Summary

Connector

a maj !

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

KILL SWITCH

The ignition uses the Kill switch input as a selector between 3 functions:

- Setup

- Optional Rev-limiter

- Stop engine.

Setup Mode

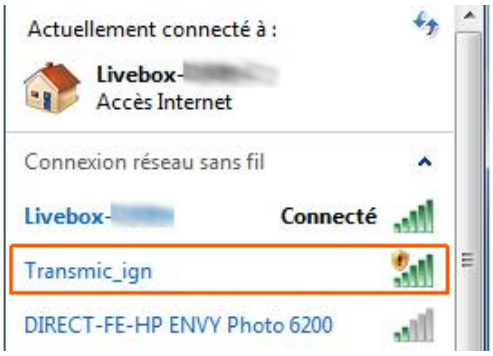
1) Turn the **Kill Switch ON** (*blue wire connected to ground*) **PRIOR** to power on the ignition box.

2) **Power on** the ignition box with a 12v battery.
When the ignition box detects that the kill switch is already grounded, it turns into SETUP Mode.

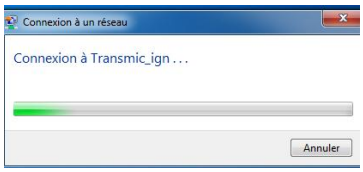
3) The **Blue Led** inside the box blinks 3 times then flash every 5 seconds.

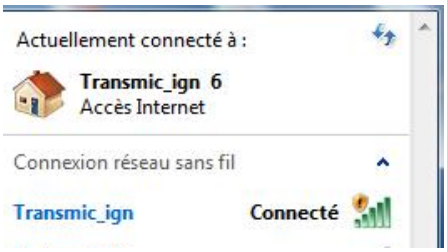
4) The ignition box starts a **WiFi AP** (*Access Point*)

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



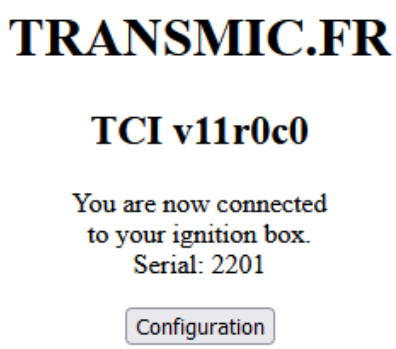
6) **Connect** to it (*there is no password*)





8) Once your device is connected to the AP, open up a **browser** and head over to **http://192.168.4.1/**

9) Once connected your browser should display:

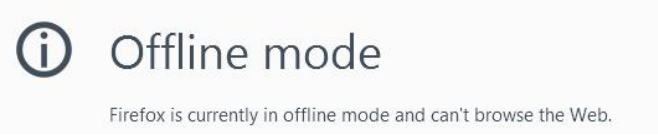


10) Turn the **Kill Switch OFF** (*blue wire disconnected from ground*) **for Running mode**.

V11R5C10

Troubleshooting WiFi connection

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



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

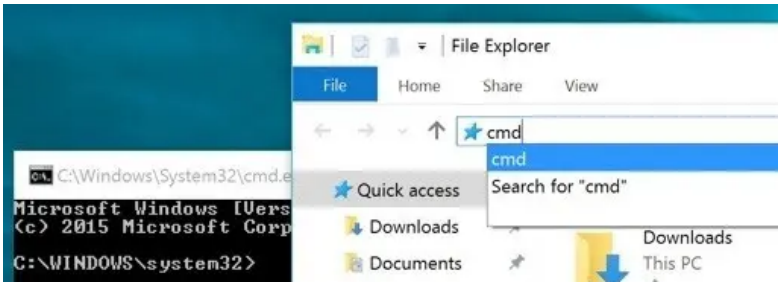
- You can see available SSID with a Wifi Analyzer as NetSpot for Android or Wifi-Analyzer for W10

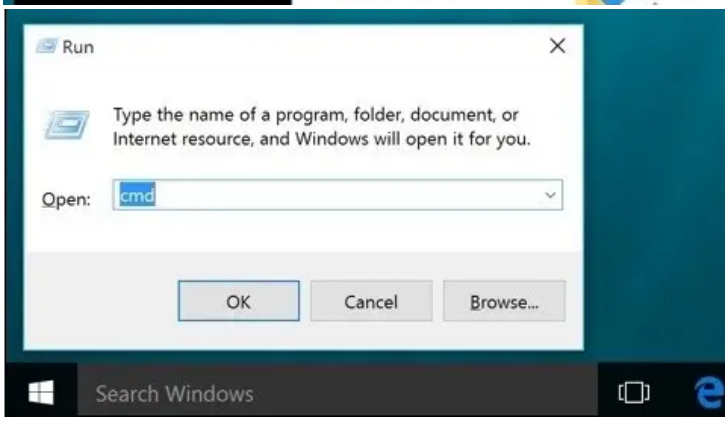
- You can test the network connection from your laptop to the ignition box:

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"



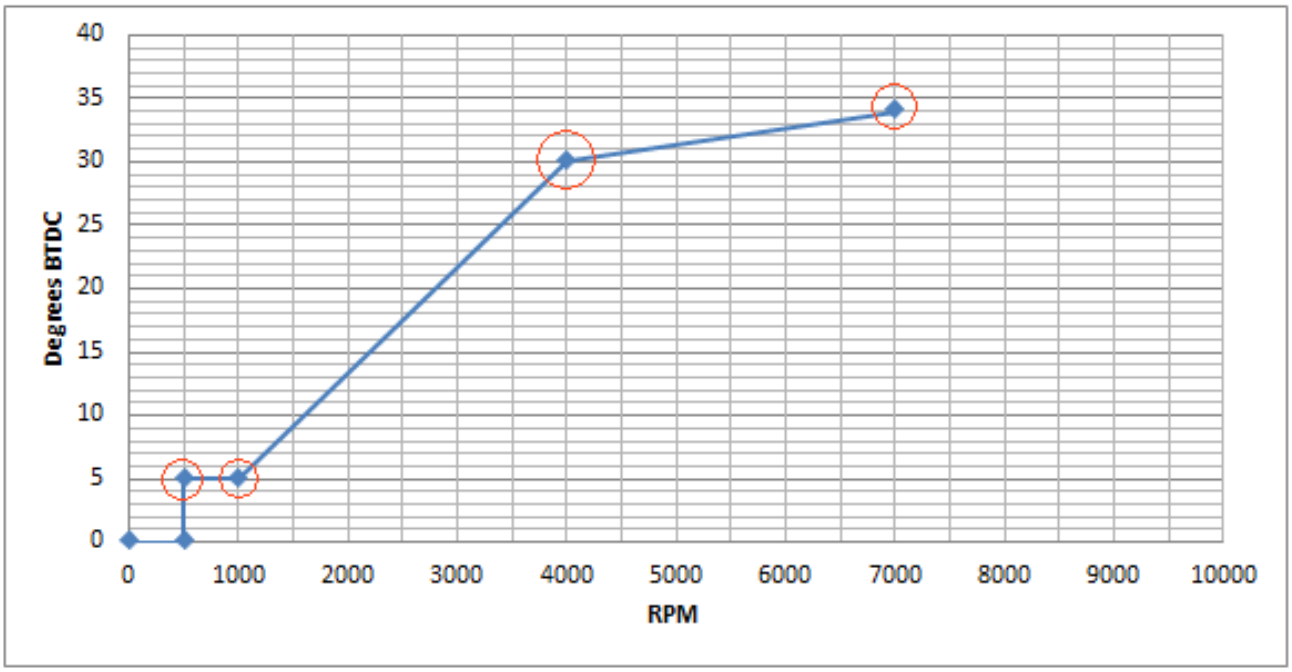


ping the ignition box, it should replies:

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

Ignition Timing

Assuming you want this ignition curve:



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

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

The curve above is defined by 4 pairs of values

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

Those values MUST be filled out in the form consecutively and in ascending order of RPM along with the pickup position.

Pickup Position

1) 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:

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

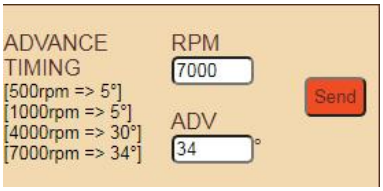
2) The **blue Led flashes** when value is processed, then the *Pickup Position* appear on the left hand side of the form.

3) Proceed now to enter the advance timing.

We want to setup:

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

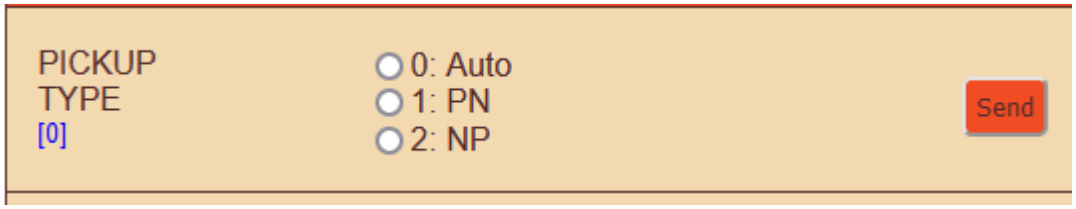
Enter values consecutively in ascending order of RPM !
Pair 500:5 first etc etc…
7000 being the last value (*as the firmware stops reading when it meets a null value*),
7000 will act as the hard rev-limiter: No more sparks at 7001 RPM !



RPM can be entered with a precision of 100rpm
Timing can be entered with a precision of 1°
Any timing values will be COMPLETELY OFF IF PICKUP POSITION IS FALSE: ***PICKUP POSITION IS KEY***

See Appendix 1 for Position

Pickup Polarity

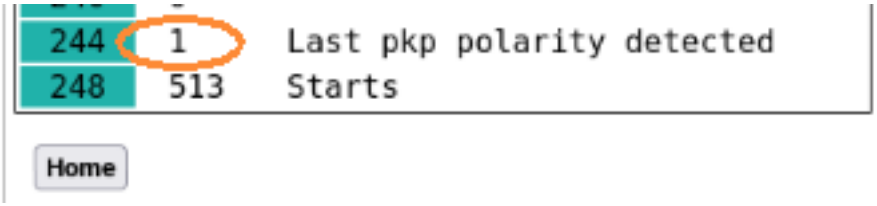


When the LEADING edge of the magnet passes in front of the pickup coil, a wave is produced and another wave of opposite voltage is generated when the FALLING edge of the magnet leaves the pickup coil.

Depending on the wiring, the first pulse at Leading Edge can be positive (then negative at Falling edge), or the exact opposite.

When "*Pickup Type*" has been set to "*Auto(0)*" the ignition try to detect the polarity of the pickup.

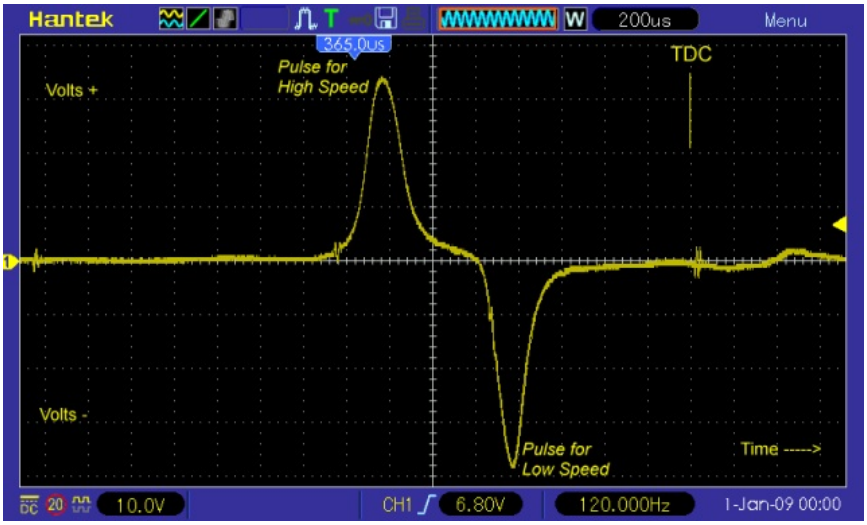
Log:
The ignition box logs the Polarity/Type that was sensed into the Eprom at the address **244** which is accessible by clicking the "READ" button.



0 = pickup not detected
1 = pickup detected as a PN type (Positive going first then Negative)
2 = pickup detected as a NP type (Negative going first then Positive)

If you already know the "*pickup polarity*" because you saw it on a scope or if the "*Auto*" detection always see the pickup as one type at @244 then **Please force the Pickup Polarity to that type in order to avoid future false detection leading to false timing !**

Example of PN type: (Positive going first then Negative)



Dwell

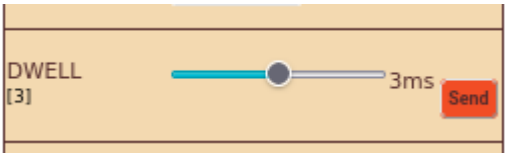
Default: 3

Range of values: 1 to 5

Dwell time is the charge time for the ignition coil.

It vary with different types of ignition coil and is typically 2 milliseconds for many modern coils and 4 or 5 milliseconds for older ignition coils.

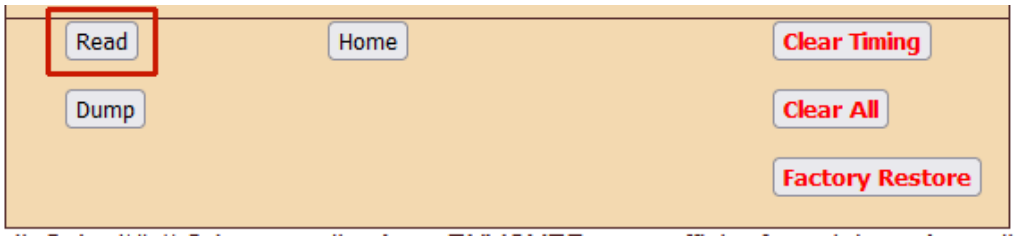
Spark appends when the current flow is stopped after Dwell time.



Keep in mind that the longer the Dwell time, the lower the max RPMs.

Read

To display the values that have been set, click on the **Read** button on the **Home** page :



Stored Values:

Timing Curve:

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

exit

Stored Values:

Timing Curve:

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

exit

Settings:

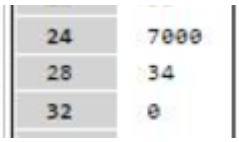
208	0	Autospark (TCI)
212	0	Pickup Type
216	50	Pickup Position
220	0	DwellType (TCI)
224	2	Dwell (TCI)
228	0	Console output
232	0	Bypass
236	0	
240	0	
244	1	Last pkp polarity detected
248	513	Starts

Home

Modification

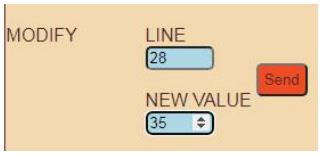
Say you want to modify the advance timing for 7000rpm and set 35° instead of 34°

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



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

Line	**28**
New value	**35**
then	**Send**



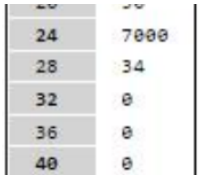
Same thing to change any other values.

Add points

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

In *Read* 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:



24	7000
28	34
32	0
36	0
40	0

Address **32** for RPM and Address **36** for timing

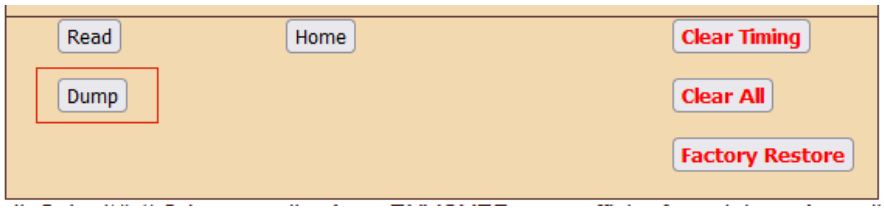
We now have to enter :

Line **32**
New value **8000**
then **Send**

Line **36**
New value **34**
then **Send**

Dump

Read EEPROM addresses and display them in HEX values for debug purpose.



Dump EEPROM Hex Values:

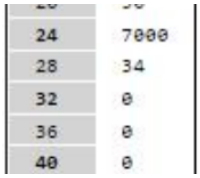
0	F4	01	00	00	05	00	00	00
8	40	1F	00	00	28	00	00	00
16	34	21	00	00	28	00	00	00
24	00	00	00	00	00	00	00	00
32	00	00	00	00	00	00	00	00
40	00	00	00	00	00	00	00	00
48	00	00	00	00	00	00	00	00
56	00	00	00	00	00	00	00	00
64	00	00	00	00	00	00	00	00
72	00	00	00	00	00	00	00	00
80	00	00	00	00	00	00	00	00
88	00	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

Clear points

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

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



24	7000
28	34
32	0
36	0
40	0

To zero out those values we now have to enter :

Line **24**
New value **0**
then **Send**

Line **28**
New value **0**
then **Send**

Clear Timing

This button will **clear TIMING values** WITHOUT confirmation.
Pickup position, polarity 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 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 etc are set to default values.

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

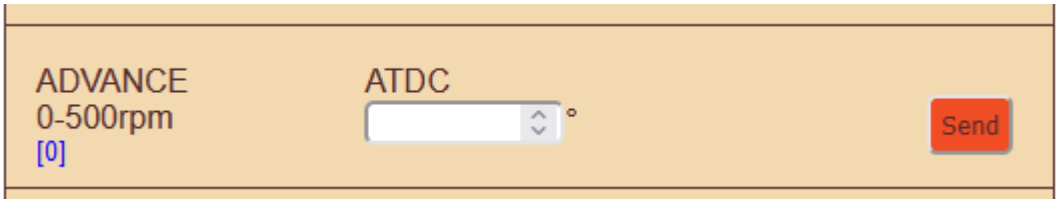
If you don't need those Extra settings, just let them to their default value.

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)



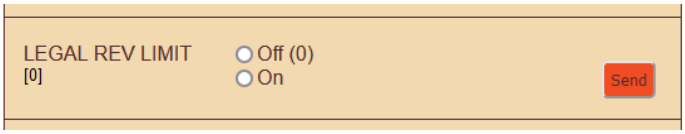
Restricted Mode

Default: Off

This function create a **temporary rev-limiter** that restrict the engine to **4000rpm** max.

It is useful for 50cc bikes to seem to be « *Street legal* » in countries where there are limited to 50km/h or to lend the bike to a rookie… ;-)

This setup lets you enable [1] or disable [0] the option of capping the maximum RPM to 4000 when Kill wire is connected to ground during the 30 first seconds following the very first spark.



When "Legal Rev Limiter" is enabled [1], to enter in this restricted mode :

- Turn on the master ignition key.
- **Start** the bike
- Flip the **Kill switch** ON then OFF once during **the first 30 seconds**.
- Engine is **now limited** to 4000rpm until you turn off the master key.

(After 30 seconds since the first spark, the Kill switch acts normally and stops the ignition.)

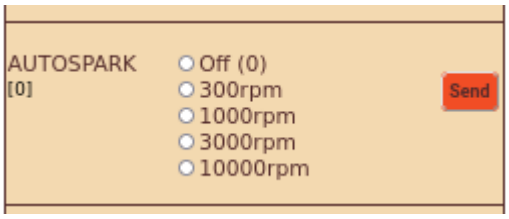
AutoSpark

Default: Off

Range of values: 0ff, 300 1000, 3000, 10000rpm

This **autotest function** is usable on TCI only.
The TCI box fires the ignition by itself at 300/1000/3000/10000rpm WITHOUT any pickup connected.

This way you can test the wiring, the TCI, the coil and sparkplug.



Bypass

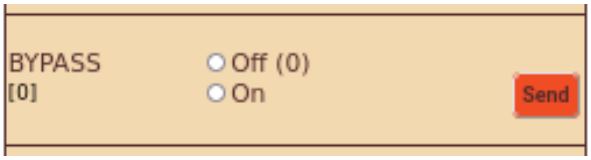
Default: Off

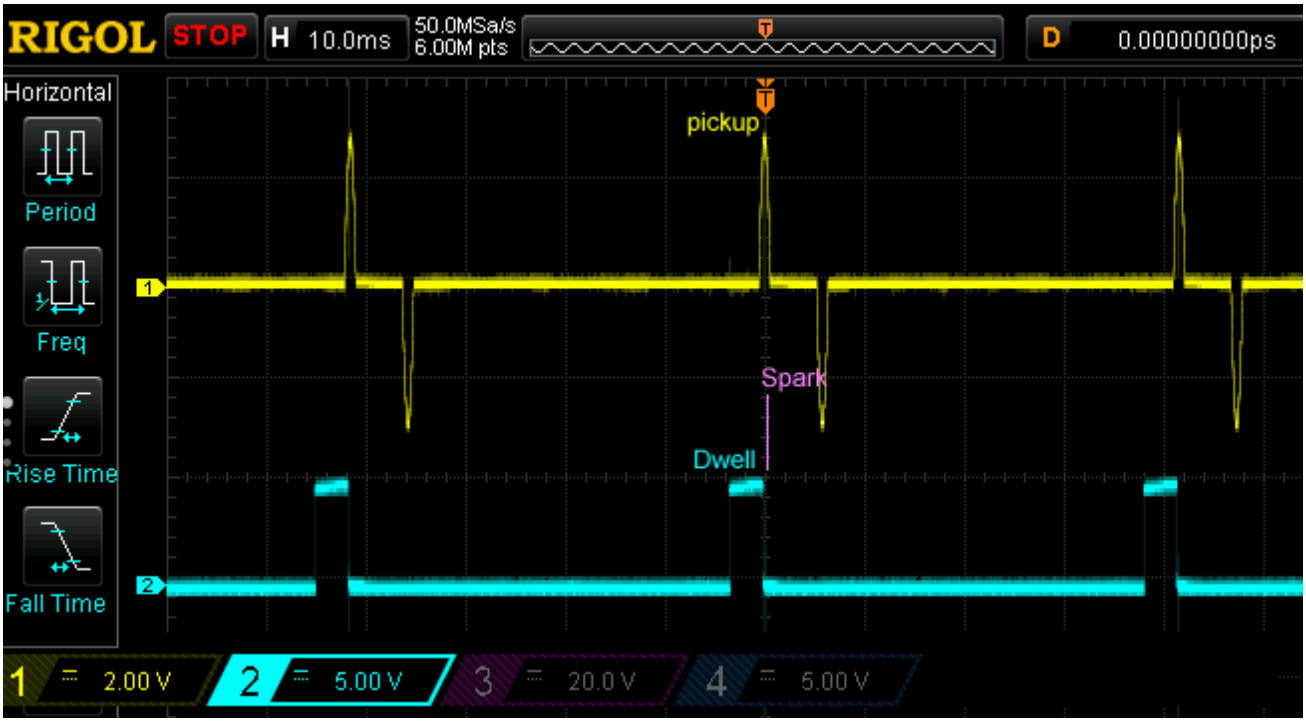
This function bypass the advance timing and trigger a spark AS SOON AS a pickup pulse has been detected.

This function comes handy when you want to know the pickup position with a Timing Lamp :
Remove the sparkplug out of the engine and connect it to the metal frame, then rotate the engine with a drill machine.

With points and mechanical advance system, TCI in Bypass mode is acting as a simple Transistorized Ignition.

/!\ Don't use the function on a running engine with pickups or hall sensors otherwise the spark will append way too soon and can harm the piston !!





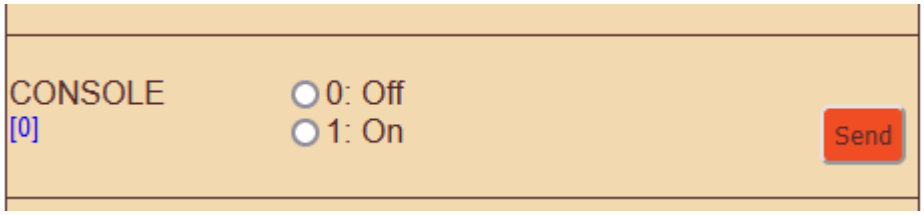
Console

Default: Off

Enable the Console output:

- Turn the ignition box in **Setup Mode**

- Go to "**CONSOLE**", check "1" to enable the console output, press Send



- Power **off** the ignition box

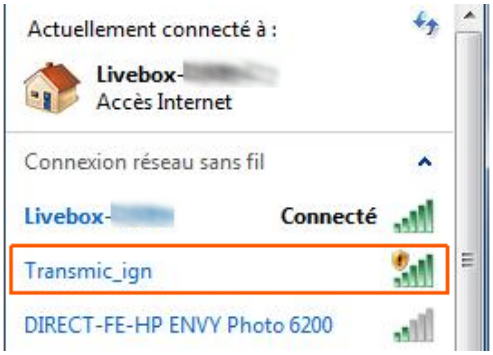
- **Disconnect** the **Kill** wire from ground

1) **Power on** the ignition box, it goes in "**Run Mode**"

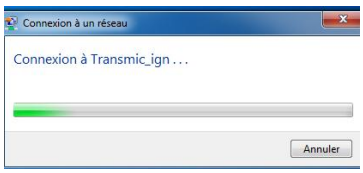
2) The **blue LED** stays on (if pickup *Auto* mode) or blinks one time (if pickup forced to NP or PN)

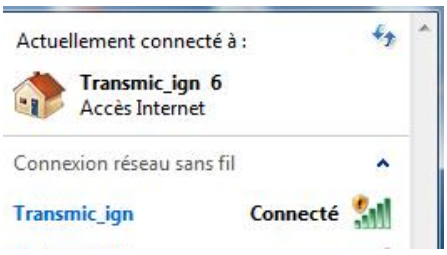
4) The ignition box also creates a **WiFi AP** (*Access Point*)

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 NetSpot for Android or Wifi-Analyzer for W10



6) **Connect** to it (*there is no password*)

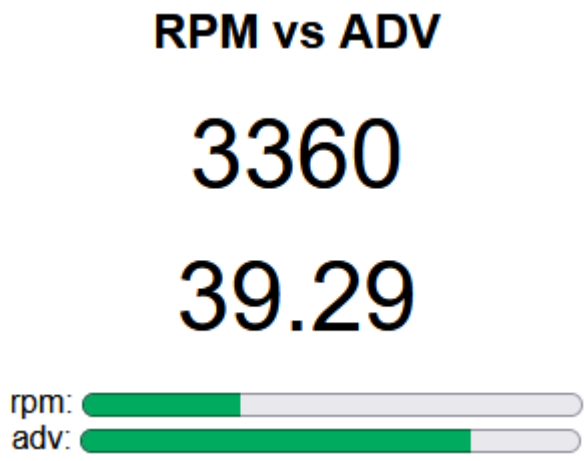




7) **Start** the engine

8) Once your device is connected to the AP, open up a **browser** and head over to http://**192.168.4.1**

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

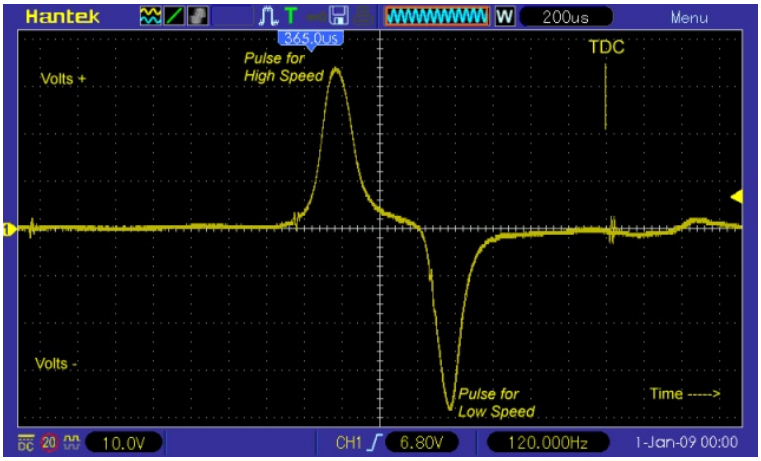


Pickup Type

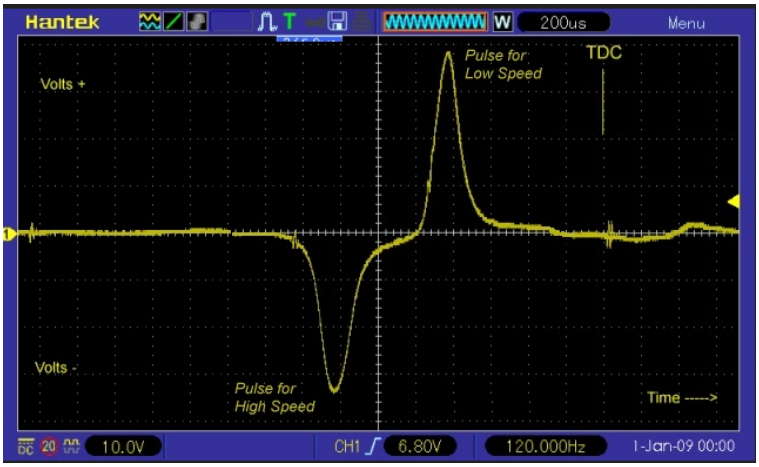
VR Pickup

Analog **VR pickup** is connected between **Green wire and Ground**

The pickup coil can be connected in order to send a **POSITIVE PULSE FIRST:**



or to send the opposite: **NEGATIVE PULSE FIRST:**



To avoid EMI pickup sensor must be connected using a shielded cable. Shield grounded on one side only. Twisted pair is better.

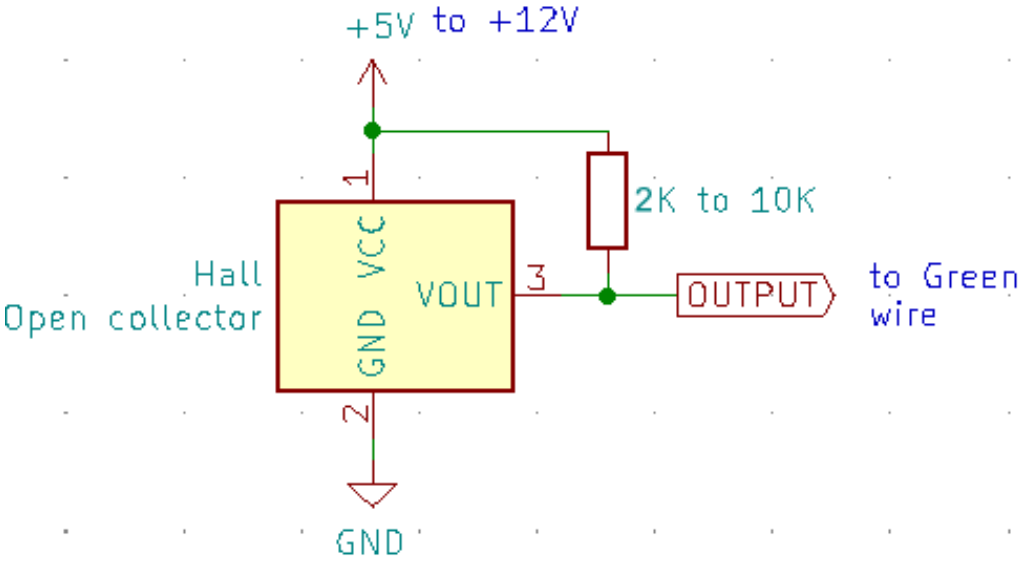
Hall Sensor

A **Hall Sensor** can be connected between **Green wire and Ground**

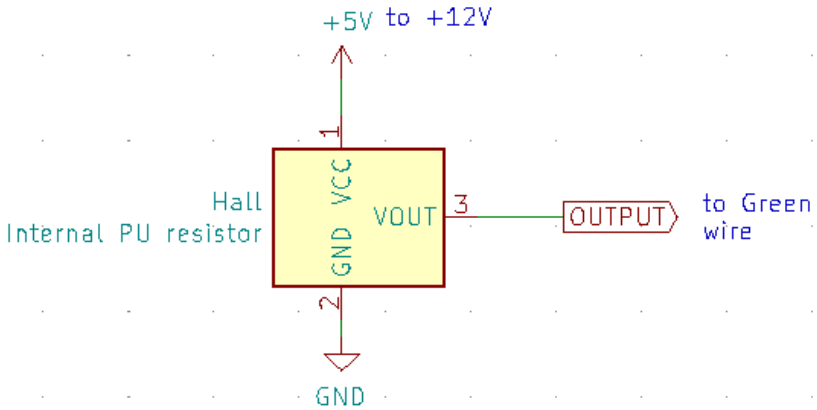
Pickup Polarity must be set to [**1**] **PN** for use of a Hall sensor.

2 types of Sensors

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



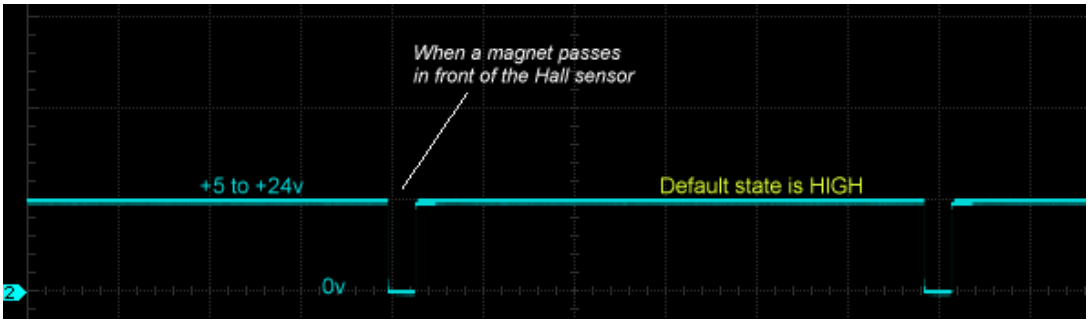
- Hall sensors with **built-in pull-up resistor** give positives voltage when no magnet.



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

See Appendix 2 for Position

Output of a Hall sensor



Timing

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

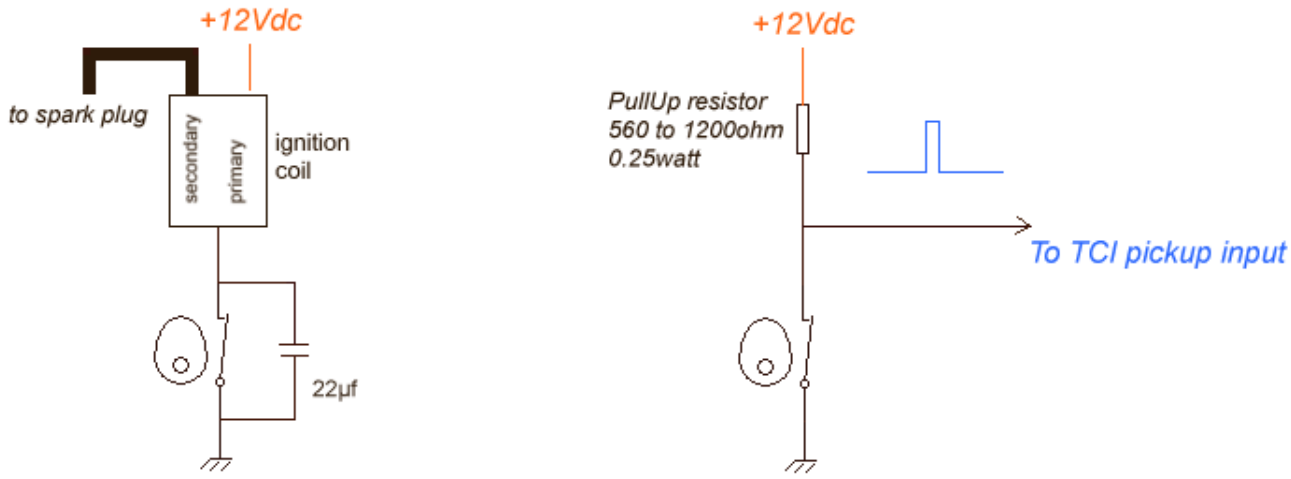
*You can even connect an **Optical Sensor** as long as it puts out a CLEAN square signal similar to the one above.*

Points

it’s possible to convert **points** to give an input to the TCI.

First step:

Modify the wiring:



Second step:

Most conventional points have a mechanical advance with weights that change the timing depending on RPM. Now that TCI will be controlling the timing you will need to lock out these mechanisms.

2 possibilities:

A) You move the points or lock the mechanical timing to the **farthest advanced position**.

ie: If the mechanical system can shift the points until 30° BTDC. lock the points in this position and tell the TCI "*Pickup Position*" is 30°

B) Points don’t have mechanical system or choose to lock the mechanical system for NO advance 0°

Then tell the TCI "*Pickup Position*" is at TDC by entering 360°

Third step:

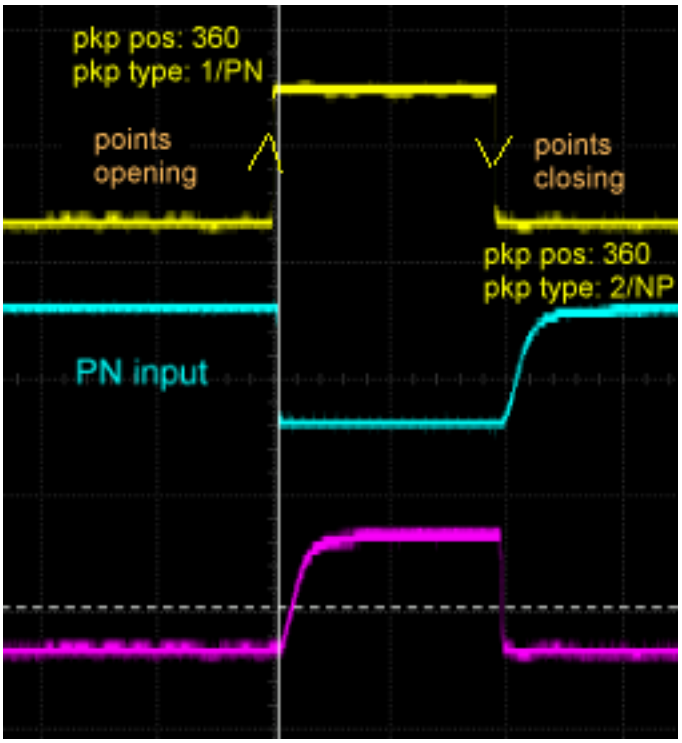
Select what event will trigger the TCI

2 possibilities:

A) You want to trigger the TCI when points open than choose "**Pickup Type = 1**"

or "**Pickup Type = 0**" if you want to trigger the box when points close.

It is obvious that depending on how long the points are open, the timing is changing a lot !



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 normal "**Run Mode**"

3) The **blue LED** stays On waiting for pickup signal if Pickup is set in "*Auto*" Mode.
or flash 1 time then stays Off if Pickup is forced "*PN*" or "*NP*" Mode.

4) Start the engine. The blue LED **blinks** in time **with RPM**.

5) When the engine runs, if **Kill** wire is connected **to ground** during **AFTER 30 seconds** THEN it **stops** the engine.

/! 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!)

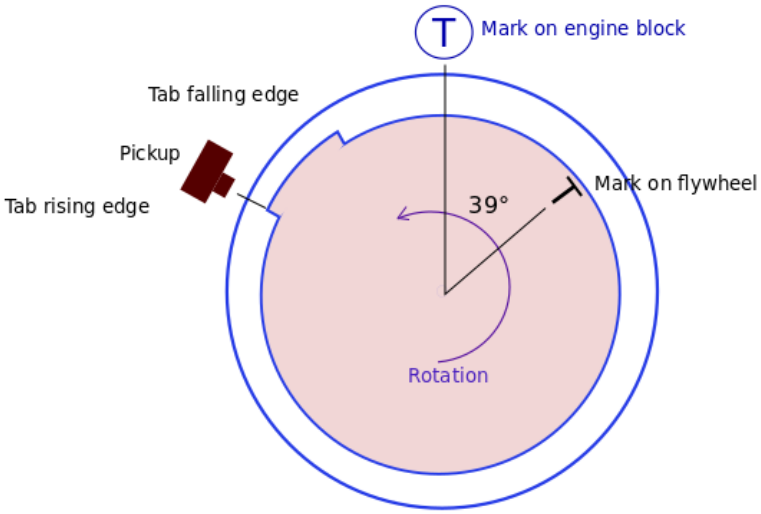
Appendix 1

Find the physical position of the analog **pickup** relative to Top Dead Center.

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

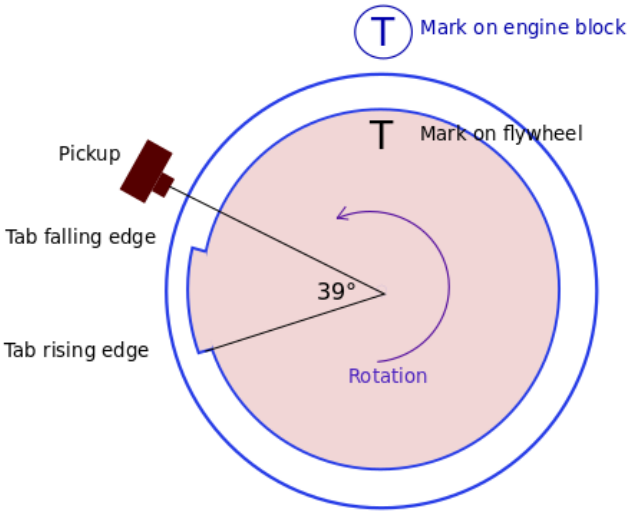
Method N°1

Pickup aligned with rising edge



Method N°2

Engine at TDC

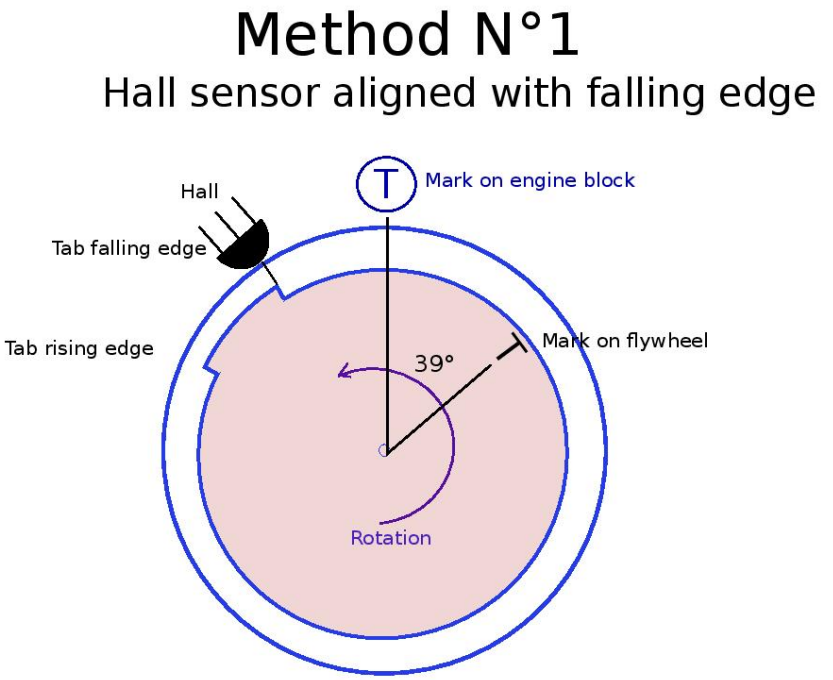


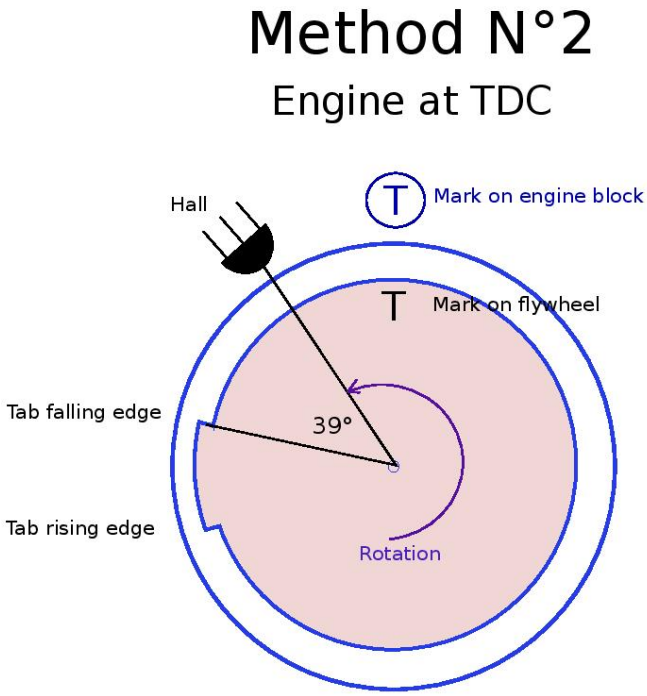
Leading|Rising edge generate pulse for high revs
Trailling|Falling edge generate pulse for idle.

Appendix 2

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

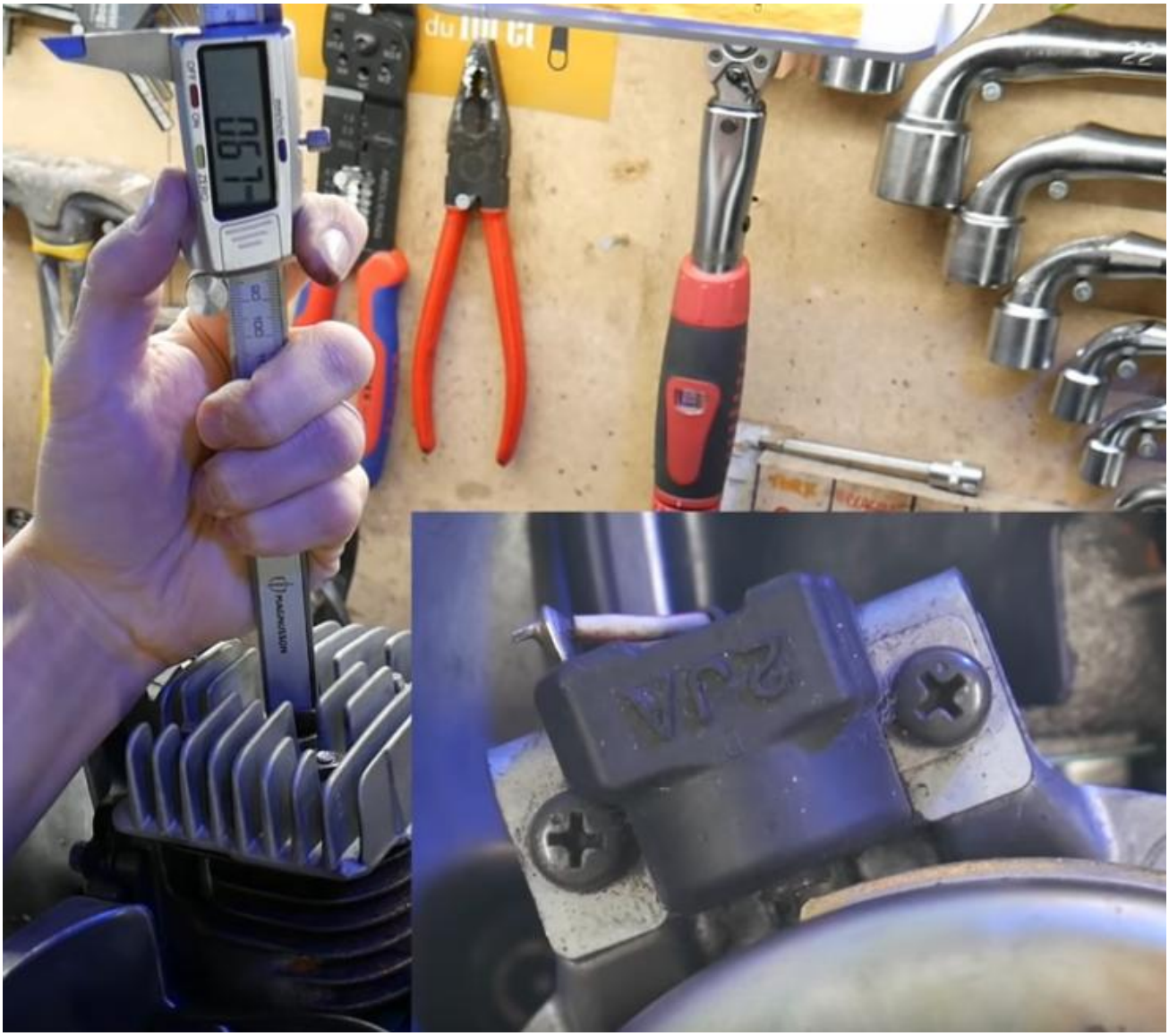




Appendix 3

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

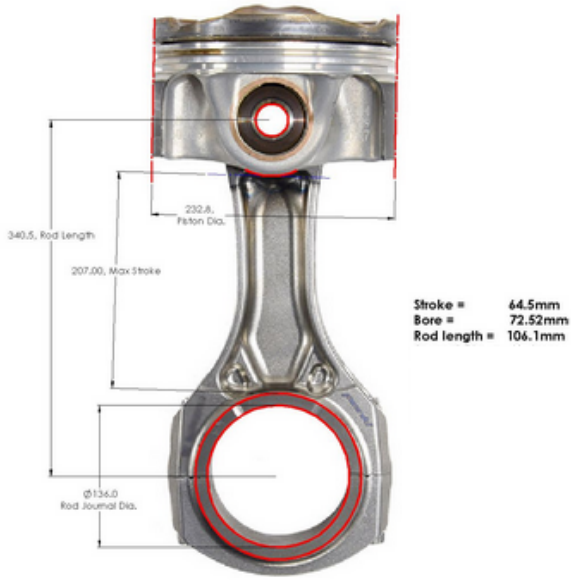
B) Align the pickup with the beginning of the magnet on the rotor and measure the travel of the piston with the caliper rule:



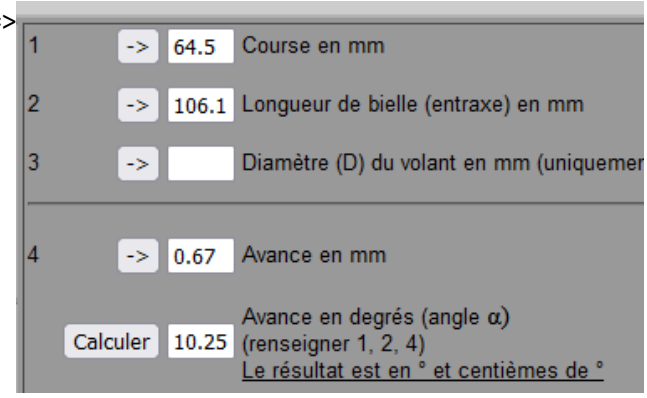
C) Use an online timing calculator to convert millimeters into degrees:

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:



=>



Appendix 4

Tries and errors and Timing Lamp

If you set the "*Pickup position*" to 40° BTDC and 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° → 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° → 35°)

Other 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.