Summer 2015 | Volume 8 | Issue 2

TechNews

Innovation that excites

New!
NissanTechNews.com

Visit NissanTechNews.com to view a complete archive of previous issues of **Nissan TechNews**. Search by vehicle system or published date.

Camshaft Timing
HVAC
Genuine Parts
TechInfo Website

Brought to you by your local Wholesale Mechanical and Collision Repair Network Dealer

NISSAN

Innovation that excites

MORE WAYS THAN EVER TO GET THE ADVANTAGE.

VALUE ADVANTAGE™ PARTS DELIVER MORE FOR LESS!

NISSAN VALIDATED FIT & PERFORMANCE ▪ COMPETITIVE PRICING ▪ IMPROVED CUSTOMER SATISFACTION

Designed for today's competitive market, Value Advantage™ parts offer Nissan validated fit and performance with additional savings of 35%+ off MSRP*.

And we've made it even easier for you to get Genuine Nissan Parts with savings of 35%+ off MSRP* on over 7,500 popular parts. Offering next-day delivery on thousands of parts if the part you need is not in stock.**

35%+ OFF* POPULAR PARTS MSRP EVERY DAY

Help is Here

When you are unsure how to fix it, call the no-fee Nissan Installer Repair Hotline powered by Identifix: 1.855.828.4018.

parts.NissanUSA.com.

*See participating dealer for details. 35%+ off MSRP for eligible popular parts only. MSRP excludes all applicable taxes. Participating dealer sets actual price. **Contact your local dealer for order details and times. Exclusions apply. Subject to part availability.

Group Publisher
Christopher M. Ayers Jr.
cayers@automotivedatamedia.com

Editorial Director
Bob Freudenberger
bfreud@automotivedatamedia.com

Managing Editor
Tom Nash
tnash@automotivedatamedia.com

Contributing Editors
Bob Chabot, Paul Cortes, Phil Fournier, Chris Ligocki, Christian Strohm

VP of Business Development
Tamra Ayers
tayers@automotivedatamedia.com

Art Director
Christopher Ayers III
ayersc3@automotivedatamedia.com

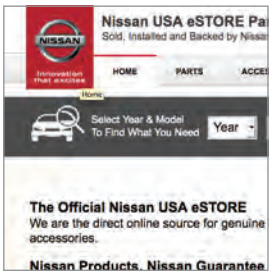
Nissan North America
Sr. Planner, Wholesale Channel Marketing & Promotion
Rachael Even
rachael.even@nissan-usa.com

Nissan North America
Technical Content Advisors
James Von Ehr
james.vonehr@nissan-usa.com

Editorial and Circulation Offices:
134B River Road
Montague, NJ 07827
Phone: 330.620.3929
www.automotivedatamedia.com

Contents

Features



Departments

Feature

Timing Is Everything

In this first article of a series designed to improve understanding of Nissan camshaft control systems, we'll provide an overview of how two popular engines control the timing of their camshafts, including timing chains, tensioners, guides, and sprockets.

It's no secret that today's vehicles have become more complex with each coming model year. Computers and sensors now control everything that once was performed by mechanical devices. Fuel injection has replaced the carburetor. Modern, computer controlled, ignition systems have made distributors a thing of the past. While most of us are familiar with these common modern systems, we sometimes forget that every part of the vehicle has evolved along with them. One of the least understood systems is the camshaft control system. This article will address these systems and shed some light on an often overlooked, but crucially important part of the engine.

This is the first in a series of articles designed to bring greater understanding to what's going on underneath that timing cover. We'll identify and describe the many components that play a part in the system. After all, how can we hope to fix something if we don't know how it works?

In later articles, we will look deeper into common failures, what causes them, and how to diagnose and fix them correctly the first time.

To make things easier to follow, we will focus on the 2013 Nissan Altima, the first model year of the fifth generation Altima. We will be using this particular vehicle because it employs two of Nissan's most popular engines, the sturdy QR25DE 4-cylinder (182 hp, 180 lb·ft) and the workhorse VQ35DE V6 (270 hp, 258 lb·ft). These engines have some things in common, but also boast a few very interesting differences. Let's take a look at how these engines control their camshafts.

VQ35DE

Camshafts

Everything we will be covering in this article is designed to control the camshafts. It's critical that they are clocked correctly with the crankshaft so they can open the valves right on time. Let's quickly cover some of the terms important to camshafts:

- Camshaft lift height, measured in mm, is directly proportional to the height valves will open.
- Camshaft duration, measured in degrees of crankshaft rotation, is the amount of time that the valve will be open. One might think duration should be measured in a unit of time, but as the engine speeds up and slows down, the time a valve is open changes. What's important is that the duration in degrees of crankshaft is the same at all engine speeds (assuming there is no CVTCS activity. We will discuss that later).
- Camshaft overlap, also measured in degrees of crankshaft rotation, is the duration of time that both valves are open.

Engines have always utilized a bit of valve overlap to create maximum power. By keeping both valves open for a short time, flow is improved, and the maximum intake charge can enter the cylinder. However, today's engines can also use valve overlap to control emissions. Keeping some of the exhaust in the cylinder is a more efficient way to limit NOx emissions than a conventional EGR system, and you may notice that neither of these engines is equipped with an EGR system. Nissan employs variable valve timing, referred to as Continuously Variable Valve Timing Control System (CVTCS), which allows the engine to have small valve overlap when power is desired, and large valve overlap when cruising to minimize emissions.

Both engines in the 2013 Altima are equipped

with CVCTS, but they work a bit differently. The QR25DE has control over both intake and exhaust timing, while the VQ35DE only has control over intake timing. Nissan also has a variable valve lift system, VVEL, but neither of these engines employ it. The QR25DE has slightly more lift (about .5mm) on the intake side; the VQ35DE has more lift (about 1.5mm) on the exhaust side, but neither is variable.

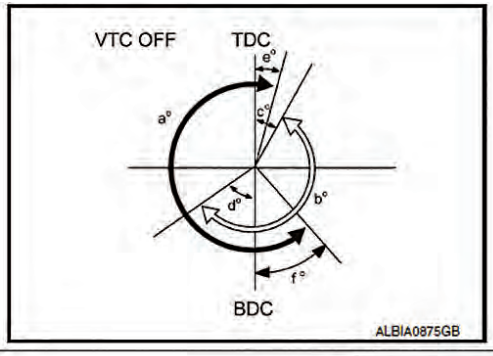
Camshaft Sprockets

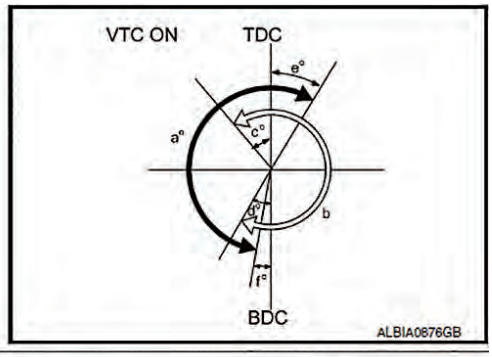
There was a time when camshaft sprocket design was pretty straightforward. The timing chain drove the sprocket, which in turn drove the camshaft. Their main purpose was to spin the camshafts at half the speed of the crankshaft. This is achieved by simply making them twice as big as the crankshaft sprocket. Beyond this, the sprocket was just a basic chunk of metal. Tooth design and construction material have advanced over the years, but for a long time, the camshaft sprocket basically stayed the same.

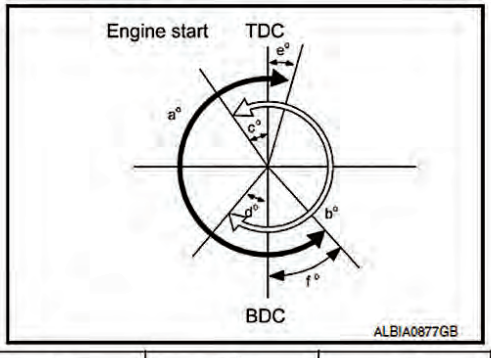
Then variable camshaft timing came along. First introduced by Nissan as Variable Camshaft Timing, or VCT, it has evolved into the CVTCS used in Nissan engines today. The camshaft sprocket would never be considered simple again. Early, basic, valve timing sprockets used a solenoid to apply oil pressure to vanes in the sprocket, shifting its position relative to the crankshaft sprocket. These early systems were on/off type, either in normal position or full advance. While they improved upon performance, they were very limited.

Today, the camshaft timing is continuously variable. The control solenoid can apply oil

Valve timing
⇦: Intake valve
⬅: Exhaust valve







	a	b	c	d	e	f
VTC Minimum phasing (Mechanical) *1	224	244	5	69	3	41
VTC Maximum phasing (Mechanical) *2	224	244	35	29	48	4
Intermediate lock phasing (Mechanical) *3	224	244	5	59	3	41

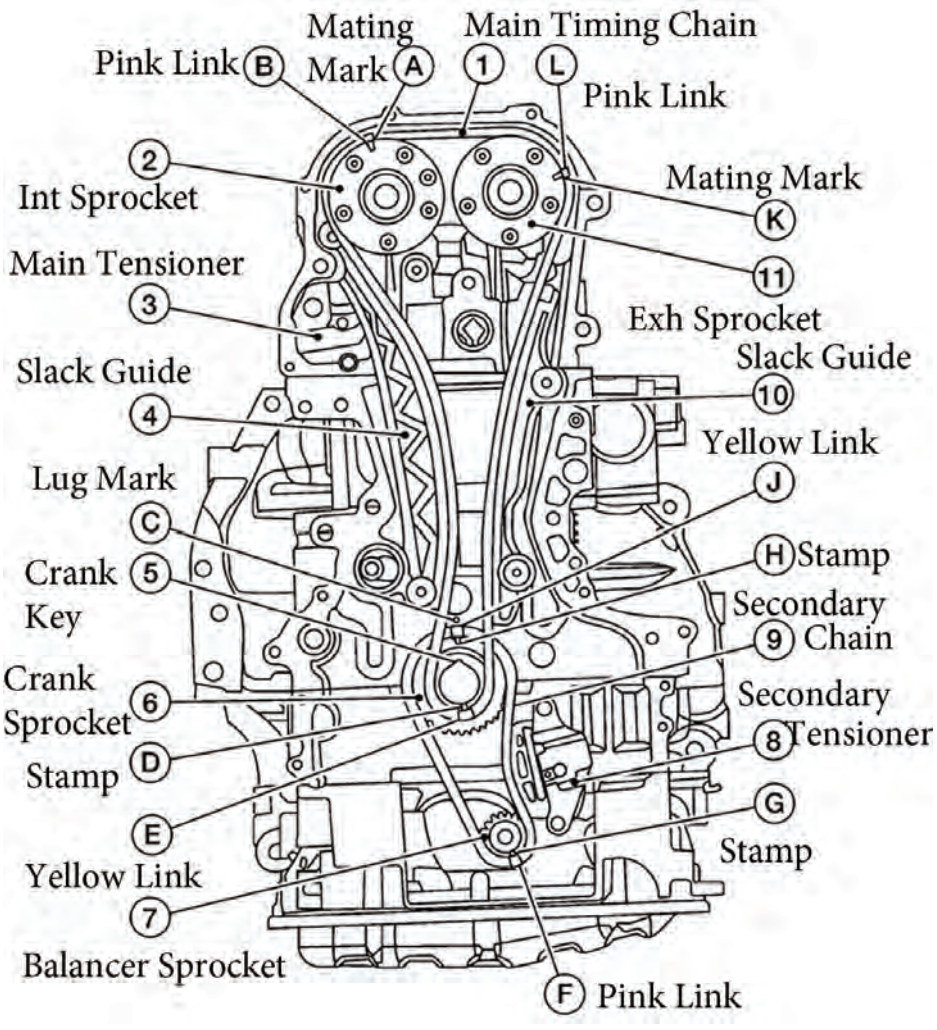
The QR25DE's valve overlap, in degrees of crankshaft rotation. Notice that the total time either valve is open (a° and b°) are always the same, only their timing changes.

pressure to either side of the vanes in the camshaft sprockets, providing continuously variable control. The QR25DE's intake valve can be made to open as early as 35° BTDC or as late as 5° ATDC. Its exhaust valve can be made to open as early as 41° BBDC or as late as 4° ABDC. That's 40° of variability for the intake valve and 45° for the exhaust valve – quite a range of overlap.

Timing Chain

Nissan has always been partial to timing chains, as evident by use in the majority of their engines. So, the million dollar question is why a chain, and not a belt. Belts are a cheaper and simpler system to produce, but they aren't as strong and require preventative maintenance that is costly to the customer. Chains cost more initially and are more complex, but they are stronger and under normal operating conditions they shouldn't ever require service. Most importantly, timing belts wear out and can break. Timing chains do wear, but rarely, if ever, break. Both the QR25DE and the VQ35DE are interference engines, and a valve timing failure would cause catastrophic engine damage.

The QR25DE has two timing chains. The main timing chain that connects the crank pulley to the cam pulleys, and the balancer timing chain that connects the crank pulley to the balance shaft pulley. The sprockets have alignment marks and the chain also has colored links to ensure proper installation. The main chain has two pink links that line up with mating marks on the cam sprockets, and a yellow link that lines up with a mating mark on the crank sprocket. The balancer chain has a pink link for the balancer sprocket, and a yellow link for the crank sprocket.



The QR25DE timing chain schematic. Pink and yellow links on the chain ensure proper installation.

The VQ35 has three timing chains. The primary timing chain which connects the intake cam sprockets (one for each bank) to the crank sprocket, and two secondary chains that connect each banks intake cam sprocket to its exhaust cam sprocket. The primary timing chain also drives the water pump, as opposed to the QR25DE which drives the water pump with the serpentine belt. Along with the sprocket alignment marks, these chains also have colored links to ensure proper installation. The primary chain has pink links for the intake

cam sprockets and an orange link for the crank sprocket. The secondary chains have double orange links for the exhaust cam sprocket and single orange links for the intake cam sprocket.

Tensioners & Guides

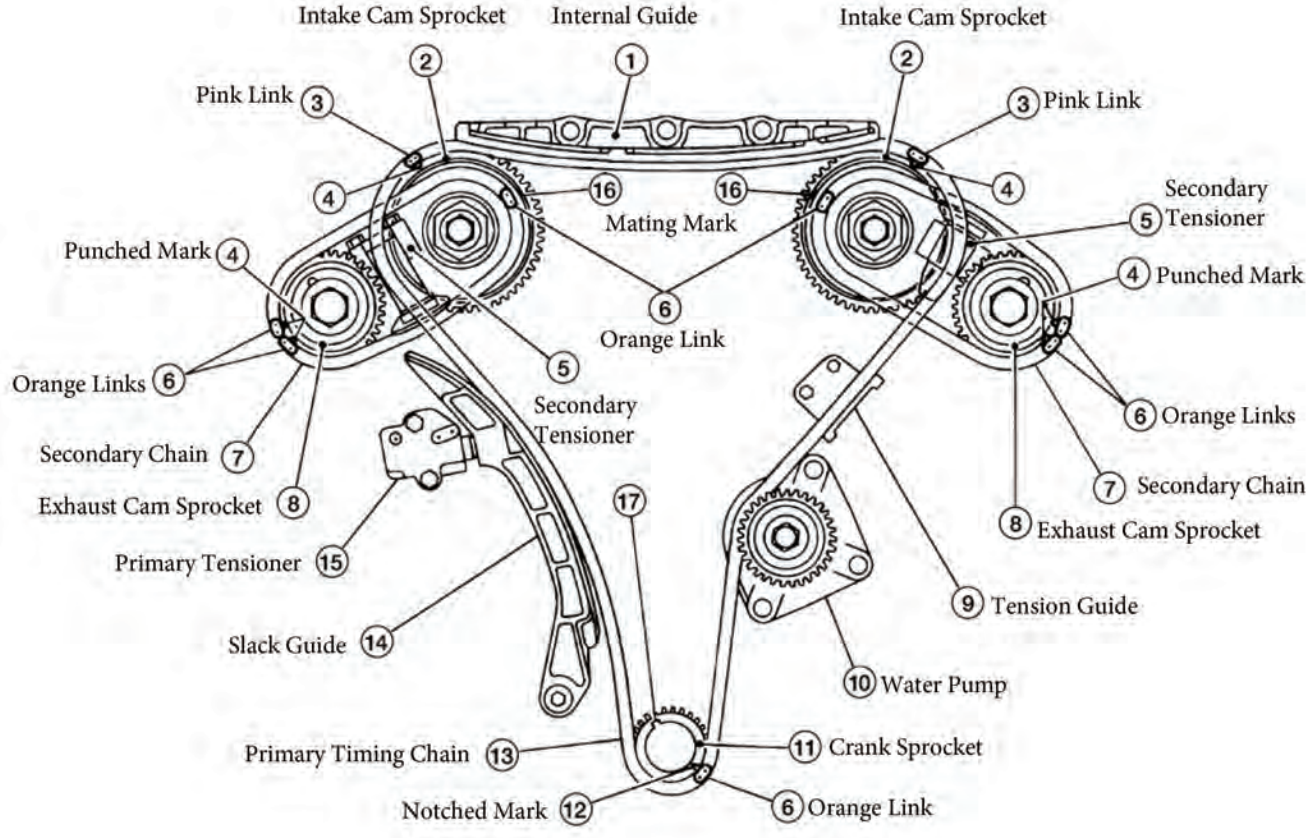
Both engines keep their primary timing chain taut with oil pressure regulated tensioners that are identical in operation. Both are located under the upper left hand side of the timing cover. While there are no springs in the primary tensioners, the ratcheting mechanism (referred to as "coaxial structure with lever") must be released before the tensioner can be retracted and locked in.

The VQ35DE has a pair of secondary timing chain tensioners, one for each bank. The left bank tensioner faces down, and the right bank tensioner faces up. Both are also operated with oil pressure. They do not have the ratcheting mechanism, but when removing tension from them Nissan recommends not only holding them with a pin, but also with a thin plate to avoid the plunger falling out during disassembly.

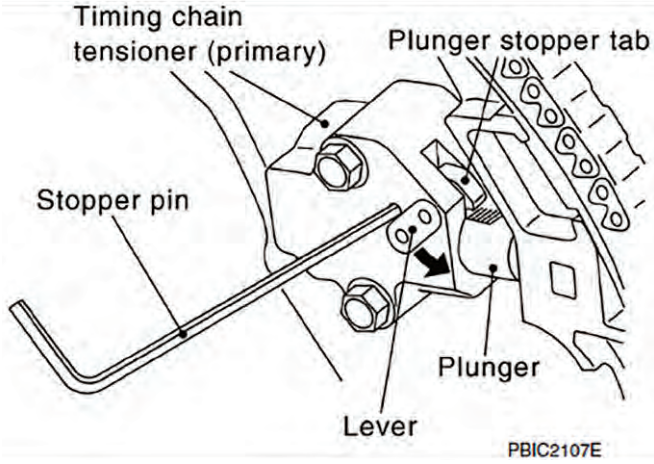
The QR25DE's secondary chain, which runs the balance shaft, is the only tensioner that does not operate by oil pressure. It is spring loaded and has a stopper tab that must be released before tension can be removed.

The primary timing chains for both engines run along a series of guides to keep them in place. None of the secondary chains have guides, because they are much shorter and do not require guides.

The QR25DE has a pair of guides that span most of the distance between crank and cam pulleys. The slack guide runs along the left side and is acted upon by the main timing chain tensioner. The tension guide runs along the right side. This is a bit confusing, because one would



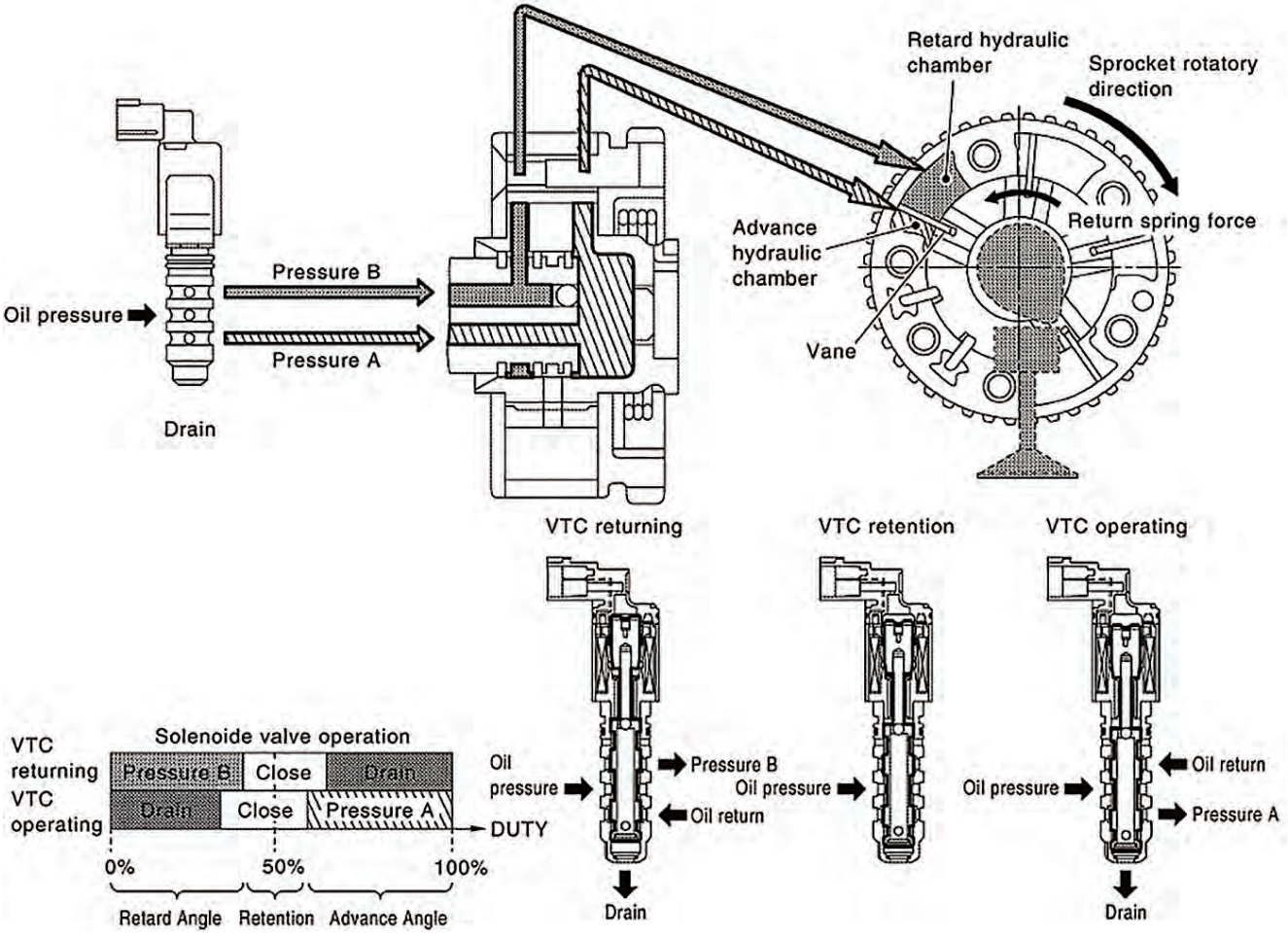
The VQ35DE timing chain schematic. Notice the water pump takes up most of the space that a longer tension guide would occupy.



The main timing chain tensioners for both of these engines work in the same way. Move the lever down to release the ratchet, depress plunger, then move lever back up to lock plunger in place.

think the tensioner should act upon the tension guide. But that is not the case. The engine spins clockwise, so the crank sprocket is pulling the timing chain from the right side. Thus the right side of the timing chain is the tension side.

The VQ35DE requires three guides, due to the greater distance between the cam pulleys. Like the QR25DE, the slack guide runs along the left side and is acted upon by the main tensioner. The tension guide runs along the right side of the engine, like the QR25DE's, but it is much shorter. The reason for this is the water pump. It's mounted on the right side below the tension guide, taking up most of the space that a longer guide would occupy. The third guide is called the internal chain guide, and it spans the entire length between the intake cams of bank 1 and bank 2.



The three-position solenoid can advance, retard, or hold current timing, based on its duty cycle.

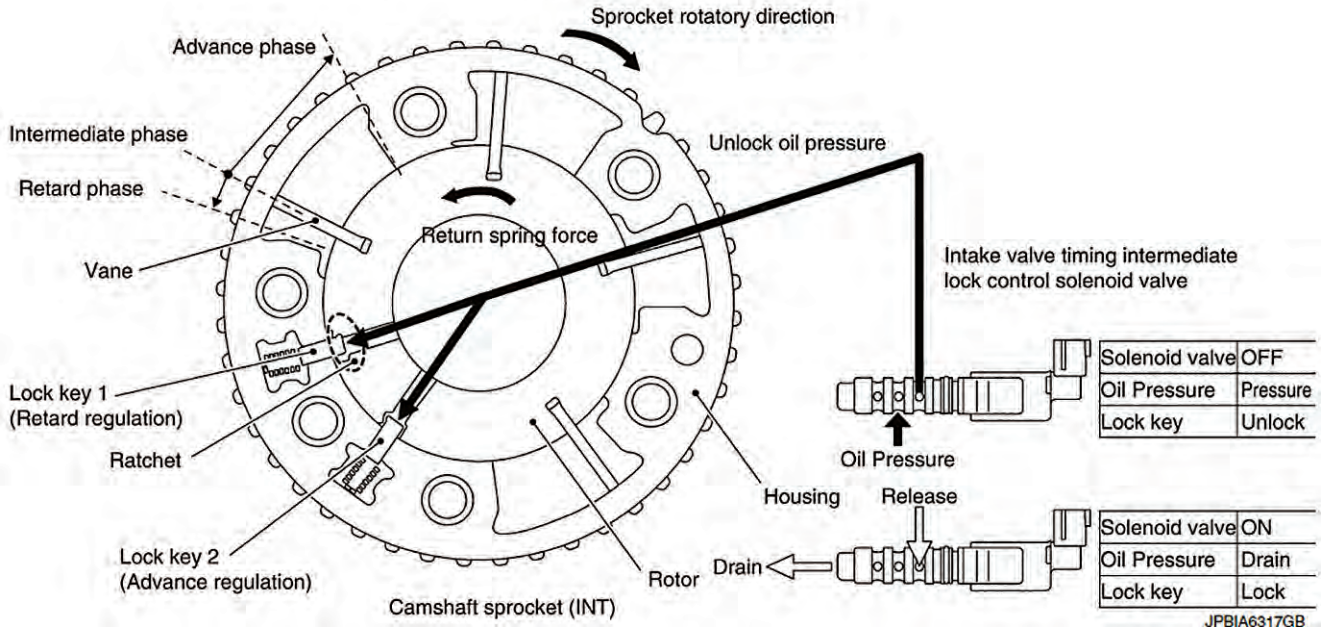
Valve Timing Control

The Valve Timing Control Cover, located in front of the cam sprockets, houses the CVCTS solenoids. The QR25DE has one housing that contains three solenoids, and the VQ35DE has two housings that contain one solenoid each. The VQ35DE's only solenoid is called the Intake Valve Timing Control Solenoid Valve, and it does just that. The ECM controls this solenoid by varying its duty cycle. The solenoid has two oil passages that lead to either the Advance Hydraulic Chamber, or the Retard Hydraulic Chamber, both located inside the intake camshaft sprocket. When oil pressure is directed to one of these chambers, it is simultaneously drained from the other chamber. The solenoid can also be closed to both passages to maintain constant timing.

The QR25DE has an Intake Valve Timing Control Solenoid and an Exhaust Valve Timing Control Solenoid that work in the same way. The third solenoid is the Intake Valve Intermediate Lock Control Solenoid Valve. It locks the intake camshaft into what is called Intermediate Lock, where the intake valve opens 5° BTDC (25% advanced from its position at idle). This improves the cleaning ability of exhaust gasses at cold start.

When in the ON position, the solenoid drains oil pressure from the two lock keys in the camshaft sprocket. The lock keys are spring loaded, so without oil pressure to hold them open, they are forced closed and lock the camshaft sprocket in a fixed position. When the engine reaches 140°F (60°C), the solenoid is commanded OFF by the ECM. When OFF, the solenoid closes and oil pressure builds to overcome the spring force on the lock keys and intake valve timing becomes continuously variable.

As you can see, camshaft timing systems are anything but simple in today's modern engines. There's far more going on under the timing cover than there used to be. Despite how complex it seems, these modern engines create more power using less gas than previous, simpler, versions. They are also far more reliable. That being said, things may break. Next time, we will look at common failures, how to diagnose them, and proper repair procedures.



The lock keys are located inside the intake cam sprocket. During cold start, oil pressure is released by the solenoid and spring tension forces the keys to engage and lock the sprocket. Once the engine warms up, the solenoid closes, and oil pressure overcomes the spring tension to unlock the sprocket.

NISSAN

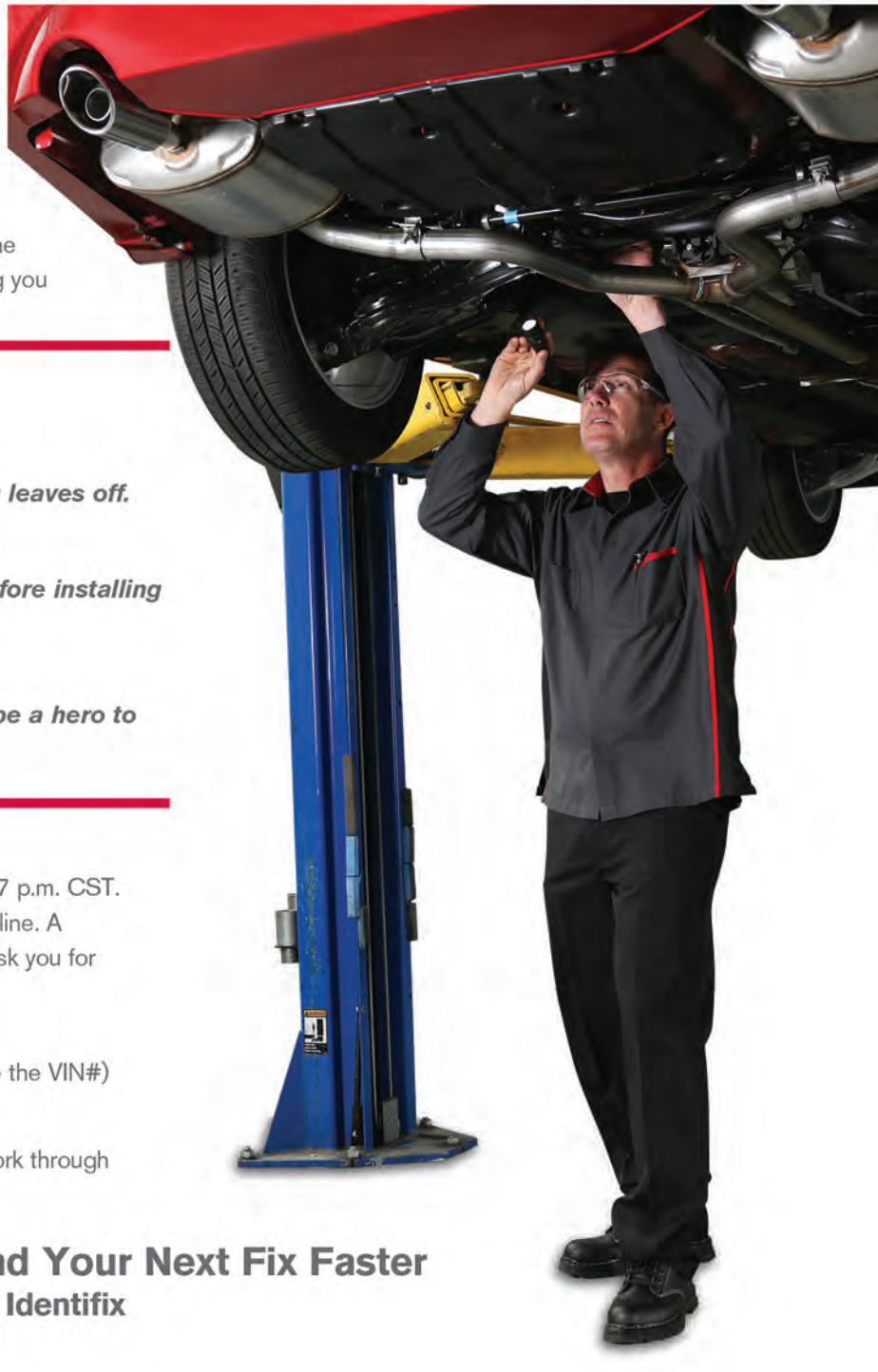
Innovation that excites

No Fee Nissan Repair Hotline

When you are unsure how to fix it, give us a call at: 1.855.828.4018

If you are pressed for time on a tough vehicle problem, we have a friendly team of ASE Master, L1 Nissan Repair Specialists dedicated to help you find your fix.

Our experts have taken millions of calls on all kinds of vehicle issues. A repair that might be new to you, has probably been seen before and the research has been done to find the right fix, saving you time and frustration!



Call Us When...

1. **The Usual Suspects Aren't The Problem**
   We can pick up where your initial testing leaves off.

2. **You Need A Trusted Second Opinion**
   When you need to be sure–especially before installing a costly part.

3. **You Don't Want To Turn Away A Job**
   Be an expert on any Nissan vehicle and be a hero to your customers.

How It Works...

Call toll-free at **1.855.828.4018,** M-F, 7 a.m. - 7 p.m. CST. Listen to the menu and press 3 for the Repair Hotline. A technical support hotline dispatch associate will ask you for the following:

- VIN#, Vehicle mileage
- Year, make, model and engine (if you don't have the VIN#)
- A brief description of the vehicle problem

A Nissan Repair Specialist will call you back to work through your issue.

Call 1.855.828.4018 And Find Your Next Fix Faster

Nissan Repair Hotline Powered by Identifix

Feature

Attack HVAC!

Many independent service facility technicians are unfamiliar with Nissan heating, ventilation, and A/C systems. Here's an overview of the main components of Nissan HVAC systems, and some helpful diagnostic tips and strategies.

Some HVAC problems are easy to diagnose: low refrigerant, low coolant, a clogged cabin filter. But once in a while, a car will roll into your bay that thumbs its nose at you. Of course, the service manual contains the information you'll need, but it always helps to have a general idea of how a system should work before trying to figure out why it's not working. Let's review Nissan HVAC systems so you'll be primed for your next diagnostic challenge.

A/C

We'll start by reviewing how the A/C refrigerant loop works. Refrigerant carries heat from the inside of the cabin to outside the car. It absorbs heat when it changes from liquid to gas in the expansion valve as it enters the evaporator. The refrigerant then continues to the condenser where it releases the heat it picked up from the cabin, before the compressor squeezes it back into a liquid so it can repeat the cycle.

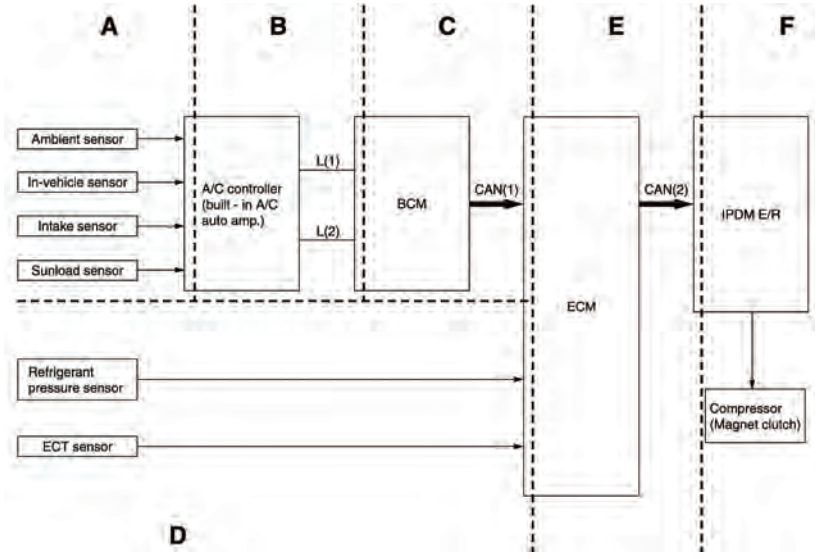
For the system to work well, all the components need to be working properly. The compressor must be capable of creating the necessary suction and discharge pressures. The condenser must be free of restriction and have good heat transfer. The receiver-drier must filter out debris and remove moisture that might reduce system performance. The temperature sensing bulb and expansion valve must open to allow flow, and close to prevent freezing and blockage. The cooling fans must pull cool air over the condenser to remove heat. Finally, the system must have enough refrigerant charge to move the heat, but not so much that low side pressure can't drop. We'll cover how to test all of this later in this article.

Heat

The heater is a loop system as well. Heat generated by the engine is put to use to warm the cabin. Engine coolant is pumped from the block to the heater core using the engine's water pump, an auxiliary heater pump, or both. Once the warm coolant reaches the heater core, the blower strips

the warm air radiating from the heater core and blows it into the cabin. Some vehicles also use a Positive Temperature Coefficient (PTC) electrical heating element in addition to the heater core, or in the case of the LEAF, to warm the coolant, as there is no internal combustion engine to generate heat.

For the heating system to work, the thermostat must allow the coolant to reach operating temperature. Cold engine coolant can result in a cold driver. The water pump(s) must also be working properly to keep the coolant flowing. Finally, the coolant level must be correct. The heater core often sits relatively high in the system so when the level drops, the heater core fills with air, which is a poor conductor of heat.



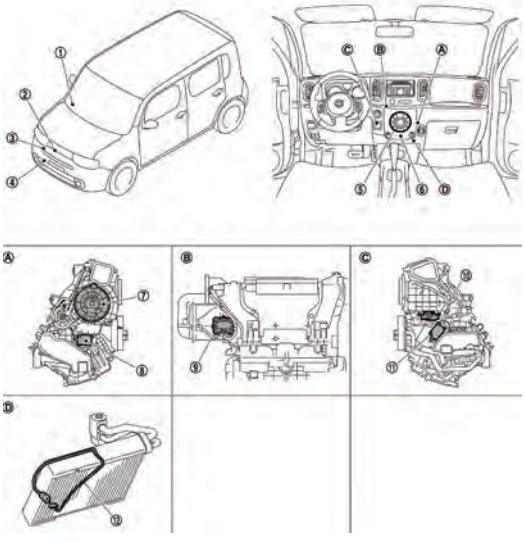
The conceptual diagram found in the Heating and Air Conditioning Control System -> System Description section of the service manual provides a very quick way to get up to speed on how the system works.

Controls

We've covered how the evaporator gets cold and the heater core gets hot, but there's a lot more to the HVAC system. The system must be made to do the driver's bidding. It's not enough to have hot and cold under the dash; the driver must be able to choose the temperature he wants and where the warm or cold air is directed.

Once upon a time the driver would direct air flow through the use of levers, cables, and flaps; acting as a human thermostat and adjusting the system when he noticed he was uncomfortable. Modern vehicles are far more automated; the driver lets the system know what he wants and a control unit makes it happen, leaving the driver to concentrate on driving. Fuzzy logic allows the system to make decisions much like a human. Adjusting a manual system may seem simple to us, but our comfort actually requires that thousands of rules be programmed. Sensors monitor temperature and sun load, and the controller adjusts air flow and temperature to our liking.

The climate control unit is either integrated into the control panel or a separate unit using the control panel as one of its inputs. If separate, the control unit is usually called the "A/C Auto Amp" or "Automatic Amplifier." If integrated, the control unit may be called the "Front Air Controller" or "A/C Auto Amp." A quick check of the system



Diagnostic strategy will depend in part on the accessibility of the various test points. Knowing where the components are located is important when developing your plan of attack.

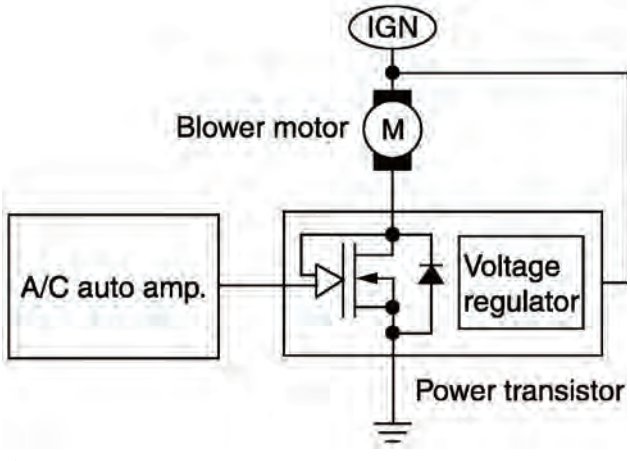
description section in the service manual is always a good plan. Knowing the players, their names, and where they're located is a big help.

A single control unit is "in charge" so to speak but, these days, most outputs are not directly actuated. Instead, outputs are able to work on their own once they have instructions. The controller and the outputs are connected via a network. The controller might issue an instruction to the blend door to open 30%, and the blend door will carry out the instruction on its own. In older systems, the controller would send a PWM signal to the blend door servo and monitor the position sensor voltage change. Now the controller is more like a manager of autonomous employees. This is great for technicians because the networked outputs can be tested using a self-diagnostic function or the CONSULT. Check the service manual; even some very old Nissan products have surprisingly robust self-diagnostic functionality.

Outputs

BLOWER MOTOR

Typically the blower motor is controlled by duty cycle. The more on-time, the faster the motor spins. The A/C auto amplifier ramps the blower motor speed up slowly to prevent an unpleasant blast of air. Also, after a cold start it may not run the blower for a while to prevent the driver from being hit with a chilly burst of air. Once the coolant warms a little, it will ramp up to the optimal speed.



Solid state blower motor control is more efficient and offers a greater degree of control than a set of switched resistors in series with the blower motor.

MODE DOOR MOTOR

The mode door directs air flow to the defroster vents, dash vents, floor vents, or a combination of two or three. Door position information is often sent to the control unit via a single wire network connection. The mode door position can be automatically selected on vehicles with automatic climate control. Mode door position can be directly controlled using the self-diagnostic functions explained in the service manual.

AIR MIX DOOR MOTOR (BLEND DOOR)

The air mix door directs air flow over the heater core, evaporator, or a combination of the two. Its position can be automatically adjusted on vehicles with automatic climate control. Air mix door position can be directly controlled by using the self-diagnostic functions explained in the service manual.

INTAKE DOOR MOTOR

The intake door switches the intake side of the blower duct from outside air to inside air. The A/C auto amplifier will automatically select the optimal door position on vehicles with automatic climate control unless the driver overrides it. The intake door function can be tested using self-diagnostic functions explained in the service manual.

A/C COMPRESSOR CLUTCH

The compressor clutch engages or disengages the compressor from its drive belt pulley. Typically, the climate control unit sends a "clutch on" request to the ECM, which relays the request to the IPDM E/R provided the engine is not overloaded or overheating. The IPDM E/R sends 12V power to the compressor clutch coil. The coil usually grounds directly through the compressor body.

Inputs

SUNLOAD SENSOR

When the sun shines on you, it feels warm. The sunload sensor input helps the A/C auto amp compensate for this. Typically a sunload sensor trouble code will set any time there is no sun (like when you're in the shop). Shine a bright flashlight on the sunload sensor to clear the code.

Refrigerant Pressure Sensor

The Refrigerant Pressure Sensor breaks the compressor clutch circuit when the pressure becomes too high or too low. A high pressure will strain and may damage the compressor. A low pressure usually means low refrigerant, which also means poor lubrication for the compressor.

DEFROST

Even automatic A/C systems need driver input to activate the defroster. The rear window defroster is usually a resistive grid built into the rear window. The front window is defrosted by directing blower output to the windshield and front side windows, using fresh air, and using the A/C to dehumidify the air.

RECIRC

Recirculation can be manually controlled or controlled by the A/C auto amp logic. In defrost mode, the auto amp will switch to fresh. When maximum cooling is needed it will be switched to recirculation.

AMBIENT TEMP, INTAKE TEMP, & CABIN TEMP

The A/C auto amp uses ambient air temperature, inlet air temperature and cabin temperature to help plan its strategy for keeping the cabin comfortable.

COOLANT TEMP

The A/C auto amp uses the coolant temperature in its decisions on blower operation. There's no point in blowing air over the heater core if it's still cold.

VSS

The VSS is also used in making decisions about blower operation. Blower noise will be less noticeable when vehicle speed and road noise are higher.

System Diagnosis

Start by taking inventory of what works and what doesn't. This will usually take care of the first step in diagnosis as well. Verify the customer's complaint. Start in the cabin by checking the following functions:

- Does the blower work in all speeds?
- Does the mode control switch air flow between floor, vent, defrost, etc.?
- Does the vent temperature get hot with the heater on?
- Is the vent temperature sufficiently lower than ambient temperature?
- Do the defrosters work normally?

What to check next depends on what problems you find during the function checks.

The Vent Temperature is Not Cold Enough with the A/C On

How cold is cold enough? There are many rule of thumb specifications, and they may be adequate for a quick check, but the best way is to follow the test procedure in the service manual.

A contact pyrometer is a very useful tool for climate control diagnosis. An infrared thermometer can also be used, but reflective metallic surfaces or attempting to measure small areas can lead to inaccurate readings.

This means setting conditions exactly as they're outlined in the manual and taking humidity into account. If you don't have a hygrometer, just check the National Weather Service's website at www.weather.gov. You can look up local humidity by entering your zip code.

If cooling is inadequate, start by dividing the system. Is the problem in the refrigerant loop or somewhere else in the climate control system? A quick way to find out is to check the low side line temperature at the evaporator. It should be pretty cold, usually around 40°F. If it's cold but the vent is not, check the climate control. If it's not cold, check the refrigerant loop for problems. A quick check to see if the compressor is engaged is a good place to start. If it is, check pressures with an A/C pressure gauge set. If not, check into the compressor clutch control.

Pressure gauges are an under-used diagnostic tool. Often, a technician may not be confident in his ability to interpret the pressure readings. The truth is you don't need to be a thermodynamic guru to use a pressure gauge set to accurately diagnose an A/C system. The service manual has a chart that provides normal and abnormal pressure readings and their meanings. Look at the gauge readings. Find similar readings in the chart. Read the information in the probable cause column.

Depending on where the service ports are in the refrigerant loop, it's sometimes possible to have good pressure readings but poor cooling. The loop is kind of like a series circuit, where all of the voltage drops are equal to the source voltage. Ideally, all the voltage is being dropped across the component doing the work instead of being wasted in parts of the circuit with high resistance.

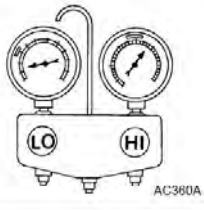
Restrictions in the A/C loop can cause pressure drops. This is bad because, when the refrigerant goes from higher pressure to lower pressure, it goes from higher temperature to lower temperature. When this happens somewhere other than in the evaporator, it doesn't help to cool the cabin.

So, how can we find restrictions in the A/C system? Well, because we know a restriction will cause cooling, we can check for cold spots. A pyrometer could be used for this, but feeling with your hands will work just as well. Restrictions usually occur in the receiver-drier, condenser, or in a damaged or kinked line near the condenser. To check, just compare the inlet and outlet temperatures of the receiver-drier, feel the condenser in several places for cold spots, and run your hands along the lines to check for kinks or cold spots.

Finding A/C Leaks

The most frequent problem with A/C systems is low refrigerant caused by a leak. An A/C sniffer can be used to find leaks, but UV dye is arguably a much better method, with the possible exception of finding an evaporator core leak. It's worth noting that removing the cabin air filter will often provide a line of sight to the evaporator core, which can be used to check for leaks with UV dye.

Before charging the system, do a careful visual inspection. When refrigerant leaks, oil also leaks. Unlike the refrigerant, the oil does not evaporate and leaves behind an oily dust-collecting stain. Check exposed areas of the condenser and O-ring

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is excessively high and low-pressure side is too low. 	High-pressure pipe and upper side of condenser become hot, however, liquid tank does not become so hot.	Clogged or crushed high-pressure pipe located between compressor and condenser.	Repair or replace the malfunctioning parts.

A/C Pressure Gauge Chart.

joints, hose to line crimps, and the compressor seal area for stains. It's also possible that dye has been added to the system in the past, so a quick inspection with a black light is worth a try.

A vacuum decay test is also a good plan before adding any refrigerant. It will not find small leaks, but it will prevent adding refrigerant to a system that may lose refrigerant as fast as you add it.

No Heat

Poor heating complaints are often due to low coolant or a stuck-open thermostat, but can also be caused by issues with the blend door, heater control valve, water pump or auxiliary water pump, PTC heater, or even a restricted heater core.

Checking for low coolant is pretty straightforward, but be sure to consider the possibility of air pockets. Many Nissan products have cooling system bleeders to help trapped air escape. The Nissan cooling system fill tool can also be used to avoid trapped air.

A stuck-open thermostat can be found by monitoring the temperatures of the upper and lower radiator hoses while the engine warms up from cold. Assuming the lower hose leads to the thermostat housing, the upper hose should slowly increase in temperature and the lower hose should stay relatively cold. When the coolant temperature reaches about 180°F, the lower hose temperature should rise quickly. A CONSULT is a great way to monitor the coolant temperature for this test. If the temperatures of both hoses rise equally, the thermostat is stuck open or missing.

Here's a quick and easy water pump test: squeeze the upper radiator hose and snap the throttle. You'll feel a pressure pulse every time the throttle is snapped. Unfortunately, there are no newer Nissan products with cable actuated throttles, so this test is limited to older models.

The self-diagnostic functions or a CONSULT will help with diagnosis most other issues.

Self-Diagnostic Functions

A/C Auto Amp inputs and outputs can be tested using the self-diagnostic function built into the A/C Auto Amp – no CONSULT required. Typically the self-diagnostic mode can be activated by starting the engine, then pressing and holding the OFF button on the climate control interface for five seconds. You must do this within 10 seconds of starting the engine. Navigation once in the self-diagnostic mode is usually accomplished with the temperature control. To exit self-diagnostic mode, either press the AUTO button or just turn the ignition off.

The CONSULT can also be used for climate control diagnosis, although its capabilities will vary model to model. At a minimum, you'll have active tests for the cooling fans and compressor clutch relay, and data list items for the Refrigerant Pressure Sensor, coolant temperature, compressor request, and cooling fan request.

Press and hold the OFF button for five seconds right after starting the engine to enter self-diagnostic mode.

NISSAN

Innovation that excites

Everyday Wholesale Guarantee

- 35% off* MSRP on eligible Genuine Parts categories.
- Thousands of the most popular parts in stock.
- Ready for delivery now!

Everyday Low Pricing on Nissan's Most Popular Parts Categories!

- Air/Oil Filters
- A/C Compressors
- Alternators/Starters
- Batteries
- Blower Motors
- Brake Calipers/Cylinders
- Brake Pads/Shoes
- Brake Rotors/Drums
- Cabin Filters
- Catalytic Converters
- Drive Belts/Tensioners
- Drive Shafts
- Engine Cooling Fans
- Engine Gaskets
- Evaporators
- Fuel Injectors/Sending Units
- Mass Air Flow Sensors
- Mufflers
- Oxygen Sensors
- P/S Pumps
- Radiators/Caps/Hoses
- Spark Plugs/Ignition Coils
- Shocks/Struts
- Water Pumps
- Wiper Blades/Inserts/Motors

- Value Advantage™ Air Filters, Brake Pads, Brake Rotors, Clutch Kits, Radiators, Spark Plugs, Shocks/Struts, Timing Belt Kits, and Wiper Blades

Trust the Original. Genuine Nissan Parts.

*Certain restrictions apply. See participating dealer for details. 35% off MSRP for eligible popular parts only. MSRP excludes all applicable taxes. Participating dealer sets actual price.

Nissan Genuine Parts: The Real Thing

Using Genuine Nissan Parts to repair your customer's Nissan vehicle is always the best decision. Here's why and how you can easily order online using the Nissan USA eSTORE.

Back in 1963, Coca-Cola® began using the slogan, "Things Go Better with Coke."© The slogan inferred that food tasted better and social gatherings were more enjoyable if you drank Coke®. The public never believed that to be true. During the next several years, Coca-Cola's® sales lead over rival Pepsi-Cola® began to slowly dwindle. After five years of little growth, Coca-Cola® realized that something had to be done in order to keep its crown. In 1969, the company asked for input from major advertising companies and settled on, "It's the Real Thing."© This slogan, the company hoped, would emphasize that Coca-Cola® was the original cola drink and make people want to buy and consume it because the original is always thought to be better by quality than copy-cat products. The original, the slogan inferred, is always the leader and best. Sales of Coke® rocketed to new levels and the company held its lead over its cola rival.

So it is with automobile repair parts. The original part, designed and approved by the company for repairing its vehicles is always the best option because it meets the manufacturer's specifications for fit, function, durability and efficiency.

Unlike a soft drink, the use of correct parts is a matter of safety, reliability and peace of mind for customer. It's also good business for the installing shop by ensuring customer satisfaction and avoiding costly comebacks; things that help provide customer retention and build a good reputation.

When you use Genuine Nissan Parts, you can rest assured the part is perfect for the repair – The Real Thing.

Using Genuine Nissan Parts for your customer's vehicle is always the best choice.

The Real Thing vs Aftermarket Parts

While third-party or online aftermarket parts may seem cheaper, in the long run, using Genuine Nissan Parts is likely to provide the best value.

First, if you order parts from your local Nissan Wholesale Mechanical and Collision Repair Network Dealer, the parts are already nearby – no long waiting period for shipping. You'll get speedy delivery, or pick up availability.

Building a relationship with your local Nissan Program Dealer may entitle you to discounts or promotional prices and any parts that must be returned or core returns are easily handled – not so with some sources. The chance of getting the wrong part is minimized. And, you can also easily establish a wholesale account.

Parts ordered from your local Nissan Wholesale Mechanical and Collision Repair Network Dealer can be delivered in a timely manner or picked up.

Simply stated: If you order Nissan parts from your local Nissan dealer, you'll get "The Right Parts, at the Right Price, Right Now." A list of Nissan Wholesale Mechanical and Collision Repair Network Dealers can be found at the end of this magazine.

Navigating the Nissan eSTORE Parts Website

Many service facilities find the best way to order Genuine Nissan Parts is by using the Nissan USA eSTORE parts website at www.parts.NissanUSA.com. You'll find it quick and easy to order parts once you have used it a time or two. Let's take a quick tour of the Nissan USA eSTORE parts website to learn the many aspects of the site and how it can be very valuable to your shop and Nissan-owning customers.

First, log onto the website at www.parts.NissanUSA.com. In the upper right corner you'll notice three portal phrases which take you directly to helpful areas once you have made your initial purchase and established an account: "SITE FEEDBACK, RETURNING CUSTOMERS and WHOLESALE ACCOUNTS." We'll cover these a little further along, but first, let's talk about the basics of navigating the website.

Along the top of the page, you'll see the Nissan logo at the left side and a series of tabs for several sections named: HOME, PARTS, ACCESSORIES, MERCHANDISE and PROMOTIONS. Of course, you're already on the HOME tab section, but these tabs will appear on most section pages so you can easily click on whatever tabs you wish to navigate around the site.

Before we explain the other section tabs, please note the dark gray search bar section below the section tabs displaying the silhouette of a car and a magnifying glass. This area has drop-down menus for search by year, model and parts by number or part name. This handy tool bar will appear on just about every page to help you purchase the correct parts.

Here is a brief explanation of the tab sections:

PARTS: You can use the search bar, or enter the VIN for best results.

ACCESSORIES: This section contains nearly 1200 items covering Audio, Exterior, Interior and NISMO. You can check the appropriate "Categories" box for the type of accessories you need.

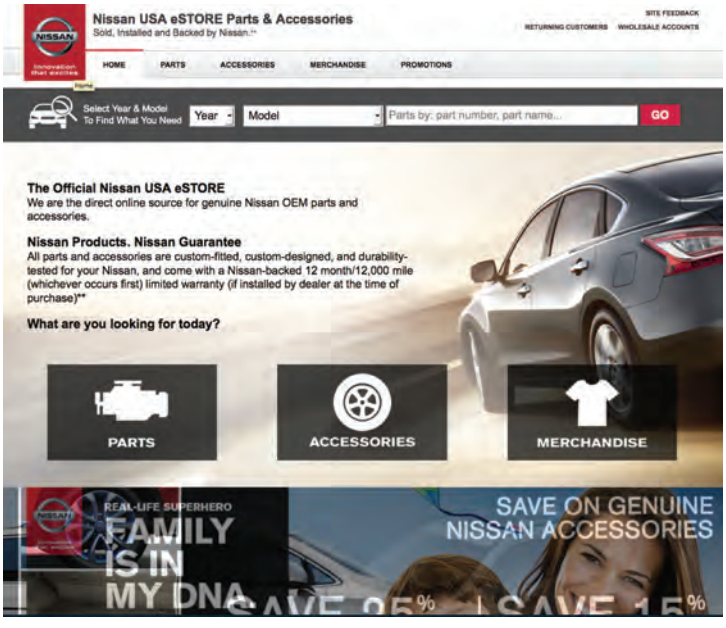
MERCHANDISE: This area offers apparel, auto accessories, drinkware, GTR items, hats, Heritage Collection items, JUKE items, NISMO items, outerwear, Pens and Office items, Titan items, XTerra Items and Z items.

Even if you are not interested in purchasing any of these items for yourself, they can be used as shop decorating pieces to promote the fact that you professionally service Nissan vehicles or used as "thank you" gifts for your Nissan-owning customers.

PROMOTIONS: This section features videos of some of the accessories available and any special accessory promotions with online coupons. These promotion items are great opportunities to sell Genuine Nissan accessories to your Nissan customers.

Big Gray Search Buttons

Before we move on, you'll notice three big gray buttons – or, more accurately – rectangles, for searching specific items. At the left is the PARTS button with a white silhouette of an engine. In the middle, the ACCESSORIES button shows a white tire. On the right is the MERCHANDISE button



The Nissan USA eSTORE HOME page.

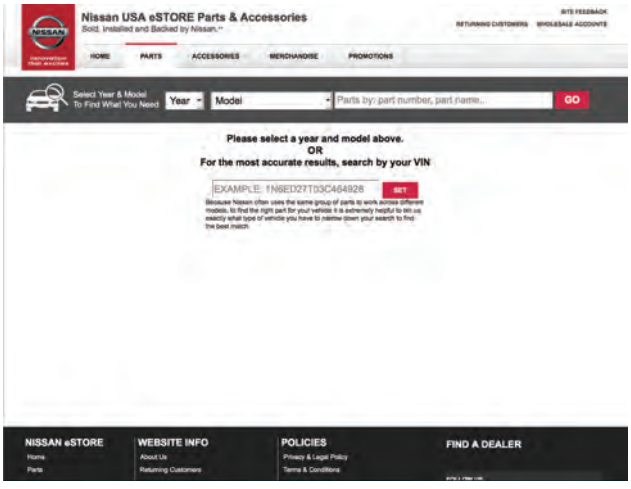
with a white T-shirt. These are a quick way to get to the area you wish to search. These buttons serve the same function as the tabs on the search bar above.

SITE FEEDBACK, RETURNING CUSTOMERS and WHOLESALE ACCOUNTS Portals

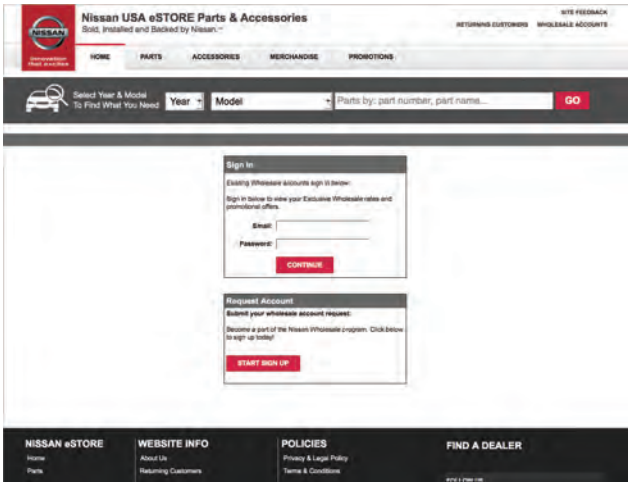
Let's go back to those portals in the upper right corner we mentioned earlier. The SITE FEEDBACK portal is a great way to interact and communicate with the company about the website, its operation and function, and the opportunity to make helpful suggestions to improve the site.

The RETURNING CUSTOMERS portal is the place to log into your eSTORE account once you have one established.

The WHOLESALE ACCOUNTS portal is the ordering and account managing area for service facilities who have established a wholesale account.



Searching for parts is easily performed by using the search bar, or enter the VIN for best results.



The WHOLESALE ACCOUNTS portal is the go-to place for establishing and managing a Nissan eStore wholesale account.

The RETURNING CUSTOMERS portal is the place to log into your eSTORE account once you have one established.

The WHOLESALE ACCOUNTS portal is the ordering and account managing area for service facilities who have established a wholesale account.

The Value of a Wholesale Account

Having a Nissan Wholesale Account is quite advantageous for several reasons. Logging onto your account page you can:

- Order easily. You can order by make, model, year or VIN.
- Quick Order if you know the part numbers or VIN.
- See your recently searched vehicles.
- Quickly check order status.
- Quickly confirm parts selection.

Additional advantages include the ability to check parts availability and view parts diagrams and VIN-verified part numbers for every vehicle system and sub-system.

When finalizing your order and checking out, you'll find the process to be very smooth:

- Your pricing and discounts are readily visible.
- Your purchase and delivery preferences are always saved for your next order.
- You can make payments or set up billing quickly and easily.

The Nissan Installer Repair Hotline

Nissan offers quick help when you are unsure how to service a Nissan vehicle or have a problem installing a Genuine Nissan Part. A complimentary hotline, powered by Identifix, is available at 855-828-4018 to help you get your customer's Nissan back on the road quickly and repaired properly.

The Real Thing - Just a Click Away

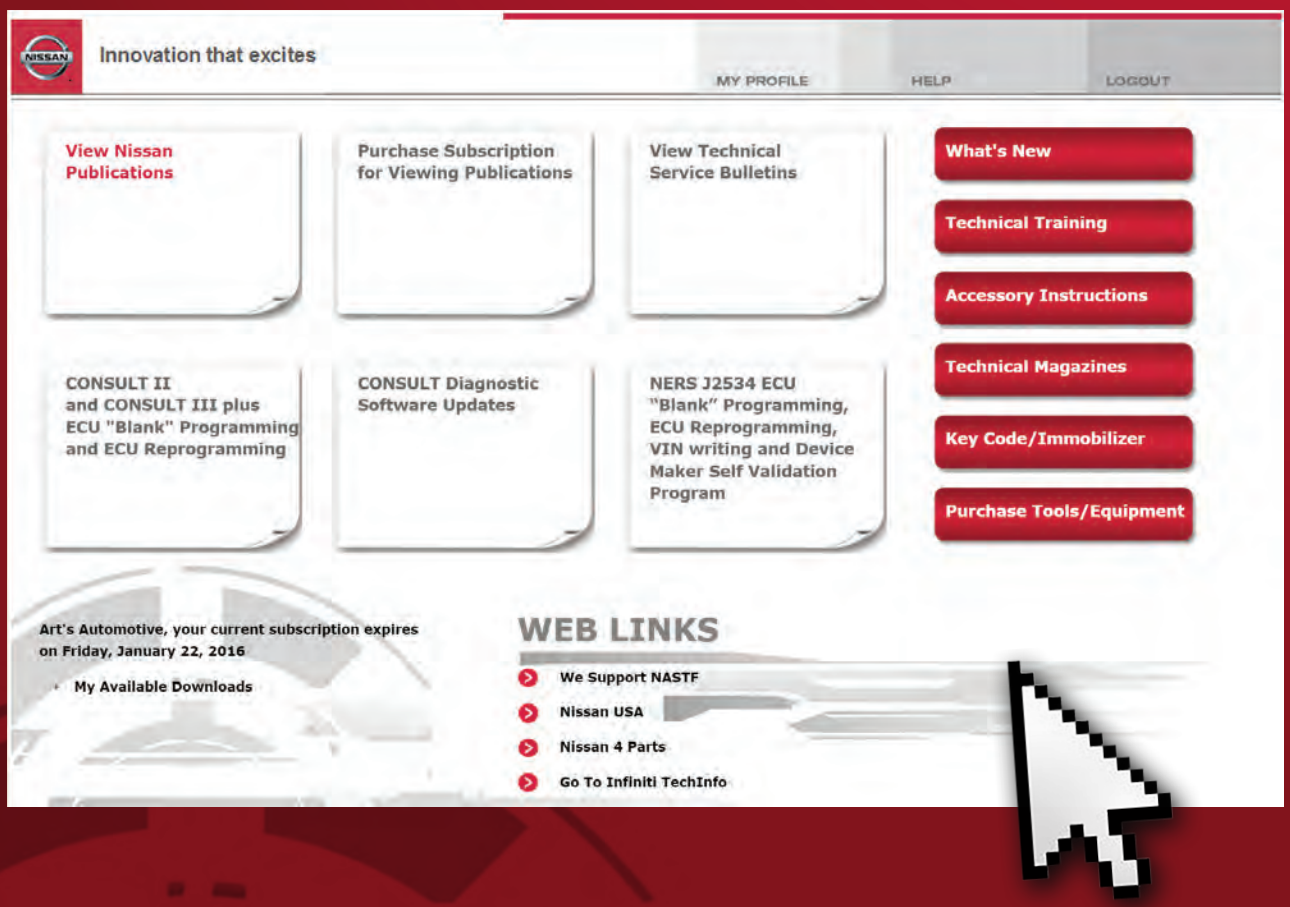
Genuine Nissan Parts are just a click away. If you haven't taken advantage of using www.parts.NissanUSA.com to order Genuine Nissan Parts to keep your customer's vehicles truly "original," check it out today. It's in the best interests of your customers and your shop. Remember to "Trust the Original. Genuine Nissan Parts."

Feature

A Wealth of Information:

Navigating the Nissan TechInfo Website

With a subscription to the Nissan Technical Information website, you have access to a wealth of information beyond a basic repair manual. Here's how to find the most commonly sought-after facts needed for proper Nissan repairs, and some added benefits available to technicians with a subscription.

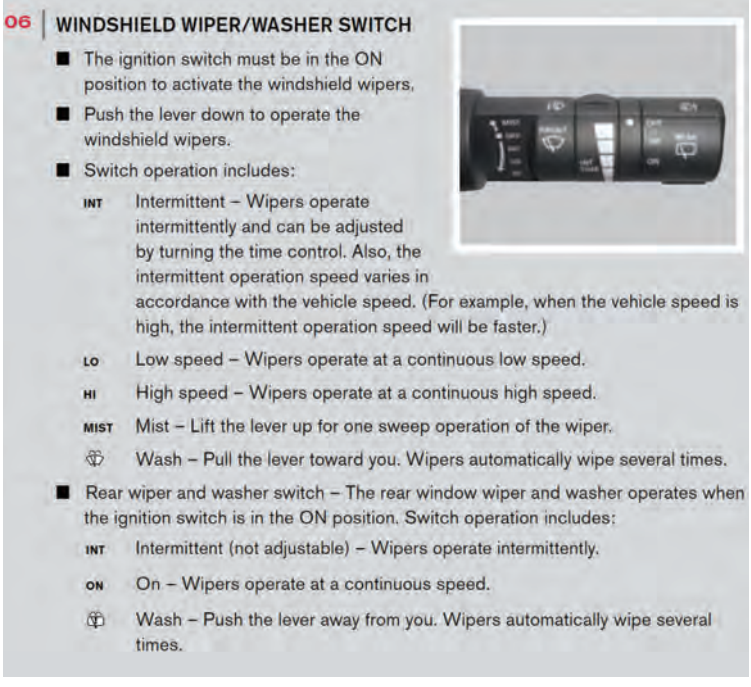


The key to vehicle repair is information. Thanks to the Internet, technicians have unprecedented access to details about any vehicles that may come into the shop. Beware that not all information is created equal! Many general information subscription services have inaccurate procedures, specifications, or maintenance intervals. Nissan's official TechInfo website is always accurate, up-to-date, and includes more than just service manuals. Navigate to www.nissan-techinfo.com to begin the subscription process.

Gaining Access

First things first, you need to purchase a subscription to the Nissan TechInfo site. Be aware that this subscription is for information access only. There are separate fees for CONSULT tool software updates, and per-use charges for ECM reprogramming calibration files or immobilizer key codes. When purchasing TechInfo.com access, you will have options for the duration desired. Shops that specialize in Nissan can purchase full-year subscriptions at the best value; however, Nissan also offers single day, 30-day, and 90-day access if desired. Any Nissan subscription also includes identical access to Infiniti TechInfo (www.infiniti-techinfo.com). Note that all discussion relevant to Nissan TechInfo applies to Infiniti TechInfo.

Nissan-techinfo.com also offers the ability, without a subscription, to place an online order for a physical hard-copy of repair manuals and other publications. The hard-copy is a CD-ROM with the digital manual in PDF format, preserving the quick navigation links and document structure. It is a one-time purchase, so the manual will not be reissued in the event of revision.



06 | WINDSHIELD WIPER/WASHER SWITCH

- The ignition switch must be in the ON position to activate the windshield wipers.
- Push the lever down to operate the windshield wipers.
- Switch operation includes:

INT Intermittent – Wipers operate intermittently and can be adjusted by turning the time control. Also, the intermittent operation speed varies in accordance with the vehicle speed. (For example, when the vehicle speed is high, the intermittent operation speed will be faster.)

LO Low speed – Wipers operate at a continuous low speed.

HI High speed – Wipers operate at a continuous high speed.

MIST Mist – Lift the lever up for one sweep operation of the wiper.

Wash – Pull the lever toward you. Wipers automatically wipe several times.

- Rear wiper and washer switch – The rear window wiper and washer operates when the ignition switch is in the ON position. Switch operation includes:

INT Intermittent (not adjustable) – Wipers operate intermittently.

ON On – Wipers operate at a continuous speed.

Wash – Push the lever away from you. Wipers automatically wipe several times.

Every technician knows how complicated headlight and wiper behaviors can be, and how they are implemented differently on every vehicle.

Without a Subscription

Before you subscribe, you should know that the following documents types DO NOT require an active subscription for access:

- Owner's Manual
- Navigation System Manual
- Quick Reference Guide
- Towing Guide (separate for MY2004-2006 only)
- First Responder's Guide
- Dismantling Guide
- Roadside Assistance Guide
- Body Builder's Guide
- Accessory instructions

Also, you DO NOT need an active subscription to purchase ECM calibration files or immobilizer key codes. Nor do you need a TechInfo subscription to purchase the CONSULT scan tool hardware or the software for the CONSULT. This is useful for shops that do not have CONSULT, but wish to purchase ECM files for their compatible J-5234 device.

The navigation system manual, roadside assistance guide, and quick reference guides are parts of the owner's manual to further describe technology package additions, or what to do in event of emergency.

As a technician, the quick reference guide may be useful to identify certain unique, driver-oriented functions.

The First Responder's and Dismantling guides have quick reference information for workers who need to know how to make a vehicle safe. They do not include enough details for a technician to perform service.

The guide for Body Builder's gives reference information for professional commercial modification of large-duty vehicles like the Nissan NV series. Owners who wish to install accessibility features, refrigeration, or similar shop-tool additions can find information about where to bolt things, where not to cut, and how to avoid shifting the vehicle's center of gravity.

Accessory installation instructions are guides for adding Nissan factory accessories, available for purchase through the dealership network. The instructions are in the same format as a Nissan Service Manual page.

With the Subscription

Once you're subscribed, you will have unlimited access to the following:

- Service manuals
- Body and collision repair manuals
- Technical Service Bulletins (TSBs)
- E-learning modules
- TechTalk articles

The main benefit of a subscription to Nissan TechInfo is access to the factory repair manuals, but we will discuss some of the lesser known benefits: up-to-the-minute TSBs, the TechTalk magazine, and E-learning modules.

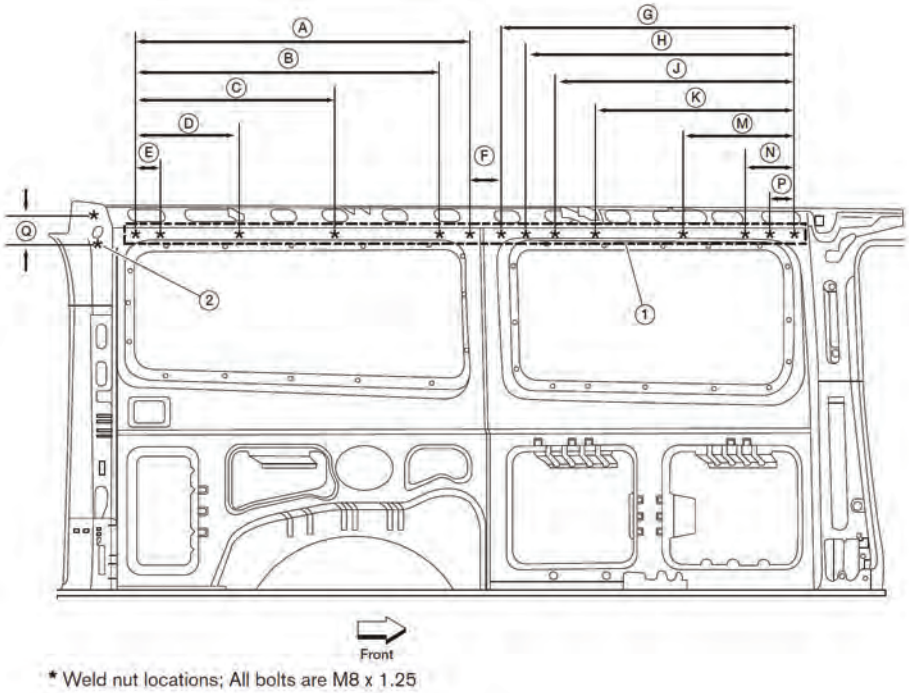
Technical Service Bulletins

Technical Service Bulletins are issued by Nissan to assist technicians with diagnosis and repair of specific or complicated issues. TSBs address concerns such as rough idle, noises, rattles, or to introduce an improved service procedure. These specific concerns can be the result of customer or repair shop feedback. The TSB for any topic will provide an up-to-date, Nissan engineer-approved vehicle modification, repair procedure, or upgraded part.

Some generic information subscription services offer TSB publications, but they only have what the manufacturer chooses to share. If you want to be sure to have the absolute up-to-date and correct TSBs, you must check the factory technical information websites. Let's describe the process on Nissan's website.

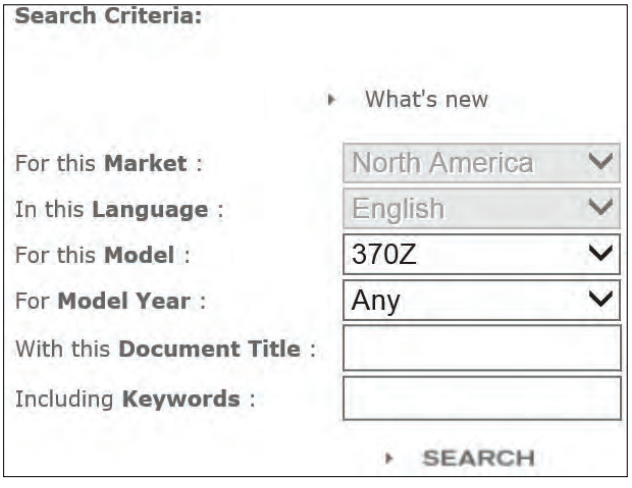
From the main home page, click the large button VIEW NISSAN PUBLICATIONS, then from the next page's drop down menu on the left, choose Technical Service Bulletins. The right side page will have vehicle selection and document search.

Every web search field handles queries differently, so let's describe Nissan's implementation as detailed as possible. This discussion is true for all Nissan TechInfo web forms. First, I recommend you actually CLICK

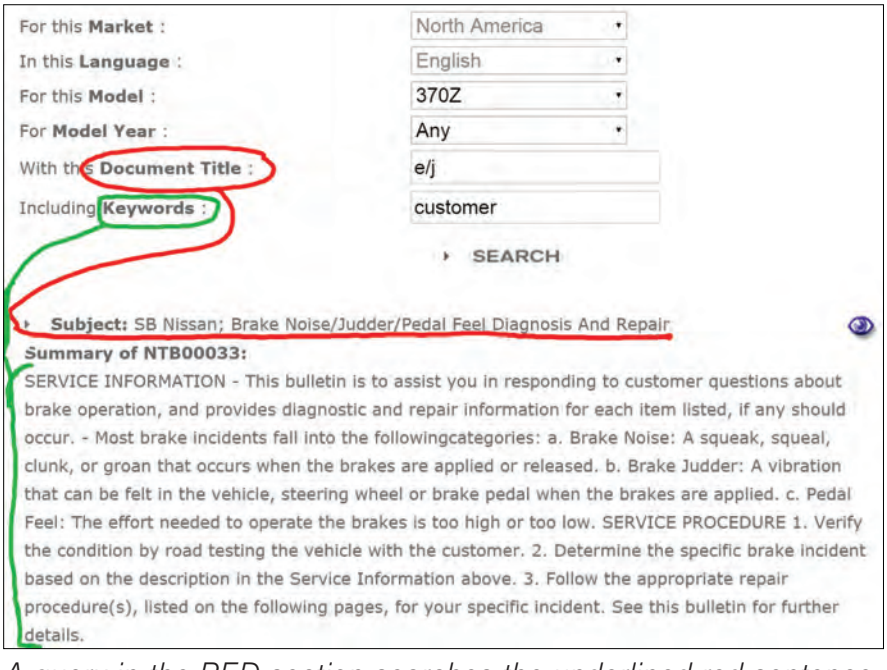


Avoid making an expensive mistake during body modification by using the Body Builder's reference guides.

search, rather than press the enter key for best results. If you were to click search with no fields selected (or click "What's New"), you will get a list of every TSB for every Nissan vehicle ever published, starting with the newest. Every horizontal search field that you change will limit the results further. If you choose 370z and click search, it will then return every TSB relevant for the 370z regardless of topic or date. It is not necessary to type any search terms, but most times you will want to.



TSB search.



A query in the RED section searches the underlined red sentence. A query in the GREEN section searches the document body.

If you enter a query, it must be at least 3 letters. If you search any field for "BRA" it will display results for BRAKE or VIBRATION or any other word that contains the exact order of letters you enter. Keep in mind that multiple search terms are unlikely to produce the results you desire. Once you put a space between search terms, the web software will require that the phrase be matched exactly as you entered. For example, if you knew the TSB document title was "Brake Noise/Judder" and you typed "brake judder" for your search, the document would NOT be returned. Even though "brake" and "judder" are found in the title separately, your query phrase "brake judder" is not found written together exactly. The website form does not support advanced inputs like explicit OR, logical code functions (e.g. "||" or "&&"), comma-delineated terms (e.g. "brake, judder"), or parentheses. To finish the thought, if you searched for "e/j", the document would be found since that string of characters matches.

These details matter when working with computer code; sometimes it is better to shorten your search query term to ensure the maximum documents are returned. For example, let's say you typed the full word "BRAKE", because of the computer logic, a relevant TSB may not be returned if the TSB title was spelled "Braking force decreases over time." As a human, the connection is obvious, but to a computer, the exact five letters "BRAKE" are nowhere to be found in the word "BRAKING." We need to shorten our search term to "BRAK" to catch this.

Reference the search result image. Typing words into the DOCUMENT TITLE field will return anything that matches within the "subject" line of the search result only. Typing words into the KEYWORD field will return anything that matches a word within the large document

summary. However, when you type into BOTH fields, the search results are filtered such that ALL entries MUST be present in their respective sections. Query terms are not case sensitive; it will find matching words regardless of differences in capitalization. Be aware that the title of this sample search result "NTB00033" cannot be input into either text field; there is no way to search by TSB title.

If you notice, for a list of search results, the subject line includes a two letter designation for at-a-glance reference. "SB" means a standard service bulletin, "TT" means a TechTalk article, and "CP" stands for a voluntary recall campaign.

TechTalk Magazine

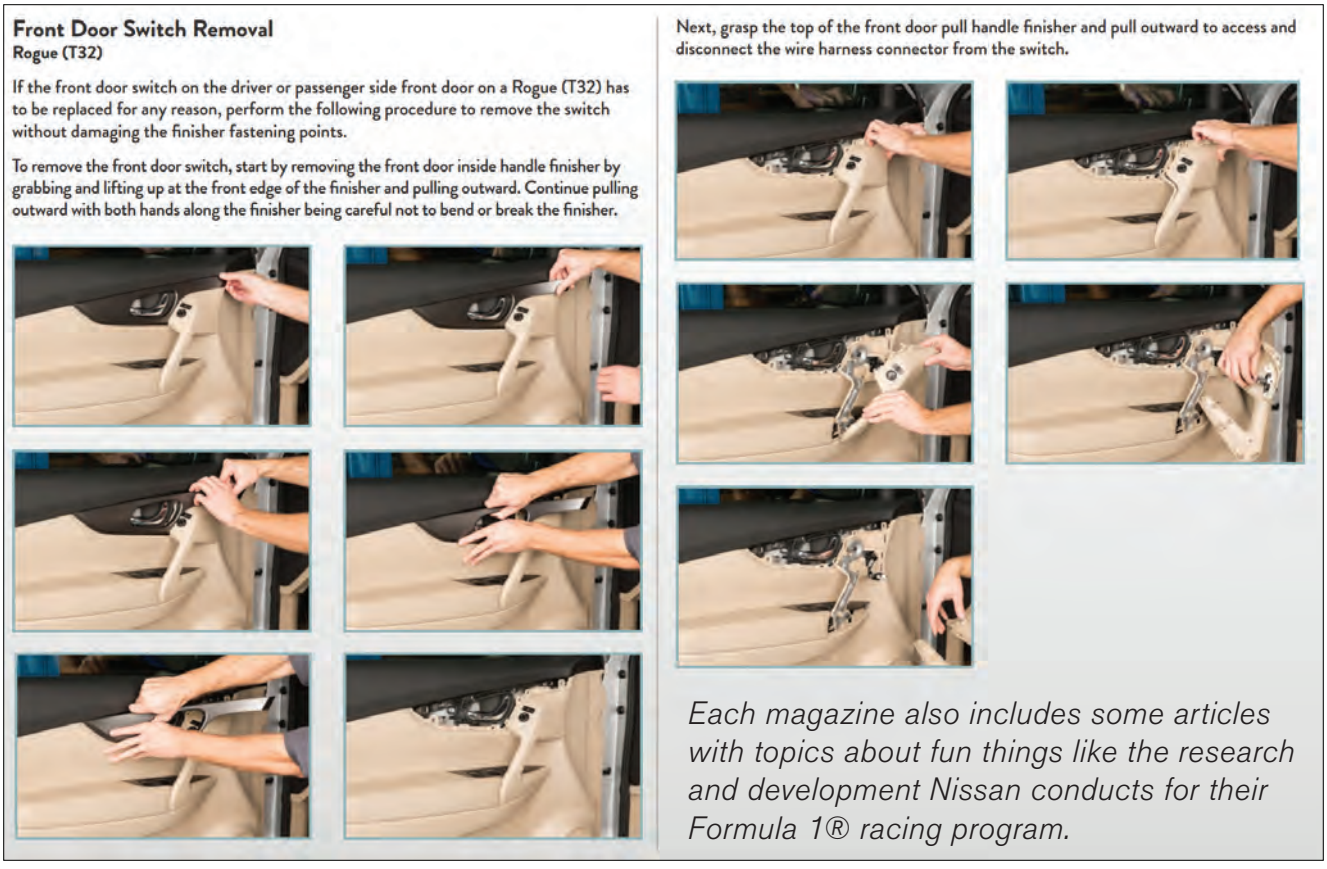
Nissan publishes an internal magazine called TechTalk for their dealership network. This periodical gives technicians an excellent introduction to new vehicle models, details about new vehicle systems, and picture montages of repair manual procedures. Each magazine also includes some articles with topics about fun things like the research and development Nissan conducts for their Formula 1® racing program.

The TechTalk magazine is available to Nissan TechInfo subscribers. Once signed into your active subscription, click the main NISSAN PUBLICATIONS button on the home screen. On the right pane, choose TechTalk Magazine from the "Publication Type" drop down menu. At this point, you can simply click search and see all available TechTalk magazines.

Not all search fields are activated for the TechTalk sections. In other words, you cannot use MODEL to limit the results in any way; in fact, choosing a model will always return zero results. However, the DOCUMENT TITLE and KEYWORD fields are interchangeable: you can enter a term in either field and successfully limit results. Use the MODEL YEAR field to restrict magazines to that specific calendar year.

Training Materials: E-Learning Modules

Subscribers to Nissan TechInfo also gain access to download the official E-Learning modules used in internal training. Once signed in, click the large horizontal red TECHNICAL TRAINING button on the right of the home page, or choose TECHNICAL



Each magazine also includes some articles with topics about fun things like the research and development Nissan conducts for their Formula 1® racing program.

TRAINING from within the familiar drop down list of NISSAN PUBLICATIONS. On the right side, you could purchase Classroom Materials to set up and proctor Nissan-made training courses for the shop. Likewise, you could purchase SIR training videos for in-depth, step-by-step walkthroughs of specific Nissan repair procedures. The E-Learning modules are free with subscription and have great material for research. The icon with a question mark will give a more detailed description of each learning package. If something sounds interesting, click the compressed file icon. This will download the documents to your computer, and you can refer to them offline.

Where Do I Find…?

Almost all your interaction with the Nissan TechInfo website will be with the service manuals. Access them from the NISSAN PUBLICATIONS button, and it will bring up the familiar search section to the right. Choose by vehicle application (MY + year). Do not include any search terms on this screen, as they will not search the contents of the manual. Once you have loaded the desired manual's PDF, you will be met with a main index page for the vehicle that has interactive hyperlinks. From this index, you can find anything about any Nissan vehicle.

…Maintenance Info

Preventive maintenance is crucial for both our industry's survival, and for customers' confidence in their cars. Performing factory scheduled maintenance is a huge part of a day's work. Modern vehicle designs change frequently, and so do their service procedures. New automotive technologies may have special lubricants, or different specifications.

At the very bottom of the index, click MA (Maintenance). From this PDF, you are able to easily reference needed specifications and procedures for all scheduled maintenance items. You can also search by using CTRL+F to quickly find known service. If needed, the periodic maintenance schedule is published in the owner's manual.

...Service and Diagnostic Procedures

Reference the main index page. If it is your first time using a Nissan factory manual, the GI section will include Nissan-specific acronyms, abbreviations, any special service tools required, and other conventions.

The EC (Engine Control) is the go-to section for most performance diagnostics. The section contains extensive reference guides, system descriptions, wiring diagrams, and replacement procedures for electronic engine controllers. The "P" and "U" diagnostic trouble code information is here, along with normal operating behaviors, diagrams for pinning out connectors, and operating specifications for all control sensor outputs. The section end has many symptom tables with hyperlinked service procedure pages.

Use the link to BRM for the complete Body Repair Manual that is indexed and searchable. The service manuals link titles are fairly self-explanatory, so there should not be much learning curve.

Troubleshooting

The most common issues with getting any technical information website to cooperate are configuration issues with your computer's installed browser and operating system software. The exact reasons why this happens are about as complicated as why some brake pads are better than others. If you are having issues, first compare your computer set up to Nissan's TechInfo system requirements at www.nissan-techinfo.com/sysreq.aspx.

Internet Explorer was the industry standard web browser, and it is pre-installed on every Windows computer. Each different browser software brand (Firefox, Chrome, Opera, Safari, Tor, etc.) handles internet communication differently; therefore, to ensure compatibility, use only Internet Explorer when working with Nissan's TechInfo website.

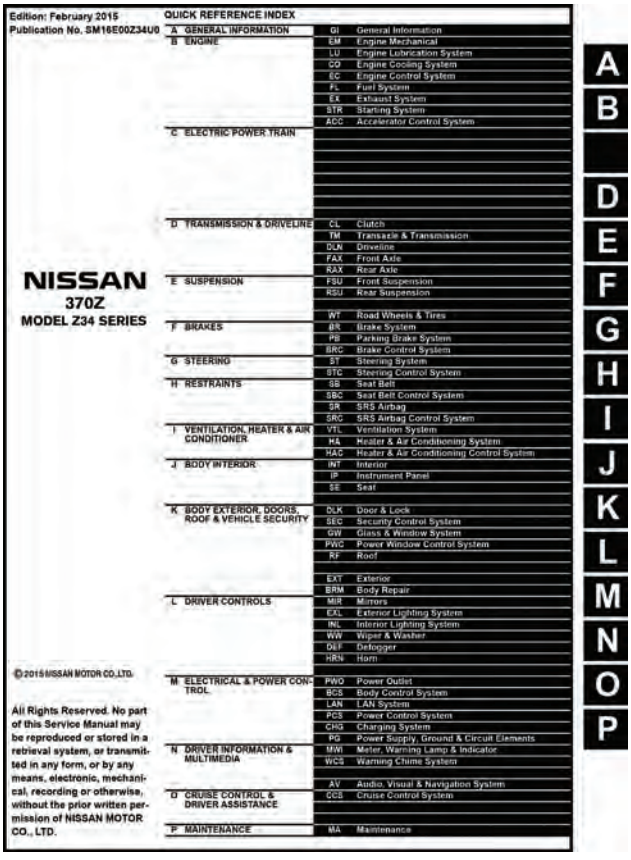
Adobe Reader is the industry standard PDF (portable document format) viewer. Nissan service manual pages are formatted as PDFs; therefore, you must have software installed to view them. Wiring diagrams are displayed using a format called SVG (scalable vector graphic). Most modern browsers can handle SVGs. If you are having display or navigation issues, verify your Internet Explorer and Adobe installations meet the system requirements.

If you cannot click any of the links in a PDF file:

- The Windows 8(.1) default application "Reader" does not support links. Solution: install Adobe (Acrobat) Reader 11.0.10.

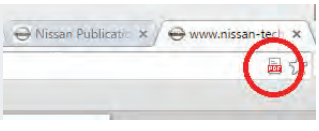
- Built-in Chrome PDF viewer does not work. Solution: install Adobe. Once Adobe is installed, disable the Chrome viewer in chrome://plugins. Or, run both, but click the small PDF icon in the Chrome address bar, observe whether "Some parts of this document cannot be displayed," then choose "use Adobe to view."
- Built-in Firefox PDF viewer hyperlinks are broken; clicking only zooms. Solution: install adobe plugin. Once installed, configure Firefox by navigating OPTIONS > APPLICATIONS > (find PDF document type and select it) > Deselect "preview in Firefox" and choose Adobe Reader from the drop down menu.
- You have Adobe DC installed. It is not supported. Uninstall Adobe DC then, re-download a supported version of Acrobat Reader (11, at time of writing) from their download page: www.adobe.com/downloads/other-downloads.html.

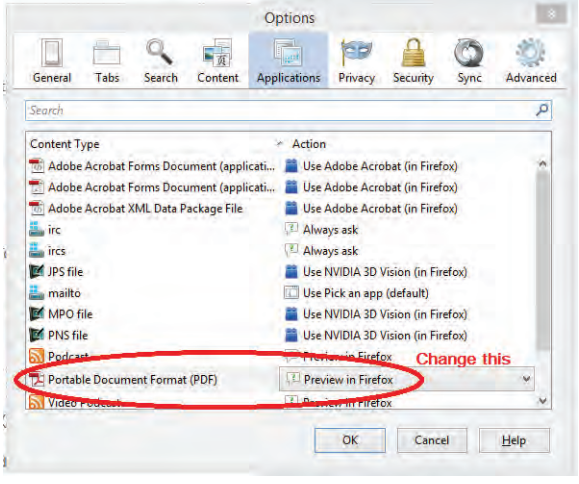
If you cannot view a subscription item, or a search query generates a server error: log in has expired or failed. Check login.



Get familiar with the main index. It will be your go-to place for finding information.

Chrome PDF troubleshooting





Firefox PDF troubleshooting.

Nissan Body Repair Manual Fundamentals 2015 Update

Nissan has recently updated the Body Repair Manual Fundamentals for 2015. The 276-page manual contains valuable information on auto body construction and structure; collision and body service; materials and bonding; refinishing and painting, and more.

The Body Repair Manual Fundamentals edition for 2015 can be accessed on the Nissan TechInfo website at www.nissan-techinfo.com. After logging onto your account, click on the "View Nissan Publications" button, that takes you to the "SEARCH PUBLICATIONS" page.

On the right side of the page, under "How to Find a Publication," go to "Publication Type" and use the pull-down menu, select Body Repair Manual and click on "SEARCH" below. On the "SEARCH RESULTS" page, you will see the listing for "Body Repair Manual - Fundamentals - 2015 Edition." Click on the blue eye icon to view the contents.

NISSAN

Innovation that excites

Genuine Nissan Parts. Just a Click Away.

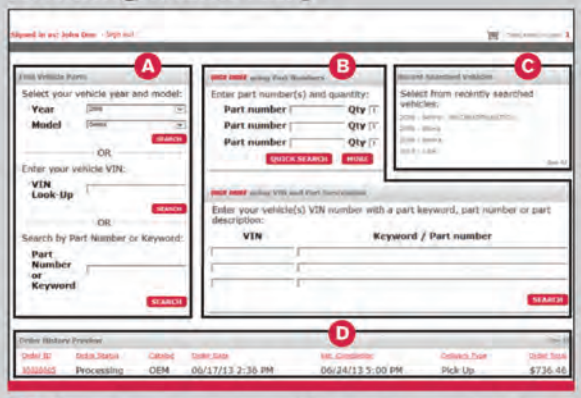
Ordering OE parts is just a click away with the Nissan eSTORE. Genuine Nissan OE replacement parts always deliver model-specific engineering, perfect fit and like-new performance. And now, with our new Wholesale Accounts portal it's even easier to order.

Trust the Original. Genuine Nissan Parts.

parts.NissanUsa.com

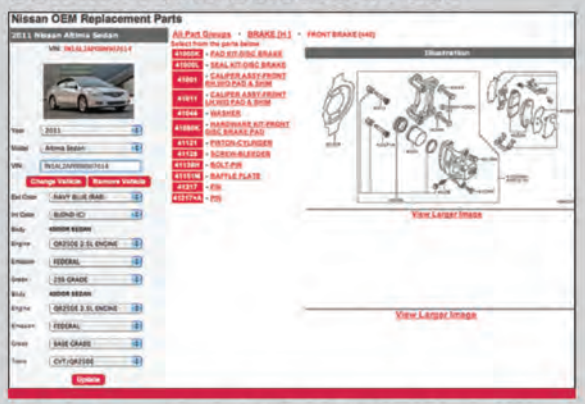
When you are unsure how to fix it, call the Nissan Installer Repair Hotline powered by Identifix: 1.855.828.4018

Ordering Made Easy



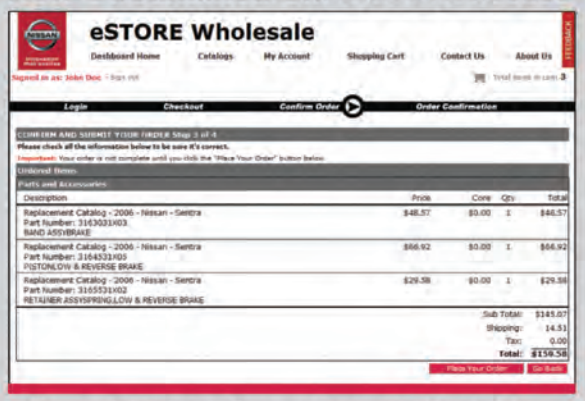
- **A** Order by Make, Model, Year, or VIN, or Part Type.
- **B** Quick Order if you know the Part Numbers or VIN.
- **C** See recently searched vehicles.
- **D** Check order status.

Confirm Parts Selection. Fast.



- Parts diagrams and VIN-verified part numbers for every vehicle system and sub-system.
- Current parts availability shown.

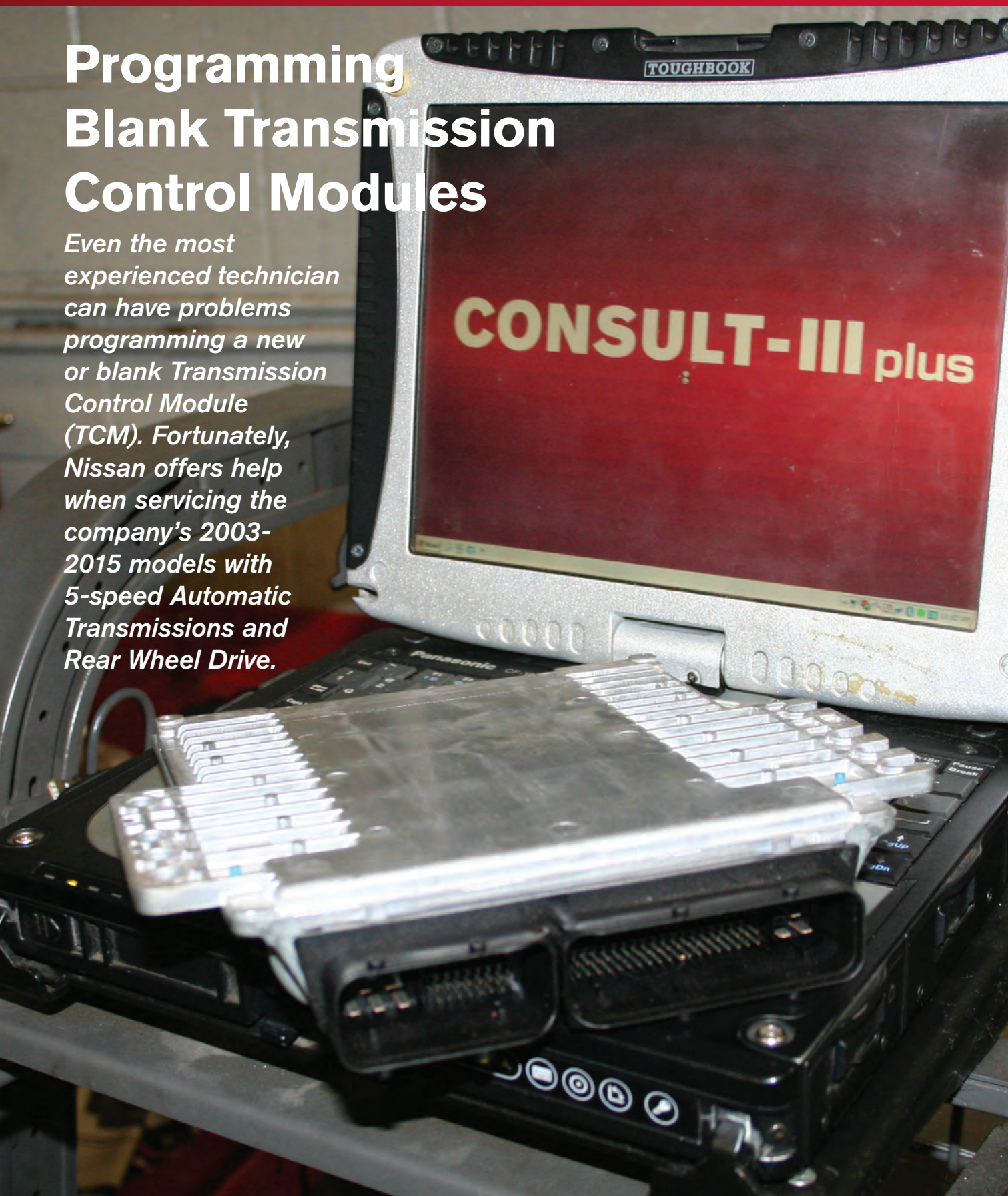
New Streamlined Check Out Process



- Your pricing and discounts are readily visible.
- Purchase and delivery preferences are always saved for your next order.
- Make payments or set up billing quickly and easily.

Programming Blank Transmission Control Modules

Even the most experienced technician can have problems programming a new or blank Transmission Control Module (TCM). Fortunately, Nissan offers help when servicing the company's 2003-2015 models with 5-speed Automatic Transmissions and Rear Wheel Drive.



Nissan technical experts often receive questions regarding programming blank TCMs on rear wheel drive vehicles with automatic transmissions. The company has developed a Technical Service Bulletin that guides you through the entire process.

Nissan notes that all replacement 5-speed rear wheel drive automatic transmission (A/T) assemblies and replacement control valves now are delivered with blank TCMs. That is to say, they **do not** have software and must first be programmed (not **re**programmed) and configured after installation before they will function.

This article will get you started and direct you to the TSB where all your questions will be answered. For the sake of clarity, we will only be addressing the following Nissan vehicles with 5-speed A/T and RWD:

The TSB can be found on the Nissan TechInfo website at www.nissan-techinfo.com. The bulletin, number NTB14-033a, is titled "Nissan; Programming Blank TCMs." By entering any of the above models and model years, you can search any of the keywords: "Programming" or "TCMs" and the document will appear below the search section. Simply click on the correctly numbered document to view.

The bulletin contains details for:

- Saving and copying information from the old (current) TCM and applying it to the new (replacement) TCM.
- Obtaining the newest TCM P/N in WIN FAST (or other electronics parts catalogs) when not able to access the TCM with CONSULT-III plus (C-III plus).
- Obtaining and installing program information into the new A/T or valve body's blank TCM when it cannot be copied from the old TCM.

- 2002-2015 NV
- 2003-2008 350Z
- 2004-2009 350Z Roadster
- 2004-2015 Armada
- 2004-2015 Titan
- 2005-2012 Pathfinder
- 2005-2015 Frontier
- 2005-2015 XTerra

Blank TCM Programming Procedure Summary

The following is a summary of the steps for blank TCM programming. For complete details, go the website and follow all steps and procedures.

NOTE: Erase any stored Diagnostic Trouble Codes (DTCs) and perform DTC-related repairs before starting the programming procedure in the bulletin.

For vehicles where the old/current TCM can be accessed (TCM P/N can be read) with Consult III plus (C-III plus):

a. Connect and launch C-III plus:

- From the C-III plus home page, select **Re/Programming, Configuration** (Fig. A).
- Proceed to **Re/Programming**.

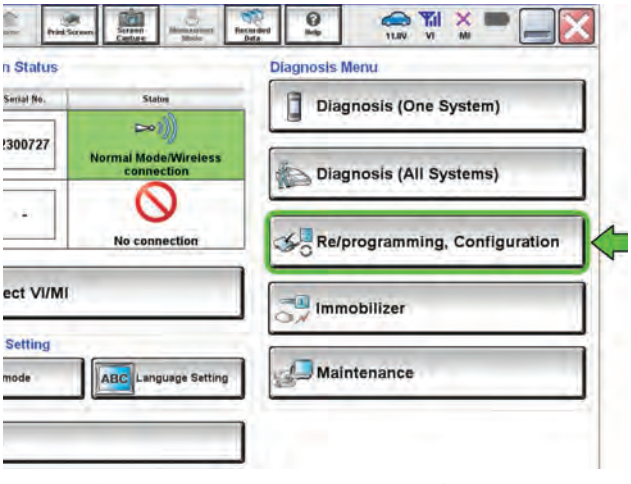


*Fig. A: Select **Re/Programming, Configuration**.*

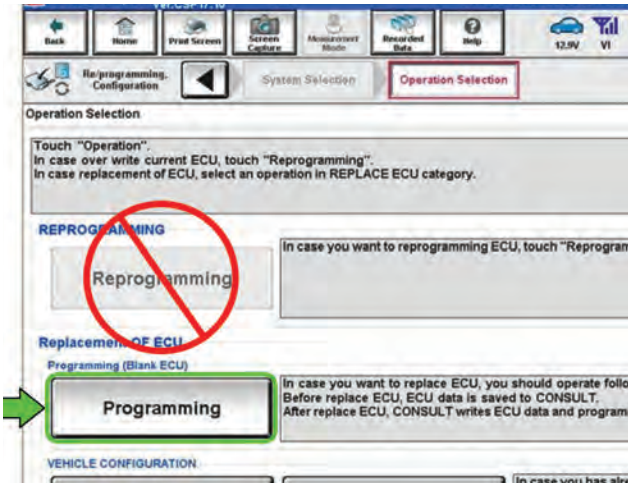


*Fig. B: Select **Programming**. Do not select **Reprogramming**.*

- Select **Programming** (Fig. B).

b. Select **Before Replace ECU** (Fig. C).
c. Save the current TCM P/N and Vehicle Identification Number (VIN).
d. Replace the 5-speed rear wheel drive automatic transmission assembly or control valve with a new one that contains a blank TCM.
e. Select vehicle model & year, then select confirm.
f. Select **After Replace ECU** (Fig. D).
g. Select **Start** (to begin programming).
h. Once programming has completed, configure the new TCM and erase DTCs.
i. Close C-III plus.

For vehicles where the old/current TCM cannot be accessed (TCM P/N can be read) with Consult III plus (C-III plus):

a. Replace the 5-speed rear wheel drive automatic transmission assembly or control valve with a new one that contains a blank TCM.
b. Obtain the TCM software P/N by using the VIN in the electronic parts catalog to look up the part number for the transmission assembly (A/T).
NOTE: When ordering a replacement A/T or control valve, the electronic parts catalog (WIN FAST or eStore) will list the software (P/N) for a blank TCM under the A/T only.
c. Connect C-III plus, go to the screen that shows the selection **Programming**, and then select **Programming**.
d. Select **After Replace ECU**.
e. Select the P/N from the list that matches the one from the parts catalog. Double-check to make sure the correct P/N has been selected.
f. Select **Start** (to begin programming).
g. Once programming has completed, configure the new TCM and erase DTCs.
h. Close C-III plus.

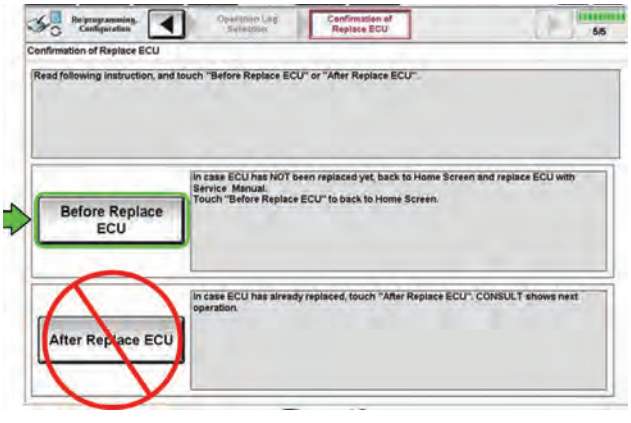


*Fig. C: Select **Before Replace ECU**.*

Parts Ordering

When ordering a replacement A/T or control valve, the electronic parts catalog (WIN FAST or eStore) will list the software (P/N) for a blank TCM under the A/T only.

Always enter the VIN when ordering or looking up a replacement A/T assembly or control valve (Fig. E).

Pre-Programming Preparation

When connecting the C-III plus Vehicle Interface (VI) to the vehicle, make sure you have the correct VI for the C-III plus **(plus VI)** (Fig. F).

Make sure the VI is securely connected to the DLC. If the VI connection is loose during

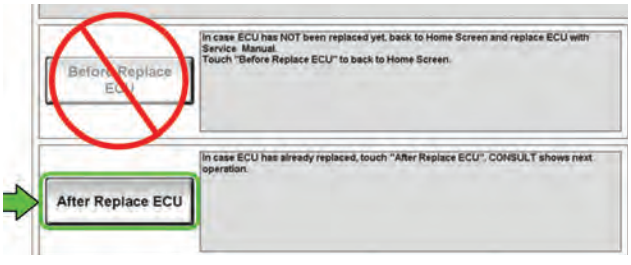


*Fig. D: Select **After Replace ECU**.*

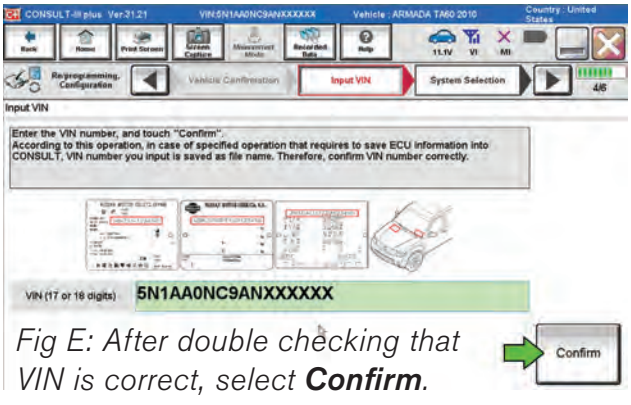


*Fig E: After double checking that VIN is correct, select **Confirm**.*

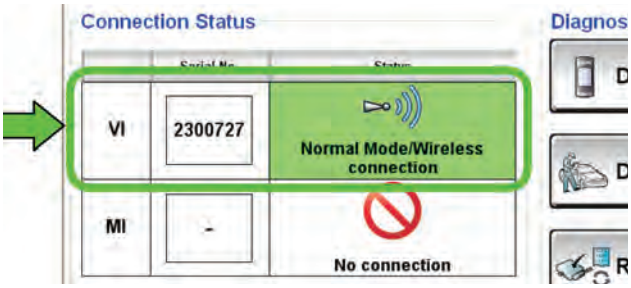


Fig. F: The serial number will display when the plus VI is recognized.

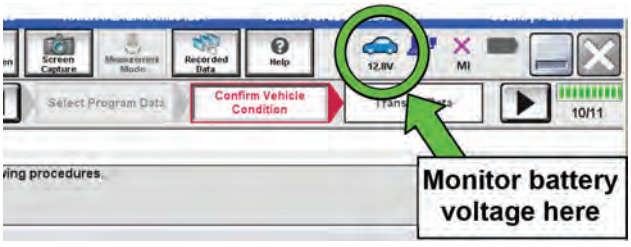
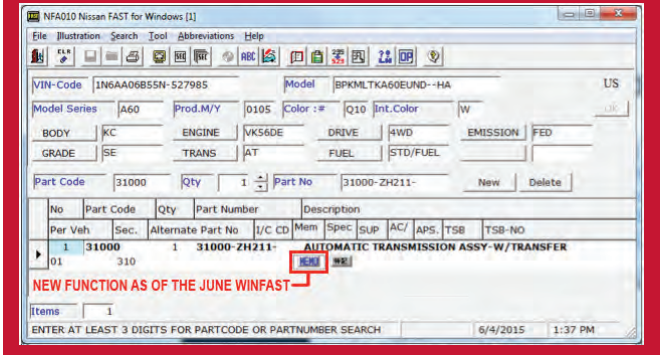


Fig. G: The voltage level is displayed at the top of the screen. It must stay between 12.0 V and 15.5V to avoid damage to the TCM.

New MEMO Icon

Nissan has added a new Memo icon button to the WIN FAST screen to aid in ordering the correct control valve part or software. To use it, you must upgrade your system to the most recent edition of FAST, dated June, 2015. It will show you a path to choose the correct part for your VIN. It will then also tell you how to find the program data you may need for CONSULT programming. Please make sure read any information that pops up and follow any instructions noted.



programming, the process will be interrupted and the TCM may be damaged.

Be sure to connect the AC Adapter to the CONSULT PC. If the CONSULT PC voltage drops during programming, the process will be interrupted and the TCM may be damaged.

Connect a battery charger to the vehicle. When using the GR-8 Battery and Electrical Diagnosis Station, set to "Power Supply." Be sure the battery charger is connected securely to the battery and the voltage stays between 12.0 V and 15.5V. The voltage level is displayed at the top of the screen. If the voltage goes out of range during programming, the process will be interrupted and the TCM may be damaged (Fig. G).

Turn off all external Bluetooth devices (cell phones, printers, etc.) within range of the CONSULT PC and the plus VI. If Bluetooth signal waves are with range of the CONSULT PC and plus VI during programming, the process will be interrupted and the TCM may be damaged.

Turn the vehicle ignition ON (Engine OFF). The engine must not start or run during the programming procedure.

Turn OFF all vehicle electrical loads. These include exterior light, interior lights, HVAC, blower fan, rear defogger, audio, NAVI, seat heater, steering wheel heater, etc.

Programming

To determine if the old TCM can be accessed with a C-III plus Select Diagnosis (One System) > Transmission, then read the TCM P/N.

Do not replace or install the new A/T or valve body with a blank TCM until instructed to do so in the SERVICE PROCEDURE.

You can obtain the programming file from the website. Be sure to review the readme file that comes with the download and place the programming files in the correct location.

This brief article on the intricacies of programming blank TCMs is merely a summary of the entire subject. To perform blank TCM programming properly and completely, log onto the Nissan TechInfo website at www.nissan-techinfo.com and follow the step-by-step procedures outlined in Technical Service Bulletin NTB14-033a.

Visit NissanTechNews.com to view a complete archive of previous issues of **Nissan TechNews**. Search by vehicle system or published date.