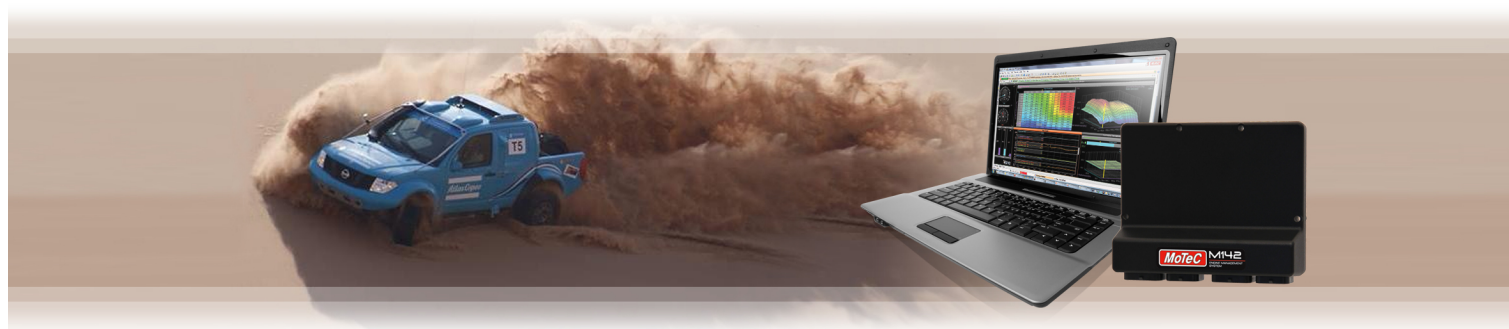




M1 VK50VE ENGINE PACKAGE



The Nissan VK50VE 2009 package is based on MoTeC's successful GPR package series and is available on MoTeC M150 ECUs. It is a versatile and adaptable platform that is configured to run the Nissan VK50 engine in the OEM configuration, which includes the Variable Valve Lift system. The package allows for easy changes to engine tuning and hardware.

The product incorporates many ancillary features commonly found on race cars, such as anti-lag, driver switches (pit switch, launch enable, boost trim, etc.), gear shift control, knock control, intercooler sprays, launch control, chassis logging (steering, suspension), gearbox coolant pumps and traction control.

Also accommodated are many of the systems found on modified road vehicles, such as air conditioning control and definable control outputs. Most ECU input and output pin allocations can be user-defined to suit individual requirements.

The product fully integrates with other MoTeC products, and provides pre-defined CAN messaging for all current display loggers, loggers, E888, VCS, GPS, ADR, BR2, PDM, and SLM.

Original Equipment (OE) CAN messaging is not supported and car specific integration is not provided.

► FEATURES

- Pre-configured sensor calibrations for Original Equipment (OE) sensors and engine triggers. **Lambda Control is supported with optional LTC with Bosch LSU4.9 sensor or LTCN with NTK sensor.**
- Pre-configured injector calibrations and ignition timings.
- Pre-configured reference mode for engine synchronisation and control of 4 camshafts with tunable inlet and exhaust timing tables.
- Pre-configured on-board knock control for each cylinder with OE knock sensor and selectable centre frequency.
- Pre-configured physical settings for engine displacement, fuel density, stoichiometric ratio, fuel pressure, and injector linearisation, which allow for simplified engine start-up prior to tuning.
- Pre-configured Engine Efficiency table, engine load and fuel volume calculation (**requires additional inlet manifold temperature sensor, DELCO sensor preconfigured**).
- Pre-configured control of the dual bank VVEL variable valve lift system (**requires 2 additional external Dual Half Bridges, an additional 100 Ohm resistor has to be wired across each bridge**).
- Pre-configured fuel closed loop.
- Pre-configured transient fuelling compensation using physical modelling of fuel film.
- Support of MoTeC devices: ADR, E8XX, PDM, SLM, VCS.
- 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.
- Support of 2 coolant fans (PWM controlled).
- Air conditioner support with switched output control.
- Coolant temperature compensations for engine speed limit, ignition timing, fuel mixture, boost limit.
- Engine Speed Limiting with ignition cut and/or fuel cut.
- Gearbox position detection via optional sensor.
- Gearbox shift request via up shift switch / down shift switch or gear lever force sensor.
- Gearbox shift control with ignition cut, fuel cut, throttle blip and engine speed matching.
- GPS acquisition and logging via CAN or RS232.
- 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 launch engine speed, launch throttle limit, launch boost aim, and launch fuel volume trim.
- Race time system with tables for ignition timing compensation, fuel mixture aim, boost limit, and throttle limit.
- Idle closed loop control system using drive by wire actuation.
- Engine Load Average channel with tables for engine speed limit, ignition timing trim, fuel mixture aim, boost limit, and throttle limit.
- 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 3 CAN buses.
- ECU CAN transmit of the most common channels using standard MoTeC CAN templates. OE CAN messaging is not supported.
- 6 switches and 4 rotary switches with 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.
- 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 (optional), 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 Gas Temperature (EGT) via TCA Thermocouple Amplifier, generic CAN, or E888 for collector, bank 1 and 2 collector, and cylinders 1 to 8
 - Exhaust lambda via LTC, LTCN, or PLM for collector, Bank 1 and 2 Collector, and Cylinders 1 to 8
 - Fuel pressure and temperature
 - Fuel tank level
 - Gear position
 - Gear lever force
 - Gear neutral switch
 - Gear shift request
 - Intercooler temperature
 - Steering angle and pressure
 - Transmission temperature
 - Turbocharger speed
 - G-force (acceleration) – longitudinal, lateral, vertical
 - Wheel speed sensors front/rear left/right, wired or CAN input.

► OPERATIONAL DIFFERENCES

Operation of VVEL differs from the OEM behaviour; it is only operational when the M150 ECU is powered, and the engine is turning and exceeding a specified engine speed threshold.

► VK50VE M150 PINOUT

M150 Connector A - 34 Way

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

Pin Number	Designation	Full Name	OE Pin	Function	Description
A01	AT5	Analogue Temperature Input 5			
A02	AT6	Analogue Temperature Input 6			
A03	AV15	Analogue Voltage Input 15			
A04	AV16	Analogue Voltage Input 16			Throttle Pedal Sensor Main Voltage
A05	AV17	Analogue Voltage Input 17			Throttle Pedal Sensor Tracking Voltage
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			ECU Sensor 5V0 C Voltage
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			ECU Sensor 5V0 C Voltage
A19	SEN_5V0_B2	Sensor 5.0V B			ECU Sensor 5V0 B Voltage
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 Number	Designation	Full Name	OE Pin	Function	Description
B01	OUT_HB9	Half Bridge Output 9			Inlet Camshaft Bank 1 Actuator
B02	OUT_HB10	Half Bridge Output 10			Inlet Camshaft Bank 2 Actuator
B03	UDIG8	Universal Digital Input 8			
B04	UDIG9	Universal Digital Input 9			
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			Inlet Manifold Pressure Sensor Voltage
B11	AV10	Analogue Voltage Input 10			
B12	AV11	Analogue Voltage Input 11			Engine Oil Pressure Sensor Voltage
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			Fuel Pressure Sensor Voltage
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			Valve Lift Bank 2 Servo Motor Output (requires a 1000hm resistor wired across the output pins)
B21	OUT_HB8	Half Bridge Output 8			Valve Lift Bank 2 Servo Motor Output (requires a 1000hm resistor wired across the output pins)
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			ECU Sensor 5V0 A Voltage

M150 Connector C - 34 Way

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

Pin Number	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			ECU Sensor 5V0 A Voltage
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			ECU Sensor 5V0 B Voltage
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			Throttle Servo Bank 1 Position Tracking
C16	AV3	Analogue Voltage Input 3			Throttle Servo Bank 2 Position Main
C17	AV4	Analogue Voltage Input 4			Throttle Servo Bank 2 Position Tracking
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			Exhaust Camshaft Bank 1 Actuator
C24	INJ_LS2	Low Side Injector 2			Exhaust Camshaft Bank 2 Actuator
C25	AV5	Analogue Voltage Input 5			Valve Lift Bank 1 Servo Position Sensor Main Voltage
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			Throttle Servo Bank 2 Motor Output
C32	OUT_HB4	Half Bridge Output 4			Throttle Servo Bank 2 Motor Output
C33	OUT_HB5	Half Bridge Output 5			Valve Lift Bank 1 Servo Motor Output (requires a 1000hm resistor wired across the output pins)
C34	OUT_HB6	Half Bridge Output 6			Valve Lift Bank 1 Servo Motor Output (requires a 1000hm resistor wired across the output pins)

M150 Connector D — 26 way

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

Pin Number	Designation	Full Name	OE Pin	Function	Description
D01	UDIG1	Universal Digital Input 1			Engine Speed Sensor
D02	UDIG2	Universal Digital Input 2			Inlet Camshaft Bank 1 Position
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			Fuel Temperature Sensor Voltage
D07	KNOCK1	Knock Input 1			Knock Sensor 1
D08	UDIG3	Universal Digital Input 3			Inlet Camshaft Bank 2 Position
D09	UDIG4	Universal Digital Input 4			Exhaust Camshaft Bank 1 Position
D10	UDIG5	Universal Digital Input 5			Exhaust Camshaft Bank 2 Position
D11	UDIG6	Universal Digital Input 6			
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			ECU Sensor 6V3 Voltage
D20	AV6	Analogue Voltage Input 6			Valve Lift Bank 1 Servo Position Sensor Tracking Voltage
D21	AV7	Analogue Voltage Input 7			Valve Lift Bank 2 Servo Position Sensor Main Voltage
D22	AV8	Analogue Voltage Input 8			Valve Lift Bank 2 Servo Position Sensor Tracking Voltage
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		