

Titan Cam, NOS & Idle Controller

Introduction

This Cam Control Unit (CCU) is designed as a standalone unit to supplement current ECU's with features not currently housed on them or where they lack the number of drivers available to do the work. It is based on the Titan hardware and tuning software. To keep cost low it uses the same software as for the Spitronics Titan ECU. Some of the names of the tuning spaces may be hard to understand but it is explained in this manual. The hardware is configured as a basic Type 2 setup which makes it a bit less expensive as the Standard ECU from Spitronics. Other features may follow which can also be uploaded in this hardware.

Features

- VVTI Cam Control on 4 separate cams with Pulse Width Modulation (PWM)
- NOs Control on 2 separate solenoids with PWM
- Idle Control on 2 and 3 wire solenoid valves with PWM
- Rev Counter Calibration Signal scalable from 1 to 60 pulses / Revolution
- 2 x General Purpose outputs operating on TPS & RPM

Setup

Map Sensor (kPa x10)	<input type="text" value="10"/>
RPM Range	<input type="text" value="7000"/>

Choose the RPM range for the correct operating RPM of your engine.

Map Sensor must be on 10 for 100% TPS

<input checked="" type="checkbox"/> Throttle Position Sensor	<input type="button" value="Calibrate"/>
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TPS Must be calibrated

<input checked="" type="checkbox"/> Trigger	<input type="button" value="↓"/>	<input type="checkbox"/> Test
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You must connect some trigger signal for an rpm pulse to the unit. The harness is made for the square wave pulse coming from the Titan ECU. Should you require a magnetic pulse to work you may require a different harness.

Crank Angle Sensor
Gear Teeth <input type="text" value="35"/>

Set the Gear Teeth for the total number of pulses per revolution that you supply the system with. This example was for a 36-1 gear. The system will calibrate itself correctly.

RPM Output
Pulses per RPM <input type="text" value="4"/>

The Cam Controller has an RPM output that can be calibrated for rev counters. Just put in the number of pulses required for your rev counter. See the Titan ECU manual for correct wiring procedures for the different types.

General Purpose Outputs

Output 1		Output 2	
<input checked="" type="radio"/> RPM	<input type="radio"/> Lambda	<input type="radio"/> RPM	<input type="radio"/> Lambda
<input type="radio"/> Vacuum	<input type="radio"/> Water Temp	<input type="radio"/> Vacuum	<input type="radio"/> Water Temp
<input type="radio"/> TPS	<input type="radio"/> Air Temp	<input checked="" type="radio"/> TPS	<input type="radio"/> Air Temp
<input type="radio"/> Idle Control		<input type="radio"/> Idle Control	
Min <input type="text" value="5000"/>	Max <input type="text" value="7000"/>	Min <input type="text" value="90"/>	Max <input type="text" value="100"/>

On the GP outputs you may use the idle control or select RPM for shift lights or TPS for kick down signal etc. For 1 wire idle control GP2 must be used. For 2 wire idle control GP1 & GP2 must be used.

For Idle control only valves can be done directly from the unit. For a stepper idle control you will require the F9 idle controller. For setup on the please refer to the Titan User manual.

Idle Control

RPM

Start %

Response Time
UP DOWN

Low Limit

High Limit

Type Selection
 Valve Stepper

Idle Cut-off TPS %

The Idle Cut-off TPS must be larger than the actual TPS value at closed throttle to operate the idle valve correctly.

Cam Control

Coil Combination

Single Multi Coil

Wasted Spark Two Stroke

If a vehicle has 4 VVTi cams and you want to control them each separately, put this setting on Multi Coil. Now use the 4 RPM correction graphs for each cam. Low is for inlet cam 1. Cruise is for exhaust cam 1. High Cruise is for inlet cam 2. High is for exhaust cam 2.

Low Cruise High Cruise High

Coil Combination

Single Multi Coil

Wasted Spark Two Stroke

If you have 4 cams but the inlet cams require the same signal and the exhaust cams require the same signal, put this setting on Wasted Spark.

Now use only the Low & Cruise correction graphs for each cam.

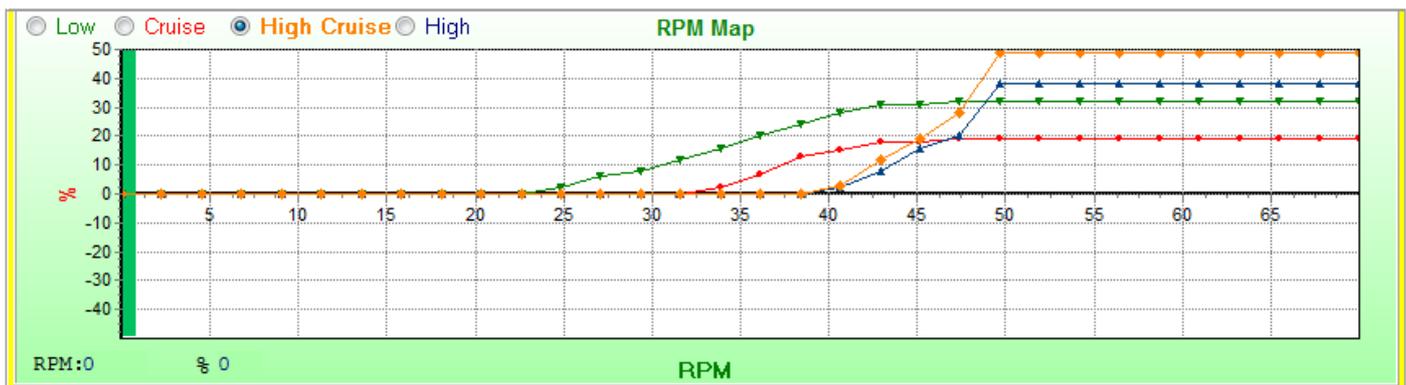
Low Cruise

You still connect the 2 inlet cams and the 2 exhaust cams to its own driver but both signals will be the same inlet cams and both signals will be the same for the exhaust cams.

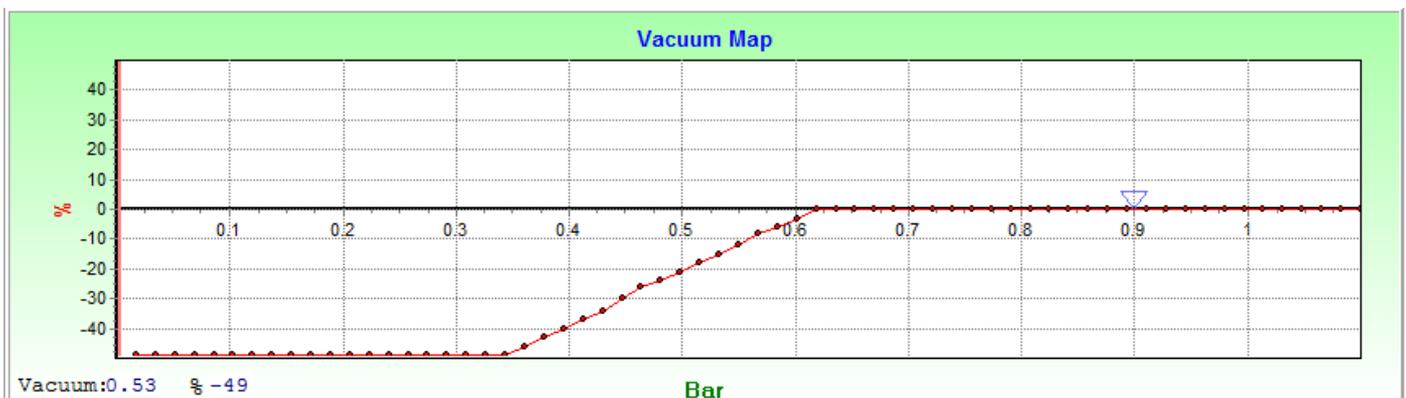
Adjusting the graphs.

Understanding the settings.

The real time value of both the graphs is multiplied by 2 and then added together. If the result is larger than 100, the pulse width will stay 100%. If the result is smaller than zero the pulse width will stay 0%. This means if the RPM signal is set at 40%, the actual duty cycle on the cam will be 80% PWM. Now if the TPS signal is -20% the result is -40%. Now if you add it together with the RPM graph, the cam will be on $80 - 40 = 40\%$ PWM.



In the above example the Low or inlet cam will start to open at 2500 RPM and open to a maximum of 64% PWM (32). And the rest is the same operation.



This Graph will manipulate all cams according to the same TPS position. Some VVTi cams need to be adjusted not only for RPM but also according to the load on the engine. In this example - 100% duty cycle is forced until 35% TPS value. So regardless what is adjusted on top the result will always be zero. This means that no cam action will take place. Then above 60% TPS whatever is adjusted on the RPM graph will be imposed on the cams.

NOs Control

Two control solenoid valves for NOS and Fuel can be ratio controlled with PWM to adjust the amount of fuel and Nitrous that has to be administered under certain conditions. The ratio can be adjusted according to the RPM signal and can be activated according to the TPS position signal. This means that if the throttle is not fully open the NOS circuit will not operate.

Coil Combination

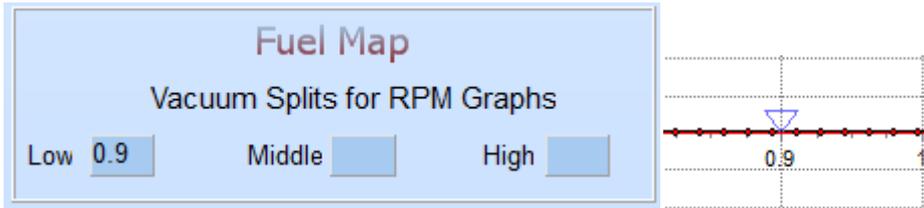
Single Multi Coil
 Wasted Spark Two Stroke

This setting must be on Wasted Spark for NOS control. The cams can still work as described above.

Now use only the High Cruise & High correction graphs for NOS & the Fuel Solenoid. Use the High Cruise graph for the fuel solenoid and the High graph for the NOS solenoid.

High Cruise High

Only the RPM correction Graph is working with these solenoids.



On the TPS graph this setting is used as a TPS cut-off point for the NOS to be activated. If the TPS falls below this value the solenoids will be shut down. The TPS value on the graph has no influence on the NOS calculation. This means that the NOS can work separately from the cams.