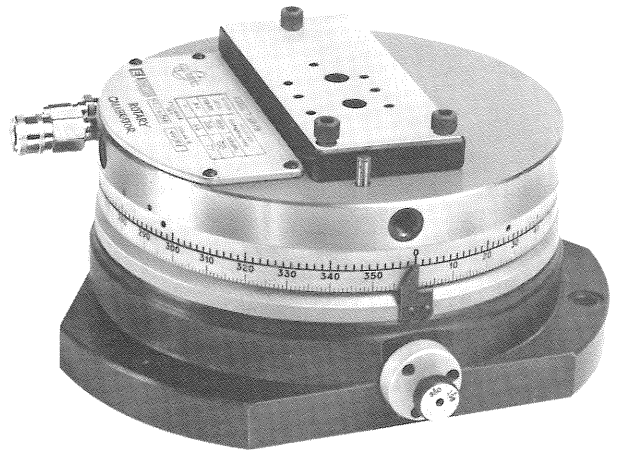


Put TEETH - RELIABILITY - ACCURACY

IN YOUR ROTARY CALIBRATION

■ The A. G. DAVIS ROTARY CALIBRATOR is a 360 position or a 360/198 position Master Circle Divider™ for use in the angular calibration of rotary devices. A. G. DAVIS ROTARY CALIBRATOR features a serrated tooth (Hirth) coupling which is the fundamental design element that provides the incredible repeatability and ultimate accuracy.

■ The A. G. DAVIS ROTARY CALIBRATOR used in conjunction with a laser angular measurement system or autocollimator will give your rotary inspection requirements the versatility, accuracy, and credibility you desire to accurately calibrate a rotary device.



INCREDIBLE

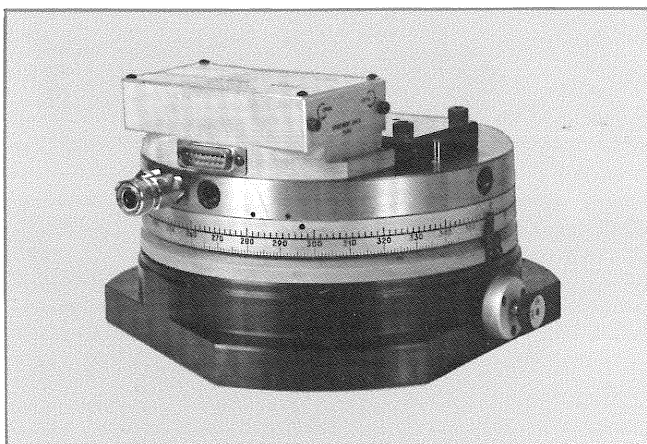
Accuracy and Repeatability

■ The incredible accuracy of the A. G. DAVIS ROTARY CALIBRATOR, GRADE 2, is 0.2 Arc Second Band (equivalent to .000006 inches at a six inch radius.) Other grades (accuracies) are available. These grades are 0.4, 0.6, 0.8 and one second arc band. The repeatability of the Rotary Calibrator is better than 0.02 arc second band. Like all A. G. Davis Circle Dividers™, their accuracy is maintained indefinitely and never requires adjustment. All features affecting

accuracy are manufactured to exact relationships and, therefore, require no adjustments to maintain those relationships.

FEATURES

- ULTRA-PRECISION
- INCREDIBLE REPEATABILITY
- COMPUTER INTERFACE
- LOW PROFILE
- HIRTH COUPLING (FACE GEARS)
- MAINTENANCE FREE



A.G. Davis Rotary Calibrator Model 360/198 CI.

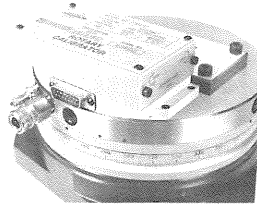


A.G. Davis Rotary Calibrator Model 360.

COMPUTER INTERFACE OPTIONS

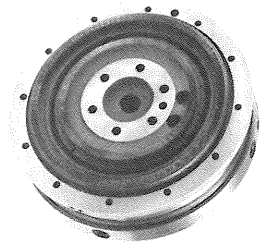
■ The Computer Interface (C.I.) Option performs the following functions:

- A. Pushbutton Locking/Unlocking of Rotary Calibrator with status indications.
- B. IEEE-488 Digital Interface to a Computer.
- C. Gives the computer the capability of Locking/Unlocking the Rotary Calibrator over the Interface.
- D. Sends status information to the computer for: Angular Position, Locked and Unlocked Conditions of the Rotary Calibrator.



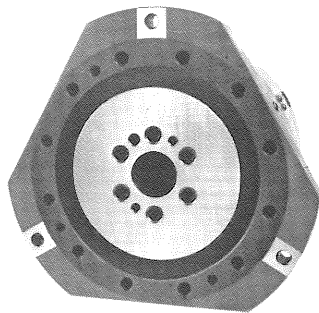
STATIONARY PLANE FACEPLATE

■ The A. G. DAVIS ROTARY CALIBRATOR is unique in design eliminating the annoying lift action characteristic of many competitive models. The A. G. DAVIS ROTARY CALIBRATOR employs a double Hirth Coupling designed to allow the faceplate to remain in a stationary plane. This no-lift characteristic simplifies the calibration set up procedure and will maintain optimum laser alignment. This feature also increases the laser's capacity which will allow you to inspect tables with lift-type indexing characteristics.



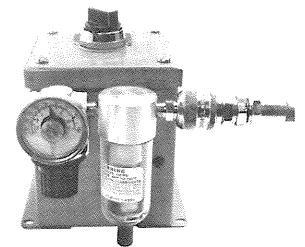
THREE POINT BASE

■ The A. G. DAVIS ROTARY CALIBRATOR features a three point anti-distortion mounting pattern reducing the possibility of twisting or warping the Rotary Calibrator Base when mounting to the rotary device being calibrated. This mounting helps ensure that the original certified accuracy levels are maintained.



REMOTE FACEPLATE LOCK AND UNLOCK

■ A built-in air cylinder mechanism locks and unlocks the A. G. DAVIS ROTARY CALIBRATOR. The Basic Calibrator is controlled by a Remote Manual Air Valve Assembly. The Calibrator with the C.I. Option is supplied with a computer controlled Solenoid Controlled Valve. This feature maintains a constant lock pressure and also helps to eliminate the possibility of a technician's hands interrupting the laser beam path. **NOTE: INTERRUPTION OF THE LASER BEAM PATH DURING AN INSPECTION PROCEDURE WILL REQUIRE THE INSPECTION TO BE RESTARTED.**



THEORY ON USE OF 360/198 A.G. DAVIS ROTARY CALIBRATOR IN THE CALIBRATION OF ROTARY DEVICES

■ A common procedure used to calibrate a rotary device is an equal sided polygon, usually of 8 sides, or a master 360 position index table, in conjunction with a laser measurement system or autocollimator. The use of an equal sided polygon or 360 position indexing device does not reveal the rotary error that cycles in between the positions inspected. The A. G. DAVIS ROTARY CALIBRATOR MODEL 360/198 is designed with the standard 360 position Hirth Coupling, as well as a 198 position Hirth Coupling. With the 198 position capability, the rotary device can be inspected every 20 degrees (18 equally spaced positions) and then each 20 degrees can be divided into 11 parts (1.818182 degrees). This provides an inspection method for establishing the error that cycles within each one degree of rotation.

EXAMPLES OF ROTARY DEVICES WHICH REQUIRE THE 360/198 CAPABILITY

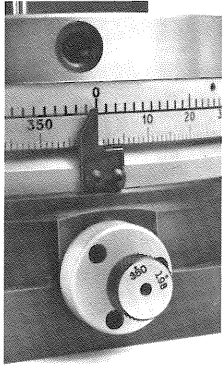
■ INDUCTOSYN plates of 360, 720, or 1440 poles have two basic error patterns. The one cycle per revolution error due to the centering relationship of the stator or rotary winding pattern, and the cyclic error due to the sine shaping electronics which interpolate between the poles of the inductosyn. The between poles' error can be the greater of the two cyclical errors and is more likely to deteriorate with use.

ROTARY DEVICES WHICH HAVE THEIR POSITION FEEDBACK AT SOME GEAR RATIO TO THE FACEPLATE i.e. Encoder, Resolver/Feedback. Each rotary member between the angular feedback device and the faceplate generates a cyclic error based on its ratio which is often divisible by 360.

IT CAN BE CONCLUDED THAT ANY ROTARY DEVICE WHICH INHERENTLY HAS A ONE DEGREE CYCLICAL ERROR CANNOT BE INSPECTED ACCURATELY WITH ONLY AN 8 OR 360 SIDED POLYGON.

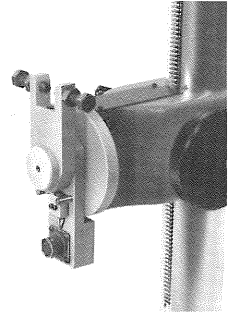
■ The **MODEL 360/198 ROTARY CALIBRATORS**

incorporate two (2) sets of Hirth Couplings. One coupling of 360 positions, and the other coupling of 198 positions. A selector knob is provided on the Base of the Calibrator to manually select the option you desire.



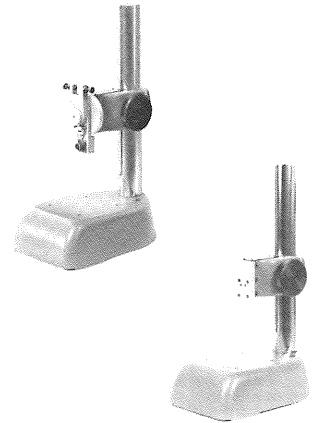
A. G. DAVIS ROTARY CALIBRATOR ANTI-ROTATION BAR AND STAND

■ The A. G. DAVIS ROTARY CALIBRATOR design incorporates an Anti-rotation Bar available in both six (6") and twelve (12") inch lengths, and can be joined together providing for longer bars if and when required. The Anti-rotation Bar used in conjunction with the Adjustable Stand traps the Rotary Calibrator Faceplate radially. This Bar maintains the laser beam alignment during rotation and allows the rotary device being calibrated to drive the base of the A. G. DAVIS ROTARY CALIBRATOR, eliminating the need for manual rotation. Also, since the quick-disconnect Air Lines and Electrical Connection (C.I. Option) are connected at the Faceplate, the annoying cable wrap up problem is eliminated.



STANDARD ACCESSORIES

- | | |
|-------------------------|--|
| Part No. 5022-11487-001 | Anti-rotation Bar, 6 Inches Long |
| Part No. 5022-11487-002 | Anti-rotation Bar, 12 Inches Long |
| Part No. 5020-11653 | Adjustable Stand for Anti-rotation Bar |
| Part No. 5020-11654 | Transit Case Anti-rotation Bar Stand |
| Part No. 5023-11478 | Angular Measurement Optics Adapter Plate with Bolts |
| Part No. 5020-11655 | Optical Mirror for Autocollimator |
| Part No. 5020-11656 | Adjustable Stand for Angular Interferometer |
| Part No. 5020-11657 | Transit Case for Angular Interferometer Stand |
| Part No. 5020-11658 | Transit Case for Rotary Calibrator |
| Part No. 5020-11659 | Instructions and Maintenance Manual |
| Part No. 5020-11660 | Remote Hand Operated Control Valve Assembly |
| Part No. 5020-11665 | Air Lines |
| Part No. 5024-11668 | Rotary Calibrator Computer Interface Option |
| Part No. 5024-11669-001 | Rotary Calibrator to Computer Interface Cable Assembly |
| Part No. 5024-11669-002 | Anti-rotation Bar Stand to Computer Interface Cable Assembly |
| Part No. 5020-11681 | Beam Bender and Reflector Mount for 5526A Hewlett-Packard Laser System |
| Part No. 5020-11687 | Computer Interface Case |

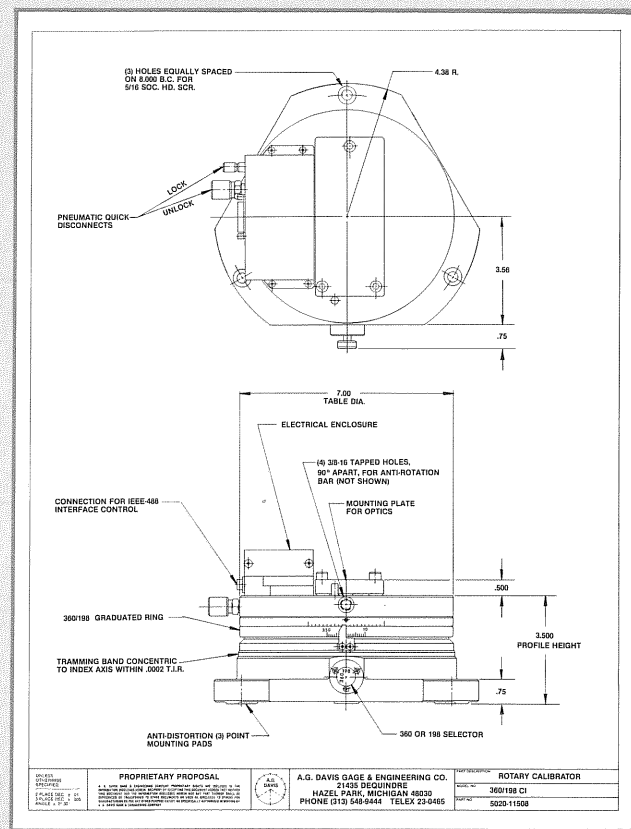
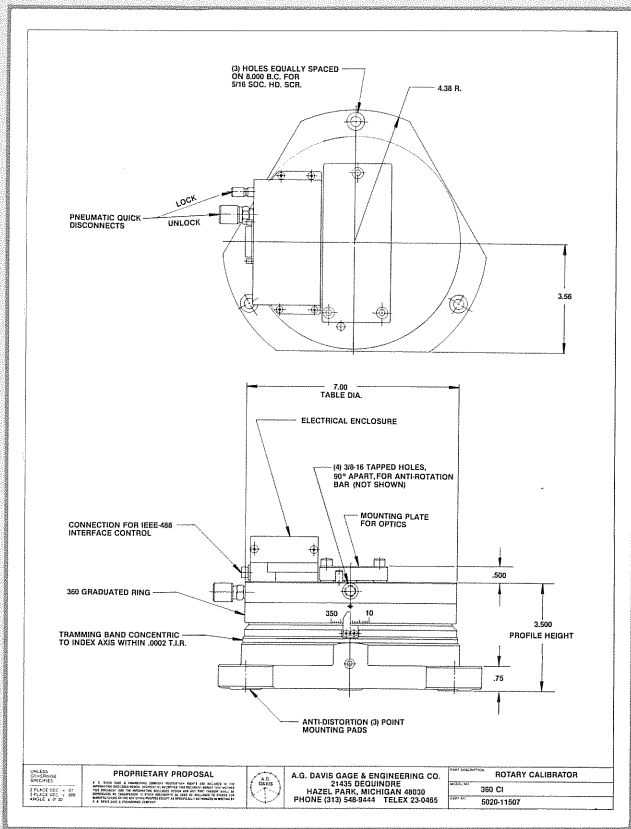
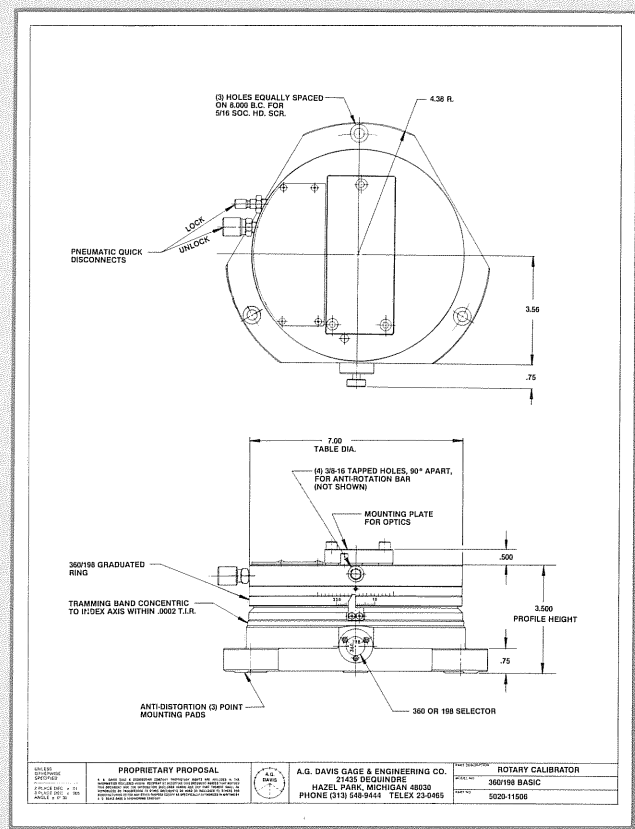
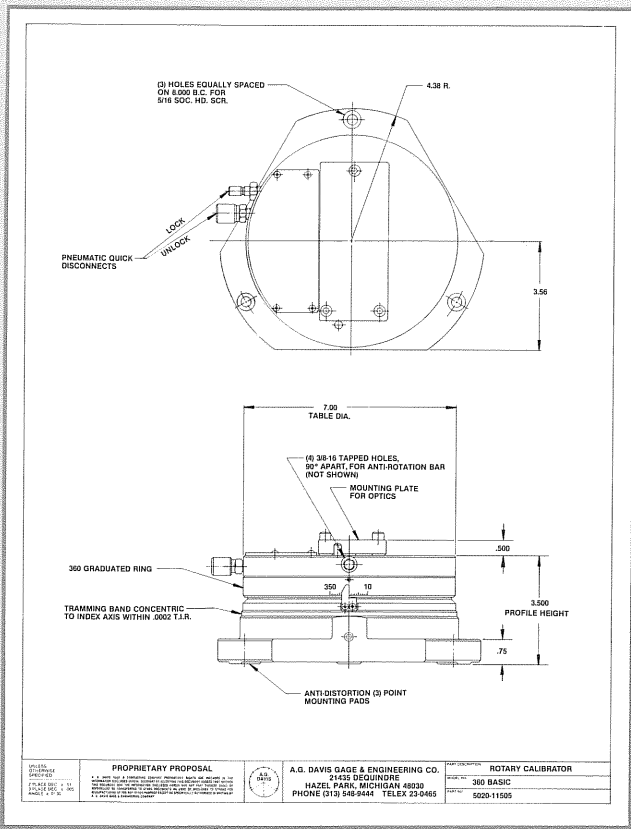


SPECIFICATIONS

A. G. DAVIS ROTARY CALIBRATORS (All Models)

MODEL NUMBER	GRADE	Coupling Indexing Accuracy (Arc Second Band)	Index Plane Repeatability (Arc Second Band)	Coupling Coning (Wobble Accuracy) (Arc Second Band)	Number of Positions	Unit Weight in Pounds
360	10	1	0.02	2	360	37
360	8	0.8	0.02	1.6	360	37
360	6	0.6	0.02	1.2	360	37
360	4	0.4	0.02	0.8	360	37
360	2	0.2	0.02	0.4	360	37
360/198	10	1	0.02	2	360/198	38
360/198	8	0.8	0.02	1.6	360/198	38
360/198	6	0.6	0.02	1.2	360/198	38
360/198	4	0.4	0.02	0.8	360/198	38
360/198	2	0.2	0.02	0.4	360/198	38

NOTE: The C.I. (Computer Interface) OPTION specifications are the same as the above specifications.



BASIC MANUAL CALIBRATION PROCEDURE

1. Set up rotary device to be calibrated using the A.G. DAVIS ROTARY CALIBRATOR, Part No. 5020-11505, Remote Hand Operated Control Valve Assembly, Part No. 5020-11660, Anti-rotation Bar, Part No. 5022-11487-001, Adjustable Stand for Anti-rotation Bar, Part No. 5020-11653, Adjustable Stand for Angular Interferometer, Part No. 5020-11656, suitable Laser Head, Angular Interferometer and Angular Measurement Optics, similar to Figure No. 1.
2. Initialize Laser Display, zero and record.
3. Unlock the Calibrator with the remote hand operated Control Valve Assembly.
4. Index rotary device to the next calibration station. The Anti-rotation Bar will hold the Calibrator radially stationary while the rotary table rotates the Base of the Calibrator to the next inspection station.
5. Lock Calibrator with remote hand operated Control Valve.
6. Record Laser Reading.
7. Repeat Steps 2 through 7 until rotary calibration is complete.

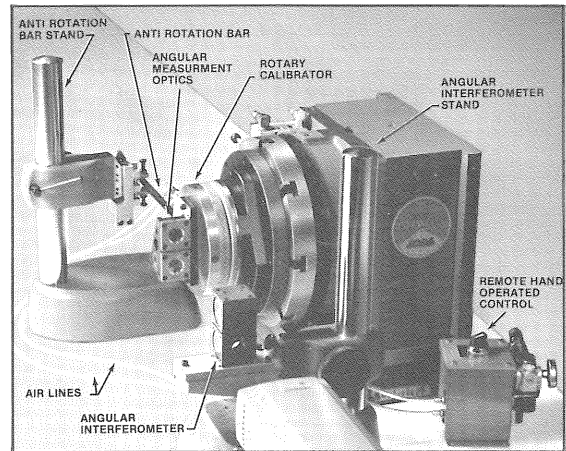


Figure 1

BASIC AUTOMATIC CALIBRATION PROCEDURE (C.I. OPTION)

1. Set up rotary device to be calibrated as per Figure #1 of Basic Rotary Table Manual Calibration Procedure above. (Lock Calibrator and rotary device at ZERO degrees.)
 2. Load and run the "CALIB" Program on the Hewlett-Packard Model 85B Computer.
 3. Program the rotary device to be calibrated for the index desired with a 20 second delay between index sequences.
 4. Start computer. Computer will unlock Calibrator and prompt start up of the automatic rotary device controls.
 5. Computer will automatically control the Calibrator and take data from laser electronics.
NOTE: Above procedure is based on using the Hewlett-Packard Computer Package.
- The Hewlett-Packard Computer programmed with the Exclusive A. G. Davis "CALIB" Program performs the following functions.
- a. Waits to detect rotary motion
 - b. Detects motion stop
 - c. After detection of motion stop, 18 second clock is started
 - d. Checks for correct rotary position. (If position is not correct, alarm sounds, inspection is aborted.)
 - e. Locks Calibrator
 - f. Locked Calibrator is verified
 - g. Computer waits 3 seconds
 - h. Computer reads laser data
 - i. Calibrator is unlocked
 - j. Returns to Step "a", repeats until all index positions are inspected
 - k. Computer now consolidates the data which now is available in various formats

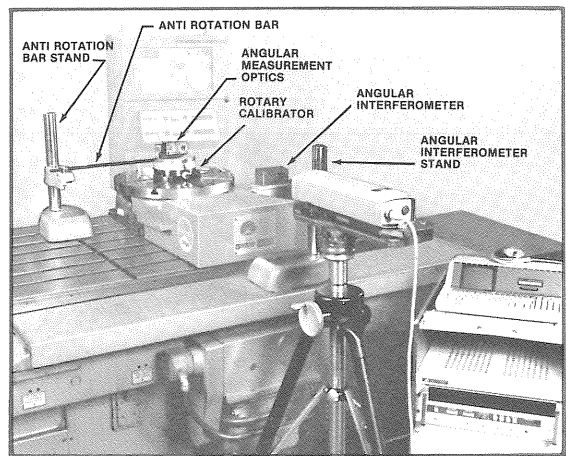
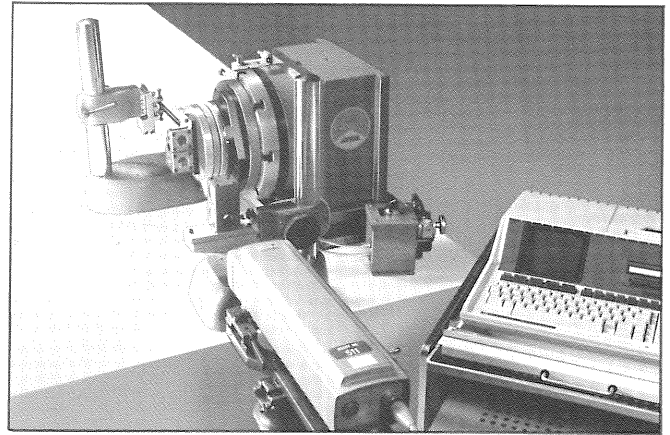
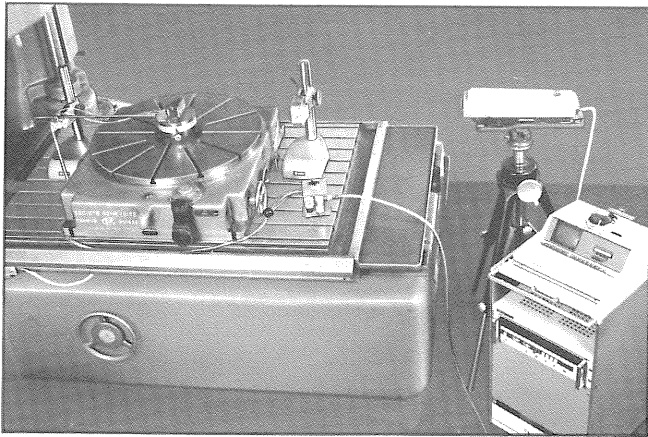
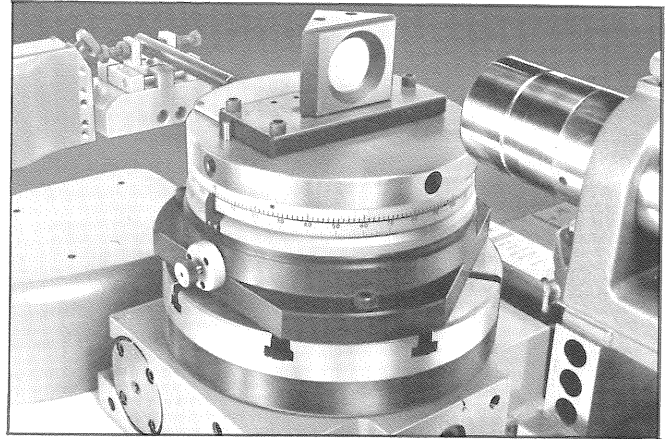
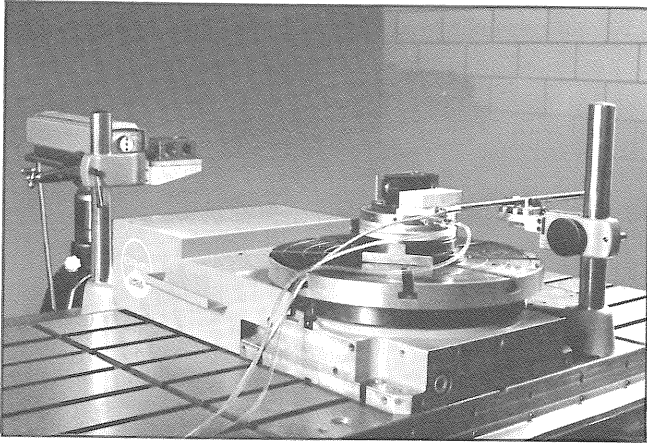


Figure 2

TYPICAL APPLICATIONS



THE EXCLUSIVE A. G. DAVIS "DAAAM" SYSTEM

(Dual Axis Automatic Angular Measurement)

■ The "DAAAM" SYSTEM is used to certify the angular accuracy of the ROTARY CALIBRATOR.

System Features . . .

- Calibrator Index and Wobble Planes are Measured Simultaneously
- Hewlett-Packard 5526A Laser System
- Resolution - 0.005 Arc Second
0.024 Micro-Inches per Inch
1.54 Inches in 1,000 Miles
- Certifies Accuracy to 0.2 Arc Second Band.
(.000006 Inches per Inch)
- All Laser Optics are Mounted and Supported by Low Coefficient of Expansion Materials to Minimize the Effects of Temperature Changes
- Computer Controlled
- Data Output via Graph Plots and Printed Variable Data

