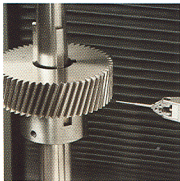# M & M 3000 QC Gear Analyzer
True universal gear inspection with improved speed and accuracy

Smart™ Probe package. LVDT gage head and microprocessor-based convertor deliver high-speed measurement data in microinches.

We make gear inspection marvelously simple... with the simply marvelous 3000 QC System

Our Model 3000 QC Gear Analyzer is a third generation CNC gear inspection system incorporating all of the comprehensive analytical tests and evaluation capabilities of previous M & M gear checking systems, such as our Model 2000, but with these added capabilities:

- Dramatically improved speed and accuracy through new mechanical system design and advanced CNC control. Ask about our proprietary ZFE (Zero Following Error) technology.
- Computer hardware and applications software are modular to allow the user to buy only the required capability. This makes the 3000 QC adaptable to laboratory testing or production-line inspection. All parallel-axis gears, as well as gear cutting tools, can be tested.
- Integrated Statistical Process Control with local data base capability is an optional feature.
- Networking with MAPS compatibility is available.
- Robotic interfacing for totally automatic load/test/unload operation can be incorporated.

All of these advanced features can be incorporated into the delivered system or added as a field upgrade at a later time.

Alpha-numeric keyboard with "Mouse" for one-time entry of part print and tolerance data. "Mouse" permits use of CAD techniques.

System Control Center is color graphics CRT with "touch-screen" control for fast and simple operation.
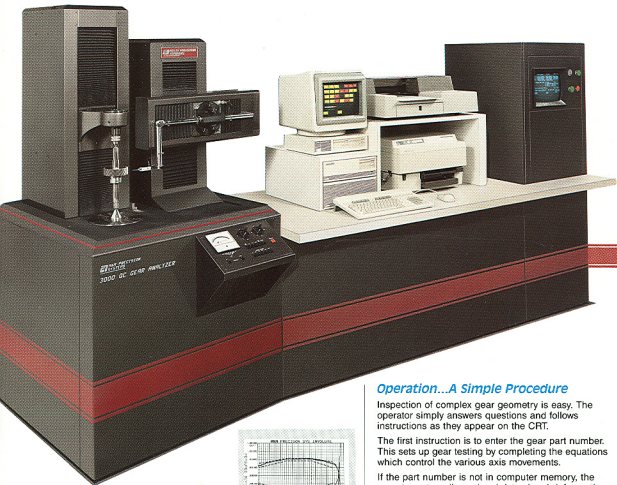

Operator Control Panel for part loading and machine set up. Also provides gagehead meter indication.

System Description...Improved Mechanics and Computer Control

The 3000 QC Series system design uses simple and elementary, but highly accurate, mechanical subsystems. These mechanics are managed and controlled by a proprietary CNC DC servo controller capable of high-speed, high-accuracy, simultaneous axes moves. This is accomplished through the application of our ZFE (Zero Following Error) technology.

The activities of these subsystems, as well as those of the microprocessor-base gaging subsystem, are directed by the system controller—the powerful and reliable HP 9000/300 Series computer. This computer features a minimum of 1 megabyte of onboard RAM. Typical systems are configured with "touch-screen" control and color graphics to greatly simplify operator interface.

The modular configuration of the Hewlett-Packard computer allows a wide selection of peripheral equipment from the variety of available HP disk storage units, printers, and plotters. Standard systems configurations provide for abundant storage of test data, as well as hard copy presentation of charts and analyzed test data.

Graphics printer copies CRT graphics and tabular test data.

Graphics plotter delivers multicolor hard copy of graphics and tabular test data.

CNC status monitor provides status and positional display of mechanical system and CNC control functions.
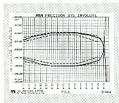
Operation...A Simple Procedure

Inspection of complex gear geometry is easy. The operator simply answers questions and follows instructions as they appear on the CRT.

The first instruction is to enter the gear part number. This sets up gear testing by completing the equations which control the various axis movements.
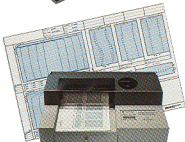
If the part number is not in computer memory, the operator enters dimensional data via a brief question and answer session. Gear data is displayed for operator review.

Menus are presented to the operator for selection of the type of test. Next, the operator is instructed to load the part and position the probe to a location where the computer can take over. The computer can now complete the specified series of tests without further operator action.

While the test series is in progress, the computer transfers measurement values into memory. These can subsequently be subjected to a variety of data analysis techniques. Test result data may optionally be stored on a peripheral device or uploaded to a main frame. Hard copy outputs of test results are computer generated in a variety of tabular and graphic formats.
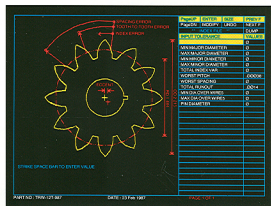
Data Entry and Specifications
Data entry simplified with touch-screen control
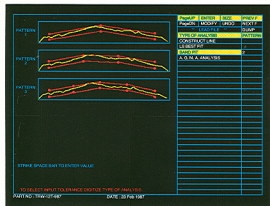
Display of Band-Fitting Patterns To Be Selected for Tooth-Form Evaluation.

Tooth-Spacing Attributes Are Displayed During Tolerance Input Session.

Tolerancing systems data entry

Interactive graphics using CAD techniques with "Mouse" operation are used extensively to create a flexible and simple operating system for one time entry and subsequent editing of part tolerance data. Capabilities available include AGMA Class evaluation as well as line fitting, curve fitting, and end-user-designed band fitting for gear-tooth form evaluation. Any of these data evaluation techniques may be readily selected by the end user during his tolerancing input session for each attribute of the part being evaluated.

Tooth Form and Pattern Used to Evaluate the Form Clarify Data Being Entered for Involute Tolerances.

Specifications

Dimensions	Model 3012	Capacities	Model 3012
Cast Iron Base	36″ × 36″	Outside Diameter	12″
Table Diameter	8″	Part Weight	500 lbs
X-Axis Travel	8″	Diametral Pitch	0.785 and up
Y-Axis Travel	12″	Helix Angle	0° to 90°
Z-Axis Travel	12″	Distance Between Centers	20″

Power Requirements: 115 volts ac, 60 Hz, 25 amp
Air Requirements: 85 psi clean, dry air; 5 SCFM
Warranty: One year on parts and labor, FOB Dayton, OH

M&M PRECISION SYSTEMS