# EdgePerformance AS

## «ECU tuning and setup instructions»

- Once the EFI install has been completed, double check to verify that all electrical terminals and connections are securely fastened, that all wires have sufficient play and freedom to move, and that no wires are in such a way that they can be exposed to fretting.
- Insert the spiral communication cable with the 3.5mm mini-jack into the ECU com-port, connect the other end of this cable, the DB9 serial connector into the DB9 mating connector on the USD-RS232 converter. Then connect the USB end into your laptop.
- Power on the ECU and launch the Autronic SM4 software.

- In some cases, you might need to enter the "device manager" to locate the USB port in use. As you can see, this PC has COM4 in use.
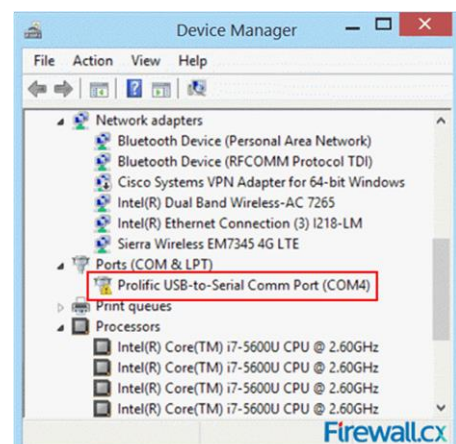
- Once in the software, unless the software automatically reads from the ECU, select "try another port" and select the COM port shown active in you device manager.
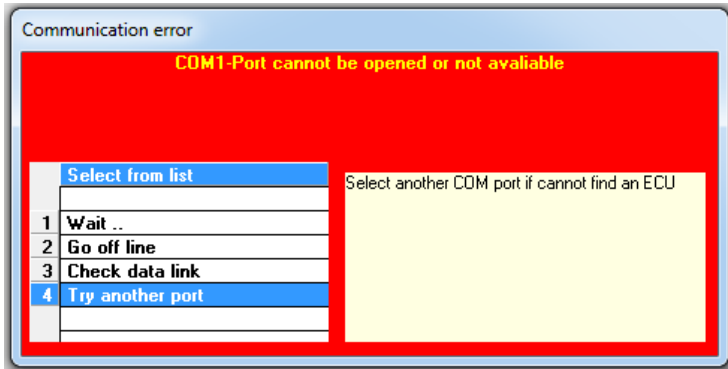
- Once online, there are a few hotkeys you might want to know about. F2 quick saves the CAL files. Right click on the mouse and create new file. Make sure not to overwrite the file supplied from your supplier. Next is F4 which saves the current CAL file to the ECU. Always save the file by F2 and then write to the ECU F4 after doing changes. Whenever making changes it is a good thing to save as new files and add a number (ex. N5622R_001). Press ECU to enter the menus and navigate with the arrows. Press enter to enter the sub menus and to insert new values.

- First thing you want to do is to run the engine warm. Once warn, set the desired idle RPM by adjusting the idle stop screw on the throttle body, typically at 1450-1650rpm. Once this is done, enter the M1 menu, then I/P Analogs followed by the I/P Throttle.
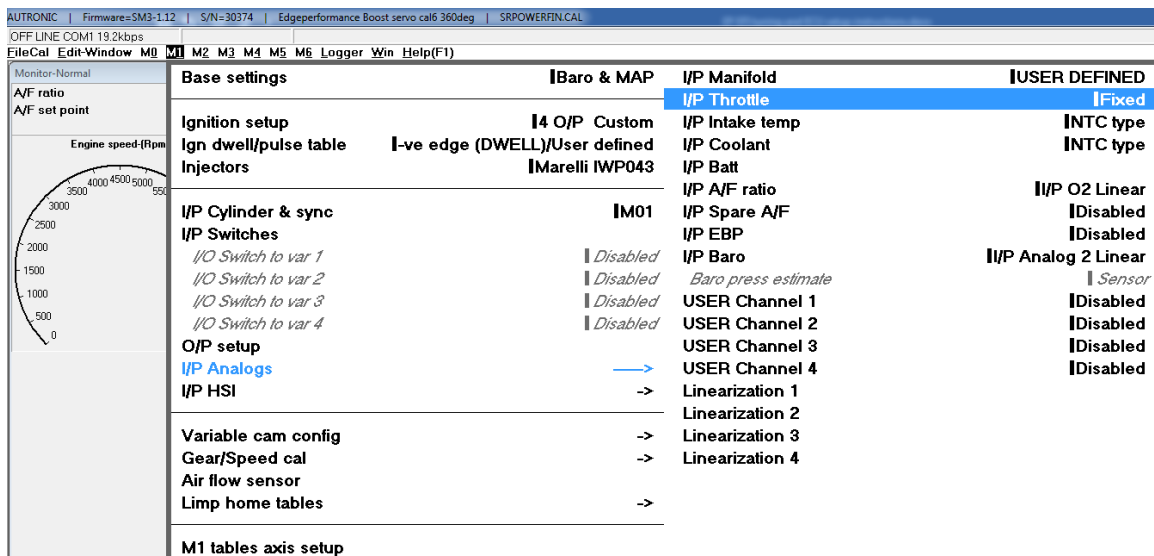
- Now set the throttle to idle and read off the TPS volts. Insert the TPS volts, typically around 0.5-0.7v in the 0% limit. Next, set the throttle to wide open and read the TPS volts. Insert the value into the 100% limit, typically 4.0-4.6v. See screen shot on the next page.

AUTRONIC | Firmware=SM3-1.12 | S/N=30374 | Edgeperformance Boost servo cal6 360deg | SRPOWERFIN.CAL
OFF LINE COM1 19.2kbps
FileCal Edit-Window M0 -M1- M2 M3 M4 M5 M6 Logger Win Help(F1)

I/P Throttle

	Parameters	Value	
1	I/P Throttle		Fixed
2	Error limit lo	0.000	Volts
3	Error limit hi	5.000	Volts
4	0% limit	0.738	Volts
5	100% limit	4.560	Volts

I/P throttle learn mode

Typical=Auto

!!WARNING!!WARNING!!
WHEN CHANGING FROM "AUTO" TO "FIXED" MODE, "0% LI

NOTE1
If TPS volts goes above or below "Error limit lo/

NOTE2
See "Help", "Throttle (TPS) learn" for more detai

Calibrating "Auto" TPS limit mode

1. Ignition switch on, engine stopped.

2. Disconnect throttle position electrical connec

3. Reconnect throttle position electrical connect

4. Ensure that throttle is closed for at least 5

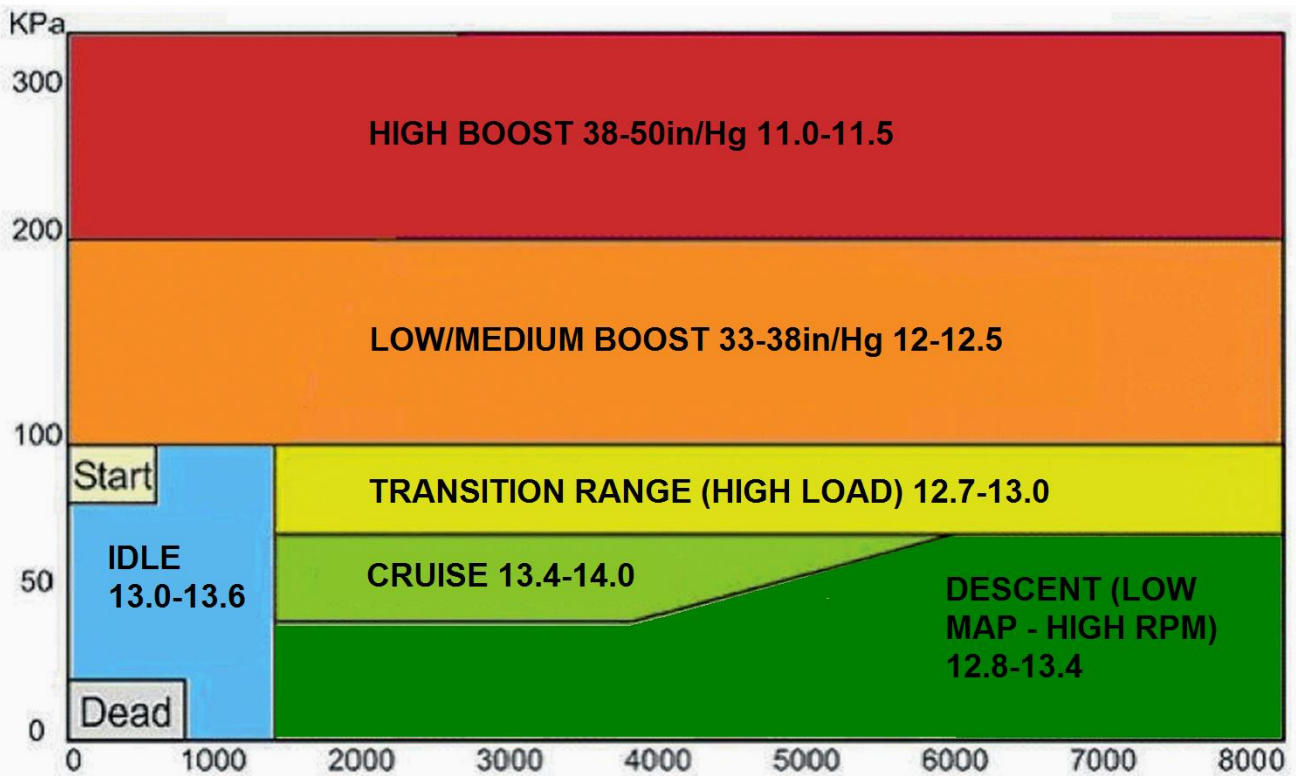5. Fully open the throttle for at least 5 seconds
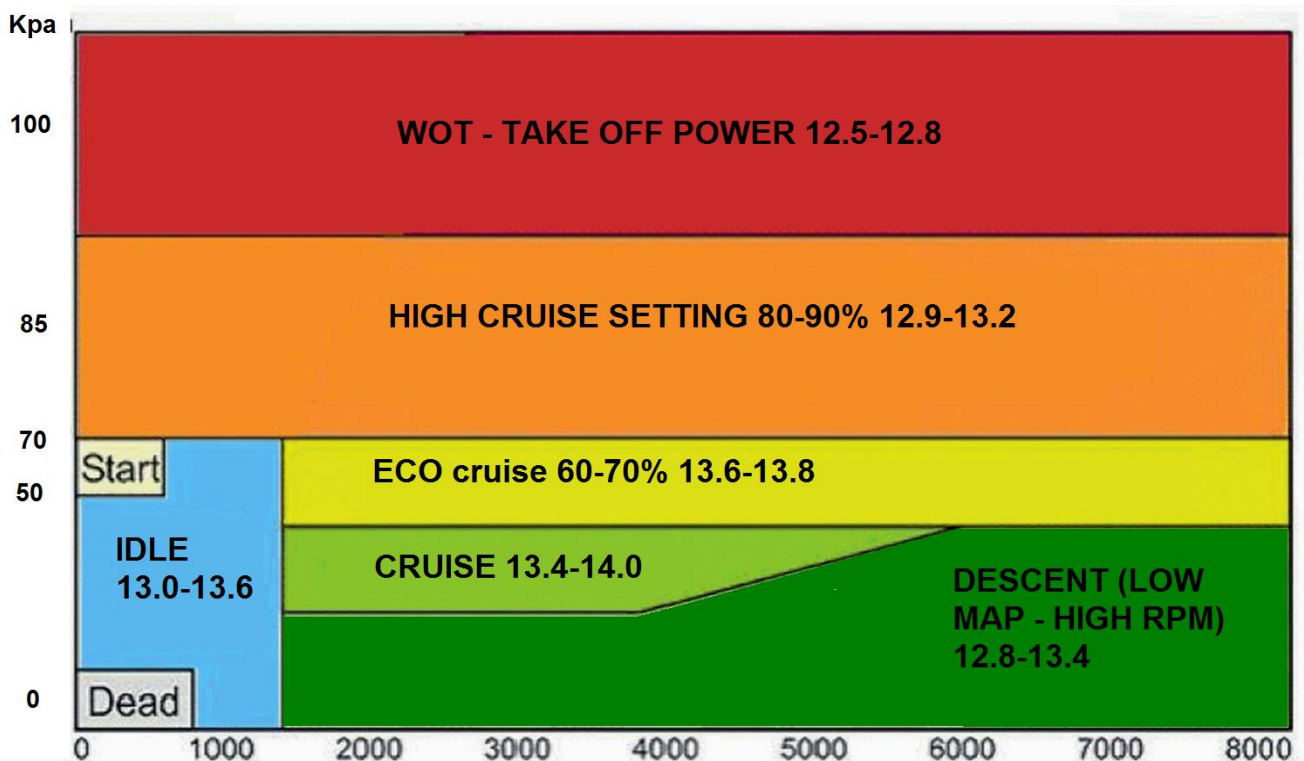
A/F ratio :1
A/F set point :1

10.00

Engine speed-(Rpm)

Throttle position-(%)
0.0 — 100.0

Charge temp	Deg C
Battery voltage	Volts
TPS volts	Volts
TPS learn zero	Volts
TPS learn full	Volts
Error Reg	Hex
Er.Throttle	On/Off

LOAD %
Manifold pressure Kpa
Ign. Angle -MEAN- Degrees
Inj. Time -MEAN- mSec
Inj. Duty -MEAN- %
Inj. End Degrees
Inj. Start Degrees
Intake temp Deg C
Coolant temp Deg C

- Now ensure that the "Throttle position (%)" displays 0.0 at idle and 100.0 at WOT.
- With the TPS calibrated, start the engine, let it run warm before you start to make any fuel changes. By entering the M2 – Base fuel delivery, you will see a table with RPM going horizontal, and LOAD % vertical. The LOAD is basically MAP (Manifold air pressure) and 100kpa equals 1bar, 0psi or 30in/Hg. The numbers in these tables can either be increased or decreased in two ways. Either by pressing the + or – on your keyboard, or by pressing enter in the table you want to make changes to and entering a higher or lower number. The higher number means more fuel at the specific rpm/load, and lower numbers is less fuel.
- It is essential to have a O2 wideband gauge to verify correct air-to-fuel mixture also referred to as AFR, and it is also helpful to have EGT sensors on each cylinder in order to be able to trim the amount of fuel going into each cylinder to ensure a balanced and equal fuel distribution to each cylinder. Only make small changes at the time and see how they affect the AFR values on the O2 sensor display. Also keep an eye on the EGT and ensure you always stay within the given limits provided by the engine manufacture. On the next page there is a table showing common AFR values to aim for on both a normally aspirated engine, and a turbocharged boosted engine.
- *BEFORE RUNNING THE ENGINE, SECURLY TIE DOWN THE AIRCRAFT!*

Air - Fuel - Ratio   TURBO

KPa

HIGH BOOST 38-50in/Hg 11.0-11.5

LOW/MEDIUM BOOST 33-38in/Hg 12-12.5

Start

TRANSITION RANGE (HIGH LOAD) 12.7-13.0

IDLE 13.0-13.6

CRUISE 13.4-14.0

DESCENT (LOW MAP - HIGH RPM) 12.8-13.4

Dead

300 — 200 — 100 — 50 — 0

0   1000   2000   3000   4000   5000   6000   7000   8000

Air - Fuel - Ratio NORMALLY ASPIRATED

Kpa

WOT - TAKE OFF POWER 12.5-12.8

HIGH CRUISE SETTING 80-90% 12.9-13.2

Start

ECO cruise 60-70% 13.6-13.8

IDLE 13.0-13.6

CRUISE 13.4-14.0

DESCENT (LOW MAP - HIGH RPM) 12.8-13.4

Dead

100 — 85 — 70 — 50 — 0

0   1000   2000   3000   4000   5000   6000   7000   8000

- During the tuning process, start from idle, and make small changes, in one table only at the time. The table with the blue highlight, is the table that the engine runs in. Makes changes + or – here until you have the desired AFR. Then slowly increase the RPM and LOAD to move into the next table to the right. Proceed doing so throughout the entire operating range of the motor until you have reached WOT (Wide Open Throttle). Keep an eye on CHT, Coolant, Oil temp, Oil pressure and EGT`s while running the engine.
- Once the desired AFR values are achieved, you can consider making adjustments to the injector trims. Only do so if you have 4x reliable EGT`s, meaning one EGT per cylinder.
- Go to M2 – Fuel Trims. The injectors can individually be trimmed based on rpm and load. Typically, how this is performed is by locating the highest EGT on the EGT gauge, and unless it is critical high or out of limit, removed fuel from the other 3 cylinders in order to get the EGTs as close to equal as possible. Make a test run throughout the whole rpm and load range to ensure they don't divert during higher loads. If in doubt, leave them all at 100 (no fuel trims). A nice tip is to read the spark plugs after a short test flight or ground run. By looking at the spark plug color you can easily determine If any cylinders are running hot, cold or correct.

- For those running turbo engines, we can adjust the boost settings in a few ways, but first thing first. Once the ECU power is ON, make sure that the wastegate servo pulls the wastegate valve to the closes position with a small amount of pre-tension. Not much is needed. You can fine tune and calibrate the closed position in the M6 table, GPC 2 and GPC2 table.

- In the row to the right, 90.2 set a smaller or greater value depending on the servo orientation and rotation to ensure the wastegate valve closes. Make small changes at the time, typically 2-5 numbers to prevent causing damage to the cable, wg valve or servo motor. Once the closed position is calibrated, the engine can be run. As the manifold pressure increased, there will be a red box moving towards the left in the tables. Make changes in the 50.2, 29.8 and 20.0 tables to adjust the desired MAP. We normally run the Rotax engines at 25-28in/Hg at ECO cruise, 30-34in/Hg medium power cruise, 35-38in/Hg at high power cruise and 40-44in/Hg for take-off WOT only. Make small changes and ensure NOT to over boost the engine. Always keep an eye on the engine fluid temps, and the IAT (intake air temp) while running on the ground.

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FileCal Edit-Window M0 M1 M2 M3 M4 M5 -M6- Logger Win Help(F1)

User table B (-1599.9 .. 1599.9) % Target[GPc2=I/P Analog 1]

Boost setpoint(Kpa(abs))　　GPC 1 duty(%)　　　　　　　　　　　　Attr:30.00%

		20.0	29.8	50.2	90.2		
100.0		3.0	5.0	7.0	9.0		
110.0		3.0	5.0	7.0	9.0		
120.0		3.0	5.0	7.0	9.0		
130.0		3.0	4.0	7.0	9.0		
140.0		3.0	4.0	7.0	9.0		
150.0		3.0	4.0	7.0	8.0		

A/F ratio　　　　　　:1
A/F set point　　　　:1

10.00

Engine speed-(Rpm)	Throttle position-(%)		Charge temp	Deg C
			Battery voltage	Volts
	0.0	100.0	Boost setpoint	Kpa(abs)
	LOAD	%	I/P Analog 1	%
	Manifold pressure	Kpa	GPC 2 set.p	%
	Ign. Angle -MEAN-	Degrees	GPC 1 duty	%
	Inj. Time -MEAN-	mSec	GPC 2 duty	%
	Inj. Duty -MEAN-	%	GPC 2 adapt	%
	Inj. End	Degrees	GPC 2 inhibit	Sec
	Inj. Start	Degrees	Error Reg	Hex
	Intake temp	Deg C		
	Coolant temp	Deg C		