



The Ultimate Solution for Measuring and Quality Control

Smart_Projector

State-of-the-art Video Measuring Instrument:
Fast, Accurate, Compact and Easy-to-use

Smart_Projector Series

Fast Industrial Video Measuring & Dimensional Inspection Machine



"Smart_Projector allows automatic, objective, repeatable, easy and fast dimensional quality check of any part"

Easy & Fast

Smart_Projector by SmartVision is the first and exclusive instrument designed to perform a **complete and automatic check** of any component in a easy and fast way.

Automatic & Productive

This machine is the revolutionary digital evolution of the traditional profile projector and micrometer caliper. It allows to check an **unlimited number of measurements per item in just few seconds**. There is no need for part alignment, no manual collimation nor focus and there are not moving components inside the machine.

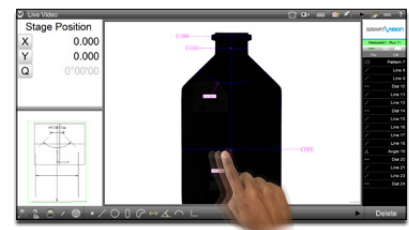
Accurate

Smart_Projector provides objective and repeatable measurements and signals a simple « Pass / Fail » lamp output, **with no contribution nor interpretation by the operator**, ensuring a full automatic evaluation and reporting of all control activities in compatible and ready-to-print Excel files (CSV, TSV, TXT), PDF and Image files.

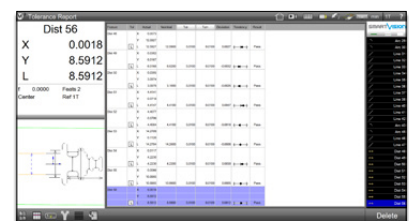
Industrial & Compact

Smart_Projector is a fast, compact, rugged, static, easy-to-use and easy-to-program device, **designed for harsh environments and heavy duty cycles use**.

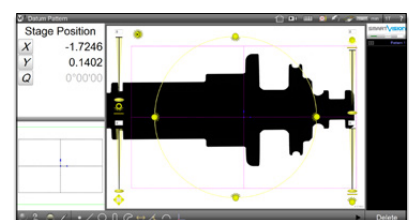
Smart Software: TOUCH & MEASURE!



- Multi touch-screen software
- Automatic feature recognition



- Automatic data report
- CSV / TSV / TXT / DXF / PDF



- Software programmable light
- Front / Back / Diffused light

Hardware Features

The Power of Two Smart_Projector in One: Vertical & Horizontal Use

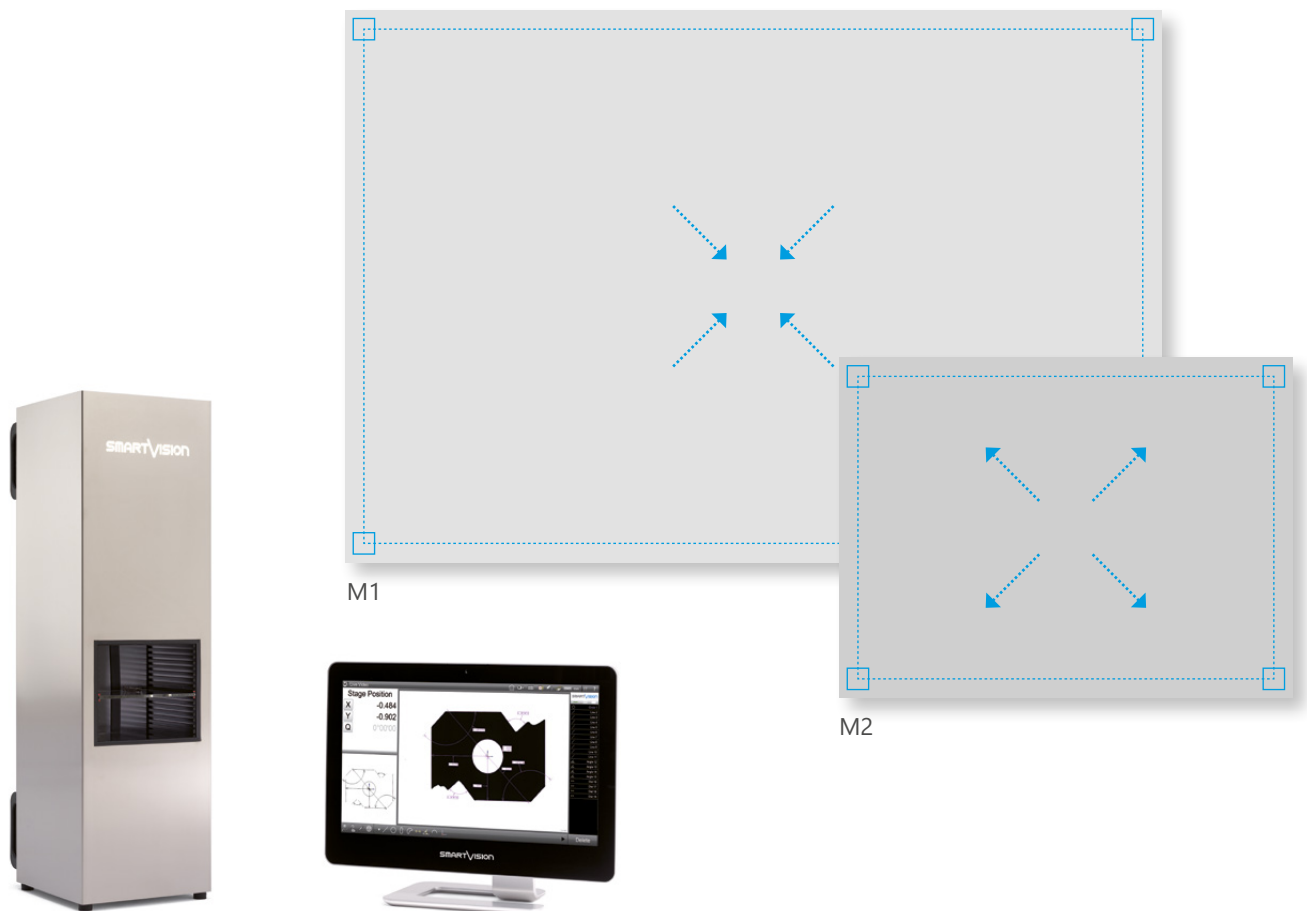


Features & Benefits

- Designed for massive quality and incoming inspection
- No external light and dust influence
- Reduces time and money of quality control
- Eliminates subjectivity and errors of operator-based measuring
- Up to 16000 dimensions checked in few second
- Performs full automatic reporting and SPC
- Ready for Automation
- Suitable for unskilled operators use
- Fast Return on Investment
- No moving parts, maintenance free
- Plug-and-play instruments (no tuning needed)
- Several languages available
- Horizontal Layout + Stage to easy sample positioning
- Optical contactless system
- Made in Italy

Smart_Projector_Double

Fast Industrial Bi-Magnification Video Measuring Instrument



Two in One

Smart_Projector_Double is a digital Profile Projector with **two different levels of magnification** in one instrument. It has been specifically designed for companies with a wide range of products' sizes and it allows to measure items with very different dimensions.

Static & Efficient

Contrary to other profile projectors, **Smart_Projector_Double** is a completely static device. The switching between the Fields of View does not involve any movable part, therefore **no re-calibration is needed**. It is possible to create automatic programs that involve the two different FoVs, for a complete check of the items.

Power & Accurate

The areas of the two Fields of View can be chosen among a large set, matching the configuration of the instrument to the needs of the customer. This ensures to get the **maximum accuracy** also on complicated items and components, without having to buy two instruments compromises in precision.

Features & Benefits

- Wide choice of FoV pairs
- Capex and Opex reduction (compared to two separate instruments)
- Perfect fit between machine capabilities and production/laboratory needs
- Reduced Time for Quality Control
- Maintenance free, no need for Re-calibration
- Space-saving
- Ideal for harsh environment and heavy duty cycle use



Smart_Projector_Quattro

High Performance ZOOM Video Measuring Instrument



Automatic & Productive

Smart_Projector_Quattro is an automatic Profile Projector that combines the precision, objectivity, repeatability and user-friendliness of measurement guaranteed by **SmartVision's Technology**.

Four in One

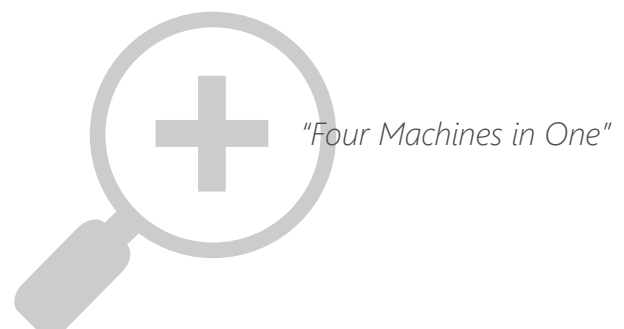
With an innovative optical solution of zoom lenses in only one device, **Smart_Projector_Quattro** allows four different magnifications, changing the Field of View by software. This feature makes this product a **4-in-1 solution** for complete and automatic dimensional check of a wide range of products.

Accurate

The device guarantees measurement stability of the image center when focusing and switching from one level of magnification to another. The benefits given by the **flexibility of the zoom lenses** and the accuracy of fixed optics are merged together in this machine with no compromises in precision. **4 different FoV in a single instrument:** precision, flexibility and cost-efficiency!

Features & Benefits

- Suited for massive (production) quality inspection, in-line control, incoming inspection
- Increases number of quotas and quality check rate, up to 16000 checking features in a few seconds
- Performs full automatic reporting and SPC (Min, Max, Range, Average, Std Dev, 6 Sigma)
- Ready to connect with SPC software
- Suitable for unskilled operators use
- Clever investment with a fast Return on Investment



Smart_Projector_Ruby

Video Measuring Profile Projector for Micromechanics



Precision without compromise

Smart_Projector_Ruby is an automatic Profile Projector that combines the precision, objectivity, repeatability and user-friendliness guaranteed by **SmartVision's Technology** in one instrument.

Small & Powerful

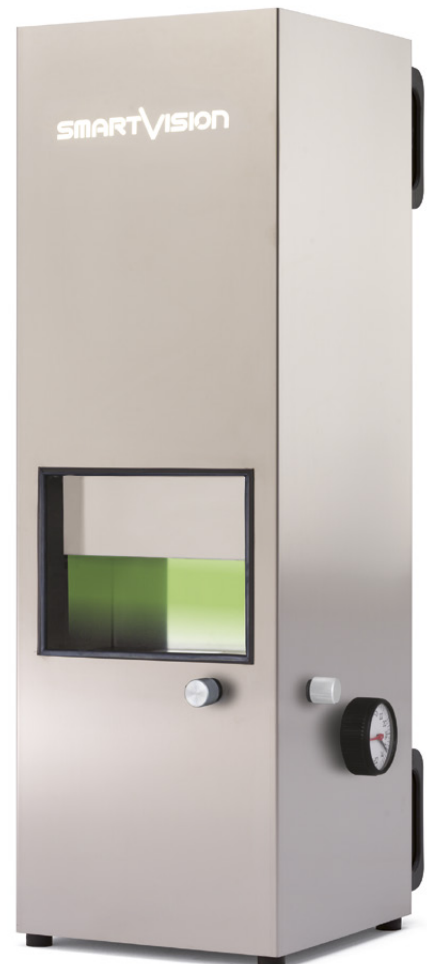
Its unique **extra small FOV and X/Y moving axes solution** makes this equipment ideal for those application that require toughest precision tolerances, such as watch components, microelettronics and micromechanical in general.

Accurate & Stable

This equipment guarantees measurement stability of the image center when focusing and moving from one side to another. The benefits given by the **precision of the Double Episcopic lights** and the accuracy of the on board optics are put together in this equipment with no compromise in precision.

Industrial & Compact

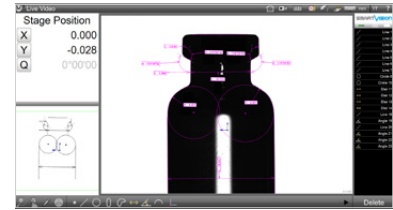
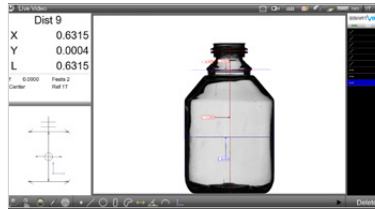
Smart_Projector_Ruby is a fast, compact, rugged, static, easy-to-use and easy-to-program device, **designed for harsh environments and heavy duty cycles use.**



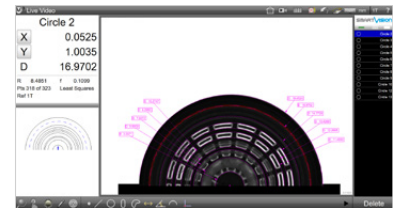
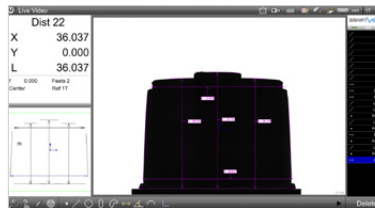
Smart_Projector Application Cases

Industrial Quality Control & Dimensional Inspection

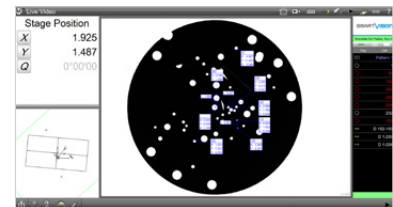
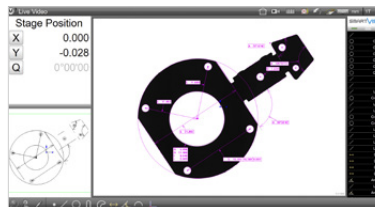
GLASS



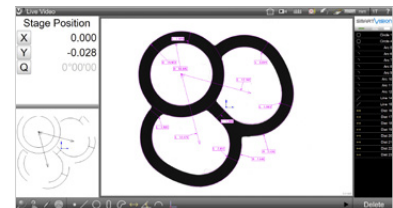
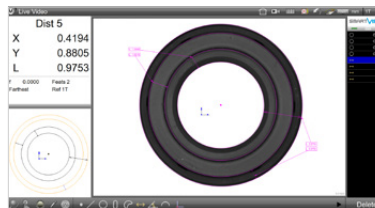
PLASTIC



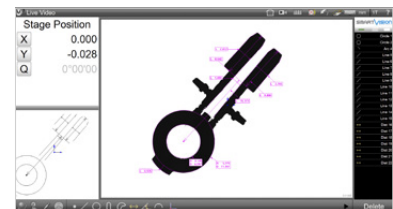
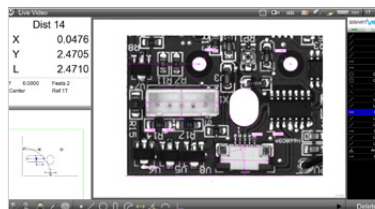
CUTTED



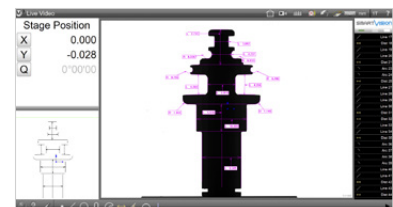
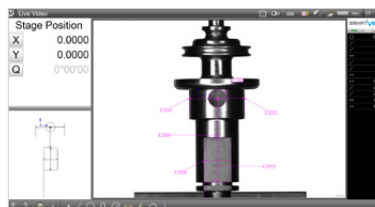
RUBBER



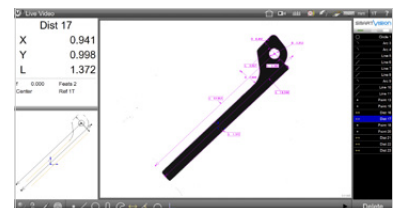
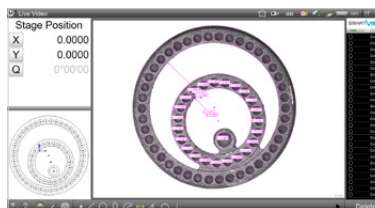
ELECTRONICS



TURNED



MICROMECHANICS



Smart_Projector all Available Models

Technical Specifications



Pc AIO



S_P@7



S_P@29



S_P@55



S_P@108

Layout usage	Vertical	Vertical	Vertical / Horizontal	Vertical / Horizontal
Magnification	-	-	-	-
Field of View ³ (mm)	7x4.5	29x19	55x37	108x73
FoV ³ Diagonal (mm)	8	30	60	125
FoV ³ Area (mm ²)	31	530	2000	7800
FoV ³ Type	Rectangular	Rectangular with vignetting	Rectangular with vignetting	Rectangular with vignetting
Measuring Chamber ⁵ (mm)	218x125 H.55	218x125 H.55	200x200 H.175	200x230 H.240
Repeatability accuracy ⁴	±0.07 µm	±0.2 µm	±0.5 µm	±1 µm
Measurement accuracy ⁴	±0.5 µm	±1.5 µm	±3 µm	±6 µm
Diascopic Light ¹	Collimated	Collimated	Collimated	Collimated
Episcopic Light ²	-	-	Yes	Yes
Light receiving lens	Double telecentric	Double telecentric	Double telecentric	Double telecentric
Dimensions (mm)	324x330 H.490	324x330 H.490	284x330 H.873	284x330 H.1255
Weight (kg)	18	18	29	45

PC & Software

SmartVision PC	Powerful All-in-One PC, FULL HD touchscreen, Monitor resolution 1920x1080, Windows 10 PRO 64-bit
Software interface	Multilanguage: English, German, Spanish, French, Italian, Portuguese, Russian, Chinese, Japanese, Polish, Czech, Romanian (all languages are editable).
User account control	Supervisor, Users 1 to 20 (with password login and editable rights)
Measurement points	16000 features max
Pattern search	XYΘ (accepts random positioning)
Statistical Analysis	Ready to connect with SPC software
CAD export	dxf file with nominal values and tolerance
CAD import	dxf file for profile match, nominal values and tolerance
Data Report	xlsx, csv, tsv, txt
Print Report	pdf

				
S_P@168	S_P@224	Double	Quattro	Ruby
Vertical ⁶	Vertical	Vertical / Horizontal	Vertical / Horizontal	Vertical
-	-	2 steps: M2 and M1	4 steps	-
168x113	224x150	60x45 / 108x73	Ø 10 / 20 / 40 / 80	2.2x1.7
195	235	75 / 125	-	2.78
18500	32550	2700 / 7800	78 / 314 / 1256 / 5026	3.74
Rectangular with vignetting	Rectangular with vignetting	Rectangular / Rectangular with vignetting	Circular	Rectangular
250x330 H.405	419x450 H.475	200x230 H.240	203x225 H.200	200x130 H.120
±1.5 µm	±2 µm	±0.5 / ±1 µm	±0.2 / ±0.4 / ±0.5 / ±1 µm	±0.075 µm
±8 µm	±12 µm	±3 / ±6 µm	±0.5 / ±1.5 / ±3 / ±6 µm	±0.2 µm
Collimated	Collimated	Collimated	Collimated	Collimated
Yes	-	Yes	Yes	Yes
Directional ⁶	Directional	Double telecentric	Double telecentric	Double telecentric
335x380 H.1255	553x510 H.1813	284x330 H.1255	282x330 H.1025	282x330 H.875
41	150	46	31	29

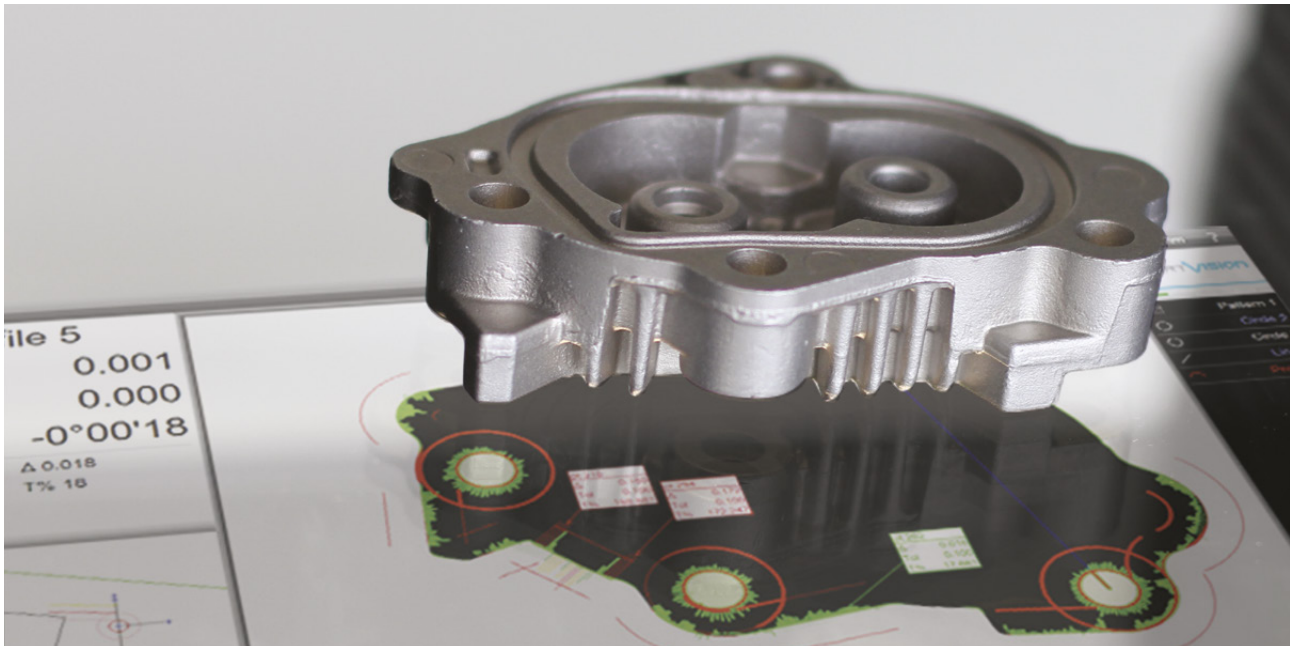
Notes

1. Diascopic Light: Collimated Projector with green led light or Standard Directional led backlight. Collimated projector intensitiy is software programmable when also Episcopic Light Control (2) is available.
2. Episcopic Light Control: 4 independent 90° sectors, software programmable, front / episcopic white diffused led light.
3. Standard models, other custom FoV available on request.
4. Precision of measurement ($\pm\mu\text{m}$) of a line, obtained measuring a specific calibration target located approximately in FoV center, best focus position, at 25° C $\pm 1^\circ$.
5. The dimensions of the measuring chamber are not the dimensions of the Field of View, therefore they have not to be considered as test area.
6. The model 168x113 is available with Collimated Diascopic Light (1) under request, in this case is possible to use horizontally with the S_H_A_K Option.



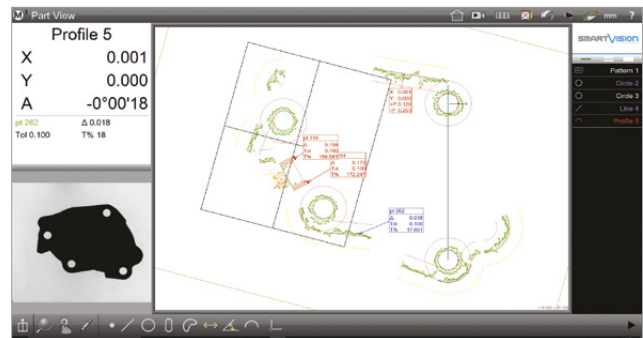
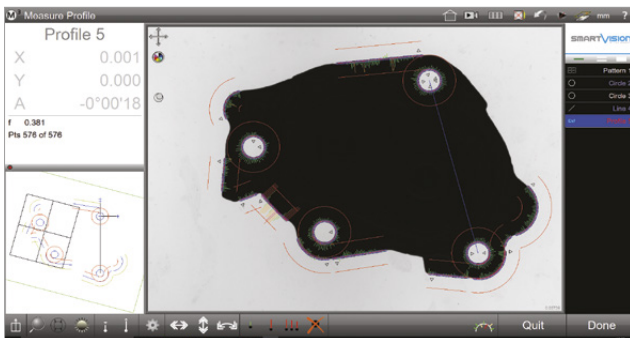
Smart_Profile_Matching Option

Advanced Digital Profile Check Tool



Smart_Profile_Matching is an **automatic Profile Check advanced feature**, which can control any item compared to a DXF master. This feature replaces the use of a traditional profile projector that requires the overlay of a glossy sheet on the component's projection.

Smart_Profile_Matching is able to perform a very fast check of a profile verifying the tolerances within a given range. Standard applications include components such as punched and formed parts, injection-molded (plastic and metal) and laser cut workpieces, die-cast, extrusions, millings, CNC machining.



Features & Benefits

- **Pattern Recognition:** the system automatically performs the Smart_Profile_Matching no matter what's its orientation nor position in the field of view
- **Profile Fit:** the software compares a DXF file containing position, angle and tolerance data to a corresponding component shown in the live video window. It shows resulting errors with coloured whiskers and returns the overall profile position, angle and form.
- **Master Creation:** the master shape can be either extracted by a real sample or obtained by a technical drawing in dxf format, allowing the Technical Office and the production line to be completely aligned.
- **Reverse Engineering:** the shape of the sample can be exported in the industry-standard DXF file format for reverse engineering or use with other software applications.

Smart_Thread_Measurement Option

Complete Threads Analysis & Check

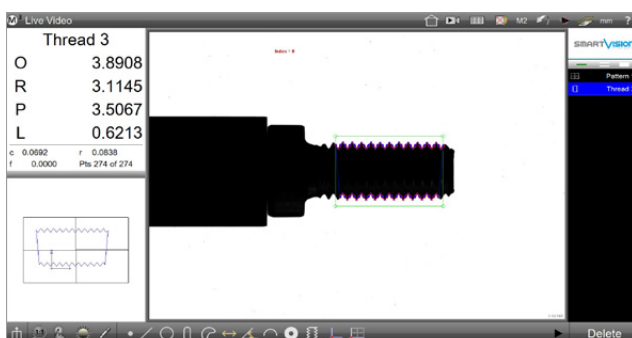


Measuring threads can be difficult. With Smart_Projector plus **Smart_Thread_Measurement** software *option* is now possible to perform **a complete and automatic dimensional check** of threads measurements with different tolerances according to International Standards.

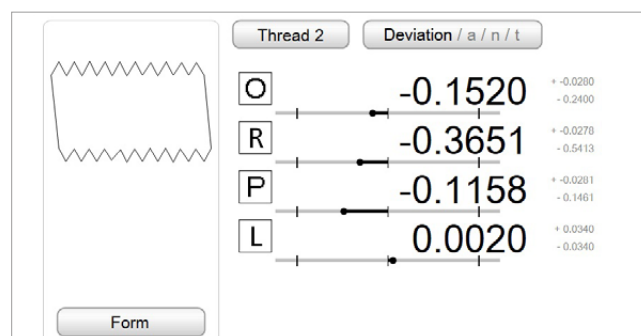
ISO Metric Thread Designation	Pitch	External Threads						
		Tolerance Class	Major Dia		Pitch Dia		Minor Dia	
			Max	Min	Max	Min	Max	Min
M8x1,25	1	6g	7.972	7.760	7.160	7.042	6.619	6.272

Example of external metric table chart and fastner size M8

- The software is capable to autodetect sizes from M1.6 to M200
- Related Pitch from 0.35 to 6.0
- Tolerances Classes : 6g, 6h o 4g6g



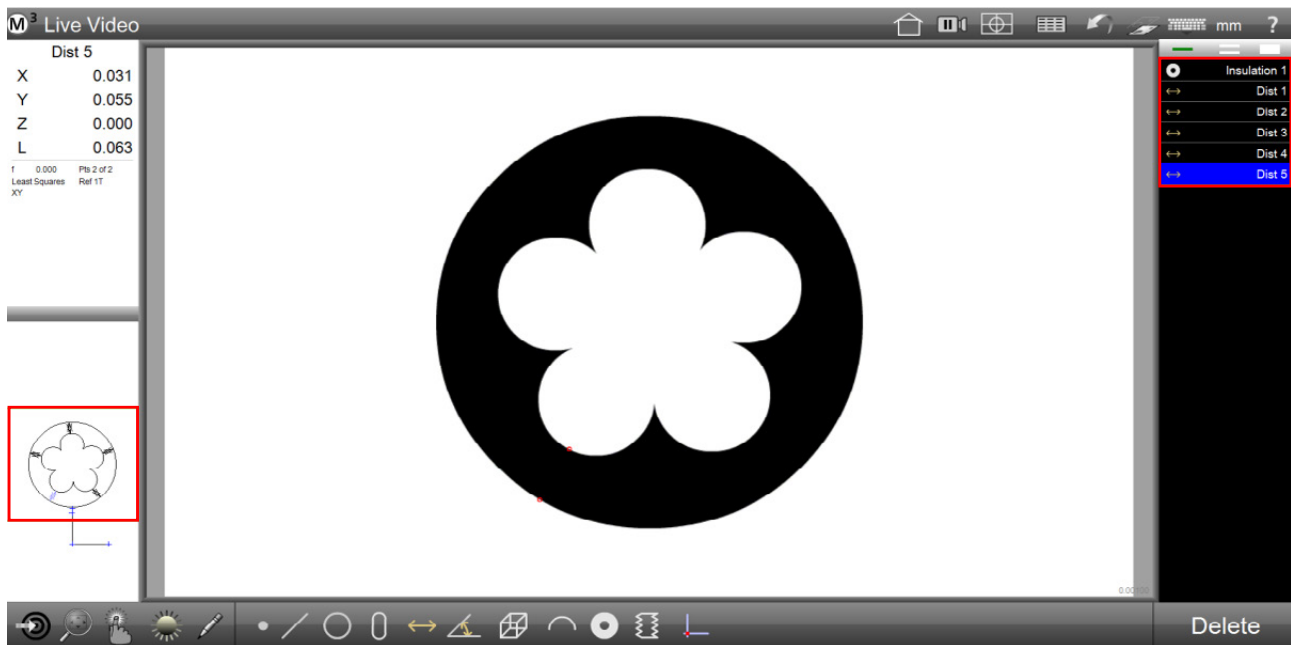
Automatic thread etching



Characteristics Analysis

Smart_Wire_Measurement Option

Measure the Thickness of Wire insulation samples



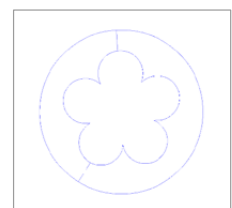
Thanks to the **Smart_Wire_Measurement** insulation tool it is possible to determine the number of strands in a wire automatically, as well as manually select the appropriate figure.



The Wire Insulation Measurement function calculates the absolute minimum distance between the outer “blob” of the insulation profile and the inner “blob” of the insulation profile. Once this minimum distance is determined, the system breaks the diameter of the insulation into six 60 degrees segments, based on the minimum distance at 0 degrees. The minimum distance between the inner and outer “blobs” is determined from within each of these 60 degrees segments. This mechanism is used when there is a single strand on the inside lobe (like in a simple gasket), or there are 6 or more lobes or wire strands.

- “d0” represents the minimum distance
- “d1” represents the maximum distance
- the character “d” in the detail information screen represents the average distance

Insulation 1	
d0	0.058
d1	0.062
d	0.060
C%92.3	X: 0.001
Y: 0.423	t: 0.000
Pts 2415 of 2415	Centroid
Ref 1T	XY



Features & Benefits

- **Automatic:** by selecting the “Auto Strand” button and clicking on an edge of the insulation sample, the System determines the number of strands automatically.
- **Fixed-Strands Measurement:** when the wire sections is blurry the number of strands can be manually specified by choosing one of six different strand count selections.
- **Distance Results Mode:** if the Distances Mode button is enabled, the Software automatically displays and creates every distance between strands and edges during the regular insulation measurement. It also determines the minimum, maximum and average distance between strands and edges within the insulation profile.

Smart_Data_Collection_SPC Option

Analyze & Collect Data



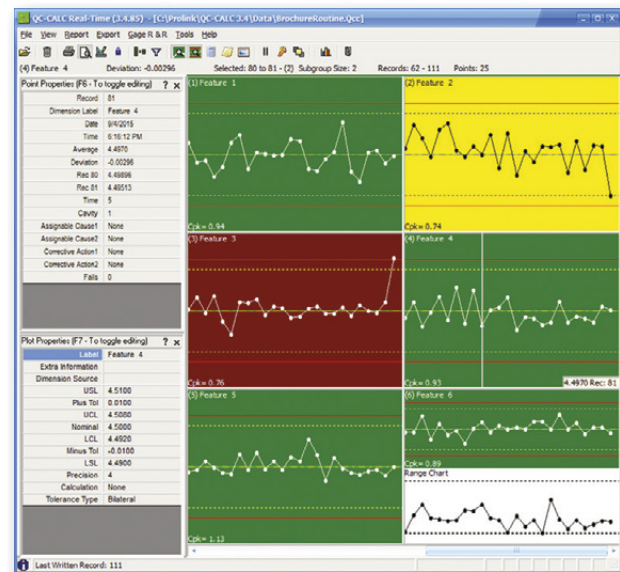
SPC Package

QC-CALC SPC is a complete SPC package that analyzes the data collected by QC-CALC Real-Time. The wide variety of charts and reports available in QC-CALC SPC allow close monitoring of the manufacturing process in order to stay in control. In seconds, QC-CALC SPC gives a precise picture of how the production line is performing with easy-to-use menus.

Data Integrity Report						
Printed on January 27, 2020						
ProLink						
SummarizePart.Qcc						
This report lists all changes made to the raw QC-CALC data containing inspection data. All changes are documented and include the record number, user, and comment for each change.						
If you receive a report for a specific part, serial number, or other identifier, please create a review filter to reduce the results. Or, if needed, you can create a data filter to see all features, records for a particular day or range of dates. If needed, you can search for a particular value entered into a record or record for one or more features. See the help for more details.						
Rec	Date	Part	Feature	Old Value	New Value	User
				Dimension	Dimension	
4	1/15/2020 1:55:05 PM	Part 1000	Feature 1	4.5100	4.5100	John Doe
5	1/15/2020 1:55:05 PM	Part 1000	Feature 1	4.5100	4.5100	John Doe
14	1/15/2020 1:55:05 PM	Part 1000	Feature 1	4.5100	4.5100	John Doe
22	1/15/2020 1:55:05 PM	Part 1000	Feature 1	4.5100	4.5100	John Doe
46	1/15/2020 1:55:05 PM	Part 1000	Feature 1	4.5100	4.5100	John Doe

Features & Benefits

- Record and Dimension filtering
- Control charts
- Process capability charts
- Attribute charts
- Ability to print to PDF and email reports
- Built-in report designer
- Remote Real-Time monitoring
- Multiple database grouping
- Built-in password protection



QC-CALC Real-Time

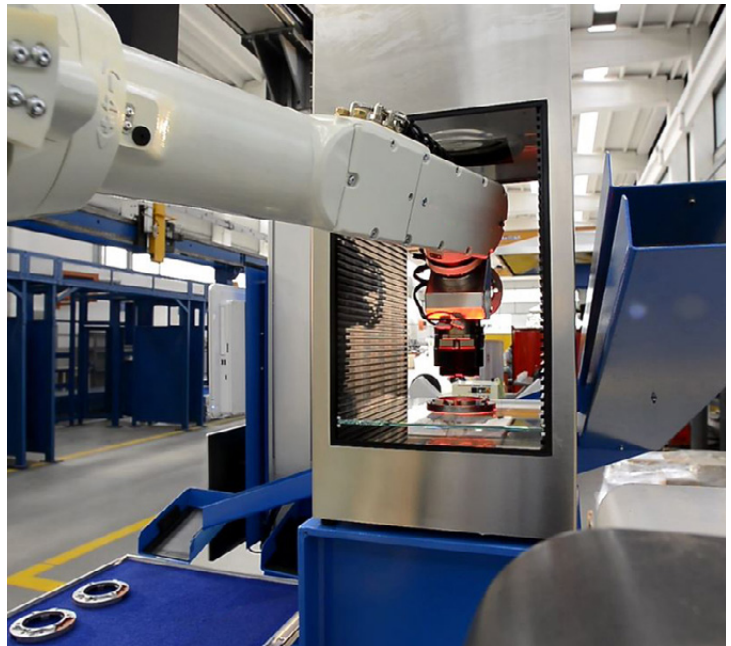
QC-CALC Real-Time is used to collect and display measurement results from all CMMs, Video CMMs, and hand gages without operator intervention. Reports can be created and data can be exported to spreadsheets, databases, and other SPC programs. This means it is possible to transfer data from all measurement devices to any SPC package using one program.

Features & Benefits

- Fully automatic data collection from over 200 types of machines
- View up to 1200 live plots (dimensions) while collecting data for many more
- Manual and automatic export capability to over 40 different output formats
- Manual and automatic report generation
- Trend detection with email alerts
- Dynamic filtering of dimensions
- Multiple gage output combined into one screen (MultiSource)
- True Position Charting with 2D position charts
- Flexible plots support I&MR, XBar & Range, Scatter, Whisker, and True Position Plots

Smart_Automation_Suite Option

Automation Features for Smart_Projector



Smart_Automation_Suite is a Hardware-Software combination that includes an integrated I/O Module and a dedicated software.

Smart_Automation_Suite allows to manage the **Automatic Measuring System** functions through the automation of the production process.

"A complete solution for automated Quality Control Process"



Features & Benefits

- Record and Dimension filtering
- Control charts
- Process capability charts
- Attribute charts
- Ability to print PDF and email reports
- Built-in report designer
- Remote Real-Time monitoring
- Multiple database grouping
- Built-in password protection



Smart_Rotating_Robot Option

Automated 360° Measurements for Smart_Projector



The innovative **Smart_Rotating_Robot** is designed to extend the Smart_Projector's application range, allowing **quality control of cylindrical components** and any other item that needs to be examined on different projection planes at defined angles.

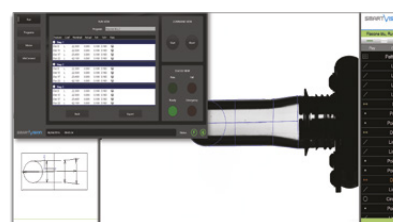
It is made of a special automated test plan inserted in the **Smart_Projector's measuring chamber** and connected to the supplied PC All-In-One through a dedicated Control Station. Smart_Rotating_Robot allows the operator to place in the test area components such as bottles and vials vertically.

The pieces are secured on a **robotic rotation** chuck system controlled by software and a dedicated control box, which shows the results instantly.

The easy integration of the Smart_Rotating_Robot in the Smart_Projector System grants **maximum flexibility** and reduces the time needed to control parts from different angles of views thanks to the automatic load of different programs for different views.



- Easy to use software
- Automatic data visualization



- Full integration with the main software

Specifications

ROTATING ROBOT

Available models S_R_R@55; S_R_R@108; S_R_R@168

Technical Features

- Angular Accuracy $\pm 0.1^\circ$
- Rotational speed (self-centering chuck and tailstock)
- Interchangeable spacer blocks
- Custom fixing tools arrangements
- Software controlled angular positioning (from 0° to 360°)
- Number of positioning: association of compatible measuring programs via software
- Number of programs: unlimited

Material Anodized Aluminum

CONTROL STATION

Main Functions

- Manual movement of the Rotating_Robot
- Run the program
- Abort the program
- Output features: warning / power on / ready / Pass Fail Result

Dimensions (mm) 275x245 H.175/270

Weight (kg) 1

Power supply 220 V

Communication interface USB 2.0

Case Black Opaque painted Anodized Aluminum



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