

Spatial coordinate measuring devices

# VECTORON



株式会社 小坂研究所  
Kosaka Laboratory Ltd.



# The standard for articulated measurement instruments

Spatial coordinate measuring devices

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With a history stretching back 40 years, Vectoron is a world-first three-dimensional measuring system that is completely domestically produced.

It has been heavily used in various fields, especially in Japan's auto manufacturing as well as in heavy industry, government offices, and the iron and steel sector.

Most recently, the incredibly convenient VAR700M series has been released by bringing together existing knowhow.

- Optimum convenience
- Highest precision in the industry
- Ultra-sensitive non-contact scanning
- Superb portability
- Advanced usability based on self-developed software
- Reliable technical support system
- Extensive customizations with long-term track records





# High-end Measurement System VMC7000M

## Latest high-end arms for highly precise and high-quality measurement

The Vectoron articulated three-dimensional measurement system features seven joints for highly flexible handling and measurement with the highest precision in the industry. Contact probes and non-contact laser sensors can be installed in the tip of the arm instrument, enabling measurement of all kinds of shape.

\*VMC7000M is the high-end model among the Vectoron lineup.

## Characteristics

### •High-precision and highly functional arms plus self-developed non-contact laser sensors

- Non-contact laser sensors use the flying spot measurement method and are capable of high-precision scanning.
- Realizes scanning without powder spray.
- Can flexibly adjust measured point cloud density, and can scan minute shapes such as holes, protrusions, edges and ribs.
- Rigidity of arms has been strengthened while maintaining precision, realizing more stable operation.
- Lightweight arm ends and flexible brake function significantly improve operability.
- Can accommodate various environmental conditions seen in diverse work places.

### •Superb portability

- Simple transport and installation for three-dimensional measurement at any location.
- Boxless controller and improved battery drive for easier installation and transport.

### •Self-developed software

- Self-developed software to control Vectoron.
- Advanced operability realized by incorporating requests of various industries, especially automakers in Japan.
- Smooth operation for anyone, thanks to easy-to-understand interface.
- Single software can handle everything, from contact, non-contact and calibration to arm management.
- Software customization that takes IOT (Interoperability testing, initial operational test etc) into account, in addition to building system solutions unique to TTS.

### •Easy calibration

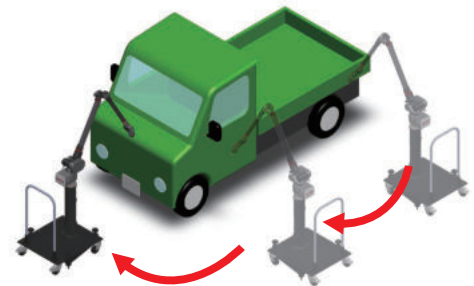
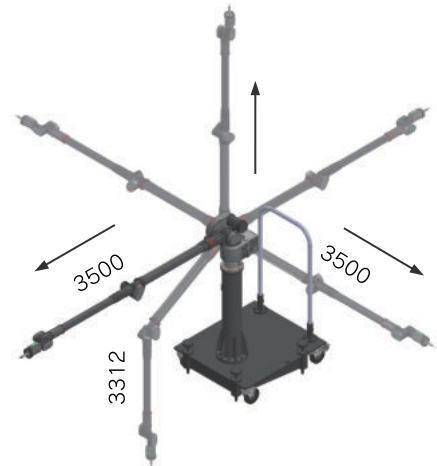
- Precision confirmation function on board system as standard feature.
- Precision can be adjusted by customers.
- Real-time grasp of operation circumstances of each section of main unit, expediting maintenance and response upon failure.

### •Extensive customization

- Various options and extension probes. Items can be selected according to usage.
- Can develop and manufacture dedicated or special items according to customer's usage.
- Extensive production track records.

### •Maintenance

- Stable and reassuring support system unique to domestic measurement instruments.
- Extensive support system also established overseas.
- No obligatory maintenance agreement.



## Main specifications



### End grip

Ergonomic grip.  
Multiple buttons with placement based on operability.  
\*Photo above is when using contact probe.



### Arm principle

Shaft encoder and polar coordination calculation



### Arm stand

Select from various types, including mobile carriage with casters, magnetic design and lifting stand.

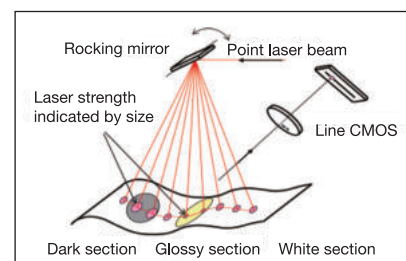
## Non-contact ApiScan

Using flying spot method, can measure glossy or black surfaces without spray. Realizes highest precision and resolution in the industry

\*Laser class: Class 2

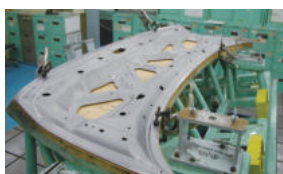


## Sensor principle (Flying spot [laser])



Model		VMC7000M	VMC7000L
Maximum travel range of probe	X-axis direction	3500 mm	3900 mm
	Y-axis direction	3500 mm	3900 mm
	Z-axis direction	3312 mm	3712 mm
Precision (manufacturer's specs)	Fixed point reproducibility	2 $\sigma$ : 0.03 mm	2 $\sigma$ : 0.05 mm
	Contact measurement accuracy	2 $\sigma$ : 0.04 mm	2 $\sigma$ : 0.06 mm
	Non-contact measurement accuracy	$\pm 0.06$ mm	$\pm 0.08$ mm
Measurement arm	Total length	1750 mm	1950 mm
	Flexibility	Joints: 7	Joints: 7
	Weight	Approx. 12 kg (including non-contact controller)	Approx. 13 kg (including non-contact controller)
Power source		AC100-240C, 50/60 Hz, 115 VA (PC not included)	
Device weight	VTL03	Approx. 21 kg	Approx. 22 kg
	VTL41	Approx. 108 kg	Approx. 109 kg
	VTL60	Approx. 77 kg	Approx. 78 kg
Sensor specifications	Model	PU-OL100-SP	
	Size	76 (W) x 106 (D) x 124.6 (H) mm	
	Weight	Approx. 640 g	
	Beam diameter	$\phi 0.183$ mm or less	
	Measurement Z range	60 mm	
	Standoff	145-205 mm	
	X pitch	0.016-0.063	
	Field length (width)	21.56-213.54 mm	
	Number of points per line	210-513 points/line	
	Number of measurement lines	40-100 lines/second	

## Recommended examples



Press



Liquid form



Resin molding

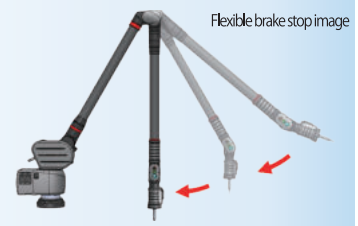
# Main Changes with Latest Model

## Flexible brake switch



## Flexible brake

Arm can be maintained at any position, improving workability. Brake can be canceled only in an energized state, limiting risk of arm falling



## Lightweight edge

Weight reduced by 800 g for a totally new dimension in operability

## Button placement

Due to form and placement, buttons can be distinguished without looking, to prevent errors when pressing



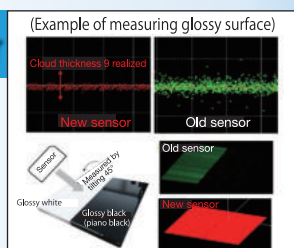
## All-in-one non-contact controller



Non-contact controller is integrated in arm. Weight has been reduced compared to previous model, and hot-swap compatibility makes attachment/release easier and faster.

## Latest model API sensor

Realizes cloud thickness 8 $\mu$ m, significantly improving sensitivity and glossy surface measurement. Can scan all kinds of items with high precision.



## Reinforced mobility

Simplified main unit structure and updated carrying case for improved mobility



## New attachment & release mechanism for probes



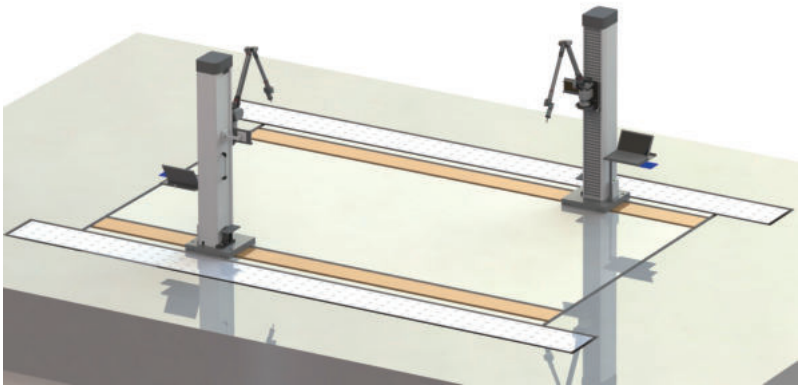
Fixed nuts are integrated and probes can be attached with a single touch, enabling instant probe and sensor switches.



# Full-scale Measurement System

## VSC series base drive method

The base drive system can measure a wide area at one time without connecting coordinates, and it is heavily used in measurement of automobile bodies, large casting parts and outsized equipment. Various types can be selected according to usage, and customization is available.



Model		VSC3726M (VSC3726L)	VSC3736M (VSC3736L)	VSC2726M (VSC2726L)	VSC2736M (VSC2736L)
Maximum travel range of probe	X-axis	3500 (3900) mm + surface table distance			
	Y-axis	1750 (1950) mm *In case of column front			
	Z-axis	3770 (4170) mm		3270 (3670) mm	
Vertical travel range		1500 mm		1000 mm	
Arm measurement precision	Repetition precision	2σ: 0.03 (0.05) mm			
	Measurement precision	2σ: 0.04 (0.06) mm			
Horizontal travel precision		Varies by amount of movement; please separately confirm			
Measurement arms	Total length	1750 (1950) mm			
	Degree of freedom	7			
	Weight	Approx. 12 (13) kg			
Device weight		Approx. 400 kg	Approx. 350 kg	Approx. 380 kg	Approx. 330 kg
Power source		AC100-240C, 50/60 Hz, 150 VA (PC not included)			
Compatible model		VAR700M (VAR700L)			

## Recommended examples



Automobile body



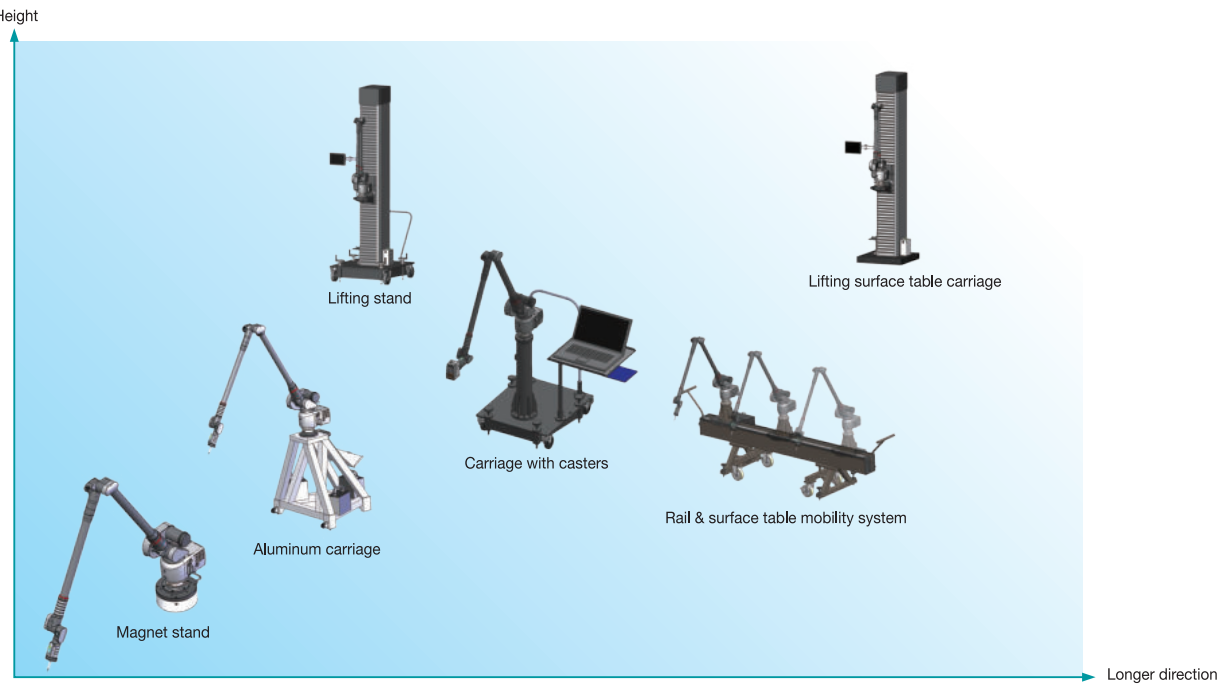
Large casting parts



Vehicle tests

Other  
Industrial machinery, other large parts  
\*At left are examples for reference

## Carrier specification variations



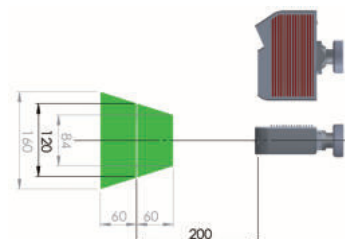
# Standard Measurement System VME300M

## Entry-level arm for multi-articulated measurement, realizing both cost reduction and functional improvement!

With advanced cost competitiveness, contact probes and non-contact laser sensors can be installed, just as with VMC7000M. "RaptorEye2," a proprietary ultra-high-speed sensor, promises peak results with projects where precision requirements are not very high, such as welded structures, management of assembly processes, measuring of large items and building materials, as well as with objects for which a larger sample size is desired.

### Characteristics

- Mechanism to pursue operability and the original offset structure of Vectron improve operational area
- Switchless operation when moving between contact and non-contact
- The outstanding characteristic is RaptorEye2, a non-contact sensor developed in-house. It realizes ultra-high-speed measurement at 400Hz. This tremendous scanning speed outstrips others and can instantly analyze shapes, offering optimum outcomes with objects with a large sample size
- 3D-MagicREGALIS, the same dedicated software as 7000M; a single software can handle arm control, measurement and calibration
- Extensive support via TTS. Everything can be done in Japan, and there is no need for costly hardware maintenance. The long supply period of parts gives peace of mind
- Customization available according customer needs; TTS solution systems based on usage will be offered



### Sensor developed in-house Raptor Eye 2



### New mounting/dismounting mechanism

Model		VME300M
Maximum travel range of probe	X-axis	3500mm
	Y-axis	3500mm
	Z-axis	3312mm
Precision (manufacturer's specs)	Fixed point reproducibility	2σ: 0.07mm
	Contact measurement accuracy	2σ: 0.08mm
	Non-contact measurement accuracy	±0.1mm
Measurement arms	Total length	1750mm
	Degree of freedom	7
	Weight	Approx. 11 kg
Power source	AC100-240C, 50/60 Hz, 200 VA (PC not included)	
Device weight	VTL03	Approx. 21 kg
	VTL41	Approx. 108 kg
	VTL60	Approx. 77 kg
Sensor specifications	Product name	Raptor Eye 2
	Model	RE 02
	Size	48 (W) x 102 (D) x 148 (H) mm
	Weight	550g
	Measurement Z range	±60mm
	Standoff	200
	X pitch	0.06~0.10mm
	Field length (width)	120mm
	Number of points per line	1688 points/line
	Number of measurement lines	400 lines/second

### Recommended examples



Welded structures



Experimentation fields



White body

\*Specialty products and suggestions on systems according to your company's specifications are also available; please feel free to inquire with sales rep in charge.



# Options

## Stylus



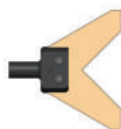
Sharp edge stylus  
VST28-0.1



Ball stylus  
VST29-2-6  
\*Various sizes  
available



Ruby stylus  
\*Various sizes  
available



Stylus for measuring pipes  
\*Various sizes available

## Probes



Standard probe



Touch probe



Straight probe  
150-500 mm  
\*Please inquire for  
special use.



Extension probe  
150-350 mm  
Select edge angle  
from 30, 45, 75 and  
90°  
\*Please inquire for  
special use.



Probe holder shaft  
\*Holder for  
extension probe

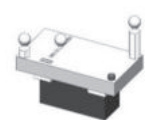


Extension bar  
\*Used in  
combination with  
extension probe.  
Please inquire  
regarding length.

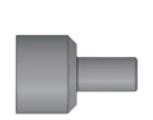


Special  
angled probe

## Gauges and adjustment jibs



Multi gauge



Tapered stylus



Surface table for  
inspection



Gauge stand



Ball bar gauge



Adjustment jig for  
probe inspection

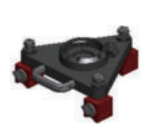


Merge jig



Ball bar gauge  
stand  
\*Stand for ball bar  
gauge

## Base specifications



Magnet block arm  
fixed base



Magnetic arm fixed  
base



Aluminum stand



Dedicated spacer  
for aluminum stand



Carriage with  
casters



Base + dedicated  
carrier

## Other options



Arm storage box



Sensor storage box



Probe tray



Coordinate display  
monitor



Sensor grip

# Vectoron Control & Analysis Software

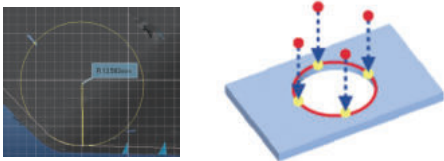
Newly released 3D-magic REGALIS is proprietary software specifically developed for Vectoron that brings together past knowhow to support Japan's manufacturing and product creation. With its simple and easy interface and various analysis functions as well as high-speed processing of ultra-large volumes of data, a measurement assist function and report & information sharing, it enables immediate on-site analysis.



**Everything all-in-one REGALIS for control of large-volume data**  
3D-magic series and Libella series are integrated into one software package and reborn as 3D-magic REGALIS ("king" in Latin).

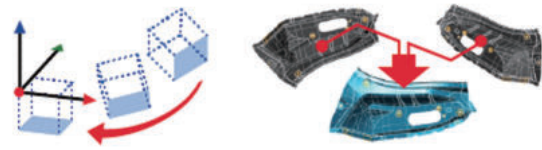
## •Contact measurement & CAD comparison

Element measurement, various geometrical tolerance (GD & T) cross-sections and profile measurements of size and angles of holes, pins and cones are easily calculated. Compatible with various CAD comparisons.



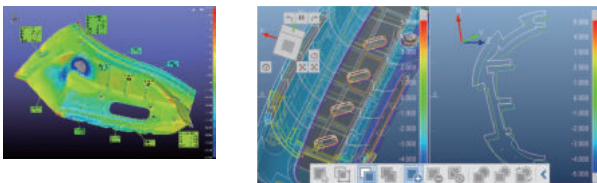
## •Various alignment functions

3-2-1, 3 points or 6 points alignment as well as a best-fit function, digital Assy to overlay measurement data and merging functions for large object measurements are available.



## •Non-contact measurement & test functions

Comparison of measurement data or 3D CAD data is possible, and error color maps (including extracting and testing of various elements) can easily be output in real time. In addition, STL data can be prepared. Comparison of data can also be done without CAD data.



## •Macro & management point functions

Functions within the software can easily create macros and implant inspection points with CAD data, which are tremendously effective in specific measurement tasks and repeated measurement.



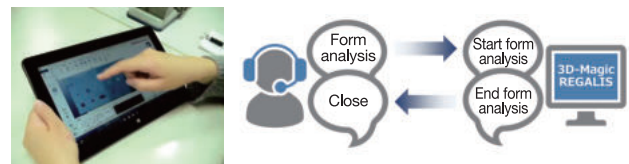
## •Measurement assist function

Through organizing point groups and controlling pack level differences by processing large-volume data, STL processing is conducted and measurement failure is prevented. In addition, a convenient command guidance function is built in.



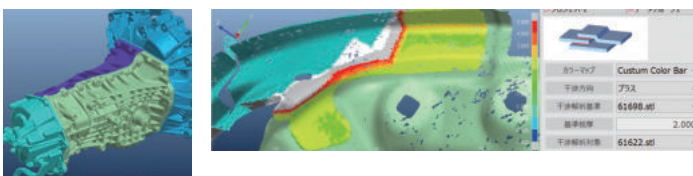
## •Touch panel & voice interface

PC-less operation and voice input support simple system operation.



## •Multi-part analysis

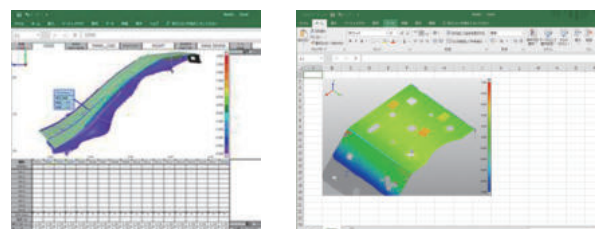
Multiple parts can be processed with Assy using digital data; distance gaps, interference and errors are instantly calculated.



## •REGALIS Viewer, Report

REGALIS Report function can handle preparation of all kinds of test reports, making it ideal for automation of inspection reports. In addition, using the exclusive Viewer allows sharing of measurement results across the entire company.

(Also compatible with Excel)



## Customization examples

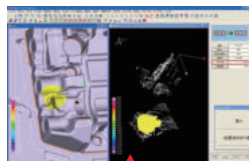
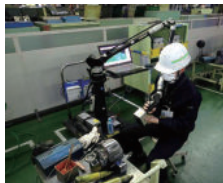
Creation of special functions and measurement functions unique to customers dramatically reduces workload.

Tokyo Boeki helps not only with arms but also with building systems for customers.

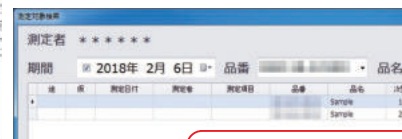
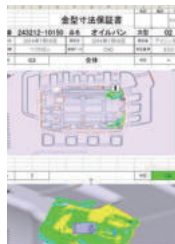
### •Die-casting mold modification & easy measurement function configuration

Even non-experts can easily measure and grasp areas for modification and follow-up confirmation, realizing improved outcomes and fewer instances where modification is necessary. As a result of visiting worksites and working with users, testing functions and measurement marcos have been built to meet the needs of worksites.

This dramatically reduces workload and eliminates erroneous operation when making modifications as well as reducing extra processes.



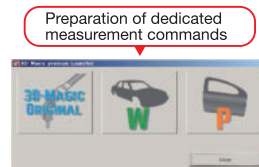
Align CAD and measurement figures at one point



Data management and automatic saving of such information as product name, part number, generation, position

### •Dedicated test functions for press panel products and configuration of report functions

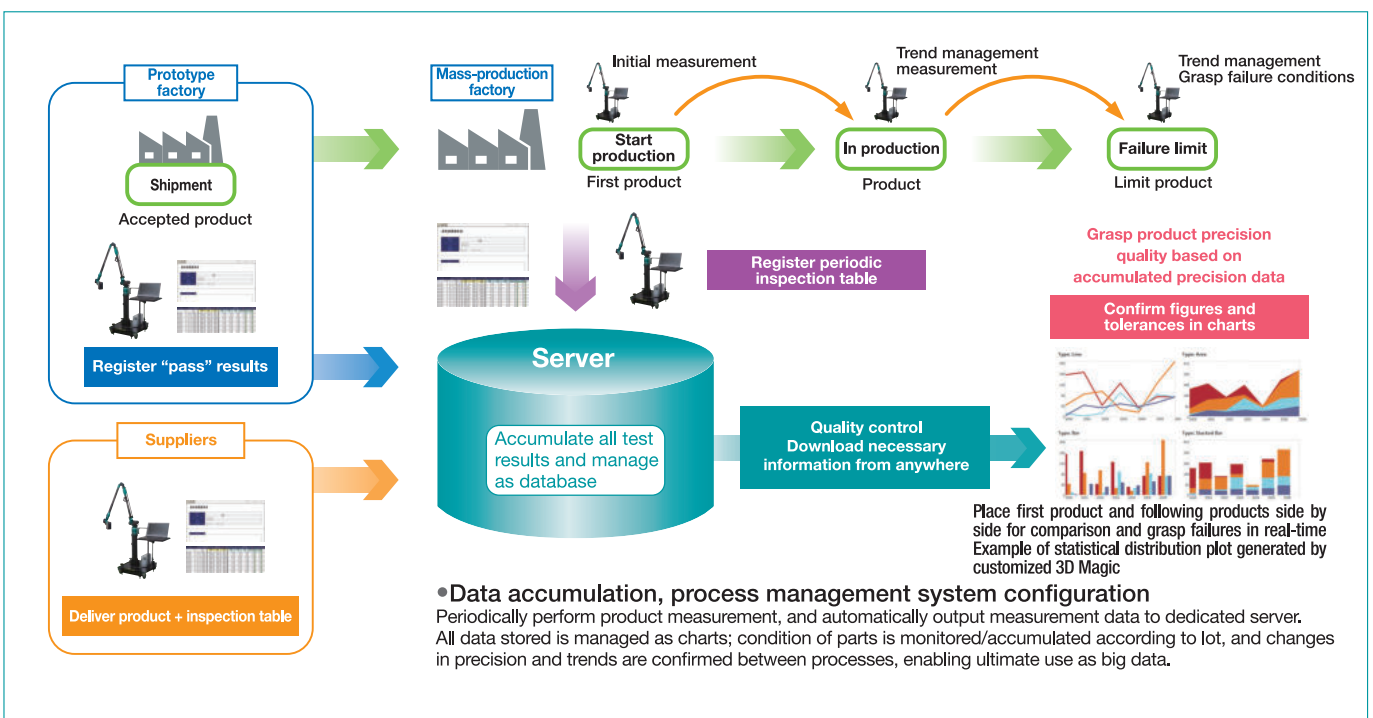
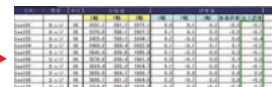
All functions necessary for measurement are included in the measurement menu. Commands for each press product are selected upon measurement; afterward, calculation and test reports are all generated automatically. This significantly reduces test processes and lead time, facilitating timely feedback.



Preparation of dedicated measurement commands



Automatic output of results after measurement



## Other development examples

- Panel product evaluation report
- Railroad bogie measurement system
- Assembly evaluation report
- Resin part evaluation report
- Chassis part precision table function
- Pipe measurement function
- Belt molding measurement function
- Automatic error conversion for vehicle direction upon hole measurement
- Edge probe compatible
- Spot welding test function
- Evaluation function of gauge for resin
- Special report output function
- Preparation of development view of fire-resistant material residual quantity



# Tokyo Boeki Techno-System (TTS) Network

TTS Network provides global coverage from various locations in Japan and cities around the world. Customers can take advantage of the nearest TTS office at any time.



## About Tokyo Boeki Techno-System (TTS)

TTS is a 3D specialty group that has been providing 3D measuring equipment to various sectors – including automobile, heavy industry, home electric appliances, health care and public facilities – since 1960. It is a total solution company that takes care of optimal system development (hardware customization, software and peripheral equipment development) according to customers' needs, as well as calibration, traceability response and repair.

## About Kosaka Laboratory Ltd.

Since its foundation in 1950, Kosaka Laboratory has been developing products in the three fields of precision instruments, fluidic devices and automated equipment by fully utilizing precision engineering technology. With most products and technologies developed in house, the laboratory has fulfilled customers' needs and contributed to today's industrial development in diverse areas. Kosaka's high value-added offerings will continue to support industry in the future.



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