

Selettra ignitions

How the Selettra inner rotor ignition works

The ignition system presented here is a CDI ignition (Capacitive Discharge Ignition).

The ignition works independently of the rest of the vehicle electrical system (battery) and generates the electricity for the ignition process through the rotor and stator itself.

A CDI ignition is completely low-maintenance. Electronics control the discharge of the ignition voltage.

There is no need to adjust and change a mechanical breaker. The ignition only needs to be adjusted and set once during installation. No maintenance, readjustment or care of the system.

The ignition system consists of the following 3 components:

- Ignition coil
- Stator
- Rotor



Process of charging and discharging

The rotor and stator are each equipped with 2 powerful magnets.

The rotation of the crankshaft and thus the rotor generates electrical voltage through the magnets. A capacitor in the ignition coil is charged by a charging coil in the stator. At the command of the electronic system, the voltage is discharged via the spark plug.

The system can be used universally on any engine.

Technical data of the ignition system

Maximum speed: 27,000 rpm (electrical and mechanical)



Selettra ignition coil

The most important component of an ignition system is the ignition coil. The integrated electronic system guides and controls the time of discharge via the stored ignition curve.

The curve is decisive for the power, maximum speed and responsiveness of the engine.

It is therefore essential that the ignition curve matches the characteristics of the engine.

Otherwise, engine damage or poor performance will be the result.

The data required for ordering can be seen from the stator or rotor lists and the diagrams.

When making your selection, always take into account the technical requirements (installation dimensions) and the characteristics of your motor. Partially there is a choice between different plug connections.

The individual plugs have no effect on the ignition. Only the plug connection of the stator and coil has to match.

Selettra racing ignition assembly instructions

Install the ignition coil properly with the core lamination package (bracket), ideally hanging on the vehicle frame, see Fastening the ignition coil. The electronics are protected against vehicle vibrations and shocks by silent blocks.

Establish a good ground connection between the engine block and the vehicle frame using a ground line with at least 4mm².

Silent blocks must be bridged with a separate ground line, otherwise the electronics will be destroyed in a few seconds.

Never apply a bending moment to the ignition coil holder. NO GUARANTEE!

Fasten the stator using the three elongated holes in the motor housing. For vehicles in which a Selettra racing ignition is retrofitted, a specially made adapter plate may be necessary (non-magnetic material, if possible non-conductive to keep the engine heat away from the stator).

The rotor is placed on the crankshaft side journal. Impurities must be removed beforehand, the crankshaft stub and inner rotor cone must be free of grease.

It is important to ensure that the rotor is seated firmly; it may be necessary to lap the rotor onto the side journal with a grinding paste.

The position of the crankshaft, rotor and stator must be observed, see "Setting the ignition".

Connect all the necessary ground lines for the ignition.

Connect the stator connector to the ignition coil. Connect the ignition switch and, for ignitions with 2 ignition curves, connect the ignition curve selector switch.

A breakaway switch is often used as a safety switch in racing, and can also be used as a changeover switch for the second programmed ignition curve.

Function of the tear-off switch (quick stop, emergency stop):

If the connection line is connected to ground, the ignition is switched off. If it is not connected, the ignition is ready for use.

For ignitions with 2 ignition curves, the 2nd ignition curve is activated when the connection cable is connected to ground. If the line is not connected, the 1st ignition curve is active.

With Selettra ignitions, you can switch between the ignition curves during operation.



A radio interference suppressed spark plug connector with 5 kOhm is recommended for digital ignition systems!

Alternatively, radio interference suppressed spark plugs can be used, these items are available in our Dmon-Parts Shop.

Screw the spark plug connector into the ignition cable and plug the spark plug connector onto the built-in spark plug.

Example calculations from timing calculation V1.1 (Christoph Köhler):

Engine type	Degrees crank angle before TDC	Piston position in mm before TDC
500cc Motor cycle	10°	0.8 mm
Stroke 86 mm	20°	3.2 mm
Connecting rod length 160 mm	30°	7.2 mm
250cc Motor cycle	10°	0.5 mm
Stroke 68 mm	20°	2.7 mm
Connecting rod length 130 mm	30°	5.6 mm
125cc Motor cycle	10°	0.5 mm
Stroke 54 mm	20°	2.0 mm
Connecting rod length 110 mm	30°	4.4 mm
50cc Moped	10°	0.4 mm
Stroke 44 mm	20°	1.6 mm
Connecting rod length 85 mm	30°	3.6 mm
50cc Scooter	10°	0.4 mm
Stroke 40 mm	20°	1.5 mm
Connecting rod length 80 mm	30°	3.3 mm

Sample information without guarantee!

For flashing off the Selettra ignition, we recommend the stroboscopic flash lamp from Bosch with the number 0 684 100 309 - 424

Setting the ignition

The static ignition timing advance is set by turning the stator.

For vehicles that are converted to Selettra racing ignition systems, you need:

Max. advance ignition in degrees of crank angle or tuning level

Max. advance of the Selettra ignition according to the ignition curve diagram

Align the stator on the rotor:

The stator is fastened in the crankcase in such a way that the desired pre-ignition is achieved.

Turn the crankshaft to the desired position before TDC.

Fix this position and twist the stator so that until the markings of stator and rotor are covering each other.

Since the ignition curves differ significantly, it is not possible to create general setting instructions.

You should therefore observe the special setting instructions for the digital Selettra system on the following pages.



Please always check beforehand which system you have!

Align the rotor on the stator

Install the stator in the crankcase.

Take into account a suitable cable routing from the motor housing.

Fasten the stator so that the screws in the elongated holes are roughly centered.

This gives you the opportunity to fine-tune the ignition timing afterwards without having to pull off the rotor again.

Turn the crankshaft to the desired position before TDC and fix this position (e.g. piston stopper or measuring clock).

Put the rotor on and twist it on the crankshaft stub until the markings on the stator and rotor are covering each other.

Screw the rotor tight in this position. Loosen the crankshaft fixing and check the setting.

You can fine-tune the ignition by turning the stator.

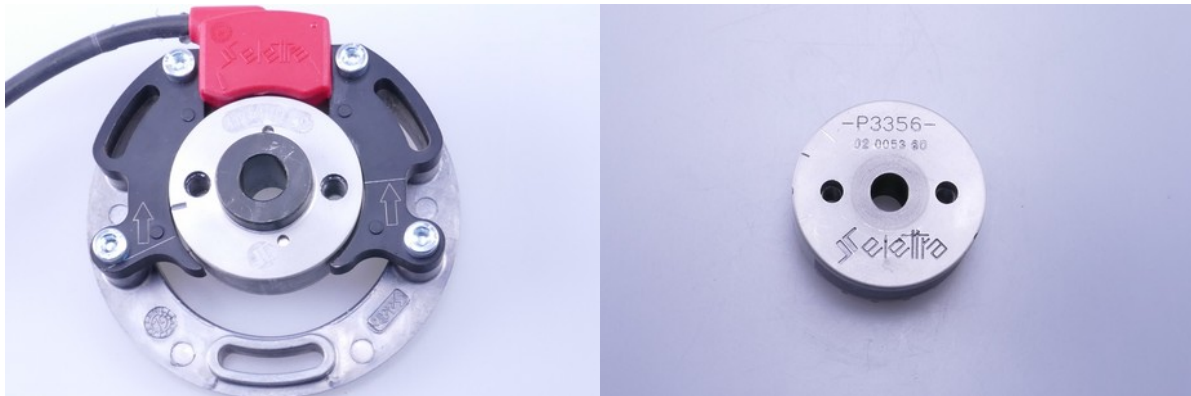
In general, all stators are suitable for left and right rotating motors. However, not all stators have a marking for the directions of rotation.

A distinction must therefore be made between stators:

- Turning only counterclockwise or clockwise only, a mark on the right or left stator arm.
- Left and right turn, two markings about 180 ° opposite.
- Digital systems usually have two additional markings

The only difference between the rotors is the screwed-in cone.

The magnetic poles and the marking are mostly the same.





Assembly instructions for Selettra ignitions

Ignoring and disregarding the information contained in this manual could damage your new ignition and the engine components!

Please read all of the information contained herein and follow the appropriate instructions.

Your engine is an assembly of many machined components, and each part has tolerances that are allowed in production.

Because of these tolerances, it may be necessary to set the magnet igniter for your specific engine.

Attaching the ignition coil

The ignition coil and the CDI module are one unit.

Please check whether the ignition coil can be attached directly to the chassis or frame with a good earth connection (absolutely necessary).

If not, it may be necessary to create a small tab that is welded directly to the mass (frame part) of the vehicle.

The fastening must be secure and stable, and we recommend the use of lock nuts to prevent them from vibrating loose.

It is **essential to connect the earth cable** of the ignition coil to the frame at a **well-earthed point**. Without an earth cable, there is a **risk of overload** and the associated **total ignition failure!** Clamp the earth connection (earth cable) to the coil under the fastening screw.

Make sure none of the cables come into contact with your machine's exhaust. When this happens, the insulation on the wires can melt, creating a short circuit and potentially destroying the ignition system.

For applications with particularly high vibration levels, it is recommended to surround the coil with foam and, for example, wrap it with duct tape to prevent these vibrations. The earth cable with the ring connection must be earthed on the frame of the machine or the motor.

If attachment with a fixed device is not possible, you can attach the spool with any method that holds the spool securely to the frame, e.g. with cable ties or in a foam sleeve with duct tape.

The earth cable with the ring connection must in turn be earthed on the frame of the machine or the motor.

The spark plug connector supplied with the digital system is specially designed for resistance spark plugs with a 5000 ohm value.

This type of connector must be used for the system to function properly.

When the coil is in place, it can be connected to the stator depending on the type of system. The wire (female connector) that leads out of the coil is to be used as the wire for the kill button (tear-off switch).



Any device that can carry power to ground should do this, but we recommend using a device which is designed for use on motorized vehicles (e.g. Quickstop).

Note

Two types of spark plug connectors are used in Selettra ignitions:

For analog ignitions: Dmon spark plug connector "Standard"

For digital ignitions: Dmon spark plug connector "Digital" 5kOhm



To connect an electronic tachometer, the respective manufacturer of the tachometer usually refers to the use of the 5 kOhm spark plug connector, as otherwise malfunctions can occur.

During assembly, the ignition coil must always be fastened in such a way that vibrations during driving do not lead to the dismantling of the ignition coil.

The ignition coil must be earthed via the earth cable, otherwise there is a risk of total failure.

Installing stator and rotor

After having removed the existing magnet igniter from the motor, attach the Selettra stator plate (is manufacturer and type-specific) with the stator to the motor housing.

Make sure that the fastening screws for the stator do not sit on any part of the motor housing ("sit on block", this creates harmful stress!).

If this happens, the stator plate can be damaged or destroyed. If necessary, file or grind the ends of the screws that are too long. Leave the stator mounting screws a little loose at first.

If an adapter plate is **additionally** attached (between stator plate and housing, e.g. when installing in Simson S51, Zündapp, KTM, etc.), the adapter plate must be designed in such a way that an absolutely firm connection between stator plate and motor housing is guaranteed, if it is loosened due to vibrations otherwise there will be damage.

Note!

Before assembling the rotor, clean both the bore of the rotor and the side journal of the crankshaft with contact cleaner, acetone or another suitable product to ensure that they are clean and free of grease, oil or other deposits.

Place the rotor on the crankshaft. The right rotor (vehicle type-related) should now slide onto the crankshaft (side journal) without resistance or hindrance.



Never hit the rotor with force!

No groove or feather key is required. The torsional force is only transmitted via the cone (conical seat).

Note:

When using an adapter plate (special accessory) between the motor housing and Selettra stator plate, the axial position of the rotor must be placed in such a way that the rotor magnets are axially aligned in the center of the stator legs.

The rotor must have sufficient radial play, i.e. it must not rub against the stator. The axial position of the rotor results from the construction of the thickness of the adapter plate.

If there is not enough axial play (rotor jams) between the rotor and the legs of the stator, use an insert or screwdriver to loosen the four screws which fasten the stator coil unit to the stator mounting plate.

If the rotor fits properly without loosening the screws, proceed directly to the ignition timing adjustment.

If it is necessary to loosen the screws, you must now complete the alignment procedure.

Use your fingers (not pliers or screwdrivers) to push the legs of the stator against the rotor and tighten the screws.

The ignition system must always be connected to the ground of the vehicle with good conductivity. The earth cable on the ignition coil must be connected to the vehicle earth.

Never rotate the rotor of the built-in ignition system without a consumer (spark plug to ground)!

If there is no spark plug in the connector, the ignition system has no ground and builds up an overvoltage that cannot be diverted.

This can cause a total failure of the ignition!

Check by hand (turn several times) that the rotor can turn without touching.

Check the side bearings of the engine for excessive play by wiggling back and forth on the side journal of the crankshaft.

If the side bearings of the motor have too much play, the rotor begins to tumble and chafes the stator.

This leads to the stator plate tearing loose and wear to the rotor surface or magnets and ultimately to total ignition failure.

Among other things, there is a risk of engine damage here!

Only use the Dmon extractor. Failure to follow this instruction can damage / destroy the rotor!

There are two holes in the rotor.

These holes are intended for the attachment of optional rotor weights.



Only the two holes are intended for attaching the extraction tool!

Remove the crankshaft nut; use a suitable counter holding device for this purpose.

Never hold the rotor by the circumference with pliers to prevent it from twisting, this will damage the rotor surface (magnets) and cause ignition malfunctions!

Fasten the extractor in the holes provided in the rotor using the delivered screws.



Screw in the screws completely so that the forces cannot tear out the thread.

Use an adjustment key to hold the extractor rod against twisting. Use a wrench to firmly tighten the jackbolt, which should now be touching the end of the crankshaft.

If the rotor does not come off the crankshaft at this point, use a light hammer to hit the jack screw hard to loosen the rotor from the crankshaft.

The Selettra digital spark plug connector supplied with the digital system has a resistance value of 5 kOhm and has been specially tested for digital ignitions.

This type of connector must be used for the system to function properly. The use of other spark plug connectors can lead to total failure.

In this case, any guarantee becomes void.

While almost all electronic ignitions can withstand moisture during operation, if moisture gets into the coils or they are damaged by the resulting corrosion, they will be damaged.

We recommend removing the magneto ignition cover after use so that any accumulated moisture can evaporate.

This is especially important after the machine has been washed with a high-pressure cleaner.

An added benefit of doing this is that you can identify any problems caused by a faulty seal or bearing.

A defective side bearing almost always results in the destruction of the ignition.

The setting of the ignition timing of an engine is directly related to the compression of the engine.



The higher the compression, the less advance (i.e. advance of the piston when reaching top dead center or the highest position) can be used for the ignition point.

Since the exhaust pipe, carburetor, cylinder, and cylinder head are all tied to an amount of heat generated by the engine, they must be taken into account when tuning the motor's ignition.

Particularly consider the heat generated in the combustion chamber.

An engine burning a certain fuel can only tolerate a certain amount of heat, and all of the above factors are related to that amount of heat.

Since the ignition timing and its effect on the amount of heat are directly related to the life of the engine, it is important that you work carefully.

Too much pre-ignition and you will overheat the engine; too little and you are wasting performance. Gasoline and alcohol (methanol) have different values due to their combustion properties.

In general, alcohol burns slower than gasoline and requires more heat (cooler combustion, so-called internal cooling with methanol).

The performance of an engine can be influenced in several ways, including advancing the ignition timing or increasing the compression.

However, you can only use as much heat / energy as the motor can handle.

Tuning is a very complex subject for experts and should only be used when high performance is required and the service life of an engine is not of major importance.

Installation of an additional flywheel as a rotor disc on the Selettra ignition

On Selettra ignitions, so-called flywheels can optionally be mounted on the rotor if a larger flywheel mass is required.

These flywheels are also made of high-strength steel (non-magnetic material), stainless steel, brass or bronze and must run perfectly smooth with the rotor and fit exactly.

The material should be checked for cracks after processing and finely balanced together with the rotor.

The fastening screws must be chemically secured with screw locking agent.

At speeds of up to 20,000 rpm, even the smallest imbalance causes vibrations that can not only destroy the crankshaft bearings, but also loosen the rotor flywheel and even the side journal.

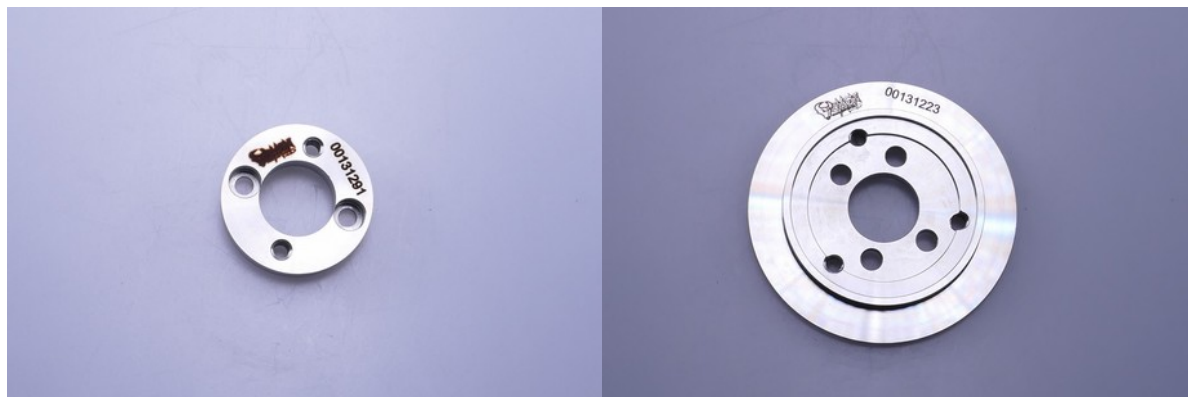
If the material is faulty (micro-cracks in the structure) there is a risk that the additional flywheel mass will destroy itself and virtually explode due to the high rotational and centrifugal forces and the vibrations generated by the engine.

Warning!

There is a great risk of injury here, and we expressly point out that any liability and warranty are excluded.



Use only the flywheels supplied by the manufacturer.



Setting the ignition time

Note:

As a rule, your Selettra rotor does not have a keyway; this is correct due to the design and no feather key is used.

The rotor can therefore be positioned on the side journal in the range of 360 ° crank angle.

To set the ignition point, a degree disk or a dead center measuring device (dial gauge) is used to measure the position of the piston before top dead center (TDC).

By aligning the markings on the rotor and the stator, in conjunction with the measurement of the piston position before top dead center, you can set the ignition timing of the ignition on the engine.

When the stator is roughly in the middle of the available adjustment range (elongated holes in the stator plate), carefully tighten the stator fastening screws so that it does not move by itself, but can still be turned by hand.

Slowly turn the crankshaft in the direction of rotation until the piston is in the desired position, e.g. TDC or before TDC. (e.g. 1.6 mm).



Note

Before installing the rotor, clean both the bore of the rotor and the side journal of the crankshaft with contact cleaner, acetone or another suitable product to ensure that they are clean and free of grease, oil or other deposits.

Install the rotor on the crankshaft so that the ignition timing mark on the rotor matches with the mark on the crankshaft.



Many Selettra stators have markings for **both directions of rotation**. Make sure you choose the **correct mark** for the **direction of rotation** of your motor!

The following applies to the rotor:

Bring the loose rotor approximately into the position in which the markings on the rotor and stator overlap and place the rotor in this position on the side journal.

Tighten the rotor nut or screw with the required torque.

If the marking on the stator is **exactly** aligned with the marking on the rotor, the ignition timing is correct. Check the correct ignition timing to check.

Reposition the piston in the desired position, e.g. TDC or before TDC and check whether the markings on the rotor / stator still match.

If not, simply loosen the stator fastening screws and move the stator so that the markings match, then tighten the stator screws again correctly.

If the markings cannot be aligned with one another when the piston is in the correct TDC position, the rotor must be pulled off the side journal with a DMon extractor.

The setting procedure must be repeated.

Auxiliary markings with a permanent fiber pen on the housing and rotor are helpful for this.

Another helpful tool is the digital goniometer. This is available in our webshop.





Testing the Selettra ignition

Some of the Selettra components can be subjected to a resistance test.

A digital ohmmeter should be used to test Selettra ignition components.
Do not use an analog measuring device as it is not accurate enough.

Note:

Do not check the components when they are still hot! You have to let the components cool down to room temperature before testing them!

Insert a probe into each end of the two wires after they have been disconnected from the stator coil.

For an analog stator, it doesn't matter which probe is used on which wire.

Note:

When testing the ignition coil, check directly on the ignition cable and not via the spark plug connector.

Units can operate slightly above the recommended range with test results.

If the readings are in the lower end of the scale, but the system is working properly, damage can be assumed.

To be on the safe side, the component should be replaced with a new one, as a short-term total failure can be assumed.

Recommended range		
Stator Type	Measured value (Measurement with direct voltage at approx.20°C)	Number of windings
KZ 2200 90/94 48mm	102 Ohm \pm 10%	2200 Windings
KZ 3200 90/94 48mm	162 Ohm \pm 10%	3200 Windings
P3356 90/94 58 mm	115 Ohm \pm 10%	2700 Windings
NO2019 90/94 034-IG-14	57 Ohm \pm 10%	2400 Windings
A11 90/94 58mm	200 Ohm \pm 10% approx.180 - 220 Ohm	3700 Windings
Mini 034-IG-75	80Ohm \pm 10% approx.216.6-239.4Ohm	

Components on which a resistance test cannot be carried out and which must be sent in for precise testing:



Markings of the different Selettra systems:

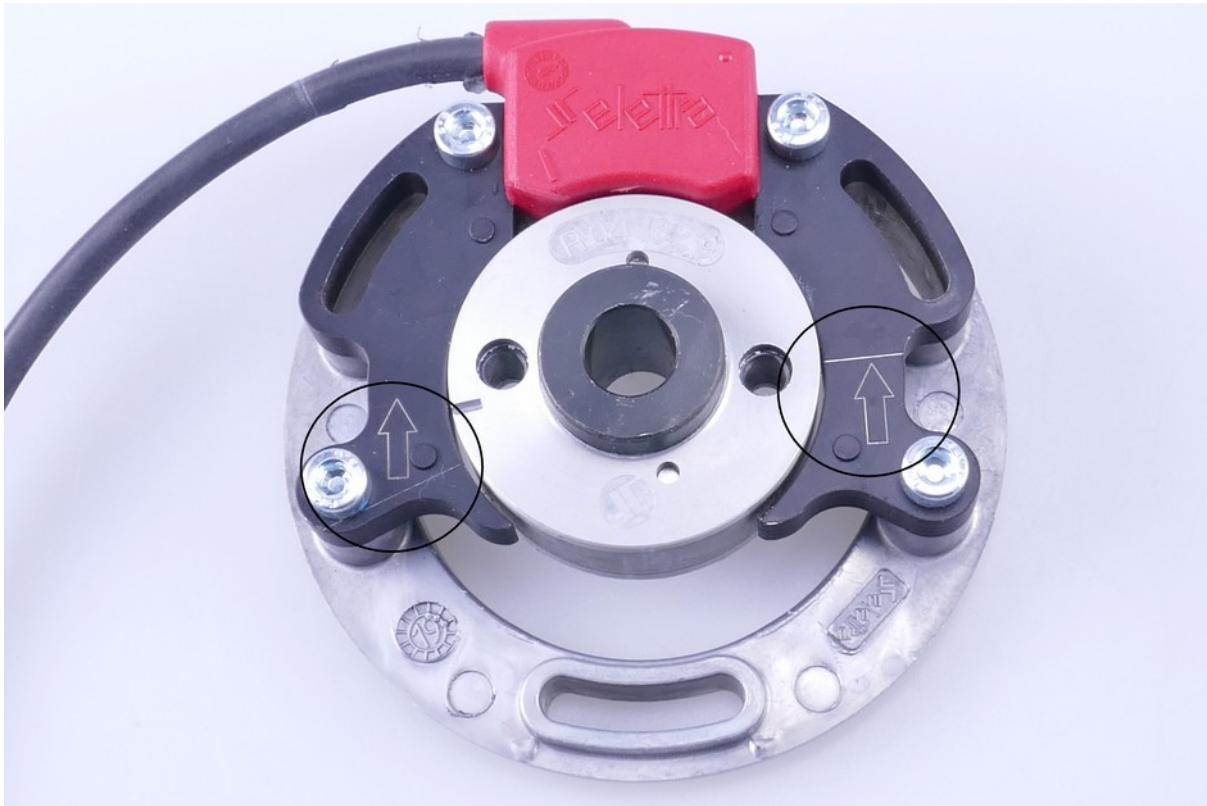
Selettra KZ10 analog

Stator 2200 Wdg 90 mm DMon 00131230
Stator 2200 Wdg 94 mm DMon 00131231
Stator 3200 Wdg 90 mm DMon 00131228
Stator 3200 Wdg 94 mm DMon 00131229

Coil A10 DMon 00131222
Coil A20 DMon 00131459
Coil A2 DMon 00131215

Rotor 48 mm R041029

Basic setting: eg. 20 – 25 degrees before TDC. See diagram above





Selettra KZ10 digital 2 strokes

Stator 3200 Wdg 90 mm DMon 00131228

Stator 3200 Wdg 94 mm DMon 00131229

Coil KZ10 Digital DMon 00131232 0301256001/0301256002

Rotor 48 mm R041029

Basic setting: Piston on TDC.





Selettra KZ10 digital 4 strokes

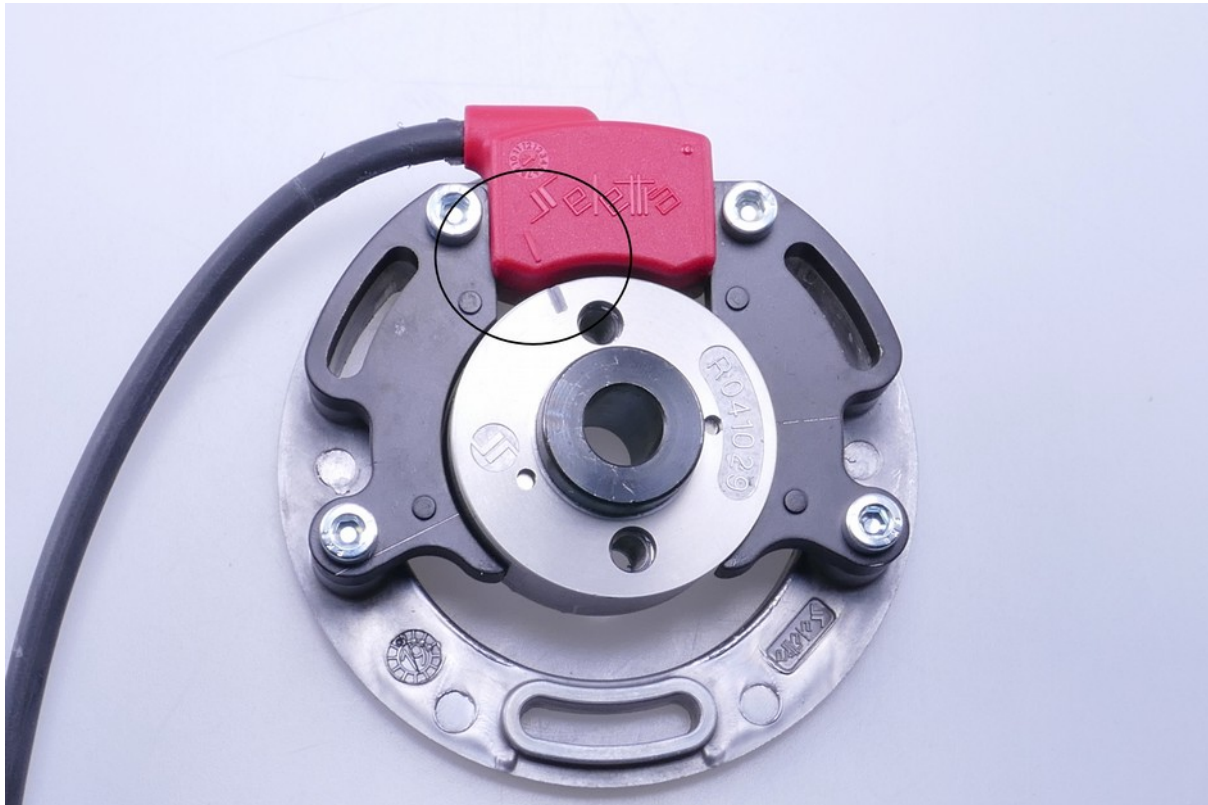
Stator 3200 Wdg 90 mm DMon 00131228

Stator 3200 Wdg 94 mm DMon 00131229

Coil KZ10 Digital DMon 00131232 – 0301256001/0301256002

Rotor 48 mm R041029

Basic setting: Piston on TDC. (T.D.C.)





Selettra NO2019 with homologated rotor 034-IG-14

Stator NO2019 034-IG-14 2400 Wdg 90 mm DMon 00131684

Stator NO2019 034-IG-14 2400 Wdg 94 mm DMon 00131685

Coil NO2019 034-IG-14 DMon 00131683

Rotor NO2019 034-IG-14 DMon 00131686 TM, ASPA, LENZO 1:5

Rotor NO2019 034-IG-14 DMon 00131687 IAME, VORTEX, SEVERI, SEVEN 1:7,5

Basic setting: eg. 20 – 25 degrees before TDC. See diagram above





Selettra NO2019 with digital coil

Selettra NO2019 with rotor P3356 without homologation
Stator NO2019 034-IG-14 2400 Wdg 90 mm DMon 00131684
Stator NO2019 034-IG-14 2400 Wdg 94 mm DMon 00131685

Digital coil NO2019 with 2 ignition curves and RPM limiter DMon 00131930 - 0301256003

Rotor P3356

Basic setting: Piston on TDC. (T.D.C.)





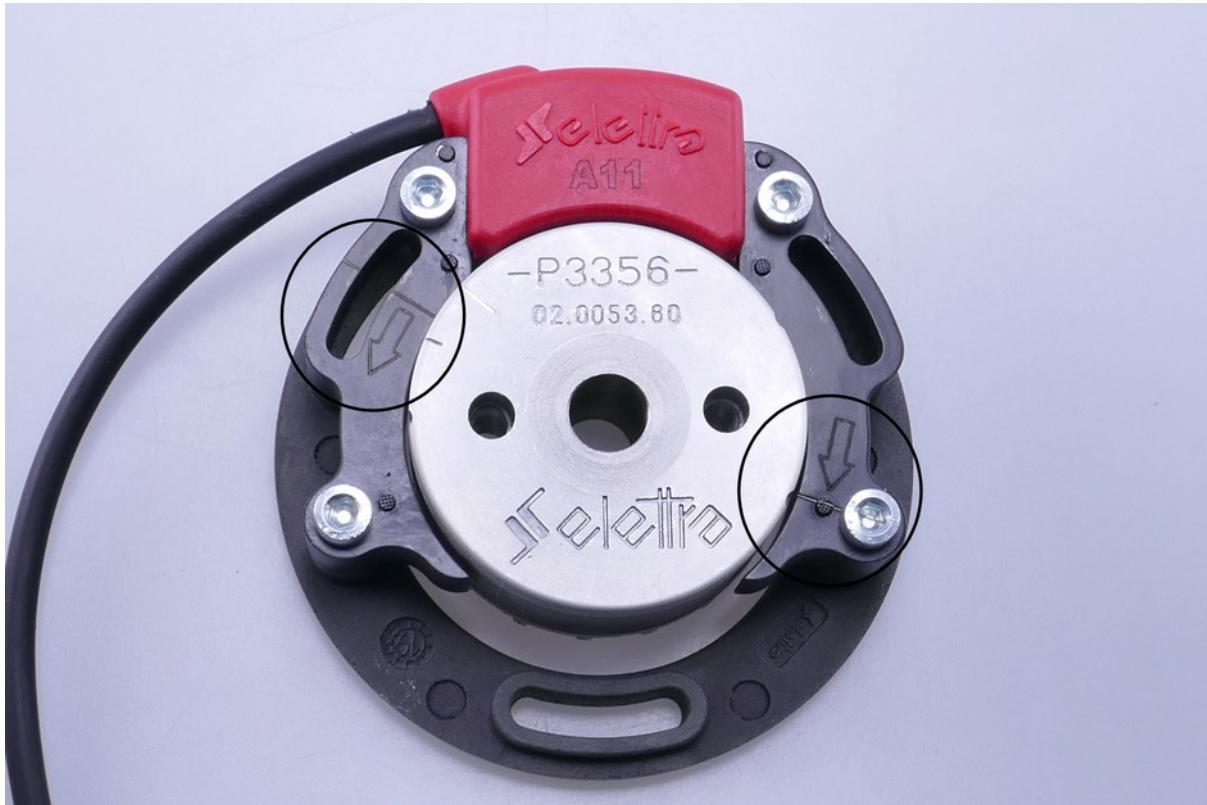
Selettra A11 with rotor P3356 – 13 ° curve

Stator A11 3700 Wdg 90 mm DMon 00131932
Stator A11 3700 Wdg 94 mm DMon 00131944

Coil A11 DMon 00131931

Rotor P3356

Basic setting: eg. 20 – 25 degrees before TDC. See diagram above



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