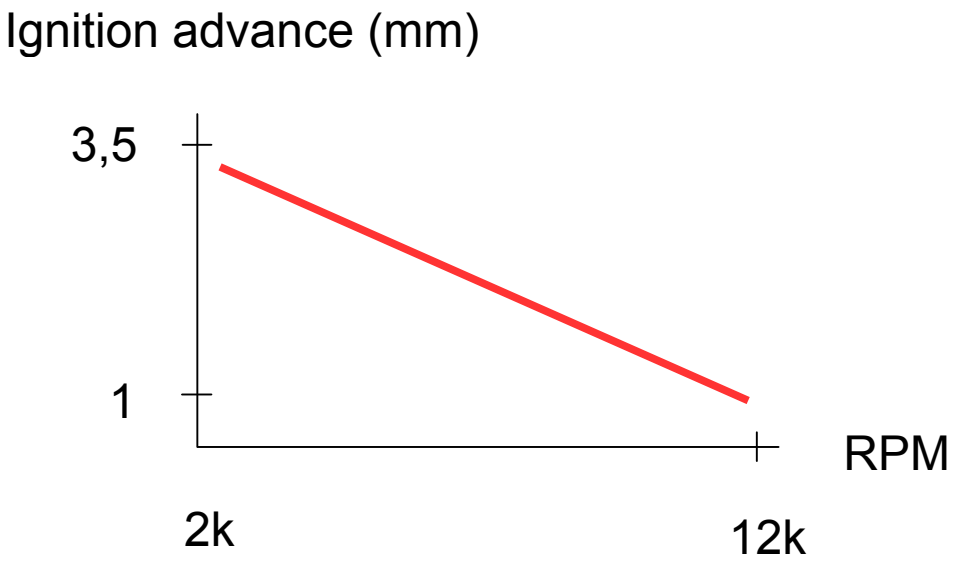
Retarderingskrets till Kokusansystem

Orientation
Trimmed two-stroke engines require that the ignition be retarded (delayed) as the speed increases to provide optimal engine power. It takes longer at low rpm than at high rpm to ignite the fuel / air mixture so that a high cylinder pressure is obtained. This is because the fuel in the combustion chamber is teardrop-shaped at low speeds and atomized at high speeds when the fuel / air mixture is turbulent. In order for maximum cylinder pressure to occur in the correct position against the position of the crankshaft, approx. 15 degrees after TDC, the ignition therefore needs to be adapted to the engine rpm.

This can be achieved on standard Kokusan systems with fixed ignition by connecting a circuit with electronic components between the pulse input on the CDI and earth. The circuit causes the fuel / air mixture to ignite later as the speed increases, in the same way as for more expensive ignition systems.

The result is that the engine delivers higher power at low and intermediate rpm, while maintaining peak power, than with a fixed ignition that is set correctly so that the engine provides high peak power without getting spontaneous ignitions at high rpm. This is especially noticeable on highly tuned engines where you lose power in low and intermediate registers when cylinder ports, carburetor and exhaust system are optimized for high speeds. The circuit also makes it much faster to enter the active area of the exhaust system again if the rpm has dropped a little too much at the moment of gear change, and it initiates extra power at start-up and better throttle response.

Example on how spark advance varies with engine rpm after the circuit has been switched on and the ignition has been adjusted:

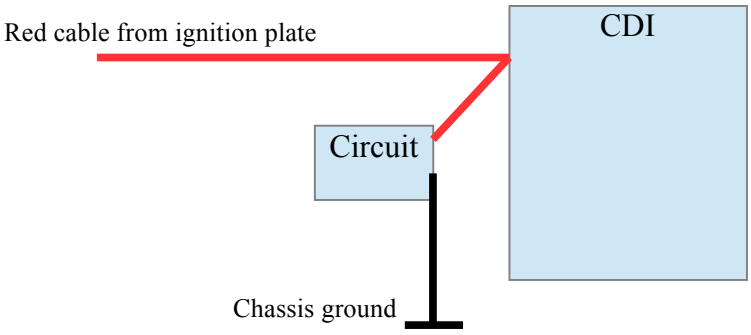


Connection of the circuit
The circuit has two connections, one red and one black cable. The red cable is connected to the existing red cable that goes from the ignition plate to the CDI. The black cable connects to the chassis ground. The connection should be made near the CDI to eliminate the risk of the circuit picking up interference.

You need to make sure to anchor the circuit with cable ties so that it does not risk shaking loose, and make sure to clamp cable connectors with a good tool. The existing red cable to the CDI and the red cable from the circuit should be twisted together and clamped in a new flat pin sleeve which is then reconnected to the same pin in the CDI. It should provide a very secure clamping connection. Soft soldering is also a good solution, but it requires that you have a good working knowledge with soldering so that it does not get worse than a properly made clamping joint.

The ground cable (black) is clamped in a ring cable connector and screwed into the chassis in the same place as the CDI is grounded. The cables to the circuit are 0.75 mm ^{2} so it is safest to fold the ground cable double in a 1.5 mm ^{2} cable connector and it should be self-locking.

PLEASE NOTE!
Be very thorough with the cable pressings so that they get strong and stable. If the circuit gets loose from one connection the engine will run with full advance on high RPM with great risk of engine failure.



Ignition setting
To be able to optimize the ignition setting, you should use a Stroboscope lamp. In this way you can ensure that the spark comes in the right position, when the piston is 1-1.5 mm before TDC, at the speed where the engine gives the most power, e.g. 12000 RPM. At idle, the spark should come when the piston is about 3-3.5 mm before TDC. Ignition at idle is quite uncritical. **The important thing is to make sure you have the right ignition at the maximum speed at which the engine will operate.**

Since the circuit operates already from low speeds, the grooves in the ignition plate may need to be extended so that it is possible to adjust the ignition as above (1-1.5 mm at maximum speed). As an example, it is usually enough to extend the grooves in the plate 5 mm counterclockwise on a Zundapp and then turn the plate maximum clockwise. If the screws that hold the plate end up under a coil on the ignition plate, use screws with a low skull. There is usually some excess plastic underneath on the ends of the coils that can be cut off with pliers if needed if it blocks a screw.
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The picture shows how the groove for a locking screw has been extended on the left side in a Zundapp motor so that the plate can be turned more clockwise. If the grooves are behind the coils and are difficult to access, it is easiest to start by unscrewing the three star screws and removing the entire package of coils. To get a nice extension of the grooves, you can first drill with a 4 mm drill and then file the grooves to the desired length with the right radius.

On a Zundapp engine with a Kokusan system without a retardation circuit, the trigger should normally end up at 11 o'clock and with a retardation circuit in position at 12 o'clock. However, there do exist flywheels where the center is differently mounted so the ignition advance always needs to be checked with a stroboscope.

Do not start by filing the grooves in the plate, but turn it max clockwise first and check which ignition is obtained with a stroboscope lamp. If there is already a reserve from the beginning to turn the ignition plate more clockwise, the grooves do not need to be expanded.

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