PicoScope®

pico® Technology

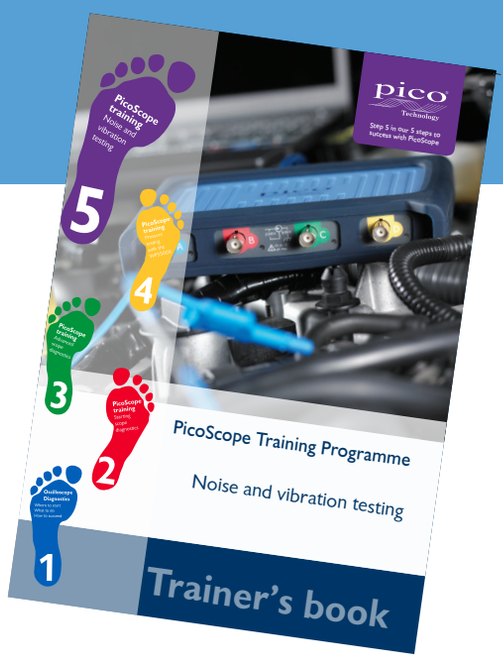
Eradicate NVH issues

With PicoDiagnostics' Noise, Vibration and Harshness Testing

With PicoDiagnostics' award winning NVH kit you can take the guesswork out of your Noise, Vibration and Harshness testing.

The NVH kit is designed to be intuitive and easy to use. It provides all the data required to ensure that you can make a quick and reliable diagnosis of even the most complex NVH issues.

Step 5 in our *5 Steps to success* training programme consists of a one day NVH training course.



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WHAT IS NOISE, VIBRATION AND HARSHNESS TESTING?

Noise, vibration and harshness (NVH) is the study of noise and vibration signals about a vehicle. Noise refers to an unexpected sound at any time (be it steady or intermittent), vibration is any repetitive motion of an object while harshness is a sudden, sharp and aggressive shock following an event.

In reality, your customers may describe it as an “annoying rattle or sound”. Often this sound or vibration will change with the vehicle’s road or engine speed. While the cure for these symptoms can be found simply and quickly, have you actually fixed the root cause of the problem? Modifying the panel may cause it to stop vibrating, but what was causing the vibration in the first place and will it return?

Noise and vibration are very subjective, and there is likely to be a difference between your experience of them and your customer’s. What if you cannot find a simple explanation? How do you prove a reduction in the NVH occurrence?

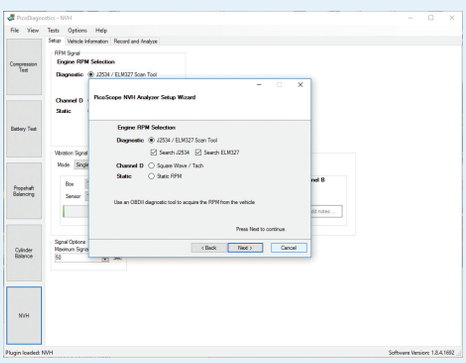
The PicoDiagnostics NVH kit can help you with these questions. More importantly, it gives you the ability to record data both before and after your fix. This enables you to show your results (and prove any work undertaken) to your customer.

SO HOW DOES IT WORK?

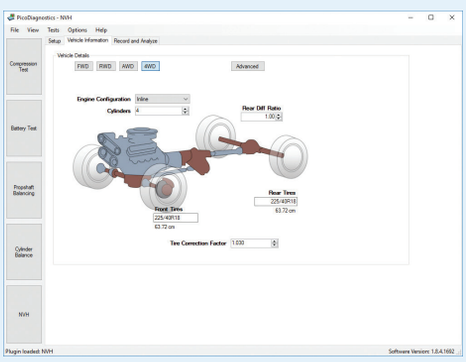
Our NVH kit uses a combination of accelerometers, microphones and technical data to measure, calculate and analyze the rotating and vibrating components in a vehicle. By analyzing the results you see on-screen, you will be able to identify the root cause of your NVH issue.

Let us look at how PicoDiagnostics NVH works in a practical situation:

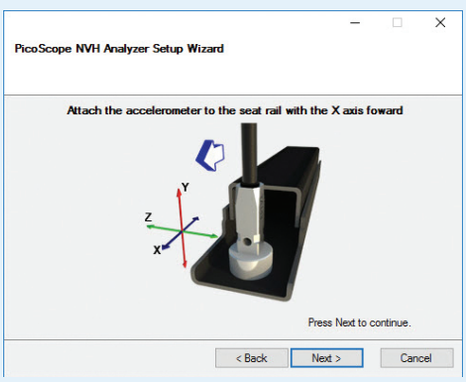
Our NVH test is built into our PicoDiagnostics software. Click the icon on your Desktop and select NVH from the selection of test buttons (you have to have a PicoScope connected and an NVH license to run this test). The software will run you through a setup wizard to prepare the vehicle for a live test. You will be asked to:



1. Select **J2534** (this is the suggested manner in which) to obtain Engine/Road speed via the vehicle’s OBD socket.



2. Input vehicle data, engine configuration, drivetrain arrangement, differential ratio, and tire size information.

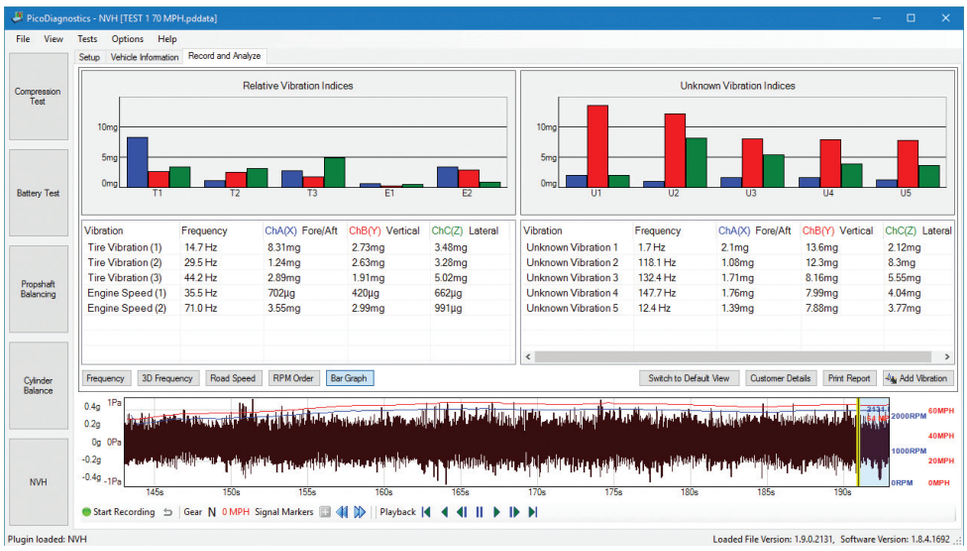


3. Configure and position accelerometers as instructed by the wizard

Start capturing data until you have reproduced and recorded the problem.

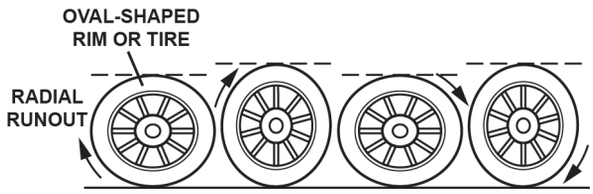
THE RESULT

Once you have completed the test, you will have an analysis page as per the below:



On the analysis page you can move the bar within the signal history chart (at the bottom of the screen), to view portions of time and look for changes in vibration orders and high levels of frequency changes. These spikes indicate the component type that is likely to cause the issue. The information provided by PicoDiagnostics is very clear and detailed, complete with a help system to guide you through your results and the likely causes to investigate.

As you become more proficient with the software you can add additional vibration orders if required. E (Engine), T (Tire) and P (Propshaft) refer to the rotating parts the software is analyzing, and in each case this is suffixed by a number. This number refers to the vibration order of each recorded event (the number of occurrences of a given vibration per revolution of that component). This illustration shows an oval shaped rim or tire, which would cause 2 shocks per revolution (cycle). This is called a 2nd order tire vibration, or **T2** in our software.



It is also worth noting that in most cases, the area you or your customer feels or hears the issue in is not always the root of the problem. The definitions below will help explain this.

Every vibration consists of 3 elements:

Source Component

(Excitation) – A component causing a vibration, for example the engine.

Transfer Path

The object that transfers the vibration, for example the exhaust mounts.

Responding Component

The noticeable component that is vibrating, in our case the trim panel in the drivers compartment

It might be tempting to pack the trim within the cabin to solve the issue. However, once we understand that this could be the responding component, and have carried out diagnosis with our NVH software, we discover an engine vibration being transmitted by a faulty exhaust mount. Armed with this information you can fix the source of the problem.

Once the complaint is resolved, you can run the same road test again and **prove the fix**. This gives you a record of your diagnosis and work completed that you can save and share with other users. The real benefit of our NVH system is that it is objective and repeatable.

How do I start?

We do a range of NVH kits depending on what you wish to analyze, and the details you wish to see. Each kit contains an interface box which connects the accelerometer or microphone to your existing PicoScope 4000 Series automotive scope.

KIT SELECTION

3- or 4-axis kit?

The 3-axis kit will allow you to measure vibrations on 3 axes, (X, Y and Z). The 4-axis kit gives you the option to measure vibration or sound on a single axis at another location on the vehicle. Both kits are available in a carry case or foam tray to enable users to store their NVH Diagnostics kits safely in a tool chest of their own choosing.

Mongoose Pro ISO/CAN J2534 lead (TA293)

Having used the Mongoose Pro alongside Pico products for some time, we are confident it is the best and most reliable product to use with our NVH kit for the acquistion of a road speed signal. Therefore, we now have kits available with the Mongoose lead included.

Optical balancing kit (PP991)

The purchase of our **Optical Balancing kit** allows on-vehicle balancing in order to rectify first order shaft vibrations. Included as part of our PicoDiagnostics software, the **Propshaft balancing** test provides clear advice and guides you through analysis and test procedures:

- Support for pinion flange, single weight, and hose clamp balancing weights
- Step-by-step procedures with help and graphical displays

DESCRIPTION	ORDER CODE IN CARRY CASE	ORDER CODE IN FOAM
Pico 3-axis NVH Diagnostics kit	PP986	PQ025
Pico 4-axis NVH Diagnostics kit	PP987	PQ026
Pico 3-axis NVH Diagnostics kit + J2534 lead	PQ043	PQ044
Pico 4-axis NVH Diagnostics kit + J2534 lead	PQ045	PQ046
Optical Balancing kit	PP991	

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