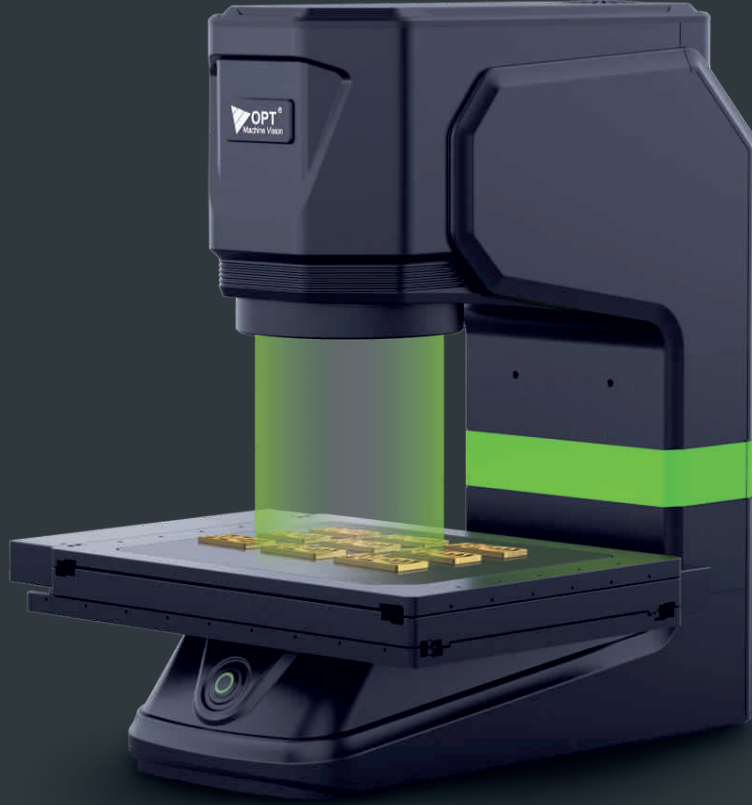


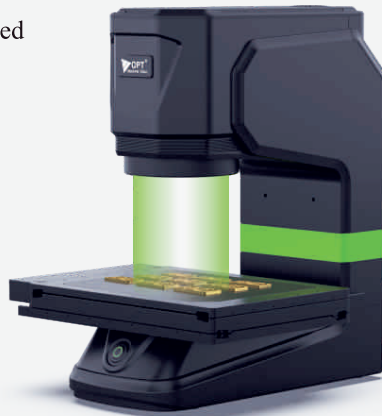
SmartFlash

One-Click Measurement Sensor



One-Click Measurement Sensor SmartFlash Series

High accuracy Up to $1\mu\text{m}$
Highly efficient parallel computing
Drawing Import No Programming Required



Function introduction

One-Click Measurement Sensor
SmartFlash Series



Optimize measurement procedures, improve the test efficiency and develop new measurement standards of the industry

- No programming is required; intelligent programming can be realized by importing CAD drawings of products to facilitate operation.
- Large field of view + image mosaic for rapid measurement of large-sized products, with a measurement range of 315x190mm.
- The one-key measurement sensor software is compatible with a high-stability, high-precision optical image system for full-size measurement of products.
- High-efficiency and high-precision measurement and analysis on product contour.
- Special-purpose measurement modes for threads, gears and rubber rings.

Hardware

■ Combination of two telecentric lenses

- ▷ Automatically adjust the light source to the optimal position with double telecentric lenses + automatic lifting and lowering downlighting combination.
- ▷ Double telecentric lenses feature the extended depth of field and almost zero distortion, thus avoiding object and image perspective distortion and lighting attenuation and improving the measurement accuracy.

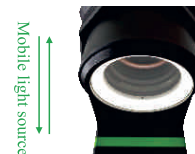


■ Four-channel multi-angle + low-angle directional lighting source combination

- ▷ Four-channel multi-angle + low angle directional lighting source combination, through the illumination of a more intuitive response to the surface characteristics of the product, significantly improve the product detection effect.
- ▷ A light source is crucial for the proper functioning and optimal performance of a one-key measurement sensor, which directly determines the accuracy and stability of the sensor.

■ Applicable to measurement of products within a certain range of height

The combination of elevating and falling light illumination automatically adjusts the height, brightness and angle of the light source provides a more intuitive reflection of surface characteristics, delivering high resolution, high contrast and uniformly consistent images to ensure the accuracy and repeatability of measurement.



■ High-precision motion platform

- ▷ Use the $0.1\mu\text{m}$ high-precision grating ruler on the moving axis for full closed-loop control, to ensure the positioning accuracy and increase the running speed.
- ▷ The linear motor runs stably, so the measurement accuracy is not affected by the reciprocating platform and lead screw. This is conducive to image stitching and high-precision dimensional measurement due to no error accumulation, no reverse clearance and low repetition accuracy.



Hardware



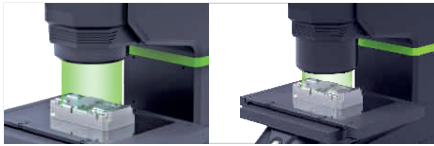
When kept far away from a workpiece, the light source provides large-scale and uniform illumination. It can be lifted for higher contrast.



Illuminating the peripheral contour laterally with a low-angle light source produces high-contrast images.

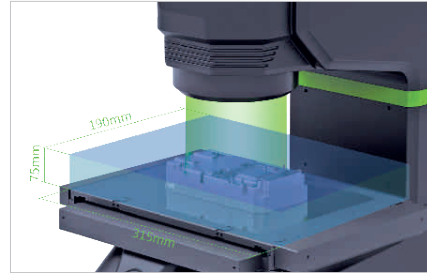
Adjustable ring light source for optimal lighting and high-precision edge measurement

The lifting type multi-angle ring light source with multiple lighting units is adjustable to get clear contour images.



Range of measurement 315*190 mm

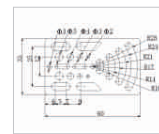
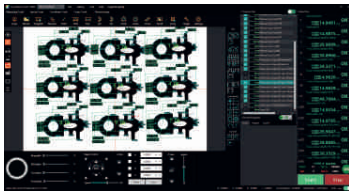
High-speed and high-precision mobile platform is used and together with software image stitching, can realize measurement of 315*190 view field rapidly.



Software

Concise and straightforward software interface, easy measurement operations

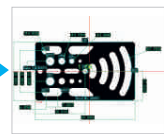
The software interface is simple, powerful and extremely easy to learn, anyone can easily set up and measure; instant evaluation of results, statistical analysis graphs and test reports after measurement.



Import of CAD drawing file



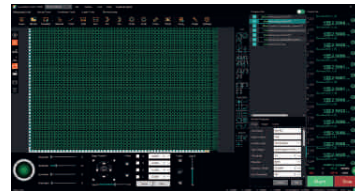
Program conversion



Measurement and report output

Efficient parallel measurement

Fast parallel measurement: measurement and output of 1600 parts within 7s.



Measurement Software Features

- ▷ Measurement of basic geometric features such as points, lines, circles, arcs, curves, point clouds, C angles, R angles, etc.
- ▷ Measurement of gears, springs, threads, gaps, needle rows, line finding, circle finding, auto sizing, character recognition, meter weights, and other special tools.
- ▷ Advanced functions such as autofocus, offline programming, image stitching, contour extraction, and contour comparison.
- ▷ Provide multiple feature extraction and construction methods, multiple shape tolerance and position tolerance dimensional output.
- ▷ SPC analysis, customized output reports and other extended functions, data upload.

One-Click measurement can be realized wherever the product is located

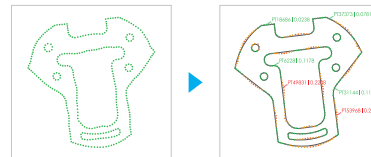
Quickly measure any workpieces within the field of view due to automatic template matching, without the need for fixture.

CAD drawing import and automatic programming

Support CAD drawing import and realize automatic offline programming in a rapid manner.

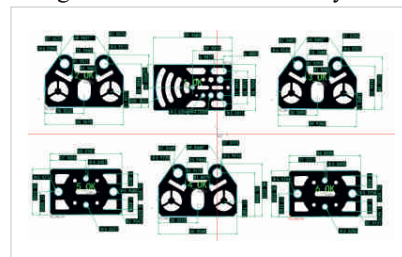
Contour comparison

Extract the product image contour and compare it with standard contour on CAD drawing, and calculate the contour difference rapidly.



Simultaneous measurement of different types of products

Software positioning recognition; it may measure over 100 products and more than 300 parts at the same time. Individual programming measurement is unnecessary for similar products.



Software

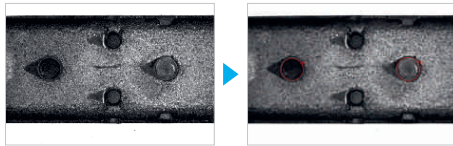
Automatic recognition of edge burrs

It may recognize burr or defect at the point of detection automatically and skip, to assure stability and high precision of the results of measurement.



Special edge processing

Automatically filter out spots, black shadows and bright white edges and other interferences, enabling effective and automatic measurement of edges with large spots or fuzzy edges.



Parts of segment different within the measurement range for the depth of field, no influence on size

Together with telecentric lens, camera imaging will not increase the error change and even though there is segment different at the point of detection, it may mitigate the influence of surface segment difference on measurement.



Imaging of general-purpose lens Imaging of OPT double telecentric lens

Small imaging distortion within the field of view

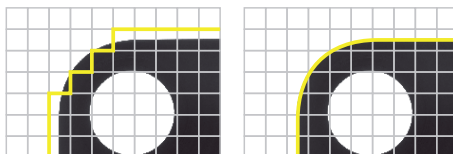
The matched lens is of small distortion. Edge distortion of product imaging is very small. Influence of position on results of measurement is very little.



Imaging of general-purpose lens Imaging of OPT double telecentric lens

Sub-pixel computing for extraction of edge features

Sub-pixel computing is done for extraction of edge features, Divide one pixel into data less than 0.01 pixel for computing, to realize high-precision measurement.



Sub-pixel not used for computing

Sub-pixel used for computing

Non-professional detection personnel can operate

The operation is convenient and non-professional detection personnel can also learn how to operate it

rapidly, so as to minimize the difference arising from different operators and improve the equipment activation by reducing the burden of quality department.

Reduce time of product detection

Improve production capacity and lower down manufacturing cost by reducing time of product detection.

Special measurement modules

Software has a special modules of measuring the threads, gears, rubber rings, etc., to facilitate operation.


Applications

- Machinery, electronics, mold, injection molding, hardware, rubber, LV electrical appliances, magnetic materials, precision hardware, precision stamping, connector, coupler, terminal, mobile phone, home appliances, printed circuit board (circuit board and PCB), automobile, medical apparatus and instruments, clock & watch, instruments and apparatus etc.



Automatic saving of measurement result report

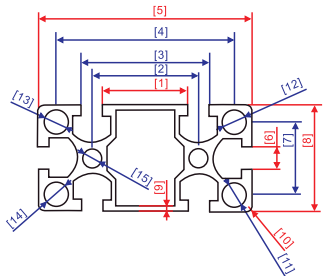
Data about the measurement results will be saved to the designated location automatically and it can be saved in pdf, xlsx, txt and a multiple of formats.



Dimensional Measurement Report

Date: 2024/3/19

Company name:	OPT	Product name:	P1
Equipment no.:	BH00530	Program no.:	Prog01
Operator:	QA		



Measurement Results:

Dimension number	Measured value	Theoretical value	Upper tolerance	Lower tolerance	Deviation value	Result
1	31.5110	31.7000	0.1500	-0.1500	█	NG
2	40.0442	40.0000	0.1500	-0.1500	█	OK
3	48.3722	48.3000	0.1500	-0.1500	█	OK
4	66.9522	67.0000	0.1500	-0.1500	█	OK
5	79.7657	80.0000	0.1500	-0.1500	█	NG
6	8.6750	8.3000	0.1000	-0.1000	█	NG
7	27.0206	27.0000	0.1500	-0.1000	█	OK
8	39.6985	40.0000	0.0500	-0.1500	█	NG
9	1.6621	2.2000	0.0500	-0.0500	█	NG
10	0.0000	1.5000	0.0500	-0.0500	█	NG
11	9.3309	9.4000	0.1000	-0.1000	█	OK
12	9.3474	9.4000	0.1000	-0.1000	█	OK
13	9.3746	9.4000	0.1000	-0.1000	█	OK
14	9.3386	9.4000	0.1000	-0.1000	█	OK

List of Parameters

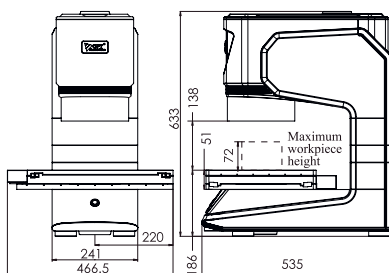
Product name	One-Click Measurement Sensor SmartFlash Series			
Software	2D Measurement System-SmartFlash			
Specification and model	SmartFlash 3020	SmartFlash 2020	SmartFlash 1010	
Camera Element	20MP COMS			
Light-emitting Diode(LED)	Double Double Telecentric Lens			
Field Of View Of The Camera	Wide-field	82x55mm		
	High-precision	30x20mm		
Lighting Systems	Transmitted Light	Telecentric parallel light source (green)		
	Radiant	Four channels of multi-angle diffuse illumination (optional green)		
	Radiant	Low angle directional illumination (optional green)		
	Radiant	Coaxial light (optional)		
XY Axis Travel Range	235X135mm	135X135mm	-	
Z1, Z2 Axis Travel Range	72mm			
Measurement range	Wide-field	315X190mm	215X190mm	-
	High-precision	265X155mm	165X155mm	-
Repeated precision	Table Not Moved	Wide field of view mode: $\pm 1\mu\text{m}$		
		High accuracy mode: $\pm 0.5\mu\text{m}$		
	Table Movement	Wide field of view mode: $\pm 2\mu\text{m}$		-
		High accuracy mode: $\pm 1.5\mu\text{m}$		-
Measurement precision $\pm 2\sigma$	Not spliced*1	Wide field of view mode: $\pm 3\mu\text{m}$		
		High accuracy mode: $\pm 2\mu\text{m}$		
	Spliced*2	Wide field mode: $\pm(5+0.02L)\mu\text{m}$		-
		High accuracy mode: $\pm(3+0.02L)\mu\text{m}$		-
Max load of workbench	3KG		5KG	
Working Distance	145mm			
Power System	110-240V 50-60Hz Power 350W			
Operating environment	Temperature $25\pm 10^\circ\text{C}$, humidity 20%-80% RH (non-condensing)			

*1. In the focal position, using an ambient temperature of $20\pm 1^\circ\text{C}$.

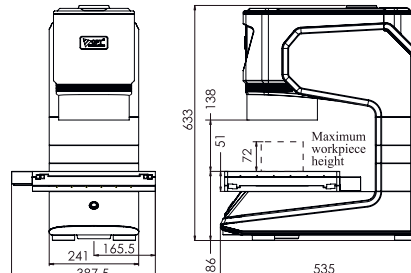
*2. In the focal position, at an ambient temperature of $20\pm 1^\circ\text{C}$, and with a load of 1 kg or less on the stage, L is the amount of movement of the cradle stage (mm).

Dimensions (mm)

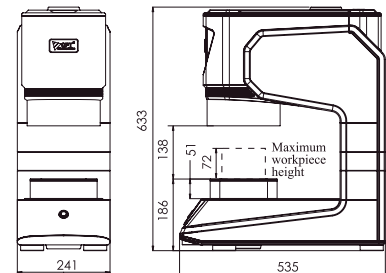
SmartFlash 3020



SmartFlash 2020



SmartFlash 1010





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