

MECHANICAL INDICATORS



Representante Exclusivo no Brasil
METROMECC - Instrumentos de Medição Ltda.
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www.metromec.com.br

CDI
CHICAGO

CHICAGO DIAL INDICATOR CO., INC.

CDI — Working For You



Unmatched Precision in Measurement

PRIDE

We built our first mechanical gage in 1932. In fact, Chicago Dial Indicator (CDI) is a pioneer in the gaging industry, with a legacy built on the simple philosophy of creating the highest quality products backed by tireless service. Nearly 70 years have passed. Designs improve, technology changes. Our pride endures. We changed the industry then and we're changing the industry now.

PARTNERSHIPS

CDI products share in your success. We specialize in partnerships, helping you create the finest products possible. Companies large and small depend on us. We work with some of the biggest names in business, from the fields of aeronautics to hydro-electrics, civil engineering to mechanical construction. How can we help your business?

VERSATILITY

Although we made our name with mechanical gages, we didn't stop there. Our complete line of digital measuring gages and indicators, as best represented by the Logic series, is the most advanced in the world. Accurate. Reliable. Quality workmanship. Service. All hallmarks of our business, the standards in which CDI has made its reputation.

MOVING FORWARD

Our company's foundation was forged long ago. Our ongoing success lies in today. Throughout this catalog you will see the finest mechanical indicators and accessories on the market, built and serviced with the same steadfast commitment that put us where we are today. For those special needs, we offer custom-designed gages for all your unique applications. CDI is moving forward, just as we always have.

OUR PROMISE

We, the employees of Chicago Dial Indicator, are committed to exceeding the requirements of our customers and co-workers the first time — every time — through a zero defects and continuous quality improvement philosophy.



For 70 years, CDI has been a trusted supplier for major American manufacturers.

In producing precision testing and measuring instruments of the highest quality, CDI has kept pace with the industries' ever

increasing demand for greater product reliability.

Through advanced technology in quality control and manufacturing areas, CDI has maintained the most exacting requirements. Our experience and total capability — which extends from the design phase through manufacturing — from incoming raw materials through final inspection — is at your disposal.



How to select, order and care for Chicago Dial Indicators

Ordering Information

To place your order, simply phone, fax, or e-mail us with the items you require. Please provide your customer number, if you have one, and tell us how you want your order shipped. We will acknowledge the order and confirm the information you provided within 24 hrs.

If you do not have an account with us, we will need your company name, billing/shipping address and business references. If you prefer we can give you the names of local distributors in your area that you can order through.

We also accept VISA, MasterCard and AMERICAN EXPRESS for your convenience.

If you want help in determining which gage will best fit your application, call toll-free 1.800.344.GAGE



Selection

Here are some useful tips to help you select the Chicago Dial Indicator that will best meet your requirements:

Graduation—

Select an indicator that is closest to 10% of the tolerance spread. For example, if acceptable tolerance is $\pm .001$ ", select an indicator having $.0025$ " graduations. This will give a span of 10 divisions on the dial.

Working With Your Indicator

Mounting your indicator securely will reduce deflection and improve repeatability. Mount indicators close to support columns and keep columns and arms as short as possible.

Proper care and cleaning will extend life and prevent wear. Clean the spindle with a lint free cloth, wipe contact point and work surface to remove dust or oil.

Size—

Two main selection criteria are: 1. How much space is available for positioning the indicator? 2. How far away must the indicator be read?

Revolution Range—

Select a dial having the required graduations. The ideal range is one which allows the tolerance spread to cover one-tenth to one-fourth of the dial.

Total Range—

All AGD indicators have a total range of 2 1/2 times the range per revolution, sufficient for most applications. Longer total range requirements up to 5" can be met with one of CDI's long range dial indicators.

Test your indicator regularly using masters or gage blocks. Be sure to test under gaging conditions and make sure that your reference surface is clean and level.

Take care not to subject your indicator to sudden blows to the spindle. Avoid clamping the stem with a single point of pressure or excessive pressure, as this may cause binding.

Do not use an indicator that is sticky or sluggish or one that has been dropped or dam-

aged. Be sure to check it for accuracy and if need be have it repaired.

Never use pliers to tighten contact points. Do not drill holes into or try to alter the case, and don't use oil as these can all damage the movement.

See reference section in back of catalog

Unmatched Precision in Measurement

CDI offers over 400 standard mechanical dial indicators and a full line of accessories to expand their usefulness. The advanced, yet simple, design of these gages is based on 70 years of experience in manufacturing dial indicators. You can be assured of superior accuracy and sensitivity, a trouble-free long life, and ease of operation.

Design Features

- Heat-treated stainless steel racks, gears and pivots
- Non-magnetic hairsprings
- One piece forged brass case
- Chrome plate finish
- Fluted bezels for easy, no-slip grip
- Bezel locks
- Acrylic plastic crystals are non-yellowing, provide high scratch resistance
- Fine, easy-to-read graduations on non-glare dials (English: white, Metric: yellow, High contrast: black/white)
- Four-position back permits 90° dial positioning
- All CDI indicators are supplied with serial # labels

Balanced and Continuous Dial Models

Two types of dials are offered in all models: Balanced dials with plus and minus readings for comparative work and continuous dials for direct measurement of length and depth. Long-range continuous dial indicators have single or dual revolution counter hands to facilitate reading.

CDI can furnish special dials to fit your specifications. Shown below. Subject to minimum orders.

Graduation and Range

CDI dial indicators are built to provide precise measurement with graduations of .0001", .00025", .0005", .001", .010", (0.002 mm, 0.005 mm, to 0.01 mm). Total range of travel is .020" to 5" (0.5 mm to 50mm)

Jeweled Bearings

All CDI dial indicators are available with fully jeweled movements. Jeweled bearing movements are recommended for heavy use applications and wherever extremely high sensitivity is required.

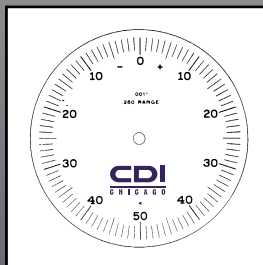
Special Applications

CDI's market niche has always been OEM or special application dial indicators. If you have a special application contact our sales department for assistance. We have been manufacturing specials for 70 years and there is a good chance we have already seen your application or experienced something similar.

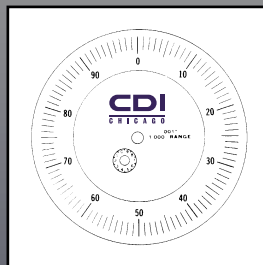
Repair Service

CDI offers fast repair service and return of indicators damaged by accident or worn through long periods of constant use. Each gage is disassembled, cleaned, worn or broken parts replaced, and gage is reassembled and calibrated. CDI ONLY REPAIRS CDI MANUFACTURED DIAL INDICATORS! No other makes or models.

Certificates of calibration are available upon request.



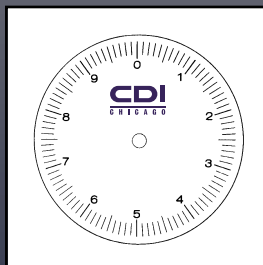
Balanced Dial
Graduated from 0 +/- 5, 10, 15, 20, 25, or 50. Standard dials read + on right and - on left. Available with + and - reversed at no charge.



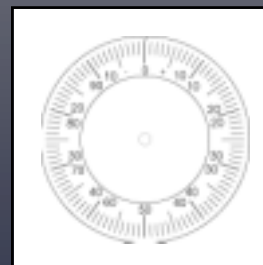
Long Range Continuous Dial
Continuous clockwise readings. Fixed center dial with outer ring dial and revolution counter hand. Counterclockwise or balanced ring dial available.



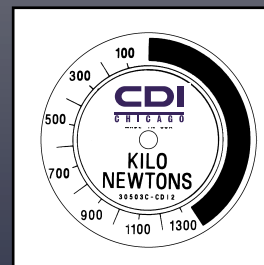
High Contrast
Most regular models are available as High Contrast type dial faces. Contact CDI for ordering information.



Continuous Dial
Continuous readings with graduations from 0 to 10, 20, 25, 30, 40, 50, or 100, reading clockwise. Counterclockwise available.

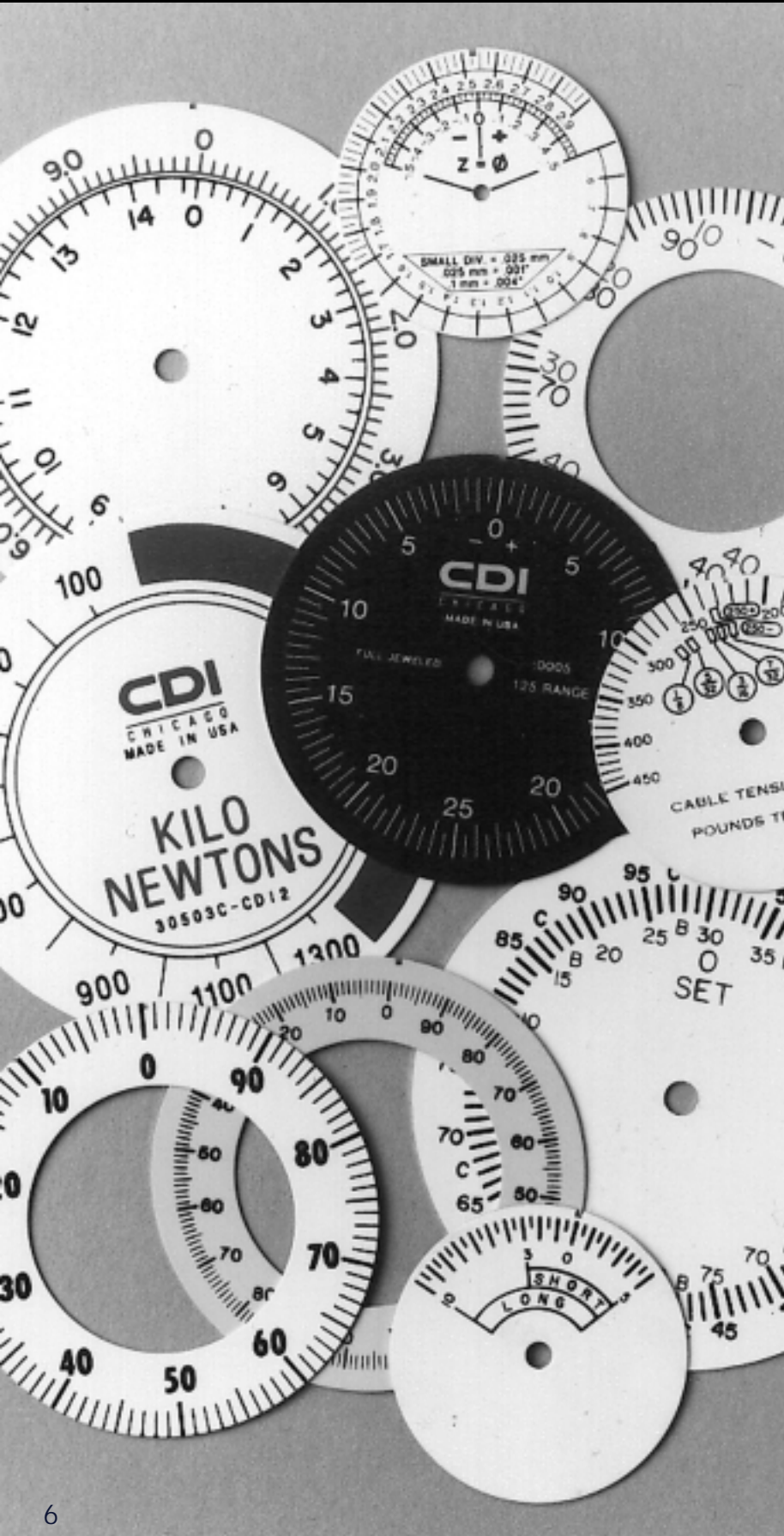


Dual Dial Faces
Dual dial faces are available. Typically formatted as balanced and continuous dial, clockwise and counterclockwise models also available.



Special Dial Faces
Special dial faces are available. Contact the sales department for assistance, or fax in your request. We will be happy to quote you.

OEM/SPECIAL APPLICATIONS

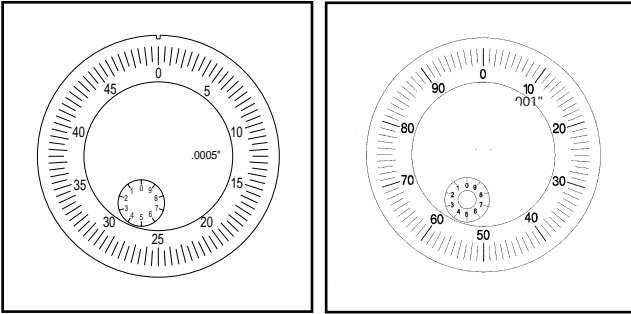


CDI has been a manufacturer of innovative, state-of-the-art digital and mechanical gages since 1932. We do more than just pull a product off the shelf and ship it. We've been working to develop new, more accurate, more advanced gages from the beginning. All this experience helps us to serve our customers more responsively, more efficiently, and more economically. Also, we pay close attention to the requests of every customer. Your custom-designed gage will have exactly the features you want. While our gages are built to American Gage Design specifications, and have the precision and accuracy customers have come to expect, our digital and mechanical OEM gages are our flagship lines.

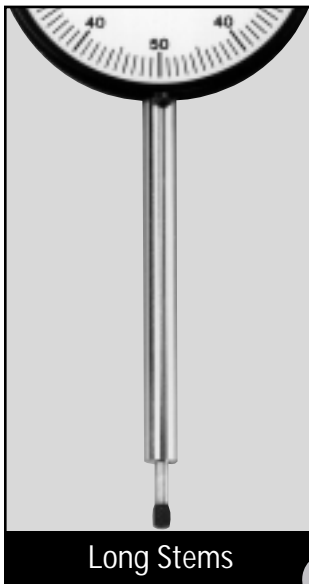
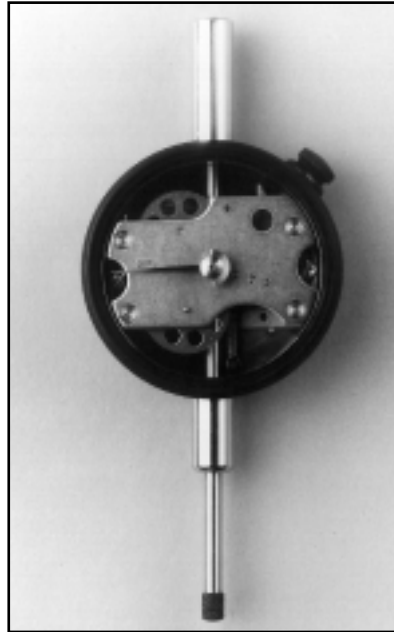
Our OEM gages represent the best in both design and flexibility. Whatever your gage application, we are ready to design a gage of the highest quality to meet your exact requirements. Whether you're looking for a combination of excellent standard features, user-settable options, or custom features, we're confident that Chicago Dial Indicator Company can make the gage you need!

Special Ratio Gages

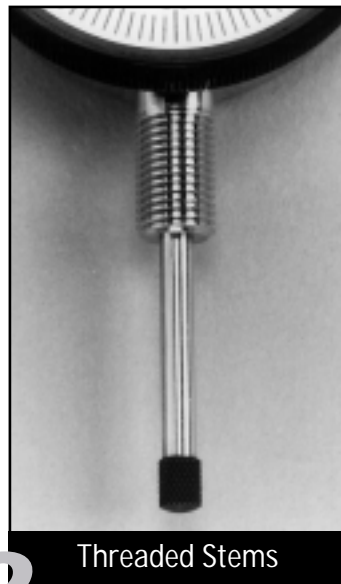
Special ratios can be obtained by changing the dial face, the movement or using a combination of both to achieve a specific result.



By utilizing a .0005 " gage and changing the dial face to .001" graduations as shown here, we illustrate a 2:1 ratio. This is ideal when measuring radius to obtain diameter or when checking chamfers. Other ratios can be used to measure angles, tapers, etc.



Long Stems



Threaded Stems



Special Stems

Pushdown Indicators

Stop Brakes

Special ratios ie 2:1

Inverted Dials

Private Label Dials

Our OEM/Special gages are ideal for:

Measurements of Outside Dimensions

Height Measurement

Comparison Measurement

Measurement of Form, Squareness, and Parallelism

Hardness Measurement

Measurement of Sheet Metals

Measurement of Inside Dimensions

Depth Measurement

Step Measurement

Angle Measurement

Screw Thread Measurement

Measurement in Roll Forming

Position Feedback of Machine Tools

Measurement of Gears

AGD GROUP 1

These dial indicators are built to American Gage Design specifications. They are furnished with a lug back (with 90° mounting holes to be used vertically or horizontally), a regular contact point 1/4" long, and a dust cap.

Note: You may order using the the EDP No. To specify jeweled bearing add suffix "J" to the EDP No.

AGD GROUP



1-11/16" Diameter

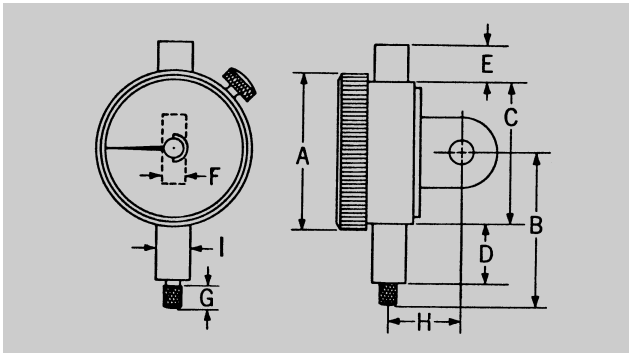
This group is recommended for fixture gaging and in applications where size or space is limited.

AGD GROUP 2



2-1/4" Diameter

This group is CDI's most widely requested style, and industries most common.



For Actual Size Drawings—Usable for designers and draftsman for fixture drawings as tracing templates, call and we will send at no charge.

Dimensions

	A	B	C	D	E	F	G	H	I
1	1-11/16"	1-5/8"	1-17/32"	5/8"	dimension E varies for (range)	1/4"	1/4"	3/4"	3/8"
2	2-1/4"	2"	2-1/16"	23/32"					
3	2-3/4"	2-1/8"	2-9/16"	5/8"					
4	3-5/8"	2-9/16"	3-7/16"	5/8"					

Dimensions F-I are AGD Standard

Total Range	Grads.	Range/ Rev.	Dial Type	AGD Group			
				1	2	3	4
.020"	.0001"	.008"	0-4-0	—	20201BJ	30201BJ	40201BJ
.020"	.0001"	.008"	0-8	—	20201CJ	30201CJ	40201CJ
.025"	.0001"	.010"	0-5-0	10251BJ	20251BJ	30251BJ	40251BJ
.025"	.0001"	.010"	0-10	10251CJ	20251CJ	30251CJ	40251CJ
.025"	.00025"	.010"	0-5-0	10252B	20252B	30252B	40252B
.025"	.00025"	.010"	0-10	10252C	20252C	30252C	40252C
.050"	.00025"	.020"	0-10-0	10502B	20502B	30502B	40502B
.050"	.00025"	.020"	0-20	10502C	20502C	30502C	40502C
.050"	.0005"	.020"	0-10-0	10503B	20503B	30503B	40503B
.050"	.0005"	.020"	0-20	10503C	20503C	30503C	40503C
.050"	.001"	.020"	0-10-0	10504B	20504B	30504B	40504B
.050"	.001"	.020"	0-20	10504C	20504C	30504C	40504C
.075"	.0005"	.030"	0-15-0	10753B	20753B	30753B	40753B
.075"	.0005"	.030"	0-30	10753C	20753C	30753C	40753C
.100"	.0005"	.040"	0-20-0	11003B	21003B	31003B	41003B
.100"	.0005"	.040"	0-40	11003C	21003C	31003C	41003C
.100"	.001"	.040"	0-20-0	11004B	21004B	31004B	41004B
.100"	.001"	.040"	0-40	11004C	21004C	31004C	41004C
.125"	.0005"	.050"	0-25-0	11253B	21253B	31253B	41253B
.125"	.0005"	.050"	0-50	11253C	21253C	31253C	41253C
.125"	.001"	.050"	0-25-0	11254B	21254B	31254B	41254B
.125"	.001"	.050"	0-50	11254C	21254C	31254C	41254C
.250"	.001"	.100"	0-50-0	12504B	22504B	32504B	42504B
.250"	.001"	.100"	0-100	12504C	22504C	32504C	42504C
.500"	.001"	.100"	0-50-0	15004B	25004B	35004B	45004B
.500"	.001"	.100"	0-100	15004C	25004C	35004C	45004C



2-3/4"
Diameter

This group size offers a larger more visible dial face for bigger fixtures and gages.



3-5/8"
Diameter

This group is CDI's largest diameter dial face. Ideal for poor lighting conditions and for larger fixture gaging.

METRIC DIAL INDICATORS

For your metric measuring requirements CDI brings a full line of metric reading dial indicators which are fully compatible with CDI's accessories. **All CDI metric dial indicators are supplied with easy-to-read graduations on yellow no-glare dial faces. These gages are supplied with U.S. standard 3/8" diameter stems. 8mm stems are available on request. Furnished with lug back, dust cap, and regular contact point 1/4" long.**

Total Range	Grads.	Range/ Rev.	Dial Type	AGD Group			
				1	2	3	4
.5mm	.002mm	.2mm	0-10-0	—	52005B	53005B	54005B
.5mm	.002mm	.2mm	0-20	—	52005C	53005C	54005C
1.25mm	.005mm	.5mm	0-25-0	—	52125B	53125B	54125B
1.25mm	.005mm	.5mm	0-50	—	52125C	53125C	54125C
2.5mm	.01mm	1.0mm	0-50-0	51025B	52025B	53025B	54025B
2.5mm	.01mm	1.0mm	0-100	51025C	52025C	53025C	54025C
10mm	.01mm	1.0mm	0-50-0	—	52100B	—	—
10mm	.01mm	1.0mm	0-100	—	52100C	—	—
25mm	.01mm	1.0mm	0-50-0	—	52250B	53250B	54250B
25mm	.01mm	1.0mm	0-100	—	52250C	53250C	54250C
25mm	.25mm	25mm	0-25	—	52250C	52250C	53250C
50mm	.01mm	1mm	0-100	—	52500CJ	53500CJ	54500CJ

Can be used for:

OEM Gages

Materials Testing

Machine Applications

Automotive Applications

Optical Applications

Wherever Precision Measuring is Required

Depth Gages

Long Range Dial Indicators



Group 1, 2, 3, and 4 dial indicators are built to American Gage Design specifications. These indicators offer longer ranges of travel where spindle access is needed or if extended measuring range is a necessity. They are also useful where absolute measurement is an application. They are furnished with a lug back (with 90° mounting holes to be used vertically or horizontally), a regular contact point 1/4" long, a dust cap, and revolution counters.

Note: You may order using the EDP No. To specify jeweled bearing add suffix 'J' to the EDP No.

Total Range	Grads.	Range/Rev.	Dial Type	AGD Group			
				1	2	3	4
.200"	.0001"	.010"	0-5-0	—	22001B	32001BJ	42001BJ
.200"	.0001"	.010"	0-10	—	22001C	32001CJ	42001CJ
.400"	.0001"	.020"	0-10-0	—	—	—	44001BJ
.400"	.0001"	.020"	0-20	—	—	—	44001CJ
.500"	.0001"	.010"	0-5-0	—	25001BJ	35001BJ	—
.500"	.0001"	.010"	0-10	—	25001CJ	35001CJ	—
.500"	.0005"	.050"	0-25-0	—	25003B	35003B	—
.500"	.0005"	.050"	0-50	—	25003C	35003C	—
.500"	.001"	.100"	0-50-0	15004B	25004B	35004B	35004B
.500"	.001"	.100"	0-100	15004C	25004C	35004C	45004C
.500"	.010"	.500"	0-100	—	25005C	35005C	—
1.000"	.0005"	.050"	0-25-0	—	26103B	36103B	—
1.000"	.0005"	.050"	0-50	—	26103C	36103C	—
1.000"	.001"	.100"	0-50-0	—	26104B	36104B	46104B
1.000"	.001"	.100"	0-100	—	26104C	36104C	46104C
1.000"	.010"	1.000"	0-100	—	26105C	36105C	—
2.000"	.001"	.100"	0-100	—	26204CJ	36204CJ	46204CJ
3.000"	.001"	.100"	0-100	—	26304CJ	36304CJ	46304CJ
4.000"	.001"	.100"	0-100	—	26404CJ	36404CJ	46404CJ
5.000"	.001"	.100"	0-100	—	26504CJ	36504CJ	46504CJ

For rapid direct reading measurements of hole depths and recesses. Bases are hardened, and ground to ensure flatness. All bases are readily interchangeable with any other indicator model. Available plain or jeweled.

Specifications

60412 Knife Edge
Range .125"
Gradations .0005"
Dial Reading 0-25-0

60312 Depth Gage
Range 1.0"
Gradations .001"
Dial Reading 0-100 CC



Engravers Depth Gage For Photo-Engravers, Printers, Electrotypers



CDI14 Engravers Depth Gage

With a CDI Depth Gage, eliminate the trouble and expense of remaking electrotypes and halftone plates. CDI's accurate, reliable Engraver's Depth Gage makes certain that halftone plates and electrotypes are etched properly for correct printing results.

Specifications:

Range .100"
Gradations .0005"
Dial Reading 0-40 Counterclockwise Includes plastic case, extra point, wrench, and test block.

Universal Dial Test Indicators



The Universal Dial Test Indicators offer flexibility to toolroom and general purpose machining and inspection applications. The compact size and perpendicular design is simple to use and adjustable to any viewing angle. They are supplied with jeweled bearings for extra-smooth action and long-life.

Balanced or Continuous models available. Both models can be furnished with 2 extra contact points, as an indicator only, or as a complete set.

Specifications

	Inch Style	Metric Style
Graduations	0.001"	.01mm
Reading, Continuous Dial	0-100	0-250
Balanced Dial	0-50-0	0-125-0
Range	.200"	5 mm

Complete Test Set Consists Of:

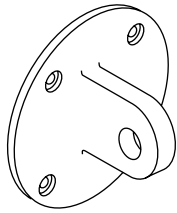
- 60100C1-1** 1— **CDI Universal Dial Test Indicator**
- CDI32-2** 1— **Clamp** with 1-1/4" capacity and 1/4-28 threaded hole for Holding Rods.
- CDI28-6** 1— **Hole Attachment** used for checking internal surfaces or those not easily reached by Dial Spindle. 0.375" dia. mounting hole, will measure holes 1-11/16" deep.
- CDI47** 1— **Tool Post Holder** 6 in long x 3/8" thick x 3/4" high with tapped hole for attaching Holding Rods.
- CDI39** 1— **Swivel** with 5/16" x 1/4" holes for Holding Rods and Dial Indicator Mounting Rods.
- CDI32-4-1** 1— **Holding Rod** 0.312" x 5" long.
- CDI32-4** 1— **Holding Rod** 0.312" x 3" long.
- BCDI60200** 1— **Fitted Case** for Indicator and Accessories.
- CDI524062** 1— **Contact Point**
- CDI5337** 1— **Contact Point**

Catalog No.	Description
60100B1-1	Indicator only balanced dial inch style.
60100C1-1	Indicator only continuous dial inch style.
60100B1M-1	Indicator only balanced dial metric.
60100C1M-1	Indicator only continuous dial metric.
60100B1	Indicator, balanced with 2 extra points.
60100C1	Indicator, continuous with 2 extra points.
60100B1M	Indicator, metric balanced with 2 extra points.
60100C1M	Indicator, metric continuous with 2 extra points.
60100B	Test Set with balanced dial indicator .001"
60100C	Test Set with continuous dial indicator .001" grad., .200" travel.
60100BM	Test Set with balanced dial indicator .01mm grad., 5mm travel.
60100CM	Test Set with balanced dial indicator .01mm grad., 5mm travel.

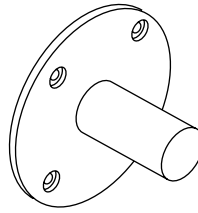


Backs for Chicago Dial Indicators

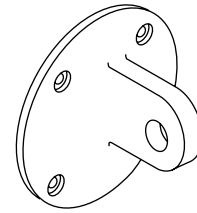
Lug (Centered)
Normally furnished



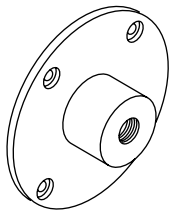
Post



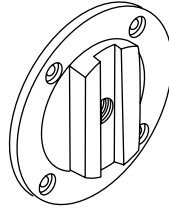
Offset Lug (Offset)
One side of lug is on centerline of back



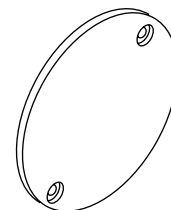
Screw Type



Adjustable



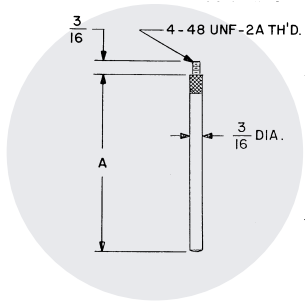
Flat



Mounting Back Style	AGD Group 1 Part Nos.	AGD Group 2-4 Part Nos.
Lug Back	CDI201	CDI20
Post Back	CDI241	CDI24
Screw Back	CDI251	CDI25
Flat Back	CDI211	CDI21
Offset Lug Back	CDI221	CDI22
Adjustable Back	CDI231	CDI23
Universal Back	CDI261	CDI26
Adjustable Rack Back	—	G20-0052

Contact Points

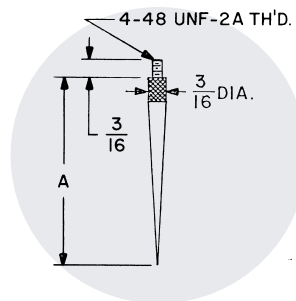
CDI50 Regular Contact Points



Regular Contact Points are made from hardened steel with polished tip to prevent scratching. Threads are AGD standard 4-48, 3/16" diameter.

PART #	DIM "A"	PART #	DIM "A"
CDI50125	1/8"	CDI501750	1 3/4"
CDI50250	1/4"	CDI502	2"
CDI50375	3/8"	CDI502250	2 1/4"
CDI50500	1/2"	CDI502500	2 1/2"
CDI50625	5/8"	CDI502750	2 3/4"
CDI50750	3/4"	CDI503	3"
CDI50875	7/8"	CDI503250	3 1/4"
CDI501	1"	CDI503500	3 1/2"
CDI501250	1 1/4"	CDI503750	3 3/4"
CDI501500	1 1/2"		

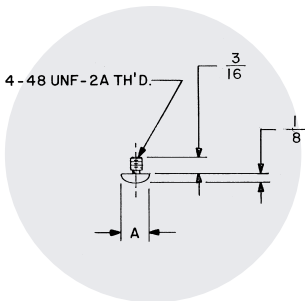
CDI52 Tapered Contact Points



Supplied in four convenient lengths with standard AGD 4-48 thread, 3/16" diameter.

PART #	DIM "A"
CDI524062	13/32"
CDI521	1"
CDI521500	1 1/2"
CDI522	2"

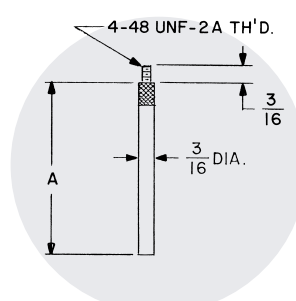
CDI53 Button Contact Points



Available in 3 diameters with AGD standard 4-48 thread.

PART #	DIM "A"
CDI5337	3/8" dia.
CDI5350	1/2" dia.
CDI5375	3/4" dia.

CDI54 Flat Contact Points

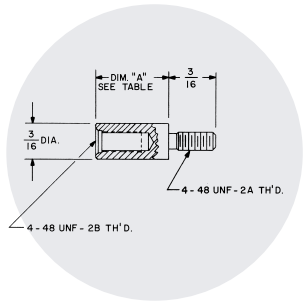


3/16" diameter with flat contact area, standard AGD 4-48 thread.

PART #	DIM "A"
CDI54125	1/8"
CDI54250	1/4"
CDI54375	3/8"
CDI54500	1/2"
CDI54625	5/8"
CDI54750	3/4"
CDI54875	7/8"
CDI541	1"
CDI541250	1 1/4"
CDI541500	1 1/2"
CDI541750	1 3/4"
CDI542	2"

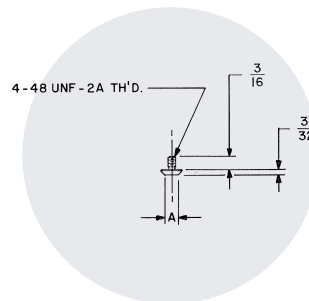
CDI82 Rack Extension

Used to extend the length of rack, for longer reach.



PART #	DIM "A"	PART #	DIM "A"
CDI82250	.250"	CDI821750	1.750"
CDI82375	.375"	CDI822	2"
CDI82500	.500"	CDI822250	2.250"
CDI82625	.625"	CDI822500	2.500"
CDI82750	.750"	CDI822750	2.750"
CDI82875	.875"	CDI823	3"
CDI821	1"	CDI824	4"
CDI821175	1.175"	CDI825	5"
CDI821250	1.250"	CDI826	6"
CDI821375	1.375"	CDI827	7"
CDI821500	1.500"	CDI828	8"
CDI821575	1.575"		

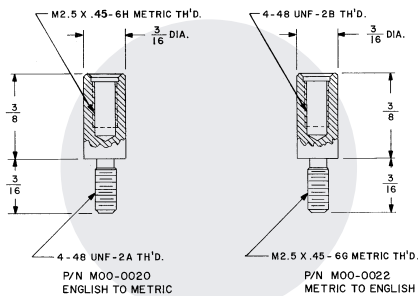
CDI55 Wide Face Flat Contact Points



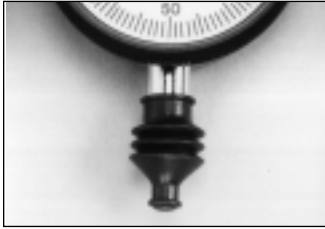
3/32" thick with beveled edges, standard AGD 4-48 thread.

PART #	DIM "A"
CDI5525	0.250 Sq." Cont. area
CDI5537	0.375 Sq." Cont. area
CDI5550	0.500 Sq." Cont. area
CDI5562	0.625 Sq." Cont. area

CDI Spindle Converter M00-0020 Inch to Metric M00-0022 Metric to Inch



Dial Indicator Accessories



Neoprene Dust Guard

Protect rack and bearings from dust, dirt, fluids and contaminants.

CDI70 — up to 1/2" Travel

CDI70-1 — up to 1" Travel



Lifting Levers

Lifts indicator rack to permit work to be placed and removed from under contact point, mounted for left-hand operation.

CDI77 group 1,2 & 3

CDI78 group 4



Spindle Weight

This series is designed primarily for measurements of compressible materials, such as plastics, felt, leather, rubber, cloth, synthetic fabrics, etc., or any application requiring constant uniform pressure.

CDI800-40

Spindle weight-40 grams

CDI800-50

Spindle weight-50 grams

CDI800-60

Spindle weight-60 grams

CDI800-80

Spindle weight-80 grams

CDI800-100

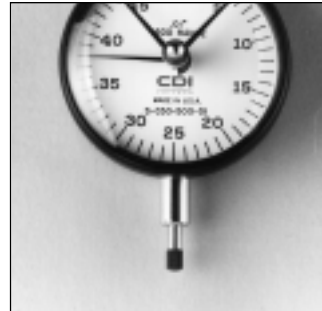
Spindle weight-100 grams

Other weights available on request.



Threaded Stem

Available on all AGD groups and dial readings, including 1" (25mm) range. Standard 3/8" - 24 thread. Other threads supplied on special order.

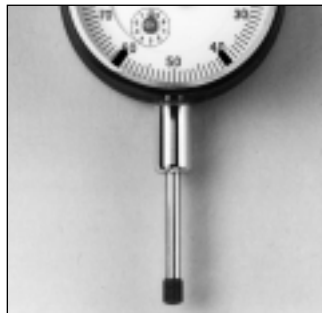


Tolerance Hands

Used in determining if parts being measured are above or below desired tolerance.

CDI73 AGD group 1,2,3

CDI74 AGD group 4

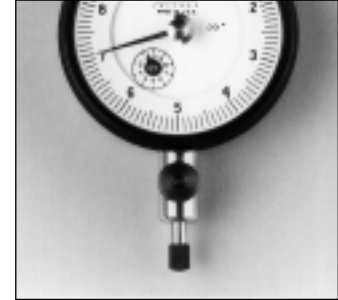


CDI74-1 Tolerance Bands

Group 2 only

Used in determining if parts being measured are above or below desired tolerance.

Note: External tolerance bands above bezel.

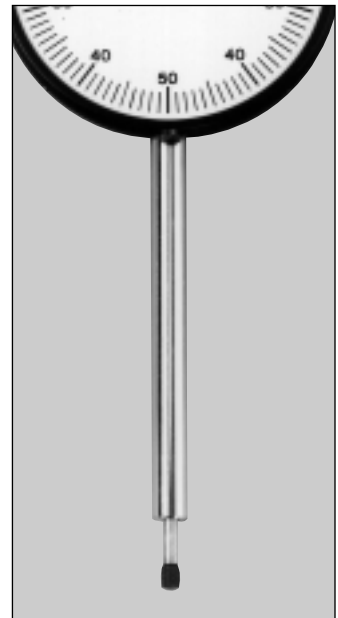


Maximum Position Brake

Stops movement and holds hand at maximum reading until reset. Supplied as a complete indicator only.

Available on AGD Groups 1, 2, 3 & 4 up to and including 1" (25mm) range.

CDI79



Long Stems

.375" diameter stems are available for AGD groups 1,2,3 and 4 up to and including 5". Other stem diameters are available, as are lengths over 5". Prices on application.



Depth Gage Bases

A complete range of sizes with various hole locations enables the user to purchase a stock base complete with dial indicator mounting collet to make their own dial depth gage using any CDI dial indicator available. The indicator mounting collet holds the dial indicator without binding and permits a slight vertical adjustment for positioning. All bases shipped with one mounting collet. Bases are 3/4" wide by 5/8" high and are hardened and ground on the contact surface.

P/N	Description
CDI512	3/4" x 5/8" x 2" 1-Hole
CDI513	3/4" x 5/8" x 3" 1-Hole
CDI514	3/4" x 5/8" x 4" 2-Hole
CDI516	3/4" x 5/8" x 6" 3-Hole
CDI518	3/4" x 5/8" x 8" 3-Hole



Holding Rod

Rigid, accurate diameters for snug fit in swivel joints. Other lengths can be supplied to suit your particular needs.

CDI60

Holding Rod

5/16" Dia. x 6" Long

CDI61

Holding Rod

3/8" Dia. x 7 1/2" Long

CDI62

Holding Rod

1/2" Dia. x 8" Long

CDI63

Holding Rod

3/4" Dia. x 8" Long



Clamp Attachment

1-1/4" capacity-clamping rod 5/16" dia. x 3" long. Also available with 3/8" dia. rod 4" long.

CDI-32 5/16" dia. rod

CDI-33 3/8" dia. rod

Internal Hole Attachment

Used for testing and checking internal surfaces or those not easily reached by regular dial spindles.

CDI28-6 long will measure holes to depth at 1-11/16".

CDI29 short will measure holes to depth of 13/16".

Right Angle Attachment

...used to check shoulder conformity or face runout. Transfers motion from axis perpendicular to the rack.

CDI30



Mounting Collets

Five models available for various fixturing applications.

CDI90

Split Collet

1/2" OD x 3/8" ID x 1/2" long

CDI92

Adapter Collet

5/16" x 40 internal thread

CDI94

Mounting Collet

1/2" x 32 external thread

CDI96

Mounting Collet

9/16" x 18 external thread

CDI98

Mounting Collet

3/8" x 32 external thread



Swivel Joints

...can be positioned to any desired angle. They speed up work because they are easily adjusted and clamp firmly on post holders and uprights.

CDI39

Swivel Joint

1/4" x 5/16"

CDI40

Swivel Joint

5/16" x 5/16"

CDI41

Swivel Joint

5/16" x 3/8"

CDI42

Swivel Joint

3/8" x 5/8"

CDI43

Swivel Joint

1/2" x 5/8"

Granite Base Comparators

Granite Base Comparators

A series of Black Granite Base Comparators designed to meet the requirements of both the large and small shop. These bases offer a smooth surface, are nonabrasive and extremely hard for frictionless movement of piece parts and are warp and rust free to provide a maintenance free working surface.

Granite Bases with Indicators

These bases are supplied with dial indicators. Any indicator can be substituted, merely add or subtract the difference from the standard indicator supplied.

6" x 6" stand normally supplied with a 26104C, .001" grads and 1.00" travel.

8" x 12" stand normally supplied with a 26104C, .001" grads and 1.00" travel.

12" x 18" stand normally supplied with a 36104C, .001" grads and 1.00" travel.



Granite Base Stand w/ Indicator

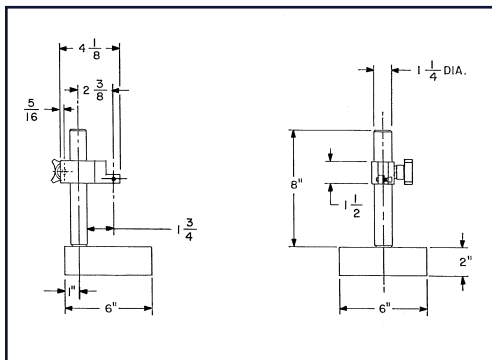
EDP#	Description
6066-1	6" x 6" x 2" With ind., Rigid Arm /Lug Mount
6066-1S	6" x 6" x 2" With ind., Rigid Arm /Stem Mount
6066-10	6" x 6" x 2" With ind., Adj. Arm/Lug Mount
6066-10S	6" x 6" x 2" With ind., Adj. Arm/Stem Mount
60812	8" x 12" x 2" With ind., Adj. Arm /Lug Mount
60812-S	8" x 12" x 2" With ind., Adj. Arm /Stem Mount
60812-R	8" x 12" x 2" With ind., Rigid Arm /Lug Mount
60812-RS	8" x 12" x 2" With ind., Rigid Arm /Stem Mount
61812	12" x 18" x 4" With ind., Adj. Arm /Lug Mount
61812-S	12" x 18" x 4" With ind., Adj. Arm /Stem Mount
61812-R	12" x 18" x 4" With ind., Rigid Arm /Lug Mount
61812-RS	12" x 18" x 4" With ind., Rigid Arm /Stem Mount

Granite Base Stand w/o Indicator

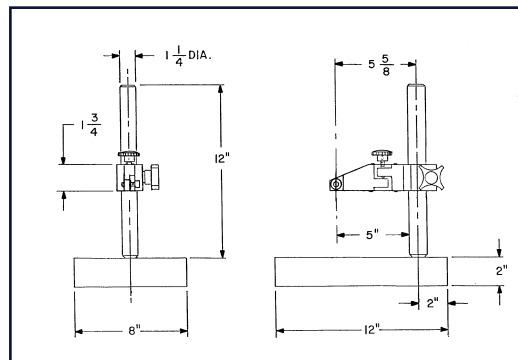
EDP#	Description
6066	6" x 6" x 2" Less ind., Rigid Arm /Lug Mount
6066-S	6" x 6" x 2" Less ind., Rigid Arm /Stem Mount
6066-20	6" x 6" x 2" Less ind., Adj. Arm/Lug Mount
6066-20S	6" x 6" x 2" Less ind., Adj. Arm/Stem Mount
60812-1	8" x 12" x 2" Less ind., Adj. Arm /Lug Mount
60812-1S	8" x 12" x 2" Less ind., Adj. Arm /Stem Mount
60812-1R	8" x 12" x 2" Less ind., Rigid Arm /Lug Mount
60812-1RS	8" x 12" x 2" Less ind., Rigid Arm /Stem Mount
61812-1	12" x 18" x 4" Less ind., Adj. Arm /Lug Mount
61812-1S	12" x 18" x 4" Less ind., Adj. Arm /Stem Mount
61812-1R	12" x 18" x 4" Less ind., Rigid Arm /Lug Mount
61812-1RS	12" x 18" x 4" Less ind., Rigid Arm /Stem Mount

Granite Base Parts

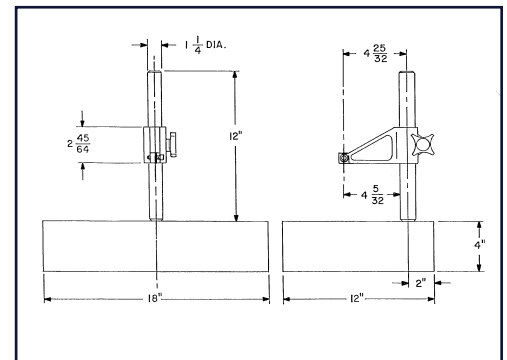
EDP#	Description
CDI6066-1	Granite Base Only 6" x 6"
CDI6066-2	8" Column for 6" x 6" Base
CDI6066-14	Assem., Mounting Arm Lug
CDI6066-15	Assem., Mounting Arm Stem
CDI6066-40	Assem., Adj./Lug Mount Arm
CDI6066-41	Assem., Adj./Stem Mount Arm
CDI812	Granite Base Only 8" x 12"
CDI1812	Granite Base Only 12" x 18"
CDI812-2	12" Column
CDI1812-2	18" Column
CDI1812-3	24" Column
CDI812-15	Comparator Arm Assem., Adj./Lug Mount
CDI812-26	Comparator Arm Assem., Adj./Stem Mount
CDI812-23	Comparator Arm Assem., Rigid/Lug Mount
CDI812-24	Comparator Arm Assem., Rigid/Stem Mount



6" x 6" Granite Base



8" x 12" Granite Base



12" x 18" Granite Base

Note: some dimensions are different for various mounting configurations.

Terminology

- Accuracy** — The difference between a true value and a measured one.
- Calibration** — The process of determining the accuracy of a measuring device or gage.
- Calibration Frequency** — The intervals at which instruments, gages, and masters are calibrated.
- Calibration Limits** — Accuracy level beyond which a measuring tool is no longer considered satisfactory for a particular user.
- Comparing** — A process where the unknown is compared to the known.
- Repeatability** — In the case of a measuring instrument, repeatability is a measuring device's inherent ability to consistently repeat its readings.
- Resolution** — In everyday use, the finest reading an instrument provides.
- Traceability** — Usually documentation showing the 'authority' of a measurement tracing masters, etc. back to a nationally recognized laboratory.
- Uncertainty** — The estimated potential error in a measurement based on tests and usually extensive mathematical calculations.
- Verification** — This term refers to the process of verifying a measured value using a different method of equal or greater precision than the first methods used.

Potential Sources of Error

1. The environment in which the measurements are taken

Temperature
Cleanliness
Humidity
Vibrations

2. The individual making the measurements

Experience Level
Skills and Knowledge
Observational or Manipulative Bias
Computational Errors
Outdated Specifications or Drawings

3. The equipment used for the work

Must have the right performance characteristics and accuracy rating
Must be in a known state of calibration
Contact force and geometry can produce discrepancies
Masters with unknown errors or of dissimilar materials

Determination of Accuracy

Deviation in Least Graduation

Least Graduation		Accuracy				
in.	mm	Repeatability	Hysteresis	First 2½ Revolutions	First 10 Revolutions	First 20 Revolutions note(1)
0.00005	0.001	± 0.2	0.50	± 1	± 4	
0.00010	0.002	± 0.2	0.50	± 1	± 3	± 4
0.00050	0.010	± 0.2	0.33	± 1	± 3	± 4
0.00100	0.020	± 0.2	0.33	± 1	± 2	± 4

Note: (1) Over 20 revolutions, consult individual manufacturers for their standard practice.

Accuracy

All types of indicators shall not be in error at any point within the minimum range more than + or - 1 least dial graduation. An additional + or - 1/3 graduation shall be allowed for hysteresis for all indicator magnifications except those graduated 0.0001 in. (0.002 mm) or finer, where the additional allowance will be + or - 1/2 graduation.

Determination of Accuracy

The accuracy of a dial indicator is the degree to which the displayed values vary from known displacements of the spindle or lever. The following procedure describes a recommended technique to check accuracy.

Calibration or the determination of accuracy may be done with a micrometer fixture, an electronic gage, gage blocks, an interferometer, or other means. Proper techniques would require that the error of the calibrating means and its resolution be no more than 10% of the least graduation value of the indicator being checked or no more than 25% for indicators having least graduation of less than 0.0001 in. or 0.002 mm.

(a) Type A and B indicators are calibrated against a suitable device of known accuracy at a minimum of four equal increments per revolution over the range, starting at approximately the ten o'clock position, after setting the pointer to dial zero at the twelve o'clock position.

(b) Type C indicators are calibrated against a suitable device of known accuracy through one revolution of the pointer at a minimum of four equal increments in the clockwise and counterclockwise modes after setting pointer and dial to zero just beyond the pointer rest position.

(c) When required, indicators of all types shall be calibrated for response to inward and outward movements of the spindle. Immediately after an inward movement is made, an outward movement shall be started without resetting the indicator dial. The maximum difference, known as hysteresis, between any observed indicator and calibrator reading shall not exceed the limit defined in the previous paragraph regarding accuracy.

(d) The table above summarizes the performance criteria for the AGD dial indicators and defines the accuracy tolerance for indicators that exceed the minimum specified range.

Repeatability

Readings at any point within the range of the indicator shall be reproducible through successive movements of the spindle or lever within + or - 1/5 least dial graduation for all types of indicators.

Determination of Repeatability

The following procedures are recommended for determining repeatability.

a) Spindle Retraction: With the indicator mounted normally in a rigid system and its contact point bearing against a nondeforming stop, the spindle or lever is retracted at least five times, an amount approximately equal to 1/2 revolution, and allowed to return gently against the stop. This procedure should be followed at approximately 25%, 50%, and 75% of full range.

b) Use of Gage Blocks: With the indicator mounted under the following conditions: (1) A rigid mounting. (2) A reference plane or anvil perpendicular to the spindle and having a flatness within 2 light bands convex, 1 light band concave over a central 1 in. diameter. (One band = 11.6 u in., approximately 0.3 u m.) (3) Positioning of the indicator such that the contact point and the anvil from four directions: front, rear, left, and right. (c) The maximum deviation in any of the readings for (a) and (b) above shall not exceed + or - 1/5 least dial graduation.

General Points to Consider

1. Calibration methods refer to the most widely used equipment as opposed to devices used by research or government labs.
2. Temperature normalizing plates should be used whenever possible to maintain the stability of items being measured.
3. The perfect master duplicates shape, hardness and material of the specimen for optimum accuracy.
4. The specification to which an item was made should be referred to, because it may define a specific procedure for calibration to ensure agreement on measured values.
5. Comparative devices should be:
A-set to a master
B-reading taken
C-master setting confirmed
6. Equipment should be allowed to cool down from friction-generated heat caused by mechanical adjustments during calibration.
7. Digital measuring heads that are being used for absolute measurement must be square to anvils beneath them.
8. If you cannot meet all requirements for calibrating a certain item, state variations on your report. You may have a valid case for acceptance / rejection despite the variations.
9. Be realistic in estimating your measuring performance. The inaccuracy of the equipment you use is usually a small part of the total errors.
10. Statistical Process Control (SPC) gage capability studies are a method of evaluating a measuring process. They are usually not properly structured for accept / reject decisions on the gaging device itself. Remember that all the statistics in the world cannot improve your accuracy.

If you have doubts about suitability of equipment or methods for a particular application, contact AMTMA Headquarters.

Industry, government, and military standards can be obtained by mail from the following addresses:

ANSI Standards

American National Standards Institute
1430 Broadway
New York, NY 10018
Attn: Sales Department

ASME Marketing Department
22 Law Dr., P.O. Box 2350
Fairfield, NJ 07007-2350

Federal Standards

General Services Administration
Specification and Consumer Information
Distribution Branch
Washington Navy Yard, Bldg.197
Washington, DC 20407

Military Standards

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

Other Standards

Global Engineering Documents
2805 McGaw Ave.
Irvine, CA 92714

Standards Council of Canada
350 Sparks St., Ste. 1200
Ottawa, Ontario K1P 6N7
Canada