

## System 719999945

**Magdyno with fully electronic solid state ignition**

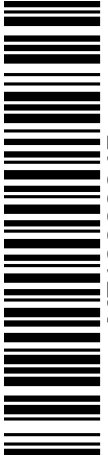
- to replace magdynos of type Bosch D2 oder LS2, Lucas MO1, Miller, Splitdorf or similar for **2 cylinder V-engines with 45° angle between cylinders**

- works in both turning directions
- shaft taper 5°42'38'' (1:5)
- solid aluminium pressure cast housing, dimensions here
- axle height may be raised from **38 (standard)** to 44,6mm (Lucas, Splitdorf) with adapter plate
- regulator and twin ignition coil are inside body, outside is advance unit

**Options:**

available as option with manually triggered advance control unit (see instructions)

possible axle heights: **38mm (Standard, wie Bosch Bosch)**, 44.6mm (Lucas), 35mm (Miller)



M719999945

<b>Assembly instructions magdyno for V-engines 42°; 45°; 47°; 50° (xx stands for the degree value)</b>	<b>12.11.2020</b>
<p><b>- never try to start the engine with the magdyno not yet correctly set and timed. This may damage both your engine and the magdyno.</b></p> <p><b>- check whether you need any add-ons (for achsel height and fastening).</b></p>	
<p>- VAPE can not monitor the compliance to those instructions, nor the conditions and methods of installation, operation, usage and maintenance of the system. Improper installation may result in damage to property and possibly even bodily injury. Therefore we assume no responsibility for loss, damage or cost which result from, or are in any way related to, incorrect installation, improper operation, or incorrect use and maintenance. We reserve the right to make changes to the product, technical data or assembly and operating instructions without prior notice</p>	
<b><u>IMPORTANT</u></b>	
<p><b>- Please read these instructions fully before starting work on your bike or any modification on the supplied system. Also, please note the remarks on the information page for this system.</b></p>	
<p><b>If you have no expertise for the installation have it done by an expert or at a specialist's workshop. Improper installation may damage the new system and your motorcycle.</b></p>	
<p> <b>- VAPE guarantees homologated products marked with the "E" mark in the ring (E8 specifically for the Czech Republic), thereby ensuring a consistent conformity of the product properties with the relevant ECE homologation regulations (especially ECE R10.05). Inspection is regularly carried out by the competent authority.</b></p>	
<p>- The magdyno is sensible to blows during transport. We therefore double pack the material (box inside box). Should the system have been despatched to you via a reseller and arrive not packed like this, please inform us.</p>	
<p><b>- The charging system is only suitable for use with rechargeable 12V (6V systems 6V) lead-acid batteries</b> with liquide electrolyte or sealed lead-acid batteries, AGM, Gel. It is not suitable for use with nickel-cadmium, nickel-metal-hydride, lithium-ion or any other types of recharchable or non rechargeable batteries.</p>	
<p><b>- If you have access to the Internet, best view those instructions online.</b> You get larger and better pictures by clicking onto them and possibly updated information. System list at <a href="http://www.powerdynamo.biz">http://www.powerdynamo.biz</a></p>	

**- First of all, make sure that the unit is suitable for your application. You should consider the following points:**

- use in 2-cylinder 4stroke V-engines (42°, 45°, 47°, 50° depending on version)
- unit is driven at camshaft speed (half crank speed)
- standard shaft height is 38mm (with optional adapter plate 44.6mm or 35mm (e.g. for Miller))
- shaft taper is 5°42'38" (1:5), this is normal for most Magdynos. shaft thread for nut is M8x1 (special nut is included)
- fastening is by band clamp or screws on an even platform (no flange mount)
- if a battery is used, it must be 12V and must be connected with its negative pole to ground (Never with the positive, even if the original system was!)  
if used without battery you need to install a smoothing condenser, otherwise you do not get full lights output.

**Please note that some characteristics of the unit differ from the original magdyno:**

- It delivers 14.4V DC (the standard voltage for a 12V system) **negative earth** (if you had positive ground, you need to reverse polarity of your battery!)
- The threading at the front end is M8x1. You will find a special tubular nut M8x1 nut in the delivery.
- There is an electronic advance unit to be fitted outside the magdyno with dimensions 55x73x28mm (without cable and fastening flaps). This could be fitted behind the battery, of if you drive without battery inside an empty battery housing. If there is no battery you need to install a smoothing condenser to get correct lighting. The condenser may than also be hidden in the battery box.

- The change between ignition advance and retard will (in standard version) be effected automatically in function on shaft revolutions and basic setting (see below) or alternatively (with a different advance unit) manually by cable operated switch which lets you change between full advance and full retards.

The switch shon in picture is not part of the pack, but may be obtained as add-on

- We made an universal magdyno that could be installed on different vintage motorcycles. Because of that we did not cut the groove for the woodruff key (which might have existed on your magdyno) Remark: The woodruff key does not actually hold the drive pinion on the shaft, this is done by the taper. It simply did guide to the correct setting which will now be otherwise achieved.



#### These parts are in the pack:

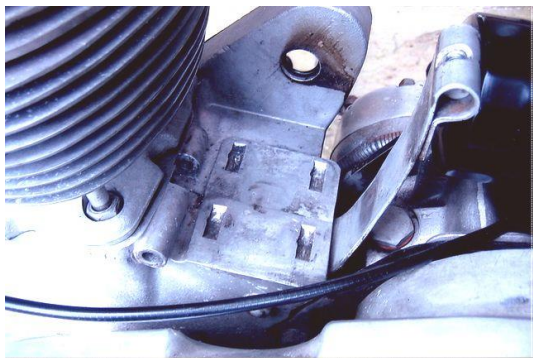
- the magdyno itself
- the advance unit (one of the 2 possible versions, box is same)
- 130mm of high tension cable
- 2 rubber grommet(s) for HT exit
- extension wire for kill wire (blue)
- special nut M8x1
- fuse and holder
- 2 cable binders



- not in pack, but needed for operation without battery is a smoothing condenser.

It will be connected to the gris as if it was the battery (but it does not have storage capacity!).

There are 2 screw mounts. One marked with + for the plus wire, the other for negative ground.



#### Preparation of installation

1. remove the stock magdyno as per manufacturers instructions
2. remove the stock 6V battery,
3. **Important:** iof you had positive ground (plus of battery to chassis) rewire that you ghet minus an chassis. In such cases also swap wires at Ampmeter (so you have)
4. clean magdyno seat. This is your ground connection!. Experience says better not rely on this, but after installation of magdyno place an extra ground wire to it.
5. place the magdyno provisionally on nthe platform without fastening yet. Check that it can stand free of cylinder fins and tubes and also enables correct fitment of drive gear.

**version with automatic, shaft revolution depending advance control (standard)**


- Check the position of the 2 small DIL switches on top of the advance unit. Their setting selects different advance curves.

In this picture as example  
 1 - switch is set to ON  
 2 - switch is set to OFF (oposite to ON)



setting of switches 1-2	ignition happening vom start till 1.250 revs/min at	at 2.500 revs/min full advance of	range of change	recommended for
OFF-OFF	6° BTDC	34° BTDC	28°	twins
ON-OFF	4° BTDC	36° BTDC	32°	twin plug singles
OFF-ON	4° BTDC	40° BTDC	36°	singles
ON-ON	2° after TDC	40° BTDC	42°	engines with kickback problems

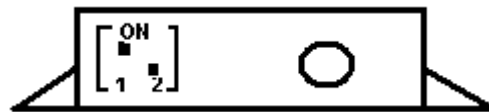
- The rev values refer to crankshaft speeds. The data in the yellow columns are fixed and can not be modified. You can however shift the complete range (green) by modifying basic setting at time of installation.

- the rather high idle revs have been chosen deliberately as many vintage bikes have problems with stable idling below 1000 revs and would therefore not get stability if change already would set it there.

**version with hand operated change from full retard to full advance**

- There also is an advance box which actually also electronically sets timing, but the change between advance and retard is not effected automatically, but by hand via some switch connecting to ground.

- You recognise those boxes by the existence of a single green wire.



	green wire to ground	green wire open	range of change	
0-0	18° BTDC	36° BTDC	18°	
1-0	18° BTDC	38° BTDC	20°	
0-1	18° BTDC	40° BTDC	22°	
1-1	4° BTDC	42° BTDC	38°	





- Not included, but recommended is a bowden operated stoplight switch. (our offer: part 79 00 250)

you may easily connect this switch to the bowden cable that did operate the manual advance & retard and thereby achieve the same function.

**cable pull = cable to ground = retarded ignition**  
**cable relaxed = cable unconnected = full advance**

- to one terminal connect good ground, to the other the green control wire from the advance unit.



- Recommended, for operating without a battery, but not included in the magdyno set is an  
 - empty battery housing (similar in appearance to original Bosch) to contain both advance unit and capacitor.



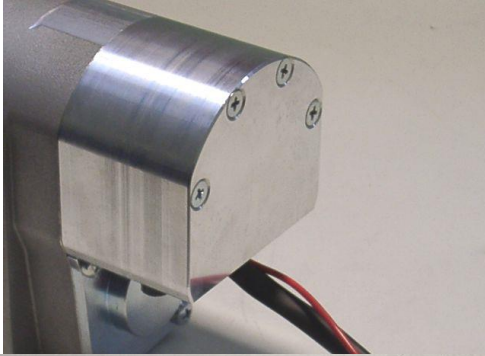
- This empty housing may also be used to house a modern 12V sealed acid battery while maintaining the appearance of the original.

The magdyno and its external advance unit are connected by a pre-assembled 4-terminal plug.

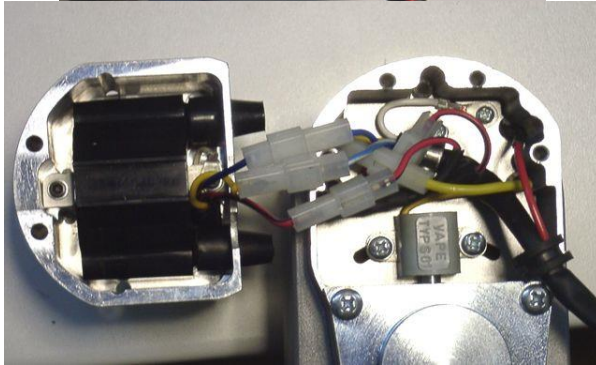
- yellow to yellow (the unprocessed trigger pulse)
- blue/white to blue/white (processed trigger pulse)
- red/black to red/black (more than 300V AC from the ignition pole)
- white to white (ground)
- The single blue cable is the cut-out cable. It should be connected to the short-circuit terminal of the ignition lock or to a kill switch.
- green cable (so existing) to selector switch

- If you have to replace it or there are cables out of the plug, you must take care that all cables are connected correctly (see left).

- If the blue cable is connected to ground, the ignition is off. For a first test of the system you are advised to leave the blue wire open (unconnected). This will reduce the scope of possible errors.

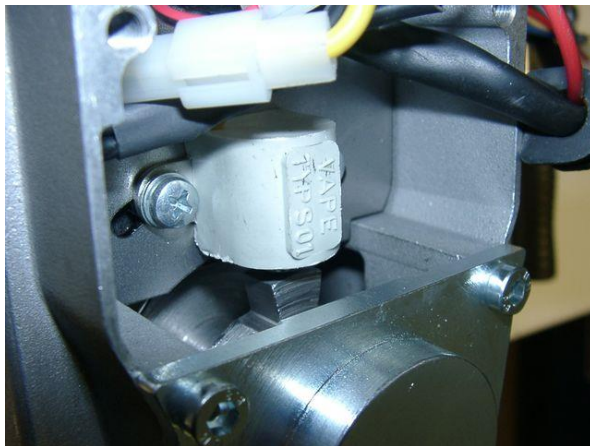
**For ignition adjustment you must:**


- Remove the 4 countersunk screws from the front upper cover. (Not the 4 lower hex head screws!)



- Pull off the cover (cap) carefully.

- **Attention**, not too far! The ignition coil is fastened with cables and plugs connected to the inside of the unit.



- You will see the grey sensor, and beneath it the rotor with its 2 trigger noses.

- The point of ignition is determined by the position of the trigger noses relative to the sensor.

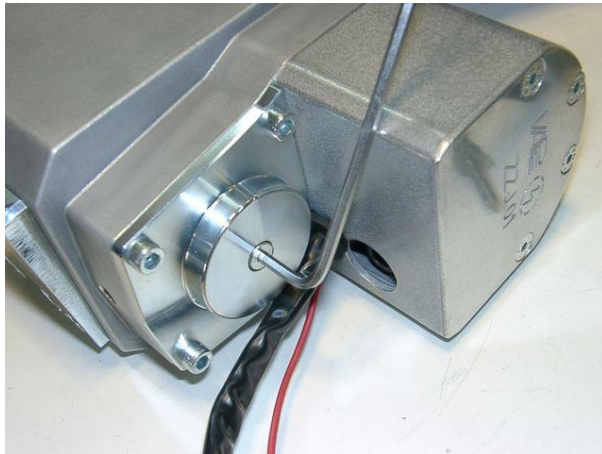


- To follow the characteristics of the V twin the 2 trigger noses are positioned in 180° minus half cylinder angle distance to each other

- When looked at the trigger disc from open rear and shaft turning clockwise (in this view) than nose No 1 is for the first cylinder. For systems where this trigger plate turns anticlockwise it is nose number 2.

- The respective cylinder has to be in compression cycle with all valves closed.

- Both cylinder always fire same time, one of them with exhaust valve open letting spark harmlessly waste into exhaust.



- To facilitate turning the shaft, there is a hex screw in the end of the rotor shaft with an accessible head.

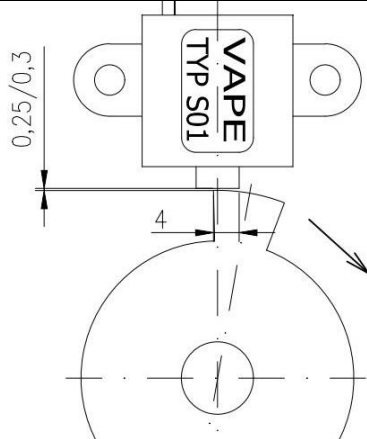
- You may insert a 3mm allen key to turn and hold it.

### Setting timing during installation

**This is the point where most problems happen, so please read carefully and try to understand the logic of the process.**

**1. Prepare the new unit by setting it into position for full advance.**

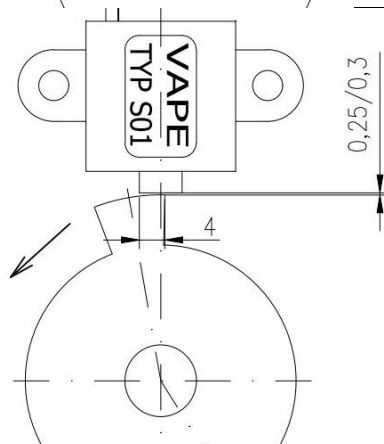
The following drawing shows where the sensor and rotor are in relation to each other when the spark actually occurs under conditions of maximal advance (that is normal driving speed).



#### - **Position at full advance**

- The position of full advance is reached (for clockwise turning units) when the left edge of the trigger has passed the sensor core by about 1/3 of its width (4mm).

- **Turning clockwise means** as seen from the front of the shaft (as shown here)!



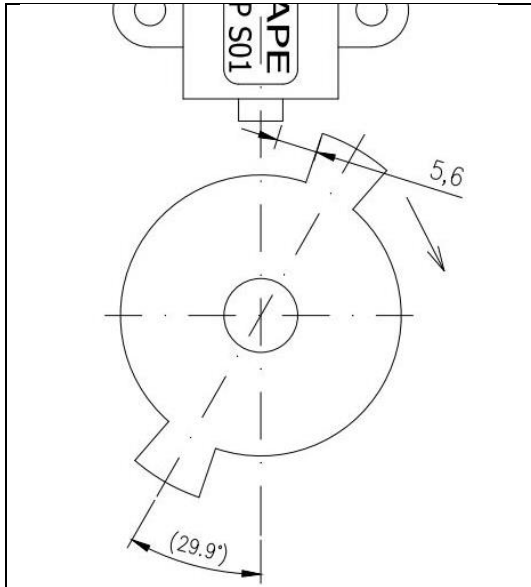
- For counter-clockwise turning units (seen from this position) the same applies in reverse.

- The system is designed to work in either direction.

**2. Prepare your engine by setting piston in cylinder 1 (firing first) into the position that is normally reached at full advance (riding position). For most motorcycles using a magdyno this is typically around 38° to 40° (crankshaft) before TDC. Make sure that you have the correct trigger lobe for the rotating direction wanted (see above)**

**3. With both, unit and engine in the described position the mag pinion or cog should be gently tapped onto taper and secured to 14 ft lbs with nut provided. Re-check timing in case of slippage.**

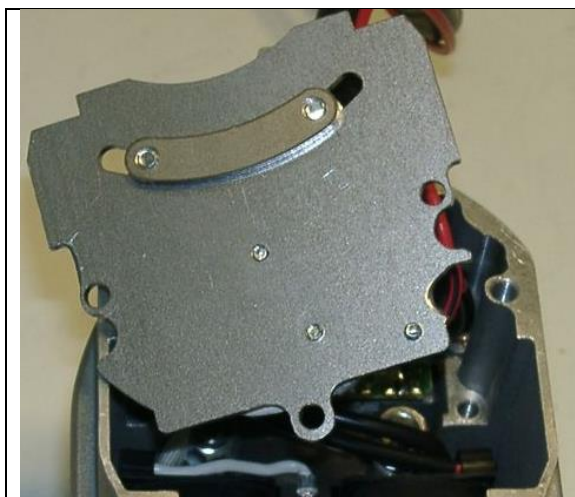




- When you have crank in TDC position of cylinder one and magneto shaft operation (seen onto open trigger plate) clockwise rotation, you should have the situation as shown here. For anticlockwise operation this is mirrored.
- This position is however nearly impossible to set for timing as the strong magnets will pull the shaft away from this.



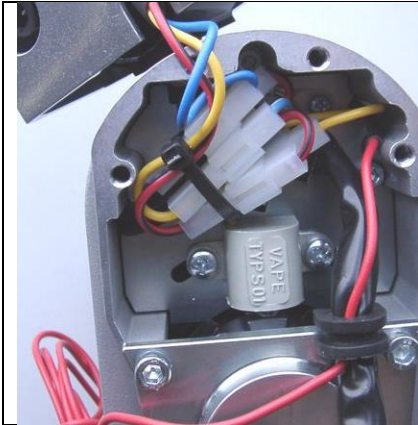
- A perfectly accurate adjustment may be difficult (often prevented by the length of the timing chain links). Furthermore, positioning the rotor precisely in specified positions can be tricky as well (because of the strong magnets pulling it away).
- We have therefore provided a means to adjust the sensor position by shifting it laterally.



**But attention:**

- Loosen the holding screws only slightly - otherwise the back plate behind may fall inside the unit (attracted by the magnets) and damage the system, if you start it.
- Don't forget to tighten the screws after the adjustment!!
- Please check these screws for tightness even if you did not adjust the sensor position initially.



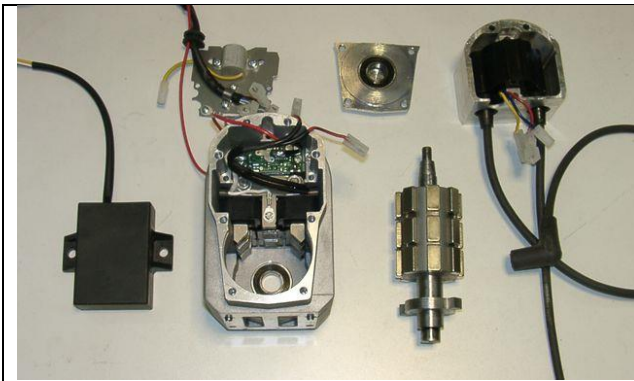


- Whenever you have opened the ignition coil housing, you must be careful to ensure that all wires there are well secured and can not accidentally become entangled in the rotor. Use a cable tie to fasten them well up.

**Attention:**

- **Never start a new unit without checking the position of these wires!**

- Before starting fit a new plug and open the gap to 0.6mm/25thou.

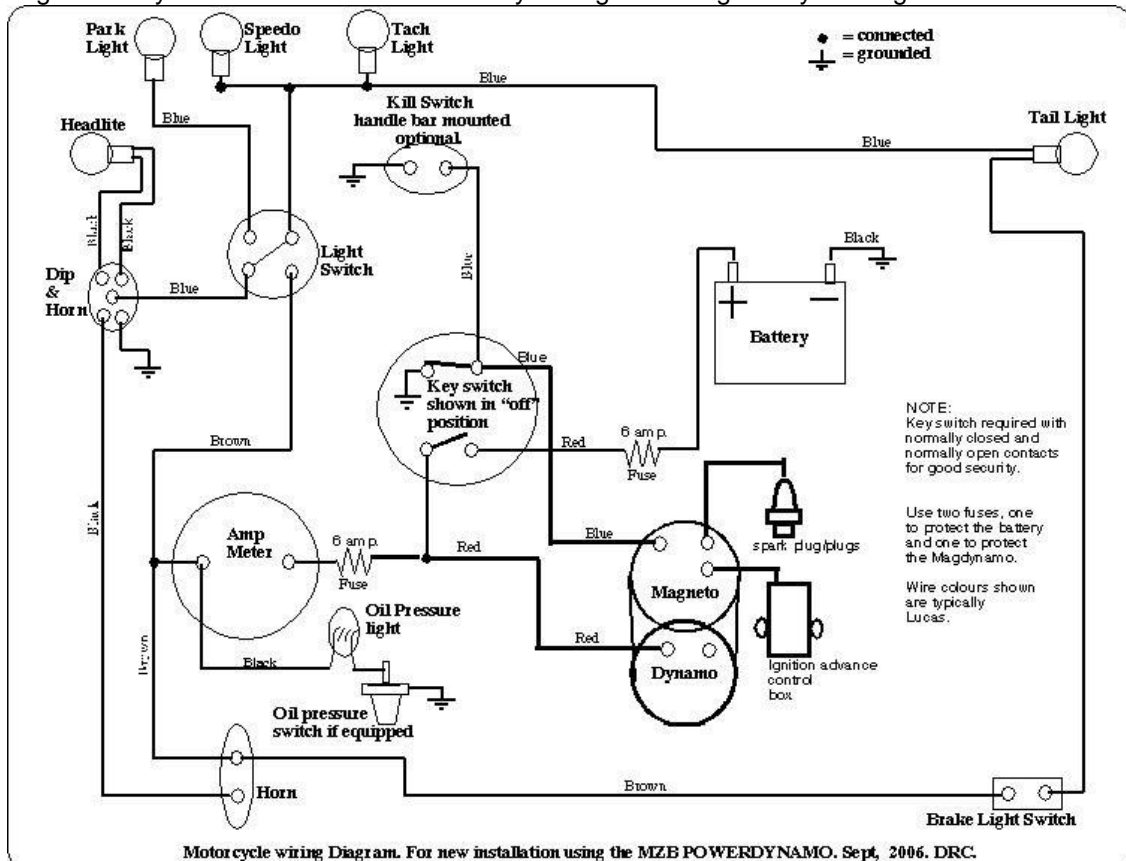


- There is no reason to open the unit (except the cover for adjusting the sensor and checking screws and cables)!! There are no other serviceable components inside. Unscrewing the rotor mounting plate could lead to severe damage and will void the warranty.

If you suspect a defect in the system, you must return it to Powerdynamo for inspection and (if needed) repair.

If you must know how it looks inside - here is a photo!

- **Wiring** will depend very much on what motorcycle you are using the magdyno for. There are however a few generally valid points. Below a general wiring diagram of a typical (British) vintage motorcycle with the new unit. You may enlarge this diagram by clicking onto it.



- Ignition wiring is done by connecting the advance unit to the magdyno via the plugs installed there as well as screwing in the high tension cables.
- Lighting voltage is output via the long red wire coming out of the unit. This carries 12V plus. Minus is internally connected to the units housing which hence requires solid electric ground connection. This wire should be fed into the existing electric system via a 6A fuse.
- If a battery is used in the system a switch should be provided to disconnect it to prevent any possible drain via the units diodes, during long periods without use.

- During operation the unit will warm up noticeably, especially at the front and the bottom. This temperature may (with motorcycle not moving) climb up to 85°C (you should be careful when touching the hot unit). This heat will not damage the electronics and is actually not produced by the electronics or near them. The heat comes from the aluminium. Similar to a microwave oven, the strong magnetic field causes the alloy particles to rub against each other, heating themselves up.

- This is normal behaviour of the unit, there is no need to worry.

- You will not be able to turn the shaft by hand. You must place a sprocket on the shaft (or use the allen key in the front opening). When turning the shaft you will notice the resistance of the magnets. That too is normal. Energy does not come from nothing. The high output of the unit requires a strong magnetic field created by very powerful high technology ceramic magnets.

- Having mentioned the internal resistance, there is no need for worry that your engine cannot pull it, or will suffer a loss of power. Quite the contrary, you should notice improved engine performance.

- You may ease starting by switching the lights on only after the engine is running on its own. The lights consume a lot of energy and bring more load to bear on the magnets. That is a suggestion only, if needed. The engine will start with lights switched on before starting as well.



- You may check timing with a stroboscope. For this the engine has to be running however.

- Precise ways of doing that vary from motorcycle to motorcycle.

- You cannot check timing with a simple timing light bulb as used in points based applications.

#### **Important safety and operating information**

- Safety first! Please observe the general health and safety regulations motor vehicle repair (MVR) as well as the safety information and obligations indicated by the manufacturer of your motorcycle.

- Ignition systems generate high tension! With our material right up to 40.000 Volts! This may, if handled carelessly, not only be painful, but outrightly dangerous. Please do keep a safe distance to the electrode of your spark plug and open high tension cables. Should you need to test spark firing, hold the spark plug socket securely with some well insulating material and push it firmly to solid ground of the engine block to earth the output.

- After installation, please check tightness of all screws, even those preinstalled. If parts get loose during run, there will be inevitably damage to the material. We pre-assemble screws only loosely.

- Give the newly installed system a chance to work, before you start to check and test values, or what is worse is to apply changes to customize the firing point before running the system. Our parts have been checked before delivery to you. You will not be able to check much anyway. At any rate do refrain from measuring the electronic components (such as ignition coil, regulator and advance unit). You risk severe damage to the inner electronics there. You will not get any tangible results from the operation anyway. Bear in mind that also your carburettor and your spark plugs and spark plug sockets might be the reason for malfunction. The general experience with our systems is that the carburettor will have to be re-adjusted to lower settings. Should the system not start after assembly, first disconnect the blue cut-off wire directly at the ignition coil (or in some cases advance unit) to eliminate any mistake in the cut-off circuitry. Check ground connections carefully and, to be on the safe side and for testing, put an additional ground wire from the regulator directly to the engine block.

- The spark of classical, points based ignition systems has with about 10,000 Volts with little energy and looks therefore yellow and fat (hence it's visible). The spark from our system is a high energy spark with up to 40,000 Volts and therefore very sharp (needle thin focused) in form and blue in colour, which makes it not so well visible. Furthermore you get spark only at kickstart operated speeds and not by pushing the kicklever down slow with your hand (as you might get on classic systems).

- Systems using a twin outlet ignition coils have a few peculiarities. Please observe that during tests on one side, the other has either to be connected to an fitted spark plug or securely earthed. Otherwise there will be no spark on either side.

- Never do electric arc welding on the bike without completely disconnecting all parts containing semiconductors (ignition coil, regulator, advance). Never use copper putty on spark plugs.

- Electronics are very sensitive to wrong polarity. After work on the system, do check correct polarity of the battery and the regulator. Wrong polarity creates short circuits and will destroy the regulator, the ignition coil and the advance unit. As a rule, wiring will always be colour to colour. Instances, where colour differs between wires are expressly mentioned in our instructions.

- Do not use spark plug sockets with a resistance of more than 5kOhm. Better use 1 or 2kOhm ones. Bear in mind that spark plug sockets do age and thereby increase their internal resistance. Should an engine start up only when cold, a defectice spark plug socket and/or spark plug is very probably the cause. In case of problems check high tension cables too. Never use carbon fibre HT-cables.

- Should the motorcycle not be in use for some longer period, please disconnect the battery (so existing) to prevent current bleeding through the diodes of the regulator. Though, even a disconnected battery will empty itself after a while.

- Please do observe these remarks, but at the same time, don't be afraid of the installation process. Remember, before you, that thousands of other customers have successfully installed the system.  
***Enjoy driving your bike with its new electric heart!***