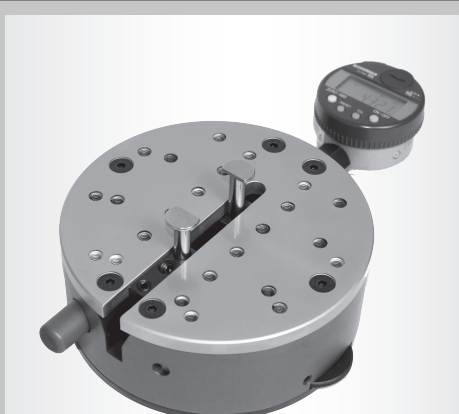


# PRECISION GAGES





# Dyer Delivers Quality, Performance, Value

## THE DYER COMPANY

**Billing Address:**  
PO Box 4966  
Lancaster, PA 17604-4966

**Shipping Address:**  
1500 McGovernville Road  
Lancaster, PA 17601

**Phone:** 717.569.3223  
800.631.3333  
**Fax:** 717.569.6721

[www.dyergage.com](http://www.dyergage.com)  
[Dyer@dyergage.com](mailto:Dyer@dyergage.com)

## TERMS & CONDITIONS

*Prices and specifications are subject to change without notice. Prices in effect at time of shipment apply.*

*Payment terms are net 30 days, F.O.B. Lancaster PA. (We prepay and bill charges.) Shipments are normally made via UPS. If requested we will ship next day.*

*All rush deliveries are shipped "Next Day Air" unless otherwise specified.*

*Dyer accepts VISA and MASTER CARD.*



*Customer satisfaction is first*



*Free customer problem-solving Application Engineering*

## Not your typical gage company

Nestled in beautiful Lancaster County, Pennsylvania, is a company with the latest technology in dimensional gaging. Dyer is a technical leader in bore gaging, groove gaging and min-wall/thickness gaging. Additionally, we offer many special application gages and systems. For over 40 years we have supplied our customers with the highest quality gages that speed measuring times and eliminate operator error.

Because we specialize, Dyer's focused technical expertise, knowledge and large product selection allows our application engineers to draw from a selection of gaging solutions. We always choose the right gage for your application; this means you will always receive the correct gage to make your measurements.

## You can count on Dyer for quality & performance

Dyer guarantees 100% customer satisfaction. Each product must meet your quality and performance specifications.

## Dyer's Pledge

We place both Quality of Products and Quality of Operations in high regard. We expect and maintain the highest standards from our suppliers and ourselves.

## Free 10-Day Trial Offer

Not sure if the gage is right for your application? Send a drawing of your measurement problem to the Dyer Engineering department and we will recommend the best gage to fit your needs. Still not convinced? We can send a standard gage model to try at your facility at no cost to you. Contact Dyer for further details.

## Call Dyer's Hotline for Fast Problem-Solving

Call Dyer and talk at once to a human who can help.  
**800.631.3333**

## Visit our web site [www.dyergage.com](http://www.dyergage.com) and find:

- Interactive electronic catalog, complete product listing
- Gages by measuring application
- Gages by industry application
- Photo gallery of special gaging solutions
- New products

We deliver more measuring solutions.





James Scott

# A TIME TO REMEMBER

1940–2011

The Dyer Company started in the early 1970's with only a handful of products and a small customer base. James Scott purchased the company in 1978 and immediately created a new culture and passion that took this small company in a new and exciting direction. Jim's motto was always, "Customer Satisfaction is #1." He would often say, "they are the life-blood of a company" and it was the "value-added experience" which was one of the most critical aspects that would set Dyer apart from all the rest.

Jim's philosophy was to service his customers above and beyond all expectations. It worked. For over 40 years of offering the finest precision gages on the market, Jim's dream and passion continues strong today.

Dyer now offers thousands of unique products and services all across North America and has distributors in every state and province. His spirit will always be a part of the Dyer company. I promise to continue his philosophy and keep Dyer as an industry leader in the Precision Measuring Instruments Field, while exceeding expectations all along the way.

**Michael Scott**  
President / CEO



## "ATTITUDE" by Charles Swindoll

"The longer I live, the more I realize the impact of attitude on life. Attitude, to me, is more important than facts. It is more important than the past, than education, than money, than circumstances, than failures, than successes, than what other people think or say or do. It is more important than appearance, giftedness or skill. It will make or break a company... a church... a home. The remarkable thing is we have a choice every day regarding the attitude we will embrace for that day. We cannot change our past... we cannot change the fact that people will act a certain way. We cannot change the inevitable. The only thing we can do is play on the one string we have, and that is our attitude... I am convinced that life is 10% what happens to me and 90% how I react to it. And so it is with you... We are in charge of our attitudes."

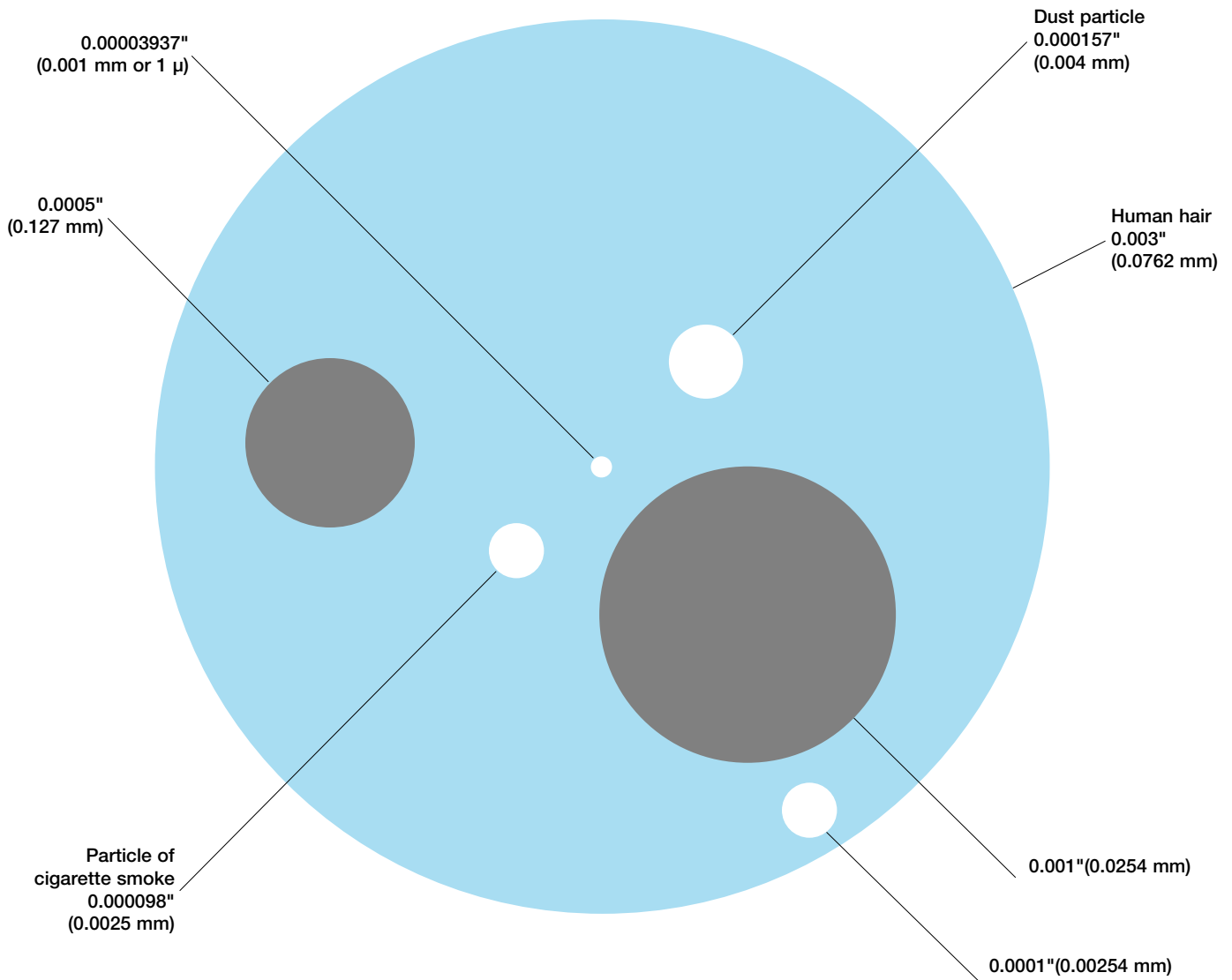


We can look at a part drawing and say...  
“Here is what you need.”

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<b>B</b>	ID Groove and ID-OD Gages
<b>C</b>	Min-Wall/Thickness Gages
<b>D</b>	Special Application Gages
<b>E</b>	Indication, Electronic and Mechanical
<b>F</b>	Universal Setting Masters, Ring and Cylinder Masters





**“Dyer’s Value-Added Service to Our Customers”**  
**We can look at a part drawing and say, “here is what you need.”**

1. Free, fast and experienced gage **application engineering**, Gage R & R capability, guaranteed with each requirement.
2. Many **unique gages** with more models and more proven gage designs.
3. **Precise, accurate, repeatable** Gage R & R capable and and table gages.
4. Fast, easy to use, **24-7 shop-rugged** quality gages.
5. King of specials and **custom designs**.
6. **Quick delivery**, all gage packages tested for function and accuracy.

Look for Dyer’s **Maximum Measuring Accuracy** on each series of gages. When we know the part’s measuring application Dyer guarantees we will meet your Gage R & R requirements.

Look for our “Build Your Own Gage” Package logo for each gage series.

Most Dyer gages are designed as modular build-up systems. This gives our customers choices when selecting components, accessories, indication and setting masters for each gaging situation. Contact Dyer and we will help you select the right gage package for your application.

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**Dyer's experience**  
• Gage R & R  
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• 2 depth locations



**A**  
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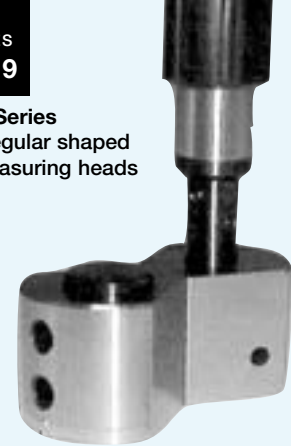
**A**  
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**240 Series  
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• 4 sets of contacts  
• 4 radial positions  
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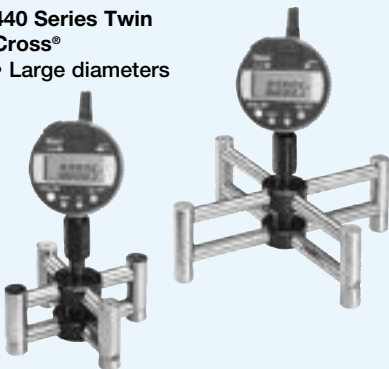
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• Irregular shaped  
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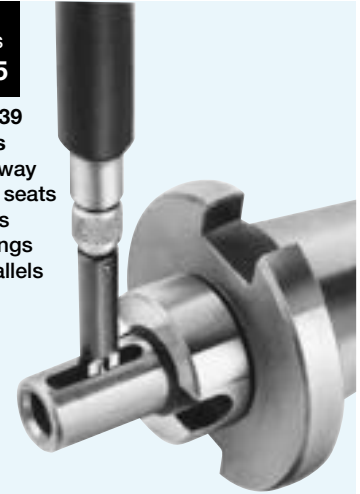
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# Photo index precision gages “find your measuring solution”



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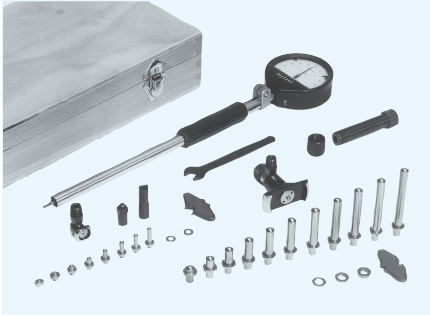
- Standard handle bore gages



# Photo index precision gages “find your measuring solution”

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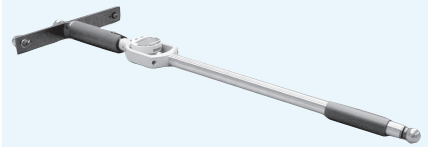
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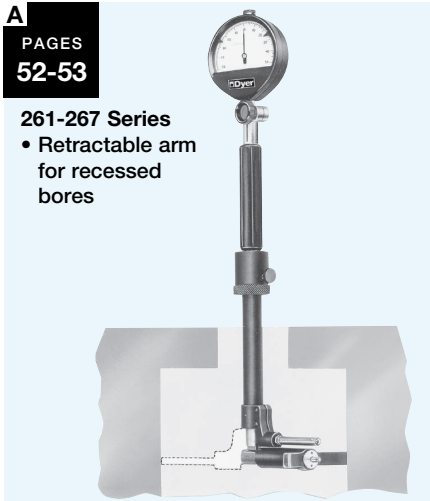
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• In-line, shallow, short bores and grooves



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**Laser Marking & Case Options**



# Photo index precision gages “find your measuring solution”



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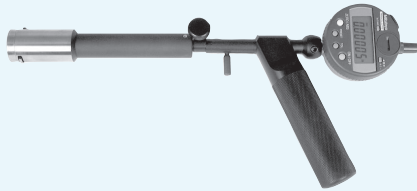




# Photo index precision gages “find your measuring solution”

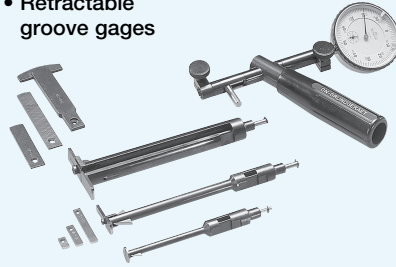
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- 242 Series**  
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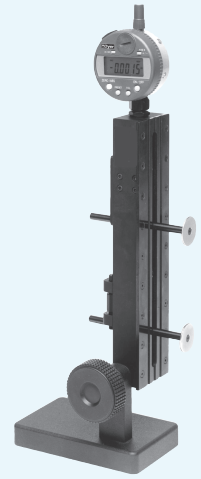
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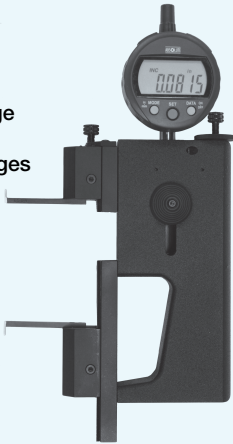
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- 131 Series**  
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- 132 Series**  
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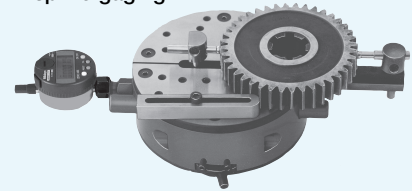
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- 747 Series**  
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- 747 Series**  
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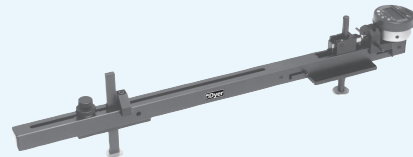
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- 134 Series**  
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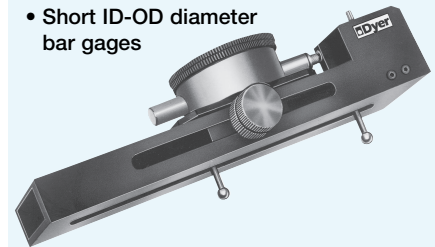
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- 135 Series**  
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# Photo index precision gages “find your measuring solution”



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- Classic Dyer
- Direct reading min-wall/ thickness gages



**C**  
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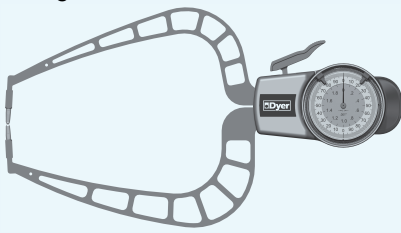
- Electronic min-wall/thickness gages



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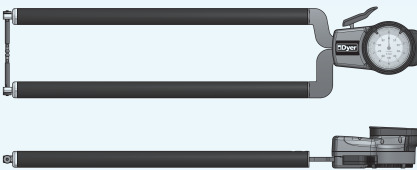
- Longer reach over flanges



**C**  
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**334 Series**

- Longest reach thickness gages



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**255, 256 Series**

- Groove/undercut width, depth, spacing



**D**  
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**550 Series**

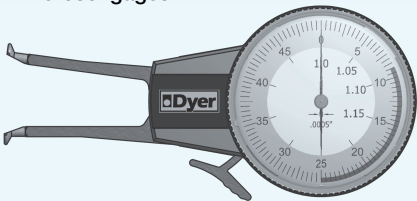
- Inside Ø's flexible, wall, parts



**D**  
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**303 Series**

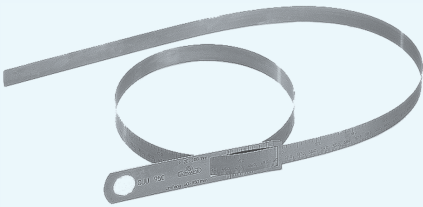
- Aerosol gages





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**Measuring Tapes**



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- Electronic and mechanical indicators, a complete selection



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- 971 Series
- Transducer probes



**E**  
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- 981 Series
- Display Box



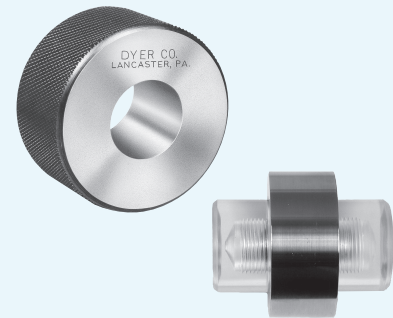
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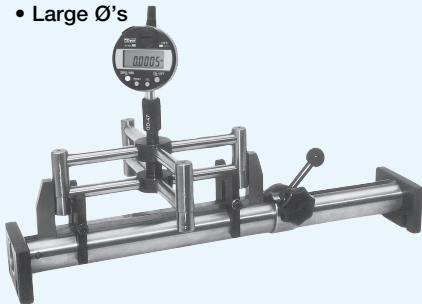
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- 800 Series Master Rings
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- 410 Series
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- 415 Series
- Automatic adjustable setting master



**visit**

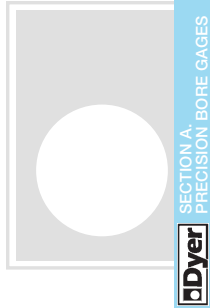
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# A



## Bore Gage Applications and Precision Measuring Solutions High Accuracy Bore Gages



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# GAGE R & R CAPABILITY, A FUNDAMENTAL QUALITY PRACTICE



## Dyer guarantees a $\leq 10\%$ Gage R & R with all our bore gages.

Using Gage R & R qualified Dyer bore gages assure that you will always be using the correct gage for the measuring application. Dyer will meet a  $\leq 10\%$  Gage R & R requirement even on 0.0002" (5 $\mu$ ) tolerance bores.

## What is Gage R & R?

Gage Repeatability and Reproducibility (Gage R & R) capability standards have direct implications for parts makers and for gage manufacturers. Repeatability is the ability of an operator using a single gage to obtain the same measurements during a series of tests. Reproducibility is the ability of different operators to obtain similar results with the same gage. Gage R & R blends these two factors together to determine a measuring system's reliability, and its suitability for a particular measuring application.

## Dyer offers more bore gage designs and more measuring options

Designed for precision bore measuring Dyer's rugged gages make gaging a "hands off" process. Advances in gage technology have brought significant improvements to the measuring process. Non-tipping two point contact bore gages assure our customers that the accuracy and repeatability of measurements doesn't depend on the skill of the operator. Dyer's "hands off" bore gages guarantee that every measurement taken with our non-tipping gage is verifiably repeatable and accurate.

## The best gage for the job, more gage options and more gaging solutions

Using Dyer's Gage R & R rated bore gages assures you will always be using the right gage for your measuring application.

For example, a gage design that meets the Gage R & R requirements for a 2.00" bore, may be unsatisfactory on 8.00" bores. A gage that meets a  $\leq 10\%$  Gage R & R for a bore tolerance of 0.001" may not be satisfactory at a tolerance of 0.0003".

Gage R & R standards will help parts makers identify the best gage for the job.

## Why Gage R & R Machine and Process Capability Studies

When establishing a capability study, you first have to select critical dimensions to be examined. Then you collect as much data as possible.

Only with Gage R & R rated gages can you be sure that you are collecting exact data, and establish the control limits for the process assuring it is really under control.

## SPC

The basis for accurate SPC charting is directly related to the accuracy, reliability and repeatability of the gage making the measurement.

Only with Gage R & R rated gages can you be sure that your measurement numbers are exact.

## Dyer knows Gage R & R – We add value to your process

We know the operating ability of our gages in most measuring situations. We guarantee that our gages are Gage R & R capable in each application.

We will run a Gage R & R study on your parts at our facility before we ship the gage.

Our Gage R & R capability assures you are using the right gage and making exact measurements.

## The Bottom Line

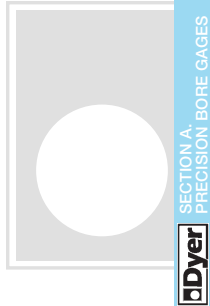
We identify the best gaging solution for each customer application. Dyer gages provide short and long term improvements that help you produce better parts.

Gage R & R rated gages benefit, six sigma manufacturing, zero defects, CPK and SPC. That goes right to your bottom line.





# DYER'S HIGH ACCURACY & REPEATABILITY ADVANTAGE



## Dyer's experience and superior gage designs result in better bore gaging

### Non-tipping, two point contact "hands off" bore gages

Dyer is a technical leader in bore gages. We have a large selection of proven gage designs to choose from when we are evaluating a bore measuring application. Many of our new designs make bore measuring a "Hands off" process.

Advances in gage technology and electronics have brought significant improvements to the bore measuring process. Dyer's non-tipping two point contact bore gages assure parts manufacturers that the accuracy and repeatability of a measurement does not depend on the skill of the operator. These "hands off" gages guarantee that every measurement taken is correct and Gage R & R capable.

### Eliminating Operator Error

A look at the operation of a non-tipping gage will show the instrument's advantages. The gaging process is quick and easy. The operator inserts the gage and takes a reading without having to do any rocking or aligning. Operator influence is a problem of the past.

### Superior Design and Construction

Here are real reasons Dyer's bore gages are the industry's best performers.

#### ◉ Linearity

$\leq \pm 0.000040"$  ( $\pm 0.001$  mm) a simple direct transfer of the contact point movement to the measurement indicator. This results in the best linear accuracy.

#### ◉ Repeatability

$\leq \pm 0.000040"$  ( $\leq \pm 0.001$  mm)

#### ◉ Automatic Centering

The correct self-centering base for each measuring range assures axial and radial alignment in each bore every time it measures.

#### ◉ Gage Stability

Heat Stabilization. The handles (measuring transfer shafts) of all Dyer precision bore gages are made from Invar steel, a special alloyed steel that resists temperature change. This eliminates errors due to circulating temperatures.

### GAGE REPEATABILITY AND REPRODUCIBILITY REPORT

Gage I.D.: General Gage R & R  
Spec. Limits: 25.375 / 25.426

Comments: Mastered @ 25.40mm  
Characteristic: Main Bore ID

No. Trials: 2  
No. Operators: 3  
No. Parts: 10

Operator A				Operator B				Operator C			
	1 Trial	2 Trial	Range		1 Trial	2 Trial	Range		1 Trial	2 Trial	Range
1	25.386	25.385	0.001	1	25.386	25.385	0.001	1	25.384	25.385	0.001
2	25.384	25.384	0.000	2	25.384	25.384	0.000	2	25.383	25.383	0.000
3	25.382	25.382	0.000	3	25.382	25.381	0.000	3	25.381	25.381	0.000
4	25.383	25.383	0.000	4	25.383	25.382	0.001	4	25.382	25.382	0.000
5	25.382	25.382	0.000	5	25.352	25.381	0.001	5	25.381	25.381	0.000
6	25.382	25.380	0.002*	6	25.381	25.380	0.001	6	25.381	25.381	0.000
7	25.382	25.382	0.000	7	25.383	25.381	0.002*	7	25.382	25.381	0.001
8	25.384	25.384	0.000	8	25.385	25.384	0.001	8	25.385	25.384	0.001
9	25.384	25.384	0.000	9	25.383	25.383	0.000	9	25.383	25.383	0.000
10	25.382	25.381	0.001	10	25.381	25.380	0.001	10	25.381	25.381	0.000
<b>Totals</b>	<b>253.831</b>	<b>253.827</b>	<b>0.004</b>	<b>Totals</b>	<b>253.830</b>	<b>253.821</b>	<b>0.009</b>	<b>Totals</b>	<b>253.823</b>	<b>253.822</b>	<b>0.003</b>

Sum	Xbar A	Rbar A	Sum	Xbar B	Rbar B	Sum	Xbar C	Rbar C
507.658	25.3829	0.004	507.651	25.3826	0.009	507.645	25.3823	0.0003

<i>Rp: 0.0043</i>	<i>R: 0.0005</i>	<i>Max X: 25.3829</i>	<i>* Limit of individual R's. Correct Rbar by repeating those readings using the same appraiser and unit or discard the values and reaverage and recompute R-bar and the value UCL-R.</i>
<i>Tv: 0.0076</i>	<i>UCL-R: 0.0017</i>	<i>Min X: 25.3823</i>	
		<i>X Diff: 0.0007</i>	

Measurement Unit Analysis:	Process Variation Analysis:	Tolerance Analysis: TOL = 0.0510
Equipment Variation (E.V.) E.V. = 0.0024	% Equipment Variation (E.V.) % E.V. = 31.94%	% Equipment Variation (E.V.) % E.V. = 4.77%
Appraiser Variation (A.V.) A.V. = 0.0017	% Appraiser Variation (A. V.) % e. v. = 31.94%	% Appraiser Variation (A.V.) % A.V. = 3.27%
Repeatability & Reproducibility R & R = 0.0029	% Repeatability & Reproducibility % R & R = 38.73%	% Repeatability & Reproducibility % R & R = 5.78%
Process Variation (P.V.) P.V. = 0.0070	% Process Variation (P.V.) % P.V. = 92.19%	% Process Variation (P.V.) % P.V. = 13.76%

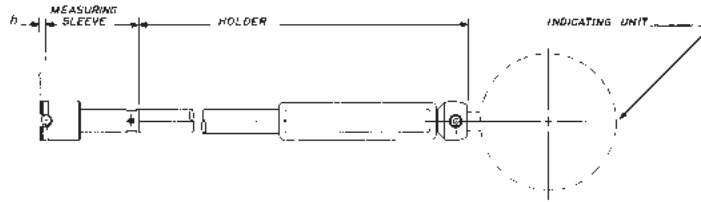


# 240 SERIES FASTER GAGING TIMES ORDERING NAMES



## Maximum Measuring Accuracy

Linear  $\pm 0.000040''$  ( $\pm 0.001$  mm)  
 Repeatability  $< 0.000040''$  ( $< 0.001$  mm)  
 Gage R & R  $\leq 10\%$  capability when measuring high tolerance bores.  
 Please contact Dyer with your application.



## Custom Standards and Specials

Dyer also makes special design measuring sleeves to fit your unique application. These special design heads can have:

- More contact travel, rough cut/final cut possibilities
- Many unique sleeve profiles
- Extra long or short sleeve lengths
- 2 or 3 point contacts
- Special depth stops
- Special masters
- Special contact shapes, types and sizes
- Special coatings
- 2, 3, or 4  $\emptyset$  planes and radial axis

## CAD Prints and Drawings

Available from Dyer is our "Quick Reference" 8-1/2" x 11" reduced drawing of our 240 Series Bore Gages. CAD drawings of our gages on your drawing paper can be done. Contact Dyer Applications Engineering Services.

The 240 Series Measuring Sleeves are dedicated gages that are specifically machined to fit a customer's bore diameter. It is very important to know your part tolerance to make sure the gage has the appropriate range to cover the part specification. On average, the total travel of a gage head is 0.010" (0.25mm).

The "h" dimension is the distance from the centerline of the measuring contact to the bottom of the measuring sleeve. This determines how close to the bottom of a bore you can measure. There are basically (3) different standard "h"

dimensions. A thru bore "h" dimension is generally 0.400" (10mm), a blind bore "h" dimension is 0.118" (3mm) on average, and a super blind "h" dimension is 0.039" (1mm).

A complete setup includes a measuring sleeve head, a holder, an indicator (mechanical or electronic), and a master ring. If a customer already has an existing holder, indicator, or master, they can adapt the 240 Series Measuring Sleeve directly to it.

We encourage a customer to send us a drawing or sectioned part print of their specific measuring requirement. Our engineering staff will be able to clearly identify the proper measuring sleeve needed to perform the task. A formal quotation can be generated listing all the items needed to make a complete system.

Our standard delivery for diameters between 0.118" (3mm) and 5.118" (130mm) is 1 to 2 weeks. Our rush delivery for these same sizes is 1 to 2 days and carries with it a premium charge. We also have an "extended" (or longer delivery) of 6 weeks for these sizes for those customers that are not in a hurry and want a discounted price. Contact Dyer customer service for further details.

240 Series sizes under 0.118" (3mm) and over 5.118" (130mm) have a standard delivery of 6 weeks. There are no "rush" or "extended" delivery options for these 240 Series sizes. (Look into the Dyer 440 Series Twin Cross for larger dedicated heads for faster delivery.)

## 240 Measuring Sleeves

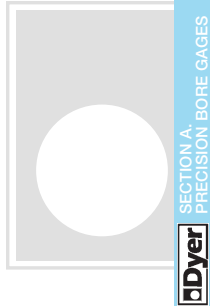
Sleeve Size Selection		Thru Bores		Blind Hole Bores		Super Blind Hole Bores		
Inch	mm	Tool Steel	h**	Tool Steel	h**	Tool Steel	h**	
0.098-0.117	2.5-3.5	N/A	N/A	240-035		N/A		
0.118-0.157	3.0-4.0	240-400	0.236 (6 mm)	240-040		240-500	N/A	
0.158-0.236	4.1-6.0	240-405		240-050		240-505		
0.240-0.472	6.1-12	240-410		240-052		240-510		
0.473-0.787	12.1-20.0	240-415		240-055		240-515	0.039" (1mm)	
0.791-1.181	20.1-30.0	240-420		240-060		240-520		
1.182-1.574	30.1-40.0	240-425		240-065	"h" DIM's	240-525		
1.579-2.362	40.1-60.0	240-430		240-070		240-530		
2.363-3.150	60.1-80.0	240-435	All "h"	240-075	range between	240-535		
3.151-3.937	80.0-100.0	240-440	DIM are	240-080	0.059" (1.5 mm)	240-540		
3.938-4.331	100.1-110.0	240-445			240-085		240-545	
4.332-4.724	110.1-120.0	240-450	0.400"	240-090	and 0.157" (4 mm)	240-550	"h" DIM is	
4.725-5.118	120.1-130.0	240-455	(10 mm)	240-095		240-555	0.047" (1.2 mm)	
5.119-5.512	130.1-140.0	240-460			240-100	Depends on		240-560
5.513-5.906	140.1-150.0	240-465			240-105	Sleeve Size		240-565
5.907-6.299	150.1-160.0	240-470		240-110		240-570		
6.300-6.693	160.1-170.0	240-475		240-115		240-575		
6.694-7.087	170.1-180.0	240-480		240-120		240-580		
7.088-7.480	180.1-190.0	240-485		240-125		240-585		
7.481-7.874	190.1-200.0	240-490		240-130		240-590		
7.875-9.000	200.1-230.0	240-616	INQ.	240-617	INQ.	N/A	N/A	

**Note:** Specify exact depth of bore for diameters under 0.472" (12 mm).  
 1. For sizes between 4 mm and 12 mm, we offer extended measuring depths of 2.0" (50 mm), 4.0" (100 mm), and 6.0" (150mm). Contact Dyer.

Chrome Rc 72-74  
 Tool Steel Rc 62-65

\*\*Distance from the centerline of contact to the bottom of sleeve.

# 240 SERIES INDICATING PLUG BORE GAGES



**Maximum Measuring Accuracy**  
 Linear  $\leq \pm 0.000040"$  ( $\leq \pm 0.001$  mm)  
 Repeatability  $< 0.000040"$  ( $< 0.001$  mm)

**Fast Delivery 24-48 hours or 1-2 weeks • 240 Bore Gages**

**Fast, Accurate and Repeatable Measurements**

Dyer's 240 Series indicating plug gages are used for repetitive bore measurement applications or dedicated high volume production runs.

This rugged and dependable 24-7 bore gage was designed with the operator in mind. Fast, easy to use and no operator error.

Best in Gage R & R performance with an impressive  $\leq 10\%$  capability, even during high tolerance applications and when measuring small or large bores.

**Heavy-duty measurement transfer holder is made of Invar steel with hand insulator shield**

**Sleeve tool steel Rc62-65, Chrome coating optional**

**Fast maintenance service, returned "just like new"**

We can turn your gage around in one day at our Lancaster facility. Also, if part dimensions change it is possible to rework your existing measuring head to a new size. If you need to quickly replace another manufacturer's measuring head, just tell us the model and thread size, we will supply a head that will fit your present holder. "Quick factory floor problem-solving reduces downtime and assures quality."

**ALL CUSTOM MEASURING SLEEVES**  
 240 Series SIZES  
 0.118" (3 mm) thru  
 5.118" (130 mm)  
 Fast Delivery, Rush 24-48 hours  
 or standard 1-2 weeks



**Complete System Availability**

Dyer is also a "one-stop" system supplier. We package in a single case the measuring sleeve, depth stop, gage holder, indicator and setting master. We will supply the indicator of your choice on each 240 Series gage. Each set is inspected for function and accuracy before shipping. "Single source responsibility assure gages arrive on time, complete and working."

**Automatic Centering and No Operator Error**

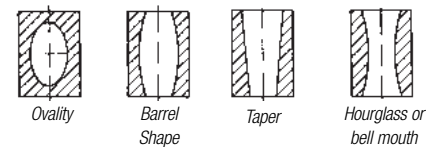
In achieving the highest accuracies, the centering sleeve is made approximately 0.001" – 0.002" under the low limit of your minimum bore tolerance. The carbide ball contact points housed in the centering sleeve, along with the free floating movement, permit the highest measuring accuracy.

The measurement is "locked in" and no operator error is possible. A special chamfer at the bottom of centering sleeve (top chamfer is optional) permits easy entry into the bore.

The spring-loaded outward contact pressure along with automatic centering and non tipping means no operator error when measuring bores.

**Two-Point Floating Contact Measuring System**

Positive two-point outward contact pressure and continuous on-line indication of the measured value permits the operator to see the bore's profile. The following geometry can be measured.



# DYER DELIVERS ADDED VALUE WITH OUR MEASURING SLEEVES



**240 Series Measuring Sleeves are adaptable to other manufacturers' handles.**

## FREE, Fast Application Engineering

Contact Dyer via web site, e-mail, fax or phone with your measuring application.

We will immediately review your specific application and supply you with a detailed quote.

We can look at a part drawing and say, "Here is what you need."

**Fast Delivery**  
24-48 hours or 1-2 weeks

**Fast service on custom dedicated measuring sleeves**

## Notable Features

Dyer supplies measuring sleeves with post threads M6, M10, M11, M12 with delivery as short as 24-48 hours Rush Delivery. Dyer's standard post thread is an M11 and our competition uses M6, M10 and M12. Now, when you quickly need to replace another manufacturers measuring sleeve, just tell us the model and we will supply a Dyer sleeve with the correct thread that will fit your present holder.

*It is easy to change over to Dyer measuring sleeves.*

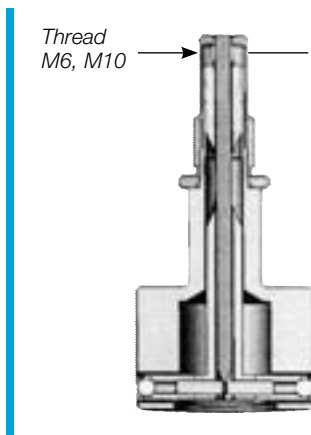
All Dyer carbide measuring needles can be taken out of the sleeve without use of a tool. Just screw off the security cap/nut. The needle movement is securely guided during the measurement transfer assuring accuracy.



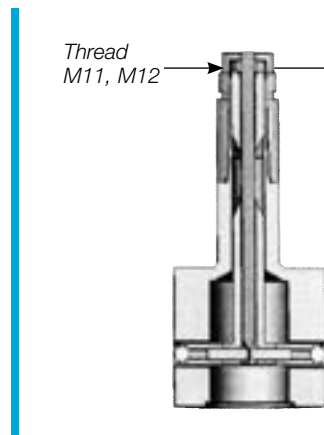
*Fast, Precise Measurement*



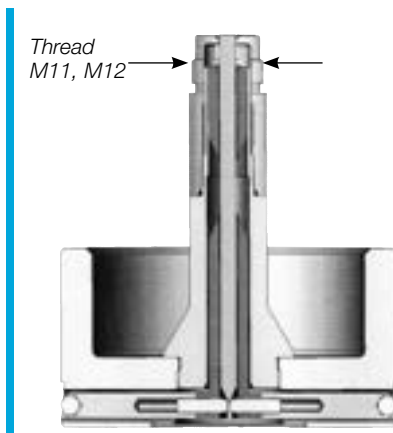
*No Operator Error*



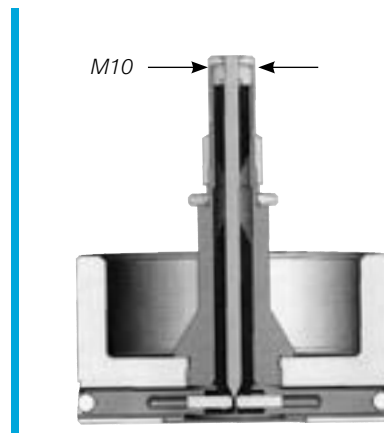
*Blind hole bore small sleeve design*



*Thru bore small sleeve design*

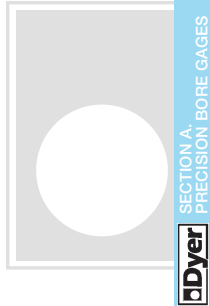


*Large sleeve design*



*Large sleeve design*

# SPECIAL ACCESSORY OPTIONS FOR DEDICATED GAGING



## Special Contact Points, Form, Size and Material Type

**Carbide balls** – Standard on all 240 Series gage heads. Special sizes are available

**Ruby, Ceramic, Chrome, Delrin and Industrial Diamond balls** – Special ball materials and sizes are available depending on your unique part application needs.

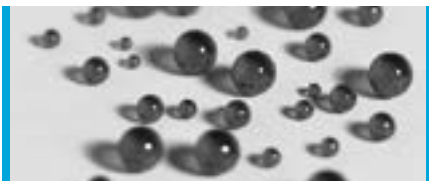
### Aluminum and other non-ferrous metals measuring

A sliding friction between carbide and aluminum or other non-ferrous metals can cause built up local heating at the contact points when measuring. This can result in aluminum sticking to the contact points.

Ruby, ceramic or chrome contacts and Dyer's push button handle are solutions to this special application.



Carbide balls



Ruby balls

### Mushroom Contacts

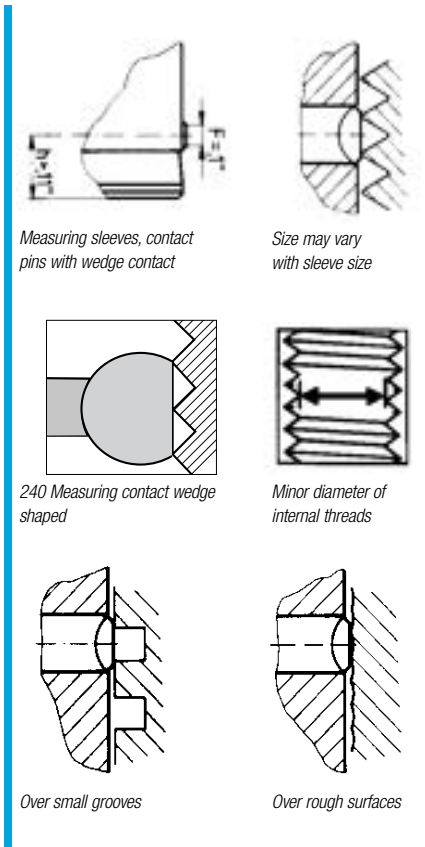
Large radius contacts are used for special applications. A radius that matches the bore size is also available. Contact Dyer.



**Chisel Contacts** – Special wedge contacts to measure the minor diameter of threads, gears, splines and other special internal profiles. These contacts are designed to span two or more teeth. Contact Dyer with your requirements.

### Soft Surface Measuring

Soft part surface materials are scratch sensitive and the measuring pressure of the gage can cause deforming of the bore's surface. This gage application can be solved with large radius contacts of Chrome or Delrin. Dyer's push button handle is used to reduce contact point pressure when moving the gage in the bore.



Chisel contact applications

## Special Chamfer Options 240 Series Measuring Heads

### Unique Standard Insertion Chamfer

The insertion chamfer of Dyer's measuring sleeve allows for easy entering of the gage into the bore with no tilting. The height of the chamfer depends on the diameter of the sleeve.

### Special 2nd Insertion Chamfer

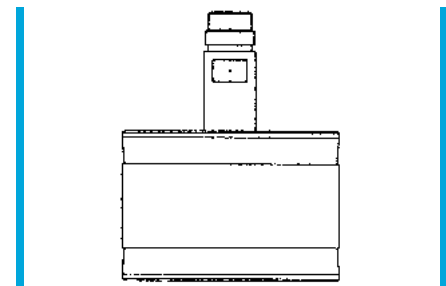
When measuring interrupted (same size) multiple bores on one line the return exiting of the measuring head can be difficult. To solve this problem we supply a measuring head with a second top chamfer. (See Dwg. 1)

### Special Insertion Chamfer for Automatic Gage Measurement

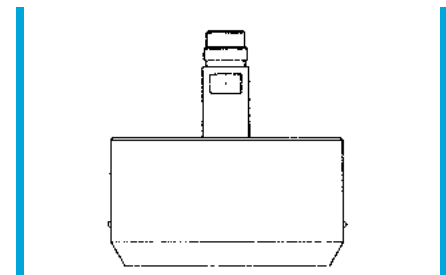
A floating holder that permits radial movement is used to hold the gage. This measuring head is offered with a special chamfer. (See Dwg. 2)

### Special No Chamfer Measuring Head

When measuring very short or thin bores, an insertion chamfer can result in bad centering. In these cases we supply a gage with little or no chamfer with a depth stop. Contact Dyer with your application requirements.



Drawing 1.  
240 Sleeve with insertion and retraction chamfer



Drawing 2.  
240 Sleeve with 30° automatic insertion chamfer



# 240 SERIES THRU BORE MODELS



## Maximum Measuring Accuracy

Linear  $\pm 0.000040''$  ( $\pm 0.001$  mm)  
 Repeatability  $< 0.000040''$  ( $< 0.001$  mm)  
 Gage R & R  $\leq 10\%$  capability when measuring high tolerance bores. Please contact Dyer with your application.

- Used to measure bores without a bottom
- Contacts are set towards the middle of sleeve to help stabilize gage in part before measurement
- Insertion chamfer makes it easy for gage to enter part
- Carbide ball contacts are standard, but other materials are available upon request
- Special contact profiles are available: such as wedge, mushroom, and special radius versions
- If the length of the bore is short, then a depth stop is recommended to stabilize gage in bore

(See depth stop page for further details)



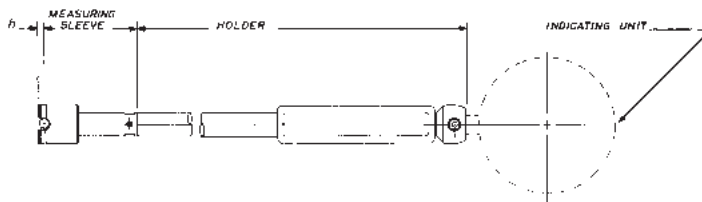
240 Thru Style measuring sleeve for 60mm  $\varnothing$  and greater

## 240 Series Thru Part Numbers

Sleeve Size Selection		Thru Bores
Inch	mm	Tool Steel
0.098–0.117	2.5–3.5	N/A
0.118–0.157	3.0–4.0	240-400
0.158–0.236	4.1–6.0	240-405
0.240–0.472	6.1–12	240-410
0.473–0.787	12.1–20.0	240-415
0.791–1.181	20.1–30.0	240-420
1.182–1.574	30.1–40.0	240-425
1.579–2.362	40.1–60.0	240-430
2.363–3.150	60.1–80.0	240-435
3.151–3.937	80.0–100.0	240-440
3.938–4.331	100.1–110.0	240-445
4.332–4.724	110.1–120.0	240-450
4.725–5.118	120.1–130.0	240-455
5.119–5.512	130.1–140.0	240-460
5.513–5.906	140.1–150.0	240-465
5.907–6.299	150.1–160.0	240-470
6.300–6.693	160.1–170.0	240-475
6.694–7.087	170.1–180.0	240-480
7.088–7.480	180.1–190.0	240-485
7.481–7.874	190.1–200.0	240-490
7.875–9.000	200.1–230.0	240-616

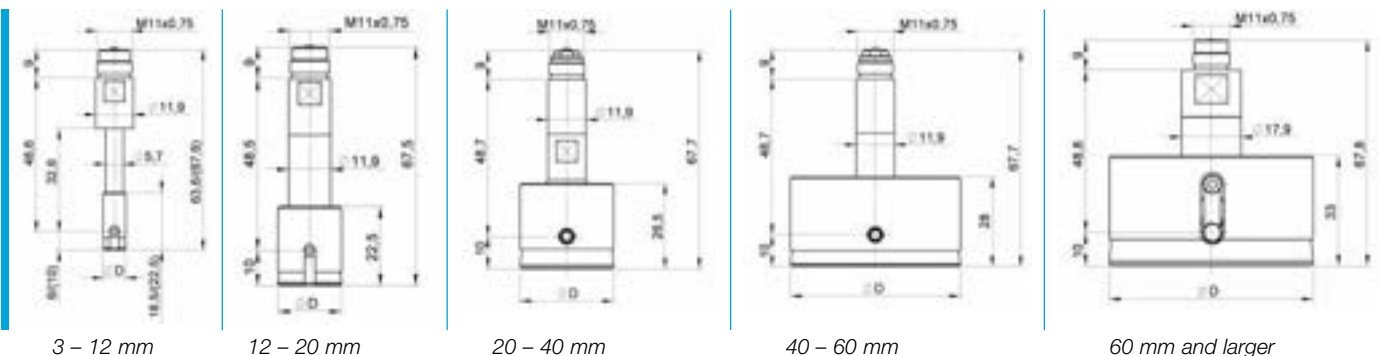
The "h" dimension is the distance from the centerline of the measuring contact to the bottom of the measuring sleeve.

- "h" = 6 mm for  $\varnothing < 9$ mm
- "h" = 10 mm for  $\varnothing > 9$ mm
- Special "h" dim. are offered on request
- A complete setup includes a measuring sleeve, holder, indicator, and master ring

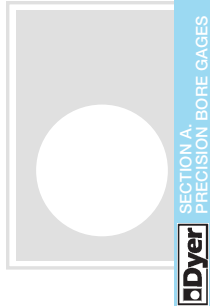


240 Series Thru Bore sleeve with 240-010 handle and 900-105 digital indicator

## 240 Thru Style Head Dimensions

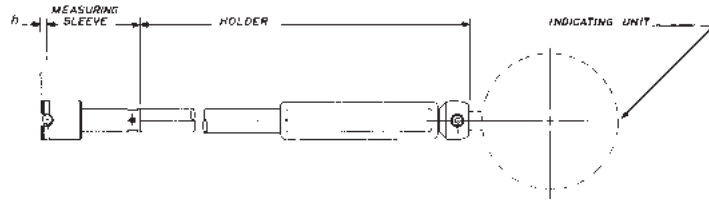


# 240 SERIES BLIND BORE MODELS



## Maximum Measuring Accuracy

Linear  $\pm 0.000040''$  ( $\pm 0.001$  mm)  
 Repeatability  $< 0.000040''$  ( $< 0.001$  mm)  
 Gage R & R  $\leq 10\%$  capability when measuring  
 high tolerance bores. Please contact Dyer  
 with your application.



Used to measure close to the bottom  
 of a bore

Contacts are set towards the  
 bottom of the sleeve to allow the  
 measurement to be close to the  
 bottom of the part

Gage can rest on the bottom of  
 the part or be raise and lowered  
 throughout the length of the bore.

Measuring at the top of the part  
 requires a depth stop for added  
 stability

Insertion chamfer makes is easy  
 for gage to enter part

Carbide ball contacts are standard,  
 but other materials are available upon  
 request

Special contact profiles are available:  
 such as wedge, mushroom, and  
 special radius versions

## 240 Series Blind Part Numbers

Sleeve Size Selection		Blind Bores
Inch	mm	Tool Steel
0.098–0.117	2.5–3.5	<b>240-035</b>
0.118–0.157	3.0–4.0	<b>240-040</b>
0.158–0.236	4.1–6.0	<b>240-050</b>
0.240–0.472	6.1–12	<b>240-052</b>
0.473–0.787	12.1–20.0	<b>240-055</b>
0.791–1.181	20.1–30.0	<b>240-060</b>
1.182–1.574	30.1–40.0	<b>240-065</b>
1.579–2.362	40.1–60.0	<b>240-070</b>
2.363–3.150	60.1–80.0	<b>240-075</b>
3.151–3.937	80.0–100.0	<b>240-080</b>
3.938–4.331	100.1–110.0	<b>240-085</b>
4.332–4.724	110.1–120.0	<b>240-090</b>
4.725–5.118	120.1–130.0	<b>240-095</b>
5.119–5.512	130.1–140.0	<b>240-100</b>
5.513–5.906	140.1–150.0	<b>240-105</b>
5.907–6.299	150.1–160.0	<b>240-110</b>
6.300–6.693	160.1–170.0	<b>240-115</b>
6.694–7.087	170.1–180.0	<b>240-120</b>
7.088–7.480	180.1–190.0	<b>240-125</b>
7.481–7.874	190.1–200.0	<b>240-130</b>
7.875–9.000	200.1–230.0	<b>240-617</b>



240 Blind Style measuring sleeve  
 for 60mm  $\varnothing$  and greater

The "h" dimension is the distance from the  
 centerline of the measuring contact to the  
 bottom of the measuring sleeve.

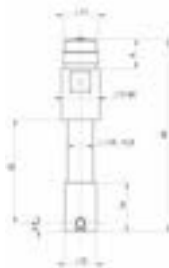
- "h" = 1.5 mm for  $\varnothing$  3–6 mm
- "h" = 2.5 mm for  $\varnothing$  6–20 mm
- "h" = 3.5 mm for  $\varnothing$  20–60 mm
- "h" = 4.0 mm for  $\varnothing$  > 60 mm
- Special "h" dim. are offered on request
- A complete setup includes a measuring  
 sleeve, holder, indicator, and master ring

240 Series Blind sleeve with 240-010  
 handle and 900-105 digital indicator

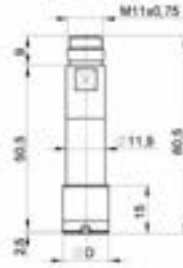
## 240 Blind Style Head Dimensions



3 – 6 mm



6 – 12 mm



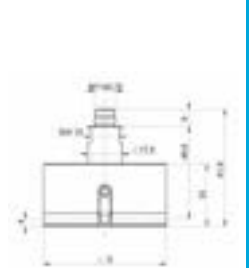
12 – 20 mm



20 – 40 mm



40 – 60 mm



60 mm and larger



# 240/440 SERIES HANDLES & DEPTH EXTENSIONS

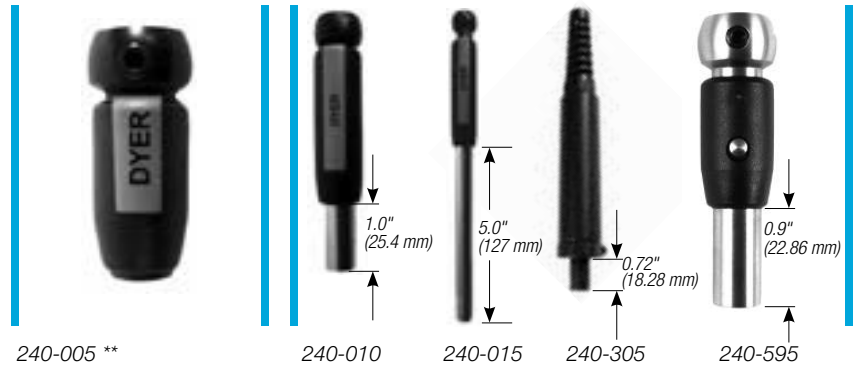
240/440 handles will accept 0.375" or 8 mm diameter stem indicator. Each handle includes two interchangeable brass bushings for each diameter and an allen wrench.

**Heat Stabilization**  
Handles of all Dyer precision bore gages are made from Invar steel, a special alloyed steel that resists temperature change. This eliminates errors due to circulating temperatures.

## Measuring Sleeve Holders

### Standard Sleeve Holders

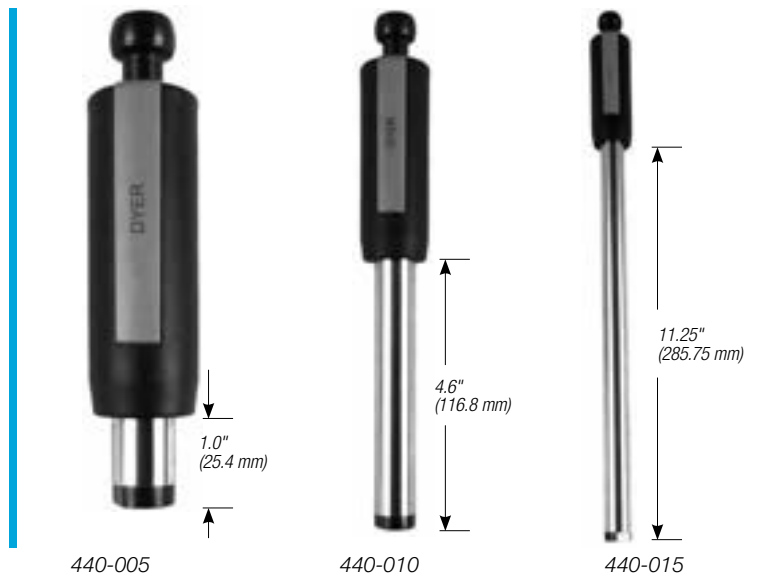
Order Number	Shaft Ø	Holder Length (overall)
240-005	0.472" (12 mm)	1.97" (50 mm) Less meas. contact pressure
240-010	0.472" (12 mm)	4.13" (105 mm)
240-015	0.472" (12 mm)	9.25" (235 mm)
240-305	0.550" (13.97 mm)	5.50" (140 mm) for electronic transducers
240-595	0.400" (10 mm)	2.75" (70 mm) Retractable (for super blind sleeves)



### Larger Ø Sleeve Holders\*

Order Number	Shaft Ø	Holder Length (overall)
440-005	0.708" (18 mm)	5.50" (139.7 mm)
440-010	0.708" (18 mm)	9.10" (235 mm)
440-015	0.708" (18 mm)	15.75" (400 mm)

\*recommended for diameters larger than 2.00" (51 mm)



### 240 Series Depth Extensions\*

Order Number	Extension Ø	Length
240-309	0.47" (12 mm)	3.9" (100 mm)
240-310	0.47" (12 mm)	9.8" (250 mm)
240-311	0.47" (12 mm)	19.7" (500 mm)
240-312	0.47" (12 mm)	29.5" (750 mm)
240-313	0.47" (12 mm)	39.3" (1000 mm)

\*for measuring sleeves larger than 0.472" (12 mm) in diameter

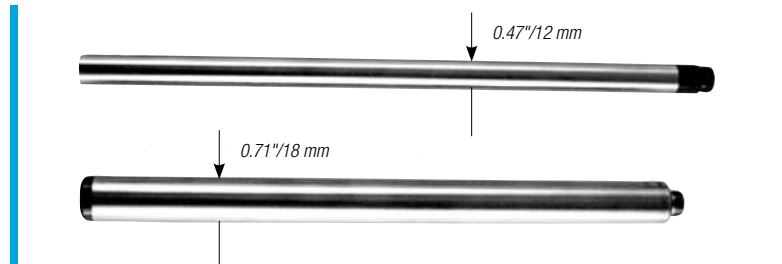
### 440 Series Depth Extensions\*

Order Number	Extension Ø	Length
440-104	0.708" (18 mm)	3.9" (100 mm)
440-105	0.708" (18 mm)	9.8" (250 mm)
440-110	0.708" (18 mm)	19.7" (500 mm)
440-115	0.708" (18 mm)	39.3" (1000 mm)

\*for measuring sleeves larger than 0.708" (18 mm) in diameter

For measuring sleeves smaller than 0.472" (12 mm) in diameter that require depth extensions, please contact Dyer.

### Depth Extensions



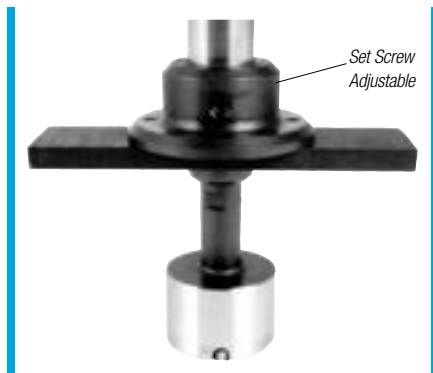
\*\* 240-005 Holder does not have a transfer rod. This means the only measuring pressure being applied to the transfer rod is from the indicating unit. Also, most likely a spindle extension or a longer contact will have to be added to the indicating unit.

# 240, 440, 441 SERIES STANDARD DEPTH STOP ACCESSORY OPTIONS



These depth stops are lightweight and easy to position and use. They will work on all types of Dyer bore gages. When purchased independently, please specify handle diameter of the gage.

## “Bar-Type Bridge” Depth Stop • Set Screw or Hand Adjustable



Part 240-341



Part 240-340



### Ring Type Depth Stop

Use for depths from 0.030" to 0.50". (0.8 – 13.0 mm)  
Specify sleeve size and tolerance when ordering.

## Stop for Measuring Depths of 0.500" (13 mm) and longer

Set Screw Type Order Number	Hand Adjustable Order Number	For sleeves With a Range		Size/Length	
		Inch	mm	Inch	mm
240-340	240-356	0.118"-1.575"	3.0-40 mm	Ø 1.97	Ø 50
240-341	240-358	1.576"-3.150"	40.1-80 mm	4.00	101.6
240-342	240-359	3.151"-4.724"	80.1-120 mm	6.00	152.4
240-343	240-360	4.724"-7.874"	120.1-200 mm	8.00	203.2

Part Order No.	Sleeve Range	
	Inch	mm
240-345	0.118-1.575	3.0-40
240-349	1.576-2.362	40.1-60
240-350	2.363-3.150	60.1-80
240-351	3.151-4.724	80.1-120
240-354	4.725-5.906	120.1-150

## “Full Diameter Bridge Collar” Depth Stop • Set Screw or Hand Adjustable



Part 240-361



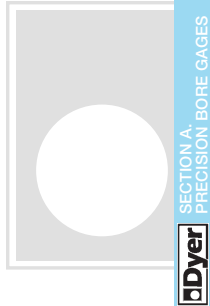
Part 240-366

## Stop for Unlimited Measuring Depths, starting at 0.040", 1 mm Depths

Set Screw Type Part Number	Hand Adjustable Part Number	Collar Diameter Size			
		ID Inch	OD Inch	ID mm	OD mm
240-361	340-366	1.37"	2.00"	34.8 mm	50.8 mm
240-362	340-367	1.97"	2.50"	50.0 mm	63.5 mm
240-363	340-368	2.60"	3.00"	66.0 mm	76.2 mm
240-364	340-369	3.16"	3.75"	80.3 mm	95.2 mm
240-365	340-370	3.75"	4.25"	95.2 mm	108.0 mm



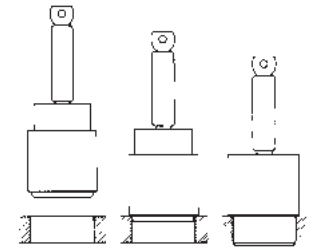
# 240, 440, 441 SERIES ACCESSORY OPTIONS



SECTION A  
PRECISION BORE GAGES  
Dyer

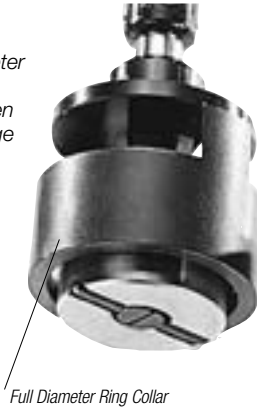
## Special Spring-Loaded

2-Step Depth Stop to Measure Diameter and Taper.  
Specify diameter and distance between depth locations. Also available in bridge design.



Gage shown in three different insertion stages.

Outside Bore      Stop One      Stop Two\*



\* to operate, push gage into hole until it stops

## 240-320 Gage Stand



## Special 1, 2, 3, 4 Position Depths to Measure Diameter and Taper



240 Series  
Notched depth stop adjusts up and down holder. Up to 4 dedicated positions possible.



240 Series  
Two-step spring-loaded depth stop. Stop, rotates and locks into position. Up to 4 depth locations possible.

## 240-315 Right Angle 90° Handle Attachment

Accessories for Series 240, 440, 441\*

249-315  
Right angle attachment maximum (240 Series) movement travel is 0.04" (1.00 mm)



Part 904-001 Indicator protective housing will work with all Dyer bore gage handles

# 240 SERIES SPECIAL MEASURING SLEEVES



## Fast, accurate, repeatable bore gaging

- |  |                               |
|--|-------------------------------|
| Speed gaging times                     | Absolute numbers              |
| Gage multiple dimensions with one gage | IP/OP to computer and machine |
| Automatic calculations                 | SPC data                      |



## Special Sleeves – 2 sets of contacts in 1 plane

### Gaging Application

Measure one bore diameter and out-of-round at specific depth with one gage and with no rotation of the gage in the bore.

### Measuring Sleeve Design

Two (2) sets of floating contacts at 90° to each other, in one line and at one depth location.

### Gage System Solution Configurations

#### 1. 240 Special Sleeve

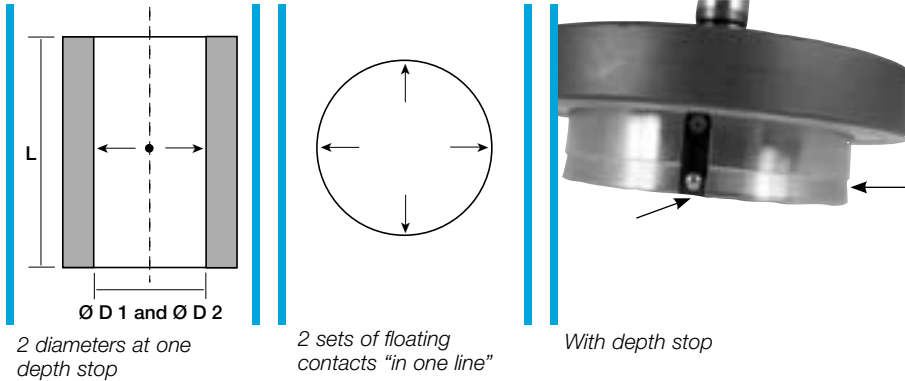
One depth stop, two handles, two electronic indicators, one ring gage set master per diameter.

#### 2. 240 Special Sleeve

One depth stop, two handles, two digital electronic pencil probes, one digital readout that does calculations automatically, one ring gage set master per diameter.

#### 3. Special All-Electronic Sleeves

Contact Dyer. One depth stop, two handles, one digital readout, one ring gage set master per diameter.



## Special Sleeves – 2 sets of contacts in 2 planes

### Gaging Application

Measure two bore diameters at two depth locations for diameter, taper, out-of-round, TIR, step or thru bore applications.

### Measuring Sleeve Design

Two (2) sets of floating contacts at one or two radial positions, at two depth locations.

### Gage System Solution Configuration

#### 1. 240 Special Sleeve

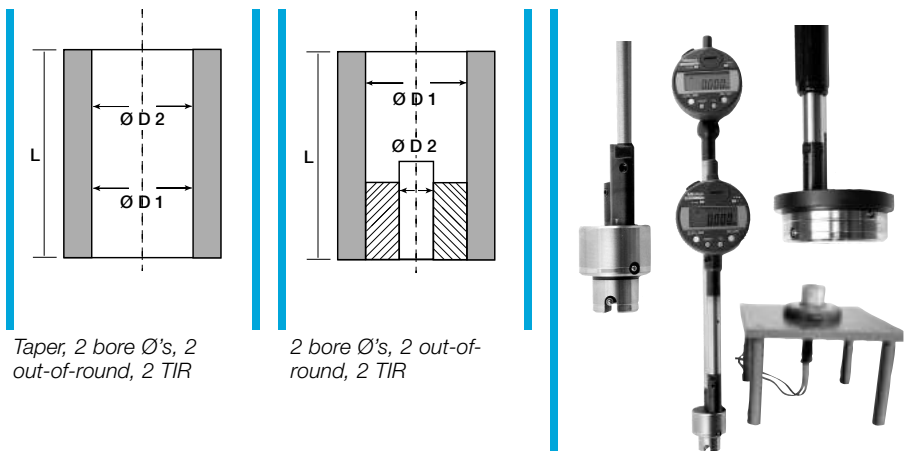
One depth stop, two handles, two electronic indicators, one ring gage set master per diameter.

#### 2. 240 Special Sleeve

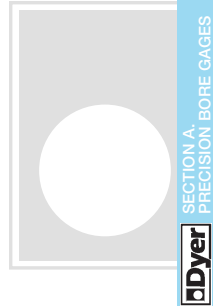
One depth stop, two handles, two digital electronic pencil probes, one digital readout that does calculations automatically, one ring gage set master per diameter.

#### 3. Special All-Electronic Sleeves

Contact Dyer. One depth stop, two handles, one digital readout that does calculations automatically, one ring gage set master per diameter.



# 240 SERIES SPECIAL MEASURING SLEEVES



SECTION A  
PRECISION BORE GAGES



## Fast, accurate, repeatable bore gaging

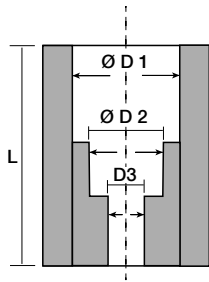
- Speed gaging times
- Measure multiple dimensions with one gage
- Automatic calculations
- Absolute numbers
- IP/OP to computer and machine
- Special sleeves available with 5 to unlimited contact positions. Contact Dyer with your application.



## Special Sleeves — 3 sets of contacts in 3 planes

### Gaging Application

Measure three bore diameters at three depth locations for diameter, taper, out-of-round and TIR.



### Measuring Sleeve Design

Three set of floating contacts at three radial positions and at three depth locations.



3 Ø's, Taper, out-of-round, TIR

### Gage System Solution Configuration

#### 1. 240 Special Sleeve

One depth stop, three handles, three electronic indicators, one ring gage set master per diameter.

#### 2. 240 Special Sleeve

One depth stop, three handles, three digital electronic pencil probes, one interface module and cable that connects to one digital read-out or direct to computer and does calculations automatically, one ring gage set master per diameter.

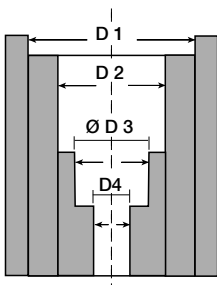
#### 3. Special All-Electronic Sleeves

Contact Dyer. One depth stop, three handles, one interface module and cable that connects to digital read-out or direct to computer and does calculations automatically, one ring gage set master per diameter.

## Special Sleeves — 4 sets of contacts in 4 planes

### Gaging Application

Measure four bore diameters at four depth locations for diameter, taper, out-of-round, and TIR.



### Measuring Sleeve Design

Four sets of floating contacts at four radial positions and at four depth locations.



### Gage System Solution Configuration

#### 1. 240 Special Sleeve

One depth stop, four handles, four electronic indicators, one ring gage set master per diameter.

#### 2. 240 Special Sleeve

One depth stop, four handles, four digital electronic pencil probes, one interface module and cable that connects to one digital read-out or direct to computer and does calculations automatically, one ring gage set master per diameter.

#### 3. Special All-Electronic Sleeves

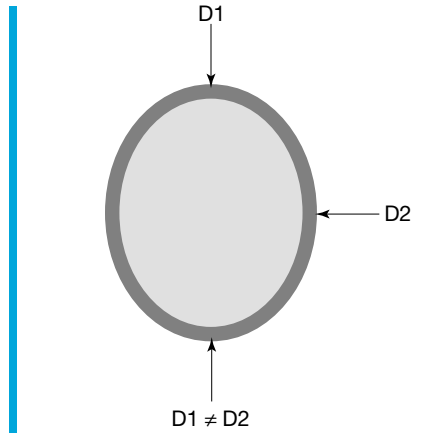
Contact Dyer. One depth stop, four handles, one interface module and cable that connects to digital read-out or direct to computer and does calculations automatically, one ring gage set master per diameter.

# 240 SERIES 3-POINT & 1-POINT MEASURING SLEEVES

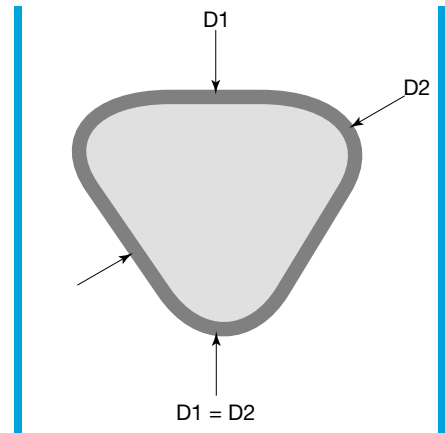


## 3-Point Measuring Sleeves

Three point contact bore gaging is designed to measure trilobing and polygonal shaped bores during the machining process. For example, centerless grinding process can produce three lobe parts. This can result in a non-fitting part assembly causing vibration, wear, and fatigue. Only 3-point contact gages are capable of measuring odd number lobes. See Figure B, Chart 1. Only 2-point contact gages will measure out-of-round conditions. See Figure A.



A. Elliptical Form, 2-point gaging



B. Trilobal Form, 3-point gaging

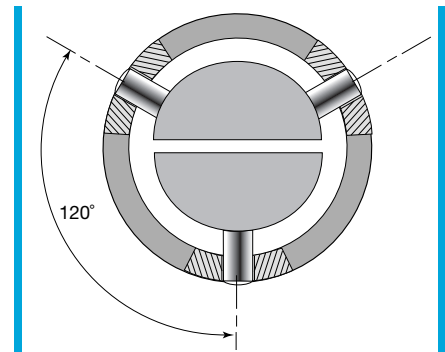
**Note:** When ordering 3-point contact sleeves just call Dyer and let us know your application.

### 3-point measuring sleeve ranges 0.390"-1.575" (10-40 mm)

By way of a special grinding of the measuring needle the linearity/maximum deviation in accuracy is  $\leq 1\%$  of the measuring travel (max. travel is 0.008" [0.2 mm]). This special floating contact design (see Dwg. 1) is used to measure smaller size bores. Also the three contact balls can be located at different radial locations if the bore wall is interrupted. Fax or e-mail Dyer your application.



240 Series Group 1, 3-point measuring heads with special contact point location for interrupted bore



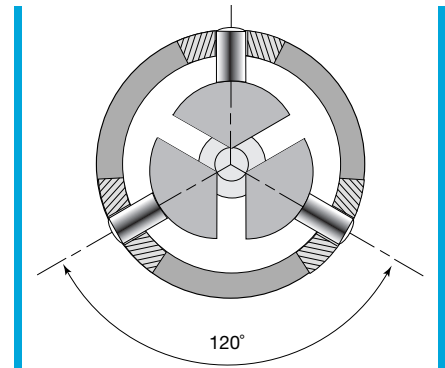
Drawing sizes <40 mm

### 3-point measuring sleeves with true 120° 3-point contact measuring ranges 1.575"-5.18" (40-130 mm)

This design has three independently moving contacts positioned at 120°. Sizes larger than 5.118" (130 mm) available. Contact Dyer with your application.



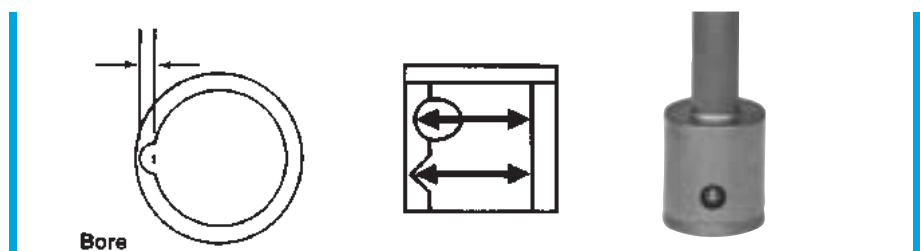
240 Series Group 2, 3-point contact sleeves for sizes >1.575" (40 mm)



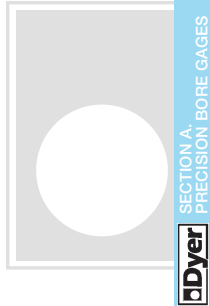
Drawing sizes >40-130 mm

## 1-Point Contact Measuring Sleeves

Measure the depth of a groove in a bore or parallel surface. These measuring heads are made with only one moveable contact point. The contact point can be retracted. Contact Dyer with your application.

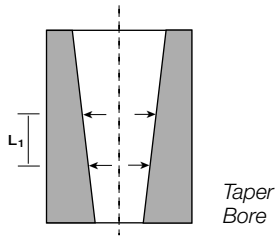
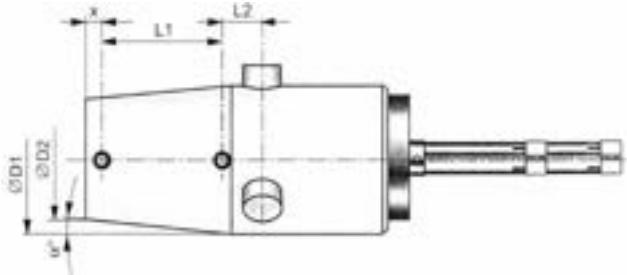


# 240 SERIES SPECIAL PROFILE SLEEVES



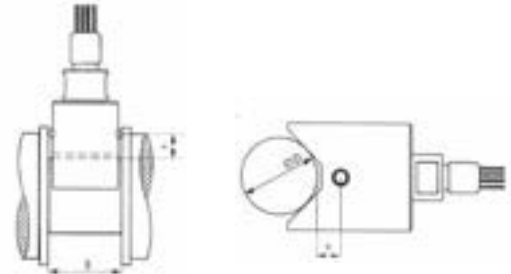
## Measure Cone-Shaped Bores

Cone-shaped bores are defined by the taper angle and the diameters at two specific measuring depths. The integrated depth stop positions the measuring axis at the exact depth. You will measure angle, taper pitch, diameters D1 and D2, out-of-round, and TIR with this gage.

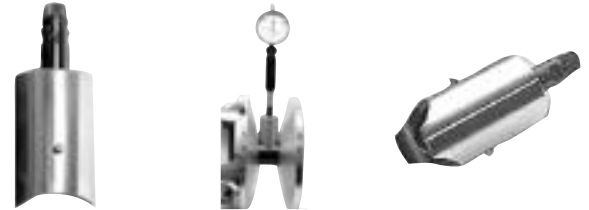


## Measure Parallel Surfaces

240 Series angled and/or radius sleeve bottom is a stop to locate gage on shaft diameter or tapered parallel dimension.



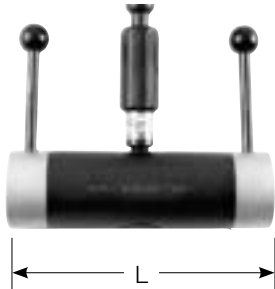
Measure crank shaft face.



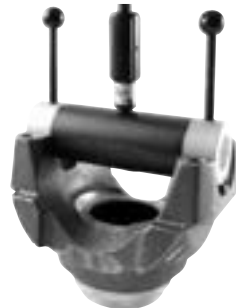
Measure a tapered ID at a specific height above shaft diameter.

## SPECIAL GROUND TO PROFILE SLEEVES 240 Series sleeves

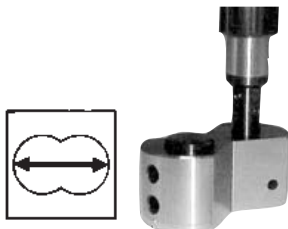
Custom shapes that will measure your irregular shaped hole. Fax or e-mail Dyer your measuring requirements.



Gage aligns itself in radius yoke and measures "L" dim parallel width



Gage in measuring position

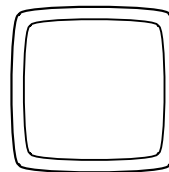


Measure major Ø of a figure-8 bore

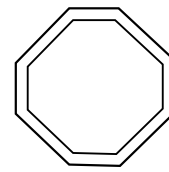


Square measuring sleeve bottom view

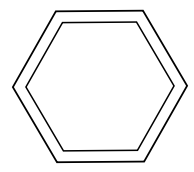
## Typical profiles of irregular holes



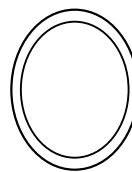
TV tube



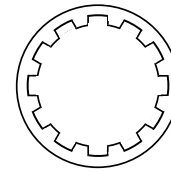
Octagon



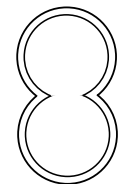
Hexagon



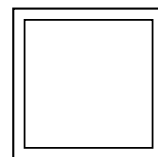
Elliptical



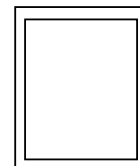
Lands & grooves



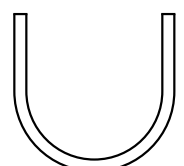
Snowman/Figure 8



Square



Rectangle



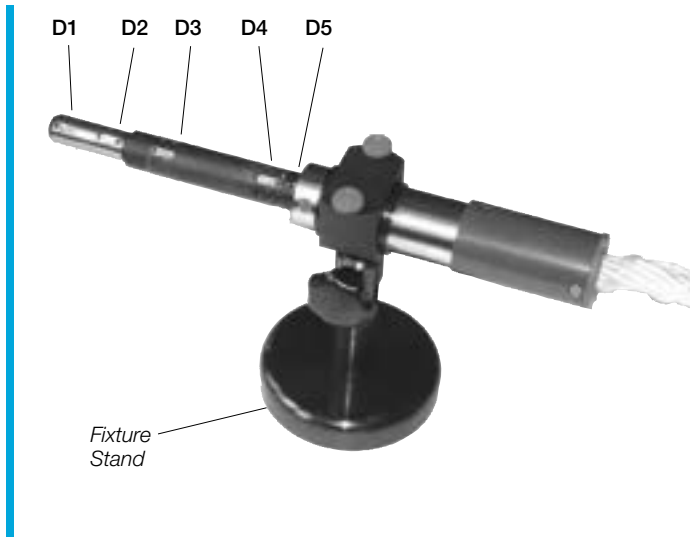
U-shape or half Ø

# SPECIAL APPLICATIONS HAND & TABLETOP GAGES



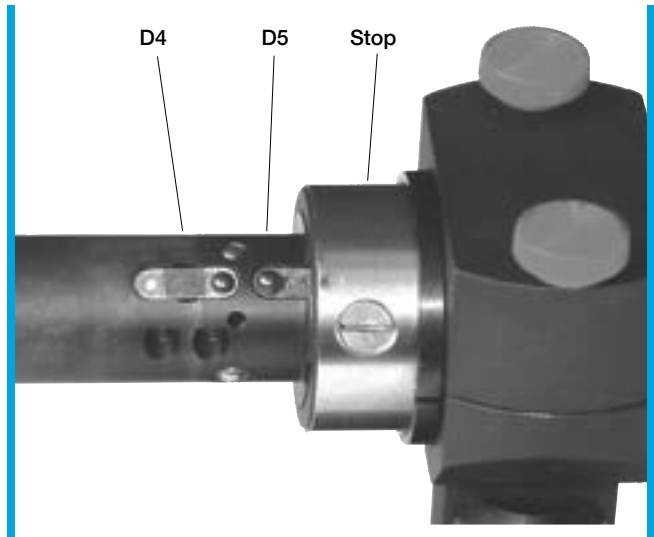
SHOW DYER YOUR APPLICATION. WE WILL HELP YOU SELECT THE RIGHT GAGE.

## Special "All Electronic" 240 Series Bore Gage



### Special 240 Series

Five sets of special small electronic contacts are placed in a measuring head. All five diameter measurements are made at once. Digital readings are displayed on one screen.



### Special 240 Series

Part is placed on gage's measuring head and pushed against a part stop. Gage measures smallest diameter at two axial positions and a second larger diameter at a three axial position.

## Tabletop stand for 240 Series gages



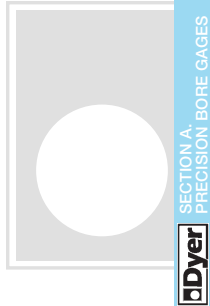
These gage stands will hold any number of 240 Series gages.



The part is placed on the gage head. Each gage has a part stop.

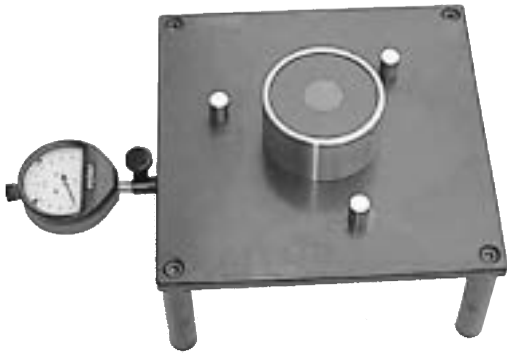


# SPECIAL APPLICATIONS HAND & TABLETOP GAGES



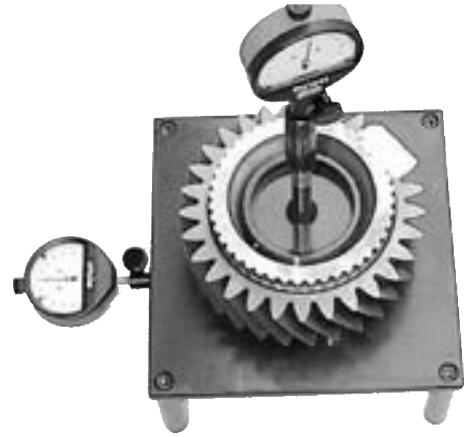
SHOW DYER YOUR APPLICATION. WE WILL HELP YOU SELECT THE RIGHT GAGE.

Measure two (2) different face diameters located on opposite sides of that part.

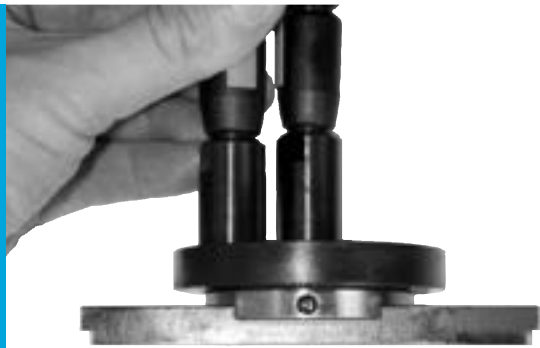


### 240 Series Special

This tabletop gage station positions the part for measuring two diameters located opposite each other. Above is Dyer's 240 Series measuring head located vertically with three part stops.

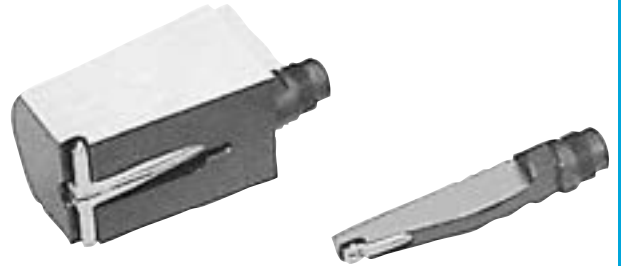


Place the part on the gage head for the first measurement. A second 240 Series gage is placed in the opposite side diameter.



### Special Dual Plane

Lower contacts are measuring a large oval  $\emptyset$ . Top contacts are measuring a circular  $\emptyset$ .



240 Sleeve with a square design and blind "h" (short) measuring height



### Special Dual Contacts on one Plane

Measure the minor  $\emptyset$  of a gear-type part. A special pin located on the sleeve locates the gage head in the P.D. Two  $\emptyset$ 's are measured "in one line" at 90° to each other.



Standard L

Special L

240 Sleeve with special L dimension

# 440 SERIES TWIN CROSS® LARGE DIAMETER BORE GAGES



## Maximum Measuring Accuracy

Linear  $\pm 0.000040"$  (0.001 mm)  
 Repeatability  $\leq 0.000040"$  (0.001 mm)  
 Gage R & R  $\leq 10\%$  capability in high tolerance bores

## Electronic Direct Reading Absolute Numbers, Bore Gages

No tipping, automatic centering and aligning of the gage in the bore.  
 Dedicated to part size and tolerance.

## Notable Features

Light weight, shop-rugged design  
 24-7 production gage.  
 Open design allows operator to view bore when measuring.  
 High accuracy and repeatability, two-point floating contact.  
 Very easy to use, no tipping and no operator error.  
 Tool steel Rc 62-65, carbide ball contacts, handles Invar steel.  
 Armoloy coating optional.

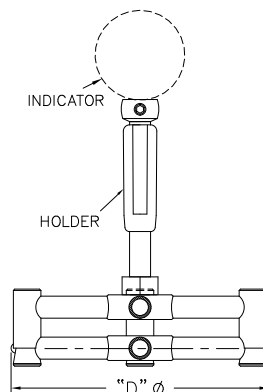


1. Choose bore gage head based on  $\varnothing$  and type of bore being measured.
2. Choose a holder.
3. Choose an indicator.
4. Use a master ring or adjustable setting master.

**Fast Delivery, Rush 24-48 hours or 1-2 weeks**

**Quick delivery on Twin Cross® sizes 5.118" (130.0 mm) thru 16.000" (406 mm)**

Cross Size Selection		Thru Bores		Blind Hole Bores	
Inch	mm	Tool Steel Cross	DIM	Tool Steel Cross	DIM
4.332-4.724	110.1-120.0	440-310		440-410	
4.725-5.118	120.1-130.0	440-315		440-415	
5.119-5.512	130.1-140.0	440-320		440-420	
5.513-5.906	140.1-150.0	440-325		440-425	
5.907-6.299	150.1-160.0	440-330		440-430	
6.300-6.693	160.1-170.0	440-335		440-435	
6.694-7.087	170.1-180.0	440-340		440-440	
7.088-7.480	180.1-190.0	440-345	ALL	440-445	ALL
7.481-7.874	190.1-200.0	440-350	"h"	440-450	"h"
7.875-8.268	200.1-210.0	440-355	DIM	440-455	DIM
8.269-8.661	210.1-220.0	440-360	ARE	440-460	ARE
8.662-9.055	220.1-230.0	440-365		440-465	
9.056-9.449	230.1-240.0	440-370	0.709"	440-470	0.276"
9.450-9.842	240.1-250.0	440-375	(18 mm)	440-475	(7 mm)
9.843-10.236	250.1-260.0	440-380		440-480	
10.237-10.629	260.1-270.0	440-385		440-485	
10.630-11.024	270.1-280.0	440-390		440-490	
11.025-11.417	280.1-290.0	440-395		440-495	
11.418-11.811	290.1-300.0	440-400		440-500	
11.812-16.690	300.1-500.0	440-700		440-800	
16.691-39.730	500.1-1000	440-705		440-805	



440 Series Twin Cross® Measuring Head



440 Twin Cross® with adjustable setting master

The "h" dimension is the distance from the centerline of the measuring conducts to the bottom of the gage head.

## Twin Cross® Measure Multiple Bores "in-line"

Long reach Twin Cross® with special leading edge blind stop that stabilizes the handle, eliminating deep bore gravity errors during the measuring process.



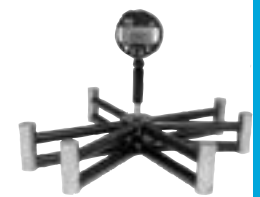
## Twin Cross® with special depth stops

Designed for large bores with depth stop requirements. Four rings are pinned into position on the four cross outer sleeves.

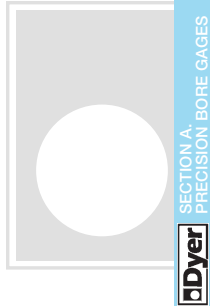


## Special Twin Cross®

with additional centering rails to center the gage in a large interrupted bore.



# 440 SERIES LARGE BORE GAGES



**Maximum Measuring Accuracy**  
 Linear  $\leq \pm 0.000040"$  ( $\leq \pm 0.001$  mm)  
 Repeatability  $< 0.000040"$  ( $< 0.001$  mm)

**Fast Delivery 24-48 hours or 1-2 weeks • 440 Bore Gages**

**Fast, Accurate and Repeatable Measurements**

Dyer's 440 Series indicating plug gages are used for repetitive bore measurement applications or dedicated high volume production runs.

This rugged and dependable 24-7 bore gage was designed with the operator in mind. Fast, easy to use and no operator error.

Best in Gage R & R performance with an impressive  $\leq 10\%$  capability, even during high tolerance applications and when measuring small or large bores.

**Heavy-duty measurement transfer holder is made of Invar steel with hand insulator shield**

**Gage Head Rc62-65, Armoloy coating optional**

**Fast maintenance service, returned "just like new"**

We can turn your gage around in one day at our Lancaster facility. Also, if part dimensions change it is possible to rework your existing measuring head to a new size. If you need to quickly replace another manufacturer's measuring head, just tell us the model and thread size, we will supply a head that will fit your present holder. "Quick factory floor problem-solving reduces downtime and assures quality."

**ALL CUSTOM MEASURING HEADS**  
 440 Series sizes from 5.118" (130 mm) thru 16.00" (406 mm) diameters  
 Fast Delivery,  
 Rush 24-48 hours or standard 1-2 weeks



**Complete System Availability**

Dyer is also a "one-stop" system supplier. We package in a single case the gage head, depth stop, gage holder, indicator and setting master. We will supply the indicator of your choice on each 440 Series gage. Each set is inspected for function and accuracy before shipping. "Single source responsibility assure gages arrive on time, complete and working."

**Automatic Centering and No Operator Error**

In achieving the highest accuracies, the centering sleeve is made approximately 0.001" – 0.002" under the low limit of your minimum bore tolerance. The carbide ball contact points housed in the centering sleeve along with the free floating movement permit the highest measuring accuracy.

The measurement is "locked in" and no operator error is possible. A special chamfer at the bottom of centering sleeve (top chamfer is optional) permits easy entry into the bore.

The spring-loaded outward contact pressure along with automatic centering and non tipping means no operator error when measuring bores.

**Two-Point Floating Contact Measuring System**

Positive two-point outward contact pressure and continuous on-line indication of the measured value permits the operator to see the bore's profile. The following geometry can be measured.



Ovality



Barrel Shape



Taper



Hourglass or bell mouth



# 441 SERIES SINGLE CROSS® BORE GAGES, LARGE DIAMETERS, SHALLOW HOLE, STEPPED BORE



### Maximum Measuring Accuracy

Linear  $\pm 0.000040"$  (0.001 mm)  
 Repeatability  $\leq 0.000040"$  (0.001 mm)  
 Gage R & R  $\leq 10\%$  capability in close tolerance bores. Contact Dyer with your application.

*"You just drop the gage in the bore, take your hands off the gage and view the measurement reading."*

- Fast, accurate measurement.
- No operator error.
- Easy to use.
- High accuracy, 2-point gaging.
- Shop-rugged 24-7 production gage.
- Ideal for use in shallow, large bores.
- Open Single Cross® design allows operator to view bore when measuring.
- Tool steel RW 60-65.
- Carbide contact points



1. Choose bore gage head based on  $\varnothing$  and type of bore being measured.
2. Choose a holder.
3. Choose an indicator.
4. Use a master ring or adjustable setting master.

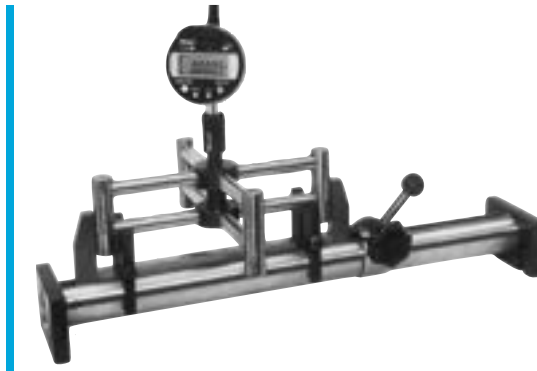
### Electronic, Non-Tipping Automatic Centering & Aligning, Dedicated Size & Range



441 Series Single Cross® Gages start at 4.138" (105 mm). Gage on right has four adjustable depth stops to position gage in bore at a specific depth.



Special 441 Single Cross® measuring head is adapted for use with an existing Mahr/Federal handle. Once the Dyer adaptor is fixed on the handle all Dyer 240, 440 and 441 Series gage heads can be used for measuring. Contact Dyer.



Large Diameter Mastering 440 and 441 Series setting master guarantees repeatable measurements on large diameters. See Section G.

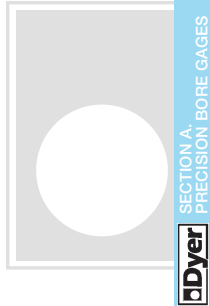


Special 441 Single Cross® with custom depth stops to position gage in the bore at a known depth location. Some gages require cross support ring.

### 441 Single Cross® Measuring Heads

Size Selection		Thru and Blind Hole Bores		Super Blind Hole Bores	
Inch	mm	Tool Steel	"h" DIM	Tool Steel	"h" DIM
4.138-4.331	105.1-110.0	<b>441-105</b>		<b>441-205</b>	
4.332-4.724	110.1-120.0	<b>441-110</b>		<b>441-210</b>	
4.725-5.118	120.1-130.0	<b>441-115</b>	ALL	<b>441-215</b>	ALL
5.119-5.512	130.1-140.0	<b>441-120</b>	"h"	<b>441-220</b>	"h"
5.513-5.906	140.1-150.0	<b>441-125</b>	DIM	<b>441-225</b>	DIM
5.907-6.299	150.1-160.0	<b>441-130</b>	ARE	<b>441-230</b>	ARE
6.300-6.693	160.1-170.0	<b>441-135</b>		<b>441-235</b>	
6.694-7.087	170.1-180.0	<b>441-140</b>	0.236"	<b>441-240</b>	0.118"
7.088-7.480	180.1-190.0	<b>441-145</b>		<b>441-245</b>	
7.481-7.874	190.1-200.0	<b>441-150</b>	(6 mm)	<b>441-250</b>	(3 mm)
7.875-11.811	200.1-300.0	<b>441-155</b>		<b>441-255</b>	
11.812-19.690	300.1-500.0	<b>441-160</b>		<b>441-260</b>	

# 441 SERIES FOR SHALLOW Ø BORES



## Maximum Measuring Accuracy

Linear  $\leq \pm 0.000040"$  ( $\leq \pm 0.001$  mm)  
Repeatability  $< 0.000040"$  ( $< 0.001$  mm)

## Fast, Accurate and Repeatable Measurements

Dyer's 441 Series indicating plug gages are used for repetitive bore measurement applications or dedicated high volume production runs.

This rugged and dependable 24-7 bore gage was designed with the operator in mind. Fast, easy to use and no operator error.

Best in Gage R & R performance with an impressive  $\leq 10\%$  capability, even during high tolerance applications and when measuring small or large bores.

**Heavy-duty measurement transfer holder is made of Invar steel with hand insulator shield**

## Complete System Availability

Dyer is also a "one-stop" system supplier. We package in a single case the gage head, depth stop, gage holder, indicator and setting master. We will supply the indicator of your choice on each 441 Series gage. Each set is inspected for function and accuracy before shipping. "Single source responsibility assure gages arrive on time, complete and working."

## Automatic Centering and No Operator Error

In achieving the highest accuracies, the centering sleeve is made approximately  $0.001" - 0.002"$  under the low limit of your minimum bore tolerance. The carbide ball contact points housed in the centering sleeve along with the free floating movement permit the highest measuring accuracy.

The measurement is "locked in" and no operator error is possible. A special chamfer at the bottom of centering sleeve (top chamfer is optional) permits easy entry into the bore.

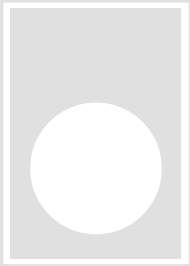
The spring-loaded outward contact pressure along with automatic centering and non tipping means no operator error when measuring bores.

## Two-Point Floating Contact Measuring System

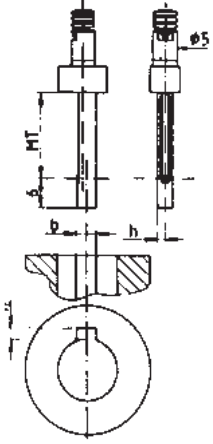
Positive two-point outward contact pressure and continuous on-line indication of the measured value permits the operator to see the bore's profile.



# KEYWAYS, SLOTS, GROOVE WIDTHS, PARALLEL SURFACES

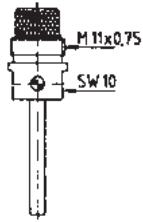


## INTERNAL KEYWAYS



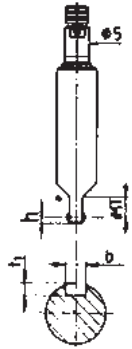
Series 430

## INTERNAL KEYWAYS



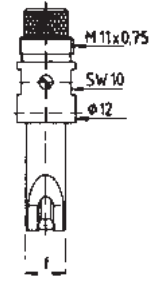
Series 431

## EXTERNAL KEYSEATS



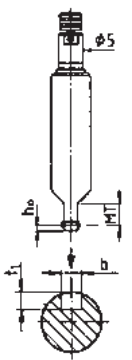
Series 432

## EXTERNAL KEYSEATS



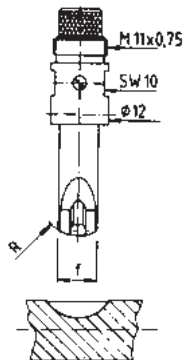
Series 433

## WOODRUFF KEYSEATS



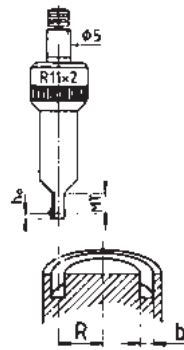
Series 434

## WOODRUFF KEYSEATS



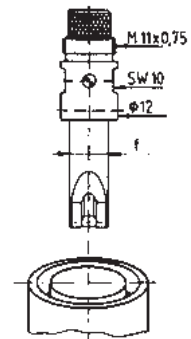
Series 435

## O-RING FACE SEALS



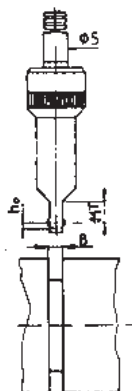
Series 436

## O-RING FACE SEALS



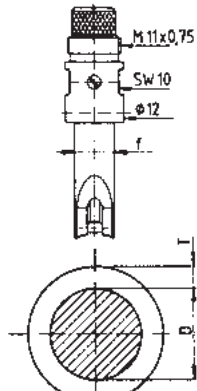
Series 437

## SNAP RINGS



Series 438

## SNAP RINGS



Series 439



Example of a slot measurement



# KEYWAYS, KEYSEATS, SLOTS, GROOVE WIDTHS, PARALLEL SURFACES

## Ideal Applications

- Internal keyways in shafts
- External key seats on hubs
- Woodruff key seats
- O-ring face seal widths
- Snap ring widths
- All parallel surfaces

## Notable Features

- Fast, repeatable, spring-loaded contact points
- High accuracies  $\pm 0.000040''/0.001\text{mm}$
- Repeatability  $< 0.000040''$
- Non-tipping, no operator error
- Mechanical or electronic for SPC
- Exact measurement displayed
- Dedicated sizes

## How to Order

- Send Dyer Application Engineering a marked-up print and we will quickly respond with a gage to fit your needs.

## Gage assembly requires the following:

- Keyway gage head
- Holder
- Indicator (digital dial)
- Parallel setting master



432/433 Style keyway



430/431 Style keyway



438 Series keyway gage with 209-020 retractable handle and 900-105 electronic indicator



209-020 retractable handle with compression bushing holding system (for Series 430/432/434/436/438)



240-595 retractable handle with threaded end holding system (for Series 431/433/435/437/439)

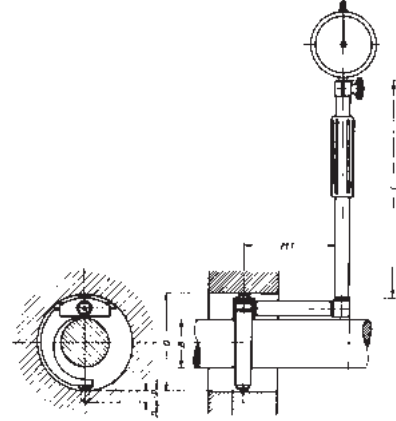
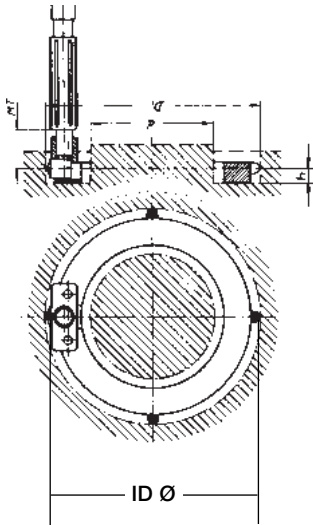
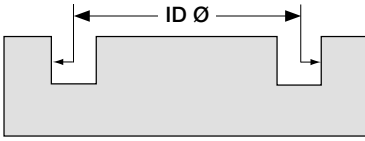
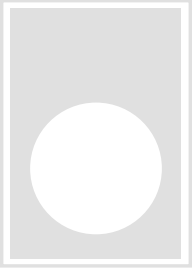


436/437 Style keyway

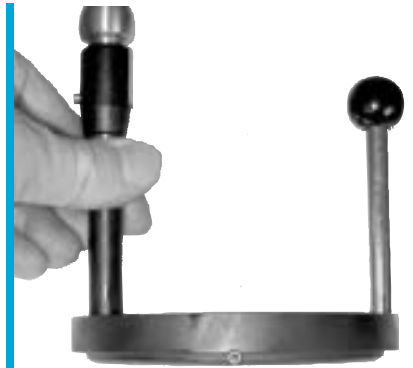


432/433 Style keyway

# 282 SERIES SPECIAL APPLICATIONS



281 Series Specials for dedicated gaging applications



282 Series Measure full circle inside diameter measuring ring. Measures ID with hub obstruction

## 281/282 Full and Partial Circle Gages

- Electronic
- Blind and shallow bores
- Automatic centering
- Adjustable depth-stop optional
- Customized standards, contact Dyer office

Precision measurements of recessed inside diameters with short or long shoulder hub obstruction.

There is no operator influence when measuring the hub. Ideal for bearing surface diameters.

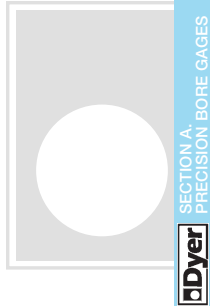


282 Series individual model to measure ID over hub, bore is deep into part



Measure precision bore with part fixture obstruction, on the machine

# 282 SERIES MEASURE PRECISION *INSIDE DIAMETER* BORE WITH CENTRAL HUB OBSTRUCTION



## Maximum Measuring Accuracy

Linear  $\leq \pm 0.000040"$  ( $\pm 0.001$  mm)  
 Repeatability  $\leq 0.000020"$  ( $< 0.0005$  mm)  
 Gage R & R  $\leq 10\%$  capability when measuring  
 high tolerance applications. Contact Dyer  
 with your specific requirements.

## Fast, Accurate and Repeatable Measurements

Dyer's 282 Series Dedicated ID Bore Gage is used to measure a variety of ID diameters, but mostly built for shallow hard-to-reach ID diameters that have a recessed OD hub obstruction in the way.

These rugged and dependable 24-7 bore gages are dedicated gages that are custom made to specific part requirements. They are fast and easy to use. Send Dyer your application and we can construct a model to meet your needs.

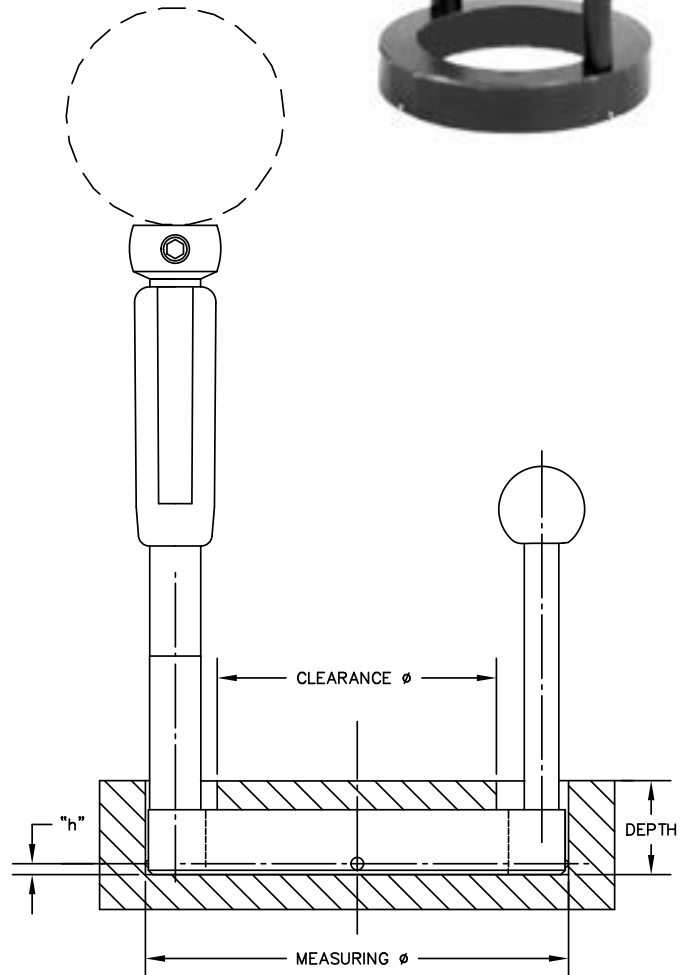
The gage performs very well when conducting Gage R&R studies. A 10% R&R can be attained even in close tolerance applications for both small and large bores.

The "h" dimension is the distance from the centerline of the measuring contact to the bottom of the gage. There is no "standard" contact height position. We can measure as close as 0.039" (1mm) to the bottom of a part. Nevertheless, we will always position the gage contacts in the best location for the job.

Carbide ball contacts are standard, but other materials are available upon request. This gage utilizes three fixed contacts and one moveable contact in order to measure the desired diameter around the obstruction features of the part.

282 Series custom measuring gages range between 1.5" (38mm) to 20" (500mm). Send Dyer your application and receive your unique quotation that will solve your measuring problem.

Dyer is your "one-stop" system supplier. We can package the measuring head, holder, indicator, and setting master in a single case. Any indicator may be used with this system. Every gage is fully tested for function and accuracy before shipping.



# 283 SERIES SPECIAL APPLICATIONS

## 283 Series Special Dedicated Full Circle and Part Circle OD Gages

Measure recessed outside diameters of short shoulder hubs with or without wall obstruction

These gages are more accurate and Gage R & R capable than snap gages. There is no operator influence when measuring the hub. Ideal for bearing surface diameters with short heights or blind end measurements in centerless grinding machines.



283 Series, OD Gage with Setting Master. Go deep into a part and measure a short OD bearing surface.



283 Series Measuring Head with special adjustable depth stop.



283 Series Measuring Head with Master Setting Disc.

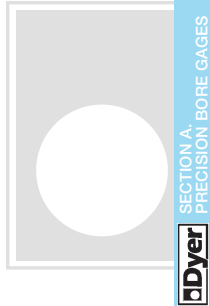


283 Special OD gage to measure splined part.



283 Special OD gage position on cylinder master.

# 283 SERIES PRECISION *OUTSIDE DIAMETER* INDICATING RINGS MEASURE SHORT HUB & SHOULDERS



## Maximum Measuring Accuracy

Linear  $\leq \pm 0.000040$ " ( $\pm 0.001$  mm)  
Repeatability  $\leq 0.000020$ " (0.0005 mm)  
Gage R & R  $\leq 10\%$  capability when  
measuring high tolerance applications.  
Contact Dyer with your specific  
requirements.

## Fast, Accurate and Repeatable Measurements

Dyer's 283 Series Dedicated OD Hub Gage is used to measure a variety of OD diameters ranging from standard high tolerance OD shafts to shallow hard-to-reach hub diameters that are recessed inside larger bores.

These rugged and dependable 24-7 bore gage are dedicated gages that are custom made to specific part requirements. They are fast and easy to use. Send Dyer your application and we can construct a model to meet your needs.

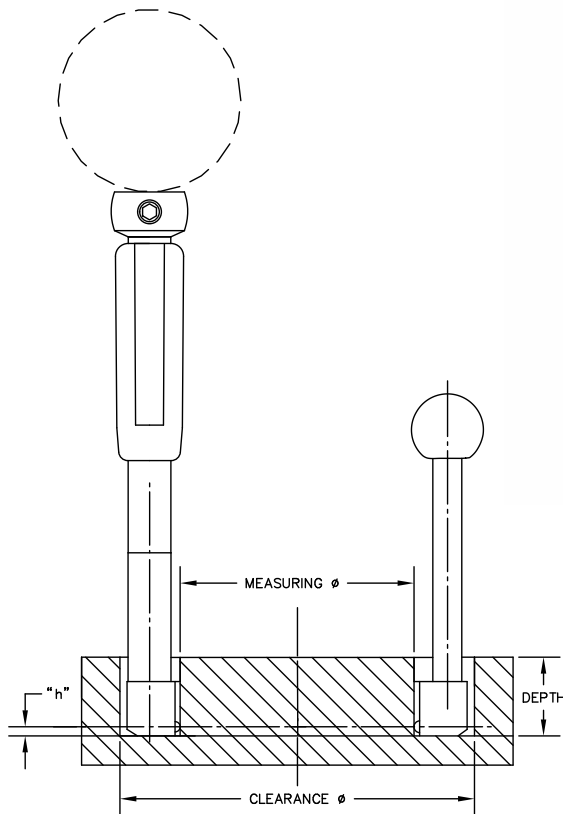
The gage performs very well when conducting Gage R&R studies. A 10% R&R can be attained even in close tolerance applications for both small and large bores.

The "h" dimension is the distance from the centerline of the measuring contact to the bottom of the gage. There is no "standard" contact height position. We can measure as close as 0.039" (1mm) to the bottom of a part. Nevertheless, we will always position the gage contacts in the best location for the job.

Carbide ball contacts are standard, but other materials are available upon request. This gage utilizes three fixed contacts and one moveable contact in order to measure the desired diameter around the obstruction features of the part.

283 Series custom measuring gages range between 1.5" (38mm) to 20" (500mm). Send Dyer your application and receive your unique quotation that will solve your measuring problem.

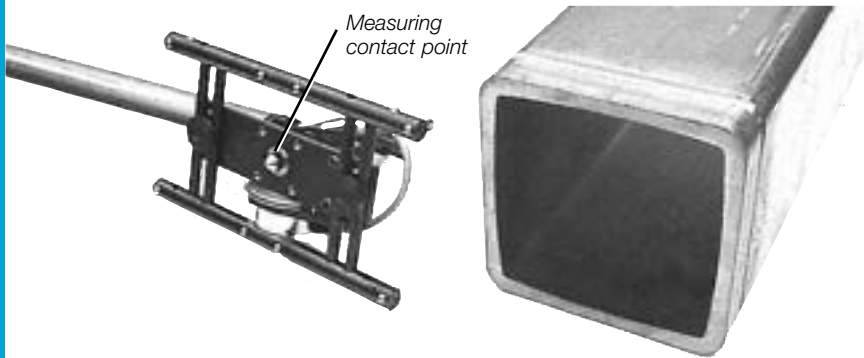
Dyer is your "one-stop" system supplier. We can package the measuring head, holder, indicator, and setting master in a single case. Any indicator may be used with this system. Every gage is fully tested for function and accuracy before shipping.



# 630 SERIES ELECTRONIC BORE GAGES REACH UP TO 50' DEPTHS



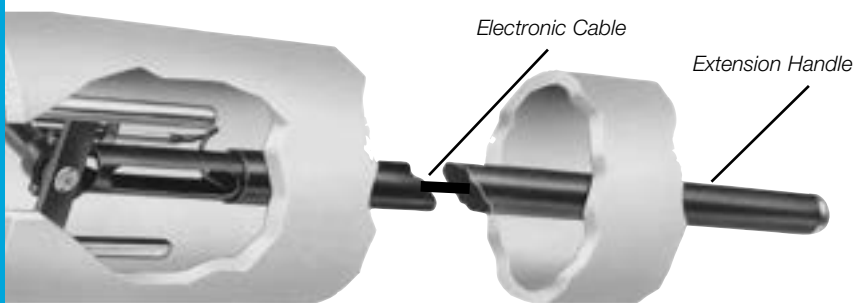
630 Series special. You can change the gage's size within the range



630 Series special

### Measure diameter and clock length at one time

This special 630 Series measuring head will measure parallel distance.  
(We can also LaserLine™ the extension handles to determine depth.)



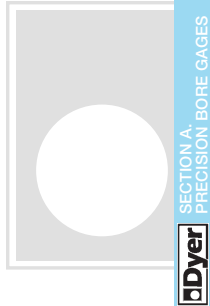
### Designed for Deep Blind Hole Measurements

#### Extension Handles for 630 Series

Electronic Cables can be located inside the light weight aluminum extension or clipped to the outside if you are making a number of bore lengths changes.



# 630 SERIES DEEP REACH ELECTRONIC BORE GAGES



### Maximum Measuring Accuracy

Linear  $\leq \pm 0.000040"$  ( $\pm 0.001$  mm)  
 Repeatability  $\leq 0.000020"$  ( $< 0.0005$  mm)  
 Gage R & R  $\leq 10\%$  capability measuring high tolerance bores.

### Notable Features

High accuracy, repeatability, long contact travel at up to 50' depths.  
 Easy to use, no operator error, floating contact design moves easily in and out of bore.  
 Fast accurate measurements, measuring head aligns automatically throughout the bore, and no operator error.  
 Large measuring ranges.  
 Cost justifiable system.  
 Systems electronic indication has several options. Gage can be battery operated and completely portable. Contact Dyer with your application requirements.  
 Measuring head configuration allows multiple depth extensions to be used without influencing the measurement.



Build up your own 630 system by selecting your components or contact Dyer application engineering and we'll create one for you.

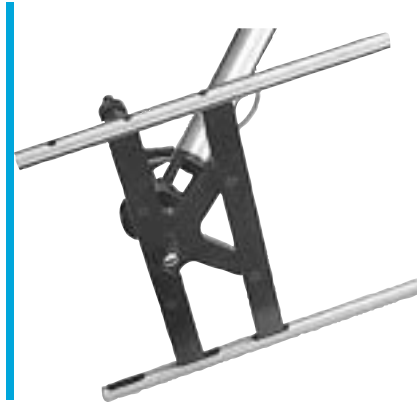
1. Measuring heads – each head includes a 39" extension.
2. Extension holders
3. Electronics
4. Adjustable set master

### Measuring Applications

Measure barrel wear injection molding machines.  
 Measure barrel wear food processing machines.  
 Large and/or bearing surfaces.  
 Irregular size deep holes.

Longer contact travel possible. Position of floating contact points on self centering base can change for blind hole applications. Contact Dyer.

### 630 Series measuring heads reach up to 50 feet depths



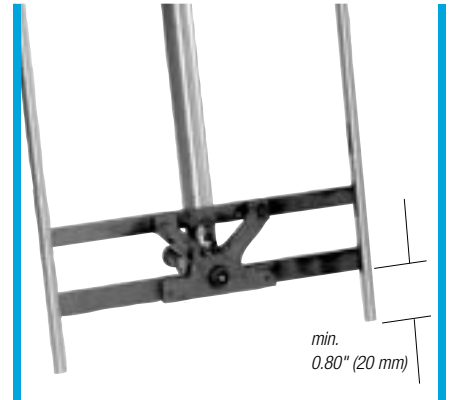
630 Series, large  $\varnothing$  measuring head. Special large ranges are available with heads. Modular design.



630 Series, full plate centering base. Available in ranges 1.38"/35 mm thru 9.05"/1230 mm.



Fixed contact point extensions



Series bottom view

### Specials

Measure precision bores up to 50' depths with portable electronic amplifier and digital pencil probe

### Specials

Measure precision bores up to 50' depths with field portable electronic indicator and special probe/cable

### Models and Specifications Measuring head

Measuring Range		Contact Travel		Order Number A & B
Inch	mm	Inch	mm	Tool Steel
1.38-2.36	35-60	0.050	1.27	<b>630-001</b>
1.97-4.72	50-120	0.055	1.4	<b>630-002</b>
3.94-9.05	100-230	0.063	1.6	<b>630-003</b>
7.87-19.69	200-500	0.100	2.5	<b>630-104</b>

### Extensions Sizes

Part Number	Length
<b>630-070</b>	30"
<b>630-080</b>	40"
<b>630-090</b>	60"
<b>630-100</b>	80"
<b>630-110</b>	100"

<sup>1</sup> Longer contact travel available, contact Dyer

# 830 SERIES "NO TIPPING" BORE GAGES ROUGH CUT/FINAL CUT GAGING



### Maximum Measuring Accuracy

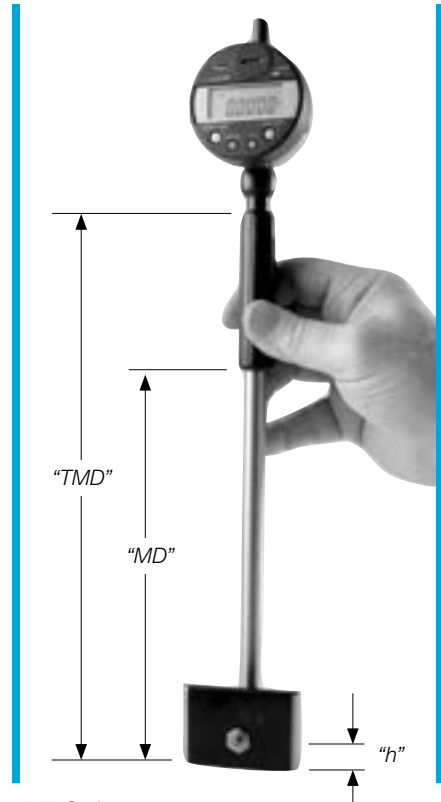
Linear  $\leq \pm 0.000040$ " ( $\pm 0.001$  mm)  
 Repeatability  $\leq 0.000040$ " ( $< 0.001$  mm)  
 $\leq 0.000008$ " (0.0002 mm)  
 Gage R & R  $\leq 10\%$  capability measuring  
 0.0003" (0.008 mm) tolerance bores.

### No Tipping, Automatic Centering and Aligning

You have the flexibility to change sizes within the gage's range.

The 830 Series Bore Gages are non-tipping and self-aligning. The gage's automatic centering base is spring loaded and locks itself in "to the maximum bore diameter."

This rugged, dependable shop gage is born from our most accurate and popular 220 Series. This proven design offers our customers a fast and easy-to-use electronic bore gage.



830 Series

830-330 Standard Handle  
 Spring-loaded, retractable, self-centering base aligns gage in the bore's measuring axis for precise Gage R & R capable measurements  
 Indicator offered separately.

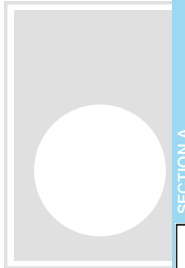


Electronic indicator selection, see Section E, indicators ordered separately.

### Models and Specifications

Measuring Range Inch (mm)	Max. Range Inch (mm)	Distance from the Bottom "h" Inch (mm)	Measuring Depth w/ Standard Handles "MD" Inch (mm)	Total Measuring Depth w/ Standard Handles "TMD" Inch (mm)	Contact Point Max. Travel Inch (mm)	Order No. Standard Handle w/ Carbide Base
0.787"-1.377" (20.0-35.0)	0.472" (12.0)	0.354" (9.0)	0.827" (21.0)	4.53" (115.0)	0.051" (1.3)	<b>830-330</b>
1.377"-2.165" (35.0-55.0)	0.551" (14.0)	0.393" (10.0)	0.906" (23.0)	4.92" (125.0)	0.051" (1.3)	<b>830-340</b>
1.968"-3.149" (50.0-80.0)	1.063" (27.0)	0.590" (15.0)	0.944" (24.0)	4.92" (125.0)	0.055" (1.4)	<b>830-350</b>
3.149"-4.724" (80.0-120.0)	1.259" (32.0)	0.590" (15.0)	0.944" (24.0)	5.51" (140.0)	0.055" (1.4)	<b>830-360</b>
4.724"-6.692" (120.0-170.0)	1.575" (40.0)	0.708" (18.0)	1.181" (30.0)	6.30" (160.0)	0.063" (1.6)	<b>830-380</b>

# 830 SERIES "NO TIPPING" BORE GAGES ROUGH CUT/FINAL CUT GAGING



**Maximum Measuring Accuracy**  
 Linear <math>\lt; \pm 0.000040 \text{ inch} \text{ (} < \pm 0.001 \text{ mm)}</math>  
 Repeatability <math>\lt; 0.000040 \text{ inch} \text{ (} < 0.001 \text{ mm)}</math>  
 Gage R & R  $\leq 10\%$  measuring  
 close tolerance bores.

**Electronic measurements, automatic centering and aligning, and no gage tipping**

You have the flexibility to change sizes within the gage's range.



**Notable Features**

- 10% Gage R & R at high tolerances.
- No operator error, "hands-off" gaging.
- Special self-centering base automatically aligns the gage in the measuring axis.
- Contact point travel 0.051"-0.063" (1.3 – 1.6 mm) allows rough and final cut bore measuring.
- No loss of accuracy for the full range of contact point travel.
- Centering base and contacts carbide.
- Customized standards optional, depth stops, modified centering base, contact point types and sizes.
- Determine a bore's profile.

**Carbide self-centering base**

**Ball contact points available standard in carbide, optional in ruby, chrome, teflon**

**Specially designed segment**

This radically machined high strength steel segment is accurately guided in a circular arc. It transfers the movement of the measuring contact point directly to a precision indicating unit.

This direct transfer and resulting accuracy, repeatability and reproducibility is exclusive to our bore gage design.



**Freedom to choose**

Any mechanical or electronic indicator can be used with our 830 Series Bore Gages. Optional sleeve holders are used with electronic probes.

The gage handle accepts 3/8" or 8 mm stem indicating units.

**The highest accuracy and repeatability**

For machine capability studies and SPC, the 830 Series gage is a leader in Gage R & R performance.

All of our 830 Series Bore Gages, small and large, are  $\leq 10\%$  Gage R & R capable when measuring high tolerance bores.

**No operator error/automatic centering**

The spring-loaded outward contact pressure along with automatic centering/non-tipping means no operator error when measuring bores.

**Rough cut/final cut bore gage**

The spring-loaded, non tipping, self centering base, along with 0.051" to 0.063" Contact Point Travel (depends on model) makes this gage perfect for rough cut/final cut bore measuring. There is no loss of accuracy for the range of the contact point travel. One Ring Gage will set both measurements.

**Precise two-point contact measuring**

Positive two-point outward contact pressure and continuous on-line indication of the measured value.

Measuring deviations in a bore's shape is accomplished by turning or moving the gage up and down in the hole.



Ovality



Barrel Shape



Taper



Hourglass or bell mouth

Unlike three-point contact bore gages that average a bore's diameter, the 830 Series' two-point contact system permits the measurement of out-of-round conditions. You will measure bores more precisely and with higher accuracies.



830-1 Special design segment

# 290 SERIES PRECISION MEASUREMENT PITCH DIAMETER OF GEARS & SPLINES



## Maximum Measuring Accuracy

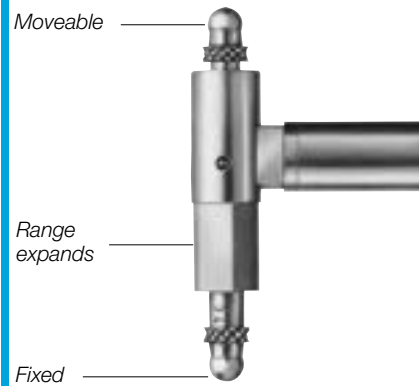
Linear  $\leq \pm 0.000040"$  ( $\pm 0.001$  mm)  
 Repeatability  $\leq 0.000020"$  ( $< 0.0005$  mm)  
 Gage R & R  $\leq 10\%$  measuring  
 close tolerance parts.

## Notable Features

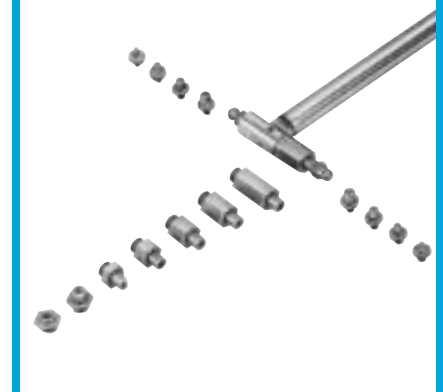
- Accuracy and large range.
- Select any carbide ball size. Many standard and custom balls in stock.
- Carbide ball contacts thread on measuring head.
- Customized standards. Contact Dyer office.

## Automotive Application

Gear pitch diameter of **transmission and drive shaft** components.



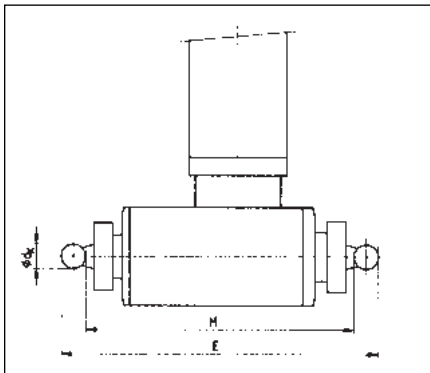
290 Series Carbide Ball Contacts



290-015 Model with set of Carbide Contact Points and Range Expanders



Long handle 290 Series, for short handles contact Dyer



Gage can either measure between balls or major diameter of splines.



## How to order

1. Select basic gage with measuring range you require. (See chart A)
2. Select a set of carbide ball threaded contact points. (See chart B). You must specify carbide ball size when ordering.
3. Select indicator, mechanical or electronic. See Section E.

## Chart A. 290 Series Models and Specifications

Range		Maximum Diameter Balls <sup>1</sup>	Maximum Travel/Contact	Order No.
Inch	mm			
0.315–0.472	8–12	0.059	$\pm 0.010$	<b>290-005**</b>
0.472–0.866	12–22	0.157	$\pm 0.011$	<b>290-010</b>
0.866–2.165	22–55	0.276	$\pm 0.019$	<b>290-015</b>
2.165–9.84	55–250	0.276	$\pm 0.027$	<b>290-020</b>
3.397–20.079	100–510	0.276	$\pm 0.027$	<b>290-030</b>

\*\*Small ranges require fixed contact points for each measurement size.

<sup>1</sup> Large ball sizes available. Contact Dyer with your application.

## Chart B. 290 Series Threaded Carbide Ball Contacts\*

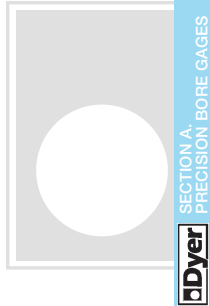
Order No. (Set)	For Gage Model	Thread Size
<b>290-105**</b>	<b>290-005</b>	M 1.6
<b>290-110</b>	<b>290-010</b>	M 1.6
<b>290-115</b>	<b>290-015</b>	M 2.5
<b>290-120</b>	<b>290-020</b>	M 4
<b>290-130</b>	<b>290-030</b>	M 4

\* You must specify carbide ball size when ordering.

\*\* Small ranges require fixed contact points for each measurement size.

# MEASURE SMALL HOLES

## BORE GAGES FROM DIAMETER 0.0185"



### Maximum Measuring Accuracy

Linear  $\pm 0.000040"$  (0.001 mm)

Repeatability  $\pm 0.000040"$  (0.001 mm)

\*50% better accuracy than shown can be obtained by using Bench Stand

### Fast, Dependable Gaging

#### Available in:

- Standard Sets
- Add-On Components Parts
- Non-Standard Lengths and Ranges.

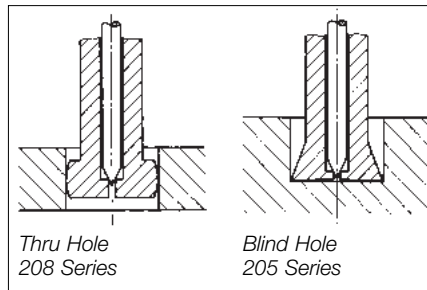


### Notable Features

- Ease of use.
- Push-button retractor holder reduces gage wear when entering and leaving bore.
- Bench Stand improves accuracy by 50% and permits electronic indicator. This is a non-tipping measurement.
- Spring-loaded contact points locate in the bore radius.
- Hard chrome contacts RC65-68 standard or carbide-tipped contacts optional.
- Precision measurements are obtained by the movement of a lapped precision needle contact extender that transfers the measurement directly to the indicator.
- Gage must be tipped through the part to attain measurement.



### Split Ball Probe Types Available





# 208 SERIES INDIVIDUAL THRU BORE MEASURING PROBE COMPONENTS



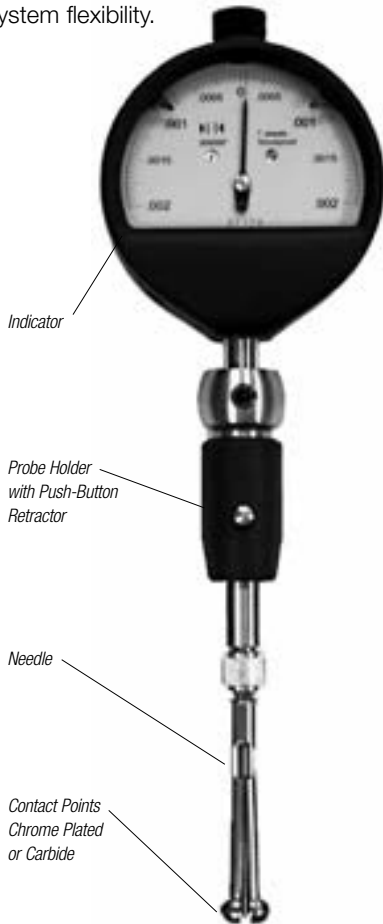
## Maximum Measuring Accuracy

Linear  $\pm 0.000040''$  (0.001 mm)  
Repeatability  $\pm 0.000040''$  (0.001 mm)

\*50% better accuracy than shown can be obtained by using Bench Stand

## Notable Features

- Push button holder reduces hole entrance and exit wear.
- Accurate in very small bores.
- System flexibility.



## Standard Individual Components

Effective Measuring Range		Measuring Depth* Inch	Measuring Distance from Bottom "h" Inch	Order No Chrome Probe	Order No Carbide Probe	Order No Needle	Order No Ring Gage	Ring Gage Size
Inch	mm							
0.0205-0.0228	0.52-0.58	0.071	0.010	208-004	—	207-202	204-004	0.0217
0.0224-0.0264	0.57-0.67	0.079	0.012	208-006	—	207-204	204-006	0.0236
0.0256-0.0303	0.65-0.77	0.098	0.012	208-008	—	207-204	204-008	0.0276
0.0295-0.0343	0.75-0.87	0.110	0.014	208-010	—	207-204	204-010	0.0315
0.0335-0.0382	0.85-0.97	0.118	0.014	208-012	—	207-204	204-012	0.0354
0.0374-0.0453	0.95-1.15	0.512	0.016	208-013	208-014	207-206	204-014	0.0394
0.0421-0.0492	1.07-1.25	0.512	0.016	208-015	208-016	207-206	204-016	0.0433
0.0460-0.0531	1.17-1.35	0.512	0.016	208-017	208-018	207-206	204-018	0.0472
0.0500-0.0571	1.27-1.45	0.512	0.017	208-019	208-020	207-206	204-020	0.0512
0.0539-0.0610	1.37-1.55	0.512	0.017	208-021	208-022	207-206	204-022	0.0551
0.0590-0.0748	1.50-1.90	0.669	0.020	208-023	208-024	207-208	204-024	0.0669
0.0708-0.0866	1.80-2.20	0.669	0.020	208-025	208-026	207-208	204-026	0.0787
0.0807-0.0965	2.05-2.45	0.669	0.024	208-027	208-028	207-208	204-028	0.0886
0.0905-0.1063	2.30-2.70	0.984	0.030	208-029	208-030	207-210	204-030	0.0984
0.1003-0.1161	2.55-2.95	0.984	0.030	208-031	208-032	207-210	204-032	0.1082
0.1102-0.1260	2.80-3.20	0.984	0.038	208-033	208-034	207-210	204-034	0.1181
0.1200-0.1358	3.05-3.45	0.984	0.038	208-035	208-036	207-210	204-036	0.1279
0.1299-0.1457	3.30-3.70	0.984	0.038	208-037	208-038	207-210	204-038	0.1378
0.1397-0.1555	3.55-3.95	0.984	0.040	208-039	208-040	207-210	204-040	0.1476
0.1496-0.1654	3.80-4.20	0.984	0.043	208-041	208-042	207-210	204-042	0.1575
0.1633-0.1890	4.15-4.80	1.614	0.044	208-044	208-102	207-212	204-044	0.1771
0.1850-0.2087	4.70-5.30	1.614	0.048	208-046	208-104	207-212	204-046	0.1968
0.2047-0.2283	5.20-5.80	1.614	0.053	208-048	208-106	207-212	204-048	0.2165
0.2244-0.2480	5.70-6.30	1.614	0.053	208-050	208-108	207-212	204-050	0.2362
0.2440-0.2677	6.20-6.80	1.614	0.057	208-052	208-110	207-212	204-052	0.2559
0.2637-0.2874	6.70-7.30	1.772	0.063	208-054	208-112	207-212	204-054	0.2755
0.2834-0.3071	7.20-7.80	1.772	0.065	208-056	208-114	207-212	204-056	0.2952
0.3031-0.3267	7.70-8.30	1.772	0.065	208-058	208-116	207-212	204-058	0.3149
0.3228-0.3465	8.20-8.80	1.772	0.069	208-060	208-118	207-212	204-060	0.3346
0.3425-0.3661	8.70-9.30	1.772	0.069	208-062	208-120	207-212	204-062	0.3543
0.3622-0.4133	9.20-10.5	1.772	0.069	208-063	208-121	207-212	204-066	0.3740
0.4016-0.4528	10.2-11.5	1.772	0.069	208-065	208-123	207-214	204-070	0.4330
0.4409-0.4921	11.2-12.5	1.772	0.069	208-067	208-125	207-214	204-074	0.4724
0.4803-0.5315	12.2-13.5	2.677	0.099	208-069	208-127	207-214	204-076	0.5019
0.5276-0.5787	13.4-14.7	2.677	0.099	208-071	208-129	207-214	204-078	0.5512
0.5669-0.6181	14.4-15.7	2.677	0.099	208-073	208-131	207-214	204-080	0.5905
0.6063-0.6575	15.4-16.7	2.677	0.099	208-075	208-133	207-214	204-082	0.6299
0.6457-0.6969	16.4-17.7	2.677	0.099	208-077	208-135	207-214	204-084	0.6693
0.6850-0.7362	17.4-18.7	2.677	0.099	208-079	208-137	207-214	204-086	0.7086
0.7244-0.7756	18.4-19.7	2.677	0.099	208-081	208-139	207-214	204-088	0.7480
0.7638-0.8150	19.4-20.7	2.677	0.099	208-083	208-141	207-214	204-090	0.7874



## Order the following:

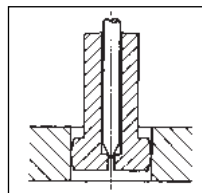
1. Probe(s) required for range.
2. Needle(s) required for range.
3. Instrument holder(s)—model depends on probe(s) ordered.
4. Indicator. See Section E for complete list and specifications.
5. Wooden box (optional).
6. Ring gage(s)
7. Accessories.

## Measuring Probe Holder

Description	Order No.
Measuring Probe Holder with push-button retractor for (recommended for smaller sizes)	209-020
Standard Measuring Probe Holder without push button for 0.0374"-0.8110" (0.95-20.6 mm)	209-030

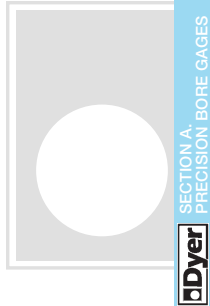
## Custom Measuring Probes

We will make in-between ranges and longer reach (deeper) measuring probes. Contact Dyer with your special applications.





# 200 SERIES SMALL HOLE BORE GAGE SETS



### Maximum Measuring Accuracy

Linear  $\pm 0.000040''$  (0.001 mm)  
Repeatability  $\pm 0.000040''$  (0.001 mm)

\*50% better accuracy than shown can be obtained by using Bench Stand

### We offer choices when ordering 200 Series sets

Sets are available with or without push-button holder. The push-button holder extends life of the measuring probe. It retracts the outward pressure of the contact points, limiting friction, allowing the entering and exiting of the bore to be smooth and effortless. These gages are operator-friendly, and easy to use.

### Special Sets

We offer sets with in-between ranges and longer (deeper reaching probes). Contact Dyer with your special needs.

### Select a Standard Set

When ordering choose between sets with or without ring gages, push-button holder, chrome or carbide. Dial indicator, see Section E, are optional. Just select the model numbers you want and place the order along with the set.



1. Select the set style: thru or blind; with or without ring.
2. Indicator.



200-140 Complete set with indicator. Indicator not included with set. Order indicator separately.

### Thru Bore Design - Complete Sets

Effective Measuring Range		Depth Range Inch	No. of Probes	Order No Chrome w/o Rings	Order No Chrome w/ Rings	Order No Carbide w/o Rings	Order No Carbide w/ Rings
Inch	mm						
Holder With Retraction							
0.0374-0.0610	0.95-1.55	0.512	5	200-005	200-105	200-205	200-305
0.0590-0.1654	1.5-4.2	0.669-0.984	10	200-110	200-110	200-210	200-310
0.0374-0.1654	0.95-4.2	0.512-0.984	15	200-015	200-115	200-215	200-315
0.1634-0.3071	4.15-7.8	1.614-1.772	7	200-031	200-131	200-231	200-331
0.1634-0.4921	4.15-12.5	1.614-2.677	13	200-040	200-140	200-240	200-340
0.3031-0.4921	7.7-12.5	1.772	6	200-046	200-146	200-246	200-346
0.4803-0.8110	12.2-20.6	2.677	8	200-055	200-155	200-255	200-355
Holder Without Retraction							
0.0374-0.0610	0.95-1.55	0.512	5	-	-	200-605	200-705
0.0590-0.1654	1.5-4.2	0.669-0.984	10	-	-	200-610	200-710
0.0374-0.1654	0.95-4.2	0.512-0.984	15	-	-	200-615	200-715
0.1634-0.3071	4.15-7.8	1.614-1.772	7	200-431	200-531	200-631	200-731
0.1634-0.4921	4.15-12.5	1.614-2.677	13	200-440	200-540	200-640	200-740
0.3031-0.4921	7.7-12.5	1.772	9	200-446	200-546	200-646	200-746
0.4803-0.8110	12.2-20.6	2.677	8	200-455	200-555	200-655	200-755

### Blind Hole Bore Design - Complete Sets

Effective Measuring Range		Depth Range Inch	No. of Probes	Order No Chrome w/o Rings	Order No Chrome w/ Rings	Order No Carbide w/o Rings	Order No Carbide w/ Rings
Inch	mm						
Holder With Retraction							
0.059-0.165	1.50-4.20	0.669-0.984	10	-	-	205-300	205-400
0.163-0.307	4.15-7.80	1.614-1.772	7	205-100	205-200	-	-
0.303-0.492	7.70-12.50	1.772	6	205-105	205-205	-	-
0.163-0.492	4.15-12.50	1.614-1.772	13	205-110	205-210	-	-
0.480-0.811	12.20-20.60	2.677	8	205-115	205-215	-	-

# 205 SERIES INDIVIDUAL BLIND HOLE BORE MEASURING PROBE COMPONENTS



## Maximum Measuring Accuracy

Gage Hand-held

Linear  $\leq \pm 0.000040''$  (0.001 mm)

Repeatability  $\leq \pm 0.000040''$  (0.001 mm)

\*50% better accuracy than shown can be obtained by using Bench Stand

## Notable Features

- Push button holder reduces hole entrance and exit wear.
- Accurate in very small bores.
- System flexibility.



## Blind Hole Probes, Needles and Ring Gages – Individual Components

Effective Measuring Range		Measuring Depth* Inch	Measuring Distance from Bottom "h" Inch	Order No Chrome Probe	Order No Carbide Probe	Order No Needle	Order No Ring Gage	Ring Gage Size
Inch	mm							
0.0590–0.0748	1.50–1.90	0.669	0.004	–	205-002	207-002	204-024	0.0669
0.0708–0.0866	1.80–2.20	0.669	0.004	–	205-004	207-002	204-026	0.0787
0.0807–0.0965	2.05–2.45	0.669	0.004	–	205-006	207-002	204-028	0.0886
0.0905–0.1063	2.30–2.70	0.984	0.004	–	205-008	207-004	204-030	0.0984
0.1003–0.1161	2.55–2.95	0.984	0.004	–	205-010	207-004	204-032	0.1082
0.1102–0.1260	2.80–3.20	0.984	0.004	–	205-012	207-004	204-034	0.1181
0.1200–0.1358	3.05–3.45	0.984	0.004	–	205-014	207-004	204-036	0.1279
0.1299–0.1457	3.30–3.70	0.984	0.004	–	205-016	207-004	204-038	0.1378
0.1397–0.1555	3.55–3.95	0.984	0.004	–	205-018	207-004	204-040	0.1476
0.1496–0.1654	3.80–4.20	0.984	0.004	–	205-020	207-004	204-042	0.1575
0.1634–0.1890	4.15–4.80	1.614	0.008	205-022	–	207-006	204-044	0.1771
0.1850–0.2087	4.70–5.30	1.614	0.008	205-024	–	207-006	204-046	0.1968
0.2047–0.2283	5.20–5.80	1.614	0.008	205-026	–	207-006	204-048	0.2165
0.2244–0.2480	5.70–6.30	1.614	0.008	205-028	–	207-006	204-050	0.2362
0.2441–0.2677	6.20–6.80	1.614	0.008	205-030	–	207-006	204-052	0.2554
0.2637–0.2874	6.70–7.30	1.772	0.008	205-032	–	207-006	204-054	0.2755
0.2834–0.3071	7.20–7.80	1.772	0.008	205-034	–	207-006	204-056	0.2952
0.3031–0.3267	7.70–8.30	1.772	0.008	205-036	–	207-006	204-058	0.3149
0.3228–0.3465	8.20–8.80	1.772	0.008	205-038	–	207-006	204-060	0.3346
0.3425–0.3661	8.70–9.30	1.772	0.008	205-040	–	207-006	204-062	0.3543
0.3622–0.4133	9.20–10.50	1.772	0.008	205-043	–	207-006	204-066	0.3937
0.4016–0.4528	10.20–11.50	1.772	0.008	205-045	–	207-006	204-070	0.4330
0.4409–0.4921	11.20–12.50	1.772	0.008	205-051	–	207-006	204-074	0.4724
0.4724–0.5315	12.2–13.5	2.677	0.010	205-054	–	207-008	204-076	0.5019
0.5276–0.5748	13.4–14.7	2.677	0.010	205-056	–	207-008	204-078	0.5512
0.5669–0.6142	14.4–15.7	2.677	0.010	205-058	–	207-008	204-080	0.5905
0.6063–0.6535	15.4–16.7	2.677	0.010	205-060	–	207-008	204-082	0.6299
0.6457–0.6929	16.4–17.7	2.677	0.010	205-062	–	207-008	204-084	0.6693
0.6850–0.7323	17.4–18.7	2.677	0.010	205-064	–	207-008	204-086	0.7086
0.7244–0.7717	18.4–19.7	2.677	0.010	205-066	–	207-008	204-088	0.7480
0.7638–0.8110	19.4–20.7	2.677	0.010	205-068	–	207-008	204-090	0.7874

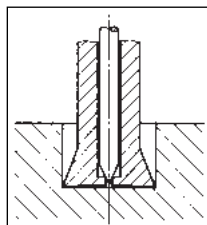


## Order the following:

1. Probe(s) required for range.
2. Needle(s) required for range.
3. Instrument holder(s)—model depends on probe(s) ordered.
4. Indicator. See Section E for complete list and specifications.
5. Wooden box (optional).
6. Ring gage(s) (optional).
7. Accessories

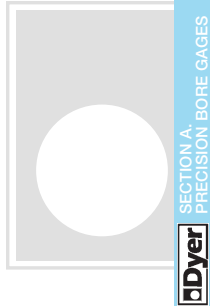
## Measuring Probe Holder

Description	Order No.
Measuring Probe Holder with push-button retractor for (recommended for smaller sizes)	209-020
Standard Measuring Probe Holder without push button for 0.0374"-0.8110" (0.95-20.6 mm)	209-030



## Custom Measuring Probes

We will make in-between ranges and longer reach (deeper) measuring probes. Contact Dyer with your special applications.



## Model 201-004 (Larger)

### Notable Features

- 50% more accuracy.
- Easy to use bore gaging.
- 200 Series is non-tipping, hands-off gaging. No operator error.
- Table Ø is 4.72" (120 mm)
- Built-in adjustable depth stop controls depth of measurement in the bore.
- Protects contact points.
- Adjusts quickly, versatile applications.
- The lever moves entire gage into part.



### Model 201-004 Bench Stand

This bench stand has adjustable height up to 9.84" (250 mm) and a stroke/lift 3.54" (90 mm).

## Model 201-000 (Smaller)

### Notable Features

- 50% more accuracy.
- Easy to use bore gaging.
- 200 Series is non-tipping, hands-off gaging. No operator error.
- Table Ø is 3.15" (80 mm)
- Built-in adjustable depth stop controls depth of measurement in the bore.
- Protects contact points.
- Adjusts quickly, versatile applications.
- The table base itself is raised by the lever.



### Model 201-000 Bench Stand

This bench stand has adjustable height up to 5.118" (130 mm) and a stroke/lift 1.57" (40 mm).

## Specials

Dyer can customize a bench stand to meet your needs. We provide part holding fixtures, special probes, base plates, stroke lift, etc. Contact our application engineering with your needs.



### 209-040 Floating Probe Holder

Eliminates radial plane errors when measuring small parts. Permits hands-off gaging.



### 201-020 90° Angle piece for hard-to-reach bores

Specifications: 90° angle piece that easily attaches to the 200 Series measuring probe and handles

# 271 SERIES BLIND HOLES, STEPPED & SHALLOW BORES



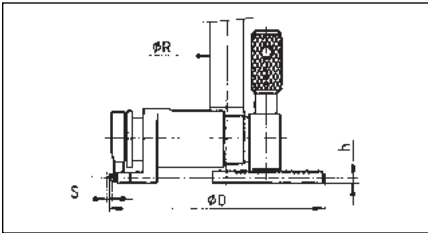
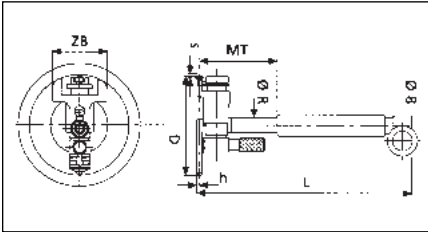
## Maximum Measuring Accuracy

Linear  $\leq \pm 0.000050"$  (0.0013 mm)  
 Repeatability  $\leq 0.000040"$  (0.001 mm)  
 Gage R & R  $\leq 10\%$  measuring high tolerance bores

## Notable Features

Accuracy, short measuring height, sliding fixed contact to change the range, gage sets

- Measure deviations in form.
- Gage rests flat on bottom blind hole, no tipping.
- Many options, ruby contacts, special base, larger ranges; contact us with your application.
- Carbide ball contacts standard, ruby optional.
- Specials for 90° bores.
- Adjustable slide base is ribbed to lock into position.



1. Select gage based on range and "h" dimension
2. Select indicator (dial or digital)
3. Select setting master



Basic Set: Gage (with 8 mm and 3/8" stem bushings), adjustable sliding contact with carbide ball, movable carbide contact, in box. Order indicator separately.



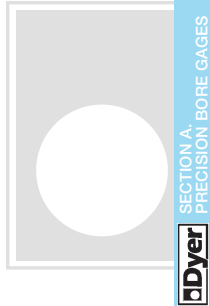
Gage will sit on a flat surface in blind hole or stepped bore, no tipping

## Models and Specifications Individual Gages

Range Inch Ø	Range mm Ø	Measuring Depth MT	Total Length L	Contact Travel S	Point of Contact from bottom h	Centering Plate Width ZB	Tube Diameter R	Number of Measuring Slides	Order No.
0.787-1.969	20-50	3.00"	6.40"	0.059"	0.059"	0.708"	0.394"	3	271-005
0.787-1.969	20-50	3.00"	6.40"	0.059"	0.039"	0.708"	0.394"	3	271-010
0.787-2.362	20-60	3.00"	6.40"	0.059"	0.059"	0.708"	0.394"	4	271-015
0.787-2.362	20-60	3.00"	6.40"	0.059"	0.039"	0.708"	0.394"	4	271-020
1.969-4.331	50-110	2.40"	6.40"	0.059"	0.059"	1.33"	0.472"	2	271-025
1.969-4.331	50-110	2.40"	5.60"	0.059"	0.039"	1.33"	0.472"	2	271-030
1.969-5.512	50-140	2.40"	5.60"	0.059"	0.059"	1.33"	0.472"	3	271-035
1.969-5.512	50-140	2.40"	5.60"	0.059"	0.039"	1.33"	0.472"	3	271-040
4.331-11.811	110-300	3.50"	5.60"	0.063"	0.079"	3.19"	0.708"	4	271-045
4.331-11.811	110-300	3.50"	6.40"	0.063"	0.039"	3.19"	0.708"	4	271-050
4.331-15.748	110-400	3.50"	6.40"	0.063"	0.079"	3.19"	0.708"	6	271-055
4.331-15.748	110-400	3.50"	6.40"	0.063"	0.039"	3.19"	0.708"	6	271-060

\* Larger ranges available. Contact Dyer office, ruby contacts on inquiry.

# 280 SERIES PRECISE MEASUREMENTS WITH BORING BAR IN PLACE



### Maximum Measuring Accuracy

Linear  $\leq 0.00012"$  (0.003 mm)  
 Repeatability  $\leq 0.000040"$  (0.001 mm)  
 Gage R & R capability  $\leq 10\%$  when  
 measuring high tolerance bores.

### Easy to use 280 Series gages

Cut labor costs, reduce scrap. Fast accurate gaging on the machine with bore tooling in place. Spring-loaded 3-point centering and 2-point measuring. Placing the gage flat against the part allows for non-tipping, no operator influence gaging.

### Notable Features

- Time saving. Use on the manufacturing machine.
- Large adjustable gage range and long contact point travel.
- Shop-rugged, fast measurements.
- Gage R & R capable, electronic indicator.
- Customize standards. Contact Dyer with your application.



*The gage will set flat against the part allowing the gaging to be electronic and non-tipping with no operator influence.*

280 Series Models - from left, 280-010, 280-020, 280-015  
 Indicators offered separately.

### 280 Series Models and Specifications

Range Inch (mm)	Contact Point Travel Inch (mm)	Diameter B Max	Measuring Depth MT	Order No.
1.00-2.75" (25-70 mm)	0.098" (2.5 mm)	0.236-1.772" (6-45 mm)	0.472" (12mm)	<b>280-005</b>
1.38-4.33" (35-105 mm)	0.118" (3.0 mm)	0.433-2.756" (11-70 mm)	0.709" (18 mm)	<b>280-010</b>
3.94-8.27" (100-210 mm)	0.138" (3.5 mm)	0.787"-5.118" (20-130 mm)	1.181" (30 mm)	<b>280-015</b>
3.94-11.02" (100-280 mm)	0.138" (3.5 mm)	0.787"-5.118" (20-130 mm)	1.181" (30 mm)	<b>280-020</b>
7.87-19.68" (200-500 mm)	0.138" (3.5 mm)	0.787-9.49" (20-240 mm)	1.181" (30 mm)	<b>280-025</b>

# 220 SERIES, STANDARD HANDLE HIGHEST ACCURACY BORE GAGE 0.000040" (0.001 mm) PRECISION

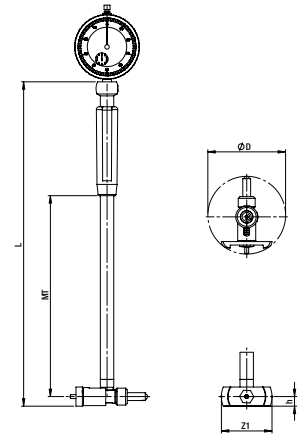


### Maximum Measuring Accuracy

Linear  $\leq \pm 0.000040"$  (0.001 mm)  
 Repeatability  $\leq \pm 0.000010"$  (0.00025 mm)  
 Gage R & R capability  $\leq 10\%$   
 Measuring high tolerance 0.0003" (0.007 mm) bores.

### Notable Features

- Highest Accuracy bore gages world wide, linear  $\leq 0.000040"$  (0.001 mm) at tolerance range from "Zero" set.
- Highest repeatability world wide  $\leq 0.000020"$  (0.0005 mm) unique special segment design.
- Best Gage R & R.



Model 220-035 Gage with fixed measuring pins, increment washers, in box. Order dial indicator separately.



1. Order gage model base or diameter range.
2. Order indicator.
3. Order Master.

Measuring Range Inch (mm)	Z1	Distance from the Bottom "h" Inch (mm)	Contact Point Max. Travel Inch (mm)	Standard Handle Measuring Depth "MT"	Standard Handle Total Measuring Depth "L"	Order No. with Carbide Contacts & Tool Steel Head	Order No. with Ruby Contacts & Tool Steel Head
0.18"-0.24" (4.5-6)	0.15	0.08" (2)	0.013" (0.35)	3.15"	3.15"	<b>220-005</b>	<b>220-305</b>
0.24"-0.31" (6-8)	0.20	0.11" (2.8)	0.019" (0.5)	3.94"	3.94"	<b>220-010</b>	<b>220-310</b>
0.31"-0.47" (8-12)	0.26	0.13" (3.3)	0.027" (0.7)	3.94"	3.94"	<b>220-015</b>	<b>220-315</b>
0.47"-0.79" (12.0-20.0)	0.36	0.18" (4.5)	0.035" (0.9)	4.33"	4.33"	<b>220-020</b>	<b>220-320</b>
0.71"-1.377" (18.0-35.0)	0.58	0.21" (5.4)	0.051" (1.3)	4.33"	8.30"	<b>220-025</b>	<b>220-325</b>
1.37"-2.36" (35.0-60.0)	1.10	0.28" (7.0)	0.051" (1.3)	5.51"	9.53"	<b>220-030</b>	<b>220-330</b>
1.97"-3.94" (50.0-100.0)	1.77	0.34" (8.6)	0.051" (1.3)	7.09"	11.55"	<b>220-035</b>	<b>220-335</b>
1.97"-5.91" (50.0-150.0)	1.77	0.34" (8.6)	0.055" (1.4)	7.09"	11.55"	<b>220-040</b>	<b>220-340</b>
3.94"-6.30" (100.0-160.0)	2.95	0.452" (11.5)	0.063" (1.6)	9.06"	14.34"	<b>220-055</b>	<b>220-355</b>
6.30"-11.02" (160.0-290.0)	4.72	0.47" (12)	0.063" (1.6)	9.06"	14.34"	<b>220-065</b>	<b>220-365</b>
11.02"-16.14" (280.0-410.0)	5.91	0.59" (15)	0.102" (2.6)	15.75"	21.50"	<b>220-070</b>	<b>220-370</b>
11.02"-20.08" (280.0-510.0)	5.91	0.59" (15)	0.102" (2.6)	15.75"	21.50"	<b>220-075</b>	<b>220-375</b>
15.75"-31.50" (400.0-800.0)	11.81	0.59" (15)	0.102" (2.6)	27.56"	33.50"	<b>220-080</b>	<b>220-380</b>

### Depth Extensions

For 1.38" (35mm) ranges and up\*  
with 3/8" and 8mm bushing stem.

Extension Length (L) inch	Extension Length (L) mm	Order No. 0.47" Dia.	Order No. 0.71" Dia.	Order No. 0.945" Dia. Carbon Fiber
9.84	250	<b>224-005</b>	—	—
19.69	500	<b>224-010</b>	—	—
29.53	750	<b>224-015</b>	—	—
39.37	1000	<b>224-020</b>	<b>224-120</b>	<b>224-130</b>
59.06	1500	—	<b>224-125</b>	<b>224-135</b>
78.74	2000	—	<b>224-126</b>	<b>224-140</b>

\* We recommend using only one depth extension for vertical measurements.



Model 224-010 Depth Extension

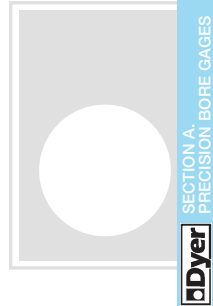


Special parallel version

Special right angle version



# 220/222/223/225 SERIES BORE GAGES HIGHEST ACCURACY, LARGE RANGE 0.180" – 31.500" (4.5 – 800 mm)



Dyer

## Maximum Measuring Accuracy

Linear  $\leq \pm 0.000040"$  (0.001 mm)  
 Repeatability  $\leq 0.000010"$  (0.00025 mm)  
 Gage R & R capability  $\leq 10\%$   
 Measuring high tolerance 0.0003" (0.008 mm)

- Best in Gage R & R performance with an impressive  $\leq 10\%$  capability, even during high tolerance applications and when measuring small and large bores.
- Gage measuring pin and interchangeable contact pins come standard carbide ball tips. Also available in ruby, chrome, teflon. Please contact Dyer Applications engineers with your specific requirements.
- Gage is used as a comparative instrument. Ideally the gage should be set with master rings but it can also be set with a universal setting device.
- Gage handle is made of invar steel with special nickel alloy that does not allow heat generated by operators hand or environment temperatures to affect the measurement result.
- Gage handle accepts 3/8" and/or 8mm diameter stem dial and digital indicators. Interchangeable brass bushings are included with each gage.
- Each gage comes with the corresponding measuring pins, spacers washers, and the necessary wrenches in a wooden box. Indicator must be ordered separately.
- Special 220 Series gages are available for measuring parallel distances, Right angle bores, hard to reach blind bores and groove diameters.



- Dyer's 220 Series is a rugged two point contact measuring instrument that can be used on the shop floor or in the inspection lab.
- These gages offer flexibility to measure various bore diameters starting from 0.18" up to 31.5" (4.5 – 800mm). Many sizes can be measured with one gage.
- Gage is a tipping style instrument. It is necessary to determine the minimum reading (reversal point) by rocking the gage while pivoting on the fixed measuring pin. When the gage axis is perfectly vertical to the bore axis, this can be attained. It is clearly found through the direction change of the pointer when using a dial indicator. A digital indicator can also be used, but we recommend one that would trap the min value.
- Gages offer the highest accuracy and repeatability due to the patented high precision deviation element that transfers movement seamlessly from one axis to another.
- The specially designed centering base allows the gage to be centered radially inside the bore. Each gage measuring range is determined by the width of the centering base.
- Gage offers three point centering while utilizing a two point measuring system. This two point system allows you to find different conditions inside the bore like ovality, taper, and out of round.
- Centering base is hardened Rc 65 and polished. It is also available with special coatings like chrome, teflon, etc.

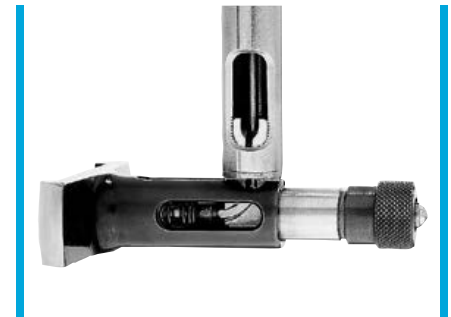
## The heart of our linear and repeat accuracy is a specially designed segment

This radially-machined high-strength steel segment is accurately guided in a circular arc. It transfers the movement of the measuring contact point directly to a precision indicating unit.

This direct transfer and resulting accuracy, repeatability and reproducibility is exclusive to our bore gage design.



Special design segment for transfer of contact movement to indicator



Transfer system in measuring head

# 223 SERIES PRECISION BORE GAGE SET BEST VALUE, MODULAR COMPONENTS



### Maximum Measuring Accuracy

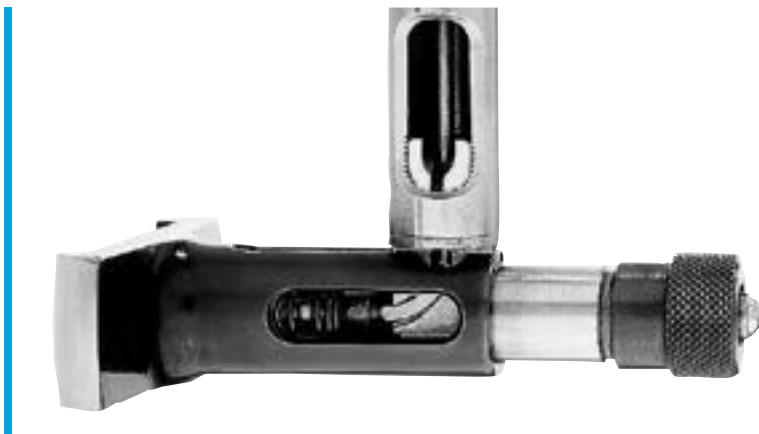
Linear  $\leq \pm 0.000040$ " (0.001 mm)  
 Repeatability  $\leq 0.000020$ " (0.0005 mm)  
 Gage R & R  $\leq 10\%$  measuring high  
 tolerance bores 0.0003" (0.008 mm)

- Fast, easy to use
- Same design benefits as 220 Series
- High accuracy, large range
- Carbide contacts oversized
- Retractable centering base RW 62-65
- In wooden box.

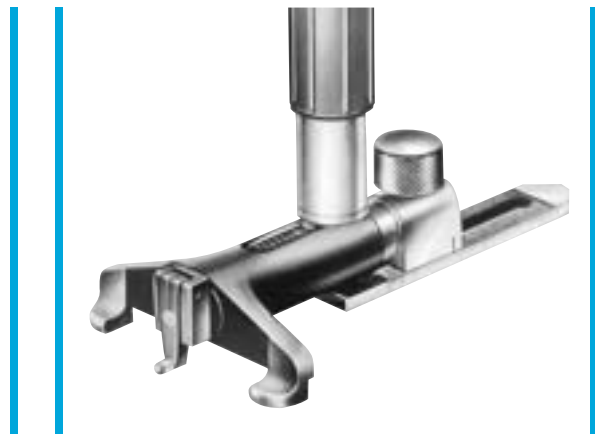


Series 223-250 Gage Set. Order indicator separately.

Description	Order No.
90° Angle piece—2.36" long	<b>223-401</b>
19" Depth Extension	<b>223-403</b>
30" Depth Extension	<b>223-404</b>



223-250 Thru bore measuring head with radial bent measurement transfer pin

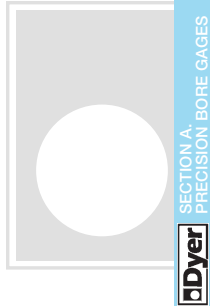


223-250 Blind hole measuring head

### Models and Specifications

Measuring Range Inch (mm)	Distance from the Bottom "H" Inch (mm)	Contact Point Max. Travel Inch (mm)	Measuring Depth	Total Measuring Depth	Order No. Standard Handle with Carbide Contacts & Tool Steel Head
Thru Hole 0.708"–6.30" (18.0–160.0)	0.334" (8.5)	0.055" (1.4)	1.18"	5.19"	<b>223-250</b>
Blind Hole 0.790"–5.51" (20.0–140.0)	0.059" (1.5)	0.059" (1.5)	3.66"	7.32"	

# 223 SERIES PRECISION BORE GAGE SETS BEST VALUE, MODULAR COMPONENTS



**Maximum Measuring Accuracy**  
 Linear  $\leq \pm 0.000040"$  (0.001 mm)  
 Repeatability  $\leq 0.000020"$  (0.0005 mm)  
 Gage R & R  $\leq 10\%$  measuring high tolerance bores 0.0003" (0.008 mm)

The most universal/best value tipping type bore gage in Dyer's offering.

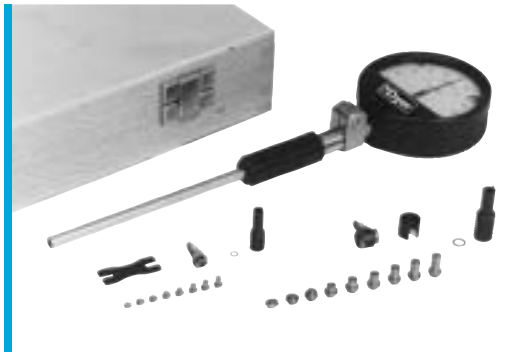
Once you use Dyer's tipping type bore gages, you will keep buying more.

**Notable Features**

- Precision, highest accuracy available in tipping type bore gages.
- Modular component sets means best value.
- Handles Invar steel.
- Wide spring-loaded centering bases for Gage R & R.
- In wooden box.

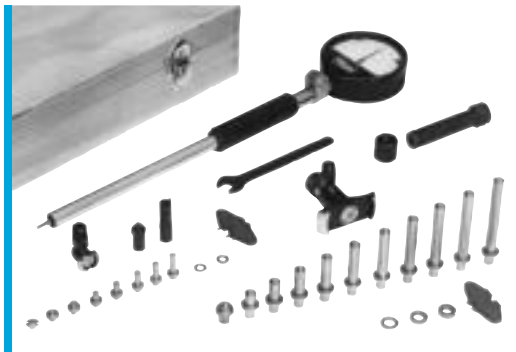
**Customized Models**

Contact our office with your bore application. Many options available, i.e., ruby contacts, special centering base.



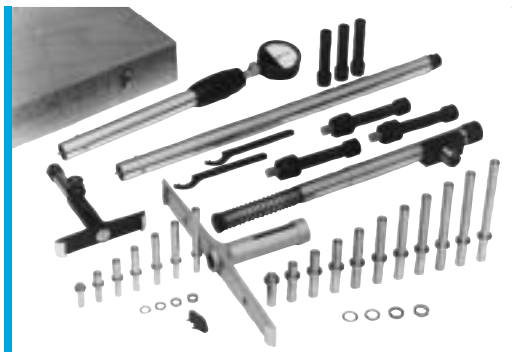
Model 223-105. Order indicator separately.

**223-105** shown with dial indicator (Range 0.236" to 0.708")



Model 223-220. Order indicator separately.

**223-220** shown with dial indicator (Range 0.71" to 6.30")



Model 223-320. Order indicator separately.

**223-320** shown with dial indicator (range 6.3" to 31.5")

**Models and Specifications**

Measuring Range Inch (mm)	Distance from the Bottom "H" Inch (mm)	Contact Point Max. Travel Inch (mm)	Measuring Depth	Total Measuring Depth	Order No. Standard Handle with Carbide Contacts & Tool Steel Head
0.24"-0.71" (6.0-18.0)	0.167" (4.25)	0.020" (0.5)	4.00" 101mm	6.50" 165mm	<b>223-105</b>
0.71"-6.30" (18.0-160.0)	0.334" (8.5)	0.055" (1.4)	5.70" 145mm	9.72" 247mm	<b>223-220</b>
6.30"-31.50" (160.0-800.0)	0.452" (11.5)	0.063" (1.6)	7.08" 180mm	13.00" 330mm	<b>223-320</b>

Each set of the 223 Series models above include two interchangeable head stocks, one handle, fixed incremental pins, and spacer washers to cover the entire specified measuring range. Indicator NOT included. Order indicator separately.

**Optional Accessories**

Description	Order No.
90° Angle piece—2.36" long	<b>223-401</b>
19" Depth Extension*	<b>223-403</b>
30" Depth Extension*	<b>223-404</b>

\*Only for 223-220 & 223-320

# 222 SERIES, SHORT HANDLE HIGHEST ACCURACY, LARGE RANGE 0.180" – 20.08" (4.5 – 510 mm)



## Maximum Measuring Accuracy

Linear  $\leq \pm 0.000040"$  (0.001 mm)  
 Repeatability  $\leq \pm 0.000010"$  (0.00025 mm)  
 Gage R & R capability  $\leq 10\%$   
 Measuring high tolerance 0.0003" (0.008 mm)

*The world's most accurate tipping bore gages.*

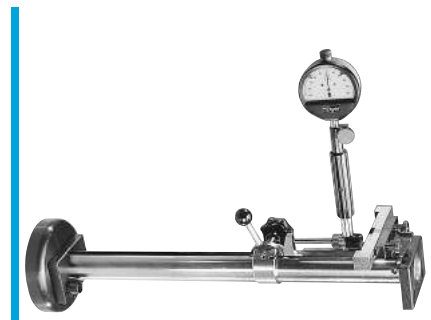
**Precision bore gages for ID's from 0.18" – 31.50" (4.5 – 800 mm)**

## Notable Features

- Oversize, retractable, spring-loaded centering base.
- Special designed segment to transfer the measurement.
- Invar steel handle for stability.
- When tipping the gage thru the reversal point, the operator sees an exact, repeatable and clearly visible reading.
- Customized models include optional chrome centering base and ruby contacts.



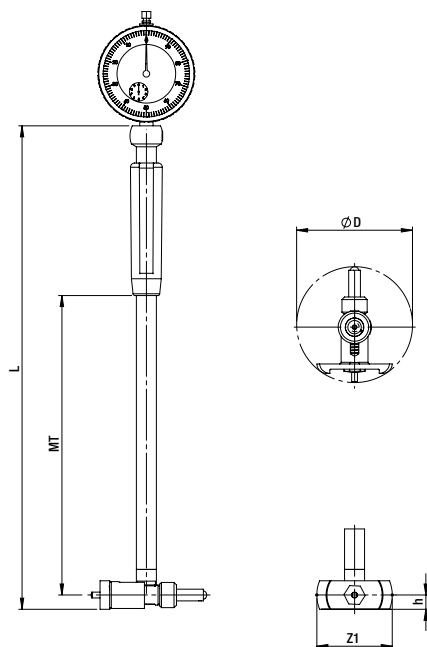
222-035 Series short handle. Indicator offered separately.



222 Series short handle gage with adjustable setting master.

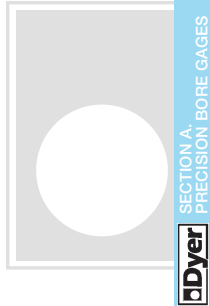
## Models and Specifications

Measuring Range Inch (mm)	Short Handle Measuring Depth "MT"	Short Handle Total Measuring Depth "L"	Order No. Short Handle with Carbide Contacts & Tool Steel Head	Order No. Short Handle with Ruby Contacts & Tool Steel Head	Order No. Short Handle with Carbide Contacts & Chrome Head
0.18"-0.24" (4.5-6)	0.94"	0.94"	222-005	222-305	—
0.24"-0.31" (6-8)	0.94"	0.94"	222-010	222-310	222-110
0.31"-0.47" (8-12)	0.94"	0.94"	222-015	222-315	222-115
0.47"-0.79" (12.0-20.0)	0.98"	0.98"	222-020	222-320	222-120
0.71"-1.377" (18.0-35.0)	0.98"	4.53"	222-025	222-325	222-125
1.37"-2.36" (35.0-60.0)	1.10"	4.92"	222-030	222-330	222-130
1.97"-3.94" (50.0-100.0)	1.18"	5.51"	222-035	222-335	222-135
1.97"-5.91" (50.0-150.0)	1.18"	5.51"	222-040	222-340	222-140
3.94"-6.30" (100.0-160.0)	1.50"	6.30"	222-055	222-355	222-155
6.30"-11.02" (160.0-290.0)	1.50"	6.30"	222-065	222-365	222-165
11.02"-16.14" (280.0-410.0)	2.17"	7.09"	222-070	222-370	222-170
11.02"-20.08" (280.0-510.0*)	2.17"	7.09"	222-075	222-375	222-175
15.75"-31.50" (400.0-800.0*)	Varies	Varies	222-080	222-380	—



1. Order gage model based on diameter range.
2. Order indicator.
3. Order Master.

# 270 SERIES MEASURE BORES AT A 90° ANGLE JIG GRINDING



We offer all Dyer bore gage models with 90° angle capacity for awkwardly positioned bores.

**Maximum Measuring Accuracy**  
 Linear ±0.000075" (0.0019 mm)  
 Repeatability ±0.000010" (0.00025 mm)  
 Gage R & R capability ≤10% when measuring high tolerance bores.

**Notable Features**

- Accuracy and Range.
- Non-tipping, range changeable available, see 830 Series, page A.32.
- Ruby contact optional.
- Customized specials available. Contact Dyer with your application.
- Component sets available.



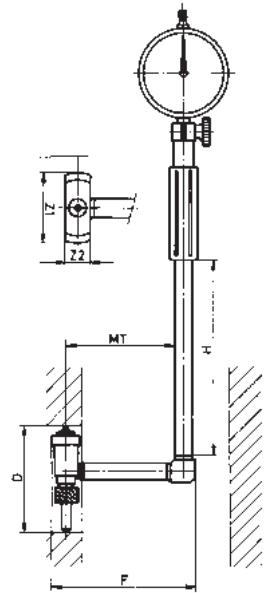
Model 270-245



**Standard Models and Specifications\***

Gage with bushings for 8mm and 3/8" diameter stem, permanently attached angle piece, fixed measuring pins, increment washers, in box.

Range Inch	Range mm	F** Inch/mm	MT Inch/mm	T Inch/mm	H Inch/mm	Z1 Inch/mm	Z2 Inch/mm	Max. Travel/ Contact Pt.	Order No. Carbide Contacts	Order No. Carbide Contacts and Head Chrome
0.177-0.236	4.5-6	1.65/41.91	1.18/29.97	5.70/144.78	2.83/71.88	0.15/3.81	0.15/3.81	0.0138"/.351	—	<b>270-105</b>
0.236-0.315	6-8	1.69/42.93	1.18/29.97	6.50/165.10	2.83/71.88	0.20/5.08	0.20/5.08	0.0197"/.500	—	<b>270-110</b>
0.315-0.512	8-12	1.73/43.94	1.18/29.97	6.50/165.10	2.83/71.88	0.26/6.60	0.26/6.60	0.0276"/.701	—	<b>270-115</b>
0.512-0.787	12-20	2.60/66.04	1.97/50.04	8.00/203.20	4.41/112.01	0.36/9.14	0.36/9.14	0.0354"/.899	—	<b>270-120</b>
0.709-1.378	18-35	2.60/66.04	1.97/50.04	8.33/211.58	4.41/112.01	0.58/14.73	0.52/13.21	0.0512"/1.30	<b>270-225</b>	<b>270-125</b>
1.378-2.362	36-60	3.15/80.01	2.36/59.94	9.66/245.36	5.51/139.95	1.10/27.94	0.55/13.97	0.0512"/1.30	<b>270-230</b>	<b>270-130</b>
1.969-3.937	50-100	3.27/83.06	2.36/59.94	9.59/243.59	5.08/129.03	1.77/44.96	0.67/17.02	0.051"/1.30	<b>270-235</b>	<b>270-135</b>
1.968-5.901	50-150	3.27/83.06	2.36/59.94	11.79/299.47	7.28/184.91	1.77/44.96	0.67/17.02	0.051"/1.30	<b>270-240</b>	<b>270-140</b>
3.937-6.300	100-160	4.13/104.90	2.76/70.10	12.60/320.04	7.28/184.91	2.95/74.93	0.91/23.11	0.063"/1.60	<b>270-245</b>	<b>270-145</b>
6.300-11.024	160-280	4.13/104.90	2.76/70.10	12.60/320.04	7.28/184.91	4.72/119.89	0.94/23.88	0.063"/1.60	<b>270-250</b>	<b>270-150</b>
11.024-16.142	280-410	4.92/124.97	3.15/80.01	21.55/547.37	15.35/389.89	5.91/150.11	1.10/27.94	0.102"/2.59	<b>270-255</b>	<b>270-155</b>
11.024-20.079	280-510	4.92/124.97	3.15/80.01	21.55/547.37	15.35/389.89	5.91/150.11	1.20/30.48	0.102"/2.59	<b>270-260</b>	<b>270-160</b>
15.75-31.50	400-800	4.92/124.97	3.15/80.01	30.90/784.86	27.00/685.80	11.81/299.97	1.37/34.80	0.102"/2.59	<b>270-265</b>	<b>270-165</b>



**Blind Hole Models and Specifications\***

Gage with permanently attached angle piece, measuring slide with carbide inserts, moveable carbide contact, in box.

Range Inch	Range mm	F** Inch/mm	MT Inch/mm	T Inch/mm	Point of Contact from Bottom "H" Inch/mm	Max. Travel/ Slide Inch/mm	Order No. Carbide
0.787-1.969	20-50	2.60"/ 66.04	1.97"/50.04	8.33"/211.58	0.059"/1.50	0.39"/ 9.91	<b>270-005</b>
0.787-1.969	20-50	2.60"/ 66.04	1.97"/50.04	8.33"/211.58	0.041"/1.04	0.39"/ 9.91	<b>270-010</b>
0.787-2.362	20-60	3.15"/ 80.01	2.36"/59.94	9.66"/245.36	0.059"/1.50	0.39"/ 9.91	<b>270-015</b>
0.787-2.362	20-60	3.15"/ 80.01	2.36"/59.94	9.66"/245.36	0.040"/1.02	0.39"/ 9.91	<b>270-020</b>
1.969-4.331	50-110	3.27"/ 83.06	2.36"/59.94	9.59"/243.59	0.059"/1.50	1.18"/29.97	<b>270-025</b>
1.969-4.331	50-110	3.27"/ 83.06	2.36"/59.94	9.59"/243.59	0.040"/1.02	1.18"/29.97	<b>270-030</b>
1.969-5.512	50-140	3.27"/ 83.06	2.36"/59.94	11.79"/299.47	0.059"/1.50	1.18"/29.97	<b>270-035</b>
1.969-5.512	50-140	3.27"/ 83.06	2.36"/59.94	11.79"/299.47	0.040"/1.02	1.18"/29.97	<b>270-040</b>
4.331-11.811	110-300	4.13"/104.90	2.76"/70.10	12.60"/320.04	0.079"/2.01	1.97"/50.04	<b>270-045</b>
4.331-11.811	110-300	4.13"/104.90	2.76"/70.10	12.60"/320.04	0.040"/1.02	1.97"/50.04	<b>270-050</b>
4.331-15.748	110-400	4.92"/124.97	3.15"/80.01	21.55"/547.37	0.079"/2.01	1.97"/50.04	<b>270-055</b>
4.331-15.748	110-400	4.92"/124.97	3.15"/80.01	21.55"/547.37	0.040"/1.02	1.97"/50.04	<b>270-060</b>

Jig grinding/bore measuring application

\* Order indicator separately. See Section E for complete list and specifications.

\*\*Available in other lengths. Contact Dyer with your requirements.

# 225 SERIES DEEP REACH, LONG HANDLE PRECISION BORE GAGES



### Maximum Measuring Accuracy

Linear  $\pm 0.000040"$  (0.001 mm)  
 Repeatability  $\pm 0.000010"$  (0.00025 mm)  
 Gage R & R <10% measuring high tolerance bores

### MEASURE I.D.'S FROM 0.18" – 31.5" (4.5 mm – 800.00 mm), GAGES HAVE LARGE SELF-CENTERING BASE

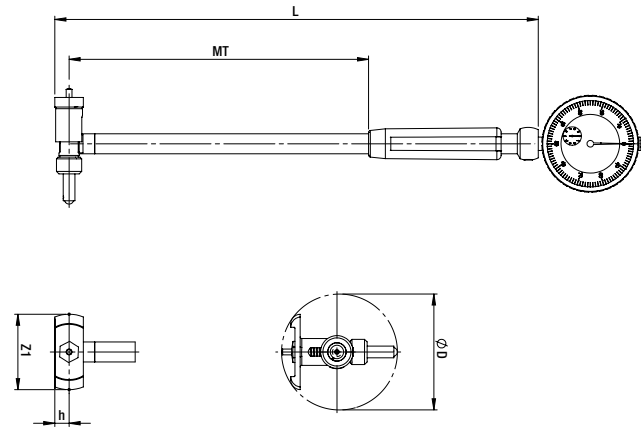
- Single-unit shaft lengths for the highest degree of measuring accuracy.
- Inch/Metric. Convert by changing dial indicator.
- In-between and longer sizes quoted on request.
- Large chrome plated self-centering base Rc 65, carbide ball contact points.
- Sealed construction, for use under dirty and oily conditions.



Model 225-035 Bore gage shown with optional indicator. Indicator offered separately.



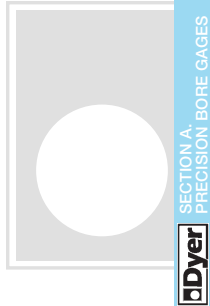
Setting Master  
See Section F



Specifications				Order No. with Meas. Depth (MT) of 9.8" (250 mm)	Order No. with Meas. Depth (MT) of 19.7" (500 mm)	Order No. with Meas. Depth (MT) of 29.5" (750 mm)	Order No. with Meas. Depth (MT) of 39.4" (1000 mm)	Order No. with Meas. Depth (MT) of 49.2" (1250 mm)	Order No. with Meas. Depth (MT) of 59.1" (1500 mm)	Order No. with Meas. Depth (MT) of 78.7" (2000 mm)	Order No. with Meas. Depth (MT) of 98.4" (2500 mm)	Order No. with Meas. Depth (MT) of 118.1" (3000 mm)
Range Inch	Range mm	Z1	Max. Travel Contact Point									
0.18-0.24	4.5-6	0.15"	0.0138"	225-005	—	—	—	—	—	—	—	—
0.24-0.31	6-8	0.20"	0.0197"	225-010	225-055	225-120	225-185	—	—	—	—	—
0.31-0.47	8-12	0.26"	0.0276"	225-015	225-060	225-125	225-190	—	—	—	—	—
0.47-0.79	12-20	0.36"	0.0354"	225-020	225-065	225-130	225-195	—	—	—	—	—
0.71-1.38	18-35	0.58"	0.0512"	225-025	225-070	225-135	225-200	225-255	—	—	—	—
1.38-2.36	35-60	1.10"	0.0512"	225-030	225-075	225-140	225-205	225-260	225-300	225-340	225-380	225-420
1.97-3.94	50-100	1.77"	0.051"	225-035	225-080	225-145	225-210	225-265	225-305	225-345	225-385	225-425
1.97-5.91	50-150	1.77"	Var.	225-040	225-085	225-150	225-215	225-270	225-310	225-350	225-390	225-430
3.94-6.30	100-160	2.95"	0.063"	—	225-095	225-160	225-225	225-275	225-315	225-355	225-395	225-435
6.30-11.41	160-290	4.72"	0.063"	—	225-105	225-170	225-235	225-280	225-320	225-360	225-400	225-440
11.02-16.14	280-410	5.91"	0.102"	—	225-110	225-175	225-240	225-285	225-325	225-365	225-405	225-445
11.02-20.08	280-510	5.91"	0.102"	—	225-115	225-180	225-245	225-290	225-330	225-370	225-410	225-450
15.75-31.50	400-800	11.81"	0.102"	—	—	—	225-250	225-295	225-335	225-375	225-415	225-455



# 226 SERIES CARBON FIBER DEEP REACH, LONG HANDLE PRECISION BORE GAGES

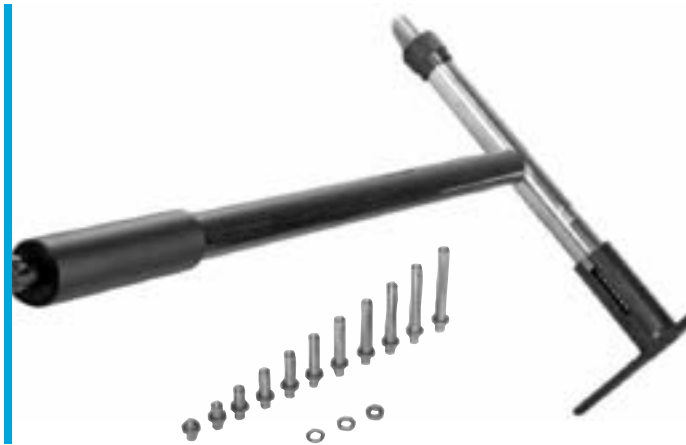


## Maximum Measuring Accuracy

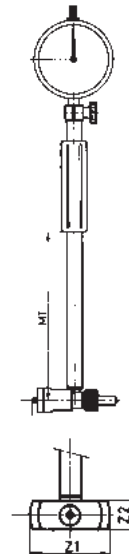
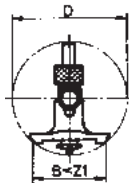
Linear  $\pm 0.000040''$  (0.001 mm)  
 Repeatability  $\pm 0.000010''$  (0.00025 mm)  
 Gage R & R capability <10% measuring high tolerance bores.

## MEASURE I.D.'S FROM 1.97" – 31.5" (50 mm – 800.00 mm)

- Measuring head is accompanied by 24mm  $\varnothing$  carbon fiber interchangeable extensions to reach desired measuring depth.
- 75% less weight than 225 Model while still maintaining rigidity.
- Lighter gage with extensions translates to smaller storage box, which makes it easier to ship and to store.
- Gages have large chrome plates self-centering base Rc65 and carbide ball contacts.
- Inch/Metric. Convert by changing dial indicator.
- Sealed construction for use under dirty and oily conditions.
- Special ranges or longer measuring depths quoted on request.



Model 226-115. Order indicator separately.



Setting Master  
See Section F



Close up look of carbon fiber material.

Specifications				Order No. with Meas. Depth (MT) of 19.7" (500 mm)	Order No. with Meas. Depth (MT) of 39.4" (1000 mm)	Order No. with Meas. Depth (MT) of 59.1" (1500 mm)	Order No. with Meas. Depth (MT) of 78.7" (2000 mm)
Range Inch	Range mm	Z1	Max. Travel Contact Point				
1.97-3.94	50-100	1.77"	0.051"	226-080	226-210	226-305	226-345
1.97-5.91	50-150	1.77"	Var.	226-085	226-215	226-310	226-350
3.94-6.30	100-160	2.95"	0.063"	226-095	226-225	226-315	226-355
6.30-11.41	160-290	4.72"	0.063"	226-105	226-235	226-320	226-360
11.02-16.14	280-410	5.91"	0.102"	226-110	226-240	226-325	226-365
11.02-20.08	280-510	5.91"	0.102"	226-115	226-245	226-330	226-370
15.75-31.50	400-800	11.81"	0.102"	—	226-250	226-335	226-375

# 230 SERIES SPHERICAL DIAMETERS



### Maximum Measuring Accuracy

Linear  $\leq \pm 0.000040"$  (0.001 mm)  
 Repeatability  $\leq \pm 0.000010"$  (0.00025 mm)  
 Gage R & R capability  $\leq 10\%$  when  
 measuring high accuracy parts.

### Notable Features

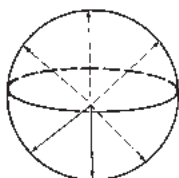
- Accuracy and range.
- 2 spring-loaded, retractable, self-centering bases align gage in part.
- Rugged 24/7 gages designed for production use.
- Customized standards. Contact Dyer with your application.

### Ideal Applications

- Bearing seats of pillow block housings.
- Valve housings.
- Ball joints.
- Bearing raceways of outer rings.

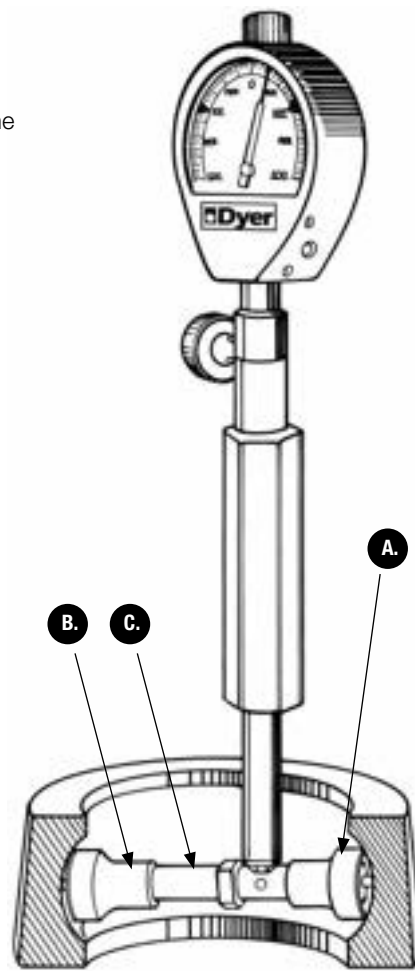


Model 230-006  
 Shown with dial indicator (not included with set).



- A.** Permanently fixed, spring-loaded, centering plate with moveable contact which transmits the measurement to the indicator. Contains a spherical ring segment whose size is determined by the range.
- B.** Removable, spring-loaded centering plate with fixed contact. This base has a self-centering contact surface with a spherical radius centering base.
- C.** Gage includes standard interchangeable range extensions that allow the operator to measure any diameter within the specified gage measuring range.

Gage can also be ordered with one interchangeable range extension to measure a specific diameter.



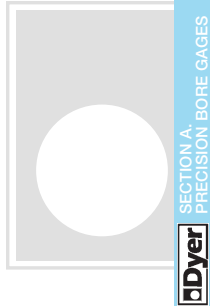
### 230 Series Models and Specifications

Range Inch	Range mm	Measuring Depth	Order No. Complete Set*	Order No. with one Extension**
0.551-0.787	14-20	4.33"	<b>230-001</b>	<b>230-101</b>
0.787-1.378	20-35	4.33"	<b>230-002</b>	<b>230-102</b>
1.102-1.772	28-45	5.51"	<b>230-003</b>	<b>230-103</b>
1.772-4.138	45-105	7.09"	<b>230-004</b>	<b>230-104</b>
2.953-5.118	75-130	7.09"	<b>230-005</b>	<b>230-105</b>
5.118-11.024	130-280	9.06"	<b>230-006</b>	<b>230-106</b>

\* Dial gage not included; choose from Dyer's selection.

\*\* Please specify  $\emptyset$  when ordering.

# 136 SERIES HIGH ACCURACY, LARGE DIAMETER SHALLOW BORE GAGES



SECTION A.  
PRECISION BORE GAGES



## Maximum Measuring Accuracy

Linear  $\pm 0.0001"$  (0.0025 mm)  
Repeatability  $\leq 0.0001"$  (0.0025 mm)  
Gage R & R capability  $\leq 10\%$  when measuring high tolerance bores. Contact Dyer with your application.

## Direct "in-line" electronics, better large bore gaging

When gaging large bores there are many problems to overcome. Up to now, the "bar type" gage designs (i.e. shallow hole, swing gages) or I.D. mics have been used to measure large bores. Unfortunately, these designs do not meet the accuracy, repeatability and Gage R & R requirements of today's manufacturing processes.

Dyer's 136 Series will meet and exceed your large bore measuring requirements and at a reasonable cost. Also, we guarantee a  $\leq 10\%$  Gage R & R on high tolerance bores.

Let's see why the 136 Series is the best choice to measure large bores:

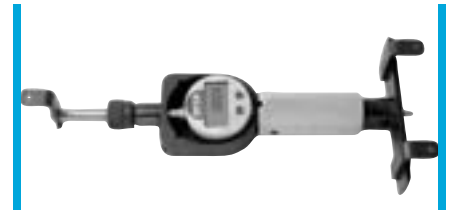
## When gaging large bores, we have to consider the following issues:

1. Easy to use and lightweight.
2. No operator influence when mastering or measuring. Automatic aligning in the bore.
3. Precise linear accuracy and repeatability.
4. 10% Gage R & R capability at high tolerances.
5. One gage for rough cut and final cut measurements. Long contact point travel.
6. Large measuring range using one gage and the ability to change size ranges easily.
7. Electronic reading.
8. Retracting contacts for recess and groove measurements.

The 136 Series gage will measure large bores "directly in-line", on the measuring axis. These gages are designed for **large bore diameters with short measuring depths.**

## Notable Features

- Easy to use and lightweight**  
 "You place the gage in the bore, take your hands off and view the measurement."
- Spring loaded self-centering base**  
 "Automatically aligns the gage in the bore. Hands off gaging assures accuracy and repeatability when mastering and measuring."
- Precise linear accuracy  $\pm 0.0001"$  (0.0025 mm) and repeatability  $< 0.0001"$  (0.0025 mm)**  
 Gage and indicator are directly "in line" on the measuring axis, eliminating hysteresis and mechanical transfer errors." 50% higher accuracy is possible. Contact Dyer.
- Long contact point travel 0.475" (12 mm)**  
 "Accurate linear measurements are a result of the in-line indicator design." Optional contact point retracting pin for groove and recess applications. Contact Dyer.
- Dyer guarantees a 10% Gage R & R capability on high tolerance bores.**
- Large size range capability**  
 Model 136-100 has a 9" range (11.00 - 20.00") and Model 136-200 has a 15.75" range (15.75-31.50"). Larger sizes available. Contact Dyer.
- Length changeable Depth stops locate on the bore's face or step.**  
 Gage drops into the "in-line axis" measuring position. There are no "hanging contact feet".
- Many indicator possibilities for SPC data collection**



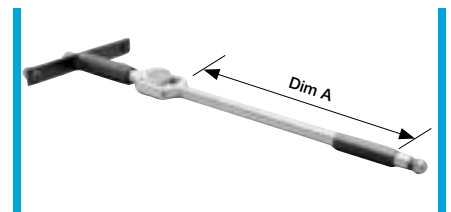
Model 136-100 with depth stops



Model 136-210 spring-loaded centering base with depth stops



Model 136-210 custom design for diameters larger than 31.00". Special contacts and centering-base designed for measuring the I.D. of large bearing races.



Model 136-210 fixed tube "Dim A" can be many lengths and interchangeable for different diameters sizes.

## Models and Specifications

Range Inch (mm)	Contact Point Travel	"h" Dim.	Fixed Contacts/ Washers	Range Extensions	Depth Stop	Order No. Inch	Order No. E/Inch/Metric
11.00-20.00" (280-510 mm)	0.475"	0.630" (16 mm)	7/4	3	3	136-100	136-110
15.75-31.50" (400-800 mm)	0.475"	0.690" (17.5 mm)	11/4	3	3	136-200	136-210

<sup>1</sup> Larger sizes possible, contact Dyer.

# PRECISION RETRACTABLE BORE & GROOVE GAGING



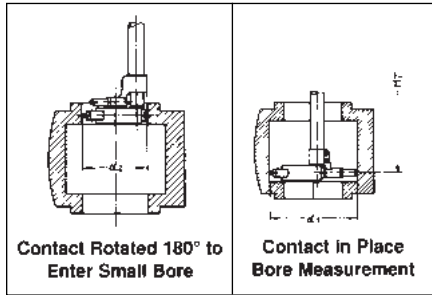
Series 261 thru 267 rotate fixed contact

Measure hard-to-reach pillow block bores, undercuts, bearing races, landing gear recesses.

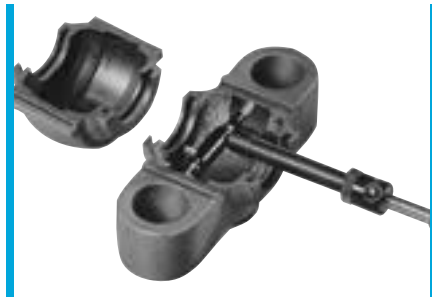


### How to order

1. Select gage from chart. If these size ranges do not fit your application, contact Dyer office.
2. Select dial indication.
3. Select set master.



Contact rotates 180°



Gage open to measure larger internal bore

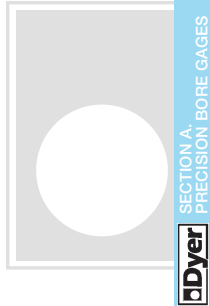


Contact point rotated 180° to enter small bore



Series 262 thru 267

# RETRACTABLE BORE GAGES MEASURE PILLOW BLOCK HOUSING & OTHER HARD-TO-REACH BORES



**Maximum Measuring Accuracy**  
 Linear  $\leq \pm 0.000040"$  (0.001 mm)  
 Repeatability  $\leq 0.000060"$  (0.0015 mm)  
 Gage R & R  $\leq 10\%$  measuring high tolerance parts.

Use these gages when your measuring application requires high accuracy, repeatability and reproducibility.



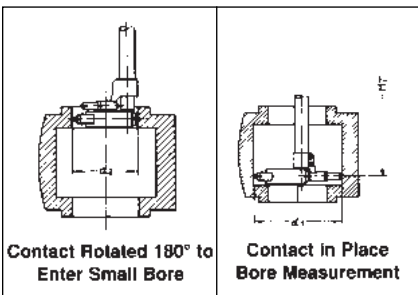
Model 264-010 with fixed contact point turned in. Contact will rotate 180° to measuring position once gage enters part.

### Notable Features

- High accuracy, ease of use, fast measurements.
- Fixed contact pin rotates 180° parallel to the centering base.
- Special depths to 79" (3000 mm).
- Special depth stops.
- Customized standards, contact Dyer office.

### Ideal Applications

- Aerospace application. Multiple angled-tapered, large deep bore within landing gears. Gages are retractable to enter smaller bore and open to measure larger bore. Very high accuracy bore gages, with custom long handles, to reach deep bores.
- Pillow block housings



Contact rotates 180°

### Models and Specifications

Standard Models and Depth of Reach							
Order No.	Depth of Reach	Order No.	Depth of Reach	Order No.	Depth of Reach	Order No.	Depth of Reach
261-005	2.36"	263-005	3.150"	265-005	4.72"	267-005	7.09"
261-010	7.87"	263-010	7.87"	265-010	15.75"	267-010	15.75"
261-015	15.75"	263-015	15.75"	265-015	29.53"	267-015	29.53"
261-020	29.53"	263-020	29.53"				
262-005	2.56"	264-005	4.33"	266-005	5.51"		
262-010	7.87"	264-010	7.87"	266-010	15.75"		
262-015	15.75"	264-015	15.75"	266-015	29.53"		
262-020	29.53"	264-020	29.53"				

\* Special depths possible, contact Dyer

Entrance Specifications												
Series	Range (Inch)	Range (mm)	Min d <sub>2</sub> (Inch)	Max d <sub>1</sub> (Inch)	Min d <sub>2</sub> (Inch)	Max d <sub>1</sub> (Inch)	Min d <sub>2</sub> (Inch)	Max d <sub>1</sub> (Inch)	Min d <sub>2</sub> (Inch)	Max d <sub>1</sub> (Inch)	Min Groove Size (Inch)	Contact Pivot
261**	1.181-2.047	30-52	0.944	1.181	1.338	1.653					0.119	120°
			0.984	1.259	1.417	1.732						
			1.062	1.338	1.496	1.811						
			1.141	1.417	1.574	1.889						
			1.181	1.496	1.653	1.968						
1.259	1.574	1.732	2.047									
262	1.969-2.756	50-70	1.574	1.968							0.300	180°
			1.574	2.165								
			1.574	2.362								
			1.692	2.559								
			1.889	2.756								
263	2.362-3.937	60-100	1.968	2.562							0.394	180°
			1.968	2.759								
			1.968	2.955								
			1.968	3.152								
			2.047	3.349								
2.444	3.546											
2.440	3.743											
2.637	3.937											
264	3.150-5.906	80-150	2.480	3.150	3.031	4.727					0.394	180°
			2.480	3.349	3.228	4.924						
			2.480	3.743	3.425	5.121						
			2.480	3.940	3.622	5.318						
			2.480	4.137	3.818	5.514						
2.637	4.333	4.015	5.711									
2.834	4.530	4.212	5.906									
265	4.724-8.661	120-220	3.740	4.724	3.740	6.102	5.118	7.480			0.433	180°
			3.740	4.921	3.937	6.299	5.314	7.677				
			3.740	5.118	4.133	6.496	5.511	7.874				
			3.740	5.314	4.330	6.692	5.708	8.070				
			3.740	5.511	4.527	6.889	5.905	8.267				
3.740	5.708	4.724	7.086	6.102	8.464							
3.740	5.905	4.921	7.283	6.299	8.661							
266	7.086-14.173	180-360	6.377	7.125	6.377	9.838	7.598	12.201			0.512	180°
			6.377	7.870	6.377	10.232	7.992	12.594				
			6.377	8.264	6.377	10.626	8.385	12.988				
			6.377	8.657	6.377	11.019	8.779	13.382				
			6.377	9.051	6.811	11.413	9.173	13.775				
6.377	9.445	7.204	11.807	9.566	14.173							
267	11.417-20.866	290-530	9.448	11.807	9.448	14.169	10.275	16.531	12.637	18.893	0.784	180°
			9.448	12.201	9.448	14.563	10.669	16.925	13.031	19.287		
			9.448	23.594	9.448	14.956	11.062	17.319	13.425	19.681		
			9.448	12.988	9.448	15.350	11.456	17.712	13.818	20.075		
			9.448	13.382	9.448	15.744	11.850	18.106	14.212	20.468		
9.448	13.775	9.881	16.138	12.244	18.500	14.606	20.866					

\*\* Depending on your application, 261 Series may not have centering base. Contact Dyer with your requirements.



# DYER SPECIAL "ADDED VALUE" SERVICES CUSTOM MARKINGS & STORAGE CASE OPTIONS

## MARKING INFORMATION

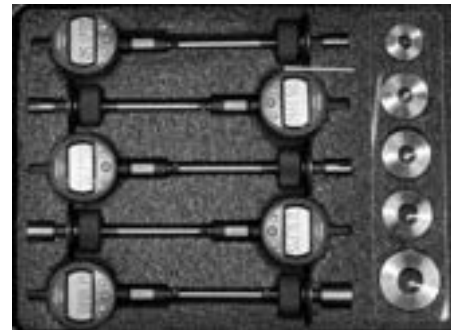
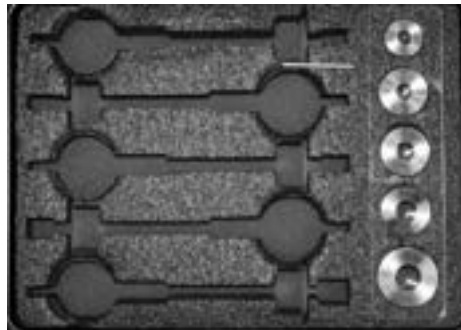
- Dyer can custom mark any information on your gage (letters, numbers, barcode, logo, etc.) A nominal fee will be applied.
- A variety of materials can be marked: tool steel, stainless steel, coated metals, anodized aluminum, plastic, acrylic, wood and even glass.
- New gages or existing gages can be marked, even other manufacturer's gages!
- Contact our Marking Specialists about your specific needs.

## STORAGE CASE INFORMATION

- Dyer can create custom storage cases to fit your gages whether they are new or existing units. (Please provide drawing of existing unit you want to store)
- Single or multiple units can be stored in one case.
- We have the capability to laser cut precisely within 0.001", so any shape is possible
- Wooden and plastic cases are standard. Other styles are available upon request.
- Special acrylic pieces can be made to keep your master rings looking new. Set your gages without ever handling the masters!
- Contact our Engineering Department about your specific needs.



Dyer laser System



### Standard PLASTIC Storage Case with Handles

Size L x W x D (inches)	Order No.
12" x 8" x 2"	308-010
15.5" x 11.5" x 3.5"	308-011
36" x 10" x 4"	308-015

### Standard WOODEN Storage Case

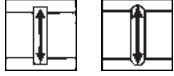
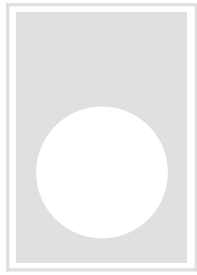
Size L x W x D (inches)	Order No.
12" x 6" x 2"	308-210
17.5" x 8" x 3"	308-211
29" x 7.5" x 6.5"	308-215

Special size wooden or plastic cases available upon request.



# B

## Groove Gage Applications and ID-OD Measuring Solutions Repeatable Groove Gaging

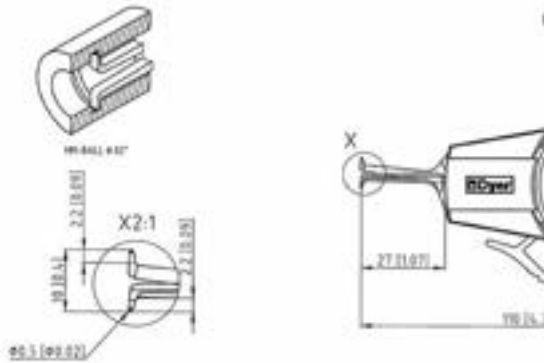
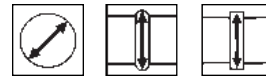


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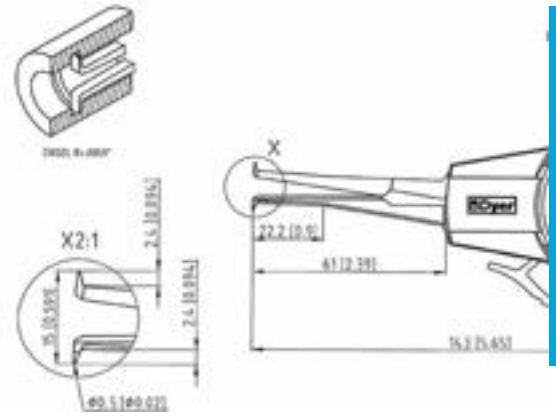
<b>Application</b>	<b>Series</b>	<b>Page</b>
Classic Direct Reading Groove Gage	104	B.2–B.3
Special Application Groove Gage	104	B.4–B.5
Standard Mid-Reach Dial Grooves	103	B.6–B.7
ID Comparative Groove Gages	103	B.8
ID Special Arm Design	103	B.9
ID Electronic Standard Grooves	651	B.10–B.11
ID Dial Groove Gage for Undercuts	103	B.12–B.13
ID Electronic Groove Gage for Undercuts	651	B.14–B.15
ID 3-Point Electronic Grooves	650	B.16–B.17
ID Long Reach Dial Grooves	101	B.18–B.19
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ID Extended Reach Dial Gages	102	B.24
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ID Precision Groove Gages	210	B.28–B.29
ID/OD Shallow Diameter Bar Gages	131	B.30
ID Large Range Groove Gages	132	B.31
ID/OD Measuring Tables	747	B.32–B.39
ID/OD Large Range Bar Gage	134	B.40
ID/OD Large Range Bar Gage	135	B.41
ID/OD Short Body Bar Gage	133	B.42

**visit** our searchable web site  
and find Dyer's interactive  
catalog, gaging solutions  
by application and industry!

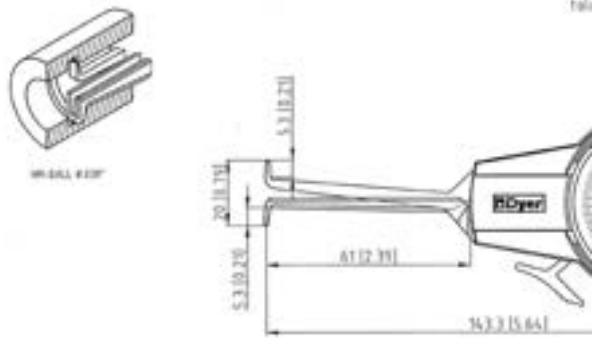
# 104 SERIES "CLASSIC" DIRECT READING ID GROOVE GAGES



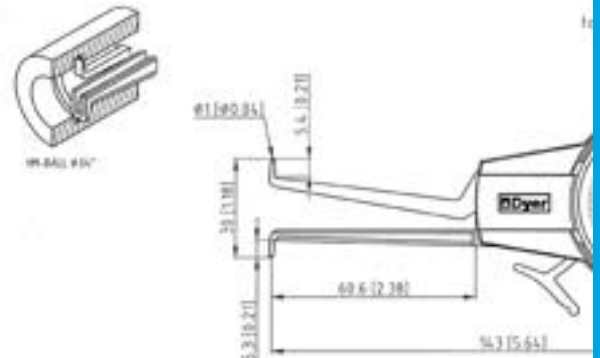
104-101



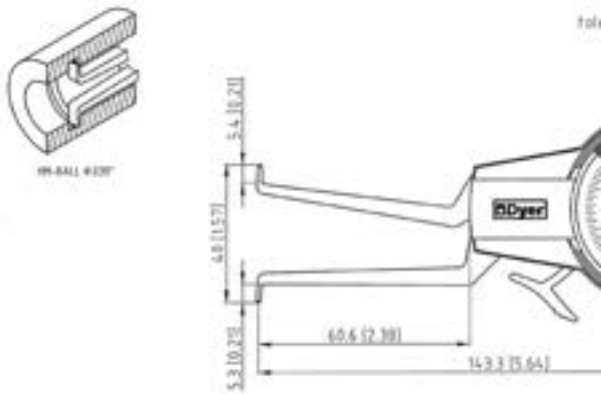
104-102



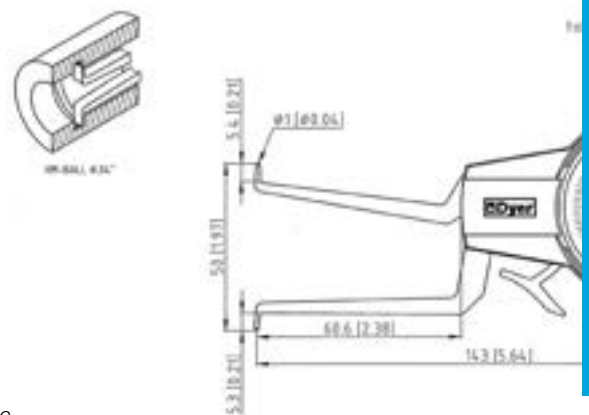
104-103



104-104

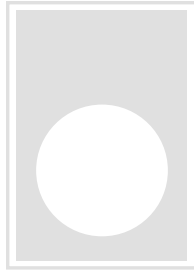
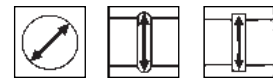


104-105



104-106

# 104 SERIES "CLASSIC" DIRECT READING ID GROOVE GAGES



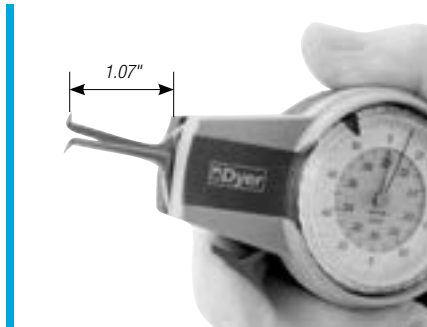
### Maximum Measuring Accuracy

Linear Accuracy at 0.100" Travel  
 $\pm 0.0005"$  (0.010 mm)  
 Full range  $\pm 0.001"$  (0.020 mm)  
 Repeatability  $\leq 0.0005"$  (0.01 mm)

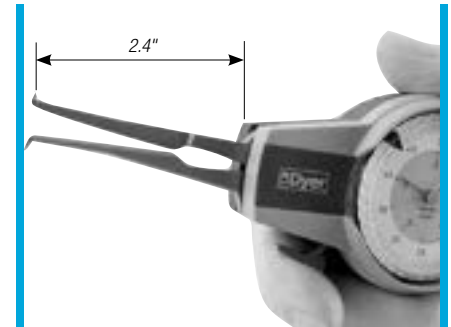
### Notable Features

Electronic option, quality and accuracy of gage, many different models.

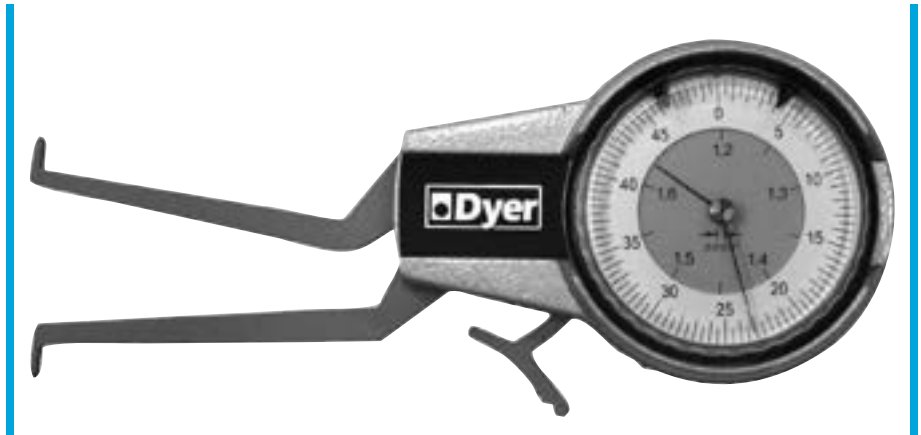
- Easy to use; the gage arms collapse to enter the small bore, then open into groove diameters.
- Customized standards in 1-2 days.
- Fast, accurate, repeatable measurements.
- Gage R & R capable (depends on tolerance and application). We will do Gage R & R on your part before we ship it to you.
- Hard steel alloyed arms and special machined case makes these gages light weight and shop durable. The arms are spring-loaded.
- New rack gear movement for increased accuracy and repeatability. Oil and corrosion resistant.
- Large, easy to read graduations. Gage uses a 2-pointer system.



Model 104-101



Model 104-102

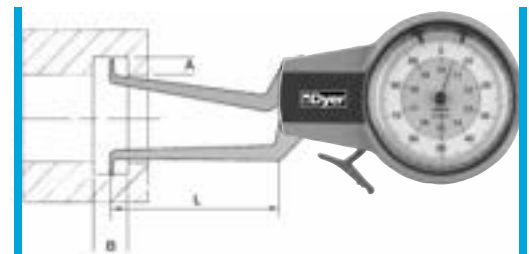


Model 104-105

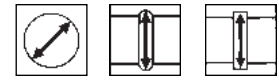
### Standard Range Models and Specifications

Measuring Number Range	L Dim Reach of Arms	A Dim Max Depth Groove	B Dim Min Width Groove	Carbide Ball Contact Standard Ø	Graduation	Order Number
<b>Inch Specifications</b>						
0.2"-0.4"	1.07"	0.094"	0.060"	0.020"	0.0002"	<b>104-101</b>
0.2"-0.6"	2.4"	0.094"	0.060"	0.020"	0.0005"	<b>104-102</b>
0.4"-0.8"	2.4"	0.200"	0.060"	0.040"	0.0005"	<b>104-103</b>
0.8"-1.2"	2.4"	0.200"	0.060"	0.040"	0.0005"	<b>104-104</b>
1.2"-1.6"	2.4"	0.200"	0.060"	0.040"	0.0005"	<b>104-105</b>
1.6"-2.0"	2.4"	0.200"	0.060"	0.040"	0.0005"	<b>104-106</b>
<b>Metric Specifications</b>						
5-10 mm	27 mm	2.4 mm	1.5	0.5 mm	0.005 mm	<b>104-201</b>
5-15 mm	61 mm	2.4 mm	1.5	0.5 mm	0.010 mm	<b>104-202</b>
10-20 mm	61 mm	5.4 mm	1.5	1	0.010 mm	<b>104-203</b>
20-30 mm	61 mm	5.4 mm	1.5	1	0.010 mm	<b>104-204</b>
30-40 mm	61 mm	5.4 mm	1.5	1	0.010 mm	<b>104-205</b>
40-50 mm	61 mm	5.4 mm	1.5	1	0.010 mm	<b>104-206</b>

Ranges >2.00"/50 mm available, call Dyer Applications Engineering.



# 104 SERIES DIRECT READING SPECIAL ARM DESIGNS



### Maximum Measuring Accuracy

Linear Accuracy at 0.100" Travel  
 $\pm 0.0005"$  (0.010 mm)  
 Full range  $\pm 0.001"$  (0.020 mm)  
 Repeatability  $\leq 0.0005"$  (0.01 mm)

### Notable Features

Electronic option, quality and accuracy of gage, many different models.

- Fast, accurate, repeatable.
- Direct reading.
- Spring-loaded contact arms.
- Needle and ball contacts also available.
- Soft materials, medical field, many applications.



*Special larger range 104 gage*

### Customized Gages from Standard Gage Models

Dyer will customize a standard "in-stock gage" to meet your part measuring needs. We can change ranges, arm sizes and lengths, add depth stops and modify contact point tips, ball sizes and types.

### Special Gage Designs (No Minimum Quantities)

Dyer will make a single gage to meet your requirements. We have a large number of special designs/gage solutions in our files. Contact our application engineers and show us your application requirements.

*We can help you!*

### Special Carbide Ball Contacts

The carbide ball sizes shown below are in stock for immediate delivery. We also offer different types of material, i.e., chrome, ruby, ceramic, teflon. Additional customized sizes are available. Contact us with your application requirements.

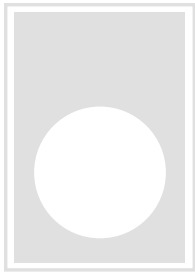
### Carbide Ball Contacts

Inch	mm
0.031 = 1/32	0.5
0.063 = 1/16	1.0
0.078 = 5/64	1.5
0.098 = 3/32	2.0
0.125 = 1/8	2.5
0.156 = 5/32	3.0
0.188 = 3/16	3.5
0.250 = 1/4	4.5
0.312 = 5/16	5.0
0.438 = 7/16	5.5
0.500 = 1/2	6.0
0.625 = 5/8	7.0



*104 Series with special arm profile*

# 104 SERIES SPECIAL DESIGNS FOR HARD-TO-REACH GROOVES



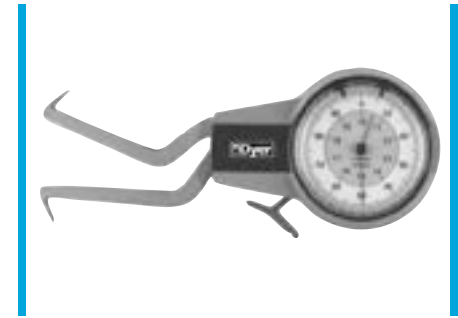
Show Dyer your application. We will help you select the right gage.



*104 Series special  
Right angle contacts to measure recessed  
grooves around a hub.*



*104 Series Special  
Thinned tips to enter slotted special sensor  
cartridge.*



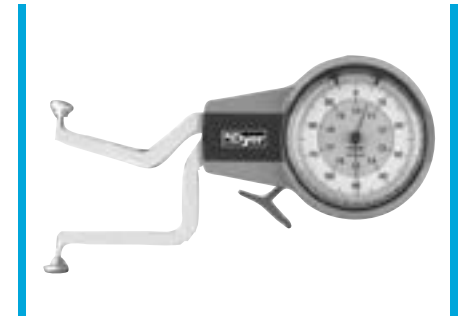
*104 Series Special  
Reverse angled contact points to measure  
a recessed groove in blind bore.*



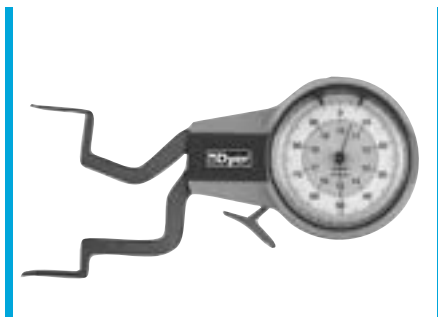
*104 Series  
104-102 Special  
Contact arms modified to enter 0.080" tube  
for 0.150" depth.*



*104 Series Special  
Needle contact points to reach small  
recesses.*



*104 Series Modified  
Special mushroom contacts that span a gear  
tooth pattern in a bore.*



*104 Series Special Arms and Contacts  
Measure ID and OD groove at bottom  
of a hub within a bore.*

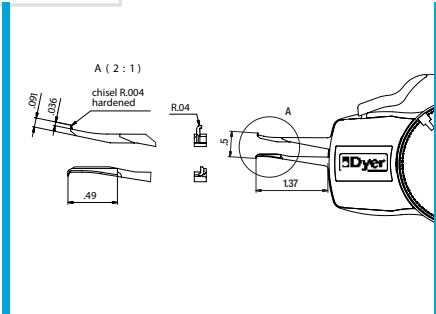
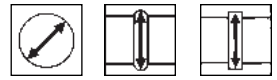


*104 Series Special  
Angled recessed groove.*

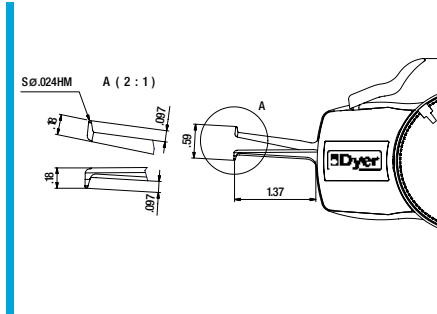


*104 Series  
Special angled contacts to measure groove  
undercut at bottom of a blind bore.*

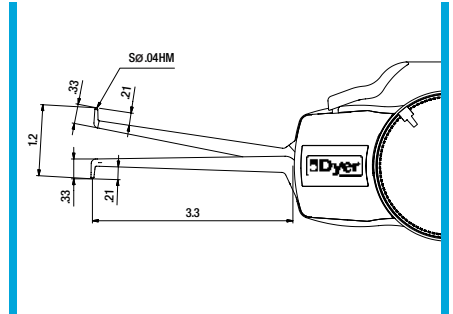
# 103 SERIES DIRECT READING O-RING/GROOVE GAGES



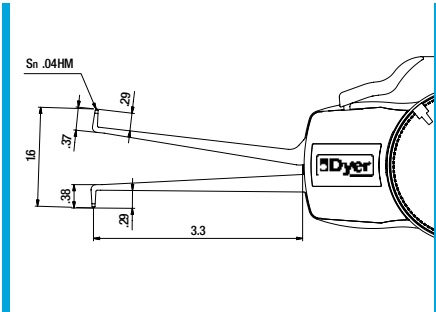
103-100



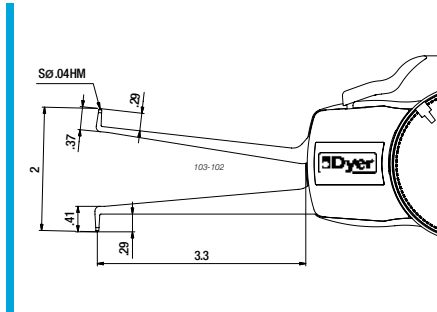
103-101



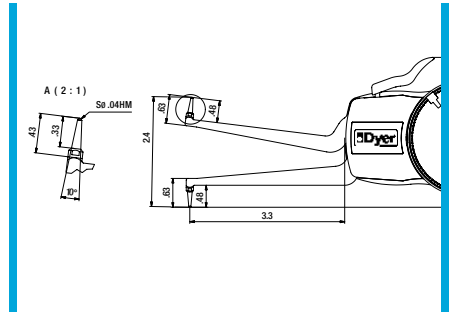
103-102



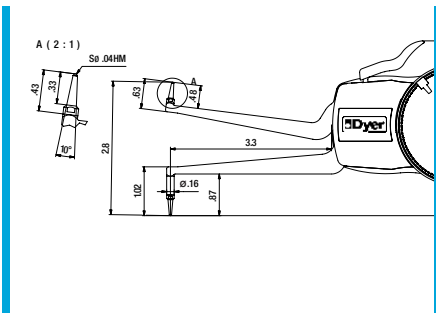
103-103



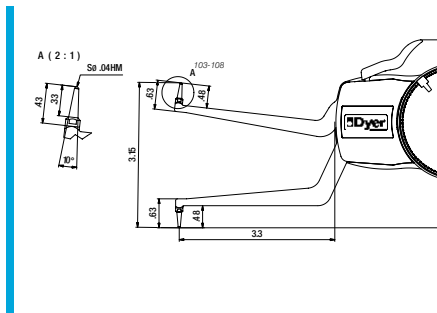
103-104



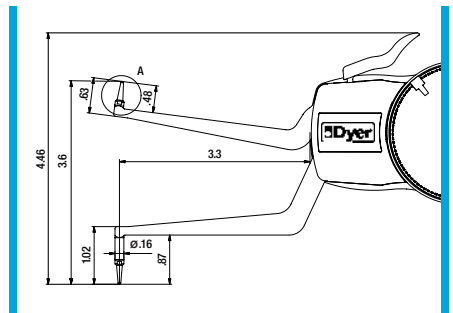
103-105



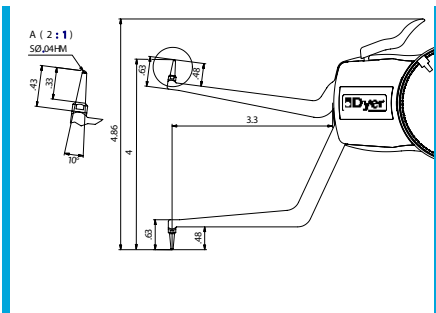
103-106



103-107



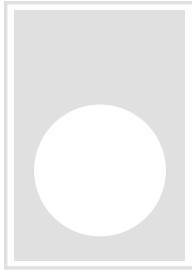
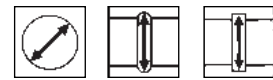
103-108



103-109



# 103 SERIES DIRECT READING O-RING/GROOVE GAGES

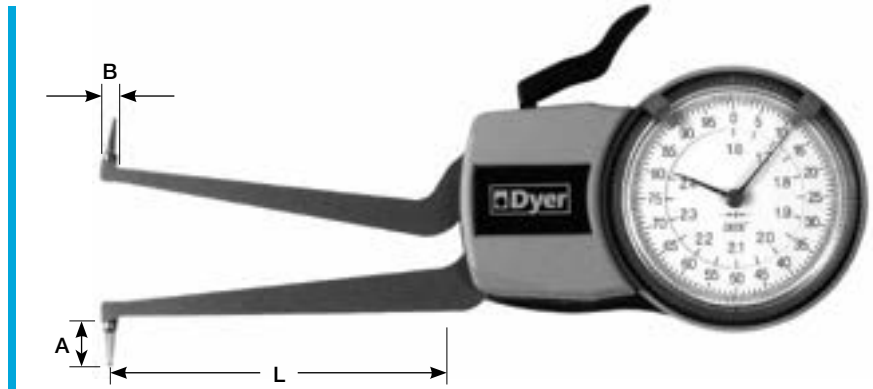


**Maximum Measuring Accuracy**  
 Linear Accuracy at 0.100" Travel  
 $\pm 0.0005"$  (0.010 mm)  
 Full Range  $\pm 0.001"$  ( $\pm 0.020$  mm)  
 Repeatability  $\leq 0.0005"$  (0.010 mm)

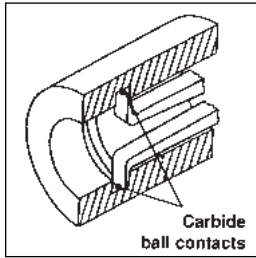
Fast service on special ranges, arms and ball contacts

**Notable Features**

- Easy to use; the gage arms retract to enter the smaller bore, then open into groove diameter.
- Direct reading.
- Fast, accurate, repeatable measurements.
- Large, easy-to-read graduations, gage uses a 2-pointer system.



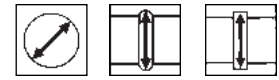
Model 103-105



**103 Series Standard Specifications**

Range	L Dim Reach of Arms	A Dim Max Depth Groove	B Dim Min Width Groove	Carbide Ball Contact Standard Ø	Graduation	Order Number
<b>Inch Specifications</b>						
0.1"–0.5"	1.37"	0.036"	0.025"	0.004" radius chisel	0.0002"	<b>103-100</b>
0.2"–0.6"	1.37"	0.098"	0.070"	0.024"	0.0002"	<b>103-101</b>
0.4"–1.2"	3.15"	0.21"	0.070"	0.040"	0.0005"	<b>103-102</b>
0.8"–1.6"	3.15"	0.29"	0.100"	0.040"	0.0005"	<b>103-103</b>
1.2"–2.0"	3.15"	0.29"	0.100"	0.040"	0.0005"	<b>103-104</b>
1.6"–2.4"	3.15"	0.48"	0.100"	0.040"	0.0005"	<b>103-105</b>
2.0"–2.8"	3.15"	0.48"	0.100"	0.040"	0.0005"	<b>103-106</b>
2.4"–3.2"	3.15"	0.48"	0.100"	0.040"	0.0005"	<b>103-107</b>
2.8"–3.6"	3.15"	0.48"	0.100"	0.040"	0.0005"	<b>103-108</b>
3.2"–4.0"	3.15"	0.48"	0.100"	0.040"	0.0005"	<b>103-109</b>
<b>Metric Specifications</b>						
2.5–12.5 mm	35 mm	0.9 mm	0.6 mm	0.1 mm radius chisel	0.005 mm	<b>103-200</b>
5–15 mm	35 mm	2.5 mm	1.7 mm	0.6 mm	0.005 mm	<b>103-201</b>
10–30 mm	85 mm	5.4 mm	1.7 mm	1 mm	0.010 mm	<b>103-202</b>
20–40 mm	85 mm	7.3 mm	2.5 mm	1 mm	0.010 mm	<b>103-203</b>
30–50 mm	85 mm	7.3 mm	2.5 mm	1 mm	0.010 mm	<b>103-204</b>
40–60 mm	85 mm	12.2 mm	2.5 mm	1 mm	0.010 mm	<b>103-205</b>
50–70 mm	85 mm	12.2 mm	2.5 mm	1 mm	0.010 mm	<b>103-206</b>
60–80 mm	85 mm	12.2 mm	2.5 mm	1 mm	0.010 mm	<b>103-207</b>
70–90 mm	85 mm	12.2 mm	2.5 mm	1 mm	0.010 mm	<b>103-208</b>
80–100 mm	85 mm	12.2 mm	2.5 mm	1 mm	0.010 mm	<b>103-209</b>

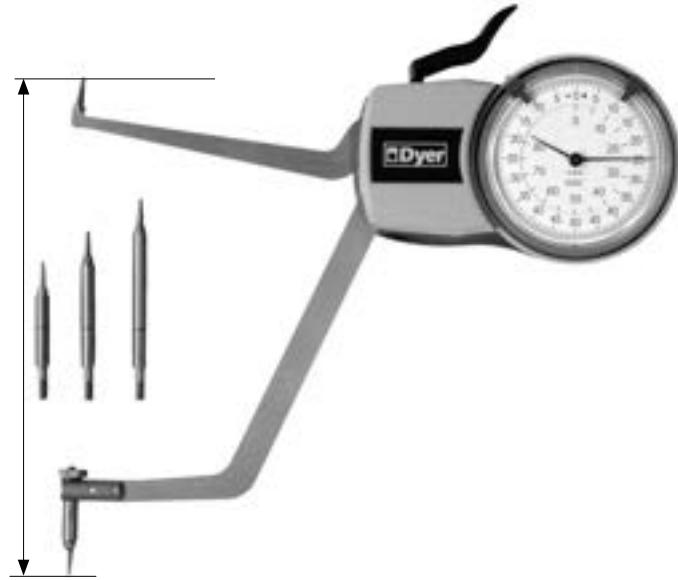
# 103 SERIES COMPARATIVE O-RING/GROOVE GAGES



**Maximum Measuring Accuracy**  
 Linear Accuracy at 0.100" Travel  
 ± 0.0005" (0.010 mm)  
 Full Range ± 0.001" (± 0.020 mm)  
 Repeatability ≤ 0.0005" (0.010 mm)

**Notable Features**

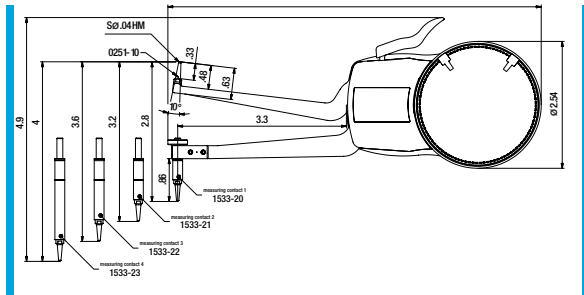
- These gages are comparative reading models.
- Large range and contact travel.
- Rugged, 24/7 shop use.



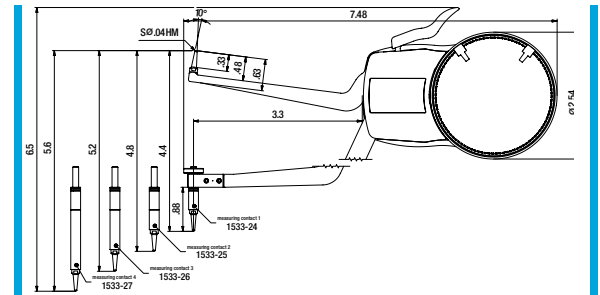
103-112

**Large Range, Comparator Measurement 103 Series**

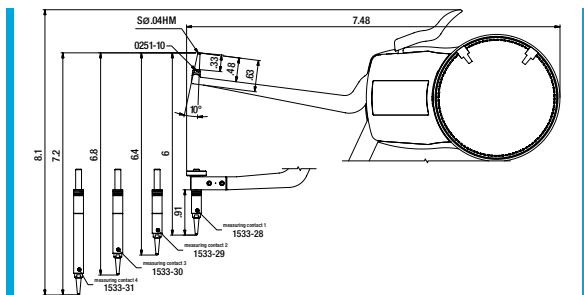
Range	L Dim Reach of Arms	A Dim Max Depth Groove	B Dim Min Width Groove	Carbide Ball Contact Standard Ø	Graduation	Order Number
<b>Inch Specifications</b>						
2.0"-4.0"	3.15"	0.48"	0.100"	0.040"	0.0005"	<b>103-110</b>
3.6"-5.6"	3.15"	0.48"	0.100"	0.040"	0.0005"	<b>103-111</b>
5.2"-7.2"	3.15"	0.48"	0.100"	0.040"	0.0005"	<b>103-112</b>
<b>Metric Specifications</b>						
50-100 mm	85 mm	12.2 mm	2.5 mm	1 mm	0.010 mm	<b>103-210</b>
90-140 mm	85 mm	12.2 mm	2.5 mm	1 mm	0.010 mm	<b>103-211</b>
130-180 mm	85 mm	12.2 mm	2.5 mm	1 mm	0.010 mm	<b>103-212</b>



103-110



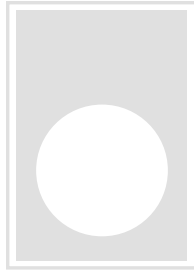
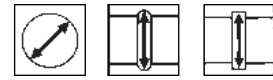
103-111



103-112

Range of Application	103-110		103-111		103-112	
	Range	Range of Indication	Range	Range of Indication	Range	Range of Indication
Measuring Contact 1	2.00-2.80"	1.98-2.82"	3.60-4.40"	3.58-4.42"	5.20-6.00"	5.18-6.02"
Measuring Contact 2	2.40-3.20"	2.38-3.22"	4.00-4.80"	3.98-4.82"	5.60-6.40"	5.58-6.42"
Measuring Contact 3	2.80-3.60"	2.78-3.62"	4.40-5.20"	4.38-5.12"	6.00-6.80"	5.98-6.82"
Measuring Contact 4	3.20-4.00"	3.18-4.02"	4.80-5.60"	4.78-5.62"	6.40-7.20"	6.38-7.22"

# 103 SERIES DIRECT READING SPECIAL ARM DESIGNS



### Maximum Measuring Accuracy

Linear Accuracy at 0.100" Travel  
 $\pm 0.0005"$  (0.010 mm)  
 Full range  $\pm 0.001"$  ( $\pm 0.020$  mm)  
 Repeatability  $\leq 0.0005"$  ( $\leq 0.010$  mm)

### Notable Features

- Fast, accurate, repeatable.
- Direct reading.
- Spring-loaded contact arms.
- Needle and ball contacts also available.



103 Series with special range

### Customized Gages from Standard Gage Models

Dyer will customize a standard "in-stock gage" to meet your part measuring needs. We can change ranges, arm sizes and lengths, add depth stops and modify contact point tips, ball sizes and types.

### Special Gage Designs (No Minimum Quantities)

Dyer will make a single gage to meet your requirements. We have a large number of special designs/gage solutions in our files. Contact our application engineers and show us your application requirements.

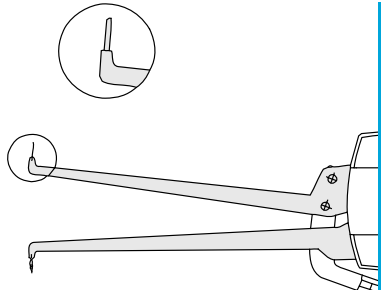
*We can help you!*

### Special Carbide Ball Contacts

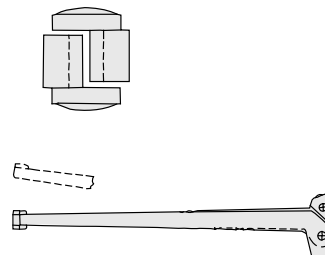
The carbide ball sizes shown below are in stock for immediate delivery. We also offer different types of material, i.e., chrome, ruby, ceramic, teflon. Additional customized sizes are available. Contact us with your application requirements.

#### Carbide Ball Contacts

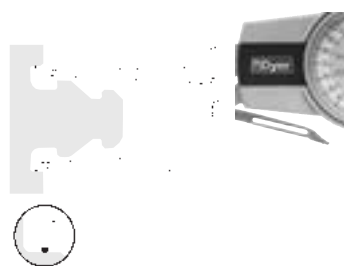
Inch	mm
0.031 = 1/32	0.5
0.063 = 1/16	1.0
0.078 = 5/64	1.5
0.098 = 3/32	2.0
0.125 = 1/8	2.5
0.156 = 5/32	3.0
0.188 = 3/16	3.5
0.250 = 1/4	4.5
0.312 = 5/16	5.0
0.438 = 7/16	5.5
0.500 = 1/2	6.0
0.625 = 5/8	7.0



101-105 Modified  
 Special needle contacts with 0.015" (0.375 mm) radius and 0.200" (5 mm) length

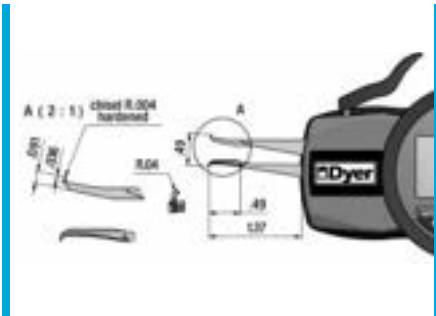
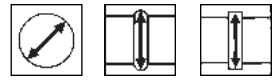


101-105 Modified  
 Special range 0.240"-0.800" (6-20 mm), special scissor contacts with 0.200" radius x 150" wide (5 x 4 mm) and special reach 3.25" (82 mm)

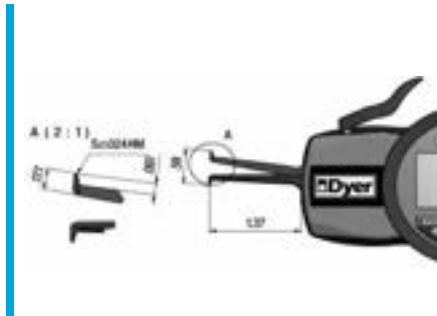


101 Series Modified  
 Measurements at hard to get to accessible places with specially designed arms

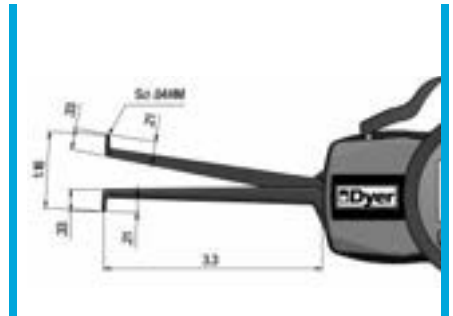
# 651 SERIES ELECTRONIC GROOVE GAGES



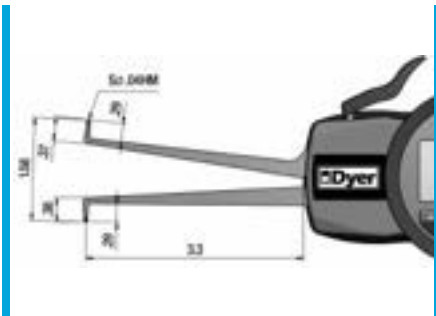
651-100



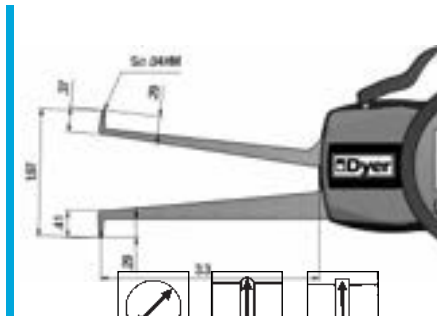
651-101



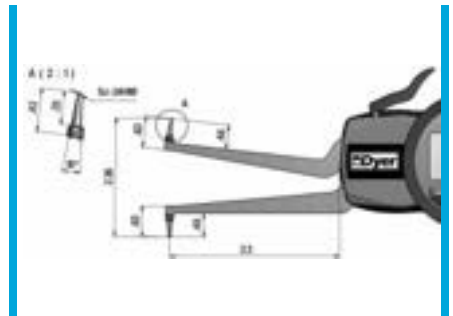
651-102



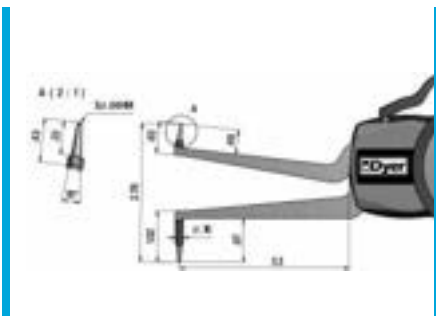
651-103



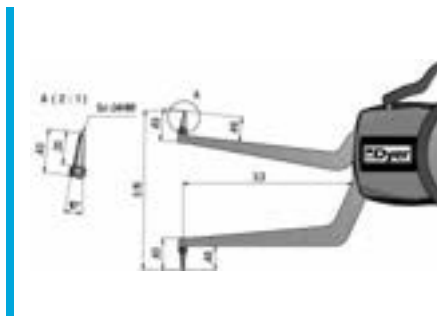
651-104



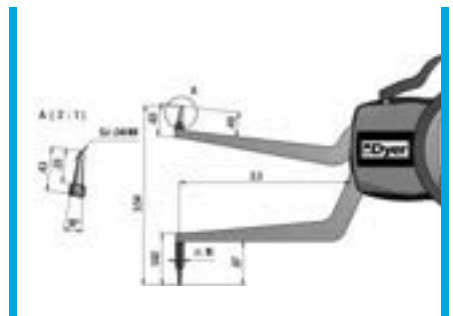
651-105



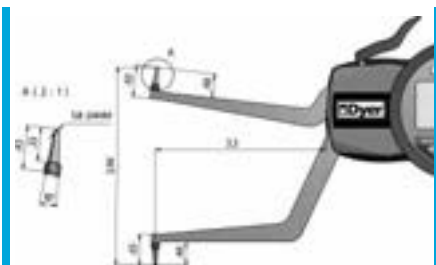
651-106



651-107

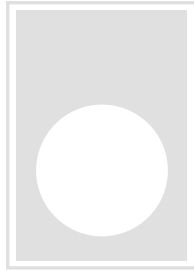
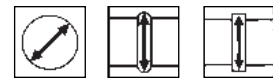


651-108



651-109

# 651 SERIES ELECTRONIC GROOVE GAGES



### Measuring Accuracy

Gages with 0.4" Travel:  
Linear Accuracy  $\pm 0.0004"$   
Repeatability  $\pm 0.0002"$

Gages with 0.8" Travel:  
Linear Accuracy  $\pm 0.001"$   
Repeatability  $\pm 0.0005"$

### Notable Features

- Fast, accurate, repeatable.
- Lightweight
- SPC output for USB or Mitutoyo devices. Cables offered separately.
- Absolute and relative modes with Min, Max and Hold programs.
- Tolerance limit markers with green/red LED for visual operator judgment
- Internal memory that holds a maximum of 80 measured values.
- Programmable auto shut off for battery savings.
- IP 67. Gages are shop rugged.
- Analog segment (fan) display.
- Keypad lock.
- Wireless data option. Contact us with your requirement.

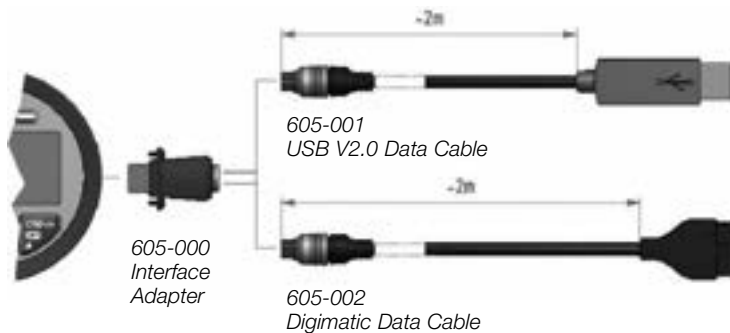
Special customized arms, ball sizes and/or ball material are also available. Dyer is dedicated to solving your special measuring applications. Contact Dyer Applications Engineering with your specific gage requirement.



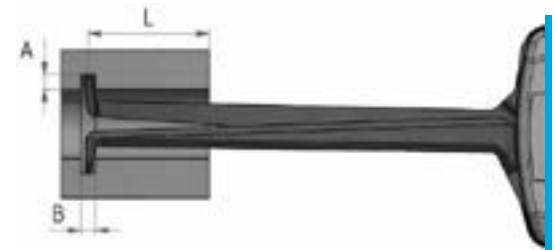
651-105

### Standard Range Models and Specifications

Application Range	Measuring Depth (L)	Groove Depth (A)	Groove Width (B)	Graduation	Contact Style	Order Number
0.10"-0.49" 2.5-12.5 mm	1.37" 35 mm	0.035" 0.9 mm	0.025" 0.6 mm	0.0002" 0.005 mm	Radius Chisel 0.004" (0.1 mm)	<b>651-100</b>
0.20"-0.59" 5-15 mm	1.37" 35 mm	0.098" 2.5 mm	0.032" 0.8 mm	0.0002" 0.005 mm	0.024"(0.6 mm) carbide ball	<b>651-101</b>
0.39"-1.18" 10-30 mm	3.3" 85 mm	0.200" 5 mm	0.059" 1.5 mm	0.0005" 0.01 mm	0.039"(1 mm) carbide ball	<b>651-102</b>
0.79"-1.58" 20-40 mm	3.3" 85 mm	0.275" 7 mm	0.059" 1.5 mm	0.0005" 0.01 mm	0.039"(1 mm) carbide ball	<b>651-103</b>
1.18"-1.97" 30-50 mm	3.3" 85 mm	0.275" 7 mm	0.059" 1.5 mm	0.0005" 0.01 mm	0.039"(1 mm) carbide ball	<b>651-104</b>
1.58"-2.36" 40-60 mm	3.3" 85 mm	0.472" 12 mm	0.059" 1.5 mm	0.0005" 0.01 mm	0.039"(1 mm) carbide ball	<b>651-105</b>
1.97"-2.75" 50-70 mm	3.3" 85 mm	0.472" 12 mm	0.059" 1.5 mm	0.0005" 0.01 mm	0.039"(1 mm) carbide ball	<b>651-106</b>
2.36"-3.15" 60-80 mm	3.3" 85 mm	0.472" 12 mm	0.059" 1.5 mm	0.0005" 0.01 mm	0.039"(1 mm) carbide ball	<b>651-107</b>
2.75"-3.54" 70-90 mm	3.3" 85 mm	0.472" 12 mm	0.059" 1.5 mm	0.0005" 0.01 mm	0.039"(1 mm) carbide ball	<b>651-108</b>
3.15"-3.94" 80-100 mm	3.3" 85 mm	0.472" 12 mm	0.059" 1.5 mm	0.0005" 0.01 mm	0.039"(1 mm) carbide ball	<b>651-109</b>

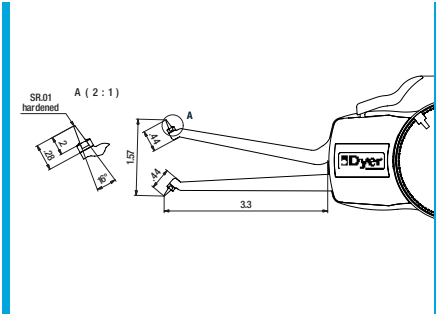
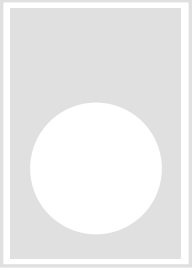
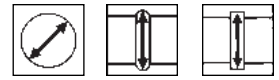


SPC Cables

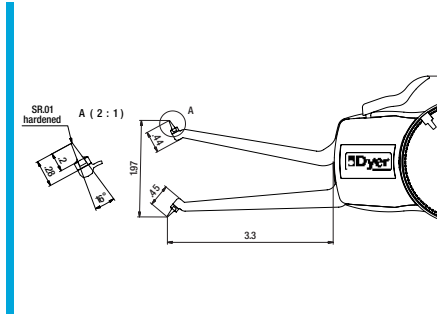


651-101

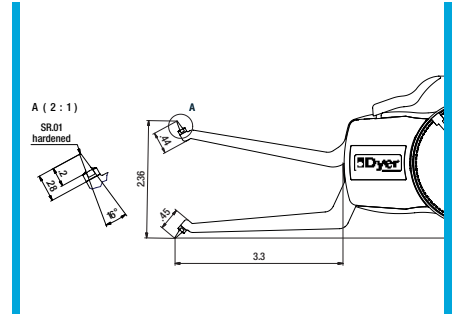
# 103 SERIES DIRECT READING O-RING/GROOVE GAGES FOR RECESSED BORES & UNDERCUTS



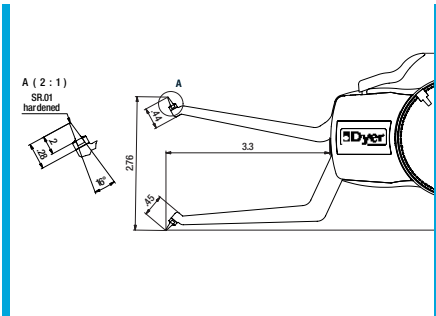
103-303



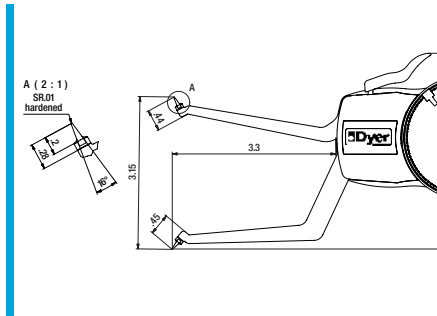
103-304



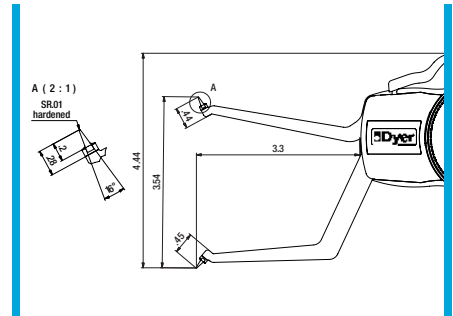
103-305



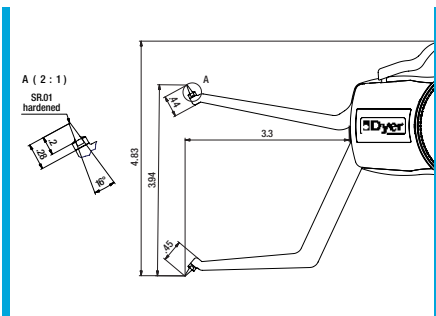
103-306



103-307



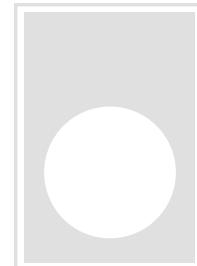
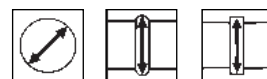
103-308



103-309



# 103 SERIES DIRECT READING O-RING/GROOVE GAGES FOR RECESSED BORES & UNDERCUTS



**Maximum Measuring Accuracy**  
 Linear Accuracy at 0.100" Travel  
 $\pm 0.0005"$  (0.010 mm)  
 Full Range  $\pm 0.001"$  ( $\pm 0.020$  mm)  
 Repeatability  $\leq 0.0005"$  (0.010 mm)

**Fast service on special ranges, arms and ball contacts**

**Notable Features**

- Easy to use; the gage arms retract to enter the smaller bore, then open to reach bottom of a blind bore.
- Direct reading.
- Customized standards in 1-2 days.
- Fast, accurate, repeatable measurements.
- Large, easy-to-read graduations, gage uses a 2-pointer system.



103-405

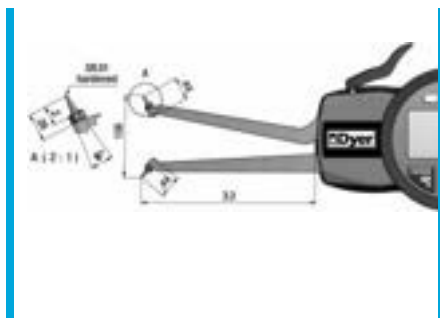
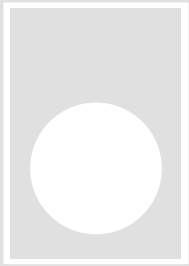
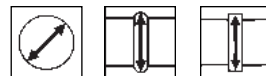


SECTION B:  
ID GROOVE GAGES  
**Dyer**

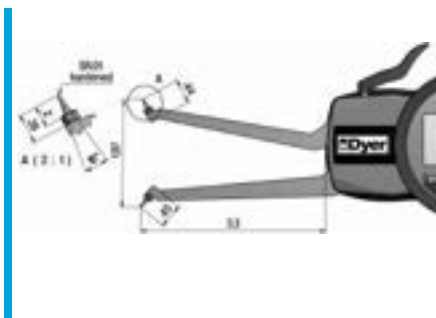
**103 Series Standard Specifications**

Range	L Dim Reach of Arms	A Dim Max Depth Groove	Contact Angle	Contact Tip Radius	Graduation	Order Number
<b>Inch Specifications</b>						
0.8"-1.6"	3.15"	0.20"	45°	SR 0.01"	0.0005"	<b>103-303</b>
1.2"-2.0"	3.15"	0.20"	45°	SR 0.01"	0.0005"	<b>103-304</b>
1.6"-2.4"	3.15"	0.20"	45°	SR 0.01"	0.0005"	<b>103-305</b>
2.0"-2.8"	3.15"	0.20"	45°	SR 0.01"	0.0005"	<b>103-306</b>
2.4"-3.2"	3.15"	0.20"	45°	SR 0.01"	0.0005"	<b>103-307</b>
2.8"-3.6"	3.15"	0.20"	45°	SR 0.01"	0.0005"	<b>103-308</b>
3.2"-4.0"	3.15"	0.20"	45°	SR 0.01"	0.0005"	<b>103-309</b>
<b>Metric Specifications</b>						
20-40 mm	85 mm	5 mm	45°	SR 0.2 mm	0.010 mm	<b>103-403</b>
30-50 mm	85 mm	5 mm	45°	SR 0.2 mm	0.010 mm	<b>103-404</b>
40-60 mm	85 mm	5 mm	45°	SR 0.2 mm	0.010 mm	<b>103-405</b>
50-70 mm	85 mm	5 mm	45°	SR 0.2 mm	0.010 mm	<b>103-406</b>
60-80 mm	85 mm	5 mm	45°	SR 0.2 mm	0.010 mm	<b>103-407</b>
70-90 mm	85 mm	5 mm	45°	SR 0.2 mm	0.010 mm	<b>103-408</b>
80-100 mm	85 mm	5 mm	45°	SR 0.2 mm	0.010 mm	<b>103-409</b>

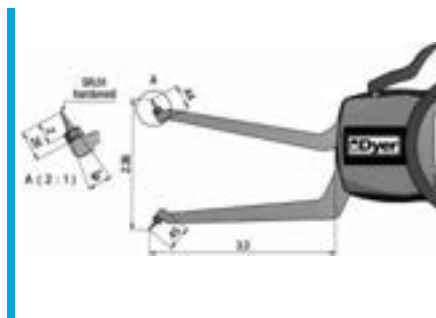
# 651 SERIES ELECTRONIC O-RING/GROOVE GAGES FOR RECESSED BORES



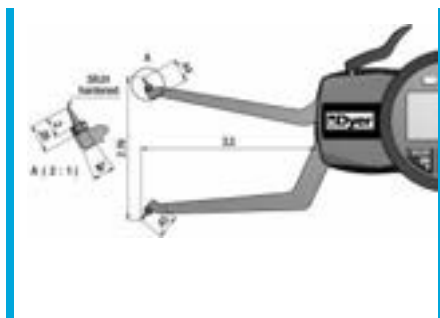
651-203



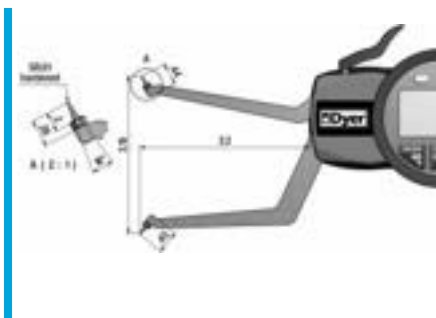
651-204



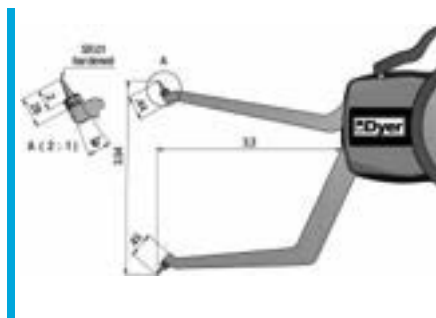
651-205



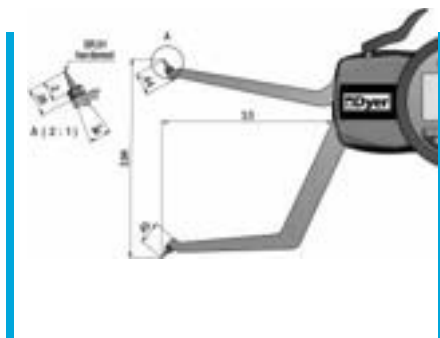
651-206



651-207

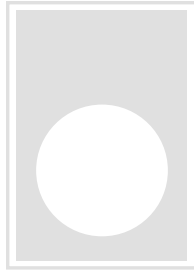
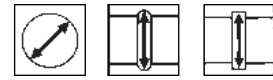


651-208



651-209

# 651 SERIES ELECTRONIC O-RING/GROOVE GAGES FOR RECESSED BORES



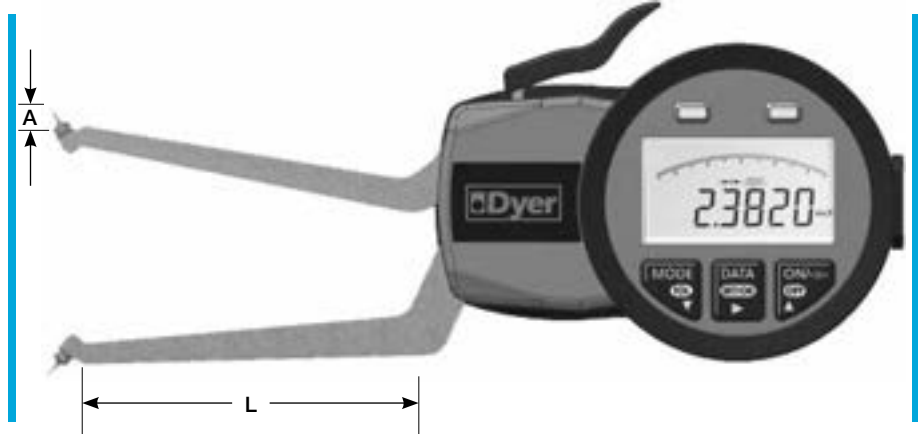
## Maximum Measuring Accuracy

Linear Accuracy at  $\pm 0.001''$   
Repeatability  $\pm 0.0005''$

## Notable Features

- Fast, accurate, repeatable.
- Light weight.
- SPC output for USB or Mitutoyo devices. Cables offered separately.
- Absolute and Relative modes with Min, Max and Hold programs.
- Tolerance limit markers with Green/Red LED for visual operator judgement.
- Internal memory that holds a maximum of 80 measured values.
- Programmable auto shut off for battery savings.
- IP 67. Gages are shop rugged.
- Analog segment (fan) display.
- Keypad lock.
- Wireless data option. Contact us with your requirement.

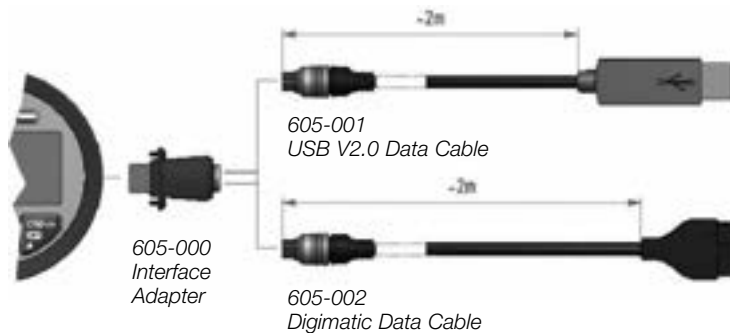
Special customized arms, ball sizes and/or ball material are also available. Dyer is dedicated to solving your special measuring applications. Contact Dyer Applications Engineering with your specific gage requirement.



651-205

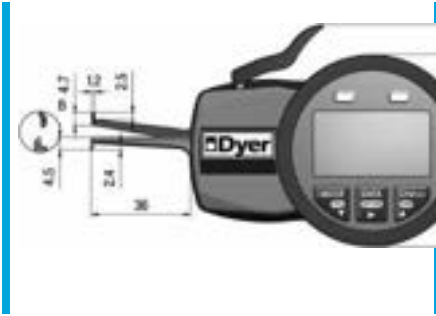
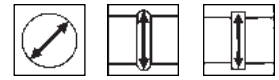
## 651 Series Models and Specifications

Application Range	Length L	Max Groove Depth A*	Contact Angle	Contact Tip Radius	Graduation	Order Number
0.8"-1.6" 20-40 mm	3.15" 85 mm	0.20" 5 mm	45°	SR 0.01" SR 0.2 mm	0.0005" 0.010 mm	<b>651-203</b>
1.2"-2.0" 30-50 mm	3.15" 85 mm	0.20" 5 mm	45°	SR 0.01" SR 0.2 mm	0.0005" 0.010 mm	<b>651-204</b>
1.6"-2.4" 40-60 mm	3.15" 85 mm	0.20" 5 mm	45°	SR 0.01" SR 0.2 mm	0.0005" 0.010 mm	<b>651-205</b>
2.0"-2.8" 50-70 mm	3.15" 85 mm	0.20" 5 mm	45°	SR 0.01" SR 0.2 mm	0.0005" 0.010 mm	<b>651-206</b>
2.4"-3.2" 60-80 mm	3.15" 85 mm	0.20" 5 mm	45°	SR 0.01" SR 0.2 mm	0.0005" 0.010 mm	<b>651-207</b>
2.8"-3.6" 70-90 mm	3.15" 85 mm	0.20" 5 mm	45°	SR 0.01" SR 0.2 mm	0.0005" 0.010 mm	<b>651-208</b>
3.2"-4.0" 80-100mm	3.15" 85 mm	0.20" 5 mm	45°	SR 0.01" SR 0.2 mm	0.0005" 0.010 mm	<b>651-209</b>

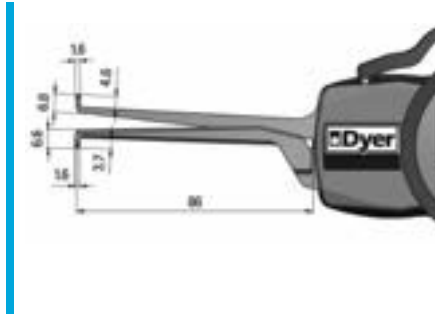


SPC Cables

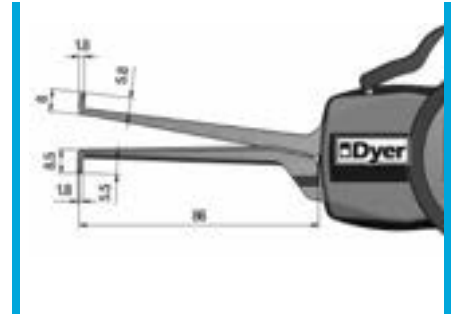
# 650 SERIES THREE-POINT ELECTRONIC GROOVE GAGES



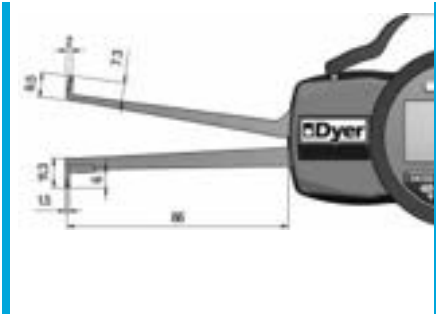
650-001



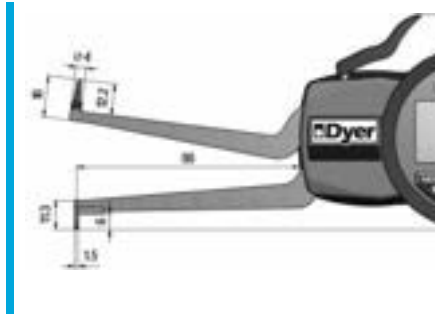
650-002



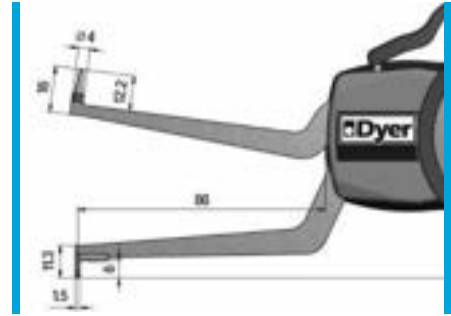
650-003



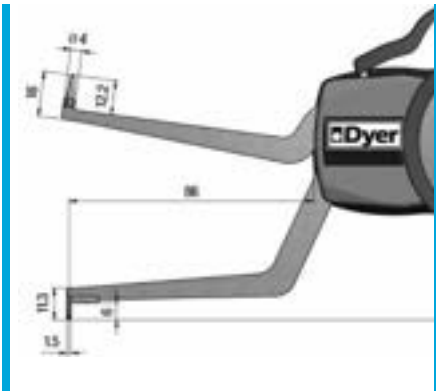
650-004



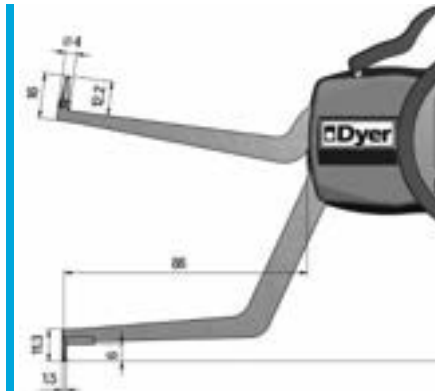
650-005



650-006

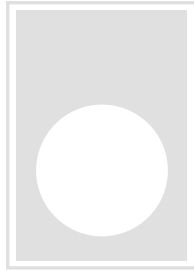
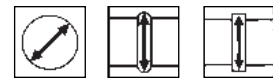


650-007



650-008

# 650 SERIES THREE-POINT ELECTRONIC GROOVE GAGES



## Measuring Accuracy

### 650-001 Model:

Linear Accuracy  $\pm 0.0002''$

Repeatability  $\pm 0.0001''$

### All other models:

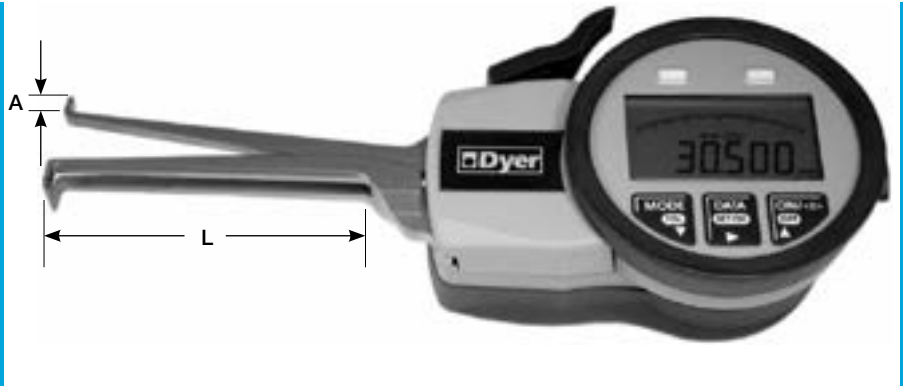
Linear Accuracy  $\pm 0.0004''$

Repeatability  $\pm 0.0002''$

## Notable Features

- Fast, accurate, repeatable.
- Light weight.
- SPC output for USB or Mitutoyo devices. Cables offered separately.
- Absolute and Relative modes with Min, Max and Hold programs.
- Tolerance limit markers with Green/Red LED for visual operator judgement.
- Internal memory that holds a maximum of 80 measured values.
- Programmable auto shut off for battery savings.
- IP 67. Gages are shop rugged.
- Analog segment (fan) display.
- Keypad lock.
- Wireless data option. Contact us with your requirement.

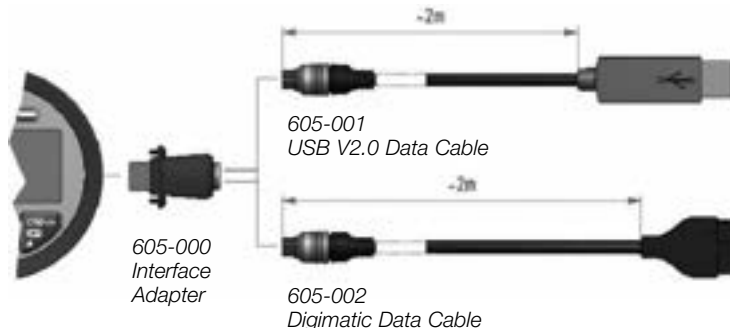
Special customized arms, ball sizes and/or ball material are also available. Dyer is dedicated to solving your special measuring applications. Contact Dyer Applications Engineering with your specific gage requirement.



650-003

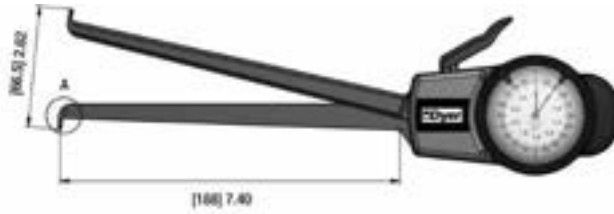
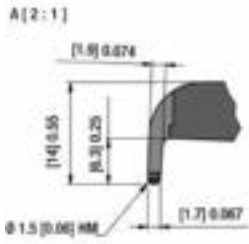
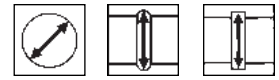
## Three Point Electronic Models and Specifications

Application Range	Length L	Max Groove Depth A*	Min. Groove Width B	Carbide Ball $\phi$	Graduation	Order Number
0.275"-0.550" 7-14 mm	1.33" 34 mm	0.085" 2.2 mm	0.031" 0.8 mm	0.024" 0.6 mm	0.0001" 0.0002 mm	<b>650-001</b>
0.393"-0.787" 10-20 mm	2.95" 75 mm	0.138" 3.5 mm	0.063" 1.6 mm	0.040" 1 mm	0.0002" 0.005 mm	<b>650-002</b>
0.590"-1.181" 15-30 mm	3.03" 77 mm	0.20" 5 mm	0.063" 1.6 mm	0.040" 1 mm	0.0002" 0.005 mm	<b>650-003</b>
0.984"-1.771" 25-45 mm	3.15" 85 mm	0.275" 7 mm	0.063" 1.6 mm	0.040" 1 mm	0.0002" 0.005 mm	<b>650-004</b>
1.574"-2.362" 40-60 mm	3.15" 85 mm	0.315" 8 mm	0.063" 1.6 mm	0.040" 1 mm	0.0002" 0.005 mm	<b>650-005</b>
2.165"-2.952" 55-75 mm	3.15" 85 mm	0.315" 8 mm	0.063" 1.6 mm	0.040" 1 mm	0.0002" 0.005 mm	<b>650-006</b>
2.755"-3.543" 70-90 mm	3.15" 85 mm	0.334" 8.5 mm	0.063" 1.6 mm	0.040" 1 mm	0.0002" 0.005 mm	<b>650-007</b>
3.346"-4.133" 85-105 mm	3.15" 85 mm	0.354" 9 mm	0.063" 1.6 mm	0.040" 1 mm	0.0002" 0.005 mm	<b>650-008</b>

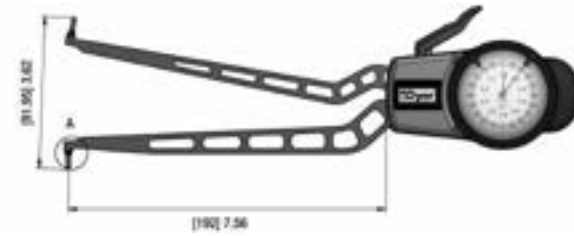
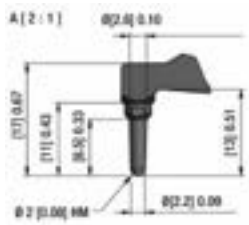


SPC Cables

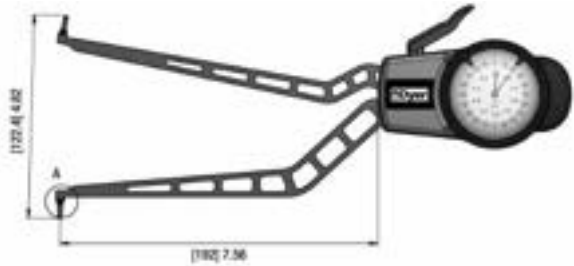
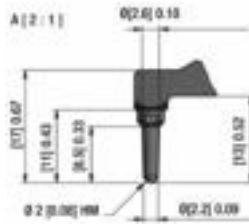
# 101 SERIES "LONGER REACH" DIRECT READING O-RING/GROOVE GAGES



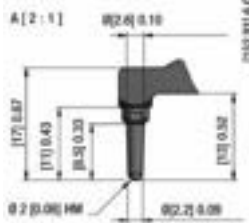
Model 101-105



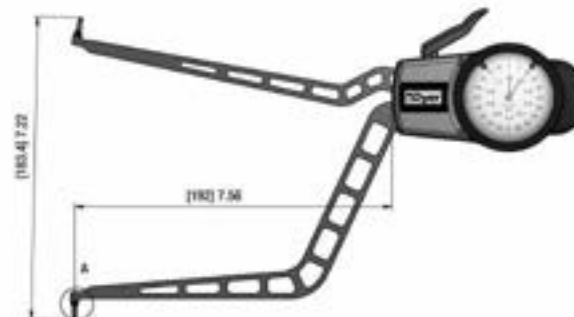
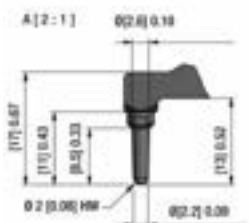
Model 101-106



Model 101-108



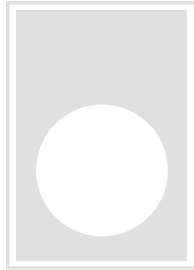
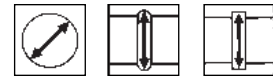
Model 101-110



Model 101-112



# 101 SERIES "LONGER REACH" DIRECT READING O-RING/GROOVE GAGES



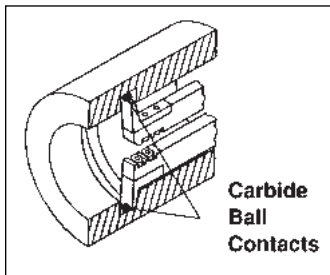
**Maximum Measuring Accuracy**  
101 Series with 7.0" reach  
Linear Accuracy  $\pm 0.002$ " (0.050 mm)  
Repeatability  $\pm 0.001$ " (0.025 mm)  
Gage R & R capable

### Notable Features

- These gages are direct reading models.
- Large range and contact travel.
- Rugged, 24/7 shop use.

### Special Carbide Ball Contacts

The carbide ball sizes shown below are in stock for immediate delivery. We also offer different types of material, i.e., chrome, ruby, ceramic, teflon. Additional customized sizes are available. Contact us with your application requirements.



### Carbide Ball Contacts

Inch	mm
0.031 = 1/32	0.5
0.063 = 1/16	1.0
0.078 = 5/64	1.5
0.098 = 3/32	2.0
0.125 = 1/8	2.5
0.156 = 5/32	3.0
0.188 = 3/16	3.5
0.250 = 1/4	4.5
0.312 = 5/16	5.0
0.438 = 7/16	5.5
0.500 = 1/2	6.0
0.625 = 5/8	7.0

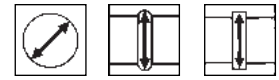


Model 101-105

### 101 Series Standard Specifications

Range	Max Contact Travel	L Dim Reach of Arms	A Dim Max Depth Groove	B Dim Min Width Groove	Carbide Ball Contact Standard $\varnothing$	Graduation	Order Number
<b>Inch Specifications</b>							
0.6–2.6"	2.0"	7.0"	0.177"	0.098"	0.059"	0.001"	<b>101-105</b>
1.6–3.6"	2.0"	7.0"	0.300"	0.098"	0.080"	0.001"	<b>101-106</b>
2.8–4.8"	2.0"	7.0"	0.300"	0.098"	0.080"	0.001"	<b>101-108</b>
4.0–6.0"	2.0"	7.0"	0.300"	0.098"	0.080"	0.001"	<b>101-110</b>
5.2–7.2"	2.0"	7.0"	0.300"	0.098"	0.080"	0.001"	<b>101-112</b>
<b>Metric Specifications</b>							
15–65	50 mm	180 mm	6.3 mm	2.5 mm	1.5 mm	0.05 mm	<b>101-207</b>
40–90	50 mm	180 mm	8.0 mm	2.5 mm	2 mm	0.05 mm	<b>101-208</b>
70–120	50 mm	180 mm	8.0 mm	2.5 mm	2 mm	0.05 mm	<b>101-210</b>
100–150	50 mm	180 mm	8.0 mm	2.5 mm	2 mm	0.05 mm	<b>101-212</b>
130–180	50 mm	180 mm	8.0 mm	2.5 mm	2 mm	0.05 mm	<b>101-214</b>

# 101 SERIES DIRECT READING SPECIAL ARM DESIGNS



**Maximum Measuring Accuracy**  
 Linear Accuracy at 0.100" Travel  
 ± 0.0005" (0.010 mm)  
 Full Range ± 0.001" (0.020 mm)  
 Repeatability ≤ 0.0005" (0.01 mm)

### Notable Features

- Fast, accurate, repeatable
- Direct reading
- Spring-loaded contact arms
- Needle and ball contacts also available
- Soft materials, medical field, many applications



*Modified 101 Series gage with a lower chisel contact and special range.*

### Customized Gages from Standard Gage Models

Dyer will customize a standard "in-stock gage" to meet your part measuring needs. We can change ranges, arm sizes and lengths, add depth stops and modify contact point tips, ball sizes and types.

### Special Gage Designs (No Minimum Quantities)

Dyer will make a single gage to meet your requirements. We have a large number of special designs/gage solutions in our files. Contact our application engineers and show us your application requirements.

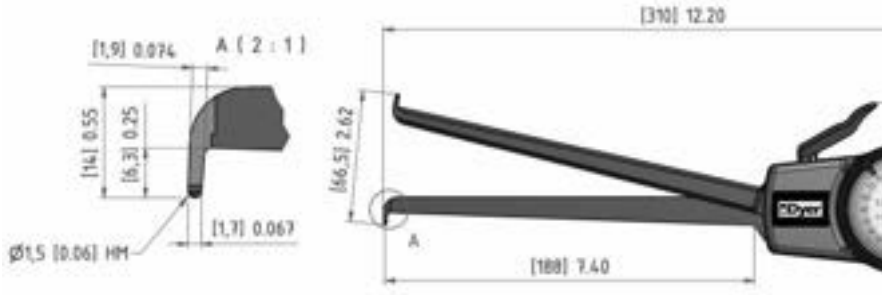
*We can help you!*

### Special Carbide Ball Contacts

The carbide ball sizes shown below are in stock for immediate delivery. We also offer different types of material, i.e., chrome, ruby, ceramic, teflon. Additional customized sizes are available. Contact us with your application requirements.

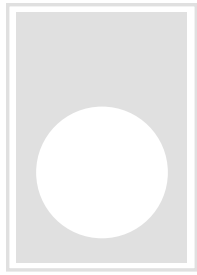
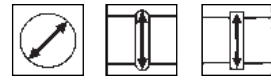
### Carbide Ball Contacts

Inch	mm
0.031 = 1/32	0.5
0.063 = 1/16	1.0
0.078 = 5/64	1.5
0.098 = 3/32	2.0
0.125 = 1/8	2.5
0.156 = 5/32	3.0
0.188 = 3/16	3.5
0.250 = 1/4	4.5
0.312 = 5/16	5.0
0.438 = 7/16	5.5
0.500 = 1/2	6.0
0.625 = 5/8	7.0



*101-105 Special. Teflon ball contacts to measure a mirror surface. Non-marking contacts.*

# 101 SERIES "LONGER REACH" DIRECT READING O-RING/GROOVE GAGES



*Modified 101 Series with special measuring range of 0.2" to 2.2" to enter small deep grooves.*



*Special 101 Series with stepped arms and reduced tips to measure a hard-to-reach feature.*



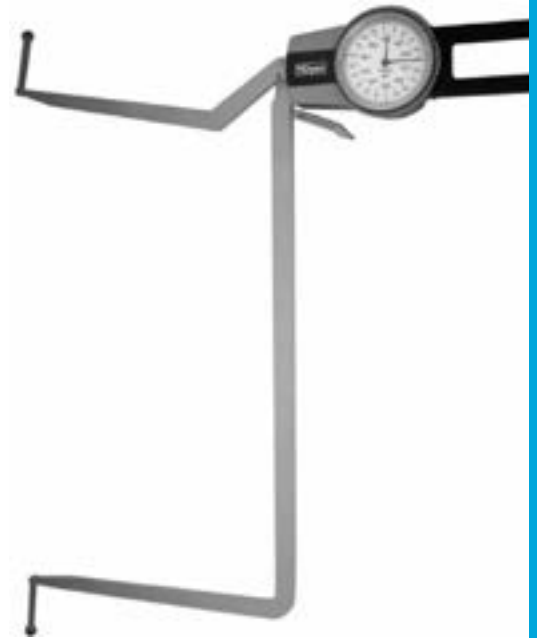
*Modified 101 Series with custom 1/2 ball contacts to measure internal spline feature.*



*Modified 101 Series with extended thin contacts to measure deep grooves.*

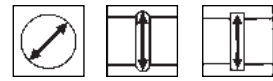


*Modified 101 Series with angled contacts.*



*Modified 101 Series with special larger measuring range.*

# 101 SERIES "LONGER REACH" O-RING/GROOVE GAGES

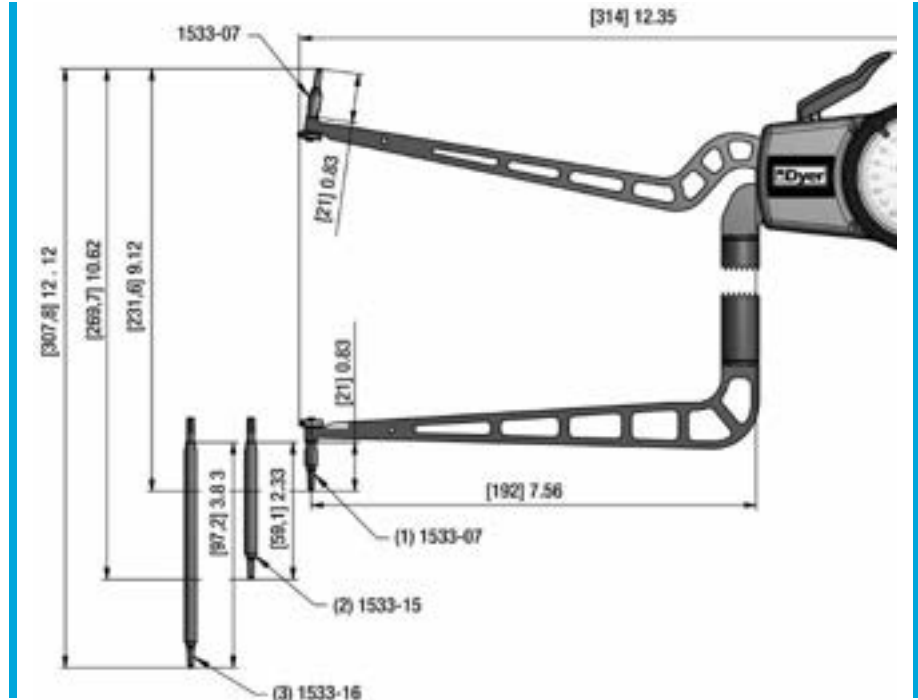


### Maximum Measuring Accuracy

101 Series with 6.9" reach  
 Linear  $\pm 0.002$ " (0.050 mm)  
 Repeatability  $\pm 0.001$ " (0.025 mm)  
 Gage R & R capable

### Notable Features

- These gages are comparative reading models (101-116 and 101-117, 101-218 and 101-219).
- Large range and contact travel.
- Rugged, 24/7 shop use.



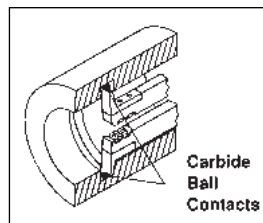
Model 101-118

### Large Range, Comparator Measurement 101 Series

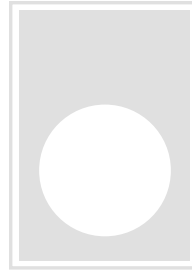
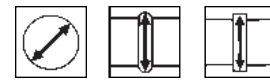
Range	Max Contact Travel	L Dim Reach of Arms	A Dim Max Depth Groove	B Dim Min Width Groove	Carbide Ball Contact Standard $\varnothing$	Graduation	Order Number
<b>Inch Specifications</b>							
7.0"-12.10"	2.0"	7.0"	0.315"	0.130"	0.080"	0.001"	<b>101-118</b>
11.80"-16.80"	2.0"	7.0"	0.315"	0.130"	0.080"	0.001"	<b>101-119</b>
16.5"-21.5"	2.0"	7.0"	0.315"	0.130"	0.080"	0.001"	<b>101-120</b>
<b>Metric Specifications</b>							
180-310 mm	50 mm	180 mm	8.0 mm	3.3 mm	2 mm	0.05 mm	<b>101-220</b>
300-430 mm	50 mm	180 mm	8.0 mm	3.3 mm	2 mm	0.05 mm	<b>101-221</b>
420-550 mm	50 mm	180 mm	8.0 mm	3.3 mm	2 mm	0.05 mm	<b>101-222</b>

### Carbide Ball Contacts

Inch	mm
0.031 = 1/32	0.5
0.063 = 1/16	1.0
0.078 = 5/64	1.5
0.098 = 3/32	2.0
0.125 = 1/8	2.5
0.156 = 5/32	3.0
0.188 = 3/16	3.5
0.250 = 1/4	4.5
0.312 = 5/16	5.0
0.438 = 7/16	5.5
0.500 = 1/2	6.0
0.625 = 5/8	7.0



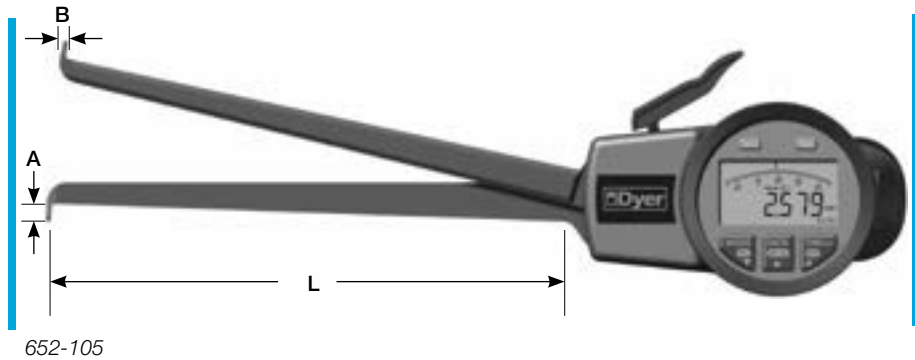
# 652 SERIES ELECTRONIC "LONGER REACH" DIRECT READING O-RING/GROOVE GAGES



**Maximum Measuring Accuracy**  
 Linear  $\pm 0.002"$  (0.050 mm)  
 Repeatability  $\pm 0.001"$  (0.025 mm)  
 Gage R & R capable

### Notable Features

- Fast, accurate, repeatable.
- Light weight.
- SPC output for USB or Mitutoyo devices. Cables offered separately.
- Absolute and Relative modes with Min, Max and Hold programs.
- Tolerance limit markers with Green/Red LED for visual operator judgement.
- Internal memory that holds a maximum of 80 measured values.
- Programmable auto shut off for battery savings.
- IP 67. Gages are shop rugged.
- Analog segment (fan) display.
- Keypad lock.
- Wireless data option. Contact us with your requirement.



652-105

### 652 Series Models and Specifications

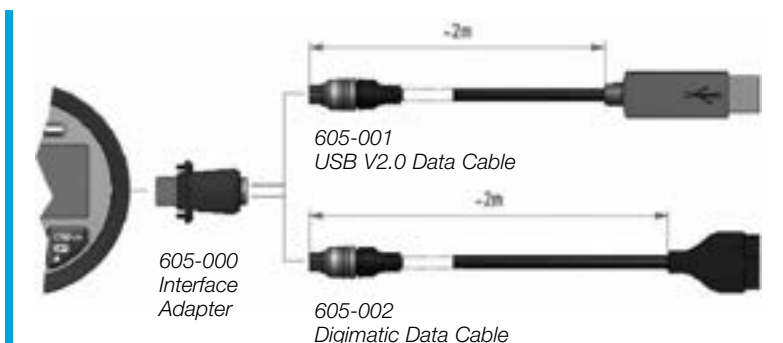
Application Range	Measuring Depth L	Groove Depth A	Groove Width B	Graduation	Carbide Ball Diameter	Order Number
0.59"-2.55" 15-65 mm	7.4" 188 mm	0.236" 6.0 mm	0.079" 2.0 mm	0.001" 0.020 mm	0.059" 1.5 mm	<b>652-105</b>
1.57"-3.54" 40-90 mm	7.5" 192 mm	0.33" 8.5 mm	0.098" 2.5 mm	0.001" 0.020 mm	0.079" 2.0 mm	<b>652-106</b>
2.75"-4.72" 70-120 mm	7.5" 192 mm	0.33" 8.5 mm	0.098" 2.5 mm	0.001" 0.020 mm	0.079" 2.0 mm	<b>652-108</b>
3.93"-5.90" 100-150 mm	7.5" 192 mm	0.33" 8.5 mm	0.098" 2.5 mm	0.001" 0.020 mm	0.079" 2.0 mm	<b>652-110</b>
5.11"-7.08" 130-180 mm	7.5" 192 mm	0.33" 8.5 mm	0.098" 2.5 mm	0.001" 0.020 mm	0.079" 2.0 mm	<b>652-112</b>
5.90"-7.87" 150-200 mm	7.5" 192 mm	0.33" 8.5 mm	0.098" 2.5 mm	0.001" 0.020 mm	0.079" 2.0 mm	<b>652-114</b>

### Special Carbide Ball Contacts

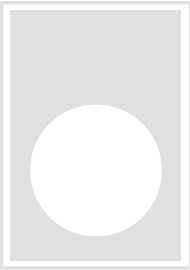
The carbide ball sizes shown at right are in stock for immediate delivery. We also offer different types of material, i.e., chrome, ruby, ceramic, teflon. Additional customized sizes are available. Contact us with your application requirements.

### Carbide Ball Contacts

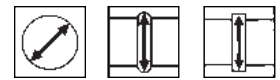
Inch	mm
0.031 = 1/32	0.5
0.063 = 1/16	1.0
0.078 = 5/64	1.5
0.098 = 3/32	2.0
0.125 = 1/8	2.5
0.156 = 5/32	3.0
0.188 = 3/16	3.5
0.250 = 1/4	4.5
0.312 = 5/16	5.0
0.438 = 7/16	5.5
0.500 = 1/2	6.0
0.625 = 5/8	7.0



SPC Cables for the 652 Series

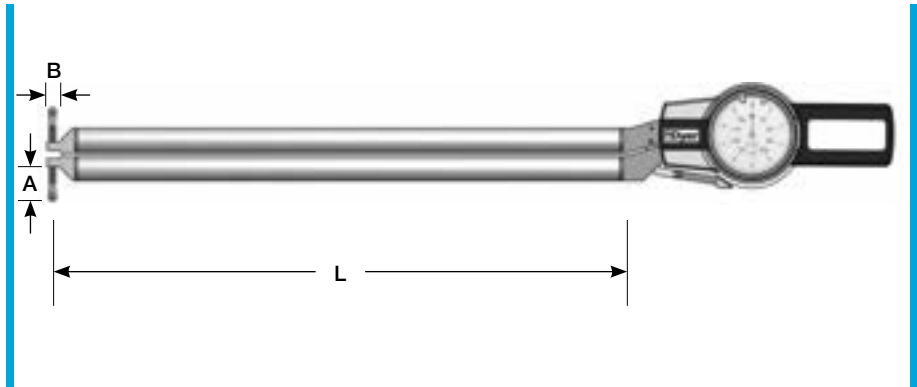


# 102 SERIES MECHANICAL DIRECT READING, LONG ARM GROOVE AND BORE GAGES

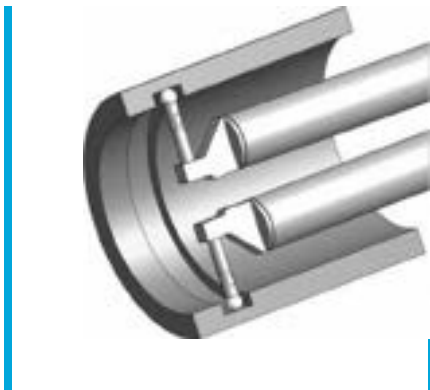


## Notable Features

- Direct reading, absolute measurement.
- Easy to view dial
- Shop rugged, rugged design.
- Dust and splash proof.
- Special contact points available.
- Contact us with your requirement.



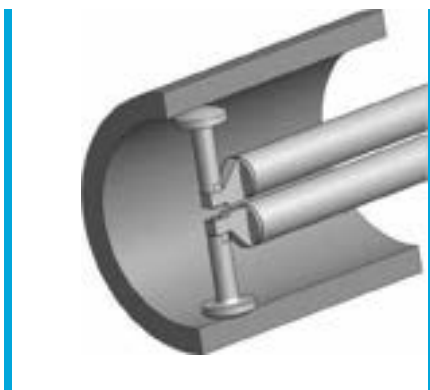
Model 102-100. All 15.5" (395 mm) reach gages have this profile.



Ball Contacts  $\varnothing$  5 mm



Model 102-105. Models 102-102 and larger are similar to this style.



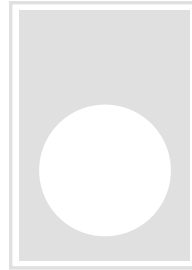
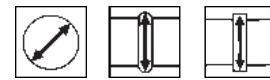
Mushroom Type R  $\varnothing$  20 mm

## Large Range, Comparator Measurement 101 Series

Range	Measuring Depth L	Groove Depth A	Groove Width B	Carbide Ball $\varnothing$	Graduation	Order Number
<b>Inch Specifications</b>						
2.0"-6.0"	15.5"	0.158"	0.216"	0.200"	0.004"	<b>102-100</b>
2.8"-6.80"	15.5"	0.55"	0.216"	0.200"	0.004"	<b>102-101</b>
3.2"-7.2"	21.0"	0.472"	0.216"	0.200"	0.004"	<b>102-102</b>
6.0"-10.0"	21.0"	1.25"	0.216"	0.200"	0.004"	<b>102-103</b>
8.6"-12.6"	21.0"	1.25"	0.216"	0.200"	0.004"	<b>102-104</b>
8.0"-16.0"	29.0"	1.14"	0.826"	SR 0.800"	0.010"	<b>102-105</b>
<b>Metric Specifications</b>						
50-150 mm	395 mm	4 mm	5.5 mm	5 mm	0.100 mm	<b>102-200</b>
70-170 mm	395 mm	14 mm	5.5 mm	5 mm	0.100 mm	<b>102-201</b>
80-180 mm	535 mm	12 mm	5.5 mm	5 mm	0.100 mm	<b>102-202</b>
150-250 mm	535 mm	32 mm	5.5 mm	5 mm	0.100 mm	<b>102-203</b>
220-320 mm	535 mm	32 mm	5.5 mm	5 mm	0.100 mm	<b>102-204</b>
200-400 mm	735 mm	29 mm	21 mm	SR 20 mm	0.200 mm	<b>102-205</b>

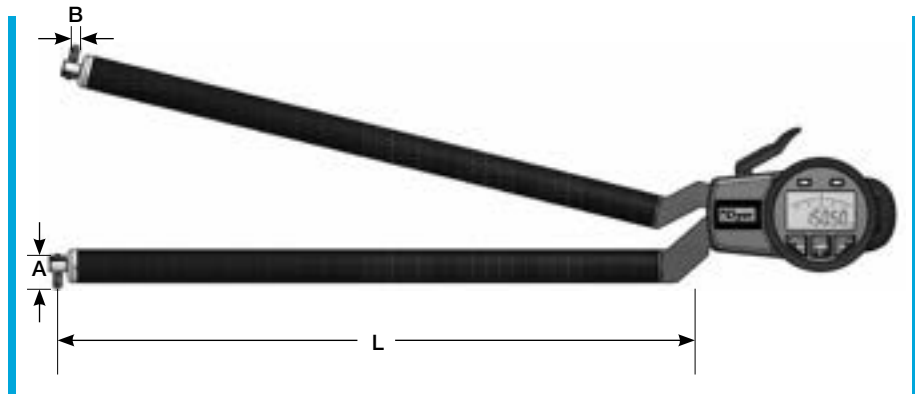


# 102 SERIES ELECTRONIC DIRECT READING, LONG ARM GROOVE AND BORE GAGES



## Notable Features

- Direct reading, absolute measurement.
- Easy to view dial
- Shop rugged, rugged design.
- Dust and splash proof.
- Special contact points available.
- Contact us with your requirement.



Model 102-300. All 15.5" (395 mm) reach gages have this profile.



Ball Contacts Ø 5 mm



Model 102-305. Models 102-302 and larger are similar to this style.

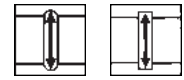


Mushroom Type R Ø 20 mm

## Model Specifications

Application Range	Measuring Depth L	Groove Depth A	Groove Width B	Carbide Ball Ø	Graduation	Order Number
2.0"-6.0" 50-150 mm	15.5" 395 mm	0.158" 4 mm	0.216" 5.5 mm	0.200" 5 mm	0.002" 0.050 mm	<b>102-300</b>
2.8"-6.8" 70-170 mm	15.5" 395 mm	0.55" 14 mm	0.216" 5.5 mm	0.200" 5 mm	0.002" 0.050 mm	<b>102-301</b>
3.2"-7.2" 80-180 mm	21.0" 535 mm	0.472" 12 mm	0.216" 5.5 mm	0.200" 5 mm	0.005" 0.100 mm	<b>102-302</b>
6.0"-10.0" 150-250 mm	21.0" 535 mm	1.25" 32 mm	0.216" 5.5 mm	0.200" 5 mm	0.005" 0.100 mm	<b>102-303</b>
8.6"-12.6" 220-320 mm	21.0" 535 mm	1.25" 32 mm	0.216" 5.5 mm	0.200" 5 mm	0.005" 0.100 mm	<b>102-304</b>
8.0"-16.0" 200-400 mm	29.0" 735 mm	1.14" 29 mm	0.826" 21 mm	SR 0.800" SR 20 mm	0.010" 0.200 mm	<b>102-305</b>

# 242 SERIES SPECIAL RETRACTABLE GROOVE GAGES DEDICATED & PRECISE



## Maximum Measuring Accuracy

Linear  $\leq \pm 0.0001"$  (0.0025 mm)  
Repeatability  $\leq \pm 0.0001"$  (0.0025 mm)  
Gage R & R capable in high tolerance applications

## Dyer Precision Design

The 242 Series measuring heads automatically self-center the gage in the bore. The contact points are released, drop in the groove and make the measurement. There is no need for tipping or radial movement of the gage. This simple design of separating the centering from the measuring means a fast accurate measurement. There is no operator influence during the measuring process, assuring the gage's R & R capability.

## Modular, measuring heads, fast change over times

Each measuring head is self contained and dedicated to a specific groove measurement. The measuring sleeve provides a precise transfer of the contact point movement to the pistol/indicator assembly. Each head will change out quickly and job to job change-over time occurs in minutes.

## Dependable, versatile gages

The 242 Series gages are rugged and dependable. All types of indicators and electronic amplifiers operate with this gage. The pistol handle is knurled lightweight aluminum and functions right or left-handed. Standard extensions permit measuring depth up to 20" (508 mm). Longer lengths are available.

## Custom contact points

The following contact point designs are available from Dyer:

### 1. Full groove widths

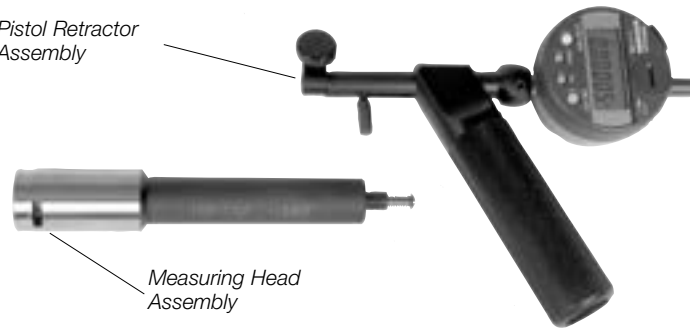
These contacts will determine corner radii growth or build-up and can be used for snap ring or O-ring grooves.

### 2. Recessed diameters

These contacts are radiuses front to back and supply a true diameter of a recessed groove or bore. The contact points are always positioned correctly in the bore.



Pistol Retractor Assembly



Measuring Head Assembly

## Special Contacts

Custom designed contact points, different contact point sizes and reaches.

## Features

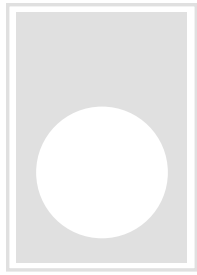
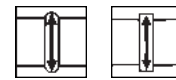
- No operator error.
- Fast, easy to use.
- High accuracy.
- Gage R & R capable.
- Dedicated to a part dimension.
- Interchangeable retracting heads, modular system.
- Gage centers off the bore, centering and measuring are independent.
- Indicator plug type design.
- Electronic direct reading.
- Rugged shop gage.
- Also measures recessed bores.



Send Dyer's application engineers your marked-up print. We need the following information:

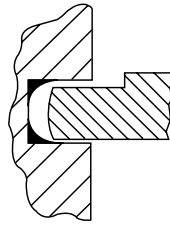
1. Groove profile square, radius, etc.
2. D1 bore diameter size/tolerance, through/blind
3. D2 Groove diameter size/tolerance, through/blind
4. L1 dim groove depth/tolerance
5. B dim width/tolerance

# 242 SERIES DEDICATED RETRACTABLE, 2-POINT ID GROOVE GAGES

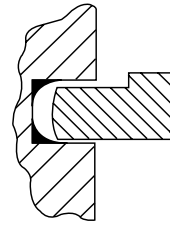


Dyer's 242 Series gages automatically self-center and align in the bore. The operator will not influence the measurements and will always obtain the true diameter of the groove.

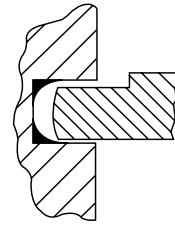
Special contact points can be made to reach into the groove corners. As the grooving tool wears the corner radii of the groove increases. With full wide contacts the 242 Series will detect the build-up.



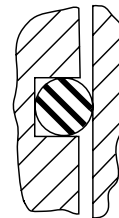
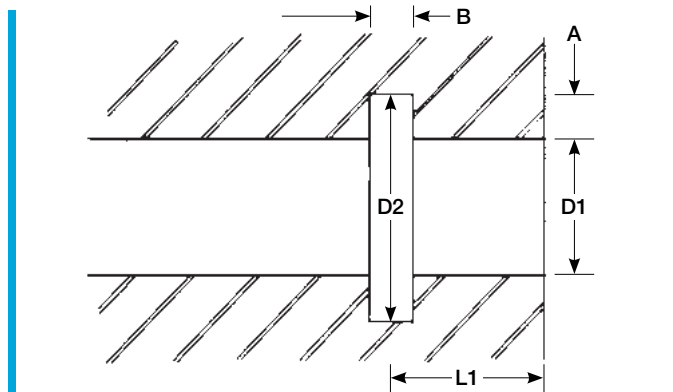
Standard contact



Special full width contact detects corner build-up



Special full width contact measures to groove corners



No corner build-up, O-Ring seal with a good fit



Corner build-up can result in excessive pressure that can lead to O-ring failure



242 Series with special long centering sleeve

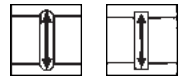


242 Series special set includes 2 retractable measuring heads with depth stop, 2 set masters, 1 pistol retractor



242 Series measuring head, 210-001 handle, indicator and set master

# 210-211 SERIES PRECISION ID GROOVE GAGES



### Maximum Measuring Accuracy

Linear  $\leq \pm 0.00015"$  (0.004 mm)  
 Repeatability  $\leq \pm 0.0002"$  (0.005 mm)  
 Gage R & R capable in high tolerance grooves

### Notable Features

- Fast, easy to use.
- High accuracy
- Gage R & R capable
- Special contact points, in between ranges, longer retraction. Contact Dyer with your part application.



### How to order

1. Order Pistol Grip Handle 210-001.
2. Select individual probe with the range you require.
3. Select individual contact with the range you require.
4. Select indicator.
5. Select setting master.



211-007 Probe body with 210-001 handle and various individual measuring contacts.

### Depth Extensions

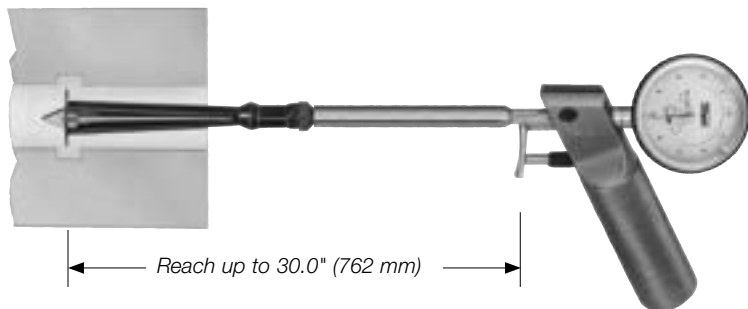


210-211 Series Depth Extensions and Depth Stop

### Individual Measuring Contacts for 211 Probe (for 211-207 [20 mm] Range Probe)

Inch Range	Metric Range	Order No.
0.79"-1.18" (0.79"-1.57")	20-30 mm (20-40 mm)	<b>211-110-20</b>
0.98"-1.37" (0.98"-1.77")	25-35 mm (25-45 mm)	<b>211-110-25</b>
1.18"-1.57" (1.18"-1.97")	30-40 mm (30-50 mm)	<b>211-110-30</b>
1.37"-1.77" (1.37"-2.17")	35-45 mm (35-55 mm)	<b>211-110-35</b>
1.57"-1.97" (1.57"-2.36")	40-50 mm (40-60 mm)	<b>211-110-40</b>
1.77"-2.17" (1.77"-2.56")	45-55 mm (45-65 mm)	<b>211-110-45</b>
1.97"-2.36" (1.97"-2.75")	50-60 mm (50-70 mm)	<b>211-110-50</b>
2.17"-2.56" (2.17"-2.95")	55-65 mm (55-75 mm)	<b>211-110-55</b>
2.36"-2.75" (2.36"-3.15")	60-70 mm (60-80 mm)	<b>211-110-60</b>
2.56"-2.95" (2.56"-3.35")	65-75 mm (65-85 mm)	<b>211-110-65</b>
2.75"-3.15" (2.75"-3.54")	70-80 mm (70-90 mm)	<b>211-110-70</b>
2.95"-3.35" (2.95"-3.74")	75-85 mm (75-95 mm)	<b>211-110-75</b>
3.15"-3.54" (3.15"-3.94")	80-90 mm (80-100 mm)	<b>211-110-80</b>
3.35"-3.74" (3.35"-4.13")	85-95 mm (85-105 mm)	<b>211-110-85</b>
3.54"-3.94" (3.54"-4.33")	90-100 mm (90-110 mm)	<b>211-110-90</b>
3.74"-4.13" (3.74"-4.53")	95-105 mm (95-115 mm)	<b>211-110-95</b>
3.94"-4.33" (3.94"-4.72")	100-110 mm (100-120 mm)	<b>211-110-100</b>

### Gage with Depth Extension



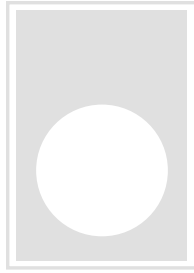
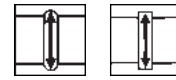
### 211 Series, individual size range

Application Range	Length L	Max Retractable Distance	Contact Width	Order Number
0.79"-2.17" 20-55 mm	5.5" 140 mm	0.39" 10 mm	0.090" 2.3 mm	<b>211-101</b>
1.57"-7.87" 40-200 mm	5.5" 140 mm	0.39" 10 mm	0.100" 2.5 mm	<b>211-104</b>
1.57"-7.87" 40-200 mm	5.5" 140 mm	0.79" 20 mm	0.100" 2.5 mm	<b>211-107</b>
<b>Pistol Grip Handle Information</b>				
Pistol Grip handle with pull-back trigger is used for all 210 and 211 Series Measuring Probes. This handle will accept both 3/8" and 8 mm diameter stem indicators.				<b>210-001</b>

### Depth Extensions for 0.775" ranges and up

Description	Order No.
3.93"/100 mm Depth Extension	<b>210-079</b>
9.84"/250 mm Depth Extension	<b>210-080</b>
14.00"/356 mm Depth Extension	<b>210-085</b>
Depth Stop	<b>210-090</b>

# 210-211 SERIES PRECISION ID GROOVE GAGES FOR SMALL DEEP GROOVE MEASUREMENTS



**Maximum Measuring Accuracy**  
 Linear  $\leq \pm 0.00015"$  (0.004 mm)  
 Repeatability  $\leq \pm 0.0002"$  (0.005 mm)  
 Gage R & R capable in high tolerance grooves

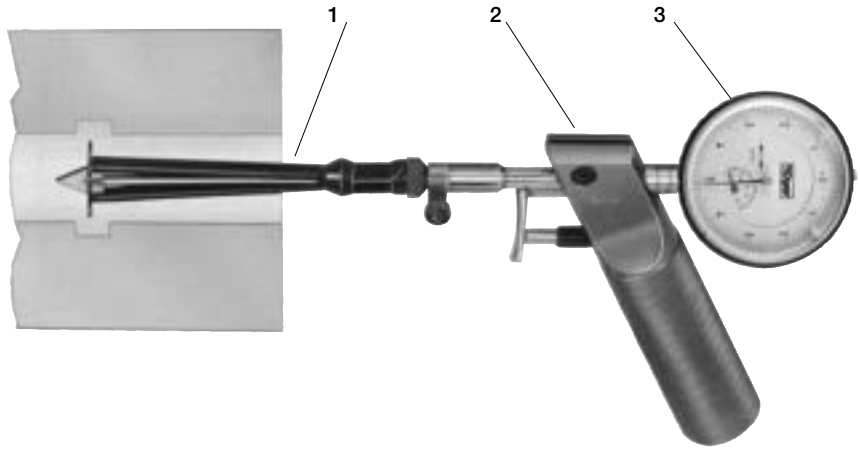
**Notable Features**

- High accuracy, easy to use, fast measurements.
- Special contact points, in between ranges, longer retraction. Contact Dyer with your part application.
- Longer length probes available in special dies.

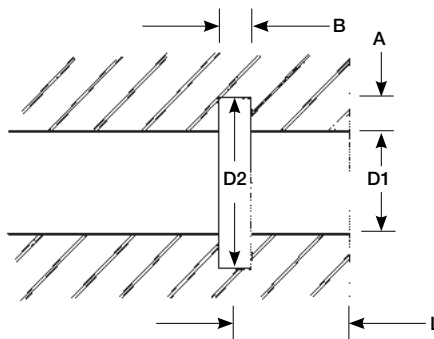


**How to order**

1. Select probe with the range you require.
2. Select pistol grip handle. All measuring probes 210 and 211 fit this basic holder 210-001.
3. Select indicator.
4. Optional – Ring set master, depth extension, depth stop.



210-001 handle with 210-010 probe. Indicator ordered separately.

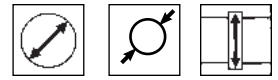


**Models and Specifications 210-211 Series Measuring Probes**

Effective Measuring Range		D1	D2	Maximum Retractable Distance	Contact Width B	Maximum Depth L	Order Nos.
Inch	mm						Standard
0.236"–0.315"	6–8 mm	0.228" 5.8 mm	0.315" 8 mm	0.090" 2.3 mm	0.039" 1 mm	2.36" 60 mm	<b>210-005</b>
0.315"–0.472"	8–10 mm	0.307" 7.8 mm	0.472" 10 mm	0.169" 4.3 mm	0.059" 1.5 mm	2.36" 60 mm	<b>210-010</b>
0.394"–0.551"	10–14 mm	0.386" 9.8 mm	0.551" 14 mm	0.169" 4.3 mm	0.059" 1.5 mm	2.36" 60 mm	<b>210-015</b>
0.472"–0.709"	12–18 mm	0.465" 11.8 mm	0.709" 18 mm	0.248" 6.3 mm	0.059" 1.5 mm	2.36" 60 mm	<b>210-020</b>
0.630"–0.866"	16–22 mm	0.622" 15.8 mm	0.866" 22 mm	0.248" 6.3 mm	0.059" 1.5 mm	3.75" 95 mm	<b>210-025</b>
<b>Pistol Grip Handle Information</b>							
Pistol Grip handle with pull-back trigger is used for all 210 and 211 Series Measuring Probes. This handle will accept both 3/8" and 8 mm diameter stem indicators.							<b>210-001</b>

Indicators optional. See Section E for complete list and specifications.

# 131 SERIES ID-OD SHALLOW DIAMETER GAGES



## Notable Features

- Large range, easy to use.
- Adjustable contacts with 1.00" (25.4 mm) retraction, gaging depths up to 2.5" (64 mm).
- Hardened and precision ground gage resting surface.
- Fine adjustment setting for fast setting.
- Fast change over ID to OD.
- Contact points can be rotated to extend useful gaging life.
- Optional bench stand available.
- Overall length with indicator 12.75" (324 mm)



## How to Order

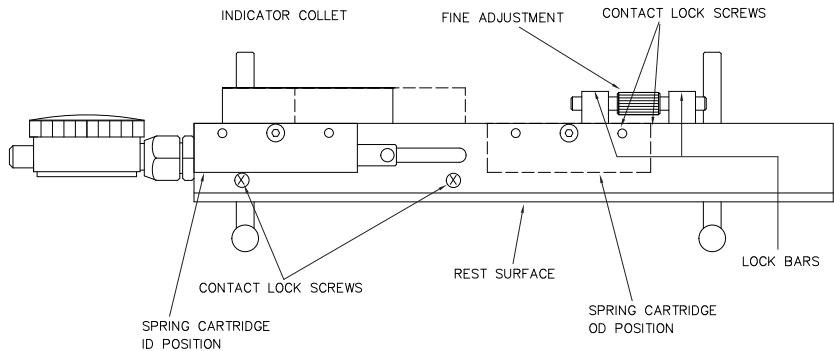
1. Select gage model
2. Select contact points



131-701 Gage with optional 131-900 bench stand

## 131 Series Models and Specifications

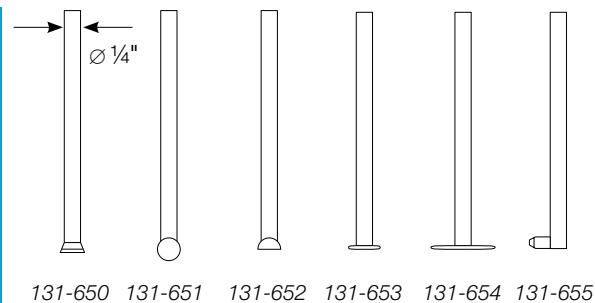
Indicator Type	Graduation	Model Number
Dial	0.0005"	<b>131-601</b>
Dial	0.0001"	<b>131-602</b>
Dial	0.010 mm	<b>131-603</b>
Dial	0.002 mm	<b>131-604</b>
Electronic	0.0005" 0.010 mm	<b>131-701</b>
Electronic	0.0001" 0.001 mm	<b>131-702</b>
Without	—	<b>131-800</b>



## 131 Series Contact Point Specification

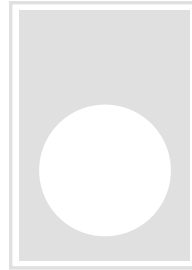
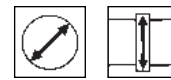
Measuring Depth Range	ID Range	OD Range	Contact Point Type	Order Number
0.080"–2.50"	0.760"–7.970"	0–7.220"	hardened steel taper foot	<b>131-650</b>
0.050"–2.50"	0.760"–7.970"	0–7.220"	0.375" C ball	<b>131-651</b>
0.050"–2.50"	0.760"–7.970"	0–7.220"	0.375" 1/2 C ball	<b>131-652</b>
0.025"–2.50"	1.020"–8.100"	0–7.100"	0.050" x 0.050" HC Disc	<b>131-653</b>
0.025"–2.50"	2.020"–8.600"	0–6.600"	0.050" x 1.000" HC Disc	<b>131-654</b>
1.00"–2.500"	1.100"–8.300"	0–6.600"	0.188" Ø ruby or C ball with 4-48 thread	<b>131-655</b>

## Contact points





# 132 SERIES ID GROOVE GAGES BIG RANGES



## 132 Series, Big Range, ID groove gages

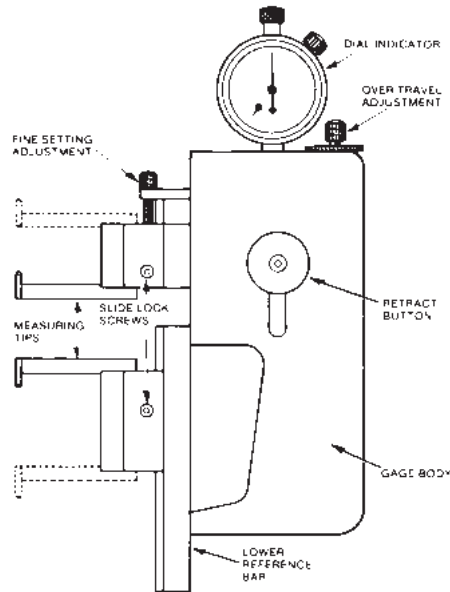
### Notable Features

- Large range 0.290"–7.900" (7.4–200 mm).
- Retractable upper arm and fixed lower arm. Upper arm remains parallel to lower arm during measuring process.
- Gage set to zero with a master.
- Gage arms (ordered separately) available in many sizes.
- Full 1" retraction for deep grooves



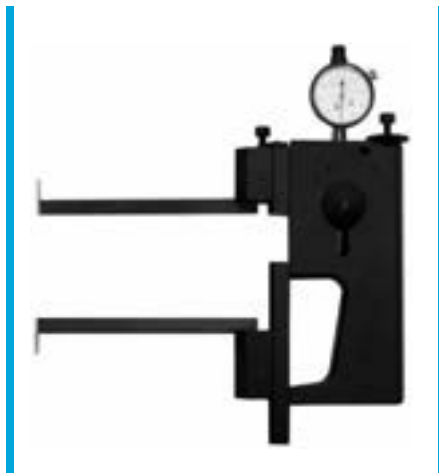
### How to order

1. Select a basic gage model.
2. Select an arm set.



### Basic Gage Models

Indicator Type	Graduation	Order Number
Dial	0.0005"	<b>132-000</b>
Dial	0.0001"	<b>132-001</b>
Dial	0.010 mm	<b>132-002</b>
Dial	0.002 mm	<b>132-003</b>
Electronic	0.0005" 0.010 mm	<b>132-100</b>
Electronic	0.0001" 0.001 mm	<b>132-101</b>
Without	—	<b>132-200</b>



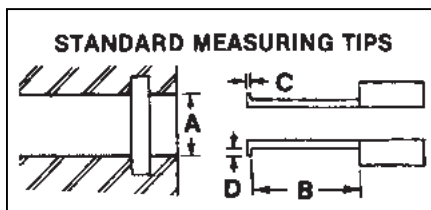
Model 132-001 with 132-050 arms



Special ranges



Model 132-100 with 132-020 arms



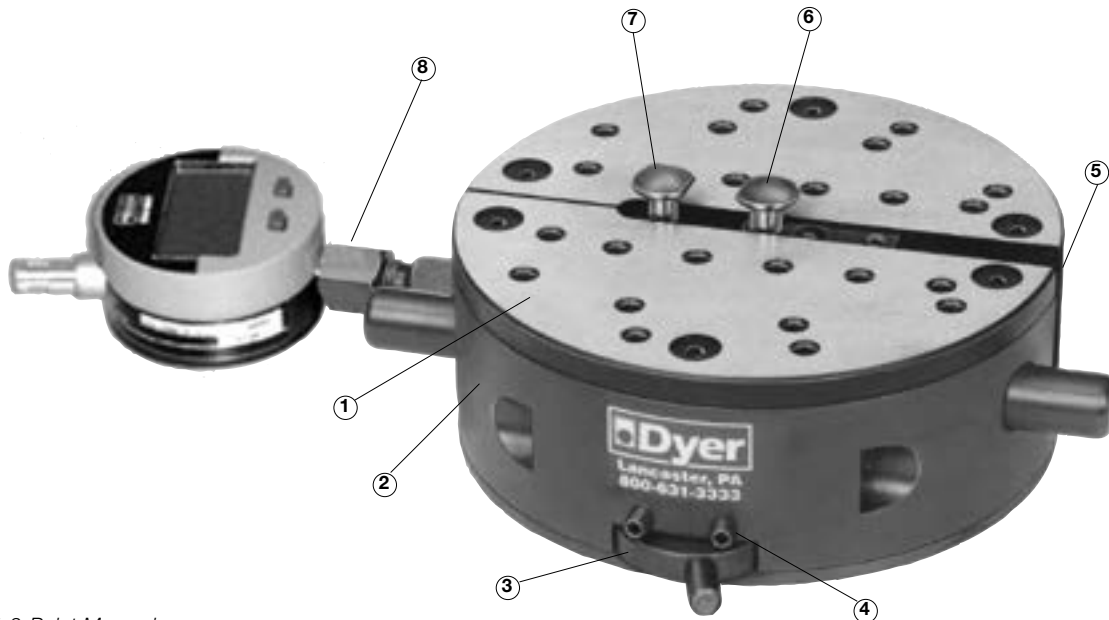
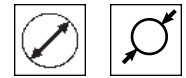
Special contact points available. Contact Dyer office with your requirements.

### Measuring Arm Models

Model No.	I.D. Range (A)	Contact Length (B)	Tip Width (C)*	Tip Length (D)
<b>132-015</b>	0.290–4.125"	1.25"	0.050"	0.110"
<b>132-020</b>	0.730–7.187"	1.25"	0.040"	0.210"
<b>132-025</b>	1.050–7.375"	1.5"	0.050"	0.210"
<b>132-030</b>	1.050–7.375"	2.5"	0.050"	0.210"
<b>132-035</b>	1.050–7.500"	3.5"	0.050"	0.250"
<b>132-050</b>	1.600–7.900"	4.5"	0.080"	0.500"

\* Special tip widths available. Contact Dyer office with your requirements.

# 747 SERIES ID-OD MEASURING TABLES



Model 747-001 2-Point Measuring

## The Highest Accuracy and Repeatability

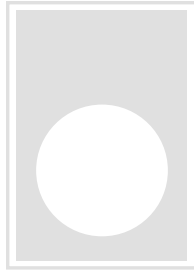
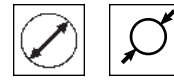
Dyer's 747 Series is a high-precision measuring table based on a precise linear movement of the moveable contact point. A single unit offers a choice of 2-point measuring or 3-point measuring. The gage can be set up as a "hands off" gage, where the operator places the part on the table and releases the measuring contact. There is no operator error and the system will provide Gage R & R capable measurements. A wide range of gaging options makes this gage Dyer's most flexible in many measuring applications, such as thin walls, plastics and hard to reach locations on metal parts.

## 747 Series ID-OD Measuring Tables Design Benefits

① Gage top plate is hardened and ground tool steel; comes standard with a thin dense chromium (TDC) satin finish coating (RC70-74); and tapped Mb threaded holes for attaching different contact accessories or fixture mountings. Key properties of thin dense chromium (TDC) include low coefficient of friction; greater lubricity and non-balling properties; high chemical and corrosion resistance, high surface hardness (RC70-72); high abrasion resistance and longer wear life. These extra-ordinary properties translate to distinct performance advantages over ordinary steel top plates.

- ② Rigid steel base
- ③ Retracting lever for large range 0.800" (20 mm)
- ④ Contact adjustment screws can limit retracting contact point travel
- ⑤ Fine adjustment of measuring pressure and direction (ID or OD) is accomplished by rotating spring-loaded disc located on opposite side of base across from retracting lever #3.
- ⑥ Fixed contact point arm adjust easily for different contact point heights.
- ⑦ Moveable spring loaded measuring contact point arm adjusts easily for different contact point heights.
- ⑧ 3/8" standard or 8 mm optional collect for holding indicating unit.

# 747 SERIES ID-OD MEASURING TABLES



### Maximum Measuring Accuracy

Linear, Range 0.0"–0.080" (0.0–2 mm)  
≤ 0.000050" (0.0013 mm)

Range 0.0"–0.200" (0–5 mm)  
± 0.000040" (0.001 mm)

Range 0.0"–0.400" (0–10 mm)  
± 0.0001" (0.0025 mm)

Range 0.0"–0.600" (0–15 mm)  
± 0.0002" (0.005 mm)

Repeatability ≤ 0.000050" (0.0013 mm)

Gage R & R capable in high tolerance applications

These gages are true value leaders and gage most measuring applications.

### Notable Features

- Armoloy coating on all tables is standard.
- ID-OD applications.
- High accuracy and set-up flexibility.
- Fast, accurate measurements.
- Gage R & R capable.
- Large range.
- Adjustable contact pressure.
- Contact point flexibility, use all types of indicators.
- Shop-rugged, 24/7.

### How to place an order

- a. Select the table model you require.
- b. Choose electronic or mechanical indication.
- c. If you need additional contacts, ring masters or part fixture design setup, contact Dyer Gage.

### Special Part Fixturing

We can recommend part fixturing and setup. Contact Dyer Application Engineering with your requirements.



2 and 3 Point Model 747-000 14.000" Long Table



Model 747-001



Model 747-005, 3rd contact stop at 90°

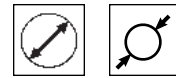


Model 747-004, 3rd contact stop at 45°

### 747 Series Models and Specifications

ID Range	OD Range	Contact Travel	Table Dimensions	Weight	Model Number
<b>Standard</b> 0.345"–7.480" 9–190 mm	<b>Standard</b> 0–6.630" 0–160 mm	0.800" 20mm	Ø x Height 5.01" x 2.4" 150 mm x 60 mm	7.72 lbs 3.5 kg	<b>747-001</b> <b>747-002</b>
<b>Standard</b> 0.709"–5.118" 18–130 mm	<b>Standard</b> 0–4.724" 0–120 mm	0.800" 20mm	3rd contact stop at 45° Ø x Height 6.89" x 3.35" 175 mm x 85 mm	11.22 lbs 5.1 kg	<b>45° Stop</b> <b>747-004</b>
<b>Standard</b> 0.709"–3.150" 18–80 mm	<b>Standard</b> 0–2.362" 0–60 mm	0.800" 20mm	3rd contact stop at 90° Ø x Height 6.89" x 3.35" 175 mm x 85 mm	11.22 lbs 5.1 kg	<b>90° Stop</b> <b>747-005</b>
<b>Standard</b> 0.590"–14.96" 15–380 mm	<b>Standard</b> 0–13.78" 0–350 mm	0.800" 20mm	Ø x Height 11.81" x 3.35" 300 mm x 85 mm	43 lbs 19.5 kg	<b>747-003</b>
<b>Standard</b> 0.345"–13.000" 9–330 mm	<b>Standard</b> 0–11.810" 0–300 mm	0.800" 20mm	L x W x H 12.8" x 6.9" x 2.4" 325 mm x 175 mm x 60 mm	19.6 lbs	<b>747-000</b>

# MANY MEASURING POSSIBILITIES WHEN YOU SELECT DYER'S 747 SERIES

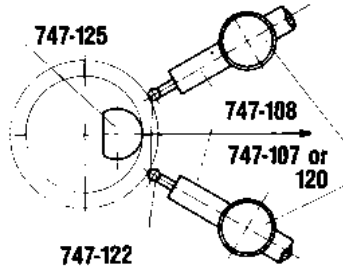


Show Dyer your application. We will help you select the right components.

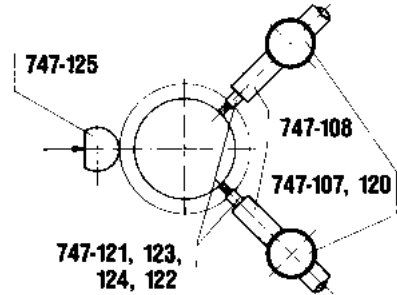
## Best Value

The 747 Series is surprisingly affordable, and because of its capability, will save you from having to buy many different types of gages.

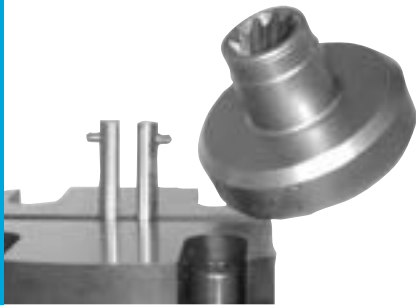
With over 2500 installations, the 747 Series ID-OD gaging station has proven its value time and time again. This measuring station is designed for maximum versatility, and the measurement of parts where inspection accuracy and tolerances are critical. Also, contact pressure is easily adjusted by operator. This gage is excellent for inspecting thin-wall parts or less rigid plastic parts.



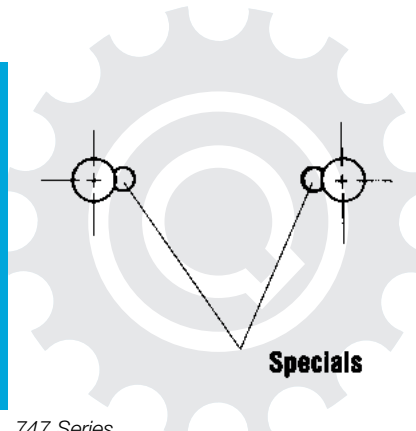
747 Series  
Measure concentricity between an internal and external diameter



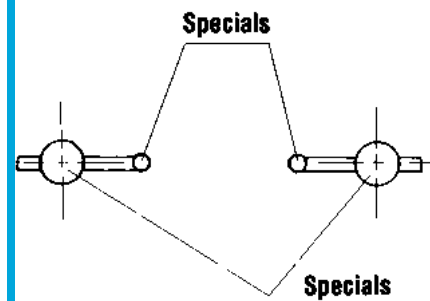
747 Series  
Measure concentricity between two external diameters



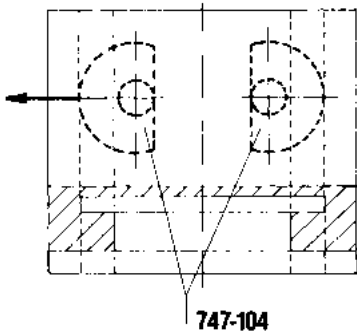
747 Series  
Small internal helical gears with ball pins



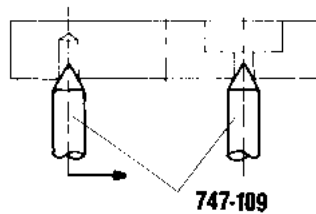
747 Series  
Measure internal and external gear/spline using custom carbide ball



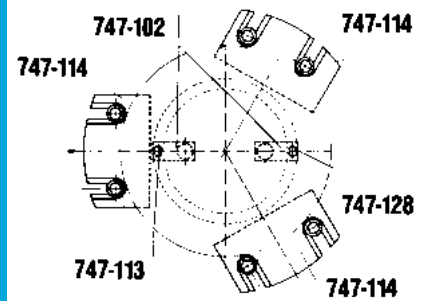
747 Series  
Measure internal and external gear/spline using custom carbide balls



747 Series  
Measure T-slot width

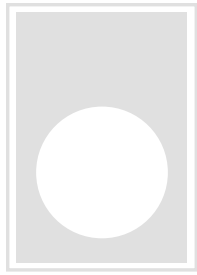
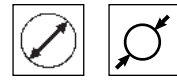


747 Series  
Measure center distance

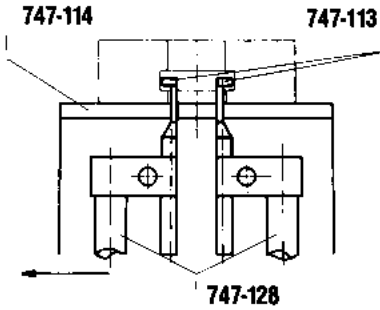


747 Series  
Measure inner diameter of narrow counterbore width from 4 to 10 mm

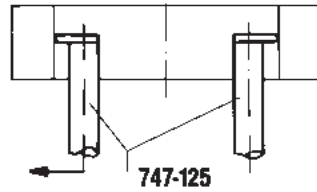
# MANY MEASURING POSSIBILITIES WHEN YOU SELECT DYER'S 747 SERIES



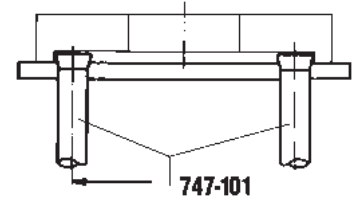
Show Dyer your application. We will help you select the right components.



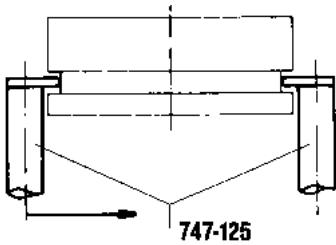
747 Series  
Measure a small internal groove



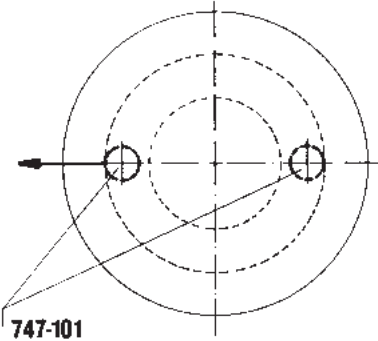
747 Series  
Measure an internal diameter



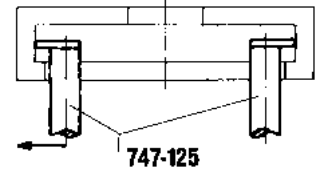
747 Series  
Measure a shallow counterbore



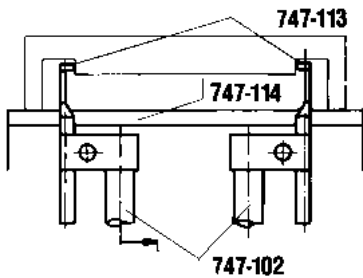
747 Series  
Measure a shallow external groove



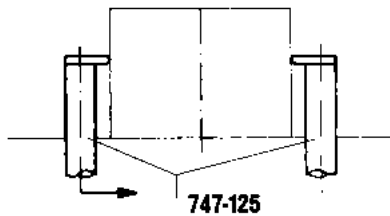
747 Series  
Measure inner diameter of counterbore



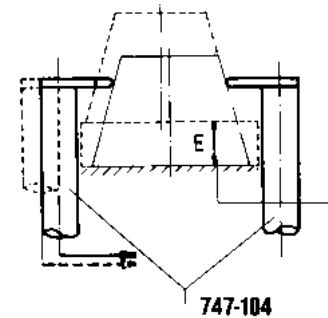
747 Series  
Measure a shallow internal groove



747 Series  
Measure a diameter with difficult  
access/boss/hub

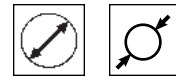


747 Series  
Measure an external diameter



747 Series  
Measure a cone

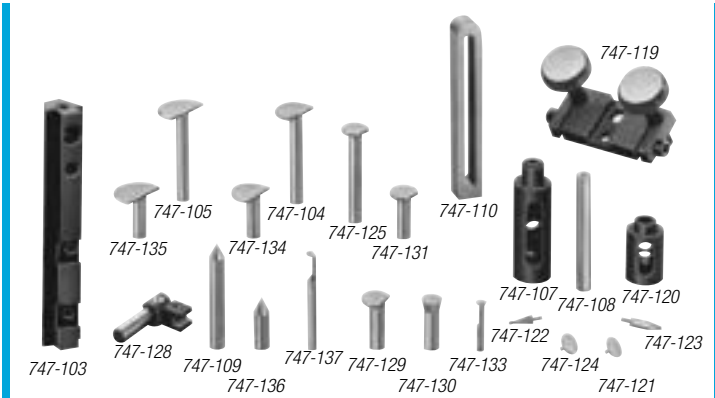
# UNLIMITED ACCESSORY OPTIONS



Dyer offers more measuring anvils from stock than shown on these pages. We also custom grind standard contacts to fit your special gaging needs.



747-149 posts with 747-431 ball tip contacts



Optional Accessories for 747 Series



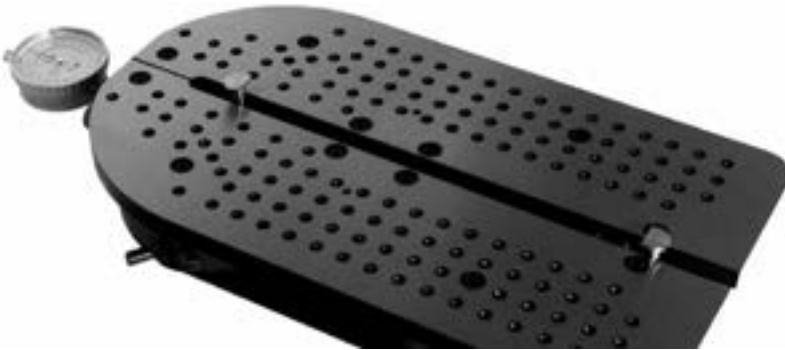
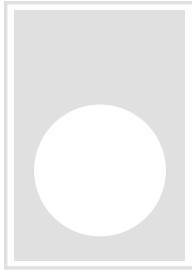
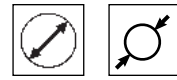
747 Series  
Special Measuring Anvils (Just send us a sketch by fax 717-569-6721 of your custom needs)

Model No.	Options	
747-001 and 747-002		Table Assemblies
747-115		Fixed and Anvil Supports
747-146 and 747-103		
747-102		Intermediate Supports
747-128		
747-125		Measuring Anvils
747-129		
747-101		
747-130		
747-104		
747-134		
747-105		
747-135		
747-131		
747-132		
747-137, 116, 117, 118		
747-133		
747-109		
747-136		
747-114		Adjustable Supports
747-119		Workpiece Supports
747-120		Stop Holders
747-107		
747-108		Stops
747-122		Gauge Head Contact Points
747-123		
747-121		
747-124		Clamps
747-110		

Special Custom Measuring Anvils (Just send us a sketch of your Special Application needs by fax 717-569-6721)



# 747 SERIES STANDARD ACCESSORIES



747-000



Included with 747-000



747-001



Included with 747-001



Included with 747-002



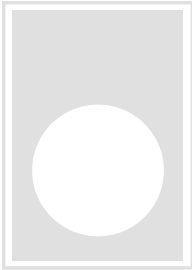
747-004



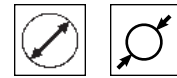
Included with 747-004



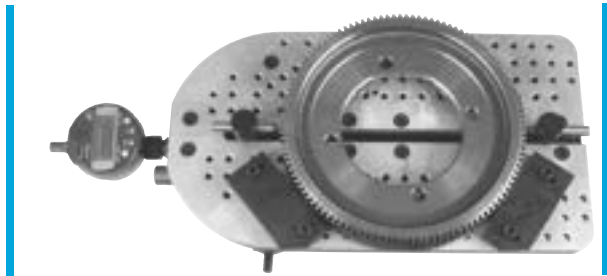
Included with 747-005



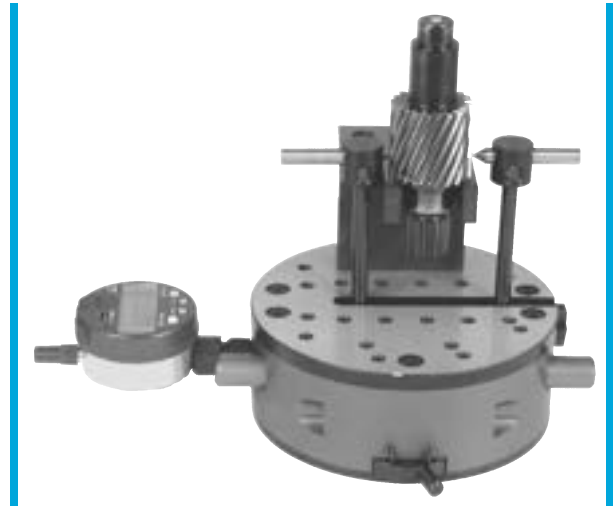
# GEAR & SPLINE GAGING CUSTOM CARBIDE CONTACT BALL



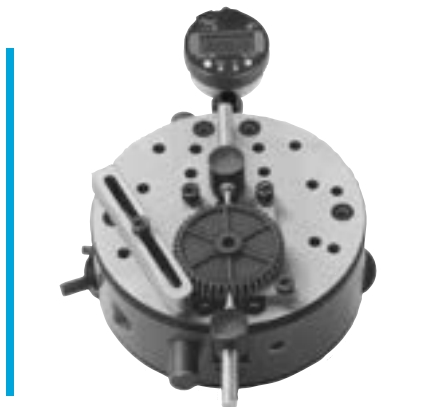
## 747 SPECIAL ACCESSORIES FOR GEAR MEASUREMENTS



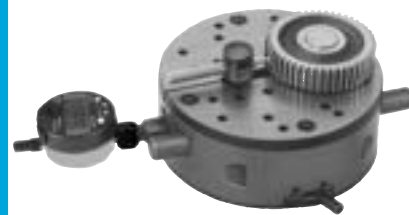
2 point PD measurement of a ID gear. Special fixturing (stops) hold the part in measuring position.



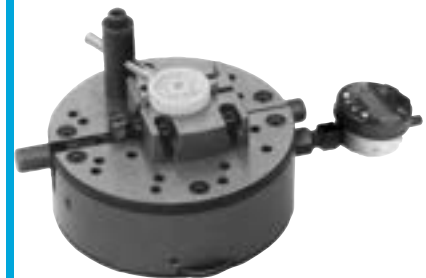
2 point OD PD measurement. Special fixturing (stops) hold the part in a vertical position.



747 Series  
OD pitch diameter



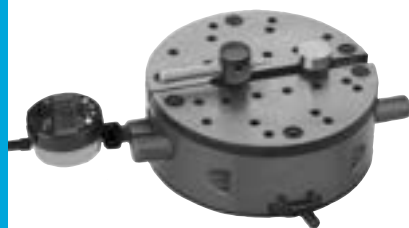
747 Series  
ID to OD gear teeth



747 Series  
OD measurement pitch  
diameter gear teeth



747 Series  
OD Gear fixturing

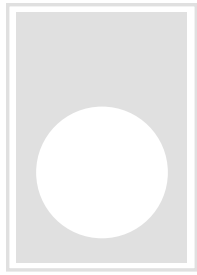
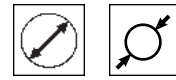


747 Series  
ID to OD fixturing



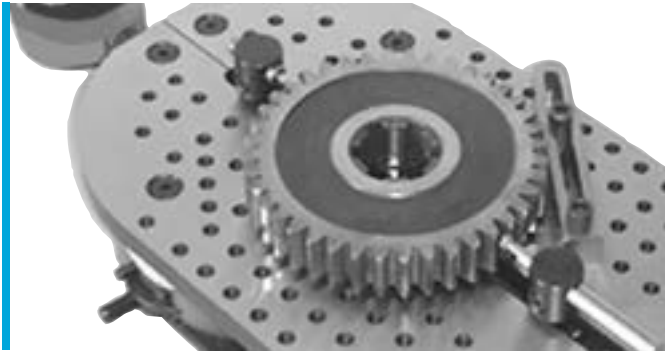
747 Series  
OD fixturing for plastic gear part

# GEAR & SPLINE GAGING ON THE FACTORY FLOOR



Show Dyer your application. We will help you select the right components.

SECTION B  
ID GROOVE GAGES



747 Series  
Measuring external pitch diameter using special size carbide balls and part stop



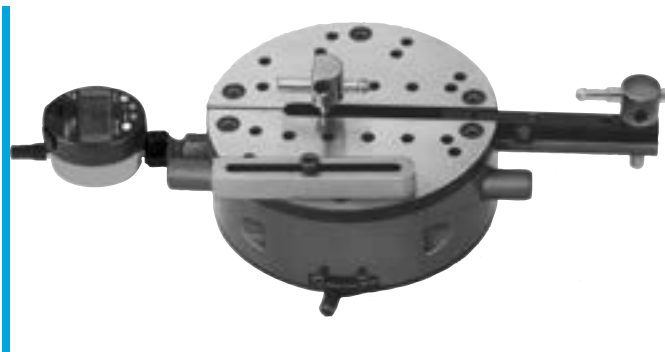
747 Series  
Measure external splines at 2 positions



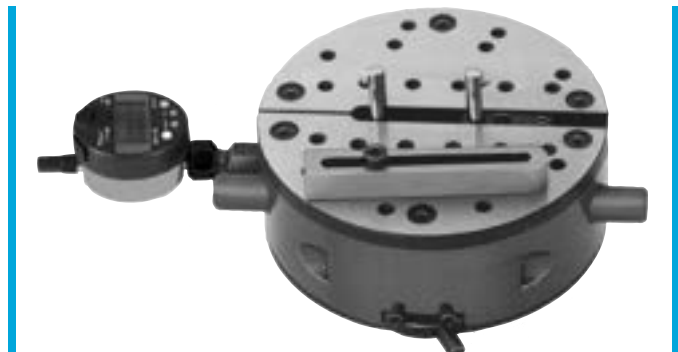
747 Series  
Measuring OD pitch diameter



747 Series  
Measuring ID pitch diameter

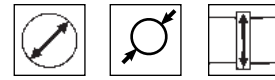


747 Series  
OD Gear pitch diameter fixturing



747 Series  
ID pitch diameter fixturing

# 134 SERIES ID-OD SHALLOW DIAMETER "BAR" GAGES



## Large Sizes

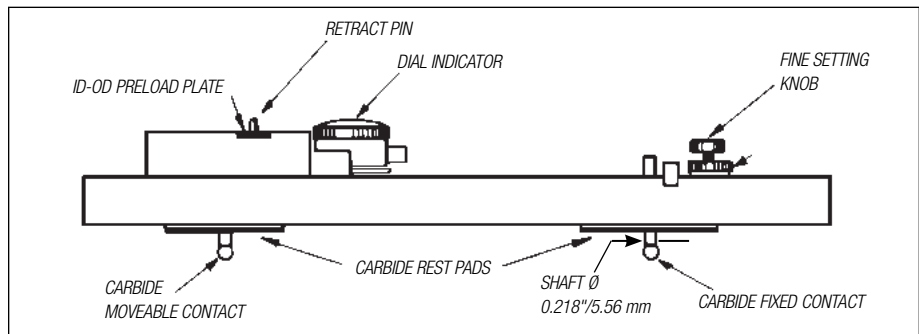
Fast, easy to use, 2-point measurement, ideal for shallow ID's and OD's, center distances of holes, PD of gears and other part dimensions

## Notable Features

- Reed transfer movement offers precise frictionless repeatability.
- Quick, easy 2-point comparison measurement.
- Light weight alloy steel air frame tubing with carbide gage surface.
- 0–1" adjustable gaging depth, contacts rotate, greatly extending useful gaging life.
- Fast acting fine adjustment setting.
- Instant change-over in seconds from ID to OD.
- Sizes larger than 60" available. Contact Dyer application engineering.
- Special contacts.
- Optional wooden storage case.



Model 134-802 with electronic indicator



134 Series



## How to Order

1. Select gage with indicator
2. Select contact points

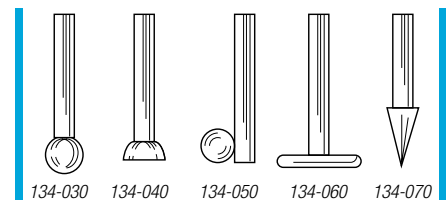
## 134 Series Models and Specifications

ID/OD Range	Indicator Travel	Adj. Gaging Depth	Length	Wgt oz.	Order No. 0.0005" Indicator 0.040" Travel	Order No. 0.0005" Digital 0.040" Travel	Order No. 0.0001" Indicator 0.025" Travel	Order No. 0.0001" Digital 0.025" Travel
4.50"–12.00"	0.040/0.025"	0–1.00"	18.00"	32	<b>134-002</b>	<b>134-802</b>	<b>134-102</b>	<b>134-902</b>
12.00"–18.00"	0.040/0.025"	0–1.00"	24.00"	34	<b>134-004</b>	<b>134-804</b>	<b>134-104</b>	<b>134-904</b>
18.00"–24.00"	0.040/0.025"	0–1.00"	30.00"	36	<b>134-006</b>	<b>134-806</b>	<b>134-106</b>	<b>134-906</b>
24.00"–36.00"	0.040/0.025"	0–1.00"	41.50"	48	<b>134-008</b>	<b>134-808</b>	<b>134-108</b>	<b>134-908</b>
36.00"–48.00"	0.040/0.025"	0–1.00"	53.50"	64	<b>134-010</b>	<b>134-810</b>	<b>134-110</b>	<b>134-910</b>
48.00"–60.00"	0.040/0.025"	0–1.00"	65.50"	72	<b>134-012</b>	<b>134-812</b>	<b>134-112</b>	<b>134-912</b>

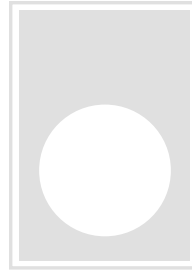
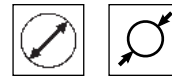
## Contact Points

Description	Order No. (Set)
1/4" carbide ball	<b>134-030</b>
1/4" half carbide ball	<b>134-040</b>
Special carbide ball Specify size	<b>134-050</b>
0.050" x 1.000" disc	<b>134-060</b>
0.125" x 0.500" taper	<b>134-070</b>

## Contact Points



# 135 SERIES ID-OD SHALLOW DIAMETER BORE & GROOVE GAGES



## Ideal for Groove Measurements

Gage inside and outside diameters of grooves, bores, step Ø's PD's gears.

## Notable Features

- Light weight, easy to use, alloy steel, air frame tubing used for gage body.
- Precise, repeatable frictionless linear ball bushing movement.
- 0.75"-1.00" (19 mm-25.4 mm) contact point retraction. Good for groove measurements.
- Adjustable gage depth up to 3.00" (76.2 mm).
- Positive reversal from ID to OD in seconds.
- Fine adjustment setting for fast setting.
- Contacts rotate providing for extended gage life.
- Sizes longer than 60" and special contacts, contact Dyer application engineering.



Model 135-802 with Electronic Indicator



## How to Order

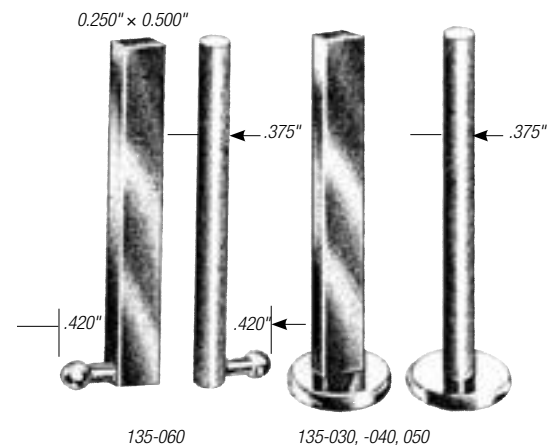
1. Select gage model
2. Select contact points

## 135 Series ID-OD Models and Specifications

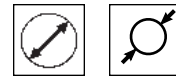
ID/OD Range	Adj. Gaging Length	Order No. w/ 0.0005" Dial Indicator	Order No. w/ 0.0005" Electronic Indicator	Order No. w/ 0.0001" Dial Indicator	Order No. w/ 0.0001" Electronic Indicator
6.5-14.00"	0-5.00"	<b>135-002</b>	<b>135-802</b>	<b>135-102</b>	<b>135-902</b>
14.00-24.00"	0-5.00"	<b>135-004</b>	<b>135-804</b>	<b>135-104</b>	<b>135-904</b>
24.00-36.00"	0-5.00"	<b>135-006</b>	<b>135-806</b>	<b>135-106</b>	<b>135-906</b>
36.00-48.00"	0-5.00"	<b>135-008</b>	<b>135-808</b>	<b>135-108</b>	<b>135-908</b>
48.00-60.00"	0-5.00"	<b>135-010</b>	<b>135-810</b>	<b>135-110</b>	<b>135-910</b>

## Contact Points

Disc Diameter	Disc Thickness	Order No. (Set)
1"	0.050"	<b>135-030</b>
1"	0.100"	<b>135-040</b>
1"	0.200"	<b>135-050</b>
0.250C	Ball	<b>135-060</b>



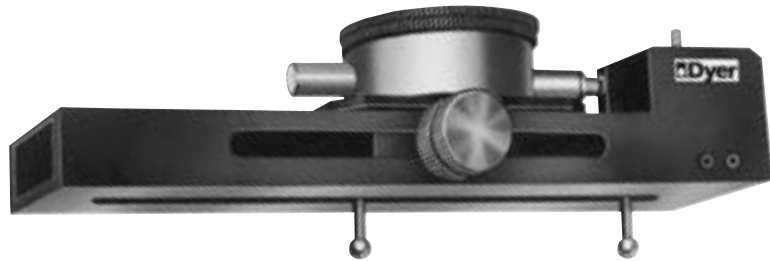
# 133 SERIES ID-OD SHALLOW DIAMETER "BAR" GAGES



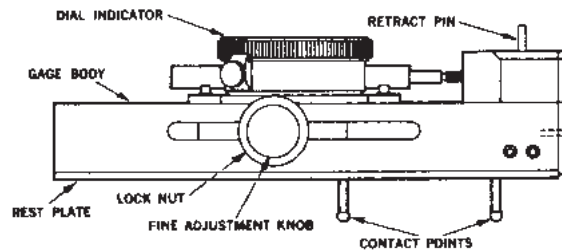
Light weight  
Fast gaging  
Ideal for shallow IDs and ODs,  
counter bores, grooves, PD's gears

### Notable Features

- Reed transfer movement offers precise frictionless repeatability.
- Fast, 2-point measurement directly across Ø.
- Hardened A-2 gage resting surface.
- Fine adjustment.
- 0–1" adjustable gaging depth, contact points rotate greatly extending useful gaging life.
- Fast acting fine adjustment setting, change over ID to OD in seconds.



133 Series



### How to Order

1. Select gage model
2. Select contact points

### 133 Series gage specifications

ID Range	OD Range	Indicator Travel	Adj Gaging Depth	Length	Weight (oz)	Order No. .0005" Indicator	Order No. .0005" Digital Indicator	Order No. .0001" Indicator	Order No. .0001" Digital Indicator
0.44"–3.25"	0.03"–3.00"	0.025"	0–1.0"	4.50"	16	133-000	133-800	133-001	133-801
0.44"–5.50"	0.03"–5.19"	0.050"	0–1.0"	7.50"	22	133-002	133-802	133-003	133-803
0.44"–9.31"	0.03"–9.00"	0.050"	0–1.0"	11.38"	26	133-004	133-804	133-006	133-806

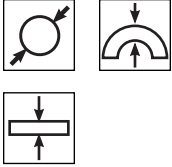
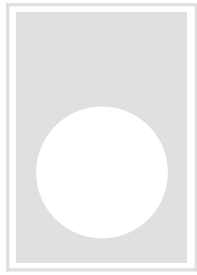
### 133 Series contact point information

Order No.	Adj Gaging Depth	Contact Point Material	Contact Points
133-005	0.0"–0.5"	Hardened Steel	
133-010	0.5"–1.0"	0.1875" Dia. Hard. Steel	
133-015	0.0"–0.5"	0.1875" Dia. Carbide Ball	
133-020	0.5"–1.0"	0.1875" Dia. Carbide Ball	
133-025	0.0"–0.5"	0.1875" Dia. 1/2 Carbide Ball	
133-030	0.5"–1.0"	0.1875" Dia. 1/2 Carbide Ball	
133-035	0.0"–0.5"	0.05" x 0.50" Disc Hard. Steel	
133-040	0.5"–1.0"	0.05" x 0.50" Disc Hard. Steel	
133-045	0.0"–0.5"	Spec Carbide Ball	
133-050	0.5"–1.0"	Contact Office	
133-055	0.0"–0.5"	Hard. Steel 0.125"–0.500" Dia. Taper	
133-060	0.5"–1.0"	Hard. Steel 0.125"–0.500" Dia. Taper	



# C

## Min-Wall/Thickness Gages, Precision Outside Diameters, Special Application Measuring Solutions

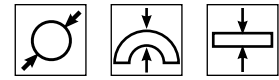


### TABLE OF CONTENTS

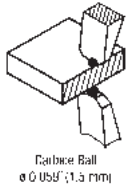
Application	Series	Page
"The 313 Series Models are Dyer Classics" and Our Biggest Sellers	313	C.2–C.5
High Accuracy Short Reach Mechanical Dial Gages	301	C.6–C.7
High Accuracy Short Reach Electronic Gages	653	C.8–C.9
Mid Reach Mechanical Dial Gages	301	C.10–C.11
Mid Reach Mechanical Electronic Gages	653	C.12–C.13
Mechanical Dial Long Reach Gages	302	C.14
Mechanical Dial Longer Reach Over Obstruction Gages	304	C.15
Special Applications and Custom Designs	302	C.16–C.17
Electronic Long Reach Thickness Gages	656	C.18–C.19
Soft Material Thickness Gages	306	C.20
Mechanical Dial up to 28" Reach Thickness Gages	334	C.21
Dedicated High Accuracy Indicating OD Ring Gage	337	C.22
Large Range Snap Gages	336	C.23
Outside Diameter Indicating Snap Gages	335	C.24–C.25
"C" Frame Gages, Reach up to 16.00"/406 mm	309	C.26–C.27
Mechanical Dial Pocket Thickness	310	C.28

**visit** our searchable web site and  
find Dyer's interactive  
catalog, gaging solutions  
by application and industry!

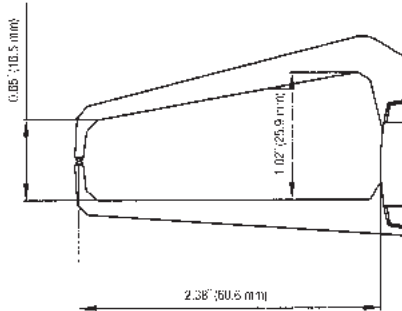
# 313 SERIES "CLASSIC" MIN-WALL/ THICKNESS GAGES



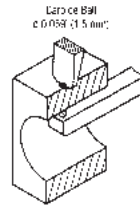
## "C" Contacts



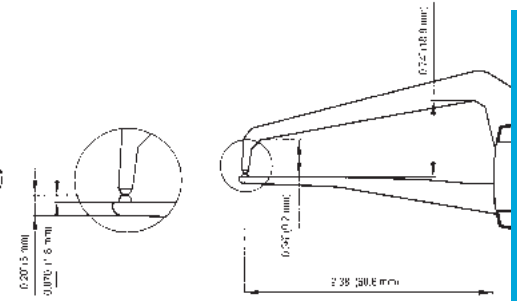
313-302



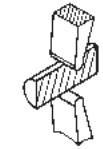
## "E" Contacts



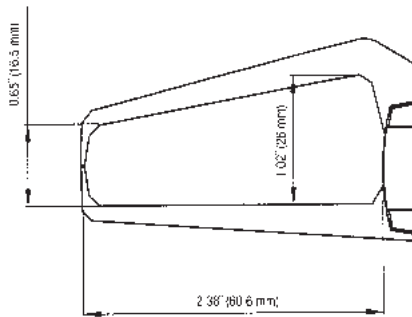
313-304



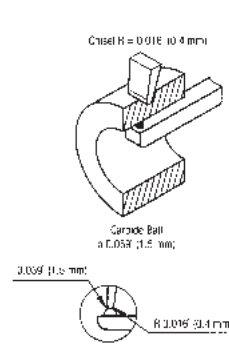
## "B" Contacts



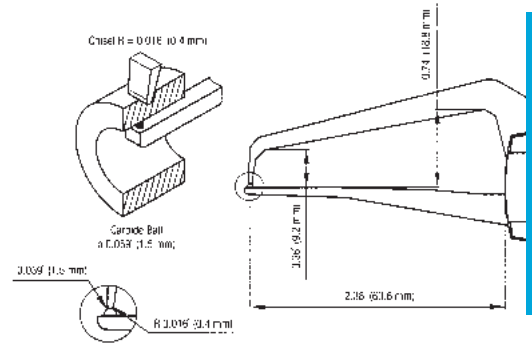
313-303



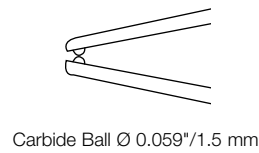
## "D" Contacts



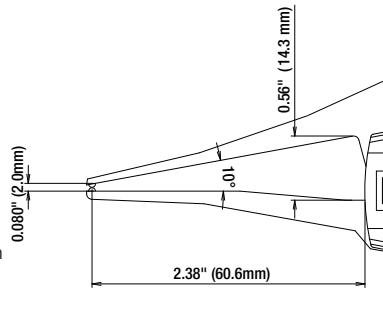
313-305



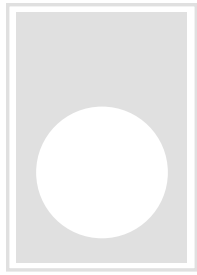
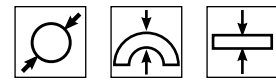
## "F" Contacts



313-306



# 313 SERIES 2.4" (61mm) REACH, DIRECT READING, MIN-WALL THICKNESS GAGES



## Maximum Measuring Accuracy

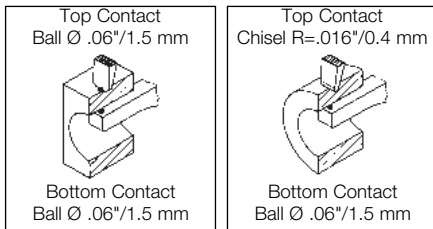
Linear Accuracy at 0.100" Travel  
 $\pm 0.0005"$  ( $\pm 0.010$  mm)  
 Full Range  $\pm 0.001"$  ( $\pm 0.020$  mm)  
 Repeatability  $\leq 0.0005"/0.010$  mm

## Notable Features

Fast, accurate, repeatable measurements.

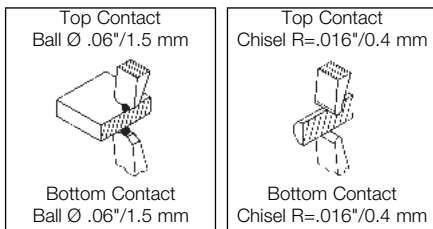
- Large easy to read graduations in 0.0005"/0.01 mm.
- Rack gear movement increases accuracy and repeatability. Oil and corrosion resistant.
- Fine steel alloyed arms, special machined case, light-weight, easy-to-use, 24-7 durable, shop-rugged gage.
- Spring-loaded arms, eliminate operator "hand-touch" variances.
- Gages reach over flanges, around curved surfaces, and reach hard to get to measurements. Special arm designs available quickly.

## Standard Contact Types



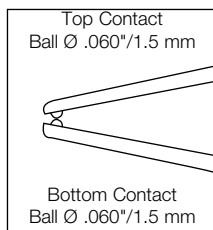
"E" Contacts

"D" Contacts

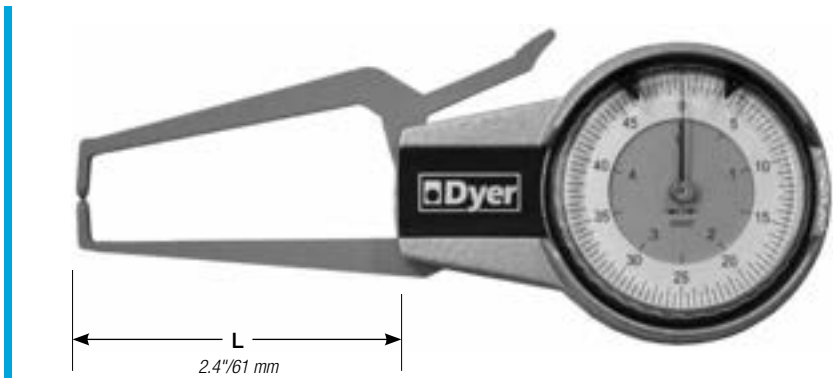


"C" Contacts

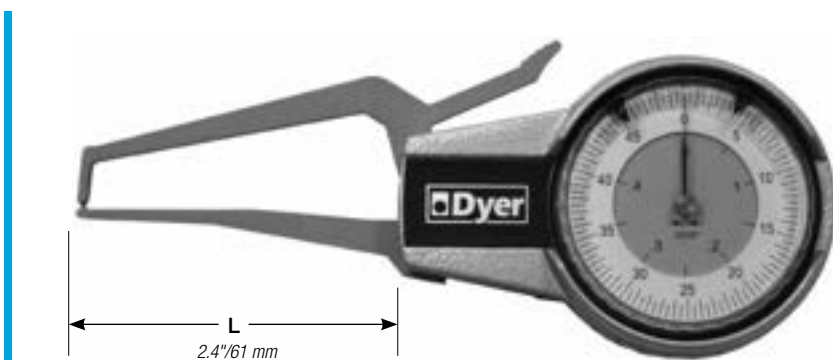
"B" Contacts



"F" Contacts



313-302

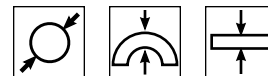


313-304

## Models and Specifications

Range	L Dim Reach of Arms	Contact Type	Graduation	Range Model Number
<b>Inch Specifications</b>				
0-0.4"	2.4"	C	0.0005"	<b>313-302</b>
0-0.4"	2.4"	B	0.0005"	<b>313-303</b>
0-0.4"	2.4"	E	0.0005"	<b>313-304</b>
0-0.4"	2.4"	D	0.0005"	<b>313-305</b>
0-0.4"	2.4"	F	0.0005"	<b>313-306</b>
<b>Metric Specifications</b>				
0-10 mm	61 mm	C	0.010 mm	<b>313-402</b>
0-10 mm	61 mm	B	0.010 mm	<b>313-403</b>
0-10 mm	61 mm	E	0.010 mm	<b>313-404</b>
0-10 mm	61 mm	D	0.010 mm	<b>313-405</b>
0-10 mm	61 mm	F	0.010 mm	<b>313-406</b>

# 313 SERIES DIRECT READING SPECIAL ARM DESIGNS

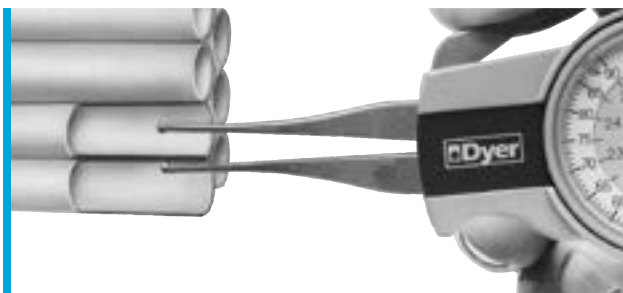


## Maximum Measuring Accuracy

313 Series with 2.4"/61 mm reach  
 Linear  $\leq \pm 0.0005"/0.01$  mm  
 Repeatability  $\leq 0.0005"/0.01$  mm

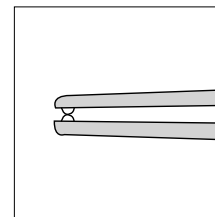
## Notable Features

- Fast, accurate, repeatable.
- Direct reading.
- Spring-loaded contact arms.
- Needle and ball contacts also available.
- Soft materials, medical field, many applications.



Model 313-360 Special

The 313-360 has special straight arms that measures thickness of parallel surfaces or web designs. Arms are set parallel to your part application specifications. Contact Dyer with your requirements.



C Ball contact  
upper and lower

## Customized Gages from Standard Gage Models

Dyer will customize a standard "in-stock gage" to meet your part measuring needs. We can change ranges, arm sizes and lengths, add depth stops and modify contact point tips, ball sizes and types.

## Special Gage Designs (No Minimum Quantities)

Dyer will make a single gage to meet your requirements. We have a large number of special designs/gage solutions in our files. Contact our applications engineers and show us your application requirements. *We can help you!*

## Special Carbide Ball Contacts

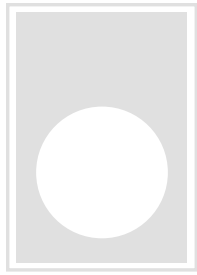
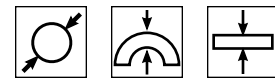
The carbide ball sizes shown at right are in stock for immediate delivery. We also offer different types of material, i.e., chrome, ruby, ceramic, teflon. Additional customized sizes are available. Contact us with your application requirements.

Inch	mm
0.031 = 1/32	0.5
0.063 = 1/16	1.0
0.078 = 5/64	1.5
0.098 = 3/32	2.0
0.125 = 1/8	2.5
0.156 = 5/32	3.0
0.188 = 3/16	3.5
0.250 = 1/4	4.5
0.312 = 5/16	5.0
0.438 = 7/16	5.5
0.500 = 1/2	6.0
0.625 = 5/8	7.0



This special 313 model has thinned arms that can fit into hard-to-reach areas on a part.

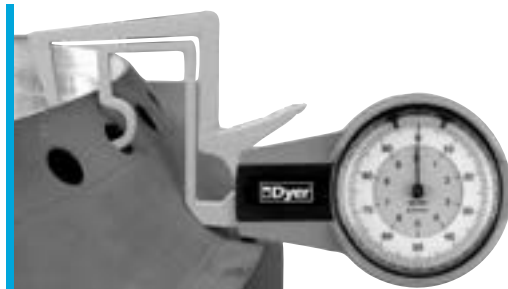
# APPLICATION IDEAS CUSTOM HAND GAGES FAST SERVICE ON SPECIAL DESIGNS



SHOW DYER YOUR APPLICATION. WE WILL HELP YOU SELECT THE RIGHT GAGE.



*313 Series Special  
Gage in position to measure 2 offset locations within a part.  
One gage saves cost and time.*



*313 Series Special with modified arms and contacts measure  
(2) two-step thickness that are offset at hard to reach locations  
on an aerospace part.*



*Special lower arm can be modified to enter holes  
as small as 0.040".*



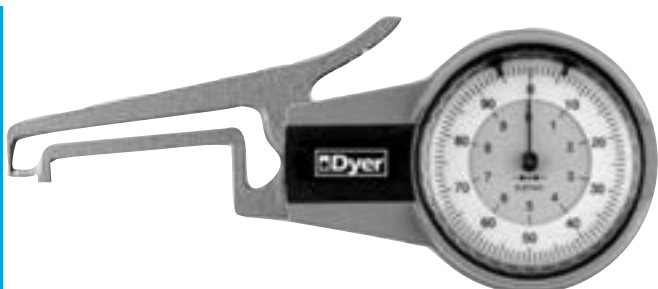
*313 Series Special  
Model 313-405 modified to measure wall thickness of nozzle  
partition for turbine engines.*



*313 Series  
Special lower arm.*



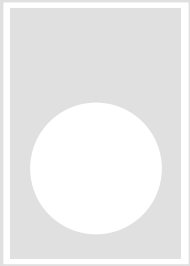
*313 Series Special  
Arm design to customer's drawing.*



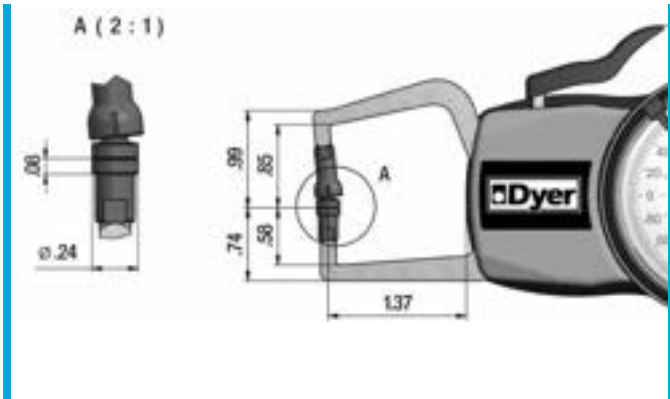
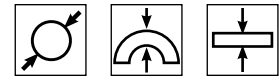
*313 Series Special  
Modified lower arm that will clear an obstruction on the part.*



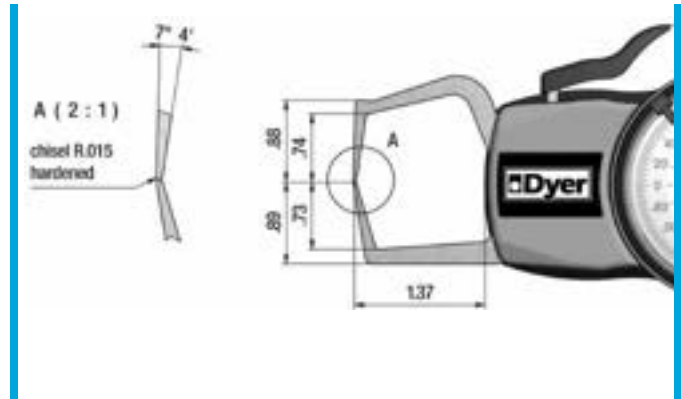
*313 Series Special  
Special lower arms with adjustable depth stop.*



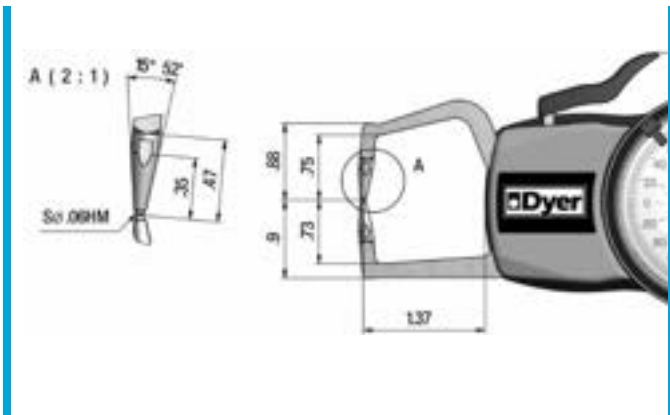
# 301 SERIES SHORT REACH DIRECT READING MIN-WALL/THICKNESS GAGES



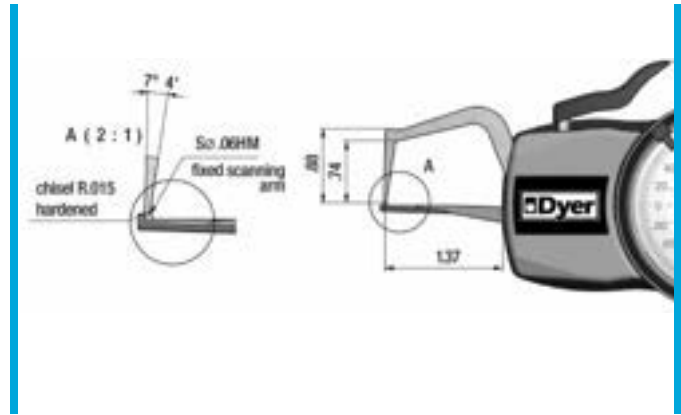
301-502



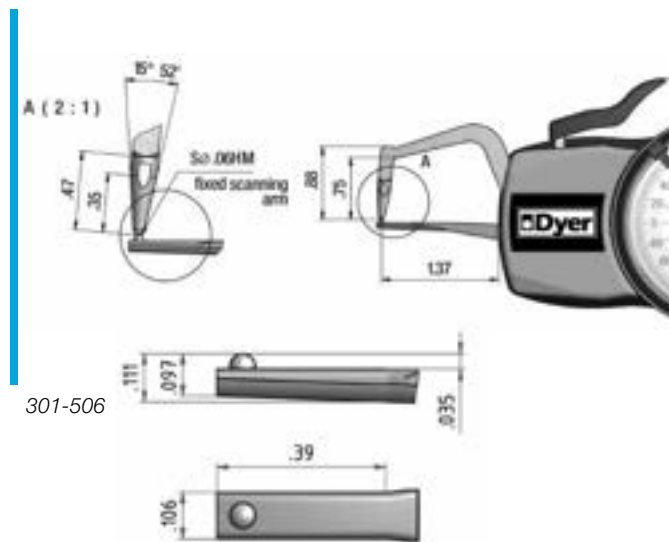
301-503



301-504



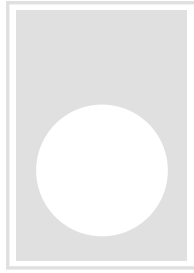
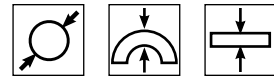
301-505



301-506



# 301 SERIES SHORT REACH DIRECT READING MIN-WALL/THICKNESS GAGES



## Maximum Measuring Accuracy

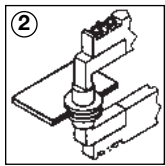
301 Series with 1.37" reach  
Linear Accuracy at 0.0004"  
Repeatability  $\pm 0.0002$ "

Five different contact tip sets available as standard. Fast service on custom arms and contact tips. Contact Dyer office.

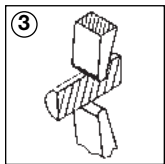
## Notable Features

- Operator friendly, no operator error.
- Fast, accurate, repeatable and shop-rugged.
- Gage will reach over flanges and measure hard-to-reach thicknesses on castings and aircraft parts.
- 1-5 day service on custom arms and contacts.
- Easy to read dial.

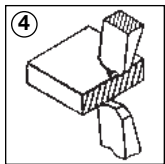
*We will customize special arms, contact and carbide ball sizes to meet your applications needs.*



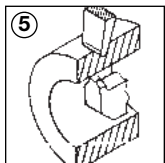
②  $\varnothing 6.0$  mm (0.24") dia.  
flat upper and lower  
upper contact swivels  
lower contact fixed



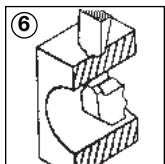
③ R 0.4 mm (0.015")  
chisel upper and lower



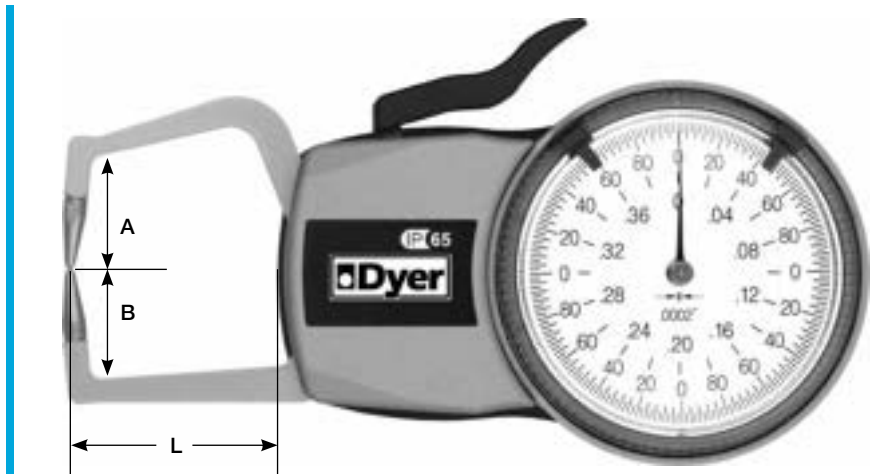
④  $\varnothing 1.5$  mm (0.06")  
ball upper and lower



⑤ R 0.4 mm (0.015")  
chisel upper arm  
 $\varnothing 1.5$  (0.06") dia.  
ball lower arm  
straight lower arm



⑥  $\varnothing 1.5$  mm (0.060")  
C. ball upper and lower  
straight lower arm

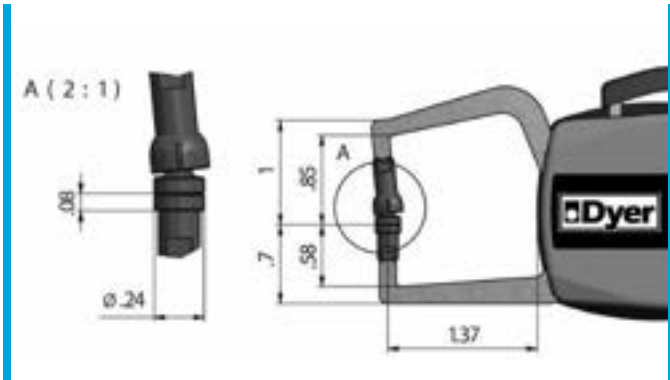
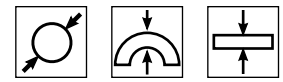


Model 301-504

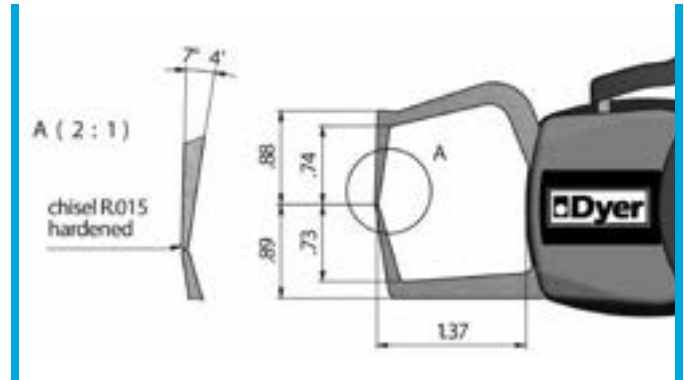
## Models and Specifications

Application Range	Length L	Dim A	Dim B	Contact Point Type	Graduation	Order Number
<b>Inch Specifications</b>						
0-0.4"	1.37"	0.85"	0.58"	2	0.0002"	<b>301-502</b>
0-0.4"	1.37"	0.74"	0.73"	3	0.0002"	<b>301-503</b>
0-0.4"	1.37"	0.75"	0.73"	4	0.0002"	<b>301-504</b>
0-0.4"	1.37"	0.74"	0.035"	5	0.0002"	<b>301-505</b>
0-0.4"	1.37"	0.75"	0.035"	6	0.0002"	<b>301-506</b>
<b>Metric Specifications (mm)</b>						
0-10 mm	35 mm	28.2 mm	20.7 mm	2	0.005 mm	<b>301-502</b>
0-10 mm	35 mm	19 mm	19 mm	3	0.005 mm	<b>301-503</b>
0-10 mm	35 mm	19 mm	19 mm	4	0.005 mm	<b>301-504</b>
0-10 mm	35 mm	19 mm	0.9 mm	5	0.005 mm	<b>301-505</b>
0-10 mm	35 mm	19 mm	0.9 mm	6	0.005 mm	<b>301-506</b>

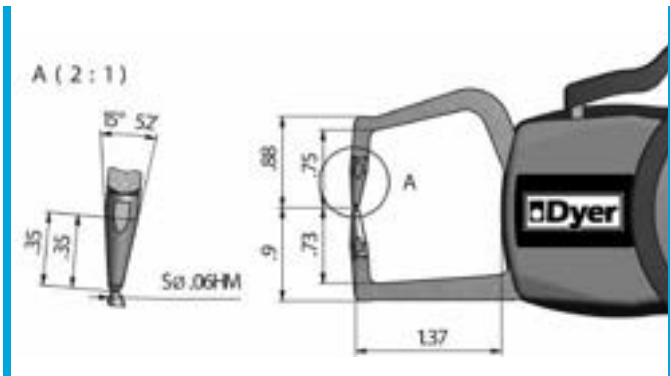
# 653 SERIES SHORT REACH ELECTRONIC THICKNESS GAGES



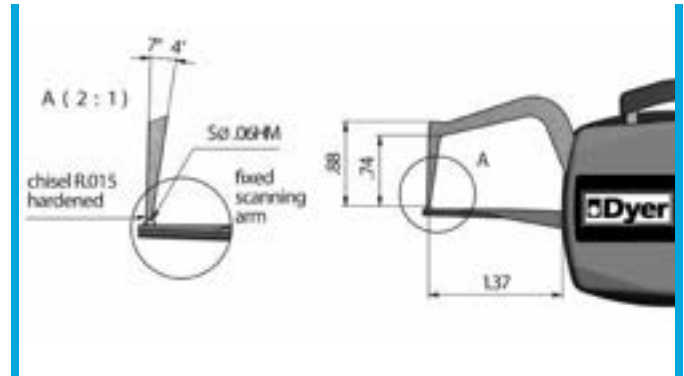
653-502



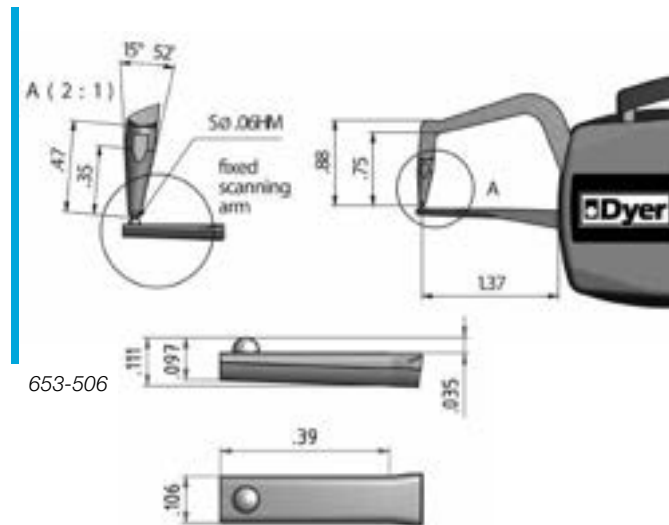
653-503



653-504

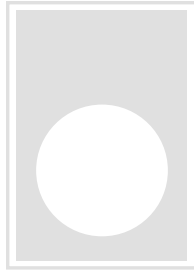
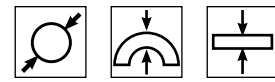


653-505



653-506

# 653 SERIES SHORT REACH ELECTRONIC THICKNESS GAGES



## Maximum Measuring Accuracy

Linear Accuracy at  $\pm 0.0004"$   
Repeatability  $\pm 0.0002"$

## Notable Features

- Fast, accurate, repeatable.
- Light weight.
- SPC output for USB or Mitutoyo devices. Cables offered separately.
- Absolute and Relative modes with Min, Max and Hold programs.
- Tolerance limit markers with Green/Red LED for visual operator judgement.
- Internal memory that holds a maximum of 80 measured values.
- Programmable auto shut off for battery savings.
- IP 67. Gages are shop rugged.
- Analog segment (fan) display.
- Keypad lock.
- Wireless data option. Contact us with your requirement.

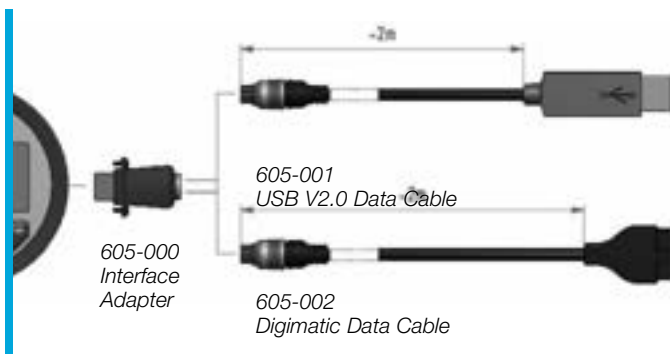
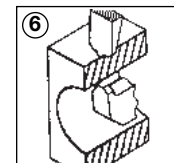
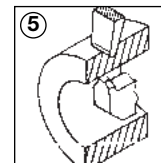
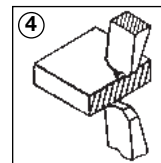
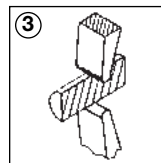
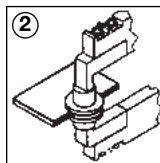
Special customized arms, ball sizes and/or ball material are also available. Dyer is dedicated to solving your special measuring applications. Contact Dyer Applications Engineering with your specific gage requirement.



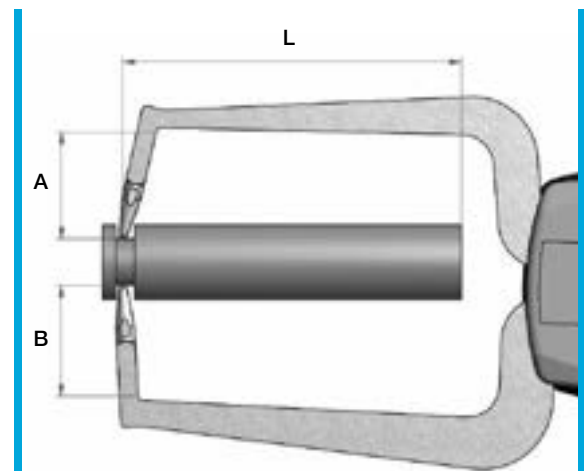
653-504

## 653 Series Models and Specifications

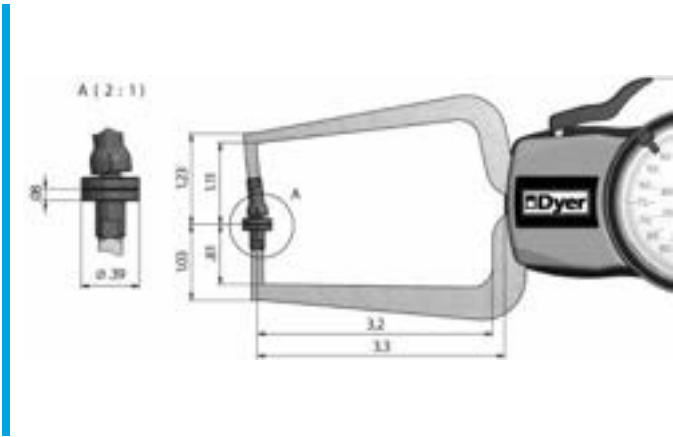
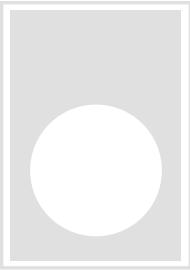
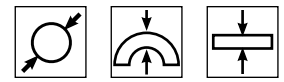
Application Range	Length L	Dim A*	Dim B*	Contact Point Type <sup>1</sup>	Graduation	Order Number
0-0.39" 0-10 mm	1.37" 35 mm	0.85" 28.2 mm	0.58" 20.7 mm	2	0.0002" 0.005 mm	<b>653-502</b>
0-0.39" 0-10 mm	1.37" 35 mm	0.74" 19 mm	0.73" 19 mm	3	0.0002" 0.005 mm	<b>653-503</b>
0-0.39" 0-10 mm	1.37" 35 mm	0.75" 19 mm	0.73" 19 mm	4	0.0002" 0.005 mm	<b>653-504</b>
0-0.39" 0-10 mm	1.37" 35 mm	0.74" 19 mm	0.035" 0.9 mm	5	0.0002" 0.005 mm	<b>653-505</b>
0-0.39" 0-10 mm	1.37" 35 mm	0.75" 19 mm	0.035" 0.9 mm	6	0.0002" 0.005 mm	<b>653-506</b>



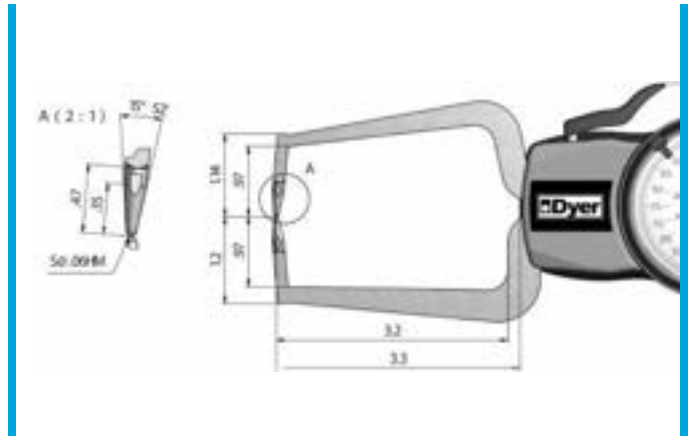
SPC Cables



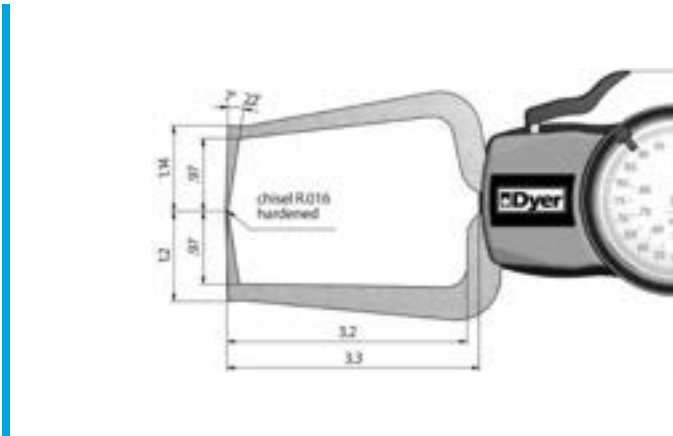
# 301 SERIES DIRECT READING MIN-WALL/THICKNESS GAGES



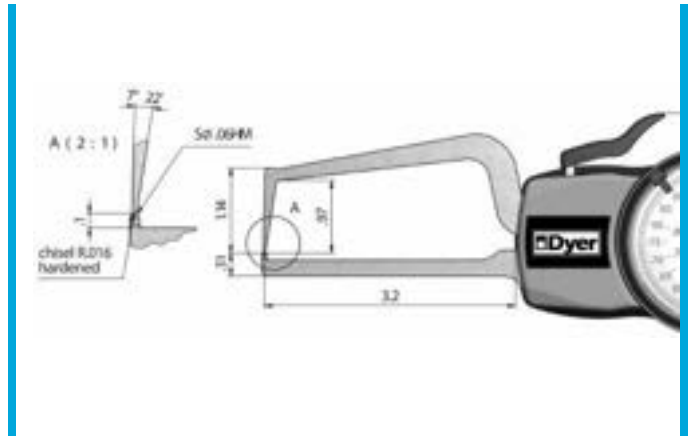
301-302



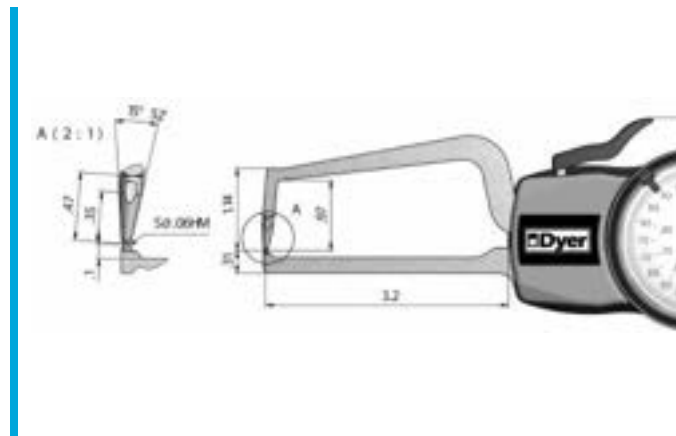
301-304



301-303

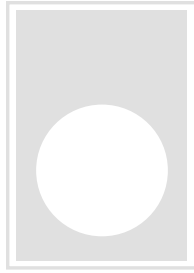
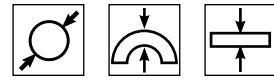


301-305



301-306

# 301 SERIES DIRECT READING MIN-WALL/THICKNESS GAGES



## Maximum Measuring Accuracy

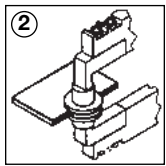
301 Series with 3.15" reach  
Linear Accuracy at 0.040" Travel  
 $\leq 0.0005"/0.010$  mm  
Repeatability  $\leq 0.0004"$  (0.010 mm)

Five different contact tip sets available as standard. Fast service on custom arms and contact tips. Contact Dyer office.

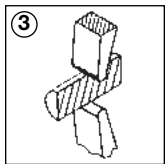
## Notable Features

- Operator friendly, no operator error.
- Fast, accurate, repeatable and shop-rugged.
- Gage will reach over flanges and measure hard-to-reach thicknesses on castings and aircraft parts.
- 1-5 day service on custom arms and contacts.
- Easy to read dial.

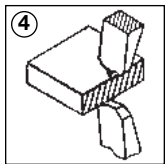
*We will customize special arms, contact and carbide ball sizes to meet your applications needs.*



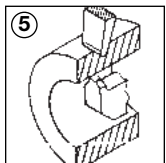
②  $\varnothing 10.0$  mm (0.394") dia.  
flat upper and lower  
upper contact swivels  
lower contact fixed



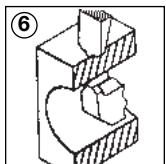
③ R 0.4 mm (0.016")  
chisel upper and lower



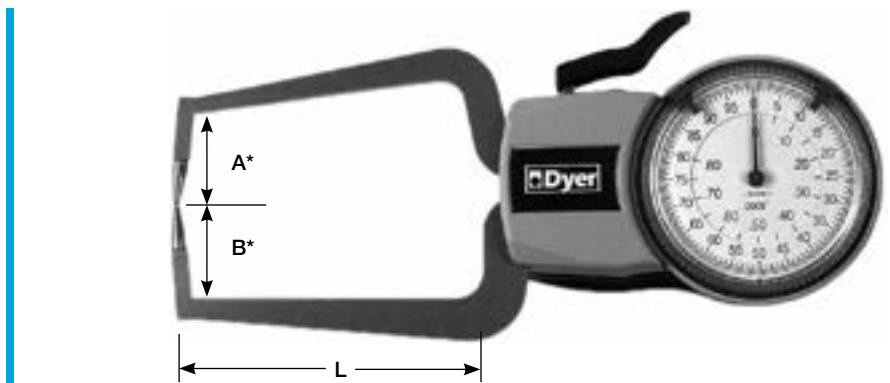
④  $\varnothing 1.5$  mm (0.06")  
ball upper and lower



⑤ R 0.4 mm (0.016")  
chisel upper arm  
 $\varnothing 1.5$  (0.059") dia.  
ball lower arm  
straight lower arm



⑥  $\varnothing 1.5$  mm (0.06")  
C. ball upper and lower  
straight lower arm



Model 301-304

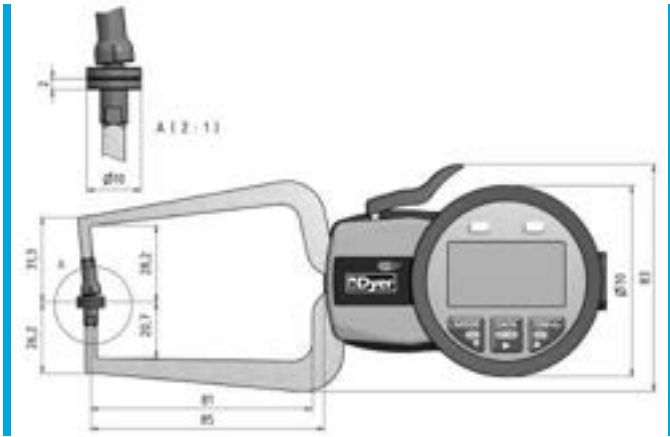
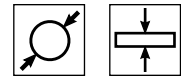


Model 301-306

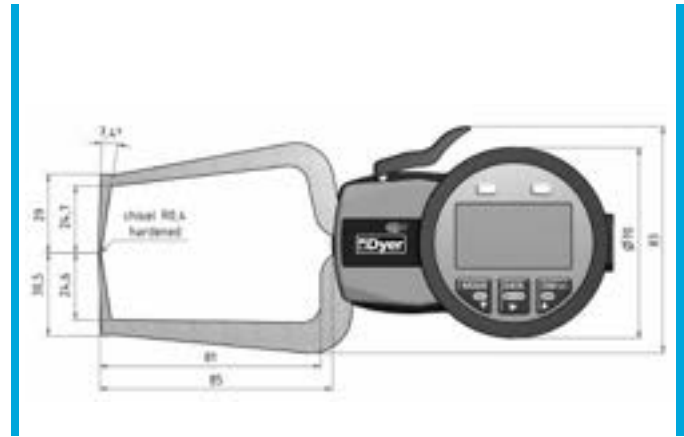
## Models and Specifications

Application Range	Length L	Dim A	Dim B	Contact Point Type	Graduation	Order Number
<b>Inch Specifications</b>						
0-0.8"	3.15"	1.11"	0.81"	2	0.0005"	<b>301-302</b>
0-0.8"	3.15"	0.97"	0.97"	3	0.0005"	<b>301-303</b>
0-0.8"	3.15"	0.97"	0.97"	4	0.0005"	<b>301-304</b>
0-0.8"	3.15"	0.97"	0.1"	5	0.0005"	<b>301-305</b>
0-0.8"	3.15"	0.97"	0.1"	6	0.0005"	<b>301-306</b>
<b>Metric Specifications (mm)</b>						
0-20 mm	80 mm	28.2 mm	20.7 mm	2	0.010	<b>301-402</b>
0-20 mm	80 mm	24.6 mm	24.6 mm	3	0.010	<b>301-403</b>
0-20 mm	80 mm	24.6 mm	24.6 mm	4	0.010	<b>301-404</b>
0-20 mm	80 mm	24.6 mm	2.5 mm	5	0.010	<b>301-405</b>
0-20 mm	80 mm	24.6 mm	2.5 mm	6	0.010	<b>301-406</b>

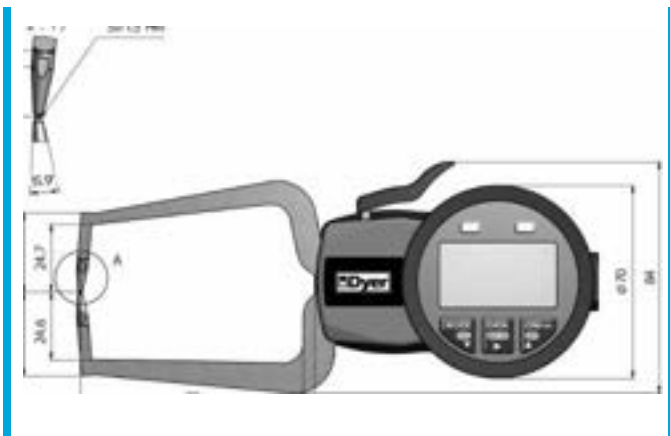
# 653 SERIES ELECTRONIC THICKNESS GAGES



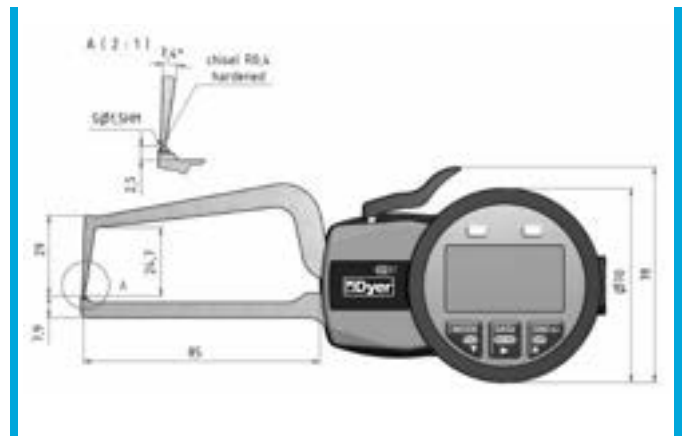
653-002



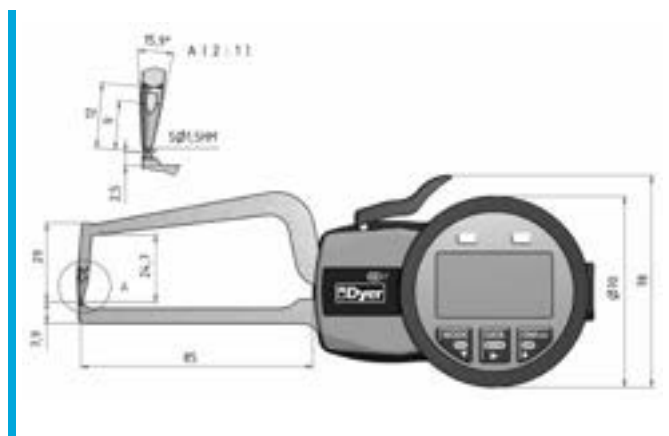
653-003



653-004



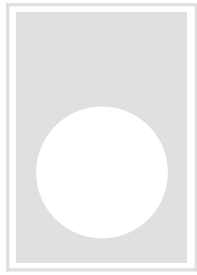
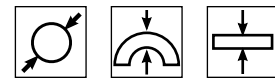
653-005



653-006



# 653 SERIES ELECTRONIC THICKNESS GAGES



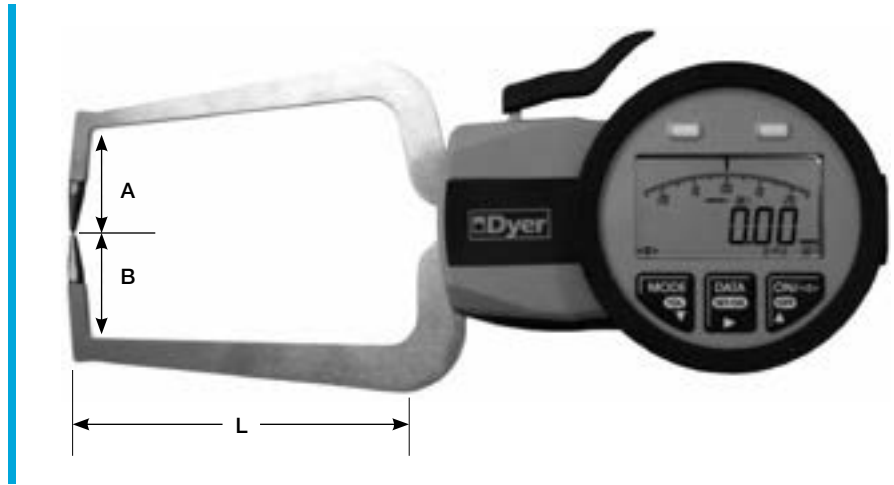
## Maximum Measuring Accuracy

Linear Accuracy at  $\pm 0.001"$   
Repeatability  $\pm 0.0005"/0.010$  mm

## Notable Features

- Fast, accurate, repeatable.
- Light weight.
- SPC output for USB or Mitutoyo devices. Cables offered separately.
- Absolute and Relative modes with Min, Max and Hold programs.
- Tolerance limit markers with Green/Red LED for visual operator judgement.
- Internal memory that holds a maximum of 80 measured values.
- Programmable auto shut off for battery savings.
- IP 67. Gages are shop rugged.
- Analog segment (fan) display.
- Keypad lock.
- Wireless data option. Contact us with your requirement.

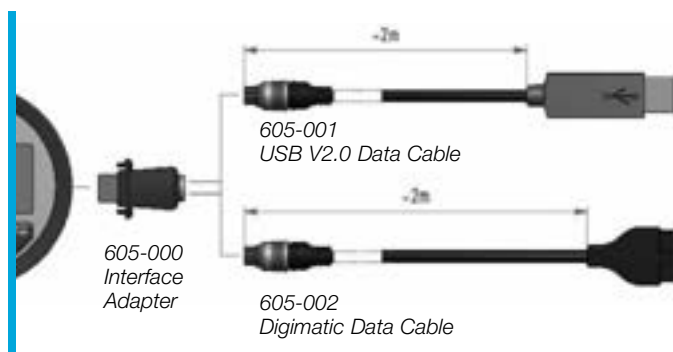
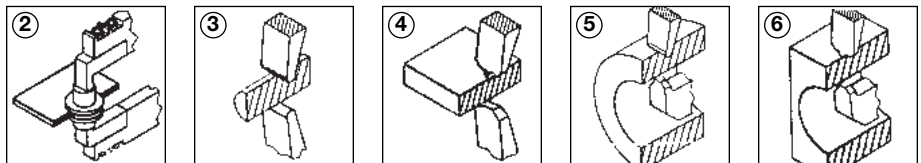
Special customized arms, ball sizes and/or ball material are also available. Dyer is dedicated to solving your special measuring applications. Contact Dyer Applications Engineering with your specific gage requirement.



653-004

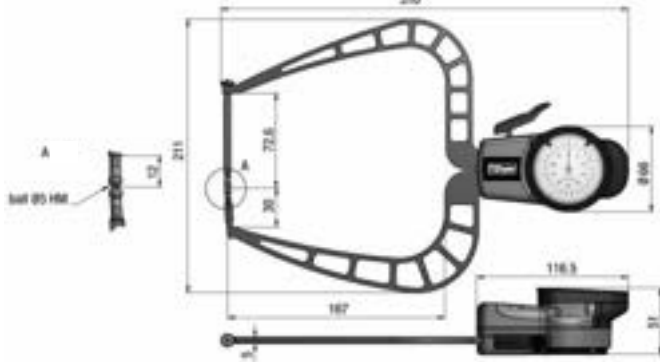
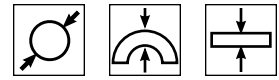
## 653 Series Models and Specifications

Application Range	Length L	Dim A	Dim B	Contact Point Type	Graduation	Order Number
0-0.8" 0-20 mm	3.15" 80 mm	1.11" 28.2 mm	0.81" 20.7 mm	2	0.0005" 0.010 mm	<b>653-002</b>
0-0.8" 0-20 mm	3.15" 80 mm	0.97" 24.6 mm	0.97" 24.6 mm	3	0.0005" 0.010 mm	<b>653-003</b>
0-0.8" 0-20 mm	3.15" 80 mm	0.97" 24.6 mm	0.97" 24.6 mm	4	0.0005" 0.010 mm	<b>653-004</b>
0-0.8" 0-20 mm	3.15" 80 mm	0.97" 24.6 mm	0.1" 2.5 mm	5	0.0005" 0.010 mm	<b>653-005</b>
0-0.8" 0-20 mm	3.15" 80 mm	0.97" 24.6 mm	0.1" 2.5 mm	6	0.0005" 0.010 mm	<b>653-006</b>



SPC Cables

# 304 SERIES GAGES FOR LONGER REACH OVER OBSTRUCTIONS



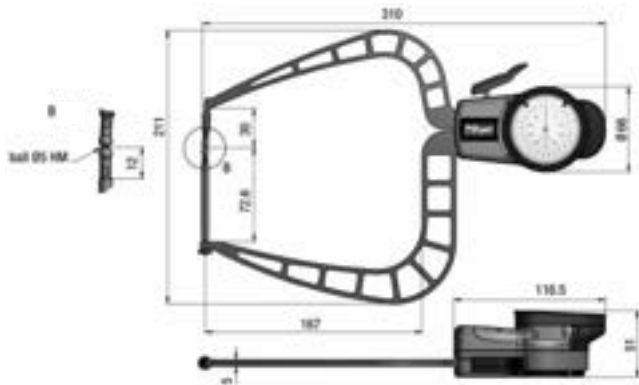
Model 304-234

## 304 Series Tall Top Contact Inch Models and Specifications

Range	Length L	Dim A	Dim B	Contact Point Type	Graduation Resolution	Order Number
0-2.0"	6.5"	2.83"	1.18"	4	0.001"	<b>304-134</b>
0-2.0"	6.5"	2.83"	0.18"	7	0.001"	<b>304-137</b>
0-2.0"	6.5"	2.83"	0.18"	8	0.001"	<b>304-138</b>

## 304 Series Tall Top Contact Metric Models and Specifications

Range	Length L	Dim A	Dim B	Contact Point Type	Graduation Resolution	Order Number
0-50 mm	167 mm	72 mm	30 mm	4	0.050 mm	<b>304-234</b>
0-50 mm	167 mm	72 mm	4.6 mm	7	0.050 mm	<b>304-237</b>
0-50 mm	167 mm	72 mm	4.6 mm	8	0.050 mm	<b>304-238</b>



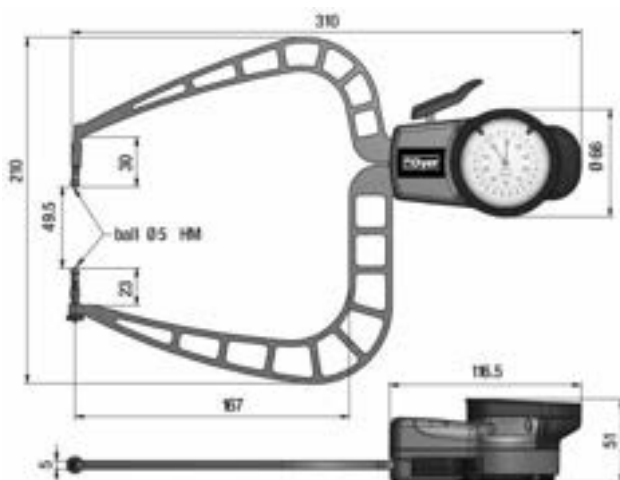
Model 304-804

## 304 Series Tall Bottom Contact Inch Models and Specifications

Range	Length L	Dim A	Dim B	Contact Point Type	Graduation Resolution	Order Number
0-2.0"	6.5"	1.18"	2.83"	4	0.001"	<b>304-704</b>

## 304 Series Tall Bottom Contact Metric Models and Specifications

Range	Length L	Dim A	Dim B	Contact Point Type	Graduation Resolution	Order Number
0-50 mm	167 mm	30 mm	72 mm	4	0.050 mm	<b>304-804</b>



Model 304-924

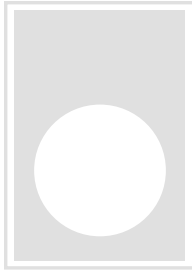
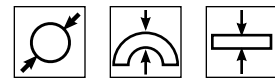
## 304 Series Large Diameter Inch Models and Specifications

Range	Length L	Dim A	Dim B	Contact Point Type	Graduation Resolution	Order Number
2.0-4.0"	6.5"	1.18"	0.90"	4	0.001"	<b>304-904</b>
4.0-6.0"	6.5"	1.18"	0.90"	4	0.001"	<b>304-914</b>

## 304 Series Large Diameter Metric Models and Specifications

Range	Length L	Dim A	Dim B	Contact Point Type	Graduation Resolution	Order Number
50-100 mm	167 mm	30 mm	23 mm	4	0.050 mm	<b>304-924</b>
100-150 mm	167 mm	30 mm	23 mm	4	0.050 mm	<b>304-934</b>

# 302 SERIES LONGER REACH OVER FLANGES



## Maximum Measuring Accuracy

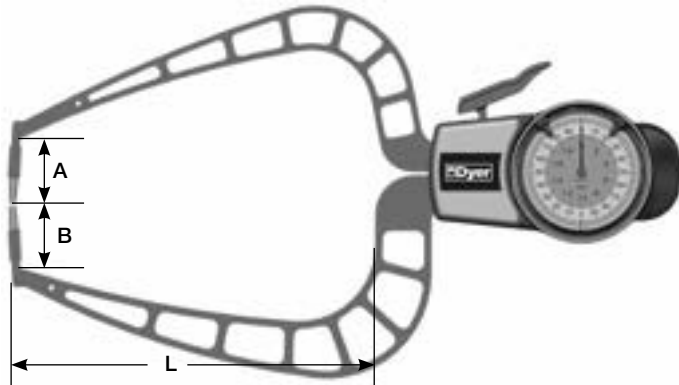
Linear  $\pm 0.002'' / \pm 0.1 \text{ mm}$   
 Repeatability  $\pm 0.001'' / \pm 0.050 \text{ mm}$

## Notable Features

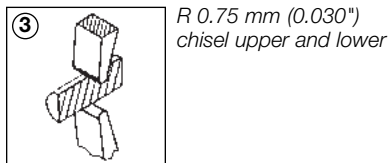
- Ease of use, operator-friendly.
- Direct reading.
- Fast, accurate, 24-7 shop-rugged.
- Gage reaches over flanges for hard-to-reach measurements.



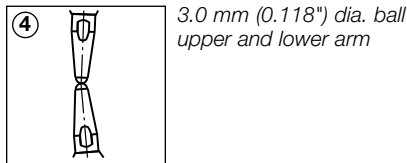
Model 302-108



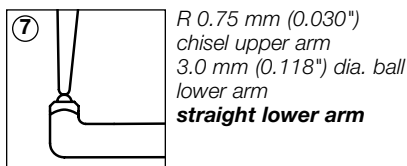
Model 302-104 with ball contact tips



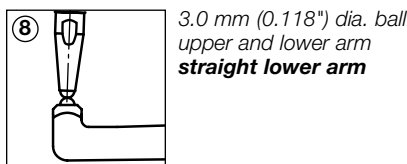
*R 0.75 mm (0.030")  
chisel upper and lower*



*3.0 mm (0.118") dia. ball  
upper and lower arm*



*R 0.75 mm (0.030")  
chisel upper arm  
3.0 mm (0.118") dia. ball  
lower arm  
**straight lower arm***



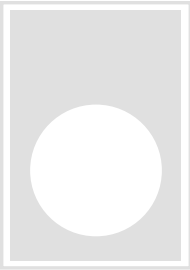
*3.0 mm (0.118") dia. ball  
upper and lower arm  
**straight lower arm***

## 302 Series Inch Models and Specifications

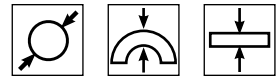
Range	Max Contact Travel	L Dim Reach of Arms	Dim A	Dim B	Contact Point Type	Graduation	Order Number
0-2.0"	2.0"	6.5"	1.18"	1.18"	3	0.001"	<b>302-103</b>
0-2.0"	2.0"	6.5"	1.18"	1.18"	4	0.001"	<b>302-104</b>
0-2.0"	2.0"	6.5"	1.18"	0.18"	7	0.001"	<b>302-107</b>
0-2.0"	2.0"	6.5"	1.18"	0.18"	8	0.001"	<b>302-108</b>

## 302 Series Metric Models and Specifications

Range	Max Contact Travel	L Dim Reach of Arms	Dim A	Dim B	Contact Point Type	Graduation	Order Number
0-50 mm	50.0 mm	167.0 mm	30.0 mm	30.0 mm	3	0.050 mm	<b>302-203</b>
0-50 mm	50.0 mm	167.0 mm	30.0 mm	30.0 mm	4	0.050 mm	<b>302-204</b>
0-50 mm	50.0 mm	167.0 mm	30.0 mm	4.6 mm	7	0.050 mm	<b>302-207</b>
0-50 mm	50.0 mm	167.0 mm	30.0 mm	4.6 mm	8	0.050 mm	<b>302-208</b>



# SPECIAL APPLICATIONS CUSTOM DESIGNS



**SHOW DYER YOUR APPLICATION. WE WILL HELP YOU SELECT THE RIGHT GAGE.**

### Customized Gages from Standard Gage Models

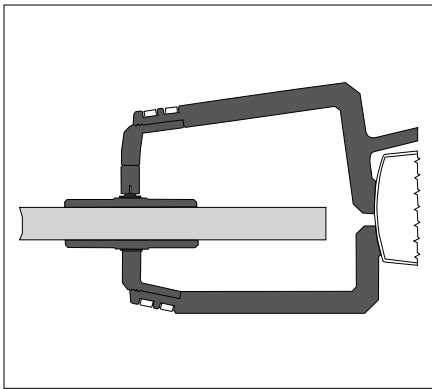
Dyer will customize a standard “in-stock gage” to meet your part measuring needs. We can change ranges, arm sizes and lengths, add depth stops and modify contact point tips, ball sizes and types.

### Standard “Off-The-Shelf” Gages

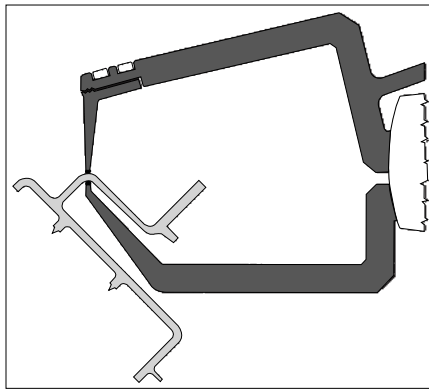
Many Dyer standard models will work in your measuring applications. Contact our gage application engineers and we’ll help you choose the right gage.

### Special Gage Designs (No Minimum Quantities)

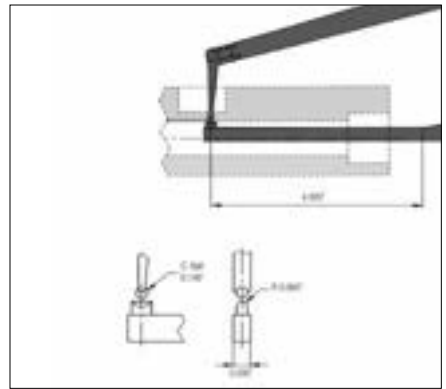
Dyer will make a single gage to meet your requirements. We have a large number of special designs/gage solutions in our files. Contact our application engineers and show us your application requirements. *We can help you!*



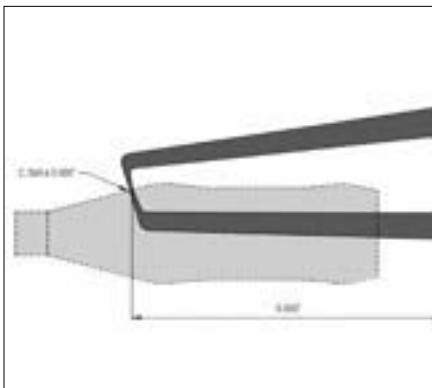
Repeatable foam thickness measurements



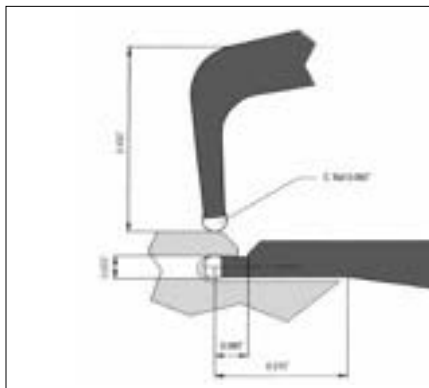
Hard-to-reach wall thickness



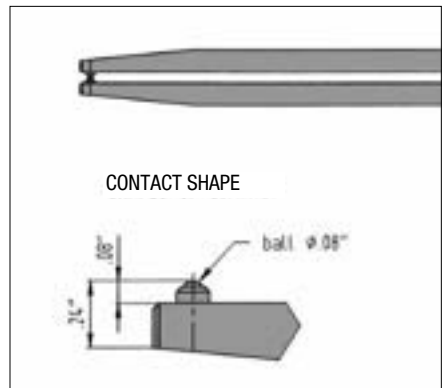
Measure Min-Wall over flange in recess



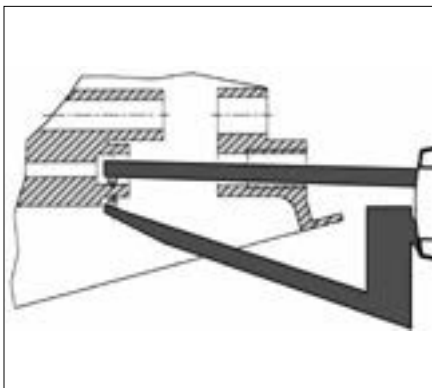
Awkwardly positioned Min-Wall is measured with angled contacts



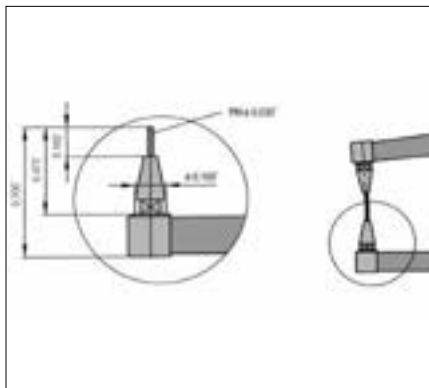
Modified contact points to measure hard-to-reach wall thickness



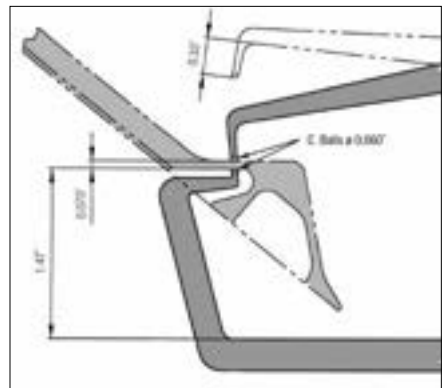
Measure thickness between ribbed material



Special arms

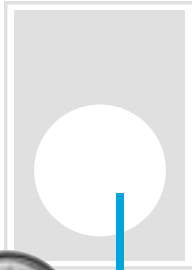
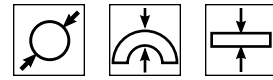


Special needle contacts



Hard-to-reach Min-Wall

# SPECIAL APPLICATIONS CUSTOM DESIGNS



Measure bottom wall thickness of container.



302 Modified  
Arms notched to clear part obstruction.



302 Special  
Measure bottom wall thickness of flower vase.



302 Special  
Parallel arms to measure thickness of walls in a web part 7" deep.



302 Special  
Long reach thin arms to reach deep into part.



302 Special  
Custom arms to reach over fixture and measure leading edge thickness of a turbine blade.



302 Special  
Gage with radius arms.



301 Special  
Modified lower arm to reach into small diameter recess.

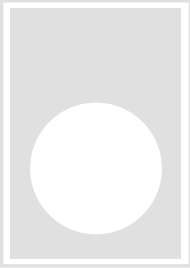


302 Special  
Extra long lower contact to clear part range.

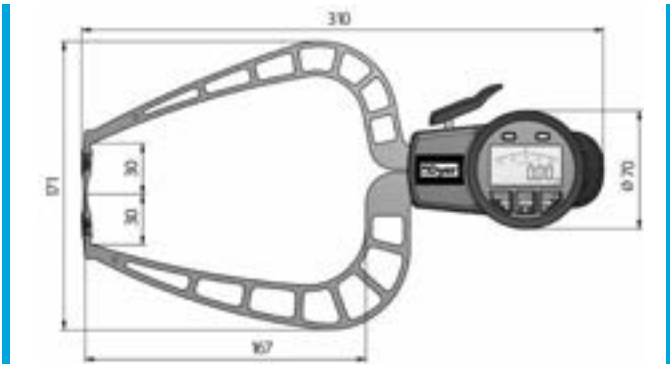
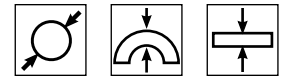


302 Special  
Modified upper arm to reach deep into part.

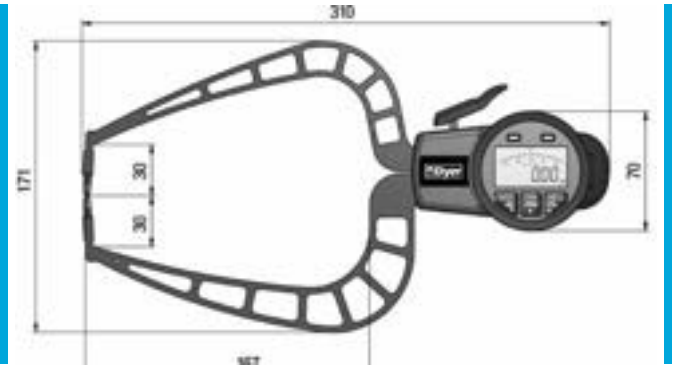




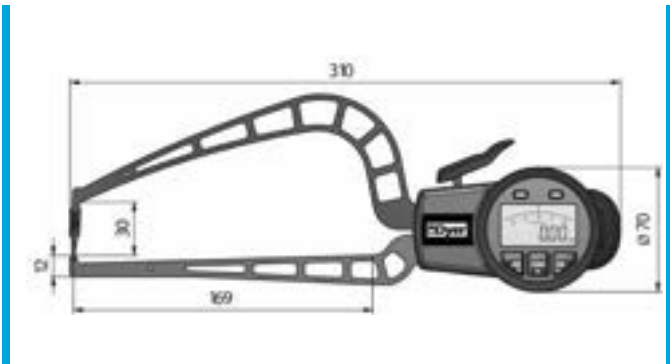
# 656 SERIES



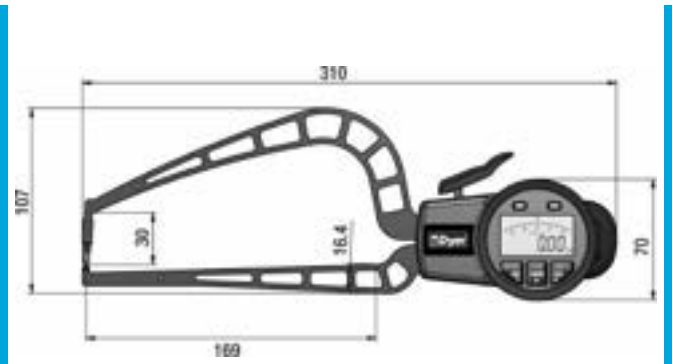
656-103



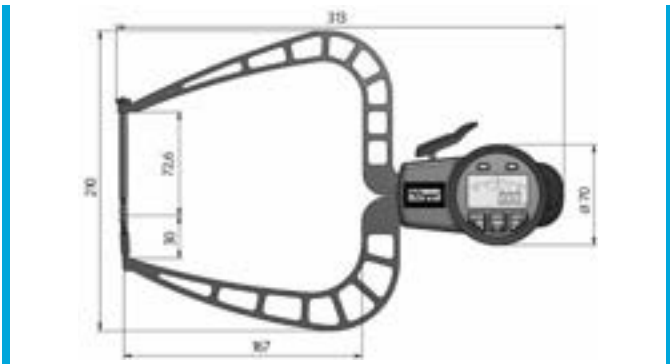
656-104



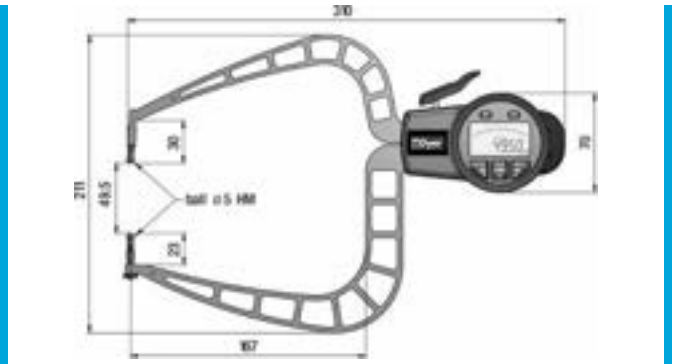
656-107



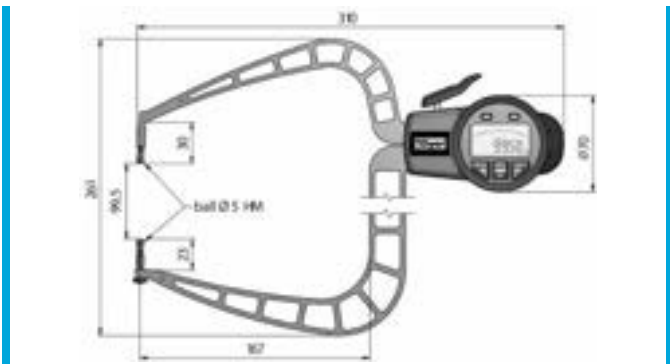
656-108



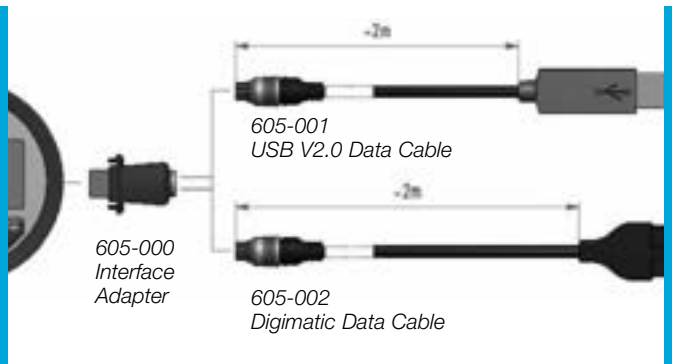
656-134



656-204



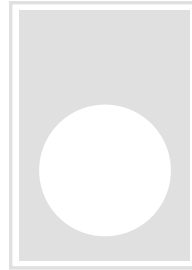
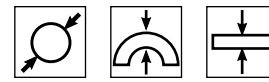
656-304



SPC Cables



# 656 SERIES ELECTRONIC "LONGER REACH" DIRECT READING THICKNESS GAGES



## Maximum Measuring Accuracy

656 Series with 6.5" reach  
Linear Accuracy  $\pm 0.002"$  (0.050 mm)  
Repeatability  $\pm 0.001"$  (0.025 mm)  
Gage R & R capable

## Notable Features

- Fast, accurate, repeatable.
- Light weight.
- SPC output for USB or Mitutoyo devices. Cables offered separately.
- Absolute and Relative modes with Min, Max and Hold programs.
- Tolerance limit markers with Green/Red LED for visual operator judgement.
- Internal memory that holds a maximum of 80 measured values.
- Programmable auto shut off for battery savings.
- IP 67. Gages are shop rugged.
- Analog segment (fan) display.
- Keypad lock.
- Wireless data option. Contact us with your requirement.

## Special Carbide Ball Contacts

The carbide ball sizes shown below are in stock for immediate delivery. We also offer different types of material, i.e., chrome, ruby, ceramic, teflon. Additional customized sizes are available. Contact us with your application requirements.



656-108

## 656 Series Digital Models and Specifications

Application Range	Length L	Dim A	Dim B	Contact Point Type	Graduation Resolution	Order Number
0.0–2.0" 0.0–50 mm	6.5" 167 mm	1.18" 30 mm	1.18" 30 mm	R0.030" Chisel R0.75 Chisel	0.001" 0.020 mm	<b>656-103</b>
0.0–2.0" 0.0–50 mm	6.5" 167 mm	1.18" 30 mm	1.18" 30 mm	0.118" Ball 3 mm Ball	0.001" 0.020 mm	<b>656-104</b>
0.0–2.0" 0.0–50 mm	6.5" 167 mm	1.18" 30 mm	0.18" 4.6 mm	Top Chisel Bottom Ball	0.001" 0.020 mm	<b>656-107</b>
0.0–2.0" 0.0–50 mm	6.5" 167 mm	1.18" 30 mm	0.18" 4.6 mm	Top Chisel Bottom Ball	0.001" 0.020 mm	<b>656-108</b>
0.0–2.0" 0.0–50 mm	6.5" 167 mm	2.83" 72 mm	1.18" 30 mm	0.196" Ball 5 mm Ball	0.001" 0.020 mm	<b>656-134</b>
2.0–4.0" 50–100 mm	6.5" 167 mm	1.18" 30 mm	0.90" 23 mm	0.196" Ball 5 mm Ball	0.001" 0.020 mm	<b>656-204</b>
4.0–6.0" 100–150 mm	6.5" 167 mm	1.18" 30 mm	0.90" 23 mm	0.196" Ball 5 mm Ball	0.001" 0.020 mm	<b>656-304</b>

## Carbide Ball Contacts

Inch	mm
0.031 = 1/32	0.5
0.063 = 1/16	1.0
0.078 = 5/64	1.5
0.098 = 3/32	2.0
0.125 = 1/8	2.5
0.156 = 5/32	3.0
0.188 = 3/16	3.5
0.250 = 1/4	4.5
0.312 = 5/16	5.0
0.438 = 7/16	5.5
0.500 = 1/2	6.0
0.625 = 5/8	7.0



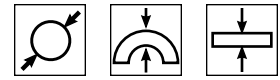
Model 656-104



Model 656-204



# 306 SERIES GAGES FOR THICK MATERIALS, SOFT OR HONEYCOMB MATERIALS



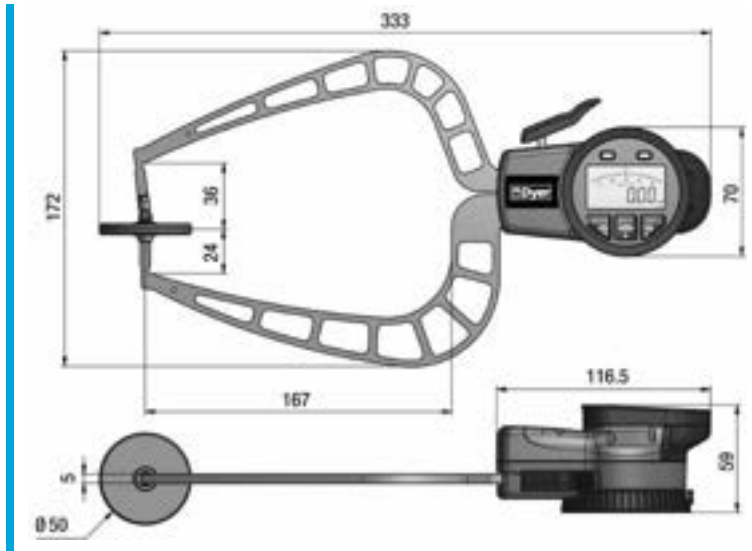
## Maximum Measuring Accuracy

Linear  $\pm 0.002"/\pm 0.1$  mm  
Repeatability  $\pm 0.001"/\pm 0.05$  mm

## Soft Materials Thickness Gages

### Features

- Measure foam, insulation, honey comb, rubber, etc.
- $\varnothing 2.0$ " (50 mm) diameter flat aluminum contacts
- Reduced spring tension no operator "hand touch"
- Special reduced weight measuring arms



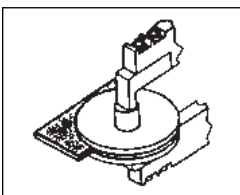
Electronic Model 306-851



Mechanical Model 306-821

## Special Flat Contacts

Dyer offers 0.39"/10 mm and 1.97"/50 mm flat contacts as standard. We will custom make flat contacts to your requirements. Contact Dyer Applications Engineering.



$\varnothing 50.0$  mm (2.0") dia. flat upper and lower top swivels, bottom fixed

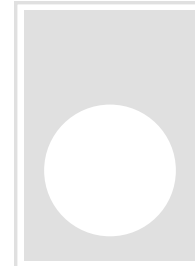
## 306 Series Electronic Models and Specifications

Range	Length "L"	Dim A	Dim B	Contact Point Type	Graduation Resolution	Order Number
0-2.0"	6.5"	1.41"	0.94"	1	0.001"	<b>306-851</b>
0-50.0	167 mm	36 mm	24 mm	1	0.020 mm	
2.0-4.0"	6.5"	1.41"	0.94"	1	0.001"	<b>306-852</b>
50.0-100.0	167 mm	36 mm	24 mm	1	0.020 mm	
4.0-6.0"	6.5"	1.41"	0.94"	1	0.001"	<b>306-853</b>
100.0-150.0	167 mm	36 mm	24 mm	1	0.020 mm	

## 306 Series Mechanical Models and Specifications

Range	Length "L"	Dim A	Dim B	Contact Point Type	Graduation Resolution	Order Number
<b>Inch Specifications</b>						
0-2.0"	6.5"	1.41"	0.94"	1	0.001"	<b>306-801</b>
2.0-4.0"	6.5"	1.41"	0.94"	1	0.001"	<b>306-802</b>
4.0-6.0"	6.5"	1.41"	0.94"	1	0.001"	<b>306-803</b>
<b>Metric Specifications (mm)</b>						
0-50.0	167 mm	36 mm	24 mm	1	0.050 mm	<b>306-821</b>
50.0-100.0	167 mm	36 mm	24 mm	1	0.050 mm	<b>306-822</b>
100.0-150.0	167 mm	36 mm	24 mm	1	0.050 mm	<b>306-823</b>

# 334 SERIES LONG REACH GAGES



## Notable Features

- Dust and splash proof
- Damped movement with steel string transmission for higher precision
- Two tolerance marks easy to adjust
- Scales are well arranged and easy to read
- Gauge for absolute measurement



Model 334-201



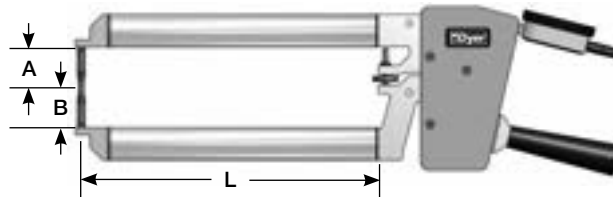
Model 334-202



Model 334-203



Model 334-207



Model 334-200



Model 334-204



Model 334-206

## Models and Specifications

Range	Length L	Dim A	Dim B	Contact Point Type	Graduation Resolution	Order Number
<b>Inch Specifications</b>						
0-2.0"	9.05"	1.26"	1.26"	0.196" Ball	0.004"	<b>334-000</b>
0-4.0"	15"	1.37"	1.37"	0.196" Ball	0.004"	<b>334-001</b>
0-4.0"	15"	1.61"	0.35"	2" Flat	0.004"	<b>334-002</b>
0-4.0"	15"	1.37"	0.59"	0.196" Ball	0.004"	<b>334-003</b>
0-4.0"	21"	1.26"	1.26"	0.196" Ball	0.004"	<b>334-004</b>
0-4.0"	21"	1.81"	1.02"	2" Flat	0.004"	<b>334-005</b>
0-4.0"	21"	5.19"	1.26"	0.196" Ball	0.004"	<b>334-006</b>
0-8.0"	28.5"	3.94"	3.94"	SR 0.79"	0.008"	<b>334-007</b>
<b>Metric Specifications (mm)</b>						
0-50	232	32	32	5 mm Ball	0.100	<b>334-200</b>
0-100	382	35	35	5 mm Ball	0.100	<b>334-201</b>
0-100	382	41	9	50 mm Flat	0.100	<b>334-202</b>
0-100	382	35	15	5 mm Ball	0.100	<b>334-203</b>
0-100	532	32	32	5 mm Ball	0.100	<b>334-204</b>
0-100	532	46	26	50 mm Flat	0.100	<b>334-205</b>
0-100	532	132	32	5 mm Ball	0.100	<b>334-206</b>
0-200	725	100	100	SR 20 mm	0.200	<b>334-207</b>

# 337 SERIES DEDICATED HIGH ACCURACY INDICATING OD RING GAGES



## Maximum Measuring Accuracy

Linear  $\leq \pm 0.000040"/\leq \pm 0.001$  mm  
Repeatability  $< 0.000040"/< 0.001$  mm

## Fast, Accurate and Repeatable Measurements

Dyer's 337 Series indicating OD ring gages are used for repetitive bore measurement applications or dedicated high volume production runs.

This rugged and dependable 24-7 bore gage was designed with the operator in mind. Fast, easy to use and no operator error.

Best in Gage R & R performance with an impressive  $\leq 10\%$  capability, even during high tolerance applications and when measuring small or large bores.

## Automatic Centering and No Operator Error

In achieving the highest accuracies, a special centering sleeve is made to guide the gage onto the part. The carbide ball contact points housed in the centering sleeve along with the free floating movement permit the highest measuring accuracy. The measurement is "locked in" and no operator error is possible.

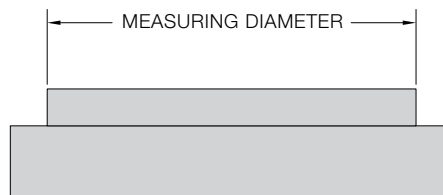
The spring-loaded outward contact pressure along with automatic centering and non tipping means no operator error when measuring bores.

## Two-Point Floating Contact Measuring System

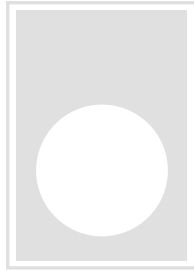
Positive two-point outward contact pressure and continuous on-line indication of the measured value permits the operator to see the bore's profile. The following geometry can be measured.



337 Series Dedicated High Accuracy Indicating OD Ring Gages



# 336 SERIES LARGE RANGE HIGH ACCURACY INDICATING SNAP GAGES



## Maximum Measuring Accuracy

Linear Accuracy at  $\pm 0.0001"/\pm 0.002$  mm  
 Repeatability  $\pm 0.000050"/\pm 0.001$  mm  
 Gage R & R  $\leq 10\%$  on high tolerance parts

## Notable Features

- Extra large measuring range.
- Direct measuring axis design allows for maximum accuracy.
- Can be hand held or used in a stand.
- Self-centering for fast repeatable measurements.
- Accepts any style indicator.
- Special anvils are available. Fax or e-mail your specifications to us.

## 336 Series Models and Specifications

Application Range	Order Number
0.79–1.77" 20–45 mm	<b>336-001</b>
1.37–2.75" 35–70 mm	<b>336-002</b>
2.36–5.11" 60–130 mm	<b>336-003</b>
4.72–8.66" 120–220 mm	<b>336-004</b>



336-002  
with optional stand



336-002



336-002  
with sample part

# 335 SERIES LARGE RANGE HIGH ACCURACY INDICATING SNAP GAGES



Dyer's 335 Series indicating snap gages are light weight and easy to use. These easily adjusted gages offer precision, repeatable measurements. They are 24/7 shop-rugged and perform  $\leq 10\%$  on Gage R & R studies in high-tolerance applications.

## Notable Features

- Fast size changes within the gage's 1.0"/25 mm range
- Contact travel 0.060"/1.5 mm standard, optional 0.100"/5 mm travel available. Contact Dyer.
- Gaging pressure easily adjustable
- Square 0.625"/16 mm carbide anvils are ground and lapped. The large lead-in radius allows for easy part loading and unloading
- Easily adjusted back stop is available in different types materials. i.e., steel, carbide, nylon. A nylon stop will protect parts during loading
- Available with optional bench stand.
- The indicating accepting collet accepts most all indicators and allows a 360° rotation
- Special anvils are available. Fax or e-mail us a part sketch of your application

**Special contact designs available, contact Dyer.**



## How to Order

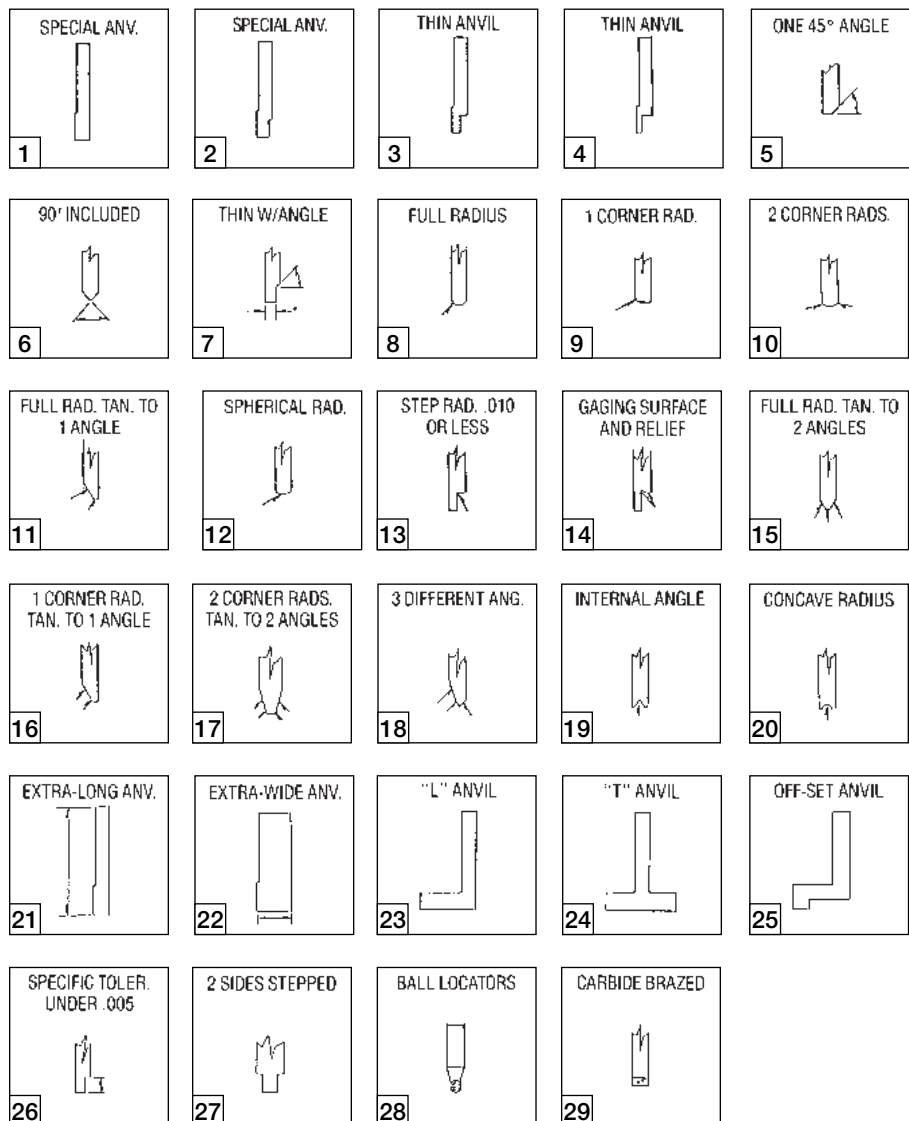
1. Select model range
2. Select an indicator

Optional

3. Select set master
4. Select a gage stand (335-400)

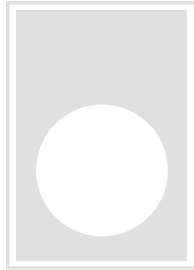


*Special blade anvils*





# 335 SERIES ORDERING INFORMATION



### Maximum Measuring Accuracy

Linear  $\pm 0.0001"$  /  $\pm 0.002$  mm  
 Repeatability  $\pm 0.000050"$  /  $\pm 0.001$  mm  
 Gage R & R  $\leq 10\%$  on high tolerance parts



335 Series with standard square anvils

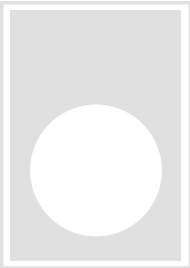


335-001 Series gage with optional transducer probe and 335-400 Gage Stand

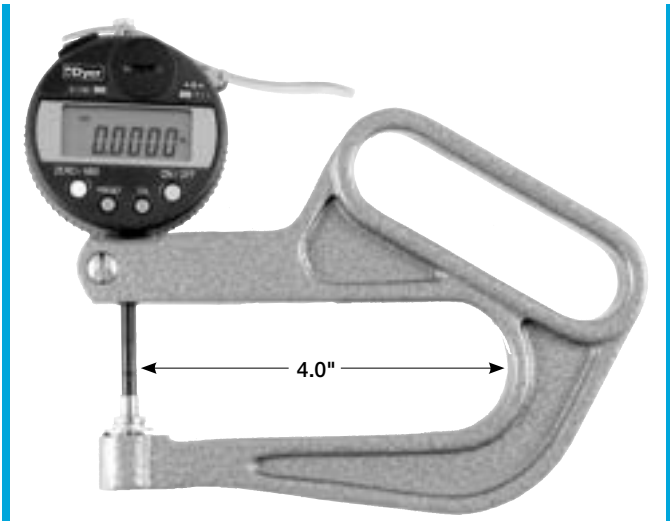
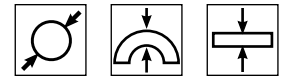
Range <sup>1</sup>		Flat & Parallel	Square Anvils <sup>2</sup>	Order Number	Changeable Blade Anvils	Order Number
Inch	Metric					
0.0–1.0"	0–25 mm	0.00015"/0.004 mm	0.625"/16 mm	<b>335-001</b>	0.125"/3.2 mm	<b>335-201</b>
1.0–2.0"	25–51 mm	0.00015"/0.004 mm	0.625"/16 mm	<b>335-002</b>	0.125"/3.2 mm	<b>335-202</b>
2.0–3.0"	51–76 mm	0.00015"/0.004 mm	0.625"/16 mm	<b>335-003</b>	0.125"/3.2 mm	<b>335-203</b>
3.0–4.0"	76–102 mm	0.00015"/0.004 mm	0.625"/16 mm	<b>335-004</b>	0.125"/3.2 mm	<b>335-204</b>
4.0–5.0"	102–127 mm	0.0002"/0.005 mm	0.625"/16 mm	<b>335-005</b>	0.125"/3.2 mm	<b>335-205</b>
5.0–6.0"	127–152 mm	0.0002"/0.005 mm	0.625"/16 mm	<b>335-006</b>	0.125"/3.2 mm	<b>335-206</b>
6.0–7.0"	152–178 mm	0.0002"/0.005 mm	0.625"/16 mm	<b>335-007</b>	0.125"/3.2 mm	<b>335-207</b>
7.0–8.0"	178–203 mm	0.0002"/0.005 mm	0.625"/16 mm	<b>335-008</b>	0.125"/3.2 mm	<b>335-208</b>
8.0–9.0"	203–229 mm	0.00025"/0.006 mm	0.625"/16 mm	<b>335-009</b>	0.125"/3.2 mm	<b>335-209</b>
9.0–10.0"	229–254 mm	0.00025"/0.006 mm	0.625"/16 mm	<b>335-010</b>	0.125"/3.2 mm	<b>335-210</b>
10.0–11.0"	254–279 mm	0.00025"/0.006 mm	0.625"/16 mm	<b>335-011</b>	0.125"/3.2 mm	<b>335-211</b>
11.0–12.0"	279–305 mm	0.00025"/0.006 mm	0.625"/16 mm	<b>335-012</b>	0.125"/3.2 mm	<b>335-212</b>
12.0–13.0"	305–330 mm	0.0003"/0.0076 mm	0.625"/16 mm	<b>335-013</b>	0.125"/3.2 mm	<b>335-213</b>
13.0–14.0"	330–356 mm	0.0003"/0.0076 mm	0.625"/16 mm	<b>335-014</b>	0.125"/3.2 mm	<b>335-214</b>
14.0–15.0"	356–381 mm	0.0003"/0.0076 mm	0.625"/16 mm	<b>335-015</b>	0.125"/3.2 mm	<b>335-215</b>
15.0–16.0"	381–406 mm	0.0003"/0.0076 mm	0.625"/16 mm	<b>335-016</b>	0.125"/3.2 mm	<b>335-216</b>
16.0–17.0"	406–432 mm	0.0003"/0.0076 mm	0.625"/16 mm	<b>335-017</b>	0.125"/3.2 mm	<b>335-217</b>
17.0–18.0"	432–458 mm	0.0003"/0.0076 mm	0.625"/16 mm	<b>335-018</b>	0.125"/3.2 mm	<b>335-218</b>
18.0–19.0"	458–483 mm	0.0003"/0.0076 mm	0.625"/16 mm	<b>335-019</b>	0.125"/3.2 mm	<b>335-219</b>
19.0–20.0"	483–508 mm	0.0003"/0.0076 mm	0.625"/16 mm	<b>335-020</b>	0.125"/3.2 mm	<b>335-220</b>
20.0–21.0"	508–533 mm	0.0003"/0.0076 mm	0.625"/16 mm	<b>335-021</b>	0.125"/3.2 mm	<b>335-221</b>
21.0–22.0"	533–559 mm	0.0003"/0.0076 mm	0.625"/16 mm	<b>335-022</b>	0.125"/3.2 mm	<b>335-222</b>
22.0–23.0"	559–584 mm	0.0003"/0.0076 mm	0.625"/16 mm	<b>335-023</b>	0.125"/3.2 mm	<b>335-223</b>
23.0–24.0"	584–610 mm	0.0003"/0.0076 mm	0.625"/16 mm	<b>335-024</b>	0.125"/3.2 mm	<b>335-224</b>

<sup>1</sup> Standard contact travel 0.060"/1.5 mm optional 0.100"/2.5 mm

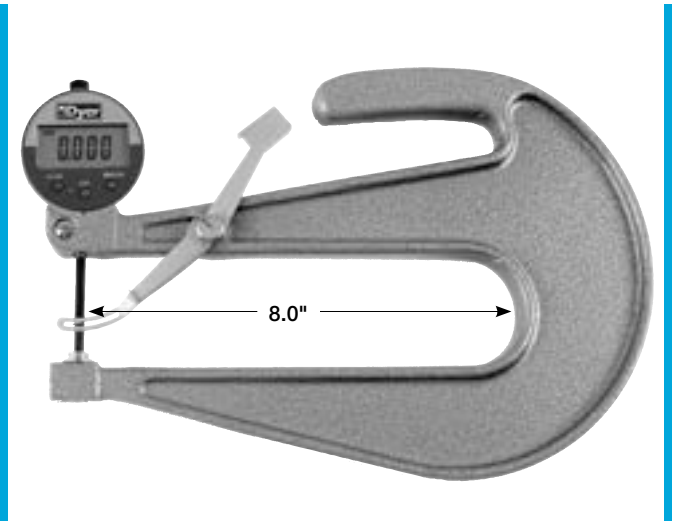
<sup>2</sup> Standard contacts carbide, ground and lapped. Large lead-in radius protects parts for fast, easy measurement.



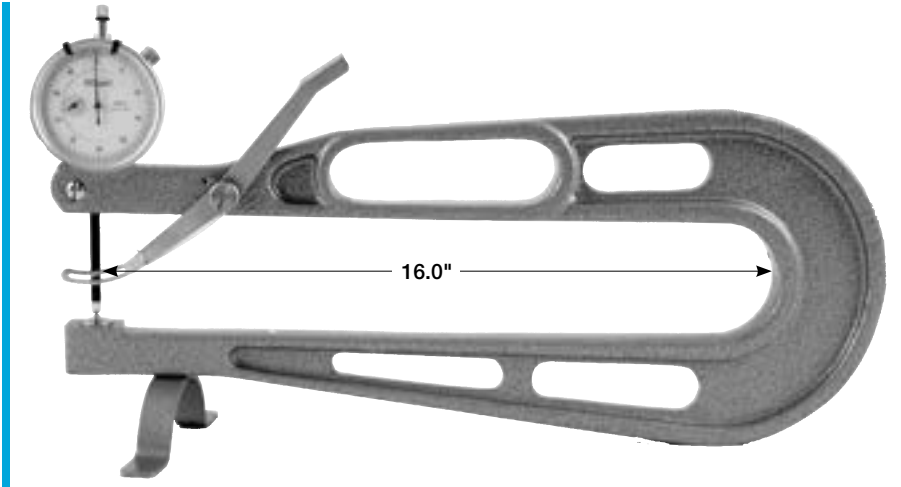
# 309 SERIES DIAL THICKNESS GAGES STANDARD AND SPECIAL APPLICATIONS



309-240 with electronic indicator



309-265 with electronic indicator



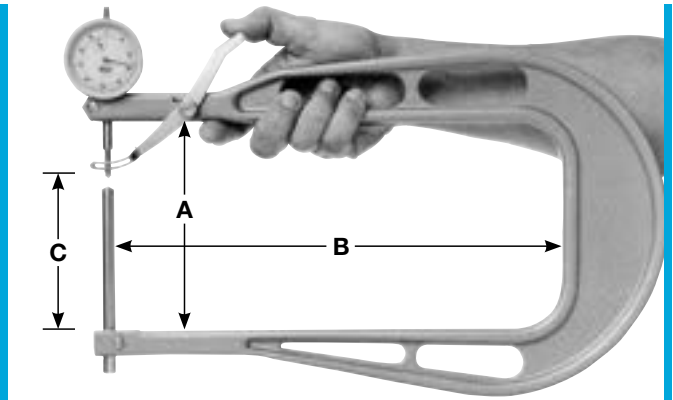
309-125



305-555  
Thickness Gage, Roller Contacts  
Range: 0-0.2"  
Grad: 0.001"  
Width of roller = 0.34"  
Measuring force = 120 gm.



309 Special  
Custom lower arm enters  
small ID and measures step  
thickness.

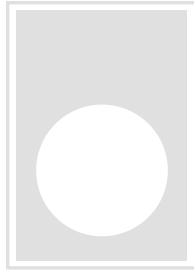
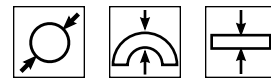


Series 308

Gage with adjustable lower contact and indicator.

Order No.	Travel	Graduation	Dist. A	Dist. B	Dist. C
308-002	0.400"	0.0005"	5.98"	12.50"	4.00"

# 309 SERIES DIAL THICKNESS GAGES STANDARD AND SPECIAL APPLICATIONS



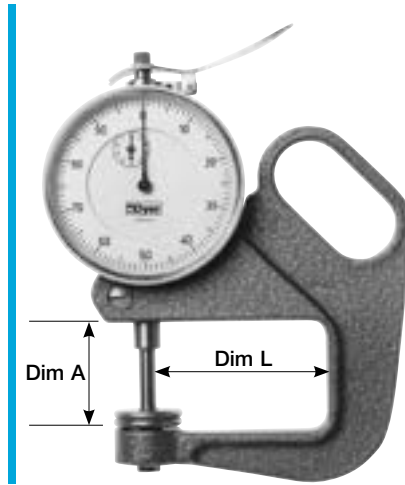
## Notable Features

- Fast, repeatable measurements.
- Cast aluminum design, light-weight, easy "one-hand" operation.
- Spring-loaded contact, no operator influence on measurement.
- Lower contact sits on a tripod for easy adjustment and alignment.
- Rugged for shop-use.
- Large selection of indicators and frames.

## Custom and Special Models

We will modify the arms and contacts to meet your special applications.

Send your present gage to Dyer's repair center and we will upgrade it to electronic indication.



309-010 gage with dial indicator



309-210 with digital indicator

## Standard contact point options

All lower contacts are set on a 3-screw tripod in a fixed position. They adjust easily to keep the lower contact in the fixed position.



Lower contact positioned on three adjustment screws. Easy-to-square contacts.

## Includes Mechanical Dial Indicator, Contacts and Lifting Lever.

Models 12.00" and 16.00" have mounting base for tabletop.

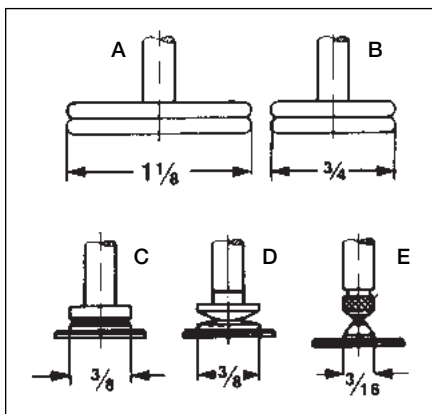
Range*	"L" Dim Reach	"A" Dim	Graduation	Order No. With "A" Contacts	Order No. With "B" Contacts	Order No. With "C" Contacts	Order No. With "D" Contacts	Order No. With "E" Contacts
0-0.400"	2.0"	2.6"	0.0005"	309-005	309-010	309-015	309-020	309-025
0-0.400"	4.0"	1.4"	0.0005"	309-030	309-035	309-040	309-045	309-050
0-0.400"	8.0"	1.9"	0.0005"	309-055	309-060	309-065	309-070	309-075
0-0.400"	12.0"	1.9"	0.0005"	309-080	309-085	309-090	309-095	309-100
0-0.400"	16.0"	1.9"	0.0005"	309-105	309-110	309-115	309-120	309-125

## Includes Electronic Digital Indicator, Contacts and Lifting Lever.

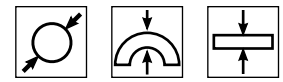
Models 12.00" and 16.00" have mounting base for tabletop.

Range*	"L" Dim Reach	"A" Dim	Graduation	Order No. With "A" Contacts	Order No. With "B" Contacts	Order No. With "C" Contacts	Order No. With "D" Contacts	Order No. With "E" Contacts
0-1.0"	2.0"	2.6"	0.0005"	309-205	309-210	309-215	309-220	309-225
0-1.0"	4.0"	1.4"	0.0005"	309-230	309-235	309-240	309-245	309-250
0-1.0"	8.0"	1.9"	0.0005"	309-255	309-260	309-265	309-270	309-275
0-1.0"	12.0"	1.9"	0.0005"	309-280	309-285	309-290	309-295	309-300
0-1.0"	16.0"	1.9"	0.0005"	309-305	309-310	309-315	309-320	309-325

\* Range will change depending on indicator selection



# 310 SERIES POCKET THICKNESS GAGES



## Maximum Measuring Accuracy

Linear Accuracy at  $\pm 0.005"/0.1$  mm  
Repeatability  $\leq 0.005"/0.1$  mm

## Notable Features

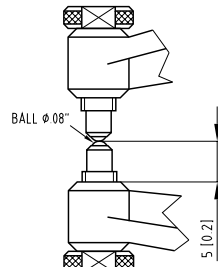
- Light weight pocket gages for fast inspection.
- Handy, durable, easy to calibrate.
- Measure bottle necks, paper, small castings, sheet metal, piping, wire, tubing, wall thickness
- Available with various contacts. Contact us with your requirement.



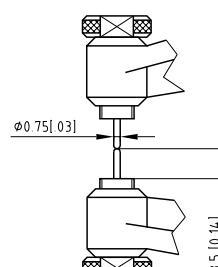
Model 310-105



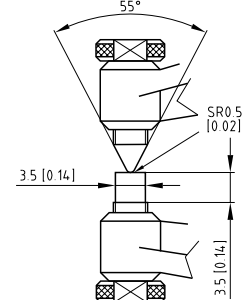
Model 310-119



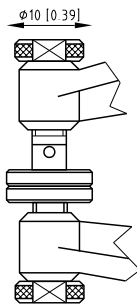
Contact Point Type 2



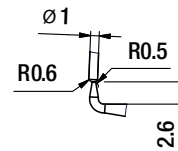
Contact Point Type 3



Contact Point Type 4



Contact Point Type 5

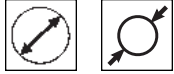


Contact Point Type 6

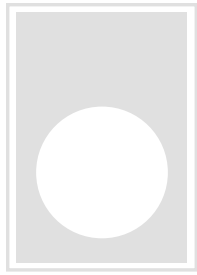
## 310 Series Models and Specifications

Application Range	Length L	Contact Point Type	Graduation	Order Number
<b>Inch Specifications</b>				
0-0.5"	1.5"	2	0.005"	<b>310-105</b>
0-0.5"	1.5"	3	0.005"	<b>310-106</b>
0-0.5"	1.5"	4	0.005"	<b>310-107</b>
0-0.5"	1.5"	5	0.005"	<b>310-108</b>
0-0.5"	1.5"	6	0.005"	<b>310-109</b>
<b>Metric Specifications (mm)</b>				
0-10 mm	35 mm	2	0.1 mm	<b>310-112</b>
0-10 mm	35 mm	3	0.1 mm	<b>310-113</b>
0-10 mm	35 mm	4	0.1 mm	<b>310-114</b>
0-10 mm	35 mm	5	0.1 mm	<b>310-115</b>
0-10 mm	35 mm	6	0.1 mm	<b>310-119</b>

# D



## Special Application Gages

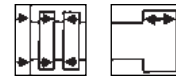


### TABLE OF CONTENTS

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Groove Width/Spacing	256	D.3
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ID's Rigid, Flexible Soft Wall Parts	550	D.5
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Inside Diameter & Circumference	422, 423, 424	D.9
Coaxiality	454	D.10

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and find Dyer's interactive  
catalog, gaging solutions  
by application and industry!

# 255 SERIES GROOVE WIDTHS/DEPTHS/SPACINGS UNDERCUT WIDTHS/SPACINGS



**Maximum Measuring Accuracy**  
 Linear  $\pm 0.00005"$  (0.0013 mm)  
 at range 0.020" (0.5 mm)  
 Repeatability  $\leq 0.000040"$  (0.001 mm)

### Notable Features

- Accuracy, precision ball bearing probe shaft.
- Easy to use, light weight, 24-7 shop rugged.
- Contact point can be positioned in any 360° location.
- Spring-loaded contact point in or out, specify when ordering.
- Unlimited specials for your application. Contact Dyer.

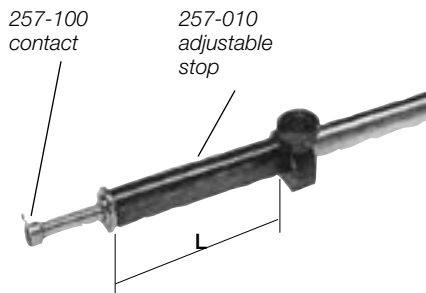


### How to Order

1. Select one basic gage unit 255-001, -002
2. Select adjustable depth stop
3. Select contact point
4. Select electronic or dial indicator.

### Optional

5. Select set master
6. Select additional contact points and adjustable depth stop
7. Wooden storage box included



257-010 Adjustable Collar Stop

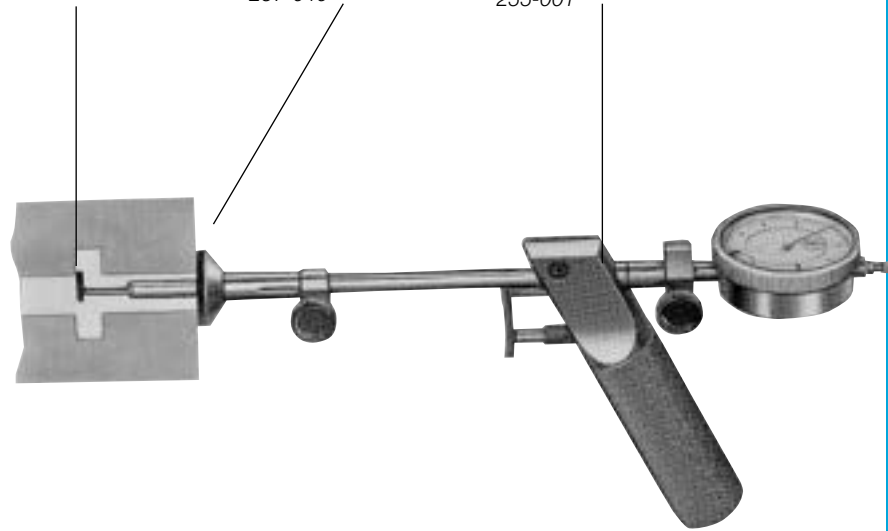
### Adjustable Collar Stop for Series 256

Description	Length	Order No.
Measuring Collar $\varnothing$ (0.465" dia.) for groove spacings — minimum upper groove width 0.04"	1.97"	257-010
	3.94"	257-020
	5.91"	257-030

Contact Foot  
257-100

Measuring Collar  
257-040

Pistol Grip Holder  
255-001

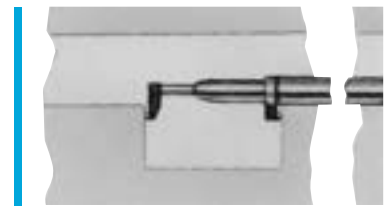
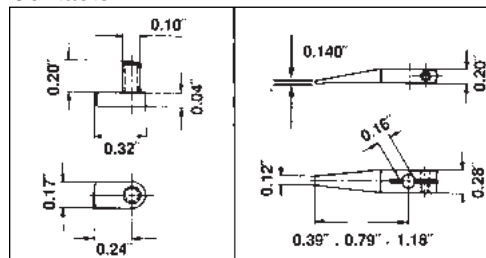


Measure a groove width, Series 255 pistol grip handle with optional indicator.

### 255 Series Basic Gage, Pistol Grip Handle

Pistol Grip Handle Order No.	Measuring Depth		Maximum Travel
	Inch	mm	
255-001	4.375"	111	0.5"

### Contacts



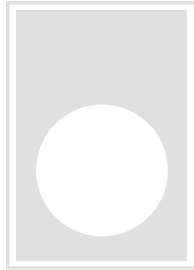
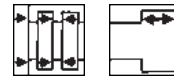
Special carbide ball contacts. Contact Dyer with your requirements.

### Contact Foot (flat) Series 255

Length	Order No.
0.24"	257-100
0.39"	257-101
0.79"	257-102
1.18"	257-103



# 256 SERIES GROOVE WIDTHS/DEPTHS/SPACINGS UNDERCUT WIDTHS/SPACINGS



## 256 Series with moveable slide contact arm

- Precision ball bearing probe shaft.
- Rotatable (360°) contact point.
- Inch or metric. Easily convert to electronics.

## How to Order

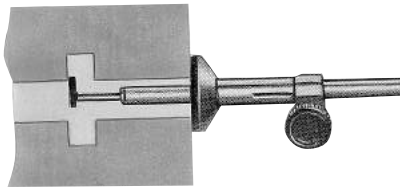
### Series 256 Components.

#### Order the following:

1. Ball bearing guided probe shaft with moveable collar: Order No. 256-010.
2. Measuring bridge or measuring collar.
3. Contact foot.
4. Indicator.
5. Depth extension.
6. Wooden box.

### Series 256 Basic Set

Gage with ball bearing guided probe shaft, 255-010 measuring bridge, 257-200 contact point and moveable collar, in box. Order indicator separately.



257-100 Contact

## 256 Series Basic Gage

Measuring Depth		Maximum Travel	Straight Handle Order No.
Inch	mm		
6.89"	175	0.5"	256-001
12.80"	325	0.5"	256-002

## Contact Foot

### Series 256

Length	Order No.
0.24"	257-100
0.39"	257-101
0.79"	257-102
1.18"	257-103

## Measuring Bridge

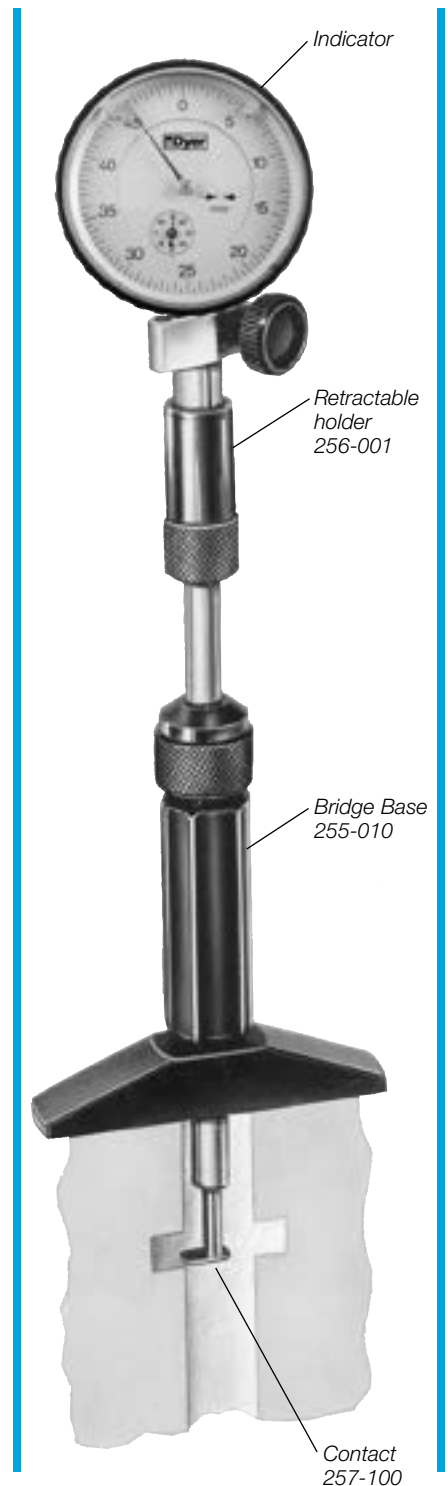
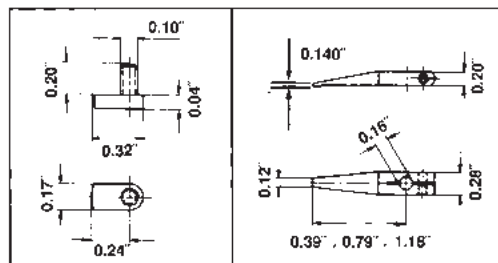
### Series 256 Handle Only

Length	Order No.
3.15"	255-010
4.72"	255-011
7.09"	255-012

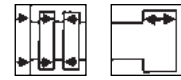
## Indicators

Grad.	Order No.
0.0001"	458-001
0.0005"	458-002
0.0005"/0.010 mm	900-101

See Section E for complete list and specifications.



# 902 SERIES GROOVE WIDTHS/DEPTHS/SPACINGS UNDERCUT WIDTHS/SPACINGS



Special gage



Outside shoulder/groove height. Measure bottom surface of part to top of groove.

Special gage with part



Digital Indicator with standard depth gage bases

### Standard Gage Bases and Accessories

Order No.	Description
902-411	2" depth gage base for ind. 1" & less
902-412	4" depth gage base for ind. 1" & less
902-413	6" depth gage base for ind. 1" & less
902-414	8" depth gage base for ind. 1" & less



Special depth gage to measure depth of key slot



Special depth gage to measure dimple indentation on part surface. Gage's base modified to set correctly on part



Special depth gage to measure over part obstruction

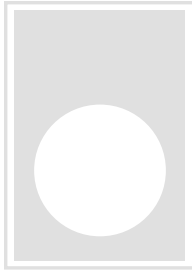
side view



Special fixture to measure multiple bore depths at one time on a machined casting

Dyer can design a special depth gage based on your specific application. Please contact Dyer with your needs.

# 550 SERIES INSIDE DIAMETERS RIGID, FLEXIBLE PARTS



## Notable Features

- Fast, easy way to measure inside diameters of fixed, flexible and soft walled parts.
- Actual diameter is read at the ring and vernier scale in the handle.
- Measuring depth range is 15-50 mm.
- Laser marked scales and stainless steel tapes.



Model 550-003



## Models & Specifications

Range	Graduation	Width × Thickness	Order No.
14–24mm	0.1mm	10 × 0.08mm	<b>550-001</b>
22–40mm	0.1mm	10 × 0.08mm	<b>550-002</b>
35–60mm	0.1mm	10 × 0.08mm	<b>550-003</b>
55–100mm	0.1mm	10 × 0.08mm	<b>550-004</b>
95–180mm	0.1mm	10 × 0.08mm	<b>550-005</b>
170–255mm	0.1mm	10 × 0.08mm	<b>550-006</b>
245–330mm	0.1mm	10 × 0.08mm	<b>550-007</b>

*Inch models available upon request.*

# 303 SERIES AEROSOL GAGES FOR CRIMP DIAMETER

## Notable Features

- Fast and accurate method to measure crimp diameters.
- Dial and digital options available.
- Fine steel alloyed arms shop-rugged.
- Light weight and ergonomically shaped.
- Spring loaded arms with form-fitting half-moon contact tips make this gage easy to use.



Model 303-008

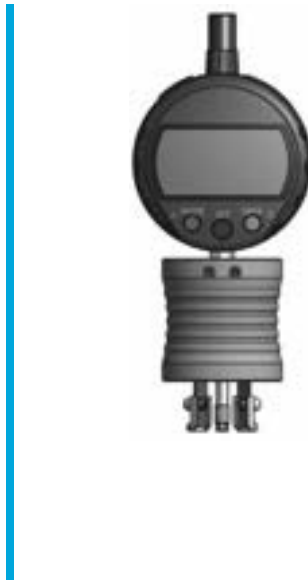


Model 303-093

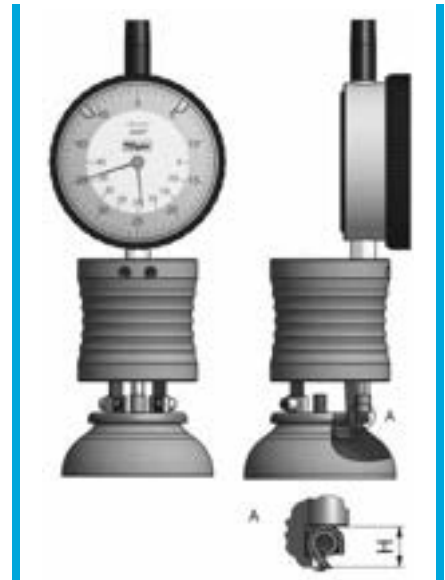
## 303 Series Aerosol Gages for Crimp Height

### Notable Features

- Fast and accurate method to measure crimp heights on aerosol containers with a crimp seal of 1.0".
- Dial and digital options available.
- New body design with three centering feet lock gage into position.
- Light weight and ergonomically shaped.



Model 303-080



Model 303-010



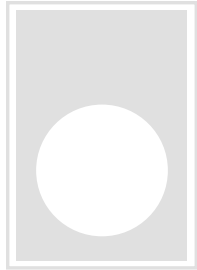
Model 303-000  
Dial Setting Master for both  
diameter and height.

### 303 Series for Crimp Diameter

Indicator Type	Measuring Range	Graduation	Order No.
Dial	1.0"-1.15"	0.0005"	<b>303-008</b>
Dial	25-29mm	0.010mm	<b>303-007</b>
Electronic	1.0"-1.15" 25-29mm	0.0005" 0.010mm	<b>303-093</b>

### 303 Series for Crimp Height

Indicator Type	Measuring Range	Graduation	Order No.
Dial	0.17"-0.22"	0.0005"	<b>303-010</b>
Dial	4.4-5.6mm	0.010mm	<b>303-011</b>
Electronic	0.17"-0.22" 4.4-5.6mm	0.0005" 0.010mm	<b>303-080</b>



## MEASURE CRIMP DEPTH



Model 303-013  
in part

Model 303-005  
with master

Model 303-013

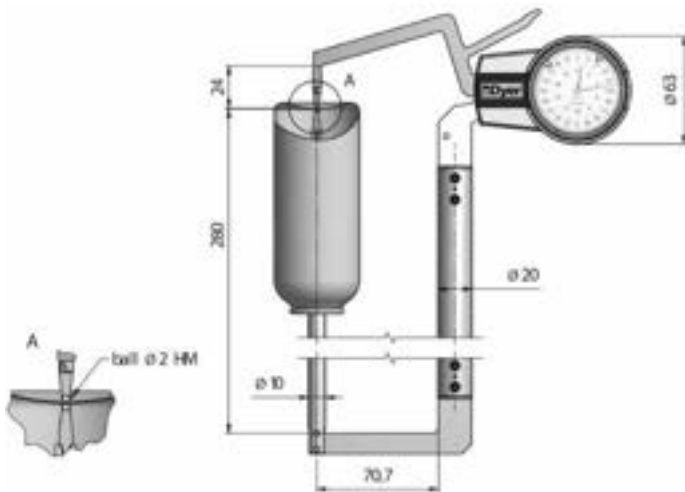
## MEASURE BEAD HEIGHT



Model 303-020

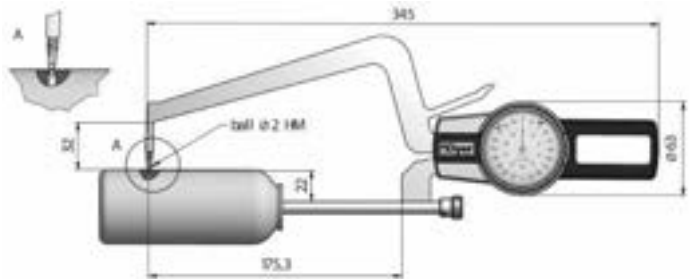
Model 303-220

## MEASURE BOTTOM THICKNESS

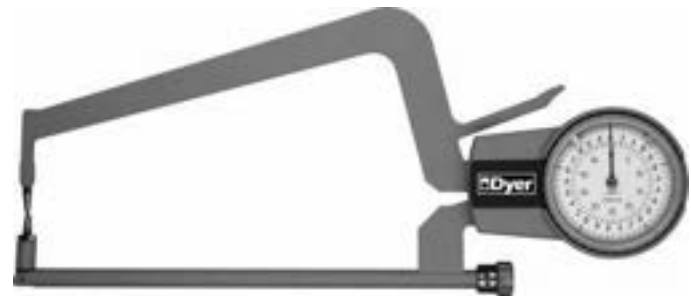


Model 303-101

## MEASURE WALL THICKNESS



Model 303-040  
with part



Model 303-040

# 420/421 SERIES OUTSIDE CIRCUMFERENCE & DIAMETER OF CYLINDRICAL PARTS



## Notable Features

- Fast, easy way to measure outside circumference and diameters of fixed, flexible and soft walled parts.
- Laser scaled tapes with 1mm/0.040" graduations and with 0.1mm or 0.005" graduations on vernier reading handle.
- Standard tape width of 16mm. Tape thickness of 0.2mm.
- Special tape width of 6/35/60mm and 0.05mm graduations vernier reading handle available upon request.



Model 420-105

## 420 Series Inch Outside Diameter Measuring Tapes

Circumference Range (inch)	Diameter Range (inch)	Order No. Stainless Steel	Order No. Black
2"-38"	0.8"-12"	420-105	420-205
37"-87"	11.8"-27.7"	420-110	420-210
86"-136"	27.4"-43.3"	420-115	420-215
136"-186"	43.3"-59.2"	420-120	420-220
186"-236"	59.2"-75.1"	420-125	420-225
235"-285"	74.8"-90.7"	420-130	420-230
284"-334"	90.5"-106.4"	420-135	420-235
334"-384"	106.3"-122.3"	420-140	420-240
383"-433"	122.0"-138.0"	420-145	420-245

## 420 Series Metric Outside Diameter Measuring Tapes

Circumference Range (mm)	Diameter Range (mm)	Order No. Stainless Steel	Order No. Black
60-950	20-300	420-405	420-505
940-2200	300-700	420-410	420-510
2190-3460	700-1100	420-415	420-515
3450-4720	1100-1500	420-420	420-520
4710-5980	1500-1900	420-425	420-525
5970-7230	1900-2300	420-430	420-530
7220-8500	2300-2700	420-435	420-535
8490-9760	2700-3100	420-440	420-540
9730-11010	3100-3500	420-445	420-545

## 421 Series

- 421 Series measuring tapes are designed to measure outside diameters of fixed, flexible and soft walled parts.
- Laser scaled tapes with 1mm or 0.040" graduations and with 0.050mm or 0.002" graduations on vernier reading handle.
- Standard tape width of 16mm tape thickness of 0.2mm.
- Special tape width of 12mm. Tape thickness of 0.12mm.



421 Series Tapes



Model 421-505

## 421 Series Inch Outside Diameter Measuring Tapes

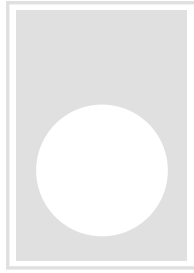
Diameter Range (Inch)	Order No. Stainless Steel	Order No. Black
0.6"-4.6"	421-105	421-205
4.0"-9.0"	421-110	421-210
27.4"-43.3"	421-115	421-215
43.3"-59.2"	421-120	421-220

## 421 Series Metric Outside Diameter Measuring Tapes

Diameter Range (mm)	Order No. Stainless Steel	Order No. Black
15-115	421-405	421-505
100-230	421-410	421-510
200-330	421-415	421-515
300-620	421-420	421-520



# 422/423/424 SERIES MEASURING TAPES



## 422 Series

### Notable Features

- 422 Series measure plane parallel distances.
- Laser scaled tapes with 1mm graduations and with 0.1mm or 0.005" graduations on vernier reading handle.
- Standard tape width of 16mm. Tape thickness of 0.2mm.
- Special measuring ranges available upon request.



422 Length Measuring Tape

## 422 Series Inch Length Measuring Tapes

Measuring Length (inch)	Order No. Stainless Steel	Order No. Black
2.4"-37.4"	422-105	422-205
35"-85"	422-110	422-210
85"-135"	422-115	422-215
135"-185"	422-120	422-220
185"-235"	422-125	422-225

## 422 Series Metric Length Measuring Tapes

Measuring Length (mm)	Order No. Stainless Steel	Order No. Black
60-950	422-405	422-505
900-2200	422-410	422-510
2200-3460	422-415	422-515
34500-4720	422-420	422-520
4700-6000	422-425	422-525

## 423 Series

### Notable Features

- 423 Series are designed to measure the inside circumference and average diameter of round and oval bores.
- Laser scaled tapes with 1mm graduations and with 0.1mm or 0.005" graduations on vernier reading handle.
- Standard tape width of 20mm.
- Fast and easy use with the help of clamping handle mechanism.



423 ID Measuring Tape

## 423 Series Inch Inside Diameter Measuring Tapes

Circumference Range (inch)	Diameter Range (Inch)	Order No. Stainless Steel	Order No. Black
28"-60"	9.0"-19"	423-105	423-205
37"-87"	11.8"-27.7"	423-110	423-210
86"-136"	27.4"-43.3"	423-115	423-215
136"-186"	43.3"-59.2"	423-120	423-220
186"-236"	59.2"-75.1"	423-125	423-225
235"-285"	74.8"-90.7"	423-130	423-230
284"-334"	90.5"-106.4"	423-135	423-235

## 423 Series Metric Inside Diameter Measuring Tapes

Circumference Range (mm)	Diameter Range (mm)	Order No. Stainless Steel	Order No. Black
720-1550	20-300	423-405	423-505
940-2200	300-700	423-410	423-510
2190-3460	700-1100	423-415	423-515
3450-4720	1100-1500	423-420	423-520
4710-5980	1500-1900	423-425	423-525
5970-7230	1900-2300	423-430	423-530
7220-8500	2300-2700	423-435	423-535

Clamping Holder for all 423 Series Measuring Tapes (needed only once)	423-000
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## 424 Series

### Notable Features

- 424 Series measuring tapes are designed to measure inside circumference of fixed, flexible and soft walled parts.
- Laser scaled tapes with 1mm or 0.040" graduations and with 0.05mm or 0.002" graduations on vernier reading handle.
- Standard tape width of 12mm. Tape thickness of 0.12mm.



424 Series Tape



Model 424-505

## 422 Series Inch Length Measuring Tapes

Measuring Length (inch)	Order No. Stainless Steel	Order No. Black
2.4"-37.4"	422-105	422-205
35"-85"	422-110	422-210
85"-135"	422-115	422-215

## 422 Series Metric Length Measuring Tapes

Measuring Length (mm)	Order No. Stainless Steel	Order No. Black
60-950	422-405	422-505
900-2200	422-410	422-510
2200-3460	422-415	422-515

# 454 SERIES COAXIALITY OF TWO BORE AXIS "ON ONE LINE"



A low cost way to measure the center line of two bores "on one line" at the machine.

The gage is centered in both bores using fixed and spring loaded balls. After zeroing the gage, the floating contact is rotated 360°, storing MIN and MAX dimensions.

A stepped bore with one reference bore and a second bore used as a bearing surface is a typical application.

### Benefits of knowing your parts coaxiality

- Easy, time-saving, parts assembly
- Minimal friction
- Reduced service wear and silent running
- Longer part life

### 454 Series Coax Mandrel

Measure center line alignment errors between two bores



454 Series

### 454 Coax Mandrel

Measures valve shaft of a cylinder head



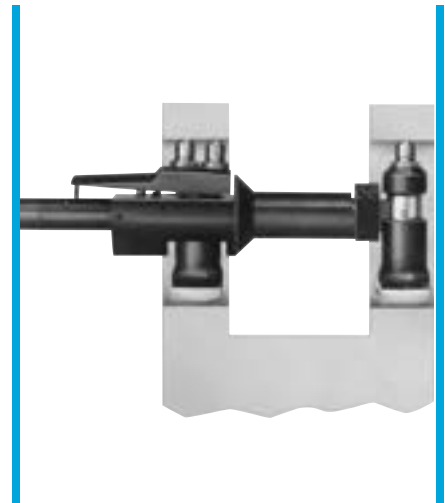
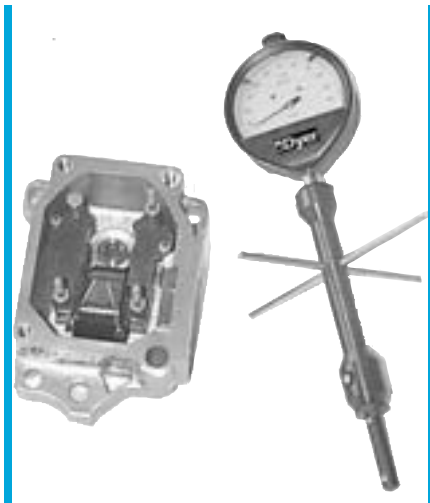
454 Series

### 454 Series Measuring contact is between two centers



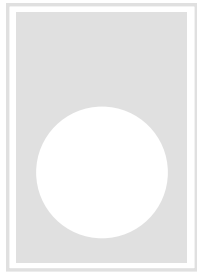
454 Series specials

Measures the bearing bore of an electrical motor



# E

## Electronic Indicators, Dial Indicators, Digital Probes, Digital Readouts



### TABLE OF CONTENTS

<b>Application</b>	<b>Series</b>	<b>Page</b>
Electronic Indicators	900, 901, 903	E.2–E.3
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Measuring Applications Solutions		E.13–E.14

**visit** our searchable web site and  
find Dyer's interactive  
catalog, gaging solutions  
by application and industry!

# 900 SERIES ELECTRONIC INDICATORS



## 900-301

### Notable Features

- Resolution 0.0005"/0.01 mm
- Range 0–0.500"/12.7 mm
- Preset, zero, ± direction  
Go/± NG functions
- Preset/recall absolute number.  
Encoder maintains settings and readings for life of battery, (even when power is off)
- SPC output
- Battery Power 5000 hours
- Face rotates 330°
- Stem Ø 0.375", contacts 4-48 UNF



## 900-305

### Notable Features

- Resolution 0.00005"/0.001 mm
- Range 0–0.500"/12.7 mm
- Preset, zero, ± direction  
Go/± NG functions
- Preset/recall absolute number.  
Encoder maintains settings and readings for life of battery, (even when power is off)
- SPC output
- Battery Power 5000 hours
- Face rotates 330°
- Stem Ø 0.375", contacts 4-48 UNF



## 900-114

### Notable Features

- Resolution 0.0001"/0.001 mm
- Range 0–0.500"/12.7 mm
- Holds min value/tolerance
- Preset up to 3 values
- Analog bar
- Preset, zero, ± direction  
Go/± NG functions
- Preset/recall absolute number.  
Encoder maintains settings and readings for life of battery, (even when power is off)
- SPC output
- Battery Power 5000 hours
- Face rotates 330°
- Stem Ø 0.375", contacts 4-48 UNF



## 900-315

### Notable Features

- Resolution 0.0005"/0.01mm
- Range 0–0.500"/0-12.7mm
- Zero, ± direction
- No preset to absolute
- SPC output
- Battery power 20,000 hours
- Low Cost
- Face rotates 330°
- Stem Ø 0.375", contacts 4-48 UNF



## 900-200

### Notable Features

- Any ratio calculation can be programmed
- Resolution adjustable from 0.000010"–0.050" (0.002 mm–1 mm)
- Range 0–0.500"/12.7 mm
- Preset, zero, ± direction Go/± NG functions
- Preset/recall absolute number.  
Encoder maintains settings and readings for life of battery, (even when power is off)
- SPC output
- Battery Power 5000 hours
- Face rotates 330°
- Stem Ø 8 mm, contacts 2.5 mm



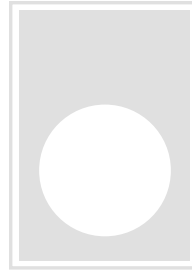
## 900-325

### Notable Features

- Resolution 0.000050"/0.0001mm
- Range 0–0.500"/0-12.7mm
- Zero, ± direction
- No preset to absolute
- SPC output
- Battery power 20,000 hours
- Low Cost
- Face rotates 330°
- Stem Ø 0.375", contacts 4-48 UNF



# 901, 903 SERIES ELECTRONIC INDICATORS



## 901-100

### Notable Features

- Resolution 0.000050"/0.001 mm
- Range 0–1.0"/25 mm
- Zero, preset/recall absolute number
- Battery Power, face rotates 270°
- RS232, SPC output, bi-directional
- Stem Ø 0.375", contacts 4-48 UNF



## 901-101

### Notable Features

- Resolution 0.0005"/0.01 mm
- Range 0–1.0"/25 mm
- Zero, preset/recall absolute number
- Battery Power, face rotates 270°
- RS232, SPC output, bi-directional
- Stem Ø 0.375", contacts 4-48 UNF



## 903-115

### Notable Features

- Range  $\pm 0.040$ "/1 mm
- Fan display
- Battery Power
- Stem Ø 0.375", contacts 4-48 UNF
- Switchable resolution  
0.000020"/0.0005 mm  
0.000050"/0.001 mm  
0.0001"/0.001 mm  
0.0005"/0.005 mm



## 903-118

### Notable Features

- Resolution 0.000050", 0.00020", 0.00010"/0.001 mm, 0.0005 mm, 0.0002 mm
- Range  
 $\pm 0.0015$ "/0.030 mm  
 $\pm 0.0006$ "/0.015 mm  
 $\pm 0.0003$ "/0.006 mm
- Preset/recall absolute number
- SPC output
- Battery Power
- Stem Ø 0.375", contacts 4-48 UNF



## 903-120

### Remote Indicator

### Notable Features

- Range  $\pm 0.040$ "/1 mm
- Fan display
- Battery Power
- Switchable resolution  
0.000020"/0.0005 mm  
0.000050"/0.001 mm  
0.0001"/0.001 mm  
0.0005"/0.005 mm



## 901-201

### Notable Features

- Resolution 0.00050"/0.01 mm
- Range 0-1"/0-25.4 mm
- Button Function: ON/OFF, ZERO, in/mm
- Auto power off
- SPC output/USB
- CR2032 Battery, Battery life > 1 year
- Stem 0.375", contacts 4-48 UNF



# 450, 451, 458 SERIES DIAL INDICATORS

## 451-001 Inch

### Notable Features

- Graduation 0.000050"
- Range 0.004" ( $\pm 0.002$ ")
- Dial face 20-0-20
- Range per revolution  $\pm 0.002$ "
- Stem  $\varnothing$  8 mm, spindle lapped
- Fine adjustment at top of case



## 451-011 Metric

### Notable Features

- Graduation 0.001 mm
- Range 0.1 mm ( $\pm 0.050$  mm)
- Dial face 50-0-50
- Range per revolution  $\pm 0.050$  mm
- Stem  $\varnothing$  8 mm, spindle lapped
- Fine adjustment at top of case



## 450-000 Inch

### Notable Features

- Graduation 0.000050"
- Range 0.004" ( $\pm 0.002$ ")
- Dial face 20-0-20
- Range per revolution  $\pm 0.002$ "
- Stem  $\varnothing$  8 mm, spindle lapped



## 458-003 Metric

### Notable Features

- Resolution 0.002 mm
- Range 1 mm
- Dial face 0-100-0
- Range per revolution 0.2 mm
- Stem  $\varnothing$  8 mm, spindle lapped



## 458-001 Inch

### Notable Features

- Graduation 0.0001"
- Range 0.200"
- Dial face 0-5-0
- Range per revolution 0.010"
- Stem  $\varnothing$  3/8", spindle lapped



## 458-002 Inch

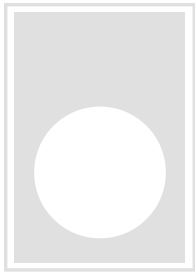
### Notable Features

- Graduation 0.0005"
- Range 0.500"
- Dial face 0-25-0
- Range per revolution 0.010"
- Stem  $\varnothing$  3/8", spindle lapped





# 450, 451, 458 SERIES DIAL INDICATORS



## 450-001 Inch

### Notable Features

- Resolution 0.0001"
- Range 0.040"
- Dial face 0-10
- Range per revolution 0.010"
- Stem Ø 8 mm, spindle lapped



## 450-002 Inch

### Notable Features

- Resolution 0.0005"
- Range 0.500"
- Dial face 0-50
- Range per revolution 0.050"
- Stem Ø 8 mm, spindle lapped



## 458-004 Metric

### Notable Features

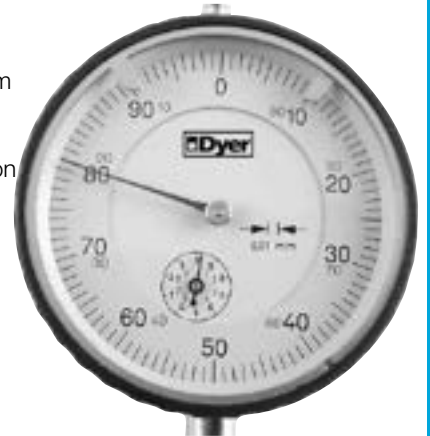
- Resolution 0.01 mm
- Range 10 mm
- Dial face 0-50-0
- Range per revolution 1.0 mm
- Stem Ø 8 mm, spindle lapped



## 450-012 Metric

### Notable Features

- Resolution 0.01 mm
- Range 10 mm
- Dial face 0-100
- Range per revolution 1.0 mm
- Stem Ø 8 mm, spindle lapped



## 458-015 Inch

### Notable Features

- Resolution 0.001"
- Range 0.080"
- Dial face 40-0-40
- Stem Ø 8 mm, spindle lapped



## 458-020 Metric

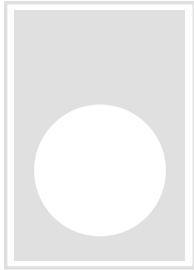
### Notable Features

- Resolution 0.010 mm
- Range 0.80 mm
- Dial face 40-0-40
- Stem Ø 8 mm, spindle lapped





# 981 SERIES DISPLAY BOX



## 981-200 Digital Readout for one axis measurements

### Notable Features

- The 981-200 has selectable resolution as low as 0.000020" (0.0005mm)
- Can store up to 1000 measured values
- Minimum/Maximum value storage
- Can calculate mean value and standard deviations
- Creates histograms and control charts
- Various other statistical functions



981-200 Box shown  
with motorized control device for transducer probe

Specifications	
<b>Data Interface</b>	Two serial interfaces: <b>RS-232-C/V.24</b> 110 to 115 200 baud <b>USB Type B</b> (UART)
<b>Operating temperature</b>	0°C–50°C (32°F–122°F)
<b>Storage temperature</b>	-40°C–85°C (-40°F–185°F)
<b>Relative air humidity</b>	Annual mean: < 75% In exceptional cases: <90%
<b>Protection</b> (IEC 60529)	IP 40 rear panel; IP 54 front panel
<b>Weight</b>	Approximately 2.5 kg (5.5 lb)
<b>Housing</b>	Benchtop Design, cast metal housing
<b>Housing dimensions</b>	Width 211 mm Height 112 mm (including feet) Depth 251 mm (including connector)



981-200 Box shown  
with various transducer stands

# 981 SERIES DIGITAL READOUTS VISUAL FEEDBACK



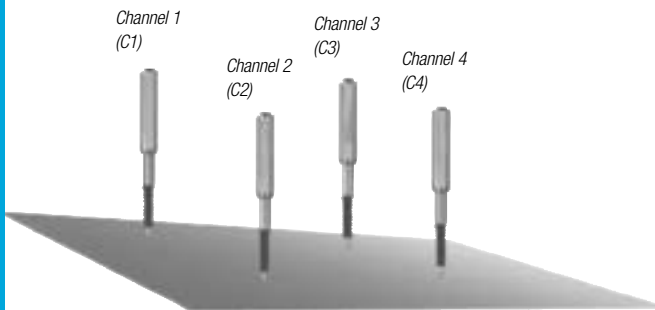
## Overview

- Up to 8 Encoder or LVDT inputs.
- LVDT Signal Conditioning.
- Color LCD Display.
- Custom Formula.
- Data Charts & Graphs.
- SPC Database & Calculations.
- Assignable dimension tolerances.



## Input/Output

- Up to eight encoder or full bridge LVDTs.
- Provides LVDT signal conditioning.
- Encoder inputs; Heidenhain, Mitutoyo, Nikon.
- LVDT inputs; Solartron, Marposs, Tesa.
- Display up to 16 dimensions.
- Parallel/serial port for printing/communications.
- Two programmable relay outputs.



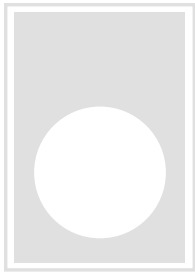
## Advanced Calculations

- Create custom formulas to track critical dimensions.
- Assign formulas to determine max and min dimensions.
- Unique "trip function" automates data entry.
- Determine run-out of a rotating shaft.
- Encoders can be combined algebraically to calculate thickness, flatness and volume.

$$F = \max (C1, C2, C3, \dots Cn) - \min (C1, C2, C3, \dots Cn)$$

# DIGITAL READOUTS 981 SERIES

## A GAGING BREAKTHROUGH FOR THE FACTORY FLOOR

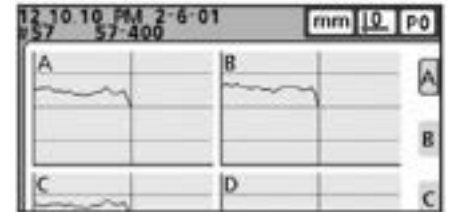


This DRO is a multi-axis metrology display that accepts up to eight discrete inputs. It features intuitive visual displays, helpful audio cues and user-defined formulas. It also reports dynamic Min/Max measurements, provides SPC analysis from an integrated database and includes connectivity to PCs and other peripherals.



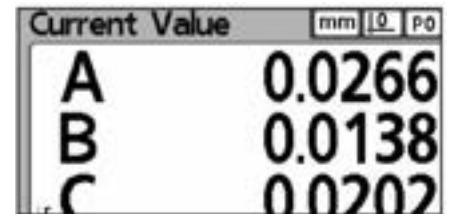
### Visual feedback

A highly visible, intuitive and familiar interface with standard color cues. Instantly informs operators of pass/fail performance details for critical part dimensions.



### Integrated SPC database

Store, retrieve and manage enormous amounts of measurement data on the shop floor. Check quality control of each gage. Share information locally and globally.



### Formulas

Up to 16 output channels apply mathematical formulas to measurement data for on-the-spot part analysis.

981 Series Specifications		Inputs
<b>LCD</b>	6" color	4 and 8-axis input available External connections: Footswitch Remote keypad Touch probe RS-232C serial port Parallel port – 16 pin  <b>Outputs</b> Parallel port – 16 pin / Data output to USB stick
<b>Display digit size</b>	.45"	
<b>Resolution down to</b>	.000004" or .0001 mm	
<b>Operating temperature</b>	0°C–45°C	
<b>Enclosure (W × H × D)</b>	11.5" × 7.5" × 2.75"	
<b>Base (W × H × D)</b>	10" × 2" × 7.5"	
<b>Enclosure weight</b>	5.4 lbs	
<b>Base weight</b>	6.2 lbs	
<b>Input voltage range</b>	85 VAC–264 VAC	
<b>Input frequency</b>	43 Hz–63 Hz	

### Ordering Information

Analog	Order No.
4 Gage Input	<b>981-004</b>
8 Gage Inputs	<b>981-008</b>

Digital	Order No.
up to 16 Gage Inputs	<b>981-000</b>

Standard boxes configured for Heidenhain probes.

# 981 SERIES DIGITAL READOUTS



## View as Column Gages

Color-coded vertical or horizontal bar graphs  
User selectable high/low tolerance limits  
User-settable audio warning limits  
Display one, four or eight bar graphs for quick pass/fail notification



## Easy to view DRO

Customizable display to reflect part dimension  
Large, easy to read numerical display  
Color coded pass/fail with audio alert  
Inch/mm toggle

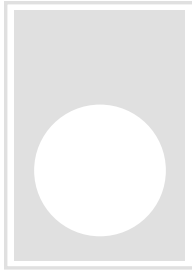


## Digital Readouts

- Ergonomic design
- Intuitive user interface
- Familiar, powerful measurement tools
- Single- and multi-sensor environments



# 981 SERIES DIGITAL READOUTS DATA VIEWING AND COLLECTION



## Data Output

- RS232 interface to computer.
- Customizable color report print-outs using standard HP ink jet printers.
- 2 switching outputs.
- Output single record measurement or an entire data report.



## Historical Data Views

- Display single or multiple dimensions.
- Display SPC statistics.
- Each dimension is time and date stamped.



## SPC Charts

X-Bar and range charts.  
Assign subgroup size.  
Set visual warning limits.  
Display charts for one, four or eight dimensions on screen.



## SPC Charts

- Display process capability charts.
- Display charts for one, four or eight dimensions on screen.

# 981 SERIES ACCESSORIES

Description	Order No.
2-function footswitch w/ 8' cable	<b>981-501</b>
8-function remote keypad w/ 15' cable	<b>981-502</b>
8-function remote keypad w/ 25' cable	<b>981-503</b>
Dot-matrix 40-column printer w/ RS-232 cables	<b>981-504</b>
Dot-matrix 80-column printer w/ RS-232 cables	<b>981-505</b>
Printer paper for 40-column printer	<b>981-506</b>
9-pin serial cable	<b>981-507</b>
Serial printer cable	<b>981-508</b>
QC tray stand	<b>981-509</b>
Swivel arm-mounting bracket for QC tray stand	<b>981-510</b>
QC arm-mounting bracket adapter	<b>981-511</b>
Arm-mounting bracket	<b>981-512</b>
Fowler's 16-bit Software Wedge	<b>981-513</b>
GC-100 instruction manual	<b>981-514</b>



*Dot-matrix printers*



*Two-function footswitch*



*Eight-function remote keypad*



MLG Mitytoyo linear gage		Order No.
6-pin round connector for Mitutoyo linear gages	1-axis	<b>981-601</b>
	4-axis	<b>981-602</b>
	8-axis	<b>981-603</b>



SL-F Solartron		Order No.
Full-bridge LVDT probe interface	1-axis	<b>981-616</b>
	4-axis	<b>981-617</b>
	8-axis	<b>981-618</b>



MP-F Marposh		Order No.
Full-bridge LVDT probe interface	1-axis	<b>981-604</b>
	4-axis	<b>981-605</b>
	8-axis	<b>981-606</b>



SL-H Solartron		Order No.
Half-bridge HBT probe interface	1-axis	<b>981-619</b>
	4-axis	<b>981-620</b>
	8-axis	<b>981-621</b>



MP-H Marposh		Order No.
Half-bridge HBT probe interface	1-axis	<b>981-607</b>
	4-axis	<b>981-608</b>
	8-axis	<b>981-609</b>



SP Heidenhain Spectro		Order No.
15-pin D-sub female connector for 1vp-p Spectro gages	1-axis	<b>n/a</b>
	2-axis	<b>n/c</b>
	3-axis	<b>n/c</b>



MSR Mitutoyo		Order No.
10-pin rectangular connector for Mitutoyo serial gages	1-axis	<b>981-610</b>
	4-axis	<b>981-611</b>
	8-axis	<b>981-612</b>



TS-F Tesa		Order No.
Full-bridge LVDT probe interface	1-axis	<b>981-622</b>
	4-axis	<b>981-623</b>
	8-axis	<b>981-624</b>



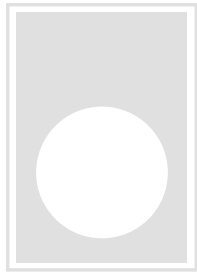
NL Nikon linear scales or Digi-Micro		Order No.
7-pin round female connector; .001mm, .002mm, .004mm, .005mm resolutions	1-axis	<b>981-613</b>
	4-axis	<b>981-614</b>
	8-axis	<b>981-615</b>



TS-H Tesa		Order No.
Half-bridge HBT probe interface	1-axis	<b>981-625</b>
	4-axis	<b>981-626</b>
	8-axis	<b>981-627</b>

Note: Digi-Micro requires 11B11219 cable

n/c - no charge  
n/a - not available



## Build Your Own Gage

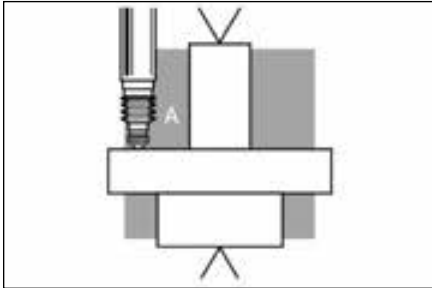
Using Dyer Digital Probes, linear encoders and digital readout, you can easily build your own tabletop gage.

## Digital Readout

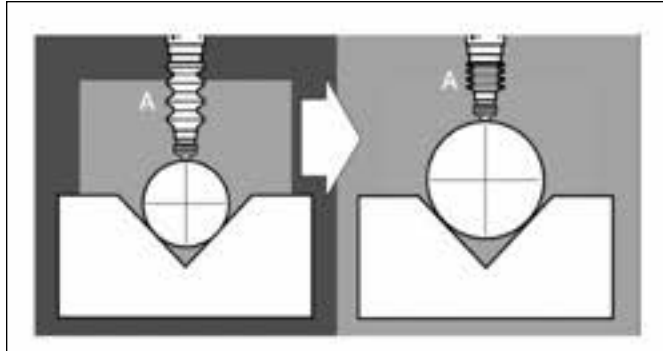
This is Dyer's most advanced, yet easy-to-use, Digital Readout. "Auto custom" display guides the operator through the setup or Dyer will set up a system for you.

## Network Systems

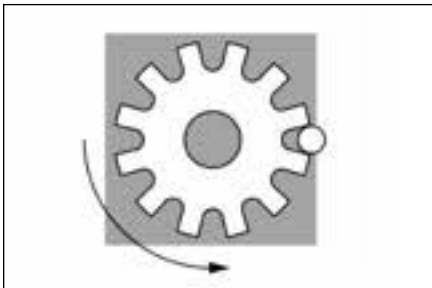
Easily sets up for SPC Data Collection.



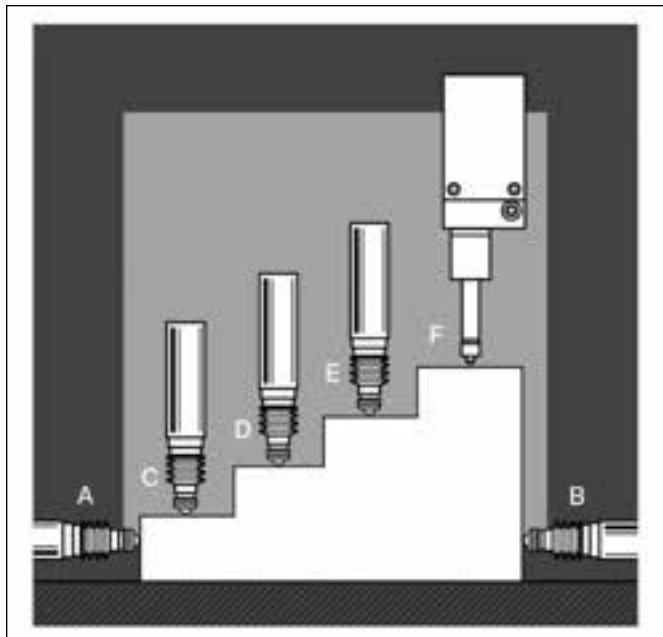
TIR max - min measuring



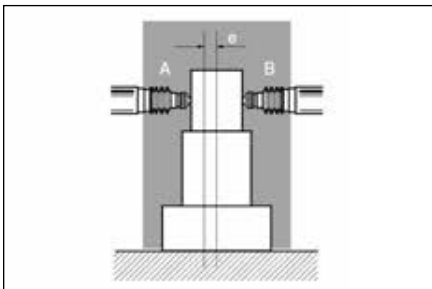
Scaling factor measuring



TIR of gears



Global pass/fail measuring of up to 30 scan channels (up to 30 probes). Each channel can be either an individual probe A + B or A - B and have its own set of limit and preset values.



Scaling mode

$$e = A - B$$

$$\frac{2}{\text{Max} - \text{min}}$$

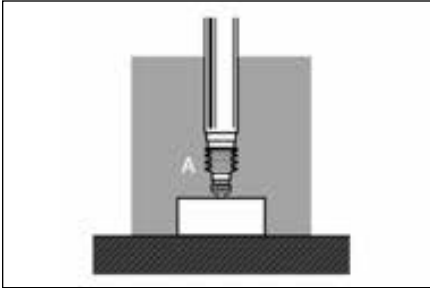
# 124, 125, 971, 981 SERIES MEASURING APPLICATION SOLUTIONS

## Build Your Own System

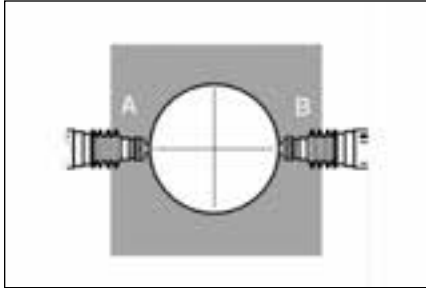
Dyer's Digital Probes and Readouts along with our component fixturing will make the high accuracy measurements you require. Just contact Dyer's office with your measuring applications.

## Absolute Measurements

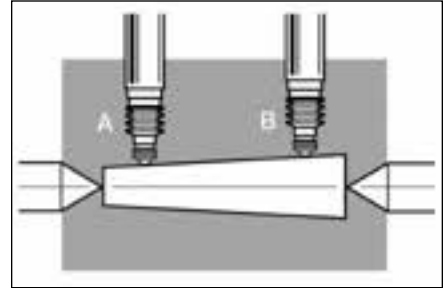
The Dyer Digital Probe is an absolute measuring device, which means when you switch it on it returns to the correct output regardless of movements during the off periods.



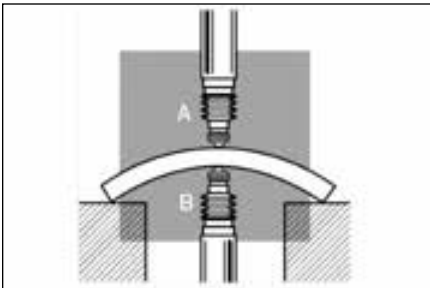
*Height or gage block measuring*



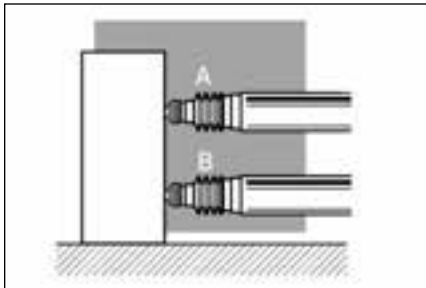
*Diameter measuring independent of eccentricity*



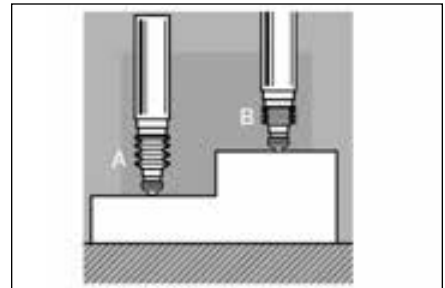
*Taper measuring independent of component dimensions*



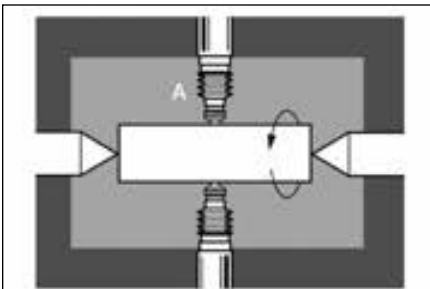
*Thickness measuring independent of component shape or location*



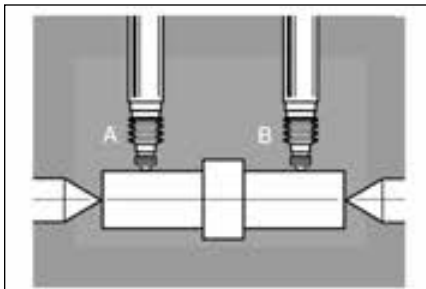
*Squareness measuring independent of position*



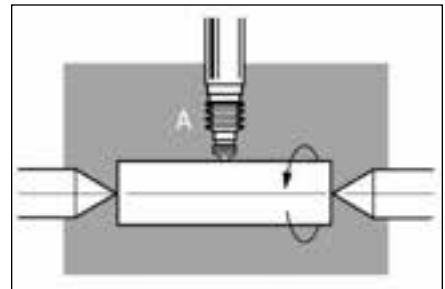
*Step height measuring*



*Max - min or max + min*



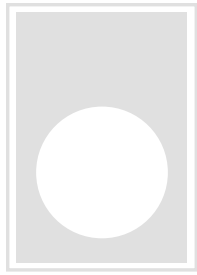
*Measuring alignment of two shafts*



*Out-of-roundness measuring independent of eccentricity with sum of measurement*

# F

## Cylindrical Set Masters Universal Setting Masters



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**visit** our searchable web site and  
find Dyer's interactive  
catalog, gaging solutions  
by application and industry!

# SERIES 801 MASTER DISCS STEEL AND CHROME

## Notable Features

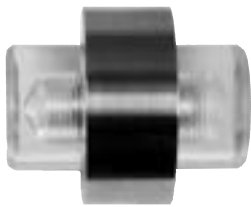
- All gage master setting discs regardless of class are lapped to size and polished. Roundness and taper of all gages will not exceed 50% of the applicable gage maker's size tolerance and are non-accumulative.
- All inch master discs will be furnished with black insulators and metric sizes yellow insulators. Red and green available on request.

Dyer setting discs are available in steel or chrome and in three styles.

When ordering master discs, please specify:

1. Exact size
2. Style in steel or chrome
3. Class

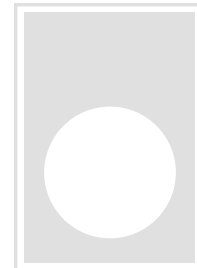
If you require chrome, please specify when ordering. Add 30% to standard price.



Style #3 Steel Order No.	Size Range Above To	Class	Tolerance Inches	Style #3 Steel Order No.	Size Range Above To	Class	Tolerance Inches
801-301	0.150"-0.230" 3.81mm-5.84mm	XX	0.00002"	801-318	7.0101"-7.510" 178.05mm-190.75mm	XX	0.00008"
		X	0.00004"			X	0.00016"
		Y	0.00007"			Y	0.00024"
801-302	0.2301"-0.365" 5.84mm-9.27mm	XX	0.00002"	801-319	7.5101"-8.010" 190.75mm-203.45mm	XX	0.00008"
		X	0.00004"			X	0.00016"
		Y	0.00007"			Y	0.00024"
801-303	0.3651"-0.510" 9.27mm-12.95mm	XX	0.00002"	801-320	8.0101"-8.510" 203.45mm-216.15mm	XX	0.00008"
		X	0.00004"			X	0.00016"
		Y	0.00007"			Y	0.00024"
801-304	0.5101"-0.825" 12.95mm-20.96mm	XX	0.00002"	801-321	8.5101"-9.010" 216.15mm-228.85mm	XX	0.00008"
		X	0.00004"			X	0.00016"
		Y	0.00007"			Y	0.00024"
801-305	0.8251"-1.135" 20.96mm-28.83mm	XX	0.00003"	801-322	9.0101"-9.510" 228.85mm-241.55mm	XX	0.00010"
		X	0.00006"			X	0.00020"
		Y	0.00009"			Y	0.00030"
801-306	1.1351"-1.510" 28.83mm-38.35mm	XX	0.00003"	801-323	9.5101"-10.010" 241.55mm-254.25mm	XX	0.00010"
		X	0.00006"			X	0.00020"
		Y	0.00009"			Y	0.00030"
801-307	1.5101"-2.010" 38.35mm-51.05mm	XX	0.00004"	801-324	10.0101"-10.510" 254.25mm-266.95mm	XX	0.00010"
		X	0.00008"			X	0.00020"
		Y	0.00012"			Y	0.00030"
801-308	2.0101"-2.510" 51.05mm-63.75mm	XX	0.00004"	801-325	10.5101"-11.010" 266.95mm-279.65mm	XX	0.00010"
		X	0.00008"			X	0.00020"
		Y	0.00012"			Y	0.00030"
801-309	2.5101"-3.010" 63.75mm-76.45mm	XX	0.00005"	801-326	11.0101"-11.510" 279.65mm-292.35mm	XX	0.00010"
		X	0.00010"			X	0.00020"
		Y	0.00015"			Y	0.00030"
801-310	3.0101"-3.510" 76.45mm-89.15mm	XX	0.00005"	801-327	11.5101"-12.010" 292.35mm-305.05mm	XX	0.00010"
		X	0.00010"			X	0.00020"
		Y	0.00015"			Y	0.00030"
801-311	3.5101"-4.010" 89.15mm-101.85mm	XX	0.00005"	801-328	12.0101"-12.510" 305.05mm-317.75mm	XX	0.00015"
		X	0.00010"			X	0.00030"
		Y	0.00015"			Y	0.00045"
801-312	4.0101"-4.510" 101.85mm-114.55mm	XX	0.00005"	801-329	12.5101"-13.010" 317.75mm-330.45mm	XX	0.00015"
		X	0.00010"			X	0.00030"
		Y	0.00015"			Y	0.00045"
801-313	4.5101"-5.010" 114.55mm-127.25mm	XX	0.000065"	801-330	13.0101"-13.510" 330.45mm-343.15mm	XX	0.00015"
		X	0.00013"			X	0.00030"
		Y	0.00019"			Y	0.00045"
801-314	5.0101"-5.510" 127.25mm-139.95mm	XX	0.000065"	801-331	13.5101"-14.010" 343.15mm-355.85mm	XX	0.00015"
		X	0.00013"			X	0.00030"
		Y	0.00019"			Y	0.00045"
801-315	5.5101"-6.0100" 139.95mm-152.65mm	XX	0.000065"	801-332	14.0101"-14.510" 355.85mm-368.55mm	XX	0.00015"
		X	0.00013"			X	0.00030"
		Y	0.00019"			Y	0.00045"
801-316	6.0100"-6.510" 152.65mm-165.35mm	XX	0.000065"	801-333	14.5101"-14.750" 368.55mm-379.25mm	XX	0.00015"
		X	0.00013"			X	0.00030"
		Y	0.00019"			Y	0.00045"
801-317	6.5101"-7.010" 165.35mm-178.05mm	XX	0.00008"	800-102	Certificate of calibration (Long form)		
		X	0.00016"				
		Y	0.00024"				



# SERIES 800 RING GAGES STEEL & CHROME



- All ring gages regardless of class are lapped to size and polished.
- Non-gaging areas are black oxidized and ring faces are surface ground.
- Gage blanks meet all requirements of B47.1-1988.
- Ring gages are manufactured in accordance with ANSI Specification B89.1.6-1984.
- Roundness and taper of all gages will not exceed 50% of the applicable gage-maker's size tolerance and are non-accumulative.
- Traceable certification and calibration available. Contact Dyer office.

### Dyer ring gages are available in three tolerances:

MASTER—Bilateral (split) tolerance

GO—Unilateral (minus) tolerance (largest size)

NO GO—Unilateral (plus) tolerance (smallest size)

When ordering ring gages—please specify:

1. Exact size
2. Class
3. Tolerance (Master, Go, or No Go)



Above 1.510"



Below 1.510"

We recommend master ring gages for setting Dyer inside diameter gages.

Steel Order No.	Size Range Above To	Class	Tolerance Inches	Steel	Chrome	Steel Order No.	Size Range Above-To	Class	Tolerance Inches	Steel	Chrome
800-100	0.025"—0.040" 0.635mm—1.02mm	XX	0.00002			800-015	4.760"—5.510" 120.90mm—139.95mm	XX	0.000065		
		X	0.00004	X	N/A			X	X		
		Y	0.00007					Y	0.00019	X	X
		Z	0.00010					Z	0.00025		
800-001	0.040"—0.070" 1.02mm—1.78mm	XX	0.00002			800-016	5.510"—6.260" 139.95mm—159.00mm	XX	0.000065		
		X	0.00004	X	N/A			X	0.00013	X	X
		Y	0.00007					Y	0.00019	X	X
		Z	0.00010					Z	0.00025		
800-002	0.070"—0.150" 1.78mm—3.81mm	XX	0.00002			800-017	6.260"—7.010" 159.00mm—178.05mm	XX	0.00008		
		X	0.00004	X	N/A			X	0.00016	X	X
		Y	0.00007					Y	0.00024	X	X
		Z	0.00010					Z	0.00032		
800-003	0.150"—0.230" 3.81mm—5.84mm	XX	0.00002			800-018	7.010"—7.760" 178.05mm—197.10mm	XX	0.00008		
		X	0.00004	X	X			X	0.00016	X	X
		Y	0.00007					Y	0.00024	X	X
		Z	0.00010					Z	0.00032		
800-004	0.230"—0.365" 5.84mm—9.27mm	XX	0.00002			800-019	7.760"—8.510" 197.10mm—216.15mm	XX	0.00008		
		X	0.00004	X	X			X	0.00016	X	X
		Y	0.00007					Y	0.00024	X	X
		Z	0.00010					Z	0.00032		
800-005	0.365"—0.510" 9.27mm—12.95mm	XX	0.00002			800-020	8.510"—9.260" 216.15mm—235.20mm	XX	0.00008		
		X	0.00004	X	X			X	0.00016	X	X
		Y	0.00007					Y	0.00024	X	X
		Z	0.00010					Z	0.00032		
800-006	0.510"—0.825" 12.95mm—20.96mm	XX	0.00002			800-021	9.260"—10.010" 235.20mm—254.25mm	XX	0.00010		
		X	0.00004	X	X			X	0.00020	X	X
		Y	0.00007					Y	0.00030	X	X
		Z	0.00010					Z	0.00040		
800-007	0.825"—1.135" 20.96mm—28.83mm	XX	0.00003			800-022	10.010"—10.760" 254.25mm—273.30mm	XX	0.00010		
		X	0.00006	X	X			X	0.00020	X	X
		Y	0.00007					Y	0.00030	X	X
		Z	0.00012					Z	0.00040		
800-008	1.135"—1.510" 28.83mm—38.35mm	XX	0.00003			800-023	10.760"—11.510" 273.30mm—292.35mm	XX	0.00010		
		X	0.00006	X	X			X	0.00020	X	X
		Y	0.00007					Y	0.00030	X	X
		Z	0.00012					Z	0.00040		
800-009	1.510"—2.010" 38.35mm—51.05mm	XX	0.00004			800-024	11.510"—12.260" 292.35mm—311.40mm	XX	0.00010		
		X	0.00008	X	X			X	0.00020	X	X
		Y	0.00012					Y	0.00030	X	X
		Z	0.00016					Z	0.00040		
800-010	2.010"—2.510" 51.05mm—63.75mm	XX	0.00004			800-025	12.260"—13.010" 311.40mm—330.45mm	XX	0.00015		
		X	0.00008	X	X			X	0.0003	X	••
		Y	0.00012					Y	0.00045	X	••
		Z	0.00016					Z	0.0006		
800-011	2.510"—3.010" 63.75mm—76.45mm	XX	0.00005			800-026	13.010"—13.760" 330.45mm—349.50mm	XX	0.00015		
		X	0.00010	X	X			X	0.0003	X	••
		Y	0.00015					Y	0.00045	X	••
		Z	0.00020					Z	0.0006		
800-012	3.010"—3.510" 76.45mm—89.15mm	XX	0.00005			800-027	13.760"—14.510" 349.50mm—368.55mm	XX	0.00015		
		X	0.00010	X	X			X	0.0003	X	••
		Y	0.00015					Y	0.00045	X	••
		Z	0.00020					Z	0.0006		
800-013	3.510"—4.010" 89.15mm—101.85mm	XX	0.00005			800-028	14.510"—15.260" 368.55mm—387.60mm	XX	0.0002		
		X	0.00010	X	X			X	0.0004	X	••
		Y	0.00015					Y	0.0006	X	••
		Z	0.00020					Z	0.0008		
800-014	4.010"—4.760" 101.85mm—120.90mm	XX	0.00005			800-029	15.260"—16.010" 387.60mm—406.65mm	XX	0.0002		
		X	0.00010	X	X			X	0.0004	X	••
		Y	0.00015					Y	0.0006	X	••
		Z	0.00020					Z	0.0008		
800-102	Certificate of calibration (Long form)										

# UNIVERSAL BORE GAGE SET MASTERS LARGE & SMALL DIAMETERS

## Adjustable Range, Setting Masters For Internal Diameter Gages

### Repeatable Mastering of Large Diameter Internal Gages

Precise mastering of large diameters can be a challenge, particularly when Master Setting Rings are not available or too expensive. It is important that ID gages are repeatably set when using a setting master. Both the gage setup and the part measuring need to be Gage R & R capable.

### Notable Features

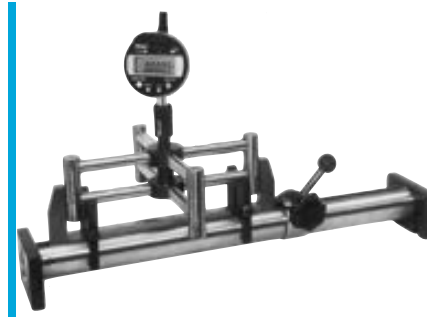
- A ratchet type clamping handle results in a reproducible clamping force of the gage blocks in the setting master.
- No operator influence during the gage mastering setup, "hands-off mastering".
- The Setting Master special jaws (designed for each gage type) means repeatable, large diameter gage setups.
- Rectangular gage blocks, ringed together, are held in precise position within the setting master's size range slot. Gage blocks are not included.
- Fast range changes and setup times lower costs.
- Large, adjustable range results in cost justifiable gaging and maximum value.
- One basic unit with different jaw setting components allows this master to be used with many internal gages.

Each Set Master System includes:

- Individual gage "setup" stand/fixture that can master a gage series in the horizontal or vertical axis position.
- One (1) set of adjustable locating jaws that hold the gage's centering base in position mastering.
- One (1) pair of carbide parallel anvils, lapped to precision grade gage block standards.



Model 410-010 Set Master with 222 Series Precision Bore Gage in a vertical measuring axis mastering setup.



Model 440-202 Set Master with 440 Series Twin Cross® Bore Gage in a horizontal axis mastering setup.



290-200 Setting Anvils next to Adjustable Setting Master

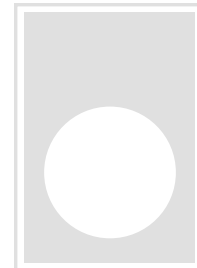


290-200 Complete Master Setup with 290-015 pitch diameter gage being set

### Adjustable Setting Master

Range		Ordering Number by Gage Series			
Inch	mm	Series 220, 222, 223, 225, 270	Series 440, 441	Series 290 20° Angle	Series 290 30° Angle
0-6.30	0-160	410-005		290-200	290-300
0-11.40	0-290	410-007	440-201	290-201	290-301
0-20.00	0-510	410-010	440-202	290-202	290-302
0-31.50	0-800	410-015	440-203		
0-39.40	0-1000	Inq.			

# 415 SERIES ELECTRONIC AUTOMATIC ADJUSTABLE SETTING MASTERS



## Notable Features

- Automatic positioning feature is designed to set a wide variety of bore, groove, and OD gages. Even indicators and 3-point gages can be mastered
- A Heidenhain high precision optical scale is utilized to ensure highest accuracies
- Safe and simple operation: A zero setting for any instrument can be made by just typing a desired value into unit. CNC motorized movement makes this possible.
- No need to purchase master rings or gage blocks
- Wide range of adapters are offered to aid in setting many different types of devices
- Ceramic reference pads come standard with the unit
- Electronic LCD display
- Stores up to 100 preset positions to set your most common gages
- Remote PC control is possible
- Store data via USB port
- Special customized models are available. Please contact Dyer Engineering for your specific needs.



Model 415-005

## Adjustable Setting Master

Internal Application Range	External Application Range	Accuracy	Resolution	Order No.
0.040"-20.0 (1-500mm)	1.57"-20.7" (40-525mm)	0.0000 60" + (L 1/300) 1.5μ + L(mm)/300	0.0000 20" (0.0005mm)	<b>415-005</b>
0.040"-39.3 (1-1000mm)	1.57"-41.0" (40-1040mm)	0.0000 60" + (L 1/300) 1.5μ + L(mm)/300	0.0000 20" (0.0005mm)	<b>415-010</b>
0.040"-59.1 (1-1500mm)	1.57"-60.7" (40-1540mm)	0.0000 60" + (L 1/300) 1.5μ + L(mm)/300	0.0000 20" (0.0005mm)	<b>415-015</b>
0.040"-78.8 (1-2000mm)	1.57"-80.3" (40-2040mm)	0.0001 20" + (L 1/500) 3.0μ + L(mm)/500	0.0000 20" (0.0005mm)	<b>415-020</b>



Adapters to set large bores



Adapters for small bores



Adapter set up for groove gages



Adapter set up for indicators



Adapter set up for 3-point gages

# SHOW DYER YOUR APPLICATION. WE WILL HELP YOU SELECT THE RIGHT GAGE.

## Dyer's Specialized Quality Repair Center

We repair most makes and models:

- All Dyer gages
  - Intertest, Oditest, Quicktest
- Dial and test indicators
- Dial thickness gages
- Dial bore gages
- Dial calipers
- Electronic repair on all Dyer products

We repair most manufacturers' models:

- Chicago Dial
- Dorsey
- Dyer
- Fowler
- Mahr-Federal
- Mitutoyo
- SPI

### Quality Standards

Our quality standards include three (3) quality inspections. It is our policy to put a repaired gage in equal to new condition. We completely disassemble all gages, ultrasonically clean them, inspect all moving parts, and replace all worn parts. The gage is then reassembled and calibrated on equipment directly traceable to NIST standards. Your gage is now processed through three separate quality inspections. Each gage is checked for calibration, mechanical movement, and smoothness. Our customer's satisfaction is guaranteed on all repaired gages.

### ISO 17025

Certificate of Calibration for each gage available upon request.

### Service Information

Dyer stocks a parts inventory exceeding \$100,000. Normal repair is two weeks or less. First in, first out. We offer a 24-48 hour Red Line repair service. It is our policy to proceed with a repair if it does not exceed 65% of replacement costs.

### Specials and Modifications

For a moderate price, our skilled technicians can modify many of our standard stock gages. We will alter arms, contact points, probes, etc. to fit your specific needs. Many of our gaging systems are made of modular components enabling us to quickly create a special gage to meet your requirements. Prompt, one- or two-day service is available on many Dyer specially modified gages.



240/440 gage assemblies and special application gages

Custom modifications and general gage repairs

Send gages for repair to: Attn: Repair Department • The Dyer Company • 1500 McGovernville Road • Lancaster PA 17601

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#### PRODUCTS

Bore Gages

Groove Gages

Min-Wall Thickness Gages

Special Application Gages

Indicating Units

Set Masters

#### Providing Thousands of Custom & Stock Production Gages for Precision Bores, Grooves, Min-Wall, Thickness, and Special Applications

Dyer Company is a technical leader in precision bore gages, ID/OD Groove gages, min-wall / thickness gages and special application gages. For over 40 years we have supplied our customers with the highest quality gages that speed measuring times and eliminate operator error. Dyer gages save time, have proven designs, are fast, accurate, repeatable and 24-7 shop rugged.

As a manufacturer and supplier of unique hand and table top gages, we guarantee a  $\leq 10\%$  gage R & R capability. We offer quick delivery, 1-5 days for standard, special and custom design gages.

##### Bore Gages

- Non-Tipping Indicating Plug Gages
- Adjustable Long Range Gages
- Deep and Shallow Bore Gages
- Special Custom Bore Gages

See More »

##### Groove Gages

- Electronic & Dial Groove Gages
- Grooves as small as 0.100"
- Long Reach, High Accuracy
- Models Available
- Many Different Arm Configurations

See More »

##### Min-Wall, Thickness Gages

- Electronic & Dial Thickness Gages
- Custom Contacts Made to Order
- Many Different Arm Configurations

See More »

##### Special Application Gages

- Gages to Measure Chamfers, Parallel Width, Depths, and height
- Custom Gages Made to Specific Part Applications

##### Indicating Units

- Electronic Display Boxes
- Digital LVDT Probes
- SPC Capabilities
- Digital and Dial Indicators

##### Set Masters

- Setting Rings & Discs (Steel, Chrome, Carbide)
- Adjustable Setting Masters
- Custom Setting Masters

[www.dyergage.com](http://www.dyergage.com)

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The Dyer Company  
1500 McGovernville Road  
P.O. Box 4966  
Lancaster, PA 17604

Phone: 717.569.3223  
800.631.3333  
Fax: 717.569.6721  
E-mail: [Dyer@dyergage.com](mailto:Dyer@dyergage.com)