SOFTWARE & TECH

350z Timing Marks

Published: November 20, 2026 | Index ID: #-

Understanding the 350z Timing Marks: A Complete Guide for the VQ35DE Engine

Proper engine timing is essential for the performance and longevity of any vehicle, and the Nissan 350Z is no exception. The 350Z, powered by the VQ35DE engine, relies on precise alignment of its timing chain and camshafts to ensure smooth operation. Whether you are replacing a timing chain, fixing a misfire, or rebuilding the top end of the engine, understanding the **350z timing marks**is critical. Misaligning these marks can lead to serious engine damage, poor performance, or even catastrophic failure. This guide breaks down everything you need to know about locating, setting, and verifying the timing marks on a 350Z engine.

What Are Timing Marks and Why Do They Matter?

Timing marks are physical indicators cast or etched into the engine components such as the camshaft sprockets, crankshaft sprocket, and timing chain. These marks allow technicians and DIY enthusiasts to align the camshafts and crankshaft in perfect synchronization. On the 350Z, the VQ35DE is a DOHC (dual overhead camshaft) engine with a timing chain (not a belt). The chain connects the crankshaft to the two camshaft sprockets. If the **350z timing marks**are not aligned correctly, the valves and pistons can collide, bending valves or damaging pistons. Therefore, knowing exactly where each mark should be is non-negotiable.

Tools You Will Need for Timing Mark Alignment

Before diving into the process, gather the necessary tools. Attempting to set timing marks without proper equipment is risky. Here is a list of essentials:

- Socket set with metric sizes (10mm, 12mm, 14mm, 17mm, etc.)
- Torque wrench (ft-lb and in-lb ranges)
- Timing chain tensioner tool (or a pin to lock the tensioner)
- Camshaft sprocket holding tool (to prevent rotation while tightening bolts)
- Bright flashlight or work light
- Permanent marker or paint pen (for marking chain links if needed)
- Service manual (Nissan factory service manual recommended)
- Clean rags and degreaser

Locating the Timing Marks on a 350Z VQ35DE Engine

The VQ35DE engine has specific **350z timing marks**on the camshaft sprockets, the crankshaft sprocket, and often on the timing chain itself. The most common reference points are:

- Camshaft sprockets: Each sprocket (intake and exhaust on both banks) has a small dot or line. These must align with specific notches on the camshaft bearing caps or the cylinder head surface.
- Crankshaft sprocket: A keyway or mark on the sprocket aligns with the number one cylinder top dead center (TDC) indicator on the engine block or oil pump housing.
- Timing chain links: Many replacement chains come with colored links (e.g., blue or gold) that correspond to the sprocket marks. If the old chain is still in place, you may need to transfer those marks or count links.

Step-by-Step Procedure to Set 350z Timing Marks

Follow this procedure carefully. Always work on a cold engine and disconnect the battery negative terminal. Rotate the engine by hand using a socket on the crankshaft bolt—never use the starter.

Rotate the crankshaft clockwise (as seen from the front) until the timing mark on the crankshaft sprocket aligns with the TDC indicator on the engine block. On the VQ35DE, this is usually a notch on the oil pump housing. Verify by looking at the number one cylinder piston position (or use a TDC tool). When at TDC for cylinder 1, the camshaft lobes for that cylinder should be pointing away from each other (both pointing up or down depending on valve overlap).

With the crankshaft at TDC, examine the camshaft sprockets on both banks. The **350z timing marks** on the sprockets should align with the corresponding marks on the cylinder head. For the VQ35DE, the left bank (driver side in left-hand drive cars) and right bank (passenger side) each have intake and exhaust sprockets. Typical alignment:

- Left bank exhaust and intake sprockets: the marks should face upward and be parallel to the cylinder head surface.
- Right bank exhaust and intake sprockets: the marks should face upward as well, but may have specific orientation depending on the model year. Refer to a reliable diagram.

If the marks do not align, you may need to remove the timing chain and reset the sprockets. Do not force the engine to rotate.

To adjust the timing chain, you must release or remove the tensioner. On the VQ35DE, the tensioner is hydraulic and is located on the front of the engine. Carefully remove the tensioner bolts and pull it out. You may need to compress and pin the tensioner if you plan to reuse it. Once removed, the chain will have slack.

If you are installing a new chain or correcting misalignment, place the chain over the crankshaft sprocket first, ensuring the colored chain link (if present) aligns with the crankshaft mark. Then route the chain up to the camshaft sprockets. The camshaft sprockets often have three or more positions; you must choose the one that aligns with the chain's colored link or your measured link count. On many VQ35DE chains, there are two colored links for the cam sprockets and one for the crank. Align them precisely. Double-check that the **350z timing marks** on the sprockets match the chain links and that the camshafts themselves are not rotated out of position.

Once the chain is correctly aligned on all three sprockets, reinstall the timing chain tensioner. Torque it to specification. Then rotate the crankshaft by hand two full turns (720 degrees) to bring it back to TDC for cylinder 1. Recheck the alignment of all timing marks. They should line up again. If any mark is off by even a single tooth, repeat the process. A common mistake is to align the marks but not account for chain slack, which causes misalignment after tensioning.

Common Mistakes When Setting 350z Timing Marks

- Assuming the chain has no stretch: Older chains may have stretched, causing the marks to appear misaligned when they are actually fine. If in doubt, measure chain length or replace the chain.
- Not locking the camshafts: Camshafts can rotate slightly when you handle the sprockets. Use a holding tool or a wrench on the cam hex to keep them stationary.
- Confusing intake and exhaust sprockets: The VQ35DE has different marks for intake and exhaust sprockets. Swap them and the engine will not run.
- Skipping the verification step: Always rotate the engine twice by hand and recheck marks. This simple step saves your engine.

Verifying Correct Timing Without Removing Covers

If you suspect the timing is off but do not want to disassemble, you can perform a basic check using a scan tool with live data (look at camshaft position sensor correlation) or use a compression tester. However, the most reliable method remains visual inspection of the **350z timing marks** with the timing cover removed.

What If the Marks Don't Line Up After Installation?

Occasionally, you might install everything correctly but the marks seem slightly off. This can happen if the chain is new and the old sprockets are worn, or vice versa. In such cases, ensure the engine is at true TDC (use a piston stop tool). Also, check if the camshaft sprockets are the correct orientation (some aftermarket sprockets have multiple keyways). For the VQ35DE, the keyway on the camshaft aligns with a specific sprocket hole. If you use the wrong hole, the timing will be off by several degrees.

Tools and Resources for 350z Timing Marks

Several online resources provide detailed diagrams, but the Nissan factory service manual (FSM) is the gold standard. Many 350Z forums also have step-by-step guides with photos. If you are replacing the timing chain, consider purchasing a kit that includes the chain, tensioner, guides, and sprockets. Using quality parts prevents future issues.

Conclusion

Mastering the **350z timing marks**on the VQ35DE engine is a rewarding skill that can save you time and money. Whether you are a seasoned mechanic or a dedicated enthusiast, taking the time to understand and correctly align these marks ensures your 350Z runs smoothly, efficiently, and reliably. Always double-check your work, use the right tools, and consult the service manual when in doubt. A properly timed engine is the heart of a great driving experience.

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