



## M150 Nissan Patrol TB48 2001-2010



**This Package, used with an activated M150, is a fully programmable replacement for the factory-fitted Nissan Patrol Y61 TB48 2001 - 2010 ECU.**

Included are numerous ancillary features common to race cars, such as anti-lag, driver switches (launch enable, boost limit etc.), motorsport gearbox control, knock control, intercooler sprays, launch control, gearbox coolant pumps 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.

A unique feature of this product is the **Flame** strategy, which controls the amount of ignition cut and retard to assist in creating backfires and flames from the exhaust for show purposes.

This Package 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.

### ► FEATURES

- Fully integrates with these original systems: ABS / Brakes, Air Conditioning, Start . **Lambda control is supported with optional LTC and Bosch LSU4.9 sensor.** See 'Operation' section for further information.
- Pre-configured sensor calibrations for Original Equipment (OE) sensors and engine triggers.
- Pre-configured control of primary (Port Injector) fuel system.
- Optionally configurable secondary (Port Injector) fuel control with a tuneable balance table.
- Pre-configured single fuel operation with selectable properties.
- Pre-configured reference mode for engine synchronisation.
- Pre-configured physical settings for engine displacement, fuel density, stoichiometric ratio, fuel pressure, and primary injector linearisation, which allow for simplified engine start-up prior to tuning.
- Pre-configured CAN messaging for OE systems including dashboard and ABS.
- Pre-configured control of OE coolant fan with temperature thresholds.
- Pre-configured transient fuelling compensation using physical modelling of fuel film for port injectors.
- Idle closed loop control system using ignition and drive by wire actuation.
- Pre-configured adjustable inlet manifold flap control.
- Pre-configured on-board knock control for each cylinder using the OE knock sensors and multiple centre frequencies.
- Configurable boost control with single wastegate actuator. Single and dual solenoids supported.
- Pre-configured air conditioner request and clutch control.
- Configurable anti-lag for single turbo variants with ignition timing limit, fuel volume trim, ignition cut, fuel cut, engine speed limit, boost aim and throttle aim tables.
- GPS acquisition and logging via CAN or RS232.
- Intercooler temperature and spray control.
- Lap distance, time and number via GPS, BR2 or switched input, with split and sector options.
- Support of MoTeC devices: ADR, E8XX, PDM, SLM, VCS.
- Coolant pump output with PWM control.
- Coolant pump after-run functionality, optionally with additional pump output.
- Configurable launch control with tables.
- Race time system with tables for ignition timing trim, fuel mixture aim, boost limit, and throttle limit.
- 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 with differing access options.

- ECU CAN Receive from a defined ID base address for data reception from MoTeC devices.
- 4 configurable driver switches and 2 rotary switches each with 9 positions that can be simultaneously mapped to launch control, anti-lag, traction, race time reset, engine speed limit maximum, throttle pedal translation, ignition timing, fuel mixture aim, boost limit, nitrous, Flame Limit, traction aim, and traction control range.
- Pre-configured pulsed 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, control range.
- Optional channels for additional sensors via input pin and/or CAN message, including:
  - Ambient Pressure and Temperature
  - Boost Pressure
  - Brake Switch
  - Clutch Switch, Pressure and Position
  - Coolant Pressure and Temperature
  - Engine Oil Pressure and Temperature
  - Engine Crankcase Pressure
  - Exhaust Pressure
  - Exhaust Temperature (EGT) via TCA Thermocouple Amplifier, Generic CAN, or E888 for Collector and Cylinders 1 to 6.
  - Exhaust Lambda via LTC, LTCN, or PLM for Collector and Cylinders 1 to 6.
  - Fuel Flow Supply and Return
  - Fuel Pressure and Temperature
  - Fuel Tank Level
  - Intercooler Temperature
  - Steering Angle and Pressure
  - Transmission Temperature
  - Turbocharger Speed
  - G-Force (acceleration) - Longitudinal, Lateral, Vertical
  - Wheel Speed

## ► LICENCING

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To load the **Nissan Patrol 1997 TB48DE** Package onto the ECU, the **M1 Licence – Middle East 4WD** (part number 23073) is required.

## ► VEHICLE COMPATIBILITY

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Numerous model year and wiring harness variants of the TB48 Patrol exist. MoTeC produces a single M1 Package variant to suit the following:

- Nissan Y61 Patrol TB48DE Jun 2001 - 2016

## ► ECU WIRING

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MoTeC does not presently produce an adaptor loom for this product.

If the loom schematic and pinout which follow this section are adhered to, the pre-configured Package from MoTeC Online will operate with minimal extra set-up work.

**Note:** Automatic Transmission models are equipped with a servo throttle and the M1 Package is configured for use with this variant. Idle control is achieved via ignition timing and servo throttle control.

Manual transmission models are equipped with a cable throttle. Idle control is achieved via a 4-pole idle stepper valve, which is available, but not configured in the M1 Package.

The following pinout and loom schematic identifies pins to be used for either idle stepper operation or throttle servo operation, depending on the transmission type.

## ► OPERATION

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When the M150 ECU is installed according to the included wiring pinout, this Package mimics most aspects of OE operation as follows:

### Starting

Starter motor operation is not controlled by the M1 ECU.

### Alternator

The original equipment alternator on this vehicle has no interaction with the engine ECU.

### Air Conditioning

Air conditioning requests are received from the vehicle via CAN. The M1 ECU controls the **Air Conditioner Clutch** based on the request and additional settings within the **Air Conditioner** group.

### Wheel Speeds

A single wheel speed channel is received from the OE CAN messaging and is used in many subsystems, including Vehicle Speed, Traction Control, Gear Detection.

If required, OE wheel speed information may be replaced by using hard-wired wheel speed sensors and re-configuring the Wheel Speed resources.

### Gear Shift

Operation is configured similarly to that of MoTeC's M1 GPR Packages.

### Lambda sensing via MoTeC LTC

If the supplied Package is used, all CAN communication is at 500kbit/sec on CAN Bus 1. If a MoTeC LTC is required for

Lambda sensing, the LTC should have its CAN transmit speed set to 500kbit/sec before the device is connected to the installation.

Alternatively (on M150 variants) the LTC may be connected to CAN Bus 2 or 3 at 1Mbit/sec.

## Flame feature

Flame is a strategy to control the amount of ignition cut and retard to assist in creating backfires and flames from the exhaust for show purposes.

Flame has three modes:

- **Limit** - flames occur at a set Engine Speed while the throttle is pressed.
- **Overrun** - flames occur when the throttle is lifted and the vehicle is decelerating.
- **Cruise** - flames occur above a specified throttle position with some normal cylinder firings used to maintain vehicle cruising speed.

Each mode has its own Driver Switch to enable the mode, and a multi-position **Driver Flame Severity Switch** to alter the control settings.

The Flame control cycles from ignition cut to fill the exhaust with unburnt fuel and air, followed by ignition retard to light the mixture. Depending on the mode and conditions, some normal cylinder firings follow to maintain engine speed before the cycle repeats.

The number of sequential cylinder ignition cuts is random between the **Flame Minimum Cut Count** and **Flame Maximum Cut Count** followed by a number of retarded cylinder firings set in **Flame Retard Count**. The Ignition Timing is set to **Flame Retard Ignition Timing** and **Flame Fuel Volume Trim** applied to **Fuel Volume Trim** during the cut and retard phases.

The randomness of the ignition cut gives a rev limiter or antilag sound while these conditions happening sequentially in a controlled way can give reliable flames and backfires from the exhaust.

The sounds and types of flames is dependent on the engine and type/length of the exhaust system, however the system allows for the tuning of blue or yellow flames with the right hardware and conditions.

Note: Multiple Flame modes can be enabled at the same time, however the conditions to activate the control dictate which is actually used at any one time.

► **PINOUT – M130 CONNECTOR A – 34 WAY**

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

Pin	Designation	Full Name	OE Pin	Function
A01	OUT_HB2	Half Bridge Output 2	X09	External AUX OUT
A02	SEN_5V0_A1	Sensor 5.0V A	94, 103	
A03	IGN_LS1	Low Side Ignition 1	18	Ignition Cylinder 1 Output
A04	IGN_LS2	Low Side Ignition 2	19	Ignition Cylinder 2 Output
A05	IGN_LS3	Low Side Ignition 3	20	Ignition Cylinder 3 Output
A06	IGN_LS4	Low Side Ignition 4	21	Ignition Cylinder 4 Output
A07	IGN_LS5	Low Side Ignition 5	29	Ignition Cylinder 5 Output
A08	IGN_LS6	Low Side Ignition 6	30	Ignition Cylinder 6 Output
A09	SEN_5V0_B1	Sensor 5.0V B	X10	External AUX 5V
A10	BAT_NEG1	Battery Negative	153,156,159	Ground
A11	BAT_NEG2	Battery Negative	165,168	Ground
A12	IGN_LS7	Low Side Ignition 7	55,56	Coolant Fan 1 Output
A13	IGN_LS8	Low Side Ignition 8	24	Air Conditioner Clutch Outout
A14	AV1	Analogue Voltage Input 1	108	Throttle Servo Sensor Main
A15	AV2	Analogue Voltage Input 2	X03	Inlet Manifold Pressure Sensor (Ext)
A16	AV3	Analogue Voltage Input 3	X06	External AUX Fuel Pressure
A17	AV4	Analogue Voltage Input 4	98	Throttle Servo Sensor Tracking (Auto/Trans)
A18	OUT_HB1	Half Bridge Output 1	27	Inlet Manifold Flap Actuator Output
A19	INJ_PH1	Peak Hold Injector 1	5	Fuel Cylinder 1 Primary Output
A20	INJ_PH2	Peak Hold Injector 2	6	Fuel Cylinder 2 Primary Output
A21	INJ_PH3	Peak Hold Injector 3	7	Fuel Cylinder 3 Primary Output
A22	INJ_PH4	Peak Hold Injector 4	13	Fuel Cylinder 4 Primary Output
A23	INJ_LS1	Low Side Injector 1	38	Tachometer Output
A24	INJ_LS2	Low Side Injector 2	40,41	Fuel Pump Output
A25	AV5	Analogue Voltage Input 5	87	Throttle Pedal Sensor Main (Auto/Trans)
A26	BAT_POS1	Battery Positive	163,166	Switched BAT_POS
A27	INJ_PH5	Peak Hold Injector 5	14	Fuel Cylinder 5 Primary Output
A28	INJ_PH6	Peak Hold Injector 6	15	Fuel Cylinder 6 Primary Output
A29	INJ_PH7	Peak Hold Injector 7	42	ECU Power Relay Output
A30	INJ_PH8	Peak Hold Injector 8	152	Inlet Camshaft Actuator Output
A31	OUT_HB3	Half Bridge Output 3	154 or 48	Throttle Motor – (A/T) or Idle Stepper (M/T)
A32	OUT_HB4	Half Bridge Output 4	151 or 50	Throttle Motor + (A/T) or Idle Stepper (M/T)
A33	OUT_HB5	Half Bridge Output 5	49	Idle Stepper (M/T)
A34	OUT_HB6	Half Bridge Output 6	51	Idle Stepper (M/T)

► **PINOUT – M130 CONNECTOR B – 26 WAY**

**Mating Connector:** Tyco Superseal 26 Position Keying 1 (MoTeC #65045)

Pin	Designation	Full Name	OE Pin	Function
B01	UDIG1	Universal Digital Input 1	63	Engine Speed Sensor *Note 1
B02	UDIG2	Universal Digital Input 2	84	Engine Synchronisation Sensor *Note 1
B03	AT1	Analogue Temperature Input 1	X05	External AUX EGT
B04	AT2	Analogue Temperature Input 2	121	Coolant Temperature Sensor
B05	AT3	Analogue Temperature Input 3	X07	External AUX Oil Temp
B06	AT4	Analogue Temperature Input 4	X02	External AUX Inlet Air Temperature Sensor
B07	KNOCK1	Knock Input 1	126	Knock Sensor 2
B08	UDIG3	Universal Digital Input 3	79	Steering Pressure Switch
B09	UDIG4	Universal Digital Input 4	53	Ignition Switch
B10	UDIG5	Universal Digital Input 5	52	Speed Sensor
B11	UDIG6	Universal Digital Input 6	86	A/C Request
B12	BAT_BAK	Battery Backup	95	BAT_HOT
B13	KNOCK2	Knock Input 2	125	Knock Sensor 1
B14	UDIG7	Universal Digital Input 7	60	Snow Switch
B15	SEN_0V_A2	Sensor 0V A	89, 100	
B16	SEN_0V_B2	Sensor 0V B	109, X01	External AUX 0V
B17	CAN1_HI	CAN Bus 1 High	174, L03	Vehicle 500 kbit/sec CAN
B18	CAN1_LO	CAN Bus 1 Low	171, L02	Vehicle 500 kbit/sec CAN
B19	SEN_6V3	Sensor 6.3V	X11	External AUX 6.3V
B20	AV6	Analogue Voltage Input 6	117	Throttle Pedal Sensor Tracking (A/T)
B21	AV7	Analogue Voltage Input 7	X08	External AUX 9 Position Switch
B22	AV8	Analogue Voltage Input 8	X04	External AUX Oil Pressure
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

\*Note – REF and SYNC swapped on NATS models

### ADAPTOR LOOM WIRING SCHEMATIC

