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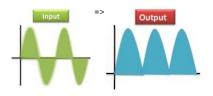
## Wiring

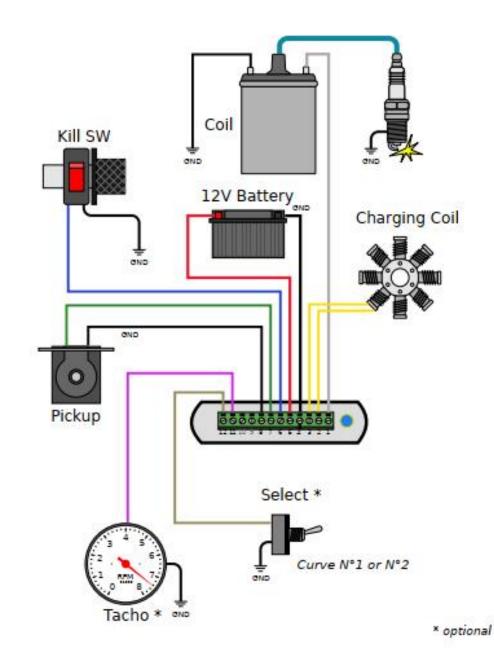
The charging coil that charges the internal capacitor of this AC-CDI can be connected in two different ways:

#### **Full-Rectification**

One wire of the charging coil is connected to the connector on **pin 2** (*HV input*) and the other wire goes to connector **pin 3** (*HV input*)

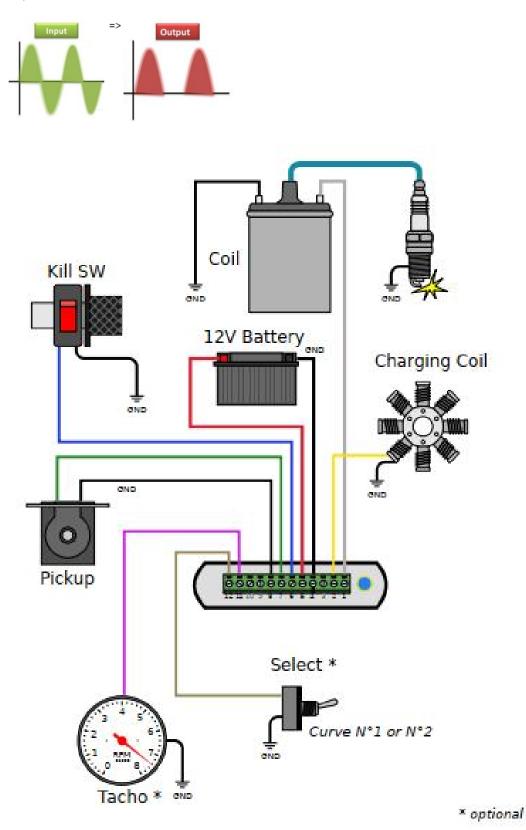
This wiring provides an isolated ground (*stator output is not connected to the ground in any way*) and a Full Rectification that double the AC voltage.





#### Half-Rectification

One wire of the charging coil is connected to the connector on **pin 2** (*HV input*) and the other wire goes to connector **pin 4** (*Ground of the AC-CDI*) or on any metal part of the frame connected to ground/minus battery



### **Stator**

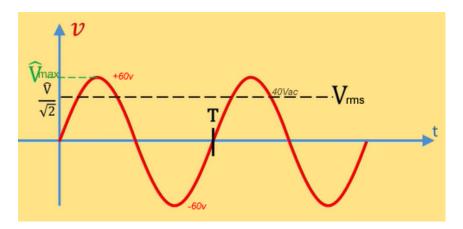
All AC-CDI need a working stator/High Voltage AC charging system.

Even if the stator passes the User Manual resistance check, only a voltage test will show if the stator is reliable throughout the rev range.

The voltage fluctuates with rpm. Check the voltage across the rpm range as well, since it should grow as the revs raise.

Voltage depend on the type of charging coils, number of coils and magnets etc...

For example, at 1500rpm, it should read approximately 30-40Vac, at 3000rpm it should read 60-80Vac, at 6000rpm 120-160vac and so on.



An oscilloscope will show you the peak to peak voltage.

ie: +60V max to -60v min = 120V peak to peak (120Vpp)

RMS Voltage = Vmax /  $\sqrt{2}$  = 60/1.414=40Vac

The given formula only applies to pure sinus waves.

But because a stator produces a non-sinusoidal waveform, a basic Digital Multimeter will provide inaccurate readings.

Only **TrueRMS** Multimeters can display a stator output's RMS value. (*here +40v*) Or classic multimeter with a DVA adapter will show the Vmax voltage. (*here +60v*)

## Connector



To ignition coil 1 output High Voltage from Charging Coil 2 input High Voltage from Charging Coil 3 input ground frame (=minus from battery) 4 input +12Vdc from battery 5 input 6 input Kill switch 7 input Analog Pickup 8 input Pickup or Hall Sensor Ground 9 input Digital Hall Effect Sensor \* 10 input If second analog Pickup for Low RPM 11 output Tachometer \* 12 input Curve Selection \*

## Kill Switch

The ignition uses the Kill switch input as a selector between <u>2 functions</u>:

- <u>Setup</u>

- <u>Stop engine</u>.

### **Setup Mode**

1) Turn the Kill Switch ON (connector pin6 connected to ground) PRIOR to power on the ignition box.

2) **Power on** the ignition box with a 6 to 12v battery.

Warning: The Power and Ground connections MUST BE SECURE.

A power outage during the setup process may cause the ignition box to brick !

When the ignition box detects that the kill switch is already grounded, it turns into SETUP Mode.

3) The Led <u>blinks 5 times</u> meaning grounded Kill switch has been detected.

Then wait for the WiFi server to start,

then blinks 5 times again meaning "Wifi Ready" and finally flashes once every 5 seconds.

4) The ignition box starts a Wifi AP (Access Point)

5) On your phone, laptop, PC, whatever, go to the Wifi setting and search for a new SSID called Transmic\_ign

Actuellement connecté à		49	-
Accès Internet			
Connexion réseau sans fil		^	
Livebox-	Connecté	100	
Transmic_ign			Е
DIRECT-FE-HP ENVY Phot	o 6200		

#### 6) Connect to it. Password is required: it's "password"

Accès Internet			🔮 Cor	nnexion à un réseau	×	Actuellement connecté à		49	*
Connexion réseau sans fil	Connecté	~	Con	nexion à Transmic_ign		Transmic_ign 6 Accès Internet			
Transmic_ign		<u></u> =			Annuler	Connexion réseau sans fil		^	
	Connect	ter				Transmic_ign	Connecté	<b>3</b> 11	

8) Once your device is connected to the AP, open up a **browser** and head over to <u>http://192.168.4.1/setup</u> (http not https !)

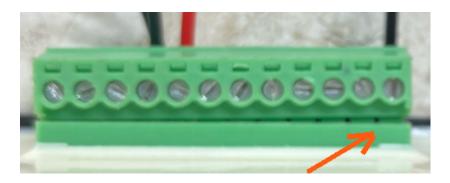
9) Once connected your browser should display:

#### TRANSMIC.FR



10) Turn the Kill Switch OFF for Running mode.

- Check that the 12pins connector is FULLY inserted and there is nothing preventing the male connector from fully engaging.



- Reboot the ignition box. (Power off/power up)

- Ignore any browser message saying it's not connected to internet:



Offline mode

Firefox is currently in offline mode and can't browse the Web.

Indeed, it's connected ONLY to the Ignition box, not to the web. (It's impossible to reach Google and the ignition box at the same time)

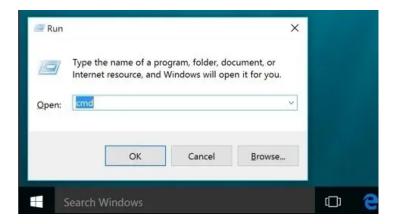
- You can see available SSID with a Wifi Analyzer as NetSpot for Android or Wifi-Analyzer for W10

- You can test the network connection from your laptop to the ignition box:

Open a command Prompt:

Type "cmd" into the address bar of File Explorer and hit Enter or Press Windows+R to open "Run" box. Type "cmd" and then click "OK"





ping the ignition box, it should replies:

#### C:\>ping 192.168.4.1

Pinging 192.168.4.1 with 32 bytes of data : **Reply** from 192.168.1.1 : bytes=32 time<1ms TTL=64 **Reply** from 192.168.1.1 : bytes=32 time<1ms TTL=64 **Reply** from 192.168.1.1 : bytes=32 time<1ms TTL=64

#### Clear DNS cache

Windows:	in MsDos console:	C:\>ipconfig /flushdns
MacOS:	in Terminal :	sudo dscacheutil -flushcache
Linux:	in Terminal:	sudo systemd-resolve –flush-caches

#### Troubleshooting display

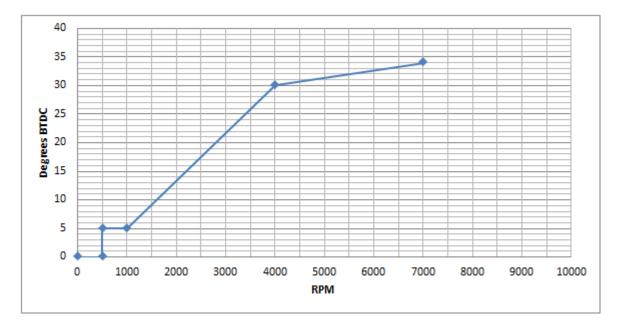
Console URL is http:// NOT https:// but some browsers like Chrome automatically switch to secure https://

- Use Firefox. *Close <u>all</u> Firefox windows than relaunch it.* 

- or Use a lightweight, portable browser as <u>QtWeb</u>
- or <u>disable **HSTS**</u> In Chrome.

## **Ignition Timing**

Assuming you want this ignition curve:



One can define the curve with 4 points but you can use up to 13 points.

(0 to 500rpm at 0° BTDC is <u>hard coded</u> for no kickback.)

The curve above is defined by 4 pairs of values

500 i	rpm	=	5°	BTDC
1000	rpm	=	5°	BTDC
4000	rpm	=	30°	BTDC
7000	rpm	=	34°	BTDC

Those 4 couples of values MUST be filled out in the form <u>consecutively and in ascending order</u> of RPM along with the pickup position.

Use this Windows software to draw the curve: Interactive Graph.exe with Video

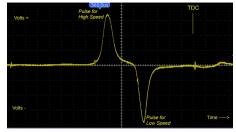
## **Pickup Type**

#### Default: 0 MENU PICKUP PICKUP TYPE POSITION STROKES CYLINDERS SHAFT ADVANCE ADVANCE AUTO TIMING 0-500rpm SPARK DWELL BYPASS CONSOLE MODIFY UPDATE [0] O: Analog Pickup Coil (VR-PN) O 1: Analog Pickup Coil (VR-NP) 0 2: Digital Hall Effect Sensor \* Send \* option

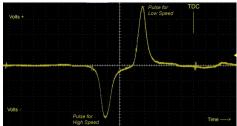
Select the type of pickup attached to the Ignition box:

When the LEADING edge of the magnet passes in front of the pickup coil, a wave is produced and another wave of opposite voltage is generated when the FALLING edge of the magnet leaves the pickup coil. Depending on the wiring, the first pulse at Leading Edge can be positive (then negative at Falling edge), or the exact opposite.

**0** = VR stands for Variable Reluctor aka pickup coil/trigger coil (Analog signal) **Positive** first (PN)



1 = Variable Reluctor (Analog signal) Negative first (NP)



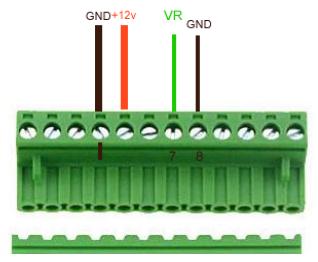
2 = Hall Effect Sensor (Digital signal)

This ignition box works best with Positive first pickup (VR-PN)

If the pickup is internally grounded into the stator there is no choice, the pickup output is either PN or NP But if both pickup wires are available, then just <u>swap the wires</u> to change the polarity in order to get a **Positive first** signal (PN) on connector **pin7**.

# **VR** pickup

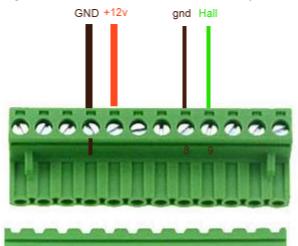
Analog VR pickup is connected between pin 7 and pin 8(gnd)



To avoid ElectroMagnetic Interference (EMI) it's safer to connect the pickup sensor through a shielded cable. Shield grounded on CDI side only. Twisted pair is better.

# Hall Sensor

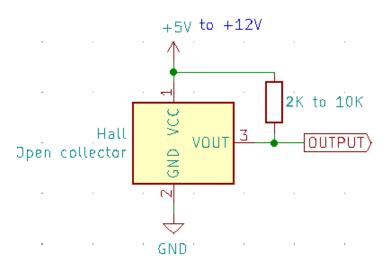
Digital Hall Sensor is connected between pin 9 and pin 8(gnd)



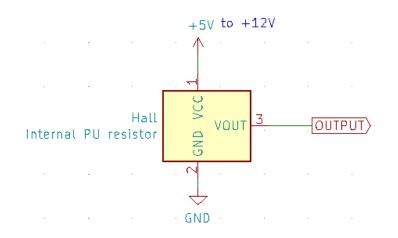
<u>Pickup Type</u> must be set to [2] for use of a Hall sensor.

#### 2 types of Sensors

- Hall sensors with **open-collector** output, give a floating voltage when no magnet. They needs a pull-up resistor.



- Hall sensors with **built-in pull-up resistor** give positives voltage when no magnet.

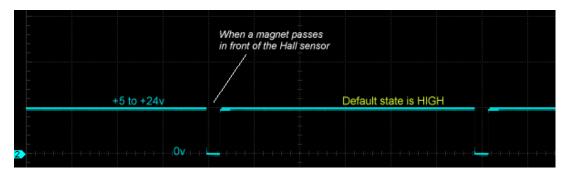


Hall sensors require a +5v to +12vdc supply voltage. See datasheet

You can even connect an **Optical Sensor** as long as it puts out a CLEAN square signal similar to the one above.

See <u>Appendix 2</u> for Position

#### Output of a Hall sensor



#### <u>Timing</u>

The ignition box uses the **rising edge** of the Hall sensor signal.

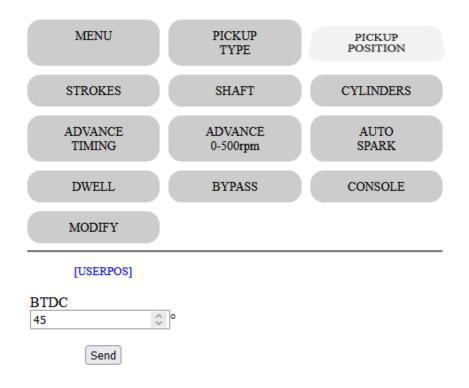


You can even connect an **Optical Sensor** as long as it puts out a CLEAN square signal similar to the one above.

### **Pickup Position**

### Default: 50

Range of values: 1 to 360



- Go back to the browser and first thing first, enter the Pickup Position then click Send

Formula is: *Pickup position = Base advance + Magnet Length* 

Magnet Length:		E	and and a		luutun
	30	20	10	0	10
	hadaa	lunlun	lonhu	Innlin	daalaa

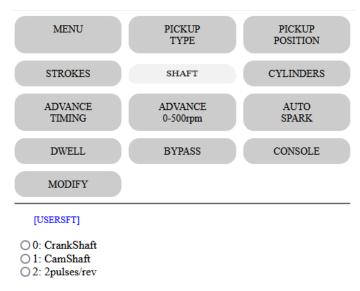
Base advance is generally 5 to 15° BTDC

See <u>Appendix</u> 1,2,3 to find the physical position of the pickup relative to TDC.

Current value appears in blue on the form.

### Shaft

Default: 0



Send

- Select if the pickup is placed :

- 0: on the crankshaft via the flywheel (2stk) with 1 pulse per rotation
- **0**: on the **crankshaft** via the flywheel (4stk) with 1 pulse per rotation with wasted spark. (*one spark occurs during the compression stroke and another during the exhaust stroke.*)
- 1: on the **camshaft** (4stk) with 1 pulse per 2 rotations.
- 2: on the crankshaft with 2 pulses per rotation

Current value appears in blue on the form.

### **Advance Timing**

#### Default: Empty

#### - Proceed now to enter the advance timing.

#### We want to setup:

500 i	rpm	=	5°	BTDC
1000	rpm	=	5°	BTDC
4000	rpm	=	30°	BTDC
7000	rpm	=	34°	BTDC

#### Enter values consecutively in ascending order of RPM !

#### Pair 500:5 first etc etc...

7000 being the <u>last value</u> (as the firmware stops reading when it meets a null value), 7000 will act as the <u>hard rev-limiter</u>: No more sparks at 7001 RPM !

MENU	PICKUP TYPE	PICKUP POSITION	Stored
STROKES	SHAFT	CYLINDERS	Timing
ADVANCE TIMING	ADVANCE 0-500rpm	AUTO SPARK	Timing 0
DWELL	BYPASS	CONSOLE	4
			8
MODIFY			12
			ΙZ
NOL NOL			16
urve Nº1 or Nº2*			
urve N°l or N°2* USERTIM			16
urve Nºl or Nº2* USERTIM PM			<b>16</b> 20
USERTIM			<b>16</b> 20 <b>24</b>
USERTIM PM 100 © DV			<b>16</b> 20 <b>24</b> 28
USERTIM PM 100 © DV	] ]•		16 20 24 28 32

\* Option

RPM can be entered with a 100rpm step but RPM will be measured with **1rpm** precision. Timing can be entered with a precision of 1° but the processor calculate all timing values between the points you entered using linear interpolation so an **accuracy of 0.1**° is done at this step.

Any timing values will be COMPLETELY OFF IF PICKUP POSITION IS FALSE: PICKUP POSITION IS KEY

See Appendix 1 for Position

Curve N°1 is stored from addresses 0 to 100

### **Select curve**

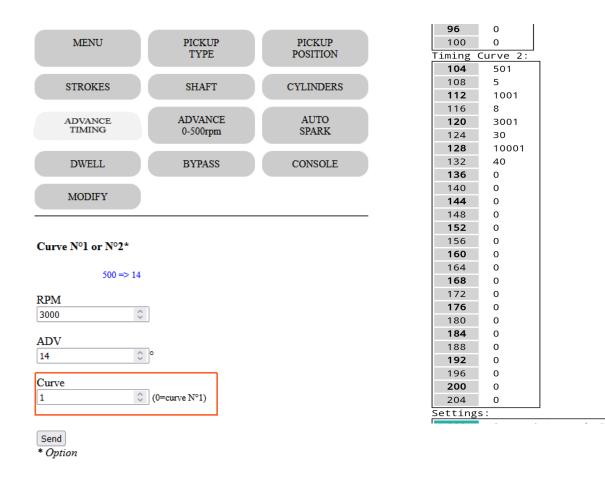
#### Default: curve N°1

If you bought the 2 curves option, then connect a switch between connector pin 12 and ground.

When switch is **open** (or no switch connected), **curve** N°1 will be used.

If switch is **on** (*pin 12 connected to ground*) <u>BEFORE</u> turning on the ignition box, then **curve N°2** will be used.

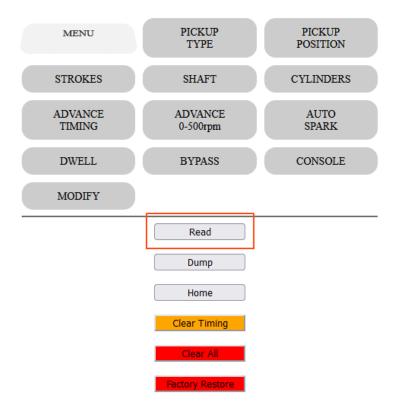
#### You cannot change the curve while running.

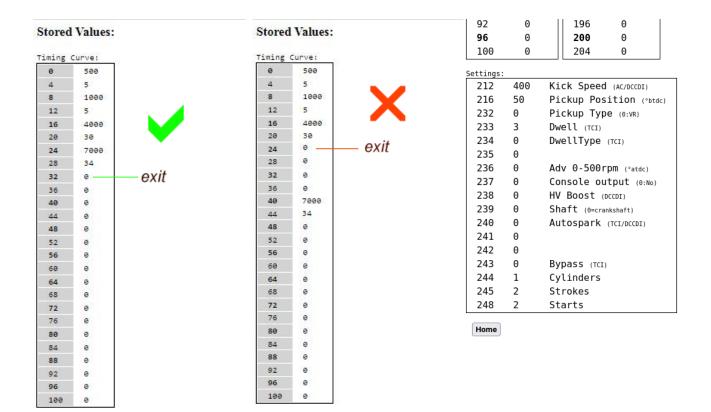


Curve N°2 is stored at addresses 104 to 204

### Read

- To display the values that have been dialed in, click on the Read button on the Home page :





All values must be consecutive and in ascending order of RPM !

### Dump

Read EEPROM addresses and display them in HEX values for <u>debug</u> purpose.

PICKUP TYPE PICKUP POSITION MENU STROKES CYLINDERS SHAFT ADVANCE 0-500rpm ADVANCE TIMING AUTO SPARK DWELL BYPASS CONSOLE MODIFY Read Dump Home Clear Timing

Click on the **Dump** button on the **Menu** page :

#### Dump EEPROM Hex Values:

Θ	F4	01	00	00	θ5	00	00	00
8	40	1F	00	00	28	00	00	00
16	34	21	00	00	28	00	00	00
24	00	00	00	00	00	00	00	00
32	00	00	00	00	00	00	00	00
40	00	00	00	00	00	00	00	00
48	00	00	00	00	00	00	00	00
56	00	00	00	00	00	00	00	00
64	00	00	00	00	00	00	00	00
72	00	00	00	00	00	00	00	00
80	00	00	00	00	00	00	00	00
88	00	00	00	00	00	00	00	00
96	00	00	00	00	00	00	00	00
104	00	00	00	00	00	00	00	00
112	00	00	00	00	00	00	00	00
120	00	00	00	00	00	00	00	00
128	00	00	00	00	00	00	00	00
136	FE	00	00	00	00	00	00	00
144	00	00	00	00	00	00	00	00
152	00	00	00	00	00	00	00	00
160	00	00	00	00	00	00	00	00
168	00	00	00	00	00	00	00	00
176	00	00	00	00	00	00	00	00
184	00	00	00	00	00	00	00	00
192	00	00	00	00	00	00	00	00
200	00	00	00	00	00	00	00	00
208	00	00	00	00	00	00	00	00
216	32	00	00	00	00	00	00	00
224	02	00	00	00	00	00	00	00
232	00	00	00	00	00	00	00	00
240	00	00	00	00	01	00	00	00
-								

Home

## **Modification**

Say you want to modify the advance timing for 7000rpm and set 35° instead of 34°

In <u>Read</u> mode above, we saw that RPM 7000 is stored at address 24 and timing for 7000rpm is at address 28.

7000
34
0

Since we want to modify the advance timing at line 28, we now have to enter :

Line	28
New value	35
then	Send

CONSOLE	BYPASS	MODIFY
LINE 28	<>	
NEW VALUE	<b>\$</b>	
Send		

Same thing to change any other values.

Remember: All timing values must be in <u>ascending</u> order of RPM and <u>no blank address</u> between timing values.

Use <u>Read</u> button to check that.

## Add points

Say you want to add one advance timing of 34° @ 8000rpm

In <u>*Read*</u> mode above, we saw that last RPM 7000 is stored at address 24 and timing for 7000rpm is at address 28.

The next 2 **empty slots** available are:

7000
34
0
0
0

Address 32 for RPM and Address 36 for timing

We now have to enter :

Line	32
New value	8000
then	Send
Line	36
Line New value	36 34

Remember: All timing values must be consecutive and in ascending order of RPM !

Use <u>Read</u> button to check that.

## **Clear points**

Say you want to remove the last advance timing of 34° @ 7000rpm

In <u>*Read*</u> mode above, we saw that last RPM 7000 is stored at address 24 and timing for 7000rpm is at address 28.

20	
24	7000
28	34
32	0
36	8
40	0

To zero out those values we now have to enter :

Line	24
New value	0
then	Send
Line	28
Line New value	28 0

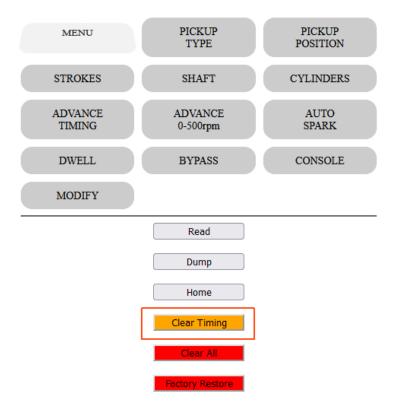
Stored Values:

Remember: All timing values must be **<u>consecutive</u>** and in <u>ascending</u> order of RPM ! Use <u>Read</u> button to check that.

0	500	
4	5	
8	1000	
12	5	
16	4000	
20	30	
24	0	— exit
28	ø	
32	0	
36	0	
40	7000	
44	34	
48	ø	
52	ø	
56	0	
60	0	
64	0	
68	0	
72	ø	
76	e	
80	e	
84	e	
88	0	
92	0	
96	0	
100	0	

## **Clear Timing**

This button will **clear TIMING values** WITHOUT confirmation. Pickup position, polarity, shaft, dwell etc are kept.



Browser shows :

### Timing values cleared!

Please restart the ignition box.

This box now has no Advance Curve and cannot operate until you set timing values.

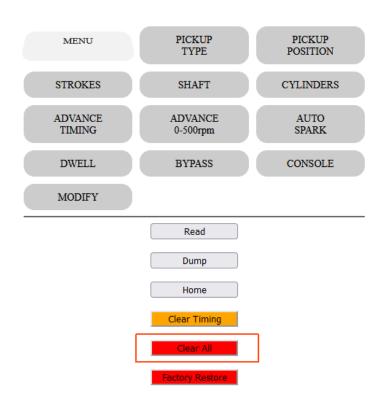
Restart the ignition box. (power off/power on)

Don't forget the Kill switch position if you want to return in Setup mode ....

### **Clear All**

#### This button will clear ALL values WITHOUT confirmation.

Timing, Pickup position, polarity, shaft, dwell etc are zeroed.



Browser shows :

### **EEPROM** values cleared!

Please restart the ignition box.

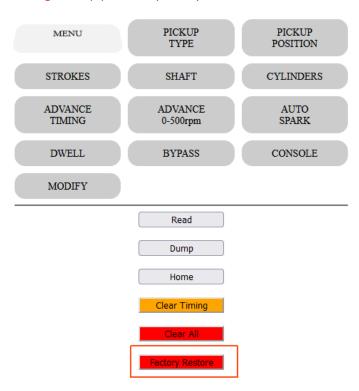
This box is now empty and cannot operate until you set values.

Restart the ignition box. (power off/power on)

Don't forget the Kill switch position if you want to return in Setup mode....

### **Factory Restore**

This button will **Restore Factory Default** WITHOUT confirmation.



Timing, Pickup position, polarity, shaft, dwell etc are set to default values. (Payed Options are kept)

Browser shows :

#### Init All done!

#### This box now have a default Advance Curve which is not the one you need... Tune the values before to start the engine!

Restart the ignition box. (power off/power on)

Don't forget the Kill switch position if you want to return in Setup mode ....

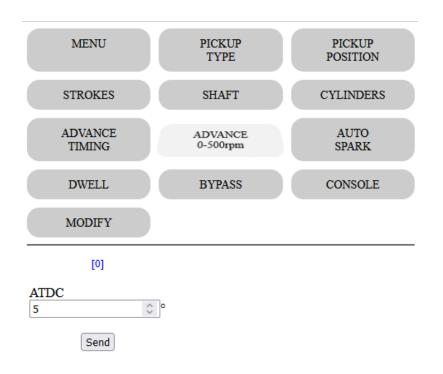
## Advanced settings

If you don't need those Extra settings, just let them to their default value.

## Advance at kick start

#### Default: 0 Range of values: 0 to 10

For an easier Manual Kick start and to avoid kick backs, you can delay the advance between 0 to 500rpm to send the spark a few degrees **After** Top Dead Center (ATDC)



Current value appears in blue on the form.

# Kick Speed

#### Default: 800

Range of values: 100 to 1000rpm

For an easier Manual Kick start and to avoid kick backs, you can select what will be the RPM of the very first engine rotation when it is kick started.

ADVANCE 0-500rpm	AUTO SPARK	KICSP
DCCDI	CONSOLE	MODIFY
[	800]	
Kick Speed	~	rpm
s	end	

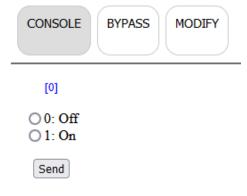
Current value appears in blue on the form.

# Console

#### Default: Off

Enable the Console output:

- Turn the ignition box in <u>Setup Mode</u>
- Go to "CONSOLE", check "1" to enable the console output, press Send



Current value appears in blue on the form.

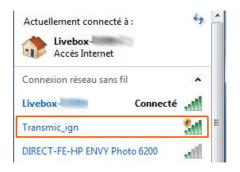
- Power off the ignition box
- Disconnect the Kill wire from ground
- 1) Power on the ignition box, it goes in "Run Mode"

2) The LED flashes once if curve N°1 is selected or flashes twice for curve N°2

4) The ignition box also creates a WiFi AP (Access Point)

5) On your phone, laptop, PC, whatever, go to the Wifi setting and search for a new SSID called Transmic\_ign

You can see available SSID with a Wifi Analyzer as <u>NetSpot for Android</u> or <u>Wifi-Analyzer for W10</u>



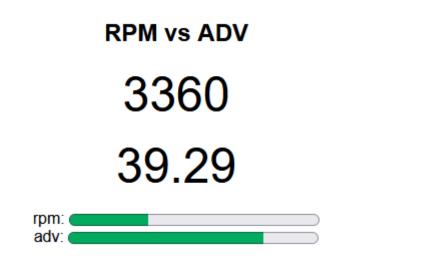
6) **Connect** to it. Password is required: it's "*password*"

Accès Internet		Connexion à un réseau	Actuellement connecté à :	-
Connexion réseau sans fil		Connexion à Transmic_ign	Transmic_ign 6 Accès Internet	
Livebox- Transmic_ign	Connecté		Annuler Connexion réseau sans fil	
	Connecter		Transmic_ign Connecté	

#### 7) Start the engine

8) Once your device is connected to the AP, open up a **browser** and type in the address bar: <u>http://192.168.4.1/console</u>

9) After a few seconds, the browser should display both the **RPM and the advance timing** in degrees BTDC followed by 2 bargraphs



Display appears ONLY when the engine is running.

Because of the impact on Ignition box performance, please use it for debug only and disable this function when you are done with it!

## Troubleshooting

Console URL is http:// NOT https:// but some browsers as Chrome automatically switch to https://

#### Workarounds

- Use Firefox. *Close <u>all</u> Firefox windows than relaunch it.* 

- Use a lightweight, portable browser as <u>QtWeb</u>

- In Chrome, disable HSTS (HTTP Strict Transport Security) that forces to open websites in HTTPS:
  - Write **chrome://net-internals/#hsts** in the address bar.
  - Scroll down the page to :

Delete domain security policies
Input a domain name to delete its dynamic HSTS policy. (You cannot delete preloaded entries.)
Domain: 192.168.4.1 Delete

- add **192.168.4.1** and hit **Delete** to disable Force https for this particular website.

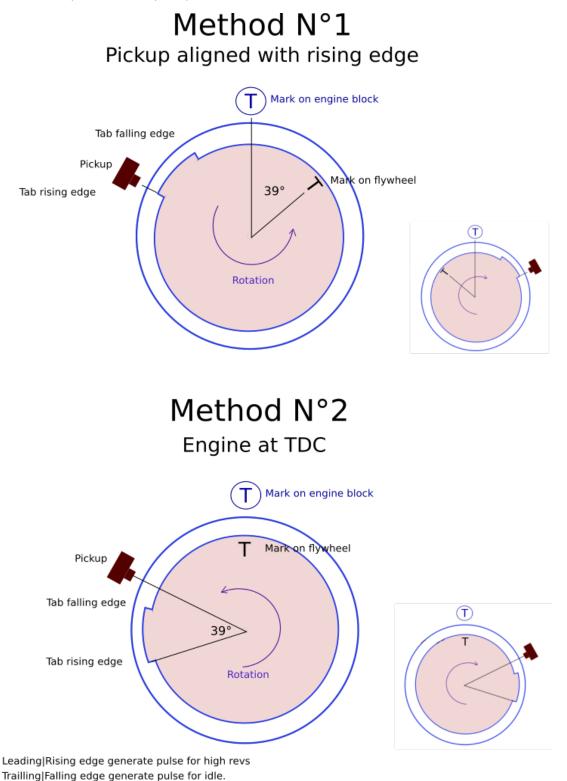
### **Running Mode**

- 1) Disconnect the Kill wire from ground if you previously went into Setup Mode
- 2) Power on the ignition box, it goes in "Run Mode"
- 3) The LED flashes one time.
- 4) Start the engine. The LED **blinks** in sync with RPM.
- 5) When the engine runs, if **Kill** wire is connected **to ground** THEN it **stops** the engine.

**/!\ XT550-XT600**: Kill the engine with the Kill switch BEFORE shutting down the +12v. (As it's a software kill, the processor must be powered on to be able to kill the engine!)

Find the Hall sensor or Pickup position.

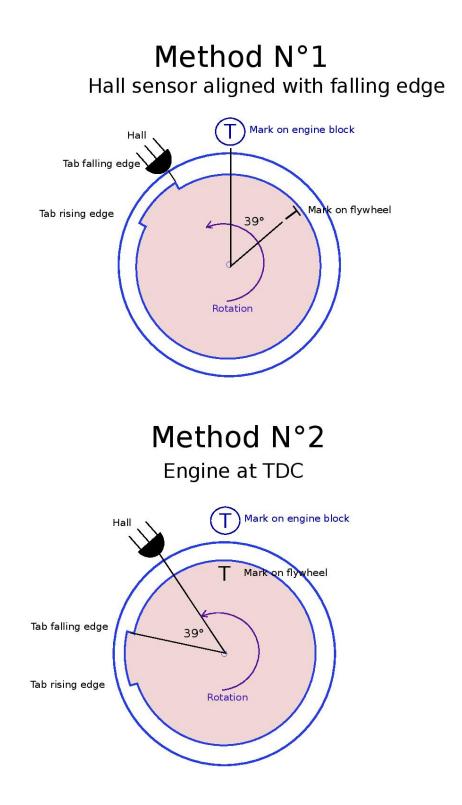
In the example below the pickup/sensor is set at 39° BTDC



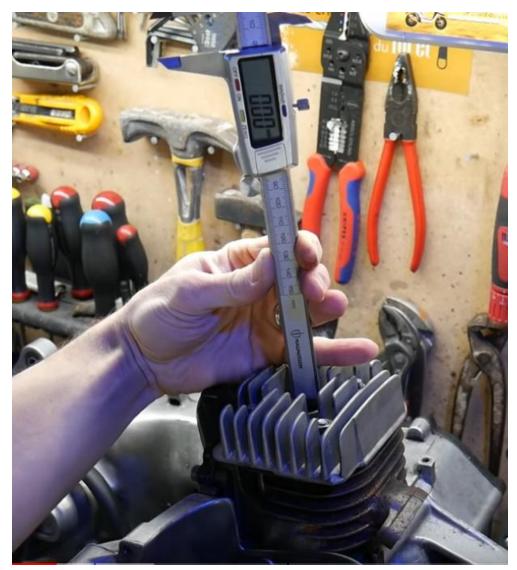
calageTDC\_pickup\_2methods.svg

Find the physical position of the digital **Hall Sensor** relative to Top Dead Center.

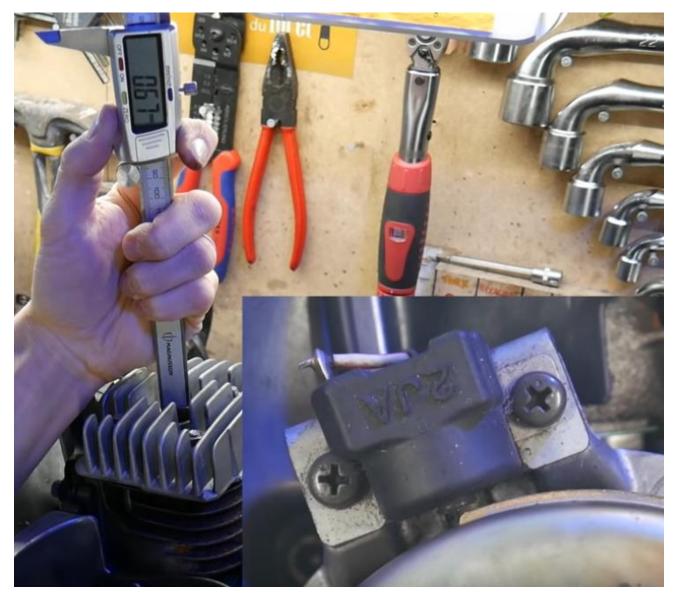
In the example below the sensor is set at 39° BTDC



A) Remove the sparkplug, find the TDC position with a *dial indicator gauge* or a *caliper rule*:



B) Align the pickup with the beginning of the magnet on the rotor and measure the travel of the piston with the caliper rule:

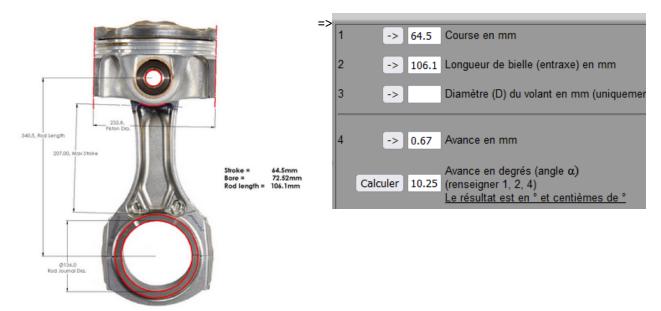


C) Use an online timing calculator to convert millimeters into degrees:

https://lambretta-images.com/tuningh/port-timing-calculators/degrees-to-mm-timing-calculator/ or

http://www.ajcshop.fr/Calculettes/html/calculette-convertisseur-allumage.htm

ie:



#### Tries and errors and Timing Lamp



First method:

For example, if you set the "*Pickup position*" to 40° BTDC plus some timing points then with your Timing Lamp you measure MORE advance than what is set in the user interface (ie you measure 35° instead of 30°@3000rpm) then INCREASE the "*Pickup position*" (40°  $\rightarrow$  45°)

If you set the "*Pickup position*" to 40° BTDC and with your Timing Lamp you measure LESS advance than what is set in the user interface (ie you measure 25 instead of 30°@3000rpm) then LOWER the "*Pickup position*" (40°  $\rightarrow$  35°)

#### Second method:

Set a FLAT advance timing with a SAFE value: Example: 10° BTDC from 500 to 4000rpm

Run the bike and measure the timing with a Timing Lamp.

If you measure say 15° BTDC (instead of 10°) that mean the "*Pickup Position*" is off by 5°. Increase the "*Pickup Position*" by 5.

If you measure say 5° BTDC (instead of 10°) that mean the "*Pickup Position*" is off by 5°. Lower the "*Pickup Position*" by 5.