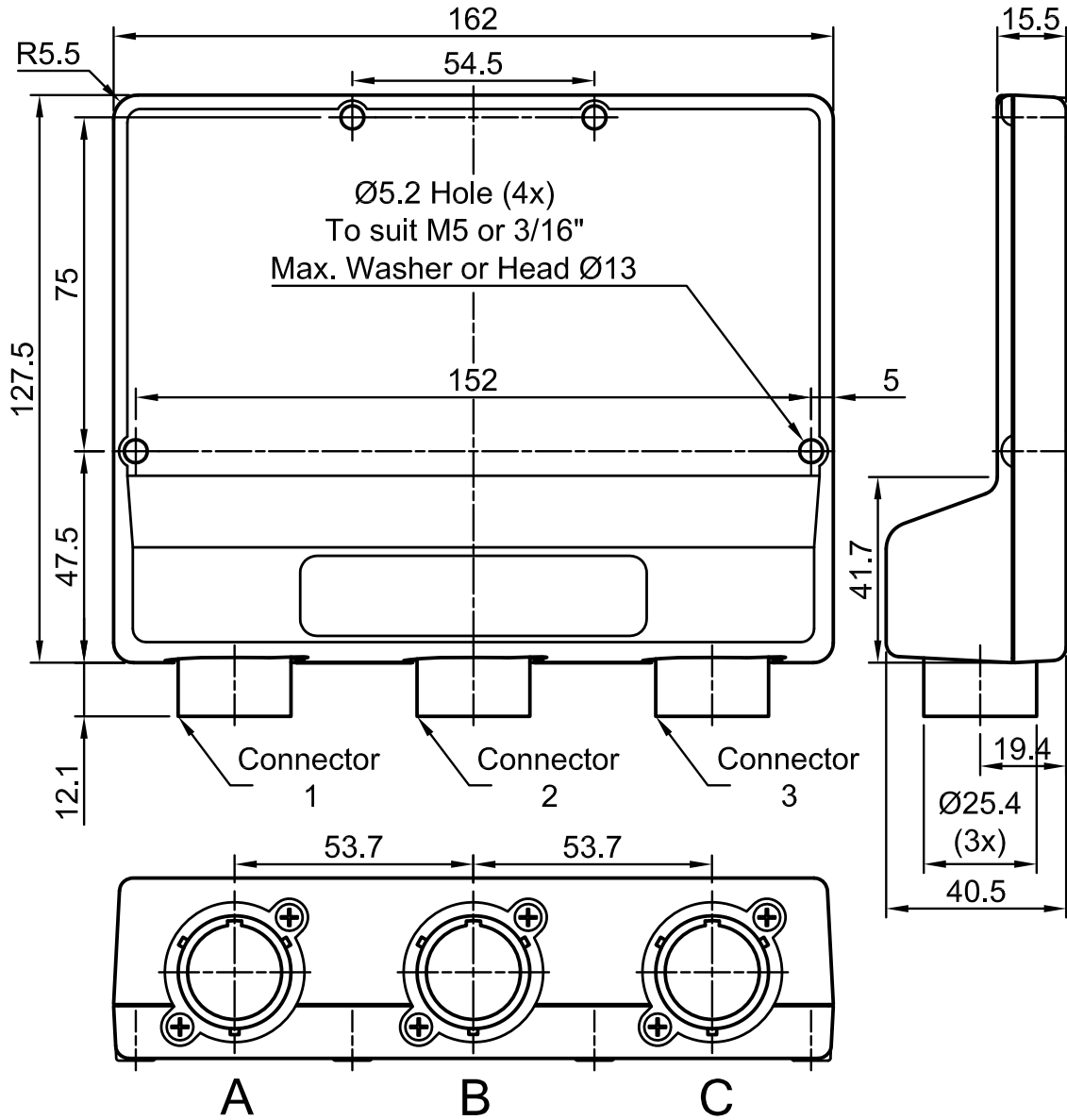
Data

- CAN bus: 3

- RS232: 1

- LIN: 1

- Logging Memory: 250 Mb

Physical

- Dimensions: 162 x 127.5 x 40.5 mm

- Weight: 510 g

- Autosport connectors:

   – 1 x 55 pin yellow

   – 1 x 26 pin red

   – 1 x 55 pin red

▶ DIMENSIONS AND MOUNTING

Ø5.2 Hole (4x)
To suit M5 or 3/16"
Max. Washer or Head Ø13

Connector 1

Connector 2

Connector 3

Ø25.4 (3x)

A   B   C

▶ M190 PINOUT

M190 Connector A — 55 way

Mating Connector: Autosport 55 way Yellow - (Deutsch) AS6-16-35SA – MoTeC #65031

Pin Number	Designation	Full Name	OE Pin	Function	Description
A01	INJ_LS3	Low Side Injector 3			
A02	INJ_LS2	Low Side Injector 2			
A03	INJ_LS1	Low Side Injector 1			
A04	INJ_LS12	Low Side Injector 12			
A05	INJ_LS4	Low Side Injector 4			
A06	LA_NB2	Lambda Narrow Input 2			
A07	LA_NB1	Lambda Narrow Input 1			
A08	SEN_5V0_C1	Sensor 5.0V C			
A09	SEN_5V0_C2	Sensor 5.0V C			
A10	INJ_LS8	Low Side Injector 8			
A11	INJ_PH1	Peak Hold Injector 1			
A12	INJ_PH2	Peak Hold Injector 2			
A13	AV11	Analogue Voltage Input 11			
A14	DIG2	Digital Input 2			
A15	RS232_RX	RS232 Receive			
A16	SEN_5V0_C3	Sensor 5.0V C			
A17	INJ_LS11	Low Side Injector 11			
A18	SEN_0V_C1	Sensor 0V C			
A19	SEN_0V_C2	Sensor 0V C			
A20	SEN_0V_C3	Sensor 0V C			
A21	DIG1	Digital Input 1			
A22	LIN	LIN Bus			
A23	RS232_TX	RS232 Transmit			
A24	CAN2_HI	CAN Bus 2 High			
A25	INJ_LS7	Low Side Injector 7			
A26	INJ_PH3	Peak Hold Injector 3			
A27	AV15	Analogue Voltage Input 15			
A28	AV16	Analogue Voltage Input 16			
A29	AV17	Analogue Voltage Input 17			
A30	DIG3	Digital Input 3			
A31	CAN2_LO	CAN Bus 2 Low			
A32	INJ_LS10	Low Side Injector 10			
A33	INJ_PH4	Peak Hold Injector 4			
A34	AV13	Analogue Voltage Input 13			

Pin Number	Designation	Full Name	OE Pin	Function	Description
A35	AV12	Analogue Voltage Input 12			
A36	INJ_PH7	Peak Hold Injector 7			
A37	DIG4	Digital Input 4			
A38	BAT_BAK	Battery Backup			
A39	CAN3_HI	CAN Bus 3 High			
A40	INJ_LS6	Low Side Injector 6			
A41	AV14	Analogue Voltage Input 14			
A42	INJ_PH9	Peak Hold Injector 9			
A43	INJ_PH10	Peak Hold Injector 10			
A44	INJ_PH6	Peak Hold Injector 6			
A45	INJ_PH5	Peak Hold Injector 5			
A46	CAN3_LO	CAN Bus 3 Low			
A47	INJ_LS9	Low Side Injector 9			
A48	INJ_LS5	Low Side Injector 5			
A49	INJ_PH11	Peak Hold Injector 11			
A50	INJ_PH12	Peak Hold Injector 12			
A51	INJ_PH8	Peak Hold Injector 8			
A52	IGN_LS12	Low Side Ignition 12			
A53	IGN_LS9	Low Side Ignition 9			
A54	IGN_LS10	Low Side Ignition 10			
A55	IGN_LS11	Low Side Ignition 11			

M190 Connector B — 26 way

Mating Connector: Autosport 26 way Red - (Deutsch) AS6-16-26SN – MoTeC #65034

Pin Number	Designation	Full Name	OE Pin	Function	Description
B_A	OUT_HB1	Half Bridge Output 1			
B_B	OUT_HB2	Half Bridge Output 2			
B_C	OUT_HB3	Half Bridge Output 3			
B_D	OUT_HB4	Half Bridge Output 4			
B_E	OUT_HB5	Half Bridge Output 5			
B_F	OUT_HB6	Half Bridge Output 6			
B_G	BAT_NEG1	Battery Negative			
B_H	BAT_POS1	Battery Positive			
B_J	BAT_POS2	Battery Positive			
B_K	BAT_POS3	Battery Positive			
B_L	BAT_POS4	Battery Positive			
B_M	OUT_HB10	Half Bridge Output 10			
B_N	OUT_HB9	Half Bridge Output 9			
B_P	OUT_HB8	Half Bridge Output 8			
B_R	OUT_HB7	Half Bridge Output 7			
B_S	OUT_LS4	Low Side Output 4			
B_T	OUT_LS6	Low Side Output 6			
B_U	OUT_LS1	Low Side Output 1			
B_V	OUT_LS2	Low Side Output 2			
B_W	BAT_NEG2	Battery Negative			
B_X	BAT_NEG3	Battery Negative			
B_Y	BAT_NEG4	Battery Negative			
B_Z	BAT_NEG5	Battery Negative			
B_a	OUT_LS5	Low Side Output 5			
B_b	OUT_LS3	Low Side Output 3			
B_c	BAT_NEG6	Battery Negative			

M190 Connector C — 55 way

Mating Connector: Autosport 55 way Red - (Deutsch) AS6-16-35SN – MoTeC #68090

Pin Number	Designation	Full Name	OE Pin	Function	Description
C01	IGN_LS4	Low Side Ignition 4			
C02	IGN_LS3	Low Side Ignition 3			
C03	IGN_LS8	Low Side Ignition 8			
C04	IGN_LS6	Low Side Ignition 6			
C05	IGN_LS5	Low Side Ignition 5			
C06	AV8	Analogue Voltage Input 8			
C07	AV10	Analogue Voltage Input 10			
C08	IGN_LS2	Low Side Ignition 2			
C09	IGN_LS7	Low Side Ignition 7			
C10	UDIG8	Universal Digital Input 8			
C11	AV6	Analogue Voltage Input 6			
C12	AV7	Analogue Voltage Input 7			
C13	AV9	Analogue Voltage Input 9			
C14	SEN_0V_A1	Sensor 0V A			
C15	SEN_0V_A2	Sensor 0V A			
C16	IGN_LS1	Low Side Ignition 1			
C17	UDIG7	Universal Digital Input 7			
C18	UDIG1	Universal Digital Input 1			
C19	UDIG12	Universal Digital Input 12			
C20	UDIG11	Universal Digital Input 11			
C21	UDIG10	Universal Digital Input 10			
C22	UDIG9	Universal Digital Input 9			
C23	SEN_0V_B1	Sensor 0V B			
C24	CAN1_HI	CAN Bus 1 High			
C25	UDIG3	Universal Digital Input 3			
C26	ETH_RX-	Ethernet Receive-	Ethernet Orange		
C27	UDIG4	Universal Digital Input 4			
C28	AV4	Analogue Voltage Input 4			
C29	AV5	Analogue Voltage Input 5			
C30	SEN_0V_B2	Sensor 0V B			
C31	CAN1_LO	CAN Bus 1 Low			
C32	UDIG2	Universal Digital Input 2			
C33	ETH_RX+	Ethernet Receive+	Ethernet Orange/White		
C34	ETH_TX-	Ethernet Transmit-	Ethernet Green		
C35	AV3	Analogue Voltage Input 3			

Pin Number	Designation	Full Name	OE Pin	Function	Description
C36	AV2	Analogue Voltage Input 2			
C37	AT1	Analogue Temperature Input 1		1k Pull up to SEN_5V_A	
C38	AT3	Analogue Temperature Input 3		1k Pull up to SEN_5V_B	
C39	AT2	Analogue Temperature Input 2		1k Pull up to SEN_5V_A	
C40	UDIG5	Universal Digital Input 5			
C41	ETH_TX+	Ethernet Transmit+	Ethernet Green/White		
C42	AV1	Analogue Voltage Input 1			
C43	KNOCK3	Knock Input 3			
C44	KNOCK2	Knock Input 2			
C45	AT5	Analogue Temperature Input 5		1k Pull up to SEN_5V_C	
C46	AT4	Analogue Temperature Input 4		1k Pull up to SEN_5V_B	
C47	UDIG6	Universal Digital Input 6			
C48	SEN_5V0_A1	Sensor 5.0V A			
C49	KNOCK4	Knock Input 4			
C50	SEN_5V0_B1	Sensor 5.0V B			
C51	KNOCK1	Knock Input 1			
C52	AT6	Analogue Temperature Input 6		1k Pull up to SEN_5V_C	
C53	SEN_5V0_A2	Sensor 5.0V A			
C54	SEN_6V3	Sensor 6.3V			
C55	SEN_5V0_B2	Sensor 5.0V B			