BASIC UNIVERSAL WIRE-IN HARNESS FOR NEXUS T2/T1 ECU 2.5m (8')

QUICK START GUIDE

HT-181200



HARNESS OVERVIEW

Congratulations on purchasing a Basic Universal Wire-in Harness for your Nexus T2 or Nexus T1 ECU.

This universal harness plugs directly into your Nexus ECU and features unterminated cables at the other end, allowing it to be wired to a wide range of engines. For your convenience, all unterminated wires are colour-coded and labelled in groups, making identification simple and wiring design a breeze.

When used in conjunction with a Nexus T2 or T1 ECU, this harness provides access to all advanced engine tuning options available through the Nexus Software Programmer (NSP).

This quick start guide will assist you through the installation process, showing you how to wire common sensors, actuators, and other engine components.

Harness Features:

- Harness terminated with a Nexus T2/T1 ECU 34-pin connector
- All wires grouped, color coded and labeled for ease of identification
- Terminated connection for Haltech CAN devices (e.g., PDMs, digital displays, keypads, etc.)
- Shielded 4 core crank (trigger) and cam (home) sensor cables for reluctor or hall effect sensor types
- 5x Analog Voltage Inputs (AVIs) wires to connect to voltage type sensors (e.g., MAP, temperature, pressure, position)
- 1x Synchronized Pulsed Input (SPI) wire for frequency type sensors (e.g., speed sensor, flex fuel sensor)
- 1x Shielded 2 core knock sensor / SPI 2 cable
- 5x Digital Pulsed Outputs (DPOs) wires
- 6x Ignition output wires (4x if using Nexus T1)
- 6x Injector output wires (4x if using Nexus T1)



What's in the bag?

- 1 x Basic universal wire-in harness for a Nexus T2 or Nexus T1 ECU (2.5m/8')
- 1 x Quick start guide



GENERAL INSTALLATION WARNING:

A Nexus series ECU or VCU allows connection to your laptop via the Nexus Software Programmer (NSP) using the included USB cable, without the need for +12V power. This feature conveniently lets you set up your ignition, injector, and various other outputs before initially powering up the ECU using this harness. Turning on the ECU with incorrect configurations can lead to damage to both the engine and ECU components.

This wiring harness is not designed to provide grounding for your engine. Ensure your engine is adequately grounded using a grounding or earthing strap to connect your engine to the battery.

Avoid creating sparks or using electrical devices near flammable substances. Always disconnect the battery cables when working on the electrical systems of your vehicle. Make sure all fuel system components and wiring are installed away from heat sources, properly shielded if necessary, and in well-ventilated areas.

After installation, double-check for any fuel leaks and ensure that no wiring is left exposed or uninsulated to avoid the risk of a fire from a spark or short circuit.

Do not charge or disconnect the battery while the engine is running. Doing so could expose the ECU to an unregulated power supply, which might lead to ECU failure.

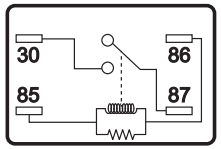
Power and Ground Pins

The Nexus T2 or Nexus T1 ECU power (A26) and ground (A10) pins must be wired correctly to ensure reliable and effective operation.

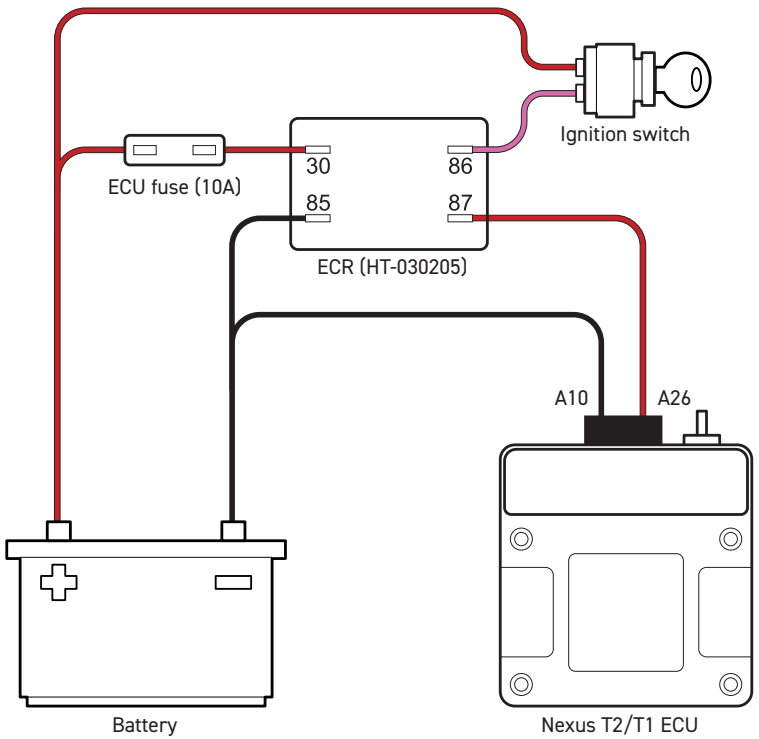
The ECU ground pin must be wired directly to the battery negative terminal. The power supply pin must be fused and switched through an Engine Control Relay (ECR) to provide a stable and protected power supply.

The ECR must be wired so that the relay receives a switched 12V signal from the ignition switch, and that this signal remains active when the ignition key is in both the ON and START positions. This ensures the ECU remains powered during ignition and engine cranking, preventing start-up issues that could place unnecessary strain on engine components.

The wiring diagram provided below illustrates this configuration in detail. The relay shown in the wiring diagram is a HT-030205 micro relay using the following internal schematic:



If you are using a different relay, ensure that it is wired according to that relay's specific switching schematic.



Example wiring configuration for the ECU's main power and ground, with the ignition key switch controlling the Engine Control Relay (ECR).

Crank (Trigger) and Cam (Home) Inputs

Crank and cam position sensors are required so that the ECU has the necessary information available to determine engine speed and engine angular position at any point in time.

Generally, there are two types of sensor for these inputs:

- **Hall Effect / Optical sensor**

This type of sensor sends out a digital square wave signal. Hall Effect sensors will usually have three pins: a signal, signal ground, and a +12V power wire. If required, the ECU can also supply regulated 5V power through pin A9, which connects to the orange wire in the harness.

- **Reluctor sensor**

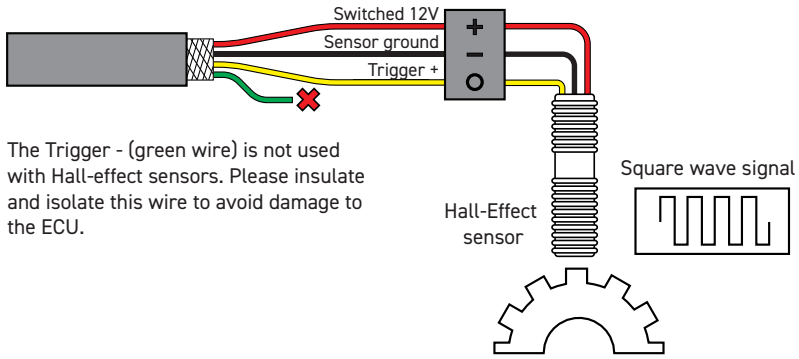
This type of sensor produces a sine wave signal. Reluctor sensors do not require external power, as these sensors can generate their own voltage signal as they detect a moving tooth or trigger.

This harness is equipped with a four-core grey shielded cable for connection to a crank sensor (i.e. Trigger), and a four-core grey/black shielded cable for connection to a cam sensor (i.e. Home). The shields on these cables are already connected to the ECU's battery ground wires within the harness and do not require any additional grounding.

Refer to the diagram below for wires required to connect to either a Hall Effect or Reluctor sensor.

Specs:

- -10V to +10V input
- Selectable 1.2k or 440-ohm pull-up to 5V
- Selectable ground reference (full differential standard mode)
- -75V to +75V indefinite withstand
- 48kHz max signal frequency



Ignition Outputs

Ignition outputs are used to control the engine's ignition system. These outputs may be connected directly to ignition coils only if the coils are equipped with internal igniters.

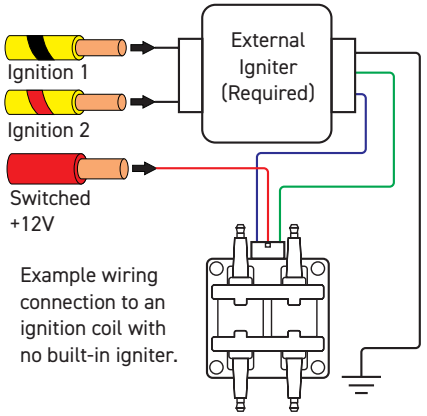
Ignition coils without internal igniters draw high current and must therefore be triggered via an external igniter module. Connecting the ECU ignition outputs directly to coils without internal igniters will damage the ECU.

Specs:

- Number of Ignition channels -
  Nexus T2: 6
  Nexus T1: 4
- Software selectable global 12V or 5V pull-up voltage
- Software selectable individual 270-ohm pull-up enable
- Flyback protected
- 3A sink current
- 10kHz switching speed
- Automatic overtemperature / overcurrent protection
- 0 to 27V voltage feedback

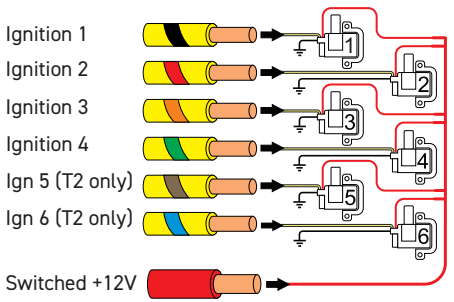
Unused ignition outputs can also be used as:

- Generic switched or PWM outputs (3A)
- Low speed digital switch inputs (0-12V)



Example wiring connection to an ignition coil with no built-in igniter.

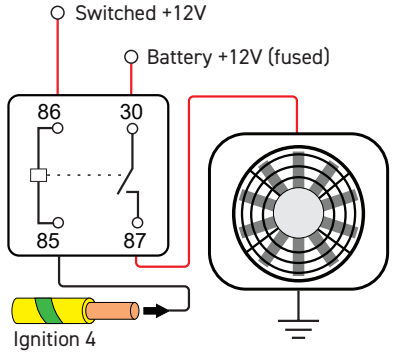
6-Cylinder Direct Fire Ignition
(Wire as per cylinder order)



NOTE: The coils (HT-020102) illustrated in this diagram are equipped with internal igniters. Do not connect ignition outputs directly to coils unless they have internal igniters, as doing so will damage the ECU. For coils without internal igniters, an external igniter module is required.

WARNING!

Connecting the ECU ignition output to an ignition module without first correctly setting the required ignition firing edge in NSP may damage both the ignition module and the ignition coil. As a precaution, either disconnect the ignition coils or switch off power to the ignition system until the ECU has been correctly configured.



Example wiring connection using a spare ignition output as a digital switched output to control a fan through a relay.

Injector Outputs

All injectors must be wired directly to the ECU injector output pins and connected to a shared +12 V power supply, as shown in the diagram below. Injector outputs should also be wired according to the engine's cylinder order, which the ECU will fire based on the configured firing order in NSP.

When not allocated for injector control, spare injector outputs can also function as generic digital pulsed outputs (DPO) capable of either switching to ground or using pulse width modulation (PWM).

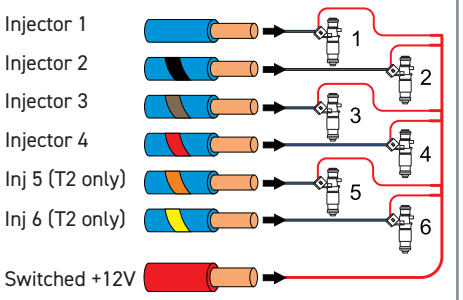
Specs:

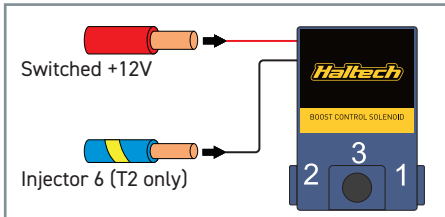
- Number of Injector channels -
  Nexus T2: 6
  Nexus T1: 4
- Current controlled output
- 8A Peak, 2A Hold
- 0 to 55V voltage feedback

Unused injector outputs can also be used as:

- Generic switched or PWM outputs (2A)
- Low speed digital switch inputs (0-12V)

6-Cylinder Sequential Injection
(Wire as per cylinder order)





Example wiring connection using a spare injector output to digitally pulse a boost control solenoid.

Knock Inputs

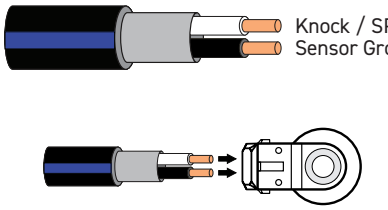
This universal wire-in harness for the Nexus T2 or T1 ECU is equipped with a twin-core shielded cable for knock sensor input. The shield on this cable is already connected to the ECU's battery ground wire within the harness and does not require any additional grounding.

When a compatible piezoelectric knock sensor is connected, the ECU can perform knock detection and control, actively adjusting ignition timing to prevent further engine knock.

Specs:

- -2.5 to +2.5V AC input only
- 160Hz to 48kHz signal frequency band
- +/-3V indefinite AC voltage withstand
- 50V indefinite DC withstand

NOTE: If not used with a knock sensor, this input on the Nexus T2 or T1 ECU can be used as SPI 2 and will operate as per the SPI specifications.



Example wiring connection to a Bosch Knock sensor.

5V Sensor Power and Sensor Ground

This harness includes a 5V power supply wire designed to power typical three-pin analogue voltage devices, such as MAP sensors, pressure sensors, throttle position sensors, and rotary trim switches. The 5V power supply wire can be shared among multiple sensors, with the Nexus T2 or T1 ECU providing a total current capacity of 200 mA. This pin also features protection against overvoltage and short-circuit conditions.

Similarly, a dedicated sensor ground wire is provided for connection to typical sensors, as shown in the diagram on the next page. The sensor ground can be shared among multiple sensors and can sink up to 500 mA of current. Do not connect the sensor ground to any high-current ground, such as the engine, chassis, or battery.

Analog Voltage Inputs

Analog Voltage Inputs (AVI) serve as input channels to the ECU, capable of accepting variable voltage signals, such as sensors measuring pressure, temperature, and position. Additionally, these inputs can accommodate switch signals that alternate between two distinct voltage levels.

AVIs feature a software-selectable 1K pull-up resistor to +5V. This can be enabled within the NSP software when configuring two pin temperature sensors or switched to ground inputs.

Specs:

- Number of channels: 5
- 0 to 5V analog inputs
- 1000 samples per second
- Selectable 1k pull-up to 5V
- -10V to +30V indefinite withstand
- 1.5kHz signal frequency max

Synchronized Pulsed Input

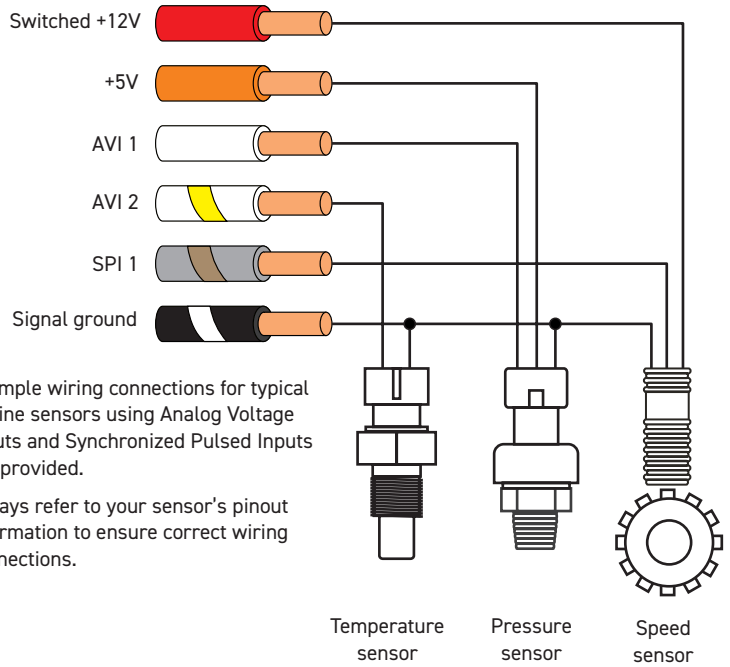
The Synchronized Pulsed Input (SPI) can measure the frequency, duty cycle, state condition, or relative position of a signal. Additionally, like AVIs, they can read 0-5V analog voltage sensors.

These inputs are suitable for various sensors, including cam position sensors, flex fuel composition sensors, vehicle speed sensors, and general switches that turn functions in the ECU on or off.

The Synchronized Pulsed Inputs is compatible with both digital (hall effect or optical) and reluctor (analog) based sensors, and can measure frequencies up to 22.5 kHz.

Specs:

- Number of channels: 2 (SPI 1 + Knock/SPI 2)
- -10V to +10V digital input
- 0 to 5V analog input
- Selectable 1k pull-up to 5V
- -15 to +30V indefinite withstand
- 22.5kHz signal frequency max



Example wiring connections for typical engine sensors using Analog Voltage Inputs and Synchronized Pulsed Inputs are provided.

Always refer to your sensor's pinout information to ensure correct wiring connections.

Digital Pulsed Outputs

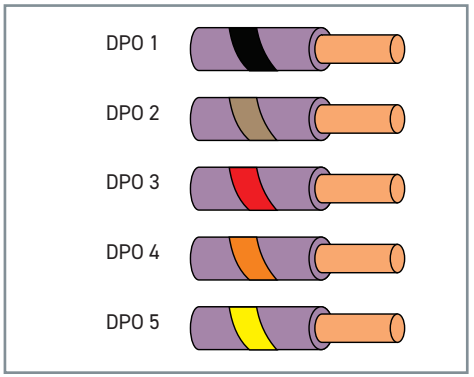
Digital Pulsed Outputs (DPO) are designed to ground-switch devices or to provide frequency-based control or pulse width modulation as needed.

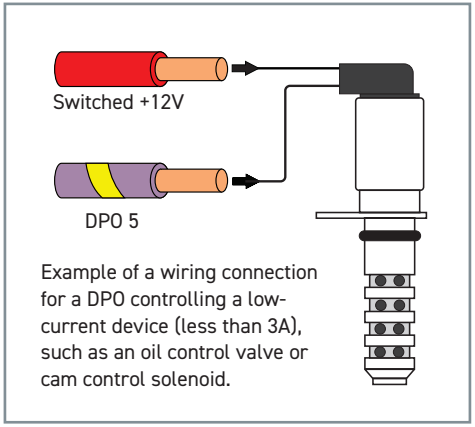
Common devices paired with DPOs include relays, idle air control valves, boost control solenoids, oil control valves, etc. Each DPO channel has a maximum sink current of 3A.

Unused DPOs can also function as low-speed digital switch inputs (0-12V).

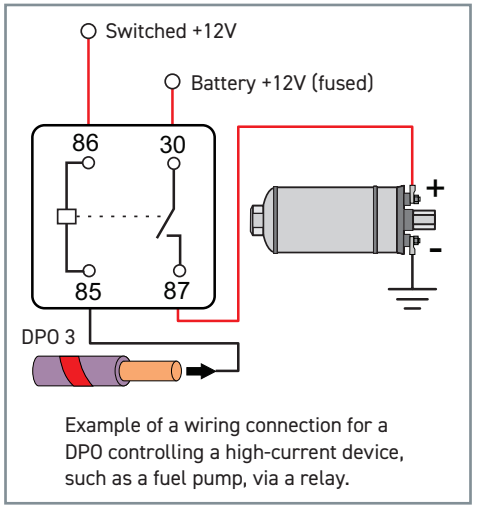
Specs:

- Number of channels: 5
- Low side drive (3A max current)
- Software selectable 4k7 pullup to +12V or +5V
- Overcurrent and flyback protection
- Over temperature protection
- 10kHz switching speed
- 0 to 27V feedback





Example of a wiring connection for a DPO controlling a low-current device (less than 3A), such as an oil control valve or cam control solenoid.



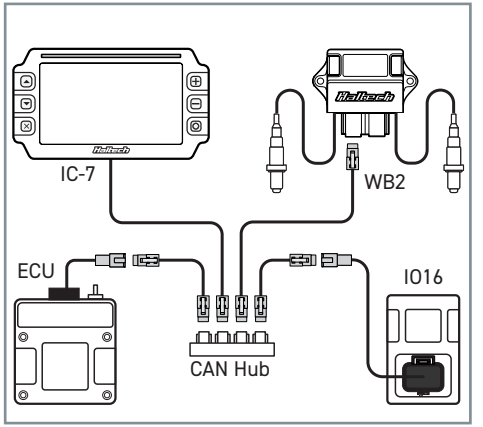
Example of a wiring connection for a DPO controlling a high-current device, such as a fuel pump, via a relay.

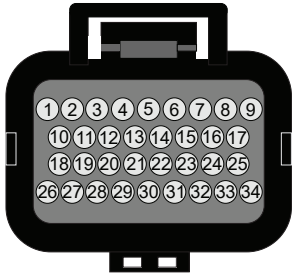
Haltech CAN connection

This harness comes equipped with a 4 pin DTM connector designed to connect to a myriad of Haltech CAN devices that expands the functionality of the Nexus T2 or T1 ECU. Haltech CAN devices include wideband O2 sensor controllers, display dashes, IO expanders, or even power distribution modules. Multiple Haltech CAN devices can be used simultaneously by connecting them to a Haltech CAN hub.

Specs:

- Supports CAN speeds up to 1 Mbit/s
- Selectable 120ohm termination resistor per CAN channel





Nexus T2/T1 ECU harness connector pinout
Wire side view

PIN	FUNCTION	WIRE COLOUR	USER NOTES
1	DPO 2	Violet / Brown	
2	AVI 1	White	
3	Ignition 1	Yellow / Black	
4	Ignition 2	Yellow / Red	
5	Ignition 3	Yellow / Orange	
6	Ignition 4	Yellow / Green	
7	Ignition 5 (Nexus T2 only)	Yellow / Brown	
8	Ignition 6 (Nexus T2 only)	Yellow / Blue	
9	+5V sensor supply	Orange	
10	Power ground	Black	
11	Sensor ground	Black / White	
12	SPI 1	Grey / Brown	
13	Knock / SPI 2	Black / Blue	
14	AVI 2	White / Yellow	
15	AVI 3	White / Grey	
16	CAN High	White	
17	CAN Low	Blue	
18	DPO 1	Violet / Black	
19	Injector 1	Blue	
20	Injector 2	Blue / Black	
21	Injector 3	Blue / Brown	
22	Injector 4	Blue / Red	
23	DPO 3	Violet / Red	
24	DPO 5	Violet / Yellow	
25	DPO 4	Violet / Orange	
26	+12V ECU power supply	Red	
27	Injector 5 (Nexus T2 only)	Blue / Orange	
28	Injector 6 (Nexus T2 only)	Blue / Yellow	
29	AVI 4	White / Violet	
30	AVI 5	White / Green	
31	Trigger +	Yellow	
32	Home +	Yellow	
33	Trigger -	Green	
34	Home -	Green	

WARRANTY CERTIFICATE

At Haltech we make every effort to design and manufacture fault-free products that perform up to or above the market expectations. All our products are covered by a Limited 12 Month Warranty.

Haltech Limited Warranty

Unless specified otherwise, Haltech warrants its products to be free from defects in material or workmanship for a period of 12 months from the date of purchase.

If the Haltech product is found to be defective as mentioned above, it will be replaced or repaired if returned prepaid along with proof of purchase. Proof of purchase in the form of a copy of the original purchase invoice, receipt or bill of sale which indicates that the product is within the warranty period, must be presented to obtain warranty service.

Replacement or repair of a defective product shall constitute the sole liability of Haltech. To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representations, either expressed or implied, including any implied warranty of merchantability or fitness. In no event shall Haltech, be liable for special or consequential damages.

Product Returns

Please include a copy of the original purchase invoice, receipt or bill of sale along with the unused, undamaged product and its original packaging. Any product returned with missing accessory items or packaging will incur extra charges to return the item to a re-saleable condition.

All product returns must be sent via a freight method with adequate tracking, insurance and proof of delivery services. Haltech will not be held responsible for product returns lost during transit.

Returns of Products Supplied in Sealed Packaging

The sale of any sensor or accessory supplied in sealed packaging is strictly non-refundable if the sealed packaging has been opened or tampered with. This will be clearly noted on the product packaging. If you do not accept these terms please return the sensor in its original unopened packaging within 30 days for a full refund.

A sensor or accessory product may be returned after 30 days of purchase (with its sealed packaging intact) for credit only (no refunds given) and will be subject to a 10% restocking fee.

Installation of Haltech Products

No responsibility whatsoever is accepted by Haltech for the fitment of Haltech Products. The onus is clearly on the installer to ensure that both their knowledge and the parts selected are correct for that particular application. Any damage to parts or consequential damage or costs resulting from the incorrect installation of Haltech products are totally the responsibility of the installer.

Always disconnect the battery when doing electrical work on your vehicle. Avoid sparks, open flames or use of electrical devices near flammable substances. Do not run the engine with a battery charger connected as this could damage the ECU and other electrical equipment.

Do not overcharge the battery or reverse the polarity of the battery or any charging unit. Disconnect the Haltech ECU from the electrical system whenever doing any welding on the vehicle by unplugging the wiring harness connector from the ECU.

After completing the ECU installation, make sure there is no wiring left un-insulated. Uninsulated wiring can cause sparks, short circuits and in some cases fire. Before attempting to run the engine ensure there are no leaks in the fuel system.

All fuel system components and wiring should be mounted away from heat sources, shielded if necessary and well ventilated. Always ensure that you follow workshop safety procedures. If you're working underneath a jacked-up car, always use safety stands!

Haltech Off-Road Usage Policy

In many states it is unlawful to tamper with your vehicle's emissions equipment. Haltech products are designed and sold for sanctioned off-road/competition non-emissions controlled vehicles only and may never be used on a public road or highway.

Using Haltech products for street/road use on public roads or highways is prohibited by law unless a specific regulatory exemption exists (more information can be found on the SEMA Action Network website www.semasan.com/emissions for state by state details in the USA).

It is the responsibility of the installer and/or user of this product to ensure compliance with all applicable local and federal laws and regulations. Please check with your local vehicle authority before purchasing, using or installing any Haltech product.

05-2026



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