UNIVERSAL
WIRE-IN HARNESS
FOR NEXUS S3 / S2 ECU
2.5m (8')

QUICK START GUIDE

HT-182200

9 356450 014694

HARNESS OVERVIEW

Congratulations on purchasing a Haltech universal wire-in harness for your Nexus S3 or Nexus S2 ECU!

This versatile harness plugs directly to the Nexus S3/S2 ECU, with unterminated cables at the other end that can be wired to most popular engines. For your convenience, all unterminated wires are colour coded and labelled in groups, making identification easy.

In conjunction with the Nexus S3/S2 ECU, this harness provides access to all the advanced tuning options available through the Nexus Software Programmer (NSP).

This quick start guide is here to help you through the installation process, including steps for wiring common sensors, actuators, and other engine components.

Harness Features:

Haltech Nexus S3/S2 ECU connectors

All wires grouped, color coded and labeled for ease of identification

Dual CAN bus connections for Haltech CAN devices (e.g., digital displays, keypads, etc.)

Shielded crank (trigger) and cam (home) sensor wires for reluctor or hall effect sensor types

11 x analog voltage inputs (AVIs) to connect to voltage type sensors (e.g., MAP, temperature, pressure, position)

6 x synchronized pulsed inputs (SPIs) for frequency type sensors (e.g., speed sensors, flex fuel sensors)

2 x knock sensor inputs

1 x wideband lambda sensor control

6 x digital pulsed outputs (DPOs)

4 x half bridge outputs (HBOs)

8 x ignition outputs (4x if using Nexus S2)

8 x injector outputs (4x if using Nexus S2)

1 x engine control relay (ECR) output

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.

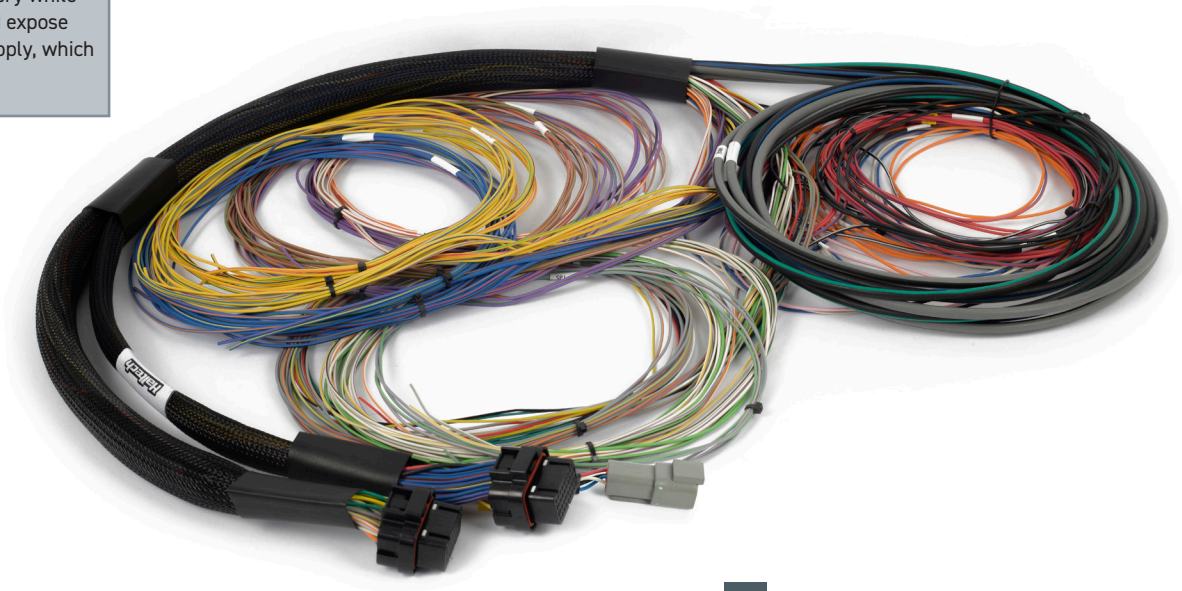
Do not charge or disconnect the battery while the engine is running. Doing so could expose the ECU to an unregulated power supply, which might lead to ECU failure.

What's in the bag?

HT-182200 - Universal wire-in harness for a Nexus S3 or Nexus S2 ECU.

Harness length: 2.5m (8')

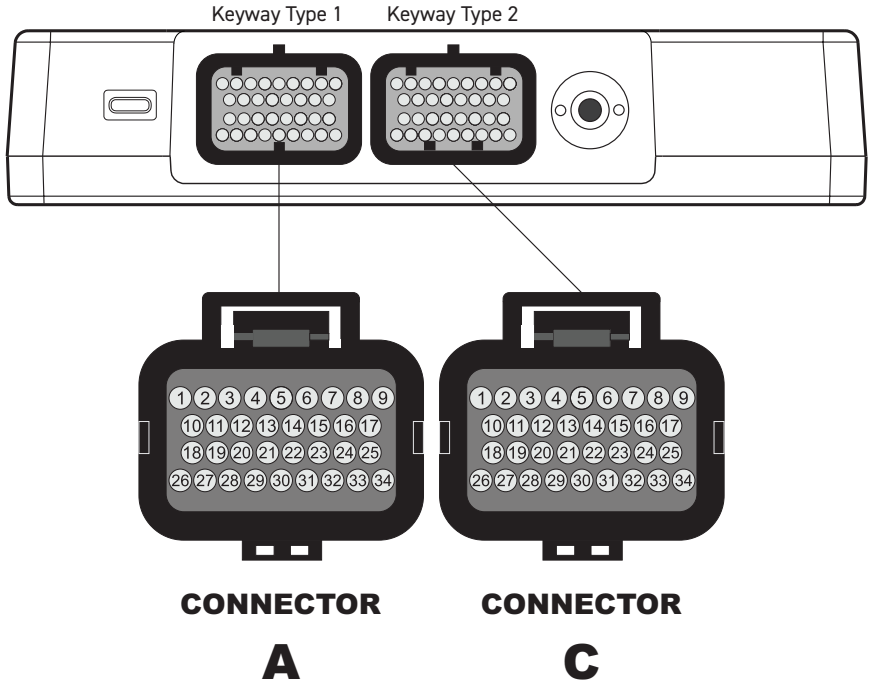




HARNESS PINOUT DIAGRAM

CONNECTOR A (KEYWAY TYPE 1)		
Pin	**Function**	**Colour**
A1	Injector 1	Blue
A2	Injector 2	Blue/Black
A3	Injector 3	Blue/Brown
A4	Injector 4	Blue/Red
A5	Injector 5 (S3 only)	Blue/Orange
A6	Injector 6 (S3 only)	Blue/Yellow
A7	Injector 7 (S3 only)	Blue/Green
A8	Injector 8 (S3 only)	Blue/Violet
A9	DPO 1	Violet/Black
A10	Battery Ground input	Black
A11	Battery Ground input	Black
A12	DPO 2	Violet/Brown
A13	Ignition Switch input	Pink
A14	DPO 3	Violet/Red
A15	DPO 4	Violet/Orange
A16	DPO 5	Violet/Yellow
A17	DPO 6	Violet/Green
A18	+12V switched input	Red
A19	HBO 1	Brown/Black
A20	HBO 2	Brown/Red
A21	HBO 3	Brown/Green
A22	HBO 4	Brown/Pink
A23	CAN 1 H	White
A24	CAN 1 L	Blue
A25	+12V switched input	Red
A26	ECR output	Black/Red
A27	Ignition 1	Yellow/Black
A28	Ignition 2	Yellow/Red
A29	Ignition 3	Yellow/Orange
A30	Ignition 4	Yellow/Green
A31	Ignition 5 (S3 only)	Yellow/Brown
A32	Ignition 6 (S3 only)	Yellow/Blue
A33	Ignition 7 (S3 only)	Yellow/Violet
A34	Ignition 8 (S3 only)	Yellow/Gray

CONNECTOR C (KEYWAY TYPE 2)		
Pin	**Function**	**Colour**
C1	Trigger +	Yellow
C2	Trigger -	Green
C3	Home +	Yellow
C4	Home -	Green
C5	SPI 1	Gray/Brown
C6	SPI 2	Gray/Red
C7	SPI 3	Gray/Orange
C8	SPI 4	Gray/Yellow
C9	+8V sensor power	Orange/White
C10	AVI 1	White
C11	AVI 2	White/Yellow
C12	AVI 3	White/Gray
C13	AVI 4	White/Violet
C14	AVI 5	White/Green
C15	AVI 6	White/Orange
C16	AVI 7	White/Black
C17	AVI 8	White/Brown
C18	AVI 9	White/Red
C19	SPI 5	Gray/Pink
C20	SPI 6	Gray/Light Green
C21	CAN 2 H	White
C22	CAN 2 L	Blue
C23	Knock 1	White
C24	Knock 2	White
C25	+5V sensor power	Orange
C26	Signal ground	Black/White
C27	AVI 10	Light Green
C28	AVI 11	Light Green/Black
C29	WBI 1 Heater +	Gray
C30	WBI 1 Input	Yellow
C31	WBI 1 Pump	Red
C32	WBI 1 Nernst	Black
C33	WBI 1 Heater -	White
C34	WBI 1 Cal	Green





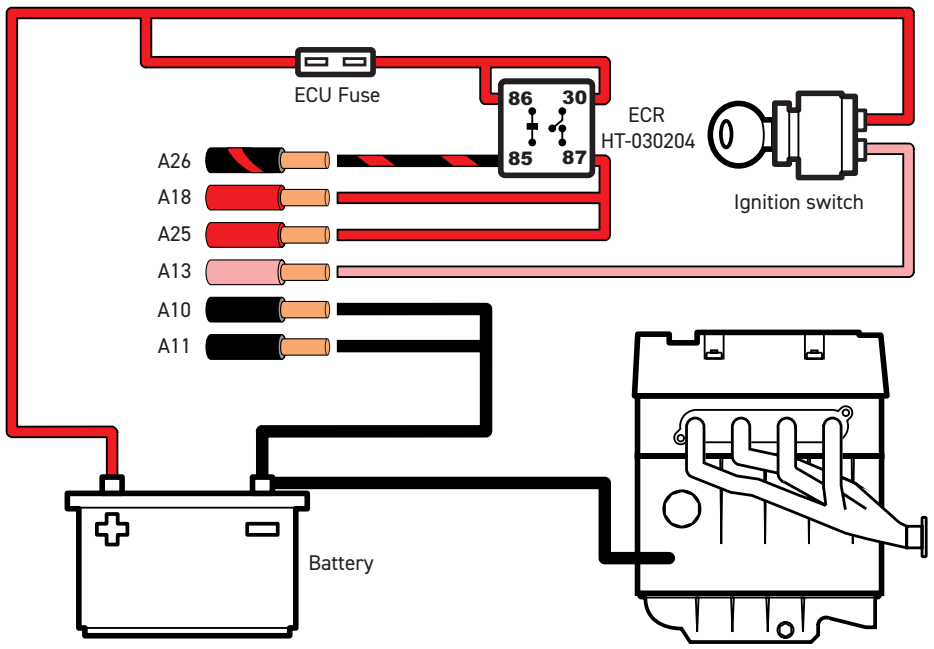
Main Power and Ground

To ensure that your Nexus S3 or Nexus S2 ECU operates effectively and reliably, it is imperative to wire the ECU's main power and ground pins correctly. Specifically, you must correctly connect two +12V power pins, A18 and A25, and two battery ground pins, A10 and A11.

The ECU also requires the power source to be fused and switched through an Engine Control Relay (ECR) to ensure a consistent and stable power supply. The wiring diagram provided below illustrates this configuration in detail.

The ECU is designed so that the ECR output, pin A26, switches to ground once the Ignition Switch input, pin A13, detects a +12V signal. This function is operational even when the ECU is powered off, enabling it to control the ECR and switch power to the main power pins to power itself on.

When setting up the Ignition Switch signal, it is crucial that the signal remains active when the Ignition Key Switch is in the Ignition On and Start positions. This ensures the ECU stays powered on while the engine is cranking, preventing start-up issues that could strain engine components.



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

NOTE: The relay depicted in this diagram corresponds to the pin numbering for a HT-030204 relay. If you're using a different relay, make sure you wire it according to the pinout that specific relay requires.

Crank (Trigger) and Cam (Home) Inputs

The 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 necessary, the harness also provides a +8V and a +5V power supply wire.

Reluctor sensor

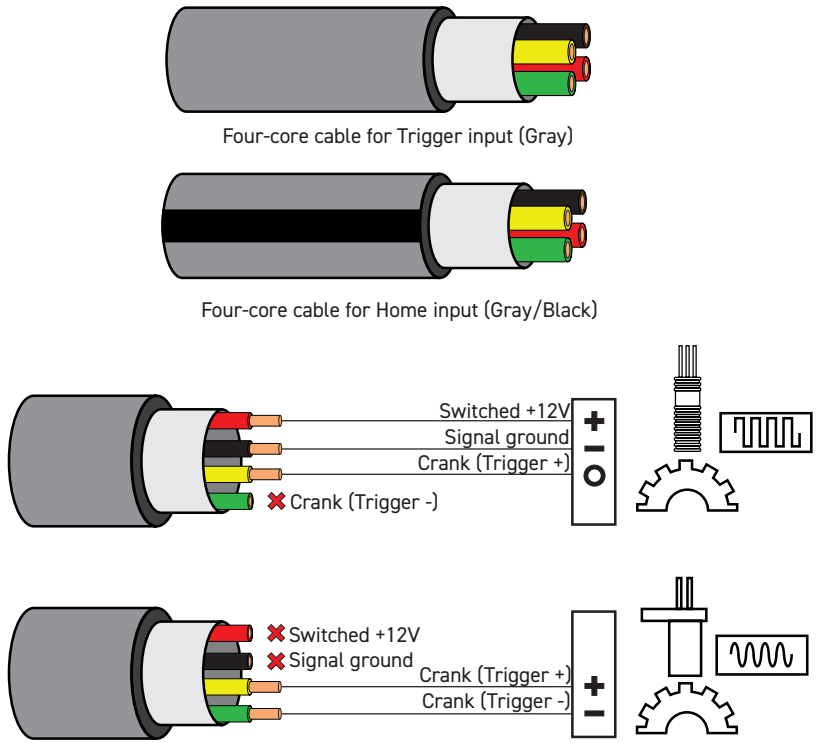
This type of sensor produces a sine wave signal. Reluctor sensors do not require external power, as these sensors can generate their own voltage signal as they detect a moving tooth or trigger.

This harness comes equipped with a four-core gray shielded cable for the Crank sensor (i.e. Trigger), and a four-core gray/black shielded cable for the Cam sensor (i.e. Home). The shields on these cables are already connected to the ECU's battery ground wires within the harness and does not require any further 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



✖ indicates not connected. Please insulate and isolate to avoid damage to the ECU.

Ignition Outputs

Ignition outputs are used to control the ignition system of the engine. The ignition outputs can be connected directly to ignition coils only if the coils are equipped with internal igniters.

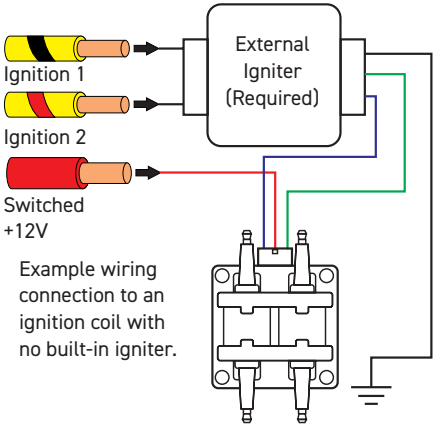
Ignition coils without internal igniters draw large amounts of current and thus must use an external igniter module to be safely triggered by the ECU's ignition outputs. Connecting directly to a coil without internal igniters will damage the ECU.

Specs:

- Number of Ignition channels -
  Nexus S3: 8
  Nexus S2: 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

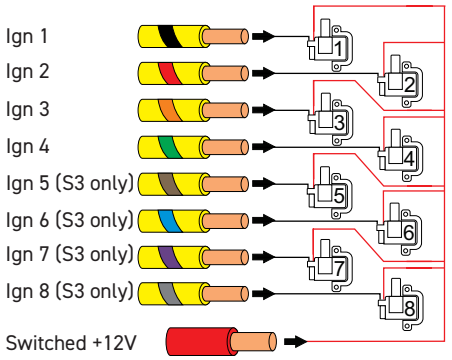
Unused ignition outputs can also be used as:

- 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.

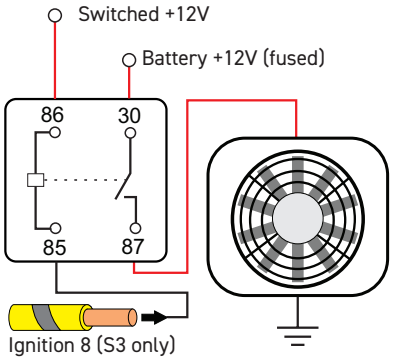
8-Cylinder Direct Fire Ignition
(Wire as per cylinder order)



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 to an ignition module without first properly setting the ignition firing edge could damage both the module and the coils. As a precaution, either unplug the module or disconnect the power to the ignition system until the ECU has been correctly configured.



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

Injector Outputs

All injectors should be wired directly to the corresponding cylinder output pins on the ECU and connected to a shared +12V power supply.

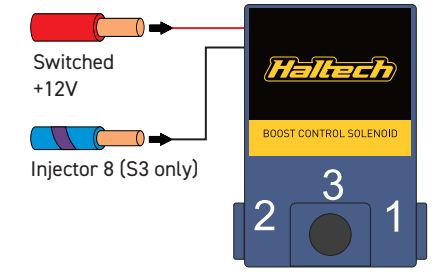
When not allocated for injector control, the additional injector outputs can function as generic digital pulsed outputs (DPO) capable of either switching to ground or using pulse width modulation (PWM).

Specs:

- Number of Injector channels -
  Nexus S3: 8
  Nexus S2: 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)



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

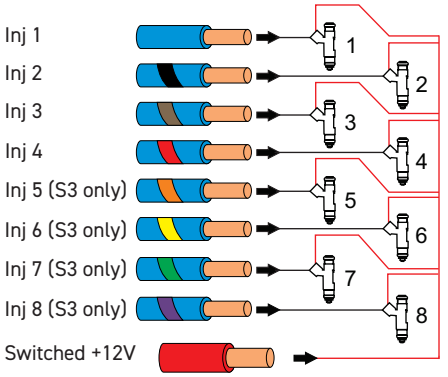
Knock Inputs

This universal wire-in harness for Nexus S3 or S2 is equipped with dual shielded cables for knock sensor input. The ECU can perform knock detection when a compatible piezoelectric knock sensor is mounted to the engine block.

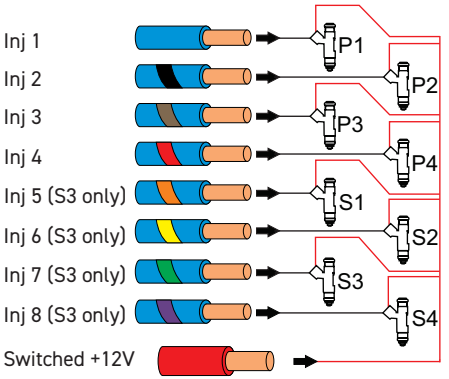
Specs:

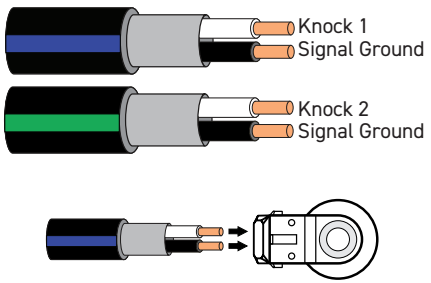
- Number of channels: 2
- -2.5 to +2.5V AC input only
- 160Hz to 48kHz signal frequency band
- +/-3V indefinite AC voltage withstand
- 50V indefinite DC withstand

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



4-Cylinder Two-Stage Injection





Example wiring connection to a Bosch Knock sensor.

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: 11
- 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 Inputs

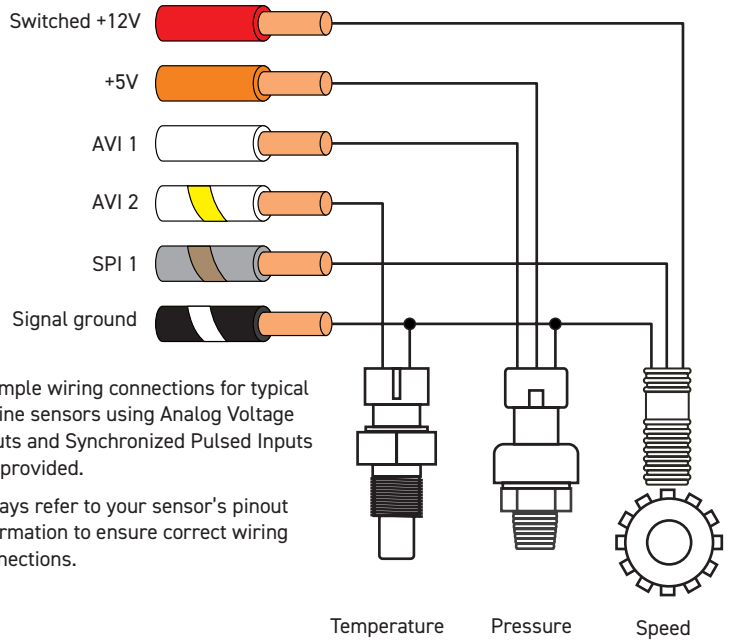
Synchronized Pulsed Inputs (SPI) can measure the frequency, duty cycle, state condition, or relative position of a signal. Additionally, like AVIs, they can read 0-5V analog voltage sensors.

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.

Synchronized Pulsed Inputs are 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: 6
- -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.

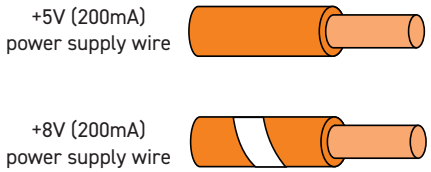
Always refer to your sensor's pinout information to ensure correct wiring connections.

5V Sensor Power Supply

This harness includes a +5V power supply wire, designed to power typical 3-pin analog voltage devices such as MAP sensors, pressure sensors, throttle position sensors, and rotary trim switches. The +5V wire can be shared among multiple sensors, with the Nexus S3 or S2 ECU providing a total current of 200mA.

For sensors that specifically need +8V power, the harness also features an +8V power supply wire, capable of delivering a similar 200mA current.

Both the +5V and +8V power supply pins from the Nexus S3 or S2 ECU features protection from overvoltages and short circuits.



Digital Pulsed Outputs

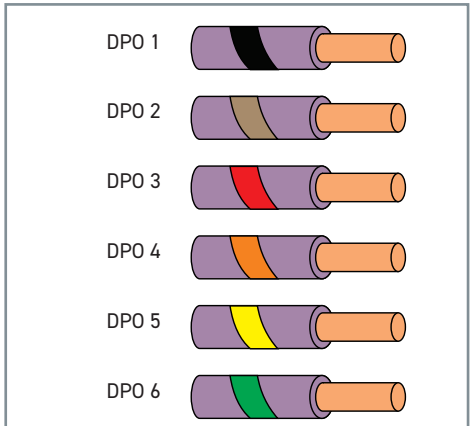
Digital Pulsed Outputs (DPO) are designed to ground-switch devices or to provide frequency-based control or pulse width modulation as needed.

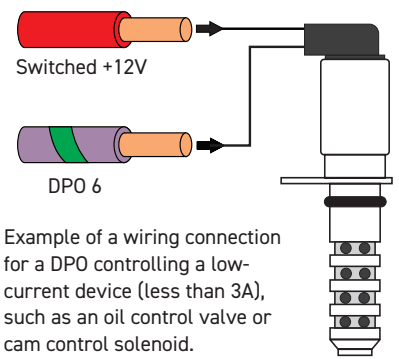
Common devices paired with DPOs include relays, idle air control valves, boost control solenoids, oil control valves, etc. Each DPO channel has a maximum sink current of 3A.

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

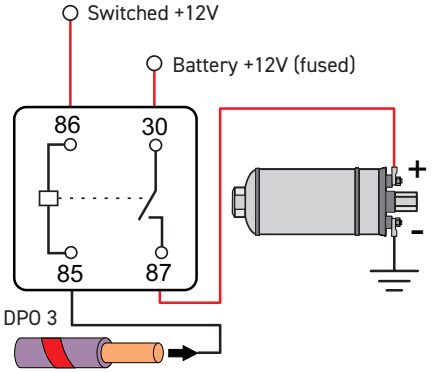
Specs:

- Number of channels: 6
- 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.

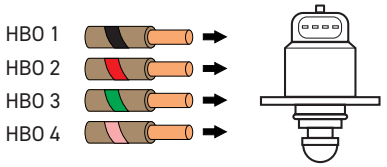
Half Bridge Outputs

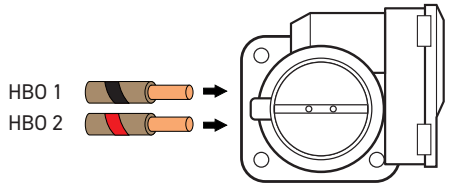
Half bridge outputs (HBO) function as push-pull, pulse width modulated channels suitable for controlling stepper motors, drive-by-wire throttles, or electronic wastegates.

HBOs can also be used to provide +12V power to high-side driven devices such as VTEC solenoids or high-side switched automatic transmission solenoids.

Specs:

- Number of channels: 4
- 8A source (12V) or 8A sink (ground) output
- 5A max when used as push-pull PWM (eg DBW)
- 18kHz switching speed in DBW mode
- Automatic overcurrent and overtemp protection
- 0 to 27V feedback
- Unused HBOs can function as generic push-pull outputs with a 2.2kHz PWM frequency



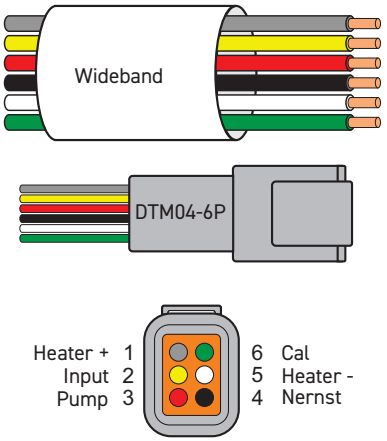


A typical application of Half Bridge Outputs includes controlling a 4-pin idle air stepper motor or using a push-pull HBO pair to operate the motor in a drive-by-wire throttle system.

Wideband O2 Sensor

The Nexus S3 or S2 ECU features on-board control for a single wideband O2 sensor giving you the option to use either a Bosch LSU4.9 or an NTK LZA08-H5 sensor.

To use this feature, the six wires in this harness, labelled as "Wideband," need to be terminated with a DTM04-6P female connector.



Wire side view

This allows connection to Haltech wideband sensor kits, which include:

HT-010746 - Bosch LSU4.9 wideband sensor
HT-010747 - NTK LZA08-H5 wideband sensor

Using a wideband lambda sensor is recommended to accurately tune the engine for fuel, and it enables the ECU to use features such as closed-loop O2 control or lean-out protection strategies.

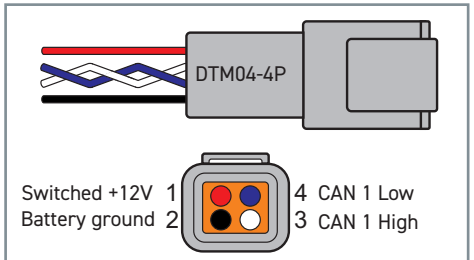


Haltech CAN connection
(Label: CAN 1 and CAN 2)

This harness features two sets of CAN twisted pair wiring, designated for the dual CAN channels available on the Nexus S3 or Nexus S2 ECU.

Specs:

- Supports CAN speeds up to 1 Mbit/s
- Selectable 120ohm termination resistor per CAN channel
- Supports all Haltech CAN expansion products
- Selectable preconfigured vehicle CAN interface (OBDII compliant)

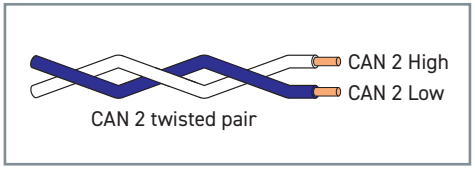


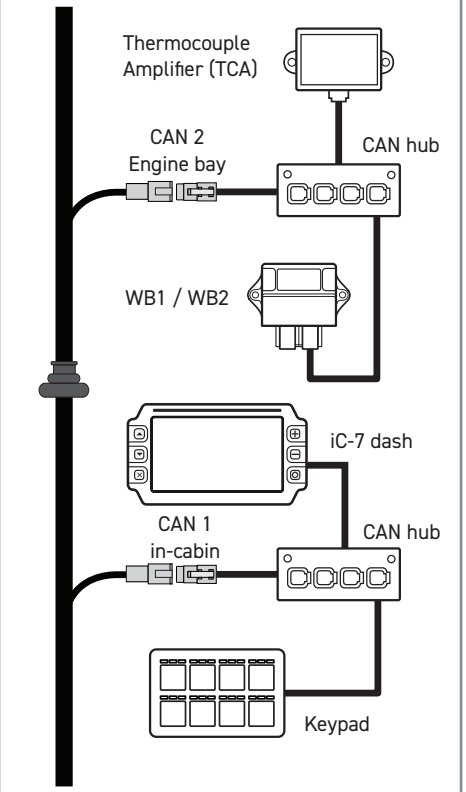
Wire side view

CAN 1 comes pre-terminated with a DTM04-4P connector to suit the standard 4-pin DTM connection commonly found on Haltech CAN devices. CAN 1 is supplied with switched 12V power and a power ground near the ECU for easy in-cabin access for devices such as Haltech dash displays or a Haltech CAN keypad.

CAN 2, on the other hand, is left as an unterminated twisted pair flying lead long enough to reach the engine bay. Depending on your installation requirements, you can cut this twisted pair wiring to your desired length and terminate it with a DTM04-4P female connector, as shown in the diagram above.

To ensure minimal susceptibility to electromagnetic disturbances and crosstalk, it is important to maintain the twisted configuration of the CAN high and CAN low wires during installation.







CONNECTOR A (KEYWAY TYPE 1)		
Pin	**Function**	**Notes**
A1	Injector 1	
A2	Injector 2	
A3	Injector 3	
A4	Injector 4	
A5	Injector 5 (S3 only)	
A6	Injector 6 (S3 only)	
A7	Injector 7 (S3 only)	
A8	Injector 8 (S3 only)	
A9	DPO 1	
A10	Battery Ground input	
A11	Battery Ground input	
A12	DPO 2	
A13	Ignition Switch Input	
A14	DPO 3	
A15	DPO 4	
A16	DPO 5	
A17	DPO 6	
A18	+12V switched input	
A19	HBO 1	
A20	HBO 2	
A21	HBO 3	
A22	HBO 4	
A23	CAN 1 H	
A24	CAN 1 L	
A25	+12V switched input	
A26	ECR output	
A27	Ignition 1	
A28	Ignition 2	
A29	Ignition 3	
A30	Ignition 4	
A31	Ignition 5 (S3 only)	
A32	Ignition 6 (S3 only)	
A33	Ignition 7 (S3 only)	
A34	Ignition 8 (S3 only)	

CONNECTOR C (KEYWAY TYPE 2)		
Pin	**Function**	**Notes**
C1	Trigger +	
C2	Trigger -	
C3	Home +	
C4	Home -	
C5	SPI 1	
C6	SPI 2	
C7	SPI 3	
C8	SPI 4	
C9	+8V sensor power	
C10	AVI 1	
C11	AVI 2	
C12	AVI 3	
C13	AVI 4	
C14	AVI 5	
C15	AVI 6	
C16	AVI 7	
C17	AVI 8	
C18	AVI 9	
C19	SPI 5	
C20	SPI 6	
C21	CAN 2 H	
C22	CAN 2 L	
C23	Knock 1	
C24	Knock 2	
C25	+5V sensor power	
C26	Signal ground	
C27	AVI 10	
C28	AVI 11	
C29	WBI 1 Heater +	
C30	WBI 1 Input	
C31	WBI 1 Pump	
C32	WBI 1 Nernst	
C33	WBI 1 Heater -	
C34	WBI 1 Cal	

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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