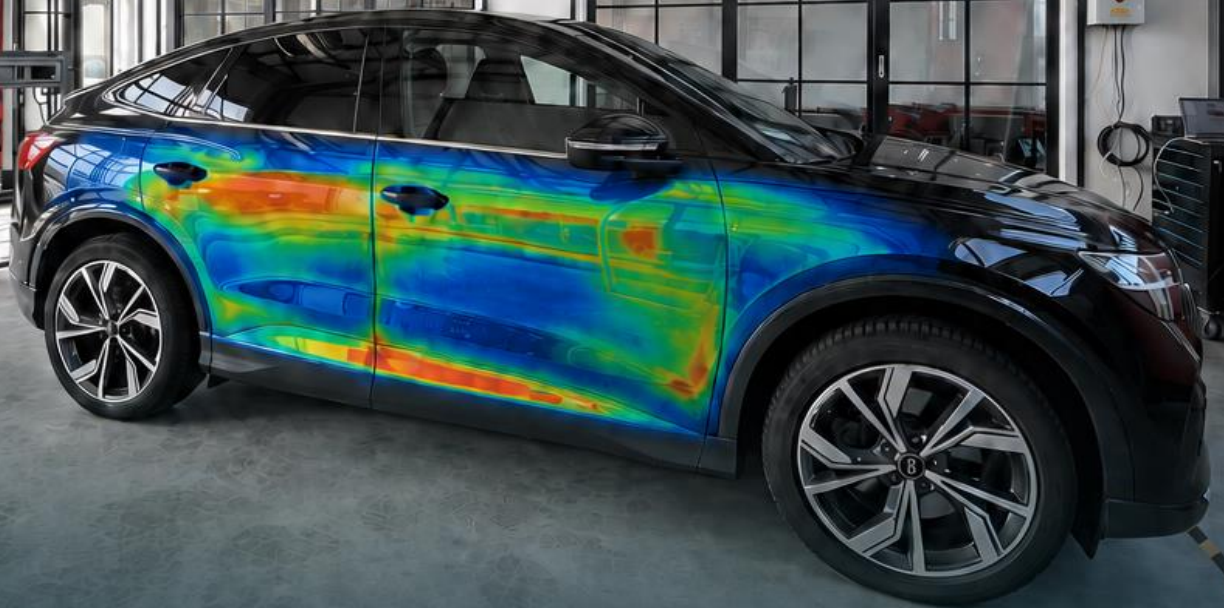


CARSCAN
POWERED BY THE CHVERSTANO



CarScan

See more. Decide better.

Contact-free. Non-destructive. Image-based.

More clarity when you need to decide.

CarScan adds an image-based view of paint build-up, bodywork and components to an expert vehicle assessment. It can provide indications of whether

- the bodywork has been repaired with filler
- the vehicle has received additional paint or clear coat
- the vehicle has been damaged by hail
- damaged bodywork parts have been replaced or repaired
- the bodywork has been welded
- wheels or bodywork attachments have been painted or repaired



01 Detect

Make unusual areas visible across the vehicle.

02 Document

Make images and findings easy to understand.

03 Decide

Discuss findings with confidence.

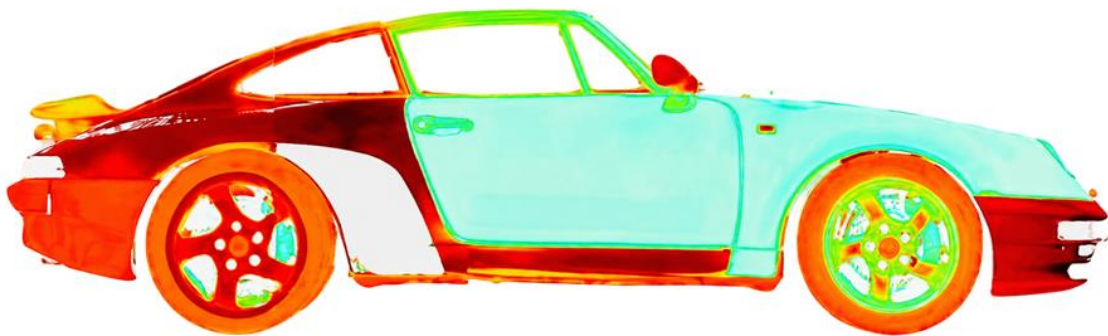
Look beneath the surface.

Active thermography turns differences in a surface's thermal response into images.

VEHICLE VIEW / MATCHED REFERENCE IMAGE



THERMOGRAPHIC VIEW



visible surface > image data

The thermographic view provides indications of differences within an area. It does not replace an expert assessment, but shows where a closer look is worthwhile. In this example, the right rear fender and the right rear wheel rim show indications of repainting.

Important: CarScan is a contact-free, image-based addition to an expert inspection. The results are indications, not an independent statement about accident history, repair cause or roadworthiness.

01

Stimulate

Light and heat stimulate the surface.

02

Capture

The IR camera records temperature profiles.

03

Evaluate

Image data is processed in a structured way.

04

Classify

Indications are assessed in context.

From vehicle to clear image documentation.

The scope is tailored to the vehicle, the surface and the inspection objective.



Video: our three scanners in everyday use



01 Clarify the inspection objective

Which areas and questions matter most?

02 Capture the vehicle

Document vehicle data and relevant views.

03 Scan the agreed areas

Examine the agreed vehicle areas in a targeted way.

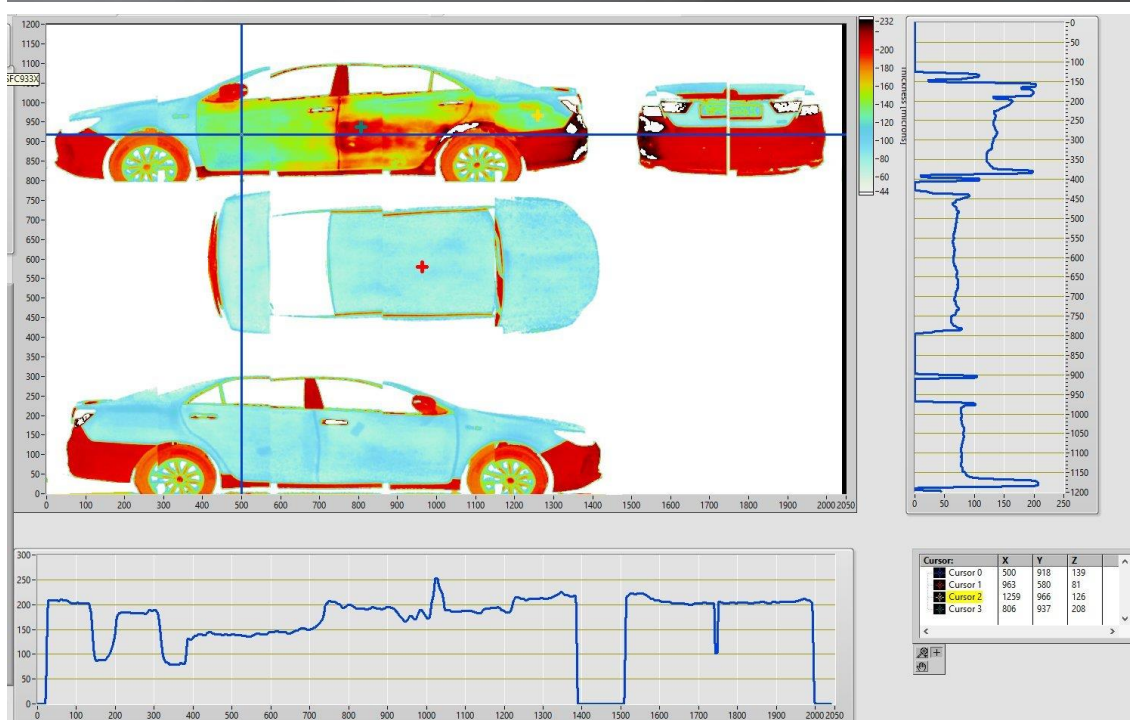
04 Discuss the result

Review the images and findings together.

When first impressions are not enough.

CarScan is especially useful when a surface looks unremarkable but questions remain about its layer structure or history.

- Has an area been repainted?
- Are there indications of filler or repair material?
- Was a component repaired or replaced?
- Do bodywork areas have different build-ups?
- Are there irregularities beneath a vehicle wrap?
- Which areas should be examined in addition?



Thermographic indications are always classified together with vehicle data, measurement conditions and further expert inspection.

Three scanners. One shared evaluation principle

The scanner configuration depends on the vehicle, the inspection objective and the areas to be covered.

ECO scanner

The entry-level unit scans the vehicle sides or individual areas. It cannot scan the roof or bonnet. It is available in motorised and non-motorised versions, with either two 8 kJ flash lamps or one 6 kJ flash lamp. The unit is guided freely along the vehicle. A full scan takes about 20 minutes.

ECO PRO scanner

Unlike the ECO scanner, this unit also has a horizontal module for the bonnet and roof. It runs on an L-shaped rail. The vehicle must be turned to scan the other side. A short setup change allows horizontal scanning. With its partial automation, a full scan also takes about 20 minutes.

3D scanner

The vehicle is scanned fully automatically in about seven minutes. First, the system measures the vehicle to determine the robot positions.

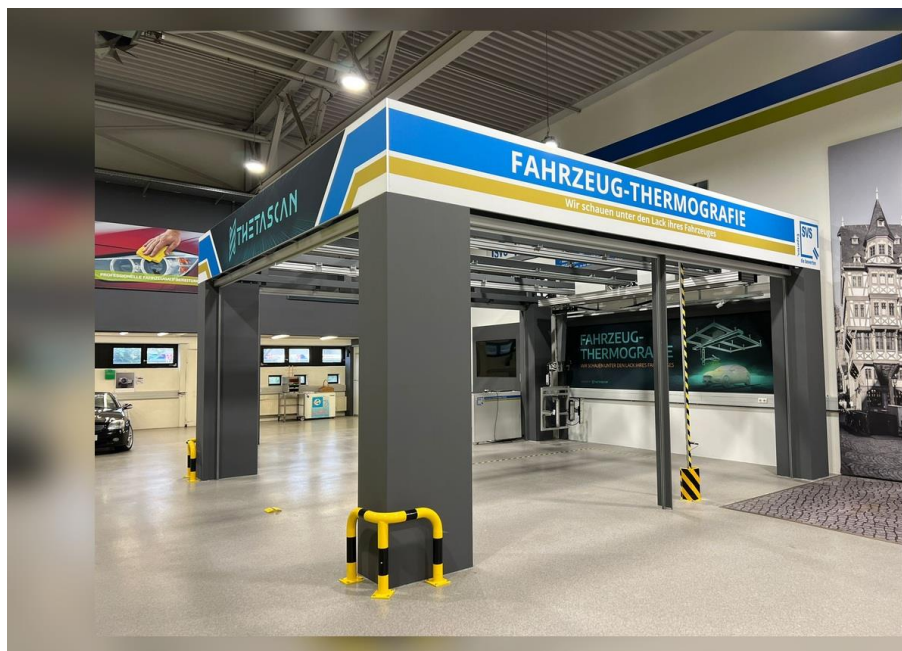
The evaluation remains technically consistent. The scope and accessible areas differ depending on the configuration.



ECO SCANNER



ECO PRO SCANNER



3D SCANNER

A CarScan report combines vehicle data, thermographic images and finding notes in clear, traceable documentation.

The illustration is a small preview from the Mazda demo report, not a complete finding for an arbitrary vehicle.

For assessors. For sellers. For better decisions.

CarScan brings structure to questions that are otherwise often answered only through assumptions.

01 Assessors

Image-based addition to existing inspection and evaluation methods.

02 Vehicle sellers

More transparency when handing over or selling a vehicle and when discussing its condition with customers.

03 Decision-makers

Structured images make specific questions easier to assess.

04 Private buyers and sellers

For buyers who want to check a vehicle's actual condition before purchase. A report can support price negotiations or help avoid a vehicle with extensive repairs.

For private sellers who want to document a used vehicle in good condition and support its asking price. Clear evidence can make a well-maintained vehicle easier to sell.

05 Car dealers

For dealers who understand the value of a complete CarScan report. Full disclosure and transparency strengthen the dealer's brand.

Inspect trade-ins completely and determine their actual condition and value

Document the condition of well-maintained vehicles

Use the report when speaking with cautious or sceptical customers

Use the report when clarifying issues with suppliers

Protect a good reputation in consignment sales

Assess a vehicle when a handheld gauge is not enough, especially when modern vehicles contain different and complex materials

Assess special vehicles objectively

06 Insurance companies

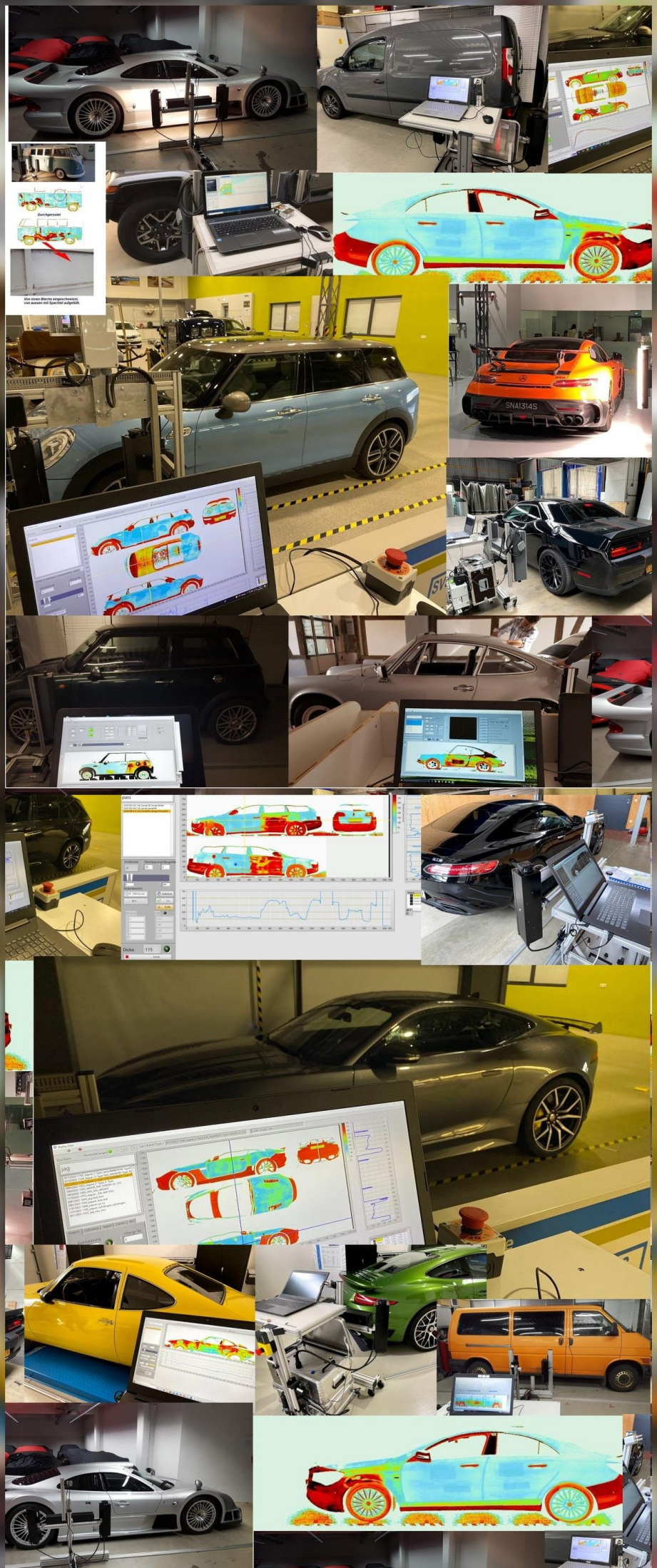
Detect fraud and assess repair quality after damage

Preventively inspect high-value or rare vehicles before they are insured

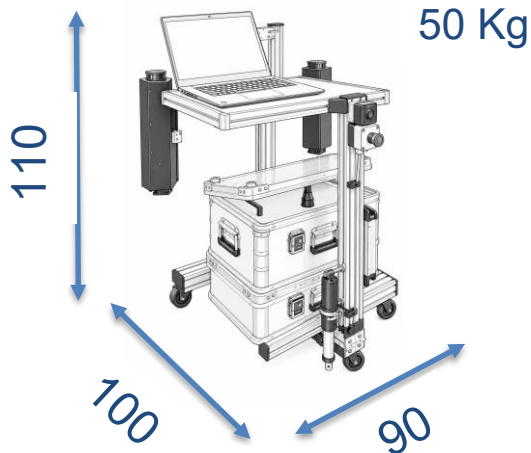
07 Leasing companies

Fully inspect and assess possible damage on returned or traded-in vehicles

The goal is not technology for its own sake, but a reliable basis for discussion.



Service prices reflect the inspection effort.



SYSTEM PURCHASE

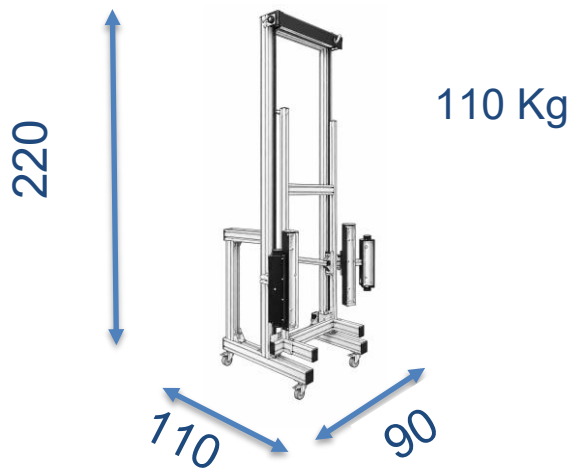
Tripod system only, 6 kJ - EUR 18,000

Non-motorised, 6 kJ - EUR 20,000

Motorised, 6 kJ - EUR 24,000

Motorised, 8 kJ - EUR 30,000

Inspection time without roof: approx. 25 minutes

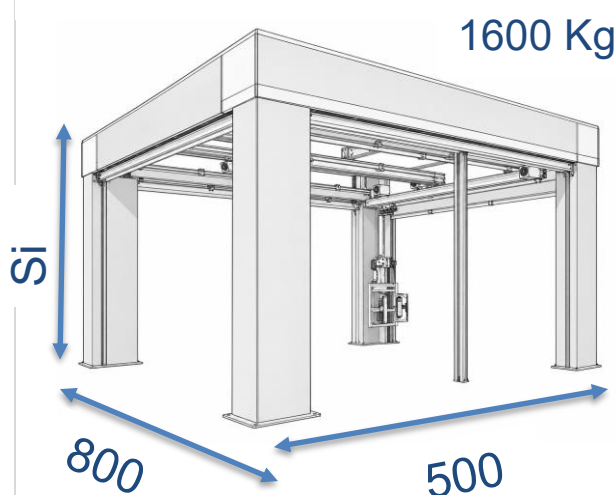


SYSTEM PURCHASE

Motorised, 8 kJ - EUR 42,000

Inspection time with roof and partial automation

approx. 20 minutes



SYSTEM PURCHASE

EUR 120,000

Inspection time with full automation

approx. 7 minutes

The inspection price is based on the vehicle, inspection objective, accessible areas, system, time required and documentation. The final price is confirmed in advance. System prices shown on this page are guide prices for purchasing equipment, not inspection prices.

Clear agreement before the inspection. No hidden packages.

**For assessors.
For vehicle sellers.
For local access.**

Services can be booked regionally.
Availability, scope and prices are agreed
directly with the local partner.

SVS
GUTACHTEN
K
SVS Gutachten
Frankfurt



SV Lücke
Wolfenbüttel

Carus Finance
Düsseldorf



FRG
D3IN
GT8R

Michael Schneider

EXPERT REPORTS | VALUATIONS | CONSULTATIONS
GUTACHTEN | BEWERTUNGEN | BERATUNGEN



KFZ Messtechnik

A map of Germany with the locations of the nine German cities included in the study marked with red dots and labeled. The cities are: Stade, Hannover, Wolfenbüttel, Düsseldorf, Ettfurt, Frankfurt, Nürnberg, and München.

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Technical annex:

The following information adds the shared components, operating limits and common evaluation principle of the CarScan systems.

TECHNOLOGY AT A GLANCE

Technical status: 09/2026. Guide values; confirm the exact equipment version, inspection area and measurement scope before commissioning.

TECHNICAL ANNEX	COMPONENTS OF THE ECO AND ECO PRO SYSTEM
SCANNER Notebook: Lenovo V320 Camera: IR camera Software: CarScan Dimensions: 800 x 800 x 1300 (2200) W x D x H Weight: approx. 40 kg (100 kg) Motion control: stepper motor	

The following tables compile additional information on components, interfaces and safety standards. Individual values may vary depending on the equipment version.

GENERATOR	STIMULATION AND LIGHT SYSTEMS
GENERATOR G6000Z SPECIAL Power connection: 230 - 240 V / 10 A, 50 Hz Flash power: 6000 Ws (factory setting 990 VDC) Flash voltage: max. 1000 VDC (factory setting 990 VDC) Fuse: 10 A Charging time: 6000 Ws, approx. 15 seconds Housing dimensions: 580 x 380 x 250 W x D x H Weight: 23 kg Scope of delivery: 1 x G6000Z Special generator, 1.5 m power cable; synchronisation cable; USB cable	Generator 

FLASH AND HALOGEN SYSTEM

SYSTEM	TECHNICAL DATA
Flash system	1 x 6000 W, 230 Volt Weight: approx. 4 kg
Halogen system	2 x 1500 W, 230 Volt Weight: approx. 2 kg



IR CAMERA



Optical resolution: 382 x 288 pixels
 System accuracy: ± 2 °C or $\pm 2\%$, whichever is greater
 PC interfaces: USB 2.0
 Ambient temperature: 0 ... 70 °C
 Storage temperature: -40 ... 85 °C
 Relative humidity: 20-80%, non-condensing
 Housing (protection rating): IP 67 (NEMA 4)
 Shock / vibration: IEC 60068-2
 Power supply: via USB

DIGITAL INPUT / OUTPUT MODULE



Bidirectional, 55 ns
 BNC connectivity
 Individually configurable channel directions

ONE-SLOT BUS-POWERED USB MODULE



These specifications apply only to the NI-cDAQ-9171 chassis. Unless otherwise stated, the values are typical at 25 °C. Refer to the relevant documentation for the specifications of the C Series module used.

STEPPER MOTOR



Driver input voltage: DC
 Type: planetary gear
 Compliance: RoHS; CE
 Safety and compatibility: EMC directives
 CE marking: Class B

CONTROL		ELECTRONICS, DRIVE AND ENVIRONMENT
COMPONENT	TECHNICAL DATA	
ANALOG INPUT	Timing accuracy: 50 ppm of the sampling rate Time resolution: 12.5 ns	
ANALOG OUTPUT	Timing accuracy: 50 ppm of the sampling rate Time resolution: 12.5 ns	
DRIVER WITH BUILT-IN CONTROLLER	Multi-axis control Power supply: 24/48 VDC RoHS compliant: These products contain no substances above the concentration limits of the RoHS directive. Compliance: CE Protocol: Modbus RTU mode	
DIGITAL SIGNAL CHARACTERISTICS	Timing accuracy: 50 ppm Network (network converter)	
BUS INTERFACE	USB specification: USB 2.0 Hi-Speed	
POWER SUPPLY	USB power consumption: 5 V, maximum 500 mA Idle state: maximum 2.5 mA	
STEPPER MOTOR	Driver input voltage: DC Type: planetary gear Compliance: RoHS; CE Safety and compatibility: EMC directives CE marking: Class B Ambient temperature: 0 ~ 40 °C (32 ~ 104 °F), frost-free Ambient humidity: 85% or less, non-condensing Protection rating: motor IP66; gear head IP54 Permitted axial load: 179.85 lb	
ENVIRONMENTAL CONDITIONS	Operating temperature (IEC 60068-2-1 and IEC 60068-2-2): -20 °C to 55 °C Storage temperature (IEC 60068-2-1 and IEC 60068-2-2): -40 °C to 85 °C Operating humidity (IEC 60068-2-56): 10% to 90% relative humidity, non-condensing Storage humidity (IEC 60068-2-56): 5% to 95% relative humidity, non-condensing Pollution degree (IEC 60664): 2 Maximum altitude: 5,000 m Indoor use only.	

SAFETY	STANDARDS AND COMPLIANCE
SCOPE	TECHNICAL DATA
HAZARDOUS LOCATIONS	U.S. (UL): Class I, Division 2, Groups A, B, C, D, T4; Class I, Zone 2, AEx nA IIC T4 Canada (C-UL): Class I, Division 2, Groups A, B, C, D, T4; Class I, Zone 2, Ex nA IIC T4 Europe (ATEX) and internationally (IECEX): Ex nA IIC T4 Gc
ELECTROMAGNETIC COMPATIBILITY	This product meets the requirements of the following EMC standards for electrical measurement, control and laboratory equipment: EN 61326-1 (IEC 61326-1): Class A emissions; basic immunity EN 55011 (CISPR 11): Group 1, Class A emissions EN 55022 (CISPR 22): Class A emissions EN 55024 (CISPR 24): immunity AS/NZS CISPR 11: Group 1, Class A emissions AS/NZS CISPR 22: Class A emissions FCC 47 CFR Part 15B: Class A emissions ICES-001: Class A emissions Note: In the United States (under FCC 47 CFR), Class A equipment is intended for commercial and light- and heavy-industrial environments. In Europe, Canada, Australia and New Zealand (under CISPR 11), Class A equipment is intended exclusively for heavy-industrial environments. Note: Group 1 equipment (under CISPR 11) is industrial, scientific or medical equipment that does not intentionally generate radio-frequency energy for material treatment or test and analysis purposes. Note: For EMC declarations, certifications and further information, see the Online product certification section.
SHOCK AND VIBRATION	To meet these specifications, the NI-cDAQ-9171 system must be installed in a panel, a locking NI USB cable must be used, and ferrules must be fitted to the ends of the connection wires. Operating shock: 30 g peak, half-sine, 11 ms pulse (tested according to IEC 60068-2-27; test profile) Random vibration, operating: 5 Hz to 500 Hz, 0.3 g rms Random vibration, non-operating: 5 Hz to 500 Hz, 2.4 g rms (tested according to IEC 60068-2-64; the non-operating test profile exceeds the requirements of MIL PRF-28800F, Class 3.)
SAFETY STANDARDS AND STANDARDS FOR HAZARDOUS LOCATIONS	This product was designed to meet the requirements of the following safety standards for electrical measurement, control and laboratory equipment: IEC 61010-1, EN 61010-1 UL 61010-1, CSA 61010-1 EN 60079-0:2012, EN 60079-15:2010 IEC 60079-0: Ed 6, IEC 60079-15; Ed 4 UL 60079-0; Ed 6, UL 60079-15; Ed 4 CSA 60079-0:2011, CSA 60079-15:2012 Note: For UL and other safety certifications, see the product label or the Online product certification section.
CE COMPLIANCE	This product meets the essential requirements of the following applicable European directives: 2014/35/EU; Low Voltage Directive (safety) 2014/30/EU; Electromagnetic Compatibility Directive (EMC) 2014/34/EU; Directive for equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
ONLINE PRODUCT CERTIFICATION	Further information on regulatory compliance is provided in the product Declaration of Conformity (DoC). Product certifications and the DoC are available at ni.com/certification . Search for the model number or product line and click the relevant link in the Certification column.

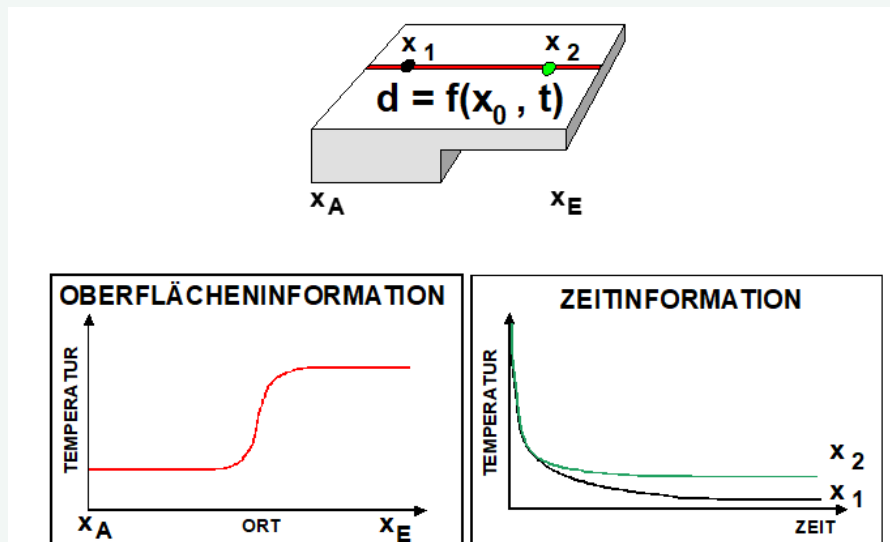
Technology explained clearly.

Here you will find the key answers about CarScan use, process, technology and significance. They complement the detailed technical information in this brochure.

01 What is CarScan?

CarScan is an image-based inspection method based on active thermography. Light sources briefly stimulate the vehicle surface; an infrared camera then records how heat spreads and equalises. This makes

differences in paint build-up and paint thickness visible. When two areas differ in paint or material thickness, heat flows differently, as shown in the model on the left. Thinner areas warm up more quickly and become warmer than thicker areas. Their heat-flow curves also differ over time. An algorithm processes the infrared data and calculates an image that represents



paint thickness. Colours make the differences easy to see.

02 What irregularities can CarScan reveal?

The images can provide indications of repainting, filler and repair areas, replaced or restored components, and different materials or substrates. The images show irregularities; the responsible expert classifies them. We distinguish between pulse thermography with a flash for paint thicknesses up to 800 micrometres and long-pulse thermography with halogen lamps for 500 to 4,000 micrometres. Pulse thermography is highly sensitive to thin paint layers, so changes in clear coat and second paint layers can also become visible. Long-pulse thermography is slower, but can look deeper into the material.

03 Is the inspection contact-free and non-destructive?

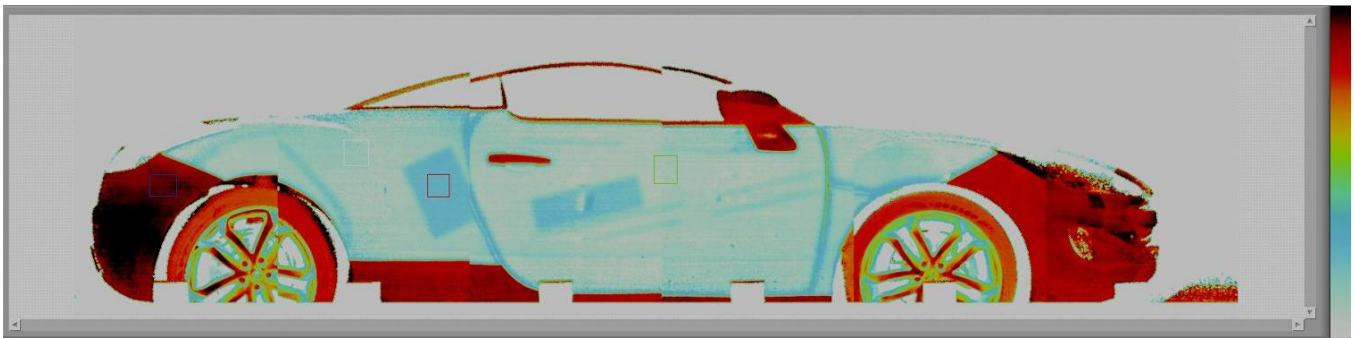
Yes. The measurement is made without contact with the bodywork and without mechanical impact on the paint. Light and heat pulses are used for stimulation - not X-rays or ultrasound. When the system is used as intended and the specified protective measures are followed, the procedure is non-destructive.

04 Do I need to prepare the vehicle before the inspection?

Special cleaning, heating or cooling is generally not required. What matters is safe positioning, sufficient access to the areas to be scanned and suitable measurement conditions on site. The vehicle should be clean and dry. A scan at -10 °C and one at 30 °C are evaluated on the same principle; the site conditions still need to be suitable.

05 Which vehicles and materials is CarScan suitable for?

CarScan can be used on modern vehicles, used cars, sports cars and special vehicles. Depending on the build-up, steel, aluminium, GRP and CFRP can be examined. Wrapped surfaces can also be scanned; the significance depends on the surface and its layer structure. White vehicles are more difficult to scan than black vehicles because the lamps' radiation is



absorbed differently. Metals also conduct heat differently from plastics or CFRP, which changes the colour contrast in the evaluation images. In this example, metal appears light blue; the darker areas are bonded anti-vibration elements, while red indicates plastic. Differences in paint thickness would appear as different colours.

06 How does an inspection generally work?

The vehicle is positioned on a surface that is as level as possible. The scanner is guided next to the vehicle - manually using floor markings or automatically with a rail system. The surface is usually stimulated and captured by the IR camera in sections about 1 m wide. The individual measurements are then combined into clear image documentation and evaluated.

07 Why are flash and halogen systems used?

The two stimulation methods complement each other. The flash system creates a short, intense heat pulse, while the halogen system stimulates for longer and more continuously. This helps capture different layer structures and thermal reactions. A flash measurement takes only a few seconds; a halogen measurement takes more than 30 seconds. Halogen energy is applied over a longer period, whereas the flash releases its energy within a few milliseconds. This limits the penetration depth of the heat wave and therefore the depth of the information.

08 Which scanner variants are available?

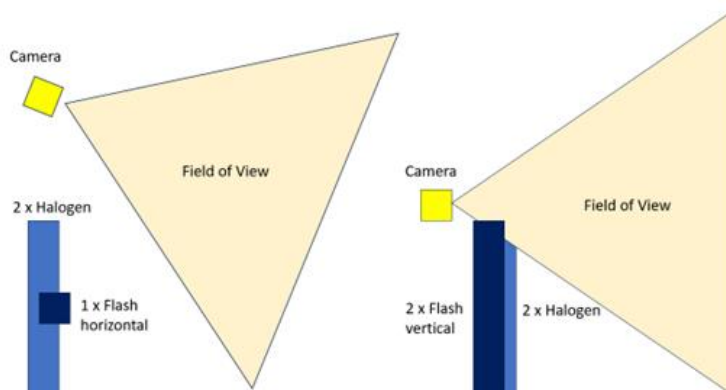
Depending on the inspection objective, three variants are available in addition to a tripod system: the fully automated 3D scanner, which scans a vehicle at the push of a button in about seven minutes; the semi-automated ECO PRO scanner, with an inspection time of about 20 minutes; and the ECO scanner, also with an inspection time of about 20 minutes. All devices use the same evaluation principle. The ECO scanner is available in three versions for different price points.



1 x 6 KJ



2 x 4 KJ



seven minutes; the semi-automated ECO PRO scanner, with an inspection time of about 20 minutes; and the ECO scanner, also with an inspection time of about 20 minutes. All devices use the same evaluation principle. The ECO scanner is available in three versions for different price points. The simplest version is non-motorised and uses 6 kJ, so it provides less energy and therefore less penetration depth. Because it uses one horizontally mounted flash lamp, the camera angle is less favourable than in the ECO PRO version with 2 x 4 kJ. The wide-angle lens can introduce perspective distortion, so individual

measurements do not align as well into one overall image. The evaluation follows the same principle; the amount of information depends on the system and scan coverage.



09 Which areas of a vehicle can be inspected?

The vehicle sides are typically examined. Depending on the system and build-up, the front and rear areas, roof and bonnet can also be included. The ECO scanner is not designed for horizontal scans such as the roof or bonnet; a suitable scanner or additional solution is required, such as the ECO PRO. Individual areas can also be examined; their size is approximately 1 m x 1.6 m.

10 What does the evaluation or report contain?

The documentation can contain vehicle data, thermographic images, marked irregularities and expert finding notes. Curves or supplementary information help classify individual zones. The report provides a traceable basis for the next stage of the vehicle assessment.

11 Does CarScan replace a conventional paint-thickness gauge?

No. A paint-thickness gauge provides point readings; CarScan maps thermal differences across larger areas. The two methods complement each other. CarScan is not proof of every aspect of a vehicle's history; the significance depends on the material, surface, accessibility and expert interpretation. Most importantly, the evaluation image shows the assessor where to take a closer reading with a paint-thickness gauge. The values calculated by the system are not calibrated paint-thickness readings; they are reference indications. The high-resolution image can reveal very small areas that might otherwise be found only by chance during a single gauge reading.

12 How long does training take and how is it provided?

Each scanner buyer receives about four hours of training during installation. This covers operation. Learning to evaluate the images takes longer; we support you during that first phase. Basic review is easy to learn, while interpretation develops with experience. We remain available remotely to help with evaluation and interpretation.

13 How much energy does a system use?

Energy demand is very low. The smaller systems require a 230 V mains connection, preferably with a slow 16 A fuse. Charging the flash generators usually takes about eight seconds at 12 A. The halogen lamps use 3 or 2 kW with a switching time of 15 seconds per measurement. The large 3D scanner requires 400 V with a 32 A fuse.

14 How often does the scanner need servicing?

The systems are designed to be maintenance-free. An annual inspection is available as a service.

15 Who is CarScan particularly useful for?

CarScan primarily supports assessors, vehicle sellers, insurers and other professional vehicle evaluators. It helps document irregularities systematically, check the plausibility of repair information and base conversations about vehicle condition on traceable images.

16 Where can a CarScan inspection take place?

Inspections are possible at suitable partner locations in Germany and worldwide. Thanks to mobile, demountable solutions, the scanner can in principle also be used at other suitable locations. Confirm availability, setup and local conditions directly with the relevant inspection partner.

17 What does an inspection cost?

Prices depend on the vehicle, accessibility, scan variant, scope and requested documentation. In this brochure, basic inspections start at EUR 100 and complex inspections go up to EUR 400. The exact assignment is agreed and priced individually before work begins.

18 How long does an inspection take?

The duration depends on the device, scope and accessibility. The scan itself can take approximately seven minutes with the 3D scanner and approximately 20 minutes with ECO PRO and ECO. Positioning, setup changes, data review and evaluation are added depending on the assignment.

19 Is the scanner transportable?

The ECO scanner can be easily dismantled and transported in an estate car. It mainly consists of a chassis, electronics box, flash generator, computer and camera. Assembly and dismantling take approximately 10 minutes. The assembled weight is approximately 50 kg. Transporting an ECO PRO scanner is more difficult, but not impossible. At approximately 120 kg, it is too heavy for an estate car. The height boom is also 2.2 m long. A van with at least 2.5 m of loading space would be more suitable. Assembly and dismantling take approximately 20 minutes.

20 What type of floor do I need?

The scanners move on relatively small rollers. The floor should be even and free of joints; otherwise the chassis may stall.

21 Is the flash light dangerous?

The light is very intense and can injure the eyes at very close range (under 50 cm). Protective eyewear is therefore mandatory.

Contact details and responsibility

Direct contact for CarScan

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thermography

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