

THE BENCHMARK OF INDICATING MEASURING INSTRUMENTS. **MARAMETER.**



The latest information on MARAMETER products can be found on our website:

www.mahr.com, WebCode 211

► | MaraMeter is the ideal measuring instrument for highly precise measurements of internal and external diameters on either an individual part or on serial components. Our indicating measuring instruments obtain the best results due to their constant measuring force, their exact transmission lever system as well as their high parallelism on the measuring faces. For special measuring tasks such as threads, teeth, grooves or precision mechanical parts MaraMeter offers the right solution. | ◀

► | MaraMeter. Indicating Measuring Instruments

Indicating Measuring Instruments for Outside Dimensions, Indicating Snap Gages

**MaraMeter 1000 P / 300 P / 840 F / 840 FC / 840 FH /
840 FG / 840 FM / 840 FS** **9- 2**

With fixed or interchangeable measuring faces

MaraMeter 840 E **9- 18**

For extremely high precision

MaraMeter 852 / 852 TS / 853 **9- 19**

For threads, pitches, roots, serrations

Portable Thickness Gages

MaraMeter 22 P / 26 P / 838 A / 838 B / 838 AB / 57 B **9-26**

With digital and/or analog display

Caliper Gages

MaraMeter 49 P / 838 TA / 838 EA / 838 TI / 838 EI **9-33**

With digital and/or analog display

Depth Gages

MaraMeter 837 / 65 P-40 / 75 P-30 / 75 P-30 / 75 B-1 **9-41**

Indicating Measuring Instruments for Inside Dimensions,

Dimentron® Plug Inside Diameter Gages **9-46**

Designed for high production I.D. gaging

MaraMeter 844 D **9-51**

Indicating Plug Gage for rapid testing of serial components

MaraMeter 844 K **9-58**

Self-centering Dial Bore Gage

Marameter 1280 P Adjustable Bore Gages **9-63**

Superior accuracy for production and inspection

MaraMeter 844 N **9-66**

Self-centering Dial Bore Gage

MaraMeter 844 Z **9-70**

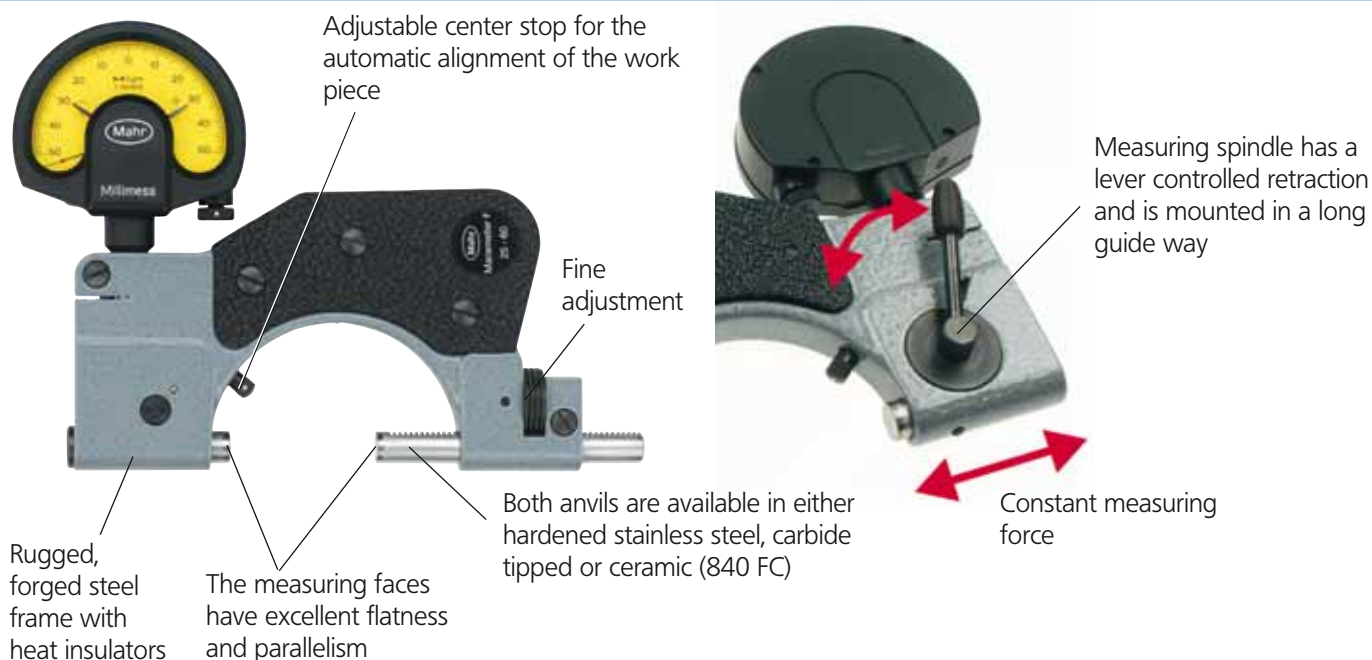
Dial Bore Gage for internal serrations

MaraMeter. Indicating Snap Gages

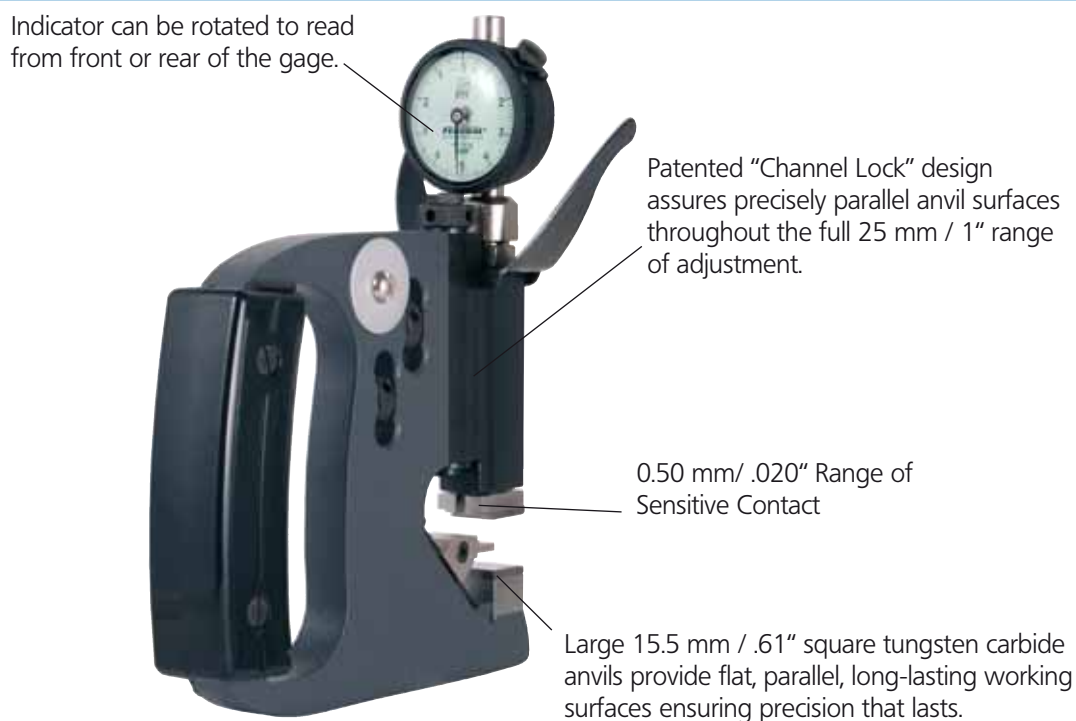
OVERVIEW

► | The Indicating Snap Gages **MaraMeter** 840 F / 300 P-1 are ideal for highly accurate and reliable results on cylindrical work pieces with a narrow tolerance. | ◀

MaraMeter 840 F



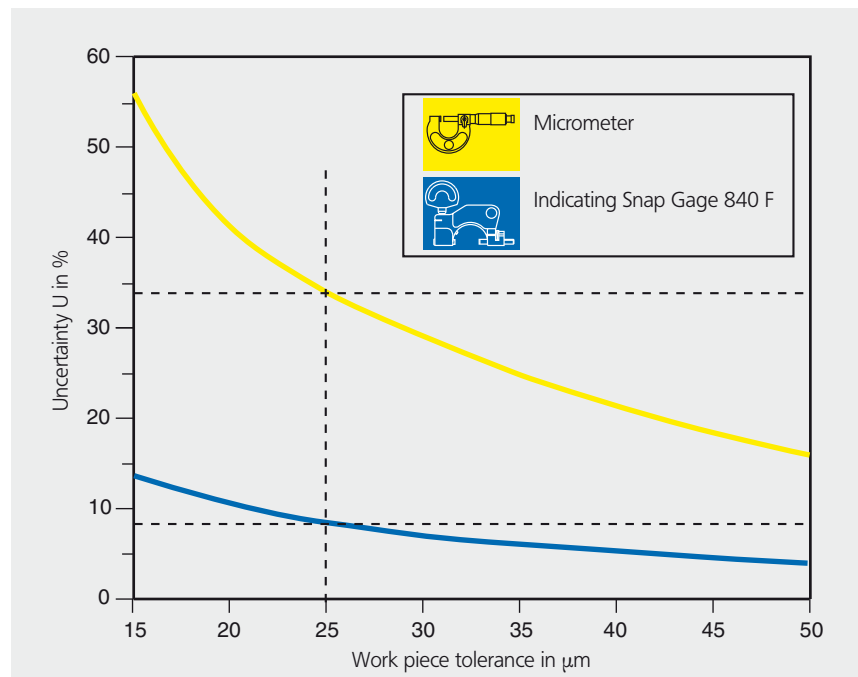
MaraMeter 300 P-1



Advantages of the Snap Gage 840 F compared to a Micrometer

• Reduced Measuring Uncertainty

The MaraMeter Indicating Snap Gages have a notably reduced measuring uncertainty in comparison to a Micrometer.



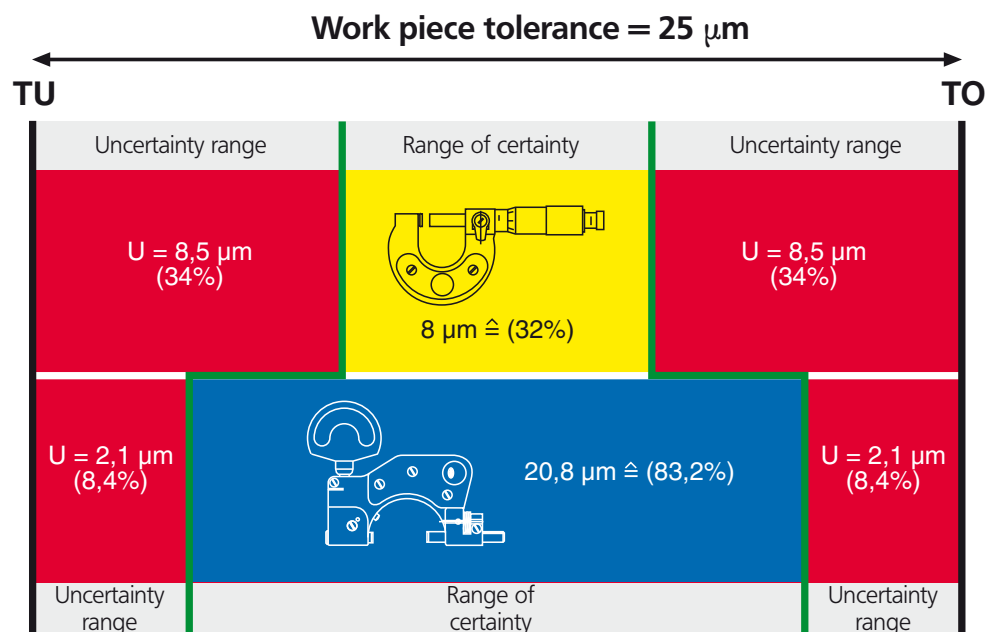
Measuring Uncertainty U is dependent upon the tolerance of the work piece

• Better utilization of the tolerance zone

Example:
Work piece tolerance 25 μm

The measured value in the uncertainty range can lie outside of the tolerance range, therefore the utilized tolerance of the micrometer is reduced to only 32% (8 μm).

With a MaraMeter Indicating Snap Gage 840 F, 83% (20.8 μm) of the work piece tolerance can be utilized.



Advantage:

With the Indicating Snap Gage the tolerance zone can be used to far greater extent, thus reducing the production costs.

Snap Gages for Outside Diameters 1000P



The economical way to check outside diameters on the shop floor.

Features

- Flat lower anvil (reference) adjustable over a broad range.
- Radiused upper anvil (sensitive) spring-loaded to counter balance the weight of the gage.
- 0.01 mm grads. on Metric Models. .0005" grads. on Inch Models.
- 0.50 mm / .020" Range of Sensitive Contact.
- Indicator can be rotated to read from front or rear of the gage.
- Anvils are tungsten carbide for long life.

1000P-3

0.01 mm or .0005" Dial Indicator normally furnished

Technical Data

Capacity mm	(inch)	Reference Anvil Diameter mm / inch	Order no. Metric	Order no. Inch
0 - 25	(0 - 1")	13 / .50"	1000P-1M*	1000P-1*
19 - 50	(.75 - 2")	13 / .50"	1000P-2M*	1000P-2*
44 - 82	(1.75 - 3.25")	13 / .50"	1000P-3M	1000P-3
76 - 114	(3 - 4.5")	16 / .625"	1000P-4M	1000P-4
102 - 152	(4 - 6")	16 / .625"	1000P-5M	1000P-5
152 - 203	(6 - 8")	19 / .75"	1000P-6M	1000P-6
203 - 254	(8 - 10")	19 / .75"	1000P-7M	1000P-7

Series 1000P gages with greater capacity, alternate Indicators, alternate contact configurations, or other modification to suit specific applications are available – contact Mahr Federal.

* Insulated grip not available.

Snap Gages for Outside Diameters 300P

Superior precision for
O.D. checks



EDI-301P-1

BA-26 Bench Stand (not included)

Features

- Patented "Channel Lock" design assures precisely parallel anvil surfaces throughout the full 25 mm / 1" range of adjustment.
- All Series 300P Snap Gages are fully adjustable with positive position locking at any point within the range.
- 0.50 mm / .020" Range of Sensitive Contact.
- Snap Gages available over a wide range of sizes, styles, and readout configurations.
- Large 15.5 mm / .61" square tungsten carbide anvils provide flat, parallel, long lasting working surfaces ensuring precision that lasts.
- Indicator can be rotated to read from front or rear of the gage.
- Optional lift-lever model (301P) available for retracting the upper anvil.
- All adjustments accomplished using a single hex wrench (furnished).

Technical Data

Style	Normally Furnished Indicating Instruments Readings	Snap Style	Separately, Order no.
12I/22I	.0001"	Flat Anvil	IDT-102/IDT-106
O1I/P1I	0.002 mm	Flat Anvil	IDS-206/IDS-208
Maxµm®III ⁽¹⁾	selectable ⁽³⁾	Flat Anvil	2033109
Maxµm®III ⁽²⁾	selectable ⁽³⁾	Flat Anvil	2033119
2034201	0.0005 mm / .00002"	Flat Anvil	2034201
B5M/C5M	.0005"	Groove Anvil	IDS-101/IDS-105
O6I/P6I	0.010 mm	Groove Anvil	IDS-207/IDS-209
Maxµm®III ⁽¹⁾	selectable ⁽³⁾	Groove Anvil	2033109
Maxµm®III ⁽²⁾	selectable ⁽³⁾	Groove Anvil	2033119
with Air Probe for 2500:1		All	*
with Electronic Gage Heads		All	*



A300P-2

* Call Mahr Federal.

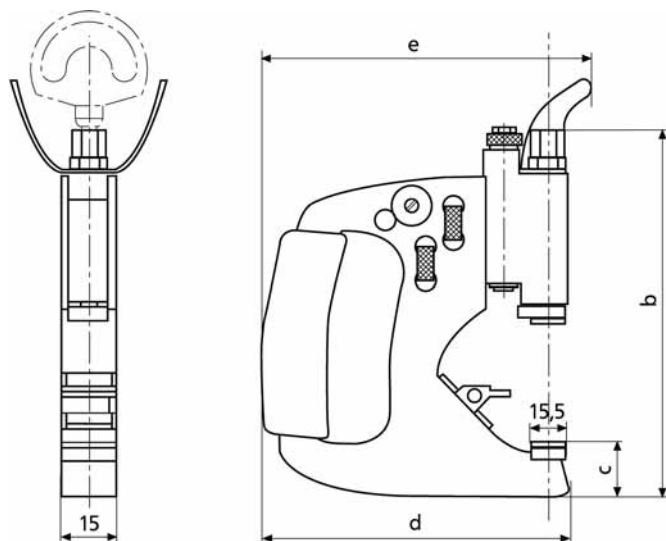
(1) With no Data Output

(2) With Data Output (6 pin)

(3) Selectable Readings — 0.001 mm / 0.005 mm / 0.0005 mm / .0001" / .0005" / .00002"

Snap Gages for Outside Diameters 300P

Technical Data



Dimensions

Meas. range mm / <i>inch</i>	b	c	d	e
0 - 25.4 / 0-1"	150/ 6"	29/ 1.16"	145/ 5.8"	158/ 6.3"
25.4 - 50.8 / 1-2"	175/ 7"	29/ 1.16"	141/ 5.6"	154/ 6.16"
50.8 - 76.2 / 2-3"	200/ 8"	29/ 1.16"	155/ 6.2"	167/ 6.7"
76.2 - 101.6 / 3-4"	226/ 9"	29/ 1.16"	167/ 6.7"	180/ 7.2"
101.6 - 127 / 4-5"	251/ 10"	29/ 1.16"	180/ 7.2"	193/ 7.7"
127 - 152.4 / 5-6"	278/ 11"	30/ 1.2"	203/ 8"	215/ 8.6"
152.4 - 177.8 / 6-7"	303/ 12"	30/ 1.2"	213/ 8.5"	226/ 9"
177.8 - 203.2 / 7-8"	329/ 13"	30/ 1.2"	231/ 9.2"	244/ 9.7"
203.2 - 228.6 / 8-9"	335/ 13.5"	30/ 1.2"	248/ 9.9"	261/ 10.4"

Ordering Information

Plain Anvils (Anvils included in price – choose from list below)

Capacity mm/ <i>inch</i>	No Indicator	No Indicator with 8 mm adaptor	With Maxµm®/// indicator	With µMaxµm®// indicator	With AirProbe®	No Indicator with 8 mm adaptor & lift lever	With Dial Indicator No lift lever	With lift lever
0 - 25.4 / 0-1"	OMI-300P-1	2003100	EMD-300P-1	EDI-300P-1	A300P-1	2003110	300P-1	301P-1
25.4 - 50.8 / 1-2"	OMI-300P-2	2003101	EMD-300P-2	EDI-300P-2	A300P-2	2003111	300P-2	301P-2
50.8 - 76.2 / 2-3"	OMI-300P-3	2003102	EMD-300P-3	EDI-300P-3	A300P-3	2003112	300P-3	301P-3
76.2 - 101.6 / 3-4"	OMI-300P-4	2003103	EMD-300P-4	EDI-300P-4	A300P-4	2003113	300P-4	301P-4
101.6 - 127 / 4-5"	OMI-300P-5	2003104	EMD-300P-5	EDI-300P-5	A300P-5	2003114	300P-5	301P-5
127 - 152.4 / 5-6"	OMI-300P-6	2003105	EMD-300P-6	EDI-300P-6	A300P-6	2003115	300P-6	301P-6
152.4 - 177.8 / 6-7"	OMI-300P-7	2003106	EMD-300P-7	EDI-300P-7	A300P-7	2003116	300P-7	301P-7
177.8 - 203.2 / 7-8"	OMI-300P-8	2003107	EMD-300P-8	EDI-300P-8	A300P-8	2003117	300P-8	301P-8
203.2 - 229 / 8-9"	OMI-300P-9	2003108	EMD-300P-9	EDI-300P-9	A300P-9	2003118	300P-9	301P-9

Blade Anvils (Anvils included in price – choose from list below)

0 - 25.4 / 0-1"	OMI-300P-31	EMD-300P-31	EDI-300P-31	A300P-31	300P-31	301P-31
25.4 - 50.8 / 1-2"	OMI-300P-32	EMD-300P-32	EDI-300P-32	A300P-32	300P-32	301P-32
50.8 - 76.2 / 2-3"	OMI-300P-33	EMD-300P-33	EDI-300P-33	A300P-33	300P-33	301P-33
76.2 - 101.6 / 3-4"	OMI-300P-34	EMD-300P-34	EDI-300P-34	A300P-34	300P-34	301P-34
101.6 - 127 / 4-5"	OMI-300P-35	EMD-300P-35	EDI-300P-35	A300P-35	300P-35	301P-35

Larger capacities available on request.

To specify Metric models, add suffix "M" to the Model number. To specify Digital Output, add suffix "D" to Model numbers of EMD-300P and EMD-301P Series Gages. To specify both, add suffix "MD" to Model numbers of EMD-300P and EMD-301P Series Gages.

Examples: 300P-2 specifies a Snap Gage with a 121 (.0001" grad.) Dial Indicator, 25-50 mm / 1-2" capacity.

EMD-301P-33D specifies a Groove Diameter Snap Gage with lift lever, 50-76 mm / 2-3" capacity, AL-110 Blade Anvils, 2033119 (selectable units and resolution) Maxµm/// Indicator with Digital Output

Snap Gages for Outside Diameters 300P

Accessories



BA-71
Bench Stand for Disc Masters



Groove Diameter Snap Gages – One pair of anvil inserts must be specified with each gage. Stocked anvils (shown below) are hardened steel. If no other anvils are specified, AL-110 will be provided.

Anvil Inserts – For all Series 300P-30 and 301P-30 groove gages (2 required per gage).

Order no.

Bench Stand for Gages

Clamps 300P and 1000P Series Gages firmly. A 6.4 mm / .25" mounting hole allows permanent fastening to bench surface.

BA-26

Bench Stand for Disc Masters

Holds any AGD style 3 Disc up to 127 mm / 5" diameter and 27 mm / 1.12" wide. Two 6.4 mm / 0.25" mounting holes allow permanent fastening to bench surface

BA-71

Gaging pressure options

For EMD, OMI and Dial Indicator models

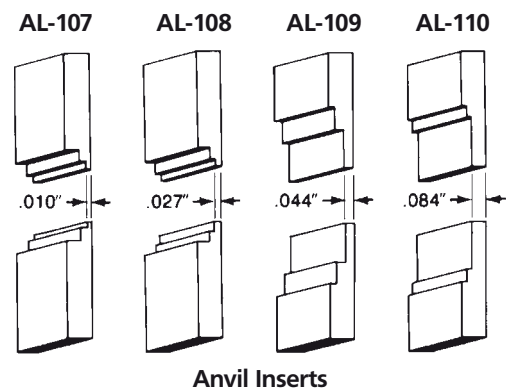
Lighter
Heavier

SP-192
SP-118

For EDI models only

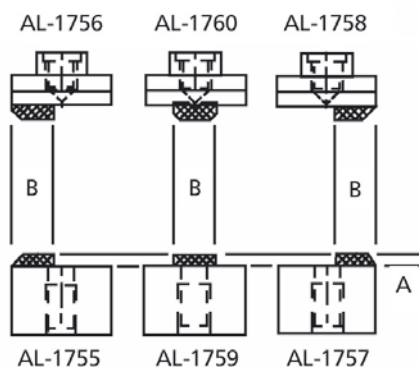
Lighter
Heavier

2243295
2243297



Anvil Inserts

Plain Anvil Options Front View



A = 2mm/.080in
B = 6.35mm/.250in

Blade Anvils

Width mm / inch	Depth mm / inch	Order no. Steel	T.C.
0.25 / .010"	0.76 / .030"	AL-107	AL-1741
0.69 / .027"	1.02 / .040"	AL-108	AL-1742
1.12 / .044"	4.83 / .19"	AL-109	AL-1743
2.13 / .084"	6.35 / .25"	AL-110*	AL-1744

* normally provided

Indicating Snap Gages 840 F / 840 FC MaraMeter F



Features

- For cylindrical parts such as shafts, bolts and spindles, for thickness and length measurements
- Rugged, forged steel frame with heat insulators
- Measuring spindle is mounted in long guide way with lever-controlled retraction
- Anvil spindle can easily be fine adjusted
- Measuring spindle and anvil spindle are both made of hardened stainless steel, carbide-tipped or ceramic (840 FC) measuring faces
- Adjustable center stop for automatic alignment
- Maximum wear resistance due to non-contact positioning in conjunction with carbide-tipped measuring faces
- Constant measuring force as a result of built-in spring, thus eliminating user influence
- Universally applicable and extremely versatile. Each instrument spans a broad measuring range, within this range any dimension and fit can be very quickly and easily adjusted
- Supplied with: Wooden case, steel flat contact points 903

Technical Data

	Measuring range		Repeatability f_w μm	Distance of moveable anvil mm	Measuring force** N	Measuring face		Order no.*
	mm	(inch)				Flatness μm	Parallelism μm	
840 F	0 - 25	(0 - 1")	≤ 0.5	2	7.5	≤ 0.2	≤ 1	4450000
	25 - 60	(1 - 2.36")	≤ 0.5	2	7.5	≤ 0.2	≤ 2	4450001
	50 - 100	(2 - 4")	≤ 1	2.5	7.5	≤ 0.2	≤ 2	4450002
	100 - 150	(4 - 6")	≤ 1	2.5	7.5	≤ 0.2	≤ 2	4450003
	150 - 200	(1 - 2.36")	≤ 1	2.5	7.5	≤ 0.2	≤ 2	4450004
840 FC	0 - 25	(0 - 1")	≤ 1	2	7.5	≤ 0.2	≤ 1	4450100
	25 - 60	(1 - 2.36")	≤ 1	2	7.5	≤ 0.2	≤ 2	4450101

* Excludes indicating instrument

** Further measuring forces are available on request

Indicating Instruments

All indicating instruments that has a 8 mm mounting shank may be used. Recommended are:

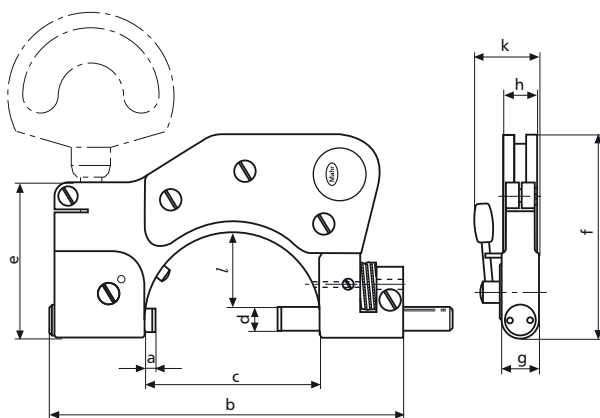
Dial Comparator		Readings		Order no.	
		mm	/ inch	mm	/ inch
Compramess	1004 / 1004 Z	5 μm	/ .0001"	4333000 / 4333900	
Millimess	1003 / 1003 Z	1 μm	/ .00005"	4334000 / 4334900	
Millimess	1003 XL	2 μm		4334001	
Supramess	1002 / 1002 Z	0.5 μm	/ .00002"	4335000 / 4335900	
Extramess	2000	0.2 μm	/ .00001"	4346000*	
		0.5 μm	/ .00002"		
		1 μm	/ .00005"		
Extramess	2001	0.2 μm	/ .00001"	4346100*	
		0.5 μm	/ .00002"		
		1 μm	/ .00005"		
$\mu\text{Max}\mu\text{m II}$		0.0005 mm	/ .00002"	2034207**	

Digital Indicators see Chapter 5

Electrical Indicating Instruments see Chapter 7

* 230 V, for 115 V please refer to page 6-5

** requires contact 4360107



Meas. range mm	0 - 25	25 - 60	50 - 100	100 - 150	150 - 200
a*	5	5	6.5	6.5	6.5
b	97	140	193	258	316
c	34	68	110	162	212
d	8	9	10	12	12
e	54	60	60	70	75
f	65	77	103	141	171
g	12	13	14	16	16
h	13	13	13	12	12
k	23	25	28	31	31
l	14	30	54	81	106

* In initial position

Accessories

Reference Discs 390 see Chapter 13

Gage Blocks see Chapter 13

Holder 840 Fk and Stand 840 Ff see Page 9-15

Indicating Snap Gage 840 FH with interchangeable anvils



Features

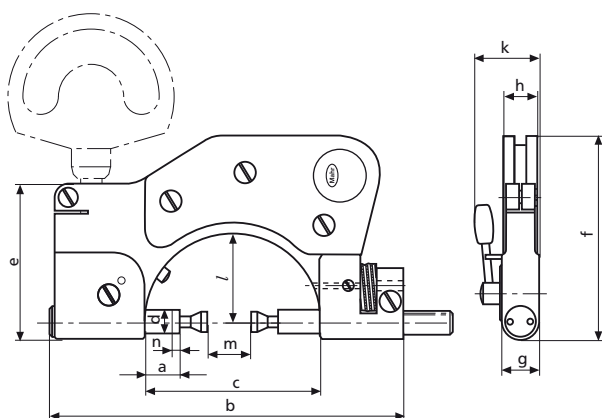
- Measuring spindle and anvil spindle have precision tapered bores for mounting interchangeable anvils 40 He
- For cylindrical parts such as shafts, bolts and spindles
- Rugged, forged steel frame with heat insulators
- Measuring spindle is mounted in long guide way with lever-controlled retraction
- Anvil spindle can easily be fine adjusted
- Measuring spindle and anvil spindle and both made from hardened stainless steel
- Maximum wear resistance due to non-contact positioning
- Constant measuring force as a result of built-in spring, thus eliminating user influence
- Universally applicable
- All kinds of measurement problems can be solved with the broad range of interchangeable anvils
- Supplied with: Wooden case, steel flat contact points 903, spanner DIN 902-3.5

Technical Data

	Measuring range*		Repeatability	Distance of moveable anvil	Measuring force	Order no.**
	mm	(inch)	$f_w \mu m$	mm	N	
840 FH	0 - 30	(0 - 1.18")	≤ 1	2	7.5	4451000
	30 - 80	(1.18 - 3")	≤ 1	2.5	7.5	4451005

* Measuring is dependent upon the length of the anvils being used

** Excludes indicating instrument (and anvils)



Meas. range 840 FH		
m (mm)	0 - 30	30 - 80
a*	12.5	7.5
b	140	193
c	68	110
d	9	10
e	60	60
f	77	103
g	13	13
h	13	13
k	25	28
l	34	59
n**	2	2.5

* In initial position

** Distance of moveable anvil

Indicating Snap Gage 840 FH with interchangeable anvils

with tapered shank

Catalog no.	Features	Order no.
40 He 0H*	Flat faces	4152036
40 He 1	Stepped flat faces	4152011
40 He 1H*	Stepped flat faces	4152033
40 He 2	Stepped flat faces	4152012
40 He 2H*	Stepped flat faces	4152032
40 He 3	Discs	4152013
40 He 4	Discs with V-groove	4152014
40 He 5	Blades	4152015
40 He 6	Offset blades	4152016
40 He 7	Recessed blades	4152017
40 He 8	Recessed flat faces with V-grooves on sleeve	4152018
40 He 9	Recessed flat faces with slip on support	4152019
40 He 10	With clearance bores	4152020
40 He 11	Point	4152021

* Carbide version

Indicating Instruments

All indicating instruments that has a 8 mm mounting shank may be used. Recommended are:

Dial Comparator	Readings mm / inch	Order no. mm / inch
Compramess 1004 / 1004 Z	5 µm/ .0001"	4333000/4333900
Millimess 1003 / 1003 Z	1 µm/ .00005"	4334000/4334900
Millimess 1003 XL	2 µm	4334001
Supramess 1002 / 1002 Z	0.5 µm/ .00002"	4335000/4335900
Extramess 2000	0.2 µm/ .00001"	
	0.5 µm/ .00002"	4346000*
	1 µm/ .00005"	
Extramess 2001	0.2 µm/ .00001"	
	0.5 µm/ .00002"	4346100*
	1 µm/ .00005"	
µMax µm II	.0005 mm/ .00002"	2034207**

Digital Indicators see Chapter 5

Electrical Indicating Instruments see Chapter 7

* 230 V, for 115 V please refer to page 6-5 ** requires contact 4360107

Accessories

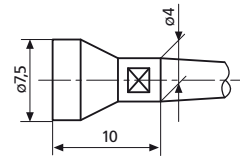
Spanner (Included in scope of supply)
for 840 FH, to loosen anvils

Order no. 4880210

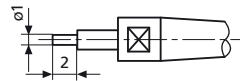
Reference Discs 390 see Chapter 13

Gage Blocks see Chapter 13

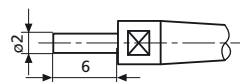
Holder 840 Fk and **Stand 840 Ff** see Page 9-15



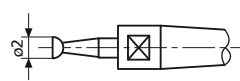
40 He 0H



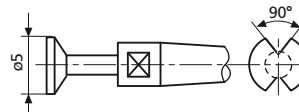
40 He 1



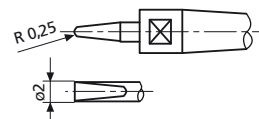
40 He 2



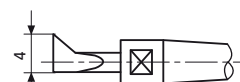
40 He 3



40 He 4



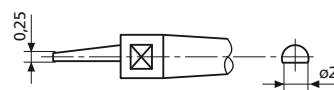
40 He 5



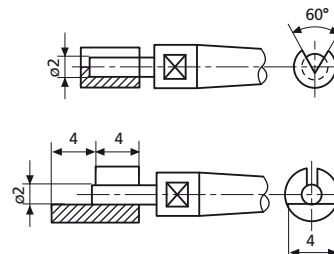
40 He 6



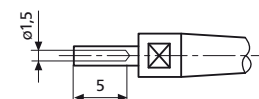
40 He 7



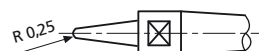
40 He 8



40 He 9



40 He 10



40 He 11

Indicating Snap Gages 840 FG with interchangeable anvils



Features

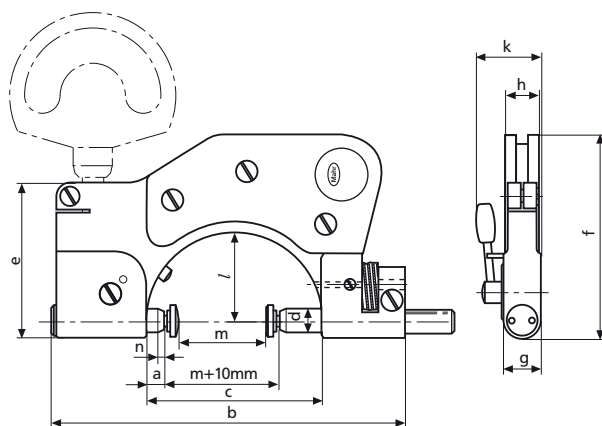
- Measuring spindle and anvil spindle have a M 2.5 connection thread, thus enabling the use of interchangeable anvils that are also used in dial indicators and dial comparators
- For cylindrical parts such as shafts, bolts and spindles
- Rugged, forged steel frame with heat insulators
- Measuring spindle is mounted in long guide way with lever-controlled retraction
- Anvil spindle can easily be fine adjusted
- Measuring spindle and anvil spindle and both made from hardened stainless steel
- Maximum wear resistance due to non-contact positioning
- Constant measuring force as a result of built-in spring, thus eliminating user influence
- Universally applicable
- All kinds of measurement problems can be solved with the broad range of interchangeable anvils
- Supplied with: Wooden case, steel flat contact points 903

Technical Data

	Measuring range*		Repeatability	Distance of moveable anvil	Measuring force	Order no.**
	mm	(inch)	$f_w \mu m$	mm	N	
840 FG	0 - 50	(0 - 2")	≤ 0.5	2	7.5	4454000
	40 - 90	(1.57 - 3.57")	≤ 0.5	2.5	7.5	4454001

* Measuring is dependent upon the length of the anvils being used

** Excludes indicating instrument (and anvils)



Meas. range 840 FG		
m (mm)	0 - 50	40 - 90
a*	5	6.5
b	140	193
c	68	110
d	9	10
e	60	60
f	77	103
g	13	14
h	13	13
k	25	28
l	34	59
n**	2	2.5

* In initial position

** Distance of moveable anvil

Interchangeable Anvils for Indicating Snap Gage 840 FG

Catalog no. Features Order no.

901 H	Standard contact point with carbide ball, ball dia. 3 mm	4360002
902 H	Spherical contact point, with carbide face, R = 6 mm	
	Length l in mm	
	10	4360041
	15	4360043
	20	4360044

903 H*	Flat contact point, carbide tipped	
	Length l in mm	
	6	4360101
	10	4360103
	15	4360105
	20	4360106

904 H	Conical contact point, carbide tipped	4360131
--------------	---------------------------------------	----------------

906 H Ball Contact Points

with carbide ball,
manufacturing tolerance ball dia. 0/-6 μm

Ball dia. d mm	l mm	Order no.	Ball dia. d mm	l mm	Order no.
1	8.5	4360150	5.5	9	4360161
1.25	8.5	4360151	6	9	4360162
1.5	8.5	4360152	6.35 (1/4")	9	4360163
1.75	8.5	4360153	6.5	10	4360164
2	8.5	4360154	7	10	4360165
2.5	8.5	4360155	7.5	11	4360166
3	8.5	4360156	8	11	4360167
3.5	8.5	4360157	8.5	12	4360168
4	8.5	4360158	9	12	4360169
4.5	8.5	4360159	10	13	4360170
5	9	4360160			

Indicating Instruments

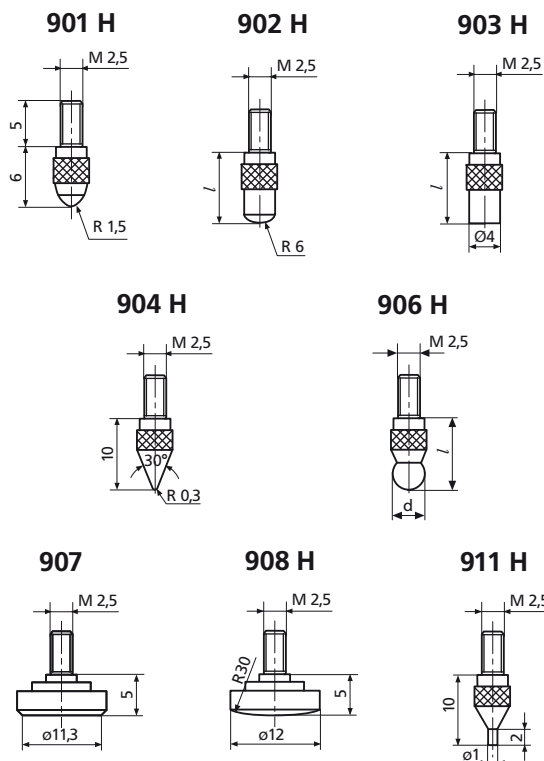
All indicating instruments that has a 8 mm mounting shank may be used. Recommended are:

Dial Comparator	Readings mm / inch	Order no. mm / inch
Compramess 1004 / 1004 Z	5 $\mu\text{m}/$.0001"	4333000/4333900
Millimess 1003 / 1003 Z	1 $\mu\text{m}/$.00005"	4334000/4334900
Millimess 1003 XL	2 μm	4334001
Supramess 1002 / 1002 Z	0.5 $\mu\text{m}/$.00002"	4335000/4335900
Extramess 2000	0.2 $\mu\text{m}/$.00001"	
	0.5 $\mu\text{m}/$.00002"	4346000*
	1 $\mu\text{m}/$.00005"	
Extramess 2001	0.2 $\mu\text{m}/$.00001"	
	0.5 $\mu\text{m}/$.00002"	4346100*
	1 $\mu\text{m}/$.00005"	
$\mu\text{Max}\mu\text{m II}$.0005 mm/ .00002"	2034207**

Digital Indicators see Chapter 5

Electrical Indicating Instruments see Chapter 7

* 230 V, for 115 V please refer to page 6-5 ** requires contact 4360107



Catalog no. Features Order no.

907	Flat contact plates* steel, dia. 11.3 mm, A = 1 cm ²	4360200
907 H	Flat contact plates*, carbide tipped, dia. 7 mm	4360201
908	Spherical contact plates, steel	4360210
908 H	Spherical contact plates, carbide tipped	4360211
911 H	Pin contact point, carbide tipped, dia. 1 mm, plan	4360240

* When using a flat contact plate the opposite facing anvil must be a spherical contact plate.

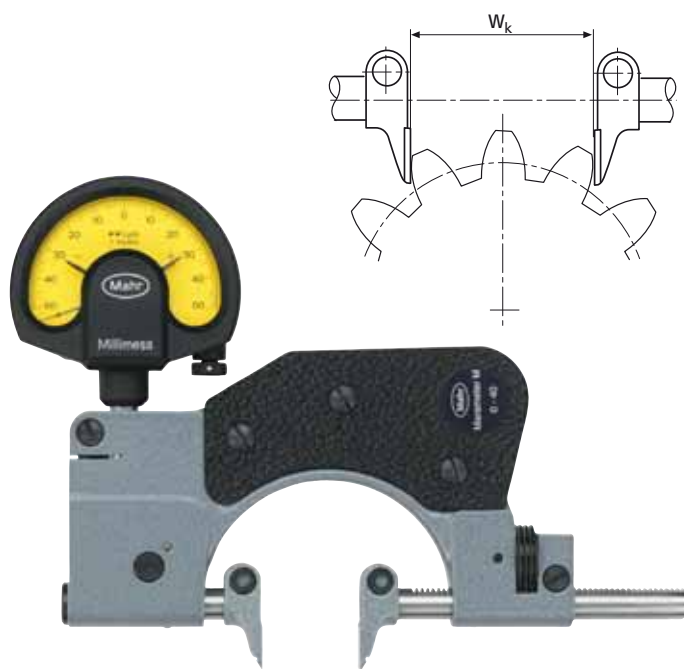
Accessories

Reference Discs 390 see Chapter 13

Gage Blocks see Chapter 13

Holder 840 Fk and Stand 840 Ff see Page 9-15

Indicating Snap Gages 840 FM MaraMeter M with measuring jaws



Features

- For diameters of small hubs, registers, shoulders on shafts and groove widths as well as for tooth span W_k as indirect, reference-free determination of tooth thickness on spur gears with straight and helical teeth
- Rugged, forged steel frame with heat insulators
- Measuring spindle is mounted in long guide way with lever-controlled retraction
- Anvil spindle can easily be fine adjusted
- Maximum wear resistance due to non-contact positioning in conjunction with carbide-tipped measuring faces
- Measuring spindle and anvil spindle made of hardened stainless steel; with extending carbide-tipped measuring jaws
- Constant measuring force as a result of built-in spring, thus eliminating user influence
- Universally applicable and extremely versatile, each instrument spans a broad measuring range, within this range any dimension and fit can be very quickly and easily adjusted
- Supplied with: Wooden case, steel flat contact points 903

Technical Data

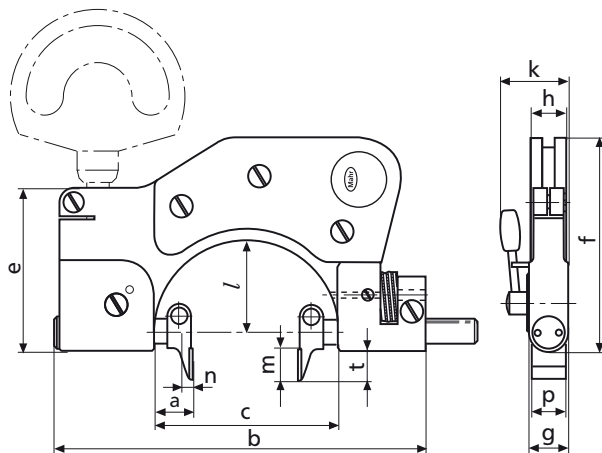
	Measuring range		Repeatability $f_w \mu\text{m}$	Measuring force N	Measuring face			Tooth span measurements as per module m	Order no.*
	mm	(inch)			Area mm	Flatness μm	Parallelism μm		
840 FM	0 - 40	(0 - 1.57")	1	7.5	12 x 12	≤ 0.5	≤ 2	0.5	4452000
	40 - 80	(1.57 - 3")	1	7.5	12 x 12	≤ 0.5	≤ 3	0.5	4452001
	80 - 130	(3 - 5")	1	9	15 x 17	≤ 0.5	≤ 3	1.0	4452002
	130 - 180	(5 - 7")	1	9	15 x 17	≤ 0.5	≤ 3	1.0	4452003

* Excludes indicating instrument

Dimensions

Meas. range (mm)	0 - 40	40 - 80	80 - 130	130 - 180
Dist mov. anvil (mm)	2	2.5	2.5	2.5
a*	14	14	19	15
b	140	193	258	316
c	68	110	162	212
e	60	60	70	75
f	77	103	141	171
g	13	14	16	16
h	13	13	12	12
k	25	28	31	31
l	34	59	87	112
m	12	12	17	17
p	12	12	15	15
t	11	11	17	17

* In initial position



Accessories

Indicating instruments, see Page 9-9
 Reference Discs 390 see Chapter 13
 Gage Blocks see Chapter 13
 Holder 840 Fk and Stand 840 Ff see Page 9-15

Accessories for Dial Indicators and Dial Comparators



840 Fk

Holder 840 Fk for Dial Indicators and Dial Comparators

- For attaching to the following measuring instruments
840 F/FC, 840 FH, 840 FG, 840 FM and 852
- Straight transfer of the spindle movement to the indicator
- Following the Abbe principle allows an even higher degree of accuracy than the already excellent level obtained with the standard set-up employing 90° transmission
- When the indicating instrument is in the shown position it is often easier to read
- For stationary application when in conjunction with the **Stand 840 Ff**

Catalog no.	Suitable for instruments with measuring ranges (mm)					Order no.
	840 F/FC	840 FH	840 FG	840 FM	852	
840 Fk/1	0 - 25					4450050
840 Fk/2	25 - 60	0 - 30	0 - 50	0 - 40	0 - 45	4450051
840 Fk/3	50 - 100	30 - 80	40 - 90	40 - 80	45 - 85	4450052
840 Fk/4	100 - 150 150 - 200			80 - 130 130 - 180	85 - 140 140 - 190	4450053



840 Ff

Stand 840 Ff

- For stationary application in conjunction with the following measuring instruments
840 F/FC, 840 FH, 840 FG, 840 FM, 840 E and 852
- User has both hands free for insertion of work piece and retraction of moving spindle
- Indicating instrument is always in operator's field of vision
- Rugged, rigid cast-iron stand with clamp for locking the indicating snap gage
- Indicating snap gage is locked in mounting hole for dial comparator
- Only in conjunction with **Holder 840 Fk**

Catalog no.	Suitable for instruments with measuring ranges (mm)					Order no.
	840 F/FC	840 FH	840 FG	840 FM	840 E	
840 Ff	0 - 25 25 - 60	0 - 30	0 - 50	0 - 40	0 - 25	4450020

Indicating Snap Gages 840 FS MaraMeter S



Features

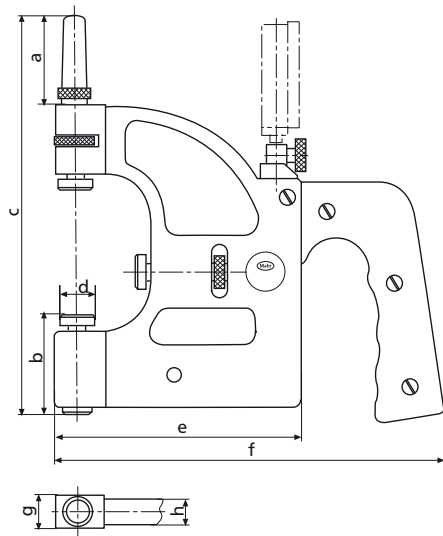
- For all kinds of cylindrical work pieces, whether directly on a machine tool or in the production control
- Rigid frame; convenient handle with heat insulators open on one end to eliminate heat transfer from user's hand
- Both spindles are made of hardened stainless steel and mounted in long guide ways
- Carbide-tipped measuring faces slightly chamfered at the front to facilitate positioning
- Projects over width of frame for measurement of narrow registers or when measuring directly at shoulders
- Maximum accuracy. Straight transfer of spindle movement to indicator. During the measurement, the weight of the gage rests on the anvil spindle
- Adjustable center stop for automatic alignment
- Indicating instrument is protected against possible impact during handling by a laterally projecting guard
- Direct indication and evaluation of measurement results
- Universally applicable and extremely versatile, each instrument spans a broad measuring range, within this range any dimension and fit can be very quickly and easily adjusted
- Constant measuring force as a result of built-in spring, thus eliminating user influence
- Supplied with:
Wooden case, allen key

Technical Data

	Measuring range		Repeatability f_w μm	Measuring force N	Distance of moveable anvil mm	Measuring faces		Weight kg	Order no.*
	mm	(inch)				Flatness μm	Parallelism μm		
840 FS	10 - 30	(.39 - 1.18")	1	13.5	0.7	≤ 0.5	≤ 3	0.6	4455000
840 FS	30 - 60	(1.18 - 2.36")	1	13.5	0.7	≤ 0.5	≤ 3	0.9	4455001
840 FS	60 - 100	(2.36 - 4")	1	13.5	0.7	≤ 0.5	≤ 3	1.3	4455002
840 FS	100 - 150	(4 - 6")	1	15	0.7	≤ 0.5	≤ 3	1.7	4455003
840 FS	150 - 200	(6 - 8")	1	15	0.7	≤ 0.5	≤ 3	2.0	4455004
840 FS	200 - 250	(8 - 10")	1	15	0.7	≤ 0.5	≤ 3	2.2	4455005
840 FS	250 - 300	(10 - 12")	1	15	0.7	≤ 0.5	≤ 3	2.5	4455006
840 FS	300 - 350	(12 - 14")	1	15	0.7	≤ 0.5	≤ 4	3.3	4455007
840 FS	350 - 400	(14 - 16")	1	15	0.7	≤ 0.5	≤ 4	3.3	4455008
840 FS	400 - 450	(16 - 18")	1	15	0.7	≤ 0.5	≤ 4	4.3	4455009
840 FS	450 - 500	(18 - 20")	1	15	0.7	≤ 0.5	≤ 4	4.7	4455010

* Excludes indicating instrument

Technical Data



Dimensions

Meas. range mm	dia. d	a	b	c	e	f	g	h
10 - 30	18	37	46	154	87	161	17	15
30 - 60	18	45	51	199	122	196	17	15
60 - 100	22	56	62	260	154	228	20	18
100 - 150	22	71	62	335	189	263	20	18
150 - 200	22	71	62	385	214	288	20	18
200 - 250	22	71	62	436	248	322	20	18
250 - 300	22	71	62	487	280	354	20	18
300 - 350	22	71	62	537	310	384	20	18
350 - 400	22	71	62	587	350	424	20	18
400 - 450	22	71	62	637	380	454	20	18
450 - 500	22	71	62	687	410	484	20	18

Accessories

Indicating Instruments

All indicating instruments that has a 8 mm mounting shank may be used. Recommended are:

Dial Comparator	Readings mm / inch	Order no. mm / inch
Compramess 1004 / 1004 Z	5 µm/ .0001"	4333000/4333900
Millimess 1003 / 1003 Z	1 µm/ .00005"	4334000/4334900
Millimess 1003 XL	2 µm	4334001
Supramess 1002 / 1002 Z	0.5 µm/ .00002"	4335000/4335900
Extramess 2000	0.2 µm/ .00001"	
	0.5 µm/ .00002"	4346000*
	1 µm/ .00005"	
Extramess 2001	0.2 µm/ .00001"	
	0.5 µm/ .00002"	4346100*
	1 µm/ .00005"	
µMaxµm II	.0005 mm/ .00002"	2034207**

Digital Indicators see Chapter 5

Electrical Indicating Instruments see Chapter 7

* 230 V, for 115 V please refer to page 6-5 ** requires contact 4360045



2000



1003

Electronic Snap Gage 840 E MaraMeter E for extremely high accuracy



Features

- Inductive measuring system incorporated directly into frame
- Readings selectable down to 0.01 μm
- Rugged, forged steel frame with heat insulators
- Measuring spindle mounted in extra long guideway with lever-controlled retraction
- Anvil spindle can easily be fine adjusted
- Measuring spindle and anvil spindle made of hardened stainless steel; measuring faces carbide-tipped
- Adjustable center stop for automatic alignment
- Extremely accurate due to the straight transfer of spindle movement to the inductive measuring system according to the Abbe principle
- Universally applicable and extremely versatile, each instrument spans a broad measuring range, within this range any dimension and fit can be very quickly and easily adjusted
- Maximum wear resistance due to non-contact positioning in conjunction with carbide-tipped measuring faces
- Constant measuring force as a result of built-in spring, thus eliminating user influence
- Supplied with:
Wooden case

Technical Data

	Measuring range	Readings / Resolution adjustable to*	Measuring force	Measuring faces dia.	Repeatability	Measuring faces Parallelism	Order no.**
	mm	μm	N	mm	f_w μm	μm	
840 E	0 - 25	0.01	4.5	7.5	≤ 0.1	≤ 0.3	4453000

* Depending upon which indicating instrument is being used

** Excludes indicating instrument

Accessories

Reference Discs 390 see Chapter 13

Gage Blocks see Chapter 13

Stand 840 Ff see Page 9-15

Recommended indicating instruments:

Electrical indicating instruments; recommended are C1208M, C1208M and 1240; please refer to Chapter 7



C 1208M



1240

Indicating Bench Snap Gage 852 TS



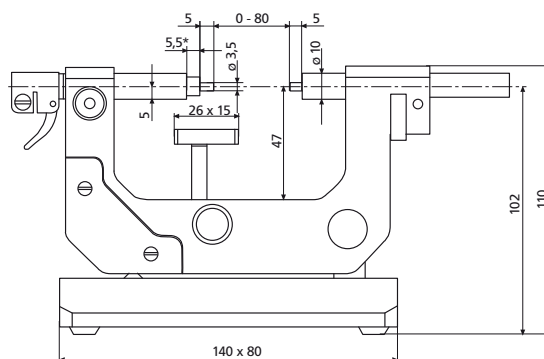
Applications

- For rapid measurements of diameters of cylindrical parts (shafts, bolts and shanks)
- For measuring pitch, root and outside diameters of all kinds of external threads as well as serrations
- For thickness and length measurement
- Particularly suited for batch produced parts

Features

- Rugged steel frame, can be inclined up to 45° from the sturdy base
- Measuring spindle and anvil spindle are both made of hardened stainless steel, with mounting bore for insertion of interchangeable anvils
- Anvil spindle can easily be fine adjusted
- Height adjustable stop
- Constant measuring force as a result of built-in spring, thus eliminating user influence
- Universally applicable and extremely versatile, each instrument spans a broad measuring range
- Scope of supply: TC-tipped -anvils dia. D= 3.5 mm, Dial Comparator 1003

Technical Data



Measuring range**	Repeatability	Retraction	Measuring force	Measuring face	Mounting dia.	Order no.
mm (inch)	f_w μm	mm	N	Parallelism μm		
0 - 80 (0 - 4")	1	1.2	6.5	≤ 2	8 mm 8 mm .375"	4510030*** 4510031 + 4510035 +

* In initial position

** Depending upon which anvils are being used

*** Delivery with a different indicating instrument is available upon request

+ Excludes indicating instrument, order indicating instrument separately.

Accessories

Order no.

Standard TC-tipped anvils,
Pair dia. D= 3.5 mm

4510840

Interchangeable Anvils please refer to Pages 9-23 to 9-25
Thread Setting Plug Gages see Page 13-20

Indicating Thread Snap Gage 852



Features

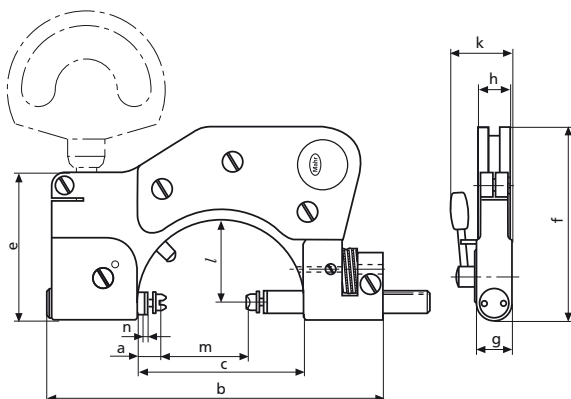
- For measuring pitch, root and outside diameters of all kinds of external threads as well as serrations
- Rugged, forged steel frame with heat insulators
- Measuring spindle is mounted in long guide way with lever-controlled retraction
- Anvil spindle can easily be fine adjusted
- Measuring spindle and anvil spindle are both made of hardened stainless steel, with mounting bore for insertion of interchangeable anvils
- Adjustable center stop for automatic alignment
- Maximum wear resistance due to non-contact positioning
- Constant measuring force as a result of built-in spring, thus eliminating user influence
- Universally applicable and extremely versatile. each instrument spans a broad measuring range
- Supplied with:
Wooden case, steel flat contact points 903

Technical Data

	Measuring range*		Repeatability f_w μm	Measuring force N	Order no.**
	mm	(inch)			
852	0 - 45	(0 - 1.77")	1	7.5	4510000
852	45 - 85	(1.77 - 3.34")	1	7.5	4510001
852	85 - 140	(3.34 - 5.51")	1	9	4510002
852	140 - 190	(5.51 - 7.48")	1	9	4510003

* Depending upon which anvils are being used, purchase separately

** Excludes indicating instrument and anvils



Meas. range m (mm)	0-45	45-85	85-140	140-190
Dist mov. anvil n (mm)	2	2.5	2.5	2.5
a*	13	8	10	6
b	140	193	258	316
c	68	110	162	212
e	60	60	70	75
f	77	103	141	171
g	13	14	16	16
h	13	13	12	12
k	25	28	31	31
l	34	59	87	112

a* = In initial position

Technical Data

Indicating Instruments

All indicating instruments that has a 8 mm mounting shank may be used. Recommended are:

Dial Comparator	Readings mm / <i>inch</i>	Order no. mm / <i>inch</i>
Compramess 1004 / 1004 Z	5 µm/ .0001"	4333000/4333900
Millimess 1003 / 1003 Z	1 µm/ .00005"	4334000/4334900
Millimess 1003 XL	2 µm	4334001
Supramess 1002 / 1002 Z	0.5 µm/ .00002"	4335000/4335900
Extramess 2000	0.2 µm/ .00001"	
	0.5 µm/ .00002"	4346000*
	1 µm/ .00005"	
	0.2 µm/ .00001"	
Extramess 2001	0.5 µm/ .00002"	4346100*
	1 µm/ .00005"	
	.0005 mm/ .00002"	2034207**
µMaxµm II		

Digital Indicators see Chapter 5

Electrical Indicating Instruments see Chapter 7

* 230 V, for 115 V please refer to page 6-5 ** requires contact 4360107



2000



1003

Accessories

Interchangeable Anvils please refer to Pages 9-19

Thread Setting Plug Gages see Page 13-14

Holder 840 Fk and **Stand 840 Ff** (for 0-45 mm) see Page 9-15

Indicating Thread Snap Gage 853 for taps



Features

- For pitch, root and outside diameters on taps in conjunction with interchangeable anvils
- Measuring spindle mounted in long guideway, lever-controlled retraction with mounting bore for interchangeable anvils
- Anvil spindle adjustable with thumbscrew via worm and rack, for mounting interchangeable support yokes
- Measuring spindle and anvil spindle are made of hardened stainless steel
- Further features are similar to the model 852; for details please refer to Page 9-20
- Supplied with: Wooden case, steel flat contact points 903

Technical Data

	Measuring range		Repeatability	Measuring force	Order no.*
	mm	(inch)	f_w μm	N	
853	1.2 - 35	(.04 - 1.37")	2	7.5	4511000
853	35 - 75	(1.37 - 3")	2	7.5	4511001

* Excludes indicating instrument and the support yokes 853 q

Interchangeable Support Yokes 853 q

Depending upon the number of flutes, allowance has to be made for a compensation factor when reading the result. See table below:

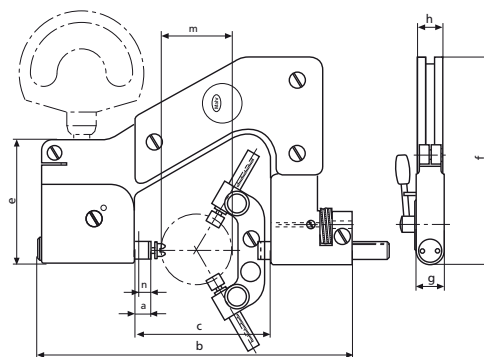
Cat. no.	No. of flutes of taps	For meas. range mm	Compens. factor**	Order no.
853 qk 3	3	1.2 - 35	x 1	4511024
853 qk 5	5	1.2 - 35	x 1.34	4511026
853 qk 7	7	1.2 - 35	x 1.42	4511028
853 qg 3	3	35 - 75	x 1	4511025
853 qg 5	5	35 - 75	x 1.34	4511027
853 qg 7	7	35 - 75	x 1.42	4511029

** Allowance is to be made for other compensation methods when using the Holder 840 Fk

Indicating Instruments

All indicating instruments that has a 8 mm mounting shank may be used. Recommended are:

	Readings	Order no.
MarCator 810 S	0.001 mm	4311000
Compramess 1004/1004 Z	5 μm / .0001"	4333000/4333900
Zentimess 1010/1010 Z	0.01 mm / .0005"	4332000/4332900
MarCator 1087R/1087 ZR	1 μm / .00005"	4337160/4337170



Meas. range m (mm)	1.2-35	35-75
Dist mov. anvil n (mm)	8	8
a*	12	11.5
b	152	192
c	66	110
e	60	65
f	98	125
g	14	14
h	11.5	14

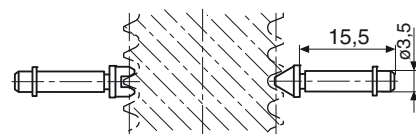
a* = In initial position

Accessories

Interchangeable Anvils see from Pages 9-23 to 9-24
Thread Setting Plug Gages see Page 13-20

Interchangeable Anvils for 852, 852 TS and 853

For pitch, root and outside diameters. Special wear-resistant hardened steel. With cylindrical mounting shank and retainer ring which ensures locking while permitting rotation in bore of indicating snap gages.



Sets consist of:

For pitch diameters

852 - 1 V-anvil and 1 blade
853 - 1 V-anvil and 2 radiused blades

For root diameters

852 - 1 V-anvil and 1 blade
853 - 1 V-anvil and 2 blades

For outside diameters

852 - 2 flat-face anvils
853 - 3 flat-face anvils

Anvils for pitch diameters for 852 and 852 TS

Metric thread (60°)			Whitworth thread (55°)			American UST thread (60°)		
Pitch	V-anvil	Blade	Pitch range	V-anvil	Blade	Pitch range	V-anvil	Blade
mm	Order no.	Order no.	tpi	Order no.	Order no.	tpi	Order no.	Order no.
0.2*	4173007	4173707	40 - 32	4173043	4173743	60 - 48	4173113	4173813
0.25*	4173008	4173708	32 - 24	4173044	4173744	48 - 40	4173114	4173814
0.3*	4173009	4173709	24 - 18	4173045	4173745	40 - 32	4173115	4173815
0.35*	4173010	4173710	18 - 14	4173046	4173746	32 - 24	4173116	4173816
0.4*	4173011	4173711	14 - 10	4173047	4173747	24 - 18	4173117	4173817
0.45*	4173012	4173712	10 - 7	4173048	4173748	18 - 14	4173118	4173818
0.5 - 0.7	4173000	4173700	7 - 4.5	4173049	4173749	14 - 10	4173119	4173819
0.7 - 1	4173001	4173701	4.5 - 3	4173050	4173750	10 - 7	4173120	4173820
1.25 - 2	4173002	4173702	3 - 2.5	4179408	4179410	7 - 4.5	4173121	4173821
2 - 3.5	4173003	4173703				4.5 - 3	4173122	4173822
3.5 - 5	4173004	4173704						
5 - 7	4173005	4173705						
7 - 9	4173006	4173706						

Anvils for pitch diameters for Indicating Thread Snap Gage 853

Metric thread (60°)			Whitworth thread (55°)			American UST thread (60°)		
Pitch	V-anvil	Blade	Pitch range	V-anvil	Blade	Pitch range	V-anvil	Blade
mm	Order no.	Order no.	tpi	Order no.	Order no.	tpi	Order no.	Order no.
0.2	4173051	4174007	40 - 32	4173043	4176043	60 - 48	4173124	4176113
0.25	4173052	4174008	32 - 24	4173044	4176044	48 - 40	4173125	4176114
0.3	4173053	4174009	24 - 18	4173045	4176045	40 - 32	4173115	4176115
0.35	4173054	4174010	18 - 14	4173046	4176046	32 - 24	4173116	4176116
0.4	4173055	4174011	14 - 10	4173047	4176047	24 - 18	4173117	4176117
0.45	4173056	4174012	10 - 7	4173048	4176048	18 - 14	4173118	4176118
0.5 - 0.7	4173000	4174000	7 - 4.5	4173049	4176049	14 - 10	4173119	4176119
0.7 - 1	4173001	4174001	4.5 - 3	4173050	4176050	10 - 7	4173120	4176120
1.25 - 2	4173002	4174002	3 - 2.5	4179408	4179411	7 - 4.5	4173121	4176121
2 - 3.5	4173003	4174003				4.5 - 3	4173122	4176122
3.5 - 5	4173004	4174004						
5 - 7	4173005	4174005						
7 - 9	4173006	4174006						

Carbide anvils for 852, 852TS and 853

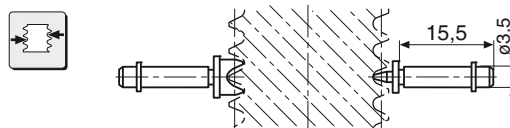
1.25 - 2	4511105	4511104
2 - 3.5	4511108	4511107
3.5 - 5	4511140	4511139
5 - 7	4511142	4511141

* V-anvil covers 3 pitches

Interchangeable Anvils for 852, 852 TS and 853

For root diameters

Each pitch requires a separate V-anvil.
Blade can be used for several pitches.



Anvils for root diameters

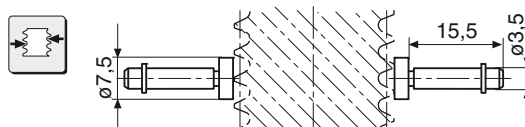
Metric thread (60°)			Whitworth thread (55°)			American UST-thread (60°)	
Pitch	V-anvil	Blade	Pitch	V-anvil	Blade	The same anvils are to be used as with the Whitworth-thread (55°).	
mm	Order no.	Order no.	range tpi	Order no.	Order no.		
0.5	4173213	4173719	40	4173331	4173833		
0.6	4173214		36	4173321			
0.7	4173215		32	4173332			
0.75	4173216		28	4173333			
0.8	4173217		26	4173335			
0.9	4173218	4173723	24	4173336	4173840		
1	4173219		22	4173337			
1.25	4173221		20	4173338			
1.5	4173222		19	4173339			
1.75	4173223		18	4173340			
2	4173225	4173727	16	4173342	4173843		
2.5	4173226		14	4173343			
3	4173227		12	4173345			4173847
3.5	4173229		11	4173346			
4	4173230		10	4173347			
4.5	4173231	4173731	9	4173349	4173851		
5	4173233		8	4173350			
5.5	4173234		7	4173451			
6	4173235		6	4173453			4173855
7	4173237		5	4173454			
8	4173238	4.5	4173455				
9	4173239	4	4173457	4173860			
		3.5	4173458				
		3.25	4173459				
		3	4173460				

For outside diameters

Anvil 40 Za, flat

Measuring face dia. 7.5 mm
with 853 smallest
measurable O.D. dia. 5 mm

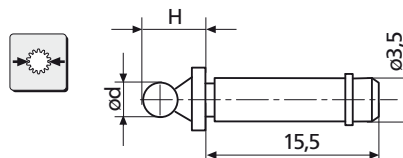
Hardened steel Order no. 4173210
Carbide tipped Order no. 4511190



Interchangeable Anvils for 852 and 852 TS

Ball Anvils

For measuring gears and for special applications. Carbide ball. With cylindrical mounting shank and retainer ring.
For mounting into mounting bores of thread micrometers 40 Z and 852.



Shank dia. 3.5 mm
Shank length 15.5 mm
Manufacturing tolerance
Ball dia. $\pm 2 \mu\text{m}$

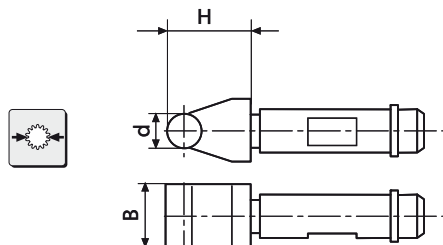
dia. d mm	H mm	Order no.	dia. d mm	H mm	Order no.	dia. d mm	H mm	Order no.
0.5	5.0	4179150	1.65	6.2	4179168	3.048	7.5	4179182
0.551	5.1	4179151	1.7	6.2	4179169	3.2	7.7	4170570
0.62	5.1	4179152	1.75	6.3	4170553	3.25	7.8	4170566
0.623	5.1	4179153	1.782	6.3	4179170	3.4	7.9	4179183
0.63	5.1	4179154	1.8	6.3	4179171	3.5	8.0	4170558
0.722	5.2	4179155	1.829	6.3	4179172	3.658	8.2	4179184
0.862	5.4	4179156	1.9	6.4	4179173	3.7	8.2	4170571
0.895	5.4	4179157	2	6.5	4170554	4	8.5	4170559
0.965	5.5	4179158	2.032	6.5	4170568	4.5	9.0	4170560
1	5.5	4170550	2.2	6.7	4170569	4.835	9.3	4179185
1.1	5.6	4179159	2.25	6.8	4170564	5	9.5	4170561
1.118	5.6	4179160	2.284	6.8	4179174	5.25	9.8	4179186
1.125	5.6	4179161	2.386	6.9	4179175	5.486	10.0	4179187
1.25	5.8	4170551	2.438	6.9	4179176	5.5	10.0	4170562
1.35	5.9	4179162	2.5	7.0	4170556	6	10.5	4170563
1.372	5.9	4179163	2.667	7.2	4179177	6.096	10.6	4179188
1.385	5.9	4179164	2.704	7.2	4179178	6.35	10.9	4179189
1.5	6.0	4170552	2.713	7.2	4179179	6.5	11.0	4170567
1.524	6.0	4179165	2.721	7.2	4179180	7	11.5	4170572
1.54	6.0	4179166	2.743	7.2	4179181	8	12.5	4170573
1.6	6.1	4179167	2.75	7.3	4170565	9	13.5	4170574
			3	7.5	4170557	10	14.5	4170575

Further sizes are available upon request (material: steel)

Roller Blades

For measuring gears and for special applications. The measuring roller is made of carbide.
To be mounted in the mounting bores of the 40 Z and 852.

Shank dia. 3.5 mm
Shank length 15.5 mm
Manufacturing tolerance
Ball dia. $\pm 2 \mu\text{m}$



dia. d mm	Dimension H mm	Dimension B dia. mm	Order no.
1	5.5	5	4510200
1.25	5.8	5	4510201
1.5	6.0	5	4510202
1.75	6.3	5	4510203
2	6.5	5.5	4510204
2.5	7.0	5.5	4510206
3	7.5	5.5	4510207
3.5	8.0	5.5	4510208
4	8.5	5.5	4510209
4.5	9.0	5.5	4510210
5	9.5	6	4510211
5.5	10.0	6	4510212
6	10.5	6	4510213

Further sizes are available upon request (material: steel)

Portable Thickness Gages 22 P

Portable measurement of sheet materials and small parts

Features

- Indicator built into gage frame for maximum ruggedness.
- Lift-lever for one-hand operation.
- Continuous reading dials with revolution counter for absolute measurement of thin materials, plastic films, a small parts.
- 6.3 mm / .25" diameter, flat steel contacts.
- XLI Models (with μ Max μ m®// XL Digital Indicator) can be Left/Right hand operated or front mounted and used with BA-26 Stand for bench applications.



22P-15



XLI-22P-20 with 2034212 μ Max μ m®// XL Digital Indicator (front mounted) and BA-26 Stand (Stand not included)



XLI-22P-20 with 2034212 μ Max μ m®// XL Digital Indicator

Technical Data

Metric	Inch	Capacity mm / <i>inch</i>	Throat Depth mm / <i>inch</i>	Graduation
22P-10M	22P-11	0 - 2.54 / 0 - .10"	28.6 / 1.13"	.002 / .0001"
22P-15M	22P-15	0 - 12.70 / 0 - .50"	50 / 2"	.01 / .001"
22P-20M	22P-20	0 - 25 / 0 - 1"	50 / 2"	.01 / .001"
XLI-22P-20		25 / 0 - 1"	50 / 2"	.001 / .00005" (Resolution)

Portable Thickness Gages 26 P



Features

- Push-down movement.
- Molded body fits shape of hand; built-in indicator.
- Gage is normally open for easy part entry. Push-down button to close the contacts.
- Rugged and compact for roving inspection.
- 6.3 mm / .25" diameter, flat steel contacts.

Technical Data

Metric	Inch	Capacity mm / <i>inch</i>	Throat Depth mm / <i>inch</i>	Graduation mm / <i>inch</i>
26P-7M	26P-7	0 - 7.6 / 0 - .30"	16 / .63"	.01 / .001"

Portable Thickness Gages 838

838 A



838 B



Features

- Rugged sturdy frame made from hard aluminum
- Built-in Digital or Dial Indicator
- With a lifting lever for the moveable upper measuring spindle
- Convenient heat insulated handle, open at one end
- Versions with a throat depth of 200 mm have a removable stand

Thickness Gage 838 A

- With flat measuring faces
- For measuring soft materials for example; foil, felt, rubber, paper and cardboard

Thickness Gage 838 B

- With spherical measuring faces
- For measuring hard materials for example; sheet metal, hardboard, wooden panels and panes of glass

Technical Data

	Throat depth		Measuring range		Measuring face dia.	Measuring face radius	Order no. with Indicator 810 0.01 mm Res	Order no. with Indicator 1075 R 0.005mm/0.0001" Res	Order no. Wooden case
	mm	(inch)	mm	(inch)	mm	mm			
838 A	50	(2")	0 - 20	(0 - .750")	11.3 = 1 cm ²	-	4495000	4495120	4495050
	100	(4")	0 - 20	(0 - .750")	11.3 = 1 cm ²	-	4495001	4495121	4495051
	200	(8")	0 - 20	(0 - .750")	11.3 = 1 cm ²	-	4495002	4495122	4495052
	50	(2")	0 - 20	(0 - .750")	20 = 3.14 cm ²	-	4495103	4495125	4495050
	100	(4")	0 - 20	(0 - .750")	20 = 3.14 cm ²	-	4495104	4495126	4495051
	200	(8")	0 - 20	(0 - .750")	20 = 3.14 cm ²	-	4495105	4495127	4495052
	50	(2")	0 - 20	(0 - .750")	30 = 7.06 cm ²	-	4495109	4495130	4495050
	100	(4")	0 - 20	(0 - .750")	30 = 7.06 cm ²	-	4495110	4495131	4495051
	200	(8")	0 - 20	(0 - .750")	30 = 7.06 cm ²	-	4495111	4495132	4495052
838 B	50	(2")	0 - 20	(0 - .750")	12	30	4495010	4495135	4495050
	100	(4")	0 - 20	(0 - .750")	12	30	4495011	4495136	4495051
	200	(8")	0 - 20	(0 - .750")	12	30	4495012	4495137	4495052

838 AB



Features

- Rugged sturdy frame made from hard aluminum
- Built-in Digital or Dial Indicator or Dial Comparator
- With a lifting lever for the moveable upper measuring spindle
- Convenient heat insulated handle, open at one end

Thickness Gage 838 AB

- Lower measuring face is flat
- Upper measuring face is spherical
- For measuring hard materials for example; sheet metal and hardboard

Technical Data

	Throat depth		Measuring range		Measuring face dia.	Measuring face radius	Order no.	Order no.	Order no.
	mm	(inch)	mm	(inch)	mm lower	mm upper	with Indicator 810 0.01 mm Res	with Indicator 1075 R 0.005mm/.0001" Res	Wooden case
838 AB	50	(2")	0 - 20	(0 - .750")	11.3 = 1 cm ²	30	4495504	4495140	4495050
flat / spherical	100	(4")	0 - 20	(0 - .750")	11.3 = 1 cm ²	30		4495141	4495051

	Throat depth		Measuring range		Measuring face dia.	Measuring face radius	Order no.	Order no.	Order no.
	mm	(inch)	mm	(inch)	mm lower	mm upper	with Indicator 1075 R 0.005mm/.0001" Res	with Comparator 1003 1 µm Res	Wooden case
838 AB	50	(2")	0 - 20	(0 - .750")	11.3 = 1 cm ²	30	4495145	4495519	4495050
flat / spherical	100	(4")	0 - 20	(0 - .750")	11.3 = 1 cm ²	30	4495146	4495517	4495051

Dead Load Thickness Gages 57B



XLI-57B-15

Features

- Solid casting with ribbed frame provides strength and rigidity for accurate measurements.
- 0.003 mm / .0001" parallelism with tables up to 19 mm / .75" diameter.
- 283 g / 10 oz. dead load weight for constant gaging pressure.
- 10 mm / .407" diameter flat upper 54.0 mm / 2.125" lower contacts.
- Indicator mounts with adjustable back for quick positioning for each gaging requirement.
- Available with Dial Indicator or Digital Electronic Indicator.
- Gage is supplied with a lift lever so work can be easily placed between the table and contact.
- Four-inch throat depth for part clearance.

Technical Data

Metric	Order no.	Inch	Capacity mm / <i>inch</i>	Description
57B-14M	57B-14		0 - 2.5 / 0 - .10"	Dial Indicator readout with 2.5 mm / .10" sensitive range and .002 mm / .0001" grads.
57B-15M	57B-15		0 - 25 / 0 - 1"	Dial Indicator readout with 25 mm / 1" sensitive range and .01 mm / .001" grads.
	XLI-57B-15			μMaxμm®// XL Digital Indicator with 25 mm / 1" range and .001 mm / .00005" resolution.

*Alternate Indicators and contact points available upon request.
Contact Mahr Federal.*

Wire Insulation Thickness Gages 57B

For checking wall thickness of wire insulation and other small-diameter tubular parts



57B-13

Features

- Using the basic design of the Model 57B-13 (Model 57B-13M — Metric) Gage, the lower contact is PT-103, 1.10 mm / .043" diameter rod, mounted horizontally. The upper contact is a flat chisel contact, in line with the rod. By slipping tubular parts onto the lower contact, the gage can measure the thickness of the wall of the tube. An auxiliary weight on the Indicator provides a total dead-load weight of 25 grams. (Replacement lower rod: PS-43)

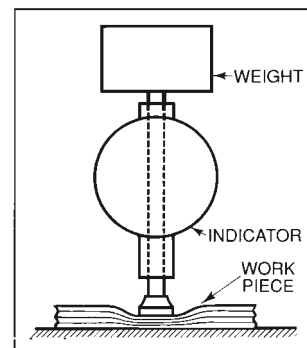
Technical Data

Metric	Order no.	Inch	Capacity mm / <i>inch</i>	Description
57B-13M	57B-13		7.62 / 0 - .30"	Dial Indicator readout with 7.6 mm / .30" sensitive range and 0.01 mm / .0005" grads.
	XLI-57B-13			μMaxμm®//XL Digital Indicator with 25 mm / 1" range and 0.001 mm / .00005" resolution.
Options				
	PT-2245			0.050 mm / .02" diameter Pin, Lower Contact Assembly

Measuring Compressible Materials

Compressible materials such as paper, plastics, rubber or fabrics must be measured under controlled conditions. Many materials have measurement standards specified by A.S.T.M., U.L., or other industry standards organizations. Measurement standards specify dead load weight, upper and lower contact configurations, and Indicator resolution.

Series 57B Gages are easily modified to meet most of these industry standards. Mahr Federal has on file designs for the measurement of paper, latex foam rubber, sponge rubber, vulcanized rubber, asbestos tape and cloth, sheet and roll felt, and many other materials. When inquiring, specify A.S.T.M. Specification Number, if possible.



Thickness Gages 57B Bench Style



57B-12

Features

- Solid casting with ribbed frame provides strength and rigidity for accurate measurements.
- Gage is furnished with a lift lever so work can be easily placed between the contacts.
- Large 54 mm/ 2.125" diameter lower anvil provides convenient stage for small parts or flat materials.
- 4.75 mm/ .187" diameter radiused upper contact normally provided.
- 102 mm/ 4" throat depth for part clearance.
- Indicator mounts with adjustable back for quick positioning for each gaging requirement.
- Available with Dial Indicator or Digital Electronic Indicator.

Technical Data

Metric	Order no.	Inch	Capacity mm / <i>inch</i>	Description
57B-11M	57B-11		0 - 25 / 0 - 1"	Dial Indicator readout with 25 mm / 1" sensitive range and .01 mm / .001" grads.
	XLI-57B-11			μMaxμm® XL Digital Indicator with 25 mm/ 1" range and .001 mm / .00005" resolution.
	EMD-57B-11		0 - 21.5 / 0 - .85"	Maxμm/// Digital Indicator with selectable range and resolution, 2033101.
	EDI-57B-11			μMaxμm® Digital Indicator with 2 mm / .08" sensitive range, .0005 mm / .00002" resolution.
57B-12M	57B-12		0 - 12.5 / 0 - .5"	Dial Indicator readout with 12.50 mm/ .50" sensitive range and .01 mm / .0005" grads.
	XLI-57B-12			μMaxμm® XL Digital Indicator with 12.50 mm / .50" range and .001 mm / .00005" resolution.

*Alternate Indicators and contact points available upon request.
Contact Mahr Federal.*

Caliper Gages 49P

The most widely used gages for checking medium tolerance dimensions on patterns, castings, forgings, dies, sheet metal.



49P

Features

- The most widely used gages for checking medium tolerance dimensions on patterns, castings, forgings, dies, sheet metal.
- Generous clearance on jaws reaches over non-measured part protrusions for easy access to areas where thickness must meet critical dimensional specs.
- Retraction lever is conveniently located for one-hand operation.
- .02 mm or .1 mm / .01", .001", or 1/64" grads. available.
- Continuous reading dials with revolution counters normally provided.
- Cylindrical radius steel contact tips normally furnished.

Technical Data

Metric	Order no.	Inch	Capacity*	Gaging Depth	Minimum Graduation	A	B
			mm / <i>inch</i>	mm / <i>inch</i>	mm / <i>inch</i>		
49P-17M	49P-17		0 - 50 / 0 - 2"	100 / 4"	0.02 / .001" grads.	1-1/4	1-1/4
49P-19M	49P-19		0 - 50 / 0 - 2"	200 / 8"	0.02 / .001" grads.	2-9/16	2
49P-1M	49P-1		0 - 75 / 0 - 3"	100 / 4"	0.1 / .01" grads.	1-1/4	1-1/4
49P-2M	49P-2		0 - 75 / 0 - 3"	200 / 8"	0.1 / .01" grads.	2-9/16	2

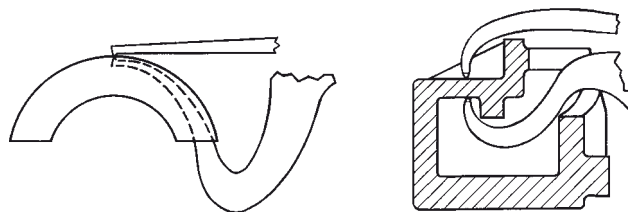
* Ordinarily this gage is used as a comparator. The actual measuring range of the instrument is 38 mm / 1.50".

If the gage is used for direct linear measurement, chordal errors may need to be corrected.

Contact Mahr Federal Technical Assistance for details.

Special Applications

Series 49P and 149P Caliper Gages have many design possibilities. Specially shaped arms of various lengths can be designed to reach inaccessible spots or get around obstructions to make measurements possible which might otherwise go unchecked. For alternate contact shapes or materials, alternate capacities and gaging depths, and special designs to meet your application contact Mahr Federal Technical Assistance.



Gages (Metric) for External Measurement 838 TA to measure thickness and wall thicknesses

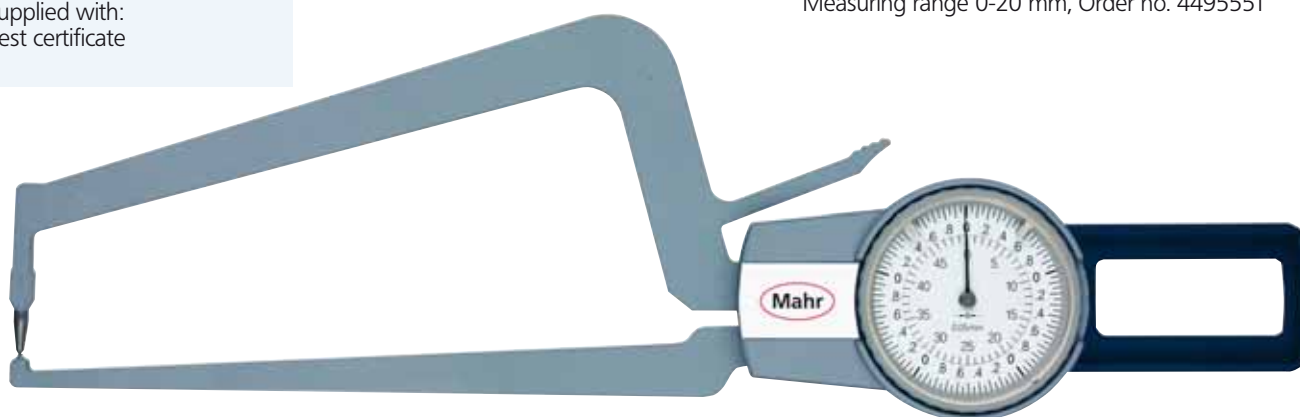
Features

- For measuring thicknesses and wall thicknesses
- Easy to operate, very habile and portable
- Easy to read tolerance markers
- Dust and splash waterproof
- Contact points are made from carbide
- Absolute measuring instrument
- Supplied with:
Test certificate



Type A

Measuring range 0-20 mm, Order no. 4495551



Type B with handle

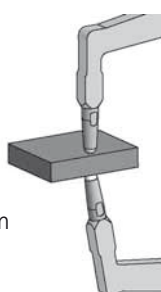
Measuring range 0-50 mm, Order no. 4495554

Technical Data and Dimensions

				Type A			Type B	
Measuring range	Meb	mm	0 - 10	0 - 20	0 - 20		0 - 50	0 - 50
Readings	Skw	mm	0.005	0.01	0.01		0.05	0.05
Error limit	G	mm	0.015	0.03	0.03		0.05	0.05
Repeatability limit	r	mm	0.005	0.01	0.01		0.025	0.025
Measuring depth	L	mm	35	85	85		170	170
Contact point - length (move.)	Hb	mm	19.1	24.6	24.6		32	32
Contact point - length (fixed)	Hf	mm	18.6	24.6	2.5		32	1
Contact point - ball dia.	D	mm	1.5 ¹⁾	1.5 ¹⁾	1.5 ²⁾		2 ¹⁾	2 ²⁾
Measuring force	F	N	0.8 - 1.2	1.1 - 1.6	1.1 - 1.6		1.2 - 1.8	1.2 - 1.8
Protection class			IP65	IP65	IP65		-	-
Order no.			4495550	4495551	4495552		4495553	4495554

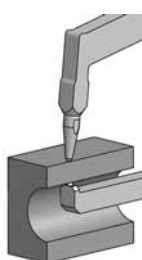
Applications

1)

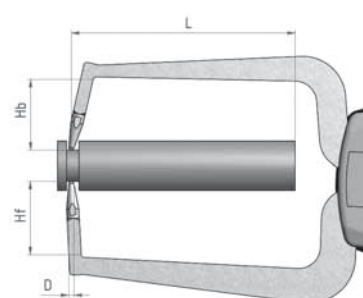


Ball dia. 1.5 mm
Ball dia. 2 mm
Ball dia. 3 mm

2)



Ball dia. 1.5 mm
Ball dia. 2 mm
Ball dia. 3 mm



Gages (Inch) for External Measurement 838 TA to measure thickness and wall thicknesses

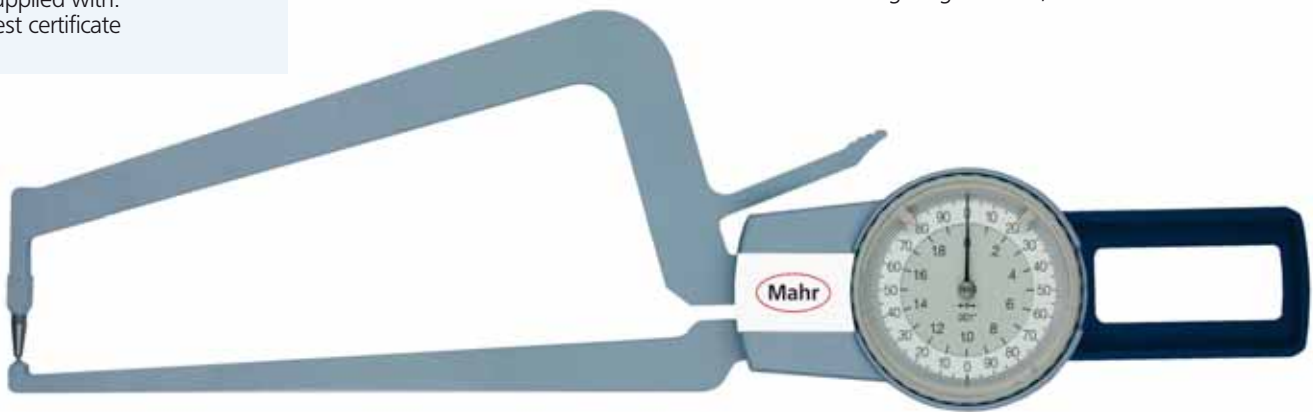
Features

- For measuring thicknesses and wall thicknesses
- Easy to operate, very habile and portable
- Easy to read tolerance markers
- Dust and splash waterproof
- Contact points are made from carbide
- Absolute measuring instrument
- Supplied with:
Test certificate



Type A

Measuring range 0 - .80", Order no. 4495951



Type B with handle

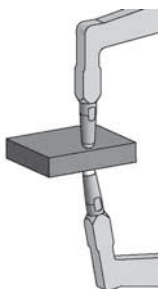
Measuring range 0 - 2.0", Order no. 4495954

Technical Data and Dimensions

			Type A			Type B	
Measuring range	Meb	inch	0 - .40	0 - .80	0 - .80	0 - 2.0	0 - 2.0
Readings	Skw	inch	.0002	.0005	.0005	.001	.001
Error limit	G	inch	.0008	.0015	.0015	.002	.002
Repeatability limit	r	inch	.0002	.0005	.0005	.001	.001
Measuring depth	L	inch	1.37	3.2	3.2	6.8	6.8
Contact point - length (move.)	Hb	inch	.75	.97	.97	1.26	1.26
Contact point - length (fixed)	Hf	inch	.75	.97	.097	1.26	.04
Contact point - ball dia.	D	inch	.06 ¹⁾	.06 ¹⁾	.06 ²⁾	.08 ¹⁾	.08 ²⁾
Measuring force	F	N	0.8 - 1.2	1.1 - 1.6	1.1 - 1.6	1.2 - 1.8	1.2 - 1.8
Protection class			IP65	IP65	IP65	-	-
Order no.			4495950	4495951	4495952	4495953	4495954

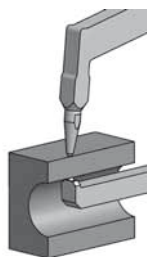
Applications

1)

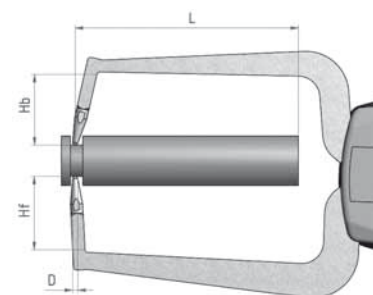


Ball dia. .06"
Ball dia. .08"

2)



Ball dia. .06"
Ball dia. .08"



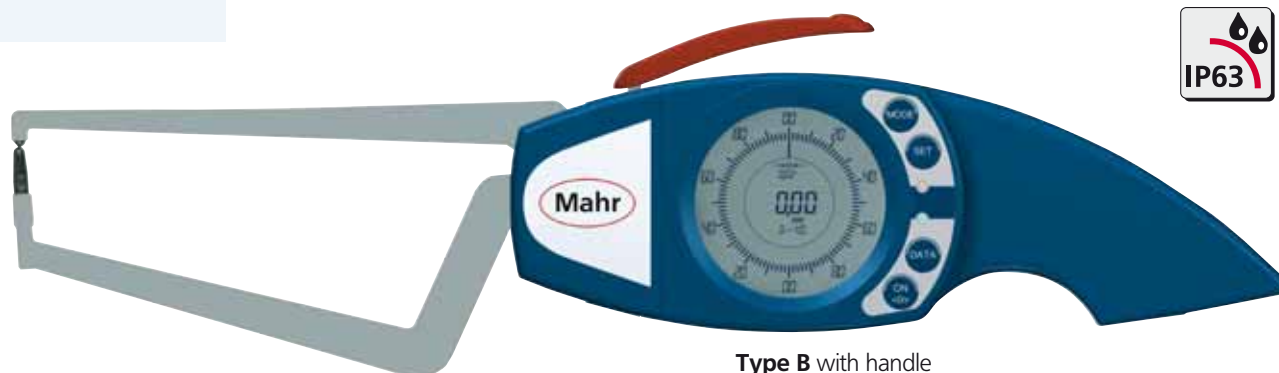
Electronic Gages for External Measurement 838 EA to measure thickness and wall thicknesses

Features

- High contrast analog and digital LCD
- Specified measuring programs according to application
- Absolute/Relative measuring program
- Tolerance is displayed with 2 LEDs
- mm/inch switchable
- Protection class IP67 or IP63 according to EN 60529
- Supplied with:
Test certificate
Battery



Type A
Measuring range 0-20 mm, Order no. 4495561



Type B with handle
Measuring range 0-40 mm, Order no. 4495167



Technical Data and Dimensions

			Type A			Type B	
Measuring range	Meb	mm	0 - 10	0 - 20	0 - 20	0 - 40	0 - 40
Resolution	Skw	mm	0.005	0.01	0.01	0.02	0.02
Error limit	G	mm	0.015	0.03	0.03	0.04	0.04
Repeatability limit	r	mm	0.005	0.01	0.01	0.02	0.02
Measuring depth	L	mm	35	85	85	115	115
Contact point - length (move.)	Hb	mm	19.1	24.6	24.6	25	25
Contact point - length (fixed)	Hf	mm	18.6	24.6	2.5	25	1
Contact point - ball dia.	D	mm	1.5 ¹⁾	1.5 ¹⁾	1.5 ²⁾	3 ¹⁾	3 ²⁾
Measuring force	F	N	0.8 - 1.2	1.1 - 1.6	1.1 - 1.6	1 - 1.5	1 - 1.5
Protection class			IP67	IP67	IP67	IP63	IP63
Order no.			4495560	4495561	4495562	4495059	4495167

Accessories

	Order no.
Digimatic interface incl. data connection cable for Type A	838 di 4495083
Digimatic interface incl. data connection cable for Type B	838 di 4495084
USB data cable incl. Software for Type A	838 usb 4495079
Battery Alkaline AAA 1.5 V for Type A*	4243073
Battery Alkaline AA 1.5 V for Type B	4243072

Contact point information see page 9-34

* 2 batteries are required

Electronic Gages for Internal Measurement 838 EI for measuring bores and internal grooves

Features

- High contrast analog and digital LCD
- Specified measuring programs according to application
- Absolute/Relative measuring program
- Tolerance is displayed with 2 LEDs
- mm/inch switchable
- Protection class IP67 or IP63 according to EN 60529
- Supplied with:
Test certificate
Battery



Type A

Measuring range 10-30 mm, Order no. 4495591



Type B with handle

Measuring range 15-55 mm, Order no. 4495596

Technical Data and Dimensions

			Type A						Type B	
Measuring range	Meb	mm	5 - 15	10 - 30	20 - 40	30 - 50	40 - 60	50 - 70	15 - 55	35 - 75
Resolution	Skw	mm	0.005	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Error limit	G	mm	0.015	0.03	0.03	0.03	0.03	0.03	0.04	0.04
Repeatability limit	r	mm	0.005	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Measuring depth	L	mm	35	85	85	85	85	85	114	114
Groove depth	A	mm	2.3	5.2	7.0	7.0	8.3	8.3	4.5	8
Groove width	B	mm	0.8	1.2	1.2	1.2	1.2	1.2	2.5	3
Contact point - length (move.)	Hb	mm	2.5	5.4	7.3	7.3	12.2	12.2	6	8.5
Contact point - length (fixed)	Hf	mm	2.5	5.4	7.3	7.3	12.2	12.2	6	8.5
Contact point - ball dia.	D	mm	0.6	1	1	1	1	1	1.5	2
Measuring force	F	N	0.8 - 1.2	1.1 - 1.6	1.1 - 1.6	1.1 - 1.6	1.1 - 1.6	1.1 - 1.6	1.2 - 1.7	1.3 - 1.8
Protection class			IP67	IP67	IP67	IP67	IP67	IP67	IP63	IP63
Order no.			4495590	4495591	4495592	4495593	4495594	4495595	4495596	4495597

Accessories

	Order no.		Order no.
Digimatic interface incl. data connection cable for Type A	838 di 4495083	Battery Alkaline AAA 1.5 V for Type A*	4243073
Digimatic interface incl. data connection cable for Type B	838 di 4495084	Battery Alkaline AA 1.5 V for Type B	4243072
USB data cable incl. Software for Type A	838 usb 4495079	* 2 batteries are required	

Gages (Metric) for Internal Measurement 838 TI for measuring bores and internal grooves

Features

- For measuring bores and internal grooves
- Easy to operate, very habile and portable
- Easy to read tolerance markers
- Dust and splash waterproof
- Contact points are made from carbide
- Absolute measuring instrument
- Supplied with:
Test certificate



Type A

Measuring range 10-30 mm, Order no. 4495581



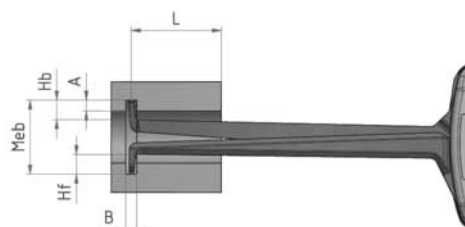
Type B with handle

Measuring range 15-65 mm, Order no. 4495076

Technical Data and Dimensions

			Type A						Type B	
Measuring range	Meb	mm	5 - 15	10 - 30	20 - 40	30 - 50	40 - 60	50 - 70	15 - 65	40 - 90
Readings	Skw	mm	0.005	0.01	0.01	0.01	0.01	0.01	0.05	0.05
Error limit	G	mm	0.015	0.03	0.03	0.03	0.03	0.03	0.05	0.05
Repeatability limit	r	mm	0.005	0.01	0.01	0.01	0.01	0.01	0.025	0.025
Measuring depth	L	mm	35	85	85	85	85	85	175	175
Groove depth	A	mm	2.3	5.2	7.0	7.0	8.3	8.3	4.5	8
Groove width	B	mm	0.8	1.2	1.2	1.2	1.2	1.2	2.5	2.5
Contact point - length (move.)	Hb	mm	2.5	5.4	7.3	7.3	12.2	12.2	5.3	8.5
Contact point - length (fixed)	Hf	mm	2.5	5.4	7.3	7.3	12.2	12.2	5.3	8.5
Contact point - ball dia.	D	mm	0.6	1	1	1	1	1	1.5	2
Measuring force	F	N	0.8 - 1.2	1.1 - 1.6	1.1 - 1.6	1.1 - 1.6	1.1 - 1.6	1.1 - 1.6	1.2 - 2	1.2 - 2
Protection class			IP65	IP65	IP65	IP65	IP65	IP65	-	-
Order no.			4495580	4495581	4495582	4495583	4495584	4495585	4495076	4495077

Application



Gages (Inch) for Internal Measurement 838 TI for measuring bores and internal grooves

Features

- For measuring bores and internal grooves
- Easy to operate, very habile and portable
- Easy to read tolerance markers
- Dust and splash waterproof
- Contact points are made from carbide
- Absolute measuring instrument
- Supplied with:
Test certificate



Type A

Measuring range .40 - 1.20", Order no. 4495981



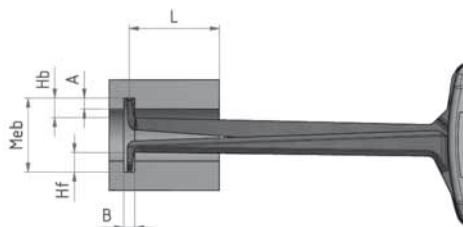
Type B with handle

Measuring range .60 - 2.60", Order no. 4495476

Technical Data and Dimensions

			Type A						Type B	
Measuring range	Meb	inch	.20 - .60	.40 - 1.20	.80 - 1.60	1.20 - 2.00	1.60 - 2.40	2.00 - 2.80	.60 - 2.60	1.60 - 3.60
Readings	Skw	inch	.0002	.0005	.0005	.0005	.0005	.0005	.001	.001
Error limit	G	inch	.0008	.0015	.0015	.0015	.0015	.0015	.002	.002
Repeatability limit	r	inch	.0002	.0005	.0005	.0005	.0005	.0005	.001	.001
Measuring depth	L	inch	1.37	3.2	3.2	3.2	3.2	3.2	6.9	6.9
Groove depth	A	inch	.09	.19	.26	.31	.31	.31	.19	.31
Groove width	B	inch	.032	.06	.08	.08	.08	.08	.09	.10
Contact point - length (move.)	Hb	inch	.097	.21	.29	.29	.33	.33	.21	.33
Contact point - length (fixed)	Hf	inch	.097	.21	.29	.29	.33	.33	.21	.33
Contact point - ball dia.	D	inch	.024	.04	.04	.04	.04	.04	.06	.08
Measuring force	F	N	0.8 - 1.2	1.1 - 1.6	1.1 - 1.6	1.1 - 1.6	1.1 - 1.6	1.1 - 1.6	1.2 - 2	1.2 - 2
Protection class			IP65	IP65	IP65	IP65	IP65	IP65	-	-
Order no.			4495980	4495981	4495982	4495983	4495984	4495985	4495476	4495477

Application



Definition of Terms Specifications for inspection and test acceptance procedure of mechanical and electronic caliper gages

1. Basics

The inspection only follows approximately the testing methods and procedures of the German standard DIN 878 for dial gages and the testing statements for caliper gages according to VDI/VDE/DGQ 2618 sheet 12.1 and 13.1. The gages are referred to without special reference as gages for 'absolute' measurements and adjustable zero point.

2. Definitions

Definitions of length checking techniques see DIN 2257 part 1 and part 2 (see Illustration).

2.1 Application range Awb

Application range Awb of a gage corresponds to the sum of adjusting and measuring range.

2.2 Measuring range Meb

The measuring range of an indicating gage represents the range of measuring values in which agreed error limits must not be exceeded.

2.3 Reading Zw

The reading Zw of a numerical interval of a numerical scale is the modification of the value of a measured variable that causes the modification of the indication by one interval. The numerical interval corresponds to the scale interval of a line scale and is indicated in the unity of the measured variable.

2.4 Scale interval Skw

The scale interval Skw is indicated on the scale, i.e. 0.01 mm. It corresponds to the measuring value between two scale graduation marks.

2.5 Deviation within the measuring range f_M

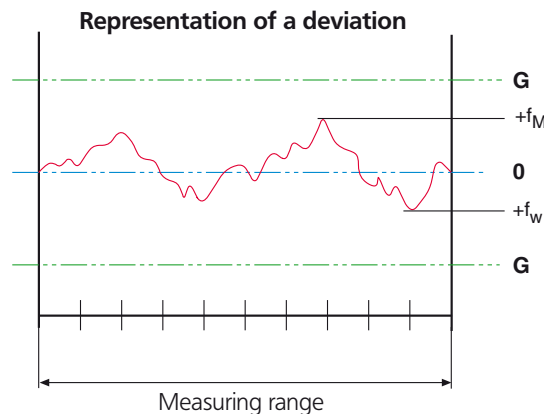
The deviation within the measuring range (range of deviation) f_M represents the distance of ordinates between the highest and the lowest position in the deviation diagram when the movable caliper arm closes. The **error limits** G for f_M is symmetrically positioned to the zero line and is indicated as $\pm f_{Mzul}$.

The deviation in the partial measuring range f_r can only be determined by using electronic testing methods during the preparation of certificates of quality.

2.6 Repeatability f_w

Repeatability f_w is a characteristic value for deviations of the measured variable within the measuring range in the same motion direction of the movable caliper arm (usually n is 5).

The limits of error f_w are referred to with **repeatability limit r**.



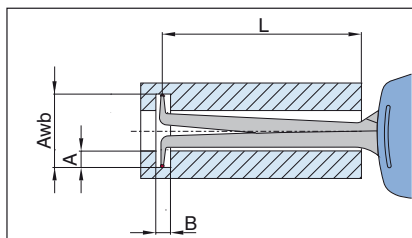
Measuring Capacity of Internal Measuring Instruments

Data listed in the table referring to groove depth A, groove width B and measuring depth L are only meant to be rough guidelines.

For each type of instrument there is dependence of these three values from each other and on the application range Awb. This is shown in the adjacent table of examples. For each inside measuring instrument this table is available upon request in connection with a detailed data sheet.

		Application range Awb (mm)										
		10	11	12	13	14	15	16	17	18	19	20
Groove depth A (mm)	0	0/55	0/55	0/56	0/56	0/57	0/57	0/57	0/57	0/57	0/57	0/58
	0.5		1.4/55	1.4/56	1.4/56	1.4/56	1.4/56	1.4/56	1.4/56	1.4/57	1.4/57	1.4/57
	1			1.4/56	1.4/56	1.4/56	1.4/56	1.4/56	1.4/56	1.4/56	1.4/56	1.4/57
	1.5				1.4/55	1.4/55	1.4/55	1.4/55	1.4/56	1.4/56	1.4/56	1.4/56
	2					1.4/55	1.4/55	1.4/55	1.5/55	1.5/55	1.5/56	1.5/56
	2.5						1.4/55	1.5/55	1.5/55	1.6/55	1.6/55	1.6/55
	3							1.5/54	1.6/54	1.6/55	1.6/55	1.6/55
	3.5								1.6/54	1.6/54	1.6/54	1.6/55
	4									1.7/54	1.7/54	1.7/54
4.5										1.7/53	1.8/54	
		Relationship B/L										

Relationship B/L



B = Min. groove depth (mm)
L = Max. usable caliper arm length (mm)

Example: Awb = 12 B = 1.4
 A = 0.5 L = 56

Indicating Depth Gage 837



Features

- Cross beam is hard chrome plated and hardened
- Measuring faces are finely lapped
- Supplied with:
Cross beam,
Anvil 902 12 mm

Technical Data

Length of cross beam mm	Width of cross beam mm	Flatness of the cross beam der	Mounting hole mm	Order no.*
80	16	DIN 876/0	8H7	4494010
100	16	DIN 876/0	8H7	4494011
120	20	DIN 876/0	8H7	4494012

* Excludes indicating instrument

Accessories

Spherical Contact Points 902

Depth measuring range*	L	Order no.
mm	mm	
10 - 20	25	4360015
20 - 30	35	4360017
30 - 40	45	4360026
40 - 50	55	4360031
50 - 60	65	4360035
60 - 70	75	4360020
70 - 80	85	4360036
80 - 90	95	4360029

* for Indicators with a 10 mm measuring range

Indicating Instruments

Recommended are:

Indicator	Readings / Resolution mm	Measuring range mm	Order no.
810 AT	0.01	10	4311060
1075 R	0.01	12.5	4336010
1086 R	0.01	25	4337130
1086 R	0.01	50	4337131

Indicating Depth Gage 65P-40, 75P-30



75P-35



75P-30



65P-40

Features

- **65P-40** has a "V" shaped base and a needle contact. Movement is "Push-Down" style. Ideal for measuring etch depth, pits, or small, shallow recesses.
- **75P-30** Depth Gages have rectangular, flat base and a radiused contact point. 75P-30 is supplied with contact point, for measuring depths from the base as a reference. Contact points for other depths are available upon request.
- **75P-35** Depth Gages have three interchangeable contact points, allowing inspection of depths to 76 mm / 3". Check depths against a setting

Technical Data

Order no. Metric	Order no. Inch	Capacity	Range of Sensitive	Graduation Contact	Base Dimensions	Contact Style/ Length
65P-40M	65P-40	0-2 mm / 0-.075"	0-2 mm / 0-.075"	0.01 mm / .0005"	64 mm / 2.50"	Needle
75P-30M	75P-30	0-4 mm / 0-.15"	0-4 mm / 0-.15"	0.01 mm / .0005"	64x14 mm / 2.5x.56"	radiused: 3 mm / .13"
75P-35M	75P-35	0-75 mm / 0-3"	0-75 mm / 0-3"	0.01 mm / .001"	64x14 mm / 2.5x.56"	(3) radiused: 3 mm / .13" 28 mm / 1.13" 54 mm / 2.13"

* Indicator not included.

Depth Gages 75P-50



75P-52 with
Setting Master

Features

- Modular depth gages for all applications.
- Single and multi-purpose bases with choice of Dial Indicator for comparative or direct measurement.
- Indicator collet mounting allows easy interchangeability of Indicators and bases — use one Indicator with several bases or change Indicators to meet range requirements.
- Family of contact points available to cover wide range of depth measurement applications.
- Setting masters available with anvil ground to specified depth (± 0.0025 mm / $\pm .0001$ " in accuracy).

Technical Data

- **For Comparative Measurement:** Unless otherwise specified, a comparative measurement Indicator will be furnished. Correct contact point will be furnished for the gaging depth specified.

Metric: Furnished with .01 mm grads. / 2.50 mm range, balance dial.

Inch: Furnished with .0005" grads. / .075" range, balanced dial.

- **For Direct Measurement:** (Special Order) Contact point for 0-25 mm / 0-1" depth will be furnished unless otherwise specified.

Metric: Model SP6IS (.01 mm grads. / 25 mm range, continuous dial with revolution counter).

Inch: Model 28ISN (.001" grads. / 1" range, continuous dial with revolution counter).

Digital: Model 2034212 (.001 mm/.00005" resolution, 25 mm / 1" range)

- For long range models contact Mahr Federal.

Base Dimensions (all bases are 15 mm / .59" high x 19 mm / .75" wide)

Order no. Metric	Inch	Length mm / <i>inch</i>	Width mm / <i>inch</i>	Diameter mm / <i>inch</i>	Measuring Positions	Base only Model*
75P-50M	75P-50	50 / 2"	19 / .75"	—	One	BA-42
75P-51M	75P-51	76 / 3"	19 / .75"	—	One	BA-43
75P-52M	75P-52	102 / 4"	19 / .75"	—	Two	BA-44
75P-53M	75P-53	152 / 6"	19 / .75"	—	Three	BA-45
75P-54M	75P-54	203 / 8"	19 / .75"	—	Three	BA-46
75P-55M	75P-55	—	—	19 / .75"	One	BA-47
75P-56 M	75P-56	—	—	32 / 1.25"	One	BA-76

Ordering Information

When ordering please specify:

1. Model Number.
2. Comparative or Direct Measurement.
3. Depth to be gaged.
4. Master Setting Block, if required.
5. Any special or optional features such as special contact points, Indicator Housing, or alternate Indicators.

* If base only is specified, it is supplied without the indicator holding collet, model AD-87.

Order collet separately if required.

Depth Gages 75P-50

Contact Points

To increase the versatility of any **75P-50** Series Depth Gage, additional contacts may be used to extend the capacity of the gage. Specify additional contact points required from the table at right.

To order the entire set of points, order by Model **PT-750** Contact Point Set.

Gaging Depth mm / <i>inch</i>	Contact Point model*	μMaxμm
0.00 - 1.60 / 0 - .063"	PT-201	PT-564
1.60 - 4.80 / .063 - .188"	PT-232	PT-14
4.80 - 8 / .188 - .313"	PT-305	PT-564
8 - 11 / .313 - .438"	PT-565	PT-31
11 - 14 / .438 - .563"	PT-239	PT-201
14 - 17.50 / .563 - .688"	PT-50	PT-232
17.50 - 21 / .688 - .813"	PT-235	PT-305
21 - 24 / .813 - .938"	PT-241	PT-565
24 - 27 / .938 - 1.063"	PT-100	PT-239
27 - 30 / 1.063 - 1.188"	PT-51	PT-50
30 - 33.40 / 1.188 - 1.313"	PT-243	PT-235
33.4 - 37 / 1.313 - 1.438"	PT-696	PT-241
37 - 40 / 1.438 - 1.563"	PT-101	PT-100
40 - 43 / 1.563 - 1.688"	PT-245	PT-51
43 - 46 / 1.688 - 1.813"	PT-102	PT-243
46 - 49 / 1.813 - 1.938"	PT-566	PT-696
49 - 52.4 / 1.938 - 2.063"	PT-247	PT-101

* For "C" size dial indicators, "EDI-" and "XLI-" μMaxμm Digital Indicators.

Semi-finished Model

0-25 mm/ 0-1"	25-50 mm/ 1-2"	Gaging Positions	Used with Model	"A"	"B"	"C"	"D"
MR-501	MR-502	One	75P-50, 75P-30/35	25 mm/ 1"	25 mm/ 1"	—	—
MR-511	MR-512	One	75P-51	38 mm/ 1.5"	38 mm/ 1.5"	—	—
MR-521	MR-522	Two	75P-52	50 mm/ 2"	25 mm/ 1"	25 mm/ 1"	—
MR-531	MR-532	Three	75P-53	75 mm/ 3"	25 mm/ 1"	25 mm/ 1"	25 mm/ 1"
MR-541	MR-542	Three	75P-54	102 mm/ 4"	25 mm/ 1"	25 mm/ 1"	25 mm/ 1"
MR-551	MR-552	One	75P-55, 75P-56	17 mm/ .68"	17 mm/ .68"	—	—

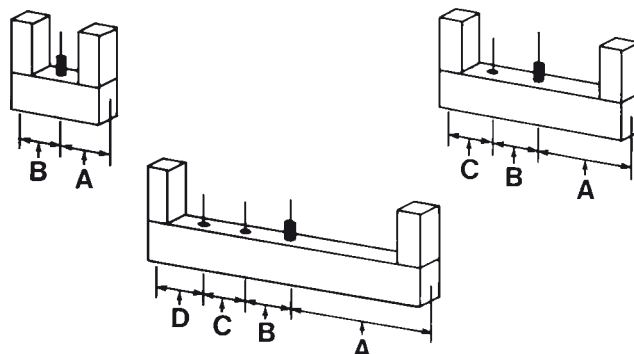
Six different setting masters are available for Series 75P Models. Setting masters are available in two styles: Finished (ground to final size) and Semi-finished (assembled but not ground to final size). Finished depths available from 0 - 50 mm / 0 - 2". Unground Anvil can be purchased separately. Specify **Model AL-89**.

For multi-position masters, please specify the anvil location.

Protective Housings for the Dial Indicator are available, see page 5-23.

For Series 75P-50 style depth gages with alternate Indicators, greater gaging depth, alternate contact configurations or other modifications, contact Mahr Federal Technical Assistance.

For master finished to size, specify size and add suffix "F". Example: MR-502F, size 1.265" (Master for 75P-50 set to 1.265").



Bench Depth Gages 75B-1

For inspecting small parts



75B-1

Features

- Available with Dial Indicator (75B-1 Models) or Maxµm®/// and µMaxµm®// Digital Electronic Indicators (EMD-75B and XLI-75B Models).
- Two contact points provided, 6 mm / .25" and 32 mm / 1.25" to check features up to 50 mm / 2" deep.
- 89 x 102 mm / 3.50 x 4" hardened, ground work surface provides excellent reference surface.
- Four #10-32 tapped holes provided for mounting part location fixturing.
- Indicator adjustable vertically over 32 mm / 1.25".

Technical Data

Order no.		Indicator Range / Graduation or Resolution
Metric	Inch	
75B-1M	75B-1	25 mm / .01 mm (1" / .001") graduation Dial Indicator.
EMD-75B-1		Maxµm®/// Digital Indicator with selectable range and resolution, 2033201.
XLI-75B-1		µMaxµm®// XL Digital Indicator, 25 mm / 1" range, .001 mm / .00005" resolution
XLI-75B-2		µMaxµm®// XL Digital Indicator, 12 mm / .50" range, .001 mm / .00005" resolution

To specify Digital Output on EMD-75B Models, add suffix "D". Example = EMD-75B-1D.
Output is standard with XLI and EDI models.

Dimentron® Plug Gages

The Dimentron System - Built for Performance



Dimention Plug Assembly – shown with *Maxum®III* Indicator, Housing and Handle



Special depth gaging applications



Shown with bench stand 2239307

The Dimentron plug gage, which is formed by the plug body, the panto-assembly with contacts and the transfer rod, is the measuring system comprising the Dimentron plug. It can be interchanged by simply unscrewing it from the display assembly.

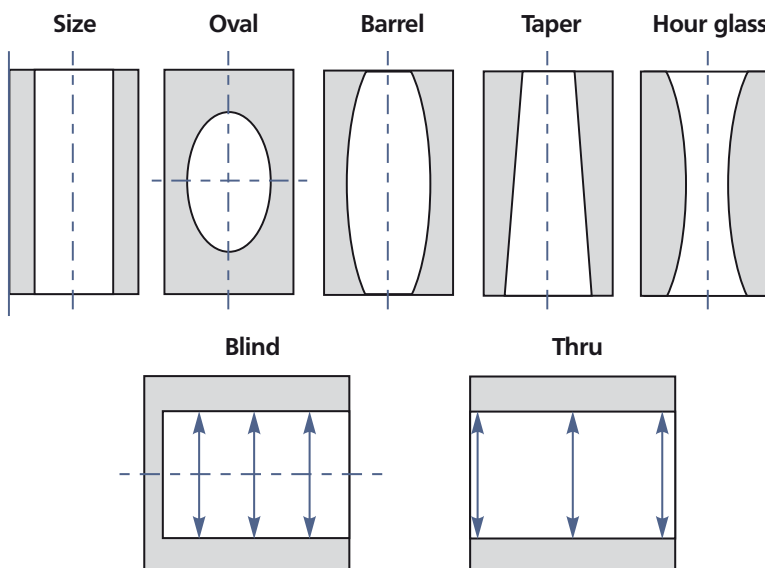
The **plug body** is made from through hardened 440 stainless steel, tempered and ground, with hardness 52-56 HRC, guides the plug gage; its easy entry guide facilitate introduction into the bore.

Standard **contacts** are made of tungsten carbide and based on the bore diameter range, come in two possible radii. Other contact materials are available based on the part being measured. Diamond, Ruby or hard-chrome-covered contacts are also available. Diamond or ruby contacts are suggested for soft aluminum or highly wearing applications; hard chromed ones (1000 HV) for aluminum and relevant alloys. Also based on the thickness of the surface available options cylindrical contacts may be ordered.

Either 2 or 4 steel spring assemblies **form panto-spring assemblies**. The design of the transfer assembly is determined by the diameter of the plug. This panto-design produces true straight-line transfer to the Vee-rod.

A **transfer rod**, with spherical tungsten carbide tip, slides on a tempered steel V-shaped guide and inclined plane, transferring the measurement to the display device. This unique floating system has been designed and tested to resist for over 10,000,000 measuring cycles.

Though designed for the toughest shop conditions, wear items do occasionally need replacement. Because of the individual components **service is fast and easy**. All parts are available separately from Mahr Federal and with standard tools, can be replaced in minutes to help maintain up time on the floor.



Dimentron® Plug Inside Diameter Gages



Thru-hole and Blind Hole
Dimentron Plugs

Features

- Designed for high production I.D. gaging.
- High chrome content; hardened stainless steel bodies ground precisely for specified size measurement.
- Plug tooling interchangeable for quick changeover.
- Measuring is easy — just insert plug into diameter and read. No rocking needed.
- Set to nominal dimension with a single master ring.
- Long life: Tungsten carbide contacts and vee rod ensure durable motion transfer.
- Three styles of plugs available — Thru-hole, Blind Hole and Super-blind.
- Open design rinses clean easily.
- Explore bores for taper, barrel shape, bell-mouth and 2-point out-of-round.
- Stop Collars available for all standard sizes.
- Captive vee rod design.

Technical Data

Blind Hole Plugs***

Use Dimension "A" below. Dimension "B" is 4 mm / .157".

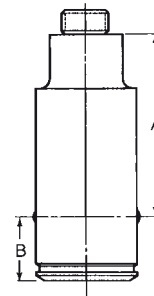
Super-blind Plugs

Use Dimension "A" below. Dimension "B" is 2 mm / .08", for 5.5 mm / .217" & up .108" for 3.2 mm / .125" to 5.5 mm / .217"

Super-Super blind Plugs

Use Dimension "A" below. Dimension "B" is 0.79 mm / .031". (4.500" to 9.00" are not available with this model.)

Dimentron Plug Dimensions



Blind Hole Plugs



Thru-hole Plugs

Sizes above mm / inch	To and include mm / inch	A mm / inch	B mm / inch	Group*
3.2 / .125"	5.5 / .217"	30.4 / 1.2"	6.4 / .25"	no group**
5.5 / .217"	8.2 / .322"	34.8 / 1.37"	6.5 / .256"	5
8.2 / .322"	9.5 / .375"	34.8 / 1.37"	6.5 / .256"	6
9.5 / .375"	12.7 / .50"	35.4 / 1.39"	13 / .512"	8
12.7 / .50"	19.05 / .75"	35.4 / 1.39"	13 / .512"	8
19.05 / .75"	25 / 1"	48.3 / 1.90"	16 / .63"	12
25 / 1"	38 / 1.50"	48.3 / 1.90"	16 / .63"	12
38 / 1.50"	63 / 2.50"	46.7 / 1.84"	19 / .748"	12
63 / 2.50"	114.3 / 4.5"	46.7 / 1.84"	19 / .748"	12
114.3 / 4.50"	228.6 / 9.0"	46.7 / 1.84"	9.5 / .375"	12

* Group Number specifies thread size on gaging plugs. Threaded bushings are provided with each plug to allow mounting to Maxym® Adaptor or Electronic Handle Assembly.

** Only available as Thru- and Blind Hole Small Bore Probe. For larger or smaller plugs, alternate contact materials, extended gaging depths, more clearance, or other plug modifications - contact Mahr Federal Technical Assistance.

*** A blind-hole, Dimentron Plug Gage with µMaxym® Digital Electronic Indicator makes a compact, lightweight portable hand tool.

Dimetron® Plug Inside Diameter Gages



Dimetron Plug Assembly
shown with Maxum®III Indicator,
Housing and Handle

Ordering Information

When ordering specify:

1. Diameter
2. Tolerance
3. Gaging depth
4. Plug style
5. Contact type — polished chrome steel or tungsten carbide
6. Stop collar

Gaging Range:

Dimetron Plugs are ground to one of four measuring ranges, based on part tolerance.

Technical Data

Sizes above mm / inch	To and include mm / inch	Metric M01 Inch 050 mm / inch	Maximum Part Tolerance		
			M02 100 mm / inch	M05 200 mm / inch	M08 400 mm / inch
3.18 / .1250"	3.62 / .1426"	±0.025 / ±.0010"	±0.038 / ±.0015"		
3.62 / .1426"	5.52 / .2171"	±0.025 / ±.0010"	±0.046 / ±.0018"	±0.076 / ±.0030"	
5.50 / .2171"	7.94 / .3125"	±0.025 / ±.0010"	±0.046 / ±.0018"	±0.069 / ±.0027"	±0.102 / ±.0040"
7.94 / .3125"	9.50 / .375"	±0.030 / ±.0012"	±0.051 / ±.0020"	±0.069 / ±.0027"	±0.127 / ±.0050"
9.50 / .3750"	12.7 / .500"	±0.038 / ±.0015"	±0.058 / ±.0023"	±0.086 / ±.0034"	±0.137 / ±.0054"
12.7 / .5000"	19.05 / .750"	±0.038 / ±.0015"	±0.069 / ±.0027"	±0.102 / ±.0040"	±0.165 / ±.0065"
19.05 / .750"	25.4 / 1.000"	±0.038 / ±.0015"	±0.076 / ±.0030"	±0.127 / ±.0050"	±0.180 / ±.0071"
25.4 / 1.000"	38 / 1.500"	±0.038 / ±.0015"	±0.076 / ±.0030"	±0.152 / ±.0060"	±0.221 / ±.0087"
38 / 1.500"	114.3 / 4.50"		±0.076 / ±.0030"	±0.152 / ±.0060"	±0.254 / ±.0100"
114.3 / 4.5"	229 / 9.00"			±0.152 / ±.0060"	±0.254 / ±.0100"

Order Maxum Indicator and Accessories separately.

Maxum®III Indicator

Inch: Specify **2033101** (**2033111** if Digital Output is required) for .00005" resolution, .0001" grad., and "0" on the Indicator in the 12 o'clock position.
For "0" at 6 o'clock position, specify **2033201**.

Metric: Specify **2033101** (**2033111** if Digital Output is required) for 0.001 mm resolution, 0.001 mm grad., and "0" at 12 o'clock. For "0" at 6 o'clock position, specify **2033201**.

EKT-1120-W1 is required to mount the Maxum®III Indicator to Dimetron Plugs. (Specify **EKT-1120-W2** for Maxum®III Indicators with 8 mm stems). This adaptor kit includes mounting adaptor, hex wrench, and flat-end, carbide faced contact point for the Indicator.

Other models include:

EKT-1120-W3 — EDI/Dial .375" stem — 4-48 thread

EKT-1120-W4 — EDI/Dial 8 mm stem — 2.5 thread

EKT-1120-W6 — 1002 - 1010 8 mm stem — 2.5 thread

Protective Housings for Plugs over 50 mm/ 2"

EHG-1172 For Maxum®III Indicators without Output. Requires in-line or pistol style grip Handle (**HA-88** Handle and **AT-124** Adaptor).
EHG-1198 For Maxum®III Indicators with Output. Requires pistol style grip Handle (**HA-88** and **AT-124** Adaptor).

B-12668 For Maxum®III Indicators with Output. Complete with in-line style handle. **AT-125** Bench Stand Adaptor permits the Maxum Indicator in a Protective Housing to be clamped in **BA-26** Bench Stand. (See pages 9-5 and 9-7)

Dimentron® Plug Inside Diameter Gages

With Electronic Gage Heads

Gage heads are mounted to Dimentron Plugs using HA-88 and AD-140 Adaptor. Electronic Gage Heads can be ordered separately. The following Handle Assemblies include Adaptor, Wrenches and Gage Head:

Handle Assemblies

Order no.	Description
EHA-1146	Flat Contact 3 m / 11 ft, coiled cable
EHA-1145	Flat Contact 1.5 m / 5 ft, straight cable

Accessories

Base, BA-100

Heavy cast base has tooling plate allowing plug to be mounted vertically or horizontally. Can be used with Electronic Gage Heads or Maxum Remote Transducers or Maxum/// Digital Transducers.

Stop Collars

Stop collars are available for all Dimentron Plugs.



Right Angle Adaptor
AT-155

Extensions

Extensions for Dimentron Plugs are available for Plugs over 9.5 mm / .375". See table below:

Group 8 Plugs 9.3 mm/.366" O.D.	Group 12 Plugs 16 mm/.63" O.D.	Extension Length
EX-204	EX-210	50 mm/ 1.97"
EX-205	EX-211	100 mm/ 3.94"
EX-206	EX-212	200 mm/ 7.87"

Consists of 1280P Indicator and Handle Assembly with stocked adaptor:

	Order no.		Minimum graduation
Inch	550P-10	Dial Indicator	.0001"
Metric	550P-20	Dial Indicator	.002 mm
	EDI-550P-10	(with EDI-50102*)	.00005"/.001 mm
	EDI-550P-20	(with 2034201)	.00002"/.0005 mm

* no output



EDI-550P-10



Remote Maxum Transducer or Maxum///
Digital Transducer Dimentron Plug
Handle/ Adaptor: HA-141



BA-100 (Dimentron Plug
not included)

Dimetron® Plug Inside Diameter Gages

This table depicts available readouts for Dimetron Plug Inside Diameter Gages. After making a Plug selection, follow the chart for all the components needed to make up a gaging system suited to your application.

Dimetron Plug Gage	Adaptors	Handles	Readout	Housing Housings	Handle
Dimetron Plug			2014802		
Stop Collar			2034201		
Extension	EKT-1120-WX		2033111	B-12668	
				EHG-1198	AT-124
			2033101	EHG-1172	HA-88
			2033001 - no Data Output		
		HA-141	2033011 - with Data Output (6 pin)		
			2033091 - canister style*		
			2033099 - pencil style*		
			* ± 1 mm/ ±.040" Range Digital Transducer.		
			550P-10/20	Dial Indicator	
		EHA-1146	832 AMP		
		EHA-1145			
		BA-100			
		AAT-192	D-2500: 1 - 4000:1		
		AAT-193			
		AAT-194			
		EDI-550P-10	μMaxμm//		
		EDI-550P-20			

Change-WX suffix as required:
For adaptor selection see page 9-46

Indicating Plug Gages 844 D



Features

- For the rapid testing of diameter, roundness and conicity of bores
- Especially suitable for testing batches with tight tolerances
- No rocking in the bore is required to determine the reversal point
- Therefore ideal for use in conjunction with a digital indicating instrument and for subsequent processing of measured values
- Measuring head has a hardened chromium plated guide cylinder and carbide tipped anvils
- The carbide expanding pin transfers radial movement to indicating instrument
- Constant measuring force as a result of built-in spring, thus eliminating user influence
- Measuring head, holder, depth extension, right angle attachments and depth stops are part of an extensive modular system

Technical Data of the Measuring Heads

Nominal diameter of the bore	Measuring range starting from the minimum bore dimension to be measured			
	844 Dk/844Dkr		844 Dks (from 4 mm)	
2.98 - 8 mm	= - 0.02	+ 0.1 mm	= - 0.02	+ 0.1 mm
over 8 - 16 mm	= - 0.02	+ 0.15 mm	= - 0.02	+ 0.15 mm
over 16 - 32 mm	= - 0.02	+ 0.2 mm	= - 0.02	+ 0.15 mm
over 32 - 70 mm	= - 0.03	+ 0.2 mm	= - 0.03	+ 0.15 mm
over 70 - 200 mm	= - 0.04	+ 0.2 mm	= - 0.04	+ 0.15 mm

When placing an order please quote the nominal diameter and tolerances, for example:

Bore diameter	Tolerance	
35 D7	+ 80	+105 μm
35 H7	+ 0	+25 μm
35 R7	- 50	-25 μm

The diameter of the guide cylinder is produced between 0.02 and 0.07 mm smaller than the minimum dimension of the bore to be checked.

Example:

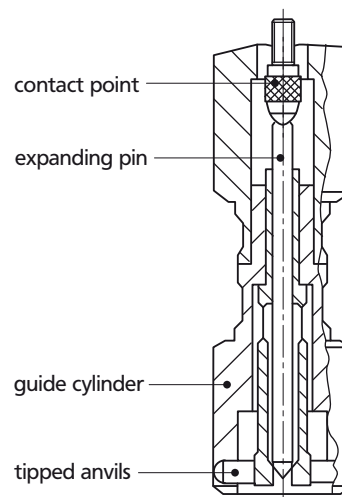
Plug Gage 844 Dk for bore 35 D7

Nominal diameter: 35 mm
 Minimum dimension: 35.080 mm
 Maximum dimension: 35.105 mm
 Meas. range: 35.050 - 35.280 mm

Accuracy

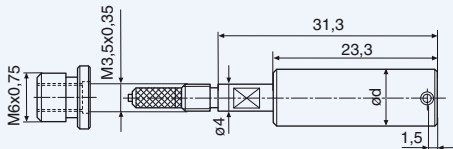
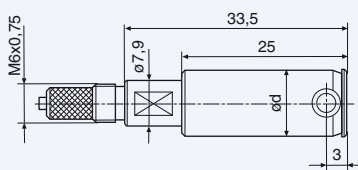
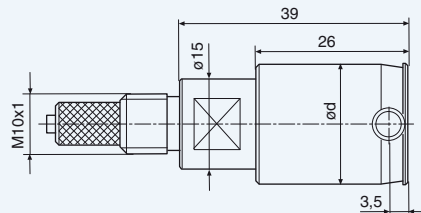
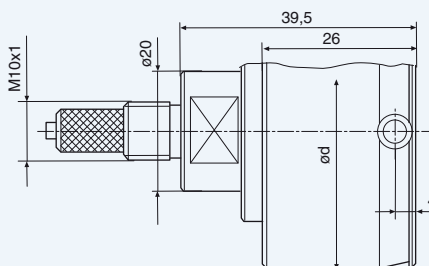
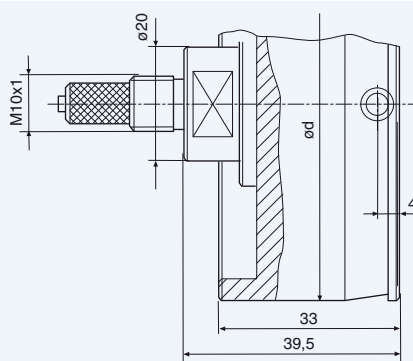
Hysteresis
 Repeatability
 Linearity
 Linearity 844 Dks >16 mm

$f_U \leq 0.4 \mu\text{m}$
 $f_W \leq 1 \mu\text{m}$
 $\leq 1 \%$
 $\leq 2 \%$



Plug Gages

Measuring Head 844 Dk, Standard version

	Nominal ^① diameter mm mm	Manufacturing ^② tolerance mm	Meas. range ^③ dia. d	Order no.	
over	2.98 - 3.99 3.99 - 8	-0.02/-0.04 -0.02/-0.04	0.1 0.1	4480184* 4478200*	
over	8 - 16	-0.02/-0.04	0.15	4478201	
over over over	16 - 25 25 - 32 32 - 44	-0.02/-0.05 -0.02/-0.05 -0.02/-0.06	0.2 0.2 0.2	4478202 4478204 4478205	
over over over	44 - 50 50 - 60 60 - 70	-0.03/-0.06 -0.03/-0.06 -0.03/-0.06	0.2 0.2 0.2	4478206 4478207 4478208	
over over over over over over over over over over over over over over over over	70 - 80 80 - 90 90 - 100 100 - 110 110 - 120 120 - 130 130 - 140 140 - 150 150 - 160 160 - 170 170 - 180 180 - 190 190 - 200	-0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	4478209 4478210 4478211 4478212 4478213 4478214 4478215 4478216 4478217 4478218 4478219 4478220 4478221	

① Nominal diameter = smallest bore diameter

② dia. d in reference to the smallest bore diameter

③ Measuring range refers to the nominal diameter

* With Adaptor for connection to the holder

Plug Gages

Measuring Head 844 Dks, for blind holes, to measure almost to the base of a bore

	Nominal ^① diameter mm	Manufacturing ^② tolerance mm	Meas. range ^③ dia. d mm	Order no.	
	4 - 8	-0.02/-0.04	0.10	4478285*	
over	8 - 16	-0.02/-0.04	0.15	4478245	
over over over	16 - 25 25 - 32 32 - 44	-0.02/-0.05 -0.02/-0.05 -0.02/-0.06	0.15 0.15 0.15	4478230 4478232 4478233	
over over over	44 - 50 50 - 60 60 - 70	-0.03/-0.06 -0.03/-0.06 -0.03/-0.06	0.15 0.15 0.15	4478234 4478235 4478236	
over over over over over over over over	70 - 80 80 - 90 90 - 100 100 - 110 110 - 120 120 - 130 130 - 140 140 - 150	-0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07	0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15	4478237 4478238 4478239 4478240 4478241 4478242 4478243 4478244	

① Nominal diameter = smallest bore diameter

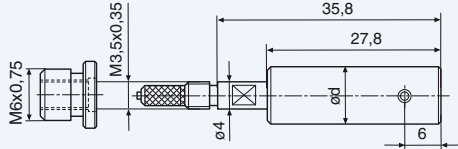
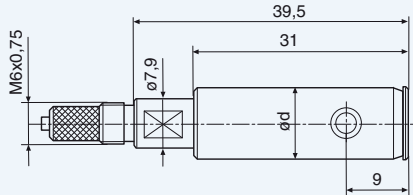
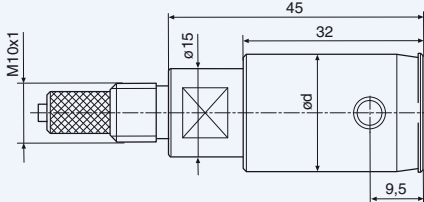
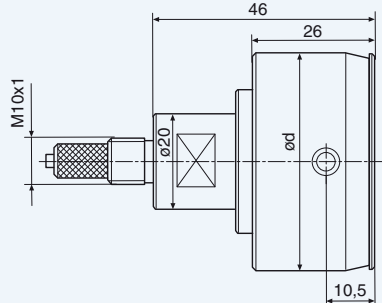
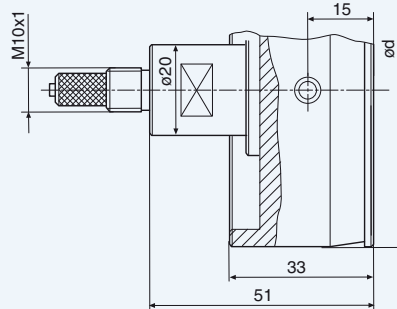
② dia. d in reference to the smallest bore diameter

③ Measuring range refers to the nominal diameter

* With adaptor for connection to the holder

Plug Gages

Measuring Head 844 Dkr, with an extended guide cylinder to measure through holes from the edge of a bore, ideal for narrow parts

	Nominal ^① diameter mm	Manufacturing ^② tolerance mm	Meas. range ^③ dia. d mm	Order no.	
over	2.98 - 3.99 3.99 - 8	-0.02/-0.04 -0.02/-0.04	0.1 0.1	4478272* 4478250*	
over	8 - 16	-0.02/-0.04	0.15	4478251	
over over over	16 - 25 25 - 32 32 - 44	-0.02/-0.05 -0.02/-0.05 -0.02/-0.06	0.2 0.2 0.2	4478252 4478254 4478255	
over over over	44 - 50 50 - 60 60 - 70	-0.03/-0.06 -0.03/-0.06 -0.03/-0.06	0.2 0.2 0.2	4478256 4478257 4478258	
over over	70 - 80 80 - 90 90 - 100 100 - 110 110 - 120 120 - 130 130 - 140 140 - 150 150 - 160 160 - 170 170 - 180 180 - 190 190 - 200	-0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07 -0.04/-0.07	0.2 0.2	4478259 4478260 4478261 4478262 4478263 4478264 4478265 4478266 4478267 4478268 4478269 4478270 4478271	

① Nominal diameter = smallest bore diameter

② dia. d in reference to the smallest bore diameter

③ Measuring range refers to the nominal diameter

* With adaptor for connection to the holder

Modular Unit System 844 D

Standard Holder 844 Kg/844 Dg - Standard version

With locking clamp for an indicating instrument and a connecting thread for a measuring head. Heat insulated handle. The model 844 Dg is made from Invar steel.

Cat. no.	Connecting thread g	Length L mm	Handle dia. D mm	Order no.
844 Kg	M6 x 0.75	50	14	4470851
844 Dg	M10 x 1	150	26	4478851

Short Holder 844 Dgk - Short version

With locking clamp for an indicating instrument and a connecting thread for a measuring head. Heat insulated handle.

Cat. no.	Connecting thread g	Length L mm	Handle dia. D mm	Order no.
844 Dgk	M10 x 1	61	26	4478050

Holder 844 Dge for Inductive Measuring Probes

With long sleeve for shock and waterproof mounting of inductive measuring probes. Strain relief clamp for probe cable. Threaded connection for measuring heads. Heat insulated handle.

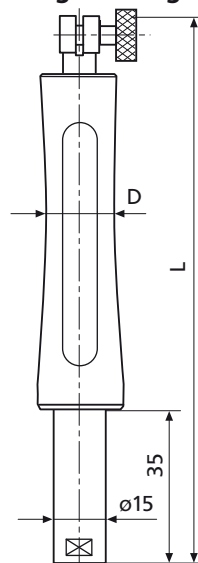
Cat. no.	Connecting thread g	Length L mm	Handle dia. D mm	Order no.
844 Dge	M6 x 0.75	195	33	4478020
	M10 x 1	195	33	4478021

Right Angle (Elbow) Attachment

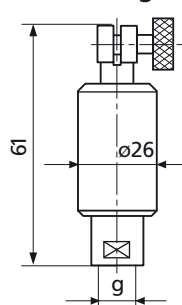
For measuring difficult to reach bores, e.g. in tight spaces, on a machine tool or when work piece bores are inconveniently located. For screwing in between holder and measuring head.

Cat. no.	Connecting thread g mm	Elbow		Order no.
		Length L mm	Height H mm	
844 Kw	M6 x 0.75	26.5	22.5	4470110
844 Dw	M10 x 1	36.7	17	4478110

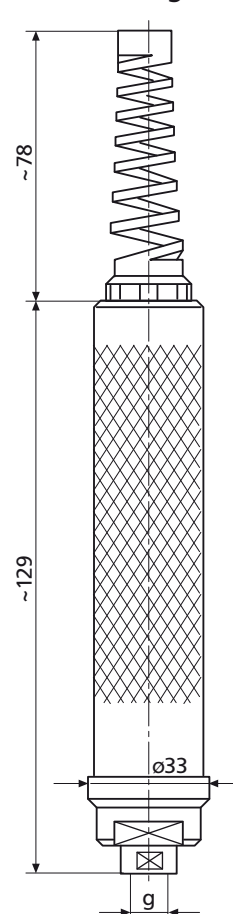
844 Kg / 844 Dg



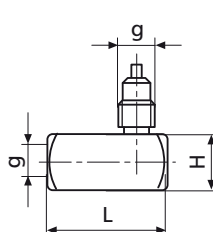
844 Dgk



844 Dge



844 Kw / 844 Dw



Modular Unit System 844 D

Extensions

For extra-deep bores. Screws in between holder and measuring heads. Several extensions can be screwed together as of 8 mm. Models 844 Dv and 844 Dvk made of **Invar steel**.

Cat. no.	Connecting thread g	Length L mm/ <i>inch</i>	dia. D mm/ <i>inch</i>	Order no.
844 Dvk	M6x0.75/M3.5x0.35	64/ 2.5"	3.8 / .15"	4478080
844 Kv	M6 x 0.75	64/ 2.5"	8 / .32"	4470070
844 Dv	M10 x 1	64/ 2.5"	15 / .6"	4478070
844 Dv	M10 x 1	80/ 3"	15 / .6"	4478071
844 Dv	M10 x 1	100/ 4"	15 / .6"	4478072
844 Dv	M10 x 1	125/ 5"	15 / .6"	4478073
844 Dv	M10 x 1	250/ 10"	15 / .6"	4478074
844 Dv	M10 x 1	500/ 20"	15 / .6"	4478075

Depth Stops

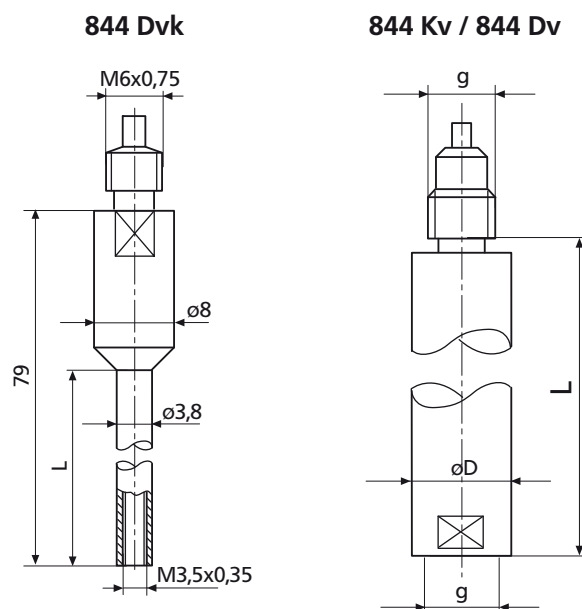
For limiting depth of insertion of measuring head in bore. Can be attached to Extensions 844 Kv or 844 Dv. With clamping screw.

Cat. no.	Mounting hole dia. d mm/ <i>inch</i>	Stop surface dia. A mm/ <i>inch</i>	Height h mm/ <i>inch</i>	Order no.
844 Kt	8 / .32"	24 / 1"	60 / 2.36	4470115
844 Dt	15 / .6"	45 / 1.8"	30 / 1.18	4478115
844 Dt	15 / .6"	75 / 3"	30 / 1.18	4478116
844 Dt	15 / .6"	110 / 4.3"	30 / 1.18	4478117
844 Dt	15 / .6"	160 / 6.3"	30 / 1.18	4478118
844 Dt	15 / .6"	220 / 8.6"	30 / 1.18	4478119

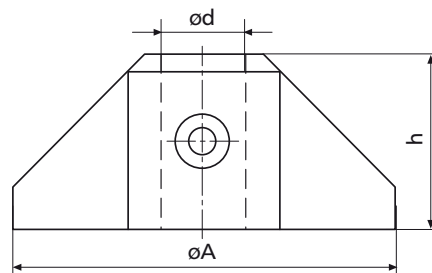
Depth Stop Rings

For limiting depth of insertion of measuring head in bore. Clamped onto the measuring head.

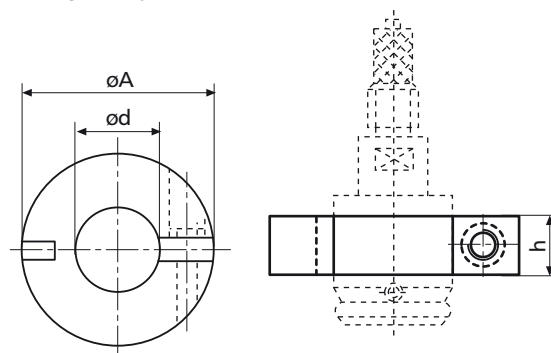
Cat. no.	Mounting hole dia. d mm	Stop surface dia. A mm/ <i>inch</i>	Height h mm/ <i>inch</i>	Order no.
844 Dtr	3 - 5	27 / 1.1"	10 / .4"	4478130
	> 5 - 8	30 / 1.2"	10 / .4"	4478130
	> 8 - 11	33 / 1.3"	10 / .4"	4478130
	> 11 - 15	37 / 1.5"	10 / .4"	4478130
	> 15 - 20	42 / 1.7"	10 / .4"	4478130
	> 20 - 25	50 / 1.9"	12 / .5"	4478131
	> 25 - 30	55 / 2.1"	12 / .5"	4478131
	> 30 - 35	60 / 2.3"	12 / .5"	4478131
	> 35 - 40	65 / 2.5"	12 / .5"	4478131
	> 40 - 45	70 / 2.8"	12 / .5"	4478131
	> 45 - 50	75 / 3.0"	12 / .5"	4478132
	> 50 - 60	85 / 3.3"	12 / .5"	4478132
	> 60 - 70	95 / 3.7"	12 / .5"	4478132
	> 70 - 80	105 / 4.1"	12 / .5"	4478132
	> 80 - 90	115 / 4.5"	12 / .5"	4478133
	> 90 - 100	125 / 4.9"	12 / .5"	4478133



844 Kt / 844 Dt

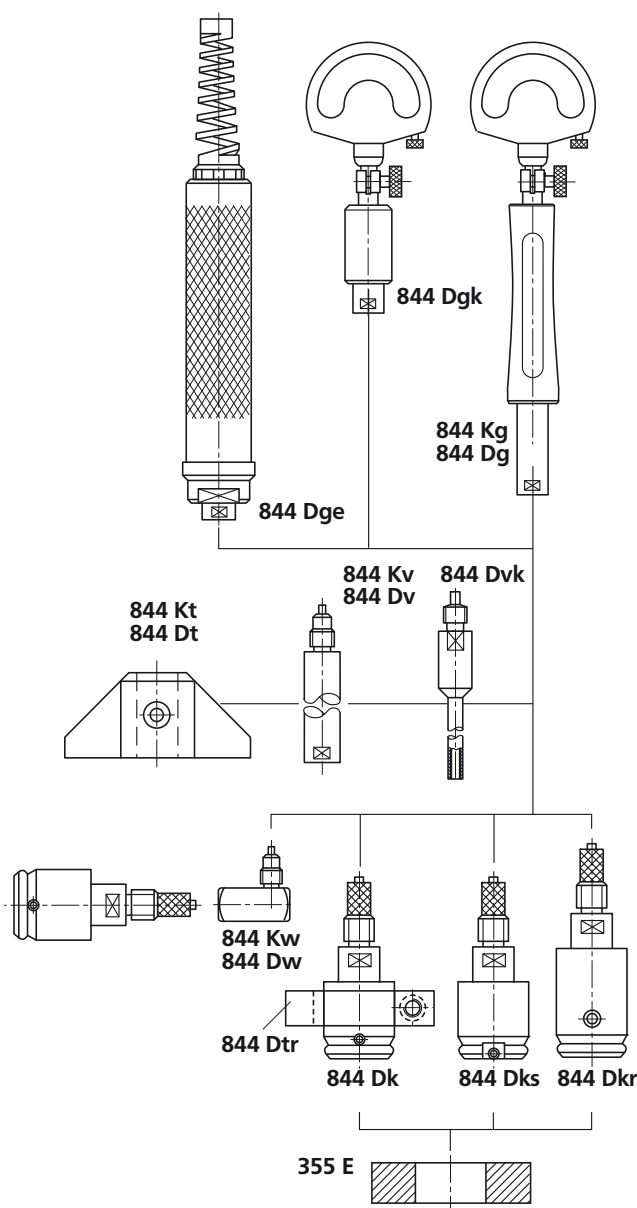


844 Dtr



Modular units	Diameter of Measuring Heads		
	2.98 - 8 mm	8 - 16 mm	over 16 mm
844 Kg	4470851		4478851
844 Dg			
844 Dgk			
844 Dge			
	4478020		4478021
844 Dvk 844 Kv 844 Dv	4478080	4470070	4478070 to 4478076
844 Kt 844 Dt			
		4470115	4478115 to 4478119
844 Kw 844 Dw	4470110		4478110
844 Dk 844 Dks 844 Dkr			
355 E	see page 9-44		

Modular unit	Diameter of Measuring Heads			
	2.98 - 20 mm	20 - 44 mm	44 - 80 mm	80 - 100 mm
844 Dtr	4478130	4478131	4478132	4478133



Indicating Instruments

All indicating instruments that has a 8 mm mounting shank may be used. Recommended are:

Indicator	Readings	Order no.
Compramess 1004	5 μm	4333000
Millimess 1003	1 μm	4334000
Supramess 1002	0,5 μm	4335000
Extramess 2000	0,2 μm , 0,5 μm , 1 μm	4346000
Extramess 2001	0,2 μm , 0,5 μm , 1 μm	4346100
Millimar C 1208	± 3 , 10, 30, 100, 300, 1000 μm 3000 μm , 10000 μm	5312080
Millimar P 2004 M		5323010
Millimar S 1840	± 10 , 30, 100, 300, 1000 μm 3000 μm , 10000 μm	5318400
Millimar P 2004 M		5323010

Digital Indicators see Chapter 5

Electrical Indicating Instruments see Chapter 7

Adjustment of Plug Gages 844 D

Ring Gage 355 E:

Special wear-resistant gage steel. Hardened and lapped. With actual deviation engraved.

Dimensions: DIN 2250, type C
Manufacturing tolerance: DIN 2250
Available diameters: see page 13-19

Self-Centering Dial Bore Gages 844 K Intramess



Features

- Measuring the diameter, roundness and conicity of bores
- Spring-loaded halves of measuring probe are split via expanding pin with precision lapped taper. This movement is transferred to indicating instrument
- Maximum wear-resistance due to hard chrome plating. From 4 mm alternatively with carbide tipped available on request
- Constant measuring force as a result of built-in spring thus eliminating user influence
- Highly versatile, each gage covers a large range. Within the respective limits, quickly and easily adjustable to any size and any type of measuring application
- Measuring probe, holder, depth extensions, right-angle attachments and depth stops are part of an extensive modular system
- Supplied with: Holder, probe, expanding pin and a wooden case, excludes an indicating instrument

Technical Data

Complete Instrument

- 844 K** Measuring heads hard chrome plated, expanding pin made of stainless steel
- 844 KH** Measuring heads carbide tipped on both sides, carbide expanding pin
- 844 KS** Blind hole measuring heads hard chrome plated, expanding pin made of stainless steel

Catalog no.	Measuring range mm	Number of meas. probes	Order no.*
844 K	0.47 - 0.97	6	4470000
	0.95 - 1.55	5	4470001
	1.5 - 4.2	10	4470002
	3.7 - 7.3	7	4470003**
	6.7 - 10.3	7	4470004**
	9.4 - 18.6	9	4470005**
844 KH	1.5 - 4.2	10	4471002
	3.7 - 7.3	7	4471003**
	6.7 - 10.3	7	4471004**
	9.4 - 18.6	9	4471005**
844 KS	1.5 - 4.2	10	4482163
	3.7 - 7.3	7	4482164**
	6.7 - 10.3	7	4482165**
	9.4 - 18.6	9	4482166**

* Excludes an indicating instrument

**Additionally includes measuring force spring 4470828 and disk 4470821

Accuracy

Deviation of linearity

- ≤ 2 % measuring ranges 0.47-1.55 mm
- ≤ 1 % measuring ranges 1.5-18.6 mm

Repeatability

- 1 µm manual measurement
- ≤ 0.5 µm measurement with Stand 844 Kst and Floating Holder 844 Ksts

Indicating Instruments

All indicating instruments that has a 8 mm mounting shank may be used. Recommended are:

Indicators	Readings	Order no.
Compramess 1004	5 µm	4333000
Millimess 1003	1 µm	4334000
Millimess 1003 XL	2 µm	4334001
Supramess 1002	0.5 µm	4335000
Extramess 2000	0.2 µm, 0.5 µm, 1 µm	4346000
Extramess 2001	0.2 µm, 0.5 µm, 1 µm	4346100
MarCator 1087 BR	1 µm, 2 µm, 4 µm, 10 µm	4337162

Digital Indicators see Chapter 5
Electrical Indicating Instruments see Chapter 7

Modular Unit System for 844 K Standard Measuring Probes

In addition complete Dial Bore Gages 844 K, modular units area available for assembly as required to suit an individual measuring task and or application.

Measuring Probe 844 Kk, Expander Pin, individual Ring Gage for 844 Ke

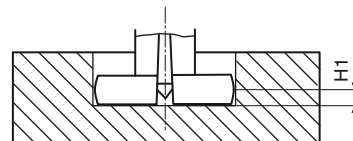
Nominal dimension mm	Measuring range mm	Measuring depth mm	Measuring probe hard chrome plated	Expanding pin steel	Measuring probe carbide tipped	Expander pin carbide	Ring gage
0.50	0.47 - 0.53	1.25	4470586	4470801			4482300
0.55	0.52 - 0.58	1.5	4470587				4482301
0.60	0.57 - 0.67	1.7	4470588	4470802			4482302
0.70	0.65 - 0.77	2.2	4470589				4482303
0.80	0.75 - 0.87	2.55	4470590				4482304
0.90	0.85 - 0.97	2.65	4470591				4482305
1.00	0.95 - 1.15	10.5	4470592	4470803			4482306
1.10	1.07 - 1.25	10.5	4470593				4482307
1.20	1.17 - 1.35	10.5	4470594				4482308
1.30	1.27 - 1.45	10.5	4470595				4482309
1.40	1.37 - 1.55	10.5	4470596				4482310
1.75	1.50 - 1.90	16	4470597	4470804	4471234	4471207	4482311
2.00	1.80 - 2.20	16	4470598		4471206		4482312
2.25	2.05 - 2.45	16	4470599	4470805	4471812	4471819	4482313
2.50	2.30 - 2.70	21	4470600		4471813		4482314
2.75	2.55 - 2.95	21	4470601		4471814		4482315
3.00	2.80 - 3.20	21	4470602		4471208		4482316
3.25	3.05 - 3.45	21	4470603		4471815		4482317
3.50	3.30 - 3.70	21	4470604		4471816		4482318
3.75	3.55 - 3.95	21	4470605		4471817		4482319
4.00	3.80 - 4.20	21	4470606		4471204		4482320
4.00	3.70 - 4.30	38	4470607	4470806	4471607	4471200	4482320
4.50	4.20 - 4.80	38	4470608		4471608		4482321
5.00	4.70 - 5.30	38	4470609		4471609		4482322
5.50	5.20 - 5.80	38	4470610		4471610		4482323
6.00	5.70 - 6.30	38	4470611		4471611		4482324
6.50	6.20 - 6.80	38	4470612		4471612		4482325
7.00	6.70 - 7.30	38	4470613		4471613		4482326
7.50	7.20 - 7.80	38	4470615		4471615		4482327
8.00	7.70 - 8.30	38	4470616		4471616		4482328
8.50	8.20 - 8.80	45	4470617		4471617		4482329
9.00	8.70 - 9.30	45	4470618		4471618		4482330
9.50	9.20 - 9.80	45	4470619		4471619		4482331
10.00	9.70 - 10.30	45	4470620		4471620		4482332
10.00	9.40 - 10.60	45	4470621	4470808	4471621	4471202	4482332
11.00	10.40 - 11.60	45	4470622		4471622		4482333
12.00	11.40 - 12.60	45	4470623		4471623		4482334
13.00	12.40 - 13.60	45	4470624		4471624		4482335
14.00	13.40 - 14.60	45	4470625		4471625		4482336
15.00	14.40 - 15.60	45	4470626		4471626		4482337
16.00	15.40 - 16.60	80	4470627		4471627		4482338
17.00	16.40 - 17.60	80	4470628		4471628		4482339
18.00	17.40 - 18.60	80	4470629		4471629		4482340



for further technical data (e.g. nominal dimensions up to 40 mm) see **WebCode 11070**

Nominal dimension mm	L mm	H 1 mm
0.50	19.50	0.25
0.55	19.50	0.27
0.60	19.50	0.29
0.70	19.50	0.31
0.80	19.50	0.33
0.90	19.50	0.35
1.00	19.50	0.60
1.75	25.30	0.90
2.50	30.60	1.20
4.00	47.30	2.00
10.00	48.50	3.30

Minimum measurement height



Modular Unit System for 844 KS Blind Hole Measuring Probes

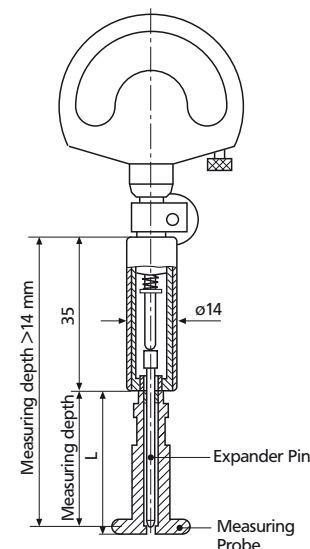
In addition to complete Dial Bore Gages 844 KS, modular units are available for assembly as required to suit a individual measuring task and or application.

Blind Hole Measuring Probe 844 Kk, Blind Hole Expander Pin

Nominal dimension mm	Measuring range mm	Measuring depth mm	Blind hole measuring probe hard chrome plated	Blind hole expander pin steel
1.75	1.50 - 1.90	16	4482228	4482176
2.00	1.80 - 2.20	16	4482229	
2.25	2.05 - 2.45	16	4482230	
2.50	2.30 - 2.70	21	4470301	
2.75	2.55 - 2.95	21	4482227	4482177
3.00	2.80 - 3.20	21	4482178	
3.25	3.05 - 3.45	21	4482179	
3.50	3.30 - 3.70	21	4470300	
3.75	3.55 - 3.95	21	4482188	4482028
4.00	3.80 - 4.20	21	4482180	
4.00	3.70 - 4.30	38	4482057	
4.50	4.20 - 4.80	38	4482162	
5.00	4.70 - 5.30	38	4482056	4482192
5.50	5.20 - 5.80	38	4470953	
6.00	5.70 - 6.30	38	4482140	
6.50	6.20 - 6.80	38	4482055	
7.00	6.70 - 7.30	38	4482108	4482192
7.50	7.20 - 7.80	38	4482204	
8.00	7.70 - 8.30	38	4482054	
8.50	8.20 - 8.80	45	4482206	
9.00	8.70 - 9.30	45	4482170	4482192
9.50	9.20 - 9.80	45	4482182	
10.00	9.70 - 10.30	45	4470375	
10.00	9.40 - 10.60	45	4482205	
11.00	10.40 - 11.60	45	4482042	4482192
12.00	11.40 - 12.60	45	4482112	
13.00	12.40 - 13.60	45	4482102	
14.00	13.40 - 14.60	45	4482181	
15.00	14.40 - 15.60	45	4482202	4482192
16.00	15.40 - 16.60	80	4482021	
17.00	16.40 - 17.60	80	4482203	
18.00	17.40 - 18.60	80	4482113	

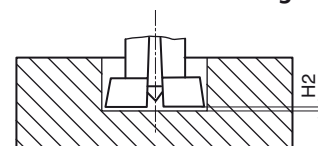


for further technical data (e.g. nominal dimensions up to 40 mm) see **WebCode 11070**



844 Kk

Minimum measurement height



Nominal dimension mm	L mm	H 2 mm
1.75 - 2.25	25.30	0.30
2.50 - 4.00	30.60	0.30
4.00 - 10.00	47.30	0.50
10.00 - 18.00	48.50	1.00

Ring Gage Sets 844 Ke

For setting Dial Bore Gages 844 K, 844 KH and 844 KS. Supplied in sets to match the measuring ranges of these instruments. Can be stored in the wooden case of the bore gages.

Diameter tolerance $\pm 1 \mu\text{m}$

Ring Gages 844 Ke are only available with the diameters shown in the table.

For all other dimensions, Ring Gages 355 E with dimensions as per DIN 2250 and with actual deviation engraved are available.

For Meas. range mm	Diameter mm	Order no.
0.47 - 0.97	0.5/0.55/0.6/0.7/0.8/0.9	4470160
0.95 - 1.55	1/1.1/1.2/1.3/1.4	4470161
1.5 - 4.2	1.75/2/2.25/2.5/2.75/ 3/3.25/3.5/3.75/4	4470162
3.7 - 7.3	4/4.5/5/5.5/6/6.5/7	4470163
6.7 - 10.3	7/7.5/8/8.5/9/9.5/10	4470164
9.4 - 18.6	10/11/12/13/14/15/ 16/17/18	4470165

Modular Unit System for 844 K

Holder 844 Kg

With locking clamp for an indicating instrument and a connecting thread for a **Measuring Head 844 Kk**. Heat insulated handle

Order no. 4470851

Extensions 844 Kv

For extra-deep bores. Screws in between Holder 844 Kg and Measuring Head 844 Kk for measuring range 10-18 mm. Length 64 mm, \varnothing 8 mm,

Order no. 4470070

Right Angle Attachment 844 Kw

For measuring bores which are difficult to reach, e.g. in tight spaces, on machine tools or when work piece bores are inconveniently located. For screwing in between Holder 844 Kg and Measuring Head 844 Kk

Order no. 4470110

Lifter 954

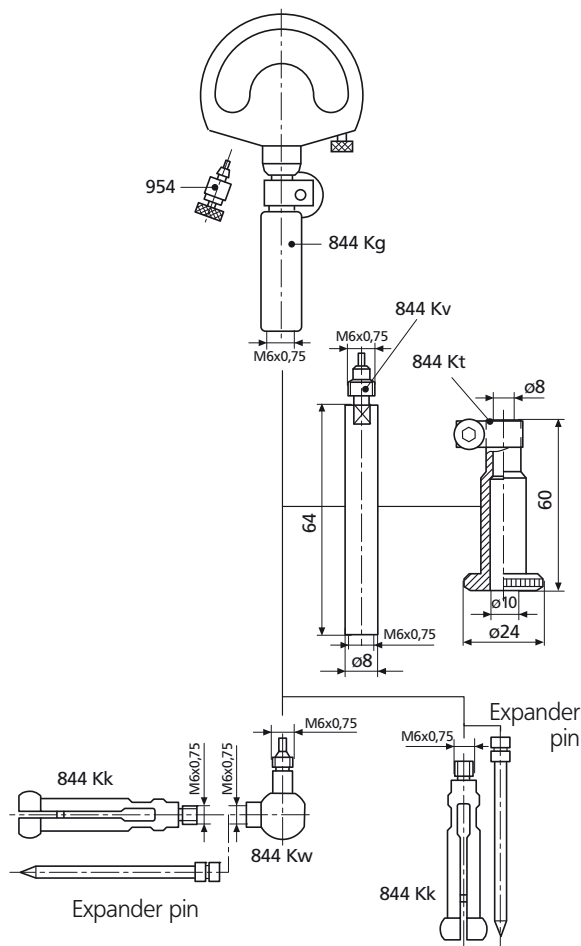
Facilitates insertion of measuring probe in bore by lifting measuring spindle of dial comparator.

Order no. 4372030

Depth Stop 844 Kt

For checking diameter of bores at prescribed depth. Only to be used with Extension 844 Kv.

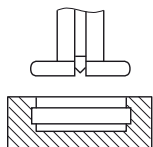
Order no. 4470115



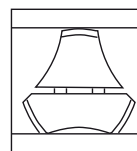
Measuring Probes for Special Applications

For measurement of blind holes, diameters of recesses, distances between plane-parallel surfaces, etc. special models of measuring probes are available on request.

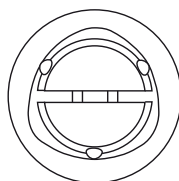
1. Measurement of the diameter of recesses



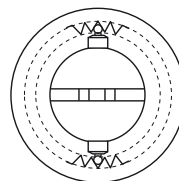
2. Measurement of plane-parallel surfaces



3. Measurement of polygon bores



4. Measurement of inside serrations, see 844 Z Page 9-70



Accessories

Stand 844 Kst



Floating Holder 844 Ksts



Features

For quick checks of bores in small work pieces. Hardened table plate can be raised with lever, thus moving test piece into position. Plate can be clamped at any height for checking eccentricity. Particularly suited to use with digital indicators, where appropriate in conjunction with data printers or computer equipment, in cases where the determination of the reversal point is inappropriate.

Table dia.	58 mm
Throat depth of arm	45 mm
Table stroke	30 mm
Max. work piece height	ca. 100 mm

Order no. 4470100

Features

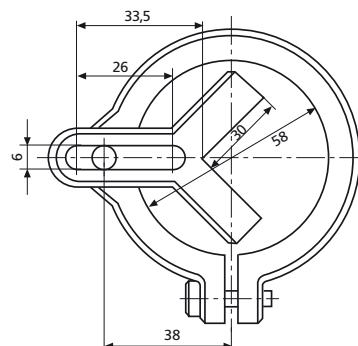
For use in conjunction with Stand 844 Kst. Enables measuring probe to find common axis of bore and measuring instrument quickly and easily on insertion into hole, thus providing optimum measuring speed and high accuracy. Particularly suitable for small diameters, as measuring confidence is considerably enhanced.

Order no. 4470105

Angle Stop 844 Ka

Facilitates positioning of cylindrical work pieces under measuring instrument. For clamping to Stand 844 Kst.

Order no. 4470120



Adjustable Bore Gages 1280 P

Superior Accuracy for Production and Inspection.



1282P-3W2 and 1280P-1W1

Features

- Rugged construction for long life and low maintenance: Stainless steel gaging head, one piece centralizing yoke with replaceable tungsten carbide balls.
- Heavy duty housing protects Indicator.
- Flow-through design makes Series 1280P Bore Gages swish clean, no disassembly required.
- Outstanding stability: Holds mastered value.
- Furnished with either Dial Indicator or Maxµm[®]/// Digital Electronic Indicator.
- Digital bore gages with output are provided with Maxµm[®]/// Indicators. The Dynamic memory of the Maxµm[®]/// greatly simplifies operation and assures repeatable readings with a single sweep of the diameter being measured.
- Output available for Statistical Quality Control requirements.

Technical Data

With Dial Indicator

Range of Sensitive Contact: 0.63 mm / **.025"**,
0.002 mm / **.0001"** grad.

With Maxµm[®]/// Indicators

Range of Sensitive Contact: 0.39 mm / **.020"**
Resolution: 0.001 mm / **.00005"** resolution,
0.001 mm / **.001"** grad.

If gage capacity is 25 mm / 1" or greater, the Maxµm[®]/// Indicator is covered with a cast aluminum protective housing.
If under 25 mm / 1" capacity, the protective housing is not normally furnished.

With Dial Indicator	With Digital Output	Capacity mm/ <i>inch</i>	Gaging Depth mm/ <i>inch</i>	End of Head to Contact mm/ <i>inch</i>
1280P-1W1	1282P-1W1	12 - 25 / .50 - 1"	76 / 3"	2.77 / .11"
1280P-2W2	1282P-2W2	25 - 50 / 1 - 2"	152 / 6"	4.37 / .17"
1280P-3W2	1282P-3W2	50 - 203 / 2 - 8"	152 / 6"	7.92 / .31"
1280P-1W2	1282P-1W2	12 - 25 / .50 - 1"	152 / 6"	2.77 / .11"
1280P-2W3	1282P-2W3	25 - 50 / 1 - 2"	305 / 12"	4.37 / .17"
1280P-3W3	1282P-3W3	50 - 203 / 2 - 8"	305 / 12"	7.92 / .31"

See matrix on next page.

Note: Model numbers do not include extensions.

Series 1280P Adjustable Bore Gages are normally furnished with adjusting wrenches. Reference contacts for particular measurement sizes must be specified separately (see table on following page). If not specified, T.C. contacts will be furnished.
For alternate gaging depths, contact materials, and other modifications are available.

Example: **1282P-3MW3** with **PT-156** and **EX-224** specifies an Adjustable Bore Gage with tungsten carbide reference contact and an extension to cover the range from 75 mm / 3" to 89 mm / 3.5".

The Gage is furnished with a Metric Maxµm[®]/// Indicator, **2033119** (which has selectable resolution, units and includes Digital Output).

Adjustable Bore Gages 1280 P

Ordering Information

To order the correct bore gage to suit your measurement application, start with the base Model Number: **128XP-XXXX** and substitute the X with the appropriate number or letter from the boxes below:

128 X P - X X X X

Indicator

- 0 – Dial Indicator
- 2 – Maxµm®III with Output

Capacity

- 1 – 12.50 - 25 mm / **.50 - 1"** gaging depth to 305 mm / **12"**
- 2 – 25 - 50 mm / **1 - 2"** gaging depth to 610 mm / **24"**
- 3 – 50 - 200 mm / **2 - 8"** gaging depth to 1220 mm / **48"**

Units

- Omit for Inch
- M – Metric

Configuration

- W – Gage only
- S – Complete kit with steel contacts*
- T – Complete kit with T.C. contacts*

* Each kit is complete with components needed for capacity ranging from 12.70 - 203 mm / .50 - 8". A fitted case is furnished for all models with a gaging depth 150 mm / 6" or under. It contains a Dial or MaxµmIII Indicator with each tube assembly and all contacts, extensions, extenders, locknuts and necessary wrenches.

Gaging Depth

- 1 – 76 mm / **3"**
- 2 – 150 mm / **6"**
- 3 – 300 mm / **12"**
- 4 – 450 mm / **18"**
- 5 – 600 mm / **24"**
- 6 – 760 mm / **30"**
- 7 – 910 mm / **36"**
- 8 – 1220 mm / **48"**

Example: If you chose **1282P-3S5** as your model number, you would have chosen an Inside Diameter gage with MaxµmIII Indicator, 50 - 200 mm / 2 - 8" capacity, inch units, having a complete kit with steel contacts and a gaging depth of 600 mm / 24". Metric equivalent Model would be: **1282P-3MS5**.

Handles / Housing

All 1280P gages have a removable handle as a part of the Indicator Housing.

All 1282P gages can be equipped with a handle which projects at 90° to the gage housing.

1282P gages with capacity 12-25 mm / .50-1" are not normally furnished with a protective housing. Handles and Housings may be ordered separately.

For Handles order **HA-88** with **AT-124** Adaptor. For Housings order **EHG-1198**.

Gaging Extensions

Specify the Reference Contact Gaging Extensions required from the table below. For all diameters below 50 mm / 2" the Reference Contact is integral with each Extension. For diameters over 50 mm / 2" the Reference Contact is separate and interchangeable among Extension Sets.



1282P-1W1
(Output Cable not included)

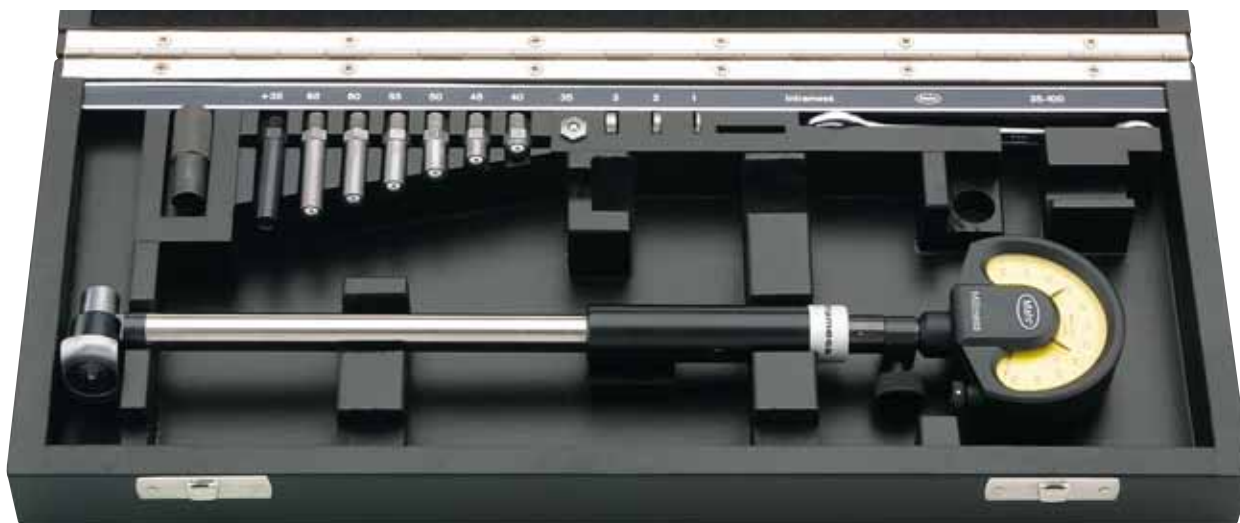
Technical Data

Diameter to be measured mm/ <i>inch</i>	Extension Required		Used on Gage Model Numbers
	Carbide	Steel	
12 - 16 / .50 - .625"	PT-562	PT-558	1280P-1xxx
16 - 19 / .625 - .75"	PT-567	PT-559	
19 - 22 / .75 - .875"	PT-568	PT-560	1282P-1xxx
22 - 25 / .875 - 1"	PT-557	PT-561	
25 - 32 / 1 - 1.25"	PT-554	PT-555	1280P-2xxx
32 - 38 / 1.25 - 1.50"	PT-553	PT-556	
38 - 45 / 1.50 - 1.75"	PT-552	PT-569	1282P-2xxx
45 - 50 / 1.75 - 2"	PT-550	PT-551	

For the gaging diameters listed below, select one Contact Point and at least one Extension Set.

Contact Point:		Extension Required	Used on Gage Models
	Carbide	PT-156	1280P-3XXX
	Steel	PT-2224	1282P-3XXX
Extension Sets:	Diameter to be Measured mm/ <i>inch</i>	Extension Sets	Used on Gage Models
	50 - 64 / 2 - 2.5"	EX-222	
	64 - 76 / 2.5 - 3"	EX-223	
	76 - 89 / 3 - 3.5"	EX-224	1280P-3XXX
	89 - 100 / 3.5 - 4"	EX-225	
	100 - 127 / 4 - 5"	EX-223 with EX-226	1282P-3XXX
	127 - 152 / 5 - 6"	EX-225 with EX-226	
	152 - 178 / 6 - 7"	EX-223 with EX-228	
	178 - 200 / 7 - 8"	EX-225 with EX-228	

Self-Centering Dial Bore Gages 844 N / 844 NH Intramess



Features

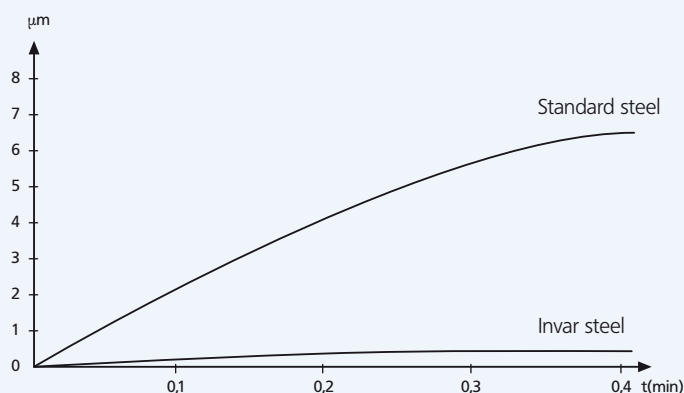
- Measuring the diameter, roundness and conical form of a bore as well as the distances of plane-parallel surfaces
- Measuring head consists of a carbide-tipped moving anvil and an interchangeable stationary anvil which has a hardened steel ball; alternatively a carbide ball is available
- Transmission lever system transfers movement of the movable anvil to indicating instrument
- The broad centering bridge ensures automatic centering in the bore
- Insensitive to temperature due to both the shank and transfer rod being made from heat resistant **Invar steel**
- Highly resistant to wear and tear due to the carbide tipped moving anvil
- Constant measuring force due to built-in spring thus eliminating user influence
- Universally applicable and extremely versatile as every instrument spans a broad measuring range, within this range it is quick and easy to adjust to any size
- Measuring head, holder, extensions, right-angle attachments and depth stops are all part of this extensive modular system
- Supplied with: Holder, measuring head, stationary anvil, wooden case, excludes an indicating instrument

The comparison between Invar and Standard steel

Invar steel has a particularly low expansion coefficient and thus makes the instrument totally insensitive to any kind of heat. Body heat from the user, increases in ambient temperature have no influence on the measuring results.

The graph on the right compares the Invar steel version to a standard type. Both gages were hand-held and thus influenced by body heat. The deviation when using Invar steel is negligible.

Change in length due to heat



Technical Data

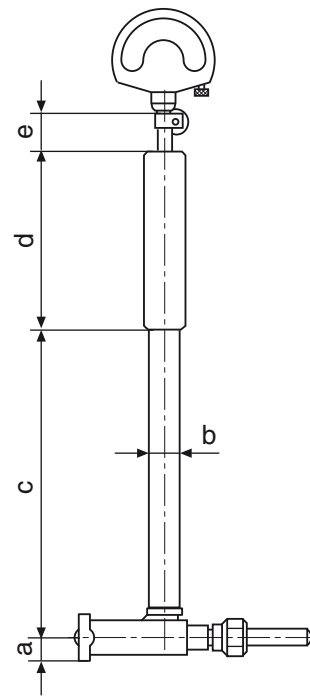
Measuring range		Error limit	Repeatability	Hysteresis	Order no*	Order no*
mm	(inch)	G_e μm	f_w μm	f_u μm	844 N	844 NH
18 - 50	(.7 - 2")	2	0.5	2.5	4474000	4475000
35 - 100	(1.4 - 4")	2	0.5	2.5	4474001	4475001
100 - 250	(4 - 10")	2	0.5	2.5	4474002	4475002
250 - 400	(10 - 16")	3	1.5	3.5	4474003	4475003
400 - 800	(16 - 32")	3	1.5	3.5	4474004	4475004
250 - 800	(10 - 32")	3	1.5	3.5	4474005	4475005

* Excludes indicating instrument

Complete Instrument

844 N Carbide-tipped moving anvil;
stationary anvil with steel ball

844 NH Moving anvil **and** stationary anvil are carbide-tipped



Measuring range	a	b	c	d	e
mm (inch)					
18 - 50 (.7 - 2")	5.35	8	115	63	22
35 - 100 (1.4 - 4")	8.5	12	148	80	22
100 - 250 (4 - 10")	11.5	18	230	100	25
250 - 400 (10 - 16")	16	24	366	110	28
400 - 800 (16 - 32")	17.5	24	366	110	28

Indicating Instruments

All indicating instruments that has a 8 mm mounting shank may be used. Recommended are:

Indicator	Readings	Order no.
	mm / inch	mm / inch
Compramess 1004 / 1004 Z	5 $\mu\text{m}/$.0001"	4333000/4333900
Millimess 1003 / 1003 Z	1 $\mu\text{m}/$.00005"	4334000/4334900
Millimess 1003 XL	2 μm	4334001
Supramess 1002 / 1002 Z	0.5 $\mu\text{m}/$.00002"	4335000/4335900
Extramess 2001	0.2 $\mu\text{m}/$.00001"	
	0.5 $\mu\text{m}/$.00002"	4346100*
	1 $\mu\text{m}/$.00005"	
$\mu\text{Max}\mu\text{m II}$.0005 mm/ .00002"	2034207**
	.001 mm/ .00005"	
MarCator 1087 BR	.002 mm/ .0001"	4337162
	.004 mm/ .0005"	
	.010 mm/ .001"	

Digital Indicators see Chapter 5

Electrical Indicating Instruments see Chapter 7

* 230 V, for 115 V please refer to page 6-5

** requires contact 4360045



Accessories to set and adjust Dial Bore Gages

1. Setting Device

Uses standard gage blocks for setting any bore diameter and any tolerance. Replaces ring gages and is universally applicable.

2. Ring Gage 355 E

Special wear-resistant gage steel. Hardened and lapped. With actual deviation engraved

Dimensions: DIN 2250, type C
Manufacturing tolerance: DIN 2250
Available diameters: see page 13-19



355 E

Components

Measuring Jaw 844 em

Measuring range mm	Dimensions (inch)	Dimensions mm/inch	Order no.
18 - 800 (.7 - 32")	60 x 9.5 x 9 / 2.36 x .37 x .35"		4470095

Setting Bridge 844 Neb

Measuring range mm	Width (inch)	Width mm/inch	Height mm/inch	Order no.
18 - 250 (.7 - 10")	70 / 2.75"		12 / .47"	4474080
18 - 400 (.7 - 16")	165 / 6.49"		17 / .67"	4474081
18 - 800 (.7 - 32")	320 / 12.59"		20 / .78"	4474082

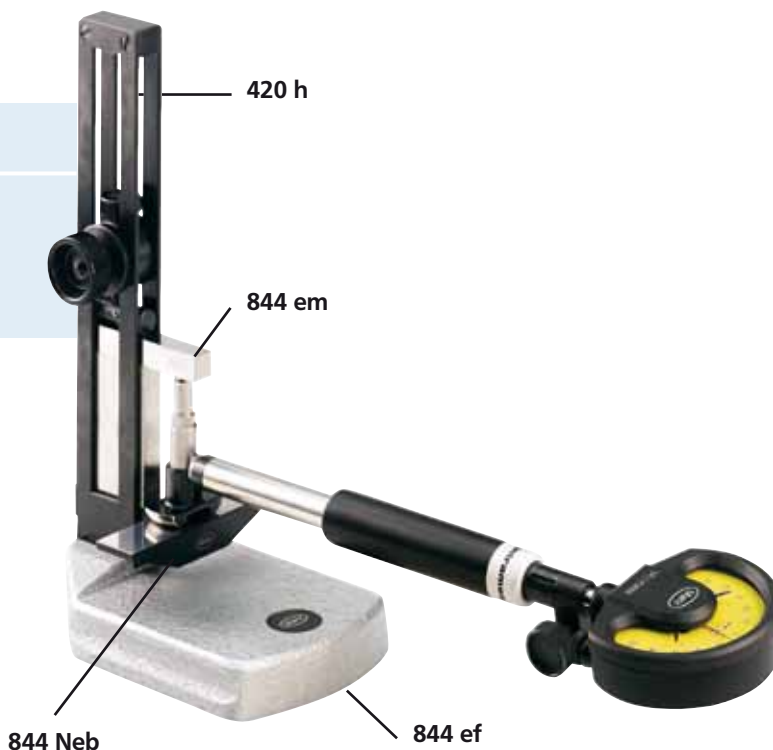
Gage Block Holder 420 h

Clamping range mm	Clamping range (inch)	Order no.
0 - 70 (0 - 2.75")		4800120
0 - 120 (0 - 4.72")		4800121
100 - 220 (4 - 8.66")		4800122
100 - 420 (4 - 16.53")		4800123
400 - 820 (16 - 32.28")		4800124

Stand 844 ef

For mounting setting device up to 420 mm

Order no. 4470098



Modular Unit System 844 N

In addition to complete Dial Bore Gages 844 N, modular units can also be compiled as required to suit a individual measuring task and or application.

Measuring Head 844 Nk, steel

Measuring Head 844 NHk, carbide

With built-in lever transmission system, carbide-tipped anvil and extra-wide centering bridge. With interchangeable stationary anvil. Threaded connection for Holders 844 Ng and 844 Ngk.

Measuring range mm (inch)	Order no. 844 Nk	Order no. 844 NHk
18 - 50 (.7 - 2")	4474151	4474156
35 - 100 (1.37 - 4")	4474152	4474157
100 - 250 (4 - 10")	4474153	4474158
250 - 400 (10 - 16")	4474154	4474159
400 - 800 (16 - 32")	4474155	4474160

Extension Set 844 Nes

For extending range of Measuring Head 844 Nk/NHk from 250-400 mm to 800 mm. Consists of additional centering bridge and two extensions.

Order no.: 4474010

Holder 844 Ng

Shank and transfer rod made of heat-resistant Invar steel. With a locking clamp for indicator.

For meas. range mm (inch)	L mm/inch	d1 mm/inch	d2 mm/inch	Order no.
18 - 50 (.7 - 2")	200/ 8"	14/ .6"	8/ .3"	4474040
35 - 100 (1.37 - 4")	250/ 10"	18/ .7"	12/ .5"	4474041
100 - 250 (4 - 10")	350/ 14"	26/ 1.0"	18/ .7"	4474042
250 - 800 (10 - 32")	500/ 20"	30/ 1.2"	24/ .9"	4474043

Short Holder 844 Ngk

Shank and transfer rod made of heat-resistant Invar steel. With a locking clamp for an indicator.

For meas. range mm (inch)	L mm/inch	d1 mm/inch	d2 mm/inch	Order no.
18 - 50 (.7 - 2")	120/ 5"	14/ .6"	8/ .3"	4474050
35 - 100 (1.37 - 4")	120/ 5"	18/ .7"	12/ .5"	4474051
100 - 250 (4 - 10")	150/ 6"	26/ 1.0"	18/ .7"	4474052
250 - 800 (10 - 32")	250/ 10"	30/ 1.2"	24/ .9"	4474053

Right Angle Attachment 844 Nw

For measuring difficult to reach bores, e.g. in tight spaces, inconveniently located or on machine tools. For screwing in between 844 Ng or 844 Ngk and 844 Nk/NHk.

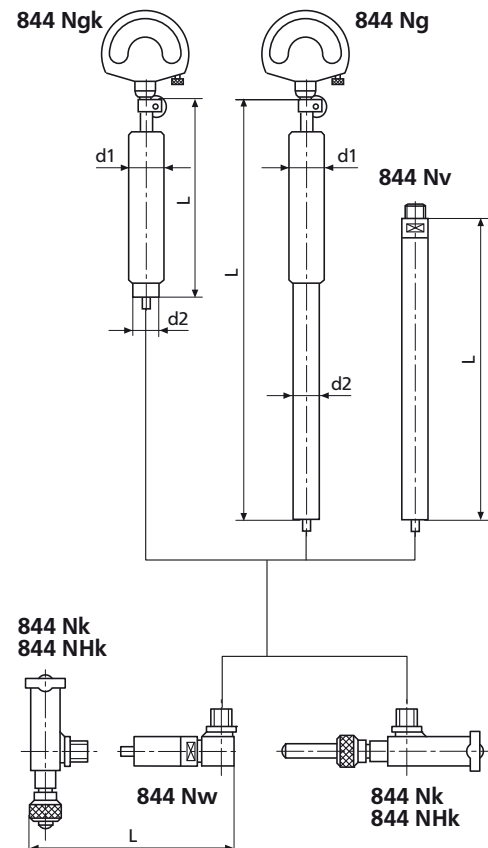
For meas. ranges mm (inch)	Length* L mm/inch	Bore depth mm/inch	Order no.
18 - 50 (.7 - 2")	66/2.6"	45/1.8"	4474070
35 - 100 (1.37 - 4")	80/3.1"	55/2.2"	4474071
100 - 250 (4 - 10")	105/4.1"	70/2.8"	4474072

* With measuring heads 844 Nk/NHk

Extension 844 Nv

For extra deep bores. For screwing in between 844 Ng and 844 Nk/NHk. Shank and transfer rod made of Invar steel.

For instruments mm (inch)	Length L (mm/inch)	Order no.
18 - 50 (.7 - 2")	250 / 9.8"	4474066
35 - 100 (1.37 - 4")	250 / 9.8"	4474060
100 - 250 (4 - 10")	250 / 9.8"	4474061
	500 / 19.7"	4474062
250 - 800 (10 - 32")	250 / 9.8"	4474063
	500 / 19.7"	4474064



Dial Bore Gage for Internal Serrations 844 Z



Dial Bore Gage 844 Z

Diametrical two ball measurement "Mdk" from 3.5 - 333 mm

Modular Unit Parts 844 Kk

"Mdk" from 3.5 - 26.1 mm (see table below)

Modular Unit Parts 844 Z

"Mdk" 26 - 333 mm (see table on opposite page)

Features

- For diametrical two ball measurement Mdk, to obtain the pitch diameter and conical form of internal gears in any position and at any depth
- For ball dimensions from 3.5 to 26.1 mm use the 844 Kk with carbide ball anvils and in conjunction with an expander pin
- For ball dimensions >26 mm the measuring heads 844 z1 or 844 z2 with the appropriate modular units are to be employed
- Maximum wear resistance due to carbide ball anvils
- Constant measuring force due to built-in spring thus eliminating user influence
- Anvils, measuring heads, holder, spacer (intermediate piece) and depth extensions form a very comprehensive modular system which can rapidly be converted to measure further gear sizes

Modular Unit Parts:

Diametrical two ball measurement „M_{dk}“ from 3.5 - 26.1 mm

Ball dimen. M _{dk} (mm)	Order no. ball dia. 1-5 graduation 0.5	Ball dia. according to table	Order no. ball dia. 7.5-10 graduation 0.5	Expander pin Steel
3.5 - 4.1	4482450	4482550		4470806
4.0 - 4.6	4482451	4482551		
4.5 - 5.1	4482452	4482552		
5.0 - 5.6	4482453	4482553		
5.5 - 6.1	4482454	4482554		
6.0 - 6.6	4482455	4482555		
6.5 - 7.1	4482456	4482556		
7.0 - 7.6	4482457	4482557		
7.5 - 8.1	4482458	4482558		
8.0 - 8.6	4482459	4482559		
8.5 - 9.1	4482460	4482560		4470808
9.0 - 9.6	4482461	4482561		
9.3 - 10.6	4482462	4482562	4482662	
10.3 - 11.6	4482463	4482563	4482663	
11.3 - 12.6	4482464	4482564	4482664	
12.3 - 13.6	4482465	4482565	4482665	
13.3 - 14.6	4482466	4482566	4482666	
14.5 - 16.1	4482467	4482567	4482667	
15.5 - 17.1	4482468	4482568	4482668	
16.5 - 18.1	4482469	4482569	4482669	
17.5 - 19.1	4482470	4482570	4482670	
18.5 - 20.1	4482471	4482571	4482671	
19.5 - 21.1	4482472	4482572	4482672	
20.5 - 22.1	4482473	4482573	4482673	
21.5 - 23.1	4482474	4482574	4482674	
22.5 - 24.1	4482475	4482575	4482675	
23.5 - 25.1	4482476	4482576	4482676	
24.5 - 26.1	4482477	4482577	4482677	

Table (Sizes in mm)

0.500 - 0.551 - 0.620 - 0.623 - 0.630 - 0.722 - 0.862 - 0.895 - 0.965 - 1.100 - 1.118 - 1.125 - 1.250
 1.350 - 1.372 - 1.385 - 1.524 - 1.540 - 1.600 - 1.650 - 1.700 - 1.750 - 1.782 - 1.800 - 1.829 - 1.900
 2.032 - 2.250 - 2.284 - 2.386 - 2.438 - 2.667 - 2.704 - 2.713 - 2.721 - 2.743 - 2.750 - 3.048 - 3.250
 3.400 - 3.658 - 4.835 - 5.250 - 5.486 - 5.500 - 6.000 - 6.096 - 6.350 - 6.500 - 7.000

Lifting Knob 954

enables the dial bore gage to gently guided into the serration. The measuring spindle of the indicating instrument can also be lifted.

Order no. 4372030

Holder 844 Kg

with a clamping device for the indicating instrument. The mounting bore diameter 8 mm

Order no. 4470851

Extension 844 Kv

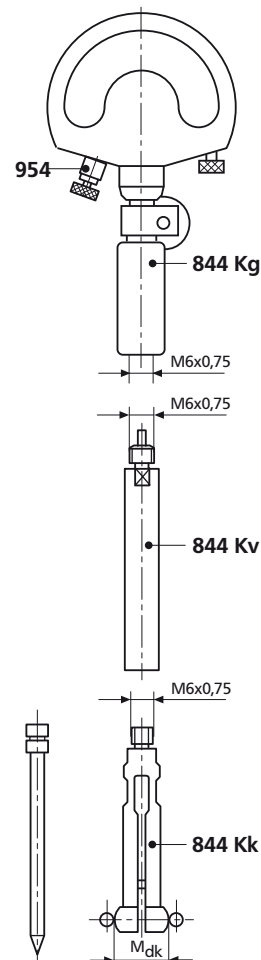
for measuring in depth bores; length 64 mm

Order no. 4470070

844 Kk Anvil

for internal serrations. ball dimension „M_{dk}“ from

3.5 - 26.1 mm



Modular Unit Parts

Diametrical two ball measurement from M_{dk} 26-333 mm

Measuring Heads

844 z1, for M_{dk} 26 - 130,5 mm

844 z2, for M_{dk} 48.5 - 333 mm

Order no.

4485000

4485001

Floating Ball Anvils with carbide ball

844 z3 Meas. range 3 mm, for Meas. Head 844 z1

Grad. (mm)

Ball dia. mm

0.5

1.0 - 5.0

acc. to table

4488300

4488301

0.5

7.5 - 10

4488302

844 z4 Meas. range 3 mm, for Meas. Head 844 z2

0.5

1.0 - 5.0

acc. to table

4488310

4488311

0.5

7.5 - 10

4488312

Ball Anvils with carbide ball

844 z5, Length 2.5 mm

0.5

1.0 - 5.0

acc. to table

4488320

4488321

0.5

7.5 - 10

4488322

844 z6, Length 5.0 mm

0.5

1.0 - 5.0

acc. to table

4488330

4488331

0.5

7.5 - 10

4488332

844 z7, Length 7.5 mm

0.5

1.0 - 5.0

acc. to table

4488340

4488341

0.5

7.5 - 10

4488342

844 z8, Length 10.0 mm

0.5

1.0 - 5.0

acc. to table

4488350

4488351

0.5

7.5 - 10

4488352

844 z15, Length adjustable from 24-34 mm

0.5

1.0 - 5.0

acc. to table

4488360

4488361

0.5

7.5 - 10

4488362

Spacer (intermediate piece)

844 z9

Length (mm)

10

4486501

844 z10

20

4486502

844 z11

40

4486503

844 z12

80

4486504

844 z13

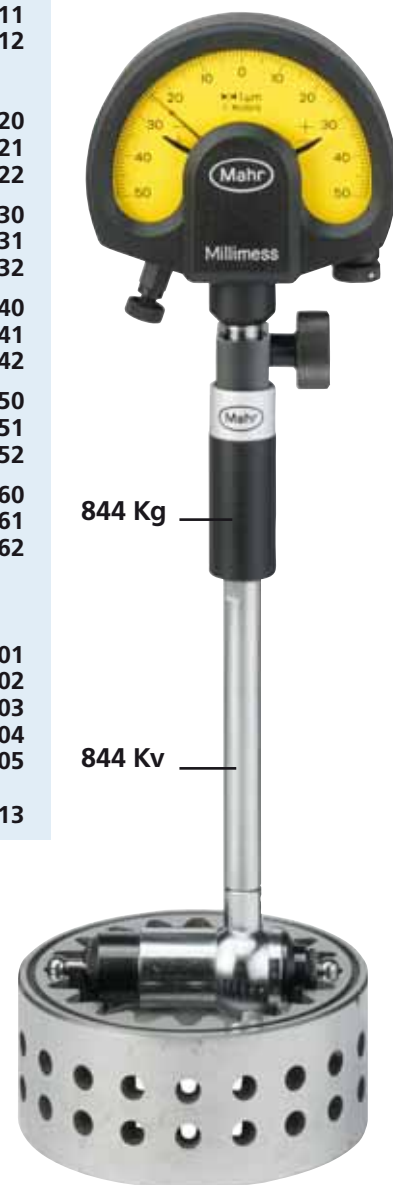
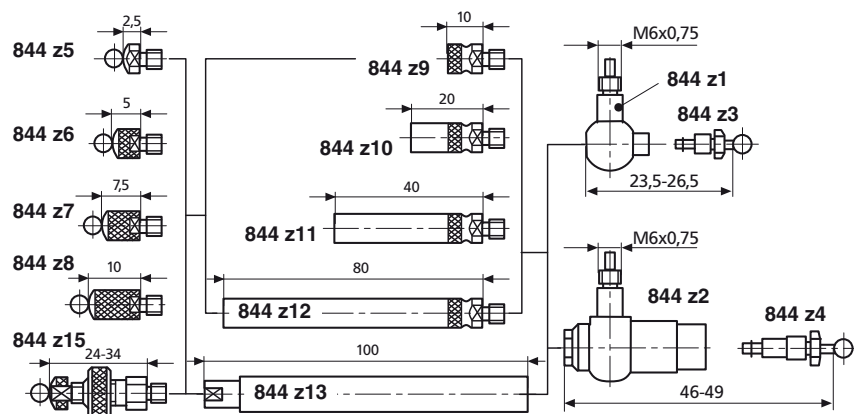
100 *

4486505

Wooden case

4485013

* Only for 844 z2



Dial Bore Gage for Internal Serrations 844 Z

Selecting Modular Unit Parts Measuring Head 844 z1 and Floating Ball Anvil 844 z3

M _{dk} in mm	844 z5	844 z6	844 z7	844 z8	844 z15	844 z9	844 z10	844 z11	844 z12	844 z13
26.0 - 29.0	x									
28.5 - 31.5		x								
31.0 - 34.0			x							
33.5 - 36.5				x						
36.0 - 39.0	x					x				
38.5 - 41.5		x				x				
41.0 - 44.0			x			x				
43.5 - 46.5				x		x				
46.0 - 49.0	x						x			
47.5 - 60.5					x					
48.5 - 51.5		x					x			
51.0 - 54.0			x				x			
53.5 - 56.5				x			x			
56.0 - 59.0	x					x	x			
57.5 - 70.5					x	x				
58.5 - 61.5		x				x	x			
61.0 - 64.0			x			x	x			
63.5 - 66.5				x		x	x			
66.0 - 69.0	x							x		
67.5 - 80.5					x		x			
68.5 - 71.5		x						x		
71.0 - 74.0			x					x		
73.5 - 76.5				x				x		
76.0 - 79.0	x					x		x		
77.5 - 90.5					x	x	x			
78.5 - 81.5		x				x		x		
81.0 - 84.0			x			x		x		
83.5 - 86.5				x		x		x		
86.0 - 89.0	x						x	x		
87.5 - 100.5					x			x		
88.5 - 91.5		x					x	x		
91.0 - 94.0			x				x	x		
93.5 - 96.5				x			x	x		
96.0 - 99.0	x					x	x	x		
97.5 - 110.5					x	x	x	x		
98.5 - 101.5		x				x	x	x		
101.0 - 104.0			x			x	x	x		
103.5 - 106.5				x		x	x	x		
107.5 - 120.5					x		x	x		
117.5 - 130.5					x	x	x	x		

Example:

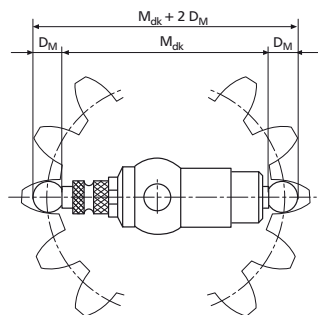
Diametrical two ball meas. M _{dk}	73.0 mm
Ball dia.	5.486 mm

When placing an order please quote the ball diameter of the modular unit system for 844 z3 - 844 z8, as well as 844 z15. On the basis of the above specified example above result several combinations that are possible to choice from is dependent upon the work piece. For further details please refer to the illustration on Page 9-67.

The measuring application can be solved with either one of the following 4 versions:

Type	Description	Ball dia. mm	Length mm	Order no.
Version 1				
844 z1	Meas. Head		23.5-26.5	4485000
844 z3	Floating Ball Anvil	5.486		4488301
844 z7	Ball Anvil	5.486	7.5	4488341
844 z11	Spacer		40.0	4486503
Meas. range			71.0-74.0	
Version 2				
844 z1	Meas. Head		23.5-26.5	4485000
844 z3	Floating Ball Anvil	5.486		4488301
844 z15	Ball Anvil	5.486	24.0-34.0	4488361
844 z10	Spacer		20.0	4486502
Meas. range			67.5-80.5	
Version 3				
844 z2	Meas. Head		46.0-49.0	4485001
844 z4	Floating Ball Anvil	5.486		4488311
844 z6	Ball Anvil	5.486	5.0	4488331
844 z10	Spacer		20.0	4486502
Meas. range			71.0-74.0	
Version 4				
844 z2	Meas. Head		46.0-49.0	4485001
844 z4	Floating Ball Anvil	5.486		4488311
844 z15	Ball Anvil	5.486	24.0-34.0	4488361
Meas. range			70.0-83.0	

Determination of setting values



D_M = Ball diameter of the ball anvil

M_{dk} = Diametrical two ball measurement

$M_{dk} + 2 D_M$ = Setting value (length of the gage block required for setting)

Indicating Instruments

All indicating instruments that has a 8 mm mounting shank may be used. Recommended are:

Dial Comparator	Readings mm / inch	Order no. mm / inch
Compramess 1004/1004 Z	5 µm/ .0001"	4333000/4333900
Millimess 1003/1003 Z	1 µm/ .00005"	4334000/4334900

Digital Indicators see Chapter 5

Electrical Indicating Instruments see Chapter 7

M _{dk} in mm	844 z5	844 z6	844 z7	844 z8	844 z15	844 z9	844 z10	844 z11	844 z12	844 z13	M _{dk} in mm	844 z5	844 z6	844 z7	844 z8	844 z15	844 z9	844 z10	844 z11	844 z12	844 z13
48.5 - 51.5	x										188.5 - 191.5	x							x		x
51.0 - 54.0		x									190.0 - 193.0					x		x			x
53.5 - 56.5			x								191.0 - 194.0		x						x		x
56.0 - 59.0				x							193.5 - 196.5			x					x		x
58.5 - 61.5	x					x					196.0 - 199.0				x				x		x
61.0 - 64.0		x				x					198.5 - 201.5	x							x		x
63.5 - 66.5			x			x					200.0 - 213.0					x	x	x			x
66.0 - 69.0				x		x					201.0 - 204.0		x				x		x		x
68.5 - 71.5	x						x				203.5 - 206.5			x			x		x		x
70.0 - 83.0					x						206.0 - 209.0				x		x		x		x
71.0 - 74.0		x					x				208.5 - 211.5	x					x	x			x
73.5 - 76.5			x				x				210.0 - 223.0					x		x			x
76.0 - 79.0				x			x				211.0 - 214.0		x					x	x		x
78.5 - 81.5	x					x	x				213.5 - 216.5			x				x	x		x
80.0 - 93.0					x	x					216.0 - 219.0				x			x	x		x
81.0 - 84.0		x				x	x				218.5 - 221.5	x					x	x	x		x
83.5 - 86.5			x			x	x				220.0 - 233.0					x	x		x		x
86.0 - 89.0				x		x	x				221.0 - 224.0		x				x	x	x		x
88.5 - 91.5	x							x			223.5 - 226.5			x			x	x	x		x
90.0 - 103.0					x		x				226.0 - 229.0				x		x	x			x
91.0 - 94.0		x							x		228.5 - 231.5	x								x	x
93.5 - 96.5			x						x		230.0 - 243.0						x	x			x
96.0 - 99.0				x					x		231.0 - 234.0		x							x	x
98.5 - 101.5	x					x		x			233.5 - 236.5			x						x	x
100.0 - 113.0					x	x	x				236.0 - 239.0				x					x	x
101.0 - 104.0		x				x		x			238.5 - 241.5	x					x			x	x
103.5 - 106.5			x			x		x			240.0 - 253.0					x		x			x
106.0 - 109.0				x		x		x			241.0 - 244.0		x				x		x		x
108.5 - 111.5	x						x	x			243.5 - 246.5			x					x	x	x
110.0 - 123.0					x			x			246.0 - 249.0				x				x		x
111.0 - 114.0		x					x	x			248.5 - 251.5	x					x			x	x
113.5 - 116.5			x				x	x													