PLEASE READ THIS BEFORE YOU START.

The electronic ignition you've purchased can provide years of great service, but requires proper installation and recommended connections.

If the install process as stated in the manual is not followed, It is very possible to damage the CDI Electronic Control Unit, this could void the product warranty, and not handling any manufacturing defect.

It is extremely important to properly connect KILL BUTTON to the Black Wire.

IN NO EVENT THIS MUST NOT GO TO WHITE WIRE.

Should connect as recommended by the manual: the black cable to the exchange which, in turn, receives power from the coil to that connected points in the stator (usually the black wire into the Motoplat Ignition).

On the last page of the manual is a typical connection diagram.

For any questions please contact us through www.rmlightning.com where we will gladly reply to any questions.

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From here begins the installation manual.

Trying to make it as simple as possible we have made an introduction to issues of common interest to our entire range of products, and separate the installation process into two major sections: the Motoplat Ignition 6-pole and 4-pole flyer.

The first were used on motorcycles with magnets and coils 4 or 5 ignition platinum, such as models Montesa Impala, Comando, Texas or Scorpion, Cota 247, 348, 349 and later, and some late Bultaco Alpina, among others.

4-pole flyers are a wider casuistry, since they include not only the 2 coils magnetos from Motoplat used in some early models of Montesa Impala, Comando, Texas or Scorpion, and some Ossa 160 and 175, but also Femsa 2 coils magnetos as those used in almost the entire range of motorcycles Bultaco with points ignition, such as Metralla, Frontera and Sherpa, among others.

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Thank you for purchasing our RMLightning - CDI Digital

Welcome to RM Lightning. We hope our ignition meets your expectations and provides you with years of good service. To this end we offer this manual, which we try to clarify some key ideas for proper installation and proper use..

1. What is it?

It is a digital capacitor discharge ignition (CDI technology in today's jargon), with pick up magnetic and variable ignition advance, designed to cover a wide range of requirements. Among others, it is valid for classic motorcycles equipped magneto Motoplat 6-pole and 4 or 5 coils, magneto Motoplat 4-pole and 2 coils or magnetos Femsa 4 poles and 2 coils.
Thus, with this product we cover virtually all production of Montesa, Bultaco and Ossa, as well as some foreign motorcycles that used equipment Motoplat or Femsa.

2. What advantage provides the CDI technology?

The CDI-Digital generates a spark ignition 50mjoules regulated power from 500RPM to 8.000RPM, feeding from the original winding low voltage magneto.
The energy of the spark comes from a 1uF capacitor previously charged to 320V by a voltage booster in high frequency.
For reference, the original set will never exceed 20mjoules, and less at low revolutions.
Furthermore, energy is delivered in a shorter time, about 50 microseconds, which causes cleaning effect of the electrodes, and better ignition..

3. Will it increase the power of my bike?

Usually a CDI spark greatly improves the maximum power of 2-stroke engine.
It also improves combustion and reduces consumption.

4. How does the magnetic pick-up work?

Depending on the model this can work with one or two encoders magnets they are fixed inside the flywheel.
A "Hall sensor" receives the magnetic field of opposite polarity of the two magnets to pass in front of the sensor and generates a signal for opening and closing.
The Hall transistor is sealed into a mechanically compatible cabinet with the points accommodation, or in a plastic holder that is fixed in the condenser housing. The original condenser of the vehicle is simply eliminated..

5. Why not dispense with the pick-up like other manufacturers?

Electronic ignitions without a pick-up lost half of the generated sparks. This limits the power obtainable for the useful spark.
In the case of a 6-pole magnet flywheels, generate two stray sparks phase exhaust and compression, which can cause explosions , with risk of damaging the engine.
For ignitions with 4-pole magneto a waste spark is generated which can even lead to reversal of the direction of rotation of the motor, with the motorcycle running.

6. How does your CDI provide variable ignition timing?

Our Digital CDI works with reverse criteria than the distributors with centrifugal advance. Instead of advancing the ignition timing at high speed, starting from a small static advance, it will retard at low speeds based on a maximum nominal advance, never exceeded.

7. Can I program different advance curves?

Yes, all our Digital CDI ignitions incorporate a double curve that can be switched (even while the engine is running) by the rider, and we also have available a programmable version, incorporating an interface through which you can define custom curves at intervals of 100 rpm.
If you want a fully programmable unit, visit the RMLightning website (www.rmlightning.com or www.avancevariable.com) for information about our latest models.

8. What advantages can be perceived with a variable timing?

Recoilless start, stable idling and smooth running at low speed, without compromising a brilliant performance at high rpm.

9. Is it easy to install?

To install the CDI Unit, a minimal experience is required in engine repair, since you'll need to disassembly and reassembly the magneto's flywheel.
If you are not familiar with this operations, please ask for your motorbike mechanic help.

10. What tools do I need?

In addition to a set of appropriate tools, you need a specific flywheel puller for the motorcycle in question, torque wrench and screwdrivers.

11. How to check and adjust the nominal advance timing?

In models 6-pole Motoplat ignitions the Hall pick-up incorporates a LED, provisionally powered by a 9V battery this indicates the jump point of the spark.
In 4 poles models we provide an external wiring that allows you to check the time jump spark with a 9-volt battery.
To adjust the timing you should proceed as with the original ignition: by turning the stator plate to the right or left, to advance or retard. Please, note that the effect of the direction of rotation has to do with the side in which the flywheel is installed.

Installation Manual

PROCEDURE FOR 6-POLES FLYWHEELS WITH MAGNETS DISC.

Motorcycles with magnetos Motoplat with 4 or 5 coils, and 6-pole flywheels, such as models Montesa Impala, Commando, Texas or Scorpion, Cotas 247, 348 and later, and some late Bultaco Alpina and Sherpa, among others.

1. Remove the starting lever and gear lever if necessary
2. Remove the flywheel cover.



3. If you do not have an impact wrench to loosen the nut of the flywheel, should be immobilizing to perform the operation with a socket wrench. For this there are several options, as the use of a dummy plug as a stop, or use a clamp around the flywheel.
4. Loosen the flywheel nut, turning it clockwise in the case of engines with a right sided ignition derived from the Montesa Impala.
5. Insert the extractor with fully unscrewed pusher. Screw down. Apply WD-40 or similar if necessary.
6. Screw the extractor plunger until the flywheel separates from the conic shaft. If the flywheel is not released, hitting slightly the pusher with a hammer can be of help. Heating the shaft is dangerous and not very useful, as both shaft and flywheel center are made of steel, with similar expansivity coefficients.
7. Clean the flywheel.
8. Place the magnets disc on the inside base of the flywheel as shown in picture 1 on the next page. Check the alignment between the rectangular notch on the disc and the flywheel keyway. Ensure that the disc sits well on the base plane of the wheel, without interfering with any cylindrical projections. Otherwise file flat where necessary.

Mark with a punch the centre of the countersunk holes on the bottom of the flywheel.



Image 1

9. Fixing is preferable made by M3 countersunk screws.

   Cover flywheel magnets with a cloth to prevent any swarf from sticking to them.
   Drill through-holes 2.5mm in the position marked using a drill suitable for stainless steel.
   Remove the cloth. Clean the flywheel turnings. A vacuum cleaner can be useful.
   Fully thread the 2.5 mm holes with a set of M3 taps.
   Screw the white disk encoder plate into position using the supplied M3 countersunk screws.

10. Alternate fixing method.

    If you cannot or don't want to drill the flywheel, you can secure the white disk encoder with epoxy adhesive for high temperature (150° as minimum).
    Note: Must meticulously clean and degrease the bonding surfaces.

11. Remove the points from the stator.
12. Remove the condenser from the stator.

    Cut or insulate the wire connecting the ignition coil with the points. The ignition coil is usually on the central of the five mounted.

    If the cable from the ignition coil is very hard or cracked, replace it, solder a new black wire, with section 1.5mm square, and 1 m. of length.

    Note: When using the soldering iron, pay attention to not overheat the coil.

    Install the pick-up on the stator plate, locating the pin on the back of the pickup where previously the condenser was located.

    Fix with M4 stainless steel screw supplied through the housing of the pickup.

    It is recommended to use Loctite thread lock, refer to image 2.

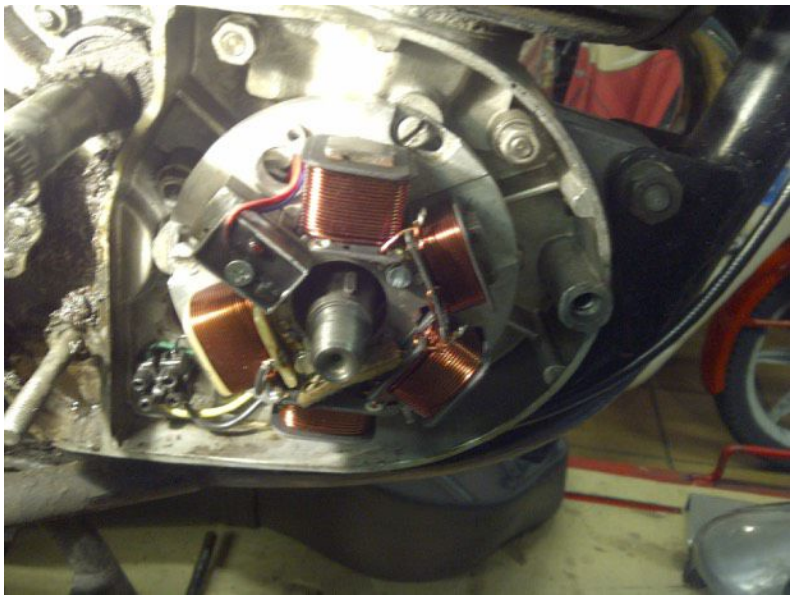


Image 2

15. Protect the 3 wires and then pass the pickup wires through the opening in the stator plate. They should not touch or rub the flywheel or crankshaft, as shown in image 3.

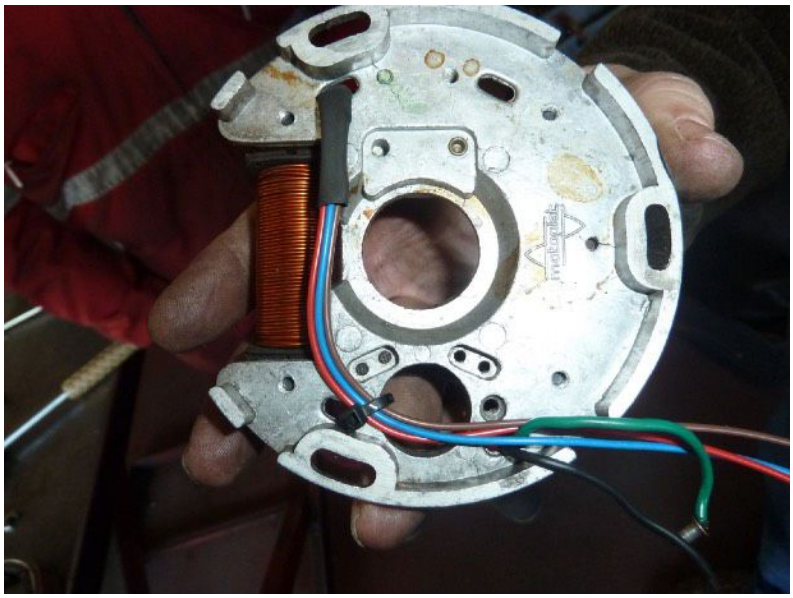


Image 3

16. Sheathe the three cables from the pick-up and the one from the ignition coil and pass them through the engine grommet. Guide and fix them to the space reserved for their connection, typically under the seat in the Impala or the high coil area in the Cotas.
17. Place the flywheel into position on the shaft then check that the distance between the outer surface of the white encoding disk magnets and top face of the pickup, it should be between 3mm to 5 mm making sure the disk does not rub against the pickup. As in image 4.

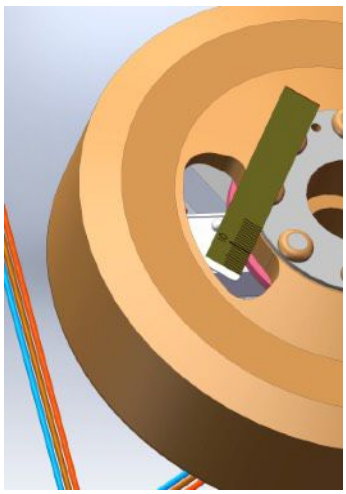


Image 4

18. Choose where to mount the electronic control unit. For the Montesa Impala the ideal place is inside the toolbox. Other areas could be under the tank with the aid of a metal brace. This is entirely up to the individual and the motorcycle model.
19. The CDI unit requires a good grounding. Connect the yellow/green wire from the CDI Unit to a clean earthing on the chassis, use the ring terminal provided, preferably by soldering or crimping the cable. It is recommended that the earthing of the control unit is the same fixing where the ignition coil is earthed.
20. The CDI unit can also be connected to earth by the mounting studs themselves, but in any case it is recommended to also connect the green-yellow cable.
21. Drill two 5mm holes to the surface of where it is to be fixed.
22. Fix the CDI unit using double washers on both sides of the bolts using the nuts and washers supplied.
23. Lay the cables to the intended place ready for the connectors. If the unit is mounted in the tool box drill holes for the wires.
24. Connect a 9v battery to the pickup wires as follows:
    - Battery positive connector to red wire from pickup
    - Battery negative connector to brown wire from pickup
29. Remove the spark plug.
30. Turn the flywheel making sure you turn it the correct way! (test by using the kick start), then slowly by hand, note that the LED goes out and then back on at every turn. Leave the flywheel in the exact position where the LED light gets on, always turning the flywheel the correct way, incorrect timing will be set if not.
31. Draw a line on the flywheel, then one on the casing, matching the 2 marks.

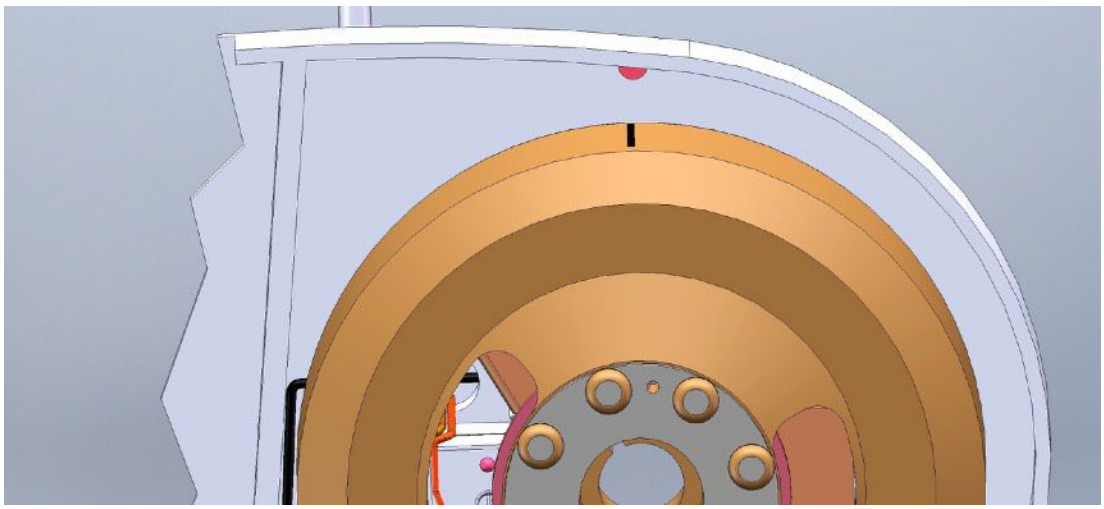


Image 8

32. Using a TDC tool, take the flywheel to TDC, turning right or left.

    This position is recognized in several ways:

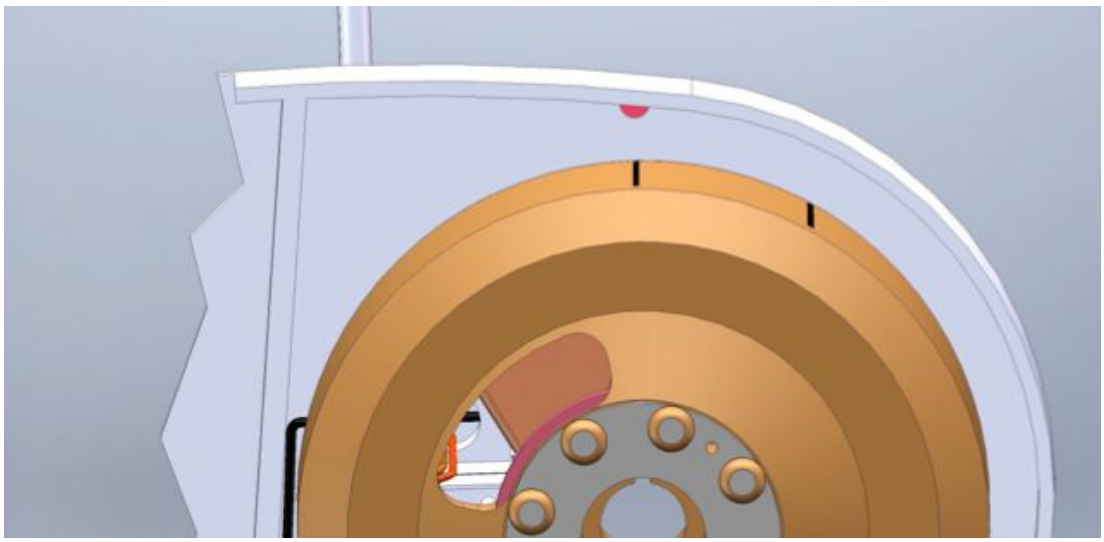
    - The keyway is in the highest position (Montesa engines only).
    - The piston is in the highest position, you can be noticed by inserting a screwdriver or a vernier calliper through the hole of the spark plug.

    Mark another line, aligned with the reference of the crankcase.

    Given the geometry of the flywheel, it may prove difficult to observe the moment when the LED lights up and turns off, especially in Cota or Scorpion with a single window inspection.

    The alternative method is to connect a tester 10v continuous scale between brown and blue wires from the pickup.

    When 0 is off and 9 is on. You should be able to test this on each half turn.



33. Measure the distance in millimetres between the two lines. For a wheel diameter of 137 mm (May vary slightly for other sizes), current progress in degrees is calculated as:

    Progress in degrees = distance in millimetres / 1.2

    Example: if the distance is 30 mm, the advance is 30 / 1.2 = 25°

34. If timing is not right for your motorcycle, remove the flywheel, loosen the three screws holding the stator and turn to advance or retard the timing. If you don't know which is the proper value for your motorcycle, set a 4.5 - 5mm before TDC, corresponding to 30 °.

    Note that this progress will only apply from the 3300RPM.

35. Once you have found the correct position, tighten the screws of the stator, and the flywheel (not forgetting to install the woodruff key) at the maximum torque recommended by the manufacturer.

    (Check the flywheel nut torque after a few kilometres)

36. Disconnect the battery then connect the pickup to the CDI unit, cut the wires to appropriate length. It is always wiser to leave them too long, not too short.

37. To make the final connections to the CDI unit you must make sure that you connect the correct wires from the pickup and stator coil.



Connections must be made as follows:

- Black cable connects the CDI control unit with black cable from the stator (the cable previously connected to the points and condenser). This cable will also connect to the stop button. NOTE: Never connect the stop button to the white wire, as you can damage the CDI unit.
- The red wire of the control cable with red from pickup.
- The blue wire of the unit with the blue pickup.
- The brown wire to the brown pickup.
- The white wire is connected to the HT coil.
- The green-yellow wire from the CDI unit must be earthed to the chassis firmly.
- The yellow wire switches between the two curves loaded by default: it will provide variable timing up to 26° before TDC with spark-cut at 8000 RPM and when grounded it will provide variable advance up to 23° with 7200 RPM spark-cut. Switches exist in the market, as 034.E00 Leonelli allowing switch from the handlebar between the two ignition curves.

38. Make sure the ignition coil is connected to the white wire. In the case of your motorcycle has a metal coil of the first series, with two terminals, the second terminal should be earthed. If the coil has a single terminal (modern red coils encapsulated in plastic) gets grounded by its fixing screws.
39. Connect the spark plug.
40. Once CDI unit installed, check for the presence of spark, toggling start before mounting the spark plug. If it is daylight, the better you will notice a white paper interspersing between the electrodes thereof.
41. If you have seen one or more sparks operating the Kickstarter, mount the crankcase cover, the levers and test the bike.
42. **NEVER VERIFY THE OPERATION circuiting OUTPUT (WHITE WIRE) to GROUND. Doing so will damage the CDI Unit.**
43. You may need to readjust the carburettor, as your new ignition improves the consumption, and your engine will probably require a leaner carburetion. Check your spark plug, and test as you would for the correct jetting. Lowering the needle 1 step can be a good starting point to do so.

PROCEDURE FOR 4-pole FLYWHEELS.

Montesa Impala models, Command, Texas or 2 Scorpion with 2 coils ignitions, Ossa 160 and 175, Bultacos Mercurio, Metralla and Sherpa, among others.

It is based on a pick-up Hall encapsulated mounted on a high temperature resistant plastic with integrated support polarizer magnet.
The holder is mounted in position to remove the condenser and is fixed by a screw.
Currently we have specific supports two magnetos coils brands Motoplat, Femsa and Bosch.
The system requires a magnet is fixed on the inner bottom of the flywheel, so that crossing in front of the Hall sensor, to a distance of approximately 3 mm. The magnet must be positioned so that the crossing occurs in one of these ways:

- Overall, 30 degrees before TDC.
- In Motoplat flywheels with 2 opposite windows, 60 ° before TDC. It is the case of Montesa Impala with two coils.
- In flyers Femsa for clockwise rotation, 48 ° before TDC.

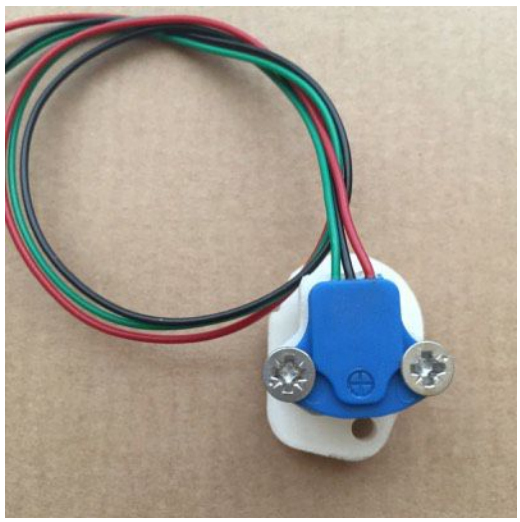
In these special cases, the CDI unit is factory programmed for these criteria, and so is indicated on the label. In fact, being a digital and fully programmable CDI, it is possible to fix the switchboard any progress required by the special geometry of a specific ignition, without modifying the curve variable advance implemented.

1. Remove the flywheel cover.
2. Loosen the flywheel nut. If you do not have an impact gun, it will be necessary immobilizing it to perform the operation with a socket wrench. For this there are several options, as the use of a dummy plug as a stop, or use a clamp around the flywheel.

   Note that certain manufacturers invest the normal direction of rotation of the nut, especially in engines with ignition on the right side of the motorcycle.
3. Insert the extractor with fully unscrewed pusher screw down. Apply WD-40 if necessary and screw the plunger until you feel resistance. Screw the extractor plunger until the flywheel separates from the conic shaft. If the flywheel is not released, hitting slightly the pusher with a hammer can be of help. Heating the shaft is dangerous and not very useful, as both shaft and flywheel center are made of steel, with similar expansivity coefficients
4. Once you've taken off the flywheel, extract the points and condenser, isolate its connection to avoid false contacts, and put the stator in the centre position of the keyways. This is set this way to get a wide adjustment range when searching for the setup that best meets our needs.

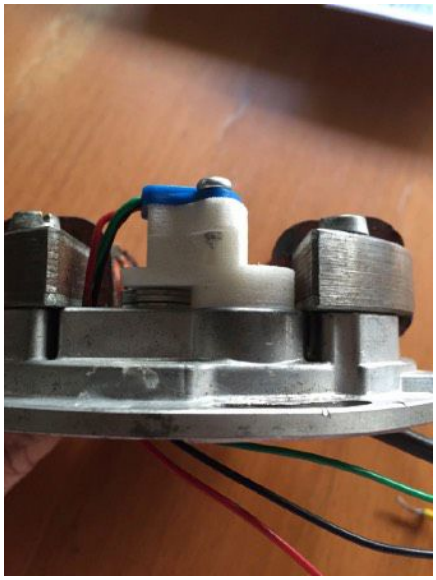
   It may be useful to mark with a pen or punch the position of the stator in the casing before removal, if at some later time you want to return to the points breaker.
5. Set the pick-up on the condenser housing.

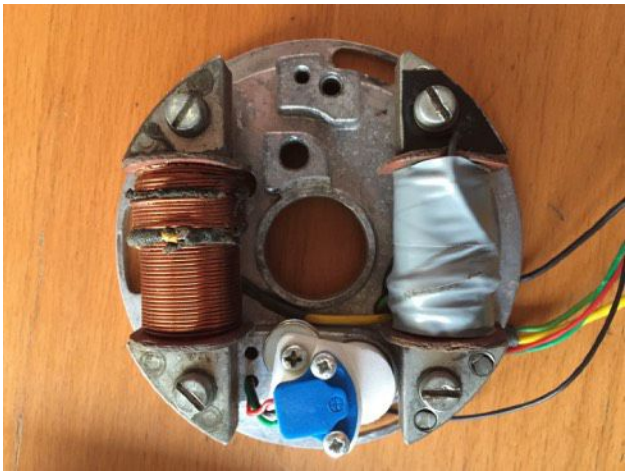




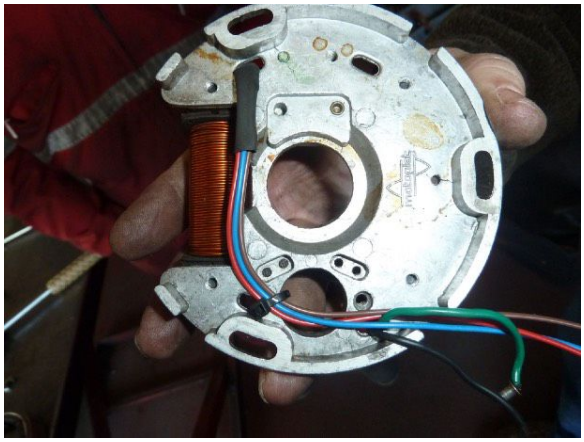
The FEMSA pickup is shown in the image on the left and the Motoplat is at right hand.

They should be screwed to the stator with an M4 screw, in the capacitor hole. In the following images we see a pickup placed on a Bultaco Mercurio FEMSA flywheel, provided with three spacers to obtain the optimal distance between the sensor and magnet:

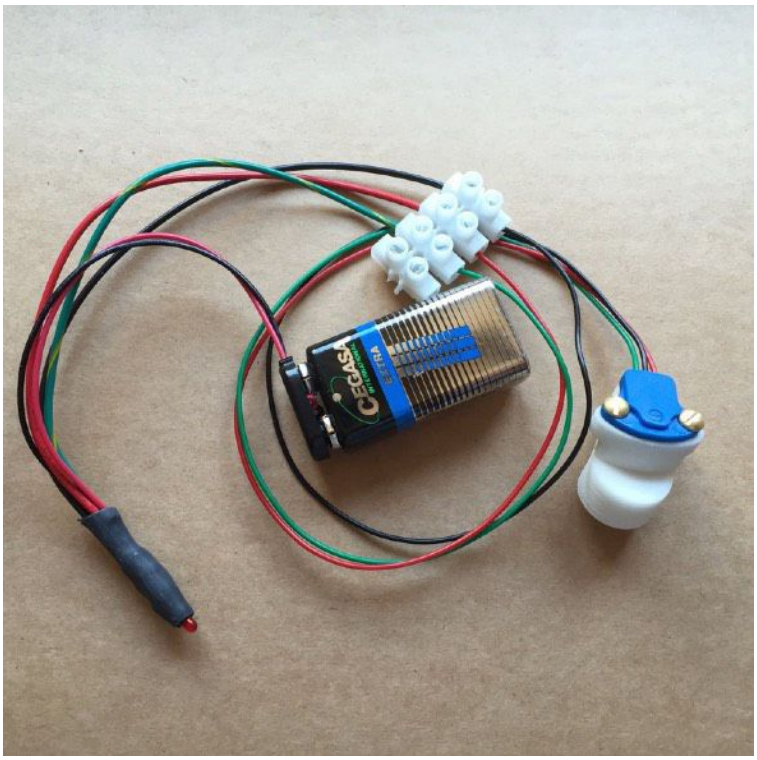




6. Pass the cables pick-up through a window of the bobbin. Immobilize the wires, making sure they do not rub against the flywheel shaft.



7. To check the operation of the sensor, we supply a small temporary wiring, that should be connected to a 9V battery. It will indicate the status of the pickup sensor by an LED. It should be set up as it is shown in the following picture:



8. Ahora conecte el sensor al cableado provisional, conectando cada cable del sensor al mismo color correspondiente: rojo a rojo, verde a verde-amarillo y negro con negro. Luego instale la batería de 9V en el clip correspondiente. Verifique que acercando el sensor al imán suministrado se consigue que el LED se encienda y al retirarlo se apague.

9. Initial determination of the correct position of the encoder magnet.

   The magnet encoder has a concave face and one flat, as seen in the picture below:

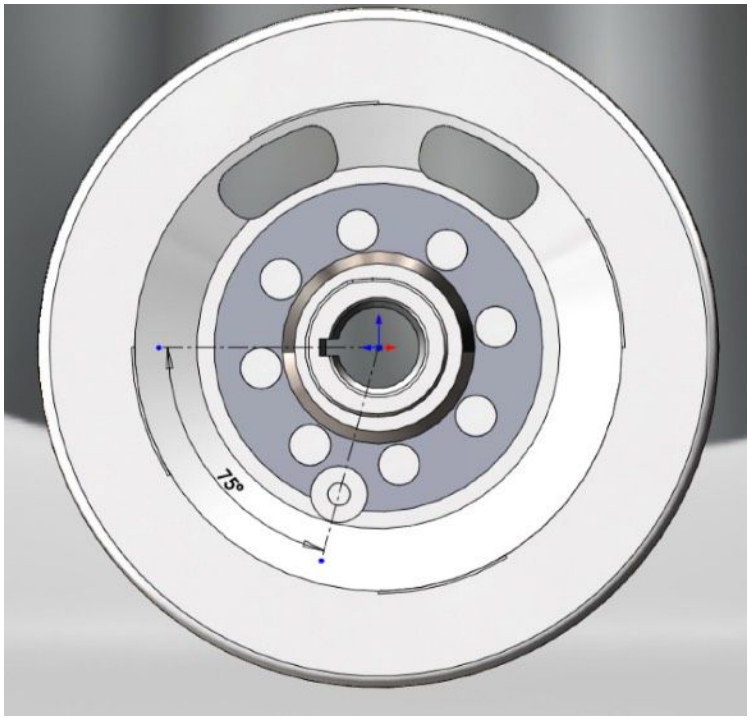


   And as shown in the picture, the correct position is "counter-intuitive" and must be screwed to flywheel with a screw on its flat face.

Since the magnet is responsible for providing information about the static BTC to the CDI, before drilling the flywheel to fix it is essential to check that it is at a suitable distance from the pickup and in the correct position, for which use the provisional wiring LED prepared.
To test before fixing, and depending on the construction of the flywheel, you can leave the magnet attached to the flywheel ferric metal or fix it with a double-sided tape face or a drop of a light glue if the flywheel is aluminium.
As we mentioned above, the position of the magnets depends on the geometry of each flywheel specifically, the most common cases being the following::

4 POLE FEMSA FLYWHEELS WITH LEFT HAND ROTATION:

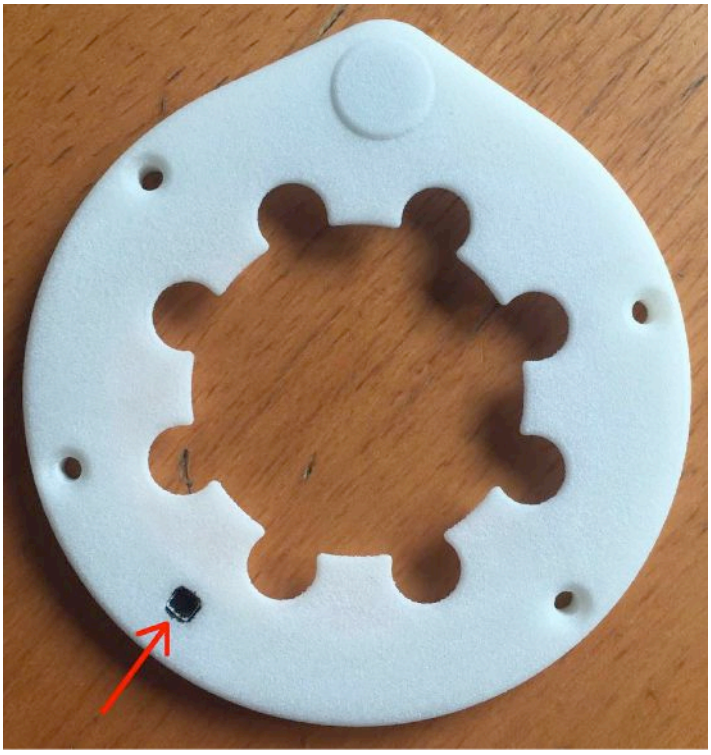
In 4-pole flywheels used on Bultaco motorcycles, we look for a maximum advance of 30 ° (5 mm before TDC). To get this done, the approximate position will be as shown at the following picture:



The magnet center should be about 32 mm. from the flywheel centre, and at 75 from the keyway, with the stator set at half of its adjustment sliders.

4 POLE MOTOPLAT FLYWHEELS WITH LEFT HAND ROTATION:

In 4-pole Motoplat flywheels such as those mounted on some Montesa and Ossa models, the adjustment is achieved by using a mounting disc that allows the magnet to be positioned in its correct position, which coincides with one of the inspection windows of the flywheel. For this, a disc is supplied whose square mark (marked with an arrow in the image below) must be aligned with the keyway, before fixing the disc.
Next, using the auxiliary wiring with the LED we will look for a 4 mm advance before TDC.



4 POLE MOTOPLAT FLYWHEELS WITH RIGHT HAND ROTATION:

In 4 pole Motoplat flywheels with right hand rotation, mounted on some Ossa models, the setting is more strange. The flywheel design forces us to set up the static advance to 60 degrees (18 mm before TDC), as shown in the image:



In this specific case of Ossa, the magnet position is located between the two rivets shown in the image, and touching both.
We recall again that in the three cases discussed, the position of the magnet within the flywheel has to do with the sensor within the stator. And remember: the static advance before TDC will be corrected by the CDI, managing a normal set fot values while the engine is running..

10. To check if the advance value is correct before drilling, it is good that we temporarily fix the magnet with a cyanoacrylate adhesive, double-sided tape, or by the magnetism itself. Remember that the South pole, which corresponds to the flat face of the supplied magnet, must face in front of the blue chip of the Hall sensor. Specifically, by its active zone, indicated by a raised circle.

11. To check the static advance before TDC value is necessary to verify that the tolerance between the pick-up and the magnet is correct. To do so, place the flywheel in position by tightening the nut without forcing, and verify that the distance between the pick-up and magnet is 2 to 3 mm. If necessary, add washers between the pickup and stator to get the correct distance. In certain Bultao models is common to use up to 4 washers and may require the use of a longer screw than the M4 originally used to fix the capacitor.

12. If we are sure that the tolerance is correct, we´ll the static advance before TDC with the supplied external wiring. Once the 9-volt battery is connected, the moment the LED lights up is the static advance. We can readjust it by turning the coil plate as usual. The normal thing for a steering wheel located on the left side of the motorcycle would be to the left to delay the moment of the jump of the spark, and to the right to overtake it. In engines with the ignition on the right, the opposite is done: turning to the left advances and to the right delays.

    Remeber that the general rule will be advance your ignition 5 mm before TDC unless the CDI is marked with 60 or 48 mm on its label.

13. Once we find the ideal position, secure the flywheel to the maximum torque recommended by the manufacturer, disconnect the led wiring and be saved in your box if then we needed to readjust the ignition timing.

14. Fixing the encoder magnet.

    Next, cover the flywheel magnets with a cloth, to prevent the swarf from adhering to them. Drill a 2.5mm through hole in the marked position using a good quality metal drill bit. Remove the cloth. Clean the flywheel well from filings and fully screw the drill with a set of M3 taps, entering through the outer face of the flywheel.
    Screw the magnet into position using the M3 stainless steel screw countersunk preferably using thread lock. This screw is made of stainless steel to avoid the magnetic interferences that normal iron screws would produce.
    Caution should be exercised when tightening the screw, because the magnet is fragile. And it's convenient cover both the magnet and the screw with thread lock.

15. If the cable from the stator from the ignition coil is very hard or cracked, replace it with new black colour wire, section 1.5mm square, and 1 m. of length.

    Note: When using the solder, pay attention to not overheat the reel coil. If the spool is badly damaged, solder the cable directly to the enamelled wire, isolate and immobilize with tape with a plastic flange.

16. Sheathe the three cables from the pick-up and the one from the ignition coil and pass them through the engine grommet. Guide and fix them to the space reserved for their connection.

17. Choose the place to mount the electronic control unit. Ideally in an area with little exposure to splashes and heat. It may be useful in some cases to use a metal tie-rod, taking advantage of the fixing studs of the control unit, but always using the washers and self-locking nuts supplied.

18. Depending on the position chosen for the control unit, it may be necessary to extend the sensor cables to take them to the place where they are to be located. In this case, it is advisable to solder the cables and insulate them with a heat shrink sleeve. Once this is done, it is convenient to sheathe the three wires from the sensor and the one from the ignition coil

and pass them through the engine gland to prevent humidity. Guide and fix them to the space reserved for their connection.

19. To make the final connections of the Digital CDI we will observe that the electronic control unit has two ends: the input end, which should be connected to the cables coming from the sensor and the stator, and the output end, which will be connected to the HT coil and grounded.

20. 

Specifically, connections must be made as follows:

Input end:

- The black cable connects the control unit with power from the stator (the cable previously connected to the points and condenser). It is this cable which will connect the stop button and NEVER to the white wire.
- The red cable of the CDI with sensor's red cable.
- The blue cable of the CDI with sensor's green cable.
- The brown cable of the CDI with sensor's black cable.
- The yellow wire switches between the two curves loaded by default: if it is insolated it will provide variable timing, and if it is grounded it provides a constant adjustment of 23° on the flywheel throughout the rev range. Switches exist in the market, as 034.E00 Leonelli allowing to switch from the handlebar between the two ignition curves.

Output end:

- The white wire is connected to the ignition coil.
- The green-yellow wire is the ground of the unit and must be firmly connected to a screw on the chassis.

The power strip supplied can be useful to organize the wiring in a correct way.

21. The CDI unit requires a good grounding. Connect the yellow/green wire from the CDI Unit to a clean earthing on the chassis, use the ring terminal provided, preferably by soldering or

crimping the cable. It is recommended that the earthing of the control unit is the same fixing where the ignition coil is earthed.

22. Make sure the ignition coil is connected only to the white wire. In the case of your motorcycle has a metal coil of the first series, with two terminals, the second terminal should be earthed. If the coil has a single terminal (modern red coils encapsulated in plastic) it gets grounded by its fixing screws.
23. Connect the spark plug.
24. Once CDI unit installed, check for the presence of spark, toggling start before mounting the spark plug. If it is daylight, the better you will notice a white paper interspersing between the electrodes thereof.
25. If you have seen one or more sparks operating the kickstarter, mount the crankcase cover, the levers and test the bike.
24. **NEVER VERIFY THE OPERATION circuiting OUTPUT (WHITE WIRE) to GROUND. Doing so will damage the CDI Unit.**
25. You may need to readjust the carburettor, as your new ignition improves the consumption, and your engine will probably require a leaner carburetion. Check your spark plug, and test as you would for the correct jetting. Lowering the needle 1 step can be a good starting point to do so.

DIAGRAMA DE CONEXIÓN VOLANTES DE 6 POLOS Y 4 ó 5 BOBINAS

