

LDperformance

Throttle Controller

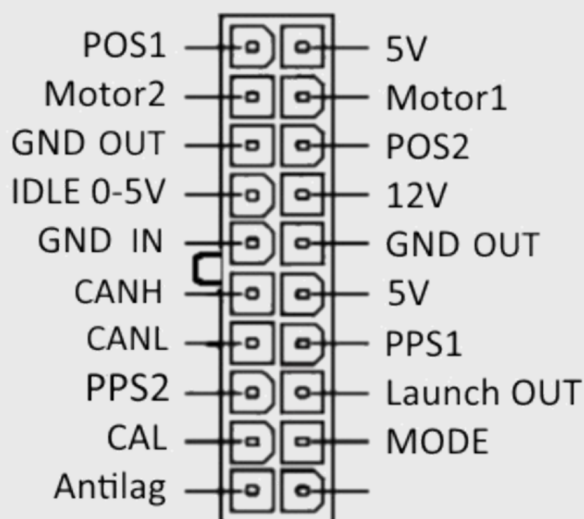
Manual



Features

- ✓ Effectively control many drive by wire throttle valves
- ✓ 0-5V Idle control
- ✓ Antilag function
- ✓ Compatible with all standalone ECUs
- ✓ Fully safe and secure

Pinout



Top 6 pins are connected to the throttle valve. Pre-made wiring loom can be provided for Bosch (VAG) throttle bodies.

Most throttle bodies have 2 wires for the motor (motor1 and motor2) and two position sensor signals (Pos1 and pos2). It doesn't matter which one is pos1 and which one is pos2 – these will be detected during calibration. The throttle body also needs 5V and ground to power the position sensors.

12V and GND IN – Connect 12V to a stable 12V source when ignition is ON.

PPS1 – Pedal position signal from the throttle pedal. 0-5V max. This sensor needs to output low voltage when the pedal is released and higher voltage when the pedal is pressed. The pedal also needs 5v and ground.

PPS2 – second pedal position sensor. Often the pedal has a second output. It should be connected for reliability purposes. If it is not connected the system will still work but with reduced reliability. If the only pedal position sensor (PPS1) is faulty or a wire gets disconnected the throttle valve could open. The Throttle controller will check for this second pedal position sensor during first calibration.

CAL – Calibration wire. Connect it to ground before first use to calibrate the controller.

Not required for basic operation:

IDLE 0-5V – 5V is lowest idle, 0V (gnd) is highest idle. Can be controlled by standalone ecu pwm idle output or can be connected to potentiometer to manually increase or reduce idle.

MODE – Connect to GND if you need to use antilag.

Antilag – Connect to GND to activate. This will keep the throttle valve open when the pedal is released. The unit will also output ground on the “Launch OUT” wire which is used to activate external Launch control module to keep the engine revs below a certain value.

CANH and CANL – CAN bus wires. The unit does not have a CAN bus termination resistor.

Calibration

When first connected the controller should be calibrated so it knows the min, max positions of the throttle pedal and valve. It is critical that the unit is calibrated before first use or when changing throttle valve.

1. Connect CAL wire to ground.
2. Fully depress the throttle pedal and turn ignition ON. (Do not start the engine!)
3. Fully release the throttle pedal.
4. Wait 5 seconds and verify correct operation of throttle.
5. Turn off ignition and disconnect CAL wire.

The throttle valve will close fully and open fully during the calibration procedure. Please note that having the serial port connected while doing the calibration procedure will output useful data.

Safety

When both pedal position sensors are connected to the controller the system is guaranteed to never open the throttle valve without user request. An FMEA analysis proves that this is true if any component fails or any wire gets disconnected or shorted.

The controller is continuously monitoring both throttle position inputs and if there is sufficient difference between the two will stop operation and log an error code. Same applies for the pedal position sensors. Additionally the controller will halt and log an error if the throttle is open more that requested for a time period of >1s.

Safety checks are also performed on every power on. These include short circuit and open circuit detection on all mosfets and throttle motor open circuit.

When using the Antilag feature both “Antilag” and “mode” wires need to be connected to ground for the throttle to actually open. This is done to make sure it is not activated if one wire accidentally touches ground.

Tuning Antilag

When the "Mode" wire is connected to Ground, the feature will be enabled. In order to actually activate it connect "antilag" wire to ground.

What it does is 2 things:

1. Set the minimum valve position to half open throttle (or the user configured antilag throttle position).
2. Turn on separate launch control/rev limiter when the throttle pedal is released.

To configure the Antilag throttle position do the following:

1. Connect CAL wire to ground
2. Turn ignition ON (DO not press the throttle pedal as before!)
3. The Throttle will operate normally. Keep the throttle at the desired position for Antilag.
4. While keeping the throttle at the desired position disconnect the CAL wire.

Advanced configuration

All that is necessary for normal operation has been explained above. Although if you are feeling lucky and you want to break something go ahead and play with the rest.

Connect a usb to serial cable and open a terminal at 115200 bitrate.

Press **U** and quickly press **n** to unlock the serial port.

Now each key you press will have a specific function. But don't go randomly pressing keys just yet.

c – show calibration data:

Pedal position min max

Pedal position 2 min max

Throttle position min, off and max – The throttle valve actually has an "off" position when no power is applied. That is often a slightly more open position than the min position.

Idle position 1 and 2 and antilag position – There are two idle positions: 1- min idle when the "idle" wire is at 0V (100% duty cycle) and idle2 – max idle position when the "idle" wire is at 5V (0% duty cycle).

PID values – these are the terms for the control loop which keeps the throttle at the commanded position.

Errors – Pedal pos error counter, Throttle pos error counter, “Valve open for too long” error counter, overcurrent error counter

z – show live data:

pedal pos, Throttle target, throttle position, motor current, motor pwm

x– Show live data2:

Pedal position, pedal pos2 difference, TPS1 position, TPS2 position

u (**o** for products made after July 2024) – Reduce Idle 1 position

U (**O** for products made after July 2024) – Increase Idle 1 position

i – Reduce Idle 1 position

I – Increase Idle 1 position

a – Reduce Antilag position

A – Increase Antilag position

s – SAVE SETTINGS

n (**m** for products made after July 2024) – Enable /disable CAN and blip mode

\$ – Enable/disable overcurrent protection

For reference only, do not change:

P – increase P term

p– decrease P term

{ – increase I term

[– decrease I term

} – increase D term

] – decrease d term

! – toggle safe/unsafe mode



CAN control

To enable it :

1. Connect a usb to serial cable and open a terminal at 115200 bitrate
2. Press **U** and quickly press **n** to unlock the serial port
3. It will show "Unlocked"
4. press **n** to enable CAN
5. 11bit CAN is used at 500kbps. Big-endian.

From ECU to DBW:

0x104 bytes 0 and 1 Throttle target 0-1023

From DBW:

0x100 bytes 0 and 1 pedal position 0-1023

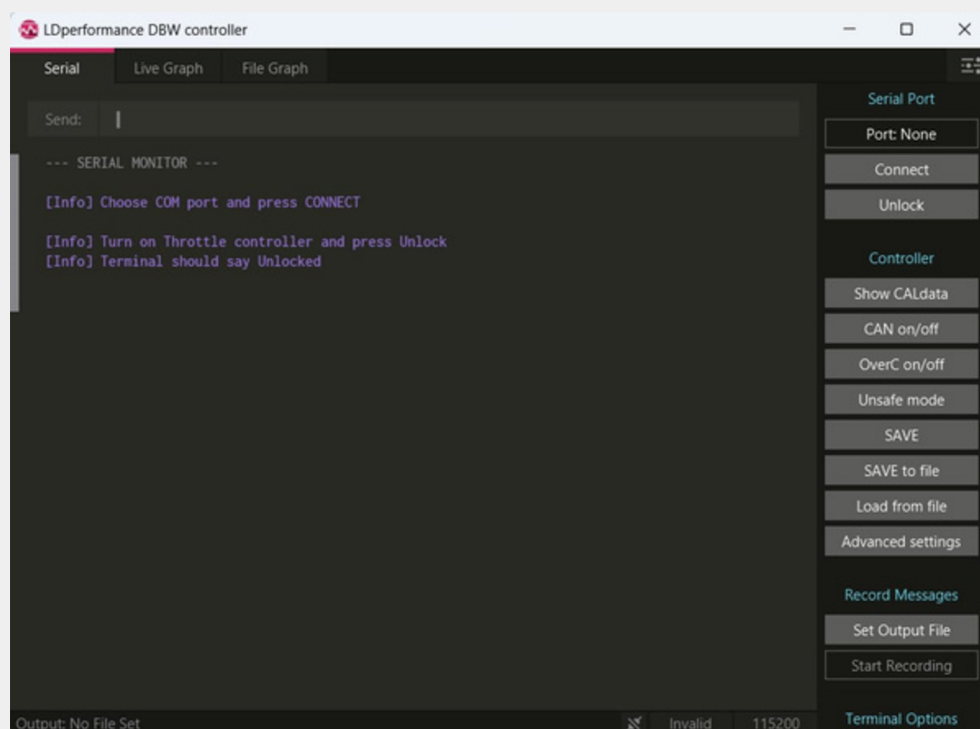
0x100 bytes 2 and 3 throttle position 0-1023

BLIP request:

0x103 byte 0 - Blip request 0-255 proportional. Note that blip needs to be enabled using n key as shown in Advanced settings

Tune software

It is now possible to configure all the settings using the new software:



Troubleshooting

If it doesn't work great from the start, connect a usb-serial cable and use a terminal (for example putty) at 115200 baudrate.

Looking at the serial port while doing the calibration procedure will show useful data.

Make sure that during calibration the throttle opens and closes fully.

Any errors will be shown on the serial port terminal.

Sometimes wrong wiring or unsupported pedal or throttle will lead to "position error" which is incorrect relation between the two sensors. This can be checked by pressing the "x" key and looking at the difference between the position sensors. Sometimes making changes to the wiring, for example reversing positions can make an improvement. For testing purposes "unsafe mode" can be enabled which will only listen to one position sensor and ignore the errors.

