

A Dummies Guide to R12 Timing at the Roadside.

With any motor there are basically two methods of setting the timing, either by:-

- (1) Measuring the piston a set distance down the bore from TDC or
- (2) Measuring by degrees of crankshaft rotation back from TDC.

With an R12 either method is simple with the motor on the work-bench, some of us are even lucky enough to have the flywheel marked to show both TDC and the full advance point although it is simple to afix a degree disc to the flywheel if it is not so marked.

The difficulty arises when the motor has been assembled into the frame and it becomes necessary to re-time for some reason.

To use Method (1) means removing a cylinder head and so sacrificing an expensive and not so easy to get gasket while Method (2) requires the removal of the gearbox (transmission) along with the drive shaft etc.

There is a way round this which, while not as accurate as the work-bench methods is adequate when you consider that a low-compression side-valve motor is not as critical as to exact ignition timing as a high-compression overhead-valve motor and with modern higher octane fuels a small amount of ignition retard can be beneficial.

Normal practice is to set the ignition timing at full advance and this is undeniably the best way but this time we are going to set up at full RETARD.

When you look at the motor specifications you find that an R12 is timed at 42 degrees before TDC.

Now look at the specifications for the Bosch magneto and you can see that there are 20 degrees of manual ignition advance available, since this is at the magneto it equates with 40 degrees at the crankshaft.

So if you set the ignition timing to Full RETARD at TDC you will be running only 2 degrees retarded from specification and the only time this would matter is when running at higher speeds than the majority of us will use when riding an R12.

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So - How to go about it.

First a little terminology clarification.

(1) We set the timing on Number 1 cylinder, practice is that cylinders are numbered from the timing end of the crankshaft towards the drive end so on an R12 the number 1 cylinder is the

right hand one when facing forward.

(2) Unlike on the later twins, the magneto on an R12 is NOT a twin spark unit, it only fires one cylinder at a time using a built-in distributor.

On the magneto the Number 1 HT pick-up is the one on the right, facing towards the Number 1 cylinder or when looking at the points

There are two "humps" on the cam-ring of the magneto so the magneto points open twice per magneto revolution and the Number 1 "hump" is the one on the opposite side to the Number 1 pick-up. This means that when setting the timing on Number 1 cylinder then the rubbing heel of the points is pointing away from that cylinder.

Now to the job itself.

It is easier if you remove the fuel tank but this is only essential if you are changing the magneto, you can reset the timing without doing so but access is more difficult.

Make sure the cam-ring housing is pressed firmly back against the magneto body, it is a separate unit and can wobble if this is not done, not good for accurate timing!

Make sure that the ignition points are set to the correct gap before you start as well!

Turn the motor over until the Number 1 piston is on the compression stroke, to do this remove the tappet adjuster cover and watch the inlet valve. As you turn the motor watch for it to open and then close again, that cylinder is now rising on the compression stroke.

(Do not rely on seeing both valves closed at the same time, when the motor is at TDC of the compression stroke of Number 1 cylinder, then Number 2 cylinder is at the top of the exhaust stroke and the exhaust valve is on the point of closing while the inlet is on the point of opening so both will appear the same at that point. CHECK!)

Now you can remove the housing over the magneto drive sprocket and loosen the sprocket on its taper.

You need some way to turn the magneto here and the dodge I use is to have the sprocket retaining nut (the proper nut has a collar and is about double the depth of a standard nut) about half way off the shaft and to put a short bolt in the open end to jam against the end of the shaft, jam nuts in reverse as it were. This allows me to turn the magneto shaft with the nut to set the points break (A piece of dental floss tied round this bolt will mean that you can easily retrieve it ~~when~~ if you drop it. DAMHIK!).

Look into the spark plug hole for the piston crown and S L O W L Y turn the motor, as soon as you see it STOP.

Now very carefully inch the motor further until you get to TDC, you'll probably overshoot the first time so wind the motor back until the piston is out of sight and bring it up again.

Don't rock the motor back and forward to get TDC, you MUST always bring it straight up to that point so that all backlash is taken out of the timing drive.

(A check for TDC here is that there is a timing mark on the camshaft sprocket that can be seen if you remove the breather cover at the front of the motor, remember that it is on the camshaft so it will point straight up on one TDC and straight down on the other.)

Set the magneto to FULL RETARD, the lever on the cam-ring housing should point up towards the fuel tank and again make sure the cam-ring housing is pressed hard back against the magneto body.

Next step is to set the points to just breaking.

With a magneto you cannot use a normal timing buzzer or light as you would with a coil ignition system, Craig Vechorick <<http://www.benchmarkworks.com>> is marketing a special unit for this job, listed as "Tool 028--solid state magneto timing indicator" or there is always the old faithful stand-by of using a cigarette paper (Rizla Blue are the thinnest).

Once you have it set then using your fingers press the magneto sprocket back onto the shaft as firmly as you can and then tighten the retaining nut to finger tight against the sprocket. Again press the sprocket in place and nip the nut up a little with a wrench. You are not tightening it fully here, just enough to hold everything in place.

Turn the motor over a few times and then bring it back up towards compression TDC on Number 1 cylinder.

Set up your chosen points break indicator and inch the motor up to TDC and check that the points break, ideally a fraction before TDC.

If all is well then fully tighten the sprocket nut, replace the sprocket housing cover (and the breather cover if necessary!), replace the points cover cap and fire up the motor.

Do not try to fire up or run the motor without this cap, the cam-ring housing is loose on the end of the magneto body and can move around or even come off if the cap is not firmly held in place by the spring clip. (once again DAMHIK!).

For a first time start it is an idea to remove the earthing wire from this cap, it is not unknown for a faulty ignition switch to give problems with starting and if you have just been working on the ignition system then the switch is the last thing you will blame.