

System 73 60 799 00
=> €/\$

generator/ignition
for [Velorex 3 wheeler \(350ccm\)](#) 



Magnet based generator with integrated ignition. Output at 12V/150W DC. Solid state ignition. Replaces old dynamo, points, ignition coils.

From old parts only the [3 holder clamps](#) and the [cover](#) with its clamp are needed.

NOTE: This is a **negative earth** system! You will have to reverse polarity.

Please note: This system does NOT replace the dynastart function (and as a result does not facilitate reverse running).

It has however a special facility to ease starting by making the ignition both magneto and battery based. Will produce strong spark already in very low revs which should definitely be reached by using the handstart facility of the Velorex.

advantage over original system:

- the system is available (Velorex system is not)
- all parts are new
- more light output
- very stable ignition with solid spark
- good starting, better fuel burning
- no wear anymore on points

documentation:

- [assembly instructions](#)
- [wiring diagram](#)
- [parts in the pack \(photo\)](#)

photos:

- [the system in an engine](#)
- [the new stator on an engine](#)
- [look at the new stator unit](#)
- [stator and rotor](#)
- [fastening of external parts on frame \(suggestion\)](#)
- [old and new housing](#)
- [the new rotor puller in action](#)

If you can install and time a stock ignition and possess basic mechanical skills, you can install a VAPE system!

If you never have worked on your ignition, better have it done by someone who knows.

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.

Please read these instructions fully and carefully before starting work on your motorcycle

Please bear in mind that [any modification of the material as well as own repair attempts which have not been agreed with VAPE may result in a loss of warranty. Do not cut off wires. This leads to a loss of reverse polarity protection and often results in damage to electronics.](#) Also, please take note of the information provided on the information page for this system. Check that what you have bought really corresponds to the motorcycle you have. Wrong ignition settings may damage your engine and even hurt you during kickstart (violent kickbacks). Be careful during the first test runs. If needed change settings to safer values (less advance). During assembly check carefully that the [rotor \(flywheel\) does not touch the stator coils or anything else](#), which may happen due to various circumstances and lead to severe damage.



IMPORTANT:

Designated use

This system is designated to replace stock dynamo/alternator & ignition systems in vintage and classic motorcycles [whose engine characteristics have not been modified aftermarket](#). This system is not a tuning system and it will not bring significant increases in engine output. It does however significantly enhance roadworthiness and comfort by offering better lighting, better function of side indicators and horn and, compared with the aging stock systems, increased reliability. As our system does not tamper with engine characteristics it does not increase emission of gaseous pollutants and noise. In most cases emission of pollutants should even be reduced due to better combustion. If used as designated the system therefore will not normally infringe the existing legal status of the motorcycle (this statement is valid for Germany, for other countries, please check locally against your road licensing regulations). This system is not suitable for use in competition events. If used other than the designated way, warranty will be voided and it might well be that you do not

obtain the desired results or, worst you loose legal roadworthiness.

The charging system is only suitable for use with rechargeable 12V (6V systems 6V) lead-acid batteries 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.](#)

This is a [replacement system and not a copy of the stock material](#). The parts in this system therefore look different and might fit differently (notably ignition coil and regulator) requiring some adaptation by you.

During assembly imperatively start with assy of engine based parts to see that those really fit before you start fitting the external parts. In many cases customers assemble those first and thereby often [modify them in breach of warranty](#) which renders them unfit for renewed sale. [Replacing old ignition systems is not a matter of taking something from a supermarket shelf as there have been very many types, versions and possibly unknown aftermarket modifications which harbour plenty of room for error.](#)

Our systems are [NOT tested for use with third party electronic devices \(such as GPS, mobile phones, LED lighting etc\)and may cause damage to such parts.](#) Possibly existing [electronic tachometers](#) will not work with the new system. Read our [information for suitable solutions](#). Possibly existing safety switches and electronic valve controls are not supported. It might be that your motorcycle was originally equipped with an ignition that did limit top speed for legal reasons. The new system does not have such a facility, so check your legal situation beforehand.

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, possibly even lead to bodily harm.

Before you order a system, please check whether a [puller tool](#) for the new rotor is included in the kit. If not, better order it at the same time. You might want to order light [bulbs](#), [fuse](#), horn, [flasher unit](#) etc.

Never use anything other than the recommended puller tool to pull the new rotor again. Damage to the rotor as a result of use of other tools or methods is not covered by warranty.

The rotor is sensible to blows (including during transport). Before assembly, please always check for damage (on rotor without

	<p>magnet plastification try to push the magnets aside with your fingers). After impact the glued in magnets might have broken loose, sticking to the rotor solely by magnetic force, so that one does not notice right away. During engine run the damage would be considerable. Before placing the rotor onto the engine, please make sure that its magnets have not collected any metal objects such as small screws, nuts and washers. That equally would lead to severe damage.</p>
	<p>If you have access to the Internet, best view those instructions online. You get larger and better pictures by clicking onto them and possibly updated information. System list at http://www.powerdynamo.biz</p>



You should have received those parts:

- preassembled stator unit
- regulator/rectifier
- twin ignition coil and HT-cables
- voltage converter
- relay with wires
- puller for new rotor
- rotorscrew M8x1x30 and washer
- divers small material



To disengage your new rotor again, please use the puller M27x1.25 (part-no.: 99 99 799 00) provided.

Note: Never use a claw puller, a hammer or any other device, that will shake the magnets off.



Disconnect your battery to avoid shortcircuits.

Right now make sure that when you reconnect the battery you must connect **MINUS to ground (no longer plus, as before)!**

Disconnect all wiring to the stock dynastart unit and remove the unit from the engine.

Take out all now unnessecary wiring ...

From the old system you will need only the 3 [holder cramps](#) and the [cover](#) together with its fastening clamp.



Have a look at the new stator unit. It has at the bottom some groove going all around the unit.

This is to take the holder clamps similar to how the stock unit did. The groove is going fully around to ease timing (you may turn the unit 360 degrees and hence have full flexibility over timing without removing the rotor).



Look again at the unit. You find a little left of the wire exit a small red marking. This is an ignition marking.



Have a look at the new rotor. You will find on its circumference a small pressed in line. That is an ignition marking. It is durable, but not well visible, so better highlighten it with some marker pen.

Check the inside of the rotor for foreign objects (screws or other metal parts) that could damage the rotor and stator during the operation.

At the moment of ignition both markings align.



Place the stator unit onto the engine and fix it with the 3 stock clamps.



You may place the unit in whatever position you like, surely preferably in such a way that the wire shows into a good direction.



Place the rotor onto the shaft.

Check carefully that it runs freely above the plates (if the shaft has been extensively repaired, the rotor might be too low).

Before you screw the rotor down to the shaft, you will have to set ignition:

Take the spark plugs out and **bring one of the 2 pistons (no matter which one) into ignition position.** The Velorex manual lists this as 3.5mm BTDC.



As this is difficult to do with the manual starter lever, place the new rotor onto the crankshaft (do not screw it down) and use it as a handle to turn the crank.

Once the correct crank position has been found, take the rotor carefully off again and re-set it in such a way, that the 2 ignition marking align as shown here.

(Picture is for demonstration only, does not show Velorex system!)



In that position, screw the rotor down with the provided screw M8x1 (place the washer there).

To disengage your new rotor again, please use the puller M27x1.25 (part-no.: 99 99 799 00) provided.

Note: Never use a claw puller, a hammer or any other device, that will shake the magnets off.



Remains to place the stock cover over the new unit and fasten it with the stock holder clamp.

The whole system is now a little lower than originally, but the cover should fit as before. It sits on the recess indicated by the blue arrows, clamp grips at the pins highlighted here red.



Remains to fit the external parts:

External parts (those outside engine block) should now be fitted in a convenient way. Thankfully enough the Velorex offers good space.



Again, remember to convert to negative earth! Failure to do so will result in immediate and assured death of the new regulator and the converter!

This system is quite different to most of our other systems. Reason for this is that we make a twin using an internal trigger system, which normally might have to little energy for the twin. We have however found a solution. The system is both, battery and magneto ignition at the same time. As a result there is full spark from first revolutions onwards. Power consumption is less than 15 Watts, in middle revs much less as there the magneto does most of the job. All in all more energy is delivered than consumed, so even with a [45 Watt headlight bulb](#) good charging of the battery is always provided.

Depending on kickstart transmission (differs from type to type) and on speed of kick, it might well be that the system works even without battery. This would have to be tested however in every single case.

*		<p>The ignition energy is amplified by adding battery power converted into some 340 Volts.</p> <p>That's why the coil has quite a lot of wires.</p>
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Connect the parts as shown in [wiring diagram 72ir-bat](#):

* **Parts of the magneto ignition**

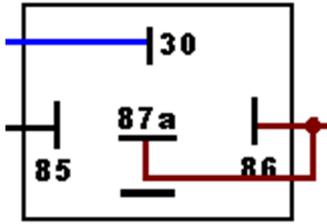
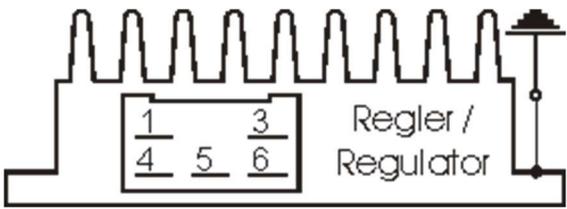
To facilitate wire exit through the often small openings in the engine casing, the plastic plug of the generator's wiring that leads to the ignition coil have not been put onto the wire terminal. You should place the plug there only once all has been properly installed on the engine side.

	<p>Look for the ignition coil with its female plug and the two wires (red and white).</p> <p>Put the provided 2-position plug housing onto this plug and insert the two wires (red and white) from the generator. Make sure that the terminals engage securely in the housing and that you connect:</p> <ul style="list-style-type: none"> • white to white • red to red
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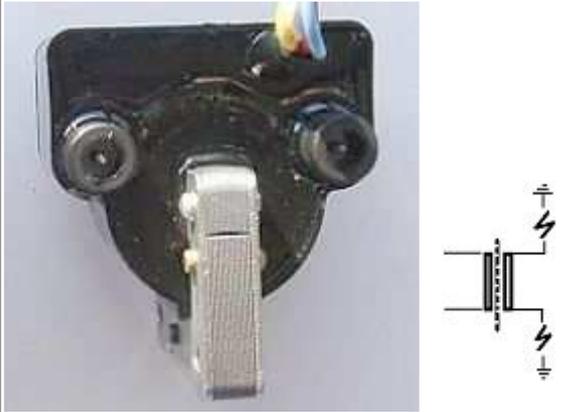
Should you need (or want) to get the terminals out of the plug housing again, enter a paper clip from front next to the terminals and push the little barb aside. Than pull the wire out.

The brown wire from the new generator with the round eye terminal have to be screwed to the holder frame of the ignition coil (ground). This connection is very important. Please don't depend on the frame as *the* earth-connection. Varnish, oil and dirt prevent often a good contact!

<p>Remains the blue (sometimes blue/white) wire at the ignition coil. This is the kill (cut-off) wire.</p> <p>* Connected to ground - it will stop ignition!</p> <p style="text-align: center;"><u>Note:</u></p> <p>Should you experience ignition failures, disconnect as a first measure this blue wire. In many cases that will permit you to get</p>	<p><u>Switch off via separate kill switch (when driving without battery):</u> The relay will not be fitted. The blue(/white) cable of the ignition coil will be connected to a kill switch, closing against ground (a button at the handlebars). Or you mount an ignition lock that has a facility to connect against ground when in OFF position.</p> <p><u>Battery method:</u> Connect the brown relay wire to good</p>
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<p>mobile again (particulars see: technical help!)!</p>	<p>ground. Lead the longer black wire from the relay to the wire that did run previously to a pin carrying voltage when the switch is on (in German bikes: pin 15) and connect it there.</p> <p>Connect the blue wire from pin 30 of the relay to the blue(/white) wire at the new ignition coil.</p> <p>should your battery fail on the road, just disconnect that blue wire and your bike will run again (it will now only not stop by switching off).</p>
<p>Relay wiring (if used):</p> 	<p>The brown wire with the ring terminal from pins 87a und 86 goes to ground.</p> <p>The black wire from pin 85 goes to a main switch terminal carrying voltage if switched on.</p>
<p>* Parts of lighting voltage generation</p>	
	<p>The new regulator/rectifier has a compact plug with 6 positions, of which <i>one</i> is not used. A female plug cover fitting to this plug is delivered. Into this female plug you have to insert the following wires (which have terminals that snap into the plug):</p>
<p>The two black cables leading from the generator ...</p>	<p>... connect to pins 1/4 of the new regulator (from there equally black wires lead inside the unit). It does not matter which wire connects to which of the both terminals (1/4) as they carry alternating current.</p>
<p>The new brown cable with the round eye terminal ...</p>	<p>... connects pin 3 of the regulator unit (from there equally a brown wire goes inside the unit) with the negative pole of the battery or (in case you drive without battery) to ground (chassis).</p>
<p>The new red cable with the round eye terminal ...</p> <p>Take care: Wrong polarity will damage the electronics!</p>	<p>... connects to pin 5 of the new regulator (from there equally a red wire goes inside the unit). Here your regulated positive voltage comes out to connect to battery plus, or (in case you drive without battery) to the voltage input terminal of the main switch (ignition lock, German bikes: pin 51/30).</p>
<p>Make sure that you have a 8A-fuse between battery and vehicle circuitry.</p>	

<p>The green/red wire at pin 6 of the new regulator ...</p> <p>Remark: Until November 2007 this wire has been a single wire outside the compact plug.</p>	<p>... is for the charge control light. You connect there the wire that formerly did run from the control light to the original regulator.</p> <p>Sure that this control only functions with a battery present. Should you drive without battery but still connect the wire, you will see that the light glows even as the generator generates voltage. So without battery, do not connect it.</p>
<p>The charge light control function is based on a transistor switch and is an additional function. Even if that should fail, the regulator might still be in ok working condition. Simple check: have the engine running, turn lights on, disconnect the battery. If you have bright lights the unit is ok.</p>	
<p>* <u>Parts of battery support for ignition</u></p>	
	<p>The converter transforms battery voltage (be that 6 or 12 Volts is of no relevance) into some 340 Volts to amplify the charge of the ignition condenser (which is inside the ignition coil).</p> <p>Depending on primary voltage (6 or 12 Volts), revs and therefore number of sparks, the unit consumes between 10 and 15 Watts.</p> 
<p>The red wire of the converter ...</p>	<p>... is the wire to input battery voltage Plus. It has to be connected to a terminal of the main switch (ignition lock) that carries voltage when the switch is in ON position (German bikes: terminal 15).</p>
<p>The white wire of the converter ...</p>	<p>... connects to minus of the battery (ground).</p>
<p>The 4-position plug of the converter (with the cables red, white, blue/white and green/red) ...</p>	<p>... connected to the fitting counterpart at the ignition coil. Consider the altered cable colours:</p> <ul style="list-style-type: none"> • red to red/white • white to brown • other colours remain same

<p>The 4-position plug of the converter (with the 3 cables white, blue/white and green/red) ...</p>	<p>... leaves disconnected.</p>
<p>* High tension cables</p>	
<p>Screw the high tension (ignition) cables ...</p> <p>Please do not use any spark amplifying cables, such as "Nology supercables" or "hot wire". This will disturb the system and possibly damage it.</p>	<p>... into the ignition coil and pull over the rubber seals before mounting the coil (it will be easier).</p> <p>Please do use the cable arriving with the pack and not any old cable.</p>
<p>You will do yourself a favour to treat your bike to new spark plugs and spark plug sockets (preferably some between 0-2kOhm). Plenty of problems are to be traced back to "apparently good" (even completely "brand-new") sparks plugs, terminals and cables.</p> <p>Do not use spark plugs with an intern suppression resistor. NGK (e.g.) offered such spark plugs coded with an "R" (for resistor).</p>	
	<p>In our twin outlet coils both ends of the secondary go to the spark plugs.</p> <p>Typical resistance between both exits is 6.2kOhm. Both exists fire at the same time (as many twin systems do). Sparks will be polarised however at a 180 degrees difference which might manifest when you strobe it.</p>
<p>Ignition will only work correctly if both plug terminals are connected. You may not test one side with the other open (not sitting on the mounted spark plug). This is because (effectively) each exit uses ground from the other. That means also that both plugs are working in serial, adding resistances, so better use low resistance spark plug (resistor) sockets and make sure they are good. If in doubt, measure resistance on a hot socket (warm it up before measuring).</p> <p>Is the flow from ground of one side via spark plug there, via coil, to the other spark plug and its ground interrupted you get no spark - on neither side. If you really want to test only one side, put the HT wire of the other to ground (earth it) than it will work. Sometimes a coil deprived of its ground from the other side searches for a substitute - with some solid fireworks around it to the chassis.</p>	
<p>* Finally - and before installing the battery and before the first kickstart - please re-check carefully all connections and fitments against the wiring diagram. Do check battery and light bulbs for correct voltage (12V).</p>	<p>Should something not work, please consult our trouble-shooting guide on our homepage. As a first step disconnect the blue wire from the coil and re-test.</p>
<p>* IMPORTANT: During crank shaft repair the dynamo shaft is often machined and gets shorter. The result is a rotor sitting lower, possibly touching now with its rivets the stator coil. The result is a</p>	

destroyed stator and ignition failure.
 For [more detail and how to check see \(online\) here.](#)

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.

The timing marks on the material are for general guidance only during first installation. Please check after assembly by suitable means (stroboscope) that settings are correct to prevent damage to the engine or possibly even your health. You alone are responsible for the installation and the correctness of settings.

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. Never pull sparkplug caps when engine is running. Wash your vehicle only with engine at standstill and ignition off.

Should you have received in the kit HT cables with a fixed rubber boot(which does not contain a resistor) you might have to use spark plugs with an inbuilt resistor (or replace the cap with one containing a resistor) to comply with your local laws.

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 apply changes to it. 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 carburetor, your spark plugs and spark plug sockets (even if completely new) might be the reason for malfunction. The general experience with our systems is that the carburetor will have to be re-adjusted to lower settings. Should the system not start after assembly, first disconnect the blue (or blue/white) cut-off wire directly at the ignition coil (or in some cases advance unit) to eliminate any malfunction in the cut-off circuitry. Check ground connections carefully, make sure there is a good electrical connection between frame and engine block. In case of troubles, please consult our [Knowledge Base](#) first before you send off the material to us for checking

The spark of classic, points based ignition systems has with about 10,000 Volts comparatively little energy and looks therefore yellow and fat (which however makes it highly visible). The spark from our system is a high energy spark with up to 40,000 Volts and therefore is needle thin focused in form, and blue in colour, which makes it

	not so visible. Furthermore you get spark only at kick-start operated speeds and not by pushing the kick-lever down slowly with your hand (as you might get with battery based ignitions).
#	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/grounded. Otherwise there will be no spark on either side. Also with such open exits long and dangerous sparks may fly all over the coil.
#	Never do electric arc welding on the bike without completely disconnecting all parts containing semiconductors (ignition coil, regulator, advance) stator and rotor need not be taken off. The same is true for soldering. Before touching electronics disconnect the soldering iron from mains! 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 jumps between wires are expressly mentioned in our instructions.
#	When you handle the new rotor, take care not to damage its magnets. Refrain from direct blows to the circumference of the rotor. When transporting never put the rotor over the stator. Observe our information relative to transport of the material.
#	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 defective 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, never use so called "hot wires" which promise to increase spark.
#	It is a good idea to cover the rotor in a thin layer of oil to reduce the risk of corrosion.
#	Never use a claw puller or a hammer to disengage the rotor. Its magnets might become loose in the event. We offer a special puller for disengaging the new rotor again (see assembly instruction)!
#	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, that before you, thousands of other customers have successfully installed the system. <i>Enjoy driving your bike with its new electric heart!</i>

Schaltplan 72ir-bat (wiring diagram)

