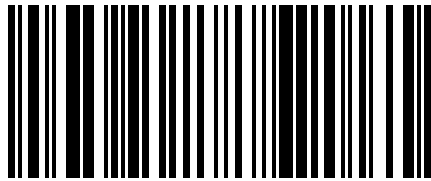




PRNDL
SIGNAL CONVERTER
FOR TOYOTA A340

QUICK START GUIDE

HT-038010



9356450011112

PRODUCT OVERVIEW

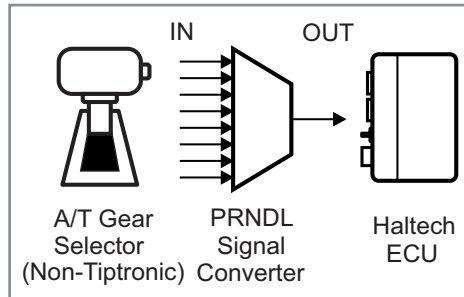
Congratulations on purchasing a Haltech PRNDL Signal Converter. This device allows you to take input from the range selector on a Toyota A340 non-Tiptronic transmission, and convert it to a single 0-5V signal for use in an Elite or Nexus ECU.

The A340 transmission has multiple discrete voltage outputs that are responsible for telling the ECU which gear you have selected on the gear shift lever.

While it is possible to wire each of these discrete inputs into a compatible Haltech ECU with automatic transmission control, this method would require the use of multiple inputs on the ECU.

The purpose of the PRNDL Signal Converter is to combine all of the discrete inputs into a single variable voltage output that the ECU can use to determine the selected gear position.

Once the ECU is aware of the desired gear position this information can then be used for Automatic Transmission Control on compatible ECUs. This information can also be useful for datalogging and body control functionality such as reverse light triggering or inhibiting the starter motor when the transmission is in gear.

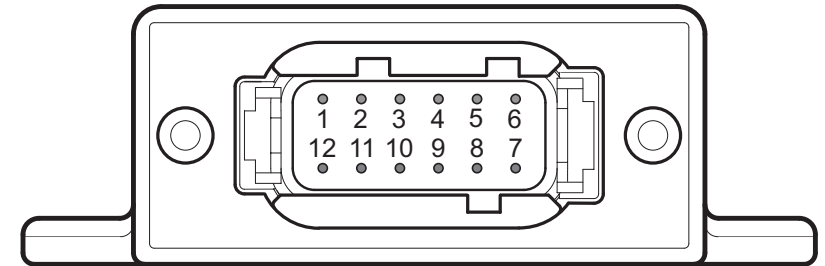


What's in the box?

- 1 x HT-038010 - PRNDL Signal Converter
- 1 x DTM12 opposing connector and pins
- 1 x Quick Start Guide



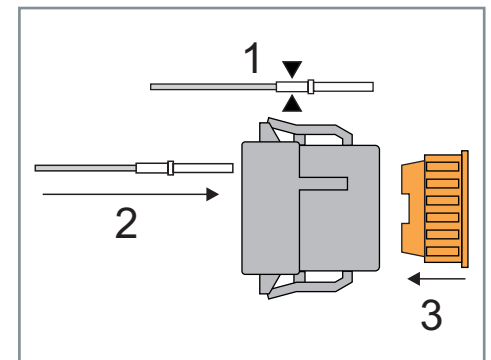
Pinout Information



PIN	FUNCTION	NOTES
1	12V Switched	+8V to +18V operating range
2	Signal Ground Input	Connect to signal ground input on the ECU.
3	Input 1	Active high. Input needs to see battery voltage to trigger logic.
4	Input 2	Active low. Input needs to see ground to trigger logic.
5	Input 3	Active low. Input needs to see ground to trigger logic.
6	Input 4	Active high. Input needs to see battery voltage to trigger logic.
7	Input 12	Active low. Input needs to see ground to trigger logic.
8	Input 10	Active low. Input needs to see ground to trigger logic.
9	Input 8	Active low. Input needs to see ground to trigger logic.
10	Input 6	Active high. Input needs to see battery voltage to trigger logic.
11	No Connection	
12	Analogue Output 0-5v	Connect to any spare AVI on the ECU. Pull-up option must be disabled.

Connector and Pin Termination Instructions

- 1.) Crimp all wires to be used into female pins.
- 2.) Insert all pins/wires into wire side of the DTM-12 connector, following the wiring recommendation on the next pages.
- 3.) Insert the wedge to lock pins in the connector.



Wiring the PRNDL Signal Converter

The PRNDL Signal Converter can be wired to a Toyota A340 transmission in two ways:

The first method is to wire to the ECU and is suitable if the requirement is to only do automatic transmission control.

The second method involves wiring to the gear selector position switch and is more suitable if the ECU is also required to display PRNDL information on a digital dash.

Method 1: Wiring to the ECU

The first diagram on page 5 shows how the PRNDL Signal Converter can be wired into the factory harness using the available PRNDL signals that go to the factory ECU location. The diagram also shows how much inputs can be saved if the discrete PRNDL signals are to be wired to the PRNDL Signal Converter instead of wiring them directly to the ECU. These now spare ECU inputs can instead be used for other switches or sensors that can provide better engine control, safety, or monitoring (e.g. datalogging).

To power the PRNDL Signal Converter properly, wire Pin 1 on the unit to a +12V switched supply and Pin 2 to a signal ground pin on the ECU.

Pin 12, which is the 0-5v output from the PRNDL Signal Converter, will need to be wired to a spare Analogue Voltage Input (AVI) on the ECU with the pullup option disabled if the input is equipped with an onboard pullup resistor.

The rest of the connections will be the PRNDL signals that are available in the factory ECU harness. These include:

- Neutral and Park switch (NSW)
- A/T second gear position indicator (2)
- A/T first gear position indicator (L)
- Overdrive gear On or Off (OD)

These are the minimum inputs needed by a Haltech ECU from the gear selector position to control a Toyota A340 transmission.

The Drive input (D) is not shown as this wire does not go to the factory ECU location. This will not affect transmission control though as "Drive" is still accounted for in the PRNDL calibration shown in the next few pages.

Method 2: Wiring to Gear Selector Position

In some applications, the initial recommendation of wiring the PRNDL Signal Converter may be insufficient, say if the intention is to have the ECU display all the gear selector positions on a digital dash like the Haltech iC-7.

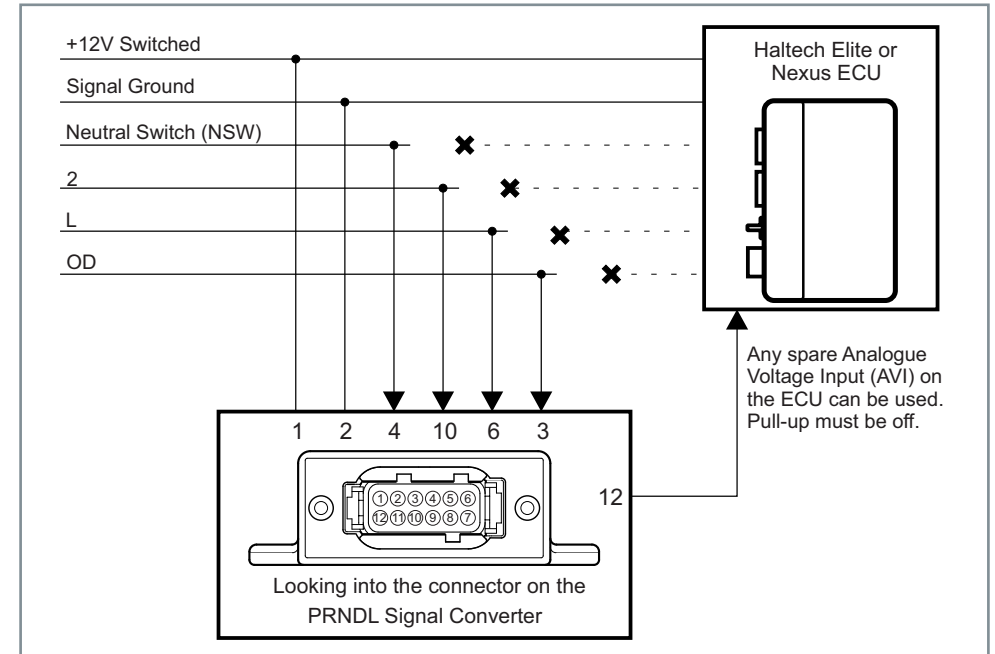
For such applications, the installer needs to access the wiring that runs directly to the gear selector position where all the discrete signals from the selector position switch are available to be used.

The second diagram on page 5 shows how the PRNDL Signal Converter needs to be wired for this type of application. It is important to take note though that wiring it this way will require some inputs on the PRNDL Signal Converter to be physically set inside the unit to be active high. That is, the input will be triggered active when it sees 12v.

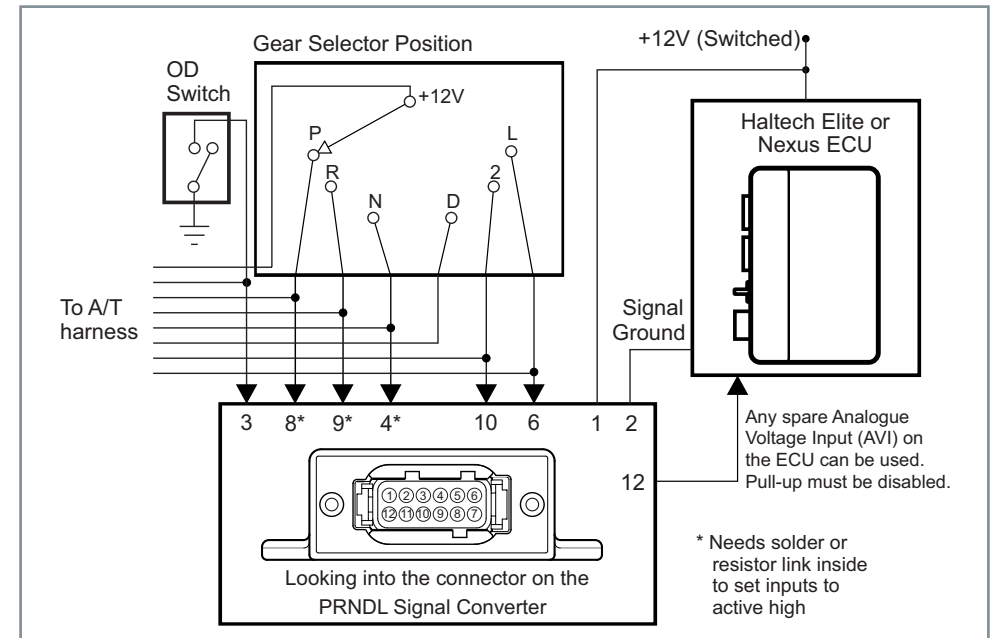
To physically set the input to active high, the PRNDL Signal Converter unit enclosure must be opened and the links on the board will have to be connected. Specifically, Input 2 (Pin 4), Input 8 (Pin 9) and Input 10 (Pin 8) will need the links to be changed from active low to high for correct operation

For a detailed procedure on how to set these inputs to active high, please refer to the instructions found on page 10.

Method 1: Wiring to the ECU



Method 2: Wiring to Gear Selector Position



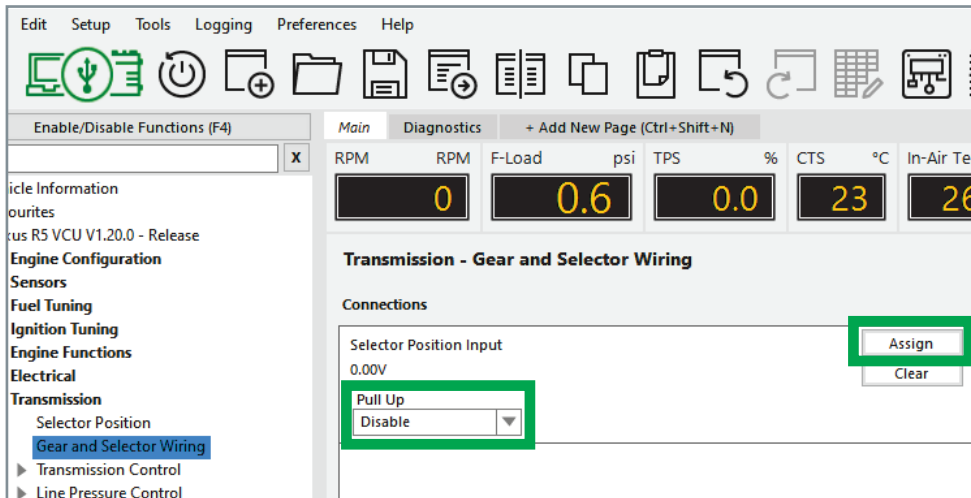
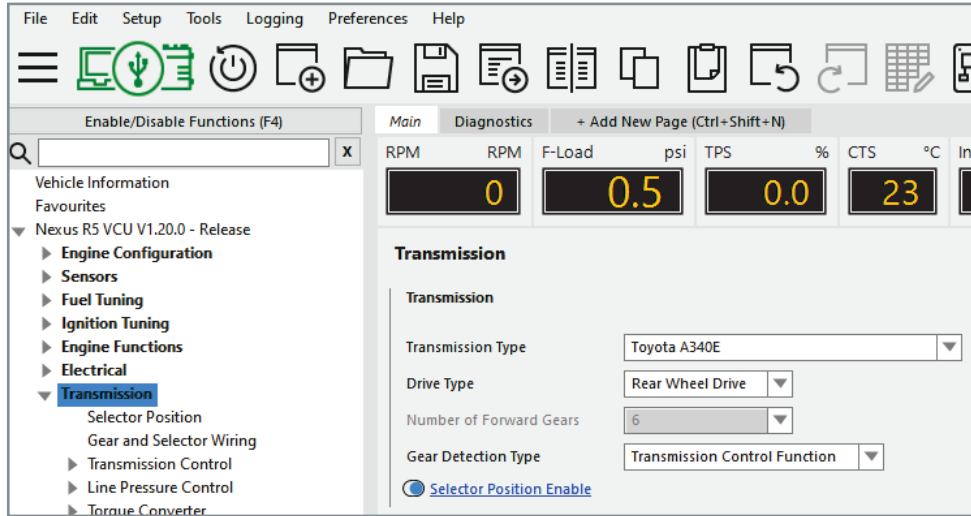
PRNDL SETUP IN NSP

Setting up your PRNDL Signal Converter in NSP is a simple and straight forward process.

1.) Select the Transmission menu from the main NSP navigation tree. Once in the Transmission menu, choose your Transmission Type to be "Toyota A340E", and Drive Type to be "Rear Wheel Drive". In Gear Detection Type, choose "Transmission Control

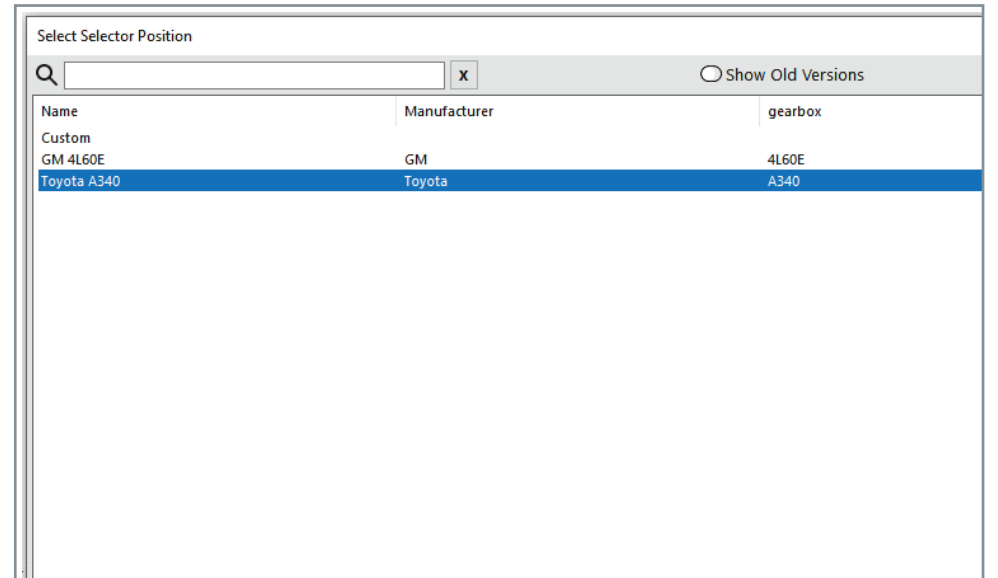
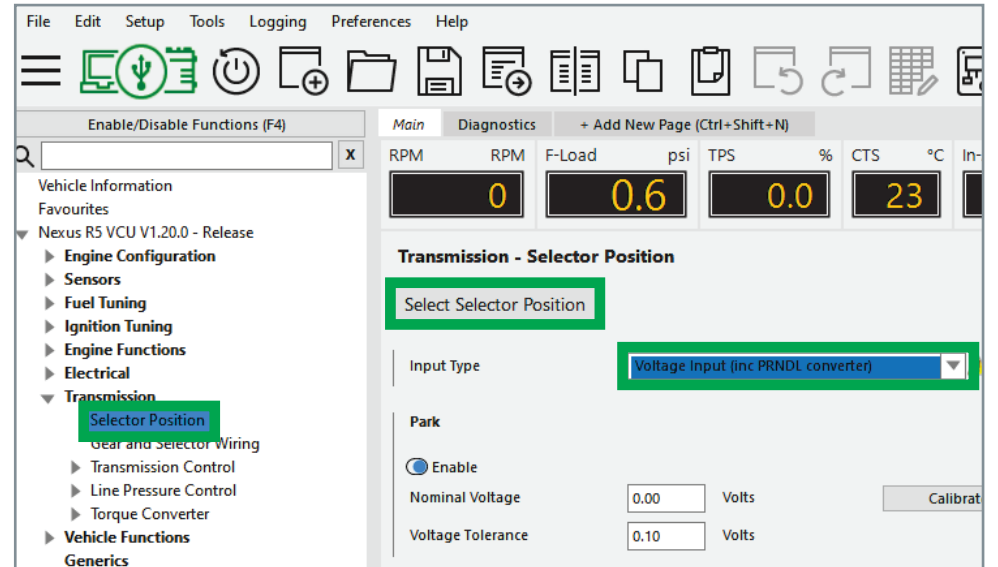
Function", then enable the use of a selector position input.

2.) Drop down the Transmission menu item and go to the Gear and Selector Wiring page to assign the correct selector position input wire that you have used. Set the pull-up option to Disable - if the input doesn't show this option, then it means the input is not equipped with an onboard pull-up which is what the PRNDL Signal Converter requires.



3.) Go to the Selector Position page still under the Transmission menu, and set the Input Type to be "Voltage Input (inc PRNDL converter)".

4.) Click on the Select Selector Position box and choose Toyota A340 among the selection.



5.) After completing the setup procedure, perform a final check by moving through all the gear selector positions and compare the voltage and gear position that the ECU displays against the table of average expected voltage shown below.

Do this by adding displays in NSP for the channels "Gear Selector" and "Selector Raw Voltage".

If the ECU detects N, D, OD, 2 and L correctly as you move the gear selector switch then the setup for the first method of wiring is now complete.

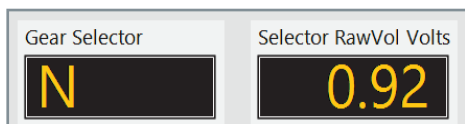
If you have wired the PRNDL Signal Converter using the second method, then continue to proceed with step 6.

SELECTOR POSITION	VOLTAGE WITH OD OFF	VOLTAGE WITH OD ON
P	3.10	3.41
R	2.49	2.80
N	0.63	0.92
D	0.10	0.32
2	1.82	2.13
L	1.23	1.53

6.) If the PRNDL Signal Converter was wired to the selector position switch, then the inputs for Park and Reverse must be manually enabled in the Selector Position page settings in NSP. Type in the values for nominal voltage and voltage tolerance as shown on the settings below.

Do a similar check as on step 5, and if the ECU detects all the selector position points P, R, N, D, OD, 2 and L, then the setup for the second method is now complete.

NOTE: If a selector position input is not displaying correctly, check that the selector raw voltage falls within the nominal voltage with the voltage tolerance applied to either side. If the raw voltage is far from the expected range, check the wiring to make sure the correct pin for the input is used or check the links inside the unit for the correct active state setup.



Park

Enable

Nominal Voltage: Volts

Voltage Tolerance: Volts

Sport

Enable

Nominal Voltage: Volts

Voltage Tolerance: Volts

Reverse

Enable

Nominal Voltage: Volts

Voltage Tolerance: Volts

Overdrive

Enable

Nominal Voltage: Volts

Voltage Tolerance: Volts

Neutral

Enable

Nominal Voltage: Volts

Voltage Tolerance: Volts

1st

Enable

Nominal Voltage: Volts

Voltage Tolerance: Volts

Drive

Enable

Nominal Voltage: Volts

Voltage Tolerance: Volts

2nd

Enable

Nominal Voltage: Volts

Voltage Tolerance: Volts

UNIVERSAL PRNDL APPLICATION

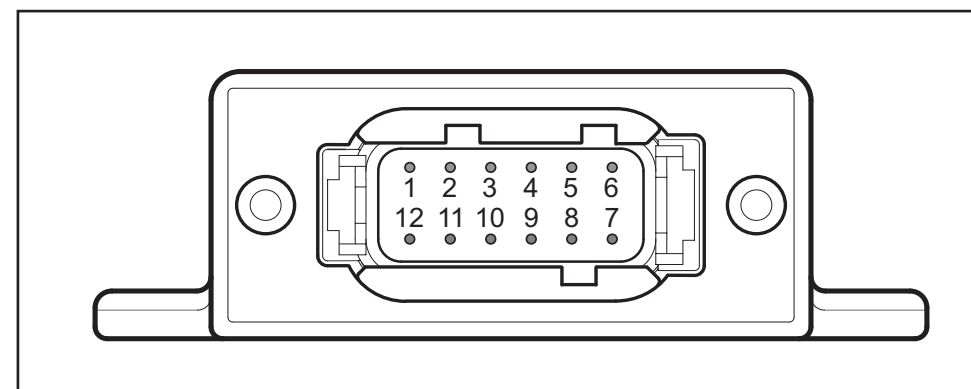
The PRNDL Signal Converter can be thought of as a 4-bit digital to analogue converter with an output voltage range of 0 to 5V.

Each input (i.e. 1, 2, 3, 4, 6, 8, 10 and 12) presents a unique voltage on the output when active. For applications where two or more inputs can be active at the same time, the respective voltages are added together on the output. Say if you have Inputs 1 and 2 being active together, then the expected voltage on the output will be about 0.946 V. This will also be

equivalent to having only Input 3 active, as seen on the table below.

Input 1 (Pin 3) is also the input that adds the smallest step of voltage on the output (about 0.326 V). And for this reason, Input 1 (Pin 3) is ideally used for a separate overdrive button like on the A340 gear selector position. This is so when the overdrive button is off, it will add to the other combinations in the smallest step to keep the other discrete output voltages unique.

ACTIVE INPUT	ACTIVE INPUT COMBINATIONS	AVERAGE VOLTAGE
Input 1 (Pin 3)		0.326
Input 2 (Pin 4)		0.637
Input 3 (Pin 5)	1 and 2	0.946
Input 4 (Pin 6)	1 and 3	1.257
	1 and 4, or 2 and 3	1.568
Input 6 (Pin 10)	2 and 4	1.872
	1 and 6, or 1 and 2 and 4	2.185
Input 8 (Pin 9)	2 and 6	2.488
	1 and 8, or 1 and 2 and 6	2.799
Input 10 (Pin 8)	2 and 8, or 4 and 6	3.100
	1 and 10, or 1 and 2 and 8, or 1 and 4 and 6	3.408
Input 12 (Pin 7)	2 and 10, or 4 and 8, or 2 and 4 and 6	3.711
	1 and 12, or 1 and 2 and 10, or 1 and 4 and 8, or 1 and 2 and 4 and 6	4.020
	2 and 12, or 2 and 4 and 8, or 6 and 8	4.329
	1 and 2 and 12, or 1 and 2 and 4 and 8, or 1 and 6 and 8	4.643



Changing Inputs to be Active High or Low

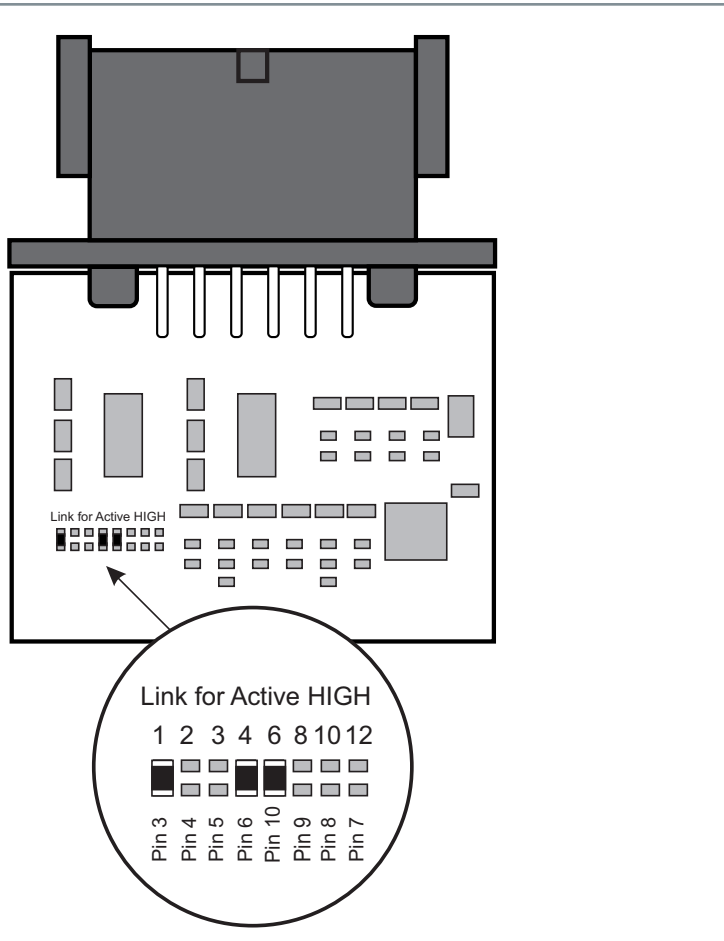
Depending on the application, the inputs on the PRNDL Signal Converter may need to be changed to active high so it the input triggers with battery voltage, or active low so it triggers with ground.

To physically set the input, the PRNDL Signal Converter unit enclosure must be opened to access the links on the board. Start by undoing the two screws at the connector side of the enclosure, then slide the board out of the case.

On the lower left section of the board will be the links that must be joined together, either by soldering or using a 0 Ohm surface mount resistor, to make each input active high.

Inversely, the links will have to be disconnected if an input requires to active low.

After all the changes have been made, slide the board back into the enclosure and secure with the two screws that were initially removed.



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.



Haltech Australia

17 Durian Place,
Wetherill Park NSW 2164
Australia
Phone: +61 2 9729 0999
Email: aus@haltech.com

Haltech New Zealand

9/B Weza Lane, Kumeu 0810
New Zealand
Phone: +64 988 706 16
Email: nz_sales@haltech.com

Haltech USA East

750 Miles Point Way,
Lexington, KY USA 40510
Phone: (888) 298 8116
Email: usa@haltech.com

Haltech USA West

Race Winning Brands,
10800 Valley View Street,
Cypress, CA 90630
Phone: (888) 298 8116
Email: usa@haltech.com

Haltech UK

Unit 1, Miras Business Estate,
Keys Park Road, Hednesford,
WS12 2FS
Phone: +44 121 285 6650
Email: uk_sales@haltech.com

Haltech Europe

Ottogasse 2A,
2333 Leopoldsdorf, Austria
Phone: +43 720 883968
Email: europe@haltech.com



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