

This is a guide to help setup your strain sensor. It is not the only way and is only to help get your started out. Each car may need some tweaks and changes based on electronics, driver, ect.

The strain sensor outputs a voltage of 2.5 volts at rest. When the shifter is moved forward or backward the sensor will either Rise voltage up to 5v or fall voltage down to 0v depending on the amount of force.

GP RACING



### General Specs

Force Range +/- 250n

Supply Voltage 8-16 VDC (Do not power when 16v charger is on)

Output .5v to 4.5v

Zero Offset Volts 2.502v

Sensitivity +/- FS: 1.999

### Wiring

Red + supply

Black 0v / Common (Sensor Ground)

White + Signal Output

# AEM Infinity

Setup in Wizard Input. (Select the input you have the signal wires to. Typically, Analog 11 or Analog 18)

The screenshot displays the AEM Infinity software interface. The main window is titled "Input Function Assignments" and shows a list of functions and their corresponding channels and pins. The "Shift Switch Setup" window is open, showing a warning about analog input pins and a graph of "Shift Switch Table Data" versus "Analog11 [V]". The graph shows a step function where the shift switch data is 1 for voltages between 1.21 and 3.55, and 0 otherwise. A table of data points is also visible.

Analog11 [V]	Shift Switch Table Data []
1.21	1
1.21	0
3.55	0
3.56	1

Setup in Wizard Shift Cut.

## GP1 STRAIN SETTINGS

Infinity-508 v96.3

— Basic Setup —

- Engine
- Tuning Preferences
- Cam/Crank
- Injector Setup
- Basic Sensors
- DBW Tuning
- Set Throttle Range
- Ignition Sync
- Advanced Setup
- Accel and Decel Fuel
- Advanced Trims
- Boost Control
- Engine Protection
- Idle
- Ignition Coil Dwell
- Input Function Assign...
- Knock Setup
- Lambda Control
- Launch Antilag
- Launch Timer
- Main Rev Limiter
- Nitrous N2O
- Rev Limit 2 Step
- Rev Limit 3 Step
- Shift Cut**
- Throttle High Timer

### Shift Cut

The ECU can decrease engine power for quick and consistent gear shift events while the driver holds full throttle. Power reduction can be achieved by a combination of ignition retard, fuel cut, and spark cut in response to a switch, a clutch pressure sensor, or a switch/strain gauge mounted to the shift lever. Use the 'Input Function Assignment' page of the wizard to configure the 1D table 'ShiftSwitch'.

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#### Shift Cut Activation

Shift Cut Minimum RPM: 8900 rpm

Shift Cut Minimum Throttle: 30 %

Shift Cut Re-Arm Delay Time: 500 ms

Shift Cut Method: Ign Retard + Spark Cut

Shift cut time can be adjusted for each gear using the 1D table 'ShiftCutTime'. After the cut time has been completed, ignition timing retard can be 'ramped out' over a certain amount of time to decrease drivetrain shock when power is reapplied.

Ign Retard Amount: 9 degrees BTDC

Ign Retard Ramp-Out Time: 100 ms

F1 for Tuning Guide

Close

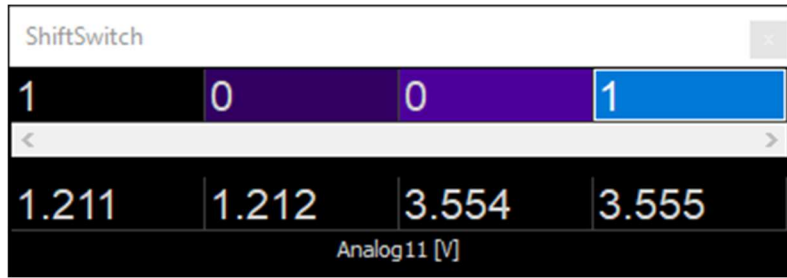
v2.96 Build 03/14/2019

Shift Cute Time in Milliseconds (How long the cut will be per gear)

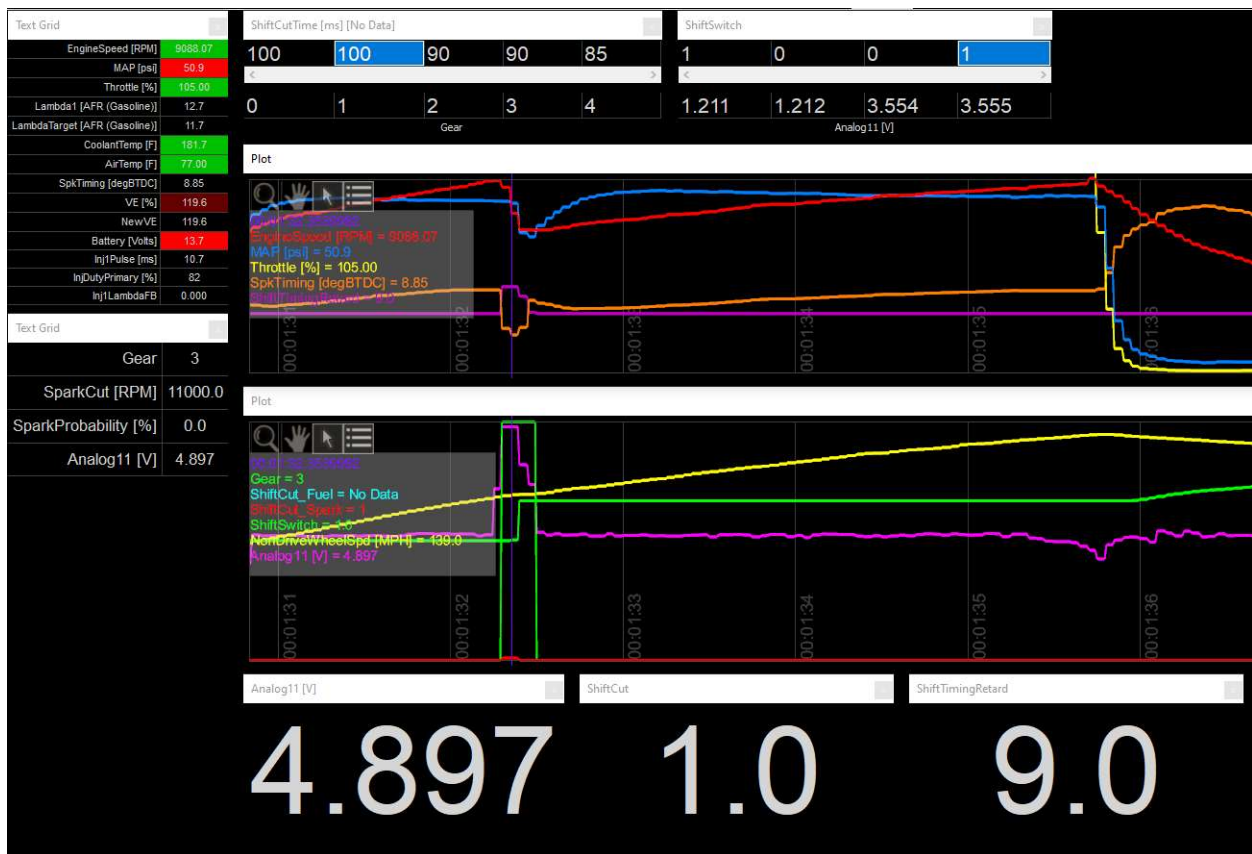
ShiftCutTime [ms] [No Data]				
100	100	90	90	85
0	1	2	3	4
Gear				

Shift Switch Settings (Voltage setting to start the cut. 1=cut 0=no cut)

# GP1 STRAIN SETTINGS



Sample Data log View of a shift cut in action.



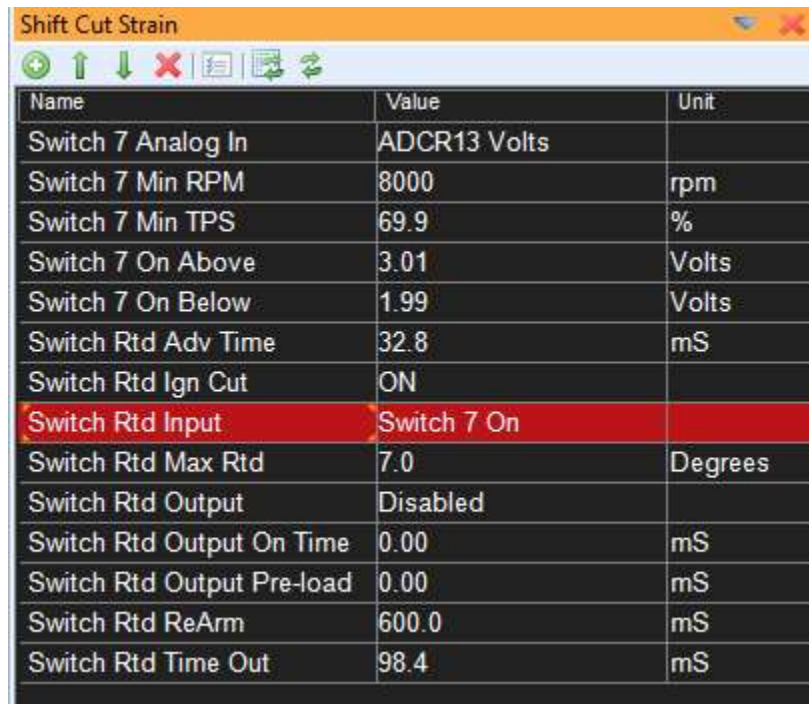
## AEM Version 2

Select the input you have the signal wires to. This example uses ADCR13 for the strain signal input

In AEM version 2 ecus you will create a switch condition to activate the cut.

We used Switch7 the software switch to input our analog voltage to. The Switch 7 will turn on in software when above 3.01v or below 1.99v in this example. Also for protection from false triggering the cut we have the min RPM, TPS set.

When Switch 7 is on the max ignition retard will be 7 deg. And cut for 123ms in the example below.



Name	Value	Unit
Switch 7 Analog In	ADCR13 Volts	
Switch 7 Min RPM	8000	rpm
Switch 7 Min TPS	69.9	%
Switch 7 On Above	3.01	Volts
Switch 7 On Below	1.99	Volts
Switch Rtd Adv Time	32.8	mS
Switch Rtd Ign Cut	ON	
Switch Rtd Input	Switch 7 On	
Switch Rtd Max Rtd	7.0	Degrees
Switch Rtd Output	Disabled	
Switch Rtd Output On Time	0.00	mS
Switch Rtd Output Pre-load	0.00	mS
Switch Rtd ReArm	600.0	mS
Switch Rtd Time Out	98.4	mS

## GP1 STRAIN SETTINGS



Display and log the channels below when dialing in the settings live.

Name	Value	Unit
Engine Speed		rpm
Throttle		%
Battery Volts		Volts
Engine Load		PSIg
Vehicle Speed		MPH
Gear		
Ign Timing		Degrees
ADCR13		Volts
Switch 7		
Switch Rtd		
Switch Rtd Amount		Degrees
Switch Rtd Inhibit		mS
Switch Rtd Output		
Switch Rtd Output Time		mS

## Motec M1

Example Package used is K series USA Drag. Similar to many others

Set the Gear Force Input to the Analog input you are wired to

The screenshot shows the Motec M1 software interface with the following settings for the Gear Force input:

- Gear**
  - Source: ~
  - Up: ~
  - Down: ~
  - Type: H Pattern
  - Minimum: Reverse
  - Maximum: Fifth
- Estimate: ~
- Position: ~
- Neutral Switch: ~
- Ratio: ~ ratio
- Lever: ~
- Up Switch: ~
- Down Switch: ~
- Force: ~ N
  - Sensor Resource: Analogue Voltage Input 16
  - Sensor: ~ N
  - Diagnostic: ~
    - Time: ~ ms
    - Low: 0.005 V
    - High: 4.999 V
    - Delay: 100 ms
  - Voltage: ~ V
    - Absolute: ~ V
    - Filter: 10.0 ms
    - Reference: Sensor 5 0V B
    - Offset: 2.540 V
    - Scale: 100.0 N
    - Target: 0.0 N

When connected live Set the Offset to the static voltage of the sensor input. This should be close to 2.5volts. Use the Q function to accept live data.



## GP1 STRAIN SETTINGS

Set the Cut force threshold up and down. Min engine speed, min throttle, and we used a timer cut on a K series drag car with PPG Dog engagement gearset.

Threshold		
Up	~	N·m
Down	~	N·m
Hysteresis		5.0 N
Drag Shift	~	
State	~	
Mode		Enabled <input checked="" type="checkbox"/>
Debounce		400.0 ms
Minimum Engine Speed		8900.0 rpm
Minimum Throttle Position		50.0 %
Shift Mode		Force <input type="checkbox"/>
Force		46.0 N
Type		Timer <input type="checkbox"/>
Closed Loop Reset	~	ms
Engine Speed	~	rpm
Match	~	%
Timing	~	ms
Ignition Cut	~	%
Main	~	%
Recover		3.0 ms
Fuel Cut	~	%
Main	~	%
Recover		-50.0 ms
Ignition Timing		
Limit Advance	~	°BTDC
Retard	~	°RTD
Recover		20.0 ms

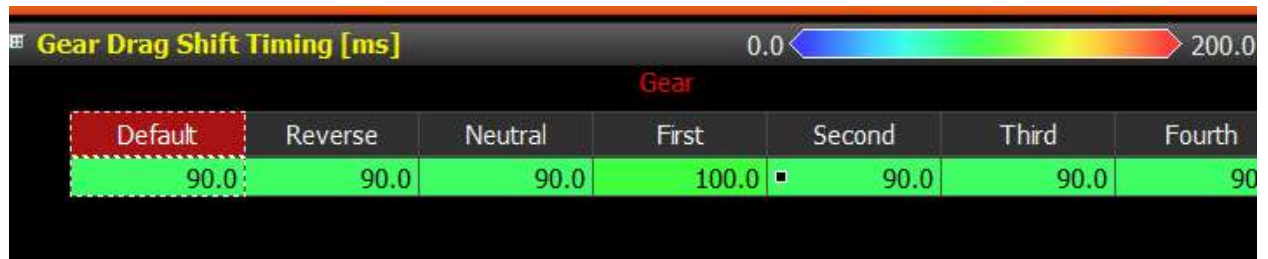
We used 55 NM for both up and back (K series with PPG trans)

Gear Lever Force Threshold Up [N·m]		-100.0 <span style="display: inline-block; width: 100px; height: 10px; background: linear-gradient(to right, blue, green, yellow, red);"></span> 100.0					
		Gear					
Default	Reverse	Neutral	First	Second	Third	Fourth	
55.0	55.0	55.0	55.0	55.0	55.0	55.0	



## GP1 STRAIN SETTINGS

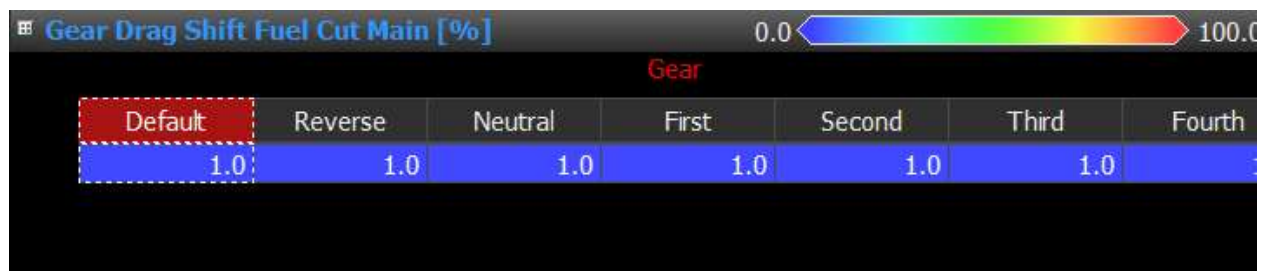
### Timer Settings



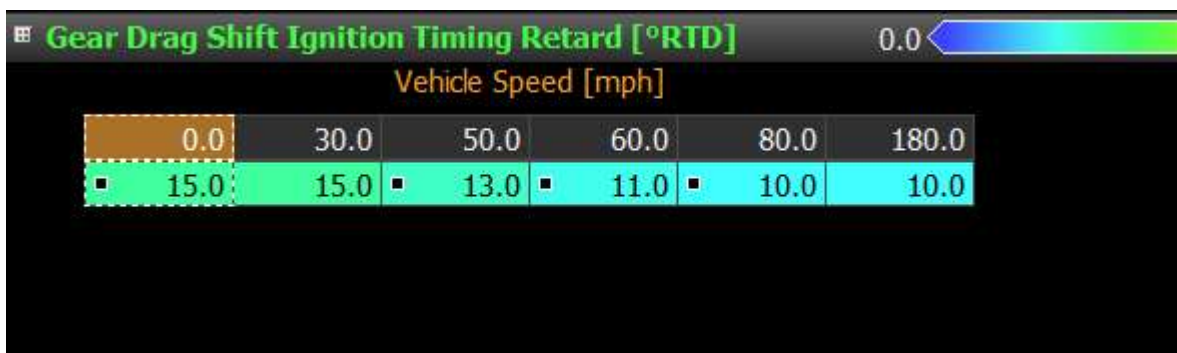
### Ignition Cut %



### Fuel Cut %



### Ignition Retard



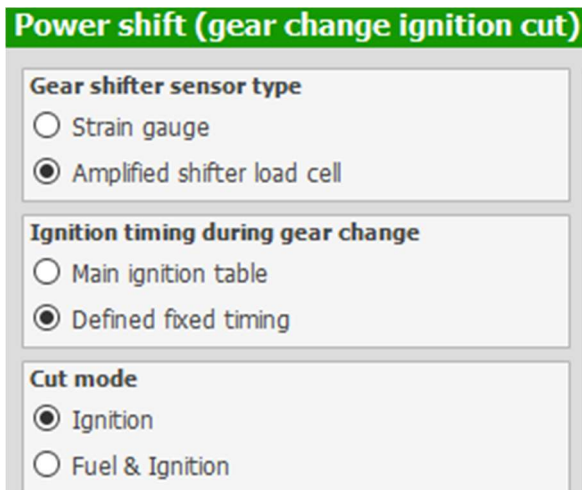
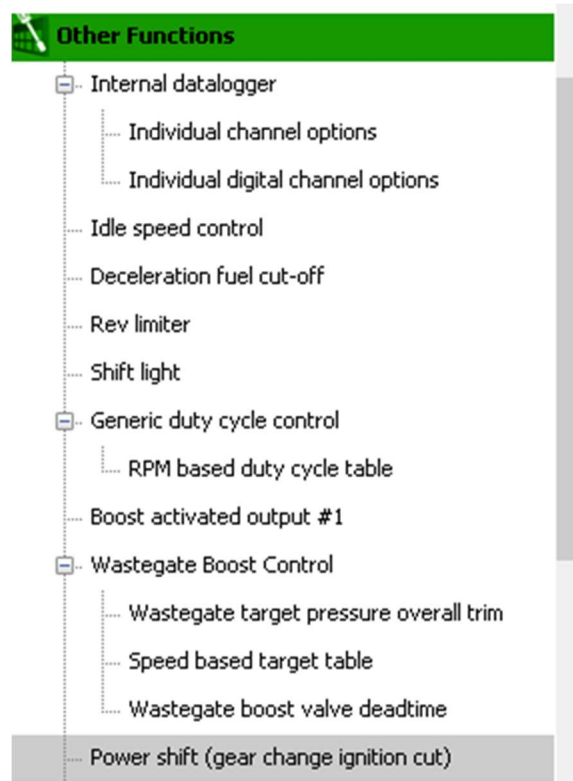
## GP1 STRAIN SETTINGS

### Engine Speed Match



## Fuel Tech

Below is a generic setup that is proven to work. With this software you have some other options that can work as well.



## GP1 STRAIN SETTINGS

**Minimum TPS**  
 Enabled  
 %

**Lock time between gear changes**  
 s

**Lock time after validated launch**  
 s

**Gear shifter type**  
 H pattern / Inline  
 Sequential shifter

**Direction**  
 Regular (5V to the front)  
 Reverse (0V to the front)

**Gear shifter sensor trigger voltage levels**

**Backwards shift**  
 V

**Forward shift**  
 V

**Power reduction during gear shift**

Power reduction duration (1.000s = 1000ms)									
1 → 2	2 → 3	3 → 4	4 → 5	5 → 6	6 → 7	7 → 8	8 → 9	9 → 10	
0.110	0.105	0.105	0.160	0.150	0.150	0.150	0.150	0.150	s

Ignition timing during power reduction									
1 → 2	2 → 3	3 → 4	4 → 5	5 → 6	6 → 7	7 → 8	8 → 9	9 → 10	
-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	°

Ignition cut on power reduction									
1 → 2	2 → 3	3 → 4	4 → 5	5 → 6	6 → 7	7 → 8	8 → 9	9 → 10	
95	90	85	20	20	20	20	20	20	%

Activate closed-loop power reduction duration according to next gear detected

# GP1 STRAIN SETTINGS

File Home Map Security View Tools Internet remote tuning

ECU Updater ECU Information Splash Screen Odometer Hourmeter ECU Factory Reset ECU Tools Reset touchscreen calibration FT Input Expander CAN Network Oscilloscope Mode Engine Simulator Project CARS interface Broadcast Real-Time Data Refresh Throttle Base updates Check updates Send map by E-Mail

**Quick access panel**

- Engine temperature compensation
- Intake air temperature compensation
- Individual cylinder trim
- Ignition limits
- Engine start
- Gear based compensation
- Gear change compensation
  - Gear change compensation table
- Other Functions**
  - Internal datalogger
    - Individual channel options
    - Individual digital channel options
  - Idle speed control
  - Deceleration fuel cut-off
  - Rev limiter
  - Shift light
  - Generic duty cycle control
    - RPM based duty cycle table
  - Boost activated output #1
  - Wastegate Boost Control
    - Wastegate target pressure overall trim
    - Speed based target table
    - Wastegate boost valve deadtime
  - Power shift (gear change ignition cut)**
  - Start button
  - RPM activated output
  - Active traction control

**Power shift (gear change ignition cut)**

**Gear shifter sensor type**

Strain gauge  
 Amplified shifter load cell

**Ignition timing during gear change**

Main ignition table  
 Defined fixed timing

**Cut mode**

Ignition  
 Fuel & Ignition

**Minimum TPS**

Enabled  %

**Lock time between gear changes**

s

**Lock time after validated launch**

s

**Gear shifter type**

H pattern / Inline  
 Sequential shifter

**Direction**

Regular (5V to the front)  
 Reverse (0V to the front)

**Gear shifter sensor trigger voltage levels**

**Backwards shift**  V

**Forward shift**  V

**Power reduction during gear shift**

**Power reduction duration (1.000s = 1000ms)**

1 → 2	2 → 3	3 → 4	4 → 5	5 → 6	6 → 7	7 → 8	8 → 9	9 → 10	
0.110	0.105	0.105	0.160	0.150	0.150	0.150	0.150	0.150	s

**Ignition timing during power reduction**

1 → 2	2 → 3	3 → 4	4 → 5	5 → 6	6 → 7	7 → 8	8 → 9	9 → 10	
-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	°

**Ignition cut on power reduction**

1 → 2	2 → 3	3 → 4	4 → 5	5 → 6	6 → 7	7 → 8	8 → 9	9 → 10	
95	90	85	20	20	20	20	20	20	%

Activate closed-loop power reduction duration according to next gear detected