

Understanding the Triumph Distributor

A Distributor is a combination of two mechanically activated switches in a plastic and metal housing. One of the switches is a simple on and off switch. This is called the points. The points ride against a multi-lobed cam that operates the points (turns the switch on and off). There are as many lobes as there are cylinders in the engine. The points tell the ignition coil when to send a spark to the cylinders (timing). Timing needs to change with engine speed so the points sit on a movable platform that advances the point timing at higher RPMs. Most distributors have two advances, mechanical and vacuum to move the plate the points sit on.

The other switch is a rotary switch that rotates to as many contacts as you have cylinders in your engine. The moving part of the switch is called the rotor. The switch contacts are in the distributor cap. The rotor sits on top of the distributor shaft and is rotated by the shaft so that it touches each contact in succession. This switch routes the spark to the correct cylinder when the points tell the coil to generate a spark.

Points (the on-off switch that tells the coil to make a spark)

The points are a replaceable on and off switch located on a plate within the top of your distributor. The points control when the coil will send a jolt of electricity through the cap and rotor to a spark plug.

The points have two contacts. One contact is stationary. The other contact has a plastic follower on its arm that rides on the distributor shaft cam. The cam pushes the follower, opening and closing the points.

One of the points is grounded, providing a return path to the battery. The other point carries electricity from the low voltage side of the coil. When the points open, a high voltage flows from the coil, through the center contact in the distributor cap, through the rotor, the cap, the spark plug and to the ground.

When you set the point gap, you are setting up the length of time the switch will be on & off in relation to the turning of the distributor shaft.

When points close each time there is a small spark between the contacts. Over time a little bit of contact material is moved from one contact to the other by the spark. A hole is created in one contact and a mound on the other. This affects the point gap which changes the timing and keeps you from correctly regapping the points with a feeler gauge. Points are worn out when you can not get proper gap with a feeler gauge. You need to replace them when this happens. You can file small mounds on point contacts and get a fresh contact surface with a miniature flat file or sand paper. This trick will get you a few more miles out of a set of points. This is a good thing to know if you are on a long trip with no replacement points handy.

If you have the ignition switch on with the engine not turning and the points are closed,

current will flow continually through the points. This causes the points to heat up and can burn them so they no longer function correctly. This is why most cars have an accessories ignition switch position. Everything is on except there is no power to the ignition system. Our older Triumphs do not have an accessory ignition switch position so we should not leave the ignition switch on when the engine is off.

Distributor advances (the way your engine tell the points when the spark is needed)

An engine needs to have the spark arrive at different times for different engine speeds. To accomplish this the distributor has a mechanical advance and usually but not always a vacuum advance. These advances advance the timing (when the points tells the coil to make a spark) at higher engine RPMs. The points sit on a movable platform. The mechanical advance is made up of a set of weights and springs. The turning of the distributor shaft pushes out the weights advancing the timing as RPM is increased. When this happens depends upon the springs. Broken or weak springs or a rusted or gunked up mechanical advance can make the vehicle seem low in power and can cause engine overheating under load. You can check for a frozen mechanical advance by using a timing light on the timing marks with the vacuum advance disconnected. You should see the mark on the flywheel pulley move when take the engine from idle to higher RPMs. If this doesn't happen you need to have your distributor rebuilt.

Most engines also have a vacuum advance as well as the mechanical ones. What this does is advance the engine even more when it is under load for better power. starting in the mid 70's some distributors came with a vacuum retard that retards the timing when the engine is under load to reduce hydrocarbon emissions. The metal disk shaped thing hanging off the side of your distributor is the vacuum advance/retard. It has a rubber diaphragm inside that is attached to the movable plate your points sit on. One side of the diaphragm is open to the outside (ambient air pressure). The other side is connected to the base of your carb or intake manifold through a tube. The level of vacuum from the base of the carb pulls a rubber diaphragm and changes the timing. You check to see if this is working with the engine off. Remove the distributor cap so you can see the point mounting platform and disconnect the vacuum line from the base of the carb or intake manifold. Apply a vacuum either mechanically by a vacuum pump such as a Mity-Vac or by sucking on the tube. You should see the point attachment platform move when you apply vacuum an stay advanced as long as the vacuum is applied. If it does not move or or moves then goes back to the original location with vacuum still applied you either have a bad diaphragm or tube/connection. Either the vacuum advance unit on the distributor need to be replaced or you have to fix or replace the vacuum line. A problem here cause two things to happen. The engine does not get proper advance for full power under load and the air leak leans out the air fuel mixture going to the cylinders. This can cause loss of power, pinging and can shorten valve life dramatically.

Cap & rotor (the rotary switch that tells the spark where to go)

The rotor sits on top of the distributor shaft and rotates around in circles. It has a metal strip that goes from the center of the rotor top to the outside of the rotor cap. This is a switch contact. The cap has a center contact and as many contacts around the top edge of the cap as there are cylinders in the engine.

The center contact is a spring loaded carbon contact that rides on the center of the rotor. The Rotor is just long enough to reach the outer contacts on the distributor cap. The high voltage electricity from the coil goes through the big wire coming out the end of the coil to the center of the distributor cap. It then travels down the carbon contact to the metal plate on the rotor, along the metal plate to one of the outer contacts on the top of the distributor cap. It goes out of the distributor, through the spark plug wire to the spark plug. A spark jumps the gap in the spark plug igniting the air fuel mixture causing it to burn.

The important thing is that the rotor needs to be pointing at the right terminal when the jolt of electricity is coming from the coil. This is set by rotating the distributor body. Since the rotor points to each contact around the cap in order, each contact on the direction of turn goes to the next cylinder that needs a spark. This is called the firing order. If you know the firing order and which distributor cap contact goes to cylinder number one, you know which spark plug wire goes where.

To set the point gap (length of time the points stay open, affects spark intensity):

Locate the plastic cam follower on the movable point arm. To set the timing, this follower needs to be sitting at the tip of a cam lobe. If you are going to set the timing afterwards, you can loosen the ring at the base of the distributor and rotate the distributor until the plastic follower is sitting on the tip of a cam lobe. If you are not planning to adjust the timing afterward, put the car into fourth gear and push the car forward until the plastic follower is sitting on the tip of the cam lobe. This is best done with a helper and in a place where the car will not get away from you. Alternatively, you can put the transmission into neutral and turn the engine over with the starter crank.

Once the plastic follower is sitting at the tip of the cam lobe, you can adjust the point gap. On most British cars the gap is set to 16 thousandths of an inch. You slightly loosen the screw holding the points down, move the arm until the gap is correct then retighten the screw.

This means the 16 thousandths feeler gauge will go between the points without opening them farther, but a 17 thousandths feeler gauge will not. Tighten the mounting screw. You are now ready to adjust the timing.

Lucas makes this nifty distributor tool that fits on your key chain. It is a combination screwdriver and feeler gauge that allows you to set the point gap anywhere, anytime.

Continuity Light (tool for setting static timing):

A continuity light is used to adjust the timing when the engine is not on. The process is called stationary timing.

A continuity light can be purchased at any auto parts store or you can make one yourself. It is basically a 12V light with two wires attached. You connect one wire to ground and the other to the movable arm of the points. Turn the ignition switch to the on position. When the points are open, the light is lit. When the points are closed, the light is not lit.

Adjusting the timing (Telling your distributor when to make a spark at idle engine RPM):

Note: This should be done after the point gap is set, not before. The distributor shaft rotates in a counter clockwise direction. If you turn the distributor housing counter clockwise, the direction that the rotor is turning, you are retarding the timing. If you turn the distributor housing clockwise, into the rotation of the rotor you are advancing the timing.

First, locate the number one spark plug. For inline engines, it is the one closest to the radiator. Follow the number one plug's wire back to the rotor. When the number one plug fires, the rotor will be pointing to that contact. Remember where the contact is located along the circumference of the distributor then remove the cap so you can see where the rotor is pointing.

Line up the timing marks on the engine block and crank pulley with the rotor pointing at the cap terminal that has the spark plug wire going to the number one spark plug. Since the crank rotates twice as fast as the distributor shaft you have a 50% chance of getting it right the first time. If the rotor is pointing to a different terminal, rotate the engine one more time until the timing marks are lined up and the rotor is pointing to the number one plug. Once you have the timing marks lined up loosen the bolt to the clamp at the base of the distributor so that the distributor body can be rotated.

What you want is for the points to just be opening when the timing point is lined up. This is where the continuity light just comes on.

If you look at the plastic follower that rubs against the distributor cam, you want it to be on the leading side of a cam lobe. This will be the counter clockwise, or left side of the cam lobe.

Attach the continuity light and turn the ignition switch on. With the follower on the correct side of the lobe, slowly turn the distributor body clockwise until the continuity light just comes on (The points just start to open). If it's already on, move the distributor body counter clockwise (retard) until the continuity light goes off. Then slowly rotate it clockwise.

Once you are satisfied that you have the distributor body in the location where the points are just opening (the light just goes on), turn the ignition off and tighten the base of the distributor. Reassemble everything and go out for a drive.