Polytec

PSV Scanning Vibrometer

Optical measurement of vibrations in 1D and 3D

Product brochure

The world vibrates

Measuring vibrations quickly and easily, making them visible and thereby understanding the world – that is our common goal. Harnessing vibration and acoustics for the greater good – that is the task. **Scanning Vibrometers from Polytec are the tool.**

Simple – Fast – Reliable

You wish to generate reliable vibration map data quickly. How can you achieve this without corrupting the measurement with contact sensors on the measurement object? Laser-based, optical measuring systems are your solution.

Here is what Scanning Vibrometers from Polytec can do:

In the event of acoustic problems and during the validation of simulation models, the measurement data generate a technical picture of dynamic behavior. Graphically visualized, the solution practically takes care of itself.

Polytec Scanning Vibrometers provide precise and easily interpretable operating deflection shapes of the entire surface and transfer functions, as well as stress and strain distributions. Modal parameters can be easily extracted, acoustic hotspots identified and surface waves visualized in the time domain.

Improve your products quickly – with vibration measurements by Polytec.

Polytec Scanning Vibrometers are perfectly normal vibration measurement systems, but they can do so much more:

- As many measurement points as you really need, even in a small area
- As much bandwidth as you need
- Completely non-contact, so that everything vibrates as it really should
- So intelligent that the visualization shows everything, both the good and the bad
- So focused that no object is too small and so flexible that no object is too big
- So compatible that FE model validations become child's play
- As virtualizable as the CAE environment in which you work
- So robust that measurements can be taken reliably, even on hot or moving surfaces

Everything you need

The PSV Scanning Vibrometer is a vibration sensor, data acquisition system, signal generator, geometry measurement system* and evaluation system all in one.

The comprehensive PSV software package is specially designed for the full-field display of structure-borne vibrations. The intuitive operation of the PSV Scanning Vibrometer always enables successful measurements to be performed in a few minutes.

* optional: integrated geometry sensor or hand-held 3D scanner

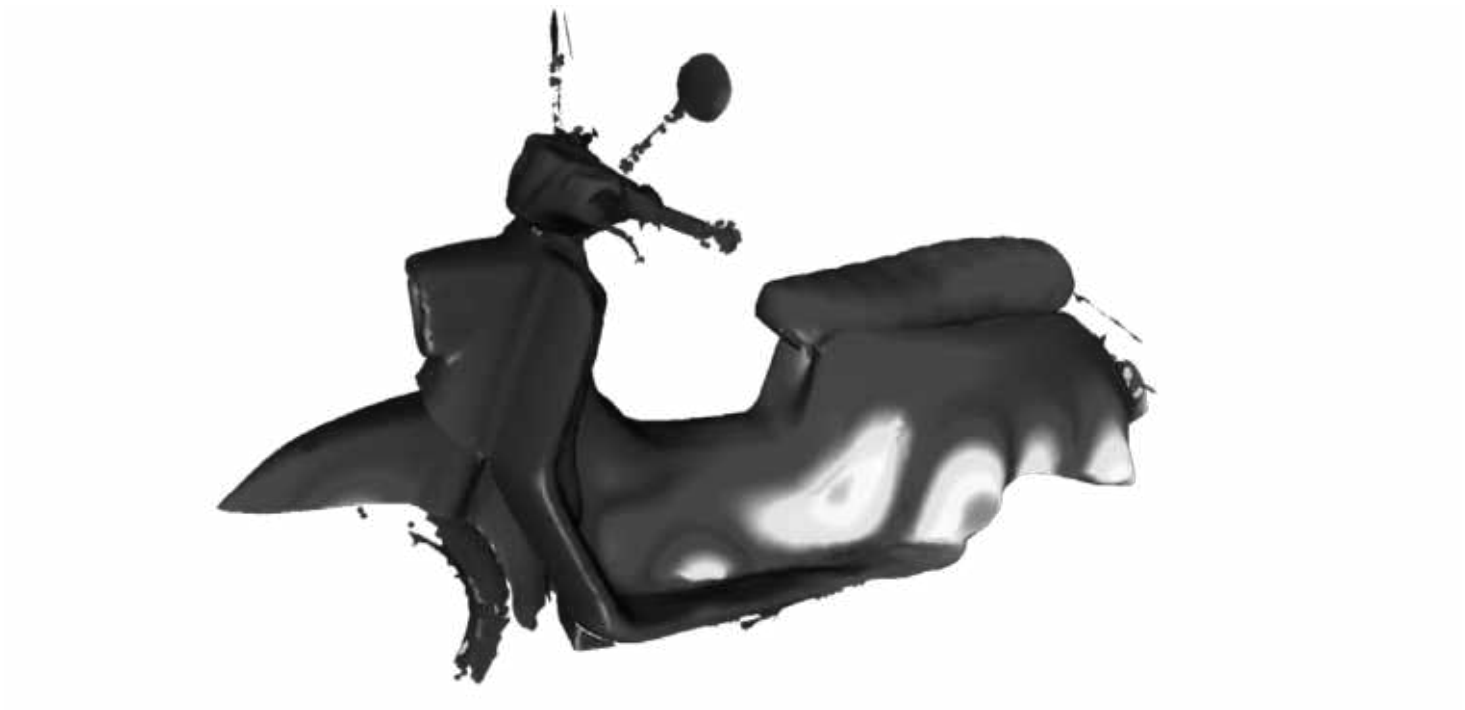
"Something is too loud here!"

Your product doesn't do what you want it to do? The Polytec Scanning Vibrometer takes you straight to the cause.

Parameterize the measurement → **Scan automatically** → **Evaluate and visualize**

Make a measurement
Recording highly accurate vibration data with the PSV Scanning Vibrometer is almost as easy as making a video: You use the video camera to sight in on your object and specify the surfaces to be measured in the software. The Scanning Vibrometer does the rest automatically.

To the point
Do you need convincing data?
The superimposition of 3D object geometry and vibration measurement data makes it much easier to draw conclusions to create a better product.



Strong on the inside – open to the outside

The intuitive operation of the Polytec Scanning Vibrometer even enables beginners to perform successful measurements in just a few minutes. This is thanks to the PSV software. The comprehensive PSV software package is specially designed for full-field measurement and the display of structure-borne noise vibrations in a CAE-integrated development environment.

YOU CREATE A MESH

A live video image, intuitive drawing and meshing tools quickly provide a suitable measurement grid. Image processing* helps you detect the laser position and automatically creates a measurement grid based on the object contour, if required. The integrated distance sensor* provides the exact 3D coordinate for each measurement point.

For the expert:

- Measurement grids as provided in an FE simulation – Work with imported CAE geometry
- No CAE data? – Generate high-resolution measurement grids with a hand-held 3D geometry scanner*

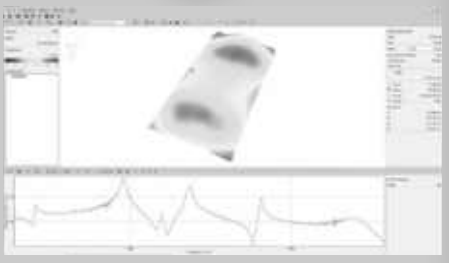
YOU MEASURE

Results under control: You define the data acquisition setting and excitation in the time- or frequency domain – while your PSV Scanning Vibrometer automatically scans the object.

For the expert:

- Choose from 10 specific waveforms for sample excitation or freely define an excitation signal according to your requirements
- MIMO measurements* with multiple shakers and up to 8 additional sensors
- Optimize your result with signal enhancement and filter tools, as well as automatic measurement range settings

YOU ANALYZE



The clear graphic representation of the measurement results and extensive integrated evaluation and post-processing options support you in interpreting the measurement data. 3D animation, identification of resonances via cursor, Bode plots, deflection shape display in volume or sections are among the standard tools for vibration analysis.

For the expert:

- The Polytec SignalProcessor* enables individual and flexible signal post-processing
- Modal and order analyses can be performed efficiently with the tailored PolyWave software**
- Use our interfaces for MatLab®, LabView®, MS Excel®, Python, ASAM ODS*

* optional ** depending on the model and configuration

YOU AUTOMATE

Do you need more? – Sample macros in Visual Basic and an increasing number of ready-made macros** from the PSV community for special tasks extend the options of the PSV software.

For the expert:

- Everything under control – You use the open Polytec File Access interface and program your own solution with LabView®, Python or other languages to control the PSV Scanning Vibrometer or to access measurement data automatically.

YOU COMMUNICATE

Communicate your results to a wider audience – 3D animations provide an intuitive understanding of the measurement results. In addition, texture data from the hand-held 3D scanner makes a good impression with a photo-realistic presentation of results.

Details become clear with profile lines and sections through volumes, and you find the right optimization approaches.

For the expert:

- Present more than images or animations with the free-of-charge Polytec ScanViewer. Embed free 3D view controls and select frequencies and present your results live in PowerPoint®.

YOU ARE UP TO DATE

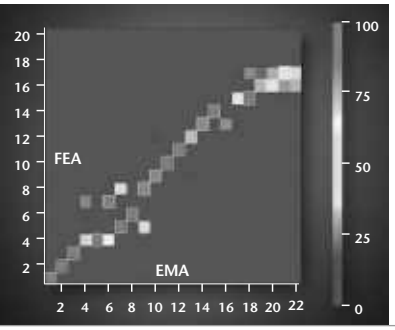
Software maintenance enables you to secure the new software functions of tomorrow today. Polytec Update automatically informs you as soon as a new software version is available for download.

As an educational institution, you secure lifelong software maintenance at particularly favorable conditions with our University Program.

For the expert:

- Also in safety critical environments Polytec Update can be used by it's unique offline update procedure.

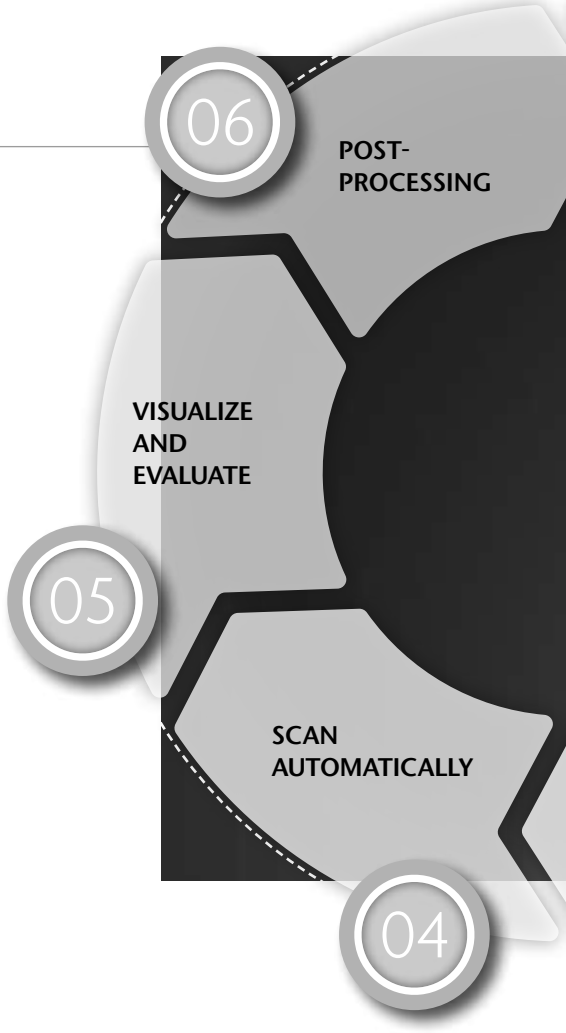
Efficient product development with your Polytec Scanning Vibrometer



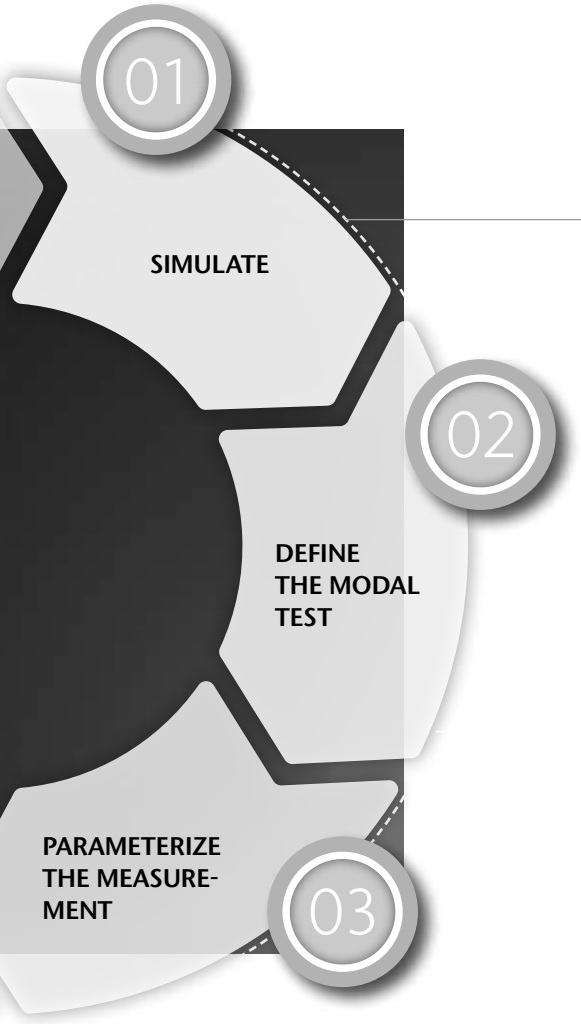
Post-Processing

Visualize and evaluate

Scan automatically



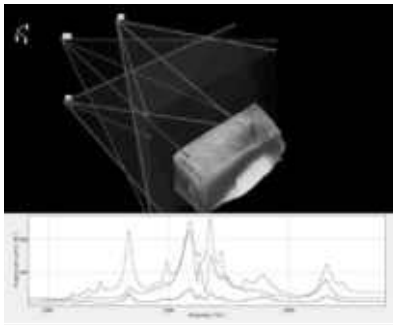
The PSV Scanning Vibrometer provides an extremely powerful, easy-to-integrate platform to optimize your product development cycle, dramatically shorten time to market and increase product quality. Open data interfaces seamlessly integrate the PSV Scanning Vibrometer in your CAE workflow.



Simulate

Define the modal test

Parameterize the measurement



1D, 3D, portable –
suitable for your requirements

The redefined sixth generation of the PSV Scanning Vibrometer is more versatile and expandable than ever before. From a compact notebook system to a complete RoboVib® test center – the PSV can be tailored to suit your task! It is your preferred choice for all tasks concerning operating deflection shape analysis in 1D or 3D, experimental modal analysis and model validation.

Flexible configuration

The PSV Scanning Vibrometer measures and visualizes vibrations from micro to macro up to 25 MHz – and down to the sub-pm range. The distribution of out-of-plane vibration amplitudes and phases is acquired across a wide area in the 1D configuration. It becomes a 3D system for measuring spatial vibration information simply by adding two more scan heads.

On the road or in the lab

The compact notebook variant enables mobile measuring worldwide. The carefully designed system cabinet* offers excellent ergonomics and storage options for everyday work. This means that the entire system is readily available when going from lab to lab.

* optional

Our technological lead – for your application

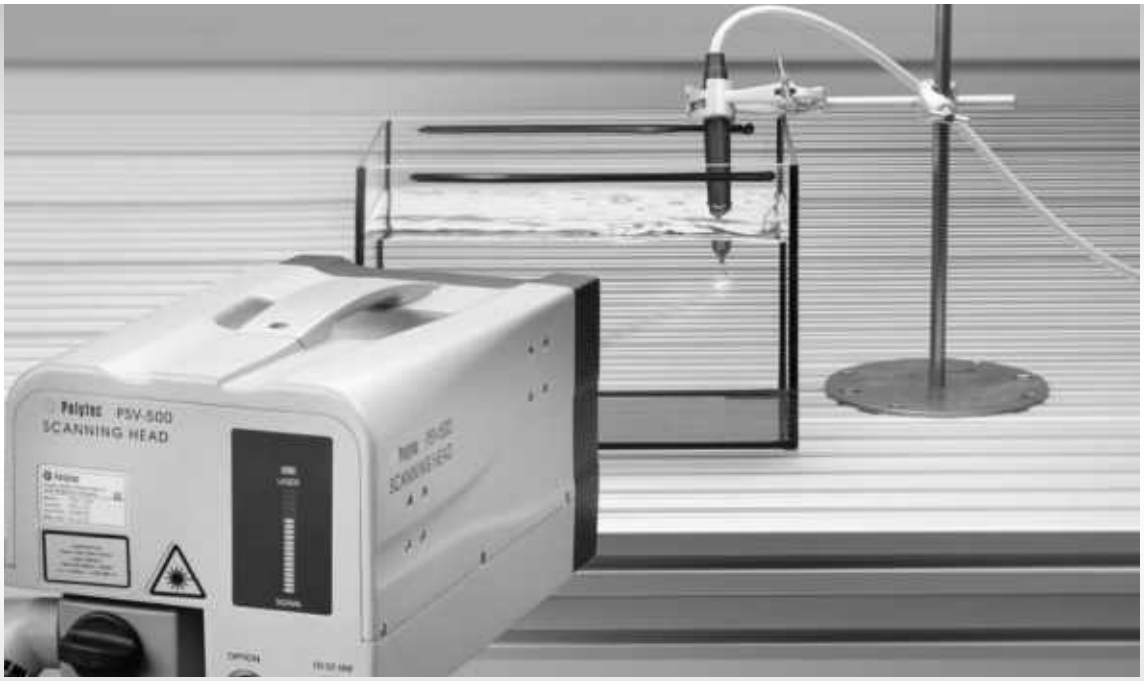
Scanning heads with a helium-neon laser

The precise helium-neon laser with its small laser measuring spot is suitable for measurements on extremely fine structures and even measures in and through water and other transparent media.

Tiny structures

Transparent media (water, glass, etc.)

PSV-500



Polytec has been carrying out research for over 30 years to ensure the best performance of laser vibrometry in real-world applications. A large number of patents document this spirit of innovation. The path led us from our classic high-precision HeNe technology and the world's first use of infrared laser technology for top performance at high stand-off distances and low-noise digital data acquisition, to the next quantum leap in optical vibration measurement: the QTec® technology.

QTec® makes Scanning Vibrometer measurements up to 10 times faster. The patented multi-path interferometry eliminates the influence of rough surfaces on the signal quality and therefore measures reliably on all surfaces with low noise. **Each technology has its strengths in its area of application. With Polytec, the choice is yours.**

PSV
QTec

Large structures

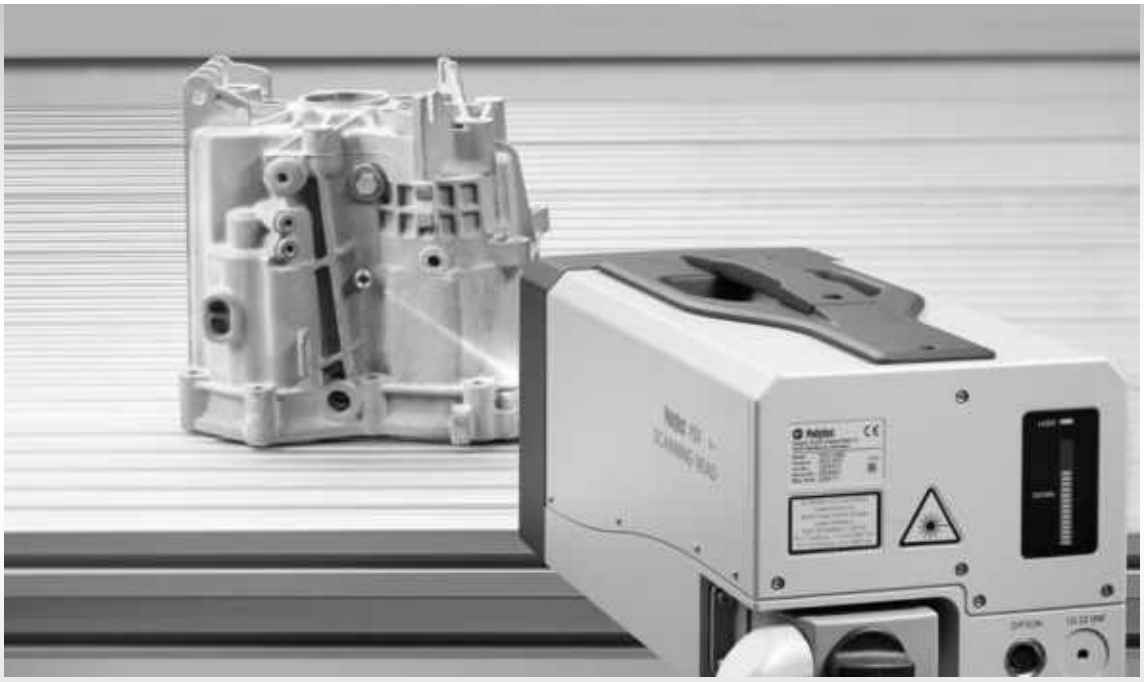
No surface preparation

High vibration velocities up to 30m/s

Scanning heads with QTec® technology

The multi-path interferometer technology QTec® based on an infrared laser is the preferred choice if you wish to measure high vibration velocities of up to 30 m/s or from high stand-off distances. It specializes in acquiring meaningful measurement data, even on dark, moving or rotating objects, as well as biological objects.

More about the patented QTec® technology can be found at www.polytec.com/qtec



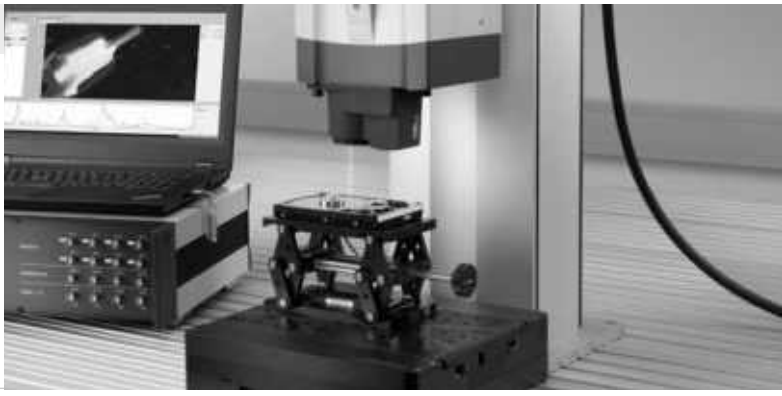
Growing with your demands

Every measurement task is different. We have learned this in over 30 years of scanning vibrometry. Together with our customers we have developed accessories that make each PSV Scanning Vibrometer applicable to your needs.

With the right accessories, you can...

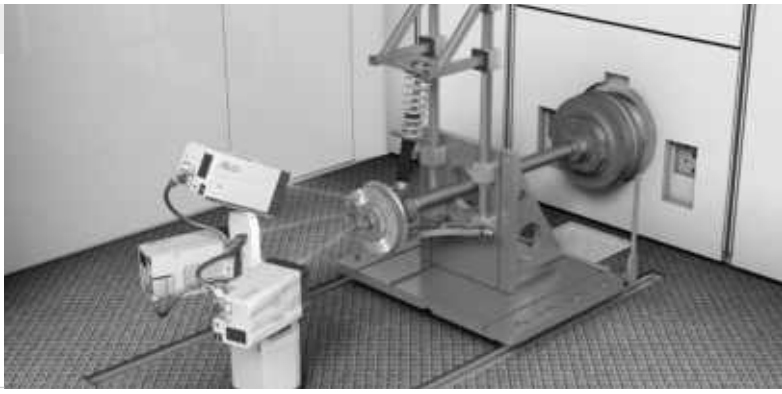
...measure even the smallest components

Get really close: this is possible with the optical and mechanical accessories for positioning, illumination and magnification. This makes the finest structures visible and measurable.



...trigger on noise

Unambiguous measurement data is obtained with an adjustable acoustic gate unit for triggering the measurement even during transient processes.



...localize noise

With the acoustic fingerprint in your ear, you can find the specific source of the disturbance directly from the measurement data, unaffected by ambient noise.

...position precisely and flexibly

Correct alignment and fast measurement, even in difficult positions, with application-optimized stands. You have the choice, from manual to fully automated.

...master even complex geometry and measurement setups

Complete geometry data not only helps with setup and measurement; it also provides a convincing presentation of the results. Texture and geometry measured with the hand-held 3D scanner complement the CAE interfaces of the PSV software to perfection.

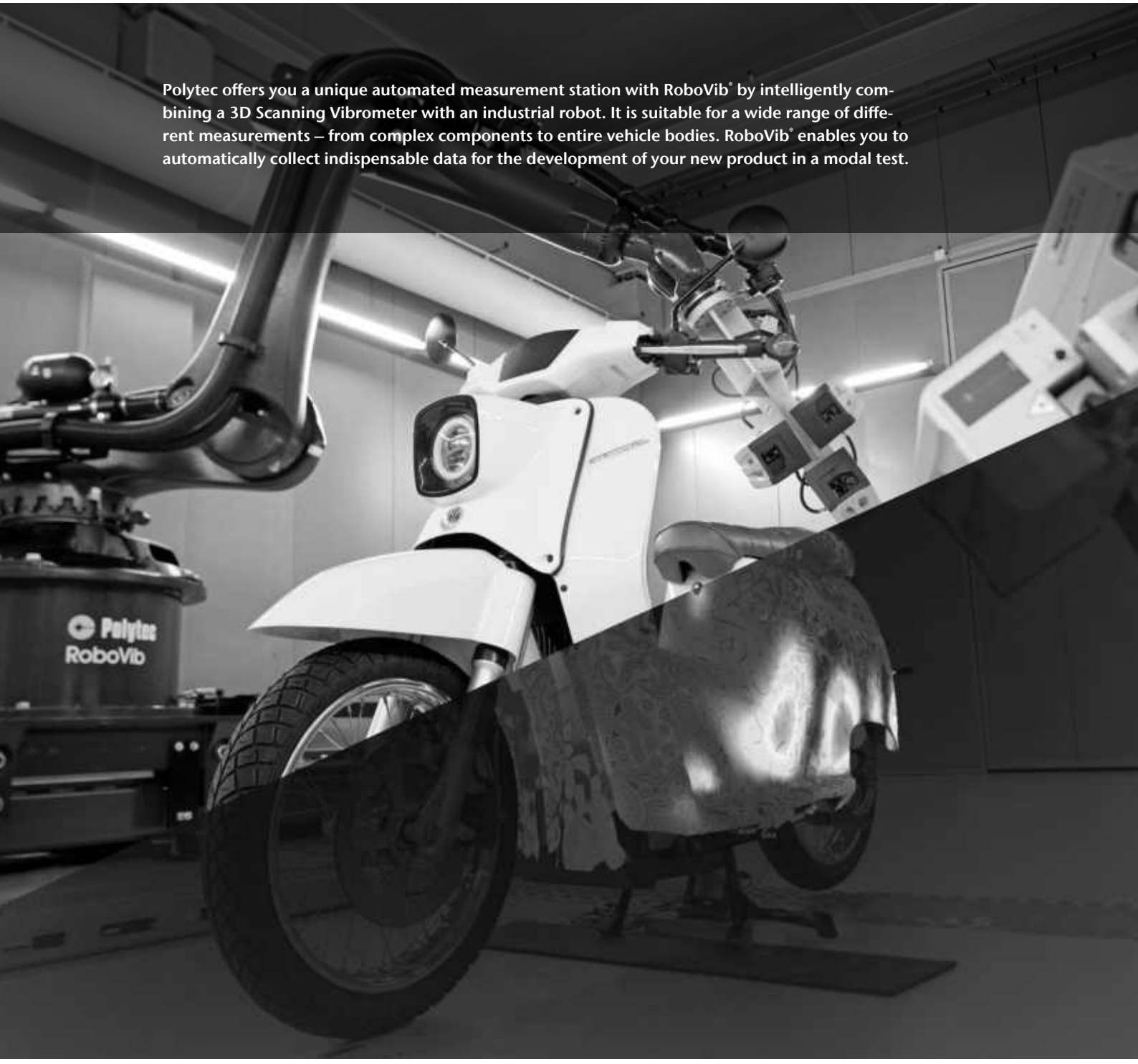
...measure in tough test bench conditions/ wind tunnels

Highly sensitive optics in wind, noise, dirt and dust? Thanks to the optically tailored protective window, it can be done.

...measure on rotating parts

The derotator enables you to measure as easily as if the object were standing still. The rotation of the object is optically compensated for.

Fully automatic vibration measurement in 3D



Polytec offers you a unique automated measurement station with RoboVib® by intelligently combining a 3D Scanning Vibrometer with an industrial robot. It is suitable for a wide range of different measurements – from complex components to entire vehicle bodies. RoboVib® enables you to automatically collect indispensable data for the development of your new product in a modal test.

Start faster

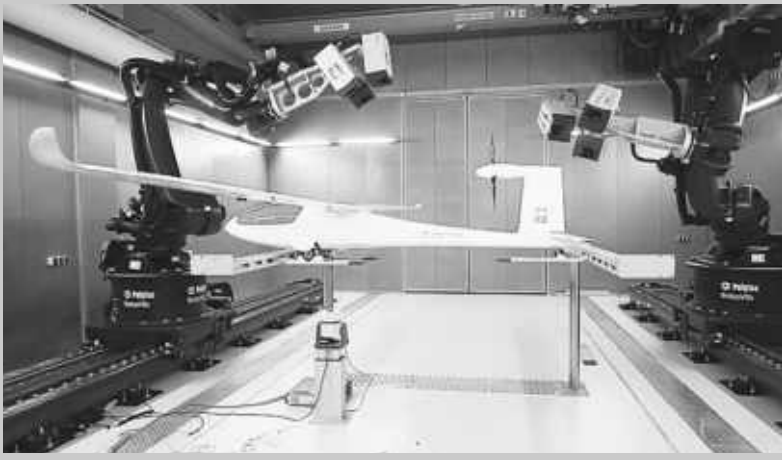
The test is prepared almost entirely on the computer. The robot program is defined in virtual rooms and the programming is checked for collision and subsequent result quality. Test rooms and prototypes are used exclusively for measuring. If you process similar objects, the programs can be reused or easily modified. This saves time, and serial measurements are also processed efficiently.

Measure faster

The laser method works extremely accurately and many times faster than conventional tactile methods. This means that the measurement data is sometimes available to you overnight and at a significantly higher spatial resolution derived from the finite element model. This makes it much easier to validate your models. For example, you can completely test a car body in 1-2 days, instead of spending weeks on the test preparation alone, as was previously the case.

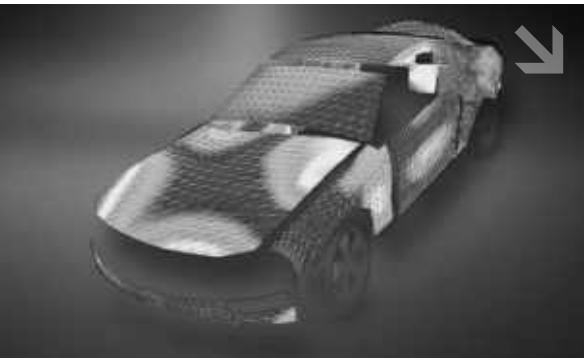
Faster time to market

Experienced Polytec engineers carry out planning, setup, measurement and analysis on your behalf. Polytec thereby ensures that your product reaches the market faster and better with test consulting, automatic experimental modal analysis and data evaluation.



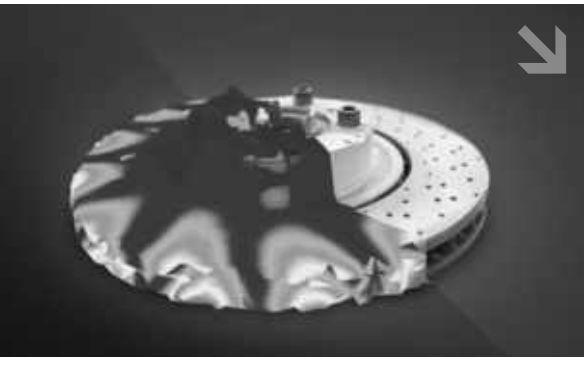
Up to any task

Vibration engineering tasks are the same in all industries. Amplitudes, resonance points and deflection shapes are essential for evaluating products during development and eliminating weak points. However, even if dimensions and frequencies vary, the dynamics and flexibility of PSV technology can meet your requirements.



Experimental modal analysis

An experimental modal test includes planning, setup, measurement of the transfer functions, display of the deflection shapes and curve fitting of the measured data. MIMO setups are configurable with PSV-3D at any time, in order to excite all modes reliably*. The PSV Scanning Vibrometer allows precise measurements at a high number of measurement points, resulting in very meaningful MAC values when comparing experiment and simulation.



Operating deflection shape analysis

Three-dimensional scanning vibrometry is a unique tool for you as a test and simulation engineer. It enables you to determine operating deflection shapes and eigenmodes of complex objects quickly and extremely accurately over a wide frequency range. Its non-contact method means that the PSV-3D Scanning Vibrometer guarantees reliable measurement data by reflecting the true vibration characteristics of the measured object. Ideal for your high demands regarding performance, accuracy and data analysis in structural dynamics testing and ultrasonic investigations.

* optional

Acoustics & NVH

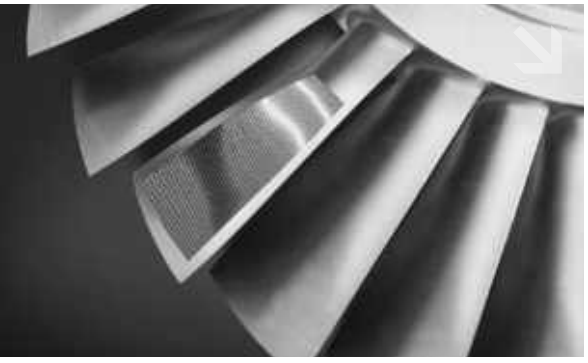
Designing quiet, low-vibration products is the task of simulation and testing. Scanning Vibrometers from Polytec enable you to detect sound sources quantitatively and with a high spatial resolution. 3D visualization helps you understand musical, medical and technical acoustics.

Ultrasound & non-destructive testing

Well-known manufacturers of ultrasonic equipment for industry and medicine rely on Polytec Scanning Vibrometers for their research and development. Measure and visualize vibration characteristics of actuators and sensors by means of laser vibrometry – the precise and reliable tool for FE validation, optimization and troubleshooting.

Rotating parts

Direct measurement on rotating surfaces represents a challenge for conventional measurement technology but is possible at any time with the PSV Scanning Vibrometer.



Stress & strain measurement

Scanning 3D vibrometry provides fast and accurate comparison of stress and strain calculations. It derives measurement points directly from the FE grid and avoids the instrumentation costs of conventional tactile methods. The high spatial resolution localizes and determines stress maxima, thereby improving component design.

Polytec

Shaping the future since 1967

High tech for research and industry.
Pioneers. Innovators. Perfectionists.

Find your Polytec representative:
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2021/04 - Technical specifications are subject to change without notice.