

Rex's Speed Shop

Guide H-1 CB250T - CB250N Hawk, Dream & Superdream 1977~

CDi Electronic Ignition Troubleshooting Guide



Introduction

The Honda CB250T Dream (Hawk in the USA) and European Superdream were enormously popular motorcycles, designed to provide practical, dependable everyday transport. In the UK, they were also the first 'proper' motorcycle for many riders, until changes to learner legislation in the early 1980s reduced the capacity limit from 250 cc to 125 cc.

This guide builds on the information in the Honda workshop manual, providing clearer, more detailed advice on diagnosing CDI ignition faults. Use it alongside the workshop manual, which contains important procedures and specifications. Take care when using aftermarket manuals: some cover later models whose electrical systems differ from those fitted to these earlier machines. With a good multimeter and a methodical approach, we explain what to test, where to take each measurement and what the results mean.

These models use a Nippon Denso self-generating CDI ignition system, with separate windings in the generator supplying the ignition and the 12 V charging system. The ignition does not rely on the battery or the charging circuit for its power. Replacing the regulator-rectifier or other charging related components therefore cannot stop the ignition from working.

Honda introduced changes during the approximately five-year production run, and ignition components and generator parts from the CB250T must not be mixed with those from later models. We supply two versions of our CDI unit to suit the different systems. However, the basic generator resistance test procedures in this guide are the same for both versions.

This guide is applicable to the following models:

CB250T - Dream/Hawk 1977-78

CB250N/NZ - Superdream 1978-79

CB250NA - Superdream 1980

CB250NB - Superdream 1981

CB250ND / NDB / NDC Superdream 1982 onward

CM250T 1980-82 - MC04

Not covered by this guide (different system) CM250C 1982 on - MC06

Start by defining the fault:

- No spark?
- Misfire when hot?
- Misfire under load?
- Intermittent spark on one cylinder?
- Did the fault change, or the ignition stopped after fitting another CDI unit?
- Is the spark yellow or orange rather than whitish-blue?
- Difficult starting or only starts by bump starting or excessive use of starter motor?

These symptoms help determine where to test next, but the age of the complete system must also be considered. Nearly half a century after manufacture, the original ignition components are now well beyond their expected service life.

Thirty years ago, replacing a single faulty part was often enough to restore reliable operation. Today these systems may need the electrical equivalent of a full engine rebuild. Owners should be prepared to budget for a thorough overhaul, including replacement parts, rather than assume that one new component will provide a lasting repair. Restoring a system of this age properly can involve a substantial investment, but it provides a sound basis for dependable service.

This guide helps identify common faults and assess the condition of the system as a whole. Fitting a new part while other components remain worn or deteriorated can leave underlying faults unresolved, with further repairs and expense to follow.

A methodical diagnosis of the complete system is therefore essential before ordering replacement parts. If a new part is returned to us for re-testing, our standard test fee may apply.

Basic Checks

Before starting, complete the basic troubleshooting checks in your workshop manual and rule out fuel-related problems or other straightforward causes. Fit new spark plugs and plug caps: these are common sources of ignition trouble and should be eliminated before moving on.

This guide focuses on components you can readily check with a good-quality multimeter. CDI units cannot be reliably tested this way. Some workshop manuals include complex resistance tables, but these can be confusing and will not reliably distinguish a serviceable unit from a faulty one.

At Rex's, we offer a low-cost, fixed-price CDI testing service using specialist equipment to verify the unit's key functions.

WARNING: Never connect a CDI unit or HT ignition coil directly to a DC power source, such as the motorcycle's battery. These components are not designed for direct DC operation, and doing so can cause immediate and serious damage to the CDI unit or HT coil.

Matched Parts

Stators, flywheels and CDI units may look identical and physically fit, but parts from different models are not necessarily compatible. Honda lists two alternator assemblies, so ensure the ignition components form a matched set. Mismatched parts can prevent the engine from running or make correct ignition timing impossible.

No spark - Kill Circuit Check

First, check whether the kill circuit is preventing the ignition from producing a spark. Locate the CDI unit and disconnect its black/white wire at the separate bullet connector. Crank the engine. If the spark returns with this wire disconnected, the fault is in the motorcycle's kill circuit.

To investigate, switch off the ignition and disconnect the battery before making any resistance measurements. Leave the black/white wire disconnected from the CDI unit.

Set your multimeter to resistance and connect it between the black/white wire from the motorcycle's wiring loom -not the CDI unit- and a good earth point, such as the HT ignition coil mounting point or its green earth wire.

With the battery still disconnected, turn the ignition switch to ON and set the kill switch to RUN. The meter should indicate an open circuit: there should be no continuity to earth.

If continuity remains, check the switches and wiring for a fault that is keeping the kill wire connected to earth. Repair the fault, then repeat the test to confirm that the circuit is open with ON and RUN selected. Reconnect the kill wire and battery.

HT Coil Check

The workshop manual describes only a performance test for the ignition coil, requiring another piece of test equipment, but we have located resistance specifications in Honda's technical data. Always remove both HT plug caps before testing. Set your multimeter to k Ω (kilo-ohms) for the secondary winding and Ω (ohms) for the primary. At 20°C, an original Honda coil should measure approximately 0.5 Ω primary and 8 k Ω secondary.

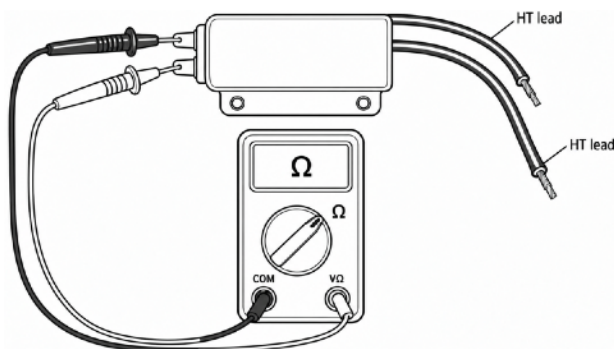
Unlike the CDI generator windings, HT ignition coils are not precision components, so aftermarket coils may give slightly different readings. Both readings should be steady. No reading or a fluctuating reading, once you have confirmed good probe contact, indicates a fault. The primary resistance must be very low. Reject coils measuring around 4 to 5 Ω : these are unsuitable for this CDI system, although they are sometimes incorrectly sold for it.



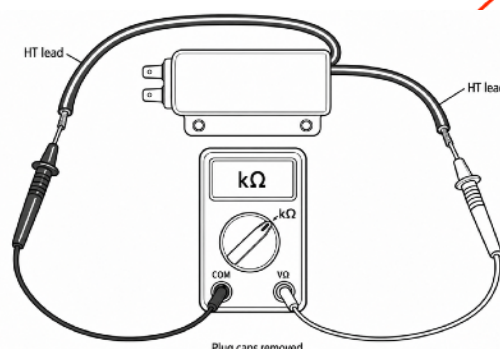
Disconnect the single black/white wire to check kill circuit function.

Measuring HT Coil Resistance, Cont.

Primary Resistance



Secondary Resistance



Inspecting the stator

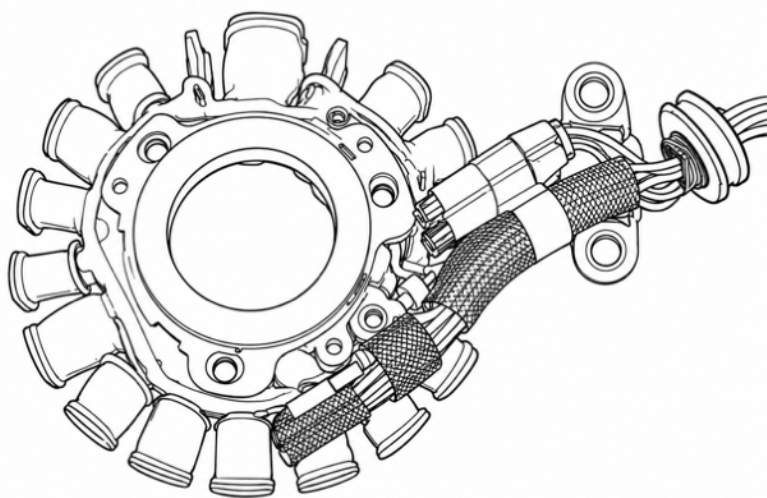
Having completed the initial checks, the next step is a careful visual inspection of the stator. Pay particular attention to the wiring leaving the stator. Electrical stress and temperature in this area are high, so the generator wiring must be in first-class condition, with no joins, repairs or hard and brittle insulation. Corroded, loose or unsuitable connectors are unacceptable in this high-stress area of the wiring.

Look carefully for mechanical damage to the windings and deterioration of the insulation. Discolouration or flaking of the coating on the windings is a warning sign. If the insulation appears burnt, brittle or readily comes away, the stator has deteriorated and should not be considered serviceable.



HTC56 Replacement Ignition Coil

If no obvious faults are found, the next step is to measure the resistance of the individual CDI source and trigger windings. These are divided into high- and low-speed source windings that power the CDI unit, and high- and low-speed trigger windings that provide the timing advance.



There are two main types of fault that commonly appear with CDI windings: wire faults, which are easily spotted with a multimeter, and insulation faults. The latter are not possible to measure due to the construction of the winding, but will show as a running symptom. If heat or load on the engine causes an ignition fault to develop, and the system is past its expected design life, this points strongly to an insulation fault. Wire faults can happen at any time, and often did even when these machines were relatively new; insulation faults tend to occur only on old equipment. Resistance measurements are taken via the six-way socket on the stator lead using a professional-level multimeter. Use the form at the end of this guide to record all your readings.

Advice When Taking Winding Resistance Readings

These tests measure the resistance of the high and low-speed source windings that power the CDI unit and the high and low speed trigger windings.

The Honda workshop manual is not as helpful as it could be here. Its broad acceptable resistance ranges, combined with the way copper resistance changes with temperature, can make it difficult to distinguish a healthy winding from a faulty one.

To give you a clearer picture, we provide temperature-corrected reference readings based on many years of testing these generators. Our table shows the resistance expected from a healthy winding at different temperatures. Select the row closest to the temperature of your generator.

Readings within 2% of the reference value are normal, allowing for small temperature differences and variations in meter accuracy. A deviation of 5% or more indicates a faulty winding, particularly in a generator that is now several decades old. Readings between these limits warrant further investigation.

An open circuit, or a reading that will not remain steady once good probe contact has been confirmed, indicates a definite, or “hard” fault.

First disconnect the CDI from the stator, once disconnected take measurements via the stator wiring connectors without needing to removing the generator from the engine, using a good-quality multimeter with suitable resistance ranges and accuracy. Leave the engine unused for several hours so the generator can cool to ambient temperature.

Measure the temperature rather than estimating it, and use the form at the end of this guide to record the temperature and all your readings. The engine must be left to cool entirely before taking these readings.

Select the closest ambient temperature to yours and read across for a healthy resistance range for that winding				
Ambient Temp °C	3. Low Speed Source Green to White	4. High Speed Source White to Blue	5. Low Speed Pick-up Light blue to Green*	6. High Speed Pick-up Pink to Green
-10	276.63 - 287.92Ω	4.3 - 4.5Ω	125.4 - 130.5Ω	13.8 - 14.4Ω
-5	282.79 - 294.34Ω	4.4 - 4.6Ω	128.1 - 133.4Ω	14.1 - 14.7Ω
0	288.96 - 300.75Ω	4.5 - 4.7Ω	130.9 - 136.3Ω	14.5 - 15.0Ω
5	295.12 - 307.16Ω	4.6 - 4.8 Ω	133.7 - 139.2Ω	14.8 - 15.4Ω
10	301.28 - 313.57Ω	4.7 - 4.9Ω	136.5 - 142.1Ω	15.0 - 15.7Ω
15	307.44 - 319.99Ω	4.8 - 5.0Ω	139.3 - 145.0Ω	15.4 - 16.0Ω
20	313.6 - 326.40Ω	4.9 - 5.1Ω	142.1 - 147.9Ω	15.7 - 16.3Ω
25	319.76 - 332.81Ω	5.0 - 5.2Ω	144.9 - 150.8Ω	16.0 - 16.6Ω
30	325.92 - 339.23Ω	5.1 - 5.3Ω	147.7 - 153.7Ω	16.3 - 17.0Ω
35	332.08 - 345.64Ω	5.2 - 5.4Ω	150.5 - 156.6Ω	16.6 - 17.3Ω
40	338.24 - 352.05Ω	5.3 - 5.5Ω	153.3 - 159.5Ω	16.9 - 17.6Ω

***If stator is removed from the engine, test the low speed pick-up from metal housing not green**

Table to Record Your Readings:

Ambient Temperature:		C or F (please circle)	
TEST	ITEM UNDER TEST	YOUR RESULTS	
Test 1	HT Coil - Cap REMOVED	Primary - Ω	
		Secondary - K Ω	
Test 2	Kill Switch - Resistance between Black/white wire and ground (green wire or HT Coil Mount). Confirm continuity or if none.	Ign ON + Kill set to RUN	
		Either Ign or Kill Set to OFF	
Test 3	Low speed source	White to Green	
Test 4	High Speed Source	White to Blue	
Test 5	Low speed trigger	Light Blue to Green	
Test 6	Advance/high speed trigger	Pink to Green	

If you'd like us to interpret this data for you please e-mail: tech@rexs-speedshop.com.

A good clear photo from a phone is a great way to send us your readings. Ensure you include a very brief description of the fault from the list at the start of this guide, your name and the bike's year and exact model.

If you are working for a customer please state this to avoid confusion of different people talking about the same bike.

Faults Caused By Electrical Load and Heat

If the stator gives correct, stable resistance readings but the motorcycle still runs poorly, consider the symptoms:

- Does the fault worsen as the engine warms up?
- Does it misfire or struggle only under load?
- Is starting difficult, requiring excessive cranking?
- Does one cylinder lose spark intermittently?
- Does it stop running once warmed up, only re-starting when cool?
- Did it stop running altogether after a new CDI was fitted?

The above can indicate that the stator's insulation is failing. As the engine heats up the electrical power finds an easier route to ground than presented by the CDI unit. Once cool the insulation temporarily regains some strength. Often this condition will show as reduced winding resistance, where the insulation has failed sufficiently to short together sections of the winding. However, where the short is between the winding and ground, the resistance may appear normal, so a good resistance does not always mean a good winding. The random way electrical insulation fails is the reason for these seemingly random symptoms.

A new CDI places the intended electrical load on the windings, charging faster and to a higher voltage than an ageing unit with tired capacitors may achieve. This can expose weaknesses in the winding insulation as it places them under the full, intended load. Problems that appear with heat or load strongly suggest insulation breakdown which a multimeter resistance test may not reveal.

Conclusion

If resistance readings are outside specification or insulation failure is suspected, the usual remedy is to overhaul the generator to its original specification. After decades of service, ignition and charging systems will almost certainly need the electrical equivalent of a full engine overhaul. Replacing a single component often exposes weakness elsewhere, so the underlying faults must be addressed to ensure reliable operation and protect new parts.

Our workshops are fully equipped to overhaul stators and trigger windings, and to test these CDI units accurately on the bench. We are happy to advise via e-mail before you send parts to us.

This guide will help you identify common faults and decide where to investigate next. Accurate diagnosis depends on careful testing of the complete system. If a newly supplied part is returned for testing because a fault remains unresolved, our standard test fee applies.



Rex's CDi unit number:
CB2N-0420

Rex's CDi unit number:
CB2T-0261



Brand-new CDI units developed for Honda CB250T and CB250N twins. At the white and blue pair, early systems use bullet connectors; later versions use plastic connector block. These ignition systems are not interchangeable so ensure you select the unit for your bike's existing system.

We specialise in classic motorcycle CDI ignition, developing replacement electronics backed by years of hands-on workshop experience.

We offer a testing and assessment service of ignition, stator and associated electrical parts.



XB05F: Correct plug cap for CB & CM twins. This system requires a 5K Ω resistor in the cap