TUNING IN TECH SYSTEM

- **I.** Connect the diagnostic interface in to your computer.
- **II.** Run the LPGTECH Gas Setting software.



Img. 1. Window overlooking initiate TECH controller connection with a computer

B LPGTECH GAS SETTING ver. 2	.0.29.68 - TECH 324 10.4.64	E manufacture into	· · · · · · · · · · · · · · · · · · ·	-	-			X			
Program Generation Gouge	s <u>L</u> anguage C <u>o</u> ntroller O <u>B</u> D <u>D</u> ocumentation <u>V</u>	iew <u>T</u> ools <u>H</u> elp									
Car parameters Settings Car ration Map Oscilloscope Errors Controller Firmware					Petrol						
For electric trans	Car Chan da ad	settings Detroit to the set	Commented (Ignition					
Engine type	Standard •	Petrol Inj. type		RPM				780			
Number of cylinders	4	Petrol inj. controlled	By ground 🔹	Engin	e load			6 %			
Cylinders per coil	1	Renix control	No •	MAP			0,27	7 bar			
RPM source	PB Injectors	 Extra-injections hiding 	No	Gas p	res.		1,51	L bar			
RPM signal	3,60 V .			Reduc	er temp.		3	5 °C			
	Gas installa	tion configuration		Gas te	emp		6	i3 °C			
Fuel type	LPG	 Reducer temp. sensor 	4k7 * •	Lamb	da 1		-				
Control algorithm	ТЕСН	 Gas temp.sensor 	10k *	Lamb	da 2		2,	11 V			
Injector type	LPGTECH Yeti/Hana 2000/Barı 🔹 .	Gas level sensor	TECHLevel-Hall grow * •		ua z		2,	41 V			
Adaptation	Off • .	Switch-over sound	No •	Gasie	evei		4,	92 V			
Acceleration options	Switch off •			Batter	ry		14,	01 V			
	Switch	-over to gas									
Reducer temp.	35 °C	RPM switch-over	700 RPM	>							
Gas temperature	-20 °C	Switch-over mode	One by one 👻								
Injectors heating	No •.	Switch-over time	3 s ÷		Teite	ation times from	1				
Fuel overlapping	0,00 ms	🗧 Fast start	Switch off •	P1	3.60	G1	0.0				
	Switch-	over to petrol		P2	3 61	G2	0.0				
Min. gas temp.	0 °C	🗧 Min. gas RPM	300 RPM	D2	2 60	62	0,0				
Min. gas press.	0,70 bar	🖶 Max gas RPM	10000 RPM		3,00	63	0,0				
& Min. gas press. time	0,20 s	🗧 & Max engine load	100 %	<u>P4</u>	3,01	G4	0,0	V			
Max gas press.	4,00 bar	Fast switch off	No 👻			\sim					
		RPM drop out time	0,5 s			ക്					
General Factory settings											

Img. 2. Window < Settings> with view after connection process

III. Run the engine at idle. Switch to petrol using the button on the switcher.

a) In the <*switching to gas*> section (1) set the switching RPM speed (2), which should be below the engine speed to idle (3) [*Img.* 3.].

B LPGTECH GAS SETTING ver. 2	0.29.68 - TECH 324 10.4.64	Real Property lies		-				- 0	×	
Program Connection Gauge										
Car parameters Settings Calibration Map Oscilloscope Errors Controller Firmware					Petrol					
Engine type	Standard •	Vernicie mit			DDM		Ignition		700	
Number of cylinders	4	Petrol ini, controlled	By ground		RPM				780	
Cylinders per coil	1	Renix control	No	-	Engine	1080	/	0.07	5 %	
RPM source	PB Injectors	Extra-injections hiding	No	_	MAP		/	0,27	bar	
RPM signal	3.60 V				Gas pr	res.		1,51	bar	
Tarroigna.	Gas installati	on configuration			Reduc	er temp		5	5 °C	
Fuel type	LPG	Reducer temp. sensor	4k7 *	•	Gas te	emp.		6	3°C	
Control algorithm	ТЕСН	Gas temp.sensor	10k *	•	Lambo	(3)—		0,0	V OC	
Injector type	LPGTECH Yeti/Hana 2000/Barı •	Gas level sensor	TECHLevel-Ha 2 -	·	Lambo	i Al		2,4	10 V	
Adaptation	Off •	Switch over sound	No	·	Gas le	vel		4,9	92 V	
Accoloration ontions	Cwitch off				Batter	у		14,0)1 V	
	Switch-o	over to gas								
Reducer temp.	35 °C	RPM switch-over	750 RPM							
Gas temperature	-20 °C	Switch-over mode	One by one	-						
Injectors heating	No •	Switch-over time	3 s							
Fuel overlapping	0,00 ms	Fast start	Switch off	•	P1	3.61	G1	0.0		
					P2	3 61	62	0,0		
Min. gas temp.	0 °C	Min. gas RPM	300 RPM		P3	3 61	63	0,0		
Min. gas press.	0,70 bar	Max gas RPM	10000 RPM		P4	3,01	G4	0,0		
& Min. gas press. time	0,20 s	& Max engine load	100 %		17	3,01	UT	0,0		
Max gas press.	4,00 bar	Fast switch off	No	•						
		RPM drop out time	0,5 s	×			ക			
Factory settings							\odot			
raciory settings										

Img. 3. Window <Settings> with setting RPM speed to switch on the gas equal on 650 [RPM]

IV. For easier contact with LPGTECH support, we introduce the basic data - contact and information about the car. Enter the tab **<Car parameters>** [Img. 4.].

LPGTECH GAS SETTING ver. 2.0.29.6	8 - TECH 324 10.4.64	-	· ·			-	Castron March			x
Car parameters Settings Calibration Ma	p Oscilloscope Errors Controlle	er Firmware	View Loois Help					Petrol		
Car parameters					Ignition					
Car make	Audi		 Horsepower 		150	RPM				780
(Engine	e load		(6 %
Car model	A4		 Engine capacity (cm³) 		2000 🊔	MAP			0,27	' bar
						Gas p	res.		1,51	. bar
Car VIN			Production year		2006 🊔	Redu	er temp.		3	5 °C
						Gas	emp.		6	3 °C
Engine code			Milage		245112 🌻	Lamb	da 1		0,0	00 V
		Gas insta	llation information			Lamb	da 2		2,3	39 V
				[/-	Gas le	vel		4,9	94 V
Reducer make			Injector type	LPGTECH Yeti/Ha	na 2000/Barrac 🔻	Batter	у		14,0	01 V
Reducer model			Nezzle diameter	0.0 mm	A					
Reducer model			NOZZIE UIdifietei	0,0 mm		>				
Controller wo	orking time (HH-MM-SS)			Gas installation service						
Working time - petrol	0000-00-47	0 %	Km per hour	100	<u>^</u>		Inje	tion times [ms]		
						P1	3,61	G1	0,0	V
Working time - gas	0000-00-00	0 %	Distance to service	SWITCH	ED OFF 🔹	P2	3,60	G2	0,0	V
			Contact			P3	3,61	G3	0,0	V
Name and surname			Jan Kowalski			P4	3,60	G4	0,0	7
Email			kowalski@xxx.p	ı)						
								CO		
lelephone			XXX XXX XXX							

Img. 4. Window <Car parameters> with, for example, the data entered

V. Then select the tab <Calibration> where we make auto-calibration process.



Img. 5. Window <Calibration> - on the right we have reducer temperature parameter: 54dg.

The auto-calibration should be performed with hot engine. If fact, the auto-calibration process will start at the temperature of 50 degrees however, the closer it is to the normal engine temperature of 90 degrees is better.

VI. If the reducer warmed up to above 50 degrees – press the button "start calibration".



Img. 6. Additional window will allow verification of your basic settings and turn on the additional options. *(1)* Now we check the engine RPMs so the shown RPMs match the actual RPMs

(2) According to the set number of cylinders per coil

(3) You can stabilize the RPMs by regulating the RPM level.

(4) Chose the <engine type>.

(5) Set the <number of cylinders>.

(6) Check the detected injection type.

(7) Here you can change the <petrol injection type> manually. Mostly, we leave it as <Sequential>

(8) The Control algorithm – the settings show TECH

(9) Chose the <fuel type>.

(10) Chose the **<injectors type>** installed in the vehicle.

(11) Set time of <Extra-injection blocking> if necessary.

(12) The correct gas temperature and pressure readout will be available after auto-calibration process has finished successfully.

(13) The setting check – it is an automatic verification of set parameters.

(14) The connection test is the verification of the cylinder connection sequence.

CAUTION!

Auto-calibration assures the correct controllers settings and performance only at idle.

(15) All injectors at ones – it is the way injectors will be turned on in full group engine.

(16) No manifold pressure control – should be set in cars without throttle.

(17) If you are sure that the settings and connections are correct, you can turn off the additional options.

(18) As per instructions, your vehicle should remain on idle and all functions impacting the engine load such as heating or air-conditioning should be off.

(19) Press <Start calibration>

VII. We expect to complete the auto-calibration.



Img. 7. Window with overall calibration progres

(1) Now, the controller will adjust the gas injection so that the petrol injection times while your vehicle is fueled by gas are unchanged from the petrol injection times while your vehicle is fueled by petrol.(2) At the third step, the calibration slider will appear.

If necessary, you will be able to correct the gas injection time after auto-calibration manually with the slider, so the petrol injection time on LPG is identical with the petrol injection time on petrol.

The change of auto-calibration parameters by the slider will be available only during auto-calibration.

(3) Below, you will see auto-calibration temperature and pressure. Those values will be set in the program after auto-calibration.

(4) In addition, you'll see the overall progress and detailed steps of the auto-calibration.



Img. 8. After completion of the calibration process, window appear with the message of the result



VIII. You can finish the calibration process by pressing <Close window>. [Img. 8.].

Img. 9. Window after the calibration process with the available slider

(1) Check petrol injection times – about 3,6ms.

(2) We also have an option to correct auto-calibration parameters by the slider available after calibration.

LPGTECH GAS SETTING ver. 2.0.29.68 - TECH 324 10.4.64 - 0 <u>- X</u> Torgram Connection Gauges Language Controller OBD Documentation View Tools Help Parameters Settings Calibration Map Oscilloscope Errors Controller Firmware RPM 780 Engine load 6 % 4. MAP 0,27 bar M= 780 [RPM] 2 -- 2 Gas pres. 1,51 bar 1 -54 °C Reducer temp. .1= 0,42 [V] Gas temp. 35 °C -1-0,46 V Lambda 1 -2-2= 2,94 [V] Lambda 2 2,62 V -3-Gas level 4,92 V -4-Battery 13,96 V 1= 3.60 [ms] ل_ 5. 5 [s/div] 0,0 Calibration gas temp. 35 °C Calibration gas press. 1,50 bar P1 3,12 G1 5,0 V P2 3,12 G2 5,0 V P3 V 3,12 G3 5,0 V P4 3,11 G4 5,0 Finish calibration Start calibration Emulator switch on. Waiting for injector impuls

IX. Switch to gas by using the button in switcher. Turn LPG on.

Img. 10. View after the switch on the gas with gas injection times

It is advisable to check if the lambda is working continuously during the petrol/gas switch-over.



Img. 11. Example overlooking oscillating lambda sensors

When oxygen sensor indicate is frozen on ~0.8-1V after switching over to gas it means that

mixture is too rich (1) for a long time remain in the upper position this means that the fuel mixture is too rich you correct it by mowing the slider (2) downward.

🔜 LPGTECH GAS SETTING ver. 20.29.68 - TECH 324 10.4.64					X	
<u>Program Connection G</u> auges Language Controller OBD Documentation <u>V</u> iew Iools <u>H</u> elp						
Car parameters Settings Calibration Map Oscilloscope Errors Controller Firmware			Gas			
Calibration oscilloscope	Ignition					
5 5	RPM				780	
	Engin	e load		9	9 %	
3 3	MAP			0,30	bar	
2 - 2	Gas pres.			1,51 bar		
	Redu	cer temp.		6	8 °C	
<u>νν γγγγγγγγγγγγγγγγγγγγγγγγγγγγγγγγγγγ</u>	Gas t	emp.		3	2 °C	
	Lamb	da 1		0,6	55 V	
	Lamb	da 2		2,9	90 V	
	Gas level			4,94 V		
P1= 2,97 [ms]	Battery			13,96 V		
5 [s/dw]						
Calibration temperature and pressure	>					
Calibration gas temp. 32 °C Calibration gas press. 1,50 bar						
Qverall calibration progress						
	D1	Inje	ction times [ms]	4.0		
	P1 D2	2,97	GI	4,8		
	P2	2,97	G2	4,8		
Current stage of calibration Stage progress	P3	2,97	G3	4,8	v	
Can can sugge or canan sugge progress	P4	2,97	G4	4,8	V	
Calibration setup			\odot			
Start calibration Finish calibration						
	-					

Img. 12. Example overlooking oscillating lambda sensors

If the lambda readout stays down (1), the fuel mixture is too lean. It is then possible to correct it by mowing the slider (2) upward.

LPGTECH GAS SETTING ver. 2.0.29.68 - TECH 324 10.4.64								x			
Program Connection Gauges Language Controller OBD Documentation	View Tools Help										
Car parameters Settings Calibration Map Oscilloscope Errors Controller Firmware						Gas					
Calibration oscilloscope						Ignition					
			5 5	RPM				780			
			4 — — 4	Engin	e load			6 %			
		i i	3 — — 3	MAP			0,27	bar			
		RPM= 780 [RPM]	2 — 2	Gas p	res.		1,51	bar			
		0.000	1 - 1	Reduc	er temp.		5	4 °C			
	00000000000000000	91.92.92.12.1=0,42 [V]	o () o	Gas te	emp.		35 °C				
			-11	Lamb	da 1		0,4	16 V			
		L2= 2,94 [V]	-22	Lamb	da 2		2,6	52 V			
		i il	-3	Gas le	evel		4,9	92 V			
		P1= 3,60 [ms]	-5 -5	Batter	γ		13,9	96 V			
		5 [s/div]	0,0								
Calibration tem	perature and pressure			>							
Calibration gas temp. 35 °C	Calibration gas press.	1,50 bar									
Overall ca	ibration progress					-H					
				P1	3.12	G1	5.0				
				P2	3.12	G2	5.0				
				P3	3.12	G3	5.0				
Current stage of calibration Stage progress					3.11	G4	5.0				
							3,3				
						- Ó					
Calibration setup						6					
Start calibration Finish calibration											
Emulator switch on. Waiting for injector imp	ulse.]							

Img. 13. View oscillations lambda sensors after proper calibration of the system

If your calibration is done correctly, the lambda readout will be shown in fluent waveing motion.

X. If at the turn on gas, times petrol on petrol work and petrol on gas work did not change, we can complete the calibration. Back to petrol.



XI. Now we go to the <MAP> tab and switch <Table>.

Img. 14. After selecting <Map> tab, go to the <Table> tab

The information (1) [*Img.14*] in this tab, tells us that we need to collect maps for both fuels. During the map collection, you can create an additional load for the engine by turning on the airconditioning, heating or headlights.

a) Your driving at the beginning, should not be too aggressive. At first, you should set as many engine load areas as possible at about 2 thousand RPMs.

b) When you get to about 90 -100% engine load, you should slowly increase the RPMs and observe the subsequent injection times.

c) After the basic petrol map is collected – you should switch to the gas. [img. 15].

Having the diagrams of petrol and gas on *(2)* [Img.14], you will see in the Table the timing differences. Petrol injection *(3)* [Img.14, 15]. Simultaneously, those differences will appear on the vertical diagram *(4)* [Img.14, 15].

XII. While driving, first we collect the map at the whole range of RPMs at about 2 - 2,5 thousand RPMs and then we turn our attention to RPMs and collect the map at full power [Img.15].

XIII. Now, we will take a look the collected map.



Img. 15. Result collect fuel map - at the top of the table view. Bar graph at the bottom.

As we can see, in the diagram, we have basic range of injection timing in optimal engine load and RPMs. This range is enough to quickly adjust gas installation because as you can see on the fuel injection indicator diagram, we have full range of injection times.



Img.16. Indicators gather maps for injection times are available under the <Bras chart> tab.

In this example [Img.16] bars showing the fuel injection time differences (1) are within the acceptable range +/-0.5ms, so mixture slider (3) leave on the 1.0 value.

Possible correction of deviation (difference of fuel injection times), separately in terms of idling can be performed using the slider idle **(4)**.

CAUTION!

Note that the optimal range of the slider reduces green field.

a) If we have the situation when the slider is moved beyond the green area then the enriched mixture with small nozzles diameter, will prolong gas injection times which will cause the system to looping the gas injection.

This will cause the warning "Multiplier too high. Use the nozzles with larger diameter"

b) In the case lean mixture, when slider is beyond green area, with too large diameter nozzles, results in a less precise regulation of installation and in effect higher gas usage. This will cause the warning *"Multiplier too low. Use the nozzles with smaller diameter"*

XIV. The optional slider setting for the properly set installation is in the middle, meaning value 1, which will also mean the correct choice of nozzles diameter.