Rex's Speed Shop

CDi Ignition Generator Checks & Ignition Timing

Yamaha DT125MX 1986-89, DT125MX 1991, DT125 1980-81
DT175 1980-81

Applicable to the above models our 'DT1' CDI unit: Where you have no spark, poor starting, misfiring, a weak or yellow spark, the engine stops, only restarting when cold, or a failure to run after fitting a new CDI unit, the generator is most often at fault.

The condition of the generator can usually be assessed with a careful visual inspection and basic multimeter tests, bearing in mind the age of the system. If fitting a new component changes the fault or stops the ignition working, this normally indicates additional faults within the system. This guide does not replace or alter any instructions or warnings given in the Yamaha workshop manual and assumes the work is being carried out by someone competent to interpret readings and complete the work to a high automotive standard.

Identify the system:

Firstly there are many subtle variations of this Mitsubishi system, carefully check you have the one this document refers to.

F3T251 Flywheel has 4 'windows'

Timing mark, aligns with flywheel mark

Single source coil, mounted on the **LEFT** of the pick-up.

Manufacturer	Mitsubishi	Item	Notes
Flywheel: (never mix flywheels and stators)	F3T251	Source coil ~ 4.0mm thick at mounting points	3J0-85512-20
OEM CDi P/N	3J0-85540-20-00	Brown ~ Black	300Ω @ 20ºC
REX CDI P/N	DT1	White/red ~ Black	10Ω @ 20ºC
IGN TIMING	DT175 ~1.45mm BTDC. 17.5º @3,000 RPM	HT Coil PRI / SEC	0.6 ~ 1.5Ω / 4KΩ ~ 8KΩ

Testing the CDi generator windings

This guide brings together the key information needed assess the bike's stator and interpret the results. The measurements themselves are carried out using a multimeter, following the procedures described in the Yamaha workshop manual. For that reason we do not repeat those step-by-step test procedures here. If you are unfamiliar with using a multimeter to take these readings, we recommend seeking assistance from someone experienced in electrical testing.

We cannot accept responsibility for incorrect diagnosis of faults within the system. Parts returned for testing that are found to be fully functional may incur standard workshop inspection charges.

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Your Test Results:

Ambient Temperature:……..C or F (please circle which units)

Measure Resistance:	Standard reading @ 20ºC	**Your Readings (un-corrected):**
Brown ~ Black	300Ω	
White/red ~ Black	10.0Ω	
HT Coil PRI / SEC	0.6 ~ 1.5Ω / 4KΩ ~ 8KΩ	

Important: Many manuals suggest accepting a large tolerance of 10 or even 20% on measured coil resistance readings, yet this is entirely misleading as CDi windings are precision components. The key point is that copper's resistance changes in a predictable way with temperature, therefore once a correction for ambient temperature has been applied, any difference between specification and a measured value gives a clear warning that the coil is breaking down internally. There is no 'allowable limit' and hence no acceptable tolerance because electricity is very like water in that once a weakness has formed, it works away at it until it escapes freely. Because copper is very temperature sensitive and meters can vary, you can expect small variations in measured resistance, 2% is common but where a discrepancy begins to reach 5% or higher you have found a failed winding. Any winding that gives no reading or one that does not remain steady has also failed.

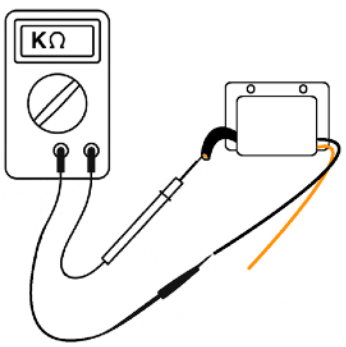
Correct for Ambient Temperature		
Temp (C)	Source Coil Ω	Pick-up Ω
-10	265	8.8
-5	270	9.0
0	276	9.2
5	282	9.4
10	288	9.6
15	294	9.8
20	300	10.0
25	305	10.2
30	311	10.4
35	317	10.6
40	323	10.8

However, measuring the copper resistance does not give us any clue as to the strength of the winding's insulation. CDi windings are high voltage items and can begin to exhibit insulation breakdown after as little as 10 years. This becomes a significant factor yet cannot be detected with a multimeter. Instead mechanics must look for clues such as, when the engine heats up, does the ignition stop sparking yet when left to cool, the sparks return? Before it gets to this stage however there maybe more subtle clues, a slight occasional misfire, difficulty in starting a hot engine, a 'cough' under load. Further clues include yellow or orange sparks or an engine that only starts when bump started.

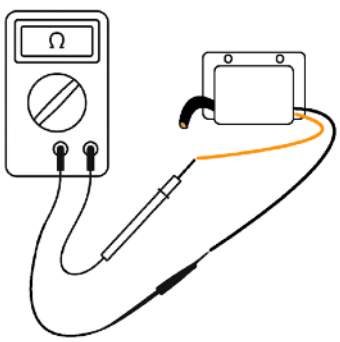
Remember: CDI ignition windings operate under significant electrical and thermal stress, insulation weakens with age allowing power to seep away unseen. Testing copper resistance does not show weak insulation.

Testing the HT coil

When measuring HT coils, remove the cap. Secondary resistance is taken between HT lead and earth wire, or the metal frame.



Primary readings are made between the primary wire and earth wire, if there is no earth wire, then the metal frame is earth.



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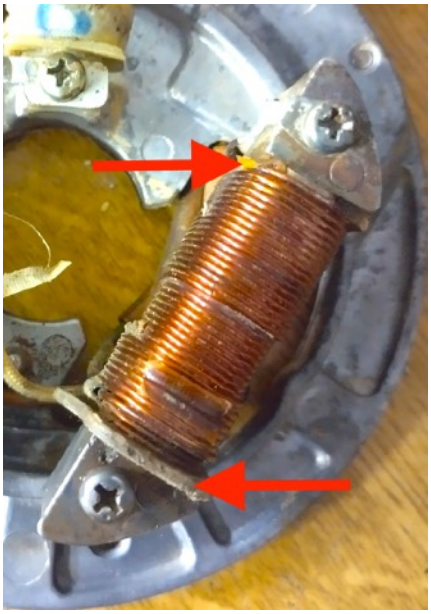
Checking the lighting coil:

The lighting coil is wound from much heavier wire than the CDi source coil, it operates at a much lower voltage and it is more robust, it is also easier to assess by inspection. Signs of burning or mechanical damage to the copper will be obvious, however patchy discolouration, usually lighter in colour due to overheating maybe less easy to spot. The copper will be an even colour over the entire winding if it is still in good condition. Age of the lighting coil, and hence it's insulation is again a significant factor.



Check for:

General condition, the winding on the right has an end piece missing, a common issue on older generators. The insulating end pieces must be intact at both ends of the winding as these prevent the copper from contacting the steel winding slot. They also form part of the mechanical support for the winding, if missing or damaged, the winding is no longer properly supported or sealed.

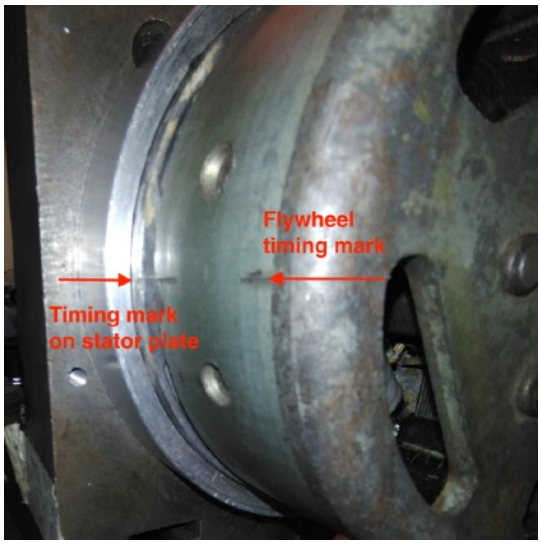
Check also the copper is tight on the steel former, firmly hold it with your fingers and attempt to move it back and forth towards the mounting screws, also attempt to twist it. Any movement of copper on the former, even slight shows a failure.

Lighting coil electrical test

Lighting and charging coils consist of several metres of relatively thick copper wire, so their resistance will always be very low, typically between **0.2 Ω and 2 Ω**. Readings in this range equal a pass. Getting the exact reading can be difficult for many multimeters as they simply are not accurate at this very low end of the scale. Don't be surprised to find your readings do not exactly match the figures in the book, 'sensible' readings are key.

Carry out the resistance tests described in the workshop manual. On the DT175 the lighting coil is grounded, so both readings are taken to ground. The resistance measured between black (or stator plate) and green/white should be slightly higher than the reading between black (or stator plate) and yellow. A good result is one reading slightly higher than the other, even if they don't exactly match what the book says.

Setting the Ignition Timing



The factory assembly timing marks on stator and flywheel allow the timing to be set without a strobe.

This is covered fully in the shop manual, however it maybe helpful to understand that Yamaha instruct you to set the timing to the fully advanced point, at idle therefore the marks do not align. By far the best method is using a strobe and ensuring that at 3,000 RPM the line on the flywheel aligns with the timing index. The stator plate is adjustable to allow this. Remove the flywheel to access the stator retaining screws.

If you don't have a strobe the operation is becomes slightly more difficult and less accurate but it is possible to set the piston to the required position BTDC, then check the stator plate timing mark aligns to the corresponding mark on the flywheel.

If setting timing is not something you are familiar with we suggest this task is deferred to an experienced person.