

# **STANDARD<sup>®</sup>**

## **Variable Valve Timing (VVT) Solenoids and Sprockets**

**Comprehensive coverage  
and premium quality for  
high-tech VVT systems**



# Comprehensive Coverage for Variable Valve Timing

Variable Valve Timing (VVT) systems are designed to reduce emissions and maximize engine performance and fuel economy. The electro-mechanical system depends on the circulation of engine oil. Lack of oil circulation can cause VVT components to fail prematurely.

Providing a premium quality replacement for this high-tech, high-failure category, Standard® and Intermotor® are proud to introduce a line of variable valve timing (VVT) solenoids and sprockets. With more than 200 SKUs in the line, Standard® and Intermotor® provide comprehensive coverage for the aftermarket.

**200+**  
**SKUs**

Standard® and Intermotor® offer more than 200 SKUs, which is comprehensive aftermarket coverage



Irregular oil change service is one of the leading causes of Variable Valve Timing failure

**HIGH**  
**TECH**

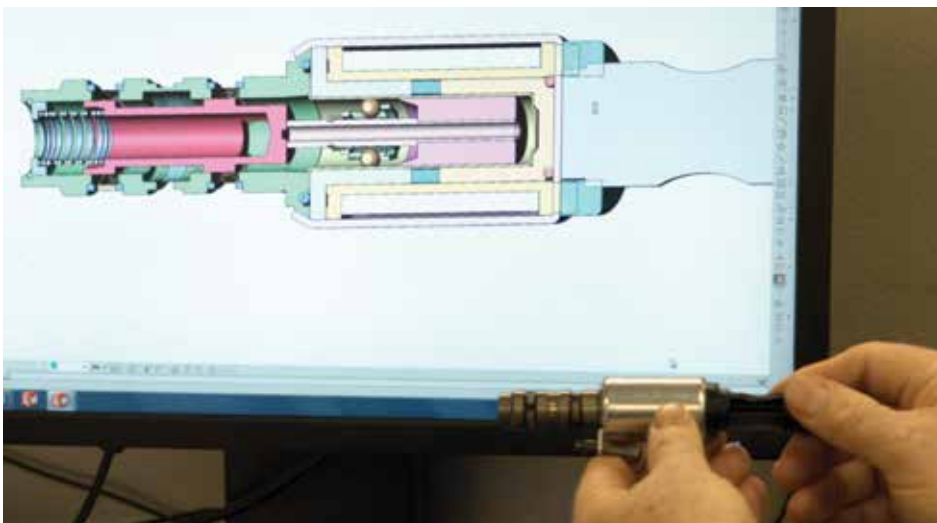
Variable Valve Timing is an extremely high tech category, which is why premium quality is a must

**100%**  
**TESTED**

Standard and Intermotor's VVT line undergoes extensive design and testing to ensure performance and longevity

## Designed and Tested for Real-World Conditions

In addition to providing comprehensive coverage, Standard® and Intermotor® are committed to supplying professional technicians with the premium quality that's critical for this high-tech category. That's why Standard® and Intermotor® VVT solenoids and sprockets undergo an in-depth design process. Our continued commitment to high-quality design and testing standards ensures that each Standard® and Intermotor® VVT component will endure real-world conditions.



# VVT Solutions for High-Failure Applications

Every Variable Valve Timing (VVT) system is slightly different, but there are three general rules to follow to ensure proper performance. First, regularly service the engine oil and filter. Second, use the manufacturer's required engine oil type. Lastly, service the engine oil and filter after you install new VVT solenoids or VVT sprockets.

A few specific applications that are known to have high failure rates for VVT solenoids include the GM 2.4L and Toyota 3.0L and 3.3L applications. As you can see below, Standard® and Intermotor® have these applications covered.

## Rattling Noises and Unstable Idle on GM 2.4L



**Years:** 2009-2010

**Make:** GM

**Engine:** 2.4L

**Common DTCs:** P0011, P0014, P0016, and P0017

**Symptoms:** Rattling noise at startup, unstable idle

**Solution:** Change the engine oil and filter during maintenance intervals and following VVT solenoid replacement

**Parts for the job:** VVT198 and VVT199

## Rough Idle on Toyota 3.0L and 3.3L



**Years:** 2001-2007

**Make:** Toyota

**Engines:** 3.0L and 3.3L

**Common DTC:** P1354

**Symptoms:** Rough idle

**Solution:** Maintain regular engine oil change intervals. When replacing the solenoids, replace the engine oil and filter.

**Parts for the job:** VVT156 and VVT157

# Variable Valve Timing (VVT) Sprockets

Located on the camshaft, VVT sprockets (also known as cam phasers) help maximize engine horsepower and torque curves while reducing emissions and improving vehicle efficiency. To ensure proper performance for this important category, Standard® and Intermotor® VVT Sprockets meet tight dimensional tolerances to improve internal sealing, minimize oil drain back, and reduce frequency of PCM correction.

## VVT500

Ford F-Series Trucks & Expedition (2013-05)

Ford Explorer & Sport Trac (2010-06)

Ford Mustang (2010-05)

Lincoln Navigator (2010-05)

Mercury Mountaineer (2010-06)

VIO Over 3.2 Million



Precision-machined to ensure accurate variable valve timing, correct rough idle, and restore drivability

OE-style installation bolts included with sprockets for ease of installation

OE-Matching sprocket tooth profiles ensure quiet operation

## Variable Valve Timing (VVT) Tech Tips:

Replacing the VVT sprocket on a Ford 5.4L engine is an in-depth job. To help you replace it correctly, here are a few repair tips from our VVT Installation Spotlight video. To watch the full installation, visit our YouTube channel.



- Use a pick tool to make a scribe on the timing chain. The scribe will show you where to put the chain with the new sprocket to avoid retiming the engine.
- Remove the entire camshaft. Otherwise, it will be difficult to align the sprocket's dowel pin. If the pin isn't aligned perfectly, it will be sheared off, causing damage to the camshaft.
- Tighten the sprocket bolt to 40Nm, then tighten an additional 90 degrees.
- Torque the camshaft caps to 10Nm, working your way from the center to the outside.



# Variable Valve Timing (VVT) Solenoids

Generally located on and/or around the cylinder head block, variable valve timing (VVT) solenoids meter the oil flow to control the actuation of the VVT Sprocket. The solenoids can fail due to low engine oil levels and/or irregularly changed engine oil or filters. As a high-quality replacement, Standard® and Intermotor® VVT Solenoids feature hard anodized components to ensure proper performance and long service life.

## VVT101

Ford F-Series Trucks & Expedition (2013-05)

Ford Explorer & Sport Trac (2010-06)

Ford Mustang (2010-05)

Lincoln Navigator (2010-05)

Mercury Mountaineer (2010-06)

VIO Over 3.2 Million

Premium O-rings and gaskets properly maintain oil pressure and prevent premature oil leaks



Designed for optimum performance and long service life

Hardened steel componentry limits sticking during sludge buildup

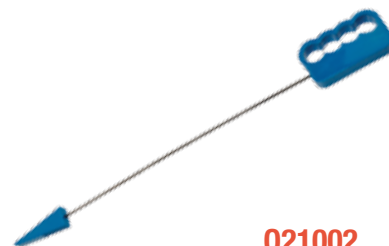


If you're replacing the VVT sprocket, our Master Technicians recommend replacing the VVT solenoid, too. Here are a few repair tips to keep in mind during the replacement:

- Make sure the solenoid screens are clean. Buildup of engine oil sludge is a leading cause of solenoid failure.
- Tighten the solenoid hold-down bolt to 5Nm.
- Perform an oil change following the repair.

## Related Part: TechSmart® Cam Gear Wedge Tool

To prevent the chain tensioner from collapsing during your VVT repairs, TechSmart's Q21002 Cam Gear Wedge Tool is a custom-designed tool that locks the sprocket in place. Here's a tip, though: do not remove the wedge tool while the cam gear is out. If the tool comes out, the timing cover will need to be removed and the engine will need to be retimed.



Q21002

# Our VVT Coverage Will Continue to Expand

Standard® and Intermotor® are committed to increasing coverage for this important category. To date, here's a sampling of the VVT solenoid and VVT sprocket coverage that Standard® and Intermotor® already offer for domestic and import applications:



## VVT207

### BMW

3-Series and X3 (2013-06)  
1-Series (2012-08)  
5-Series and X5/X6 (2011-06)  
740i/740Li (2012-11)



## VVT146

### Hyundai

Elantra (2010-02)  
Tiburon (2008-01)  
Tucson (2009-05)



## VVT196

### Ford

F-Series Trucks (2015-10)  
Mustang (2015-11)



## VVT144

### Honda

Accord (2007-03)  
CR-V and Element (2009-02)



## VVT256

### Dodge

Dodge Dart (2016-13)



## VVT147

### Nissan

Frontier, Xterra, and Pathfinder (2015-05)  
Maxima, Altima, and 350Z (2008-02)



## VVT529

### Toyota

Corolla (2008-98)  
Matrix (2008-03)  
Cellica and MR2 Spyder (2005-00)



## VVT524

### GM

Cars and Compact SUVs (2015-06)



## VVT505

### Nissan

Rogue (2013-08)  
Sentra (2012-07)  
Altima (2013-12)



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