Subaru STi/WRX 06-15 Plug-in

USER MANUAL

Rev 1.1

STi/WRX

EMtron Australia

Contents

1.0 Introduction

The Subaru STi MY06-07 and Subaru MY08-15 Plugin ECU's are designed to be plugged into the OEM harness to allow for a true "Plug and Play" install. Both models are almost identical however purchase of the correct unit for your model is essential to ensure correct operation. The unit is also compatible with the WRX throughout MY06-07 and MY08-15. Field testing indicates the ECU will also work on MY16-MY17 models, however full support has not been confirmed at the time of writing this manual.

The system is based on the KV Series Motorsport ECU, so all the same features are available with the limitation based around the OEM connector system. An Expansion loom is included giving access to unused Input channels. CAN Bus 2 is also available operating independent to the OEM Bus providing additional I/O expandability.

2.0 Plugin Features

General

- KV8 ECU based platform.
    - Dual 100MHz processors
    - 32MB ECU logging memory
        - Over 1000 channels available
        - 1Hz to 500Hz logging rate
- Aluminium 6061 Grade CNC billet enclosure
- Fully compatible with all OEM systems and user programmable.
- Compatible with all Emtron proven motorsport features(Launch Control, Rolling Launch, Anti-Lag, Traction Control)
- Upgradeable to run the Emtron fuel model through installation of a flex meter, fuel temperature and fuel pressure sensor
- Idle speed closed loop control using DBW with advanced Throttle Mass Flow (TMF) airflow calculations
- Knock control with high speed digital filtering for each cylinder using the OEM sensor with selectable centre frequency and bandwidth
- Pre-configured Calibration file loaded providing a comprehension tuning platform
- Input Expansion Capabilities through DTM connector
    - 3x User Analog Volt Inputs (Fuel Temperature, Fuel Pressure, Inlet Temperature)
    - 1x User Digital Input (Flex Meter Input)
- Emtune software for tuning and data analysis

Communications

- CAN 2.0B Node 1: 500k Baud Full CAN Bus OEM Integration (ABS, SI Drive, DCCD)
- CAN 2.0B Node 2: User CAN Bus for I/O expansion (Lambda, EGT)
- High Speed Ethernet 100Mbps

Operating Temperature

- Recommended operating range: -30 to 85°C (-22 to 185°F)

Physical

- Enclosure Size 160 mm x 162 mm x 38 mm
- 890g

3.0 Installation

3.1 Expansion Loom

The ECU's input capabilities can be expanded using the expansion connection which is a male DTM 12 Way. See Table 3.0 and Figure 3.0.

These additional inputs can be connected to any sensor, but the recommended sensors are indicated in brackets.

Pin	Function
1	Analog Sensor 0V Reference
2	5V Vref2 Supply
3	AN 8 (e.g. Fuel Temp or Inlet Temp)
4	AN 9 (e.g. Fuel Temp or Inlet Temp)
5	AN 10 (e.g. Fuel Pressure)
6	DI 6 (e.g. Ethanol Content Sensor)
7	14V Out Protected (e.g. ELC2 Power Supply)
8	Ground (e.g. ELC2 or E85 Sensor Ground)
9	Not Used
10	Not Used
11	CAN 2 Hi
12	CAN 2 Lo

Table 3.0 - Expansion Port Pinout (DTM06-12SA)

Figure 3.0 - DTM 12 Way (ECU Side)

3.2 CAN Bus 2 Wiring

The ECU CAN Bus 2 is reserved for Emtron CAN Bus devices, expanding the IO capability of the ECU. The following devices can be connected:

- ELC1/2 (Emtron Lambda to CAN 1/2 channel)
- ETC4/ETC8M (Emtron Thermocouple to CAN 4/8 channels)
- EIC10/EIC16M (Emtron Input to CAN 10/16 Channel)

For more information on each device refer to the downloads section on the website: (emtron.world/downloads)

NOTE: ECU CAN Bus 2 operates independent to the OEM CAN Bus 1.

Emtron ELC/ETC4/EIC10 to CAN

All these CAN devices share a common power, ground and CAN pinout using a 4-way DTM. See Table 3.1.

Pin	Function	Wire Colour
1	Ground	BLACK
2	CAN Lo	GREEN
3	CAN Hi	YELLOW
4	12V Supply	RED

Table 3.1. CAN Device Power and CAN Deustch Connector Pinout

To help with installation time, each CAN Device pin can be directly connected into the ECU IO Expansion Loom. Pinout information is shown Table 3.2.

Name	ECU IO Expansion 12-Way DTM	CAN Device 4-Way DTM
Ground	Pin 8	Pin 1
CAN 2 Lo	Pin 12	Pin 2
CAN 2 Hi	Pin 11	Pin 3
Power	Pin 7	Pin 4

Table 3.2. IO Expansion to CAN Device wiring

The following points should be noted when using the CAN Bus:

- CAN Bus High and Low are differential signals, so twisted pair **MUST** be used. Failing to do so will compromise the entire CAN Bus System. It is recommended to twist the CAN wire pairs at a minimum one twist per 40mm of cable.
- In some extreme environments, shielded twisted pair may be required to help with reliability and data integrity.
- The less connectors in any transmission system the better. Unnecessary connectors are almost guaranteed to present an impedance discontinuity and hence may cause reflections and data loss.
- CAN Bus termination must be done correctly by using a 120 ohm 0.25W resistor at each END of the bus system.
- Maximum Stub length to a device from the main Bus is recommended at 0.3m, in accordance with High-Speed ISO 11898 Standard specification. See Figure 3.2.

ALL Emtron CAN devices do **not** include an on-board CAN termination resistor, allowing the device to be wired at any position on the Bus. CAN Bus termination must be done correctly by using a 120 ohm 0.25W resistor at each end of the bus system as mentioned above. Figures 3.1 shows a possible CAN Bus Implementation example.

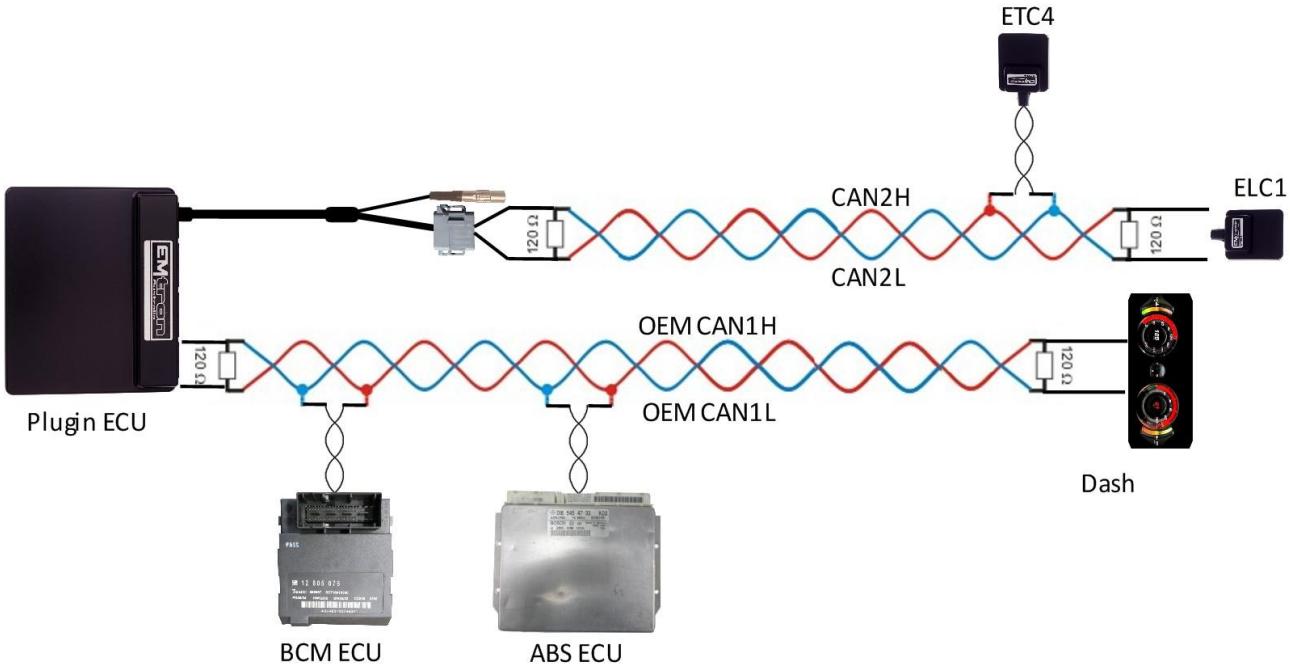


Figure 3.1. CAN Bus Wiring Example. ECU and ELC1 at each end with 120 Ohm Termination

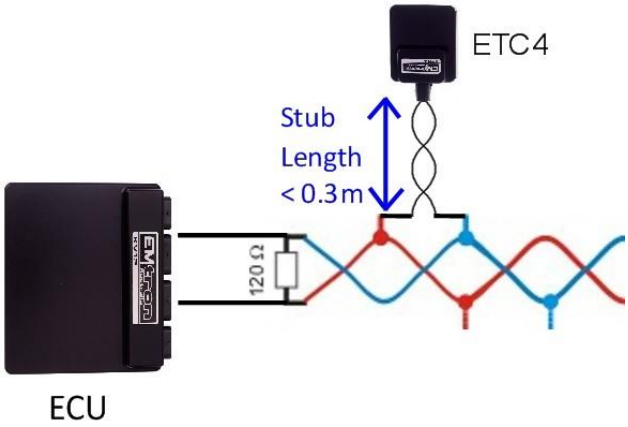


Figure 3.2. CAN Bus Wiring Example. Stub Length less than 0.3m

3.3 Sensor Wiring

5V VRef2 Sensor Supply Pin (Pin 2 of Expansion loom)

This is a 250mA 5V output designed to supply automotive sensors.

Sensor 0V Reference Pin (Pin 1 of Expansion loom)

This pin should be connected directly to the 0V (Ground) pin on any low current analog sensor, for example Pressure or Temperature. Figures 3.3 and 3.4 show the correct and incorrect wiring system.

- **DO NOT** connect the 0V Reference pin directly to the Engine Block or ECU Ground. This is a dedicated and specialised 0V/ground output for analog sensors.
- **DO NOT** connect frequency-based sensor grounds to the 0V Reference pin; for example, an Ethanol content sensor. Use Pin 8 (Ground) in the Expansion Loom.

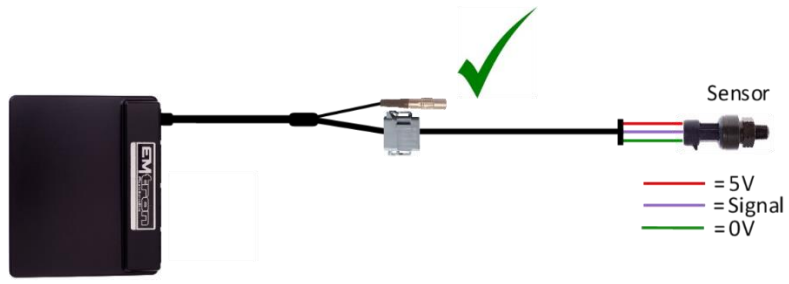


Figure 3.3. Correct Pressure Sensor 0V Wiring

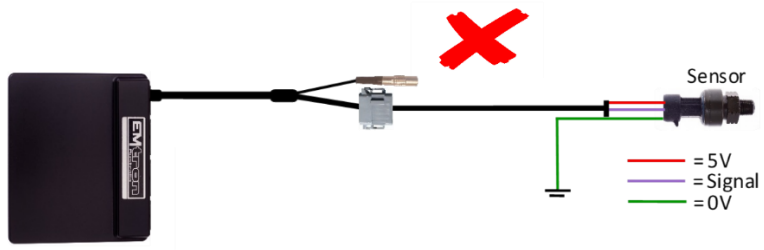


Figure 3.4. Incorrect Pressure Sensor 0V Wiring

4.0 ECU Channel Assignment

ECU Channel - Injection	Function
Injection Channel 1	Fuel Injector Cylinder 1
Injection Channel 2	Fuel Injector Cylinder 2
Injection Channel 3	Fuel Injector Cylinder 3
Injection Channel 4	Fuel Injector Cylinder 4
Injection Channel 5	Rear Lambda Heater
Injection Channel 6	DBW Relay
Injection Channel 7	Purge Solenoid 1
Injection Channel 8	Not Used
Injection Channel 9	Not Used
Injection Channel 10	Not Used
Injection Channel 11	Not Used
Injection Channel 12	Not Used

ECU Channel - Ignition	Function
Ignition Channel 1	Ignition Cylinder 1
Ignition Channel 2	Ignition Cylinder 2
Ignition Channel 3	Ignition Cylinder 3
Ignition Channel 4	Ignition Cylinder 4
Ignition Channel 5	Alternator Load Control
Ignition Channel 6	AC Fan Relay
Ignition Channel 7	Engine Fan Relay
Ignition Channel 8	AC Clutch Relay
Ignition Channel 9	Not Used
Ignition Channel 10	Not Used
Ignition Channel 11	Not Used
Injection Channel 12	Not Used

ECU Channel - Analog Inputs	Function
Analog Voltage 1	MAP
Analog Voltage 2	TPS (Main)
Analog Voltage 3	TPS (Sub)
Analog Voltage 4	MAF
Analog Voltage 5	O2 Rear Narrow Band
Analog Voltage 6	TGV RH Position
Analog Voltage 7 (Pull-up Channel)	Engine Temperature
Analog Voltage 8 (Pull-up Channel)	IO Expansion loom (Inlet Temperature)
Analog Voltage 9 (Pull-up Channel)	IO Expansion loom (Fuel Temperature)
Analog Voltage 10 (Pull-up Channel)	IO Expansion loom (Fuel Pressure)
Analog Voltage 11 (Pull-up Channel)	Intake Temperature in MAF
Analog Voltage 12 (Pull-up Channel)	TGV LH Position
Analog Voltage 13	Pedal Position (Main)
Analog Voltage 14	Pedal Position (Sub)

NOTE: Analog Voltage Channels 7-12 have switchable pull-ups which are suitable for temperature measurement.

ECU Channel - Digital Inputs	Function
Digital Input 1	Cam Position - Inlet RH
Digital Input 2	Cam Position - Exhaust LH
Digital Input 3	Cam Position - Exhaust RH
Digital Input 4	Neutral Switch
Digital Input 5	AC Pressure Switch
Digital Input 6	IO Expansion Loom (Ethanol Sensor)
Digital Input 7	Power Steer Pressure Switch
Digital Input 8	AC Switch *(non-CAN bus)*
Digital Input 9	Clutch Switch
Digital Input 10	Secondary Air Pipe Pressure Signal
Digital Input 11	Brake Switch
Digital Input 12	Start-Stop Switch/Start Position Switch
Digital Input 13	Cruise Command Switch
Digital Input 14	Cruise Switch Main

ECU Channel - Auxiliary Outputs	Function
Auxiliary 1	AVCS Solenoid Inlet LH
Auxiliary 2	AVCS Solenoid Inlet RH
Auxiliary 3	AVCS Solenoid Exhaust LH
Auxiliary 4	AVCS Solenoid Exhaust RH
Auxiliary 5	Wastegate Solenoid
Auxiliary 6	Tacho
Auxiliary 7	Fuel Pump Speed Control
Auxiliary 8	Check Engine Light *(non-CAN bus)*
Auxiliary 9	DBW +
Auxiliary 10	DBW -
Auxiliary 11	TGV LH Motor + (LH- & RH+ linked in series)
Auxiliary 12	TGV RH Motor -
Auxiliary 13	Accessory Cut Relay
Auxiliary 14	Starter Relay
Auxiliary 15	Secondary Air Pump Relay
Auxiliary 16	Secondary Comb. Valve Relay (LH Head - 5 wire)

ECU Channel - Crank/Cam	Function
Crank Index	Crank Sensor
Sync Sensor	Cam Position - Inlet LH

5.0 Plug-in Specific Information

5.1 Fuel Model

The ECU can be tuned using one of the many fuel models available. Speed Density (MAP Sensor) or using the Mass Air Flow (MAF Sensor) are the two most common ones. The Fuel Model can be adjusted using Emtune -> Config View -> Fuel -> Fuel Main -> Fuel Model Setup shown in Figure 5.0.

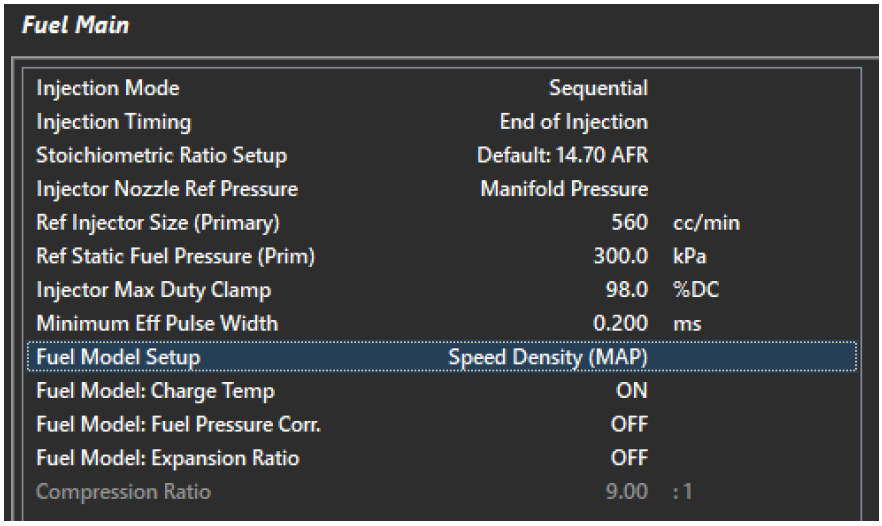


Figure 5.0. Fuel Model Setup

- When Speed Density is selected, Fuel Table 1 is used for VE correction.
- When MAF is selected, the Secondary Load table can be used to scale the MAF if required. This table will need to be switched ON. To do this, select Fuel Menu-> Fuel Table Control -> Secondary Load Table. Set to a value of 12. Figure 5.1

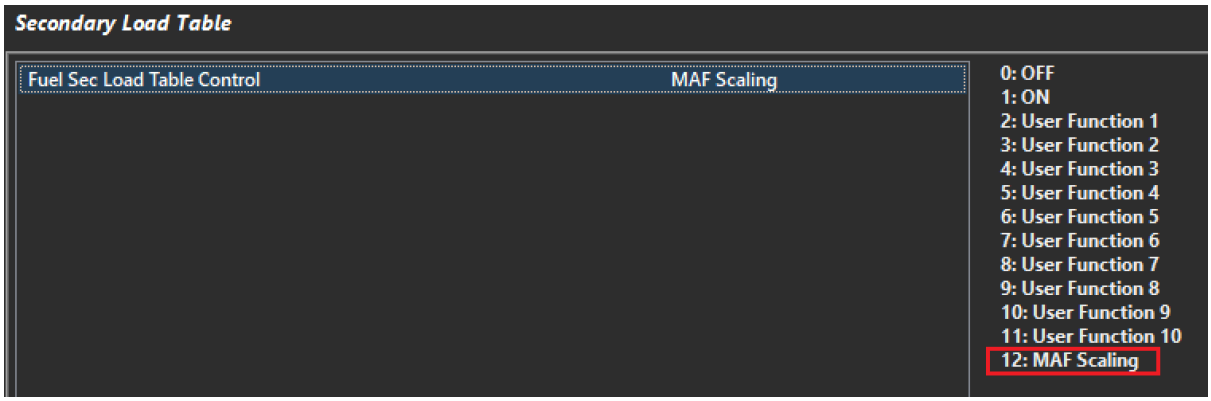


Figure 5.1. Secondary Load Table - MAF Scaling

There is also a runtime in the F3 Menu (F1) -> Fuel Tab showing the current Fuel Model the ECU is running in.

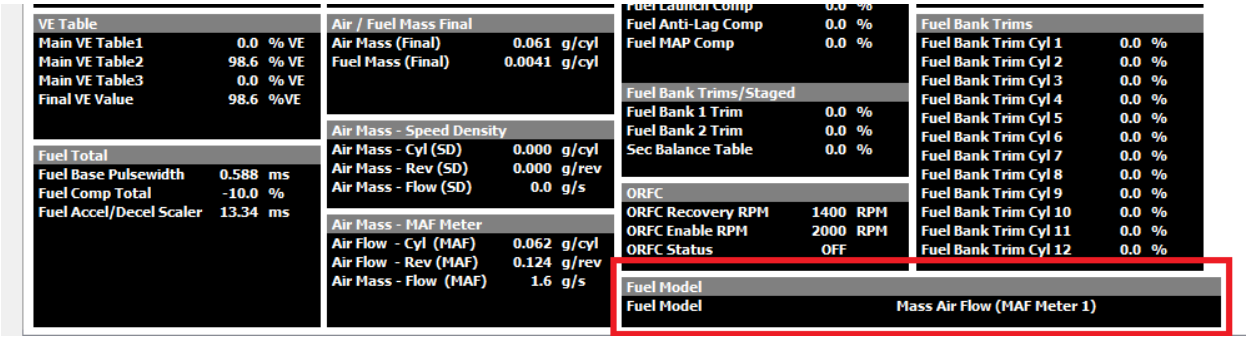


Figure 5.2. Fuel Model Runtime

5.2 Inlet Air Temperature

Some STi models have a factory fitted Inlet Temperature Sensor. This is available on Analog Input 8. Figure 5.3 shows the factory location. If this sensor is available, the "Inlet Air Temperature" should have the Input Source selected to ANV8 as shown is Figure 5.4

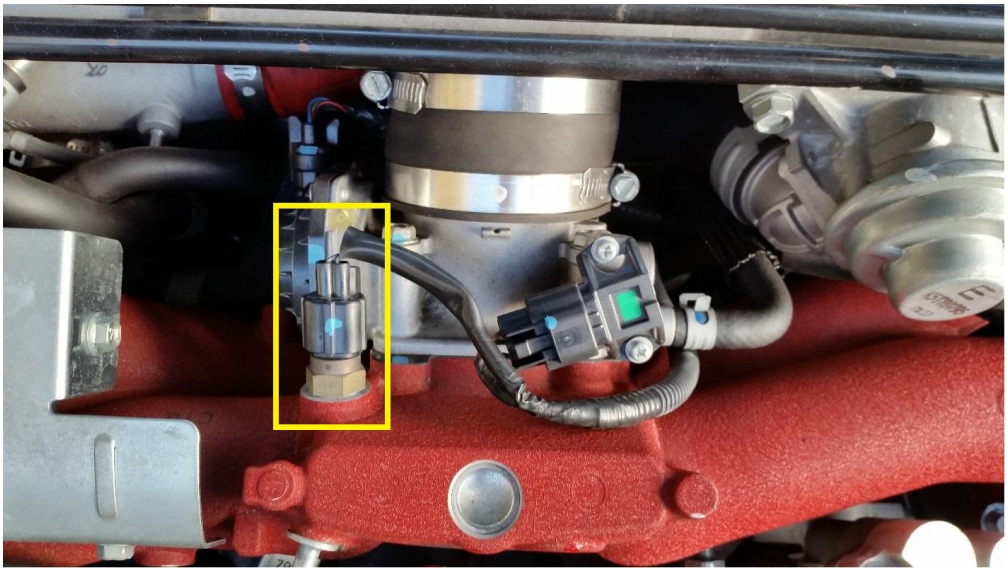


Figure 5.3. Factory Position for the IAT Sensor

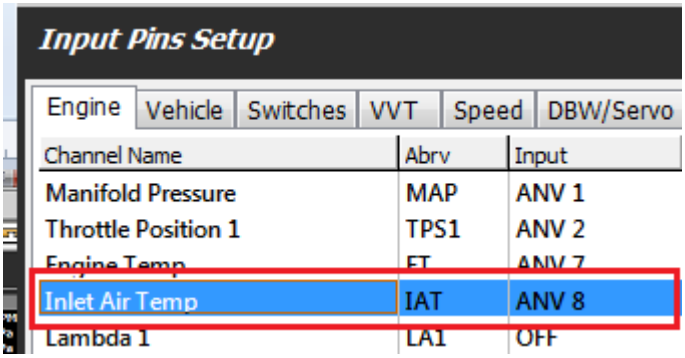


Figure 5.4. Factory IAT Sensor configured to ANV8

On models without an Inlet Temperature Sensor there are two options:

1) Fit an Inlet Temperature Sensor. Use the expansion port to bring this signal into the ECU. (AN8 and Sensor Ground).

2) Use the MAF Temp to approximate the Inlet Temperature. This is the default setting and can be adjusted using Emtune -> Config View. See Figure 5.5

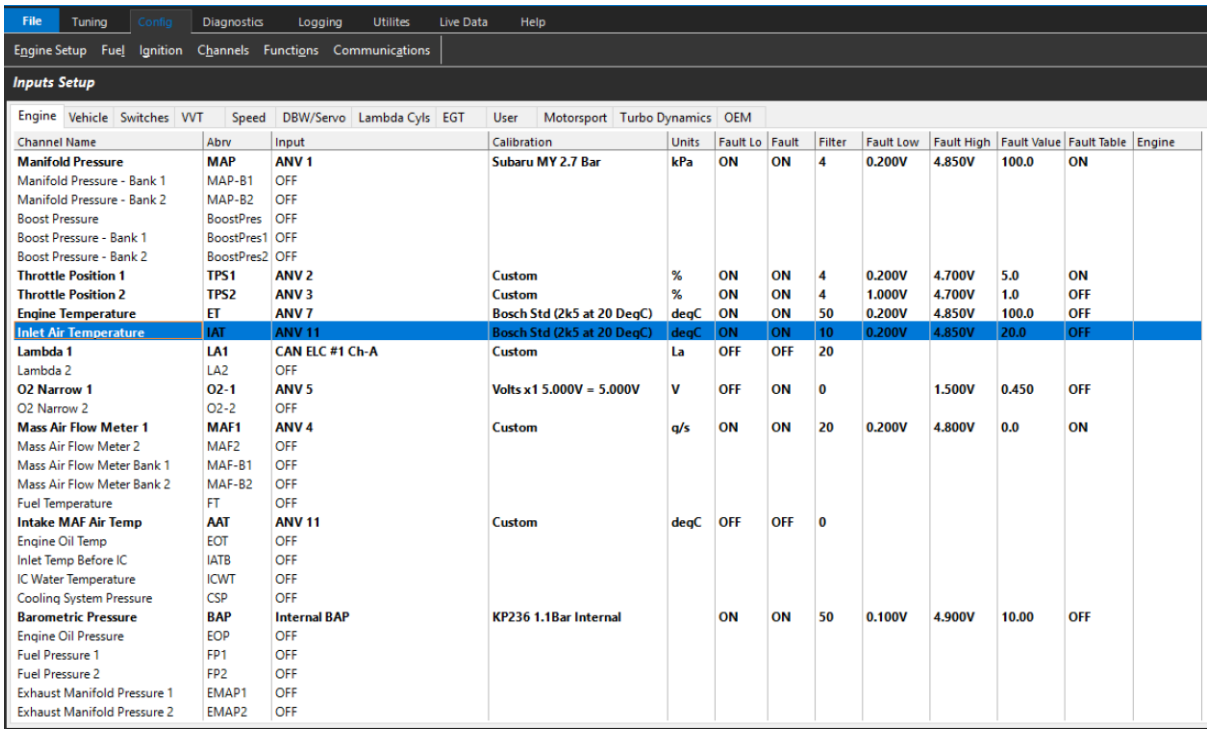


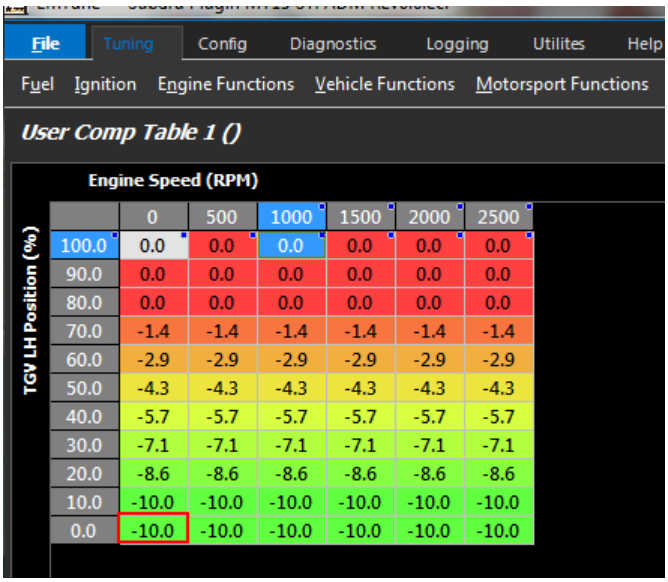
Figure 5.5. Inlet Temp assigned to the MAF Intake Temperature channel

5.3 Tumbler Generator Valves

The LH and RH valves are connected in series and controlled using Auxiliary Channels 11 and 12. The control strategies are locked and as follows:

- The valves are either fully open or fully closed.
- When Engine Temperature is less than 60 DegC the valves are always Closed at key-on. Once the engine is started they remain closed until the Pedal Position goes above 2.0% at which point they open and remain open.
- When Engine Temperature is above than 60 DegC the valves always Open at key-on.
- The valves are modulated at 10Hz, 50%DC to ensure they don't move during normal driving conditions .

As these valves significantly affect the VE of the engine when closed, the Fuel User Comp Table 1 can be used to adjust fuelling. Figure 5.6 shows the default table setup.



TGV LH Position (%)	0	500	1000	1500	2000	2500
100.0	0.0	0.0	0.0	0.0	0.0	0.0
90.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0
70.0	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4
60.0	-2.9	-2.9	-2.9	-2.9	-2.9	-2.9
50.0	-4.3	-4.3	-4.3	-4.3	-4.3	-4.3
40.0	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7
30.0	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1
20.0	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6
10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
0.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0

Figure 5.6 TGV User Comp Table 1

If the TGV valves have been removed, please switch the function off from the Config View-> Functions -> Engine Functions tab and zero all fuel corrections in the User Comp Table 1.

5.4 SI Drive

When available, the position of the SI Drive is read from the CAN Bus and is used to select the ECU's Cal Slot position. Positions 1-4 are available.

The default Cal File is setup to switch to Requested Torque Tables. Many more options are available. (See Tuning View -> Cal Control for more options). Figure 5.7 shows the current setup for the different Cal Slots.

SI Drive Mode	ECU Value	Cal Slot Position	Requested Torque Table
OFF(no SI Drive)	0	1	Table 1
Sports Sharp(S#)	1	2	Table 1
Intelligent (I)	2	3	Table 2
Sports (S)	3	4	Table 3

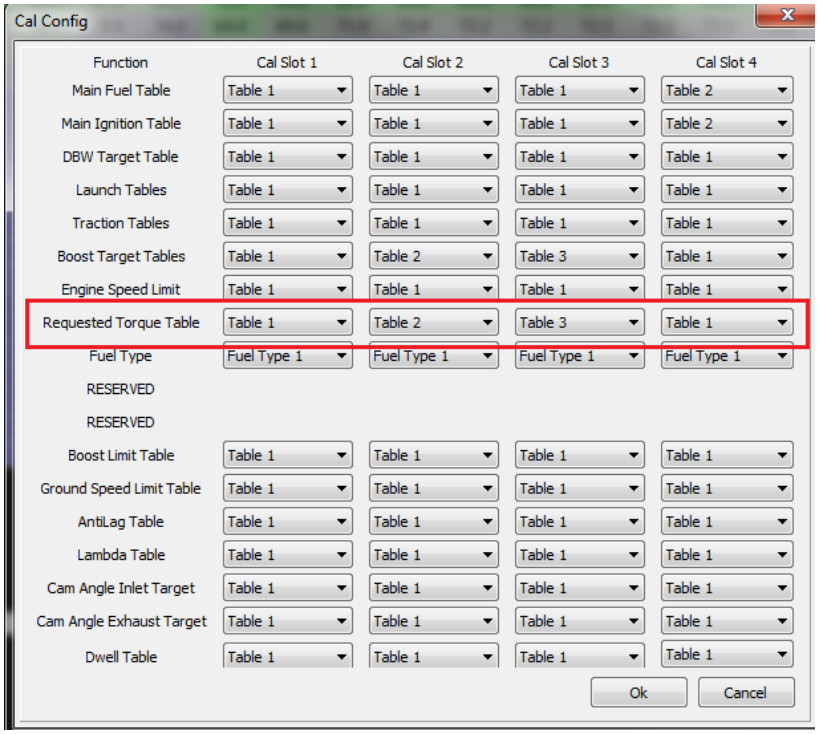


Figure 5.7. Cal Slot Setup

5.5 Push Button Start vs Key Start

A change to the Cal file will be required based on whether the vehicle has a Button Start or Key Start.

5.5.1 Push Button Start

Auxiliary Channel 14 controls the starting of the engine. When the Output is Low the engine will crank. The ECU therefore must control the starting of the engine using the "Engine Start Control " Function.

Cal File Setup:

In the Config view-> Functions -> Vehicle Functions 2 Tab, select "Engine Start Control"

- Select "Engine Starter Output" tab and make sure the Output Channel to set to Auxiliary14. See Figure 5.8.
- Select "Engine Immobiliser Output" tab and make sure the Output Channel to set to OFF.

In the Config view-> Input -> Switches Tab:

- Selected "Start/Stop Switch" Input Source to DI12
- Selected "Start Position Switch" Input Source to OFF. (See Figure 5.9)

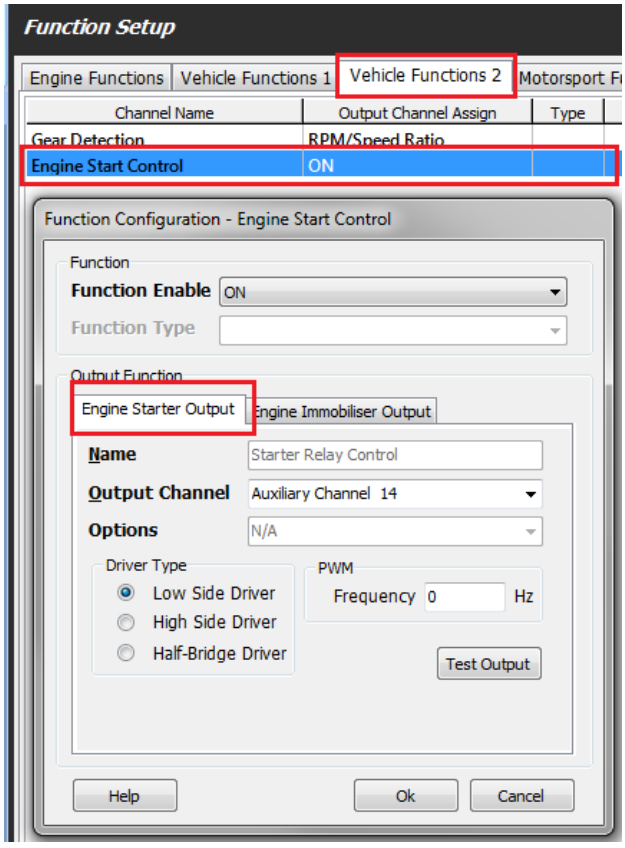


Figure 5.8. Aux 14 setup for Push Button Start

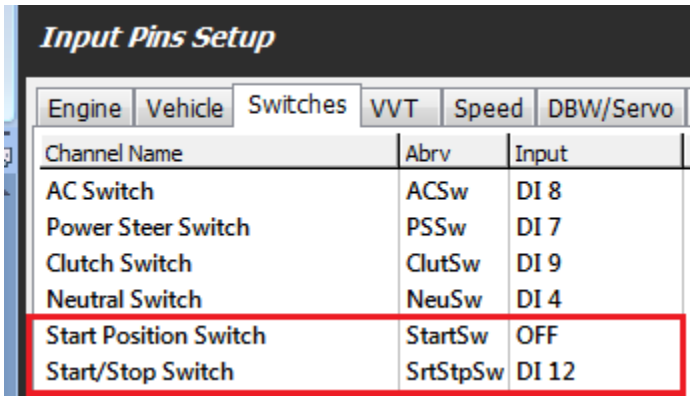


Figure 5.9. DI 12 setup for Push Button Start

The Engine Start settings can be adjusted from Tuning View -> Vehicle Functions -> Engine Start Control menu.

5.5.2 Key Start

On Key start vehicles, Auxiliary Channel 14 prevents the engine starting when the key is moved to the start position. This acts as an immobiliser function. When the Output is Low (at ground) the engine will not start.

Cal File Setup:

In the Config view-> Functions -> Vehicle Functions 2 Tab, select "Engine Start Control"

- Select "Engine Starter Output" tab and make sure the Output Channel to set to **OFF**.
- Select "Engine Immobiliser Output" tab and make sure the Output Channel to set to Auxiliary14. See Figure 5.10.

In the Config view-> Input -> Switches Tab:

- Selected "Start/Stop Switch" Input Source to **OFF**
- Selected "Start Position Switch" Input Source to DI12. (See Figure 5.11)

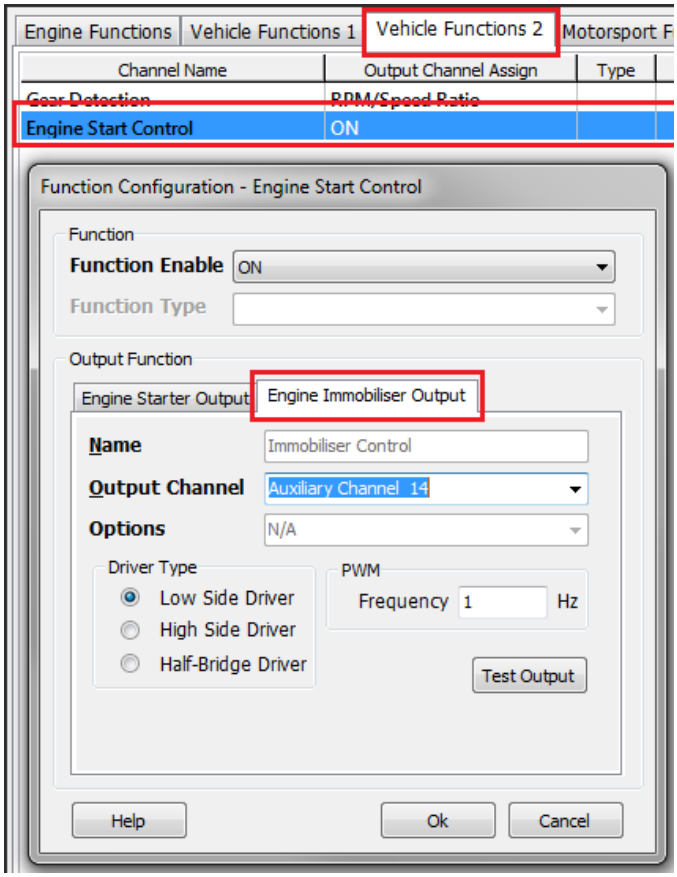


Figure 5.10. Aux 14 setup for Key Start

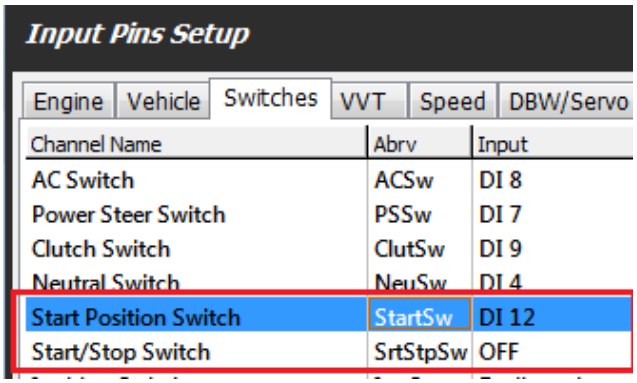


Figure 5.11. DI 12 setup for Key Start

5.6 Check Engine Light

The control of this light is done either through the CAN bus or Auxiliary Channel 8. The Default Cal file has the Output Channel selected on CAN Bus OEM. This can be adjusted from the Config View -> Functions -> Vehicle Functions 1 tab.

5.7 AirCon Switch

The AirCon Switch status is read either through the CAN bus or Digital Input 8. The Default Cal file has the Input Source selected on CAN Bus OEM. This can be adjusted from the Config View -> Inputs -> Input Pins Setup -> Switches tab.

6.0 Diagnostic Trouble Codes (DTCs)

On initial installation it is advised to clear all the DTC's if error(s) are reported. To check: connect to Emtune and look at the DTC status in the bottom toolbar. If there are Errors the status box will be Red as shown in Figure 6.0.

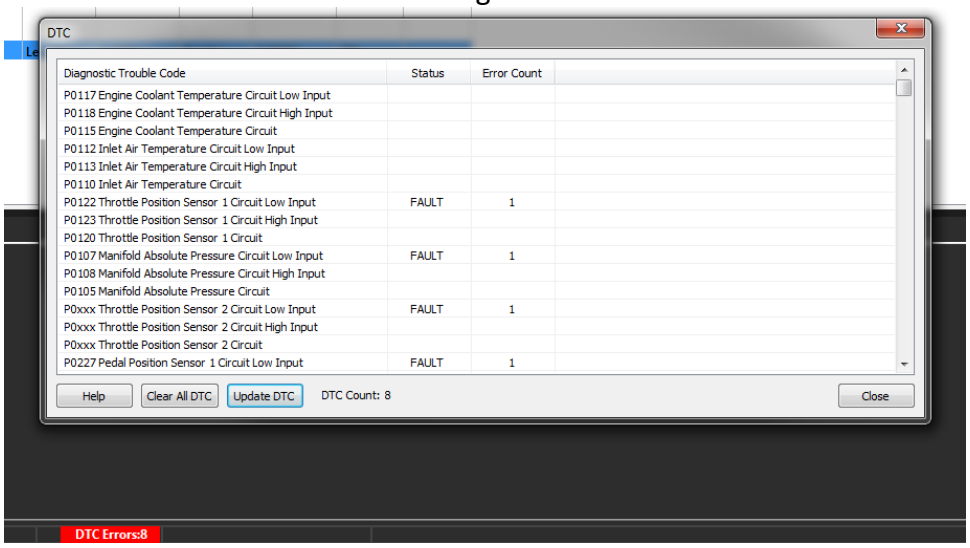


Figure 6.0. DTC example showing 8 errors.

To open the DTC window, click on the DTC Status box in the bottom toolbar OR use the File menu -> Open DTC. Next select "Clear ALL DTCs" and confirm all the Error Codes have been removed; the DTC Status box should go Green indicating this as shown in Figure 6.1. Close the DTC window.

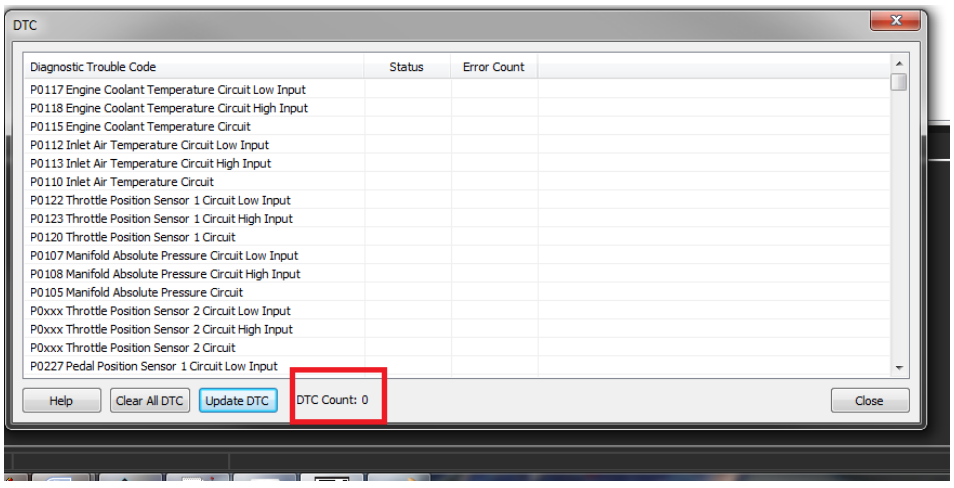


Figure 6.1. DTC example showing no errors.

If the Error Codes have not all been removed, select "Update DTC" then use the DTC window to locate the sensor that is on fault.

7.0 OEM CAN Bus 1

The ECU Communicates on CAN Bus 1 which is reserved for the Subaru OEM Bus. The ECU maintains full compatibility with all other CAN devices within the vehicle. The CAN bus protocol is defined by year and divided into 5 groups:

- Subaru Liberty MY10 (option 16)
- Subaru STi MY15+ JDM (option 17). **NOTE** JDM and ADM are different.
- Subaru STi MY15+ ADM (option 18).
- MY12-MY14 (option 19)
- MY07-MY11 (option 20)

This setting can be adjusted from the Config View -> Communications -> CAN Bus 1-> Channel 1 -> DATA Set menu.

The ECU transmits a wide range of raw and calibrated data over the Bus, communicating with other devices but also receiving data. The data available is shown in Table 7.0.

NOTE: The Input Source should be selected to "**CAN Bus OEM**" for a channel to receive this data.

ECU Channel Name	Description
Vehicle Speed	This is the average speed of the front wheels
Drive Speed Front L	Wheel Speed Front Left
Drive Speed Front R	Wheel Speed Front Right
Drive Speed Rear L	Wheel Speed Rear Left
Drive Speed Rear R	Wheel Speed Rear Right
Steering Angle	Steering Angle in degrees (negative is left, positive is right)
Front Brake Pressure	Front brake pressure (Bar)
AirCon Switch	AirCon Off/On Switch
AC Evap Temp Switch	AirCon Evaporator switch used by the ECU to control the AC Clutch
Traction Control Switch	Traction Control Off/On Switch
SI Drive	The ECU reads 1 of 3 modes: 1) Sports, 2) Intelligent, 3) Sports Sharp

Table 7.0. Subaru received OEM CAN data

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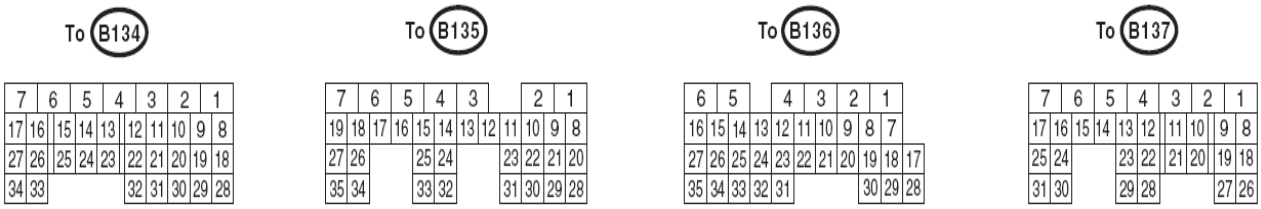
8.0 Ordering Information

Product	Part Number
Emtron Subaru STi 06-15 Plugin	1609-192015

Appendix A - ECU Pinout



Pin	Function	Channel Assignment
B134-1		
B134-2		
B134-3		
B134-4		
B134-5	Engine Block/Power Ground	
B134-6	Manifold Pressure Sensor Signal	ANV1
B134-7	ECU 14V from Main Relay	
B134-8		
B134-9		
B134-10		
B134-11	Cam Inlet RH Signal (Hall)	DI 1
B134-12	Cam Exhaust RH Signal (Hall)	DI 2
B134-13	Crank Position Sensor (+)	Crank Index +ve
B134-14	Crank Position Sensor (-)	Crank Index -ve
B134-15	Knock Sensor Signal	Knock 1 +ve
B134-16	TGV LH Position Signal	ANV 12
B134-17		
B134-18	DBW Position Main Signal	ANV 2
B134-19	+5V Eng (MAP,DBW Pos, FPS, TGV Pos, Sec Air Pres)	
B134-20		
B134-21	Cam Inlet LH Signal (Hall)	Sync Sensor
B134-22		
B134-23		
B134-24	SHIELD - Crank Position Sensor	
B134-25	SHIELD – Knock Sensor	
B134-26	TGV RH Position Signal	ANV 6
B134-27	Secondary Air Pipe Pressure Signal	DI 10
B134-28	DBW Position Sub Signal	ANV 3
B134-29	Sensor Ground Out – (MAP, TPS, ET, DBW, TGV Pos, Knock, Sec Air Pres)	
B134-30		

B134-31	Cam Exhaust LH Signal (Hall)	DI 2	
B134-32			
B134-33	Power Steer Oil Pressure Switch	DI 7	
B134-34	ET Sensor	ANV 7	

Pin	Function	Channel Assignment	
B135-1	SHIELD – Front and Rear Oxygen Sensor		
B135-2	ECU 14V from Main Relay		
B135-3	Accessory Cut Relay		
B135-4	Rear Oxygen Sensor Signal	ANV 5	
B135-5	Backup Power/Batt Constant		
B135-6			
B135-7			
B135-8			
B135-9			
B135-10			
B135-11			
B135-12	Cruise Control Main Switch	DI 14	
B135-13	Starter Switch 2	DI 12	
B135-14			
B135-15			
B135-16			
B135-17			
B135-18	Intake AT Sensor Signal (In MAF)	ANV 11	
B135-19	Ignition Switch	IGN SW	
B135-20	Brake Switch 1 (Normally Closed)	DI 11	
B135-21	+5v Eng Supply – FPS Main	+5v Supply	
B135-22	5v Eng Supply – FPS Sub	+5v Supply	
B135-23	FPS Signal – Main	ANV 13	
B135-24	Cruise Command Switch – Set/Resume/Coast/Res/Cancel	DI 13	
B135-25			
B135-26	Air Flow Sensor Signal	ANV 4	
B135-27			
B135-28			
B135-29	FPS Main Sensor Ground		
B135-30	Sensor Ground Out		
B135-31	FPS Signal – Sub	ANV 14	
B135-32			
B135-33			
B135-34	Air Flow Sensor Ground		
B135-35	SHIELD – Air Flow Sensor		

Pin	Function	Channel Assignment
B136 -1	DBW Power (From DBW Relay)	
B136-2	Front Oxygen Heater Signal 2	
B136-3	Front Oxygen Heater Signal 1	
B136-4	Rear Oxygen Heater	
B136-5		
B136-6	SHIELD – FPS,TPS Main, Neutral Sw	
B136-7		
B136-8		
B136-9	A/C Clutch Relay	IGN 8
B136-10	Alternator Load Control	IGN 5
B136-11	CEL (Non CAN Bus)	
B136-12	FPC Unit - Control Signal	AUX 7
B136-13		
B136-14		
B136-15		
B136-16		
B136-17		
B136-18	Sub Fan Relay Control	IGN 6
B136-19		
B136-20	Starter Relay Inhibit	
B136-21	DBW Power Control Relay	INJ 6
B136-22	Engine Speed Output (Tacho)	AUX 6
B136-23	Main Relay Control	Main Relay Control
B136-24	A/C Request Switch (Non CAN Bus)	DI 8
B136-25	Clutch Switch	DI 9
B136-26		
B136-27	CAN + (500kBaud)	
B136-28		
B136-29	Main Fan Relay Control	IGN 7
B136-30		
B136-31	Neutral Position Switch	DI 4
B136-32	Start/Stop Button	DI 12
B136-33		
B136-34		
B136-35	CAN - (500kBaud)	

Pin	Function	Channel Assignment
B137-1	Engine Block/Power Ground	
B137-2	Engine Block/Power Ground	
B137-3	Engine Block/Power Ground	
B137-4	DBW Motor +	AUX 9
B137-5	DBW Motor -	AUX 10
B137-6	Ignition Coil Ground	
B137-7	Engine Block/Power Ground	
B137-8	Injector Cylinder 1	INJ 1
B137-9	Injector Cylinder 2	INJ 2
B137-10	Injector Cylinder 3	INJ 3
B137-11	Injector Cylinder 4	INJ 4
B137-12	TGV LH Motor (+ to open)	AUX 11
B137-13	TGV LH Motor (- to close)	AUX 12
B137-14	AVCS Inlet LH Solenoid -	AUX 1
B137-15	AVCS Inlet LH Solenoid +	
B137-16	AVCS Inlet RH Solenoid -	AUX 2
B137-17	AVCS Inlet RH Solenoid +	
B137-18	Ignition Cylinder 1	Ign 1
B137-19	Ignition Cylinder 2	Ign 2
B137-20	Ignition Cylinder 3	Ign 3
B137-21	Ignition Cylinder 4	Ign 4
B137-22	TGV RH Motor (+ to open)	AUX 11
B137-23	TGV RH Motor (+ to close)	AUX 12
B137-24	AVCS Exhaust RH Solenoid -	AUX 4
B137-25	AVCS Exhaust RH Solenoid +	
B137-26	Ignition Coil Ground	
B137-27	Wastegate Control Solenoid	AUX 5
B137-28		
B137-29	Purge Control Solenoid Valve #1	INJ 7
B137-30	AVCS Exhaust LH Solenoid -	AUX 3
B137-31	AVCS Exhaust LH Solenoid +	

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