



Model A Ford Technical Report

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Mechanical Spark Advance System for the Model A Ford

Have you ever had trouble starting your Model A, stalled at a stop sign, lugged the engine up the hill, or worse snapped the starter bolts off because you forgot to push the spark lever up? Do you keep stalling at idle, or just sputter along getting up to speed because you forgot to move the lever down? If you're reading this article at least some of this probably sounds familiar, we have all been there. These issues are all related to proper ignition timing.

The ignition timing needs to become increasingly advanced as the engine speed increases so that the air-fuel mixture has the correct amount of time to fully burn. As the engine speed (RPM) increases, the time available to burn the mixture decreases but the burning itself proceeds at the same speed, it needs to be started increasingly earlier to complete in time. It's critical to engine performance that the spark occurs at the correct time.

The Model A Ford (1928-1931) controls this spark advance adjustment with a manual lever on the steering column. It is found where the modern turn signal lever is located.

The amount of timing advance is normally expressed in degrees of crankshaft rotation, Before or After the piston is at Top Dead Center in the cylinder (BTDC, ATDC), with zero degrees being at TDC. In a 4-stroke engine the distributor RPM is half the engine crankshaft RPM.

The Model A distributor has an initial timing point of 0 degrees TDC plus an actual manual maximum advance of 40 crankshaft degrees. The breaker plate arm slot in the bakelite distributor cover limits this travel.

The Model A ignition uses a zero degree (TDC) initial timing point so that the engine can be easily started by hand crank. Move manual spark advance lever all the way up for the TDC starting position, however the engine should never be run in this "retarded" position. The advance lever should be moved about 1/4 travel down on the steering column after starting the engine (6 to 8 degrees BTDC) for the correct idle timing. The spark then continues to be gradually advanced as the engine RPM increases, and conversely retarded (lever up) as the engine RPM slows. The maximum spark advance should generally not go more than 3/4 advanced (30 degrees BTDC) under normal running conditions.

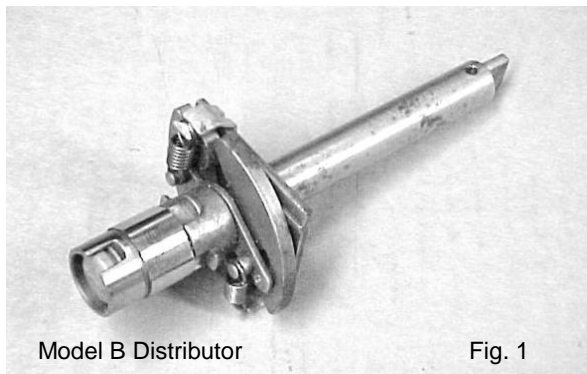
The functional Model A spark advance range is then from 0 degrees TDC to 30 crankshaft degrees BTDC, (0 to 15 distributor degrees). The amount of advance to be delivered is solely dependent on the speed that the engine, and distributor, is rotating.

You got all that? Easy enough right? Even a new Model A driver should be running that spark lever reasonably well with a couple hundred miles under the belt.

The correct timing and spark advance is critical to the efficient performance of the engine. Ford recognized early on that this timing function was too important to be manually controlled. They came up with a “better idea” and developed a mechanical spark advance mechanism that was matched to the RPM of the engine. Virtually all production vehicles made after the Model A incorporate an automatic spark advance system, including the modern car in your driveway.

With the Model B (1932-1934), Ford introduced a mechanical spark advance system that works with the changing engine speed (RPM). This is possible by using the centrifugal force of the spinning distributor shaft. Weights and springs inside the distributor rotate and affect the timing advance according to engine speed by altering the angular position of the points cam. This type of automatic spark advance is referred to as centrifugal timing advance.

The Model B used a distributor similar to the Model A, except it was equipped with a centrifugal advance weight mechanism as part of the rotating shaft assembly. These weights and springs can be seen mounted on the Model B distributor shaft (Fig. 1), and again in the exploded parts view shown in the red circle (Fig. 2).



Now for that “Better Idea” on the Model A.

The Nu-Rex Company of Akron, Ohio has designed and manufactures a mechanical spark advance system specifically for the Model A Ford. <http://www.nurex.com/>

Their design is a centrifugal timing advance system that replaces the lower distributor shaft and is shown below in Fig. 3. In this way the timing mechanism is completely hidden from view behind the valve cover (Fig. 4) and requires absolutely no modifications to the Model A distributor, engine, or timing procedures.



Nu-Rex Mechanical Advance

Fig.3



Fig. 4

The Nu-Rex automatic spark timing system has been designed to deliver between 10 to 12 degrees advance per thousand engine RPM. This provides the full spark advance range from zero degree (TDC) initial timing point for starting, through about 6 degrees BTDC at normal idle, and up to 30 degrees BTDC maximum at 2800 crankshaft RPM.

With a few common tools and moderate mechanical ability the installation process will take about an hour and a half. A very nice step-by-step instructional video is available on YouTube at [NuRex Mechanical Advance Installation Video](#). The Nu-Rex Spark Advance Kit (A-12176) sells for \$186 *at time of printing* and is available direct from Nu-Rex or through all of your favorite Model A parts suppliers.

The centrifugal advance mechanism will replace the lower distributor shaft and is located behind the valve cover on the passenger side of the engine. To install you will remove the distributor, carburetor, oil return pipe, and valve cover. The intake and exhaust manifolds do not need to be removed. The video suggests draining the engine oil, however this is not necessary as the oil level is well below the valve cover when not running. When putting the parts back together you will want to use new gaskets, unless they were recently replaced and are still serviceable. This includes the valve cover gasket (A-6521), oil return pipe gaskets (A-6648) and the carburetor to manifold gasket (A-9447). Once installed the distributor is re-installed completely unmodified, but will need to be re-timed as normal. A Nu-Rex timing wrench is included with the kit along with full instructions.

Why would I put a mechanical advance on my Model A?

No more backlash during starting because you forgot to retard the spark. No more poor idle because you forgot to advance the spark. No more stalling at stop signs. No more sputtering along as you speed up. No more lugging the engine going up a hill. No more broken starter bolts to fish out of the flywheel housing.

The engine automatically adjusts for the correct ignition timing, and you Just Drive like your modern car! But hey, there is still that double-clutching thing you can worry about.

Author's note: This paper is a compilation of online reports, blogs, and vendor information pertaining to the related topic. Very little, if any original work is included. Instead the confusing, conflicting, and sometimes inaccurate topic information readily available has been heavily edited until it is in a form that seemed relevant and made sense to me. I hope it makes sense to you also. -Willie