



Instrumentation

Millimar® C1245 Amplifier



For Large Diameter Gage applications that require simple analog and digital readout, the C1245 offers 16 programmable features any of which can be displayed on the analog meter or one of the two digital display lines. Data is not collected but can be exported via RS232 output. Feature formulas may be programmed with basic math functions.

Millimar S1841 Column System



For Large Diameter Gage applications that require a column display format, the S1841 offers 16 programmable features any of which can be displayed on any of the analog bar scales and digital line displays. The number of display columns (up to 4) and input modules (up to 4) are configured. Column displays may even be split to view 8 analog and 8 digital line readings. Data is not collected but can be exported via RS232 output. Feature formulas may be programmed with basic math functions.

GageChek Digital Readout



For Large Diameter Gage applications that require data collection and more programming capability, the GageChek offers a multi-axis metrology display and basic SPC analysis. It features intuitive visual displays, helpful audio cues and user-defined formulas. Up to 16 features may be displayed in digital or column, or a simulated dial format. It includes connectivity to PCs and other peripherals via RS232 port. Feature formulas may be programmed with basic and advanced math functions and other advanced logic statements.

MarCheck SPC System



For Large Diameter Gage applications that require the full power of a gaging computer system, the MarCheck ICS Industrial PC and Software offer full programming capabilities from custom displays to controlled data collection and more. SPC analysis, graphs, and reports are available to satisfy most any QA requirements for process control. Full math and logic capabilities plus GR&R studies. Many input channels for different input types so more than one gage can be connected. This is a fully networked data management system.



Features

- Direct contact, high accuracy measurement by the use of proven Dimentron® Plug technology.
- Increased measuring range over air gaging.
- 6 Point configuration allows for 2 Point, 3 Point or 6 Point Roundness.
- The gage, combined with a Mahr Federal amplifier, allows the display of various features such as Average Diameter, Roundness, Max, Min and more.
- System accuracy is better than 80 µin/2 µm.
- Quick setup time - typically less than 5 minutes.
- Rugged design for shop floor use.

- Typical plate sizes and measuring range:

Plate Size	ID	OD
800 mm	63.5 - 825 mm (2.50 - 32.25 in)	76.2 - 831 mm (3.0 - 32.75 in)
500 mm	63.5 - 514 mm (2.5 - 20.25 in)	76.2 - 527 mm (3.0 - 20.75 in)
200 mm	63.5 - 209 mm (2.5 - 8.25 in)	76.2 - 222 mm (3.0 - 8.75 in)

Specifications

Dimensions and Tolerances

These will vary from application to application but as a general guide typical ID and OD tolerances are in the order of magnitude of 0.0005 inch. Tolerances for Out-of-Round are typically up to 0.005 inch.

Location of Checks

OD or ID for straight wall bearings.

Condition when Checked

Parts are to be clean, dry and free from measurable debris and burrs when checked. Free from hand contact for thin wall or easily deformed parts.

Master

Mahr Federal supplied Zero Bushings for setting the Dimentron® Plug assemblies. A Min/Max Master is used to set the gain of each gagehead assembly.

Bearing Size Master

Supplied by bearing manufacturer. Typically there is a nominal size master for every part size.

System Accuracy

System accuracies of 80 µin/2 µm or better can be achieved.

Measuring Range

Measuring range of plate size depends on plate size and the family of parts to be measured. See table above under heading "Summary of Features". The measuring range of the gagehead assembly's is application dependent. The tighter the tolerances the smaller the allowable range in order to minimize centralization (chordal) and balance errors.

Mahr Federal, established for over 145 years, continues to provide the best solution to applications that can be practically measured. Bring your opportunity to us and we will bring our expert knowledge, professional service and support to meet your needs.



6633 Polk St. Houston, TX 77011-4509 Tel: 713-943-2721 Fax: 713-943-3170

Email: sales@deterco.com

We reserve the right to make changes to our products, especially due to technical improvements and further developments. All illustrations and technical data are therefore without guarantee.

Large Diameter Gage



EXACTLY

Amplifiers available for the gage, appearing left to right; Millimar® 1245, 1841 and GageChek

The Large Diameter Gage is ruggedly designed to measure large bearing diameters on the shop floor.

- Gage design may be applied to a variety of diameter ranges
- Reversible gageheads designed for easy ID/OD changeover
- Six Point configuration allows for 2, 3, or 6 Point results
- Complete with a Mahr Federal amplifier to suit virtually any customer requirement
- Simple setup combined with a reliable design

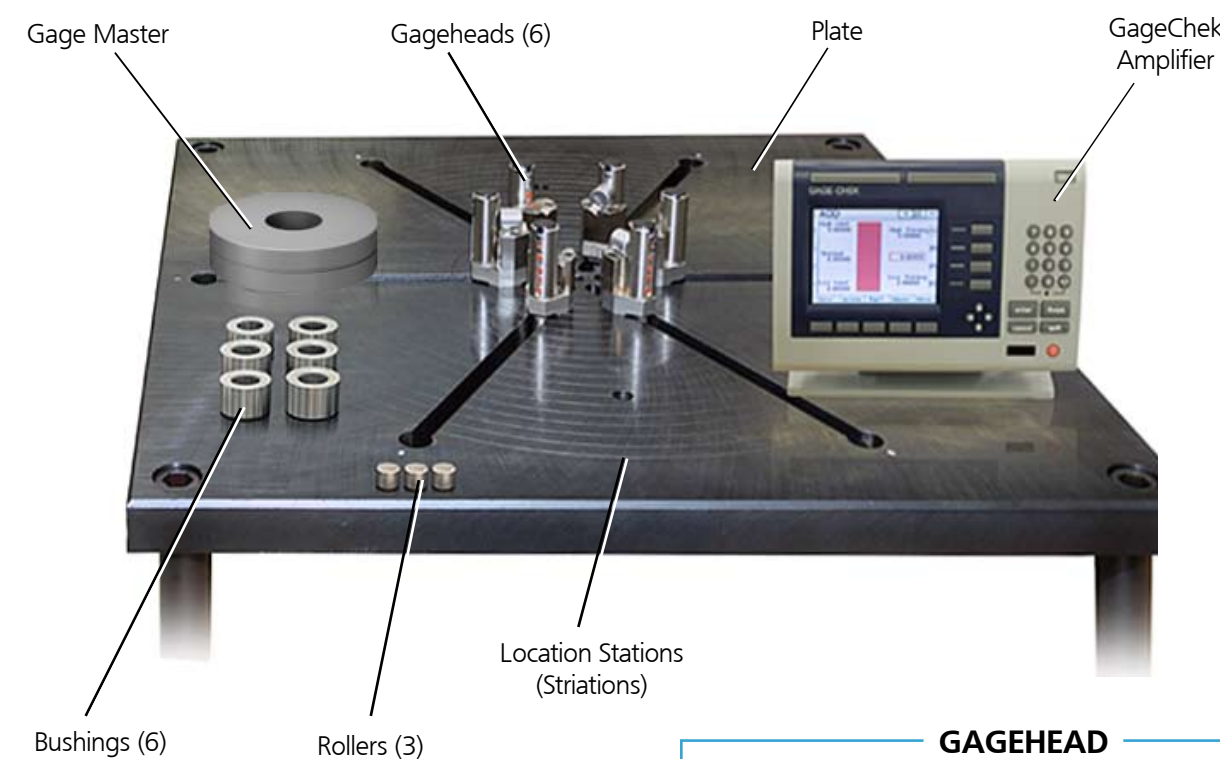
A238 1107 5M Printed in the USA

Components

Basic components of a Large Diameter Gage start with the Plate which varies in size depending on the part sizes to be measured. The Plate also has radial graduations etched into it for location of the gagehead assemblies. Each gagehead assembly is based on the rugged and proven design principles used in the Mahr Federal Dimentron® Plug products. The gagehead assembly consists of a vee block mounted along side the Dimentron® Plug body at a specified distance in reference to the plugs sensitive contact. Rollers are placed into the vee of three of the gagehead assemblies at 120° apart for equal weight distribution and reduction of friction for smooth rotation of the part. The height location to be

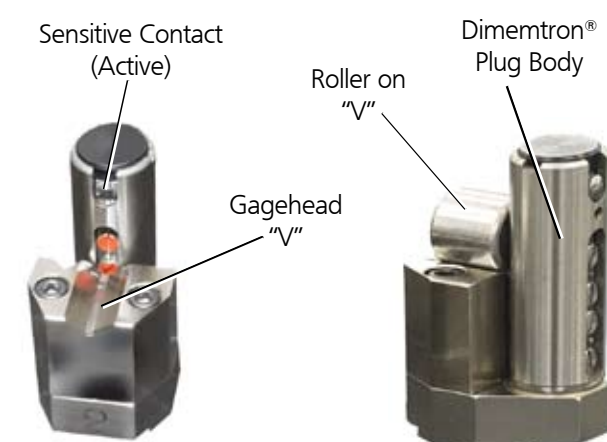
measured on the part may be adjusted using various sets of three rollers. A set of 6 Zero Bushings are used to set each gage head to virtually the same zero reference. The master (customer supplied) serves two purposes. The first purpose uses the master to setup and align the 6 gageheads precisely on the plate. The second purpose is for periodic mastering and repeat checks as part of normal metrology practice. Mahr Federal's GageChek readout (shown here) is just one of many different amplifiers available for use with the Large Diameter Gage. The type of readout device (amplifier or PC based) will vary based on application and customer requirements.

Component Locations and Nomenclature



Location Stations
(Striations)

GAGEHEAD



General Information

The Large Diameter Gage's basic design accommodates most simple straight wall parts with high accuracy gaging. It is a rugged design to measure large diameters from 3 inches minimum up to 80 inches. The gage utilizes a 6 point geometry which allows for 2, 3, or 6 equidistant measurements. Matched to one of the Mahr Federal readout instruments, it allows everything from simple real time measurements through to full data collection and SPC analysis. Another feature of the gage is the ability to easily convert the gage from ID (internal diameter) measurements to OD (outside diameter) measurements. This is done by simply loosening the gagehead assembly, sliding it out to the end of the slotted channel, lift through the round hole, rotate 180°, lower back through the hole, and slide it to the proper diameter location. There is no need to disassemble or remove the lvd probe from the gagehead assembly. The gagehead assembly is preset at the factory. Reverse the polarity settings on the readout device for ID or OD to complete the changeover.

Each Dimentron® Plug gagehead assembly uses an lvd probe that is factory calibrated to the readout device. The

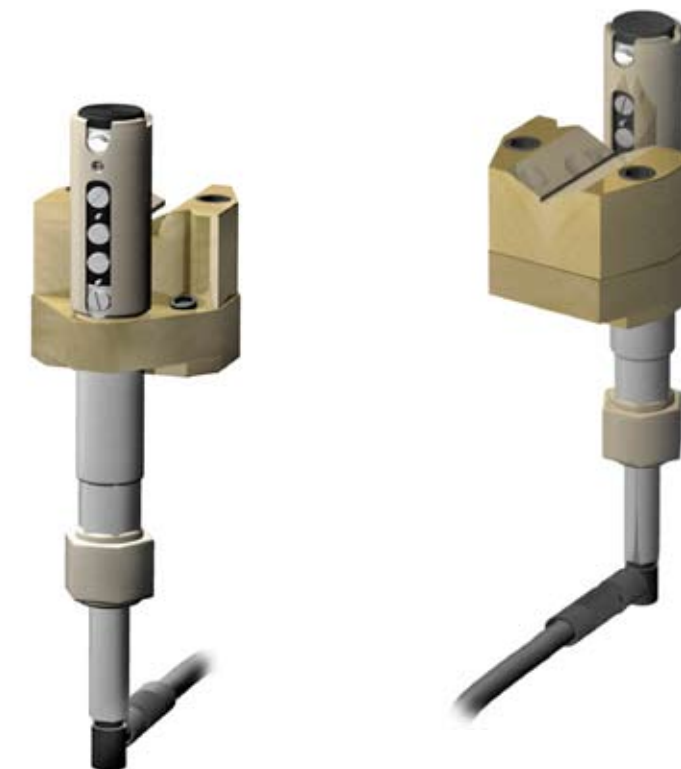
calibration range is mechanically limited to assure high accuracy and repeatability throughout the system. By focusing on the range of the Dimentron® Plug gagehead the lvd probe is calibrated over the most linear portion of its measuring range.

The advantage of contact type (large range) over non-contact air type (limited range) measurement makes it a valuable tool when diameter tolerances are tight and more measuring range is needed, like with parts that may be significantly out-of-round. Notwithstanding, the same gage can use air jets for those application parameters that are better suited to air gaging or non-contact type measurements. The gage is designed for shop floor applications and is durable for years of service with the proper maintenance and care. Part changeover and gage fixture setup times (typically less than 5 minutes) are kept to a minimum to reduce downtime and maximize gaging time.

The design is not limited to simple parts only. The gagehead assemblies may be modified for different types of measurement requirements. Parts with Out-of-Roundness

tolerances of 0.001 inch or less may also consider air jets in place of contact type gageheads. Configurations of the plate can be designed to suit most applications while keeping simplicity and flexibility of operation an important priority.

The Large Diameter gage incorporates a 6 point measuring system each measurement point with its own gagehead assembly. Based on the configuration of the fixture, measurements of 2 points or more may be made. When using the typical 6 point Large Diameter Gage, the instrumentation used must also have a minimum number of 6 inputs. Multiple input systems are generally more advanced and each system has its own capabilities. Mahr Federal is one of the few suppliers that can offer many choices to suit specific applications. A brief description of each device follows based on typical usage. For more detailed information see our Product Catalog or visit www.mahr.com.

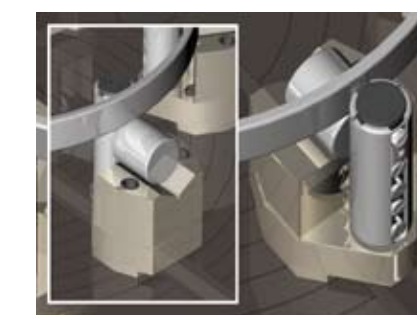
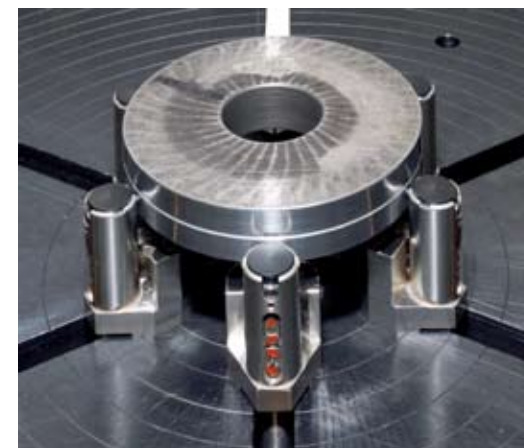


Basic Operation

Operation of the gage, while simplistic, still requires good metrology practices. There are three basic steps used in operating the gage. The first step is to adjust the gagehead assemblies for the specific part size to be gaged. This is done using the nominal master associated with the part to be gaged. After the gagehead adjustments are complete and secure the second step is to "master" the gage. This is done by simply triggering the readout to set itself to

the master mounted in the gage. The master may now be removed and stored in a safe location. The third step is to place the part onto the gage and read the measurement values on the readout display. The part may be rotated from point-to-point for static checks if desired, maintaining no hand contact after rotation to each point (depending on part tolerance, material, and wall thickness). Part data may be observed or collected and sorted as needed.

ID and OD part placement configurations are shown here. Parts are placed onto rollers which allow for easy part movement. The gage can be setup for 2, 3, or 6 point average diameter, 2-point "out of round", 3-point "out of round", or 6-point "out of round", or combinations depending on the configuration. For example, the display shown on the readout to the right, shows the 6 point average size and the master's actual or deviation value entered by the operator.



Inside and outside diameter measurements are possible by rotating the gageheads

