PLUG 'N' PLAY ADAPTER HARNESS FOR NEXUS S2/S3 ECU

SUPPORTED MODELS:
Mazda MX5 / Miata (NA) 1.6L 2-plug ECU
Mazda MX5 / Miata (NA) 1.8L 2-plug ECU
All regions except for '96-'97 OBD-II USDM

QUICK START GUIDE

HT-186336

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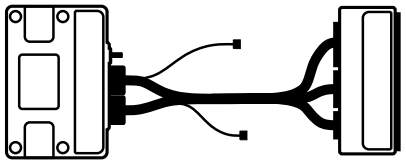
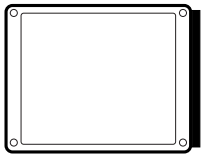
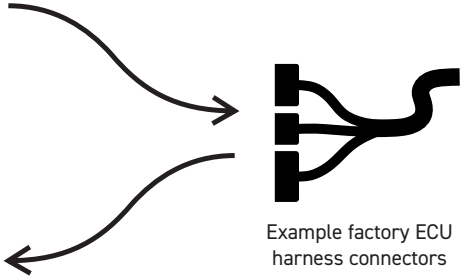
ADAPTER HARNESS OVERVIEW



Nexus ECU with Plug 'N' Play adapter harness



Example factory ECU



Example factory ECU harness connectors

Congratulations on your purchase of a Nexus Plug 'N' Play adapter harness for your vehicle. This vehicle-specific adapter harness enables you to seamlessly integrate a Nexus S2 or S3 ECU into your vehicle without the complexities of wiring an ECU. With this hassle-free solution, you can dive straight into tuning.

Nexus ECUs stand at the forefront of engine management systems, featuring cutting-edge technology and innovative features. Designed for the next generation of automotive enthusiasts and professionals, this state-of-the-art ECU seamlessly combines powerful engine control with a range of additional functionalities, making it a versatile and comprehensive solution for everyday driving to high-performance racing.

With full compatibility with a myriad of Haltech devices, it streamlines the configuration of engine parameters and additional functionalities, all programmable using a single piece of software.

What's in the box?

- HT-186336 - Mazda MX5 NA Nexus Plug 'N' Play adapter box
- HT-130400 - Nexus S2/S3 Plug 'N' Play adapter harness
- HT-010200 - Intake air temperature sensor (M14 x 1.5 thread)
- Quick Start Guide

Application Notes

- This Mazda MX5 / Miata NA Nexus Plug 'N' Play adapter harness is designed to be optimally used with a Nexus S3 ECU. Using a Nexus S2 will reduce some of the car's factory functionality. These functions are labeled "S3 only" and can be checked in the pinout reference tables found in the last few pages of this quick start guide.

- Ensure that the correct basemap is uploaded into the ECU before powering the unit through the Plug 'N' Play adapter harness.

- Please note that the basemap serves as a starting point only, and the ECU will require appropriate tuning. Haltech will not be held responsible for engine damage due to improper use of basemaps.

- TPS notes - NA6 (1.6L) manual transmission models will require the factory Throttle Position Sensor (switch type) to be unplugged and removed. A full-range (variable) Throttle Position Sensor alternative must be installed for correct functionality. Failure to do so will result in erratic behavior of the ECU at wide-open throttle along with damage to the ECU.

- Fuel pump control notes - On the NA6 (1.6L) models, the fuel pump is activated by the Air Flow Meter (AFM), and removing it will cause the fuel pump to stop functioning. To utilize the ECU's fuel pump control pin, wires 1 and 6 in the AFM connector must be bridged together to ensure proper fuel pump operation.

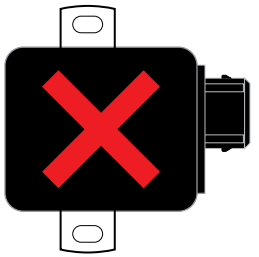
Jumper ID Settings

This Mazda MX5 / Miata NA Plug 'N' Play adapter harness is capable of being configured for use with both the 1.6L and 1.8L models.

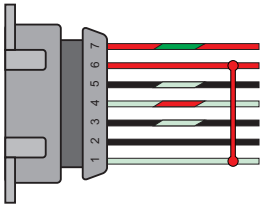
Inside the adapter box, there is a jumper header with labels next to it, labeled "1.6L" and "1.8L". These jumpers connect DP04 to the correct Thermofan Relay pin depending on the model.

The jumper is factory-set to suit the 1.8L model configuration. To access and change the jumper for the 1.6L model, the front plate needs to be unscrewed to allow the PCB to slide out.

The jumper settings for both configurations are shown below for reference.



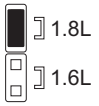
Mazda MX5 (NA) 1.6L manual transmission TPS (switch TPS) must be replaced with a full-range TPS alternative.



Mazda MX5 (NA6) 1.6L Air Flow Meter connector wiring modification for correct fuel pump operation. Wire colors are based on a 1990 Mazda MX5 Australian Model and are subject to change across different variants.

Default Jumper Configuration

Mazda MX5 (NA) 1.8L



Alternate Jumper Configuration

Mazda MX5 (NA) 1.6L

Uploading the correct basemap

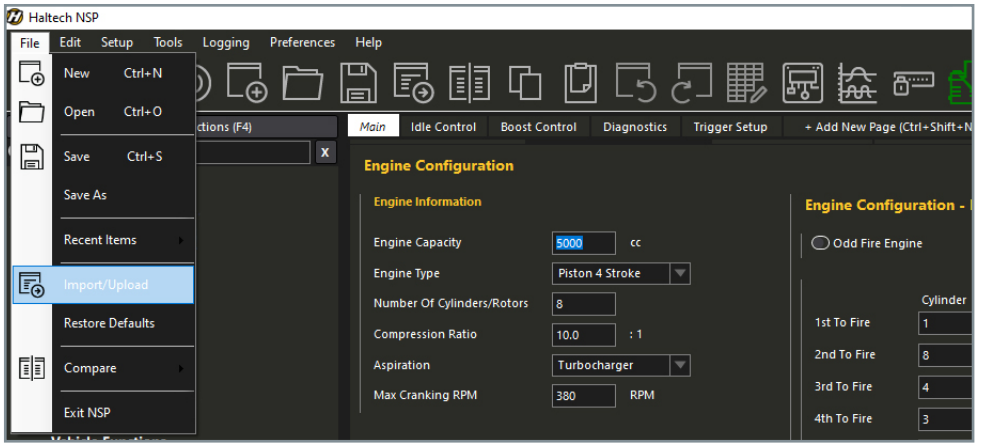
Your Nexus ECU can communicate with a laptop in low power mode using just a USB cable connection. This feature enables you to upload the basemap without powering the ECU through the Plug 'N' Play adapter harness. This ensures that all the ECU inputs and outputs are configured specifically for your engine before powering the vehicle up.

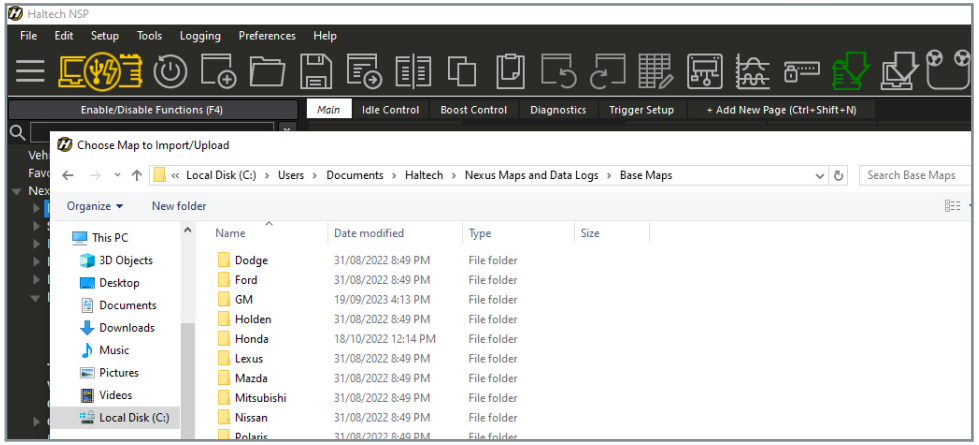
To upload the correct basemap into your Nexus ECU, follow these general steps:

1. Install/Open Haltech NSP: Haltech Nexus Software Programmer (NSP) is the software tool for configuring and tuning your Nexus ECU. Download and install NSP from the Haltech website to your Windows laptop if you haven't already done so. Instructions on how to install the software are available in the quick start guide that came with your Nexus ECU.

2. Connect to the ECU: Use the included USB-A to USB-C interface cable to connect your laptop to the Nexus ECU.

3. Upload the Basemap: Once connected, initiate the upload process by clicking on the File Menu, then click on Import/Upload, then navigate to the Haltech basemaps folder. Typically, this will be in Documents > Haltech > Nexus Maps and Data Logs > Base Maps. Choose the correct basemap file for your application as shown in the next page, then click Open.



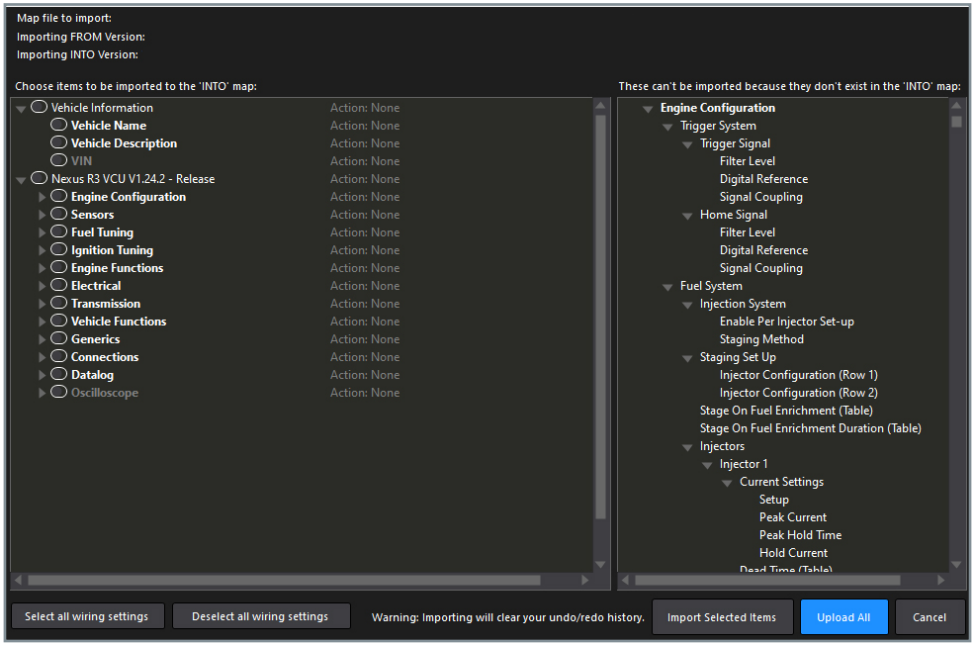


4. Upload All Settings: After opening the file, the NSP software will give you the option to upload specific parts of the map or to upload all the settings. Click on "Upload All" to copy all the base settings to your Nexus ECU. After NSP writes all the settings, click on the Reboot button to reinitialize the ECU.

5. Configure Application-Specific Settings: If you are using non-standard components on your engine, you will need to reconfigure the Nexus ECU to suit before connecting the unit to the Plug 'N' Play adapter harness and powering up the vehicle. These may include changing injector sizes/flow rates, adjusting ignition coil settings, or reconfiguring the trigger settings to match an aftermarket trigger kit.

6. Setup the Internal Jumpers: Some adapter boxes feature internal jumpers that you can set to suit specific vehicle models. If you need to change the jumper settings beyond the default configuration, open up the adapter box and follow the instructions provided in the previous section.

At this stage, the Nexus ECU and Plug 'N' Play harness are now ready to be installed into the vehicle for the initial start-up.

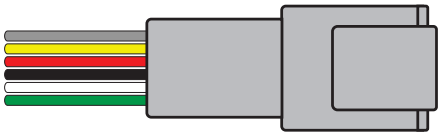


Wideband Oxygen Sensor

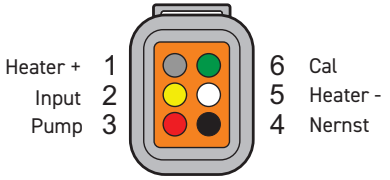
A Wideband Oxygen Sensor is a valuable tool for tuning your engine, as it measures a wide range of Air-Fuel Ratio (AFR) values that the engine operates within.

The Nexus S3/S2 ECU supports onboard wideband oxygen sensor control, specifically designed for Bosch LSU 4.9 or NTK wideband sensors, which can be selected through the NSP software.

The adapter harness is equipped with a Deutsch DTM-6 connector, allowing direct connection to the Haltech Wideband Hardware packs shown below (sold separately).



Wideband Connector (DTM04-6P)

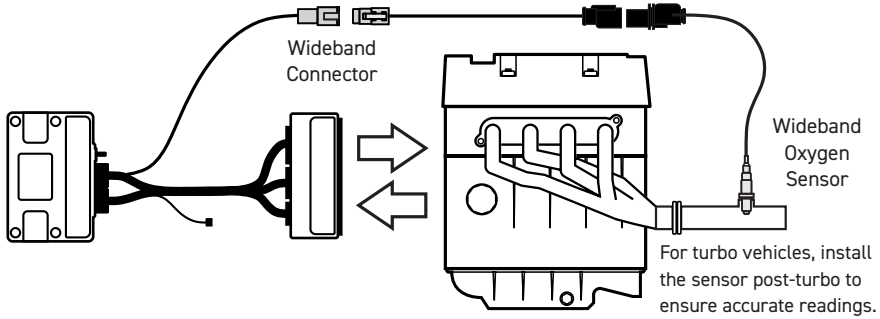


(Wire side view)

In addition to tuning, you can configure the Nexus ECU to adjust fueling to actively target the desired AFR (i.e. O2 control), or implement an engine protection strategy if the sensor detects that the engine is running too lean.

HT-010746 - Bosch LSU4.9
Wideband Hardware Pack

HT-010747 - NTK LZA08-H5
Wideband Hardware Pack

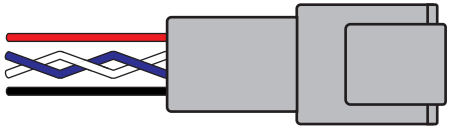


Example diagram showing how to directly connect and install a Bosch LSU4.9 Wideband Oxygen Sensor.

Haltech CAN System

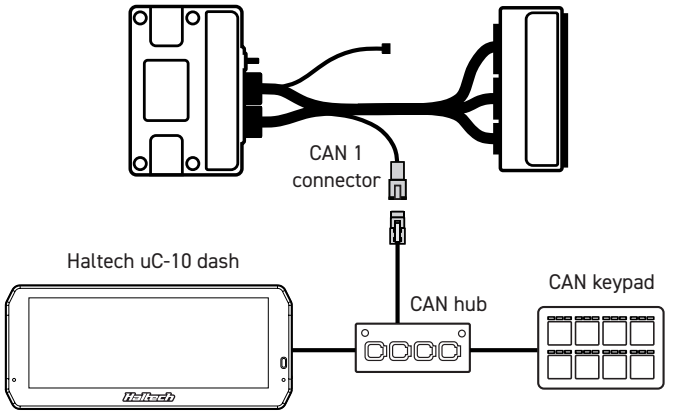
The Nexus S3/S2 ECU adapter harness is fitted with a DTM-4 CAN connector labelled as "CAN 1", which can be utilized with a range of Haltech CAN expansion products.

The diagram below illustrates example connections to multiple Haltech CAN devices (sold separately) or to a CAN WB1 / WB2 wideband module which requires external power.



Haltech CAN 1 Connector (DTM04-4P)

(Wire side view)



Example Haltech CAN devices

Air Temperature Sensor

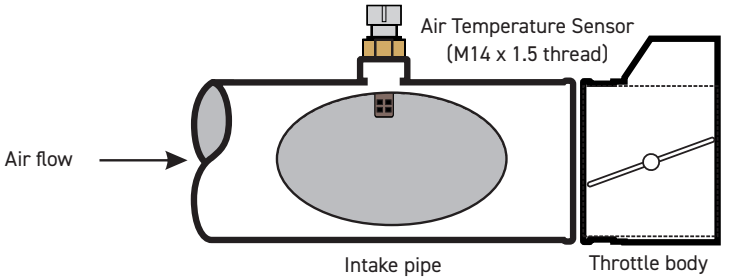
An air temperature sensor is a crucial component used in Volumetric Efficiency (VE) tuning to compensate for changes in air density caused by temperature variations.

Cold air, being denser than warm air, requires more volume of fuel to maintain the same air-fuel ratio. With this information available, the Nexus ECU can automatically adjust fuel delivery based on temperature changes using the signal received from the air temperature sensor.

While many vehicles include a factory air temperature sensor, it is often located within the Mass Air Flow (MAF) sensor assembly or integrated into the intake air manifold. Typically, performance applications involve the removal of the MAF sensor or even changing the entire intake manifold. In such cases, an air temperature sensor (HT-010200) is provided as a replacement for the factory sensor.

Mounting the included sensor in the optimal position is crucial to accurately measure the air temperature entering the combustion chamber. Typically, a good location is just before the throttle body and after a turbocharger/intercooler if using forced induction. It's essential for the sensor to be in the moving air stream for rapid response times and to minimize heat soak effects. Caution must be exercised when mounting the sensor directly into the inlet manifold, especially at the rear, as this may lead to heat soak issues, where the sensor reads the manifold temperature rather than the air moving through it.

Once a suitable position is identified, a hole must be drilled and tapped to accommodate the sensor. A weld-on bung may also be used if necessary. It's recommended to remove the air intake pipe or relevant intake hardware when installing the sensor to prevent metal shavings from entering the engine.



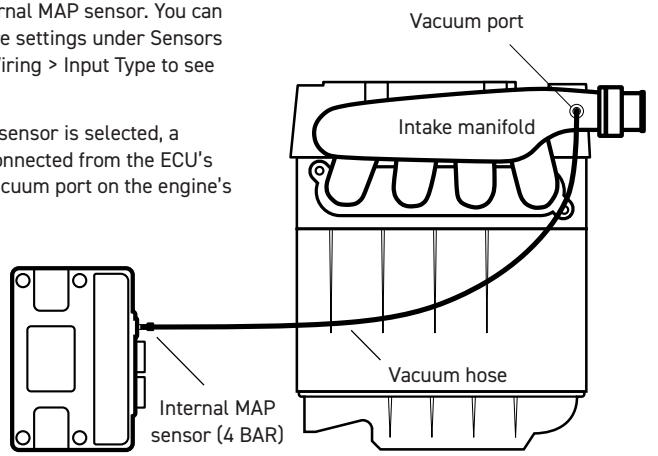
Example installation location of the included air temperature sensor

Included in this package is an air temperature sensor (HT-010200), which can be wired using the factory air temperature sensor wiring or a spare AVI or SPI, along with a signal ground connection available in the 16-pin Auxiliary connector at the rear of the adapter box. These sensors are not polarity sensitive, so either pin can be wired to either wire.

ECU Internal MAP Sensor (4 Bar)

The basemaps provided with this product will either utilize the factory MAP sensor, if the vehicle is equipped with one from the factory, or utilize the Nexus S3/S2 ECU's Internal MAP sensor. You can check this in the software settings under Sensors > Manifold Pressure > Wiring > Input Type to see which one is being used.

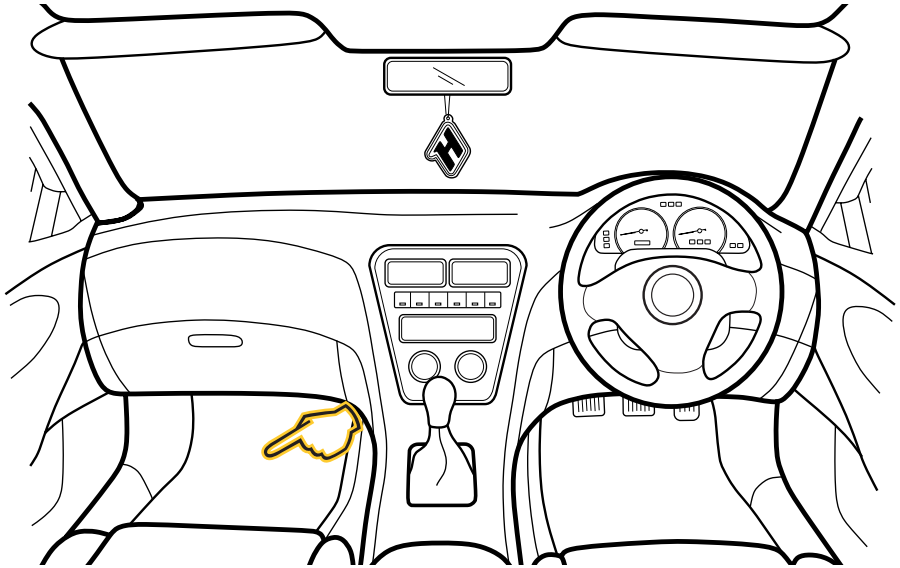
If the ECU internal MAP sensor is selected, a vacuum hose must be connected from the ECU's MAP sensor barb to a vacuum port on the engine's intake manifold. This onboard sensor is a 4 Bar MAP sensor capable of reading vacuum and boost pressures up to 43.5 psi. No user calibration is necessary for this sensor.



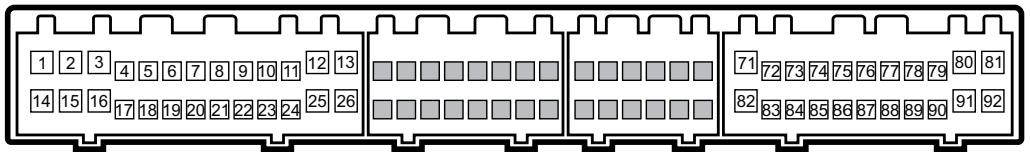
ECU location

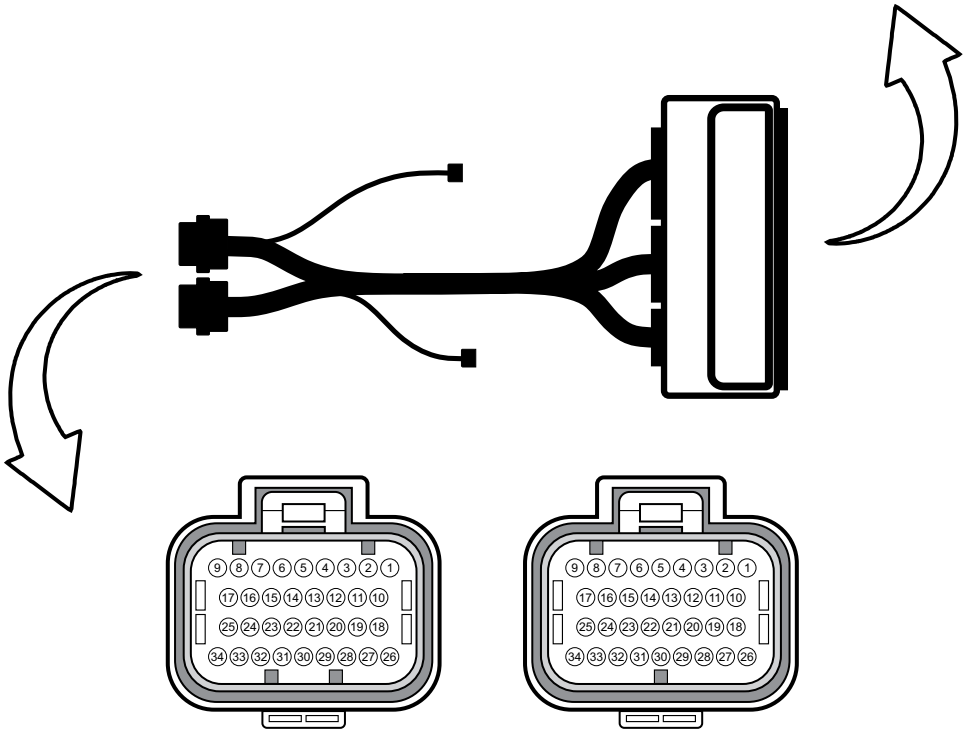
The factory ECU on the Mazda MX5 1.6L (all regions) and 1.8L (all regions, except USA) is located under a protective plate on the passenger side footwell. Removal of the panel allows the installation of this Haltech Plug 'N Play product. Below is a generic illustration for reference.

On the USDM 1.8L, the factory ECU is located behind the passenger seat.



Vehicle connector:





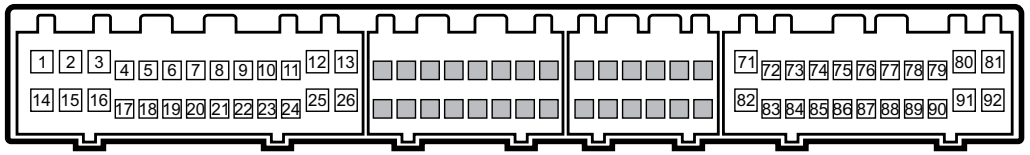
Connector C
Keyway Type 2

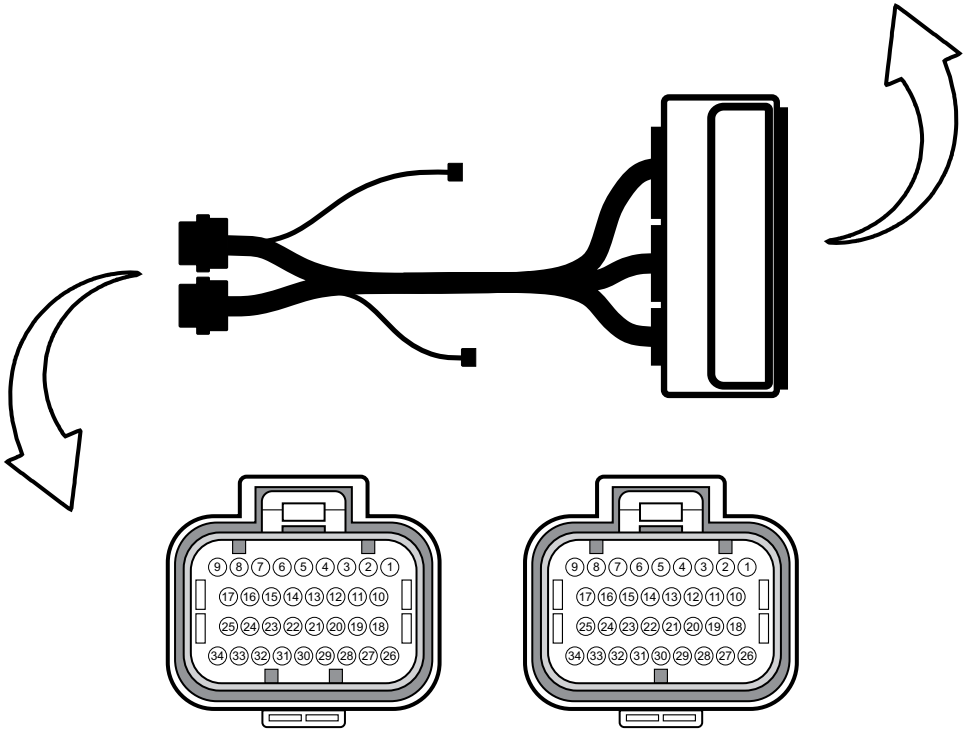
Connector A
Keyway Type 1

All connectors above are shown with reference to the pin side (front of connectors).

NEXUS S3/S2 ECU CONNECTOR A (KEYWAY TYPE 1)				
Pin	**Function**	**Colour**	**Vehicle connector**	**Function**
A1	Injector 1	Blue	3	Injector 1
A2	Injector 2	Blue/Black	16	Injector 2
A3	Injector 3	Blue/Brown	1	Injector 3
A4	Injector 4	Blue/Red	14	Injector 4
A5	Injector 5 (S3 only)	Blue/Orange	No connection	No connection
A6	Injector 6 (S3 only)	Blue/Yellow	No connection	No connection
A7	Injector 7 (S3 only)	Blue/Green	No connection	No connection
A8	Injector 8 (S3 only)	Blue/Violet	No connection	No connection
A9	DPO 1	Violet/Black	9	Tachometer
A10	Battery ground input	Black	13, 22, 25, 26	Power ground
A11	Battery ground input	Black	13, 22, 25, 26	Power ground
A12	DPO 2	Violet/Brown	88	AC control
A13	Ignition switch input	Pink	No connection	No connection
A14	DPO 3	Violet/Red	2	Idle control (BAC)
A15	DPO 4	Violet/Orange	87 (1.8L) or 84 (1.6L)	Thermofan (Jumper on PCB)
A16	DPO 5	Violet/Yellow	6, 17	Fuel pump relay
A17	DPO 6	Violet/Green	No connection	No connection
A18	+12V switched input	Red	92	+12V power from ECR
A19	HBO 1	Brown/Black	No connection	No connection
A20	HBO 2	Brown/Red	No connection	No connection
A21	HBO 3	Brown/Green	No connection	No connection
A22	HBO 4	Brown/Pink	No connection	No connection
A23	CAN 1 H	White	CAN connector Pin 3	Haltech CAN devices (See page 7 for details)
A24	CAN 1 L	Blue	CAN connector Pin 4	
A25	+12V switched input	Red	92	+12V power from ECR
A26	ECR output	Black/Red	No connection	No connection
A27	Ignition 1	Yellow/Black	78	Ignition 1 and 4
A28	Ignition 2	Yellow/Red	89	Ignition 2 and 3
A29	Ignition 3	Yellow/Orange	No connection	No connection
A30	Ignition 4	Yellow/Green	No connection	No connection
A31	Ignition 5 (S3 only)	Yellow/Brown	15	Purge solenoid
A32	Ignition 6 (S3 only)	Yellow/Blue	No connection	No connection
A33	Ignition 7 (S3 only)	Yellow/Violet	No connection	No connection
A34	Ignition 8 (S3 only)	Yellow/Gray	No connection	No connection

Vehicle connector:



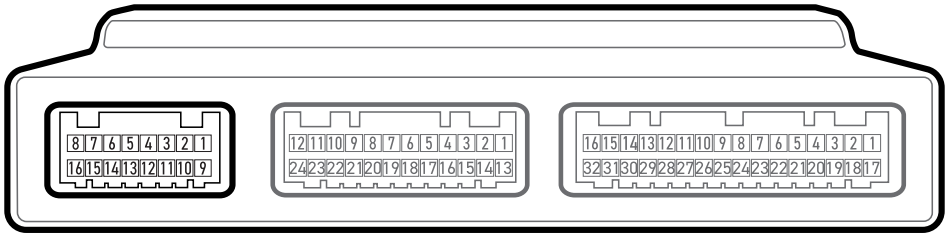


Connector C
Keyway Type 2

Connector A
Keyway Type 1

All connectors above are shown with reference to the pin side (front of connectors).

NEXUS S3/S2 ECU CONNECTOR C (KEYWAY TYPE 2)				
Pin	**Function**	**Colour**	**Vehicle connector**	**Function**
C1	Trigger +	White	11	Crank
C2	Trigger -	Black	No connection	No connection
C3	Home +	White	10	Cam
C4	Home -	Black	No connection	No connection
C5	SPI 1	Gray/Brown	75	Vehicle speed sensor
C6	SPI 2	Gray/Red	To auxiliary connector	Auxiliary IO
C7	SPI 3	Gray/Orange	No connection	No connection
C8	SPI 4	Gray/Yellow	No connection	No connection
C9	+8V	Orange/White	No connection	No connection
C10	AVI 1	White	20	Narrowband O2 sensor
C11	AVI 2	White/Yellow	No connection	No connection
C12	AVI 3	White/Gray	No connection	No connection
C13	AVI 4	White/Violet	To auxiliary connector	Auxiliary IO
C14	AVI 5	White/Green	No connection	No connection
C15	AVI 6	White/Orange	No connection	No connection
C16	AVI 7	White/Black	19	Air temperature
C17	AVI 8	White/Brown	5	Coolant temperature
C18	AVI 9	White/Red	73	AC request
C19	SPI 5	No connection	No connection	No connection
C20	SPI 6	No connection	No connection	No connection
C21	CAN 2 H	White	To auxiliary connector	Auxiliary CAN high
C22	CAN 2 L	Blue	To auxiliary connector	Auxiliary CAN low
C23	Knock 1	White	No connection	No connection
C24	Knock 2	White	No connection	No connection
C25	+5V	Orange	8, 21	Sensor power supply
C26	Signal ground	Black/White	12, 76	Sensor ground
C27	AVI 10	Light Green	7, 86	Throttle position sensor
C28	AVI 11	No connection	No connection	No connection
C29	WBI 1 Heater +	Gray	Wideband conn. Pin 1	Onboard wideband control (See page 6 for details)
C30	WBI 1 Input	Yellow	Wideband conn. Pin 2	
C31	WBI 1 Pump	Red	Wideband conn. Pin 3	
C32	WBI 1 Nernst	Black	Wideband conn. Pin 4	
C33	WBI 1 Heater -	White	Wideband conn. Pin 5	
C34	WBI 1 Cal	Green	Wideband conn. Pin 6	



Auxiliary Connector

The 16-pin auxiliary connector located on the rear side of the adapter provides additional inputs and outputs that link to the Nexus ECU. The kit is supplied with spare pins that you can use if you need to connect to these additional I/Os. Use an appropriate crimping tool, such as the HT-070300.

Please refer to the pinout information below for details on the spare inputs and outputs available for this application.

AUXILIARY CONNECTOR (16 PIN)			
Pin	**Connection**	**Function**	**Notes**
1	From Nexus ECU (C25)	+5V	+5V DC sensor supply
2	From Nexus ECU (C13)	AVI 4	Spare input
3	No connection	No connection	No connection
4	From Nexus ECU (C26)	Signal ground	Signal ground for sensors
5*	From Nexus ECU (A33)	Ignition 7 (S3 only)	Spare output
6*	From Nexus ECU (A34)	Ignition 8 (S3 only)	Spare output
7	From Nexus ECU (C6)	SPI 2	Spare input
8	From Nexus ECU (A18/A25)	+12V	+12V DC switched supply for relays and solenoids
9	From Nexus ECU (C25)	+5V	+5V DC sensor supply
10	From Nexus ECU (C21)	CAN 2H	Auxiliary CAN
11	From Nexus ECU (C22)	CAN 2L	Auxiliary CAN
12	From Nexus ECU (C26)	Signal ground	Signal ground for sensors
13	No connection	No connection	No connection
14*	From Nexus ECU (A8)	Injector 8 (S3 only)	Spare output
15	No connection	No connection	No connection
16	From Nexus ECU (A18/A25)	+12V	+12V DC switched supply for relays and solenoids

* These pins have a direct wired connection to the Nexus ECU. The rest of the pins on this auxiliary connector loop within the adapter box and back to the Nexus ECU through the 24- and 32-pin Tyco connectors.

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.

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