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M1 GPRP (GPR PADDLE SHIFT) PACKAGE



Photograph: Toyota Racing Series

Based on MoTeC's successful M1 GPR Package, the GPRP Package is a versatile and adaptable platform for the operation of port injected engines that include paddle shift gearbox control using switched actuators. This single product can be configured over a huge range of complexities, from controlling a simple engine to a multi-throttle, quad cam boosted engine with two injectors per cylinder and many other features. Configurable engine synchronisation modes accommodate most modern engine triggering systems.

Included are many ancillary features common to race cars, such as anti-lag, driver switches (pit switch, launch enable, boost trim etc.), gearbox control, knock control, intercooler sprays, launch control, gearbox coolant pump, gear shift air pump and traction control. It also caters for many systems found on modified road vehicles that may be useful in a racing context, such as air conditioning control and four definable control outputs.

This Package is available across MoTeC's range of M1 port injection ECUs (M130, M150, M170, and M190). It seamlessly integrates with other MoTeC products and provides pre-defined CAN messaging for all current Display Loggers, Enclosed Loggers, Power Distribution Modules and other devices including E888, VCS, GPS, ADR, BR2 and SLM. Example wiring schematics are provided for basic operation with each ECU variant.

► FEATURES

- Operates port injected engines from 1 to 12 cylinders (M150 or M190) or 1 to 8 cylinders (M130 or M170).
- Paddle shift gearbox control for sequential gearboxes with switched actuators and air pump support.
- Configurable engine synchronisation modes for many common engine types. Refer to the Engine Synchronisation Modes section for current details.
- 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 dependant) and selectable centre frequencies.
- Configurable camshaft control from 1 to 4 cams, plus 1 switched camshaft.
- Drive by wire throttle blip control with engine speed matching.
- Optional throttle blip and engine speed matching when the clutch is disengaged.
- Dual bank lambda control supported; requires optional LTC with Bosch LSU4.9 sensor or LTCN with NTK sensor.
- Physical settings for engine displacement, fuel density + molar mass, stoichiometric ratio and injector characteristics allow for simplified engine start-up prior to tuning.
- Easy and fast engine tuning using engine efficiency map.
- Engine load modelling based on inlet manifold pressure and inlet manifold temperature. Alternatively, for example, when using individual throttle bodies, throttle position can be used.

- Control of 2 port injectors (peak&hold or saturated) per cylinder ('high/low' configuration) with tunable balance table.
- Fuel volume calculation considers delay effects resulting from the secondary (high) injector installation position.
- Sensor calibrations available for many common automotive sensors.
- Transient fuelling compensation using physical modelling of fuel film.
- Nitrous system with two activation stages and additional fuel pumps, bottle heater control and pressure sensor.
- Transmission brake control ('bump') functionality for perfect positioning of cars.
- Support of MoTeC devices: ADR, E8XX, PDM, SLM, VCS
- Turbocharger wastegate pressure control with pressure sensor and two PWM outputs.
- Configurable boost control for a single turbo.
- Configurable anti-lag for single turbo with ignition timing limit, fuel volume trim, ignition cut, engine speed limit, boost aim and throttle aim tables.
- Supports 2 coolant fan outputs (PWM controlled).
- Air conditioner support with switched output control.
- Coolant temperature compensations for engine speed limit, ignition timing, fuel mixture, boost limit.
- Coolant pump output with PWM control.
- Coolant pump after-run functionality, optionally with additional pump output.
- Engine speed limiting with ignition cut and/or fuel cut.
- Fuel pump switched output.
- Gearbox position detection via optional sensor or engine speed / wheel speed estimate.
- Paddle shift input hard wired or via CAN, optional linear sensor.
- Optional gearbox shift request via Up Shift Switch / Down Shift Switch or Gear Lever Force sensor.
- Neutral/Reverse actuation can be locked out.
- Gearbox shift support with ignition cut, fuel cut, throttle blip and engine speed matching in forward gears.
- Up/Down actuator control, with preload times preceding the shifts and hold time to safely engage gears.
- Minimum/Maximum blip time on downshifts configurable.
- Different gear shift modes: manual, automatic, fault modes, switch selection only, disabled.
- Closed loop gear shift strategy including retries for missed shifts.
- Gear shift actuator air pump support with air pressure monitoring.
- GPS acquisition and logging via CAN or RS232 (hardware dependent).
- Intercooler temperature and spray control.
- Lap distance, time and number via BR2 or switched input, with split and sector options.
- Configurable launch control with tables for engine speed, throttle limit, boost aim and fuel volume trim.
- Race time system with trim tables for ignition timing compensation, fuel mixture aim, boost limit and throttle limit.
- Idle closed loop control system using ignition, drive by wire actuation or idle solenoid.
- Engine Load Average channel with tables for engine speed limit, ignition timing trim, fuel mixture aim, boost limit and throttle limit.
- Assist of engine start with dedicated fuel volume and idle compensations during crank and post start.
- Engine run time total for engine hour logging.
- Configurable security for multiple users.
- Configuration of brake state using a switch or a pressure sensor.
- Configuration of clutch state using a switch, a position sensor or a pressure sensor.
- Calculation of clutch slip.
- ECU-internal G-force (acceleration) – longitudinal, lateral, vertical
- ECU CAN receive from a defined CAN ID for data reception from MoTeC devices. Support of 1 (M130/M170) or 3 (M150/M190) CAN buses.
- ECU CAN transmit of the most common channels using standard MoTeC CAN templates.
- 8 configurable switches and 8 rotary switches (wired or CAN input) with each of 9 positions simultaneously mappable to Launch Control, Pit Switch, Anti-Lag, Traction, Auxiliary Time, Race Time Reset, Engine Speed Limit Maximum, Throttle Pedal Translation, Ignition Timing, Fuel Mixture Aim, Boost Limit, Traction Aim and Traction Control Range.
- Analogue tachometer output with configurable output pin and scaling.
- Dual bank drive by wire throttle servo control.
- Throttle Pedal sensor with translation table.
- Use of a Throttle Pedal sensor or a Throttle Position sensor in case of a cable throttle.
- Transmission pump output with transmission temperature threshold and hysteresis control.

- Traction control with tables for Aim Main, Aim Compensation and Control Range.
- Vehicle speed measurement using wheel speed sensors, estimation or GPS.
- Vehicle speed limiting (pit speed control).
- Configurable warning system with light and CAN output.
- Auxiliary time system with tables for ignition timing compensation, fuel volume trim and fuel mixture aim.
- 4 auxiliary outputs for PWM control of added actuators:
 - Duty cycle tables using Engine Speed and Throttle or Manifold Pressure Axis'
 - Activation based on inlet manifold pressure or throttle position
 - Auxiliary Output 1 includes tables for Ignition Timing Compensation, Fuel Volume Trim and Fuel Mixture Aim
- Optional channels for additional sensors via input pin and/or CAN message, including:
 - Airbox Mass Flow, Pressure and Temperature
 - Ambient Pressure and Temperature
 - Boost Pressure
 - Brake Pressure Front and Rear
 - Brake Switch
 - Clutch Pressure and Position
 - Clutch Switch
 - Coolant Pressure and Temperature
 - Engine Oil Pressure and Temperature
 - Engine Crankcase Pressure
 - Exhaust Pressure Bank 1 and Bank 2
 - Exhaust Temperature (EGT) via TCA Thermocouple Amplifier, Generic CAN, or E888 for Collector, Bank 1 and 2 Collector, and Cylinders 1 to 8 (M150/M190: 12)
 - Exhaust Lambda via LTC, LTCN, or PLM for Collector, Bank 1 and 2 Collector, and Cylinders 1 to 8 (M150/M190: 12)
 - Fuel Pressure and Temperature
 - Fuel Tank Level
 - Gear Position
 - Gear Lever Force
 - Paddles
 - Gear Neutral Switch
 - Gear Shift Request
 - Gear Shift Air Pressure
 - Intercooler Temperature
 - Steering Angle and Pressure
 - Transmission Pressure and Temperature
 - Turbocharger Speed
 - Turbocharger Inlet/Outlet Temperature
 - Turbocharger Wastegate Position
 - G-Force (acceleration) – Longitudinal, Lateral, Vertical
 - Wheel Speed sensors front/rear left/right, wired or CAN input.

► LICENCING

To load the Package onto the ECU, the **M1 LICENCE GPRP - PADDLE SHIFT (GPR + GBC)** (part number 23068) is required.

▶ ENGINE SPEED MODES

As of M1 System 1.4.00.0019

- BMW M54
- BMW N55 - BMW N55 and N52 engines
- BMW S1000RR MY2015
- BMW S50 - BMW S50B32 (E36M3)
- BMW S62 - BMW E36 M3 S52B32, BMW E46 M3 S64B32, BMW E39 M5 S62B50 NOTE: not tested - please contact MoTeC before running this engine
- BMW S85 - BMW E60 M3 S85B50, BMW E90 M3 S65B40
- Bosch 140 40 - General Motors LLT, Audi BXA / Lamborghini LP560, Mazda L3-VDT
- Chrysler SRT8 2005 - Chrysler 6.1l Hemi 2005-2010 (eg Chrysler 300C SRT-8, Dodge Challenger SRT-8)
- Chrysler SRT8 2011 - Chrysler "Apache" 6.4l Hemi with variable camshaft timing 2011- (eg Chrysler 300C SRT-8, Dodge Challenger SRT-8)
- Camshaft One Missing Four Stroke
- Camshaft Two Missing Four Stroke
- Corvette C4 ZR1 - GM LT5 (1990 - 1995)
- Crankshaft One Missing Four Stroke
- Crankshaft One Missing Two Stroke
- Crankshaft Two Missing Four Stroke
- Crankshaft Two Missing Two Stroke
- Custom EJ20G - Subaru GC8 WRX and STi (EJ20G, EJ20K, EJ207 etc.) from MY95 - MY00 with the MY01 crankshaft sprocket (part number 13021AA141)
- Denso 270 90
- Dodge Viper - Experimental mode for Dodge Viper pre 2008
- Dodge Viper MY2008 - Experimental mode for 2008-
- Fiat TwinAir
- Ford Coyote
- Ford Duratec Synchronisation - Duratec, EcoBoost, BA cams
- Ford Sigma TiVCT
- Ford Windsor - with 'PIP' sensor in the distributor
- General Motors DMAX LMM - General Motors 6.6L Duramax LMM diesel engines (late 2007 - early 2011) when the eighth digit of the VIN number is 6.
- General Motors LS1 - (Gen 3 V8)
- General Motors LS7
- Honda 20FC (Honda S2000)
- Honda Bike Synchronisation
- Hyundai Gamma T GDI
- Honda K20
- Honda K20C1 - Civic Type R 2015+
- Hyundai Lambda II RS GDi Engine (Hyundai Genesis V6)
- Lamborghini V10 - Experimental mode for 5.0L port injected Gallardo 2003 - 2007
- Mazda L3 - Mazda L3 VVTi (example Mazda 3 SPorts SP23, Mazda 6), Ford Duratec 23EW iVCT (e.g. Ford Fusion CD338)
- Mazda MX-5 2006: Mazda LF (MZR family) in MX5 NC (2006-), Suzuki M16A VVT in Swift Sport (2012-)
- Mazda RX8 - Mazda Renesis 13B-MSP
- Mazda SkyActiv G - Mazda6 GJ 2012+, MX5 ND 2015+, Mazda3 BM 2014+, Mazda2 DJ 2014+
- Mercedes M120 - 6.0l V12 (S600 1992 - 2001)
- Mitsubishi 4B11 - Lancer Evolution X
- Mitsubishi 4G63T
- Mitsubishi 6A12 - 6A12, 6A13, 6G74, 6G75
- Mitsubishi Fuso 4P10 (also Agco Sisu Power 49G)
- Mitsubishi Fuso 6M60 - 2015 Fuso TKG-FK61F
- Multi Tooth Four Stroke
- Multi Tooth Two Stroke
- Nissan RB26 - Nissan RB26 and other six cylinder engines with 360 degree optical trigger on camshaft
- Nissan SR20 - Nissan SR20, CA18DET and other four cylinder engines with 360 degree optical trigger on camshaft
- Nissan One wide slot - Nissan RB30 and other engines with 360 degree optical trigger on camshaft
- Nissan VK50VE
- Nissan VK56DE - Nissan VK56DE engine and others
- Nissan VQ35 - Nissan VQ35HR engine, Nissan VR38DETT engine as used in the R35 GTR 2007
- Porsche 997: Porsche Direct Injected engine, 2009 Porsche GT2 with 3.6 Lt engine (Variocam PLUS)
- PSA EP6DTS - Mini Cooper S Turbo (2007-2010) and Peugeot 207 RC/GTI (2006-2010)
- Scania DC16
- Scania SGL12A
- Subaru EJ207AVCS - Subaru EJ205, EJ207, EJ255, EJ257 from MY01 to MY05
- Subaru EJ20G - Subaru GC8 WRX and STi (EJ20G, EJ20K, EJ207 etc.) from MY95 - MY00
- Subaru EZ30 - EZ30D with Dual AVCS

- Subaru FA20D - Subaru EJ205, EJ207 etc. with dual AVCS (MY06-), Subaru FA20D for BRZ and FT86 (2012-)
- Subaru FA20DIT - Subaru Forester 2014, WRX 2015
- Toyota 1FZ FE - Toyota Landcruiser
- Toyota 1UZ-FE
- Toyota 2GR-FE - Lotus Evora, 3GR-FE etc, V6 with dual VVT-i.
- Toyota 2JZ GE - Toyota 6 cylinder 2JZ-GE with VVT (example Lexus IS300)
- Toyota 2UR-GSE in Lexus RC-F 2015 MY (2014/09 -)
- Toyota 2ZZ - Toyota 2ZZ, 3GS and others with VVT.
- Volvo D11C - D11C truck engine (FM450 Platform)
- Yamaha FX SHO

▶ **EXAMPLE GPR M150 PINOUT – COYOTE V8****M150 Connector A - 34 Way**

Mating Connector: Tyco Superseal 34 Position Keying 2 – MoTeC #65067

Pin	Designation	Full Name	OE Pin	Function	Description
A01	AT5	Analogue Temperature Input 5		1k Pull up to SEN_5V_C	
A02	AT6	Analogue Temperature Input 6		1k Pull up to SEN_5V_C	
A03	AV15	Analogue Voltage Input 15			
A04	AV16	Analogue Voltage Input 16			
A05	AV17	Analogue Voltage Input 17			
A06	IGN_LS9	Low Side Ignition 9			
A07	IGN_LS10	Low Side Ignition 10			
A08	IGN_LS11	Low Side Ignition 11			
A09	IGN_LS12	Low Side Ignition 12			
A10	SEN_5V0_C1	Sensor 5.0V C			
A11	LA_NB1	Lambda Narrow Input 1			
A12	LA_NB2	Lambda Narrow Input 2			
A13	KNOCK3	Knock Input 3			
A14	KNOCK4	Knock Input 4			
A15	DIG2	Digital Input 2			
A16	DIG3	Digital Input 3			
A17	DIG4	Digital Input 4			
A18	SEN_5V0_C2	Sensor 5.0V C			
A19	SEN_5V0_B2	Sensor 5.0V B			
A20	LIN	LIN Bus			
A21	RS232_RX	RS232 Receive			
A22	RS232_TX	RS232 Transmit			
A23	DIG1	Digital Input 1			
A24	BAT_NEG3	Battery Negative			
A25	BAT_NEG4	Battery Negative			
A26	SEN_0V_C1	Sensor 0V C			
A27	SEN_0V_C2	Sensor 0V C			
A28	CAN3_HI	CAN Bus 3 High			
A29	CAN3_LO	CAN Bus 3 Low			
A30	CAN2_HI	CAN Bus 2 High			
A31	CAN2_LO	CAN Bus 2 Low			
A32	BAT_NEG5	Battery Negative			
A33	SEN_0V_B1	Sensor 0V B			
A34	SEN_0V_A1	Sensor 0V A			

M150 Connector B - 26 Way

Mating Connector: Tyco Superseal 26 Position Keying 3 – MoTeC #65068

Pin	Designation	Full Name	OE Pin	Function	Description
B01	OUT_HB9	Half Bridge Output 9			
B02	OUT_HB10	Half Bridge Output 10			
B03	UDIG8	Universal Digital Input 8			
B04	UDIG9	Universal Digital Input 9			Engine Run Switch
B05	UDIG10	Universal Digital Input 10			
B06	UDIG11	Universal Digital Input 11			
B07	UDIG12	Universal Digital Input 12			
B08	INJ_LS5	Low Side Injector 5			
B09	INJ_LS3	Low Side Injector 3			
B10	AV9	Analogue Voltage Input 9			
B11	AV10	Analogue Voltage Input 10			
B12	AV11	Analogue Voltage Input 11			
B13	BAT_POS	Battery Positive			ECU Battery Voltage
B14	INJ_LS6	Low Side Injector 6			
B15	INJ_LS4	Low Side Injector 4			
B16	AV12	Analogue Voltage Input 12			
B17	AV13	Analogue Voltage Input 13			
B18	AV14	Analogue Voltage Input 14			
B19	BAT_POS	Battery Positive			ECU Battery Voltage
B20	OUT_HB7	Half Bridge Output 7			Fuel Pump Output
B21	OUT_HB8	Half Bridge Output 8			
B22	INJ_PH9	Peak Hold Injector 9			
B23	INJ_PH10	Peak Hold Injector 10			
B24	INJ_PH11	Peak Hold Injector 11			
B25	INJ_PH12	Peak Hold Injector 12			
B26	SEN_5V0_A	Sensor 5.0V A			

M150 Connector C - 34 Way

Mating Connector: Tyco Superseal 34 Position Keying 1 – MoTeC #65044

Pin	Designation	Full Name	OE Pin	Function	Description
C01	OUT_HB2	Half Bridge Output 2			Throttle Servo Bank 1 Motor Output
C02	SEN_5V0_A	Sensor 5.0V A			
C03	IGN_LS1	Low Side Ignition 1			Ignition Cylinder 1 Output
C04	IGN_LS2	Low Side Ignition 2			Ignition Cylinder 2 Output
C05	IGN_LS3	Low Side Ignition 3			Ignition Cylinder 3 Output
C06	IGN_LS4	Low Side Ignition 4			Ignition Cylinder 4 Output
C07	IGN_LS5	Low Side Ignition 5			Ignition Cylinder 5 Output
C08	IGN_LS6	Low Side Ignition 6			Ignition Cylinder 6 Output
C09	SEN_5V0_B	Sensor 5.0V B			
C10	BAT_NEG1	Battery Negative			
C11	BAT_NEG2	Battery Negative			
C12	IGN_LS7	Low Side Ignition 7			Ignition Cylinder 7 Output
C13	IGN_LS8	Low Side Ignition 8			Ignition Cylinder 8 Output
C14	AV1	Analogue Voltage Input 1			Throttle Servo Bank 1 Position Main
C15	AV2	Analogue Voltage Input 2			Inlet Manifold Pressure Sensor
C16	AV3	Analogue Voltage Input 3			Throttle Servo Bank 1 Position Tracking
C17	AV4	Analogue Voltage Input 4			
C18	OUT_HB1	Half Bridge Output 1			Throttle Servo Bank 1 Motor Output
C19	INJ_PH1	Peak Hold Injector 1			Fuel Cylinder 1 Output
C20	INJ_PH2	Peak Hold Injector 2			Fuel Cylinder 2 Output
C21	INJ_PH3	Peak Hold Injector 3			Fuel Cylinder 3 Output
C22	INJ_PH4	Peak Hold Injector 4			Fuel Cylinder 4 Output
C23	INJ_LS1	Low Side Injector 1			
C24	INJ_LS2	Low Side Injector 2			
C25	AV5	Analogue Voltage Input 5			
C26	BAT_POS	Battery Positive			ECU Battery Voltage
C27	INJ_PH5	Peak Hold Injector 5			Fuel Cylinder 5 Output
C28	INJ_PH6	Peak Hold Injector 6			Fuel Cylinder 6 Output
C29	INJ_PH7	Peak Hold Injector 7			Fuel Cylinder 7 Output
C30	INJ_PH8	Peak Hold Injector 8			Fuel Cylinder 8 Output
C31	OUT_HB3	Half Bridge Output 3			Inlet Camshaft Bank 1 Actuator Output
C32	OUT_HB4	Half Bridge Output 4			Inlet Camshaft Bank 2 Actuator Output
C33	OUT_HB5	Half Bridge Output 5			Exhaust Camshaft Bank 1 Actuator Output
C34	OUT_HB6	Half Bridge Output 6			Exhaust Camshaft Bank 2 Actuator Output

M150 Connector D — 26 way

Mating Connector: Tyco Superseal 26 Position Keying 1 – MoTeC #65045

Pin	Designation	Full Name	OE Pin	Function	Description
D01	UDIG1	Universal Digital Input 1			Engine Speed Sensor
D02	UDIG2	Universal Digital Input 2			
D03	AT1	Analogue Temperature Input 1		1k Pull up to SEN_5V_A	Inlet Manifold Temperature Sensor
D04	AT2	Analogue Temperature Input 2		1k Pull up to SEN_5V_A	Coolant Temperature Sensor
D05	AT3	Analogue Temperature Input 3		1k Pull up to SEN_5V_B	Engine Oil Temperature Sensor
D06	AT4	Analogue Temperature Input 4		1k Pull up to SEN_5V_B	
D07	KNOCK1	Knock Input 1			Knock Sensor 1
D08	UDIG3	Universal Digital Input 3			Inlet Camshaft Bank 1 Position
D09	UDIG4	Universal Digital Input 4			Exhaust Camshaft Bank 1 Position
D10	UDIG5	Universal Digital Input 5			Inlet Camshaft Bank 2 Position
D11	UDIG6	Universal Digital Input 6			Exhaust Camshaft Bank 2 Position
D12	BAT_BAK	Battery Backup			
D13	KNOCK2	Knock Input 2			Knock Sensor 1
D14	UDIG7	Universal Digital Input 7			
D15	SEN_0V_A	Sensor 0V A			
D16	SEN_0V_B	Sensor 0V B			
D17	CAN1_HI	CAN Bus 1 High			
D18	CAN1_LO	CAN Bus 1 Low			
D19	SEN_6V3	Sensor 6.3V			
D20	AV6	Analogue Voltage Input 6			
D21	AV7	Analogue Voltage Input 7			Throttle Pedal Sensor Main
D22	AV8	Analogue Voltage Input 8			Throttle Pedal Sensor Tracking
D23	ETH_TX+	Ethernet Transmit+	Ethernet Green/White		
D24	ETH_TX-	Ethernet Transmit-	Ethernet Green		
D25	ETH_RX+	Ethernet Receive+	Ethernet Orange/White		
D26	ETH_RX-	Ethernet Receive-	Ethernet		

▶ **EXAMPLE GPR M130 4 CYLINDER GENERIC PINOUT****M130 Connector A — 34 way**

Mating Connector: Tyco Superseal 34 Position Keying 1 – MoTeC #65044

Pin	Designation	Full Name	OE Pin	Function	Description
A01	OUT_HB2	Half Bridge Output 2			
A02	SEN_5V0_A	Sensor 5.0V A			
A03	IGN_LS1	Low Side Ignition 1			Ignition Cylinder 1 and 4 Output
A04	IGN_LS2	Low Side Ignition 2			Ignition Cylinder 2 and 3 Output
A05	IGN_LS3	Low Side Ignition 3			
A06	IGN_LS4	Low Side Ignition 4			
A07	IGN_LS5	Low Side Ignition 5			
A08	IGN_LS6	Low Side Ignition 6			
A09	SEN_5V0_B	Sensor 5.0V B			
A10	BAT_NEG1	Battery Negative			
A11	BAT_NEG2	Battery Negative			
A12	IGN_LS7	Low Side Ignition 7			
A13	IGN_LS8	Low Side Ignition 8			
A14	AV1	Analogue Voltage Input 1			Throttle Servo Bank 1 Position Main
A15	AV2	Analogue Voltage Input 2			Inlet Manifold Pressure Sensor
A16	AV3	Analogue Voltage Input 3			
A17	AV4	Analogue Voltage Input 4			Airbox Mass Flow Sensor
A18	OUT_HB1	Half Bridge Output 1			
A19	INJ_PH1	Peak Hold Injector 1			Fuel Cylinder 1 Output
A20	INJ_PH2	Peak Hold Injector 2			Fuel Cylinder 2 Output
A21	INJ_PH3	Peak Hold Injector 3			Fuel Cylinder 3 Output
A22	INJ_PH4	Peak Hold Injector 4			Fuel Cylinder 4 Output
A23	INJ_LS1	Low Side Injector 1			Fuel Pump Output
A24	INJ_LS2	Low Side Injector 2			
A25	AV5	Analogue Voltage Input 5			
A26	BAT_POS	Battery Positive			ECU Battery Voltage
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			
A31	OUT_HB3	Half Bridge Output 3			
A32	OUT_HB4	Half Bridge Output 4			
A33	OUT_HB5	Half Bridge Output 5			Tachometer Output
A34	OUT_HB6	Half Bridge Output 6			Idle Actuator Solenoid Normal Output

M130 Connector B — 26 way

Mating Connector: Tyco Superseal 26 Position Keying 1 – MoTeC #65045

Pin	Designation	Full Name	OE Pin	Function	Description
B01	UDIG1	Universal Digital Input 1			Engine Speed
B02	UDIG2	Universal Digital Input 2			Engine Synchronisation
B03	AT1	Analogue Temperature Input 1		1k Pull up to SEN_5V_A	
B04	AT2	Analogue Temperature Input 2		1k Pull up to SEN_5V_B	Coolant Temperature Sensor
B05	AT3	Analogue Temperature Input 3		1k Pull up to SEN_5V_A	Fuel Temperature Sensor
B06	AT4	Analogue Temperature Input 4		1k Pull up to SEN_5V_B	Inlet Manifold Temperature Sensor
B07	KNOCK1	Knock Input 1			Knock Sensor 1
B08	UDIG3	Universal Digital Input 3			Wheel Speed Rear Drive Sensor
B09	UDIG4	Universal Digital Input 4			
B10	UDIG5	Universal Digital Input 5			
B11	UDIG6	Universal Digital Input 6			
B12	BAT_BAK	Battery Backup			
B13	KNOCK2	Knock Input 2			
B14	UDIG7	Universal Digital Input 7			
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	Analogue Voltage Input 6			
B21	AV7	Analogue Voltage Input 7			
B22	AV8	Analogue Voltage Input 8			
B23	ETH_TX+	Ethernet Transmit+	Ethernet Green/White		
B24	ETH_TX-	Ethernet Transmit-	Ethernet Green		
B25	ETH_RX+	Ethernet Receive+	Ethernet Orange/White		
B26	ETH_RX-	Ethernet Receive-	Ethernet Orange		