Laser Radar

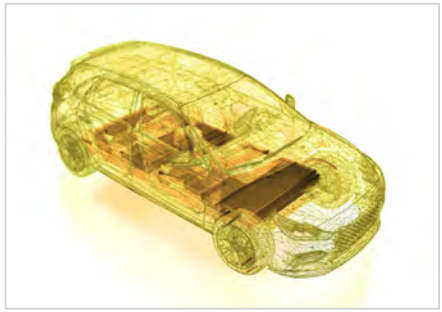
Enabling automotive companies to address the challenges of the modern manufacturing environment.

BETTER DATA, BETTER CONTROL

APDIS IN AUTOMOTIVE

MV5X - Made for the Challenge

From battery trays, giga castings and new materials, to rapid development, frequent updates and increased competition, the automotive industry is facing a number of challenges now and in the future.



IMPROVE QUALITY AND PROCESS CONTROL

At the core of this is a need for high quality, improved safety, and better process control to reduce costs and time to market. Nikon's APDIS MV5X Laser Radar is a key component in this, allowing for deployment across a wide range of applications within automotive manufacturing. MV5X allows for real time feedback, deep dive inspection and quick problem investigation to improve quality and process control throughout the factory.

Benefits for Automotive

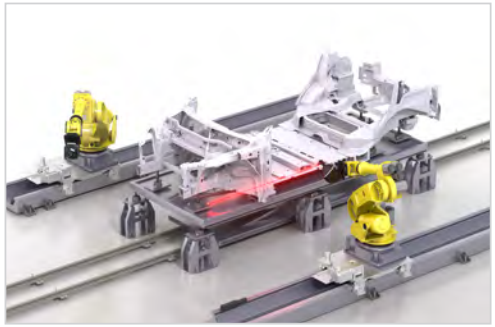
WANT TO REDUCE YOUR RAMP UP TIME AND SAVE MONEY?

- By deploying the APDIS MV5X, in-line, traceable, accurate data is available during the critical pre-series and ramp up phases of production without the need for correlation.
- With lower production rates at these times, complete inspection routines can be run in minutes, providing ample, high quality data to allow you to tune your production processes faster than before, reducing ramp up times and starting production with a higher quality product.

FASTER PROCESS TUNING

WANT TO IMPROVE YOUR PIST METRIC AND DELIVER A BETTER PRODUCT?

- Continuous measurement throughout production with the APDIS MV5X allows for feedback and feedforward of data to continually monitor and maintain the manufacturing process at high quality.



CONTINUOUS MONITORING

WANT TO REDUCE PRODUCTION DOWNTIME?

- Adjust and monitor tooling by using the APDIS MV5X as a portable measurement device.
- Perform deep dive inspections in a fraction of the time of traditional CMMs with an offline MV5X cell directly on the shop floor
- Use the same measurement method and equipment as used in-line for consistency without the need for time consuming correlation checks.

ABSOLUTE MEASUREMENTS

MV5X - Small, Fast, Accurate

Utilizing a long range, high accuracy, non-contact laser measurement technology in a small package, the MV5X has a number of advantages for automotive metrology.

ABSOLUTE ACCURACY

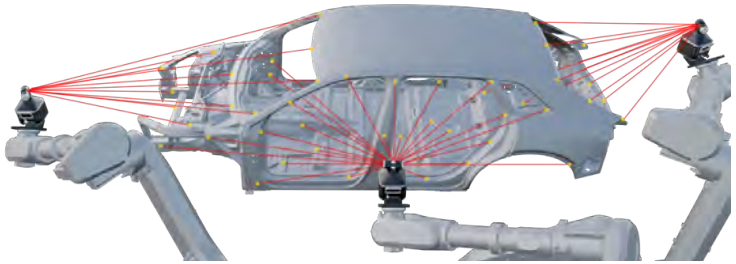
Accurate and absolute measurements meaning HA-CMM equivalent results, wherever it is installed.

MINIMAL DATASETS

Precision scanning measures only what is needed allowing for minimal datasets making analysis and data storage faster and easier.

MINIMAL POSITIONS, MAXIMUM COVERAGE

With a measurement volume of almost 3000m^3, the MV5X can cover a wide measurement area from a single position, meaning minimal positions required for typically >95% feature coverage.



356mm

<12kg

CMM RESULTS, IN-LINE

High data rate and precision beam control allow for fast and efficient measurement of features, meaning true in-line CMM measurements for critical features on 100% of parts.

SAFE FOR PARTS

Using a non-contact laser-based measurement, and 0.5 to 10m standoff, measurements are performed from a safe distance without needing to go near the part.

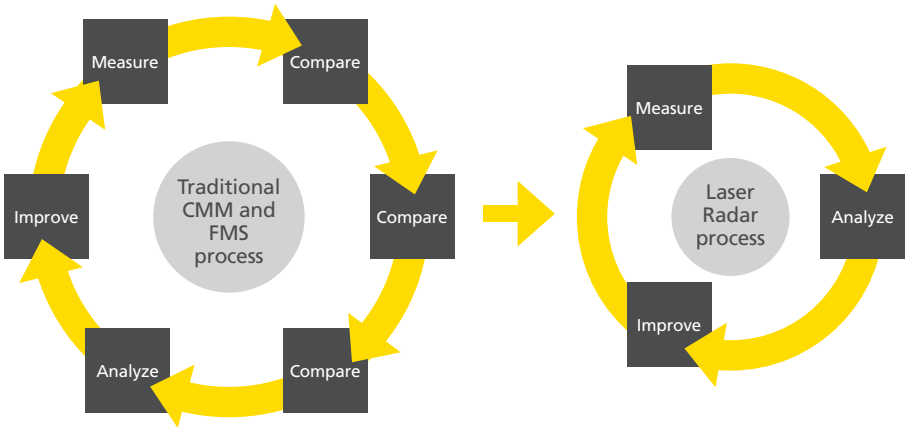
EASY TO INSTALL

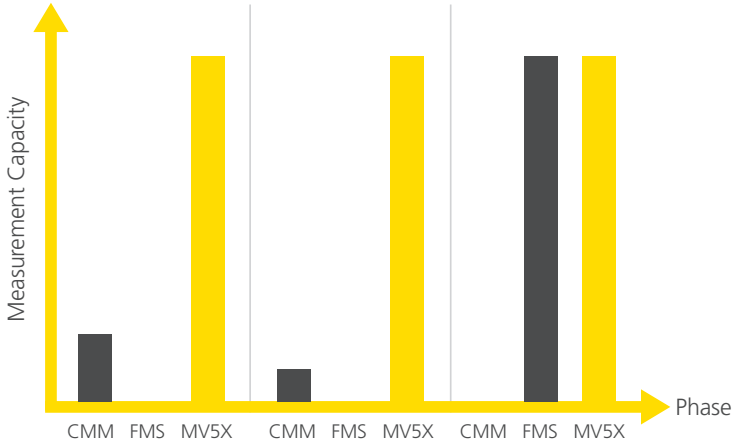
Weighing under 12kg and less than 40cm tall, the MV5X is small and light allowing for easy installation in a range of applications, in-line and offline.

MV5X, THE IN-LINE CMM

Installing the MV5X in-line from the start of prototype build allows for CMM results right from the beginning to optimize the process earlier. Utilize the same setup through pre-series into full production without needing to wait for correlation studies or remove the vehicle from the production line.

Device	Prototype	Rate Rise	Production
Traditional CMM	✓	✓	X
Traditional FMS	X	X	✓
MV5X	✓	✓	✓





MEASURE MORE, IMPROVE FASTER

By having the ability to measure absolute from prototype build to production, with the same device, development times are shortened.

TUNE THE PROCESS, TUNE THE MEASUREMENT

With low production rates, an in-line MV5X setup can measure a wide range of features to get a full picture of the vehicle geometry. As production rates rise, features can be optimized to measure just critical features to tune and control the process, whilst still having the option for detailed measurements during downtime.

Applications

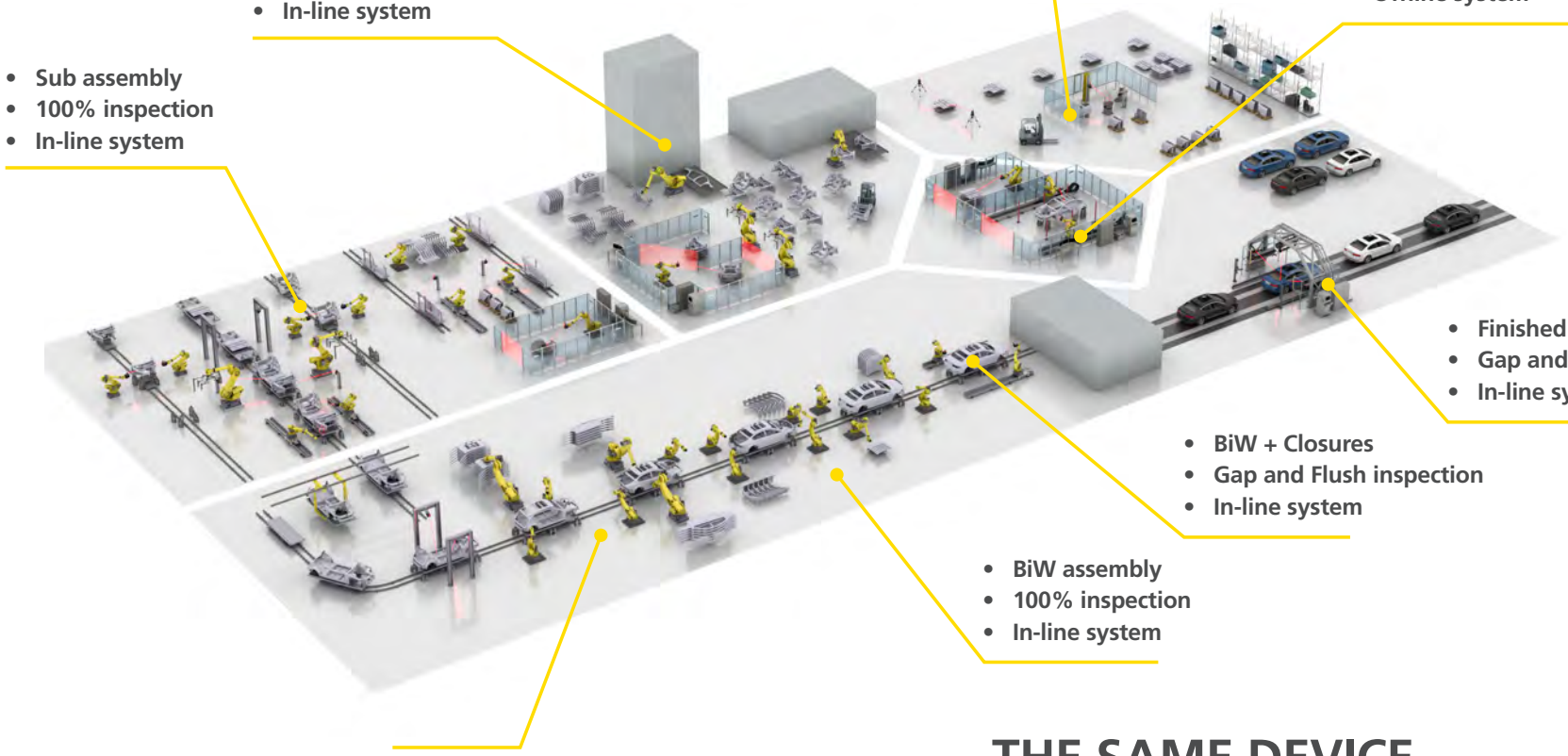
APDIS MV5X solutions can be utilized around the factory from incoming part inspection, to stamping and casting verification to in-line assembly process control and even end of line inspection.

- Incoming parts
- Inspection sampling
- Offline system

- Metrology room
- In depth inspection
- Problem analysis
- Offline system

- Stamping and casting
- Part inspection and verification
- In-line system

- Sub assembly
- 100% inspection
- In-line system



- Finished Vehicle
- Gap and Flush inspection
- In-line system

- BiW + Closures
- Gap and Flush inspection
- In-line system

- BiW assembly
- 100% inspection
- In-line system

- Tooling setup and adjustment
- Portable system

THE SAME DEVICE, THE SAME RESULTS THROUGHOUT THE FACTORY

Offline inspection cells

The APDIS IQ Stations offer a wide range of options for offline inspection cells from individual components to a full BiW chassis.

- Metrology room, or shop floor installation
- Minimize transportation time
- Maximize inspection time
- Measure a complete feature set in a fraction of the time of a traditional CMM
- Surface scanning for digital twins
- No probe changes
- Access previously difficult to reach areas such as footwells.

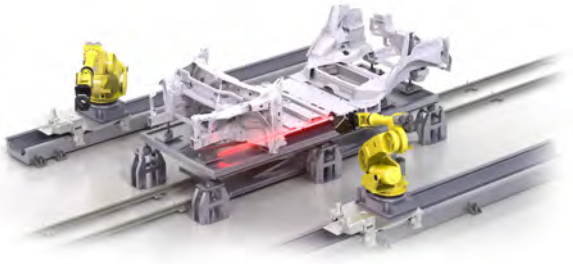
In-line component inspection

The compact and lightweight MV5X can be deployed directly in-line in a number of configurations for performing up to 100% in-line inspection of components from castings to composites to sub-assemblies.

- Statically mounted, rail mounted, or robot mounted
- Same accuracy, same speed, same results
- Measure critical and secondary features within cycle time
- Absolute accuracy, in-line measurement
- Monitor and control the assembly process

In-line BiW inspection

By utilizing MV5X systems mounted on robots, complete BiW assemblies can be measured in-line in real time providing essential high-quality data for quality control or process feedback.



- Long standoff and large measurement volume
- Simple robot programs
- No possibility of collisions with the vehicle preventing costly downtime
- Measure critical and secondary features within cycle time
- Up to 100% inspection during full production
- Full CMM quality measurements during ramp up
- Complete inspection during production downtime saving time and money from moving body to CMM room

Tooling Inspection

Small and compact, the MV5X is designed for portability allowing you to take the measurements to where you need them for tooling setup, robot calibration, regular cell checks or any other task where you need a quick setup and easy measurement.

- Move device anywhere around the factory
- Non-contact, remote measurements
- Improved operator safety
- Fully or semi automated routines for regular checks
- Deskill portable measurements

Body shop or end of line gap and flush

The APDIS Gap and Flush system provides a robot free, moving line gap and flush measurement system for either the body shop or vehicle on wheels measurement.

- Setup over an existing production line
- No conveyor interlocks or complicated robot programs
- Large standoff for safe measurements
- Vehicle position compensation
- Automated tracking of vehicle
- Precise and repeatable measurement locations

MV5X Core Features

DESIGNED FOR SPEED

Directly measure features such as holes, slots and studs quickly and efficiently allowing for true in-line deployment with minimal systems, or perform detailed investigations offline

DESIGNED FOR ACCURACY

HA CMM accuracy even on the shop floor and in-line without the need for time-consuming correlation

DESIGNED FOR FLEXIBILITY

Weighing less than 12kg, the MV5X can be easily utilized as a portable measurement device or integrated into measurement cells directly on the production line providing accurate, non-contact, automated measurements wherever you need them.

DESIGNED FOR PRODUCTIVITY

No part preparation, no targets, no adapters, no correlation

DESIGNED FOR CONSISTENCY

The same device, the same results throughout the factory

Specifications

GENERAL

	MV5X
Data Rate	24000 Hz
Measurement Speed*	6000 pts/s scanning
Measurement Volume	~3,000m³
Laser Safety	IEC Class I (IR)
Optics	NIKKOR
Weight	<12kg
Dimensions (W, D, H)	228mm x 228mm x 365mm

*Exact speed depends on settings.

ENVIRONMENTAL

	MV5X
Operating Temperature	5°C to 50°C
Ambient Light	Insensitive to Ambient Light
Ingress Protection	IP54

ACCURACY

	MV5X
Range[1]	20µm + 5µm/m
Length Accuracy[1]	~20µm + 19µm/m
Scanning[2]	<30µm

1 Accuracy given as Maximum Permissible Error (MPE) in accordance with ASME B89.4.19 – 2006 verified in vertical orientation at 20°C. Typical accuracy shown is half MPE. Approximation shown

2 Scanning accuracy standard deviation (1σ) of best fit plane from 1 to 10m on flat reference plate

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