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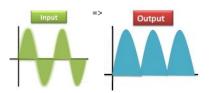
Wiring

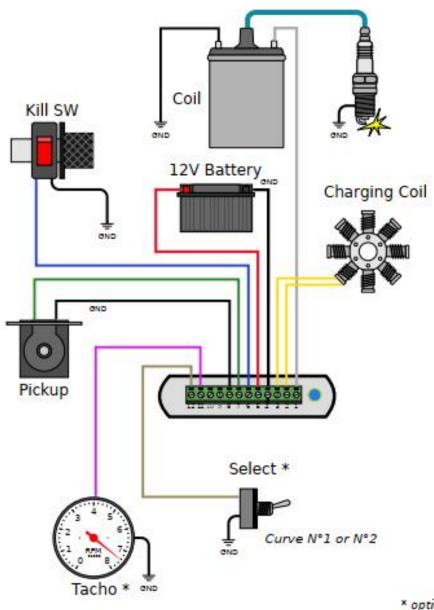
The charging coil that charges the internal capacitor of this AC-CDI can be connected in two different ways:

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.

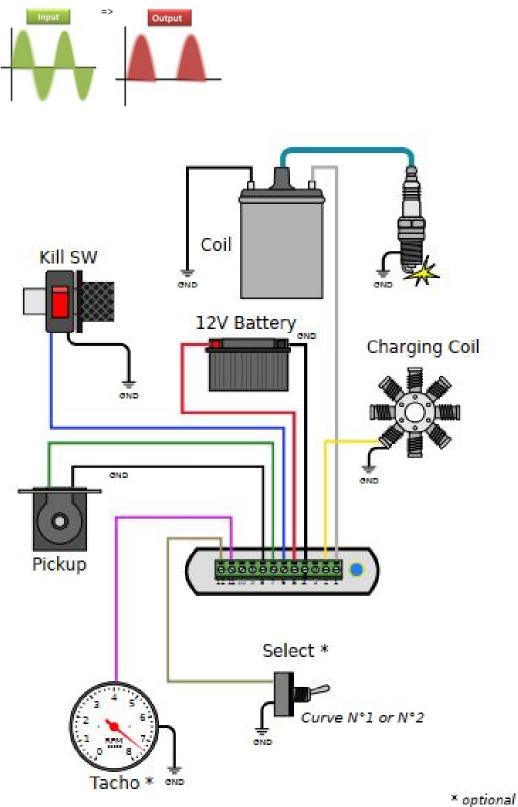




* optional

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

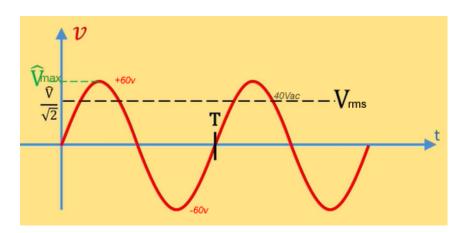
All AC-CDI need a working stator/High Voltage AC charging system.

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



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	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>
- Stop engine.

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** blinks 5 times meaning grounded Kill switch has been detected.

Kill wire can be disconnected from the ground.

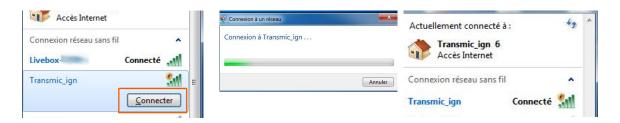
Then wait for the WiFi server to start,

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



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



- 8) Once your device is connected to the AP, open up a **browser** and head over to http://192.168.4.1/setup (http://192.168.4.1/setup)
- 9) Once connected your browser should display:

TRANSMIC.FR



10) If not yet done, turn the Kill Switch OFF (Kill wire disconnected from the ground) for Running mode.

Troubleshooting WiFi connection

- 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:



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

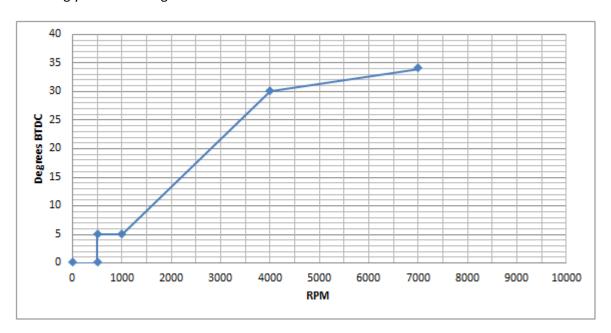
Troubleshooting display

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 **QtWeb**
- 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 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 TYPE	PICKUP POSITION
STROKES	SHAFT	CYLINDERS
ADVANCE TIMING	ADVANCE 0-500rpm	AUTO SPARK
DWELL	BYPASS	CONSOLE
MODIFY	UPDATE	

[0]

- 0: Analog Pickup Coil (VR-PN)
- 1: Analog Pickup Coil (VR-NP)
- O 2: Digital Hall Effect Sensor *

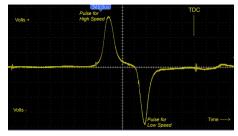
Send

* option

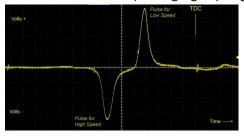
Select the type of pickup attached to the Ignition box:

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)



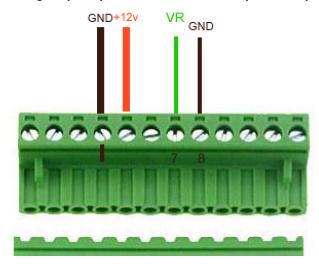
2 = Hall Effect Sensor (Digital signal)

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 swap the wires 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)

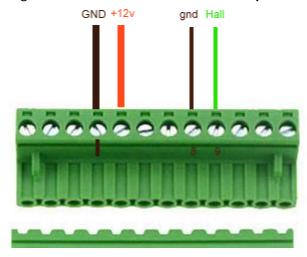


To avoid ElectroMagnetic Interference (EMI) it's safer to connect the pickup sensor through a shielded cable. Shield grounded on CDI side only.

Twisted pair is better.

Hall Sensor

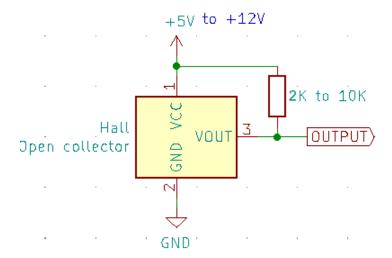
Digital Hall Sensor is connected between pin 9 and pin 8(gnd)



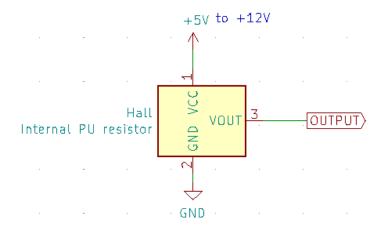
<u>Pickup Type</u> must be set to [2] for use of a Hall sensor.

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.

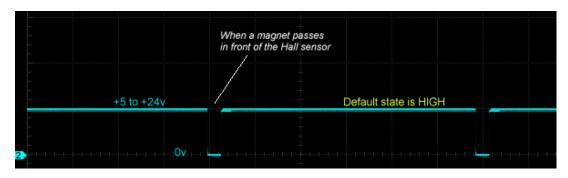


Hall sensors require a +5v to +12vdc supply voltage. See datasheet

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

See 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.

Pickup Position

Default: 50

Range of values: 1 to 360

MENU	PICKUP TYPE	PICKUP POSITION		
STROKES	SHAFT	CYLINDERS		
ADVANCE TIMING	ADVANCE 0-500rpm	AUTO SPARK		
DWELL	BYPASS CONSC			
MODIFY				
[USERPOS]				
BTDC 45 Send]•			

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

Formula is: Pickup position = Base advance + Magnet Length





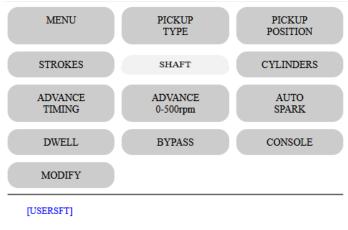
Base advance is generally 5 to 15° BTDC

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



- 0: CrankShaft
- 1: CamShaft
- O 2: 2pulses/rev

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 rpm = 5° BTDC

1000 rpm = 5° BTDC

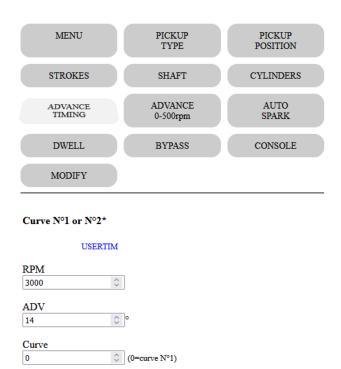
4000 rpm = 30° BTDC

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 hard rev-limiter: No more sparks at 7001 RPM!



Stored Values:

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

Send
* Option

Select curve

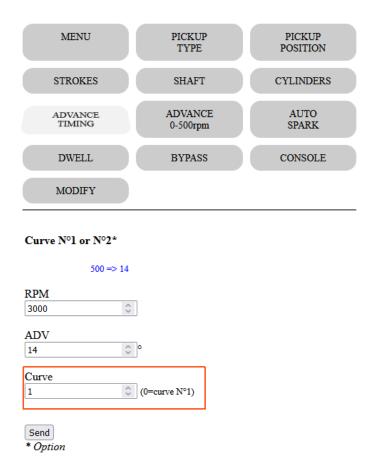
Default: curve N°1

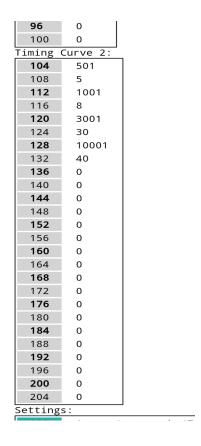
If you bought the 2 curves option, then connect a switch between connector pin 12 and ground.

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.

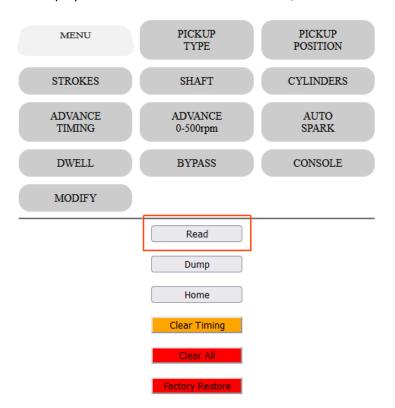


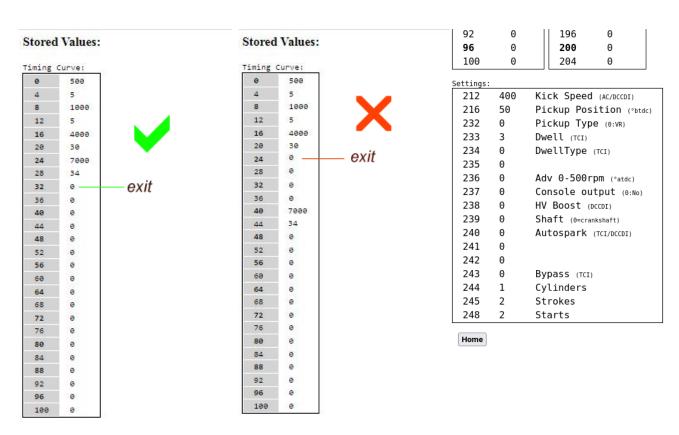


Curve N°2 is stored at addresses 104 to 204

Read

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



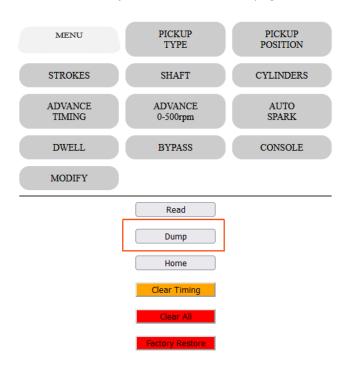


All values must be **consecutive** and in ascending order of RPM!

Dump

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

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



Dump EEPROM Hex Values:

0	F4	01	00	00	θ5	00	00	00
8	40	1F	00	00	28	00	ΘΘ	00
16	34	21	00	ΘΘ	28	00	ΘΘ	00
24	ΘΘ	00	00	ΘΘ	00	00	ΘΘ	00
32	ΘΘ	00	00	ΘΘ	00	00	ΘΘ	00
40	ΘΘ	00	00	ΘΘ	00	00	ΘΘ	00
48	ΘΘ	00	00	ΘΘ	00	00	ΘΘ	00
56	ΘΘ	00	00	ΘΘ	00	00	ΘΘ	00
64	0θ	00	00	ΘΘ	00	00	ΘΘ	00
72	ΘΘ	00	00	00	00	00	ΘΘ	00
80	0Θ	00	00	ΘΘ	00	00	ΘΘ	00
88	ΘΘ	00	00	00	00	00	ΘΘ	00
96	ΘΘ	00	00	00	00	00	ΘΘ	00
104	0θ	00	00	ΘΘ	00	00	ΘΘ	00
112	ΘΘ	00	00	00	00	00	ΘΘ	00
120	ΘΘ	00	00	ΘΘ	00	00	ΘΘ	00
128	ΘΘ	00	00	ΘΘ	00	00	ΘΘ	00
136	FE	00	00	ΘΘ	00	00	ΘΘ	00
144	ΘΘ	00	00	00	00	00	ΘΘ	00
152	ΘΘ	00	00	00	00	00	ΘΘ	00
160	ΘΘ	00	00	00	00	00	ΘΘ	00
168	ΘΘ	00	00	00	00	00	ΘΘ	00
176	ΘΘ	00	00	ΘΘ	00	00	ΘΘ	00
184	ΘΘ	00	00	00	00	00	ΘΘ	00
192	ΘΘ	00	00	ΘΘ	00	00	ΘΘ	00
200	0θ	00	00	ΘΘ	00	00	ΘΘ	00
208	0θ	00	00	ΘΘ	θΘ	00	0θ	00
216	32	00	00	ΘΘ	θΘ	00	ΘΘ	00
224	02	00	00	θ0	00	00	00	00
232	0θ	00	00	θ0	θΘ	00	00	00
240	00	00	00	θ0	θ1	00	00	00

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.

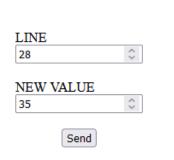


Since we want to modify the advance timing at line 28, we now have to enter:

MODIFY

Line 28
New value 35
then Send

CONSOLE BYPASS



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 Read 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:

20	20		
24	7000		
28	34		
32	9		
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

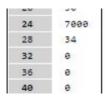
Remember: All timing values must be consecutive and in ascending order of RPM!

Use Read 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.

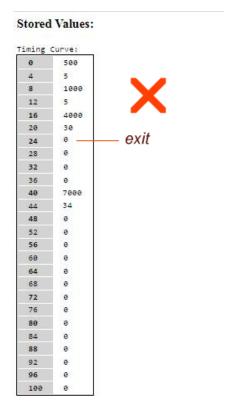


To zero out those values we now have to enter:

Line 24
New value 0
then Send

Line 28
New value 0
then Send

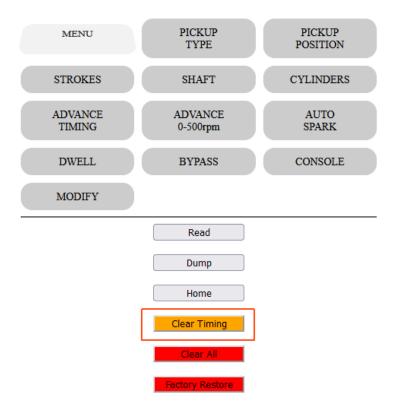
Remember: All timing values must be **consecutive** and in <u>ascending</u> order of RPM! Use Read button to check that.



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.

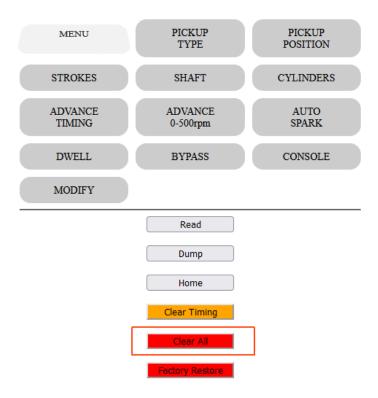
Restart the ignition box. (power off/power on)

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. '

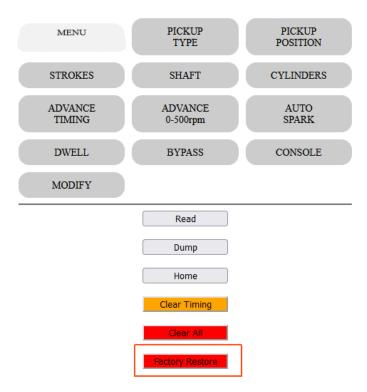
Restart the ignition box. (power off/power on)

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

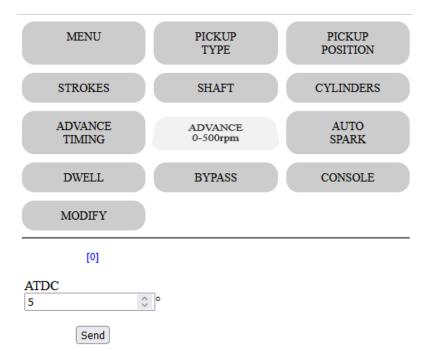
If you don't need those Extra settings, just let them to their default value.

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)



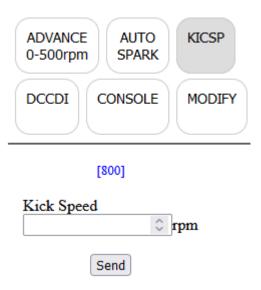
Current value appears in blue on the form.

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.



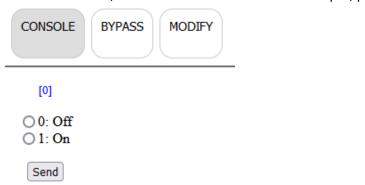
Current value appears in blue on the form.

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



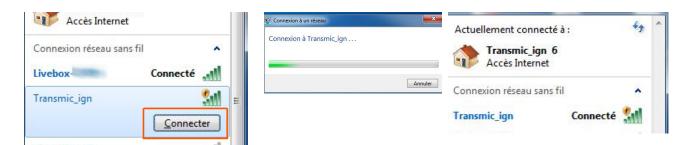
Current value appears in blue on the form.

- 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 NetSpot for Android or Wifi-Analyzer for W10



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



- 7) Start the engine
- 8) Once your device is connected to the AP, open up a **browser** and type in the address bar: http://192.168.4.1/console
- 9) After a few seconds, the browser should display both the **RPM and the advance timing** in degrees BTDC followed by 2 bargraphs

RPM vs ADV

3360
39.29

Display appears ONLY when the engine is running.

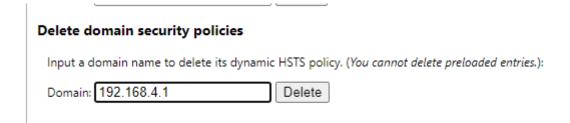
Because of the impact on Ignition box performance, please use it for debug only and disable this function when you are done with it!

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 **QtWeb**
- 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 :



- 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!)

Appendix 1

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



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

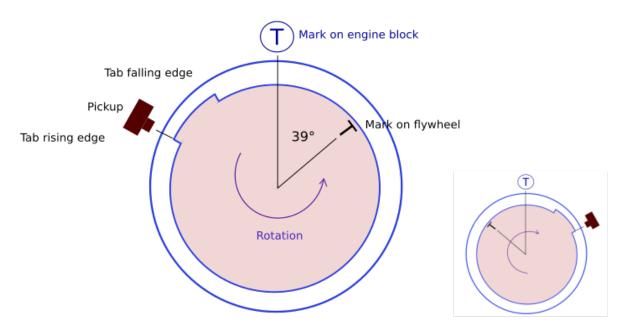
Method 1:

- First align the pickup with the rising edge of the bar. (Pay attention to direction of rotation of the crankshaft: CW or CCW)
- Measure the angle between the TDC mark on the casing and the TDC mark on the rotor

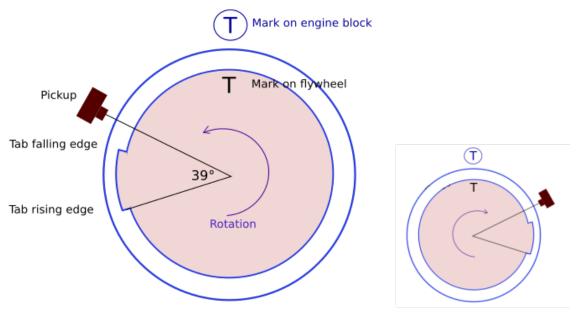
Method 2:

- Remove the sparkplug, rotate the engine to put the piston at TDC (If TDC marks on casing and rotor exist, then they should be aligned.)
- Measure the angle between the pickup and the rising edge of the bar. (Pay attention to direction of rotation of the crankshaft: CW or CCW)

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.

calageTDC_pickup_2methods.svg

This view above represents the respective positions of the rotor and the pickup as we would see them if the engine cover were transparent.

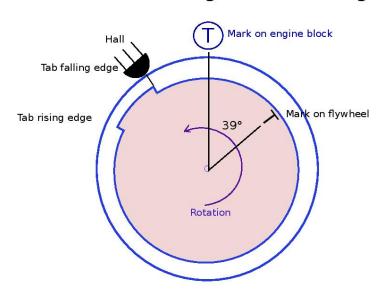
Read timing from flywheel: https://transmic.fr/2021/09/23/read-timing-from-flywheel/

Appendix 2

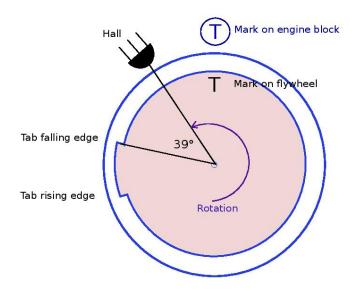
Find the physical position of the digital **Hall Sensor** relative to Top Dead Center.

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

Method N°1 Hall sensor aligned with falling edge

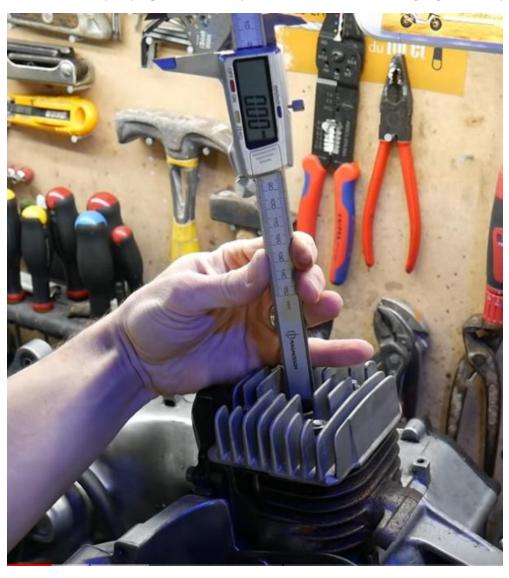


Method N°2 Engine at TDC

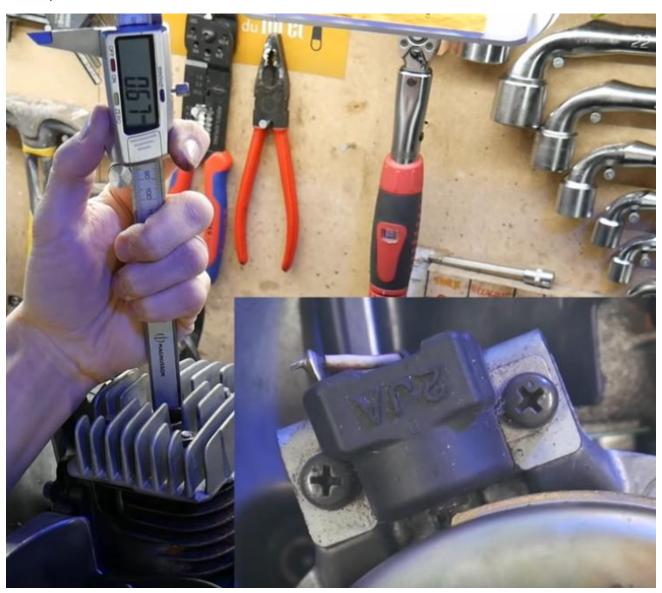


Appendix 3

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:



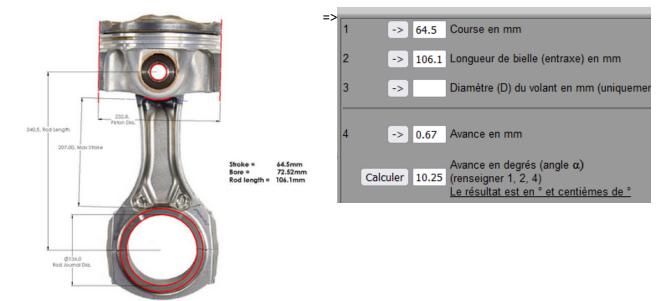
C) Use an online timing calculator to convert millimeters into degrees:

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



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*" $(40^{\circ} \rightarrow 45^{\circ})$

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" $(40^{\circ} \rightarrow 35^{\circ})$

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.