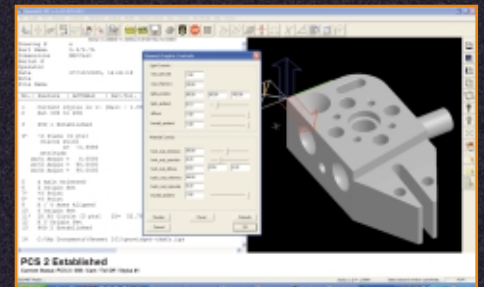
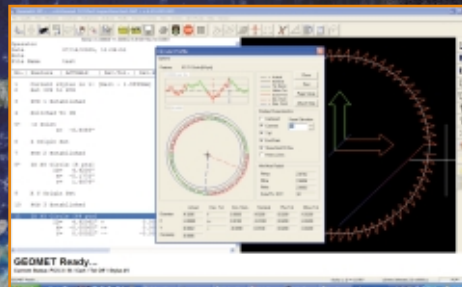
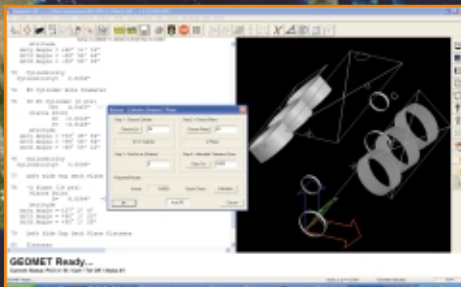


Geomet[®]

Universal CMM Software

Geomet[®] is a Coordinate Measuring Machine Software System designed to make using and managing CMMs simple and productive. The single CMM user and the global corporation both benefit from this Universal CMM language that streamlines the three-dimensional quality function by providing a common platform and interface, interchangeable programs, and unified reports, training, support, and updates across CMMs of varying types from any manufacturer.



HELMEL
Builders of CMMs Since 1973

The Universal CMM Measuring System

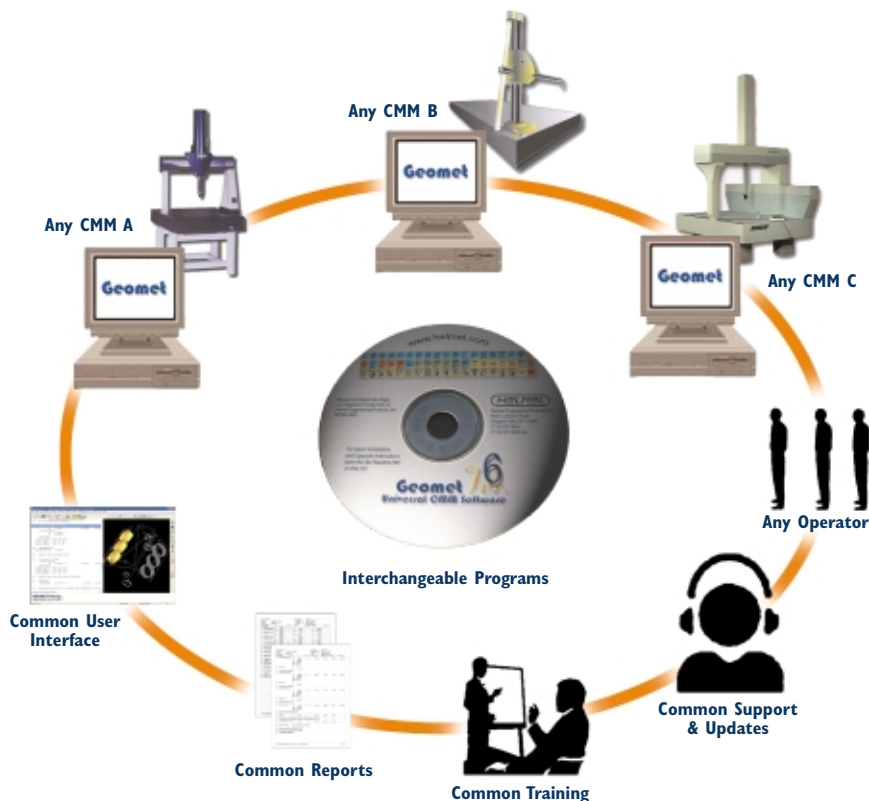
Geomet has been continuously evolving since the early '80s and is today a widely used CMM Software productivity tool. Back then it was one CMM with one computer/software program. For a second machine you might have a different hardware/software solution incompatible with the first. Before long you could have a collection of incompatible, discrete CMMs, in one plant or across multiple facilities. Neither programs nor operators were interchangeable. Geomet provides a common, familiar and easy-to-use CMM software system that unifies training, programming, the user interface, reporting

of results, support and upgrades across all CMMs, manual or DCC, of any manufacture, within an organization.

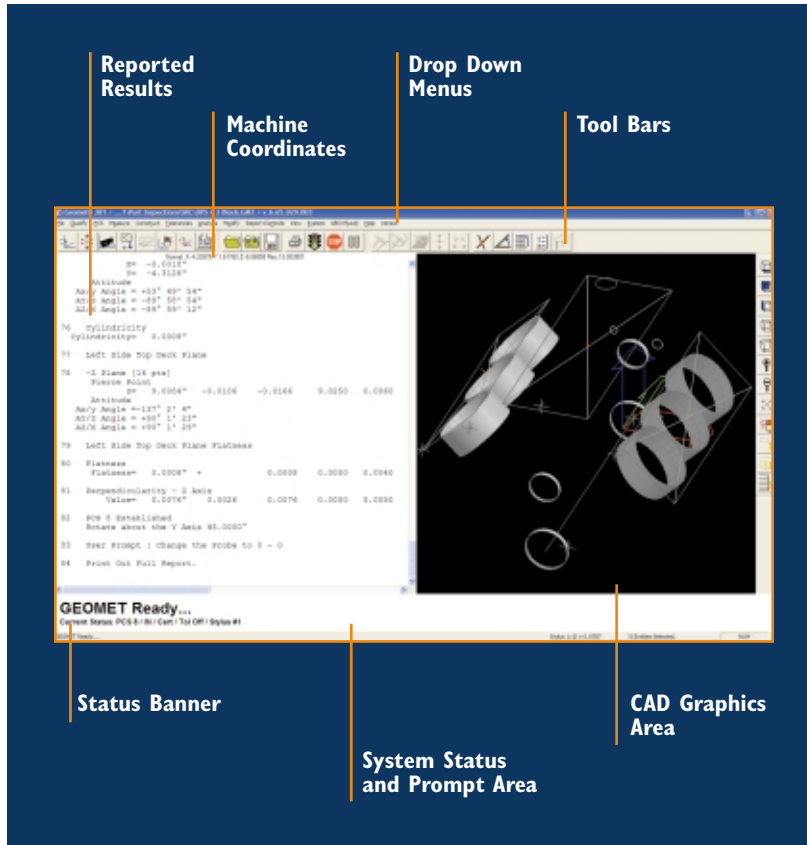
Geomet is powerful and efficient, a system that simplifies precise and comprehensive Geometric analyses in the measurement of precision 3D parts. The latest version builds on the strengths of previous versions, and adds the benefits of the current Windows OS, complimented by our trademark "Keystroke Magic™" hotkey interface. Options expand Geomet for newer probe systems and controls, extended data analysis, CAD connectivity, statistics and process control I/O.

GEOMET Provides:

- **POWER** to analyze simple or complex 3D geometry in keeping with ANSI Y14.5M principles.
- **VERSATILITY** to cope with new and unanticipated measurement requirements.
- **PRODUCTIVITY** with the speed for quick throughput and responsiveness to operators.
- **EFFICIENT USER INTERFACE** that reduces or eliminates needless operations.
- **INTEGRITY** - Geomet follows a no nonsense path to credible inspection, carefully avoiding error prone practices while offering guidance to obtain the best results.
- **UNIVERSALITY** - All Geomet equipped CMMs, manual or motor driven, speak the same language, have the same operator interface and can use interchangeable part programs.
- **EXPANDABILITY** - Upgrades from one level to the next require little additional user training.
- **BACKWARDS COMPATIBILITY** - Geomet commits to backward compatibility to keep future upgrades economical. A program written in 1996 will run in a 2006 or later version of Geomet.



User Environment



Geomet is a user's CMM software and is configurable by the user. The basic layout provides the key functional areas. As measurements are produced, results are given as both text and CAD graphics. Size, position, attitude and projections are consistent with ANSI Y14.5M principles. Selections can be made from either text or graphics for subsequent evaluations. The user chooses to emphasize text or graphic output as well as control colors and other visuals. System Status, prompts and helpful user information appear automatically when and where needed. To avoid confusion, whatever is not relevant to the task at hand is not shown.

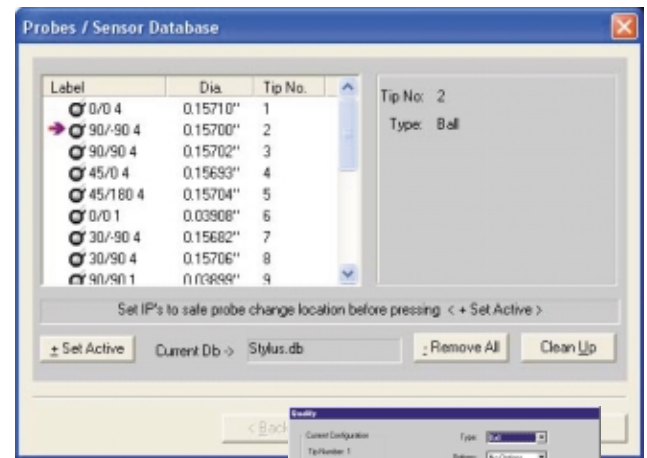
The System Status and Prompt areas are extremely useful. They tell the operator clearly what to do next and indicate important conditions of the measurement being executed, like the Part Coordinate System setup guide, Cartesian or Polar, active Stylus number and inch or millimeter units.

An endearing feature long favored by Geomet users, the keyboard key labels supplement the well-organized Windows menus and provide direct one-button access to the most frequently used functions. As any regular user of software knows we gravitate toward "hot key" commands because this is the most efficient method to direct software. Our Keystroke Magic™ is a Geomet trademark and it simplifies access to enormous measuring power. Icons are color coded into groups of related and distinct inspection operations and are always present and always in the same location for all levels of software. Operators learn to use Geomet in much the same way one learns word processing, knowing the system without looking, enabling fast execution unmatched by any other CMM Software.

Probe Management

Geomet supports touch trigger probes, scanning probes, hard probes, video probes, lasers and other sensors. The Electronic Touch Trigger Probe, the most commonly used, is calibrated on a precision reference sphere. The system handles and calibrates any combination of fixed or indexable probes, with single tip or "star cluster" stylus configurations and probe and stylus changing. The status Banner indicates at all times which stylus is being used.

Geomet simplifies probe setup and calibration. When an indexable probe is used in conjunction with a stylus rack, visual prompts guide you through the stylus and angle selections as well as through the qualification procedure.

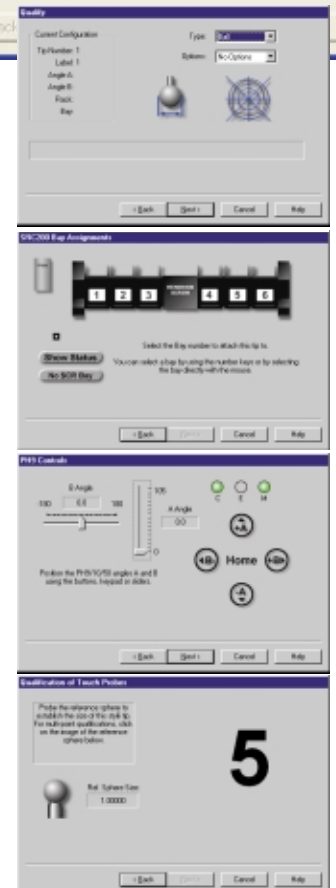


Step 1

Step 2

Step 3

Step 4



Coordinate Systems



A measured dimension is meaningless if it is not tied to a valid Part Coordinate System (PCS) as distinct from the Machine Coordinate System (MCS). One of Geomet's great strengths is its strong emphasis on the correct and efficient establishment of a PCS.

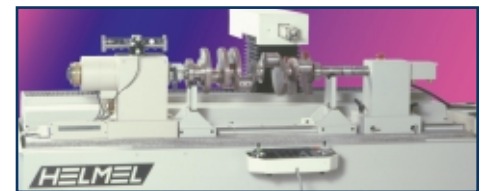
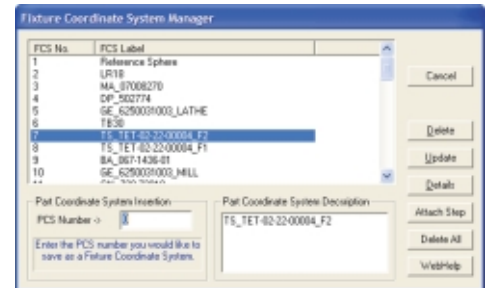
Highly flexible tools allow easy establishment of datum frames for parts in any position on the machine. A Setup Guide insures that all PCS elements are properly completed. Up to 500 PCSs can be created and used with complete flexibility during an inspection. A graphic icon indicates the location and orientation of the active PCS for reference.

PCSs can be translated and rotated and features are always projected correctly into any PCS. The components of all PCSs (for example, an origin, a datum axis or a datum plane) can be extracted for use in other constructions or PCSs. Coordinates can be Cartesian or Polar.

The Intermediate Coordinate System (ICS) concept, unique to Geomet, facilitates finishing the remaining components of a PCS with their previous values. For example, if a machine operator wants to quickly check a bore for size he can set a part on the table and with one command accept the machine coordinates so the diameter measurement will be correct.

Fixture Coordinate Systems (FCS) are handy, timesaving tools in the repetitive inspection of production parts measured in fixtures. FCS speeds the PCS setup process and reduces cycle times. Unlimited FCSs enable you to check multiples or different parts in a run.

Geomet also supports a rotary 4th axis, referred to as a Wobble Coordinate System (WCS) and it compensates for rotary runout in the system ("wobble"). This feature makes Geomet a perfect match for shaft measuring systems.



Feature Measurement and Construction



Geomet measures all the classical geometric elements as well as vectors, and contour sections and surfaces, with a minimum number of keystrokes. The user defines the default number of hits for each type, yet this remains flexible. Undesired or accidental hits can be deleted. If the CMM is capable of automatic direction sensing, probing directions and ID/OD type determinations are also automatic. Every feature type automatically recycles until another function is selected speeding measurement. Familiar audio tones inform the user as hits are accepted and features are completed. Features can also be created in CAD-like

fashion when needed as phantom or reference Geometry.

Constructions are measurements created as combinations of 2 or more previous elements such as distances, angles, bisectors, intersections, bolt circles and so on. Subsequent constructions may be produced from combinations of measured, created and constructed features. All features are reported for position, angular attitude and size as appropriate. 2D and 3D form are available.

All features are automatically labeled or user names can be applied. Geomet allows undo or erasing backwards, step-by-step, in case errors have been made. In the event of power loss, for example, the current task can be recovered even though unsaved or unfinished.

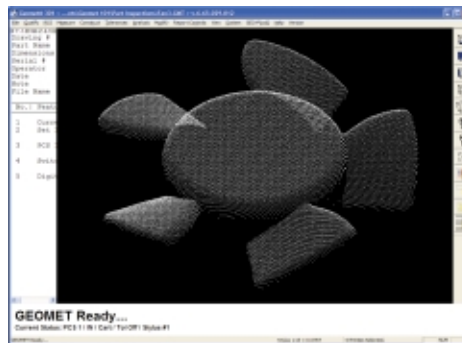


Scanning/Reverse Engineering



Geomet serves those who need to document or model the unknown and send it to a CAD system.

Several methods are available to create CAD elements or digitize geometry and surfaces. At the simplest level, the CAD entities produced in Geomet as a result of any measurement are exportable in IGES format or the stylus center points can be exported as ASCII or DXF. With our GeoTracer feature contour sections can be drag-digitized with a hard probe across the profile. Linear sections or regions defined by radial or 4 point boundaries can be automatically digitized with a touch probe under DCC control and Cardinal splines are supported. Random point clouds and high-density laser scanned surface data can also be gathered and exported as XYZ points in IGES, DXF or ASCII.



Tolerancing

Geomet provides tolerancing for any desired feature during manual measurements or as entries in programs. For any dimension, the nominal value and the related tolerances may be entered. The results will indicate this nominal and tolerance information and show deviation from nominal values along with deviation from tolerance with a proportional graphic when in tolerance or an actual value when out of tolerance. This makes finding any out-of-tolerance condition very easy.

Tolerance formats include Bilateral and True Position with support for RFS, MMC and LMC. Bonus tolerances are automatically calculated. All major Geometric Dimensioning & Tolerancing (GD&T) evaluations are included. For CMMs used



	Actual	Nominal		
Z	9.0084	9.0250	0.0060	-0.0060
			Tolerance Zone A:	0.00420
			Tolerance Zone B:	0.00480
			Tolerance Zone C:	0.00540
<input type="button" value="OK"/> <input type="button" value="Use Defaults"/> <input type="button" value="Clear All"/> <input type="button" value="Use 3 Level"/> <input type="button" value="Cancel"/>				

on the production floor, Process Control Tolerances allow a user to put actions in play before dimensions approach the tolerance limits. Three user settable thresholds can be used to trigger preventive responses, e.g. (A) Caution - watch closely; (B) Check tool for wear; (C) Halt process to correct. Production quality is managed more effectively, and costly trouble is avoided.

Programming

MANUAL MODE

Geomet is a true self-teach system. Part programs are simply created when the first part is inspected. The file is saved and may be used to inspect the next part without further input. When running a program the operator is prompted to the next measured feature via a highly visible command in the prompt area and highlighting of that feature in the graphical area, since the part was "drawn" when first inspected. It is that simple and extremely fast.

DCC MODE

DCC programs are generated in the same way, measuring the first part via joystick or even by hand, if the drive system allows. In the process intermediate motion points (IPs) are added by pressing a button on the joystick. These are "drive through" points that guide the CMM to the features and around the part and obstacles during a program run. This programming method is extremely fast and efficient and DCC programs that take hours in other systems can be produced in minutes with Geomet.

OFFLINE

Very simple tools permit the creation of manual and DCC programs away from the CMM. The measurement sequence is made with feature specific graphic windows in which parametric values for position, angular attitude and size are entered as well as the number and distribution of hits for that feature. All probed points are

displayed graphically. For DCC programs probe path for each feature is created automatically and motion between features is also handled automatically by the creation of "clearance planes" through which the probe must travel. All other steps are identical to on-line programming.

Move
Insert
Delete

Load
Last

Print
Feature
Tags

Undo

Move
Insert
Delete



Editing

One the most powerful and effective tools in Geomet is the ability to select any feature and, with the right mouse button, call up an extensive pallet of editing, modifying and analytical operations. A user can easily change a 4 hit circle to 24 hits - including all motion, then call for a graphic circular plot, change motion speeds or change the feature from inch to millimeter or add or change tolerance values all in less than a minute. It is equally as easy to mark specific dimensions for printing separately or store for SPC. Features are easily deleted or new features can be inserted in a matter of seconds.

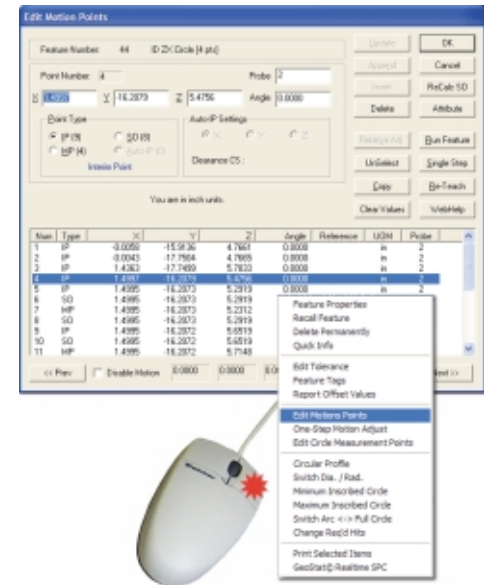
OUTPUT

Geomet results are displayed on the screen and at the user's choice to a printer, file or SPC database. Geomet includes a choice of "flags" that can be attached to any individual measurement and includes a Print flag, SPC flag (saved to a text file) and a Geostat flag

for our own integrated Geomet SPC program option. A Report Control Center subsequently allows tailored output with or without any or all flags effective and print commands can be attached to inspection programs. Output flexibility is key and reports can be organized in a compact



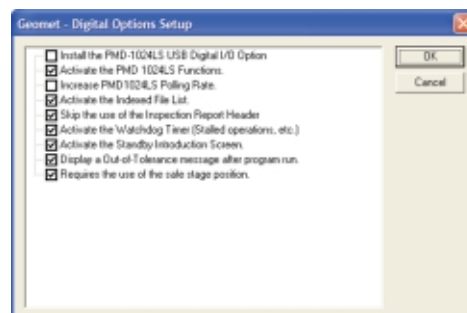
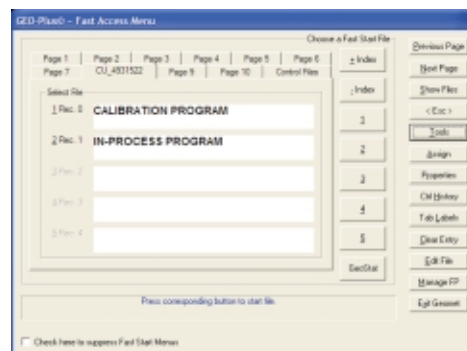
format or re-ordered for preferred presentation. In addition, the CAD entities or probed points produced within Geomet can be exported in IGES, ASCII, or DXF formats.



Geomet In-Process

As more manufacturers recognize the benefit of placing a CMM into the production process, Geomet has evolved to embrace the special needs of this process monitoring and controlling function. Our Fast Start Menu, coupled with the Process Control Tolerancing feature described above, simplify the basic input and output functions for unskilled operators. Geomet-in-Process also provides an easy to setup and use I/O control panel. Users can specify actions to specific inputs, such as barcode program selection, program initiation or fixture mis-load warning as well as specific outputs to open a door, trigger a robot or halt a process.

Geomet-in-Process is aggressive quality control. It is also one more way Geomet will make you money by producing parts of higher quality with lower scrap rates and less downtime and still provide the familiar interface, programming, support and updates of our Universal CMM Software System.



Choices in GEOMET

Geomet is offered in three levels, each with additional options. All levels use the same approach to measuring and have the same "look and feel". You can easily advance from one to the other without retraining. The keyboard labels are common to all levels. The higher levels and options just have additional key-icons and pull down menus. Each level can be expanded on-site with a unique access code. The entry level is for manual use only. Existing programs can be used across all levels. Manual programs can easily be converted into DCC programs just by adding the motion path to them.

The backwards compatibility of Geomet will allow you to use all present programs with any future windows version or release.

Please visit our website at www.Geomet-cmm-software.com for a Comparison Chart of the latest features included with each level.

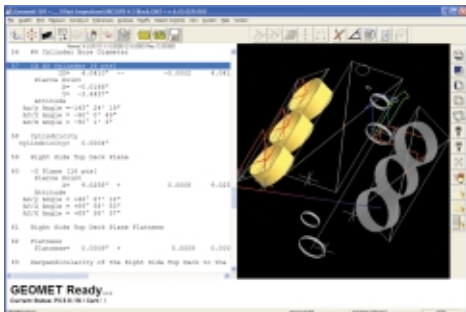
GEOMET JUNIOR: SIMPLICITY

Geomet Junior is the entry-level full 3D system of the Geomet series, yet it is packed with all the features needed for competent 3D measurement. It favors the one touch access to all basic Geometric elements in addition to a highly visible set of icons on the screen for intuitive measuring without extensive training. Automatic feature recognition is included as is our powerful Part Coordinate System (PCS) creation. The Junior Plus option allows simultaneous probe calibrations and stores PCSs for recall. Geomet 101 is the next level when more analytical power is needed.



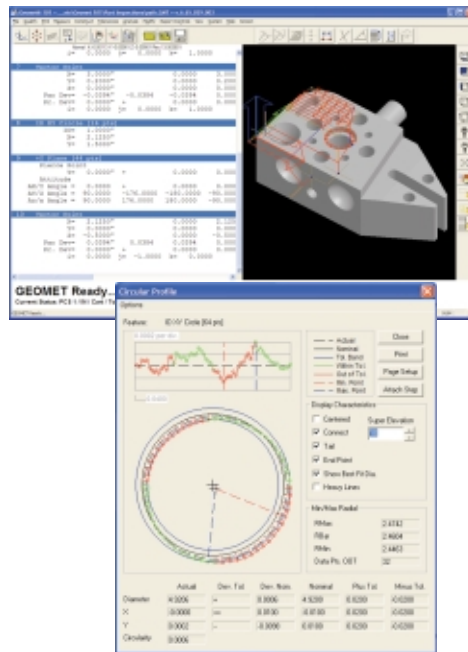
GEOMET 101: MORE POWERFUL

Geomet 101, our most popular software level, offers great flexibility for inspecting parts in the lab or on the production floor. The graphical area on the right hand side of the screen generates a CAD representation of the measured features, serves as a visual guide for part programs and as a link to CAD data. Programs are made in the self-teach mode or with off-line programming tools and editing is easy and efficient. Geomet 101 includes Surface Digitizing, GD&T Tolerancing and other high level functions, yet unskilled users can still verify a dimension with a single keystroke. The GeoPlus option offers enhancements to 101 that expand the areas of feature measurement and analysis, constructions, reporting and other special functions for yet increased power.



GEOMET 301: THE ULTIMATE

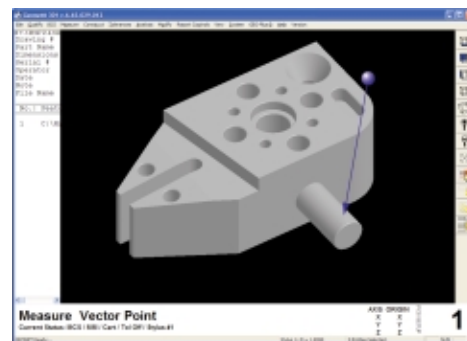
Geomet 301, our most advanced system, offers the sophisticated user unbridled measuring power and the typical user friendliness of Geomet. It contains all the above-mentioned features plus a host of other analytical tools to review and manipulate your part inspections, e.g. profiling of circles, planes and cylinders and feature tagging for SPC software.



CAD BASED

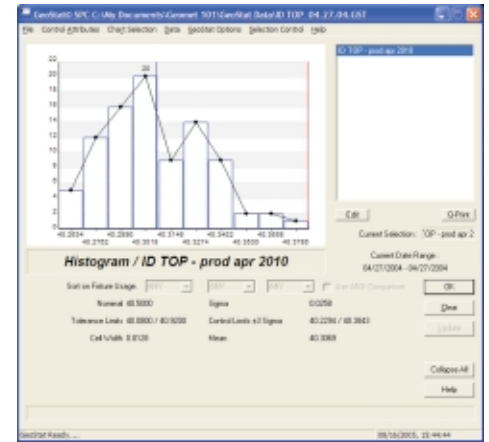
With our highest software level, Geomet 301 with GeoCAD, a 3D IGES model of the nominal part can be imported and the coordinates of the actual part are then aligned with the nominal model. All measurements proceed as normal, but Vector Point measurements on any part surface will derive xyz and ijk nominal values directly from the CAD database and report deviations of surface profile for each actual measured point.

This is the most efficient method for measuring target gage points, contour sections and surfaces to profile tolerance values. Surface point clouds can also be digitized for surface analysis.



GEOSTAT: REAL TIME SPC

GeoStat is our optional SPC package that integrates with Geomet. It performs in real time; results can be viewed instantly. It eliminates the creation and handling of separate database files outside the inspection program. GeoStat delivers seven basic control charts with filtering and sorting on dates, operators, fixtures and more. Data can be exported easily. Additional production and efficiency tracking is offered through the GeoTracker option.





If your CMM is located here, Geomet® is the ideal CMM Retrofit for you.

The Geomet Coordinate Measuring Machine Software System retrofit will bring any manual or DCC Coordinate Measuring Machine back to life. Many older Software/Computer systems still in use are seriously outdated. Geomet with current hardware can increase your measuring power and speed by a substantial margin, increasing the value and usefulness of older CMMs.

In the case of multiple installations, Geomet will unify all CMMs in your facility under one common user system. Operators will be able to run any Geomet equipped CMM in your plant without hesitation, while reducing training cost, programming time and delays resulting from incompatibility. Geomet part programs are transferable between systems and levels and between manual and DCC units. Hardware and software interfacing is available for all major CMM brands. In some instances it is advantageous to also perform a scale retrofit. Some manual systems are "plug-ins", not requiring factory installation. DCC retrofits require factory installation.

CMMs from the following manufacturers are candidates for a Geomet Retrofit:

Bendix	LK	Shelton
Boice	Leitz	Starrett
Brown & Sharpe	Mauser	Stiffelmeier
DEA	Mitutoyo	Trimek
Eley	Moore	Trimeasure
Elm	Notsa	Zeiss
ESM	Numerex	Zettmess
Federal	PiComm	
Ferranti	Poli	
Giddings & Lewis	Portage	
Hansford	Prima	
Helmel	Renault	
IMS	SIP	
Johannson	Sheffield	

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