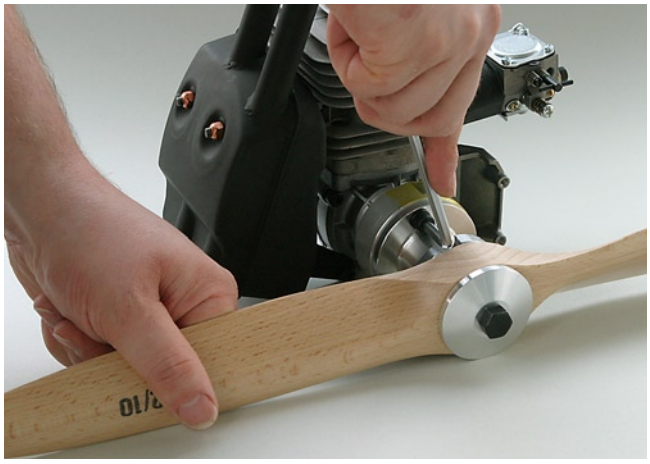
Conversion Instructions

from Magneto to Microprocessor Ignition PCI

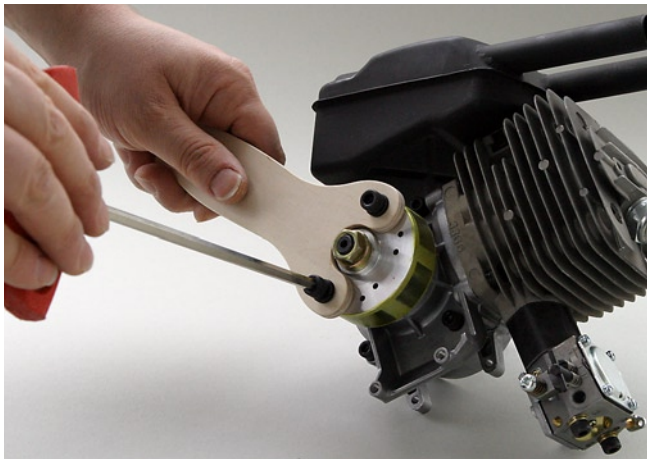
These instruction cover the Titan ZG 62SL but are applicable for the Titan ZG 45SL and the Titan ZG 74B and TitanZG 80B as well.

Remove the ignition and the power coil, keep the screws for fitting the sensor.

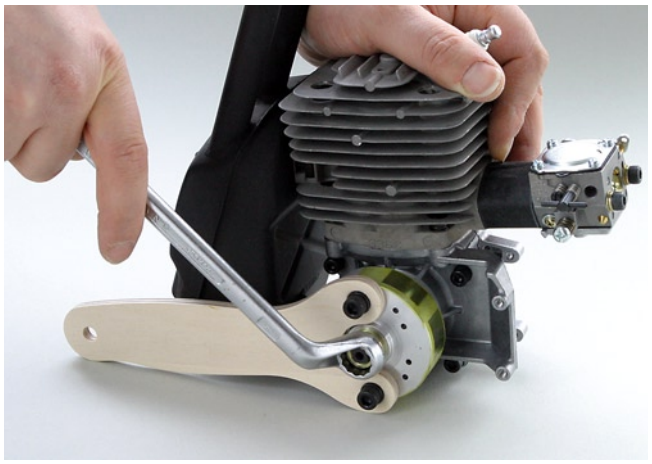


Remove the propeller hub.

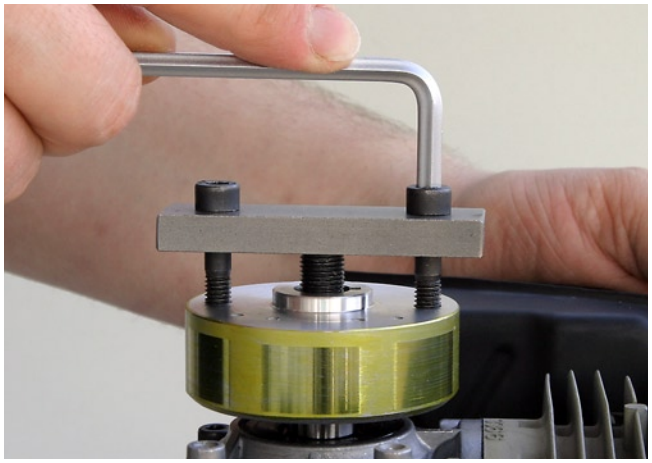
For this job, fit a propeller firmly onto the hub to enable you to unscrew the two M6 socket head screws retaining the hub. The propeller will assist in pulling off the hub from the centring stub on the flywheel.



Use the special tool shown screwed to the flywheel to remove the flywheel securing nut from the crankshaft. This tool avoids stressing the crankshaft unnecessarily.

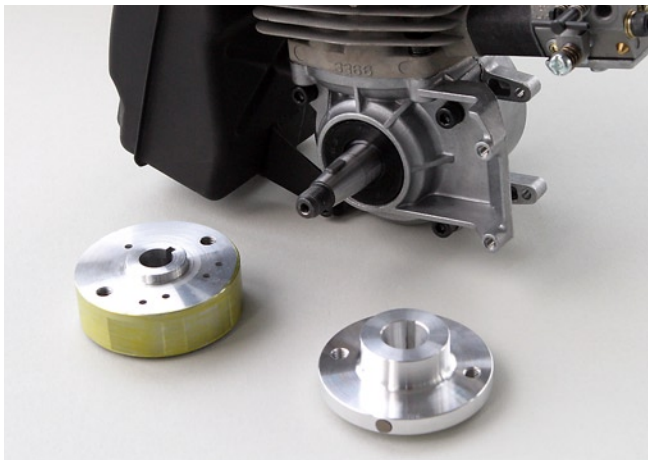


Use a 14 mm ring spanner to loosen the flywheel nut. This nut has a normal M10x1 right hand thread, the nut is really tight!

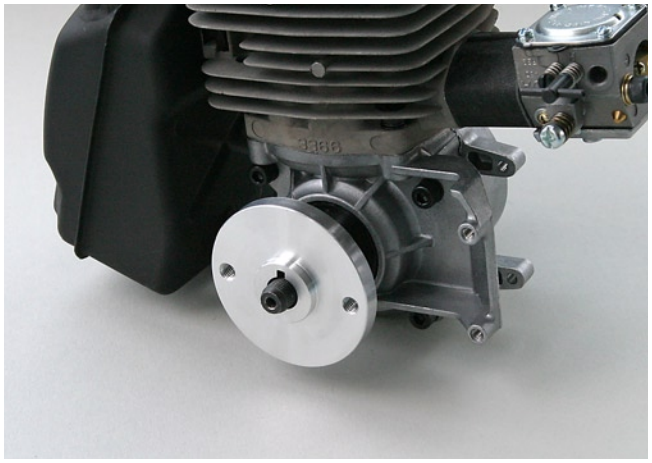


Use the extractor with the two long M6 screws to carefully pull the flywheel off the crankshaft taper.

Important: to avoid bending the screws, tighten these progressively left and right in small increments.

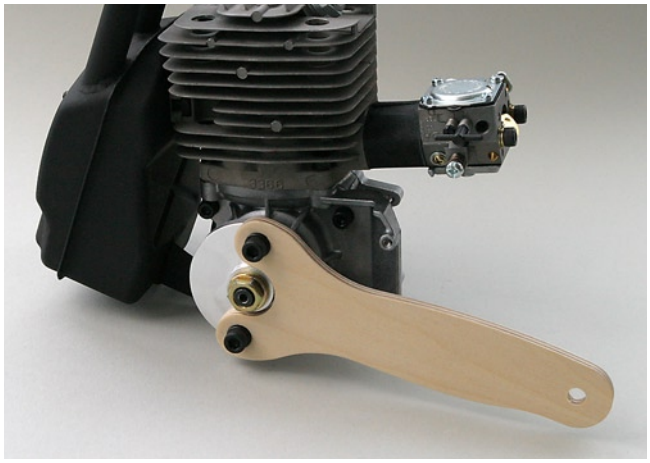


This is how it looks with the flywheel removed.

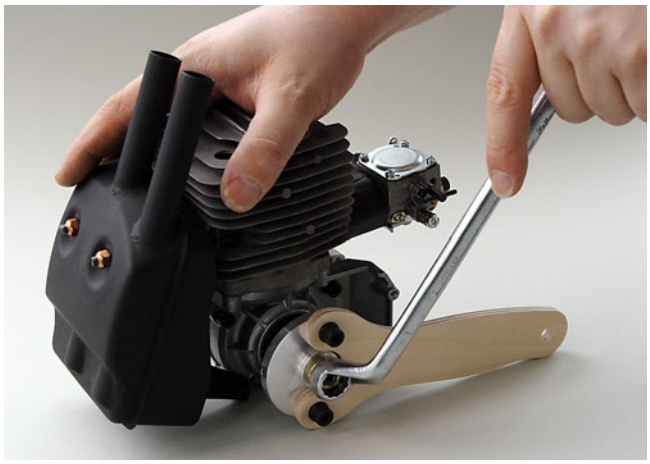


Push the propeller hub adapter onto the crankshaft taking care to see the Woodruff key is aligned with the slot. It is ideal that the adapter fits relatively tightly, the slot for the key should have no play.

Here the adaptor has taken the place of the flywheel, being secured with the same nut, springwasher and washer. Do not use Loctite as this will make dismantling unnecessarily difficult. The spring washer is totally reliable.



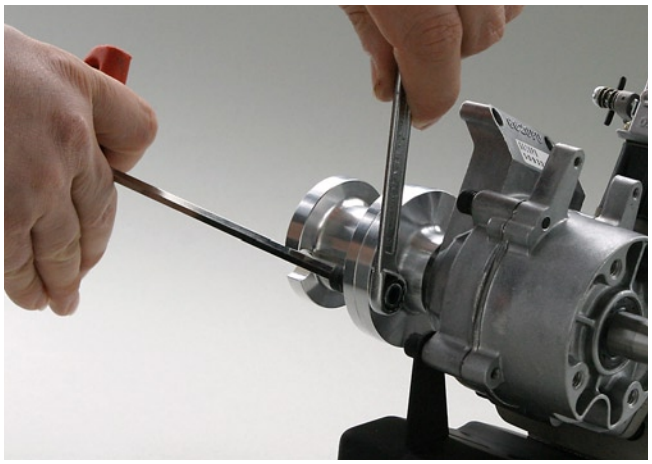
Refit the special tool to tighten down the retaining nut.



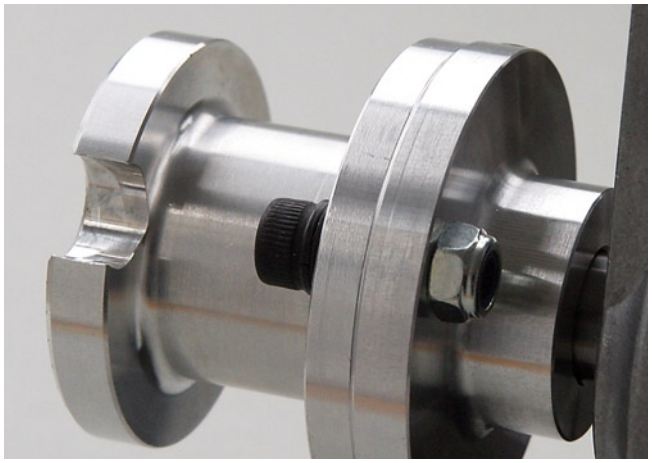
The nut needs torqueing down with 30 Nm or 22 lbsft. This equals a force of 150 N (15 kp or 32.5 lbs) at a 20 cm lever - quite a lot of force and so it is a good idea to use a long spanner.

The pressure of the hub cone on the crankshaft holds the hub secure, the Woodruff key is only there to position the hub for the correct ignition timing and nothing else.

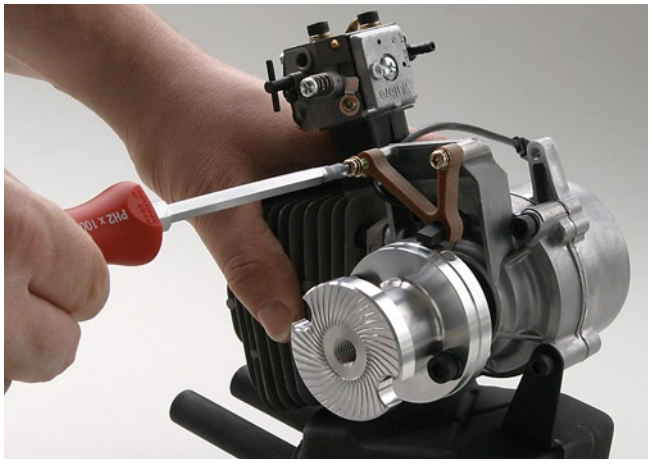
The propeller is again firmly fixed to the hub to assist in fixing the two socket head screws. Do not use Loctite, as the screws have an integrated spring washer. These screws are torqued to 10 Nm or 7 lbsft ...



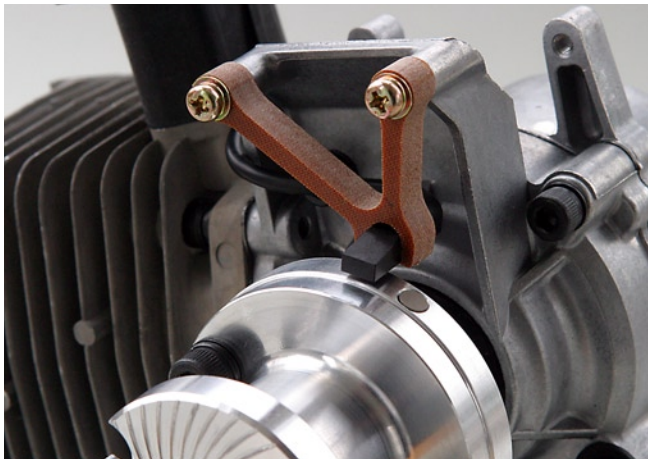
... then use the two safety nuts to lock the screws.



This is how it should look now.

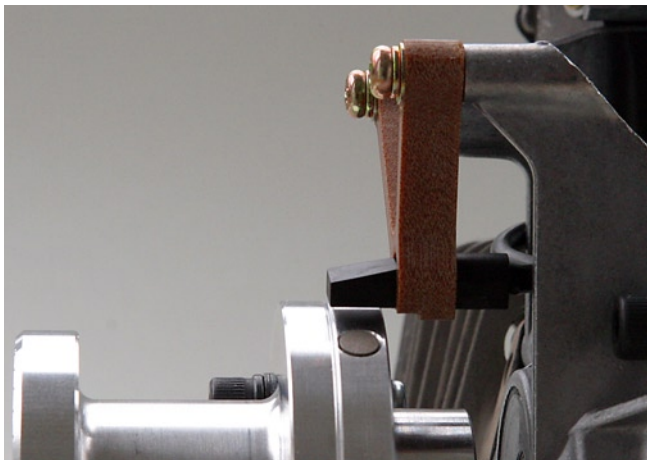


Now fit the pickup head with the power coil screws as shown. The ignition timing is automatically correct and cannot (and need not) be adjusted.



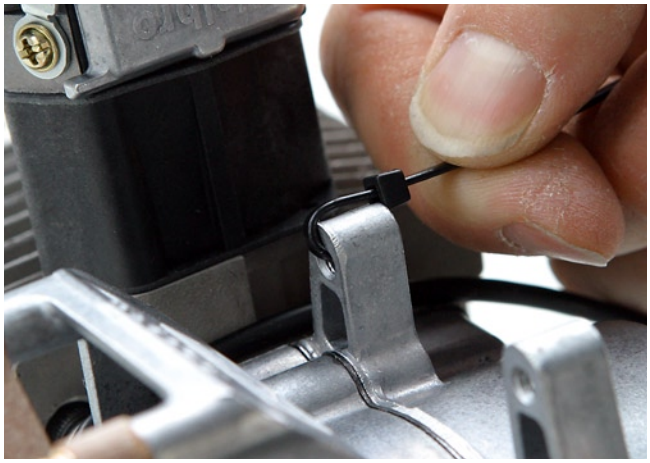
This is how the pickup should be.

The gap between the pickup and magnet is not critical, it can be anything from 0,2 to 2 mm.

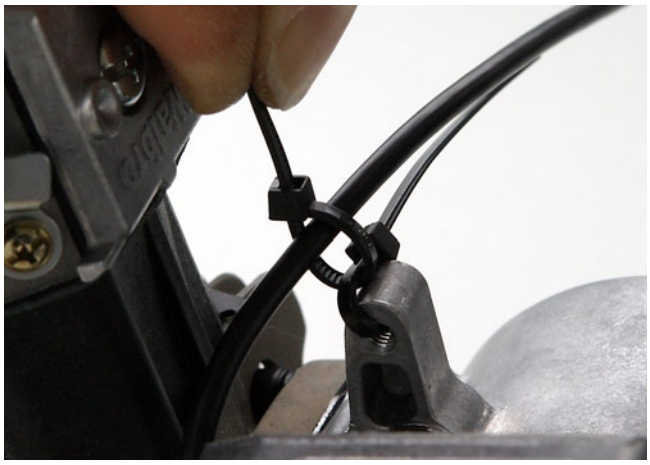


Looked at from the side, the pickup position is even less critical, you see here the middle position. Although 2 mm forwards or backwards will work perfectly well.

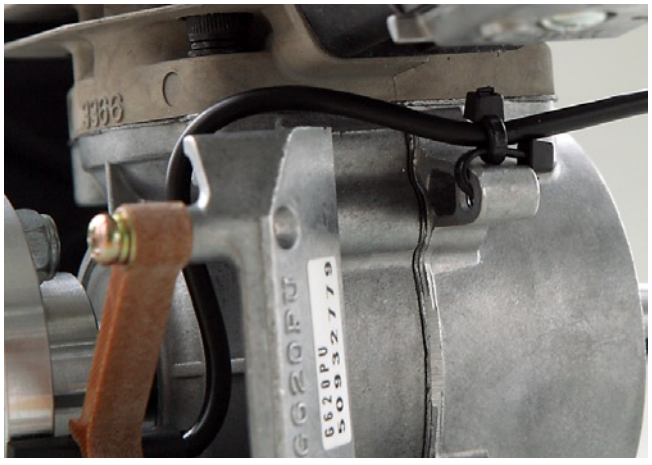
The pickup is a tight fit in the pickup mount and secured with cyano. If the pickup is sitting outside the tolerance, washers can be used for packing between the pickup head and the crankcase.



Use the nylon cable ties to secure the pickup cable. The first cable tie is shown here ...



... and with the second tie the cable is fixed to the first.



After cutting off the surplus from the nylon cable ties it looks like this.

Installation in the model

The most important rule covering battery ignition systems first:

Never ever switch the system on without the spark plug cap being on the spark plug!

Keep all parts of the battery ignition as far as possible from the receiver, minimum distance being 25 cm.

The microprocessor Ignition is protected with a tough metal case and the electronics inside are encapsulated to protect against vibration. In spite of this it is not a good idea to simply mount the ignition box onto the firewall with a couple of cable ties.

Please fit the cables very carefully into your model, especially the high tension cable, as this will not contain the 21,000 volts if it is damaged due to scuffing against the cowl inner surface. If the screening flex is damaged due to scuffing when threaded through a GRP cowl opening, it will not be long before the inner insulation is damaged also. Then the HT will short out to the screening flex and this may cause massive radio interference and will of course lead to an ignition cutout.

Mechanical damage caused to the HT cable is not covered by the guarantee!

Take care with plugging together the JR-plugs and sockets by noting that the colours should line up on opposite sides. It is possible with a little extra effort to push these together with reverse polarity. No damage will be done but the ignition will of course be dead. I tape these plugs and sockets with insulation tape for additional safety.

Switch

Use only knife edge contact switches such as the Graupner receiver cable with charger socket order no. 3046. Toggle switches with roller contacts are not suitable as these are intended for 240 V. Used on 6 V, oxidation can occur, this increases the contact resistance and will lead to ignition failure.

Battery

The battery should be either a 4 or 5 cell NiCd or NiMH type with 1000 mAh capacity at least. More capacity will certainly do no harm. The power consumption is dependant on the rpm. At 2,000 rpm the single cylinder unit draws 200 mA, at 8,000 rpm it is 680 mA. Under normal conditions you will not fly at full throttle the whole time, so a 1400 mAh battery that is carefully managed will suffice for two hours with safety.

The twin cylinder ignition draws 300/1100 mA and therefore a 2200 mAh battery is recommended for two hours flying.

Lipos

Using a 5,5 to 6,0 V linear voltage controller, like the "Digi-Switch" available from Modellbau Deutsch, you can also use twin cell Lipos.

Starting the engine

Due to the Microprocessor battery ignition starting the engine is very easy. Although the starting method is entirely different to what you are possibly used to with the magneto ignition.

One important point to begin:

Never prime the engine by sucking in with a switched off ignition! The battery ignition, unlike the magneto ignition, will not start the engine with a wet plug.

For starting follow these rules exactly:

1. Fill the tank (very helpful).
2. Close the choke.
3. Set the throttle at a slightly higher setting than normal tickover.
4. Have someone hold the model.
5. **Switch on the ignition.**
6. Immediately hit the prop **without any prior sucking in.**

The engine will start as soon as enough fuel air mix is ingested due to the closed choke, and will turn a couple of times and stop as the choke is not opened. This is nothing for concern, the engine has shown you there is enough fuel ingested. It remains to open the choke and with a couple of flicks the engine will fire, burn off the excess fuel and run. Let the engine warm up for about 15 seconds before advancing the throttle.

It is to no purpose to violently flick the propeller, just lightly flick the prop over the TDC, you will notice it only takes the small finger at the propeller tip to do this. An elegant method is to flick the propeller over from behind the engine, using the other hand to hold the model, this way you are in no danger from the prop. You will find it pays to have the transmitter in range from your flicking hand.

As a safety feature the ignition will automatically shut down when one minute has elapsed without the propeller being turned. This safety switching can be a slight problem if you get distracted when starting and you do not turn the propeller at least once inside one minute and forget to switch off and on to reactivate the ignition. With the ignition shut down you will easily suck the engine full of fuel before you notice what is wrong and it will then be probably too late and you will have to remove the spark plug and shake out the petrol.

Nevertheless always switch off the battery ignition immediately after finishing a flight as during the minute it only requires someone to carelessly flick the propeller once ...

Further with the engine stopped and the automatic shut down active, the microprocessor still draws a small current that will unnecessarily flatten the battery when forgotten.

February 2006,

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