■HOLOS: Free-form Curved Surface Measuring Program

HOLOS enables measuring and comparison measuring of free-form curved surfaces that include CAD model and other design values.
A 3D best fit function makes it possible to configure coordinate system settings.
Adding a digitizing function allows digitizing of unknown free-form curved surfaces.
HOLOS-NT consists of four modules that can be combined to suit a variety of needs.

HOLOS Light

- Simple free-form curved surface measuring
- Manual measurement also supported
- Alignment using free-form curved surface
- Graphic-based measuring program creation
- Readily available measurement results
- Graphic display of measurement results
- Color graded map display evaluation (only when Light plus is used)

HOLOS Extended

- Complex free-form curved surface measurement
- Quick measurement program creation
- Advantage of automation
- Open system for free data sharing
- Composite element model comparison
- Scanning measuring
- Color graded map display evaluation

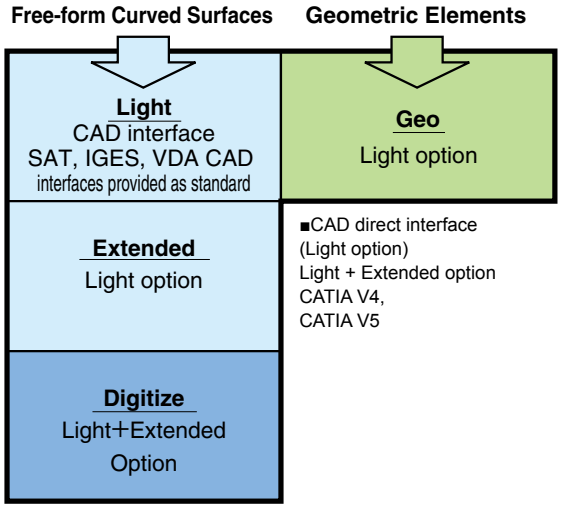
HOLOS Geo

- Standard geometric element measurement
- Measurement using assist function

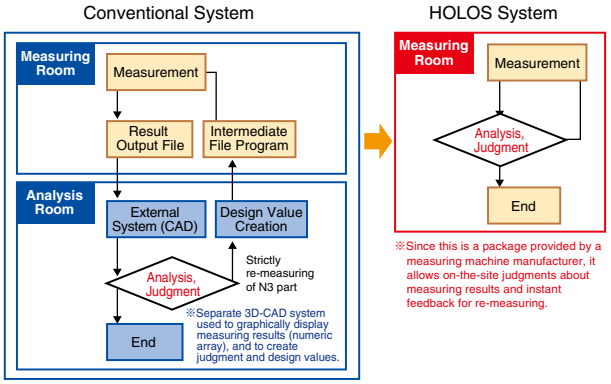
HOLOS Digitize

- Digitizing with point-to-point and scanning
- Model output with VDA data and IGES
- Automatic scanning line calculation within a specified range

HOLOS Module Configuration

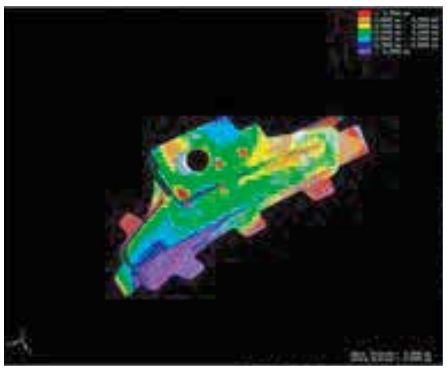


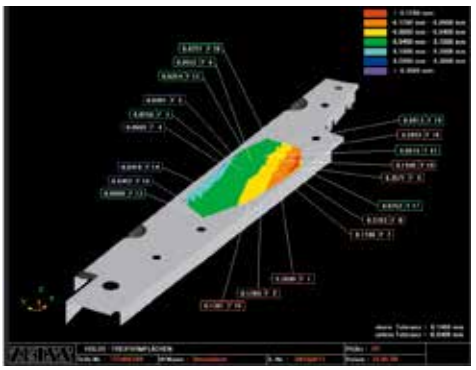
Benefits of using HOLOS



■HOLOS Light Basic Free-form Curved Surface Measuring Software

- **Speedy measuring results**
  HOLOS Light provides immediate measurement results. With the measurement program, simply click the measurement point and reference points on the screen for simple generation of measurement results. Detailed confirmation of the workpiece is possible when CAD data is available.
- **Alignment using free-form curved surface**
  HOLOS Light enables instant and simple measurement of simple free-form curved surface. It also simplifies alignment using free-form curved surfaces. Simply select six points on the surface to display the required probing points for each step.
- **Readily available measurement results**
  Edge points set on the model can be measured with ease. After probing, measurement results and measurement positions can be displayed instantly on the screen. Measurement results also can be displayed graphically to facilitate checking of measurement results, as well as degrees and directions of errors.



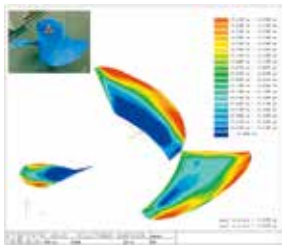


Surface Normal Direction Error Label Display
Labels can be positioned either automatically or manually.

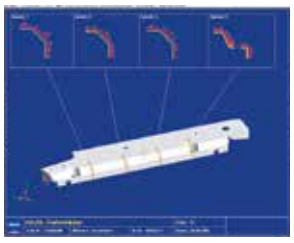
■HOLOS Extended　Extended Free-form Curved Surface Measuring Software

HOLOS Extended can be added on to HOLOS Light when speedy and accurate continuous measurement of a complex free-form curved surface is required.

- **Quick measurement program creation**
  HOLOS Extended dramatically simplifies creation of programs for point measurement on a grid, range scanning, and other measurement programs. Measurement programs provide a much higher level of efficiency than manual probing.
- **Advantage of Automation**
  HOLOS Extended supports VBScript so programs can be developed externally and incorporated as integrated modules. This makes it possible to execute a measurement operation with the press of a single key.
- **Open system for free data sharing**
  HOLOS Extended supports output of measuring data to external quality control software.
- **Composite element model comparison**
  In car body and other applications, composite elements can be compared with cross sections on the model. Correlation lines, gap sizes and more can be measured in a single step.
- **Scanning support**
  HOLOS Extended is required for scanning measurement.



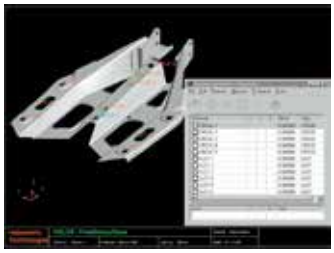
HOLOS Extended Surface Measurement Example
Measurement results can be displayed directly on the screen for color graded comparison.



Sample display of cross section evaluation and part view

■HOLOS Geo　Standard Geometric Element Measuring Software

HOLOS Geo software is for measuring standard geometric elements, such as holes, reference points, etc.
Running HOLOS GEO in combination with HOLOS Light enables measuring of free-form curved surfaces and standard geometric forms on the same platform. Geometric tolerance judgment also can be performed (option).



Circles, cylinders, cones, planes, long holes, square holes and more can be generated from the CAD model.

Measurement and evaluation of standard geometric elements generated by HOLOS.

CAD Interface Specifications

	CAD Format	Calypso				HOLOS				
		CAD Conversion for Calypso/HOLOS				CAD Converter specialized for HOLOS				
		Data Type	Version	File Extension	CAD Conversion for Calypso/HOLOS	Data Type	Version	File Extension	CAD Converter specialized for HOLOS
Standard Format Conversion	IGES	2D,3D	IGES4.0 IGES5.2/5.3	.igs	△ IGES conversion required IGES -> Calypso	○ HOLOS-Light Standard(IGES5.1) IGES -> HOLOS	3D	IGES5.2/5.3	.igs	△ IGES CAD Converter required IGES -> HOLOS
	VDA-FS	2D,3D	1.0/2.0	.vda	△ VDAFS conversion required VDAFS -> Calypso	○ HOLOS-Light Standard(VDAFS2.0) VDAFS -> HOLOS	3D	1.0/2.0	.vda	△ VDA CAD Converter required VDAFS -> HOLOS
	STEP	3D	AP203 AP214	.stp	△ STEP conversion required STEP -> Calypso	△ STEP conversion required(Via Calypso) STEP -> SAT(Calypso) -> HOLOS	3D	AP203 AP214	.stp	△ STEP CAD Converter required STEP -> HOLOS
	SAT	3D	ACIS kernel 6.0 - 23.0	.sat	○ Calypso Standard SAT -> Calypso4.6 and later	○ HOLOS-Light Standard(SAT20) SAT(Calypso) -> HOLOS	3D	ACIS kernel to 21	.sat	△ ACIS CAD Converter required SAT -> HOLOS
	DXF	2D	AutoCad up to 13	.dxf	△ DXF conversion required DXF -> Calypso	-	-	-	-	-
CAD Direct Conversion	CATIA　V4	3D	Ver.4.1.x Ver.4.2.x (up to 4.2.4)	.exp .model	△ CATIA　V4 conversion required CATIA V4 -> Calypso	△ CATIA conversion required(Via Calypso) CATIA V4 ->SAT(Calypso) -> HOLOS	3D	to Ver.4.2.5	.exp .dlv .model	△ CATIA CAD Converter required CATIA V4 -> HOLOS
	CATIA　V5	3D	Ver.2 to 22	.CATPart .CATProduct	△ CATIA V5 conversion required CATIA V5 -> Calypso	△ CATIA conversion required(Via Calypso) CATIA V5 ->SAT(Calypso) -> HOLOS	3D	Ver.10 to 23	.CATPart .CATProduct	△ CATIA CAD Converter required CATIA V5 -> HOLOS
	ProEngineer (Prro-E)	3D	Rev.19,20 2000i²/2001 Wildfire1 to 5	.prt	△ Pro-E conversion required Pro-E -> Calypso (Wildfire5 required Calypso5.0 and later)	△ Pro-E conversion required(Via Calypso) Pro-E -> SAT(Calypso) -> HOLOS	3D	Rev.13 to Wildfire5	.prt .asm .neu	△ Pro-E CAD Converter required Pro-E -> HOLOS
	Unigraphics (UG)	3D	Rev.14-18 NX1 to 6, 7.5	.prt	△ UG conversion required UG -> Calypso (NX7.5 required Calypso5.2 and later)	△ UG conversion required(Via Calypso) UG -> SAT(Calypso) -> HOLOS	3D	Rev.11 to NX8	.prt	△ UG CAD Converter required Unigraphics -> HOLOS
	SolidWorks	3D	98 to 2010, 2012	.sldprt	△ SolidWorks conversion required SolidWorks -> Calypso (2012 required Calypso5.4)	△ SolidWorks conversion required(Via Calypso) SolidWorks -> SAT(Calypso) -> HOLOS	3D	to 2012	.sldprt .sldasm	△ SolidWorks CAD Converter required SolidWorks -> HOLOS
	Inventor	3D	6 to 12, 2010 to 2012	.ipd	△ Inventor conversion required Inventor -> Calypso (2012 required Calypso5.4)	△ Inventor conversion required(Via Calypso) Inventor -> SAT(Calypso) -> HOLOS	3D	2011	.ipd	△ Inventor CAD Converter required Inventor -> HOLOS
	Parasolid	3D	10 to 24	.x_t	△ Parasolid conversion required Parasolid -> Calypso	△ Parasolid conversion required(Via Calypso) Parasolid -> SAT(Calypso) -> HOLOS	3D	to 22	.x_t	△ Parasolid CAD Converter required Parasolid -> HOLOS
	JT Open	3D	8.0 to 8.1	.jt	△ JT Open conversion required JT Open -> Calypso	△ JT Open conversion required(Via Calypso) JT Open -> SAT(Calypso) -> HOLOS	3D	6.0 to 9.5	.jt	△ JT Open CAD Converter required JT Open -> HOLOS

○: Standard function for Calypso/HOLOS　△: Optional function for Calypso/HOLOS and optional function for CAD converter specialized for HOLOS
Note: Applicable for Calypso Rev. 5.2 and later, HOLOS 2.10 and later　*Applicable for Calypso Rev. 5.4 and later, HOLOS 2.10 and later
*Contact us for details.

■HOLOS Digitize　Free-Form Curved Surface Data Generation Software (option)

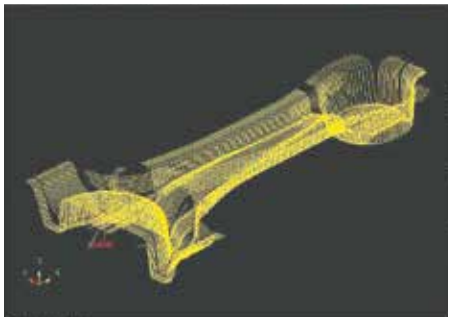
HOLOS Digitize provides speedy and highly accurate incorporation of a model (unknown free-form curved surface) and generation of a surface required for CAD.

- **Digitizing with HOLOS**

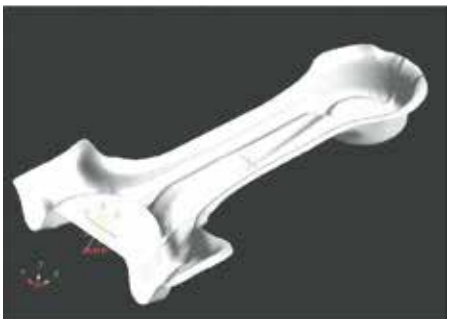
HOLOS Digitize provides digitizing of curves and surfaces in the HOLOS environment. Digitized elements can be added to an existing HOLOS model and measuring evaluation can be performed directly by HOLOS. It is possible to export the data in various data formats.

- **Accurate Model Data**

HOLOS Digitize automatically converts all workpice surface values that have been incorporated by Digitize into the appropriate CAD data. This newly generated surface data can be used directly for workpiece measuring (reverse engineering).



Scanning line generation from digitized points



Surface generation from scanning lines

HOLOS-NT enables measurement of highly difficult workpieces, such as an entire door with a single software application.
HOLOS Geo supports measurement of standard geometric elements, while HOLOS Light and HOLOS Extended enable measurement of complex free-form curves, providing support for just about any type of measuring imaginable.

■Dimension NT: Free-Form Curved Surface Generation Program (option)

Dimension is software that generates NURBS (Non Uniform Rational Basis Splines) curves and NURBS planes from 3D point groups, triangle patches, from free-form curves and free-form plane surfaces. Data can be shared via files with other non-contact form measuring machines.

Features

- Faster product development process cycle shortens the time to bring a product to market.
- Design modeling is incorporated into the process chain to reduce development costs.
- Digital die and model changes for easy delivery to the CAD system.
- Both contact and non-contact sensors for high-speed and accurate collection of point group data from the workpiece, which can be used for surface generation.
- The best solution to problems concerning reverse engineering and model archiving.

Supported geometric forms

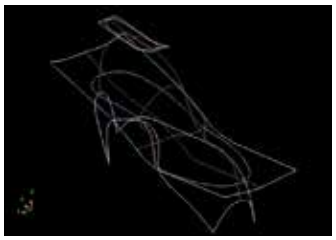
• Points	Irregular point group, scanning lines, grids
• Curves	Poly lines, straight lines, circles Free-form curves (NURBS) CONS (Curve On Surface)
• Surfaces	Planes, cylinders, cones, spheres Free-form surfaces (NURBS) Faces (trimmed surfaces) Triangular patch smoothing

Scope of Functions

• Digitize	Unknown contour scanning region Re-digitize maintaining boundary Multiple scanning line integration Re-digitize surface/face
• Conversion	Rotation, parallel move, mirror image
• Analyze	Inter point group and inter surface distance (Design value verification) Surface curvature analysis Normal direction
• Data exchange	Import/export: IGES, HOLOS, VDA Import: ASCII (point group, triangle patch) Export: STL (Triangle patch only) OFF (Triangle patch only)

Digitized point groups

Surface generated (simulated) based on point groups



2-dimensional curve generated on surface (CONS)

Finished surface model using trimmed surface (face)

HOLOS Function List

Menu	Functions	Light	Light plus	Extended	Geo	Digitize
File management	New file, open, save, close	○	○	○	○	○
	Add, compare	-	-	○	-	-
	Screen capture/screen shot	○	○	○	○	○
	Scale print	-	-	○	-	-
	Model information	○	○	○	○	○
VDA	Input/output	○	○	○	○	○
IGES	Input/output	○	○	○	○	○
SAT	Input	○	○	○	○	○
Edit object	Mask, analysis, attribute	○	○	○	○	○
	Surface nominal display/inversion	○	○	○	○	○
	Mirror image	○	○	○	○	○
	Conversion move (Move/rotation/scaling)	-	-	○	-	-
	Clear point/deselect	○	○	○	○	○
	Model cross section	○	○	○	○	○
Group	Definition/deselect/select	○	○	○	○	○
Manual measurement	Surface measurement and evaluation	○	○	○	○	○
	Edge measurement and evaluation	○	○	○	○	○
	Alignment by point (BFT method)	○	○	○	○	○
Definition of CNC measurement	Point, mesh point	○	○	○	○	○
	Line	-	-	○	-	-
	Grid	-	-	○	-	-
	Scaning	-	-	○	-	-
	Geometric element (measurement of point, straight line, circle, plane, cylinder, cone, etc)	-	-	-	○	-
	Combination of geometric element (measurement of distance, angle, etc.)	-	-	-	○	-
Edit of CNC measurement	Edit (change of coordinate, stylus, etc)	○	○	○	○	○
CNC measurement	Point measurement	○	○	○	○	○
	Scanning measurement	-	-	○	-	-
	Simulation (interference check of path)	-	-	○	-	-
Macro	Create/edit/execute	-	-	○	-	-
	Measurement by line laser sensor	-	-	○	-	-
	Use of intermediate point	-	-	○	-	-
	CNC measurement from CALYPSO to HOLOS	-	-	○	-	-
Workpiece coordinate system	Save/load/reset	○	○	○	○	○
Evaluation	Point display	○	○	○	○	○
	Color graded map display	-	○	○	-	-
	Cross section display	○	○	○	○	○
	3D best fit calculation	○	○	○	○	○
	Distance collation between point group and CAD surface	-	-	○	-	-
	Align error icon, format	○	○	○	○	○
	Output of error list (measurement record)	○	○	○	○	○
	Result file output (ASCII/HTML)	○	○	○	○	○
Graphics	Rendering	○	○	○	○	○
	Model cut-off by clipping surface	-	-	○	-	-
	Hidden line elimination	-	-	○	-	-
	Rotate/zoom/move/clear screen	○	○	○	○	○
Digitize	Point (spherical center) generation by manual measurement	-	-	-	-	○
	Curve generation from point	-	-	-	-	○
	Free-form curve generation form curve	-	-	-	-	○
	Modify generated approximate curve by CNC measurement	-	-	-	-	○
	Multipule lines scanning within specified area	-	-	-	-	○
	Surface generation from multiple lines	-	-	-	-	○