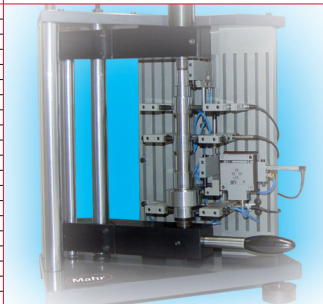




COMPONENTS FOR LENGTH METROLOGY



E X A C T L Y

COMPONENTS FOR LENGTH METROLOGY

► | Contents

MarCator	Digital / Dial Indicators	4
Millimess	Digital / Dial Comparators	62
Millimar	Electrical Length Measuring Instruments	84
MaraMeter	Indicating Measuring Instruments	112
Millimar	Pneumatic Measuring Instruments	130
Millimar	Standard Elements	160
MarConnect	Interfaces / Data Processing	268
MarMotion	Rotary Stroke Bearings	276

THEY POINT YOU IN THE RIGHT DIRECTION. MARCATOR DIAL INDICATORS.



The latest information on MARCATOR products can be found on our website:
www.mahr.com, WebCode 206

► | Dial indicators due to their versatility rank as the most frequently applied transducer, just like our MarCator series. Our mechanical dial indicators have precision gears and pinions for a maximum accuracy. They are also available in shock and waterproof versions. Our digital indicator range contains highly precise electronic measuring systems, which make measuring functions possible yet without the loss of an analog display. With the simple operation, the large display that can be read error free and the possibility of a rapid and simple transmission of all your measurement results thus meeting all requirements of a modern measuring instrument.

► | MarCator. Dial and Digital Indicators

Digital Indicators (Long Range) Overview

4

MarCator 1075 R

6

With digital display

MarConnect Integrated Wireless

8

MarCator 1086 R(i) / 1086 ZR / 1086 WR(i)

11

With large digital display and integrated tolerance function

MarCator 1087 R(i) / 1087 ZR

17

With combined digital and analog display

MarCator 1088 / 1088 W

20

With background lit display

MarCator 1087 BR(i)

22

For 2-point inside measurement

Accessories for MarCator 1086 R(i) / 1087 R(i) / 1088

24

ANSI/AGD Dial Indicators Overview

26

Dial Indicators ANSI/AGD Groups 0, 1, 2, 3, 4

31

Single Revolution Dial Indicator

37

Long Range and Extra Long Range Dial Indicator

39

Wetproof Dial Indicator Series WC & WP

41

Perpendicular Dial Indicator

43

Accessories for ANSI/AGD Dial Indicators

45

Dial Indicators - Testing and Calibration Products

49

Contact Points for ANSI/AGD Dial Indicators

51

DIN Style Precision Dial Indicators Overview

52

MarCator 803 A / 805 A / 803 S / 803 SW / 803 SB / 803 AZ

54

Small Dial Indicators

MarCator 810 A / 810 AT / 810 S / 810 SW / 810 SB /

56

810 SM / 810 SRM / 810 AZ

Standard versions

MarCator 810 AU / 810 AX / 810 SV / 810 AG

58

Special versions

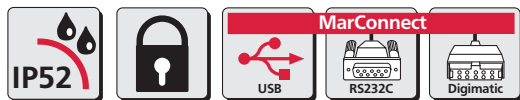
MarCator. Digital Indicators (Long range)

OVERVIEW

Functions of Digital Indicators						
		1075 R	1075 R	1075 R	1086 R(i)	1086 R(i)
						
Catalog page		6	6	6	9	10
Measuring ranges	mm / inch	12.5 / .5"	12.5 / .5"	12.5 / .5"	12.5 / .5"	12.5 / .5"
					25 / 1"	25 / 1"
					50 / 2"	50 / 2"
					100 / 4"	100 / 4"
Resolution	metric	0.01 mm	0.005 mm	0.001 mm	0.0005 mm	0.01 mm
	inch	.0005"	.0001"	.00005"	.00002"	.0005"
	metric				0.001 mm	
	inch				.00005"	
	metric				0.002 mm	
	inch				.0001"	
	metric				0.005 mm	
	inch				.0002"	
Mounting shank		8h6	8h6	8h6	8h6	8h6
	Protection class	IP class acc. to IEC 60529				
Functions:						
ON/OFF		●	●	●	●	●
Set display to zero		●	●	●	●	●
Switch between mm/inch		●	●	●	●	●
Reversal of counting direction		●	●	●	●	●
Enter numerical value	PRESET	●	●	●	●	●
Data		●	●	●	●	●
ABS/REL-switchable					●	●
Tolerance display					●	●
Dynamic measuring functions	MIN, MAX MAX-MIN (TIR)					
Search for reversal point	START/STOP					
Factor set / adjust					●	●
Analog display						
Switch the analog value						
Key lock function LOC		●	●	●	●	●
Data output:	USB	●	●	●	●	●
	Digimatic	●	●	●	●	●
	Opto RS232C	●	●	●	●	●
	Integrated wireless				● *	● *
Control output:						
* Ri versions						

1001

Digital Indicators 1075 R



Features

Functions:

- ON/OFF
- RESET (Set display to zero)
- mm/inch
- Reversal of counting direction
- PRESET (for entering a numerical value)
- DATA (data transmission with a data connection cable)
- LOCK-Function: Individual buttons can be locked
- Auto-OFF (selectable)
- Immediate measurement due to the Reference system
- Max measuring speed 1.5 m/sec (60"/sec)
- MarConnect Data output: choose either
USB
OPTO RS232C
Digimatic
- High contrast Liquid Crystal Display with 12 mm high digits
- Operating temperature 10-40°C
- Class of protection IP52 according to IEC 60529

Scope of supply:
Battery,
Operating instructions

Reference System - Just set once to zero

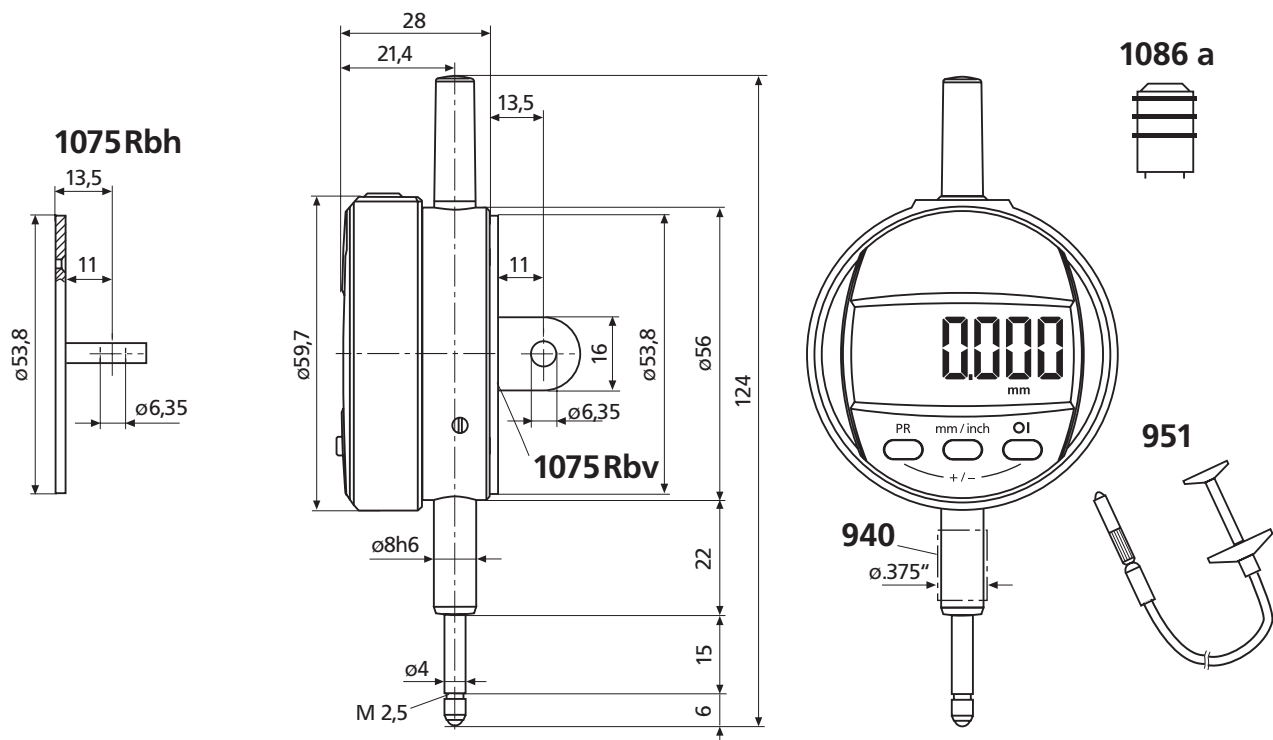
REFERENCE The new Digital Indicators 1075 R are equipped with the innovative Reference-System. The zero position only has to be set one time: once it is set, the zero remains stored for all further measurements. Therefore, when the indicator is switched ON or the measuring spindle is moved the indicator is immediately ready for measurement; thus the need to reset as with a conventional indicator is now obsolete.

Technical Data

Measuring range		Resolution		Span of error G *	Measuring force	Weight	Order no.
mm	(inch)	mm	/ inch	mm	N	g	
12.5	(.5")	0.01	/ .0005"	0.020	0.5 - 1	180	4336010
12.5	(.5")	0.005	/ .0001"	0.015	0.5 - 1	180	4336020
12.5	(.5")	0.001	/ .00005"	0.005	0.5 - 1	180	4336030

* in any zero point

Technical Data



Shown with Mounting Lug, not included.

Accessories

		Order no.	Additional Accessories
Battery 3V , Type CR 2032		4102520	See Chapter Millimar . Standard Elements
Data Connection Cable USB (2 m)	16 EXu	4102357	Accessories for Data Processing see Chapter 7 - MarConnect
Data Connection Cable Opto RS232C (2 m), with SUB-D jack 9-pin	16 EXr	4102410	
Data Connection Cable Digimatic (2 m), Flat plug 10-pin	16 EWd	4102915	
Adapter Bush for adapting mounting shank 8h6 mm to inch bore .375"	940	4310103	
Cable Release to raise the measuring spindle	951	4372000	
Lifter Protection Cap	1086 a	4337320	
Lug Back , horizontal	1075 Rbh	4336041	
Lug Back , vertical	1075 Rbv	4336042	

MarConnect Integrated Wireless

► | With integrated wireless, you have a new integrated wireless data transmission system from Mahr for the price of a cable. Data acquisition with Digital Indicators is now even simpler: Simply transmit your measuring data without being tangled up between cables directly into Microsoft Office Excel® or via a keyboard code into any other Windows program. | ◀

Inexpensive



With the integrated wireless receiver up to 8 Digital Indicators can be connected per i-stick, therefore expensive interface boxes are no longer required. When just attaching a Digital Indicator you have already a wireless data transmission for the price of a data cable.



Secure data transmission

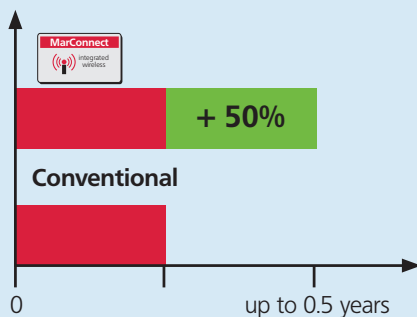


With the integrated wireless your data will be transferred to the Digital Indicator; this is confirmed with a message in the Digital Indicator's display to whether the sent data has been transferred correctly, and/or whether you are in the reception range of the i-stick.

Long battery life span



As the wireless interface is integrated in the Digital Indicator, the Digital Indicator is extremely energy efficient. In addition contrary to conventional wireless data transmission systems no additional battery is needed.



Simple data transmission



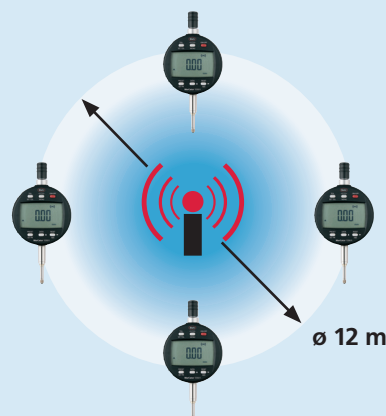
With the i-stick you can simply **transfer your measured values via integrated wireless to the PC**. The measured values are sent directly (as with a data cable) via the MarCom software to Microsoft Office Excel® or by a keyboard code into any other Windows program.

Programme	Messgeräte	Einstellungen	Messwert	Anforderung
			Werte	Ziel
1 USB-Gerät				
RF1	RF1		10.001	Taste F3
	MarCator 1087R		OK	Excel: Karbelwelle.xl/Tabelle3/1.1
	RF 01001			
RF2	RF2		49.999	
	MarCator 1087R		OK	Excel: Karbelwelle.xl/Tabelle3/2.1
	RF 01002			

Large freedom of movement



The integrated wireless clearly gives you more **freedom of movement**. When used with a Digital Indicator in conjunction with a indicating measuring instruments, for example when measuring on or at the machine or with large workpieces you are not obstructed by any cables.



Excellent ergonomics



Compared to a bulky conventional radio transmission which requires a large external transmitter with a separate battery. The integrated wireless transmitter is integrated in the Digital Indicator.



MarCator. Digital Indicators

DIGITAL INDICATORS WITH THE REFERENCE SYSTEM AND INTEGRATED WIRELESS

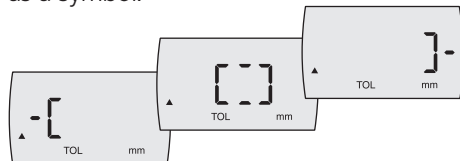
► I Once again Mahr sets a new standard in the Digital Indicator product segment with the new generation of Digital Indicators **MarCator** 1086 Ri / 1087 Ri Reference. With the new Reference system the MarCator Digital Indicators can be applied immediately as the zero-position only has to be set once for all further measurements. Also, if you need to document your data, we have our integrated wireless indicators; an integrated energy efficient wireless data transmission system, the optimal solution for transmitting your measured values to a PC.

Clear display

Tolerance is displayed. Displayed is the actual measured value and the tolerance zone position



Tolerance indication without the value in the display. In and Out of tolerance will be indicated in the display as a symbol.



Error free operation

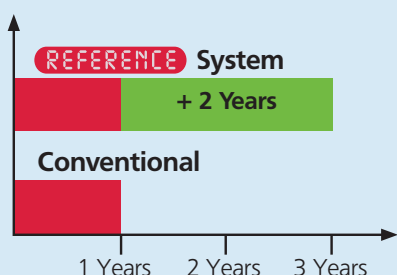


Lock function: This prevents unintentional activation of an operating button. Either all the operating buttons or only certain individual buttons can be locked. If a locked operating button is pressed the "LOC" symbol will appear in the display.

Battery service life is 3 years

The new Reference system is extremely energy efficient as when the caliper is in standby mode; almost no power is required, thus **extending the life of the battery up to 3 years***.

* When Integrated Wireless is deactivated



Universal Data-Interface



• **Integrated Wireless**
The wireless interface for the price of a data



• **USB:** No interface box is required! Simple and inexpensive way to set up a multiple measuring instruments via a USB hub



• **Digimatic:** To connect a Digimatic compatible evaluation instrument



• **Mahr Opto RS232C:** For direct connection to a COM port on a PC

Absolute function:



Digital Indicator can be set in any position to 0.000 without losing the reference to the preset value.

REFERENCE

All our **MarCator** Digital Indicators from the 1086 R(i) and 1087 R(i) series are equipped with the **innovative Reference System**. For further information regarding our Reference System please refer to page 6.

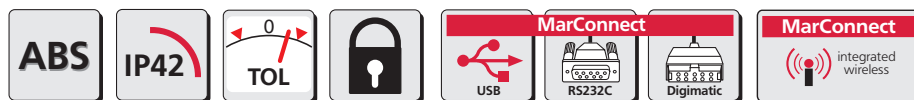


IP-Protection class IP54 (optional)

- Protection cap is sealed
- Rubber bellows for the measuring spindle
- Sealed battery compartment

Code Initial	IP	International Protection
First Numeral	5	Dust protected
Second Numeral	4	Protection against splash water in all directions

Digital Indicators MarCator 1086 Ri



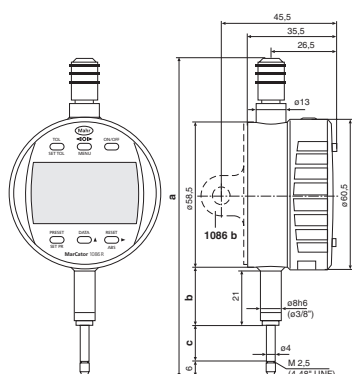
REFERENCE



12.5 mm



25 mm



Dimensions

Meas. range	a	b	c
mm (inch)	mm	mm	mm
12.5 (.5")	126.3	23	13.5
25 (1")	153.4	26.8	26.5
50 (2")	267.3	40	52
100 (4")	420.3	91	103

Features

Functions:

ON/OFF
 RESET (Set display to zero)
 mm/inch
 Reversal of the counting direction
 PRESET (Allows the entry of any value using set buttons)
 TOL (Enter tolerance limit values)
 ABS (Display can be set to zero, without losing the reference to the Preset value)
 <0> (Tolerance GO / NO GO display mode)
 DATA (when connected with a data connection cable)
 Factor (adjustable)

- Integrated Wireless data transmission
- Immediate measurement due to the Reference system
- Individual buttons can be locked - Lock Function
- Operating and display unit (bezel) can be rotated 280°
- High contrast LCD with 11 mm high digits
- Operating time approx. 3 years (2000 work. hrs/year)
- Maximum measuring speed 1.5 m/s (60"/s)
- Lifter protection cap on the measuring spindle
- MarConnect data output: choose either: USB, OPTO RS232C, Digimatic or Integrated Wireless
- Operating temperature 10 - 40°C
- Class of protection IP42 in accordance to IEC 60529

Supplied with:
 Battery, operating instructions

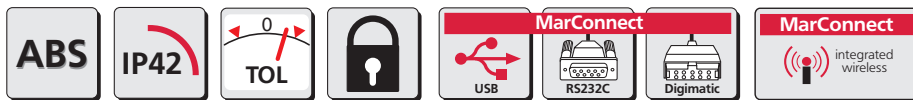
Technical Data

Measuring range	Resolution switchable	Span of error*	MarConnect**	Measuring force	Weight	Mounting shank	Order no.
mm (inch)	mm (inch)	mm		N	g		
12.5 (.5")	0.0005 / 0.001 / 0.002	0.005	●	0.65 - 0.90	130	8h6	4337624
25 (1")	/ 0.005 / 0.01 mm	0.005	●	0.65 - 1.15	140	8h6	4337625
50 (2")	(.00002" / .00005" /	0.005	●	1.25 - 2.70	190	8h6	4337626
100 (4")	.0001" / .0002" /	0.005	●	1.60 - 3.50	235	8h6	4337627
25 (1")	.0005")	0.005	●	—	140	8h6	4337628

* in any zero point

** To use the integrated wireless function an i-Stick Wireless Receiver is required, see page 24

Digital Indicators MarCator 1086 Ri, Resolution 0.01 mm / .0005"



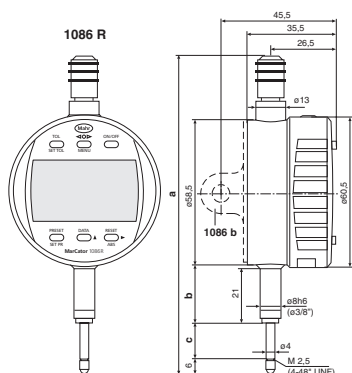
REFERENCE



12,5 mm



25 mm



Dimensions

Meas. range		a	b	c
mm	(inch)	mm	mm	mm
12.5	(.5")	126.3	23	13.5
25	(1")	153.4	26.8	26.5
50	(2")	267.3	40	52
100	(4")	420.3	91	103

Features

Functions:

- ON/OFF
- RESET (Set display to zero)
- mm/inch
- Reversal of the counting direction
- PRESET (Allows the entry of any value using set buttons)
- TOL (Enter tolerance limit values)
- ABS (Display can be set to zero, without losing the reference to the Preset value)
- <0> (Tolerance GO / NO GO display mode)
- DATA (when connected with a data connection cable)
- Factor (adjustable)

- Integrated Wireless data transmission
- Immediate measurement due to the Reference system
- Individual buttons can be locked - Lock Function
- Operating and display unit (bezel) can be rotated 280°
- High contrast LCD with 11 mm high digits
- Operating time approx. 3 years (2000 work. hrs/year)
- Maximum measuring speed 1.5 m/s (60"/s)
- Lifter protection cap on the measuring spindle
- MarConnect data output: choose either: USB, OPTO RS232C, Digimatic or Integrated Wireless
- Operating temperature 10 - 40°C
- Class of protection IP42 in accordance to IEC 60529

Supplied with:
Battery, operating instructions

Technical Data

Measuring range	Resolution	Span of error*	MarConnect**	Measuring force	Weight	Mounting shank	Order no.
mm (inch)	mm / inch	mm		N	g		
12.5 (.5")	0.01 / .0005"	0.02	●	0.65 - 0.90	130	8h6	4337134
25 (1")	0.01 / .0005"	0.02	●	0.65 - 1.15	140	8h6	4337135
50 (2")	0.01 / .0005"	0.02	●	1.25 - 2.70	190	8h6	4337136
100 (4")	0.01 / .0005"	0.02	●	1.60 - 3.50	235	8h6	4337137

* in any zero point

** To use the integrated wireless function an i-Stick Wireless Receiver is required, see page 24

Digital Indicators MarCator 1086 R / 1086 ZR



REFERENCE



12.5 mm



25 mm



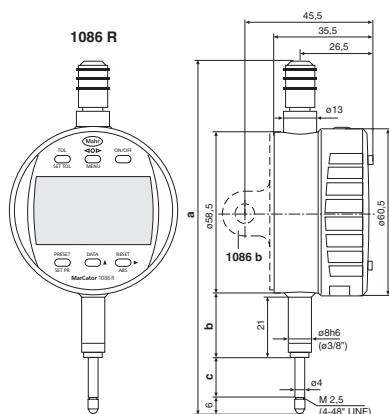
50 mm

Features

Functions:

- ON/OFF
- RESET (Set display to zero)
- mm/inch
- Reversal of the counting direction
- PRESET (Allows the entry of any value using set buttons)
- TOL (Enter tolerance limit values)
- ABS (Display can be set to zero, without losing the reference to the Preset value)
- <0> (Tolerance GO / NO GO display mode)
- DATA (when connected with a data connection cable)
- Factor (adjustable)
- Immediate measurement due to the Reference system
- Individual buttons can be locked - Lock Function
- Operating and display unit (bezel) can be rotated 280°
- High contrast LCD with 11 mm high digits
- Inductive measuring system, battery life ca. 2000 hrs.
- Maximum measuring speed 1.5 m/s (60"/s)
- Lifter protection cap on the measuring spindle
- MarConnect data output: choose either USB, OPTO RS232C, Digimatic
- Operating temperature 10 - 40°C
- Class of protection IP42 in accordance to IEC 60529

Supplied with:
Battery, operating instructions



Dimensions

Meas. range		a	b	c
mm	(inch)	mm	mm	mm
12.5	(.5")	126.3	23	13.5
25	(1")	153.4	26.8	26.5
50	(2")	267.3	40	52
100	(4")	420.3	91	103

Technical Data

Measuring range		Resolution switchable	Span of error*	Repeatability	Measuring force	Weight	Mounting shank	Order no.
mm	(inch)	mm (inch)	mm	mm	N	g	dia.	
12.5	(.5")	0.0005 / 0.001 /	0.004	0.001	0.65 - 0.90	130	8h6	4337620
25	(1")	0.002 / 0.005 /	0.004	0.001	0.65 - 1.15	140	8h6	4337621
50	(2")	0.01 mm	0.007	0.001	1.25 - 2.70	190	8h6	4337622
100	(4")	(.00002" / .00005" /	0.008	0.001	1.60 - 3.50	235	8h6	4337623
12.5	(.5")	.0001" / .0002" /	0.004	0.001	0.65 - 0.90	150	3/8"	4337650
25	(1")	.0005"	0.004	0.001	0.65 - 1.15	160	3/8"	4337651

* in any zero point

Digital Indicators MarCator 1086 R / 1086 ZR, Resolution 0.01 mm / .0005"



REFERENCE



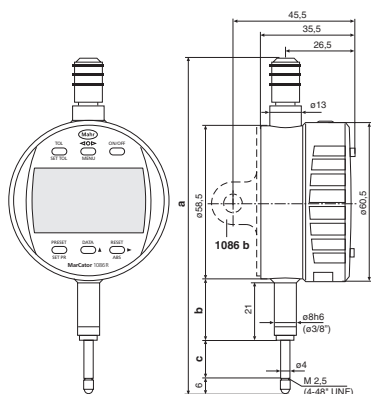
12.5 mm



25 mm



50 mm



Dimensions

Meas. range		a	b	c
mm	(inch)	mm	mm	mm
12.5	(.5")	126.3	23	13.5
25	(1")	153.4	26.8	26.5
50	(2")	267.3	40	52
100	(4")	420.3	91	103

Features

Functions:

- ON/OFF
- RESET (Set display to zero)
- mm/inch
- Reversal of the counting direction
- PRESET (Allows the entry of any value using set buttons)
- TOL (Enter tolerance limit values)
- ABS (Display can be set to zero, without losing the reference to the Preset value)
- <0> (Tolerance GO / NO GO display mode)
- DATA (when connected with a data connection cable)
- Factor (adjustable)
- Immediate measurement due to the Reference system
- Individual buttons can be locked - Lock Function
- Operating and display unit (bezel) can be rotated 280°
- High contrast LCD with 11 mm high digits
- Inductive measuring system, battery life ca. 2000 hrs.
- Maximum measuring speed 1.5 m/s (60"/s)
- Lifter protection cap on the measuring spindle
- MarConnect data output: choose either USB, OPTO RS232C, Digimatic
- Operating temperature 10 - 40°C
- Class of protection IP42 in accordance to IEC 60529

Supplied with:
Battery, operating instructions

Technical Data

Measuring range	Resolution	Span of error*	Repeatability	Measuring force	Weight	Mounting shank	Order no.
mm (inch)	mm / inch	mm	mm	N	g	dia.	
12.5 (.5")	0.01 / .0005"	0.02	0.01	0.65 - 0.90	130	8h6	4337130
25 (1")	0.01 / .0005"	0.02	0.01	0.65 - 1.15	140	8h6	4337131
50 (2")	0.01 / .0005"	0.02	0.01	1.25 - 2.70	190	8h6	4337132
100 (4")	0.01 / .0005"	0.02	0.01	1.60 - 3.50	235	8h6	4337133
12.5 (.5")	0.01 / .0005"	0.02	0.01	0.65 - 0.90	150	3/8"	4337155
25 (1")	0.01 / .0005"	0.02	0.01	0.65 - 1.15	160	3/8"	4337156

* in any zero point

Digital Indicators MarCator 1086 WRi / 1086 WR, Waterproof version



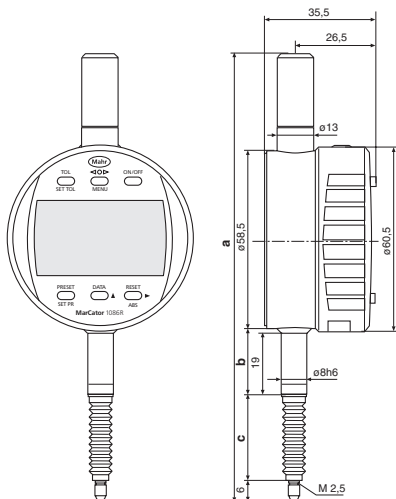
REFERENCE



12,5 mm



25 mm



* Only available in conjunction with 1086 WRi indicators

Dimensions

Meas. range		a	b	c
mm	(inch)	mm	mm	mm
12.5	(.5")	144.3	23	28.6
25	(1")	193.2	26.8	50

Features

Functions:

- ON/OFF
- RESET (Set display to zero)
- mm/inch
- Reversal of the counting direction
- PRESET (Allows the entry of any value using set buttons)
- TOL (Enter tolerance limit values)
- ABS (Display can be set to zero, without losing the reference to the Preset value)
- <0> (Tolerance GO / NO GO display mode)
- DATA (when connected with a data connection cable)
- Factor (adjustable)
- Integrated Wireless data transmission*
- Immediate measurement due to the Reference system
- Individual buttons can be locked - Lock Function
- Operating and display unit (bezel) can be rotated 280°
- High contrast LCD with 11 mm high digits
- Inductive measuring system, battery life ca. 2000 hrs.
- Maximum measuring speed 1.5 m/s (60"/s)
- Sealed protection cap
- Measuring spindle is sealed with a rubber bellows, thus preventing contamination by liquids and impurities
- MarConnect data output: choose either:
 - USB,
 - OPTO RS232C,
 - Digimatic or
 - Integrated Wireless*
- Operating temperature 10 - 40°C
- Class of protection IP54 in accordance to IEC 60529

Supplied with:
Battery, operating instructions

Technical Data

Measuring range		Resolution switchable	Span of error*	Repeatability	Measuring force	Weight	Order no.	
mm	(inch)						WRi**	WR
12.5	(.5")	0.0005 / 0.001 / 0.002 /	0.004	0.001	0.65 - 1.40	135	4337142	4337640
25	(1")	0.005 / 0.01 mm (.00002" / .00005" / .0001" / .0002" / .0005")	0.004	0.001	1.00 - 2.25	145	4337143	4337641

* in any zero point

** To use the integrated wireless function an i-Stick Wireless Receiver is required, see page 24

Digital Indicators MarCator 1086 WRi / 1086 WR, Waterproof version, resolution 0.01 mm / .0005"



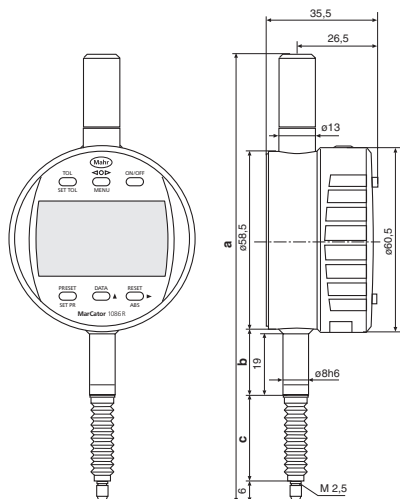
REFERENCE



12.5 mm



25 mm



* Only available in conjunction with 1086 WRi indicators

Dimensions

Meas. range		a	b	c
mm	(inch)	mm	mm	mm
12.5	(.5")	144.3	23	28.6
25	(1")	193.2	26.8	50

Features

Functions:

- ON/OFF
- RESET (Set display to zero)
- mm/inch
- Reversal of the counting direction
- PRESET (Allows the entry of any value using set buttons)
- TOL (Enter tolerance limit values)
- ABS (Display can be set to zero, without losing the reference to the Preset value)
- <0> (Tolerance GO / NO GO display mode)
- DATA (when connected with a data connection cable)
- Factor (adjustable)
- Integrated Wireless data transmission*
- Immediate measurement due to the Reference system
- Individual buttons can be locked - Lock Function
- Operating and display unit (bezel) can be rotated 280°
- High contrast LCD with 11 mm high digits
- Inductive measuring system, battery life ca. 2000 hrs.
- Maximum measuring speed 1.5 m/s (60"/s)
- Sealed protection cap
- Measuring spindle is sealed with a rubber bellows, thus preventing contamination by liquids and impurities
- MarConnect data output: choose either:
 - USB,
 - OPTO RS232C,
 - Digimatic
 - or Integrated Wireless*
- Operating temperature 10 - 40°C
- Class of protection IP54 in accordance to IEC 60529

Supplied with:
Battery, operating instructions

Technical Data

Measuring range	Resolution	Span of error*	Repeatability	Measuring force	Weight	Order no.	Order no.
mm (inch)	mm / inch	mm	mm	N	g	WRi**	WR
12.5 (.5")	0.01 / .0005"	0.02	0.01	0.65 - 1.40	135	4337147	4337145
25 (1")	0.01 / .0005"	0.02	0.01	1.00 - 2.25	145	4337148	4337146

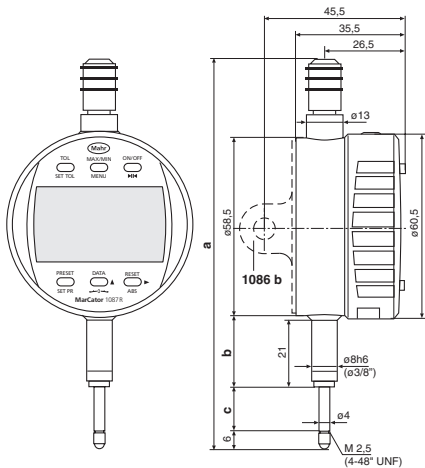
* in any zero point

** To use the integrated wireless function an i-Stick Wireless Receiver is required, see page 24

Digital Indicators MarCator 1087 Ri with analog display for dynamic measurements



REFERENCE



Dimensions

Meas. range	a	b	c
mm (inch)	mm	mm	mm
12.5 (.5")	126.3	23	13.5

Analog display

Readings		Display range	
mm	inch	mm	inch
0.001	.00005	± 0.02	± .001
0.002	.0001	± 0.04	± .002
0.004	.0005	± 0.08	± .01
0.01	.001	± 0.2	± .02

Features

Functions:

- ON/OFF
- RESET (Set display to zero) mm/inch
- Reverse the counting direction
- PRESET (Allows the entry of any value using set buttons)
- TOL (Enter tolerance limit values)
- Tolerance band max. 1.6 mm
- MAX/MIN memory, ideal for searching the reversal point
- TIR (MAX-MIN) ideal for testing concentricity and flatness
- ABS (Display can be set to zero, without losing the reference to the Preset value)
- 0 (Set analog display to zero)
- DATA (when connected with a data connection cable)
- Factor (adjustable)
- Integrated Wireless data transmission
- Immediate measurement due to the Reference system
- Individual buttons can be locked - Lock Function
- Operating and display unit (bezel) can be rotated 280°
- High contrast LCD with 8.5 mm high digits
- Operating time approx. 3 years (2000 work. hrs/year)
- Maximum measuring speed 1.5 m/s (60"/s)
- MarConnect data output: choose either: USB, OPTO RS232C, Digimatic or Integrated Wireless
- Operating temperature 10 - 40°C
- Class of protection IP42 in accordance to IEC 60529

Supplied with:
Battery, operating instructions

Technical Data

Measuring range	Resolution switchable	Span of error*	MarConnect**	Measuring force	Weight	Mounting shank	Order no.
mm (inch)	mm (inch)	mm		N	g		
12.5 (.5")	0.0005 / 0.001 / 0.002 /	0.004	●	0.65 - 0.90	140	8h6	4337663
25 (1")	0.005 / 0.01 mm (.00002" / .00005" / .0001" / .0002" / .0005")	0.004	●	0.65 - 1.15	150	8h6	4337665

* in any zero point

** To use the integrated wireless function an i-Stick Wireless Receiver is required, see page 24

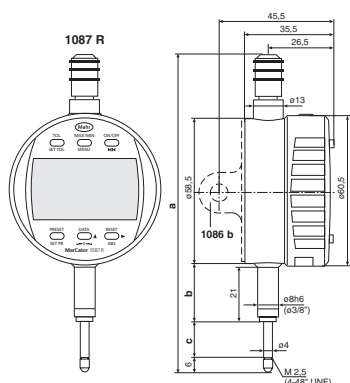
Digital Indicators MarCator 1087 R, with analog display for dynamic measurements



12.5 mm



25 mm



Dimensions

Meas. range	a	b	c
mm (inch)	mm	mm	mm
12.5 (.5")	126.3	23	13.5
25 (1")	153.4	26.8	26.5

Analog display

Readings		Display range	
mm	inch	mm	inch
0.001	.00005	± 0.02	± .001
0.002	.0001	± 0.04	± .002
0.004	.0005	± 0.08	± .01
0.01	.001	± 0.2	± .02

Features

Functions:

- ON/OFF
- RESET (Set display to zero)
- mm/inch
- Reversal of the counting direction
- PRESET (Allows the entry of any value using set buttons)
- TOL (Enter tolerance limit values)
- Tolerance band max, 1.6 mm
- MAX/MIN memory, ideal for searching the reversal point
- TIR (MAX-MIN) ideal for testing concentricity and flatness
- ABS (Display can be set to zero, without losing the reference to the Preset value)
- 0 (Set analog display to zero)
- DATA (when connected with a data connection cable)
- Factor (adjustable)
- Immediate measurement due to the Reference system
- Individual buttons can be locked - Lock Function
- Operating and display unit (bezel) can be rotated 280°
- High contrast LCD with 8.5 mm high digits
- Inductive measuring system, battery life ca. 2000 hrs.
- Maximum measuring speed 1.5 m/s (60"/s)
- MarConnect data output: choose either USB, OPTO RS232C, Digimatic
- Operating temperature 10 - 40°C
- Class of protection IP42 in accordance to IEC 60529

Supplied with:
Battery, operating instructions

Technical Data

Measuring range	Resolution switchable	Span of error*	Repeatability	Measuring force	Weight	Mounting shank	Order no.
mm (inch)	mm (inch)	mm	mm	N	g		
12.5 (.5")	0.0005 / 0.001 / 0.002 / 0.005 / 0.01 mm	0.004	0.001	0.65 - 0.90	140	8h6	4337660
25 (1")	.00002" / .00005" / .0001" / .0002" / .0005"	0.004	0.001	0.65 - 1.15	150	8h6	4337661

* in any zero point

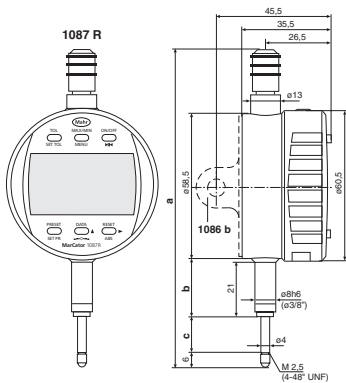
Digital Indicators MarCator 1087 ZR, with analog display for dynamic measurements



12.5 mm



25 mm



Dimensions

Meas. range	a	b	c
mm (inch)	mm	mm	mm
12.5 (.5")	126.3	23	13.5
25 (1")	153.4	26.8	26.5

Analog display

Readings		Display range	
mm	inch	mm	inch
0.001	.00005	± 0.02	± .001
0.002	.0001	± 0.04	± .002
0.004	.0005	± 0.08	± .01
0.01	.001	± 0.2	± .02

Features

Functions:

- ON/OFF
- RESET (Set display to zero)
- mm/inch
- Reversal of the counting direction
- PRESET (Allows the entry of any value using set buttons)
- TOL (Enter tolerance limit values)
- Tolerance band max, 1.6 mm
- MAX/MIN memory, ideal for searching the reversal point
- TIR (MAX-MIN) ideal for testing concentricity and flatness
- ABS (Display can be set to zero, without losing the reference to the Preset value)
- 0 (Set analog display to zero)
- DATA (when connected with a data connection cable)
- Factor (adjustable)
- Immediate measurement due to the Reference system
- Individual buttons can be locked - Lock Function
- Operating and display unit (bezel) can be rotated 280°
- High contrast LCD with 8.5 mm high digits
- Inductive measuring system, battery life ca. 2000 hrs.
- Maximum measuring speed 1.5 m/s (60"/s)
- MarConnect data output: choose either USB, OPTO RS232C, Digimatic
- Operating temperature 10 - 40°C
- Class of protection IP42 in accordance to IEC 60529

Supplied with:

Battery, operating instructions

Technical Data

Measuring range	Resolution switchable	Span of error*	Repeatability	Measuring force	Weight	Mounting shank	Order no.
mm (inch)	mm (inch)	mm	mm	N	g		
12.5 (.5")	0.0005 / 0.001 / 0.002 / 0.005 / 0.01 mm	0.004	0.001	0.65 - 0.90	150	3/8"	4337670
25 (1")	(.00002" / .00005" / .0001" / .0002" / .0005")	0.004	0.001	0.65 - 1.15	160	3/8"	4337671

* in any zero point

MarCator 1088

► | The Digital Indicator **MarCator** 1088. Tolerance monitoring is simplified with the changing of the color in the background lit display.

Dynamic measuring functions

- **MAX-MIN**-Function ideal for testing flatness and concentricity
- **MAX** and / or **MIN** for searching the reversal point



Tolerance function:
clearly visual tolerance excess due to the change of color in the background lit display.



Universal Data-Interface



- **USB**
No interface box is required!
Simple and inexpensive way to set up a multiple measuring instruments via a USB hub



- **Digimatic**
To connect a Digimatic compatible evaluation instrument



- **Mahr Opto RS232C**
For direct connection to a COM port on a PC



Control output can be connected to a SPS



Absolute function:
Digital Indicator can be set in any position to 0.000 without losing the reference to the preset value.

Protection class IP54 according to IEC 60529. Especially suited for use in a manufacturing environment (excludes measuring range 50 mm)



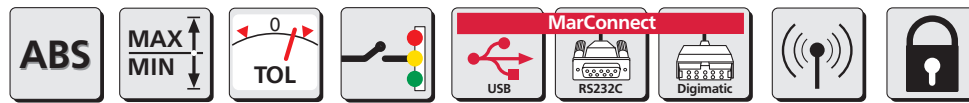
Code Initial	IP	International Protection
First Numeral	5	Dust protected
Second Numeral	4	Protection against splash water in all directions

Analog display



Readings (switchable)			Display range		
mm	/	inch	mm	/	inch
0.001	/	.00005"	± 0.030	/	± .0015"
0.002	/	.0001"	± 0.060	/	± .0030"
0.005	/	.0005"	± 0.150	/	± .0150"
0.01	/	.001"	± 0.30	/	± .030"

Digital Indicators MarCator 1088 / 1088 W, with analog display for dynamic measurements



Features

Functions:

- ON/OFF
- RESET (set digital and analog displays to zero)
- 0 - (set analog display to zero)
- PRESET (enter any numerical values)
- DATA (data transmission)
- mm/inch-switchable
- Factor (adjustable)
- Reversal of counting direction (switch value in digital display)
- MAX/MIN memory, ideal for searching the reversal point
- MAX-MIN memory, e.g. for testing flatness and concentricity
- TOL (Enter tolerance limit values)
- Tolerance band max, 1.6 mm
- LOCK: operating functions can be blocked via PC-Software
- Power supply via the main power adapter
- MarConnect data output: USB, OPTO RS232C, Digimatic
- Can be remotely operated via the interface (Opto RS232C)
- Control output compatible to Dial Comparators with limit contacts
- Operating and display unit (bezel) can be rotated 280°
- Class of protection IP54 in accordance to IEC 60529
- Operating temperature 5 - 40°C
- High contrast backlit LCD with 6.5 mm high digits
- Analog display with 4 mm pointer ensures better visual recognition, ideal when checking concentricity or flatness as well as searching for the reversal point when measuring bores
- Supplied with: Mains adapter, rubber bellows, operating instructions



Technical Data

Measuring range		Resolution		Measuring force	Span of error*	Protection class	Order no.	Order no.
mm	(inch)	mm	/ inch				230 V	115 V
12.5	(.5")	0.001	/ .00005"	0.65 - 1.40	0.005	IP54	4337000	4337010
25	(1")	0.001	/ .00005"	1.00 - 2.25	0.005	IP54	4337001	4337011
50	(2")	0.001	/ .00005"	1.25 - 2.7	0.008	IP42	4337002	4337012

* in any zero point

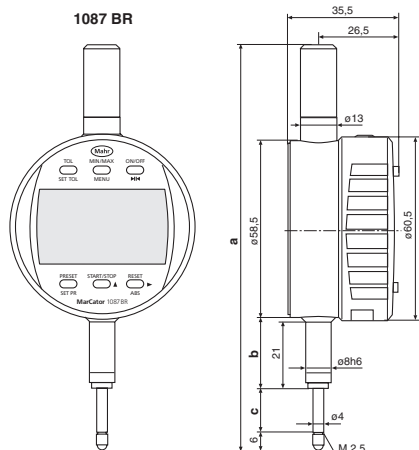
Digital Indicator MarCator 1087 BRI for 2 point inside and outside measurement



REFERENCE



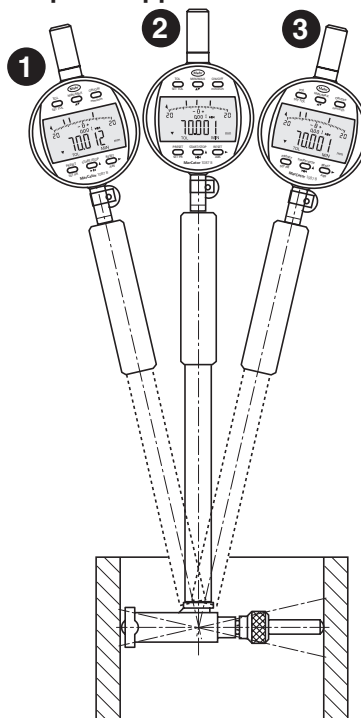
12.5 mm



Dimensions

Meas. range	a	b	c
mm (inch)	mm	mm	mm
12.5 (.5")	126.3	23	13.5

Example of application



With a 2 point inside measuring instrument the point of reversal is automatically determined through rocking back and forth. The actual value is detected and stored by the MIN function and indicated in the display (3).

Analog display

Readings		Display range	
mm	inch	mm	inch
0.001	/.00005	± 0.02	± .001
0.002	/.0001	± 0.04	± .002
0.004	/.0005	± 0.08	± .01
0.01	/.001	± 0.2	± .02

Features

Functions:

- ON/OFF
- RESET (Set the display to zero)
- mm/inch
- Reversal of the counting direction
- PRESET (Allows the entry of any value using set buttons)
- TOL (Enter tolerance limit values)
- Tolerance band max. 1.6 mm
- START/STOP for searching the reversal point
- MAX/MIN memory, ideal for searching the reversal point
- ABS (Display can be set to zero, without losing the reference to the Preset value)
- 0 (Set analog display to zero)
- DATA (when connected with a data connection cable)
- Factor (adjustable)
- Integrated Wireless data transmission
- Immediate measurement due to the Reference system
- Individual buttons can be locked - Lock Function
- Operating and display unit (bezel) can be rotated 280°
- High contrast LCD with 8.5 mm high digits
- Operating time approx. 3 years (2000 work. hrs/year)
- Max. meas. speed 1.5 m/s (60"/s)
- Sealed protection cap
- MarConnect data output: choose either:
 - USB,
 - OPTO RS232C,
 - Digimatic,
 - Integrated Wireless
- Operating temperature 10 - 40°C
- Class of protection IP42 in accordance to IEC 60529
- Supplied with:
 - Battery, Operating instructions

Technical Data

Measuring range	Resolution switchable	Span of error*	MarConnect**	Measuring force	Weight	Mounting shank	Order no.
mm (inch)	mm (inch)	mm		N	g		
12.5 (.5")	0.0005 / 0.001 / 0.002 / 0.005 / 0.01 mm (.00002" / .00005" / .0001" / .0002" / .0005")	0.004	●	0.65 - 0.90	140	8h6	4337664

* in any zero point

** To use the integrated wireless function an i-Stick Wireless Receiver is required, see page 24

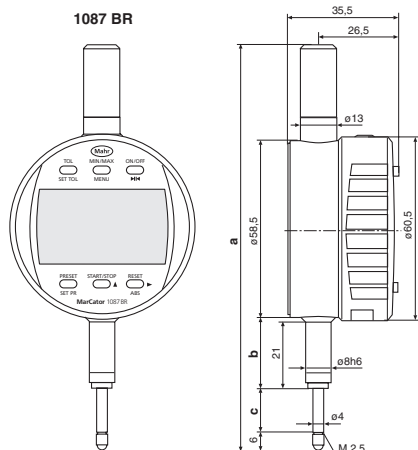
Digital Indicator MarCator 1087 BR for 2 point inside and outside measurement



REFERENCE



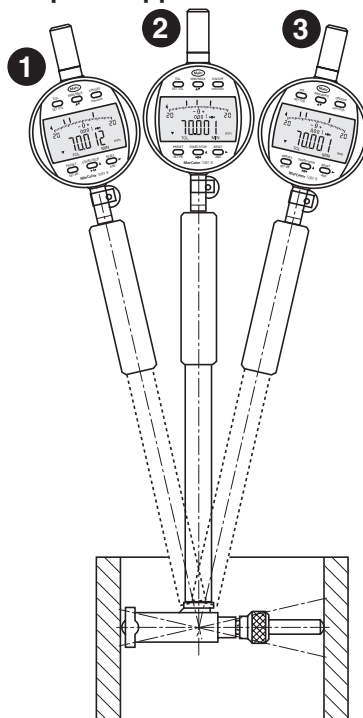
12.5 mm



Dimensions

Meas. range	a	b	c
mm (inch)	mm	mm	mm
12.5 (.5")	126.3	23	13.5

Example of application



With a 2 point inside measuring instrument the point of reversal is automatically determined through rocking back and forth. The actual value is detected and stored by the MIN function and indicated in the display (3).

Analog display

Readings		Display range	
mm	inch	mm	inch
0.001	.00005	± 0.02	± .001
0.002	.0001	± 0.04	± .002
0.004	.0005	± 0.08	± .01
0.01	.001	± 0.2	± .02

Features

Functions:

- ON/OFF
- RESET (Set the display to zero)
- mm/inch
- Reversal of the counting direction
- PRESET (Allows the entry of any value using set buttons)
- TOL (Enter tolerance limit values)
- Tolerance band max. 1.6 mm
- START/STOP for searching the reversal point
- MAX/MIN memory, ideal for searching the reversal point
- ABS (Display can be set to zero, without losing the reference to the Preset value)
- 0 (Set analog display to zero)
- DATA (when connected with a data connection cable)
- Factor (adjustable)
- Immediate measurement due to the Reference system
- Individual buttons can be locked - Lock Function
- Operating and display unit (bezel) can be rotated 280°
- High contrast LCD with 8.5 mm high digits
- Operating time approx. 3 years (2000 work. hrs/year)
- Max. meas. speed 1.5 m/s (60"/s)
- Sealed protection cap
- MarConnect data output:
 - choose
 - USB
 - OPTO RS232C
 - Digimatic
- Operating temperature 10 - 40°C
- Class of protection IP42 in accordance to IEC 60529
- Supplied with:
 - Battery,
 - Operating instructions

Technical Data

Measuring range	Resolution switchable	Span of error*	Repeatability	Measuring force	Weight	Mounting shank	Order no.
mm (inch)	mm (inch)	mm	mm	N	g		
12.5 (.5")	0.0005 / 0.001 / 0.002 / 0.005 / 0.01 mm (.00002" / .00005" / .0001" / .0002" / .0005")	0.004	0.001	0.65 - 0.90	140	8h6	4337662

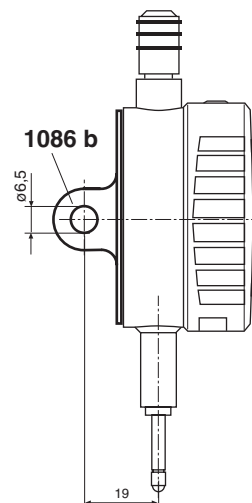
* in any zero point

Accessories for MarCator 1086 R / Ri, 1087 R / Ri and 1088

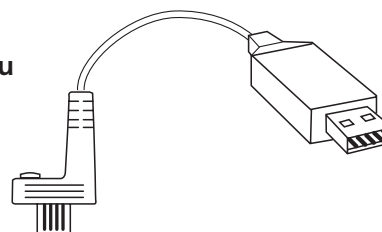
Accessories for MarCator 1086 R / Ri and 1087 R / Ri

		Order no.
Battery 3V , Type CR 2450		4884464
Data Connection Cable USB (2 m) incl. MarCom Standard	16 EXu	4102357
Data Connection Cable Opto RS232C (2 m), with SUB-D jack 9-pin	16 EXr	4102410
Data Connection Cable Digimatic (2 m), Flat plug 10-pin	16 EWd	4102915
Mounting Lug	1086 b	4337421
Adjustable Mounting Back		2246308
Rubber bellows for 1086 W - 12.5 mm		4337472
Rubber bellows for 1086 W - 25 mm		4337474

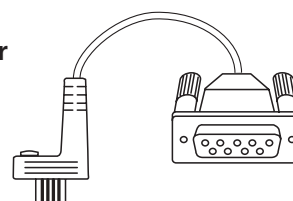
Accessories for Data Processing see Chapter 7 - **MarConnect**



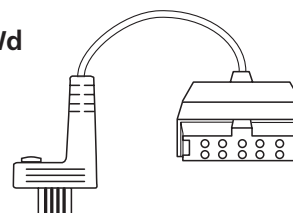
16 EXu



16 EXr



16 EWd



Accessories for MarCator 1086 Ri and 1087 Ri

	Order no.
i-Stick Wireless Receiver incl. MarCom Standard Software	4102220
Software MarCom Professional 4.0	4102552
Software MarCom Standard 3.1	4102551

Accessories for Data Processing see Chapter 7 - **MarConnect**

i-Stick



Accessories for MarCator 1088

		Order no.
Data Connection Cable USB (2 m)	2000 usb	4346023
Data Connection Cable Opto RS232C (2 m), with SUB-D jack 9-pin	2000 r	4346020
Data Connection Cable Digimatic (2 m), Flat plug 10-pin	2000 d	4346021
Cable to connect control output to an SPS	2000 sps	4346031
Mounting Lug	1085 b	4336310
Rubber bellows for 1088 W - 12.5 mm		4337472
Rubber bellows for 1088 W - 25 mm		4337474
Control Instrument for remote control operation	2000 sg	4346035

Accessories for Data Processing see Chapter 7 - **MarConnect**

Accessories for MarCator 1086 R, 1087 R and 1088

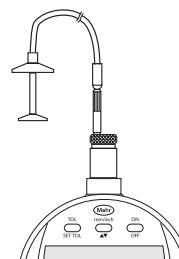
		Order no.
Cable Release for measuring ranges 12.5 and 25 mm	1085 a	4336311
Pneumatic Lifter for measuring ranges 12.5 and 25 mm	1082 p	4336237
Pneumatic Lifter for measuring ranges 50 and 100 mm	1082 p	4336230

Additional Accessories

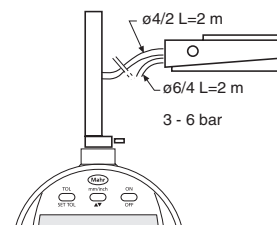
See Chapter **Millimar**. Standard Elements

Accessories for Data Processing see Chapter 7 - **MarConnect**

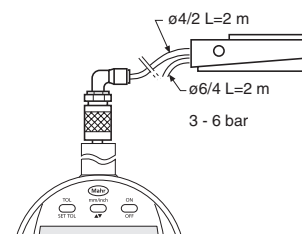
1085 a



1082 p (12.5/25)



1082 p (50/100)



MarCator ANSI/AGD Dial Indicators

OVERVIEW

Dial Indicators Selection Guide

					Order number	
Grad	Range per Rev.	Total Range	Dial Style w/o Rev	Dial Style with Rev	w/o Rev Counter	with Rev Counter
Group 0						
.0001"	.004"	.010"	0-2-0	—	A1/2Q	
.0005"	.020"	.050"	0-10-0	—	A3Q	
.001"	.040"	.100"	0-20-0	—	A6Q	
.002 mm	.100	.250	0-5-0	—	N1/2O	
.005 mm	.500	1.25	0-25-0	—	N3I	
.010 mm	1.00	2.50	0-50-0	—	N6I	
Group 1						
.0001"	.010"	.025"	0-5-0	0-10	12I	12I-RC
.00025"	.010"	.025"	0-5-0	0-10	12Q	12Q-RC
.00025"	.020"	.050"	0-10-0	0-20	B3K	B3K-RC
.0005"	.020"	.050"	0-10-0	0-20	B3Q	B3Q-RC
.0005"	.030"	.075"	0-15-0	0-30	B5M	B5M-RC
.0005"	.040"	.100"	0-20-0	0-40	B6K	B6K-RC
.0005"	.050"	.125"	0-25-0	0-50	B7I	B7I-RC
.001"	.020"	.050"	0-10-0	0-20	B3W	B3W-RC
.001"	.040"	.100"	0-20-0	0-40	B6Q	B6Q-RC
.001"	.050"	.125"	0-25-0	0-50	B7O	B7O-RC
.001"	.100"	.250"	0-50-0	0-100	B8I	B8I-RC
.002 mm	.200	.500	0-10-0	0-20	O1I	O1I-RC
.005 mm	.500	1.25	0-25-0	0-50	O3I	O3I-RC
.010 mm	1.00	2.50	0-50-0	0-100	O6I	O6I-RC
.025 mm	2.50	6.25	0-125-0	0-250	O8I	O8I-RC
Group 2						
.00005"	.004"	.010"	0-2-0	0-4	C1/2K	C1/2K-RC
.0001"	.008"	.020"	0-4-0	0-8	C1K	C1K-RC
.0001"	.010"	.025"	0-5-0	0-10	2015781	2014761
.00025"	.010"	.025"	0-5-0	0-10	2015782	2014791
.00025"	.020"	.050"	0-10-0	0-20	2015783	2014808
.0005"	.020"	.050"	0-10-0	0-20	2015784	2014810
.0005"	.030"	.075"	0-15-0	0-30	2015786	2014811
.0005"	.040"	.100"	0-20-0	0-40	2015787	2014812
.0005"	.050"	.125"	0-25-0	0-50	2015790	2014814
.001"	.020"	.050"	0-10-0	0-20	2015785	2014809
.001"	.040"	.100"	0-20-0	0-40	2015789	2014813
.001"	.050"	.125"	0-25-0	0-50	2015791	2014815
.001"	.100"	.250"	0-50-0	0-100	2015792	2011049
.001 mm	.100	.250	0-5-0	0-10	P1/2I	P1/2I-RC
.002 mm	.200	.500	0-10-0	0-20	P1I	P1I-RC
.005 mm	.500	1.25	0-25-0	0-50	2015793	2014817
.010 mm	1.00	2.50	0-50-0	0-100	2015794	2014818
.020 mm	2.00	5.00	0-100-0	0-200	2015795	2014819
1 Rev						
.0005"	—	.040"	—	—	2014793	
.001"	—	.080"	—	—	2014792	
.010 mm	—	1.00	—	—	2014795	
.020 mm	—	2.00	—	—	2014794	
.010 mm	—	1.00	—	—	2014797	
.020 mm	—	2.00	—	—	2014796	

Grad	Range per Rev.	Total Range	Dial Style w/o Rev	Dial Style with Rev	Order number	
					w/o Rev Counter	with Rev Counter
Group 3						
.0001"	.008"	.020"	0-4-0	0-8	D1K	D1K-RC
.0001"	.010"	.025"	0-5-0	0-10	32I	32I-RC
.00025"	.010"	.025"	0-5-0	0-10	32Q	32Q-RC
.00025"	.020"	.050"	0-10-0	0-20	D3K	D3K-RC
.00025"	.030"	.075"	0-15-0	0-30	D5G	D5G-RC
.0005"	.020"	.050"	0-10-0	0-20	D3Q	D3Q-RC
.0005"	.030"	.075"	0-15-0	0-30	D5M	D5M-RC
.0005"	.040"	.100"	0-20-0	0-40	D6K	D6K-RC
.0005"	.050"	.125"	0-25-0	0-50	D7I	D7I-RC
.001"	.020"	.050"	0-10-0	0-20	D3W	D3W-RC
.001"	.040"	.100"	0-20-0	0-40	D6Q	D6Q-RC
.001"	.050"	.125"	0-25-0	0-50	D7O	D7O-RC
.001"	.100"	.250"	0-50-0	0-100	D8I	D8I-RC
.002 mm	.200	.500	0-10-0	0-20	Q1I	Q1I-RC
.005 mm	.500	1.25	0-25-0	0-50	Q3I	Q3I-RC
.010 mm	1.00	2.50	0-50-0	0-100	Q6I	Q6I-RC
.020 mm	2.00	5.00	0-100-0	0-200	Q8I	Q8I-RC
Group 4						
.0001"	.008"	.020"	0-4-0	0-8	E1K	E1K-RC
.0001"	.010"	.025"	0-5-0	0-10	42I	42I-RC
.00025"	.020"	.050"	0-10-0	0-20	E3K	E3K-RC
.00025"	.030"	.075"	0-15-0	0-30	E5G	E5G-RC
.0005"	.020"	.050"	0-10-0	0-20	E3Q	E3Q-RC
.0005"	.030"	.075"	0-15-0	0-30	E5M	E5M-RC
.0005"	.050"	.125"	0-25-0	0-50	E7I	E7I-RC
.001"	.020"	.050"	0-10-0	0-20	E3W	E3W-RC
.001"	.050"	.125"	0-25-0	0-50	E7O	E7O-RC
.001"	.100"	.250"	0-50-0	0-100	E8I	E8I-RC
.002 mm	.200	.500	0-10-0	0-20	R1I	R1I-RC
.005 mm	.500	1.25	0-25-0	0-50	R3I	R3I-RC
.010 mm	1.00	2.50	0-50-0	0-100	R6I	R6I-RC
.020 mm	2.00	5.00	0-100-0	0-200	R8I	R8I-RC
Long Range						
.0001"	.010"	.500"	—	0-10		42IQ
.001"	.100"	.500"	—	0-100		2014699
.001"	.100"	1.00"	—	0-100		2014698
.001"	.100"	1.00"	—	0-100		D8IS
.001"	.100"	2.00"	—	0-100		D8IT
.001"	.100"	3.00"	—	0-100		E8IU
.010"	1.00"	1.00"	—	0-1000		2014816
.010 mm	1.00	25.00	—	0-100		SP6IS
.010 mm	1.00	25.00	—	0-100		SQ6IS
.025 mm	2.50	50.00	—	0-25		Q8IT
.025 mm	2.50	75.00	—	0-25		R8IU

Dial Indicators per ANSI/AGD

Features

You get more with Mahr Federal Dial Indicators

- Proven for the most demanding applications
- Superior design and serviceability
- Unmatched customer and technical support
- Catalog and customized styles
- Full range of accessories to suit virtually every need
- Unit construction, removable movement . . . saves repair/cleaning time and maintenance costs
- Hardened gears and stainless steel racks provide lasting protection against indicator failure due to shock or wear
- Jeweled bearings resist friction, add to longer indicator life
- Skeletonized, hobbled gears for more sensitive response, superior indicator accuracy with minimal hysteresis error
- Soft-tinted dials (green, inch, or yellow, metric) minimize eye strain
- Special steel alloy, balanced dial hand affords no-shift, precise reading
- Controlled rack and pinion mesh eliminates slope for precise response and reading
- Smooth-adjusting bezels for easy setup
- Positive pressure pull-back spring . . . less maintenance
- Compliance with ANSI/AGD dimensional and accuracy specifications
- Many models employ stainless steel stem for added durability

How to Order

How to Order Your Dial Indicator and Accessories

1. Select the type of Indicator you require. Check the specialize types as well as regular ANSI/AGD models.
2. Choose the Model best suited to the magnification, range and viewing needs of your job.
3. Accessories. These are important because they greatly increase the speed, efficiency and convenience of obtaining desired results. A wide selection of Mahr Federal dial indicator accessories are shown in this catalog.
4. Options. You are not restricted to the normally furnished equipment mentioned above. A wide choice of optionally available points, backs or dial arrangements can be specified at little or no extra cost. We maintain the most extensive stock of indicators and gages for dimensional measurement available anywhere. Items which are in stock are normally shipped within five working days. If you need them sooner, inquire when ordering. We can often make next-day deliveries. Understandably, some of the items in this catalog are not always in stock or are special order items, which take a little longer to ship.

If you need help in determining what Indicators right for your application, just ask us. Contact Mahr Federal:

1-800-333-4243

One of our experienced professionals will give you courteous, professional advice that can save you time and money.

Replacement indicators

Although Mahr Federal dial indicators are known for their lifetime service, it is not uncommon to change an indicator back, contact point, dial or to even add an accessory to suit your latest application.

When ordering a replacement dial indicator for a specific application, always verify the configuration of the indicator. Ordering a replacement using the standard model number shown on your indicator may not provide you with the configuration or accessories you desire.



Dial Indicators per ANSI/AGD

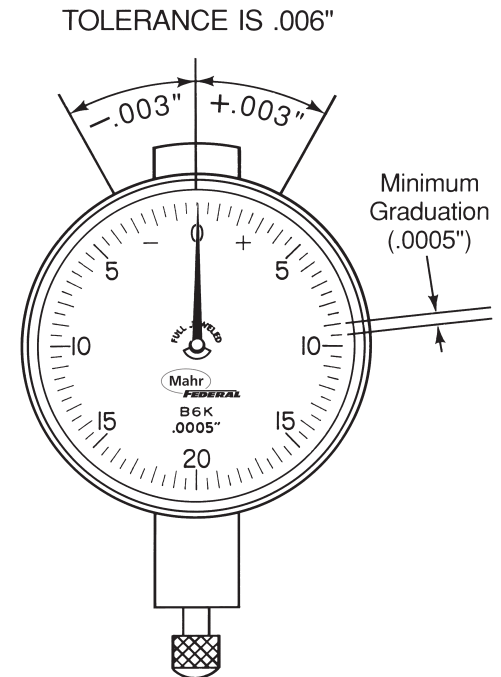
Selecting a Dial Indicator

Since modern manufacturing involves a wide range of tolerances, choosing a dial indicator might be difficult, especially since the number of indicators available is so vast. The following guidelines were prepared to assist you in selecting the right model for your application.

Consider four characteristics when selecting a dial indicator:

- **Minimum Graduation Value** — value of the smallest graduations marked on the dial. From several different values available from Mahr Federal, select the one which is closest to 10% of the tolerance spread of the work you are measuring. This assures that the tolerance will span about ten divisions of the dial.
- **Size** — represents the bezel diameter. Make your selection on the basis of space available for the indicator and the distance from which it will be viewed. The Indicator photograph shown on the first page of each ANSI/AGD Group is full scale. Simply place the page which illustrates the Indicator at the expected viewing distance, and choose the size that offers you the best readability and is the proper size for your fixture. Mahr Federal's "C" size bezels (ANSI/AGD Group 2), which have a diameter of 2-1/4", are the most popular.
- **Range per Revolution** — represents the distance the spindle travels with one complete revolution of the dial hand. From the dials available in the size and minimum graduation value you chose, select the range per revolution which allows the tolerance spread to occupy 1/10 to 1/4 of the dial.
- **Total Range** — the maximum distance over which the indicator spindle can travel. Usually, this represents 2-1/2 revolutions of the hand, which is adequate for most needs. Sometimes, however, this may not be adequate for your application and a special total range may be necessary.

If your tolerance spread is .006" ($\pm .003$ "), then, the most suitable minimum graduation value is .0005".



Your tolerance spread is .006". You have chosen an ANSI/AGD Group 2 (Mahr Federal "C" Size) dial with a minimum graduation value of .0005". Mahr Federal offers four indicator types in this size and minimum graduation value. Of these, type C5M has a range per revolution of .030" which is about midway between your tolerance extremes.

You selected a C5M indicator. Your total range, however, needs to be at least .200" so the spindle can clear the lip of your part. But, the longest range available in the C5M indicator you need is only .075". Special ranges up to .400" are available for this indicator type. Select the closest range for your application (for Model C5M, you would select .250").

If the range you need is not listed under the "Special Ranges" category, contact Mahr Federal. Chances are we can supply the range you need.

Copies of the current ANSI Standard for Dial Indicators (ANSI B89.1.1 0-1987) are available from:

The American Society of Mechanical Engineers
ASME Order Desk
22 Law Drive
Fairfield, NJ 07007
(973)882-1167

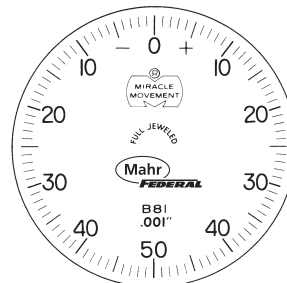
Dial Indicators per ANSI/AGD

Dial Types

1. Balanced (+) on right.

Normally furnished on all Group 0, 1, 3 and 4 ANSI/AGD indicators only, unless otherwise specified. Indicates an increasing value when contact is depressed as in comparison type O.D. snap and bench thickness gages.

Note: If Revolution Counter models are ordered, counter dial numbered counterclockwise.

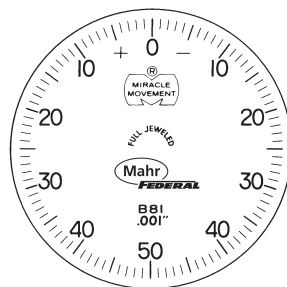


2. Balanced (+) on left.

Indicates decreasing values when contact is depressed as in comparison bore* and depth gages.

Note: With Revolution Counter models, counter dial numbered clockwise.

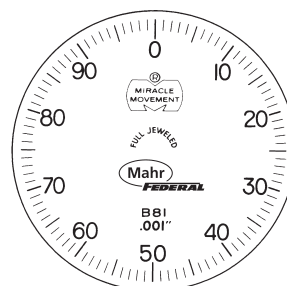
* Will vary as dictated by motion transfer design.



3. Continuous clockwise.

Normally furnished on Long and Extra Long Range Indicators, unless otherwise specified. Indicates an increasing value when contact is depressed as in direct-reading thickness gages.

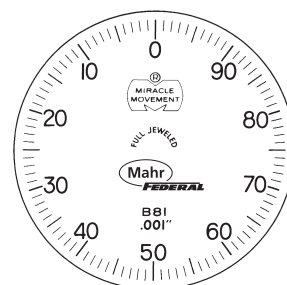
Note: With Revolution Counter models, counter dial numbered counterclockwise.



4. Continuous counterclockwise.

Indicates a decreasing value when contact is depressed as in direct reading slot, recess or hole depth measurements.

Note: If Revolution Counter models are ordered, counter dial numbered clockwise



Dial Indicators per ANSI/AGD Group 0 - Mahr Federal Series A and N

Where available space prohibits the use of a larger dial indicator.



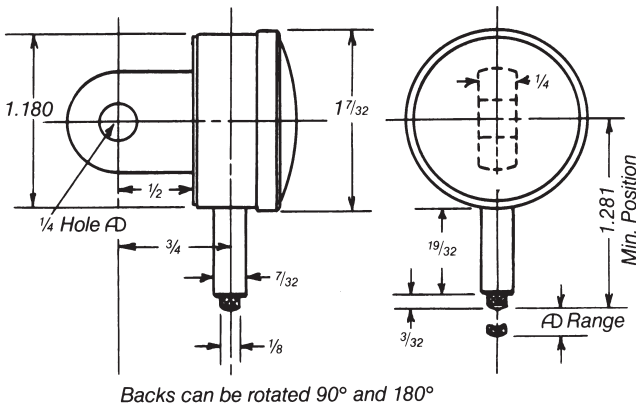
Technical Data

Mahr Federal Series A (inch)
Dial: approx. 1.250" dia. with soft-green tint

Measuring range	Graduation value	Dial style	Range per revolution	Accuracy	Order no.
.010"	.0001"	0-2-0	.004"	± .0001"	A1/2Q
.050"	.0005"	0-10-0	.020"	± .0005"	A3Q
.100"	.001"	0-20-0	.040"	± .001"	A6Q

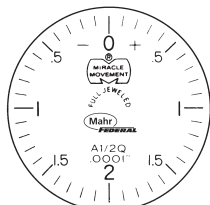
Mahr Federal Series N (Metric – mm)
Dial: approx. 32 mm dia. with soft-yellow tint

Measuring range	Graduation value	Dial style	Range per revolution	Accuracy	Order no.
0.250	0.002	0-5-0	0.100	± 0.002 mm	N1/20
1.250	0.005	0-25-0	0.500	± 0.005 mm	N3I
2.500	0.010	0-50-0	1.00	± 0.010 mm	N6I

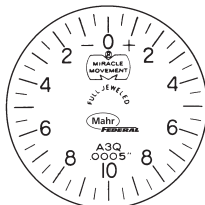


Dial Indicators per ANSI/AGD Group 0 - Mahr Federal Series A and N

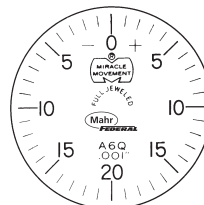
Mahr Federal Series A



A1/2Q



A3Q

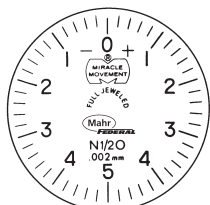


A6Q

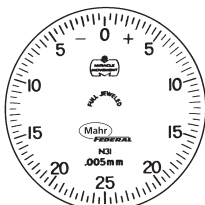
- Normally furnished: balanced dial with + on right; centered vertical lug back; regular contact point, .09" radiused, .093" long.

- Optional dials: balanced with + on left; continuous clockwise; continuous counter-clockwise. Order by part number and specify dial style desired.

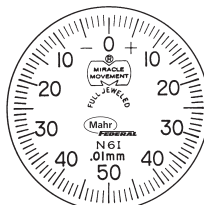
Mahr Federal Series N



N1/2O



N3I

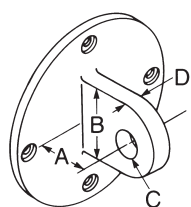


N6I

- For other dial styles or special requirements, call Mahr Federal.

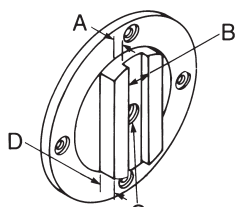
Backs for ANSI Group 0 - Series A and N

Vertical (Centered) Lug Back is normally furnished and included in price of Indicator. Back can be rotated 90° for horizontal lug mounting.



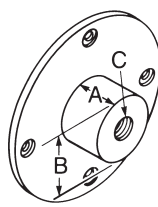
Vertical Lug (Centered)
BK-37

A	B	C	D
1/2	11/16	1/4	1/4



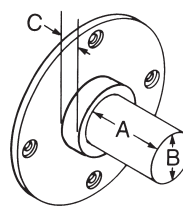
Adjustable
BK-45

A	B	C	D
1/8	3/8	8-32	1/4



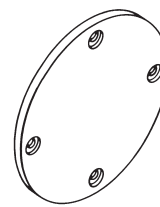
Screw Type
BK-88

A	B	C
1/2	11/16	1/4-28



Post
BK-38

A	B	C
5/16	7/32	1/16



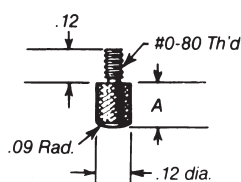
Flat
BK-32

Split Bushing, BU-112 Fits Stem (.218" I.D. x .375" O.D.). .500" long.



Points for ANSI Group 0 - Series A and N

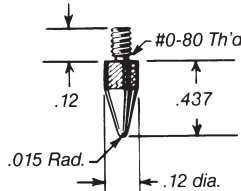
Regular PT-43
normally furnished



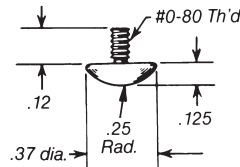
Dim. A Style

3/32"	PT-43
1/4"	PT-204
3/8"	PT-205
1/2"	PT-207
5/8"	PT-208
3/4"	PT-209
7/8"	PT-210
1"	PT-211

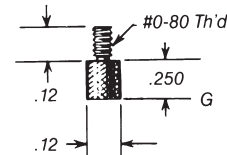
Taper
PT-119



Button
PT-118



Flat
AL-61



Dial Indicators per ANSI/AGD Group 1 - Mahr Federal Series B and O



Technical Data

Mahr Federal Series B (inch)

Dial: approx. 1.750" dia. with soft-green tint

Measuring range	Graduation value	Dial style w/o Rev Counter	Dial style with Rev Counter	Range per revolution	Accuracy	Order no. w/o Rev Counter	Order no. with Rev Counter
.025"	.0001"	0-5-0	0-10	.010"	± .0001"	12I	12I-RC
.025"	.00025"	0-5-0	0-10	.010"	± .00025"	12Q	12Q-RC
.050"	.00025"	0-10-0	0-20	.020"	± .00025"	B3K	B3K-RC
.050"	.0005"	0-10-0	0-20	.020"	± .0005"	B3Q	B3Q-RC
.075"	.0005"	0-15-0	0-30	.030"	± .0005"	B5M	B5M-RC
.100"	.0005"	0-20-0	0-40	.040"	± .0005"	B6K	B6K-RC
.125"	.0005"	0-25-0	0-50	.050"	± .0005"	B7I	B7I-RC
.050"	.001"	0-10-0	0-20	.020"	± .001"	B3W	B3W-RC
.100"	.001"	0-20-0	0-40	.040"	± .001"	B6Q	B6Q-RC
.125"	.001"	0-25-0	0-50	.050"	± .001"	B7O	B7O-RC
.250"	.001"	0-50-0	0-100	.100"	± .001"	B8I	B8I-RC

Mahr Federal Series O (Metric, mm)

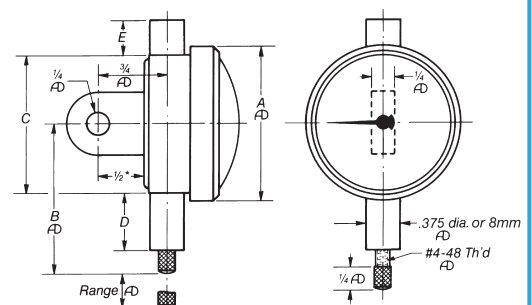
Dial: approx. 45 mm dia. with yellow tint

Measuring range	Graduation value	Dial style w/o Rev Counter	Dial style with Rev Counter	Range per revolution	Accuracy	Order no. w/o Rev Counter	Order no. with Rev Counter
0.500	0.002	0-10-0	0-20	0.200	± 0.004	O1I	O1I-RC
1.250	0.005	0-25-0	0-50	0.500	± 0.005	O3I	O3I-RC
2.500	0.010	0-50-0	0-100	1.000	± 0.010	O6I	O6I-RC
6.250	0.025	0-125-0	0-250	2.500	± 0.025	O8I	O8I-RC

Dimensions

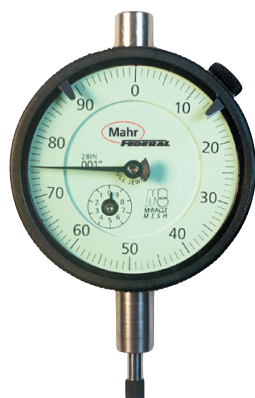
ANSI / AGD Group	Mahr Federal Styles	A mm/inch	B mm/inch	C mm/inch	D mm/inch	E mm/inch
1	B/O	42.86/ 1.688"	41.28/ 1.625"	38.10/ 1.5"	15.88/ .625"	8.73/ .344"
2	C/P	57.15/ 2.25"	50.80/ 2"	52.39/ 2.063"	18.26/ .719"	8.73/ .344"

These indicators are normally furnished with continuous dial (with R.C.) or + on right balance dial (w/o R.C.), lug back and .18" by .250" long contact.



*except E size: .425

Dial Indicators per ANSI/AGD Group 2 - Mahr Federal Series C and P



Ordering Information

In addition to the information provided below, see pages 28 & 29 for complete instructions on ordering your dial indicators and accessories.

www.mahr.com

Technical Data

Mahr Federal Series C (inch)

Dial: approx. 2.250" dia. with soft-green tint

Measuring range	Graduation value	Dial style w/o Rev Counter	Dial style with Rev Counter	Range per revolution	Accuracy	Order no. w/o Rev Counter	Order no. with Rev Counter	OLD Order no.
.020"	.0001"	0-4-0	0-8	.008"	± .0001"	C1K	C1K-RC	C1K
.025"	.0001"	0-5-0	0-10	.010"	± .0001"	2015781	2014761	C2I/22I
.025"	.00025"	0-5-0	0-10	.010"	± .00025"	2015782	2014791	C2Q/22Q
.050"	.00025"	0-10-0	0-20	.020"	± .00025"	2015783	2014808	C3K/23K
.050"	.0005"	0-10-0	0-20	.020"	± .0005"	2015784	2014810	C3Q/23Q
.075"	.0005"	0-15-0	0-30	.030"	± .0005"	2015786	2014811	C5M/25M
.100"	.0005"	0-20-0	0-40	.040"	± .0005"	2015787	2014812	C6K/26K
.125"	.0005"	0-25-0	0-50	.050"	± .0005"	2015790	2014814	C7I/27I
.050"	.001"	0-10-0	0-20	.020"	± .001"	2015785	2014809	C3W/23W
.100"	.001"	0-20-0	0-40	.040"	± .001"	2015789	2014813	C6Q/26Q
.125"	.001"	0-25-0	0-50	.050"	± .001"	2015791	2014815	C7O/27O
.250"	.001"	0-50-0	0-100	.100"	± .001"	2015792	2011049	C8I/28IN

Super Sensitive Type (Inch)

.010"	.00005"	0-2-0	0-4	.004"	± .0001"	C1/2K	C1/2K-RC	C1/2K
-------	---------	-------	-----	-------	----------	-------	----------	-------

Mahr Federal Series P (Metric, mm)

Dial: approx. 57 mm dia. with soft-yellow tint

Measuring range	Graduation value	Dial style w/o Rev Counter	Dial style with Rev Counter	Range per revolution	Accuracy	Order no. w/o Rev Counter	Order no. with Rev Counter	OLD Order no.
0.500	0.002	0-10-0	0-20	0.200	± 0.004	P1I	P1I-RC	P1I/21IN
1.250	0.005	0-25-0	0-50	0.500	± 0.005	2015793	2014817	P3I/23I
2.500	0.010	0-50-0	0-100	1.000	± 0.010	2015794	2014818	P6I/26I
5.000	0.020	0-100-0	0-200	2.000	± 0.020	2015795	2014819	P8I/28IM

Super Sensitive Type (Metric – mm)

0.250	0.001	0-5-0	0-10	0.100	± 0.002	P1/2I	P1/2I-RC	P1/2I
-------	-------	-------	------	-------	---------	-------	----------	-------

These indicators are normally furnished with continuous dial (with R.C.) or + on right balance dial (w/o R.C.), lug back, .18" by .250" long contact and tolerance hands*.

* tolerance hands not supplied on C1K, C1/2K, P1I & P1/2I.

Accessories

- Contact Points - see page 51 and 46
- Backs and Mounting Brackets - see pages 45 and 46
- Accessories - see pages 47 and 48

Dial Indicators per ANSI/AGD Group 3 - Mahr Federal Series D and Q

Recommended for larger gages and greater visibility.



Ordering Information

In addition to the information provided below, see pages 28 & 29 for complete instructions on ordering your dial indicators and accessories.

www.mahr.com

Technical Data

Mahr Federal Series D (inch)

Dial: approx. 2.750" dia. with soft-green tint

Measuring range	Graduation value	Dial style w/o Rev Counter	Dial style with Rev Counter	Range per revolution	Accuracy	Order no. w/o Rev Counter	Order no. with Rev Counter
.020"	.0001"	0-4-0	0-8	.008"	± .0001"	D1K	D1K-RC
.025"	.0001"	0-5-0	0-10	.010"	± .0001"	32I	32I-RC
.025"	.00025"	0-5-0	0-10	.010"	± .00025"	32Q	32Q-RC
.050"	.00025"	0-10-0	0-20	.020"	± .00025"	D3K	D3K-RC
.075"	.00025"	0-15-0	0-30	.030"	± .00025"	D5G	D5G-RC
.050"	.0005"	0-10-0	0-20	.020"	± .0005"	D3Q	D3Q-RC
.075"	.0005"	0-15-0	0-30	.030"	± .0005"	D5M	D5M-RC
.100"	.0005"	0-20-0	0-40	.040"	± .0005"	D6K	D6K-RC
.125"	.0005"	0-25-0	0-50	.050"	± .0005"	D7I	D7I-RC
.050"	.001"	0-10-0	0-20	.020"	± .001"	D3W	D3W-RC
.100"	.001"	0-20-0	0-40	.040"	± .001"	D6Q	D6Q-RC
.125"	.001"	0-25-0	0-50	.050"	± .001"	D7O	D7O-RC
.250"	.001"	0-50-0	0-100	.100"	± .001"	D8I	D8I-RC

Mahr Federal Series Q (Metric – mm)

Dial: approx. 70 mm dia. with soft-yellow tint

Measuring range	Graduation value	Dial style w/o Rev Counter	Dial style with Rev Counter	Range per revolution	Accuracy	Order no. w/o Rev Counter	Order no. with Rev Counter
0.500	0.002	0-10-0	0-20	0.200	± 0.004	Q1I	Q1I-RC
1.250	0.005	0-25-0	0-50	0.500	± 0.005	Q3I	Q3I-RC
2.500	0.010	0-50-0	0-100	1.000	± 0.020	Q6I	Q6I-RC
5.000	0.020	0-100-0	0-200	2.000	± 0.020	Q8I	Q8I-RC

These indicators are normally furnished with continuous dial (with R.C.) or + on right balance dial (w/o R.C.), lug back, and .18" by .250" long contact.

Accessories

- Contact Points - see page 51 and 46
- Backs and Mounting Brackets - see pages 45 and 46
- Accessories - see pages 47 and 48

Dial Indicators per ANSI/AGD Group 4 - Mahr Federal Series E and R



Technical Data

Mahr Federal Series E (inch)

Dial: approx. 3.625" dia. with soft-green tint

Measuring range	Graduation value	Dial style w/o Rev Counter	Dial style with Rev Counter	Range per revolution	Accuracy	Order no. w/o Rev Counter	Order no. with Rev Counter
.020"	.0001"	0-4-0	0-8	.008"	± .0001"	E1K	E1K-RC
.025"	.0001"	0-5-0	0-10	.010"	± .0001"	42I	42I-RC
.050"	.00025"	0-10-0	0-20	.020"	± .00025"	E3K	E3K-RC
.075"	.00025"	0-15-0	0-30	.030"	± .00025"	E5G	E5G-RC
.050"	.0005"	0-10-0	0-20	.020"	± .0005"	E3Q	E3Q-RC
.075"	.0005"	0-15-0	0-30	.030"	± .0005"	E5M	E5M-RC
.125"	.0005"	0-25-0	0-50	.050"	± .0005"	E7I	E7I-RC
.050"	.001"	0-10-0	0-20	.020"	± .001"	E3W	E3W-RC
.125"	.001"	0-25-0	0-50	.050"	± .001"	E7O	E7O-RC
.250"	.001"	0-50-0	0-100	.100"	± .001"	E8I	E8I-RC

Mahr Federal Series R (Metric, mm)

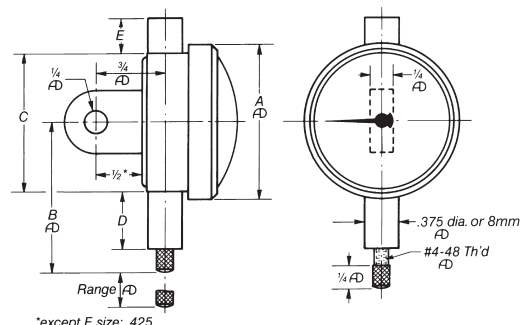
Dial: approx. 92 mm dia. with yellow tint

Measuring range	Graduation value	Dial style w/o Rev Counter	Dial style with Rev Counter	Range per revolution	Accuracy	Order no. w/o Rev Counter	Order no. with Rev Counter
0.500	0.002	0-10-0	0-20	0.200	± 0.004	R1I	R1I-RC
1.250	0.005	0-25-0	0-50	0.500	± 0.005	R3I	R3I-RC
2.500	0.010	0-50-0	0-100	1.000	± 0.010	R6I	R6I-RC
5.000	0.020	0-100-0	0-200	2.000	± 0.020	R8I	R8I-RC

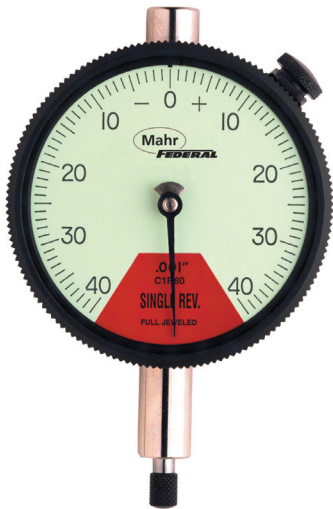
Dimensions

ANSI / AGD Group	Mahr Federal Styles	A mm/inch	B mm/inch	C mm/inch	D mm/inch	E mm/inch
3	D/Q	69.85 / 2.75"	53.98 / 2.125"	65.09 / 2.563"	15.88 / .625"	8.73 / .344"
4	E/R	92.08 / 3.625"	65.09 / 2.563"	87.31 / 3.438"	15.88 / .625"	8.73 / .344"

These indicators are normally furnished with continuous dial (with R.C.) or + on right balance dial (w/o R.C.), lug back and .18" by .250" long contact.



Easy Reading, Single Revolution Dial Indicator



Easy reading

A practical solution for inspectors and machine operators who need to eliminate the potential for indicator misreadings. No matter how far out of tolerance a part may be, the needle of a one revolution indicator will always stay in the red, non-read zone — no passing zero again — no reading errors.

- No limited contact travel
- Shockproof "Following Movement" always keeps the hand within a single revolution
- Alternate contact points, backs and other accessories are optionally available
- Metric dials are yellow
- One-piece case design
- Inserted precision bearings
- Available in ANSI/AGD Group 2 size
- Flat back

Technical Data

Measuring range	Graduation value	Stem diameter	Model no.	Order no.
2 mm	0.02 mm	.375"	P1RN-200	2014794
1 mm	0.01 mm	.375"	P1RN-100	2014795
2 mm	0.02 mm	8 mm	M1RN-200	2014796
1 mm	0.01 mm	8 mm	M1RN-100	2014797
.080"	.001"	.375"	C1RN-80	2014792
.040"	.0005"	.375"	C1RN-40	2014793

High Performance, Dial Indicators per ANSI/AGD Group 2

Features

- A well thought-out design, the use of high-quality components and materials as well as the precision engineered mechanism guarantee the outstanding quality of these indicators.
- The concentric "Speed Read" pointer (on 1.0" and .500" models) allows easy and safe reading of this Dial Indicator
- Spindle and stem are made of resistant stainless steel. Supplied with: Lug Back and Tolerance Hands



2016005



2016002

Technical Data

Measuring Range	Graduation value	Stem diameter	Dial style	Range per Rev.	Rev. Counter	Order no.
.250"	.001"	.375"	0-100	.100"	Standard	2016005
.500"	.001"	.375"	0-100	.100"	Speed read	2016004
1.00"	.001"	.375"	0-100	.100"	Speed read	2016002

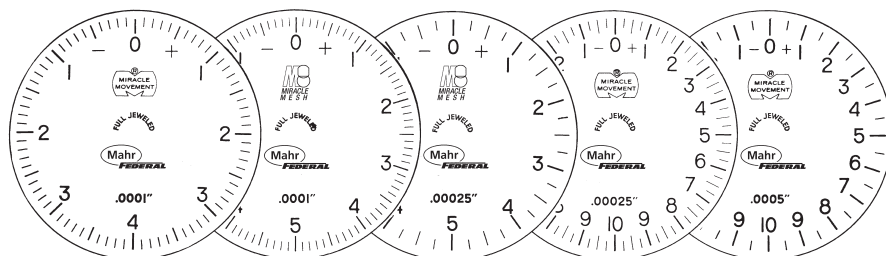
Accessories

Flat Back	2247145
Lug Back	2016007
Screw back	2016008
Post back	2016009
Adj. Back	2016010

- Contact Points - see page 51

Dial Styles for ANSI/AGD Groups 1 thru 4 Balanced Dials

Mahr Federal Series B thru E



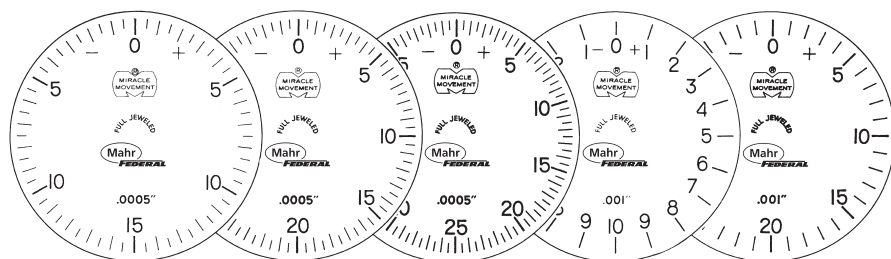
C1K
D1K
E1K

12I
2015781
32I
42I

12Q
2015782
32Q

B3K
2015783
D3K
E3K

B3Q
2015784
D3Q
E3Q



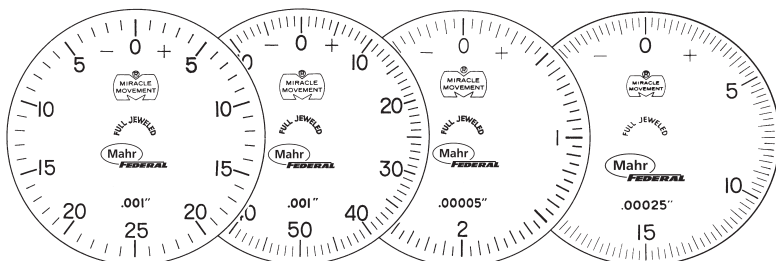
B5M
2015786
D5M
E5M

B6K
2015787
D6K

B7I
2015790
D7I
E7I

B3W
2015785
D3W
E3W

B6Q
2015789
D6Q



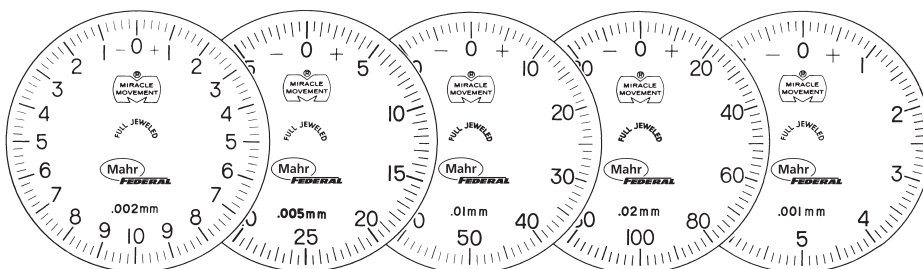
B7O
2015791
D7O
E7O

B8I
2015792
D8I
E8I

C1/2K

D5G
E5G

Mahr Federal Series O thru R



O1I
P1I
Q1I
R1I

O3I
2015793
Q3I
R3I

O6I
2015794
Q6I
R6I

Q8I
2015795
R8I

P1/2I

Indicator O8I is not illustrated: Dial style is 0-125-0, minimum graduation is .025 mm

Features

- Normally furnished: dial as illustrated; centered vertical lug back; regular contact point, .18" radiused, 1/4" long.
- Optional Dials: balanced dial with + on left; continuous clockwise; continuous counter-clockwise. (Order by part number and specify dial style desired.)
- Revolution Counters available, please specify when ordering, Includes continuous dial unless otherwise specified.
- For other dial styles or special requirements - call Mahr Federal.
- Indicator dimensions are located on pages containing individual ANSI/AGD descriptions.

Accessories

- Contact Points - see page 51 and 46
- Backs and Mounting Brackets - see pages 45 and 46
- Accessories - see pages 47 and 48

Ordering Information

In addition to the information provided above, see pages 28 & 29 for complete instructions on ordering your dial indicators and accessories.

www.mahr.com

Long Range and Extra Long Range Indicators



Technical Data

Long Range/Extra Long Range (Inch)

Dial: soft-green tint

Measuring range	Graduation value	Dial style	Range per revolution	Accuracy	ANSI/AGD	Model no.	Order no.
.500"	.0001"	0-10	.010"	.0001"	4	42IQ	42IQ **
.500"	.001"	0-100	.100"	.001"	2	28IQN	2014699
1.000"	.001"	0-100	.100"	.001"	2	28ISN	2014698
1.000"	.001"	0-100	.100"	.001"	3	D8IS	D8IS
1.000"	.010"	0-1000	1.000"	.010"	2	29I	2014816
Extra Long Range							
2.000"	.001"	0-100	.100"	.001"***	3	D8IT	
3.000"	.001"	0-100	.100"	.001"***	4	E8IU	

* for first 2-1/2 revolutions only.

** hysteresis = .0003" for full range

*** for first 1 inch of travel.

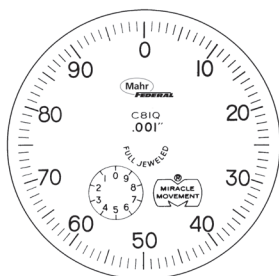
Long Range/Extra Long Range (Metric)

Dial: yellow tint

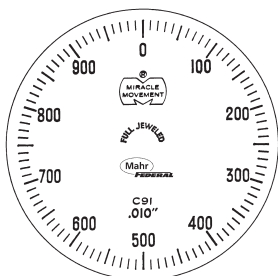
Measuring range	Graduation value	Dial style	Range per revolution	Accuracy	ANSI/AGD	Model no.	Order no.
25.000	0.010	0-100	1.000	0.020	2	SP6IS	
25.000	0.010	0-100	1.000	0.020	3	SQ6IS	
Extra Long Range							
50.000	0.025	0-25	2.500	0.025****	3	Q8IT	
75.000	0.025	0-25	2.500	0.025****	4	R8IU	

**** for first 25 mm of travel.

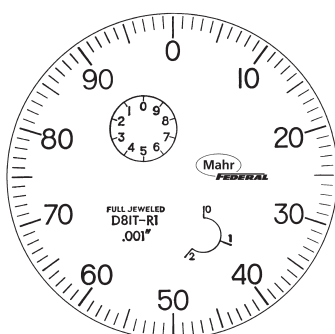
Dial Styles for Long Range and Extra Long Range Indicators



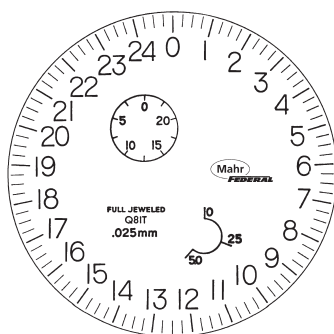
281QN, 281SN & D81S



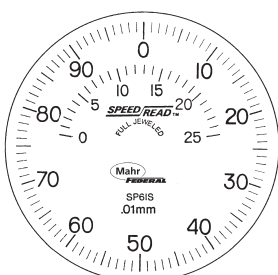
29I



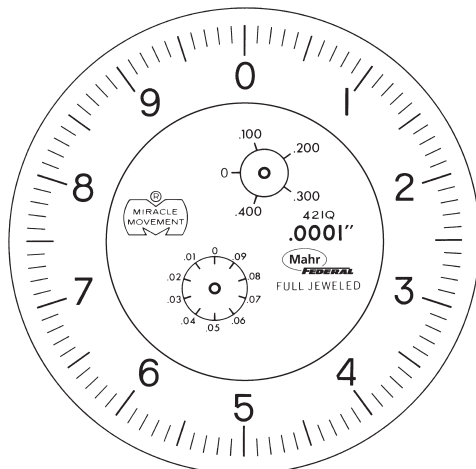
D81T & E81U



Q81T & R81U



SP61S & SQ61S



421Q

Features

- Normally furnished: continuous clockwise dial; centered vertical lug back; regular contact point, .18" radius, .250" long.
- Long Range Models: include (1) revolution counter (except C9I without revolution counter). Extra Long Range Models: include (2) revolution counters.
- For other dial styles or special requirements - call Mahr Federal.
- Indicator dimensions are located on pages containing individual ANSI/AGD descriptions.

Accessories

- Contact Points - see page 51 and 46
- Backs and Mounting Brackets - see pages 45 and 46
- Accessories - see pages 47 and 48

Dial Indicator Modifications & Specials

Available to meet specific requirements.

- Special Ranges
- Restricted Hand Travel
- Special Dials
- High Temperature
- Special Contact Points
- 8 mm Stem Diameters Special Lengths
- Specified Contact Load
- Counter-clockwise Movement
- Special Stem Lengths
- Push-Down Action
- Special Ratio Movement
- Threaded Stems

Ordering Information

In addition to the information provided above, see pages 28 & 29 for complete instructions on ordering your dial indicators and accessories.

www.mahr.com

Series WC and WP Wetproof Dial Indicators

Splashproof protection from coolant, oil, or other contaminant's.



Technical Data

Series WC and WP Wetproof Dial Indicators (Inch)

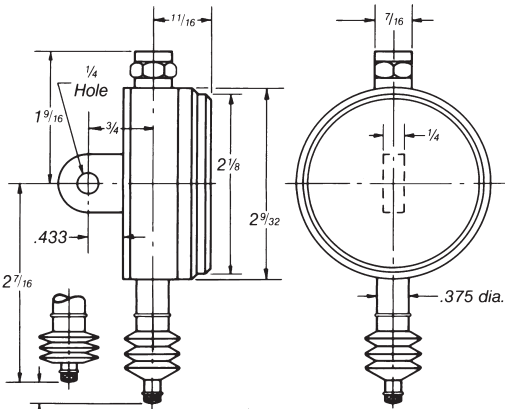
Dial: approx. 2-1/4" dia. with soft-green tint

Measuring range	Graduation value	Dial style	Range per revolution	Accuracy	Order no.
.025"	.0001"	0-10	.010"	.0001"	W22I
.050"	.00025"	0-20	.020"	.00025"	WC3K
.050"	.0005"	0-20	.020"	.0005"	WC3Q
.075"	.0005"	0-30	.030"	.0005"	WC5M
.100"	.0005"	0-40	.040"	.0005"	WC6K
.125"	.0005"	0-50	.050"	.0005"	WC7I
.250"	.001"	0-100	.100"	.001"	WC8I
1.000"	.001"	0-100	.100"	.001"	WC8IS

Series WC and WP Wetproof Dial Indicators (Metric)

Dial: approx. 57 mm dia. with soft-yellow tint

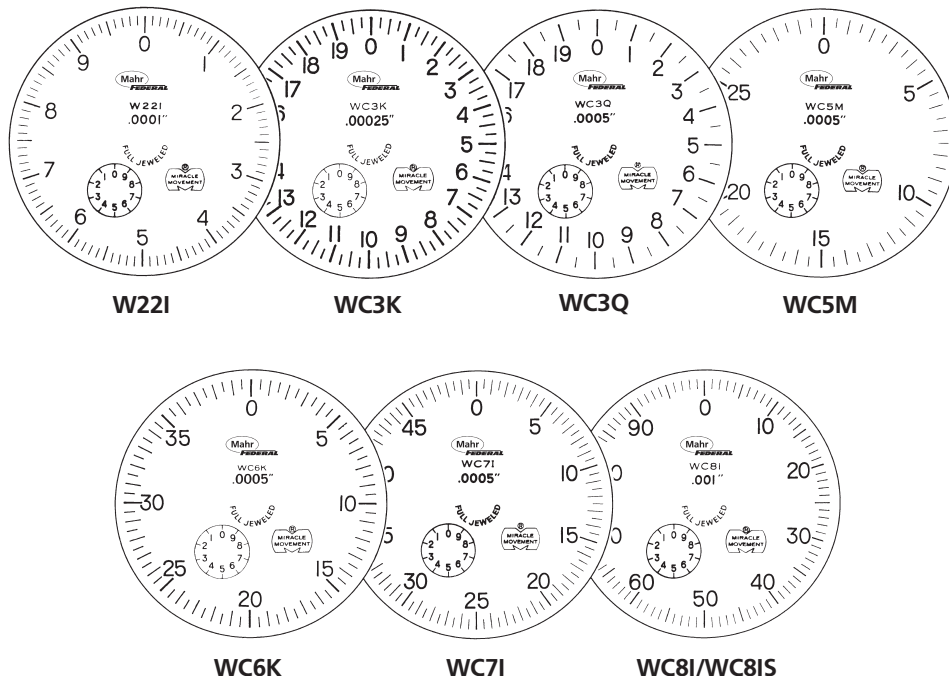
Measuring range	Graduation value	Dial style	Range per revolution	Accuracy	Order no.
0.500	0.002	0-20	0.200	0.004	WP1I
1.250	0.005	0-50	0.500	0.005	WP3I
2.500	0.010	0-100	1.000	0.010	WP6I



Backs can be rotated 90° and 180°

Dial Styles for WC and WP Wetproof Dial Indicators

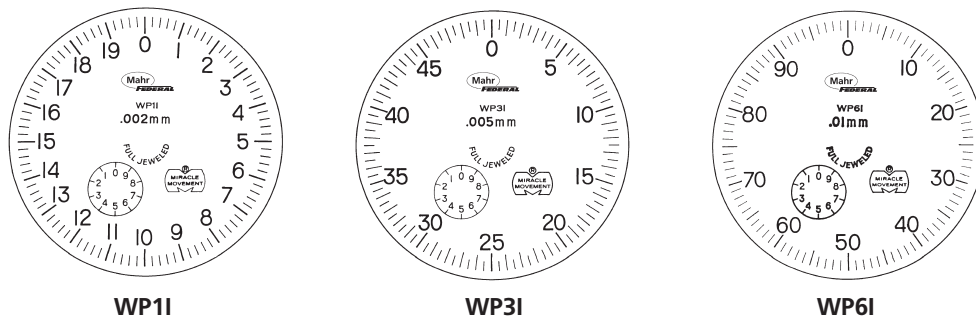
Series WC indicators



Features

- Normally furnished: continuous clockwise dial with revolution counter; BK-63 centered vertical lug back; regular contact point, .18" radius, .625" long
- Optional Dials: continuous counter-clockwise with revolution counter; balanced outer dial with + on right or left. Order by dial type and specify dial style desired.
- For other dial styles or special requirements - call Mahr Federal.

Series WP indicators



Accessories

- Contact Points - see page 46 and 51
- Accessories - see pages 47 and 48

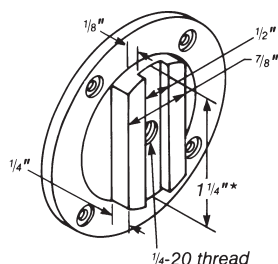
Ordering Information

In addition to the information provided above, see pages 28 & 29 for complete instructions on ordering your dial indicators and accessories.

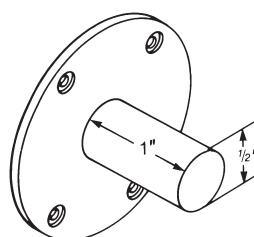
www.mahr.com

Backs for Wetproof Dial Indicators

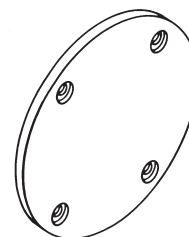
Vertical (centered) lug back is normally furnished and included in price of indicator. Back can be rotated 90° for horizontal lug mounting.



BK-68
Adjustable Back



BK-90
Post Back



BK-97
Flat Back

Perpendicular Dial Indicators

Provides improved readability where other style indicators cannot be used.



Technical Data

Series F, G, J, V (Inch)

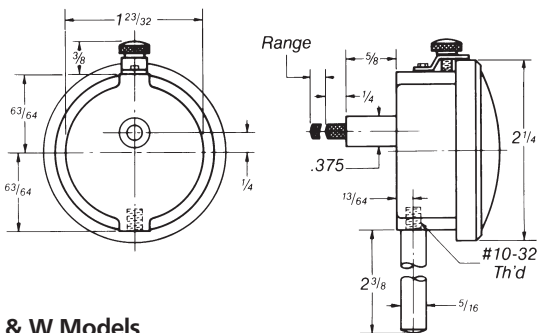
Dial: soft-green tint

Measuring range	Graduation value	Dial style	Range per revolution	Accuracy	Gear type	Dial Dia. (approx.)	Order no.
.008"	.0001"	0-4-0	.008"	.0001"	crown	2-1/4"	J1K
.040"	.0005"	0-20-0	.040"	.0005"	crown	2-1/4"	J6K
.100"	.0005"	0-12-0	.025"	.0005"	spiral	2-1/4"	G40
.100"	.001"	0-50-0	.100"	.001"	crown	2-1/4"	J8I
.100"	.001"	0-50-0	.100"	.001"	crown	1-11/16"	V8I
.200"	.001"	0-50-0	.100"	.001"	spiral	1-23/32"	F8I
.200"	.001"	0-50-0	.100"	.001"	spiral	2-1/4"	G8I

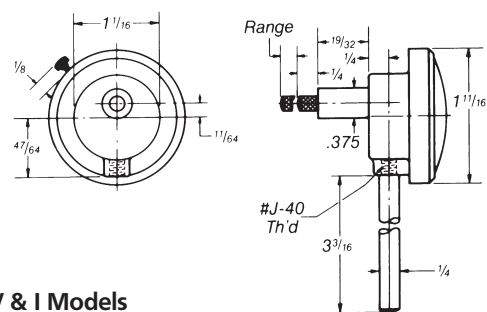
Series I, W (Metric)

Dial: yellow tint

Measuring range	Graduation value	Dial style	Range per revolution	Accuracy	Gear type	Dial Dia. (approx.)	Order no.
0.200	0.002	0-10-0	0.200	0.002	crown	57	W1I
1.000	0.010	0-50-0	1.000	0.010	crown	57	W6I
2.500	0.025	0-125-0	2.500	0.025	crown	57	W8I
2.500	0.025	0-125-0	2.500	0.025	crown	43	I8I



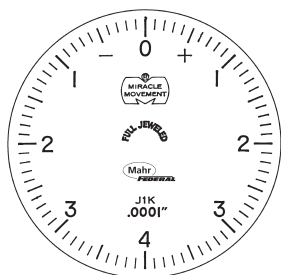
J & W Models



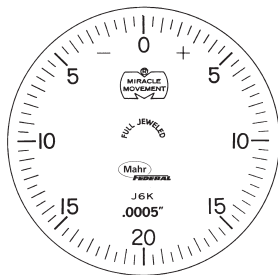
V & I Models

Dial Styles for Perpendicular Indicators

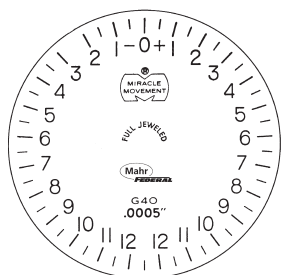
Series J, G, V, F



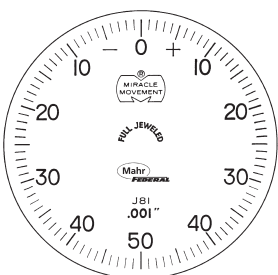
J1K



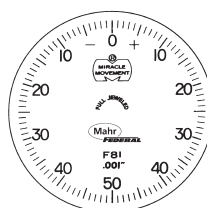
J6K



G40



J81 & G81

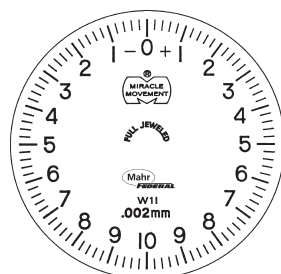


V81 & F81

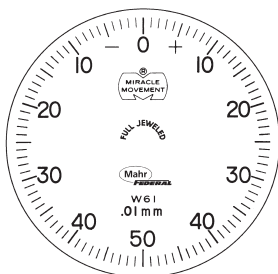
Features

- Normally furnished: balanced dial with + on right; mounting rod (see dimension drawings); regular contact point, .18" radius, .250" long.
- Threaded stem versions available as an option; AD-59 (.5622 long x .500" O.D. for "J & W" styles), 3/8-32 internally threaded bushings and AD-60 (.687" long x .500" O.D. for "G & F" Models) purchased separately. Bushings also available separately.
- For other dial styles or special requirements - call Mahr Federal.

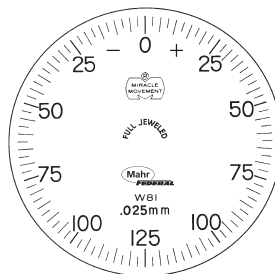
Series W, I



W11



W61



W81 & I81

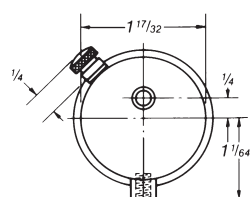
Accessories

- Contact Points - see page 46 and 51
- Accessories - see pages 47 and 48

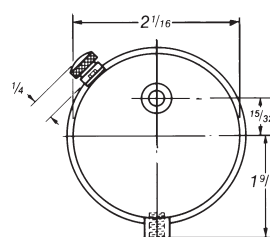
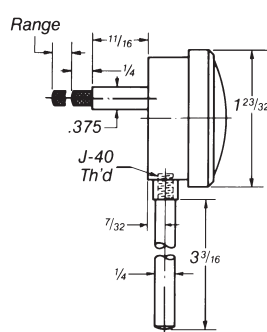
Ordering Information

In addition to the information provided above, see pages 28 & 29 for complete instructions on ordering your dial indicators and accessories.

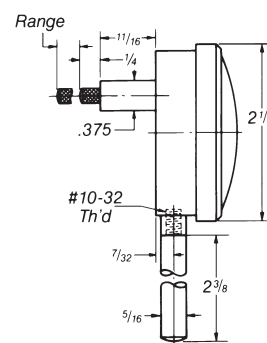
www.mahr.com



F81 Model



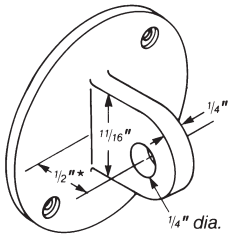
G Models



Backs for ANSI/AGD Group 1, 2, 3, and 4 Dial Indicators

Vertical Lug

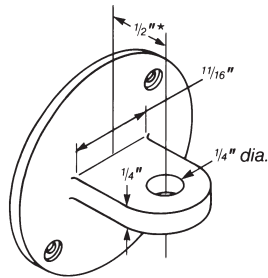
(centered) normally furnished



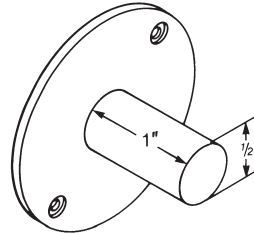
*27/64" for E/R size

Horizontal Lug

(centered)



Post

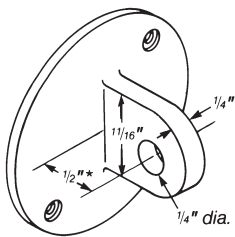


Features

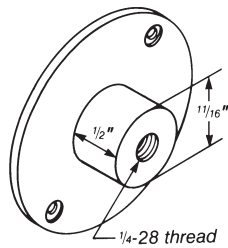
- Backs shown are for ANSI/AGD Groups 1,2,3,4, Long Range and Extra Long Range Indicators. Backs for ANSI/AGD Group 0 Indicators - see page 32. Backs for Wetproof Indicators - see page 42.
- To order - specify Back Order Number (from table below).
- Backs for ANSI/AGD Group 1 (Series B/O) Indicators can be repositioned 180°. Backs for ANSI/AGD Group 4 (Series E/R) Indicators can be repositioned 90° and 180°.
- For Special Backs - call Mahr Federal.

Vertical Lug

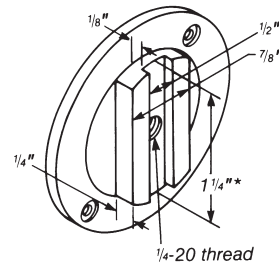
(offset) Left face of lug is on centerline of back



Screw Type

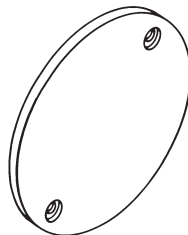


Adjustable



*7/8" for B/O size; no flats

Flat



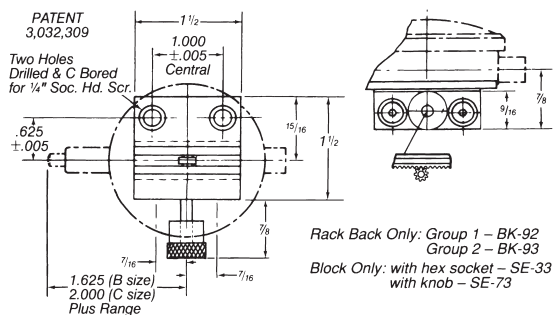
Ordering Numbers

	ANSI/AGD			
	Group 1 Series B/O	Group 2 Series C/P	Group 3 Series D/Q	Group 4 Series E/R
Vertical Lug, Centered	BK-1600	BK-383	BK-431	BK-3
Vertical Lug, Offset	BK-1601	BK-2168	BK-545	BK-4
Horizontal Lug, Centered	BK-19	BK-400	BK-109	BK-3
Flat	BK-1660	BK-470	BK-473	BK-5
Post	BK-1634	BK-2093	BK-664	BK-17
Screw	BK-1661	BK-692	BK-177	BK-16
Adjustable	BK-1633	BK-531	BK-10	BK-18

Adjustable Mounting Brackets

Features

- Allows fast, positive indicator adjustments
- Ideal for permanent indicator mounting to fixtures
- Rack Back included with all Brackets
- Sizes for ANSI/AGD Groups 1 and 2



Order Numbers

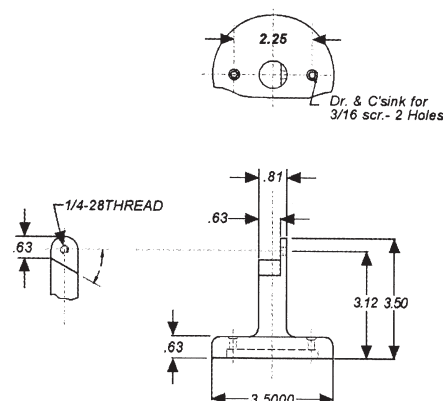
Mahr Federal Indicator	Used with	Order no.
Group 1	hex socket adjust	AT-27
Group 1	adjusting knob	AT-115
Group 2	hex socket adjust	AT-28
Group 2	adjusting knob	AT-116

Universal Mounting Base

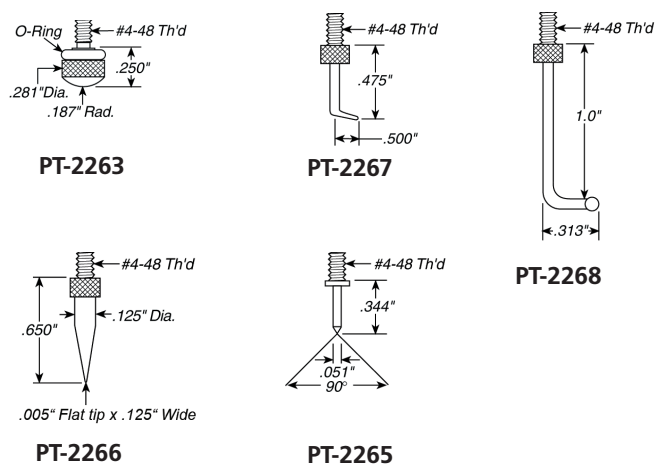
Features

- Allows mounting indicator to custom fixtures
- Uses lug back to mount indicator
- Accommodates all size indicators

Order no. **BA-1051**



Added flexibility for your Mahr Federal Dial Indicators



Description

Order no.

Shock Absorbing Contact. "O" ring over threads provides a barrier between metal surface and stem, minimizing damage if point is pushed in with excessive force.

PT-2263

Chisel Point Contact for checking small slots. Furnished with a small lock nut for positioning on the indicator.

PT-2266

Small Offset Point Contact. Small tip, .010" radius, permits checking narrow recesses. Furnished with a lock nut for indicator positioning.

PT-2267

Needle Contact for checking into small areas. Correct length for use as a replacement on Mahr Federal 65P-40 Depth Gage.

PT-2265

Right Angle Contact with a .093" diameter ball for checking hard-to-reach grooves. Right angle allows checking to bottom or to top of a groove when used with a push down action Indicator. Its 1" length makes it long enough to be used with Mahr Federal 75P-50 Series Depth Gages.

PT-2268

Contact Thread Adapter, Male M2.5 thread to 4-48 Female thread (.375" length)

AD-185

4-48 Male to M2.5 Female Threaded Adapter

2236519

Features

- Innovative Contact Points make your indicators more versatile.
- Minimize point damage with a shock absorbing contact without the need for a cushion gear.
- Needle point perfect for checking small areas – etchings, pits and more.
- Chisel point easily adapts to small slots or screw heads.
- Small offset point for narrow recesses – grooves, holes and under ledges.
- Right angle point makes hard to reach grooves easily accessible.

Indicator Accessories

Weights

Used with ANSI/AGD type and long range indicators. Applies constant pressure throughout indicator range. To order specify requirement.



Protective Housing

For ANSI/AGD Group 2 indicators. Opens at rear so indicator can be mounted by its back. Mounts to indicator stem using a .687" O.D. bushing (not included). Order **HG-100** for Indicator models with ranges up to 6.35 mm /.250", **HG-101** for ranges of 6.35 mm /.250" to 25 mm /1".

Recommended bushings: **BU-111** split bushing, or **AD-87** split collet. See next page.



Magnetic Maximum Hand

For ANSI/AGD Groups 2 and 3 indicators having plain dials. Accurately indicates maximum reading. Easy to reset. Order **2014804** (Group 2, snap-on bezel), **2011341** (Group 3, screw-on bezel).

Styles for Groups 1 and 4 indicators available on special order; consult Mahr Federal Customer Resource Center.



Range Limiting Caps

Used with ANSI/AGD type indicators. Adjustable thru 9.52 mm /.375" to limit range to any desired amount. Order **CS-123**.



Lifting Levers - CAM Type.

Used with ANSI/AGD type and long range indicators.

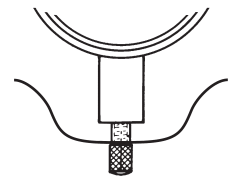


Use with Indicator Type	Order no. Left Hand	Order no. Right Hand
ANSI/AGD Group 1*	LR-46	LR-47**
ANSI/AGD Group 2*	LR-48	LR-49**
ANSI/AGD Group 3*	LR-50	LR-51**
ANSI/AGD Group 4*	LR-68	LR-69
Federal Models D8IT & Q8IT	LR-115	
Ox-Bow Lifting Lever	LR-40	

* Up to 25 mm /1" range

** Requires case to have Bezel Clamp on Left

Ox-Bow Lifting Lever - Type LR-40



Tolerance Hands

Used with ANSI/AGD, long range and some Perpendicular indicators. Furnished integrally with split bezel. Easily replaces regular bezel.



Use with Indicator Type	Order no. Snap-on Bezel	Order no. Screw-type Bezel
ANSI/AGD Group 1	HD-128	HD-59
ANSI/AGD Group 2	BZ-2503	HD-57
ANSI/AGD Group 4		HD-53

Electronic Probe Adapter

Permits using electronic probes with many Mahr Federal dial indicators. Order **AD-138**.



Indicator Accessories

Hole Attachments

For ANSI/AGD type and perpendicular indicators with .375" diameter stems. For measuring internal surfaces. Order **AT-7293**, 47.50 mm/ 1.87" long, **AT-7294**, 25 mm /1" long.



Split Collet

For .375" diameter stem indicators. Six-finger grip permits easy, secure indicator adjustment. Requires 1/2-32 threaded hole. O.D. is 17.45 mm/ .687". Can be used with protective housings, page 47, Order **AD-87**. For 1/2-32 tap, Order **V-892**. 8 mm stem, Order **AD-190**.



Brake Attachment

For ANSI/AGD indicators with .001" graduations. Requires indicator modification for assembly. Range limited to 6.35 mm/ .250" for Group 1 indicators; and to 12 mm/ .500" for Group 2 indicators. Order **AT-A-7** stem mount, **AT-81** dust cap mount.



Threaded Bushing

For ANSI/AGD indicators with 5/16-32 threaded stems (an available option from Mahr Federal). Permits conventional stem mounting of indicator in gages and fixtures. Order **AD-62**, .625" long, .500" O.D., 5/16-32 internal thread. Threaded bushings for perpendicular indicators, see page 43.



Auxiliary Plungers

For extending reach of all ANSI/AGD type and perpendicular indicators with .375" diameter stems and ranges up to 6.35 mm/ .250" range. Attaches to indicator stem by integral split collet. Body is 12 mm/ .500" O.D. Order **AT-25**, 57 mm/ 2.25" long, **AT-26**, 104 mm/ 4" long. Special lengths available. Replacement contact. **PT-184**, 8-32 thread.



Dust Guard

For ANSI/AGD perpendicular indicators with .375" diameter stems. Recommended for ranges of 7.62 mm/ .300" or less. Oil resistant to protect spindle and bushing from dust, mist and contaminant's. Order **GU-2**. For sealed indicators, see Wetproof models, page 41.



Split Bushings

Fits all ANSI/AGD type and perpendicular indicators, Permits safe, non-cramping stem mounting. Order **BU-94** without counterbore, **BU-80** with counterbore, .375" stem hole x .500" O.D., **BU-111** for use with protective housings (.375" stem hole x .687" O.D.), **BU-112** (.218" stem hole x .375" O.D.), **BU-197** with shoulder, **4310103** without shoulder. (8 mm stem hole x .375" O.D.)



Right Angle Attachments

For ANSI/AGD type and perpendicular indicators (.375" diameter stems), For making measurements at right angle to spindle movement, Order **A-9**, regular type with flat spring hinge; for ranges up to 3.05 mm/ .120". Replacement spring: **SP-56**. Order **AT-24**, long range type with pivot-type bearing; for ranges up to 9.50 mm/.375".



Long Range Indicator Calibrator

Features

Model OPTIMAR 25

- A precision, benchtop instrument, providing a wide variety of precision measuring instruments including dial and Digital Indicators, dial and digital comparators, dial and digital test indicators, electronic probes and gageheads, Air Probes® and jet probes, or any other devices that magnifies the linear displacement of a contact point or measuring spindle
- MarCheck, large clearly readable LCD monochrome digital display (240x160 pixels) with background illumination with 13 mm / 0.512" high digits
- User selectable for either inch or metric
- Output:
 - USB interface maxed at 3GB USB thumb drive
 - USB interface for PC
 - Selectable RS232 interface
 - Includes certification of calibration

Order no. 2062722



Technical Data

	Range	Resolution	Accuracy
<i>Inch</i>	1.00"	.000005, .00001, .00005, .0001, .0005, .001	±10 μ"
Metric	25 mm	0.0001, 0.0005, 0.001, 0.005, 0.01, 0.1	±0.2 μm

Description	Values
Display Power	110V - 60 Hz, 240V - 50 Hz
Dimensions Calibrator	18" x 6" x 8"
H x W x D (approx)	460 x 153 x 204 mm
Readout	10" x 7" x 2.0"
H x W x D	260 x 180 x 50 mm
Weight - Calibrator	37 lbs. / 17 kg
Weight - MarCheck	3 lbs. / 1.4 kg

Normally furnished:

MarTest Mounting Shaft 3/8" diameter	4305875
Adapter Bushing (8 mm to .375") diameter	BU-197
MarCheck Angle Display Stand	5350403

Also available:

Universal Centering Support 800b	4305893
MarTest Dovetail Mounting Shaft 4 mm diameter	4305885
Foot Switch for data transfer	5360322
RS232 Null Modem Cable 10 feet long	7024634
Dial Indicator Inspection Software QMSOFT®	5350196



Test Indicators



Dial Comparator



QMSOFT Software QM-DIAL

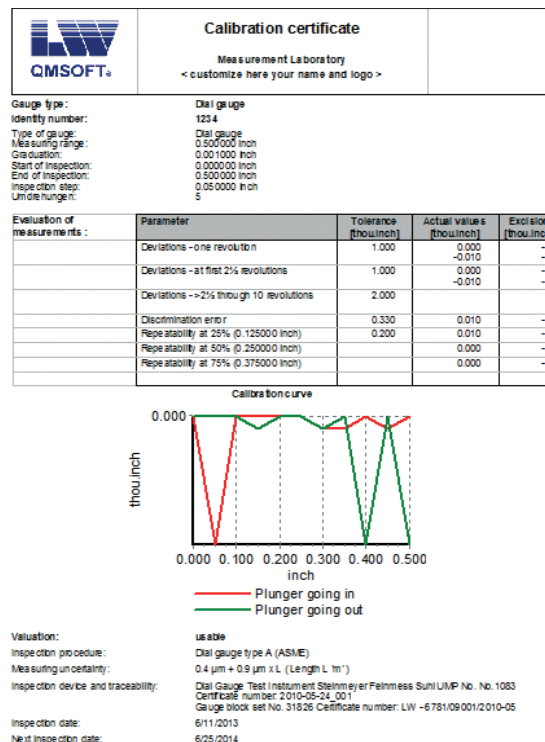
Features

The inspection program QMSOFT®/QM-DIAL is used for computer aided inspection of dial gages, dial indicators and dial test indicators. It was designed to support the inspection of these dial gages according to the worldwide mostly used standards. The QM-DIAL program includes a module to carry out the inspection according to the German standards **(DIN 878, DIN 879, DIN 2270)** inclusive the rules according to the **VDI/VDE/DGQ-standard**, the American standard **ANSI/ASME B89.1.10M-1987**, the British standards **BS 907 / BS 2795** and the Australian standard **AS 2103-1978**, the Korean and Japanese standards **KS B 5206, KS B 5207, KS B 5238, JIS B 7503, JIS B 7533** and the standard **JMAS 2001** and also the French standard **NF E 11-050**.

Order no. 5350196

Accessories

RS232 Null Modem cable 10 feet long	7024634
Foot Switch for data transfer	5360322



Dial Indicator Calibrator

Features

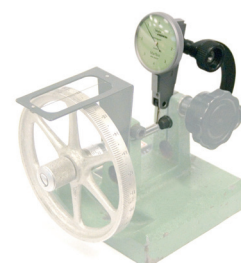
400B-3 and 400B-4 Shop-floor Calibrators

All too often we have blinders on and don't look at the whole picture on how a precision gage can do more than what's its intended to do. Take for example our Dial Indicator Calibrators 400B-3 & 400B-4. We look at it and know that its purpose is to calibrate AGD dial indicators right? But let's take it a step further! If we add the Universal centering support frame 800b (part number 4305893) from the test indicator section of our catalog and an 8 mm to .375" bushing (part number 4310103) we now have the ability to calibrate test indicators having a .0001" / .002 mm resolution giving the once only dial indicator calibrator a DUAL PURPOSE!

- For checking dial indicators (both ANSI/AGD and perpendicular styles) and other transducers.
- Large micrometer wheel has widely spaced graduations for easy setting and reading.
- Adjustable crosshair provides on-the-mark setting.
- Tungsten carbide anvil for maximum wear resistance.
- Indicator clamped in-line with micrometer spindle.



400B-3
Dial Indicator Calibrator



Technical Data

	Range	Minimum Graduation	Accuracy	Order no.
Metric (mm)	0-25	0.002	within 0.001*	400B-4
Inch	0-1.000"	.0001"	within .000050"	400B-3

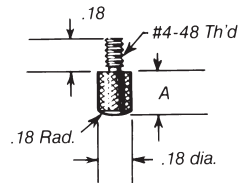
* Accuracy calibration as specified in Federal Specification GGG-105B.

- Normally furnished:
BU-112 Bushing (.218" I.D. to .375" O.D.)
AD-58 Bushing (.275" I.D. to .375" O.D.)
BU-197 Bushing (8 mm I.D. to .375" O.D.)

Contact Points

Used with ANSI/AGD Groups 1,2,3,4 Long Range Wetproof Perpendicular and *MaxµmIII*® Indicators, Points for ANSI Group 0 Indicators - see page 32. For Special Points - call Mahr Federal.

Regular



Hardened Steel (inch)

Dimension A	Order no.	Dimension A	Order no.
1/8"	PT-225	1-5/8"	PT-235
1/4"	PT-223*	1-3/4"	PT-241
3/8"	PT-563	1-7/8"	PT-100
1/2"	PT-14	2"	PT-51
5/8"	PT-564**	2-1/8"	PT-243
3/4"	PT-31	2-1/4"	PT-696
7/8"	PT-201	2-3/8"	PT-101
1"	PT-232	2-1/2"	PT-245
1-1/8"	PT-305	2-5/8"	PT-102
1-1/4"	PT-565	2-3/4"	PT-566
1-3/8"	PT-239	2-7/8"	PT-247
1-1/2"	PT-50	3"	PT-155

Hardened Steel (Metric***)

Dimension A	Order no.	Dimension A	Order no.
6 mm	EPT-1037-W1	15 mm	EPT-1037-W3
10 mm	EPT-1037-W2	20 mm	EPT-1037-W4
12 mm	EPT-1037-W6	25 mm	EPT-1037-W5

Tungsten Carbide

1/4" PT-35

Set of 8 Steel

1/8" to 1" PT-116

Diamond

1/4" PT-317

Set of 24 Steel

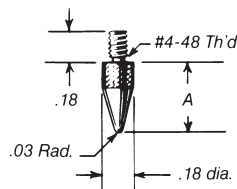
1/8" to 3" PT-115

* PT-223 normally furnished with all Indicators

** PT-564 normally furnished with all Wetproof Indicators

*** All Metric Points have M2.5 thread

Tapered



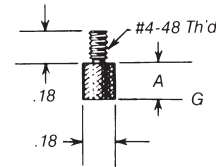
Hardened Steel (inch)

Dimension A	Order no.	Dimension A	Order no.
3/16"	PT-233	7/16"	PT-181
7/16"	PT-229	3/4"	PT-182
1"	PT-253	1"	PT-183
1-7/16"	PT-230		
2"	PT-231		

Tungsten Carbide (inch)

Dimension A	Order no.	Dimension A	Order no.
7/16"	PT-181		
3/4"	PT-182		
1"	PT-183		

Flat End



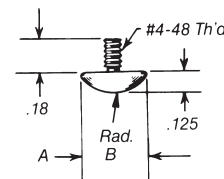
Hardened Steel (inch)

Dimension A	Order no.
1/8"	AL-19
1/4"	AL-673
3/8"	AL-20
1/2"	AL-21
5/8"	AL-22
3/4"	AL-23
7/8"	AL-24
1"	AL-25

Hardened Steel (Metric***)

Dimension A	Order no.	Dimension A	Order no.
6 mm	EAL-1016-W1		
10 mm	EAL-1016-W2		
15 mm	EAL-1016-W3		
20 mm	EAL-1016-W4		
25 mm	EAL-1016-W5		
Tungsten Carbide			
1/4"	AL-51		
Set of 8 Steel			
1/8" to 1"	AL-55		

Button



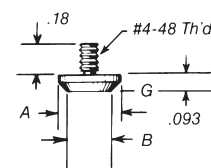
Hardened Steel (inch)

Dim. A	Dim. B	Order no.
.375"	.250"	PT-227
.500"	.375"	PT-619

Tungsten Carbide

Dim. A	Dim. B	Order no.
.375"	.250"	PT-120

Wide Face



Hardened Steel (inch)

Dim. A	Dim. B	Order no.
.356"	.250"	AL-502
.500"	.375"	AL-1510
.615"	.500"	AL-520
.731"	.625"	AL-44

Hardened Steel (Metric***)

Dim. A	Dim. B	Order no.
9.04	6.35	EAL-1020-W1
12.7	9.5	EAL-1020-W2
15.6	12.7	EAL-1020-W3
18.6	15.9	EAL-1020-W4

Tungsten Carbide (inch)

Dim. A	Dim. B	Order no.
.356"	.250"	AL-1730

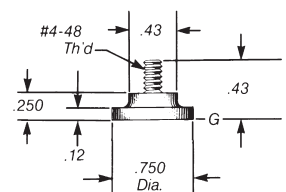
Tungsten Carbide (Metric***)

Dim. A	Dim. B	Order no.
9.04	6.35	EAL-1021

Extra Wide Face

Hardened Steel

Order no.
AL-291
2252940



MarCator Dial Indicators (DIN Style)

OVERVIEW

Precision Small Dial Indicators

Model	803 A	805 A	803 S	803 SW
				
Range	3 mm	5 mm	3 mm	3 mm
Readings	0.01 mm	0.01 mm	0.01 mm	0.01 mm
Dial style	0-50	0-100	0-50	0-50
Standard for metrological characteristics	DIN 878	DIN 878	DIN 878	DIN 878
DIN EN ISO 463				
Limit value for measurement error at the reading	Measuring range 1 revolution 1/2 revolution 1/10 revolution			
Limit value for	10 µm	12 µm	10 µm	10 µm
Limit value for	9 µm	9 µm	9 µm	9 µm
Limit value for	8 µm	8 µm	8 µm	8 µm
Limit value for	5 µm	5 µm	5 µm	5 µm
Limit value for	3 µm	3 µm	3 µm	3 µm
Limit value for	3 µm	3 µm	3 µm	3 µm
Shockproof			●	●
Measuring force	0.7 - 1.1 N	0.7 - 1.1 N	0.7 - 1.1 N	0.7 - 1.7 N
Order no.	4324050	4324060	4324000	4326000

Precision Dial Indicators

Model	810 A	810 AT	810 S	810 SW
				
Range	10 mm	10 mm	10 mm	10 mm
Readings	0.01	0.01	0.01	0.01
Dial style	0-100	0-100	0-100	0-100
Standard for metrological characteristics	DIN 878	DIN 878	DIN 878	DIN 878
DIN EN ISO 463				
Limit value for measurement error at the reading	Measuring range 1 revolution 1/2 revolution 1/10 revolution			
Limit value for	15 µm	15 µm	15 µm	15 µm
Limit value for	10 µm	10 µm	10 µm	10 µm
Limit value for	9 µm	9 µm	9 µm	9 µm
Limit value for	5 µm	5 µm	5 µm	5 µm
Limit value for	3 µm	3 µm	3 µm	3 µm
Limit value for	3 µm	3 µm	3 µm	3 µm
Shockproof			●	●
Measuring force	0.7 - 1.3 N	0.7 - 1.3 N	0.7 - 1.3 N	0.7 - 1.6 N
Order no.	4311050	4311060	4311000	4315000

803 SB**803 AZ**0.4 mm (± 0.2)**.120"**

0.01 mm

.0005"

0-20-0

0-20

DIN 878

Factory standard

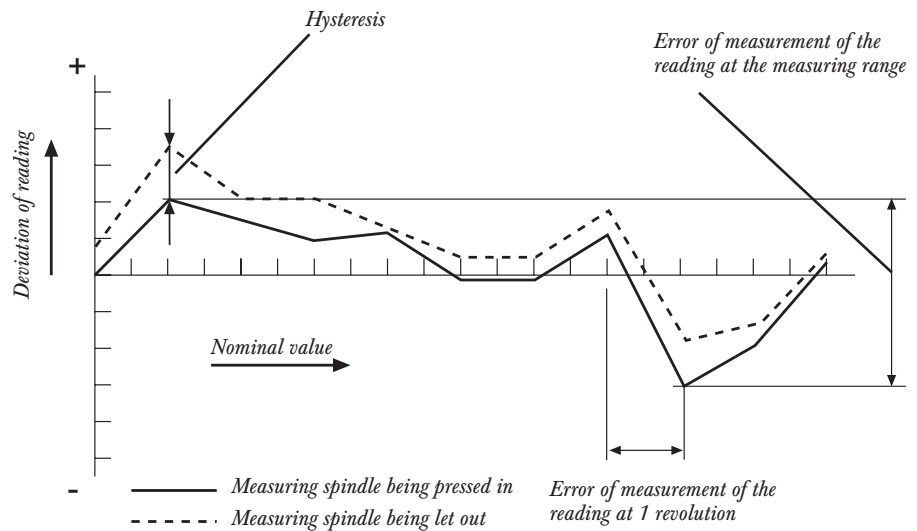
9 μm **.0004"**8 μm 5 μm **.0002"**3 μm **.00012"**3 μm **.00012"**

0.9 - 1.1 N

0.7 - 1.1 N

4324250**4324900**

Metrological characteristics

**810 SB****810 SM****810 SRM****810 AZ****810 AU****810 AX****810 AG****810 SV**0.8 mm (± 0.4)

1 mm

5 mm

.400"

10 mm

10 mm

10 mm

40 mm

0.01

0.001

0.001

.0005"

0.01

0.1

0.01

0.01

0-40-0

0-100

0-100

0-45

100-0

0-10

0-100

0-100

DIN 878

Factory standard

Factory standard

Factory standard

Factory standard

Factory standard

Factory standard

Factory standard

7 μm 4 μm 10 μm **.0005"**15 μm 50 μm 17 μm 25 μm 3 μm 3 μm 5 μm **.0002"**10 μm 50 μm 15 μm 15 μm 6 μm 2 μm 3 μm **.00012"**9 μm 30 μm 10 μm 10 μm 5 μm 1 μm 2 μm **.00012"**5 μm 15 μm 5 μm 5 μm 3 μm 1.5 μm 3 μm **.00012"**5 μm 15 μm 3 μm 3 μm 3 μm 1.5 μm 3 μm **.00012"**5 μm 15 μm 5 μm 6 μm 

0.7 - 1.1 N

1.3 - 1.8 N

1.2 - 1.7 N

0.9 - 1.5 N

1.0 - 1.8 N

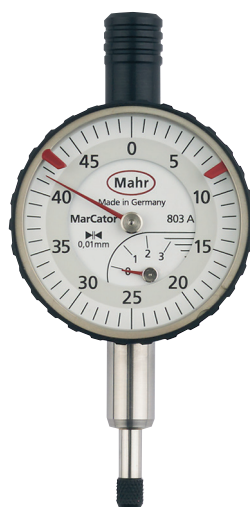
0.7 - 1.3 N

1.3 - 2.2 N

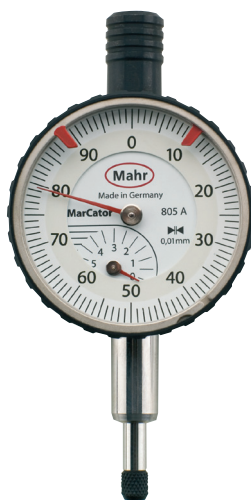
0.8 - 1.8 N

4317000**4311070****4311080****4311900****4329050****4331000****4322000****4321000**

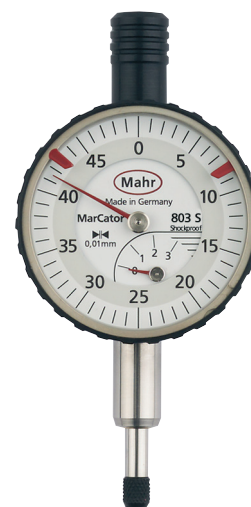
Precision Small Dial Indicators 803 / 805 DIN style



803 A



805 A



803 S

Features

Small Dial Indicator 803 A

Standard version

- High precision gears and pinions
- Lifter protection cap on the upper end of the measuring spindle
- Adjustable tolerance markers
- Chrome-plated housing

Small Dial Indicator 805 A

Standard version

- High precision gears and pinions
- Lifter protection cap on the upper end of the measuring spindle
- Adjustable tolerance markers
- Chrome-plated housing

Small Dial Indicator 803 S

Shockproof version

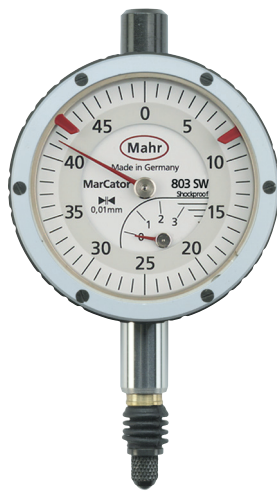
- High precision gears and pinions
- Lifter protection cap on the upper end of the measuring spindle
- Adjustable tolerance markers
- Chrome-plated housing

All indicators are delivered in plastic case

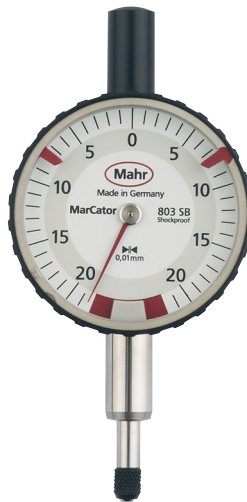
Technical Data

	Range	Readings	Dial face dia.	Overtravel	Mounting shank dia.	Measuring force	Accuracy	Order no.
	mm	mm	mm	mm	mm	N	DIN 878	
803 A	3	0.01	34	0.1	8h6	0.7 - 1.1	●	4324050
805 A	5	0.01	34	0.1	8h6	0.7 - 1.1	●	4324060
803 S	3	0.01	34	0.1	8h6	0.7 - 1.1	●	4324000
803 SW	3	0.01	34	0.1	8h6	0.7 - 1.7	●	4326000
803 SB	0.4 (±0.2)	0.01	34	4.5	8h6	0.9 - 1.1	●	4324250
803 AZ	.120"	.0005"	1.4"	.008"	8h6	0.7 - 1.1		4324900

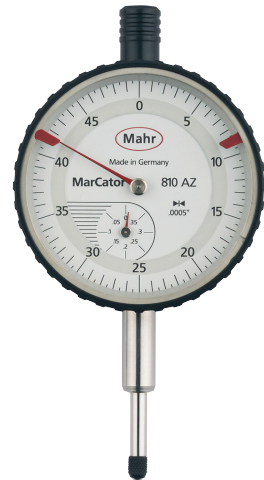
Precision Small Dial Indicators 803 / 805 DIN style



803 SW



803 SB



803 AZ

Features

Small Dial Indicator 803 SW

Waterproof and oil proof

Design features identical to 803 S, with the following exceptions:

- Hermetically sealed upper protective measuring spindle cap as well as bezel and transparent dial cover; sealed with O-rings
- Measuring spindle sealed with rubber sleeve, thus preventing contamination by liquids and impurities

Small Dial Indicator 803 SB

with limited measuring range

Design features identical to 803 S, with the following exceptions:

- Limited measuring range (0.4 mm) for error-free readings
- Large overtravel (ca. 4.5 mm), for easier insertion of test items in measuring devices
- Hermetically sealed upper protective measuring spindle cap

Small Dial Indicator 803 AZ

Inch version

Design features identical to 803 A, with the following exception:

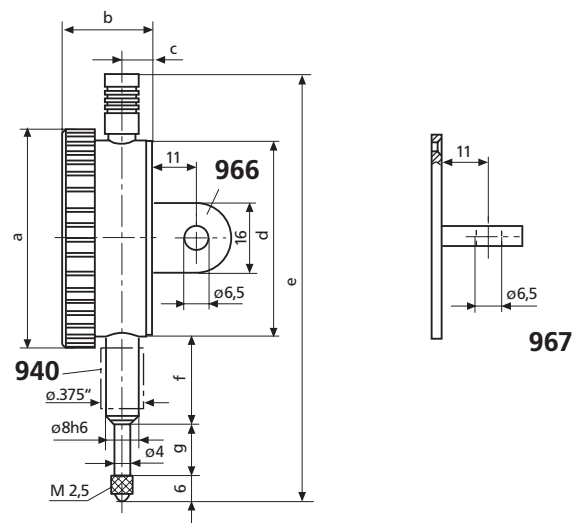
- The scope of supply includes an Adapter Bush 940 for adapting mounting shank 8h6 mm to inch bore .375"

Dimensions according to DIN EN ISO 463

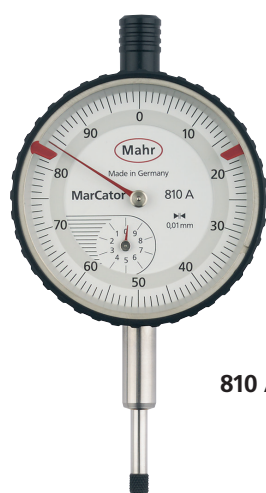
mm	a	b	c	d	e	f	g
803 A	ø 40	20.6	6.8	ø 37	83	15.5	8
805 A	ø 40	20.6	6.8	ø 37	83	15.5	8
803 S	ø 40	20.6	6.8	ø 37	80	15	5.5
803 SW	ø 44	21.6	7.1	ø 37	86	15	11
803 SB	ø 40	20.6	6.8	ø 37	83	15.5	8
803 AZ	ø 40	20.6	6.8	ø 37	83	15.5	8

Accessories

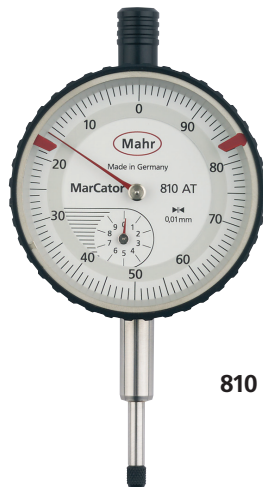
	Order no.	
Adapter Bush for adapting mounting shank 8h6 mm to inch bore .375"	940	4310103
Splash Guard Cover for bezel dia. 40 mm	956	4373021
Mounting Lugs		
Bore perpendicular to mounting shank	966	4375020
Bore parallel to mounting shank	967	4375021



Precision Dial Indicators 810 DIN style



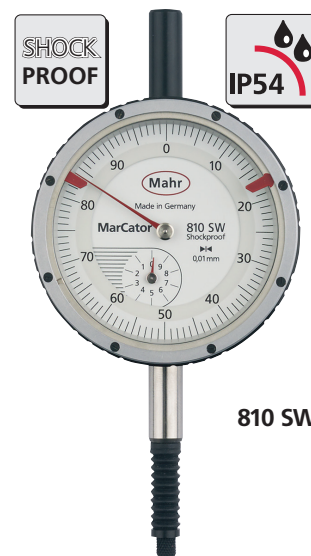
810 A



810 AT



810 S



810 SW

Features

Dial Indicator 810 A

Standard version

- High precision gears and pinions
- Lifter protection cap on the upper end of the measuring spindle
- Adjustable tolerance markers
- Chrome-plated housing

Dial Indicator 810 AT

for depth measurement

Design features identical to 810 A, with the following exception:

- Scale of the dial face is counter-clockwise

Dial Indicator 810 S

Shockproof

- High precision gears and pinions
- Lifter protection cap on the upper end of the measuring spindle
- Adjustable tolerance markers
- Chrome-plated housing

Dial Indicator 810 SW

Waterproof and oil proof

Design features identical to 810 S, with the following exceptions:

- Measuring spindle sealed with rubber sleeve, thus preventing contamination by liquids and impurities
- Hermetically sealed protective measuring spindle cap

All indicators are delivered in plastic case

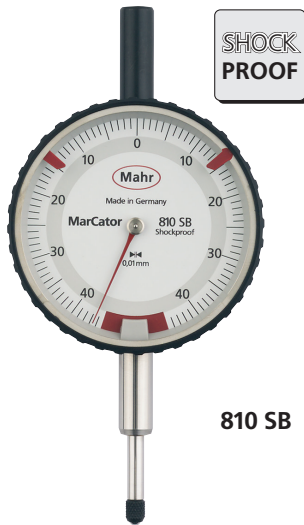
Technical Data

	Range	Readings	Dial face dia.	Overtravel	Mounting shank dia.	Measuring force	Accuracy	Order no.
	mm	mm	mm	mm	mm	N	DIN 878	
810 A	10	0.01	50	0.1	8h6	0.7 - 1.3	●	4311050
810 AT	10	0.01	50	0.1	8h6	0.7 - 1.3	●	4311060
810 S	10	0.01	50	0.1	8h6	0.7 - 1.3	●	4311000
810 SW	10	0.01	50	0.1	8h6	0.7 - 1.6	●	4315000
810 SB	0.8 (±0.4)	0.01	50	9	8h6	0.7 - 1.1	●	4317000
810 SM	1	0.001	50	4	8h6	1.3 - 1.8		4311070
810 SRM	5	0.001	50	0.1	8h6	1.2 - 1.7		4311080
810 AZ	.400"	.0005"	2"	.004"	8h6	0.9 - 1.5		4311900

Accessories

	Order no.		Order no.
Adapter Bush for adapting mounting shank 8h6 mm to inch bore .375"	940 4310103	Mounting Lug	
		Bore perpendicular to mounting shank	961 4375010
Splash Guard Cover for bezel dia. 58 mm	955 4373020	Bore parallel to mounting shank	962 4375011

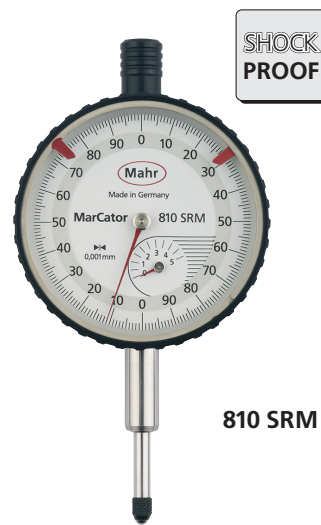
Precision Dial Indicators 810 DIN style



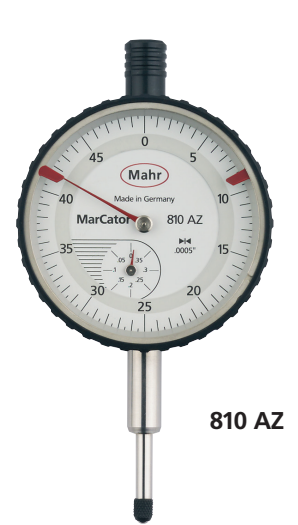
810 SB



810 SM



810 SRM



810 AZ

Features

Dial Indicator 810 SB with limited measuring range

Design features identical to 810 S, with the following exceptions:

- Limited measuring range (0.8 mm) for error-free readings
- Large overtravel (ca. 9 mm) for easier insertion of test items in measuring devices
- Hermetically sealed protective measuring spindle cap

Dial Indicator 810 SM Shockproof with reading 0.001 mm

- Precise mechanism with a combined gear lever transmission
- High accuracy with a minimum span of error
- Lifter protection cap on the upper end of the measuring spindle
- Adjustable tolerance markers
- Chrome-plated housing

Dial Indicator 810 SRM Shockproof with reading 0.001 mm

- High precision gears and pinions
- Lifter protection cap on the upper end of the measuring spindle
- Adjustable tolerance markers
- Chrome-plated housing

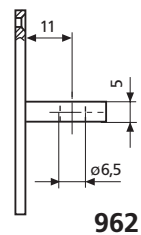
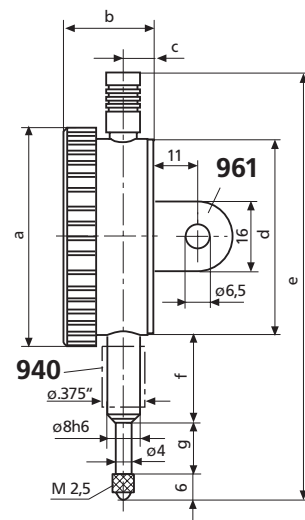
Dial Indicator 810 AZ Inch version

Design features are identical to 810 A, with the following exception:

- The scope of supply includes an Adapter Bush 940 for adapting mounting shank 8h6 mm to inch bore .375"

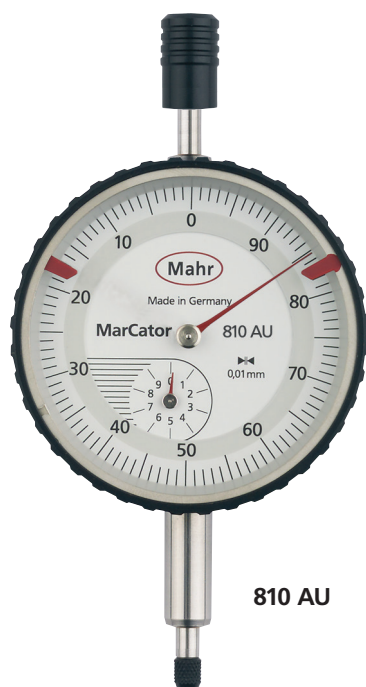
Dimensions according to DIN EN ISO 463

mm	a	b	c	d	e	f	g
810 A/AT	ø 58	23	7.5	52	112	21	16
810 S	ø 58	23	7.5	52	111.5	22	15
810 SW	ø 61	24.15	7.9	52	127.6	22	22.1
810 SB	ø 58	23	7.5	52	120	22	15
810 SM	ø 58	25	8.5	52	111.5	22	15
810 SRM	ø 58	23	7.5	52	111.5	22	15
810 AZ	ø 58	23	7.5	52	111.5	22	15

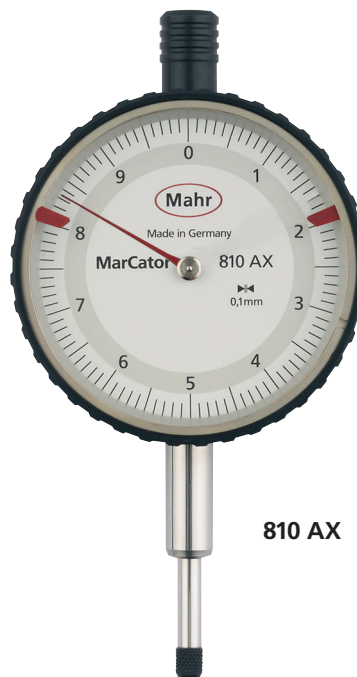
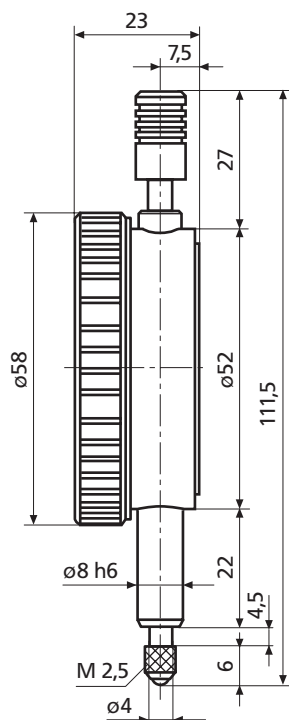


962

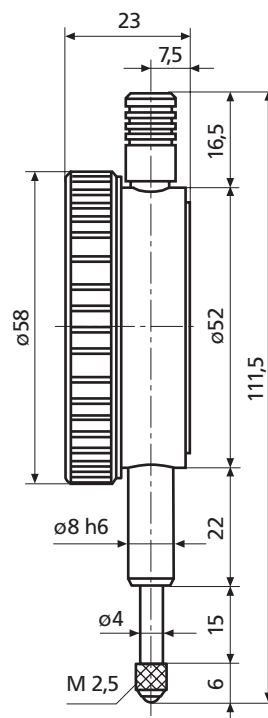
Precision Dial Indicators 810



810 AU



810 AX



Features

Dial Indicator 810 AU

with a reversed measuring force direction

- Chrome-plated housing
- Adjustable tolerance markers
- Scale on the dial increases counter clockwise (+ on left)
- Measuring force acting towards the top
- Delivered in plastic case

Dial Indicator 810 AX

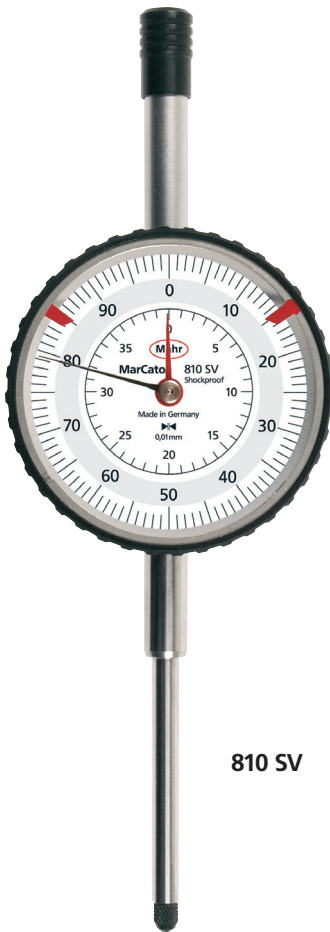
with reading 0.1 mm

- Constant measuring force
- Chrome-plated housing
- Adjustable tolerance markers
- 1 pointer movement on 10 mm
- Delivered in plastic case

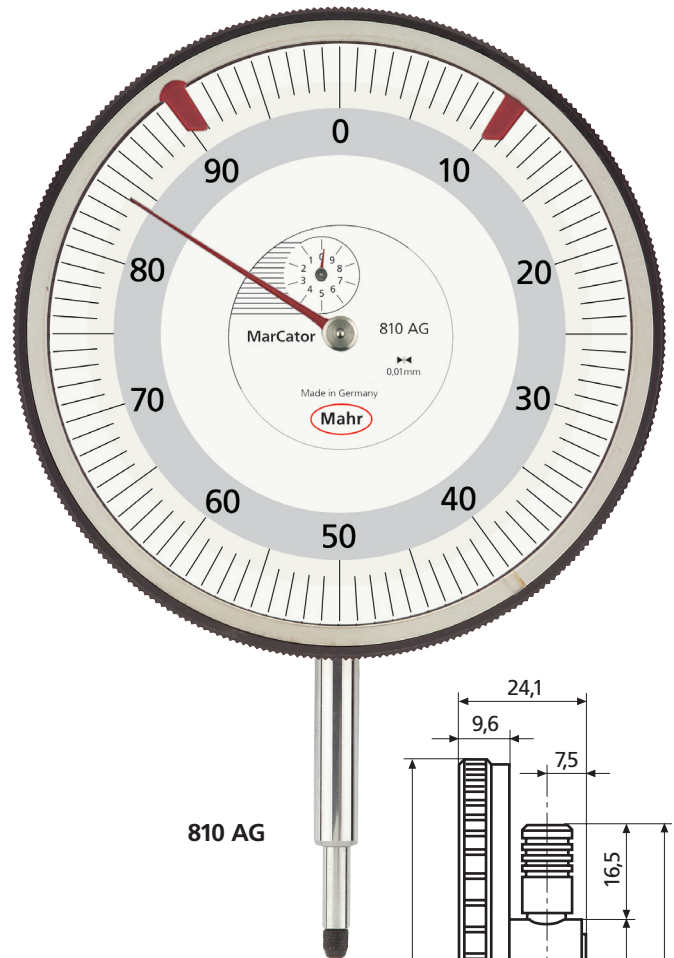
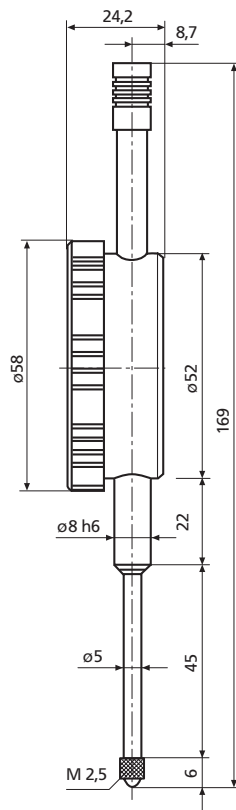
Technical Data

	Range	Readings	Dial face dia.	Overtravel	Mounting shank dia.	Measuring force	Order no.
	mm	mm	mm	mm	mm	N	
810 AU	10	0.01	50	0.1	8h6	1 - 1.8	4329050
810 AX	10	0.1	50	0.5	8h6	0.7 - 1.3	4331000
810 SV	40	0.01	50	0.1	8h6	0.8 - 1.8	4321000
810 AG	10	0.01	108	0.1	8h6	1.3 - 2.2	4322000

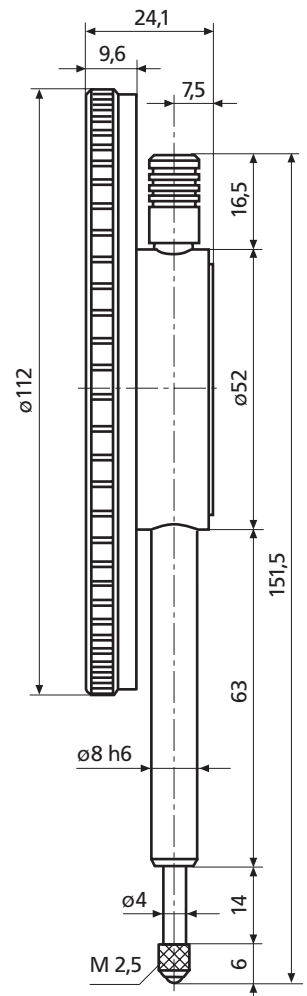
Precision Dial Indicators 810



810 SV



810 AG



Features

Long Range Dial Indicator 810 SV

with larger measuring range

- Range 40 mm
- Strengthened measuring spindle (5 mm)
- Raising of measuring spindle via lifting cap
- Adjustable tolerance markers
- Shockproof movement
- Delivered in folded box

Extra large Dial Indicator 810 AG

with dial face dia. 108 mm

- Ideal for long reading distance and in bad light conditions
- Plastic outer ring
- Delivered in folded box

Accessories

Adapter Bush for adapting mounting shank 8h6 mm to inch bore .375"

940 4310103

Splash Guard Cover for dia. 58 mm

955 4373020

Mounting Lug to mount on mounting shank of all versions

963 4375002

SIMPLE, ACCURATE AND INEXPENSIVE MEASUREMENT. MILLIMESS DIAL COMPARATORS.



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

www.mahr.com, WebCode 207

► | Millimess is the “classic” amongst all measuring instrument. For over 60 years the Millimess series of Dial Comparators has been synonymous with both high precision and extreme robustness. Both maximum accuracy and a minimal reversal span error are obtained through the levers, gears and pinions being supported with jeweled bearings and that the measuring spindle running in a ball bush guide. Millimess is therefore particularly suitable for measuring tasks where the accuracy and the reversal span of a conventional dial indicator are not sufficient. Further advantages of Millimess are the simple handling, the easy reading as well as the movement being absolute shockproof. With a digital comparator with an inductive measuring system combined with most modern state of the art digital technology readings as small as $0.2 \mu\text{m}$ / $10 \mu\text{inch}$ are realized. The practical control functions (for example tolerance monitoring or the storage of measuring values for dynamic measurements), the combined analog and digital display as well as the easy to use data transmission rounds off the complete Millimess spectrum. | ◀

► | Millimess. Digital and Dial Comparators

Inductive Digital Comparators (Short Range)

Overview

62

Millimess 2100

64

With background lit digital and analog display

Millimess 2000 / 2001

66

With digital and analog display

μMaxμm® //

68

With digital display

Maxμm® ///

70

With digital and analog display, probe

Mechanical Dial Comparators

Overview

74

Millimess 1000 A / 1000 B

77

With large dial

Millimess 1002 / 1003 / 1003 XL / 1004 / 1010 / 1050

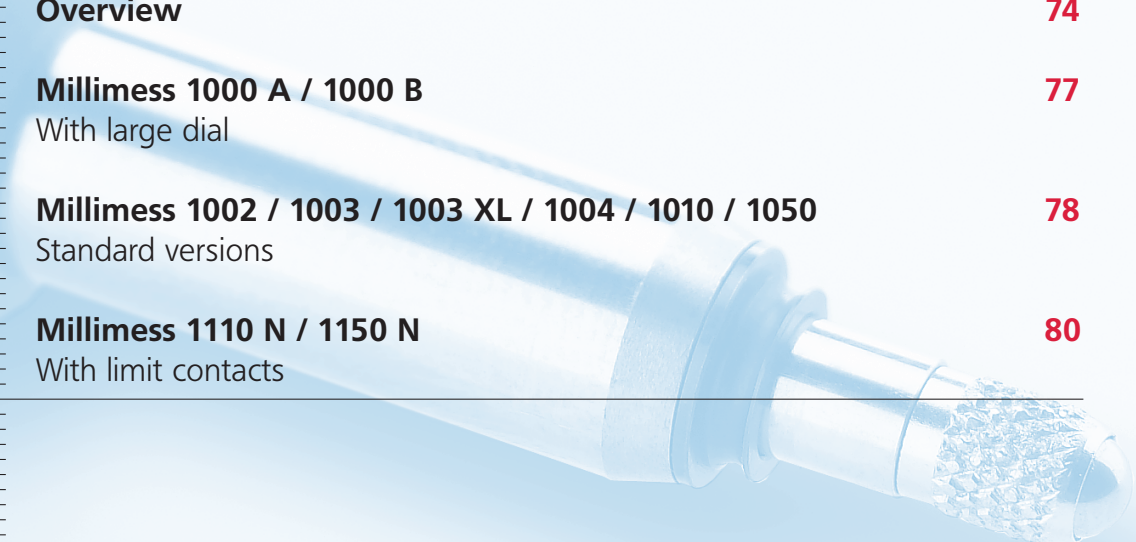
78

Standard versions

Millimess 1110 N / 1150 N

80

With limit contacts



Millimes. Digital Comparators (Short range)

OVERVIEW

Inductive Digital Comparators			
		2100	2000
			
Catalog page		64	66
Measuring range		2.8 mm	1.8 mm
Resolution		mm / <i>inch</i> 0.0005 / <i>.00002"</i> 0.001 / <i>.00005"</i> 0.005 / <i>.0002"</i> 0.01 / <i>.0005"</i>	mm / <i>inch</i> 0.0002 / <i>.00001"</i> 0.0005 / <i>.00002"</i> 0.001 / <i>.00005"</i>
Mounting shank		8h6	8h6
Protection class	IP class according to IEC 60529		
Functions:			
ON/OFF		●	●
Zero set the display		●	●
Zero set the analog display		●	●
Switch between mm/inch		●	●
Reversal of counting direction		●	●
Enter a numerical value		●	●
Preset		●	●
Data key		●	●
Data via control instrument 2000sg		●	●
ABS/REL-switchable		●	●
Tolerance display		●	●
Dynamic measuring functions	Min, Max, Max-Min (Tir)	●	●
Resolution switchable		●	●
Analog display		●	●
Analog value switchable		●	●
Lock key function		●	●
Data output	USB	●	●
	Digimatic	●	●
	Opto RS232C	●	●
Control output		●	●

2001	μMaxµm® II	Maxµm® III
		
66	68	70
1.8 mm	2 mm	2 mm / 3.98 mm
mm / <i>inch</i>	mm / <i>inch</i>	mm / <i>inch</i>
0.0002 / <i>.00001"</i>	0.0002 / <i>.00001"</i>	0.0005 / <i>.00002"</i>
0.0005 / <i>.00002"</i>	0.0005 / <i>.00002"</i>	0.001 / <i>.00005"</i>
0.001 / <i>.00005"</i>	0.001 / <i>.00005"</i>	0.001 / <i>.0001"</i>
	0.001 / <i>.0001"</i>	0.005 / <i>.0005"</i>
	0.005 / <i>.0002"</i>	
	0.010 / <i>.0005"</i>	
	0.020 / <i>.001"</i>	
8h6	8h6 / <i>3/8"</i>	8h6 / <i>3/8"</i>
		
•	•	Auto
•	•	•
•	•	•
•	•	•
•	•	•
•	•	
•	•	
•	•	
•	•	
•	•	
•	•	
•	•	
•	•	
•	•	
•	Optional	Optional
•	•	•
•	•	•
•	•	•
•		

Millimes 2100

► I The Inductive Digital Comparator **Millimes** 2100. Tolerance monitoring is simplified with the color change in the background lit display.

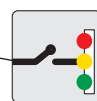
Dynamic measuring functions:

- MAX / MIN for example, finding the reversal point
- MAX - MIN storing values for example when testing concentricity and flatness



Universal SPS Interface

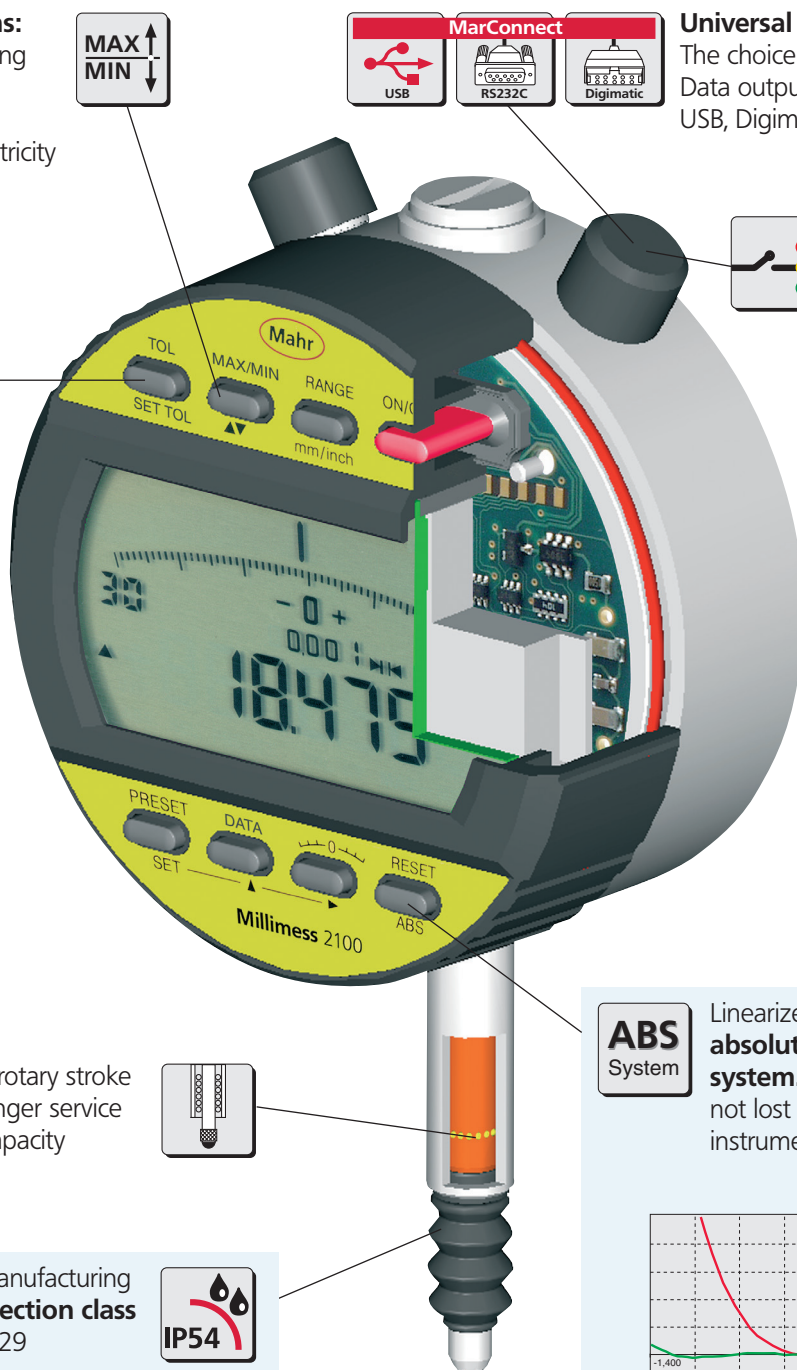
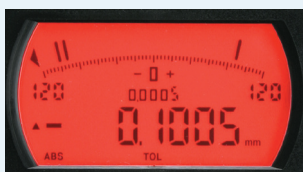
The choice is yours: **MarConnect**
Data output, choose between USB, Digimatic or RS232C



Control output
can be connected to a SPS

Tolerance function:

clearly visual tolerance excess due to the change of color in the background lit display.

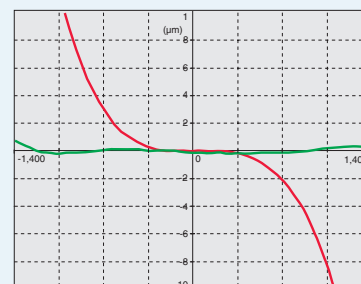


High precision rotary stroke bearings for a longer service life and higher capacity



ABS System

Linearized, inductive **absolute measuring system**. Reference point is not lost when the instrument is switched off



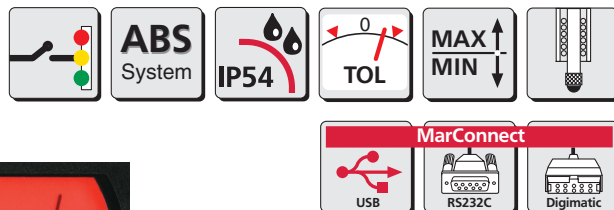
— With linearization
— Without linearization

Especially suited for use in a manufacturing environment. Waterproof: **Protection class IP54** in accordance to IEC 60529



Code Initial	IP	International Protection
First Numeral	5	Dust protected
Second Numeral	4	Protection against splash water in all directions

Inductive Digital Comparator Millimess 2100 with background lit display



Features

Functions:

ON/OFF
 RESET (zero setting the digital and analog displays)
 - 0 - (set the analog display to zero)
 PRESET (enter any numerical values)
 DATA (data transmission)
 mm/inch-switchable
 Reversal of counting direction
 RANGE (switch the measuring range and resolution)
 ABS (reference to electrical zero point)
 MAX / MIN memory, e.g. ideal to search for the reversal point
 MAX-MIN e.g. testing concentricity and flatness
 TOL (entering tolerance)
 Tolerance band max. 2.8 mm
 LOCK: operating functions can be blocked via PC-Software

- Factor can be set / adjusted
- Linearized inductive absolute measuring system
- Measurement electronic is compensated for temperature
- Power supply via the mains power adapter
- MarConnect data output: choose either
 USB
 OPTO RS232C
 Digimatic
- Dial Comparator can be remotely operated via the interface (Opto RS232C)
- Control output compatible to Dial Comparators with limit contacts
- Operating and display unit (bezel) can be rotated through 280°
- Measuring force spring is interchangeable
- Lower stop is adjustable
- Protection class IP54 according to IEC 60529
- Operating temperature 5 - 40°C
- High contrast background lit LCD with 6.5 mm high digits
- Analog display has a 4 mm long pointer which ensures better visual perception, ideal when checking concentricity and flatness and also to search for the reversal point when measuring bores
- Supplied with:
 Mains adapter, rubber bellows and spanner for preliminary stroke setting

Technical Data

Measuring ranges switchable	Resolution switchable	Display range of the analog display	Span of error* G within	Over-travel	Meas. force	Order no. 230 V	Order no. 115 V
mm (inch)	mm / inch	mm (inch)	±0.8mm ±1.4mm	mm	N		
±1.0 (.04")	0.0005 / .00002"	±0.015 (.0006")	1µm 2µm	1.8	0.7 - 0.9	4346200	4346201**
±1.4 (.055")	0.001 / .00005"	±0.030 (.0015")					
	0.005 / .0002"	±0.150 (.0060")					
	0.01 / .0005"	±0.300 (.0150")					

* 1 digit in any zero position

** Includes Adapter Bush 940

Inductive Digital Comparator 2000 / 2001



2000



2001



Features

Extramess 2000

Functions:

- ON/OFF
- RESET (Set the digital and analog display to zero)
- 0 - (Set analog display to zero)
- PRESET (enter any numerical values)
- mm/inch switchable
- Reversal of counting direction
- RANGE (Switch the measuring range and resolution)
- ABS (reference to electrical zero point)
- Battery charge level indicator
- Linearized inductive absolute measuring system
- Power supply via either the integrated rechargeable batteries (40 hrs.) or via the mains power adapter
- Rate measuring values are actualized 20 values/second
- MarConnect data output: choose either
USB
OPTO RS232C
Digimatic

- Comparator can be remotely operated via the interface
- High contrast LCD with 6.5 mm high digits. Analog display has a 4 mm long pointer for better visual perception, ideal when checking concentricity and flatness as well as search for the reversal point when measuring bores
- Operating and display unit (bezel) can be rotated 280°
- Measuring force spring is interchangeable
- Lower stop is adjustable
- Protection class IP54
- Operating temperature 5 - 40°C
- Supplied with:
Mains adapter, rubber bellows and spanner for preliminary stroke setting

Extramess 2001

Features are identical to Extramess 2000, in addition:
MAX / MIN memory, e.g. ideal to search for the reversal point
MAX-MIN e.g. testing concentricity and flatness
TOL (entering tolerance)
Tolerance band max. 180 µm

- Control output compatible to Dial Comparators with limit contacts
- Supplied with:
Mains adapter, rubber bellows and spanner for preliminary stroke setting

- Block individual operating functions via Software (see accessories)
- Factor can be set / adjusted

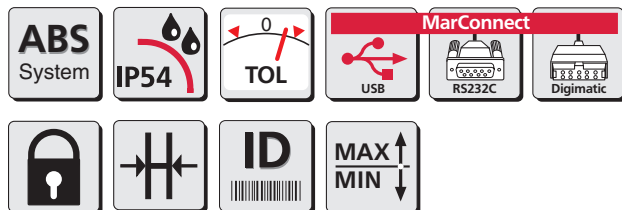
Technical Data

	Measuring ranges switchable	Resolution and readings	Display range of analog display	Span of error* G	Over-travel	Meas. force	Order no. 230 V	Order no. 115 V
	mm (inch)	mm / inch	mm (inch)	µm	mm	N		
2000	1.8 (.07")	0.001 / .00005"	± 0.030 (.0015")	0.6	2.4	0.7 - 0.9	4346000	4346900**
	1.8 (.07")	0.0005 / .00002"	± 0.015 (.0006")	0.6	2.4			
	0.8 (.031")	0.0002 / .00001"	± 0.006 (.0003")	0.3	2.9			
2001	1.8 (.07")	0.001 / .00005"	± 0.030 (.0015")	0.6	2.4	0.7 - 0.9	4346100	4346910**
	1.8 (.07")	0.0005 / .00002"	± 0.015 (.0006")	0.6	2.4			
	0.8 (.031")	0.0002 / .00001"	± 0.006 (.0003")	0.3	2.9			

* 1 digit in any zero position

** Includes Adapter Bush 940

Inductive Digital Comparator μ Max μ m® II



Advanced Functions:

- Dynamic mode operation: Max, Min, TIR
- Two point difference measurement – provides comparison of two readings or measuring locations.
 - Calculate the distance between 2 measured values
- Multiplier factor for ratio measurements
- Hold function – holds reading on display until ready to resume measuring
 Data output with serial number identification capability
- Data output with selectable continuous output or single request of reading(s)

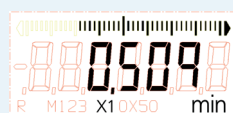
Features

Functions:

- ON/OFF
- ZERO (set the analog display to zero)
- mm/inch
- PRESET (enter any numerical values)
- Reversal of counting direction
- Switch to the analog display
- ABS (Display can be set to zero, without losing the reference to the Preset value)
- Inductive absolute measuring system, life of the battery ca. 6000 hours
- High contrast analog and digital LCD, with 8 mm high digits
- Operating and display unit (bezel) can be rotated 270°
- Zero point is not lost even when power is off
- Lightweight, contamination resistant – ruggedly built to withstand hard use – gasketed case, crystal and stem assemblies resist fluid contamination
- Auto-power down – provides extremely low battery consumption, assuring long life from readily available commercial batteries
- Increased resolution (0.0002 mm / 10 μ inch) for today's demanding tolerances
- MarConnect data output: USB, OPTO RS232C, Digimatic
- Operating temperature 5-54°C
- Unilateral Tolerances
- Go/NoGo display feature
- Supplied with: Batteries

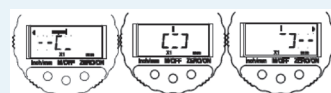
Mode A:

Actual value + bargraph
Display of tolerance



Mode B:

GO/NOGO display



Optional Factory Configured Features:

- Locked Multiplier factor for ratio measurements
- Disabled sleep mode (manual ON/OFF)
- Locked inch or mm display unit
- Power up in inch or mm unit on battery change
- Calibration mode lockout (with password entry)
- Setup mode lockout with password entry

Technical Data

Model	Range		Resolution		Accuracy % of digital range	Stem diameter	Stem Length		Order no.
	mm	/ inch	mm	/ inch			mm	/ inch	
Standard						.375"	11.7	/ .46"	2034101
Standard						.375"	38.0	/ 1.50"	2034103
Standard			0.0002	/ .00001"		8 mm	11.7	/ .46"	2034105
Standard			0.0005	/ .00002"	±0.25% over	8 mm	38.0	/ 1.50"	2034107
			0.001	/ .00005"	±0.50 mm / ±.020"				
Advanced	±1.00	/ ±0.040"	0.002	/ .0001"	±0.50% from	.375"	11.7	/ .46"	2034201
Advanced			0.005	/ .0002"	to	.375"	38.0	/ 1.50"	2034203
Advanced			0.01	/ .0005"	±1.00 mm / ±.040"	8 mm	11.7	/ .46"	2034205
Advanced			0.02	/ .001"		8 mm	38.0	/ 1.50"	2034207
Advanced Perpendicular						.375"	11.7	/ .46"	2034401

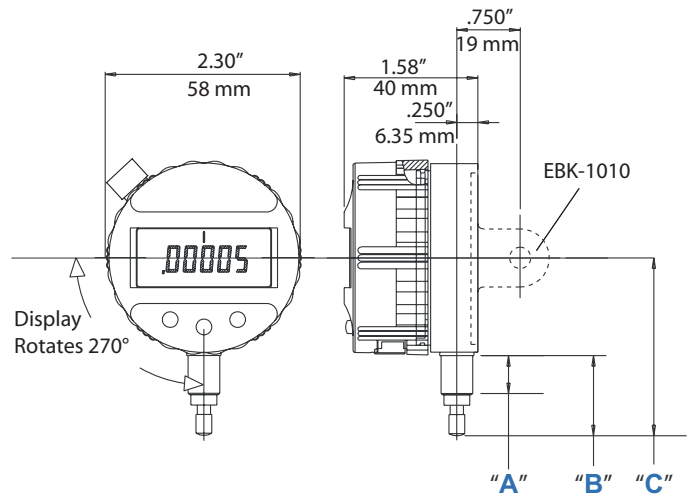
Technical Data

Display Range:	$\pm 1.067 \text{ mm} / \pm .042''$
Spindle Range:	-1.25 to 1.50 mm / - .050 to + .060''
Resolution:	0.0002 mm / .00001''
Accuracy:	$\pm 0.5 \text{ mm range: } 1.25 \mu\text{m} (0.25\%)$
(% of range)	$\pm 1.0 \text{ mm range: } 5.0 \mu\text{m} (0.50\%)$
	$\pm .020'' \text{ range: } 50 \mu\text{inch} (0.25\%)$
	$\pm .040'' \text{ range: } 200 \mu\text{inch} (0.50\%)$
Thermal Stability	0.1% of full scale/F
Gaging Force:	85 to 122 g (grams) - at center of travel
	3 to 4 oz (ounce) - at center of travel
Weight:	170 g / 6 oz
Spindle Velocity:	Unrestricted
Temperature	
Operating:	5° to 54°C / 40° to 130°F
Storage:	-17° to 60°C / 0° to 140°F
Repeatability:	$\pm 1 \text{ LSD (Least Significant Digit)}$
Battery Life:	6000 hours
	~ 12 months normal usage*

* normal usage = 12 hr/day x 7 day/wk

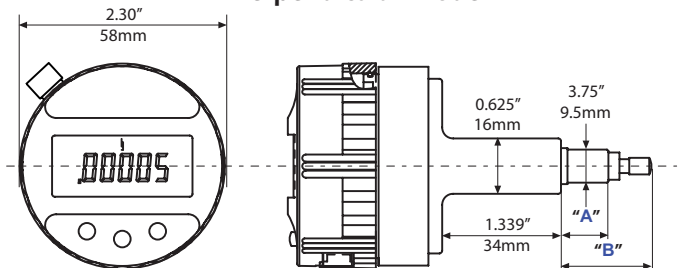
Contact Point:	(PT-223 radiused tip, 4-48 thread, furnished on 0.375" dia. Stem model) EPT-1037-W1 radiused tip, M2.5 thread furnished on 8 mm dia. stem model
Power:	3 volt lithium coin cell (2 per unit), type CR 2450. Order no. EBY-1018
Display:	Rotates through 270°

Standard Model



Dimensions mm / inch	A	B	C
	11.7 / .46"	24.1 / .95"	53.6 / 2.11"
	38.0 / 1.50"	57.2 / 2.25"	86.6 / 3.41"

Perpendicular Model



Accessories

	Order no.		Order no.
Backs:		Other Hardware:	
Flat Back (Standard on all models)	EBK-1018	Splash Cover	ECV-1307-W2
Post Back (.5" dia. x 1" long)	EBK-1012	Adaptor Bushing (8 mm to 3/8")	BU-197
Lug Back (Horizontal / Vertical)	EBK-1010	Thread Adaptor (M2.5 to 4-48 thread)	AD-185
Screw Back (11/16" dia x .5", 1/4-28 thread)	EBK-1013	Spring (for lighter gaging force: 35g)	SP-351
Adj. Slide Back (0.5" slot, 1/4-20 thread)	EBK-1016		
Adj. Rack Back*	EBK-1014		
* used on AT-28 or AT-116 - SE-33 or SE-73 Sold separately.			
Data Interface:			
USB Cable (for MarCom or PC, 2 m length)	4346023		
RS232 Cable (SUB-D jack 9-pin, 2m length)	4346020		
Digimatic Cable (10 pin plug, 2 m length)	4346021		
Transmitter (Mahr t, used w/ FM1 Receiver)	2121369		

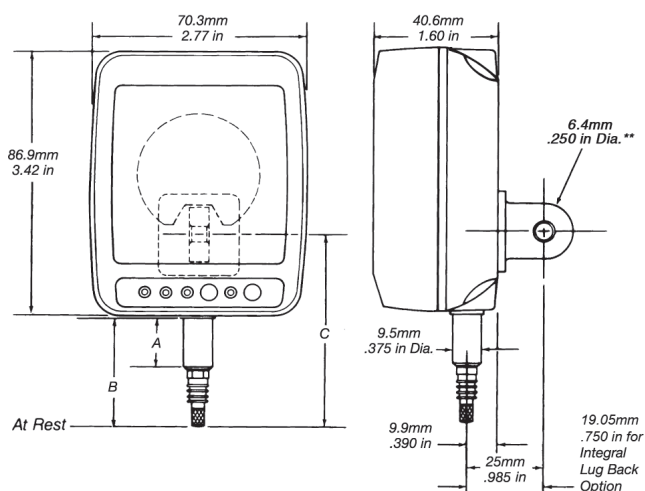
Maxum® III Digital Comparator

Features

- Features both digital display for accuracy and readability and unique fan analog display for trend and change
- User configurable in inch / metric units, normal / reverse sensing, resolution, analog scale, and tolerance setup & display
- Dynamic Capabilities: Min, Max, TIR, Hold, Reset
- Absolute Transducers - no overspeed errors. . . . no missed counts. . . . no missed readings
- Auto power down - provides extremely low battery consumption, assuring long life from readily available commercial batteries
- Data output - 3 formats - Maxum, serial, or digimatic
- Both integral and remote readout versions available
- Easily used on Snap Gages, Bore Gages, Comparator Stands, and Fixture Gages
- Special options available: setup mode or calibration lockout, remote external power, 4:5 ratio, 12 o'clock mounted integral transducer, integral vertical or horizontal lug back, 1.5, 2.0 or 3.0 inch stem length, and more. . . .
- IP54 protection
- Easy to select, order and operate!



Technical Data



For short range indicators – Standard Stem Length ($\pm 1.0 \text{ mm} / \pm .040''$ range indicators)

A	B	C
17 mm / .670''	36 mm / 1.42''	63.5 mm / 2.50''

For long range indicators – Standard Stem Length ($\pm 1.99 \text{ mm} / \pm .100''$ range indicators)

22 mm / .87''	47 mm / 1.84''	73 mm / 2.87''
----------------------	-----------------------	-----------------------

For both short and long range indicators – Long Stem Lengths

38 mm / 1.5''	57 mm / 2.25''***	84.6 mm / 3.33''***
51 mm / 2''*	70 mm / 2.75''***	97.3 mm / 3.83''***
76 mm / 3''*	95 mm / 3.75''***	123 mm / 4.83''***

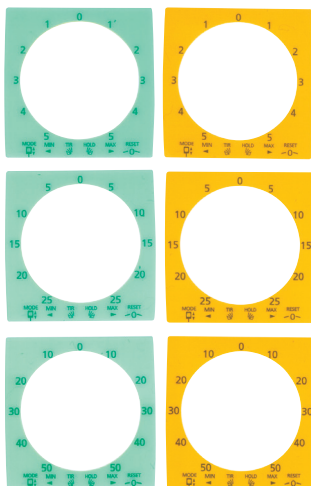
* Special Order Lengths

** Back supplied with remote indicating unit only

*** For long stem lengths add .220" to above lengths

Easily designed into your applications . . . full-size MaxumIII® Indicator and accessories, tracing templates or CAD files available on request.

Technical Data



Description	Short Range	Long Range
Digital range		
Standard	±1.00 mm / ±.040"	±1.99 mm / ±.100"
Reduced	±0.199 mm / ±.0199"	None
Digital resolution	0.005 mm / .0005"	0.005 mm / .0005"
Switchable	0.001 mm / .0001"	0.001 mm / .0001"
	0.001 mm / .00005"	
	0.0005 mm / .00002"	
Analog range	5 or 25 or 50	25 or 50
Analog resolution	0.01 mm / .001"	0.01 mm / .001"
Switchable	0.005 mm / .0005"	0.005 mm / .0005"
	0.001 mm / .0001"	
Total spindle travel	3.04 mm / .120"	6.35 mm / .250"
Pre-Travel*	0.3 mm / .010"	1.06 mm / .020"
Over-Travel*	0.8 mm / .030"	1.31 mm / .030"
Accuracy		
Standard range	0.5% of Total Range	0.35% of Total Range
Reduced range	0.25% of Total Range	N/A
Repeatability	±One Least Digit	±One Least Digit
Gaging force	3 - 4 oz / 85 - 112 grams, preloaded	
Operation temperature	10° to 55°C / 50° to 130°F	
Storage temperature	-20° to 65°C / -4° to 149°F	
IP Rating	54	
Weight	approx. 385 g / 13.6 oz.	
Battery life	approx. 4000 hours	
Power	3.0 volt Lithium battery (type CR123A or equivalent) Mahr Federal Order Number: 2239138	
Contact point	(Normally furnished — PT-223) for .375" dia. Stem, .250" long, radiused tip, 4-48 thread; (EPT-1037-W1) for 8 mm dia. stem, 6 mm long, radiused tip, M2.5 thread.	

Stem length mm / inch	Stem diameter	Data output	Order no. Short range	Order no. long range
17 / .670"	.375"	No output	2033101	2033102**
38 / 1.50"	.375"		2033103	2033104
17 / .670"	8 mm		2033105	2033106**
38 / 1.50"	8 mm		2033107**	2033108**
17 / .670"	.375"	Digital Output 6 pin (D, E1)	2033111	2033112**
38 / 1.50"	.375"		2033113	2033114
17 / .670"	8 mm		2033115	2033116**
38 / 1.50"	8 mm		2033117	2033118
17 / .670"	.375"	Digital Output with Hold / Reset 10 pin (E2)	2033121	2033122**
38 / 1.50"	.375"		2033123	2033124
17 / .670"	8 mm		2033125	2033126**
38 / 1.50"	8 mm		2033127	2033128

* dependent on standard or reduced range selected. Standard range shown.

** Long Range Indicator Stem Length is .870" / 22 mm

Maxµm® III Digital Comparator

Technical Data

Maxµm® III Remote Indicating Unit*

	Order no.
No Digital Output Port	2033001
Digital Output -6 pin (D, E1)	2033011
Digital Output with Hold & Reset -10 pin (E2)	2033021

* Maxµm® III Remote Indicating Units are NOT compatible with traditional Remote Transducer models EAS-XXXX.



Supplied with Lug back

Maxµm® III Digital Transducer^①

Digital Transducers	Short Range	Long Range
Range	±1.00 mm / ±.040"	±1.99 mm / ±.100"
Total Spindle Travel	3.04 mm / .120"	6.35 mm / .250"
Pre-Travel**	0.3 mm / .010"	0.5 mm / .020"
Over-Travel**	0.8 mm / .030"	
Gaging Force	3-4 oz / 85-112 grams, preloaded	
Operation Temperature	10° to 55°C/50° to 130°F	
Storage Temperature	-20° to 65°C/-4° to 149°F	
Contact Point	(Normally furnished — PT-223) for .375" dia. Stem, .250" long, radiused tip, 4-48 thread; (EPT-1037-W1) for 8 mm dia. Stem, 6 mm long, radiused tip, M2.5 thread 2033099 has PT-225 - .125" long.	

** dependent on standard or reduced range selected. Standard range shown.

Transducer Type	Stem Length mm / <i>inch</i>	Stem Diameter	Order no. Short Range	Order no. Long Range
Canister	17 / .670"	.375"	2033091	2033092^②
Canister	38 / 1.50"	.375"	2033093	2033094
Canister	17 / .670"	8.0 mm	2033095	2033096^②
Canister	38 / 1.50"	8.0 mm	2033097	2033098
Pencil	Body Diameter = .375"		2033099	—

Note: Cable length 4ft

① Digital Transducer models 203309X require an adaptor cable for use with traditional DEI-XXXXXX Maxµm and Maxµm Plus Indicating Units.

② Long Range Indicator Stem Length is .870" / 22 mm.
See Adaptor Cable selections as follows:

Adaptor Cables	Order no.
For DEI with 6 pin split connector (Short Range)	2239080
For DEI with 8 pin round connector (Long Range)	2239081

- Maxµm® and Maxµm Plus Transducers are available as Replacement Parts. Refer to Part Price List for Part Numbers and Pricing.
- Maxµm III Remote Indicating units sold separately from Digital Transducer.
- Any Digital Transducer may be used with a Maxµm III Remote Indicating unit.
- For English or Metric Contact Points visit pages 46 and 51 or refer to Chapter **Millimar**. Standard Elements.
- For alternate cable lengths or extension cables - call Mahr Federal's Technical Assistance Group.
- For special indicator options - call Mahr Federal's Technical Assistance Group.



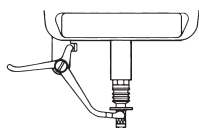
Pencil



Canister

Accessories

For Integral Maxµm® Indicators



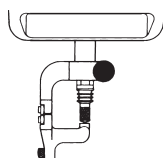
Lifting Levers¹⁾

Furnished with washer and longer contact point. Left Hand (shown)

Order no. **EAS-1903***

Right Hand (not shown)

Order no. **EAS-1904***



Right Angle Attachments

Lever Type (not shown)

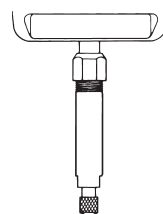
(± .187" maximum range)

Order Model **EAT-1034-W1**

Spring Type (shown)

(± .060" maximum range)

Order Model **EAT-1035-W1**

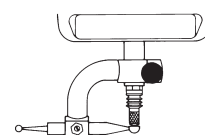


Auxiliary Plunger

3" long, .500" O.D.

Order no.

EAS-1912



Hole Attachments

Short Lever (shown)

(1.0" pivot to contact)

Order Model **EAT-1032-W1**

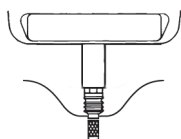
Long Lever (not shown)

(1.87" pivot to contact)

Order Model **EAT-1033-W1**

¹⁾ (For use on .670" stem length only, DEI-XX1X1)

* Not for (±.100" / 1.99 mm)



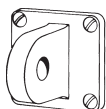
Ox-Bow Lifting Lever

Order no.

LR-40

* Other Accessories shown are for .375" stem models. Equivalent types are available for most Maxµm models having 8 mm stems. Adaptor Bushing (BU-197) may also allow 8mm stem indicators to be used with the above accessories. Full size Maxµm Indicator and accessories tracing templates are available on request.

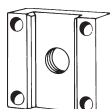
Backs for Maxµm® Indicators and Remote Indicating Units (Supplied with mounting screws)



Lug Back (.250" hole)

Mounts horizontally or vertically.

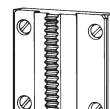
Order no. **EBK-1006**



Adjustable Slide Back

(.500" slot, 1/4-20 thread)

Order no. **EBK-1007**



Rack Back

Fits SE-33 (shown) and SE-73.

Adjustable Mounting Block (not shown).

Order no.

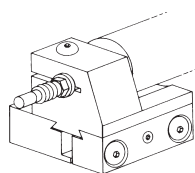
EBK-1005

Replacement Screws

2-56 x .218"

Order no.

ESW-1252

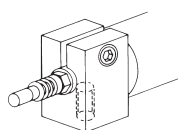


Rack Bracket (Shown mounted to SE-33 Adjustable Mounting Block.)

SE-33 and SE-73 Adjustable Mounting Blocks are available separately. SE-33 is supplied with hex-screw adjust. SE-73 is supplied with knob adjust.

Order Model **EAD-1007-W1** (.375" I.D.)

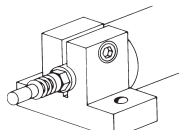
Order Model **EAD-1007-W2** (8 mm I.D.)



Square Bracket

(1/4-20 mounting thread)

Order Model **AAD-67**



T Bracket

Flange mounted.

Order Model **AAD-91**

* Mounting Brackets shown are for .375" stem models. Equivalent types are available for most Maxµm models having 8 mm stems. Adaptor Bushing (BU-197) may also allow 8 mm stem indicators to be used with the above accessories. Full size Maxµm Indicator and accessories tracing templates are available on request.

Other Maxµm Accessories

Order no.

Data Output Cables for Maxµm III

USB Cable (for MarCom / PC, length 2 m)

2121428

Serial Cable (6 pin to db9 pinF PC)

2239036

Serial Cable (10 pin to db9 pinF PC)

2239038

Digimatic Cable (6 pin to std 10 pin)

2239035

Digimatic Cable (10 pin to std 10 pin)

2239037

Send Data Footswitch used with Serial Cables above.

300-50

Transmitter (Maxµm III t, used w / FM 1 Receiver)

2121368

Mating Connectors — Maxµm III Models

For 6 pin data output type (D, E1)

ECN-1521

For 10 pin data output type (E2)

ECN-1689

Remote Switch Assembly (for Hold/Reset)

Handswitch (10 pin data output model only)

EAS-2867

Footswitch (10 pin data output model only)

EAS-2868

Splashcover for Maxµm III

ECV-1307-W1

Battery for Maxµm III

2239138

Overlay Kit for Maxµm III

2239040

Access Key (6 pin)

2240545

Access Key (10 pin)

2240547

Millimess. Dial Comparators

OVERVIEW

Models				
Metric	1000 A	1000 B	1002	1003
				
Measuring range	± 120 µm	± 50 µm	± 25 µm	± 50 µm
Readings	1 µm	1 µm	0.5 µm	1 µm
Dial style	120-0-120	50-0-50	25-0-25	50-0-50
Accuracy*	Factory standard	Factory standard	Factory standard	DIN 879-1
G _{ges}	2 µm	2 µm	0.6 µm	1.2 µm
G ^e	1.5 µm	1.5 µm	0.5 µm	1 µm
f _u	1 µm	1 µm	0.3 µm	0.5 µm
G ^t	0.7 µm	0.7 µm	0.4 µm	0.7 µm
r	0.5 µm	0.5 µm	0.3 µm	0.5 µm
Order no. Standard	4338100	4339100	4335000	4334000
Order no. Waterproof 			4335005	4334005

Inch		1002 Z	1003 Z
Measuring range		± .0010"	± .0020"
Readings		.00002"	.00005"
Dial style		.001-0-.001	.002-0-.002
Accuracy*		Factory standard	Factory standard
G _{ges}		.000025"	.00006"
G ^e		.00002"	.00005"
f _u		.00001"	.000025"
G ^t		.000014"	.000035"
r		.00001"	.000025"
Order no. Standard		4335900	4334900
Order no. Waterproof 		4335905	4334905

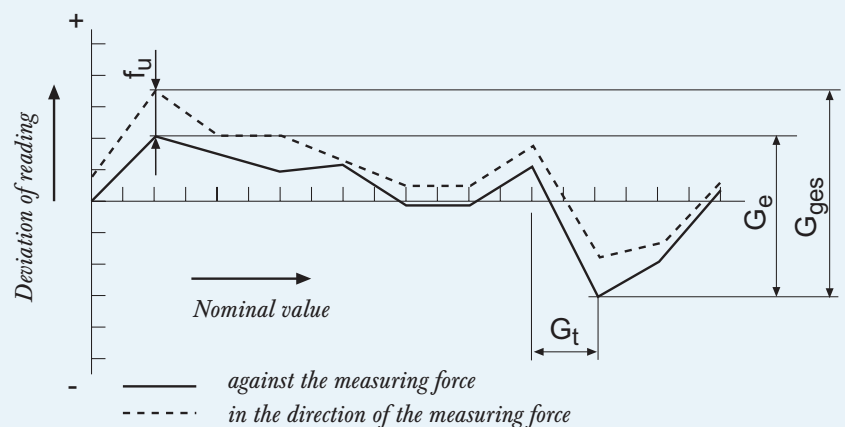
* Accuracy of 1004, 1010, 1010 Z, 1050 exceeds DIN 879-1

** Accuracy of 1110 N and 1150 N exceeds DIN 879-3

1003 XL	1004*	1010*	1050*	1110 N**	1150 N**
					
± 130 µm	± 0.13 mm	± 0.25 mm	± 1.5 mm	± 0.25 mm	± 1.5 mm
2 µm	5 µm	0.01 mm	0.05 mm	0.01 mm	0.05 mm
130-0-130	130-0-130	25-0-25	15-0-15		
DIN 879-1	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard
2.4 µm	4 µm	8 µm	40 µm	12 µm	60 µm
2 µm	3.5 µm	7 µm	35 µm	6.5 µm	35 µm
1 µm	1 µm	2 µm	10 µm	3.5 µm	17 µm
1.4 µm	3 µm	4 µm	24 µm	5 µm	25 µm
1 µm	1 µm	2 µm	10 µm	0.5 µm	17 µm
4334001	4333000	4332000	4330000	4343100	4342100
4334006	4333005	4332005	4330005	4343105	4342105

1004 Z	1010 Z
± .0050"	± .0100"
.0001"	.0005"
.005-0-.005	.01-0-.01
Factory standard	Factory standard
.00012"	.0004"
.0001"	.00035"
.00003"	.0001"
.00005"	.00025"
.00003"	.0001"
4333900	4332900
4333905	4332905

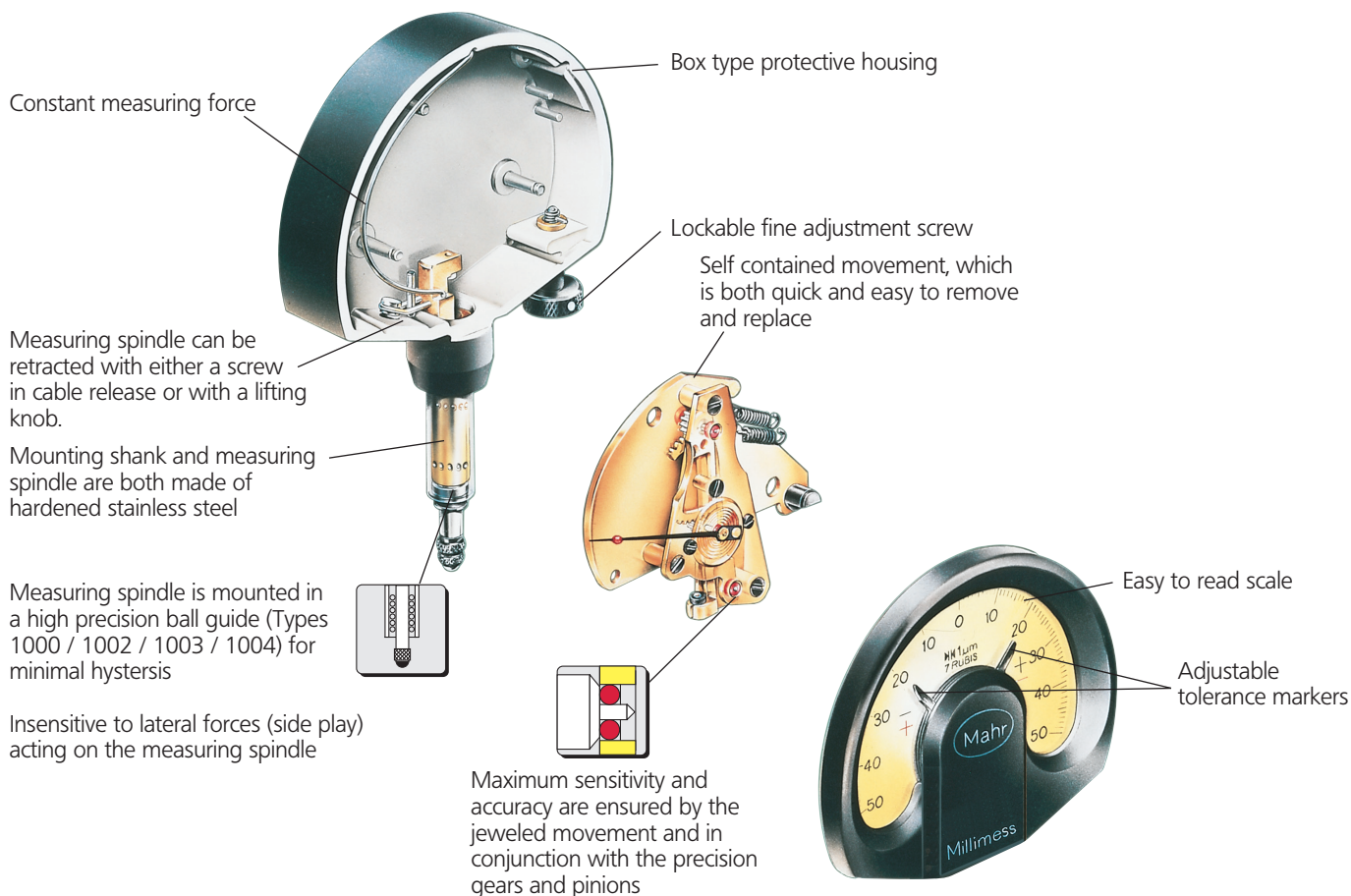
Metrological characteristics



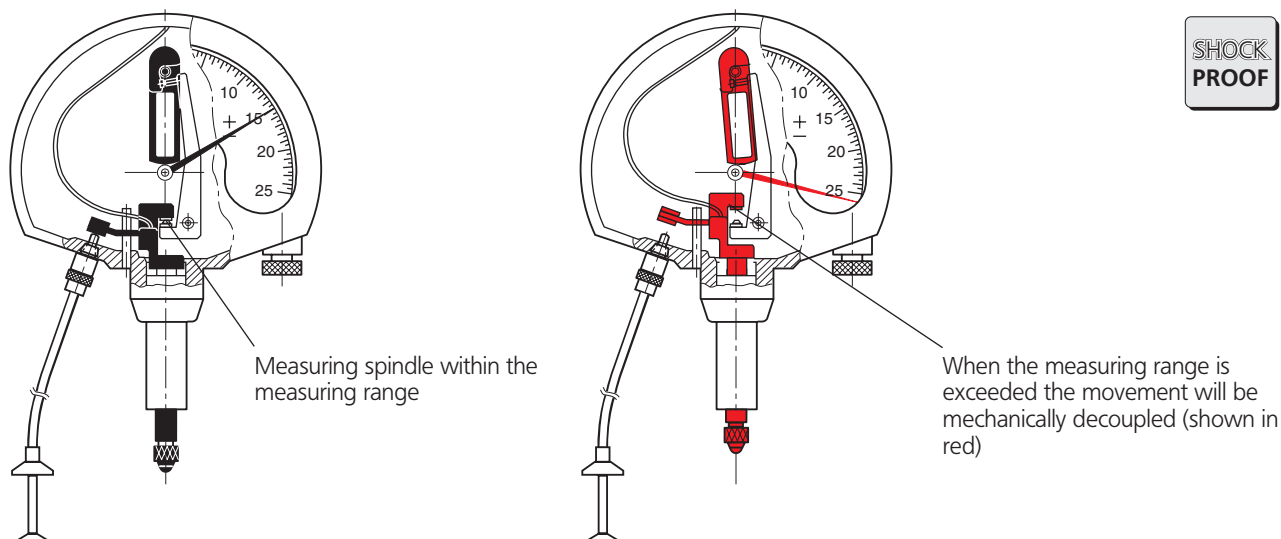
Millimess. Dial Comparators

OVERVIEW

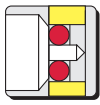
Design Features



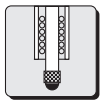
Shockproof Mechanism



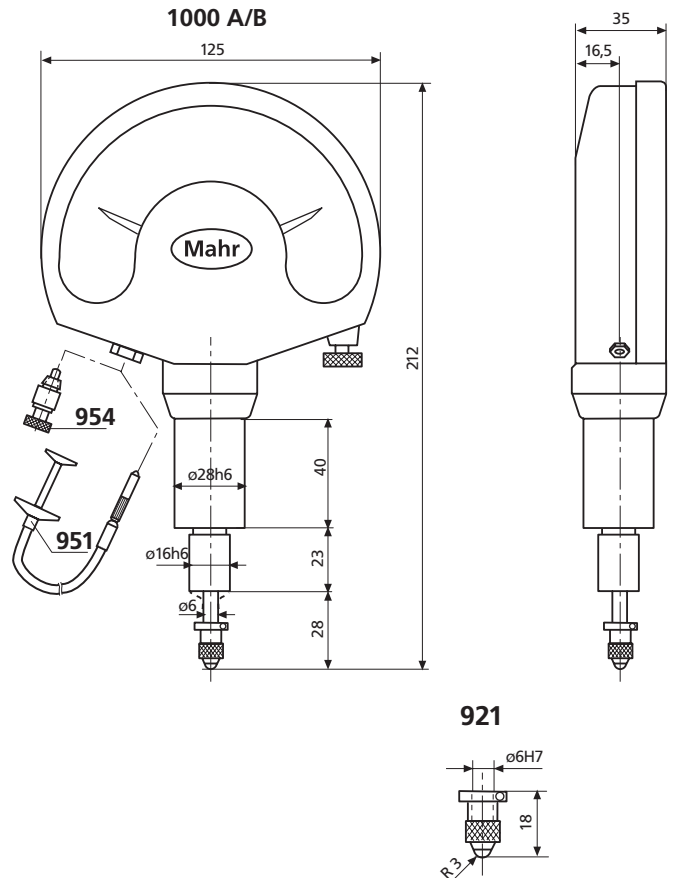
Mechanical Dial Comparator Large Type Millimess



**SHOCK
PROOF**



1000 A



Features

- Large design
- Easy to read dial
- Shockproof movement
- Jeweled movement bearings
- Measuring spindle is mounted in a high-precision ball guide which precludes play
- Supplied with: Cable Release 951, case

Accessories

	Order no.	
Contact Points		
with Steel	921	4362001
with Ruby ball	921 R	4362002
Cable Release to raise the measuring spindle	951	4372000
Lifting Knob for lifting the measuring spindle	954	4372030
Rubber Bellows to seal the open end of the measuring spindle		4338008

Technical Data

	Measuring range	Reading	Over-travel	Measuring* force	Order no.
Metric					
1000 A	$\pm 120 \mu\text{m}$	$1 \mu\text{m}$	4 mm	$1.9 \pm 0.3 \text{ N}$	4338100
1000 B	$\pm 50 \mu\text{m}$	$1 \mu\text{m}$	4 mm	$1.9 \pm 0.3 \text{ N}$	4339100

* In the vertically mounted position

Mechanical Dial Comparators



1002



1003



1004



1003XL



1003T**



Technical Data

Metric		Measuring range	Readings	Overtravel	Measuring force	DIN 879-1	Order no. Standard*	Order no. Waterproof**
1002	Supramess	± 25 μm	0.5 μm	2.8 mm	1 N	●	4335000	4335005
1003	Millimess	± 50 μm	1 μm	2.8 mm	1 N	●	4334000	4334005
1003	Millimess	± 50 μm	1 μm	2.8 mm	0.3 N	●	4334075	
1003	Millimess	± 50 μm	1 μm	2.8 mm	0.5 N	●	4334050	
1003	Millimess	± 50 μm	1 μm	2.8 mm	0.7 N	●	4334071	
1003	Millimess	± 50 μm	1 μm	2.8 mm	2 N	●	4334010	
1003	Millimess	± 50 μm	1 μm	2.8 mm	3 N	●	4334011	
1003 XL	Millimess XL	± 130 μm	2 μm	2.5 mm	1 N	●	4334001	
1004	Compramess	± 0.13 mm	5 μm	2.5 mm	1 N		4333000	4333005
1010	Zentimess	± 0.25 mm	0.01 mm	2.5 mm	1 N		4332000	4332005
1050	Dezimess	± 1.5 mm	0.05 mm	0.3 mm	1 N		4330000	4330005
Inch								
1002 Z	Supramess	± .0010"	.00002"	.11"	1 N	●	4335900	4335905
1003 Z	Millimess	± .0020"	.00005"	.11"	1 N	●	4334900	4334905
1004 Z	Compramess	± .0050"	.0001"	.10"	1 N		4333900	4333905
1010 Z	Zentimess	± .0100"	.0005"	.10"	1 N		4332900	4332905

* Incl. Plastic Case; Adapter 940 (for inch instruments only)

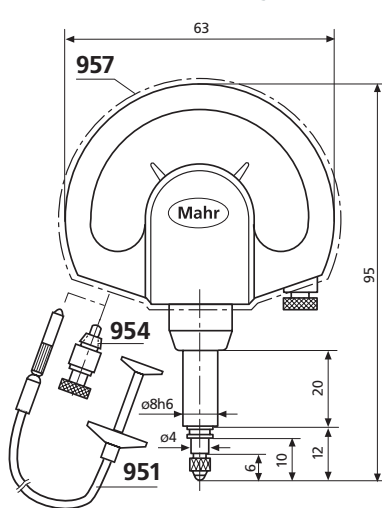
** IP54, Incl. Plastic Case, Splash Guard Cover 957, Rubber Bellows (only for 1002 / 1003 / 1004); Adapter 940 (for inch instruments only)



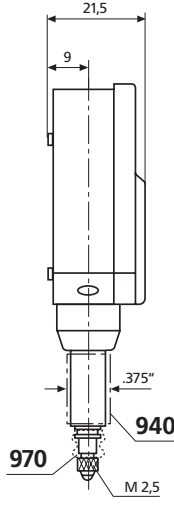
1010



1050



1002/1003/1004



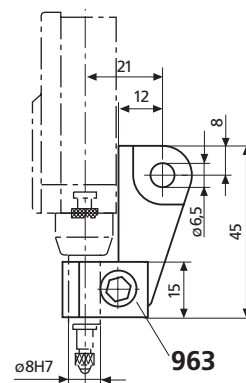
1010/1050

Accessories

	Order no.	
Adapter Bush for adapting mounting shank 8h6 mm to inch bore .375"	940	4310103
Cable Release to raise the measuring spindle	951	4372000
Lifting Knob for lifting the measuring spindle	954	4372030
Splash Guard Cover	957	4373030
Rubber Bellows for 1002/1003/1004 to seal the open end of the measuring spindle	970	4334786
Mounting Lug to mount on mounting shank 8h6 mm	963	4375002

Additional Accessories

See Chapter **Millimar**. Standard Elements



Mechanical Dial Comparators with limit contacts



1110 N



1150 N

Features

- Can be applied for example as tolerance control or as a precision contactor in automatic control systems
- Design features are identical with Mechanical Dial Comparators, but with the addition of adjustable limit contacts; made from high-grade precious metal
- Limit contacts are particularly well protected against vibration and mechanical overload

Technical Data

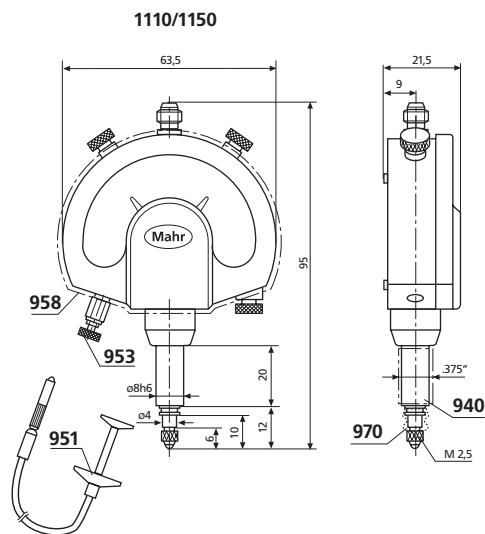
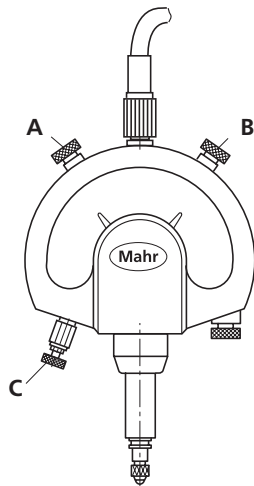
		Measuring range	Readings	Over travel	Measuring force	Order no. Standard*	Order no. Water-proof**
Metric							
1110 N	Elzentimess	± 0.25 mm	0.01 mm	2.3 mm	2 N	4343100	4343105
1150 N	Eldezimess	± 1.5 mm	0.05 mm	0.3 mm	1.5 N	4342100	4342105

* Incl. Plastic Case, Setting Knob 953, Cable (1.2m)

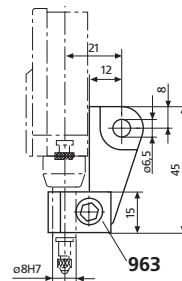
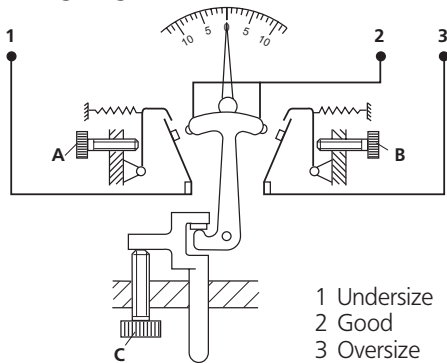
** IP54, Incl. Plastic Case, Splash Guard Cover 958, Rubber Bellows (only for 1110)

Electrical Specifications

Contact uncertainty with non-inductive load of 10 mA/24V	max. contact rating	max. contact voltage	max. contact current
1110 N +/- 1,5 µm	240 mW	24 V	100 mA
1150 N +/- 7 µm			



Wiring diagram



Zubehör

	Order no.		Order no.
Connection Cable (1.2 m), axial	4345695	Splash Guard Cover	958 4373031
Connection Cable (5 m), axial	4345694	Rubber Bellows to seal the open end of the measuring spindle	970 4334786
Adapter Bush for adapting mounting shank 8h6 mm to inch bore .375"	940 4310103	Mounting Lug to mount on mounting shank 8h6 mm	963 4375002
Cable Release to raise the measuring spindle	951 4372000		
Setting Knob for setting the limit contacts without an additional setting standard	953 4372020	Additional Accessories	
Lifting Knob for lifting the measuring spindle	954 4372030	See Chapter Millimar . Standard Elements	

COMPLEX MEASURING TASKS BROUGHT STRAIGHT TO THE POINT. **MILLIMAR**



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

www.mahr.com, WebCode 153

► | The requirements for electrical length measuring instruments are almost as broad as their scope of application. Reliability, precision as well as simple operation are the major demands, Millimar compact and column measuring instruments fulfill all these demands and requirements.

Millimar probes are the most influential components of a measurement chain. Their characteristics determine the quality of the entire measurement; depending upon the type of application we have the corresponding probe for your requirements. For example; a Millimar Inductive Probe: robust, versatile and has an attractive price.

▶ | Millimar. Electrical Length Measuring Instruments

Overview	
Electrical Length Measuring Instruments	84
Overview	
Inductive Probes Program	86
Millimar P1300	88
Millimar P2001 / P2004 / P2010 / P2104	90
Millimar 1301 / 1303 / 1304 K / 1318 / 1340	94
Overview	
Evaluation Instruments	96
Millimar 830 / 832 / C 1200 / C 1208 / C 1216 / C 1245	98
Compact Amplifiers	
Millimar S 1840	104
Column Amplifiers	
Millimar S 1841	105
Multi-Gaging Column Amplifier	
Millimar X 1715 / X 1741	108
Measuring Interface Systems	
Millimar 1901 TA	109
Measuring Amplifier with analog output	

Millimar. Electrical Length Measuring Instruments

OVERVIEW

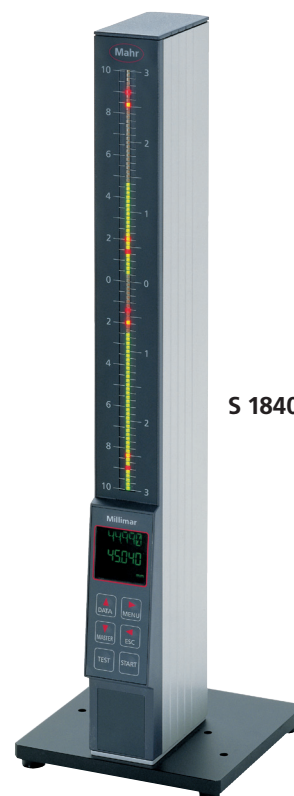
Evaluation Instruments



C 1200



C 1245



S 1840

- Compact, handy and simple to operate
- Extremely precise and easy to read due to the large clearly defined analog or digital display
- Single, sum and differential measurement; limit switches and extreme value memories

- Highly accurate, long term stability and insensitive to environmental influences
- Good zero stability even when changing the measuring range
- Short response time ideal for assessment of fast processes

- Analog or digital display
- Connect to a controller or a computer via the digital output
- Analog output (optional)

Inductive Probes

- Large linearity range, strong output signal and insensitive to interference
- Precise measuring spindle and lever, frictionless ball or spring bearing for the highest resolution with the lowest hysteresis

- Cable is plugged into the probe allowing quick and simple maintenance (P1300)
- Robust construction for use on the shop floor; further models for all applications are available.



P1300 M



P2004 M

Millimar. Electrical Length Measuring Instruments

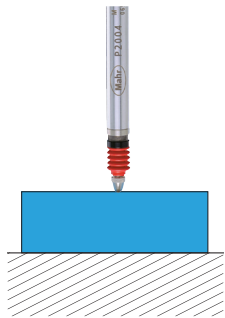
APPLICATIONS WITH INDUCTIVE PROBES

Single measurement with one probe

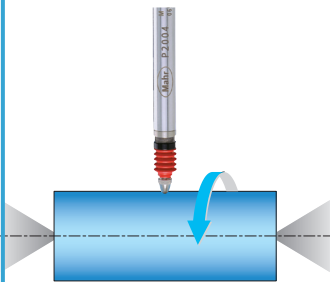
Indicating instrument instantly displays the measured value.

- Used for all kinds of direct measurements on cylindrical and flat work pieces
- Applied in the same way as with digital / dial indicators, digital / dial comparators or test indicators

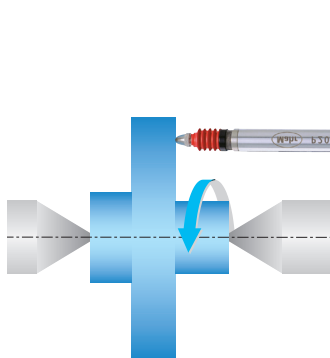
Thickness measurement



Radial run-out



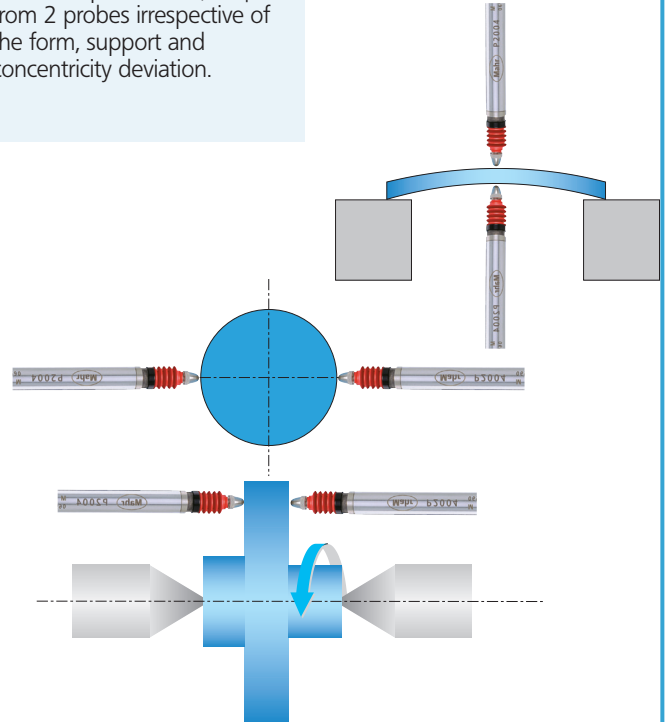
Axial run-out



Sum measurement with 2 probes

Indicates the sum of deviation (total composite error) acquired from 2 probes irrespective of the form, support and concentricity deviation.

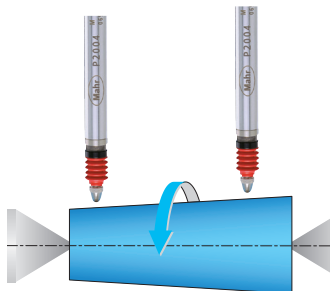
Thickness measurement



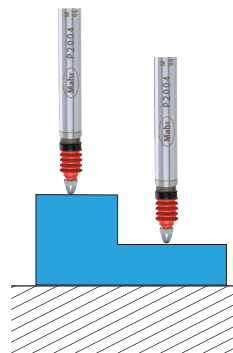
Difference measurement with 2 probes

Shows the difference between the measured values acquired by 2 probes irrespective of the absolute dimension of the test piece. This is particularly suitable for dimensional comparison of two test points.

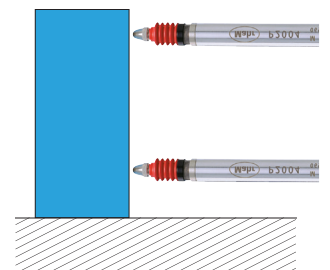
Form measurement of wedges or cones



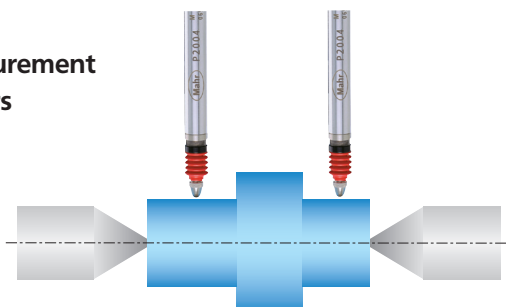
Height difference between 2 steps



Perpendicularity measurement



Concentricity measurement on 2 shaft diameters



Millimar. Electrical Length Measuring Instruments

INDUCTIVE PROBE PROGRAM

P1300-Serie (Mahr-Half bridge)



P1300 A



P1300 B

- Available in Mahr and Tesa compatibilities
- Well-proven and established Mahr-Half Bridge technology
- Easy to service: cable and probe can be separated via the plug-in connector
- Simple to change to pneumatic lifting
- Measuring spindle runs in rotary stroke bearings

Page 88

P2000-Series



P2001



P2004



P2010 A



P2104 A

- Available in all prominent compatibilities (Mahr, Mahr-Federal, Tesa, Marposs)
- Wide product spectrum; measuring ranges from 1 to 10 mm plus models with a compressed air (pneumatic) lifter or with vacuum retraction
- With rotary stroke bearings (except P2001)
- High linearity over the total measuring range
- Excellent electromagnetic shielding (EMC)
- All probes (except P2001) can be easily converted from axial to radial by mounting a slip on cap, included in the scope of supply

Page 90

1301 / 1303 / 1304 K / 1318 (Mahr-LVDT)



1301



1303



1304 K



1318

- Extremely robust in all operating conditions; measuring system is offset to guide and mounting shank
- Excellent clamping characteristics
- Measuring spindle runs in rotary stroke bearings (except 1318)
- Measuring spindle can be lifted with a cable release (1301/1303)

Page 94

1340 Mahr High Precision Probe



1340

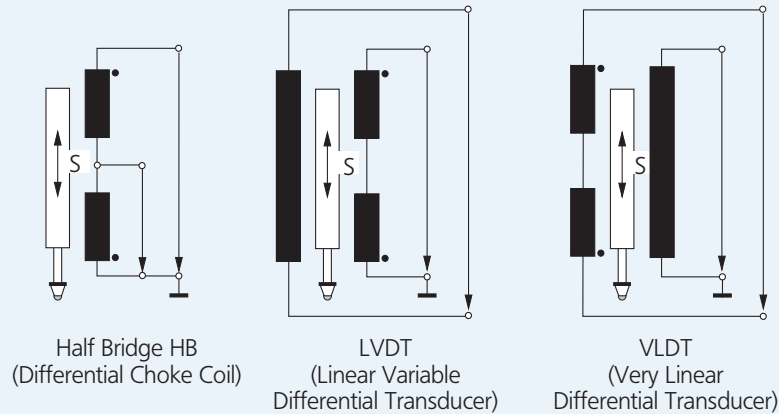
- To obtain the best results use in conjunction with Millitron 1240
- Unprecedented measuring accuracy and minimum linearity error < 0.01 %, i.e. 0.4 µm over the total measuring range

Page 94

General Technical Data of Inductive Probes

The measuring principle of inductive probes is based on the change of position of the magnets conductive core moving within a coil system, generally this is distinguished between a half bridge and LVDT's.

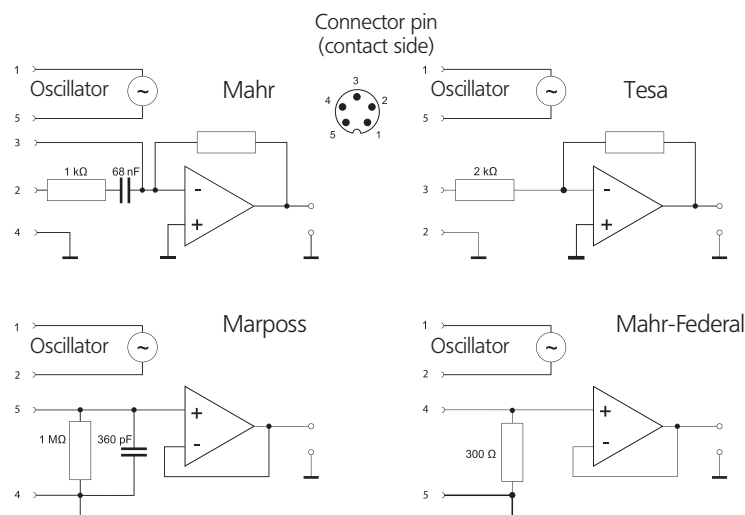
The Mahr P2000 series of probes applies a high linear, patented VLDT transducer which is similar to an LVDT transducer. This also operates according to a differential transformer principle.



Electrical specification of various compatibilities

		Type	Mahr	Tesa	Marposs	Mahr-Federal
Carrier frequency	KHz		19.4	13	7.5	5
Sensitivity	mV/V/mm	P2001 P2004 P2104	192	73.75	115	78.74
		P1300	192	73.75	—	—
		1301 1303 1304 K 1318	192	—	—	—
		P2010	19.2	29.5	11.5	7.874
Amplitude	Veff		5	3	3.5	2

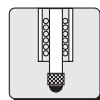
Schematic drawings of Mahr input amplifiers according to the various compatibilities



Inductive Probe Millimar P1300 M / T Half Bridge

Features

- Supplied with:
Inductive Probe P1300
Connection cable 2.5 m
Screwed sealing plug
Hose connector for
compressed air
Open-ended spanner
Operating instructions



Cable and probe can be separated with the plug-in connector.



Technical Data

Probe type	P1300 MA	P1300 TA	P1300 MB	P1300 TB
Measuring range	± 2.0 mm / ± 0.079"			
Distance of lower stop ¹⁾	- 2.2 ... 0 mm / - 0.09 ... 0"			
Distance of upper stop ¹⁾	+ 2.2 ... 4.4 mm / + 0.09 ... 0.173"			
Lifter/Retraction	Vacuum Lifter (Standard option)		Compressed Air Retraction (max. 1 bar)	
Measuring force at electrical zero point	0.75 N / ± 0.15 N ²⁾		depending upon air pressure	
Increase in measuring force	0.3 N / mm		—	
Sensitivity deviation	0.3 %			
Repeatability f _w	0.1 µm / 4 µin			
Hysteresis f _u	0.5 µm / 20 µin			

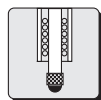
Linearity deviation with revised sensitivity

within range $\pm 0.5 \text{ mm}$	0.4 μm / 16 μin	1.0 μm / 40 μin	0.4 μm / 16 μin	1.0 μm / 40 μin
within range $\pm 1.0 \text{ mm}$	1.5 μm / 60 μin	3.0 μm / 120 μin	1.5 μm / 60 μin	3.0 μm / 120 μin
within range $\pm 2.0 \text{ mm}$	3.0 μm / 120 μin	not specified	3.0 μm / 120 μin	not specified
Protection class according to IEC 60529	IP64			
Length of cable	2.5 m / 8 ft (detachable)			
Compatibility - Half Bridge	Mahr	Tesa	Mahr	Tesa
Order no.	4400180	4400190	4400181	4400191

¹⁾ Relative to the electrical zero point. Adjustable; lower and upper stops are simultaneously adjusted

²⁾ Measuring force springs are interchangeable, following measuring force springs are available (0.25; 0.5; 1; 1.25; 1.5 N)

Inductive Probe Millimar P2000-Series



Technical Data

Probe type	P2001	P2004	P2004 A	P2004 B
Measuring range	$\pm 0.5 \text{ mm} / \pm 0.020''$	$\pm 2.0 \text{ mm} / \pm 0.079''$		
Distance of lower stop ¹⁾	—	$- 2.2 \dots 0 \text{ mm} / -0.09 \dots 0''$		
Distance of upper stop ¹⁾	—	$+2.2 \dots 4.4 \text{ mm} / 0.09 \dots 0.173''$		
Lifter/Retraction	—	—	Vacuum lifter	Compressed air (max. 1 bar)
Measuring force at the electrical zero point	$0.75 \text{ N} \pm 0.15 \text{ N}$	$0.75 \text{ N} \pm 0.15 \text{ N}^{2)}$	$0.75 \text{ N} \pm 0.15 \text{ N}^{2)}$	depending on air pressure
Increase in measuring force	$0.1 \text{ N} / \text{mm}$	$0.2 \text{ N} / \text{mm}$	$0.2 \text{ N} / \text{mm}$	—
Sensitivity deviation	0.3 %	0.3 %		
Repeatability f_w	$0.15 \text{ } \mu\text{m} / 6 \text{ } \mu\text{in}$	$0.1 \text{ } \mu\text{m} / 4 \text{ } \mu\text{in}$		
Hysteresis f_u	$0.2 \text{ } \mu\text{m} / 8 \text{ } \mu\text{in}$	$0.5 \text{ } \mu\text{m} / 20 \text{ } \mu\text{in}$		

Linearity deviation with corrected sensitivity

within range $\pm 0.1 \text{ mm}$	$0.6 \text{ } \mu\text{m} / 24 \text{ } \mu\text{in}$	—		
within range $\pm 0.5 \text{ mm}$	$1.5 \text{ } \mu\text{m} / 60 \text{ } \mu\text{in}$	$0.4 \text{ } \mu\text{m} / 16 \text{ } \mu\text{in}$		
within range $\pm 1.0 \text{ mm}$	—	$1.5 \text{ } \mu\text{m} / 60 \text{ } \mu\text{in}$		
within range $\pm 2.0 \text{ mm}$	—	$3.0 \text{ } \mu\text{m} / 120 \text{ } \mu\text{in}$		
Protection class acc. to DIN VDE 0470 Part 1 / IEC 60529	IP40	IP64		
Cable length	$2.5 \text{ m} / 8 \text{ ft}^{3)}$	$2.5 \text{ m} / 8 \text{ ft}^{3)}$		

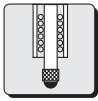
Order no.	P2001	P2004	P2004 A	P2004 B
Compatibility - Mahr	5323040	5323010	5323020	5323030
Compatibility - Tesa	5323041	5323011	5323021	5323031
Compatibility - Marposs	5323043	5323013	5323023	5323033
Compatibility - Federal	5323044	5323014	5323024	5323034

¹⁾ Relative to the electrical zero point. Adjustable; lower and upper stops are simultaneously adjusted

²⁾ Measuring force springs are interchangeable, additional measuring force springs are available (0.25; 0.5; 1; 1.25; 1.5 N)

³⁾ Extension cables are available, see accessories

Inductive Probe Millimar P2000-Series



Technical Data

Probe type	P2010*	P2010 A*	P2010 B*	P2104 A	P2104 B
Measuring range	± 5.0 mm / ± 0.197"			± 2.0 mm / ± 0.079"	
Distance of lower stop	- 5.3 mm / - .20"			- 2.2 ... 0 mm / -0.09 ... 0" ¹⁾	
Distance of upper stop	+ 5.3 / + .20"			8.4 ... 10.4 mm / -0.33 ... 0.41" ¹⁾	
Lifter/Retraction	—	Vacuum lifter	Compressed air (max. 1 bar)	Vacuum lifter	Compressed air (max. 1 bar)
Measuring force at the electrical zero point	0.75 N ± 0.15 N ²⁾	0.75 N ± 0.15 N ²⁾	depending on air pressure	0.75 N ± 0.15 N ²⁾	depending on air pressure
Increase in measuring force	0.1 N / mm	0.1 N / mm	—	0.1 N / mm	—
Sensitivity deviation	0.3 %				
Repeatability f _w	0.2 µm / 8 µin				
Hysteresis f _u	1 µm / 40 µin		0.5 µm / 20 µin		
Linearity deviation with corrected sensitivity					
within range ± 0.5 mm	—		0.5 µm / 20 µin		
within range ± 1.0 mm	—		2.0 µm / 80 µin		
within range ± 2.0 mm	4.0 µm / 160 µin		4.0 µm / 160 µin		
within range ± 5.0 mm	20.0 µm / 800 µin		—		
Protection class acc. to DIN VDE 0470 Part 1 / IEC 60529	IP64		IP64		
Cable length	2.5 m / 8 ft ³⁾		2.5 m / 8 ft ³⁾		
Order no.	P2010	P2010 A	P2010 B	P2104 A	P2104 B
Compatibility - Mahr	5324010	5324020	5324030	5324070	5324080
Compatibility - Tesa	—	5324021	5324031	5324071	5324081
Compatibility - Marposs	—	5324023	5324033	5324073	5324083
Compatibility - Federal	—	5324024	5324034	5324074	5324084

* Output $1/10$ sensitivity

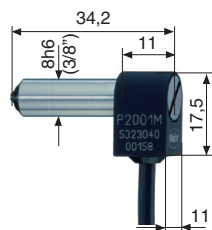
¹⁾ Relative to the electrical zero point. Adjustable; lower and upper stops are simultaneously adjusted

²⁾ Measuring force springs are interchangeable, additional measuring force springs are available (0.25; 0.5; 1; 1.25; 1.5 N)

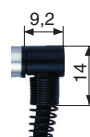
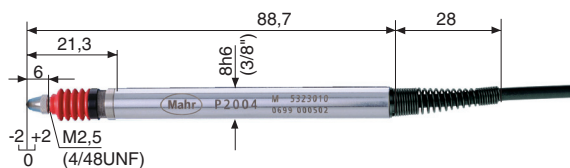
³⁾ Extension cables are available, see accessories

Inductive Probe Millimar P2000-Series

P2001

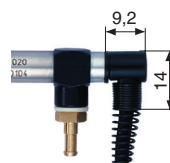
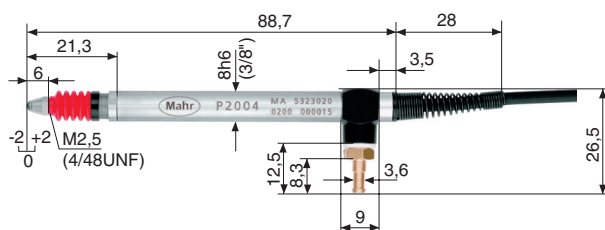


P2004



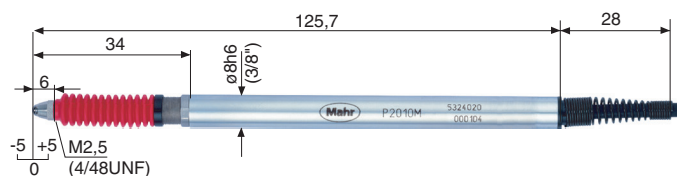
With the supplied slip-on cap, the cable can be flexed to 90° (vertical to horizontal)

P2004 A / P2004 B



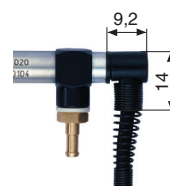
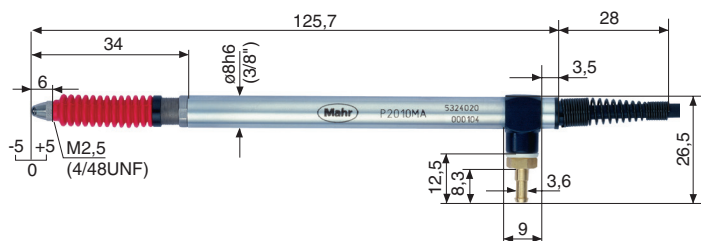
With the supplied slip-on cap, the cable can be flexed to 90° (vertical to horizontal)

P2010



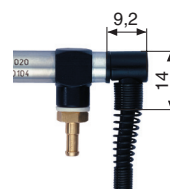
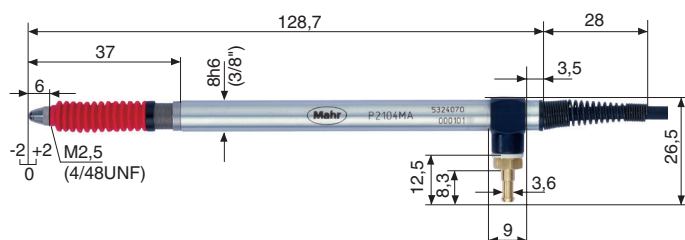
With the supplied slip-on cap, the cable can be flexed to 90° (vertical to horizontal)

P2010 A / P2010 B



With the supplied slip-on cap, the cable can be flexed to 90° (vertical to horizontal)

P2104 A / P2104 B



With the supplied slip-on cap, the cable can be flexed to 90° (vertical to horizontal)

Values shown in brackets apply to Federal-compatibility

Accessories

Extension cables		Mahr M	Tesa T	Marposs U	Mahr Federal F
Length	Description	Order no.	Order no.	Order no.	Order no.
2.5 m	C 2025	5323130	5323131	5323133	5323134
5 m	C 2050	5323140	5323141	5323143	5323144
7.5 m	C 2075	5323150	5323151	5323153	5323154
10 m	C 2100	5323160	5323161	5323163	5323164

Order no.		Order no.	
Measuring force springs¹⁾ for P2004 and 2004 A		Measuring force springs¹⁾ for 2010 and P2010 A	
0.25 N	7026827	0.25 N	7028212
0.50 N	7026827	0.50 N	7028212
0.75 N	7026828	0.75 N	7027764
1.00 N	7026849	1.00 N	7028213
1.25 N	7025579	1.25 N	7028214
1.50 N	7025505	1.50 N	7028215
¹⁾ All measuring forces (except 0.25 N) include the sealing bellows have a measuring spring force of ca. 0.25 N in zero position.		¹⁾ All measuring forces (except 0.25 N) include the sealing bellows have a measuring spring force of ca. 0.25 N in zero position.	

Order no.		Order no.	
Measuring force springs¹⁾ for P2104 A		Sealing bellows for	
0.25 N	7028212	2004, 2004 A	7021546
0.50 N	7027764	2004 B	7028220
0.75 N	7028213	2010, 2010 A, 2104 A	7027758
1.00 N	7028214	2010 B, 2104 B	7028221
1.25 N	7028215		
¹⁾ All measuring forces include the sealing bellows			

Pneumatic Lifter 1340/1	for connection with 1 Probe	5313420
Pneumatic Foot Switch 1340/1F	for connecting max. 4 Probes, types 1340, P2004xA, P2010xA, P2104xA, 1300 A, 1310 A	5313419

Temperature specifications

Temperature coefficient ftT	0.15 µm / °C
Working temperature range	+ 10 ... + 55° C (10 ... 131°F)
Operating temperature range	- 10 ... + 80° C (14 ... 176°F)
Information regarding chemical resistance	Resistant against oil, gasoline (petrol), water, alipate. Moderate against acids, alkaline solutions, solvents, ozone

Inductive Probe Millimar 1301 / 1303 / 1304 K / 1318 / 1340



Technical Data

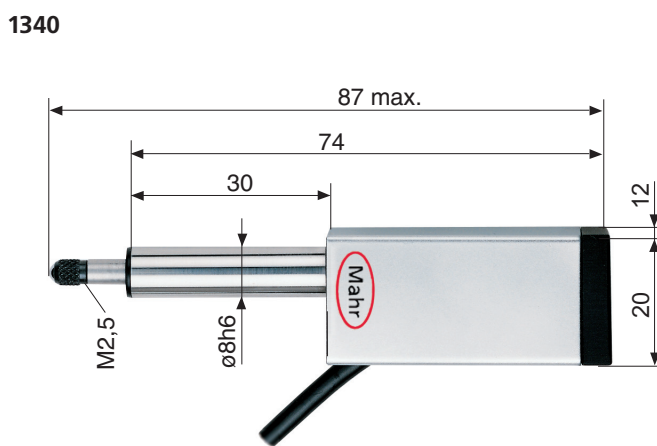
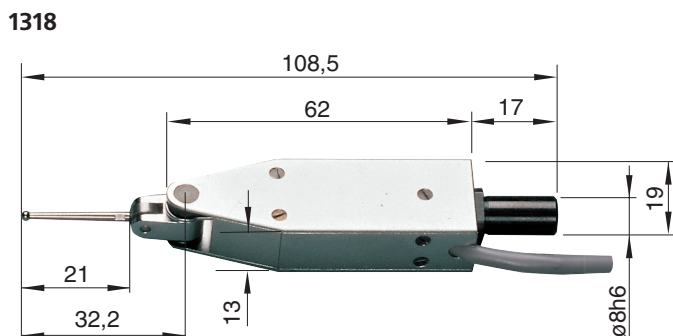
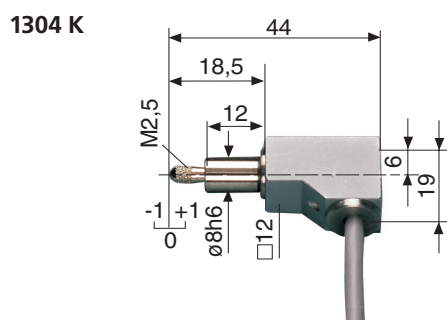
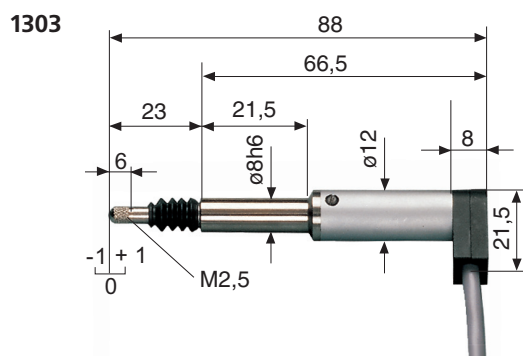
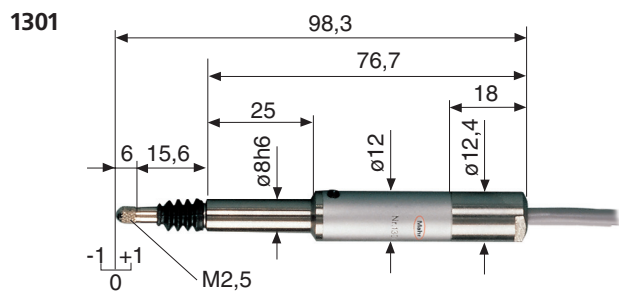
Probe type	1301	1303	1304 K	1318	1340
Measuring range	$\pm 1.0 \text{ mm} / \pm .039''$		$\pm 1.0 \text{ mm} / \pm .039''$	$-0.3 \dots +1.0 \text{ mm} / -.012 \dots +.039''$	$\pm 2 \text{ mm} / \pm .079''$
Distance of lower stop ¹⁾	$-1.1 \dots 0 \text{ mm} / -.043 \dots 0''$		$1.1 \text{ mm} / -.043''$	$-0.37 \text{ mm} / -.0146''$	$-2.2 \text{ mm} / -.09''$ (adjustable)
Distance of upper stop ¹⁾	$+2.7 \text{ mm} / +.106''$		$+1.1 \text{ mm} / +.043''$	$+1.6 \text{ mm} / +.063''$	$+3.0 \text{ mm} / +.118''$
Lifter/Retraction	Cable release		—	—	pneumatic
Measuring force at the electrical zero point	0.75 N $\pm 0.15 \text{ N}$		0.75 N $\pm 0.15 \text{ N}$	0.25 N $\pm 0.05 \text{ N}$	0.75 N $\pm 0.15 \text{ N}$
Increase in measuring force	0.4 N / mm		0.15 N / mm	0.04 N / mm	0.08 N / mm
Sensitivity deviation	0.3 %		1.0 %	0.5 %	0.3 %
Repeatability f_w	0.1 $\mu\text{m} / 4 \mu\text{in}$		0.15 $\mu\text{m} / 6 \mu\text{in}$	0.03 $\mu\text{m} / 1.2 \mu\text{in}$	$\leq 0.08 \mu\text{m} / 3.15 \mu\text{in}$
Hysteresis f_u	0.2 $\mu\text{m} / 8 \mu\text{in}$		0.2 $\mu\text{m} / 8 \mu\text{in}$	0.5 $\mu\text{m} / 20 \mu\text{in}$	0.08 $\mu\text{m} / 3.15 \mu\text{in}$

Linearity deviation with corrected sensitivity

within range ± 0.3 mm	—		—	0.9 µm / 36 µin	—
within range ± 0.5 mm	0.5 µm / 20 µin		1.0 µm / 40 µin	—	—
within range ± 1.0 mm	2.0 µm / 80 µin		4.0 µm / 160 µin	—	0.15 µm / 6 µin
within range ± 2.0 mm	—		—	—	0.4 µm / 16 µin
Protection class acc. to IEC 60529	IP64		IP62	IP50	IP64
Cable length	1.5 m ²⁾				
Compatibility - Mahr	LVDT				only with Millimar 1340
Order no.	5313010	5313030	5313049	5313180	5313400

¹⁾ Relative to the electrical zero point

²⁾ Extension cables are available, see accessories



Accessories

	Description	Order no.
Extension Cables for 1301 / 1303 / 1304 K / 1318	1288/1 1.0 m / 3 ft	5312881
	1288/2,5 2.5 m / 8 ft	5312882
	1288/5 5 m / 16 ft	5312885
	1288/7,5 7.5 m / 24 ft	5312887
	1288/10 10 m / 30 ft	5312889
Cable Release for 1301 / 1303	1399	5313990
Styluses for 1318 with carbide ball	d = 2 mm; L = 21 mm*	3005223
	d = 0.5 mm; L = 21 mm	7003901
	d = 1 mm; L = 21 mm	7003902
	d = 3 mm; L = 21 mm	7003903
	d = 2 mm; L = 21 mm	8004231
Styluses for 1318 with ruby ball		
Pneumatic Lifter for 1340	1340/1	5313420
Pneumatic hand pump with an plug-in hose ca. 1 m / 3 ft		
Pneumatic Foot Switch for 1340	1340/1F	5313419
for connecting up to 4 P1300 Probes		

* Supplied with 1318

Millimar. Evaluation Instruments

OVERVIEW

	830	832	C 1200	C 1208 / C 1216
				
Catalog page	98	99	101	102
Display	Needle analog scale	Analog display with 1 digital line display	Background lit TFT color display	Background lit LCD with an analog display and a two line digital display
Measuring channels	According to type, up to: 2 Inductive Probes (A, B)	According to type, up to: 2 Inductive Probes (A, B) 1 Pneumatic device (A, B)	1 Inductive Probe (A)	According to type, up to: 2 Inductive Probes (A, B) 1 Pneumatic device
Compatible Inductive Probe (carrier frequency)	Mahr Federal	Mahr / Mahr Federal	Mahr	Mahr / Mahr Federal
Max. Resolution	0.1 μm / .000005"	0.01 μm / .000001"	0.1 μm / 0.01 μm .000005"/.000001"	0.1 μm / 0.01 μm * .000005"/.000001" *
Input Combinations	+A, -A, +B, -B, A + B, A - B, B - A, -A - B	+A, -A, +B, -B, A + B, A - B, B - A, -A - B	+A, -A	+A, -A, +B, -B, A + B, A - B, B - A, -A - B
Features / Programs	2 / 2	2 / 2	1	2 / 2
Test steps	1	1	1	1
Dynamic measurements 	—	MAX, MIN, MAX-MIN, (MAX+MIN)/2	—	MAX, MIN, MAX-MIN, (MAX+MIN)/2, mean
Statistics functions	—	—	—	—
Classification	—	5 class LED and I/O	—	3 class LED and I/O
Control inputs and outputs / SPS connections 	—	3 inputs, 5 TTL Opto-coupler outputs	—	3 Opto-coupler inputs, 3 Opto-coupler outputs
Analog output	1	1	—	1*
Data interfaces / ports 	—	RS232, 9 pin, plug	RS232, Digimatic, USB	RS232, 9 pin, plug
Configuration	Turn switch	Keypad	Keypad	PC, Keypad
Power supply	Battery	Battery or AC powered	Battery or AC powered	AC powered
Dimensions in mm (H x W x D)	165 x 190 x 148	254 x 168 x 143	170 x 130 x 150	205 x 160 x 165

* Only C1216

C 1245	S 1840	S1841	X 1715	X 1741	1901 TA
					
103	104	105	108	108	109
Analog scale with a two line digital display	1 illuminated bar and a two line digital display	Illuminated bar and a two line digital display	None Only via PC, supplied with Software D1000X	None Only via PC, supplied with Software D1000X	None Measuring amplifier with analog output
According to type, up to: • 8 Inductive Probes • 4 Incremental Probes • 2 Pneumatic devices • 8 Analog Signals or a combination of the above	According to type, up to: • 2 Inductive Probes (A, B) • 1 Pneumatic device	According to type, up to: • 4 Inductive Probes • 2 Incremental Probes • 1 Pneumatic device • 4 DC voltage signals	According to type, up to: • 8 Inductive Probes • 4 Incremental Probes • 8 Analog Signals • 2 Temperature Sensors or a combination of the above	According to type, up to: • 16 Inductive Probes • 8 Incremental Probes • 8 Analog Signals • 4 Temperature Sensors or a combination of the above	1 Inductive Probe
Mahr / TESA / Mahr Federal	Mahr / Mahr Federal	Mahr / Mahr Federal	Mahr / TESA / Mahr Federal	Mahr / TESA / Mahr Federal	Mahr
0.1 µm / .000005"	0.1 µm / 0.01 µm .000005"/.000001"	0.1 µm / .000005"	0.1 µm / .000005"	0.1 µm / .000005"	—
Formula editor for 80 characters Functions: + / - / * / +/- / () / Factor	A, -A, B, -B, A+B, A-B, -A+B, -A-B	Formula editor for 80 characters Functions: + / - / * / +/- / () / Factor	Formula editor for 80 characters Functions: + / - / * / +/- / () / Factor		—
16 / 6	2 / 2	16 / 6	16 / 6	16 / 6	1
6	1	6	6	6	—
MAX, MIN, MAX-MIN, (MAX+MIN)/2, mean	MAX, MIN, MAX-MIN, (MAX+MIN)/2, mean	MAX, MIN, MAXMIN, (MAX+MIN)/2, mean	MAX, MIN, MAX-MIN, (MAX+MIN)/2, mean	MAX, MIN, MAX-MIN, (MAX+MIN)/2, mean	—
N, x-bar, S, Xmax, Xmin, Range	—	N, x-bar, S, Xmax, Xmin, Range	N, x-bar, S, Xmax, Xmin, Range	N, x-bar, S, Xmax, Xmin, Range	—
max. 998, max. 62 on I/O	5 class display, 3 class I/O	max. 998, max. 62 auf I/O, 5 LED	max. 998, max. 5 on I/O	max. 998, max. 79 on I/O	—
3 Opto-coupler inputs, 6 Opto-coupler outputs	3 Opto-coupler inputs, 3 Opto-coupler outputs	6 Opto-coupler inputs, 12 Opto-coupler outputs	3 Opto-coupler inputs, 6 Opto-coupler outputs	6 Opto-coupler inputs, 12 Opto-coupler outputs	—
1	1	2	1	2	1 Output voltage 1 Current output
RS232, 9 pin, plug	RS232, 9 pin, plug	RS232, 9 pin, plug	RS232, 9 pin, plug	RS232, 9 pin, plug	—
PC, Keypad	PC, Keypad	Keypad	PC	PC	—
AC powered	AC powered	AC powered	AC powered	AC powered	AC powered
210 x 160 x 155	487 x 47 x 144	245 x 225 x 487	160 x 205 x 165	235 x 180 x 160	170 x 43 x 100

Millitron 830 Gaging amplifier**F****Features**

- Battery operates more than 8 hours under full load
- Choice of Power Modules for 120 or 240 VAC operation
- ± 2 volt analog output
- Conforms to CE Standards
- Dual input - for single or differential modes
- Normal/Reverse transducer setting
- Selectable ranges in either Inch or Metric units.
- Calibration adjustments for each input.
- Convenient, front-mounted controls.
- Tilt base provides stable support and easy adjustment for best viewing angle.
- The essential performer for today's slim budgets
- For appropriate inductive probes please refer to pages 88 to 85

Technical Data

Repeatability	to within 0.00005 mm / .000002" or 1/10 of a graduation, whichever is greater
Linearity	less than 4/5 of a scale division
Calibration	less than 4/5 of a scale division
Response Speed-Display	less than .5 seconds for 10% to 90% step follow
Response Time - Output	< 15 ms
Dimensions (H x W x D)	approx. 165 x 190 x 148 mm / 6.5" x 7.5" x 5.8"
Temperature at specified accuracy	20°C / 68°F $\pm 2^\circ\text{C}$
Operating temperature	5° to 45°C / 40° to 110°F, with a temperature coefficient of .02% change/°C x full scale range
Storage temperature	0° to 60°C / 32° to 140°F

Model	120V	Order-no.	240V UK	Ranges	Resolution
Linear:		220V EU			
Standard Unit				$\pm 100 \mu\text{m}$ / $\pm .004"$	5 μm / 200 $\mu"$
830 F	2121421	2121431	2121441	$\pm 20 \mu\text{m}$ / $\pm .001"$	1 μm / 50 $\mu"$
830 M	2121404	2121405	2121425	$\pm 10 \mu\text{m}$ / $\pm .0002"$	0.5 μm / 10 $\mu"$
High Resolution – Inch				$\pm 200 \mu\text{m}$ / $\pm .004"$	10 μm / 200 $\mu"$
830 F	2121424	2121434	2121444	$\pm 50 \mu\text{m}$ / $\pm .001"$	2.5 μm / 50 $\mu"$
				$\pm 10 \mu\text{m}$ / $\pm .0001"$	0.5 μm / 5 $\mu"$
Angular:	120V	220V EU	240V UK		
Angular unit - ARCSEC (used with Mahr Federal Level Heads)				$\pm 1000 \text{ Sec}$ / $\pm .010"$	50 Sec / 500 $\mu"$
830 F	2121422	2121432	2121442	$\pm 200 \text{ Sec}$ / $\pm .002"$	10 Sec / 100 $\mu"$
				$\pm 20 \text{ Sec}$ / $\pm .0004"$	1 Sec / 20 $\mu"$

Accessories

	Order-no.	Compatible Probes	
		Used on 830 F	Used on 830 M
Analog Output Connector	PRT-2380	P2001 F	P2001 M
120V Battery Charger	EBY-1016	P2004 F	P2004 M
220V Battery Charger (EU)	EBY-1019	P2010 F	P2010 M
240V Battery Charger (UK)	EBY-1020	P2104 F	P2104 M
Battery	EBY-1021	EHE-2XXX	1301, 1303,
Battery Eliminator Kit for 110V Models	EKT-1237-W1	EGH-Levels	1304, 1318
Battery Eliminator Kit for 220 Models	EKT-1237-W2		

Millitron 832 Digital Electronic Amplifier



Features

- Dynamics – simultaneously computes the minimum, maximum, T.I.R., nominal and actual gage head signal for dynamic measurement capability.
- Multi-Range – three selectable ranges in inch or metric units.
- Message Center – display provides a simple “menu-driven” setup procedure in English, French or Spanish.
- RS-232 Output – for communicating with Data Collection Devices.
- Two Gage Head Input – Independent reading or for providing the capability of “summing” for diameter reading, matching clearances, runout and parallelism.
- Angular units – selectable arc seconds or millirads for angular measurement applications (see Electronic Levels).
- User selectable password for full lockout capability or individual key lockout in both setup and gaging modes.

Technical Data

	Measuring Range	Digital Resolution	Analog Minimum Grad.
Linear	±2 mm / ±0.100" ±.200 mm / ±.010" ±.020 mm / ±.001"	.001 mm / .0001" .0001 mm / .00001" .00002 mm / .000001"	0.1 mm / .005" 0.01 mm / .0005" 0.01 mm / .00005"
Angular	5 mrad / ±1000 arc sec. 1 mrad / ±200 arc sec.	.005 mrad / 1 arc sec. .0005 mrad / 0.1 arc sec.	.25 mrad / 50 arc sec. .05 mrad / 10 arc sec.
Auto Range Repeatability Calibration Accuracy Linear Error Response Time Thermal Stability	Automatically selects the smallest range for the best resolution, in both linear and angular units ±1 digit ±1 digit Less than .025% of full scale 42 msec. .01% /C x full scale		
Temperature Range: At Specified Accuracy Operating Storage	20°C / 68°F ±2°C 5° to 45°C / 40° to 110°F, with a temperature coefficient of .02% change/°C x full scale range. 0° to 60°C / 0° to 140°F		
Digital I/O Data Output Analog Output Measuring Modes Tolerance Indicators	Five TTL opto-isolated outputs RS-232, transmits Channels A, B, or both, units, and tolerances ±5 VDC full scale for displayed value signal Actual, Minimum, Maximum, T.I.R., Nominal Five LEDs		
Weight	1.58 kg / 3.5 lbs.		
Dimensions (W x D x H)	168 x 254 x 143 mm / 6.63" x 10" x 5.63"		
Gage Head Display Auto Power Off Power Requirements	A, B or both at any time User selectable, up to 99 minutes of non-use Rechargeable battery, 10 hour operation under full load: or 120 VAC/240 VAC 50-60Hz with power module (furnished with Amplifier)		
Replacement Battery	EBY-1015 Ni-Cad rechargeable, 4.8 V, 2.5 amp hours		

Millitron 832 Digital Electronic Amplifier

Technical Data

Power	832 F Mahr Federal probe type Order no.	832 M Mahr probe type Order no.
120VAC adapter	2004005	2004000
US battery/120VAC charger	2004007	2004002
EU/UK 220/240VAC adapter	2004006	2004001
EU battery/220VAC charger	2004008	2004003
UK battery/240VAC charger	2004009	2004004

Accessories

	Order no.
Storage Cover (opaque) – protection for the 832 Amplifier when used in harsh environments	ECV-1276
Oil/Splash Cover (clear) – protection for the 832 Amplifier when used in harsh environments	ECV-1285
Footswitch for HOLD/RESUME , 3 m / 10 ft cable (15 pin)	ECB-1857
Footswitch for DYNAMIC RESET , or remote zeroing 3 m / 10 ft cable (15 pin)	ECB-1858
Footswitch for SEND DATA , 3 m / 10 ft cable (15 pin)	ECB-1859
Footswitch for DYNAMIC RESET , or Remote Zeroing, 1.5m / 5 ft cable (Phone Plug)	300-50
Remote pushbutton for DYNAMIC RESET , or remote zeroing 1.5 m / 5 ft cable (Phone Plug)	ECB-1855
Remote pushbutton for SEND DATA , 1.5 m / 5 ft cable (15 pin)	ECB-1860
Remote pushbutton for HOLD/RESUME and SEND DATA , 3 m / 10 ft cable (15 pin)	ECB-1868
Relay Box – Five relays each with Normally Open/Normally Closed contacts; Contact Rating – 30 Vdc/120 Vac, 3 amps Power Supply – 120 Vac Dimensions – 39 mm x 129 mm x 134.6 mm d/1.53" x 5.082 x 5.3" with ECB-1886W-2, 6.1 mm/24" interconnect cable for amplifier to relay box	EKT-1236-W3
Mating connector , Digital I/O connector (15 pin MALE)	ECN-1695-W2
Mating connector , Reset Data connector (3/32 microphone plug)	ECN-1693
Mating connector , RS-232 Digital Output connector (9 pin FEMALE)	ECN-1695-W1
Mating connector , Gage Head to amplifier connector (5 pin MALE)	ECN-1690
Battery Charger Modules (For 832 Units using 3 pin connector)	
Plug-in 120 VAC, 50-60Hz charger for use with 120 Vac battery operated units	EBY-1028
220 VAC, 50-60Hz charger for use with 220 Vac battery operated units	EBY-1029
240 VAC, 50-60Hz (UK) charger for use with 240 Vac battery operated units	EBY-1030
Power Supply Module (Bypass battery operated units to direct AC source operation)	
For 120 Vac models (For 832 Units using 3 pin connector)	2010000
For 220/240 Vac models (For 832 Units using 3 pin connector)	2010001
For appropriate inductive probes please refer to pages 88 to 95	

Millimar C 1200 Compact amplifier



Features

Functions:

ON/OFF
mm/inch
Reversal of the counting direction
Measuring range selection
TOL (Enter tolerance limit values)
PRESET (Allows the entry of any value using set buttons)
Factor (adjustable)
DATA (Data transmission, when connected with a data connection cable)

- Simple to operate
- Can be operated with batteries or from the main power supply
- When battery powered the C 1200 is fully portable
- Compact housing
- Wall mounting is also possible

- Supplied with:
Operating instructions and a mains power supply plug

- High resolution and high contrast color display
- The display can be continuously inclined for the ideal field of vision

Technical Data

Display	TFT color display 11 cm (4,3"), 480 x 272 Pixel	Probe inputs	1
Display range Digital display	± 5000 μm	Compatibility	Mahr
Display range Analog display	± 5000 μm, ± 2000 μm, ± 1000 μm, ± 300 μm, ± 100 μm, ± 30 μm, ± 10 μm, ± 3 μm	Measuring combinations	+A, -A
Resolution	0,1 μm	Features	1
Readings	200 μm, 100 μm, 20 μm, 10 μm, 2 μm, 0,2 μm	Cut-off frequency	30 Hz
		Data interfaces	Opto RS232C, Digimatic, USB
		Power supply	Mains power supply 230 V/115 V; 50/60 Hz or battery operated
		Housing dimensions (H x W x D)	170 x 130 x 150 mm

Order no.

	Order no.
C 1200	5312010

For appropriate Inductive probes please refer to pages 88 to 95

Accessories

		Order no.
Data connection cable USB (2 m)	2000 usb	4346023
Data connection cable Digimatic (2 m)	2000 d	4346021
Data connection cable RS232C (2 m)	2000 r	4346020
Transmitter for e-Stick	2000 e	4102232
Wireless receiver incl. MarCom Standard Software	e-Stick	4102230

Millimar C 1208 / C 1216 Compact amplifier with background lit display



C 1208

Features

- Favorites, frequently required functions can be assigned to the SELECT key
- Static measurements $\pm A$, $\pm B$ and all combinations
- Dynamic measurements: Max, Min, Max-Min, Max+Min, mean
- Auto-Detect-Mode, two measuring instruments can be connected (Probe, Plug Gage ...)
- Programmable via the integrated key pad or by RS232 interface in conjunction with the MS-Windows configuration Software

Display

- Background lit LCD-Display with an analog and a two line digital display
- 5 three color status lamps for warning and tolerances limits
- Up to 2 features can be simultaneously displayed
- Additional resolution $0.01 \mu\text{m}$ / $1 \mu\text{in}$ at measuring ranges $\pm .008''^*$

Connections

- 2 inputs for inductive probes (also compatible with probes from Mahr, Mahr-Federal)
- RS232 interface
- 3 digital inputs for measurement start, master measurement, send measured values, ...
- 3 digital outputs for GO, NO GO, rework, measuring time, ...
- Analog output*
- Programmable analog output voltage (max. $\pm 5\text{V}$)*
- Supplied with:
Operating instructions and a mains power supply plug

* Only with the C 1216

Technical Data

Display	Background LCD, 115 mm x 70 mm	Error limit	
Analog scale	Pointer, 61 graduations	- 10 x analog display	2.5%
Range and text display	7 digit LCD, 5 x 7 dot matrix, alpha-numeric	- Digital display	0.3% (min. $0.2 \mu\text{m}$)
Measured value display	7 digit LCD, 7 segments	Temperature coefficient	0.005%/°C
Tolerance display	5 LEDs, 3 colors	Operating temperature	0°C ... 45°C / 32°F ... 113°F
Displayed ranges	$\pm 3, 10, 30, 100, 300, 1000, 3000, 10000 \mu\text{m}$ $\pm .0001; .0003; .001; .003; .01; .03; .1; .3 \text{ inch};$ or tolerance related	Interfaces	
Meas. range inductive probe	4000 (± 2000) μm , resolution $0.1 \mu\text{m}$ $\pm .08''$, resolution $.000005''$ 400 (± 200) μm , resolution $0.01 \mu\text{m}$ $\pm .008''$, resolution $.000001''$ *	Computer, printer	RS232, 9 pin interface (PC-compatible assignment)
Response time		- Control outputs	3 Opto-coupler-outputs, 2 24V, 100mA
- Meas. value memory	0.010s	- Control inputs	3 Opto-coupler-inputs, 24V, 10mA
- Digital display	0.100s	Power supply via	100V ... 240V, 47Hz ... 63Hz
- Analog display	0.100s	Mains power pack	10 VA
- Outputs	0.020s	Power consumption	IP54, with conductive dust IP43
		Protection class	ca. 205 x 160 x 165 mm
		Housing dimensions (H x W x D)	ca. 8.07" x 6.29" x 6.49"
		Weight	ca. 2.1 kg / 4.6 lbs

* Only with the C 1216

Order no.

	Order no.
C 1208 M Mahr compatible	5312080
C 1208 F Mahr-Federal compatible	5312082

For appropriate Inductive probes please refer to pages 88 to 95

Accessories

	Order no.
Extension cable (9 pin D-Sub-jack to a D-Sub-socket), length 3 m / 10 ft	7024634
Control Unit with 3 push buttons	5318430
Foot switch for	for Input 1 5330955
	for Input 2 5330956
	for Input 3 5330957
Adapter non wired for I/O port	7032401
Keypad dust cover	3025712

Millimar C 1245 Compact amplifier



Features

Functions

- 16 characteristics can be defined
- With the formula editor (80 characters) the input channels C1 to C8 are mathematically linked with 4 basic arithmetical functions with factors and brackets
- Static measurements: current value, square root, arc tangent
- Dynamic measurements: Max, Min, Max-Min, Max+Min, mean,
- Statistical functions: n, x-bar, S, Xmax, Xmin, R
- Programmable via the integrated keypad or with MS-Windows configuration software via the RS232 interface
- Memory can store up to 500 measurements
- Measurement Start / Stop

Display

- Analog indicator instrument for display of measurement values

- Two-line LCD for measuring values and help texts
- 5 three color status lamps for warning and tolerance limits
- Up to 3 features can be simultaneously displayed

Connections

- 2 input modules can be inserted into base unit
- Following modules are available:
 - 4 inputs for Inductive Probes (Mahr, Mahr-Federal, Tesa compatibility)
- RS232 interface
- 1 Analog output
- 3 digital inputs for measurement start, master measurement / zeroize, send data
- 6 digital outputs for GO, NO GO, rework, ALL GO, measuring time, 4 classes
- Supplied with:
 - Operating instructions and a mains power supply plug

Technical Data

Display	Analog indicator instrument, LCD 53 mm x 40 mm (2.087" x 1.585")	Error limits	
Analog scale	145 mm x 80 mm (5.709" x 3.149")	- 10 x Analog display	2 %
Range and Text display	7-point LCD, 5 x 7 dot matrix, alpha-numeric	- Digital display	0.3 % (min. 0.2 µm)
Measured value display	7-point LCD. 7 Segment	Temperature coefficient	± 0.005%/°C
Tolerance display	5 LEDs, 3-colors	Oper. temperature range	0°... 50°C
Display ranges	± 10, 30, 100, 300, 1000, 3000, 10000 µm ± .0003; .001; .003; .01; .03; .1; .3 inch	Interfaces	
Measuring range inductive probe	4000 (±2000) µm, resolution 0.1 µm (measured value display ± .08", resolution .000005")	Computer, printer	RS232, 9 pin interface (PC-compatible layout)
Response time		- Control outputs	6 Optocoupler-outputs, 24V, 100mA
- Meas. value memory	0.005s	- Control inputs	3 Optocoupler-inputs, 24V, 10mA
- Digital display	0.300s	Analog output. voltage	programmable
- Analog display	0.050s - 0.300s	Power supply	90 V... 264 V, 47Hz... 63Hz
- Outputs	0.020s	Power consumption	11 VA
		Protection class	IP53 with conductive dust IP43
		Housing dimensions (H x W x D)	ca. 210 x 160 x 155 mm ca. 8.268" x 6.299" x 6.103"
		Weight	ca. 2 kg / 4.40 lbs

Order no.

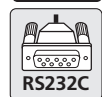
		Order no.
C 1245 M	Mahr compatible for 4 inductive probes	5331250
C 1245 M	Mahr compatible for 8 inductive probes	5331291
C 1245 F	Mahr-Federal compatible for 4 inductive probes	5331253

For appropriate Inductive probes please refer to pages 88 to 95

Accessories

		Order no.
Extension cable (9 pin D-Sub-jack to a D-Sub-socket), length 3 m / 10 ft		7024634
Control Unit with 3 push buttons		5318430
Foot switch for	for Input 1	5330955
	for Input 2	5330956
	for Input 3	5330957
Adapter non wired for I/O port		7032401
Keypad dust cover		3025712

Millimar S 1840 Compact column amplifier



Features

- Easy to read 3 color analog display
- Measurement in conjunction with inductive probes (e.g. Mahr P2004) or electronic plug gages etc
- Two inputs for inductive probes (compatible with probes from Mahr, Mahr-Federal)
- Extensive calculation of input signals: $\pm A$, $\pm B$ and all combinations
- Dynamic measurements: Max, Min, Max-Min, Max+Min, Mean
- Programmable either via the integrated keypad or the RS232 interface by means of MS-Windows configuration software
- Programmable warning and tolerance limits, exceeding the limit causes the color to change from green to yellow to red
- Background lit 2 lined LCD to display measured values, help text and measuring units
- Analog output
- 3 digital inputs (e.g. start of measurement, master measurement)
- 3 digital outputs for GO – NO GO – rework, measuring time
- Programmable analog output voltage ± 5 V
- Supplied with: Operating instructions and a mains power supply plug

Technical Data

Analog display	101 LED elements, 3 colors	Error limits	
Range and Text display	7 point LCD, 14 Segment, alpha-numeric	- 10 x Analog display	1% (101 LEDs)
Measured value display	7 point LCD, 7 Segments	- Digital display	0.3% (min. 0.2 μ m)
Tolerance display	via color changes in the analog display	Temperature coefficient	$\pm 0.005\%$ / $^{\circ}$ C
		Operating temp. range	0 ... 45 $^{\circ}$ C / 32 $^{\circ}$ F ... 113 $^{\circ}$ F
Display ranges	± 10 ; 30; 100; 300; 1000; 3000; 10000 μ m $\pm .0003$; $.001$; $.003$; $.01$; $.03$; $.1$; $.3$ inch or tolerance related	Interfaces	
Meas. range inductive probe	4000 (± 2000) μ m, resolution 0.1 μ m $\pm .08''$, resolution $.000005''$ 400 (± 200) μ m, resolution 0.01 μ m $\pm .008''$, resolution $.000001''$	Computer, printer	RS232, 9 pin. male (PC-compatible layout)
Response time		- Control outputs	3 Optocoupler Outputs, 24 V, 100 mA
- Meas. value memory	0.008 s	- Control inputs	3 Optocoupler Inputs, 24 V, 10 mA
- Analog display	0.020 s	Analog output	Voltage ± 5 V programable
- Outputs	0.020 s	Power supply	90 ... 264 V, 47 ... 63 Hz
		Power consumption	12 VA
		Protection class	IP53
			IP43 with conductive dust
		Dimensions (H x W x D)	ca. 487 x 47 x 144 mm ca. 19.173" x 1.850" x 5.669"
		Weight	ca. 1.6 kg / 3.53 lbs

Order no.

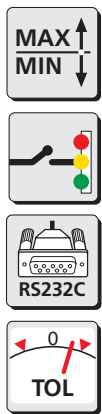
	Order no.
S 1840 M Mahr compatible	5318400
S 1840 F Mahr-Federal compatible	5318402

For appropriate Inductive probes please refer to pages 88 to 95

Accessories

	Order no.
Base Plate , for up to 3 columns	5330901
Wall Mounting	5330902
Connection Cable (9 pin D-Sub-jack to D-Sub-jack), length 3 m / 10 ft	7024634
Control Unit with 3 push buttons	5318430
Foot Switch for Millimar	
Input 1	5330955
Input 2	5330956
Input 3	5330957
Adapter non wired for I/O port	7032401

Millimar S 1841 Multi-Gaging column amplifier with 3 colored LED's



Features

The Millimar S 1841 multi-gaging column amplifier with LED display is ideal for use on the shop floor. With its modular design, the Millimar S 1841 can be easily adapted to a variety of measurement tasks.

The Millimar S 1841 offers a broad range of functions for combining the signals from both static and dynamic measurements. A formula editor enables the mathematical combination of all input channels.

The measuring results – also excellently legible at a distance – are indicated by way of 101 three-color LEDs. When the programmable warning and tolerance limits are exceeded, the LEDs change their color from green to yellow or red, accordingly. A digital display located underneath displays the numerical measured value.

Display

Up to 4 indicating and operating columns can be mounted on one base unit

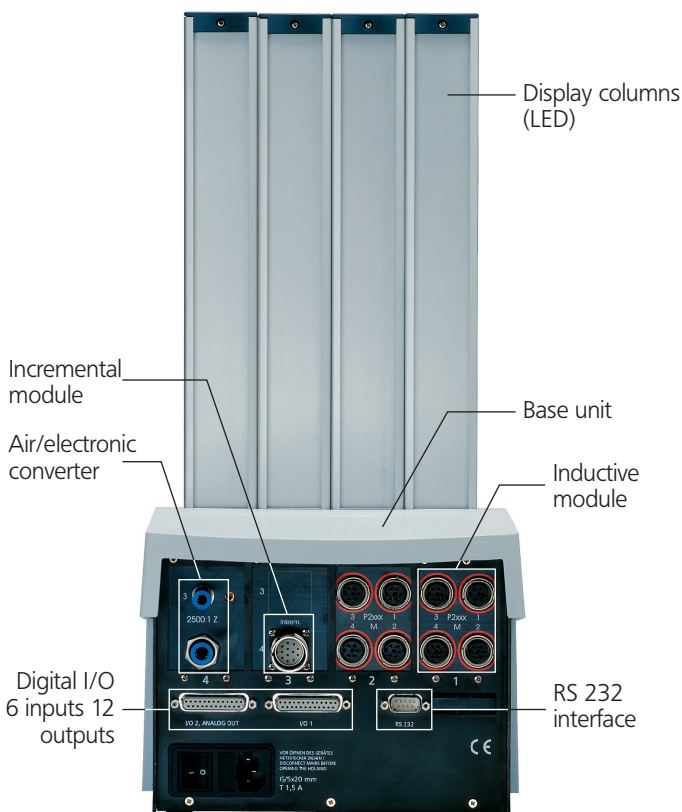
- Three-color illuminated bar graph with analog warning and tolerance limit display
- Two-line backlit LCD for indicating measured values, help texts and measuring units
- Up to two characteristics can be displayed simultaneously

Connections

- 4 input modules can be inserted in the base unit. The following modules are available:
 - 4 inputs for inductive probes (either compatible with Mahr, Tesa, Marposs, or Federal probes)
 - 2 inputs for incremental probes
 - 1 input for pneumatic measuring instruments
 - 4 inputs for DC voltage signals
- RS 232 interface
- Analog output
- 6 digital inputs for starting measurement, master measurement/zero setting, sending data
- 12 digital outputs for Accept – Reject – Rework classification, collective Accept/Reject, measuring time, 10 classes, BCD interface, GO – out of warning limits – out of tolerance for up to 4 parameters

Functions

- 16 parameters may be defined
- A formula editor (80 characters) serves for the mathematical combination of input channels C1 to C16, using the 4 basic arithmetic operations including functions and parentheses
- Static measurements: instantaneous value, square root, ARC tangent
- Dynamic measurements: Max, Min, Max - Min, Max + Min, mean value
- Static functions: n, x-bar, S, Smax, Xmin, R
- Buffering of 5000 measured values
- Measured values can be displayed in mm, μm , inch, or as an angle
- Measurement is started/stopped via keyboard, digital input, RS232
- Measured value can be transferred to different records

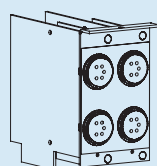
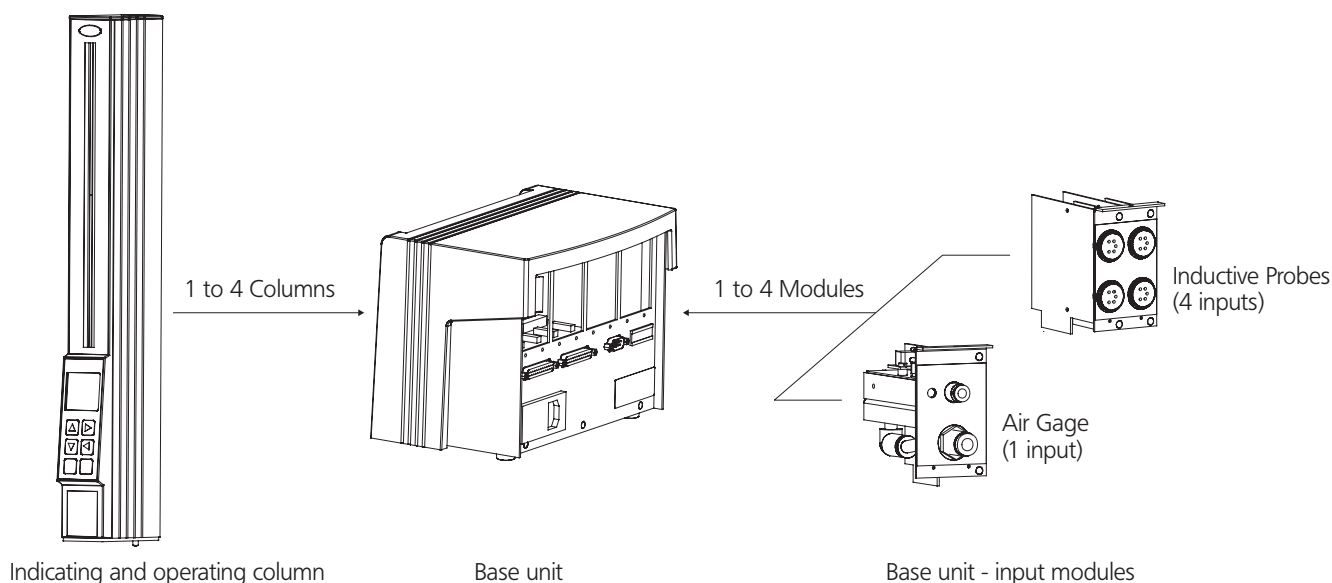


Millimar S 1841 Multi-Gaging column amplifier with 3 colored LED's

Application Examples:

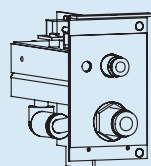
- Standard measuring units with up to 16 inductive probes for shaft measurements
- Measuring station for the inspection of workpieces with several electrical or air plug gages
- Customized multi-gaging units
- Taper jet plug gage or jet ring gage with 3 indicating columns and 2 air/electronic converter inputs. The following parameters are evaluated:
 M1: Pitch error $D2 - D1$
 M2: Taper ratio $L / (D2 - D1)$
 M3: Nominal diameter at a defined height
 $D1 + ((D2-D1)*L1 / L)$

Technical Data



Input module for inductive probes
4 input channels for inductive probes

Carrier frequency		Order no.
19,4 kHz	Mahr	5331010
13 kHz	Tesa	5331011
7,5 kHz	Marposs	5331012
5 kHz	Mahr-Federal	5331013



Input module for air gages
1 input channel for air gages air/electronic converter piezo
Supply pressure 2 bar +/- 5 % (> 4 bar before pressure reducer)
Each module requires 1 pressure reducer

	Magnification	Resolution	Order no.
Mahr	2500:1	± 50 µm	5331020
Mahr	5000:1	± 25 µm	5331021
Mahr	10000:1	± 12 µm	5331022
Mahr-Federal	2500:1	± 38 µm	5331024
Mahr-Federal	5000:1	± 16 µm	5331025
Mahr-Federal	10000:1	± 8 µm	5331026

Order no.

	Order no.
S1841/1 1 Indicating and operating column with base unit	5331001
S1841/2 2 Indicating and operating columns with base unit	5331002
S1841/3 3 Indicating and operating columns with base unit	5331003
S1841/4 4 Indicating and operating columns with base unit	5331004
1 Pressure reducer unit, on base plate	5331078
2 Pressure reducer units, on base plate	5331080
3 Pressure reducer units, on base plate	5331074
4 Pressure reducer units, on base plate	5331076

Technical Data

Bar graph	101 LEDs per indicator unit, 3-color
Range and text display	7-digit LCD, 14 segments, alphanumeric
Measured value display	7-digit LCD, 7 segments
Tolerance display	via color change of bar graph
Display range	±10, 30, 100, 300, 1000, 3000, 10000 μm ±0.0003; 0.001; 0.003; 0.01; 0.03; 0.1; 0.3 inch or tolerance-related
Measuring range inductive probe	4000 (+/- 2000) μm,
Resolution	0.1 μm (digital display)
Measuring units	mm / μm / inch
Carrier frequency	19.4 kHz (Mahr)/ 13 kHz (Tesa) / 7.5 kHz (Marposs) / 5 kHz (Federal)
Cutoff frequency	40 Hz (-3 dB)
Response time	
– Measured value memory (≅ sampling rate)	0.003 – 0.050 s
– Scale display	≤ 0.020 s
– Numerical display	≤ 0.250 s
– Analog output	≤ 0.002 s
– Digital output (RS232 and digital IO)	≤ 0.020 s
Hold time of numerical display	≤ 0.250 s
Error limits	
– Scale division 10	≤ 1% (101 LEDs)
– Numerical display	±1 digit
– Analog output	5% fullscale
– Digital output (RS232 and digital IO)	±1 digit
Repetition limit of display	1 digit
Switch repetition limit	≤ 0.1 mm
Hysteresis	zero
Hysteresis of scale display	zero
Temperature coefficient	± 0.005% / °C
Maximum number of connectable pick-ups	Maximum 4 input modules of the following types: 4 x Inductive probes from Mahr, Tesa, Marposs, or Federal 2 x Incremental probes from Heidenhain 1Vss 1 x Pneumatic input from Mahr or Federal 4 x DC voltage signals ± 10 V, ± 5 V
Working temperature	0° ... 45°C (32°F ... 113°F)
Operating temperature	0° ... 55°C (32°F ... 131°F)
Storage temperature	-15° ... +55°C (5°F ... 131°F)
Maximum relative humidity	80%, excludes condensation
Control inputs	6 optocoupler inputs, 24V / 100 mA
Control outputs	12 optocoupler outputs, 24V / 10 mA
Analog output	
– Voltage	± 10 V
– Sensitivity	± 1 V/mm, ± 1 V/10μm 1 V/.00039")
– Maximum load resistor	≥ 2 kΩ
– Residual ripple	Mahr < 0.5%
– Reference potential	0 V
– Limit frequency	≥ 250 Hz
Serial interface	RS232C; 9 pin Sub-D for PC or printer
Size of LCD field	ca. 38 x 35 mm 1.497 x 1.339") per display unit
Dimensions (L x W x H)	Max. 245 x 225 x 487 mm (9.653 x 8.865 x 19.187")
Weight	Max. ca. 8.5 kg (18.73 lbs)
Power supply	90 – 264 VAC
Power supply frequency	47 – 63 Hz
Power consumption	max. 20 VA
Protection (fuse)	2 A, time-delay fuse
Conformity	EN61010-1, EN55011, EN50082-2 EMV- Regulation 89/336/EWG
Protection class	IP53 (IP43 for conductive dust), IEC 60529

Millimar X 1715 / X 1741 Intelligent measurement interface system



Features

Millimar X 1715 / X 1741

are a smart and universal measurement interface system for complex measuring tasks on the production floor. They are ideal as a signal transformer between sensors and the electronic measured data processing.

Functions

- Static and dynamic measurements
- Equation editor
- Definition of 16 features are possible
- One or two point master measurement

Connections X 1715

- 1 to 8 measuring device inputs
- RS-232 interface
- Analog output
- 3 digital inputs and 6 digital outputs

Connections X 1741

- 1 to 16 measuring device inputs
- RS-232 interface
- 2 analog outputs
- 6 digital inputs and 12 digital outputs
- Supplied with: Operating instructions, connection cable and a mains power supply plug

Technical Data

Measuring range inductive probe	4000 (± 2000) μm . $\pm .08''$ Resolution 0.1 μm . $.000005''$	Analog output voltage	programmable (2 outputs*)
Response time		Power supply	90 V ... 264 V, 47Hz ... 63Hz
- Meas. value memory	0.005s	Protection class	11 VA
- Outputs	0.020s	Schutzart	IP53
Error limits			IP43 with conductive dust
- 0.3% (min. 0.2 μm)		Dimensions (H x W x D)	
Temperature coefficient	$\pm 0.005\%/^{\circ}\text{C}$	X 1715	ca. 160 x 205 x 165 mm ca. 6.30" x 8.07" x 6.49"
Operating temperature range	0° ... 50°C / 32° F ... 122° F	X 1741	ca. 235 x 180 x 160 mm ca. 9.25" x 7.08" x 6.29"
Interfaces		Weight	ca. 2 kg / 4.40 lbs
Computer, printer	RS232, 9 pin interface (PC-compatible layout)		
- Control outputs X 1715	6 Optocoupler-outputs, 24 V, 100 mA		
- Control outputs X 1741	12 Optocoupler-outputs, 24 V, 100 mA		
- Control inputs X 1715	3 Optocoupler-inputs, 24 V, 10 mA		
- Control inputs X 1741	6 Optocoupler-inputs, 24 V, 10 mA		

Order no.

		Order no.
X 1715	Mahr compatible for 2 Inductive probes	5331064
X 1715	Mahr compatible for 4 Inductive probes	5331063
X 1715	Mahr compatible for 8 Inductive probes	5331061
X 1741	Mahr compatible for 2 Inductive probes	9037840
X 1741	Mahr compatible for 4 Inductive probes	9038383
X 1741	Mahr compatible for 8 Inductive probes	5331057
X 1741	Mahr compatible for 16 Inductive probes	5331096

For appropriate Inductive probes please refer to pages 88 to 95

Accessories

		Order no.
Connection Cable (9 pin D-Sub-jack to D-Sub-jack), length 3 m / 10 ft		7024634*
Control Unit with 3 push buttons		5318430
Foot Switch for Millimar	Input 1	5330955
	Input 2	5330956
	Input 3	5330957
Adapter non wired for I/O port		7032401

* Included in the scope of supply

Millimar Measuring Amplifier 1901 TA with analog output

M



Features

- The measuring amplifier 1901 TA is to be used in connection with an inductive probe for measurement control processes
- Provides the inductive probe with an AC voltage and converts the carrier frequency signal into output voltage
- Output voltage: ± 10 V (Option: ± 5 V / 0 V to 10 V) at the end of the measuring range
- Simultaneously the output signal current of ± 5 mA at the end of the measuring range is available
- Supply voltage 24 V=
- The housing of the 1901 TA is designed for use in the machine room
- Connections : 1 output for one Mahr compatible inductive probe
- Supplied with: 3 pin socket plug for analog output, 3 pin coupling bushing for power supply and operating instructions

Technical Data

Measuring ranges (adjustable through bridges)	$\pm 125 \mu\text{m}$ ($\pm .00492''$)	Connections	
	$\pm 250 \mu\text{m}$ ($\pm .00984''$)		Input
	$\pm 500 \mu\text{m}$ ($\pm .01968''$)		Output
	$\pm 1000 \mu\text{m}$ ($\pm .03937''$)		Supply
	$\pm 2000 \mu\text{m}$ ($\pm .07874''$)		
Output voltage at end of measuring range	± 10 V	Response time	5-10 ms
Option:	± 5 V / $0-5$ V / $0-10$ V	Cut-off frequency	90 Hz
Current output at end of measuring range	± 5 mA	Protection class	IP54
Linearity	$\pm 0.3\%$	Dimensions: (L x D x H)	43 x 100 x 170 mm (1.69" x 3.93" x 6.69")
Supply voltage	24 V =		

Order no.

		Order no.
1901 TA	Mahr compatible for 1 Inductive probe	5319011
1901 TA/So	Mahr compatible for 1 Inductive probe 0- 10 V	9023856

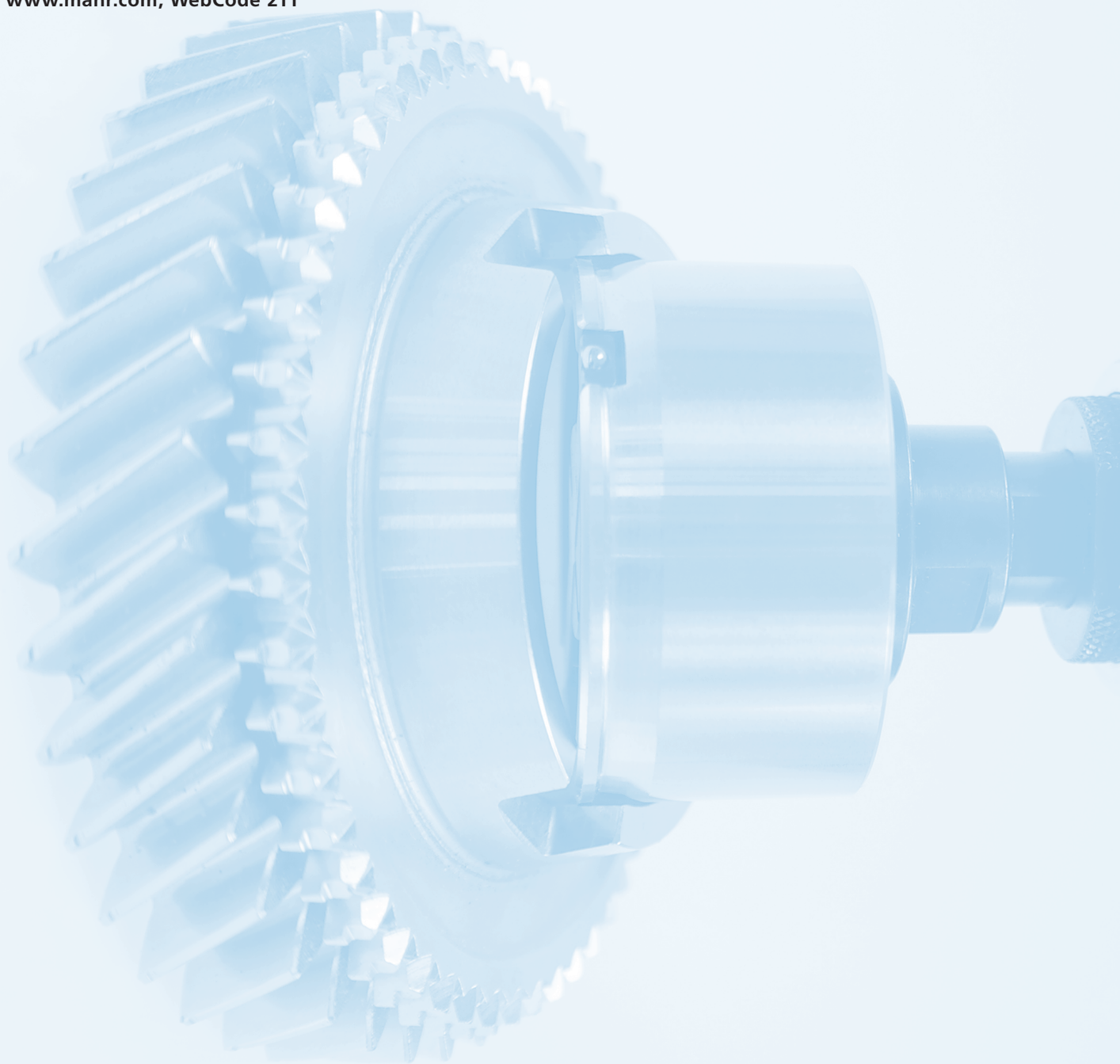
For appropriate Inductive probes please refer to pages 88 to 95

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 Indicating Plugs Gages are the the ideal measuring instruments for highly precise measurements of internal diameters on serial components with small tolerances. Our Indicating Plugs Gages are particularly suitable in conjunction with an Inductive Probe and with Digital Indicating Instruments. The measuring heads are available in various sizes, thus always ensuring you the best solution for your measuring tasks.

► | MaraMeter. Indicating Plug Gages

Indicating Measuring Instruments for Inside Dimensions

Dimentron® Plug Inside Diameter Gages

112

Designed for high production I.D. gaging

MaraMeter 844 D

118

Indicating Plug Gage for rapid testing of serial components

Settings Standards

AGD Masters

125

Master Rings / Master Discs / Master Plugs

MarGage 355 E

126

Setting Standards

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 & plug holder 2248358

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.

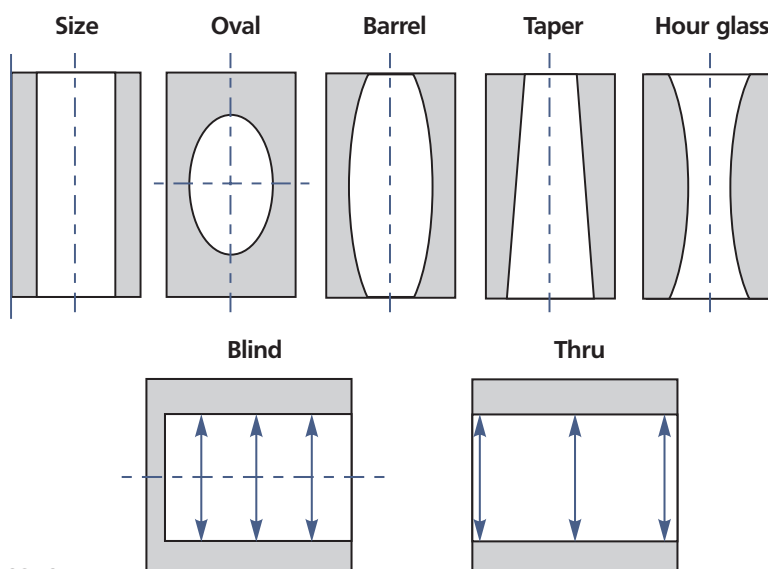
The **plug body** is made from through hardened 440 stainless steel, tempered and ground, with hardness 52-56 HRC, guides the plug gage; its easy entry guide facilitate introduction into the bore.

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".

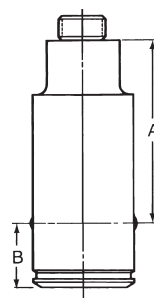
Super-blind Plugs

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



A Dimentron Plug Gage with digital Electronic Indicator makes a compact, portable hand tool.

Thru-hole Plugs

Sizes above	To and include	A	B	Group*
mm / inch	mm / inch	mm / inch	mm / inch	
3.2 / .125"	5.5 / .217"	31.4 / 1.23"	6.4 / .25"	no group*
5.5 / .217"	8.2 / 0.322"	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 / 0.50"	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 Maxum® 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.

Dimetron® Plug Inside Diameter Gages



Dimetron Plug Assembly
shown with 1087 Digital
Indicator and Housing



Dimetron Plug Assembly
shown with Maxµm®/// 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		To and include		Metric M01 Inch 050		Maximum Part Tolerance M02 100		M05 200		M08 400	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	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	.375"	12.7	.500"	±0.038	±.0015"	±0.058	±.0023"	±0.086	±.0034"	±0.137	±.0054"
12.7	.500"	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	4.50"	229	9.00"					±0.152	±.0060"	±0.254	±.0100"

Order Maxµm Indicator and Accessories separately.

Maxµm/// 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 Maxµm/// Indicator to Dimetron Plugs. (Specify **EKT-1120-W2** for Maxµm/// Indicators with 8 mm stems). This adaptor kit includes mounting adaptor, hex wrench, and flat-end, 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/// Indicators without Output. Requires in-line or pistol style grip Handle (**HA-88** Handle and **AT-124** Adaptor).

EHG-1198 For Maxum/// Indicators with Output. Requires pistol style grip Handle (**HA-88** and **AT-124** Adaptor).

B-12668 For Maxum/// 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 page 90).

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.

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 2034101)	.00005" / .001 mm
	EDI-550P-20	(with 2034201)	.00002" / .0005 mm



EDI-550P-10

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

Dimentron® Plug Inside Diameter Gages

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 Maxµm Remote Transducers or Maxµm/// Digital Transducers.

Stop Collars

Stop collars are available for all Dimentron Plugs.

Bench Stand for Gages BA-26

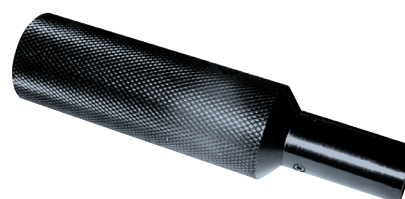
A 6.4 mm / .25" mounting hole allows permanent fastening to bench surface.



BA-100 (Dimentron Plug not included)



Right Angle Adaptor AT-155



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

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"

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					
Stop Collar			2014802		
			2034201		
Extension	EKT-1120-WX		2033111	B-12668	
				EHG-1198	
			2033101	EHG-1172	AT-124 HA-88
	<i>Change-WX suffix as required: For adaptor selection see page 114</i>		2033001 - no Data Output 2033011 - with Data Output (6 pin)		
	HA-141		2033091 - canister style* 2033099 - pencil style* * ± 1 mm/ ±.040" Range Digital Transducer.		
			550P-10/20	Dial Indicator	
	EHA-1146 EHA-1145		832 AMP		
	BA-100				
	AAT-192 AAT-193 AAT-194		D-2500: 1 - 4000:1		
	EDI-550P-10 EDI-550P-20		µMaxµm//		

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- over 8	8 mm	= - 0.02 + 0.1 mm	= - 0.02	+ 0.1 mm
over 16	16 mm	= - 0.02 + 0.15 mm	= - 0.02	+ 0.15 mm
over 32	32 mm	= - 0.02 + 0.2 mm	= - 0.02	+ 0.15 mm
over 70	70 mm	= - 0.03 + 0.2 mm	= - 0.03	+ 0.15 mm
over 200	200 mm	= - 0.04 + 0.2 mm	= - 0.04	+ 0.15 mm

Accuracy

Hysteresis
Repeatability
Linearity
Linearity 844 Dks >8 mm

$f_u \leq 0.4 \mu\text{m}$
 $f_w \leq 1 \mu\text{m}$
 $\leq 1 \%$
 $\leq 2 \%$

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

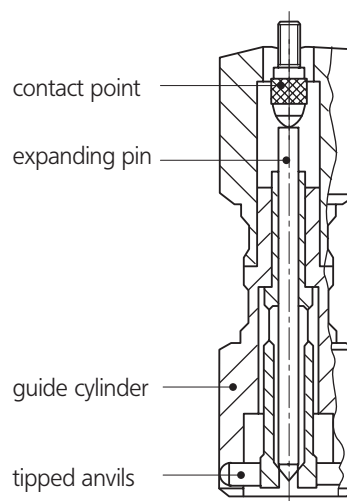
Bore diameter	Tolerance	
35 D7	+ 80	+105 μm
35 H7	+ 0	+25 μm
35 R7	- 50	-25 μm

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



Plug Gages

Measuring Head 844 Dk, Standard version

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

① Nominal diameter = smallest bore diameter

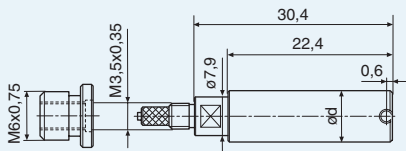
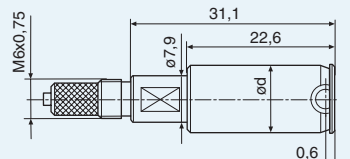
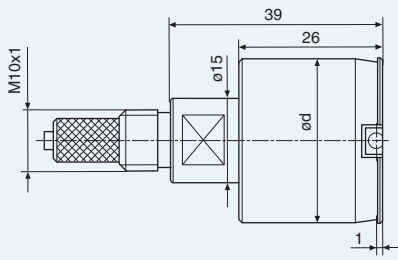
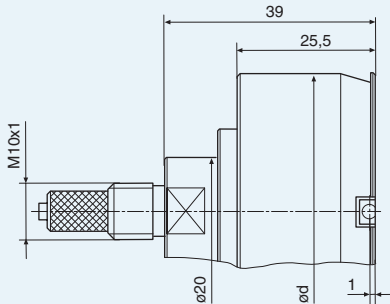
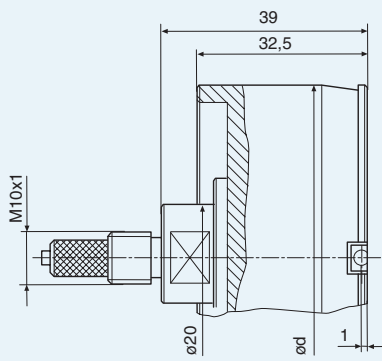
② dia. d in reference to the smallest bore diameter

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 dia. d mm	Meas. range ^③ mm	Order no.	
	4 - 8	-0.02/-0.04	0.10	4478285*	
over	8 - 16	-0.02/-0.04	0.15	4478245	
over	16 - 25	-0.02/-0.05	0.15	4478230	
over	25 - 32	-0.02/-0.05	0.15	4478232	
over	32 - 44	-0.02/-0.06	0.15	4478233	
over	44 - 50	-0.03/-0.06	0.15	4478234	
over	50 - 60	-0.03/-0.06	0.15	4478235	
over	60 - 70	-0.03/-0.06	0.15	4478236	
over	70 - 80	-0.04/-0.07	0.15	4478237	
over	80 - 90	-0.04/-0.07	0.15	4478238	
over	90 - 100	-0.04/-0.07	0.15	4478239	
over	100 - 110	-0.04/-0.07	0.15	4478240	
over	110 - 120	-0.04/-0.07	0.15	4478241	
over	120 - 130	-0.04/-0.07	0.15	4478242	
over	130 - 140	-0.04/-0.07	0.15	4478243	
over	140 - 150	-0.04/-0.07	0.15	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 dia. d mm	Meas. range ^③ mm	Order no.	
over	2.98 - 3.99	-0.02/-0.04	0.1	4478272*	
	3.99 - 8	-0.02/-0.04	0.1	4478250*	
over	8 - 16	-0.02/-0.04	0.15	4478251	
over	16 - 25	-0.02/-0.05	0.2	4478252	
over	25 - 32	-0.02/-0.05	0.2	4478254	
over	32 - 44	-0.02/-0.06	0.2	4478255	
over	44 - 50	-0.03/-0.06	0.2	4478256	
over	50 - 60	-0.03/-0.06	0.2	4478257	
over	60 - 70	-0.03/-0.06	0.2	4478258	
over	70 - 80	-0.04/-0.07	0.2	4478259	
over	80 - 90	-0.04/-0.07	0.2	4478260	
over	90 - 100	-0.04/-0.07	0.2	4478261	
over	100 - 110	-0.04/-0.07	0.2	4478262	
over	110 - 120	-0.04/-0.07	0.2	4478263	
over	120 - 130	-0.04/-0.07	0.2	4478264	
over	130 - 140	-0.04/-0.07	0.2	4478265	
over	140 - 150	-0.04/-0.07	0.2	4478266	
over	150 - 160	-0.04/-0.07	0.2	4478267	
over	160 - 170	-0.04/-0.07	0.2	4478268	
over	170 - 180	-0.04/-0.07	0.2	4478269	
over	180 - 190	-0.04/-0.07	0.2	4478270	
over	190 - 200	-0.04/-0.07	0.2	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	20	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.

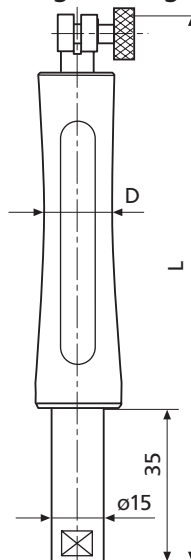
Cat. no.	Connecting thread g	Length L mm	Handle dia. D mm	Order no.
844 Dge	M6 x 0.75	195	33	4478020
	M10 x 1	195	33	4478021

Right Angle (Elbow) Attachment

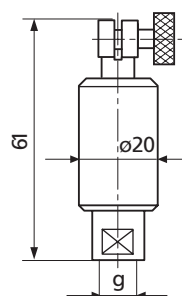
For measuring difficult to reach bores, e.g. in tight spaces, on a machine tool or when work piece bores are inconveniently located. For screwing in between holder and measuring head.

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

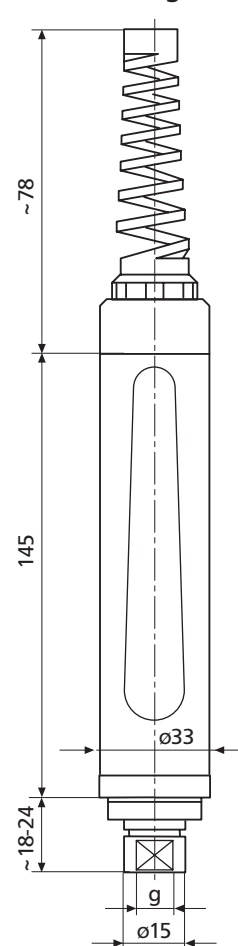
844 Kg / 844 Dg



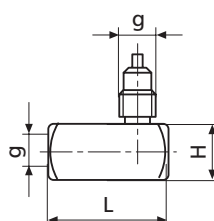
844 Dgk



844 Dge



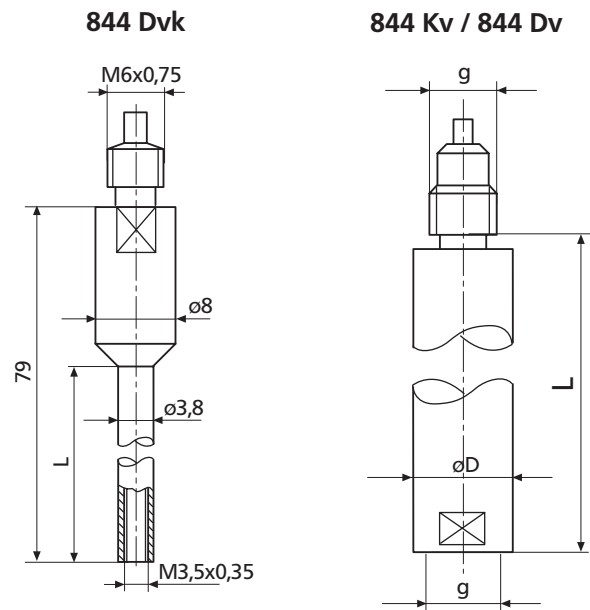
844 Kw / 844 Dw



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 / inch	dia. D mm / inch	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

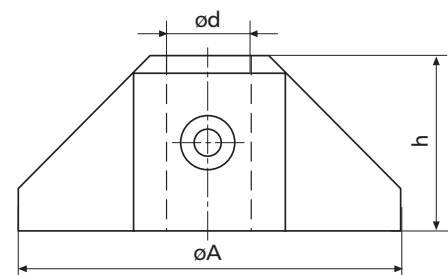


Depth Stops

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 / inch	Stop surface dia. A mm / inch	Height h mm / inch	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

844 Kt / 844 Dt

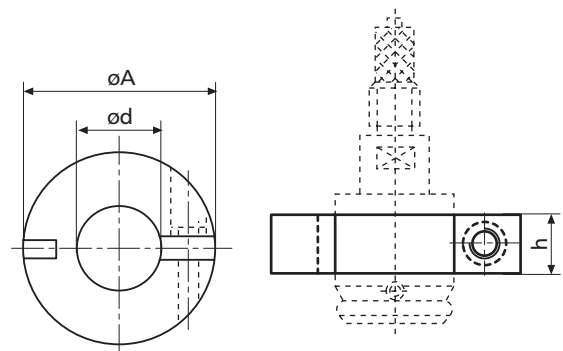


Depth Stop Rings

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

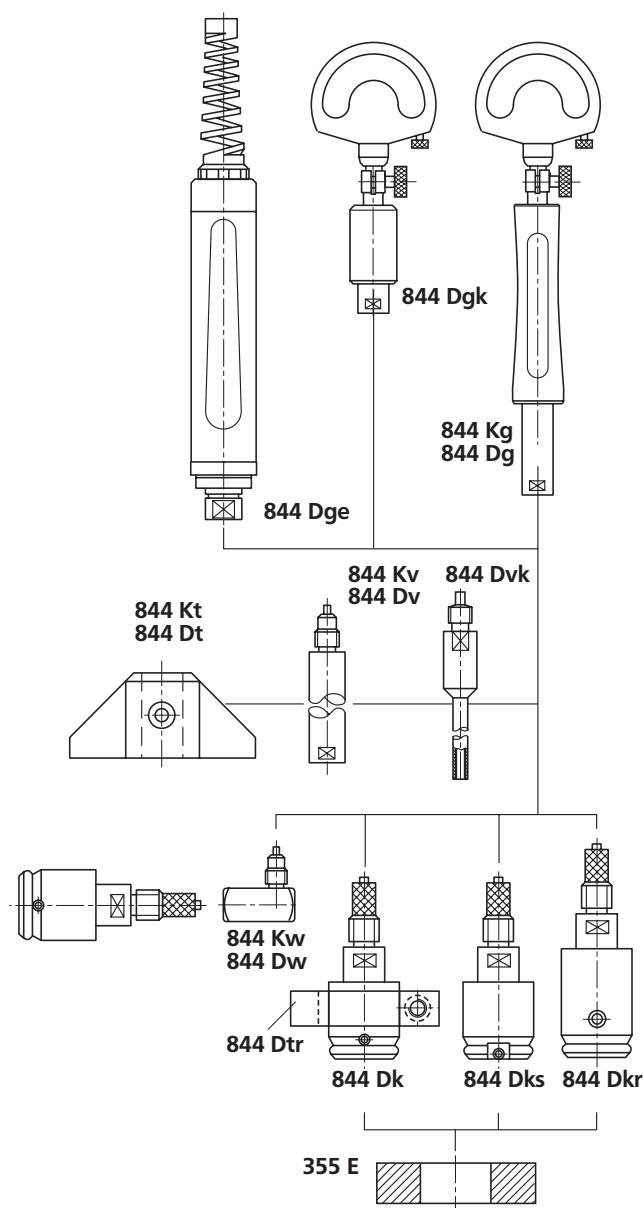
Cat. no.	Mounting hole dia. d mm	Stop surface dia. A mm / inch	Height h mm / inch	Order no.
844 Dtr	3 - 5	27 / 1.1"	10 / .4"	4478130
	> 5 - 8	30 / 1.2"	10 / .4"	4478130
	> 8 - 11	33 / 1.3"	10 / .4"	4478130
	> 11 - 15	37 / 1.5"	10 / .4"	4478130
	> 15 - 20	42 / 1.7"	10 / .4"	4478130
	> 20 - 25	50 / 1.9"	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 Dtr



Modular Unit System 844 D

	Diameter of Measuring Heads			
Modular units	2.98 - 8 mm	8 - 16 mm		over 16 mm
844 Kg	4470851			4478851
844 Dg				
844 Dgk				
844 Dge				
	4478020			4478021
844 Dvk	4478080	4470070		4478070 to 4478076
844 Kv				
844 Dv				
844 Kt		4470115		4478115 to 4478119
844 Dt				
844 Kw	4470110			4478110
844 Dw				
844 Dk				
844 Dks				
844 Dkr				
355 E	see pages 126 / 127			
	Diameter of Measuring Heads			
Modular unit	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.
Millimess 1004	5 µm	4333000
Millimess 1003	1 µm	4334000
Millimess 1002	0.5 µm	4335000
MarCator 1086 R	1 µm	4337620
MarCator 1086 Ri	1 µm	4337624
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 M	0.1 µm, 1 µm	5312080
Millimar P 2004 M		5323010

Digital Indicators see Chapter **MarCator** Digital / Dial Indicators
 Extramess Comparators see Chapter **Millimess**
 Electrical Indicating Instruments see Chapter **Millimar** Electrical
 Length Measuring Instruments

Adjustment of Plug Gages 844 D

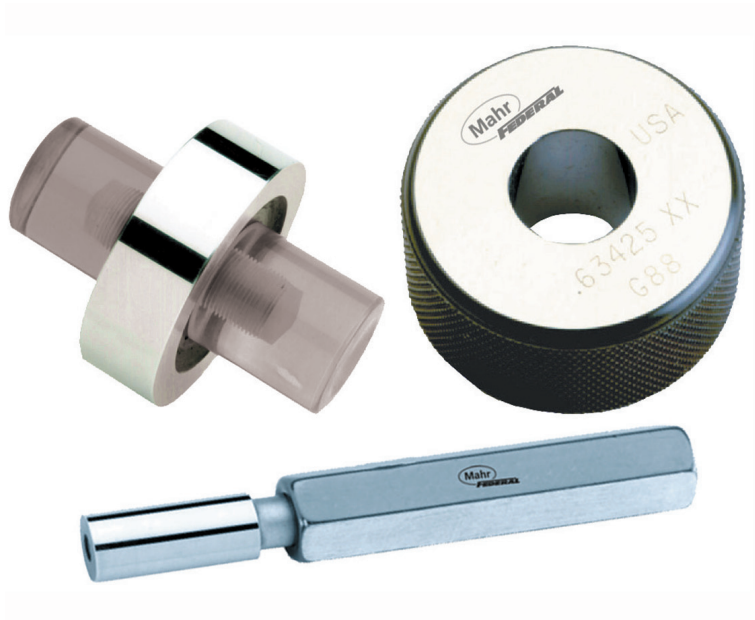
Ring Gage 355 E:

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

Dimensions: DIN 2250, type C
 Manufacturing tolerance: DIN 2250
 Available diameters: see pages 126 - 127

Setting Standards for indicating measuring instruments

AGD Masters



Master Rings

- Traceable certification and calibration available on request.
- Lapped to size and polished.
- Non-gaging areas black oxidized — ring faces ground.
- Meet all requirements of ANSI Specification B47.1-1988
- Manufactured in accordance with ANSI Specification B89.1.6-1984.

Master Discs AGD Style 3

- Traceable certification and calibration available on request.
- Lapped to size and polished.
- Non-gaging areas black oxidized — ring faces ground.
- Meet all requirements of ANSI Specification B47.1-1988
- Manufactured in accordance with ANSI Specification B89.1.5.
- Furnished with clear insulators.
- All dimensions are AGD style 3.

Master Plugs

- Traceable certification and calibration available on request.
- Stabilized and hardened.
- 100 % usable gaging surface.
- Ends ground square
- Lapped finish.

Setting Standards for indicating measuring instruments

Ring Gages 355 E



Features

- Special wear-resistant gage steel. Hardened and lapped

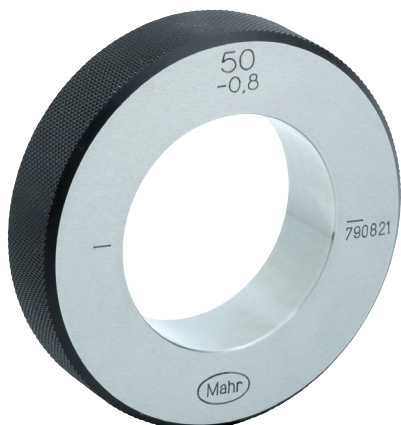
Dimensions	DIN 2250, Type C
Manufacturing tolerance	DIN 2250
Uncertainty of actual deviation	1/2 IT 1
Nominal diameter	1 - 200 mm

Diameter increments 1 mm

ø mm	Order no.	ø mm	Order no.	ø mm	Order no.	ø mm	Order no.	ø mm	Order no.	ø mm	Order no.*
1	4710006	21	4710041	41	4710061	61	4710081	81	4710101	>100-105	4714201*
2	4710010	22	4710042	42	4710062	62	4710082	82	4710102	>105-110	4714202*
3	4710014	23	4710043	43	4710063	63	4710083	83	4710103	>110-115	4714203*
4	4710018	24	4710044	44	4710064	64	4710084	84	4710104	>115-120	4714204*
5	4710020	25	4710045	45	4710065	65	4710085	85	4710105	>120-124	4714205*
6	4710022	26	4710046	46	4710066	66	4710086	86	4710106	>125-130	4714206*
7	4710024	27	4710047	47	4710067	67	4710087	87	4710107	>130-135	4714207*
8	4710026	28	4710048	48	4710068	68	4710088	88	4710108	>135-140	4714208*
9	4710028	29	4710049	49	4710069	69	4710089	89	4710109	>140-145	4714209*
10	4710030	30	4710050	50	4710070	70	4710090	90	4710110	>145-150	4714210*
11	4710031	31	4710051	51	4710071	71	4710091	91	4710111	>150-155	4714211*
12	4710032	32	4710052	52	4710072	72	4710092	92	4710112	>155-160	4714212*
13	4710033	33	4710053	53	4710073	73	4710093	93	4710113	>160-165	4714213*
14	4710034	34	4710054	54	4710074	74	4710094	94	4710114	>165-170	4714214*
15	4710035	35	4710055	55	4710075	75	4710095	95	4710115	>170-174	4714215*
16	4710036	36	4710056	56	4710076	76	4710096	96	4710116	>175-180	4714216*
17	4710037	37	4710057	57	4710077	77	4710097	97	4710117	>180-185	4714217*
18	4710038	38	4710058	58	4710078	78	4710098	98	4710118	>185-190	4714218*
19	4710039	39	4710059	59	4710079	79	4710099	99	4710119	>190-195	4714219*
20	4710040	40	4710060	60	4710080	80	4710100	100	4710120	>195-200	4714220*
								125	4710121	175	4710122

* When placing an order please inform us of the diameter

Ring Gages 355 E



Features

- Special wear-resistant gage steel. Hardened and lapped

Dimensions	DIN 2250, Type C
Manufacturing tolerance	DIN 2250
Uncertainty of actual deviation	1/2 IT 1
Nominal diameter	1 - 200 mm

Diameter increments 0.001 mm

ø mm	Order no.*	ø mm	Order no.*	ø mm	Order no.*	ø mm	Order no.*	ø mm	Order no.*
1-1.8	4732600	>35-40	4732607	>80-85	4732616	>125-130	4732638	>170-175	4732629
>1.8-3	4732641	>40-45	4732608	>85-90	4732617	>130-135	4732623	>175-180	4732630
>3-5	4732642	>45-50	4732609	>90-95	4732618	>135-140	4732639	>180-185	4732631
>5-10	4732635	>50-55	4732610	>95-100	4732619	>140-145	4732624	>185-190	4732632
>10-15	4732602	>55-60	4732611	>100-105	4732620	>145-150	4732640	>190-195	4732633
>15-20	4732603	>60-65	4732612	>105-110	4732636	>150-155	4732625	>195-200	4732634
>20-25	4732604	>65-70	4732613	>110-115	4732621	>155-160	4732626		
>25-32	4732605	>70-75	4732614	>115-120	4732637	>160-165	4732627		
>32-35	4732606	>75-80	4732615	>120-125	4732622	>165-170	4732628		

* When placing an order please inform us of the diameter

COMPLEX MEASURING TASKS BROUGHT STRAIGHT TO THE POINT. **MILLIMAR**



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

www.mahr.com, WebCode 153

► | The requirements for electrical length measuring instruments are almost as broad as their scope of application. Reliability, precision as well as simple operation are the major demands, Millimar compact and column measuring instruments fulfill all these demands and requirements.

Millimar probes are the most influential components of a measurement chain. Their characteristics determine the quality of the entire measurement; depending upon the type of application we have the corresponding probe for your requirements. For example; a Millimar Inductive Probe: robust, versatile and has an attractive price.

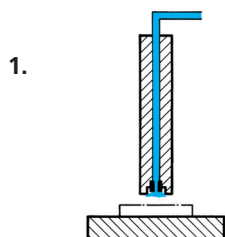
► | Millimar. Pneumatic Length Measuring Instruments

Millimar Air Gaging	130
Air Evaluation Instruments Overview	132
Dimensionair®	134
μDimensionair® II	136
832 Dimensionair®	138
Millimar C 1208 PE/M and PE/F	140
Millimar C 1245 PE/M and PE/F	141
Millimar S 1840 PE/M and PE/F	142
Millimar S 1841	144
Dimensionair® Air Gages / Air Rings, Setting Standards - AGD Masters, Setting Rings	148
Air Gaging Instruments - Accessories	156

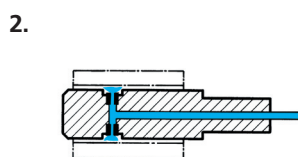
Millimar. Air Gages

PRECISION BEGINS AT THE START OF THE MEASURING PROCESS

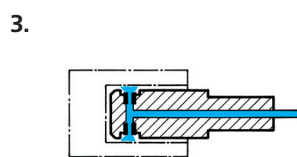
► | Air gages use the measuring effect of the change in pressure when a workpiece approaches a measuring jet. As the distance between jets and work surface decreases, the pressure increases while the velocity of flow and the respective volume flow decrease. The pneumatic measuring procedure has a relatively close linear measuring range. The limit of the measuring procedure is reached when the described generated surface A which arises due to the gap distance becomes larger than the cross-sectional area of the measuring jet with the diameter d . | ◀



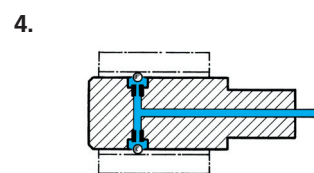
1. Thickness or wall thickness measurements with jet air gage.



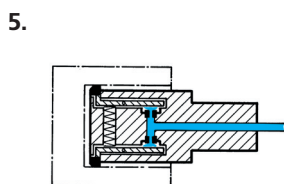
2. Diameter measurement of cylindrical through bores with jet air plug gage.



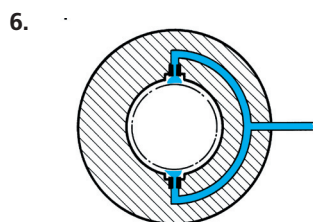
3. Diameter measurement of cylindrical blind bores with jet air plug gage.



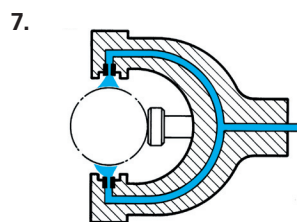
4. Diameter measurement of cylindrical through bores with ball contact plug gage.



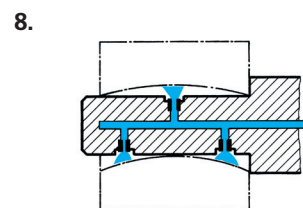
5. Diameter measurement of cylindrical blind bores with lever contact plug gage.



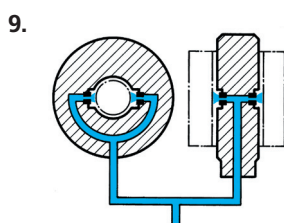
6. Diameter or thickness measurement with adjustable jet air caliper gage.



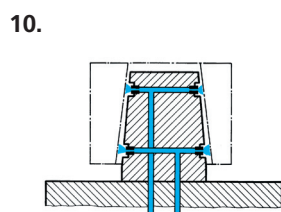
7. Diameter measurement of a cylindrical shaft with jet air rings.



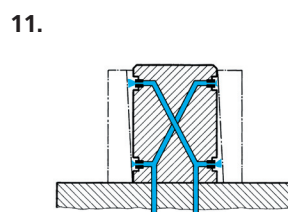
8. Straightness measurement of a cylindrical bore with special jet air plug gage.



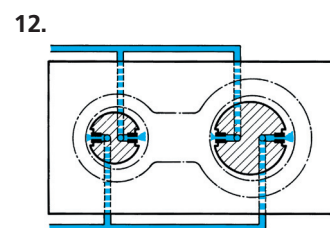
9. Mating measurement between bore and shaft with jet air plug gage and jet air ring gage.



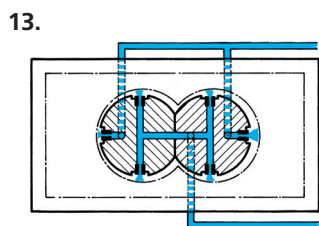
10. Taper-pitch measurement of an inside taper with taper jet air plug gage - measurement as per the differential measuring method.



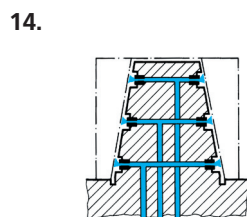
11. Measurement of a perpendicular position of a cylindrical bore to the front face with a special jet air plug gage - measurement as per the differential measuring method.



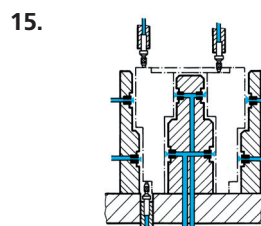
12. Measurement of hole distances of separated cylindrical bores with jet air plug gage - measurement as per the differential measuring method.



13. Measurement of hole distances of truncated cylindrical bores with jet air plug gages - measurement as per the differential measuring method.



14. Taper-pitch measurement as well as form and diameter measurement of an inside taper with taper jet air plug gage.



15. Multiple inside and outside measurements with measuring jet air gages and contact probes in connection with a seven-column unit.

Millimar. Air Gage Metrology

Metrological features

Millimar evaluation units work according to the principle of determination of changes in air pressure; the pressure differential between two chambers is measured. While one of the two chambers provides a constant reference pressure, the pressure of the other chamber (measuring chamber) is determined by the distance of the measuring jet of an air measuring value recorder to the test specimen.

Millimar evaluation units have two connection points that are each directly connected to one of the two pressure chambers. Thus the measuring value is measured directly without any conversion via a Piezo pressure sensor and is then digitalized.

Magnifications from 2500:1 to 5000:1 are realized with exchangeable instrument jets.

Millimar measuring units must be supplied with constant air pressure through a pressure reducing valve. Measuring units with pressure reducing valves can be connected to all compressed air lines from 3.5 bar to 10 bar overpressure, whereby an air filter should be interconnected.

The air must be dry and oil-free.



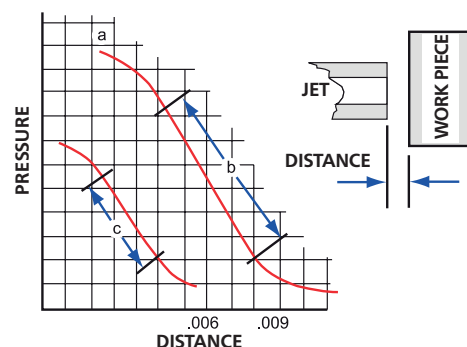
Metrological features

- Universal, reliable, proven, especially high-performing
- All measuring methods, individual, total and differential measurements
- High accuracy, long-term stability, insensitive to environmental influences
- High magnification of the measuring values, large measuring ranges
- High measuring accuracy and reproducibility for the measuring results: depending upon the magnification $0.5 \mu\text{m}$ to $20 \mu\text{m}$
- Contact-free measurements with measuring jets, no damage to the workpieces
- Reliable measurements of even uncleaned, oiled, lubricated workpieces, or workpieces with lapping paste. Measuring points are cleaned by the measuring air
- Linear display of the measuring values on a clear, large or long scale, easy and error-free reading of measuring results
- Measurement of diameters, distance between holes, tapers, eccentricities, alignment of bores, mating measurements etc.
- Various measuring possibilities due to the corresponding adaption to existing measuring problems
- Air gage display unit for all applications
- Requires little room, handy, easy to use, all measuring methods
- Fully automatically working electrical units for measuring, control and sorting processes
- Measurement control unit for production machines
- **Millimar** single and multi-column units to set-up complete testing control units
- Multi-column units according to the modular construction system due to close arrangement of the measuring columns and long scales
- Versatile measuring elements: jet air probes, jet air plugs gages, air ring gages, air caliper gages, angularity plug gages, angularity measuring rings, taper jet plug gages, taper jet ring gages and measuring units for mating parts for contact-free measurement
- Unusually long life-time of the air measuring elements
- Robust model for the shop floor. Models for all applications.
- Special models for special tasks

General Technical Data of Air Gages

Air gaging is a measuring system that uses air pressure to determine the size of measured part. The relationship between air pressure and distance of a restriction (workpiece) to the air escape (jets) can be plotted on a graph (line a).

As the distance between jets and work surface increases, the pressure decreases and the ratio becomes linear as represented by the straight section "B". This straight portion of the curve can be accurately calibrated, and represents the scale of the Dimensionair. Compare its length with "C" on the other curve, which is the usable portion of other air gage scales. This longer linear scale gives the Dimensionair its longer usable measuring range.



Millimar. Air Evaluation Units

OVERVIEW

	Analog DA	Universal DA	μDimensionAir	832 DDA
				
Catalog page	134	135	136	138
Display	Large analog scale with 2 tolerance markers	Large analog scale with 2 tolerance markers	Analog display with 1 digital line display	LCD with an analog display
Measuring channels	Single channel	Single Channel	Single Channel	Single or Dual Channel
Compatible air tooling	Mahr Federal	Mahr Federal Universal	Mahr Federal Universal	Mahr Federal
Max. Resolution	0.2 μm / .00001"	0.1 μm / .000005"	0.01 μm / .00002"	0.2 μm / 0.01 μm* .00001"/.00001"
Input Combinations				+A, -A, +B, -B, A +B, A-B, A+B, -A-B
Features / Programs	1	1	1	1
Test steps	1	1	1	1
Dynamic measurements	—	—	MAX, MIN, MAX-MIN	MAX, MIN, MAX-MIN, (MAX+MIN)/2, mean
Mastering Mode:	Nominal Master	Max/Min Master/ Nominal	Nominal or Max/Min	Nominal or Max/Min
Classification	—	—	3 classes	5 class LED and I/O
Control inputs and outputs / SPS connections	—	—	—	5 Opto-coupler outputs
Analog output	—	—	—	1
Data interfaces / ports	—	—	USB, ASCII/Digimatic	RS232, 9 pin, plug
Configuration	Turn switch	Turn switch	Keypad	Keypad
Battery operated	—	—	Yes	No, AC powered
Dimensions in mm (H x W x D)	137 x 157 x 80	165 x 190 x 148	254 x 168 x 143	205 x 160 x 165

C1208 PE	C 1245	1840 PE	S 1841 PE
			
140	141	142	144
Analog scale with a two line background lit digital display	Analog scale with a two line digital display	Column analog scale, 2 line digital display	Illuminated column with analog scale and 2 line digital display
Single Channel	Single/Dual	Single	1 to 4 channels
Mahr / Mahr Federal	Mahr / Mahr Federal	Mahr / Mahr Federal	Mahr / Mahr Federal
0.1 μm / .000005"	0.1 μm / .000005"	0.1 μm / .000005"	0.1 μm / .000005"
+A, -A, +B, -B, A + B, A - B, B - A, -A - B	Formula editor for 80 characters Functions: + / - / * / +/ () / Factor	+A, -A, +B, -B, A + B, A - B, B - A, -A - B	Formula editor for 80 characters Functions: + / - / * / +/ () / Factor
2 / 2	16 / 6	2 / 2	16 / 6
1	6	1	6
MAX, MIN, MAX-MIN, (MAX+MIN)/2, mean	MAX, MIN, MAX-MIN, (MAX+MIN)/2, mean	MAX, MIN, MAX-MIN, (MAX+MIN)/2, mean	MAX, MIN, MAX-MIN, (MAX+MIN)/2, mean
Nominal or Max/Min	Nominal or Max/Min	Nominal or Max/Min	Nominal or Max/Min
max. 998, max. 62 on I/O	max. 998, max. 62 on I/O	Nominal or Max/Min	max. 998, max. 62 on I/O, 5 LED's
3 Opto-coupler inputs, 6 Opto-coupler outputs	3 Opto-coupler inputs, 6 Opto-coupler outputs	3 Opto-coupler inputs, 6 Opto-coupler outputs	6 Opto-coupler inputs, 12 Opto-coupler outputs
1	1	1	2
RS232, 9 pin, plug	RS232, 9 pin, plug	RS232, 9 pin, plug	RS232, 9 pin, plug
Keypad	Keypad	Keypad	Keypad
No, AC powered	No, AC powered	No, AC powered	No, AC powered
210 x 160 x 155	137 x 157 x 80	165 x 190 x 148	245 x 225 x 487

Dimensionair® Air Gages (single master system)



Features

- Uses regular shop air (3–10 bar / 40 - 150 psig).
- Internal pressure regulator keeps measuring pressures within calibrated range
- Adjust meter to zero using a single setting master and the zero setting screw
- High visibility meter has fine line graduations and a needle-thin hand for clear, precise readings. An air filter is included to remove dust and dirt contaminants from air line
- Tooling mounts to the front of the unit. Connections are tight with finger pressure
- No recalibration necessary when changing tooling. Just set zero and measure.
- 4 models are available, select either mm or inch.

Technical Data

Magnification	Tooling ID no.	Range	Minimum Graduation	Dial Style	Surface Finish (recommended) $\mu\text{in} / \mu\text{m Ra}$	Part Tolerance (recommended)	Order no.
2500:1M	50	76 μm	1 μm	Diameter	50 / 1.27	$\pm 25 \mu\text{m}$	2095191
5000:1M	20	38 μm	0.5 μm		20 / 0.50	$\pm 13.5 \mu\text{m}$	2095192
2500:1	50	.003"	.00005"	Regular	50 / 1.27	$\pm .001"$	2095184
5000:1	20	.0015"	.00002"	82.6 mm / 3.25"	20 / 0.50	$\pm .0005"$	2095185
4000:1M	50	76 μm	0.5 μm	Diameter	50 / 1.27	$\pm 25 \mu\text{m}$	2095199
8000:1M	20	38 μm	0.2 μm		20 / 0.50	$\pm 13.5 \mu\text{m}$	2095200
4000:1	50	.003"	.000025"	Large	50 / 1.27	$\pm .001"$	2095195
8000:1	20	.0015"	.000010"	152.4 mm / 6"	20 / 0.50	$\pm .0005"$	2095196

Dimensionair® Air Gages (single or dual master system)



Interchangeable Dials

Each Universal Dimensionair is completely furnished with an air filter, an interchangeable dial 2242662 and an adaptor (for connecting standard Mahr Federal air tooling) Optional adaptors are available for virtually any air tooling application.

Features

- Uses regular shop air (3-10 bar) / 40 -150 psig
- Internal pressure regulators and differential meter assure ultimate stability over full operating range
- Adjust span and zero setting to tune the gaging range to the interchangeable dial ranges
- Interchangeable dials provide an easy, inexpensive means to accommodate various ranges
- High visibility meter has fine line graduations and a needle thin hand for clear, precise readings
- An air filter is integrated to remove dust and dirt contaminants from airline
- Tooling mounts to the front of the unit. Adaptors are available for virtually any tooling configuration

Technical Data

Dial size diameter	mm / inch	82.6 / 3.25"
Housing Dimensions (Height)	mm	127 x 187 x 197 (high)
	inch	5" x 7.125" x 7.75"
Weight (including filter) ca.	kg / lbs.	6.7 / 14.25
Operating Pressure		3-10 bar / 60-150 psig
Order no.		2098125

Accessories

Optional Dials

	Total Range	Range	Dial Graduations	Magnification	Order no.
Metric	152 µm	± 76 µm	2 µm	1260:1	2242770
	100 µm	± 50 µm	2 µm	1875:1	2242771
	76 µm	± 38 µm	1 µm	2500:1	2242772
	50 µm	± 25 µm	1 µm	3750:1	2242773
	38 µm	± 19 µm	0.5 µm	5000:1	2242774
Inch	.006"	± .003"	.0001"	1260:1	2242760
	.004"	± .002"	.0001"	1875:1	2242761
	.003"	± .0015"	.00005"	2500:1	2242662
	.002"	± .001"	.00005"	3750:1	2242763
	.0015"	± .00076"	.00002"	5000:1	2242764

Tooling Adaptors

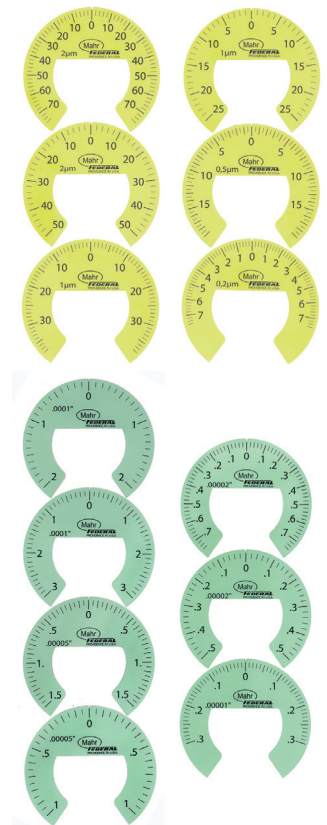
Thread/Adaptor style	Plug Type / Measured size	Order no.
10-32	2.7686 to 12.547 mm (.109" to .494")	2201515* 2086610
1/4-28	12.547 to 23.876 mm (.494" to .940")	2201514* 2201586
1/2-20	23.876 to 139.7 mm (.940" to 5.500")	2201516* 2201587
1/8 Barb	3/8-32 Female	2242767
Setlock	Moore	2242777
12mm	Mahr Row	2240623

* Includes bleed to simulate MFI jetting.

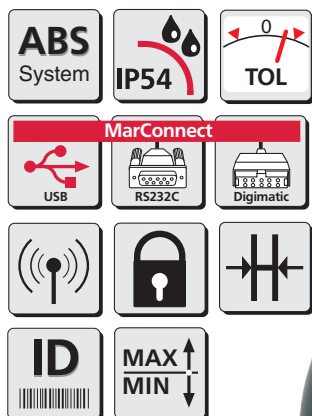
Order no.

Plastic protective cover for Universal Dimensionair

2201775



μDimensionair® Air Gages (single or dual master system)



The μDimensionair is the ultimate of portability and versatility — in your hand or at the workbench or machine tool. Shown with optional Bench Kit 2239307.



All parts of the μDimensionair are completely interchangeable and included with the gaging system — versatility is built-in.

All μDimensionair gages are supplied with output capability.

Features

- **Affordable**
- **Versatile**
- **Innovative**
- **Rugged**
- No other air gaging system offers so much — in the palm of your hand — mounted to the workbench or even right to the machine tool. μDimensionair is rated IP54, so, it can be used on the shop floor — and, the air tooling cleans dirt from the part for high performance measurements — fast and easy!
- Air gage readout is right in front of you — simple and clear.
- Fixed resolution and balanced air system makes the gage stable and reliable for your manufacturing environment.

μDimensionair II offers:

- Select Single and Min/Max mastering
- All other features of the Digital Indicator μMaxμm II :
 - Dynamic Mode operation: Min, Max, TIR
 - Multiplier factor and hold function
 - Data output with selectable serial number
 - MarConnect data output: USB, Opto RS-232C, Digimatic

Versatility

The ultimate in configuration — interchangeable handle allows for pistol grip or normal end-mount for easy application of the plug to the part. For large, heavy plugs, mount the handle between the tooling and the display — assures a well-balanced, ergonomic measuring system. Can also be mounted to a bench stand when parts are brought to the gage.

Accessories



Bench stand provides safe and secure μDimensionair storage between measurements.

Order no. 2241109



Slide valve controls air to tooling — saves cost of wasted air, reduces air noise.

Order no. 2240993



Swivel coupling allows for rotating tooling to fully explore bore.

Order no. 2240594

For applications where the local elevation is greater than 305 m / 1000 ft, special calibration is required.

μDimensionair® Air Gages (single or dual master system)

Technical Data

		μDimensionair II	
			
Measuring range	$\pm 0.080 \text{ mm}$ $\pm 0.003''$ $\pm 0.040 \text{ mm}$ $\pm 0.0015''$ $\pm 0.020 \text{ mm}$ $\pm 0.00075''$	Resolution 0.002 mm, 0.001 mm 0.0001", 0.00005" 0.001 mm, 0.0005 mm 0.00002", 0.00005" 0.001 mm, 0.0005 mm 0.00002", 0.00005"	Tooling I.D. Numbers 60 50 20
Data Output		USB / ASCII / Digimatic	
Battery Life		6000 hours	
Operating Temperature		5 - 35° C / 41 - 95° F	
Storage Temperature		0 - 60° C / 32 - 140° F	
Repeatability		± 1 Last Significant Digit (LSD)	
Calibration Accuracy		± 1 Last Significant Digit (LSD)	
Linear Error		± 1% full scale (LSD)	
Response Time		ca. 1 second	
Thermal Stability		0.1% of full scale / °C	
Tolerance Indicators		Two — over / under (3 Class)	
Weight		25 kg / 5.5 lbs	
Dimensions - Main body		ca. 100 x 60 x 70 mm / ca. 4" x 2.5" x 3"	
Auto Power Off		15 minutes of non-use	
Power Requirements		3 volt lithium battery coin cell, 2 per unit — CR-2450	
Air Supply		2.10 ± .01 bar / 30.4 ± .15 psi	
Display		Rotates through 270 degrees	
Order no.		2103200*	

* Complete with handle, adaptor and hose

Accessories

	μDimensionair II Order no.	Optional Factory functions Configured Features for μDimensionair II:
Pressure Regulator with filter	2238020*	
Pressure Meter	2095924	
Bench Kit with adaptor	2239307	
Battery 3V type CR-2450	4102520	
Insulated Handle	2237666	
Shut off Slide Valve	2240993	
Rest Stand	2241109	
Swivel Coupling Adaptor	2240594	
Air Regulator Trap	2201994	
Long Hose 6 m (20')	2237713	
Supply Hose to Regulator/Filter	2202076	
Data Interface:		
USB Cable (MarCom or PC, 2 m)	4346023	
RS232 Cable (OPTO - 2 m)	4346020	
Digimatic Cable (10 pin plug, 2 m)	4346021	

- Locked multiplier factor
- Deactive the energy saving function / sleep mode
- Lock inch/mm button
- Setup mode with password protection (blocked)
- Power up in inch/mm unit on battery change
- Calibration lockout with password

* For applications where the local elevation is greater than 305 m / 1000 ft, special calibration is required.

832 Dimensionair® Air Gaging (Zero master system)



Features

- Digital and analog displays in a single unit. Large, high contrast digital readout shows exact deviation from zero; analog display shows measurement conditions at a glance
- Fixed resolution and balanced air system makes the Digital Dimensionair a stable and reliable system for manufacturing environments.
- Only a single master required to set zero; system is precalibrated for correct magnification
- Ranges and resolutions for virtually any air gage application, including 2-, 3-, 4- and 6-jet tooling plus AirProbes and JetProbes.
- Dynamics measurement capability
- RS-232 Output – for communicating with a data collector, computer or printer, permitting statistical process control
- Master Deviation – enhances measurement by making Auto Zero even more accurate.

Technical Data

Model	Measuring Range	Digital Resolution	Analog Resolution	Tooling I.D. Number
Low Magnification	$\pm 0.080 \text{ mm} / \pm .003''$		$0.004 \text{ mm} / 150\mu''$	60
Single or Dual Input	$\pm 0.040 \text{ mm} / \pm .0015''$	$0.0002 \text{ mm} / 10\mu''$	$0.002 \text{ mm} / 75\mu''$	50
	$\pm 0.020 \text{ mm} / \pm .00075''$		$0.001 \text{ mm} / 38\mu''$	20

Operating Temperature	5~35° C / 41~95° F
Storage Temperature	0~60° C / 32~140° F
Repeatability	± 1 digit or $\pm 1\%$ of range, whichever is greater
Calibration Accuracy	± 1 digit*
Linear Error	± 1 digit
Response Time (Electronics)	43 msec.
Response Time (Air)	approx. 1 sec. (dependent on hose length of air tooling)
Thermal Stability	0.1% of full scale/°F
Digital I/O	five TTL opto-isolated outputs
Data Output	RS-232, transmits Channels A, B, (or both – dual input models only)
Analog Output	± 5 VDC full scale for displayed value signal $\pm A$, $\pm B$
Measuring Modes	Actual, Minimum, Maximum, T.I.R., Nominal
Tolerance Indicators	five LED
Weight (approx.)	5 kg / 11 lbs.
Dimensions H x W x D	254 x 197 x 216 mm / 10" x 7.752 x 10.25"
Display Modes	A, (or B or both – dual input models only)
Auto Power Off	after 30 minutes of non-use (selectable)
Power Requirements	100 Vac to 240 Vac, 50-60Hz with power module (Furnished)

Note: All models listed may be ordered for: 1-Jet, 2-Jet, 3-Jet, 4-Jet, or 6-Jet applications. At time of ordering, please designate the number of jets to be used on the system.

** For applications where the local elevation is greater than 305 m /1000 ft, special calibration is required.*

Technical Data

Number of Jets	Voltage/Adaptor	Single Input Order no.	Dual Input Order no.
1, 2, 3	240/International	2004112	2004118
4	240/International	2004113	2004119
6	240/International	2004114	2004120
1, 2, 3	110/U.S.	2004100	2004106
4	110/U.S.	2004101	2004107
6	110/U.S.	2004102	2004108

Accessories

Order no.	Description
7024634	RS-232 Cable, Amplifier to MSP-2 Printer or computer, 2m / 6ft cable
2212852	Oil/Splash Cover (opaque)—provides protection for the 832 Digital Dimensionair® when used in harsh environments
2212858	Oil/Splash Cover (clear)—provides protection for the 832 Digital Dimensionair when used in harsh environments
2211464	Footswitch to freeze the display HOLD/RESUME, 3m / 10ft cable
2211465	Footswitch to reset the memory DYNAMIC RESET, 3 m / 10ft cable
2211466	Footswitch to start data transmission SEND DATA, 3m / 10ft cable
2211462	Pushbutton to reset the memory (DYNAMIC RESET), 1.5m / 5ft cable
2211467	Pushbutton to start data transmission (SEND DATA), 1.5m / 5ft cable
2211481	Pushbutton to freeze the display (HOLD/RESUME) and to start data transmission (SEND DATA), 3m / 10ft cable
2214163	Relay Box – five relays each with Normally Open/Normally Closed contacts: Contact Rating – 30 Vdc/120 Vac, 3 amps Power Supply – 120 Vac Dimensions – 39 mm x 129 mm x 134.6 mm d/ with ECB-1886-W2*, 6,1 mm interconnect cable amplifier/relay box
2214164	Same as W3, except with 220 Vac Power Supply
2214165	Same as W3, except with 240 Vac Power Supply
2010000	Power Supply, U.S. Adaptors (120V)
2010001	Power Supply, International Adaptor (120/240V)
Mating Connectors	
2212340	Digital I/O (15 pin male)
2212336	Reset Data (3/32 microphone plug)
2212339	RS-232 Digital Output (9 pin female)

* Order ECB-1886-W1 for 305 mm / 12" interconnect cable, or, ECB-1886-W3 for 914 mm / 36" cable.

Millimar C 1208 PE/F Compact, user-friendly length measuring unit



Technical Data

Display	Backlit LCD display 115 mm x 70 mm
Analog scale	Indicator, 61 graduation
Range and text display	Characters LCD, 5 x 7, Dot matrix, alpha numerical
Measured value display	7 digit LCD, 7 segments
Tolerance display	5 LEDs, 3 colors
Display ranges	± 3, 10, 30, 100, 300, 1000, 3000, 10000 µm ± 0.0001; 0.0003; 0.001; 0.003; 0.01; 0.03; 0.1; 0.3 inch or tolerance related

Measuring range / resolution (tooling dependant)

2500:1/	76 (±38) µm / 0.1 µm
5000:1/	32 (±16) µm / 0.1 µm
10000:1/	16 (±8) µm / 0.1 µm

Error limits

10 x analog display	2 % (51 pixel)
Digital display	0.05 %
Temperature coefficient	± 0.005 %/°C
Operating temp. range	0 °C to 45 °C

Interfaces

Computer, printer	RS232, 9 pin, male (PC compatible configuration)
Control inputs	3 opto-coupler outputs, 24 V, 10 mA
Control outputs	3 opto-coupler inputs, 24 V, 100 mA
Current supply	100 V to 240 V,
Mains unit	47 Hz to 63 Hz
Power consumption	10 VA
Protection class	IP53 with conductive dust IP43
Housing dimensions (H x W x D)	ca. 205 x 160 x 165 mm
Weight	ca. 2.1 kg

Features

Display

- Backlit LCD display with scale display and two-line digital display
- 5 three-colored status lamps for warning and tolerance limits
- Up to 2 features can be displayed at the same time

Functions

- Favorites, using the SELECT button, frequently required settings can be directly called up
- Static measurements: ± A, ± B and all combinations
- Dynamic measurements: Max, Min, Max-Min, Max+Min, mean value
- Auto-detect mode: 2 measuring devices can be connected (probe, plug gage. . .) - the measuring device used is automatically shown in the display
- 1 point or 2 point master measurements
- Programmable via built-in keypad or RS232 interface via Microsoft Windows configuration software D10005

Connections

- One input for pneumatic measuring devices (optionally compatible to PE systems from Mahr, Mahr Federal)
- RS232 interface
- Three digital inputs for measuring start, master measurements, sending measuring value, . . .
- Three digital outputs for GO, NO-GO, rework, measuring time, . . .

Order no.

		Order no.
C1208 PE/F	2500:1 with regulator	5312095
C1208 PE/F	5000:1 with regulator	5312094
C1208 PE/F	10000:1 with regulator	5312093

Accessories

	Order no.
Connection cable (9 pin D-Sub jack to D-Sub jack), length 3 m	7024634
Control unit with 3 push buttons	5318430
Foot switch for Millimar for Input 1	5330955
Input 2	5330956
Input 3	5330957
Air Supply Adaptor Kit Includes Filter 2201994 and Hose 2202076	2121236

Millimar C 1245 PE/F Flexible length measuring unit for versatile tasks (single or dual master system)



Features

Display

- Analog indicator instrument for measuring value display
- Two-line LCD display to display the measuring value and help texts
- 5-color status lamps for warning and tolerance limits
- Up to 3 features can be shown simultaneously

Functions

- 16 characters can be defined
- With an equation editor (80 characters) input channels C1 to C8 are mathematically linked with factors and brackets using the 4 basic mathematical functions
- Static measurements: current value, square root, arc tangent
- Dynamic measurements: Max, Min, Max-Min, Max+Min, mean values
- Statistical functions: n, x-bar S, Xmax, Xmin, R
- Measuring value memory for 5000 measuring values
- Measuring Start / Stop via keyboard, digital input, RS232

Connections

- 2 input modules can be used in the basis unit
- RS232 interface
- 1 analog output
- 3 digital inputs for measuring start, master measurement / zeroing, sending data
- 6 digital outputs for GO, NO-GO, rework, collective goods, measuring time, 4 classes, BCD interface

Technical Data

Display	analog indicator instrument, LCD 53 mm x 40 mm
Analog scale	145 mm x 80 mm
Range and text display	7 characters LCD, 5x7 dot matrix, alphanumerical
Measured value display	7 characters LCD, 7 segment
Tolerance display	5 LEDs, 3-colored
Display ranges	± 10, 30, 100, 300, 1000, 3000, 10000 µm ± 0.0003; 0.001; 0.003; 0.01; 0.03; 0.1; 0.3 inch

Measuring range / resolution (tooling dependant)

2500:1/	76 (±38) µm / 0.1 µm
5000:1/	32 (±16) µm / 0.1 µm
10000:1/	16 (±8) µm / 0.1 µm

Error limits

10 x analog display	2 % (51 pixel)
Digital display	0.05 %
Temperature coefficient	± 0.005 %/°C
Operating temp. range	0 °C to 45 °C

Interfaces

Computer, printer	RS232, 9 pin, male (PC compatible configuration)
Control inputs	3 opto-coupler outputs, 24 V, 10 mA
Control outputs	3 opto-coupler inputs, 24 V, 100 mA
Current supply	90 V to 264 V,
Mains unit	47 Hz to 63 Hz
Power consumption	11 VA
Protection class	IP53 with conductive dust IP43
Housing dimensions (H x W x D)	ca. 205 x 160 x 165 mm
Weight	ca. 2.2 kg

Can also be used as a controller box without a display, see Millimar X 1741 on page 108. Parts number with pneumatic inputs are available upon request.

Order no.

		Order no.
C1245 PE/F	2500:1 with regulator	5331271
C1245 PE/F	5000:1 with regulator	5331272
C1245 PE/F	10000:1 with regulator	5331273

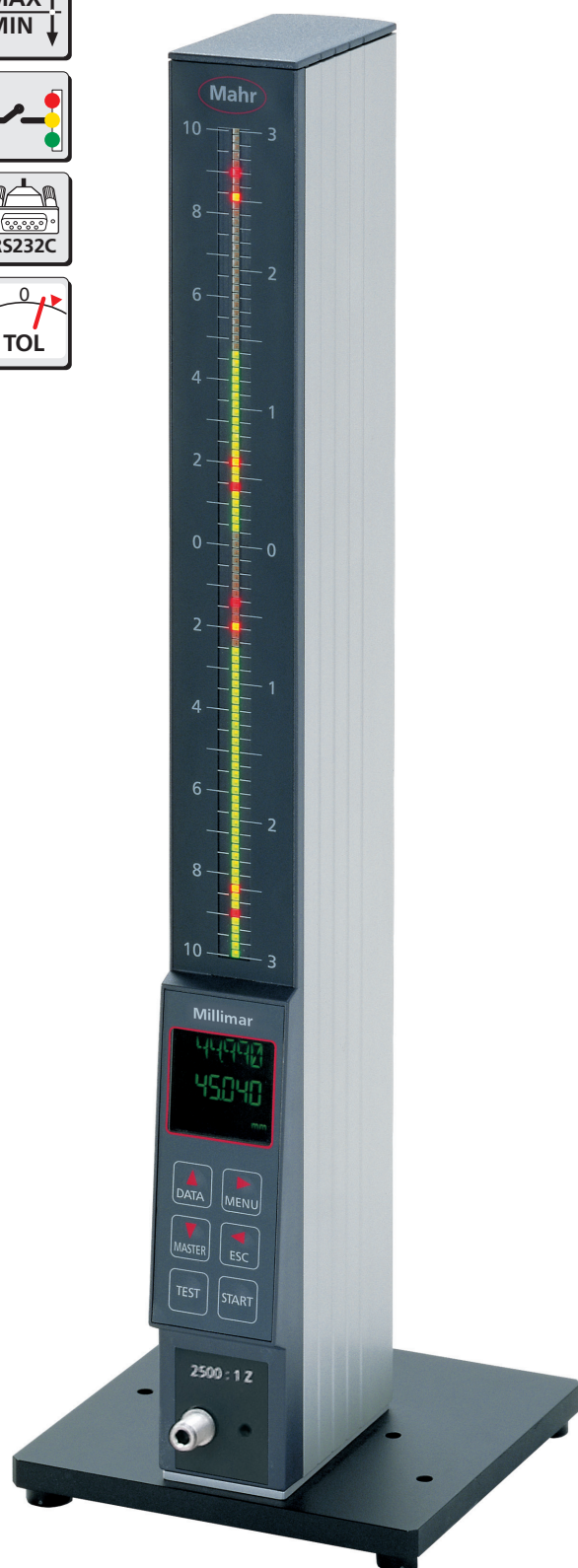
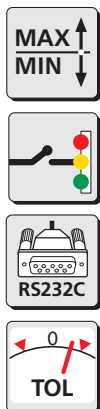
For 2 pneumatic probes

C1245 PE/F 2	2500:1 with 2 regulators	5331289
C1245 PE/F 2	5000:1 with 2 regulators	5331290
C1245 PE/F 2	10000:1 with 2 regulators	5331290

Accessories

	Order no.
Connection cable (9 pin D-Sub jack to D-Sub jack), length 3 m	7024634
Control unit with 3 push buttons	5318430
Foot switch for Millimar for Input 1	5330955
Input 2	5330956
Input 3	5330957
Air Supply Adaptor Kit Includes Filter 2201994 and Hose 2202076	2121236

Millimar S 1840 PE/F Length measuring instrument with three-color illuminated bar graph



Features

Assess and judge measuring results at a glance – nothing is easier than that with the Millimar S 1840 column amplifier. For measurements with air measuring devices

The Millimar S 1840 column amplifier offers a broad range of functions for combining the signals from both static and dynamic measurements.

Measuring results are indicated by way of 101 three-color LEDs. When the programmable warning and tolerance limits are exceeded, the LEDs change their color from green to yellow or red, accordingly – high visibility from any distance.

Display

- Easy to read 3-color illuminated bar graph with analog warning and tolerance limit display
- Backlit, two-line LCD for the display of measuring values, help tests and units of measurement
- Up to two characteristics can be displayed simultaneously

Connections

- Single input
- RS 232 interface
- Analog output
- Three digital inputs for measuring start, master measurement, etc.
- Three digital outputs for Accept – Reject – Rework classification, measuring time, etc.

Functions

- Dynamic measurements: Max, Min, Max-Min, Max+Min, mean.
 - Microsoft Windows® software for configuring the LED display.
- The Millimar S 1840 column amplifier can be programmed using a menu guide via the integrated membrane keypad or with the provided Microsoft Windows® configuration software
- Single Master or Dual Master setup
 - Password lockout in Setup Mode
 - Supplied with:
 - Mains power supply plug



Technical Data

Analog display	101 LED elements, 3-color
Range and text display	7 character LCD, 14 segment, alphanumerical
Measured value display	7-stellig LCD, 7 Segment
Tolerance display	via color range of the analog display
Display ranges	± 1, 10, 30, 100, 300, 1000, 3000, 10000 µm ± .0001; .0003; .001; .003; .01; .03; .1; .3 inch or tolerance related
Error limits	
10 x analog display	1 % (101 LEDs)
Digital display	± 1 position
Temperature coefficient	± 0.005 %/°C
Operating temp. range	0 °C to 45 °C
Interfaces	
Computer, printer	RS232, 9 pin, male (PC compatible configuration)
Control inputs	3 opto-coupler - outputs, 24 V, 10 mA
Control outputs	3 opto-coupler - inputs, 24 V, 100 mA
Analog output voltage	1 V/mm
Power supply	90 V to 264 V, 47 Hz to 63 Hz
Power consumption	20 VA
Protection class	IP53 with conductive dust IP43
Housing dimensions (H x W x D)	ca. 487 x 47 x 144 mm ca. 19.17" x 1.85" x 5.67"
Weight	ca. 1.6 kg

Air/electronic converter for Millimar S 1840 PE

Measuring principle	Differential pressure
Measuring value acquisition	Piezo

Measuring range / resolution (tooling dependant)

	2500:1	5000:1	10000:1
S 1840 PE/M			
Measuring range	100 (±50) µm	50 (±25) µm	25 (±12) µm
Resolution	0.1 µm (.000005")	0.1 µm (.000005")	0.1 µm (.000005")

	2500:1	5000:1	10000:1
S 1840 PE/F			
Measuring range	76 (±38) µm	32 (±16) µm	16 (±8) µm
Resolution	0.1 µm (.000005")	0.1 µm (.000005")	0.1 µm (.000005")

Measuring error in µm	< 1 % of measuring range, better 0.5 %		
Signal noise in µm (µinch)	<= 0.4	<= 0.2	<= 0.2
Setting time in seconds (1 m / 3.3 ft hose)	<= 0.3	<= 0.3	<= 0.3
Setting time in seconds (2 m / 6.6 ft hose)	<= 0.5	<= 0.5	<= 0.5
Operating temperature	0 ... 40 °C		
Supply pressure (> 4 bar before regulator)	2 bar ± 5 %		
Air supply connection mm (inch)	PU hose, dia 8 x 1 (.315 x .0394")		
Measuring air connection mm (inch)	PU hose, dia. 6 x 1 (.236 x .0394")		
Zero setter (OFFSET)	electrical		
Amplification (GAIN)	electrical		
Air consumption	approx. 1-2 m³ (1.308-2.616 cu.yd.)		

Order no.

Millimar S 1840 PE to connect air measuring devices

		Tooling I.D.	Order no.
S 1840 PE/F	Low magnification for 1 air gage 2500:1 without regulator	50	5318455*
S 1840 PE/F	Low magnification for 1 air gage 5000:1 without regulator	20	5318456*
S 1840 PE/F	Low magnification for 1 air gage 10000:1 without regulator	20	5318457*

* The Base with Regulator are not supplied, these are required and must be ordered separately. The Air Supply Kit is recommended.

Accessories

	Order no.
Base foot With 1 Regulator for 1 1840 PE/F Column Unit	5330914
Base foot With 2 Regulators for 2 1840 PE/F Column Units	5330915
Base foot With 2 Regulators for 3 1840 PE/F Column Units	5330916
Connection cable (9 pin D-Sub jack to D-Sub jack), length 3	7024634
Control unit with 3 push buttons	5318430
Foot switch for Millimar Input 1	5330955
Input 2	5330956
Input 3	5330957
Air Supply Adaptor Kit	2121236
Includes Filter 2201994 and Hose 2202076	

Millimar S 1841 Multi-Gaging column amplifier with 3 colored LED's



Features

The Millimar S 1841 multi-gaging column amplifier with LED display is ideal for use on the shop floor. With its modular design, the Millimar S 1841 can be easily adapted to a variety of measurement tasks.

The Millimar S 1841 offers a broad range of functions for combining the signals from both static and dynamic measurements. A formula editor enables the mathematical combination of all input channels.

The measuring results – also excellently legible at a distance – are indicated by way of 101 three-color LEDs. When the programmable warning and tolerance limits are exceeded, the LEDs change their color from green to yellow or red, accordingly. A digital display located underneath displays the numerical measured value.

Display

Up to 4 indicating and operating columns can be mounted on one base unit

- Three-color illuminated bar graph with analog warning and tolerance limit display
- Two-line backlit LCD for indicating measured values, help texts and measuring units
- Up to two characteristics can be displayed simultaneously

Connections

- 4 input modules can be inserted in the base unit. The following modules are available:
 - 4 inputs for inductive probes (either compatible with Mahr, Tesa, Marposs, or Federal probes)
 - 2 inputs for incremental probes
 - 1 input for pneumatic measuring instruments
 - 4 inputs for DC voltage signals
- RS 232 interface
- Analog output
- 6 digital inputs for starting measurement, master measurement/zero setting, sending data
- 12 digital outputs for Accept – Reject – Rework classification, collective Accept/Reject, measuring time, 10 classes, BCD interface, GO – out of warning limits – out of tolerance for up to 4 parameters

Functions

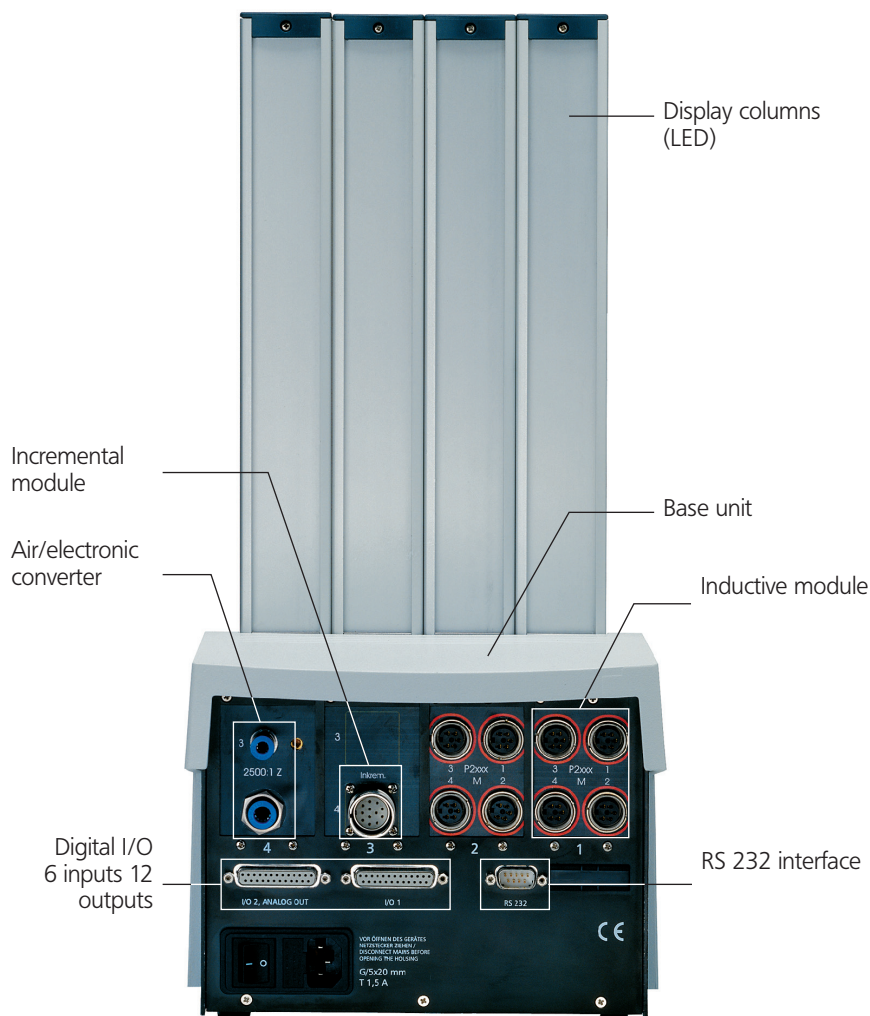
- 16 parameters may be defined
- A formula editor (80 characters) serves for the mathematical combination of input channels C1 to C16, using the 4 basic arithmetic operations including functions and parentheses
- Static measurements: instantaneous value, square root, ARC tangent
- Dynamic measurements: Max, Min, Max - Min, Max + Min, mean value
- Static functions: n, x-bar, S, Smax, Xmin, R
- Buffering of 5000 measured values
- Measured values can be displayed in mm, μm , inch, or as an angle
- Measurement is started/stopped via keyboard, digital input, RS232
- Measured value can be transferred to different records

Can also be used as a controller box without a display, see Millimar X 1741 on page 108. Parts number with pneumatic inputs are available upon request.

Application Examples:

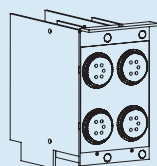
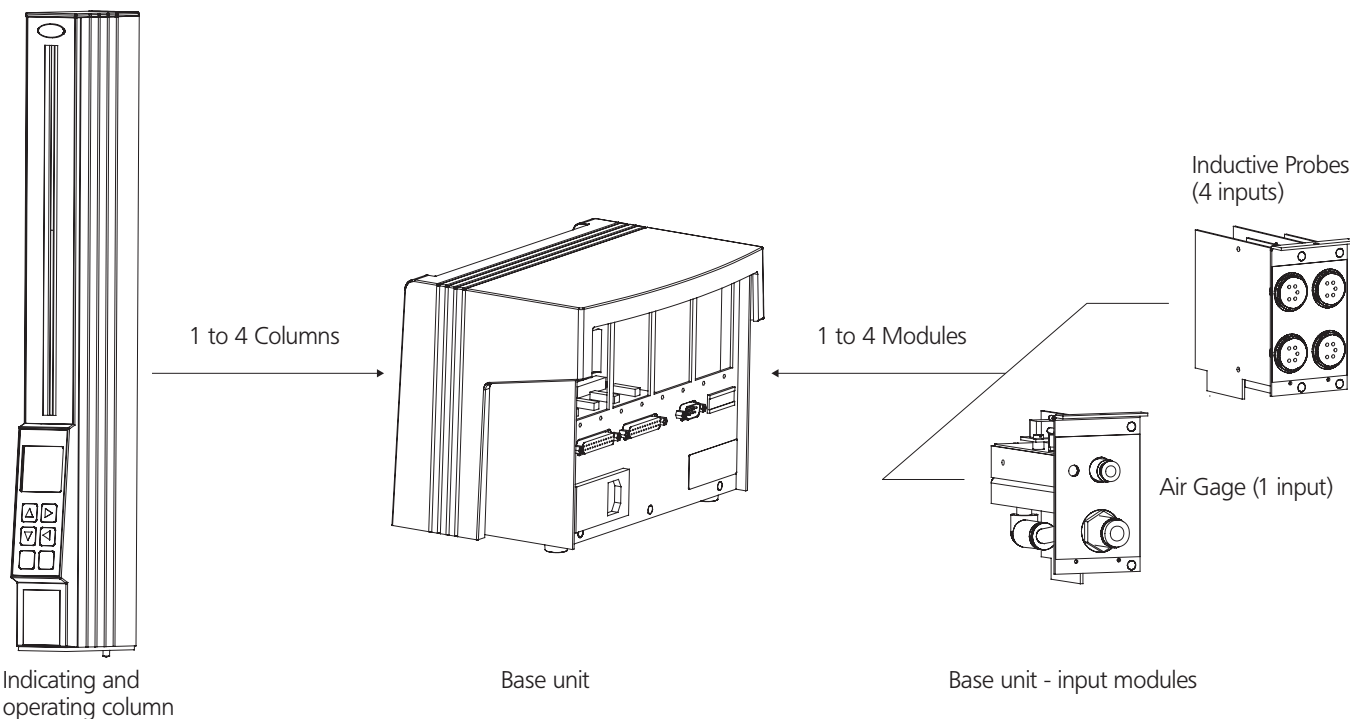
- Standard measuring units with up to 16 inductive probes for shaft measurements
- Measuring station for the inspection of workpieces with several electrical or air plug gages
- Customized multi-gaging units
- Taper jet plug gage or jet ring gage with 3 indicating columns and 2 air/electronic converter inputs. The following parameters are evaluated:
 M1: Pitch error $D2 - D1$
 M2: Taper ratio $L / (D2 - D1)$
 M3: Nominal diameter at a defined height
 $D1 + ((D2 - D1) * L1 / L)$

Technical Data



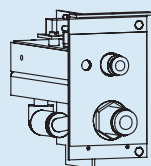
Millimar S 1841 Multi-Gaging column amplifier with 3 colored LED's

Technical Data



Input module for inductive probes
4 input channels for inductive probes

Carrier frequency	Order no.
19.4 kHz Mahr	5331010
13 kHz Tesa	5331011
7.5 kHz Marposs	5331012
5 kHz Mahr-Federal	5331013



Input module for air gages
1 input channel for air gages air/electronic converter piezo
Supply pressure 2 bar +/- 5 % (> 4 bar before pressure reducer)
Each module requires 1 pressure reducer

	Magnification	Resolution	Order no.
Mahr	2500:1	± 50 µm	5331020
Mahr	5000:1	± 25 µm	5331021
Mahr	10000:1	± 12 µm	5331022
Mahr-Federal	2500:1	± 38 µm	5331024
Mahr-Federal	5000:1	± 16 µm	5331025
Mahr-Federal	10000:1	± 8 µm	5331026

Order no.

	Order no.
S1841/1 1 Indicating and operating column with base unit	5331001
S1841/2 2 Indicating and operating columns with base unit	5331002
S1841/3 3 Indicating and operating columns with base unit	5331003
S1841/4 4 Indicating and operating columns with base unit	5331004
1 Pressure reducer unit, on base plate	5331078
2 Pressure reducer units, on base plate	5331080
3 Pressure reducer units, on base plate	5331074
4 Pressure reducer units, on base plate	5331076

Bar graph	101 LEDs per indicator unit, 3-color
Range and text display	7-digit LCD, 14 segments, alphanumeric
Measured value display	7-digit LCD, 7 segments
Tolerance display	via color change of bar graph
Display range	$\pm 10, 30, 100, 300, 1000, 3000, 10000 \mu\text{m}$ $\pm 0.0003; 0.001; 0.003; 0.01; 0.03; 0.1; 0.3 \text{ inch}$ or tolerance-related
Measuring range inductive probe	4000 (+/- 2000) μm ,
Resolution	0.1 μm (digital display)
Measuring units	mm / μm / inch
Carrier frequency	19.4 kHz (Mahr) / 13 kHz (Tesa) / 7.5 kHz (Marposs) / 5 kHz (Federal)
Cutoff frequency	40 Hz (-3 dB)
Response time	
– Measured value memory ($\cong$ sampling rate)	0.003 – 0.050 s
– Scale display	$\leq 0.020 \text{ s}$
– Numerical display	$\leq 0.250 \text{ s}$
– Analog output	$\leq 0.002 \text{ s}$
– Digital output (RS232 and digital IO)	$\leq 0.020 \text{ s}$
Hold time of numerical display	$\leq 0.250 \text{ s}$
Error limits	
– Scale division 10	$\leq 1\%$ (101 LEDs)
– Numerical display	± 1 digit
– Analog output	5% fullscale
– Digital output (RS232 and digital IO)	± 1 digit
Repetition limit of display	1 digit
Switch repetition limit	$\leq 0.1 \text{ mm}$
Hysteresis	zero
Hysteresis of scale display	zero
Temperature coefficient	$\pm 0.005\%$ / °C
Maximum number of connectable pick-ups	Maximum 4 input modules of the following types: 4 x Inductive probes from Mahr, Tesa, Marposs, or Federal 2 x Incremental probes from Heidenhain 1Vss 1 x Pneumatic input from Mahr or Federal 4 x DC voltage signals $\pm 10 \text{ V}$, $\pm 5 \text{ V}$
Working temperature	0° ... 45°C (32°F ... 113°F)
Operating temperature	0° ... 55°C (32°F ... 131°F)
Storage temperature	-15° ... +55°C (5°F ... 131°F)
Maximum relative humidity	80%, excludes condensation
Control inputs	6 optocoupler inputs, 24V / 100 mA
Control outputs	12 optocoupler outputs, 24V / 10 mA
Analog output	
– Voltage	$\pm 10 \text{ V}$
– Sensitivity	$\pm 1 \text{ V/mm}$, $\pm 1 \text{ V}/10\mu\text{m}$ 1 V/.00039")
– Maximum load resistor	$\geq 2 \text{ k}\Omega$
– Residual ripple	Mahr $< 0.5\%$
– Reference potential	0 V
– Limit frequency	$\geq 250 \text{ Hz}$
Serial interface	RS232c; 9 pin Sub-D for PC or printer
Size of LCD field	ca. 38 x 35 mm (1.497 x 1.339") per display unit
Dimensions (L x W x H)	Max. 245 x 225 x 487 mm (9.653 x 8.865 x 19.187")
Weight	Max. ca. 8.5 kg (18.73 lbs)
Power supply	90 – 264 VAC
Power supply frequency	47 – 63 Hz
Power consumption	max. 20 VA
Protection (fuse)	2 A, time-delay fuse
Conformity	EN61010-1, EN55011, EN50082-2 EMV- Regulation 89/336/EWG
Protection class	IP53 (IP43 for conductive dust), IEC 60529

Dimensionair® Air Gages – Air Plugs

Features

- Calibrated I.D. tooling for the Dimensionair® Air Gaging Systems
- Tooling is interchangeable without adjusting system magnification.
- Federal Air Plugs have large clearance (see table below), allowing easy entrance into the hole being measured and greater measuring range.
- Long life - wide clearance and hard chrome (optional) body extends useful life of the Air Plug.
- Deep, recessed jets - Air jets are recessed into the plug body which protects them from damage.
- Large jet size eliminates clogging from dirt and oils.

Plug identification



Air Plugs are marked with an identification number which identifies its size, number of jets, plug style, and the Dimensionair® Model the plug should be used with.

Identification	Nominal Size from		To & include		Clearance from Nominal Size	
	mm	inch	mm	inch	mm	inch
DP50	3	.123"	3.5	.140"	0.015	.0006"
	3.5	.140"	4.7	.185"	0.027	.0011"
	4.7	.185"	6.3	.248"	0.030	.0012"
	6.3	.248"	76.3	3.004"	0.045	.0018"
	76.3	3.004"	127	5.000"	0.071	.0028"
	Above 127	5.000"			0.081	.0032"
DP20	3	.123"	3.5	.140"	0.009	.00035"
	3.5	.140"	4.7	.185"	0.013	.0005"
	4.7	.185"	6.3	.248"	0.015	.0006"
	6.3	.248"	76.3	3.004"	0.023	.0009"
	76.3	3.004"	127	5.000"	0.071	.0028"
	Above 127	5.000"			0.081	.0032"

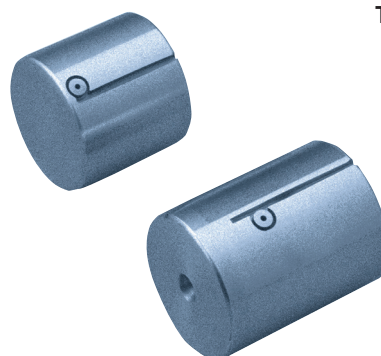
For example: DP50-T2-1.000 is the identification number of an Air Plug for a 2095184 or a standard magnification 832 Dimensionair (DP50), through-hole style with two jets (-T2), and 25 mm/1.000" nominal size (-1.000).

The number (50) which identifies the Dimensionair intended is marked on the plug and also appears on the dial of the Dimensionair to help in matching the tooling to its corresponding Dimensionair Model.

Ordering Information

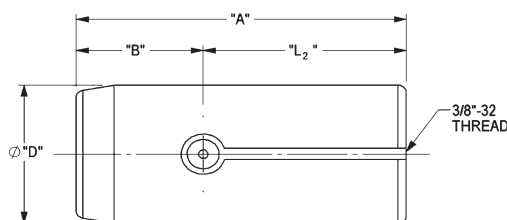
When ordering Air Plugs please specify:

1. Nominal I.D. Size and Tolerance.
2. Dimensionair Model to be used.
3. Air Plug style (Through Hole, Blind Hole, or Counterbore).
4. Air Plug finish (Chrome-plated or Hardened Steel).
5. Please order Master Setting Ring at same time. Unless otherwise specified, Mahr will furnish a 2-jet, Through Hole, High Chrome Air Plug for a 2500:1 Dimensionair.



Through Hole and Blind Hole Air Plugs

Through and Blind Holes



For every air gages an appropriate setting master according to accuracy grade N and S can be ordered.

Through Holes

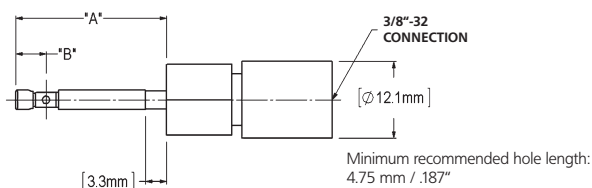
Nominal deviations from – to ø D		A		B		L2		Minimum length of bore		DP20 (5000:1) Measuring Range		DP50 (2500:1) Order no.	
mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)	µm	(inch)	µm	(inch)
3.124 - 3.553	(0.1230 - 0.1399)	23.80	(.937)	4.75	(.187)	19.05	(.750)	4.75	(.187)	13	(.0005)	2092975	25 (.0010) 2092945
3.556 - 4.696	(0.1400 - 0.1849)	23.80	(.937)	4.75	(.187)	19.05	(.750)	4.75	(.187)	19	(.00075)	2092976	38 (.0015) 2092946
4.699 - 6.312	(0.1850 - 0.2485)	38.10	(1.500)	12.70	(.500)	25.40	(1.000)	4.75	(.187)	25	(.0010)	2092977	51 (.0020) 2092947
6.314 - 9.484	(0.2486 - 0.3734)	38.10	(1.500)	12.70	(.500)	25.40	(1.000)	6.35	(.250)	38	(.0015)	2092978	76 (.0030) 2092948
9.487 - 12.494	(0.3735 - 0.4919)	38.10	(1.500)	12.70	(.500)	25.40	(1.000)	6.35	(.250)	38	(.0015)	2092979	76 (.0030) 2092949
12.497 - 13.688	(0.4920 - 0.5389)	38.10	(1.500)	12.70	(.500)	25.40	(1.000)	6.35	(.250)	38	(.0015)	2092980	76 (.0030) 2092950
13.691 - 14.933	(0.5390 - 0.5879)	38.10	(1.500)	12.70	(.500)	25.40	(1.000)	6.35	(.250)	38	(.0015)	2092981	76 (.0030) 2092951
14.935 - 20.978	(0.5880 - 0.8259)	41.28	(1.625)	15.88	(.625)	25.40	(1.000)	6.35	(.250)	38	(.0015)	2092982	76 (.0030) 2092952
20.980 - 28.699	(0.8260 - 1.1299)	41.28	(1.625)	15.88	(.625)	25.40	(1.000)	6.35	(.250)	38	(.0015)	2092983	76 (.0030) 2092953
28.702 - 37.691	(1.1300 - 1.4839)	41.28	(1.625)	15.88	(.625)	25.40	(1.000)	6.35	(.250)	38	(.0015)	2092984	76 (.0030) 2092954
37.694 - 44.193	(1.4840 - 1.7399)	50.80	(2.000)	19.05	(.750)	31.75	(1.250)	6.35	(.250)	38	(.0015)	2092985	76 (.0030) 2092955
44.196 - 63.751	(1.7400 - 2.5099)	50.80	(2.000)	19.05	(.750)	31.75	(1.250)	6.35	(.250)	38	(.0015)	2092986	76 (.0030) 2092956
63.754 - 76.299	(2.5100 - 3.0039)	50.80	(2.000)	19.05	(.750)	31.75	(1.250)	6.35	(.250)	38	(.0015)	2092987	76 (.0030) 2092957
76.302 - 89.151	(3.0040 - 3.5099)	50.80	(2.000)	19.05	(.750)	31.75	(1.250)	6.35	(.250)	38	(.0015)	2092988	76 (.0030) 2092958
89.154 - 104.115	(3.5100 - 4.0990)	50.80	(2.000)	19.05	(.750)	31.75	(1.250)	6.35	(.250)	38	(.0015)	2092989	76 (.0030) 2092959
104.117 - 114.300	(4.0991 - 4.5000)	50.80	(2.000)	19.05	(.750)	31.75	(1.250)	6.35	(.250)	38	(.0015)	2092990	76 (.0030) 2092960

Blind Holes

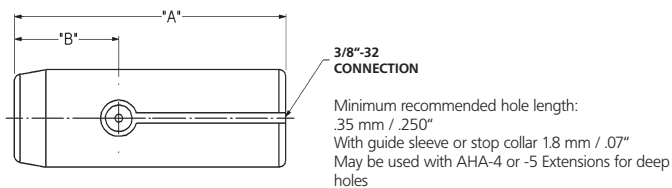
Nominal deviations from – to ø D		A		B		L2		Minimum length of bore		DP20 (5000:1) Measuring Range		DP50 (2500:1) Order no.	
mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)	µm	(inch)	µm	(inch)
3.937 - 4.696	(0.1550 - 0.1849)	19.05	(.750)	3.96	(.156)	15.09	(.594)	6.35	(.250)	19	(.00075)	2092991	38 (.0015) 2092961
4.699 - 6.312	(0.1850 - 0.2485)	29.36	(1.156)	3.96	(.156)	25.40	(1.000)	6.35	(.250)	25	(.0010)	2092992	51 (.0020) 2092962
6.314 - 9.484	(0.2486 - 0.3734)	29.36	(1.156)	3.96	(.156)	25.40	(1.000)	6.35	(.250)	38	(.0015)	2092993	76 (.0030) 2092963
9.487 - 11.859	(0.3735 - 0.4669)	29.36	(1.156)	3.96	(.156)	25.40	(1.000)	6.35	(.250)	38	(.0015)	2092994	76 (.0030) 2092964
11.862 - 14.933	(0.4670 - 0.5879)	29.36	(1.156)	3.96	(.156)	25.40	(1.000)	6.35	(.250)	38	(.0015)	2092995	76 (.0030) 2092965
14.935 - 20.978	(0.5880 - 0.8259)	29.36	(1.156)	3.96	(.156)	25.40	(1.000)	6.35	(.250)	38	(.0015)	2092996	76 (.0030) 2092966
20.980 - 28.699	(0.8260 - 1.1299)	29.36	(1.156)	3.96	(.156)	25.40	(1.000)	6.35	(.250)	38	(.0015)	2092997	76 (.0030) 2092967
28.702 - 37.691	(1.1300 - 1.4839)	29.36	(1.156)	3.96	(.156)	25.40	(1.000)	6.35	(.250)	38	(.0015)	2092998	76 (.0030) 2092968
37.694 - 44.193	(1.4840 - 1.7399)	35.71	(1.406)	3.96	(.156)	31.75	(1.250)	6.35	(.250)	38	(.0015)	2092999	76 (.0030) 2092969
44.196 - 63.751	(1.7400 - 2.5099)	35.71	(1.406)	3.96	(.156)	31.75	(1.250)	6.35	(.250)	38	(.0015)	2093000	76 (.0030) 2092970
63.754 - 76.299	(2.5100 - 3.0039)	35.71	(1.406)	3.96	(.156)	31.75	(1.250)	6.35	(.250)	38	(.0015)	2093001	76 (.0030) 2092971
76.302 - 89.151	(3.0040 - 3.5099)	38.10	(1.500)	3.96	(.156)	34.14	(1.344)	6.35	(.250)	38	(.0015)	2093002	76 (.0030) 2092972
89.154 - 101.851	(3.5100 - 4.0099)	38.10	(1.500)	3.96	(.156)	34.14	(1.344)	6.35	(.250)	38	(.0015)	2093003	76 (.0030) 2092973
101.854 - 114.300	(4.0100 - 4.5000)	38.10	(1.500)	3.96	(.156)	34.14	(1.344)	6.35	(.250)	38	(.0015)	2093004	76 (.0030) 2092974

Through Hole Plugs (DP50 - DP20)

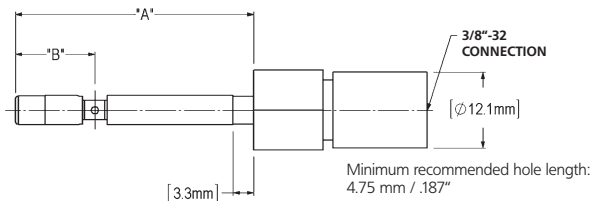
3.94-4.70 mm / .155-.185"



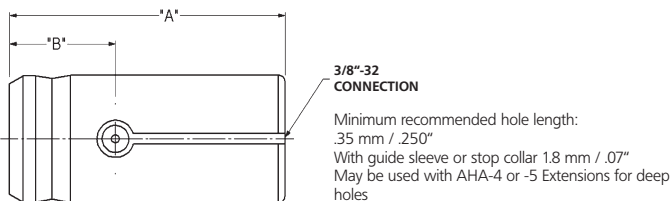
11.86-14.94 mm / .467-.588"



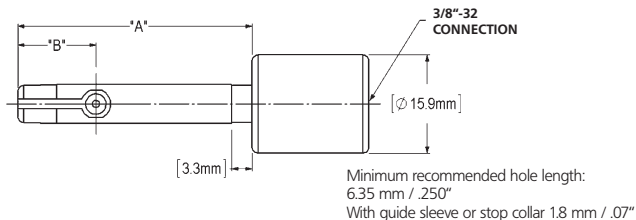
4.70-6.30 mm / .185-.248"



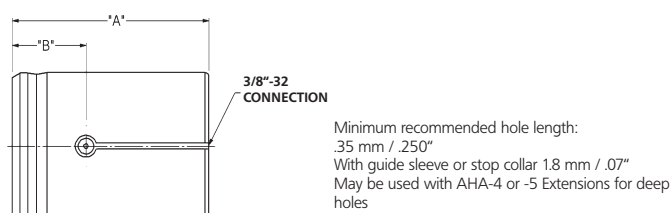
14.94-37.69 mm / .588-1.484"



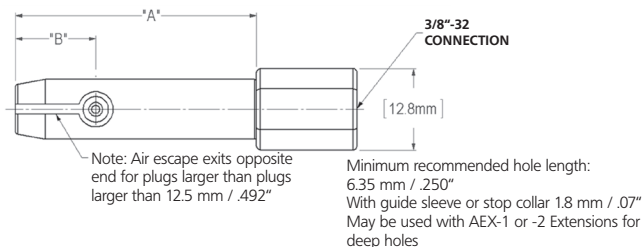
6.30-9.49 mm / .248-.3735"



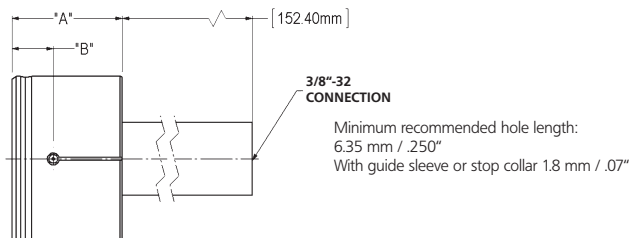
37.69-76.30 mm / 1.484-3.004"



9.49-11.86 mm / .3735-.467"



76.30-114.30 mm / 3.004-4.500"



Nominal Dimension
mm / inch

Including & Above

To

"A"

"B"

Minimum Hole
Length*

mm / inch

Measuring
range

DP50

DP20

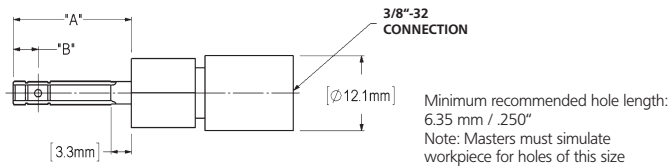
3.12 / .123"	3.56 / .140"	23.81 / .938"	4.76 / .188"	4.75 / .187"	.025 / .0010"	.013 / .0005"
3.56 / .140"	4.70 / .185"	23.81 / .938"	4.76 / .188"	4.75 / .187"	.038 / .0015"	.0200 / .00075"
4.70 / .185"	6.30 / .248"	38.10 / 1.500"	12.70 / .500"	4.75 / .187"	.051 / .0020"	.025 / .0010"
6.30 / .248"	9.49 / .3735"	38.10 / 1.500"	12.70 / .500"	6.35 / .250"	.076 / .0030"	.038 / .0015"
9.49 / .3735"	14.94 / .588"	38.10 / 1.500"	12.70 / .500"	6.35 / .250"	.076 / .0030"	.038 / .0015"
14.94 / .588"	19.05 / .750"	41.28 / 1.625"	15.88 / .625"	6.35 / .250"	.076 / .0030"	.038 / .0015"
19.05 / .750"	37.69 / 1.484"	41.28 / 1.625"	15.88 / .625"	6.35 / .250"	.076 / .0030"	.038 / .0015"
37.69 / 1.484"	76.30 / 3.004"	50.80 / 2.000"	19.10 / .750"	6.35 / .250"	.076 / .0030"	.038 / .0015"
76.30 / 3.004"	114.30 / 4.500"	50.80 / 2.000"	19.10 / .750"	6.35 / .250"	.076 / .0030"	.038 / .0015"

* If a guide sleeve or stop collar is used, minimum hole length can be as small as 1.78 mm / .070" for holes larger than 6.30 mm / .248".

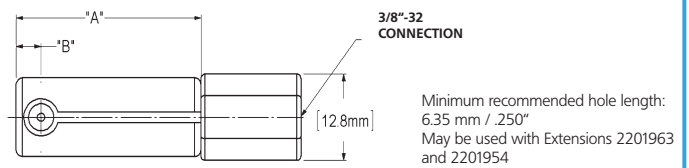
** A handle 152 mm / 6" long and 33.3 mm / 1.31" diameter is supplied with plugs over 76.30 mm / 3.004".

Blind Hole / Counterbore Plugs (DP50 - DP20)

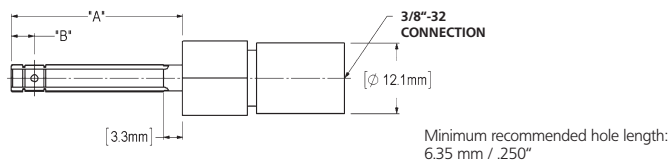
3.94-4.70 mm / .155-.185"



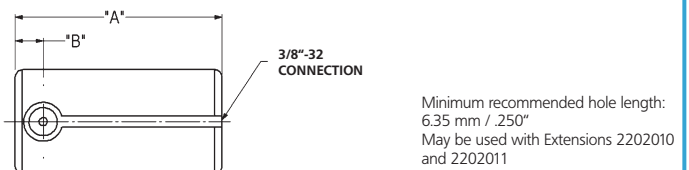
11.86-14.94 mm / .467-.588"



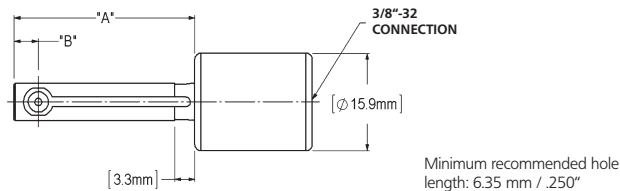
4.70-6.30 mm / .185-.248"



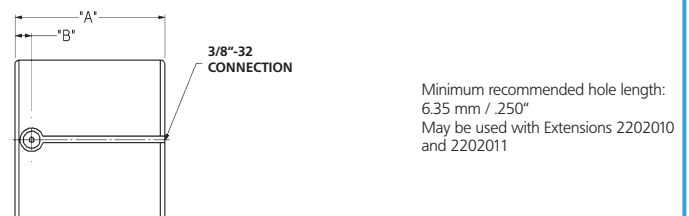
14.94-37.69 mm / .588-1.484"



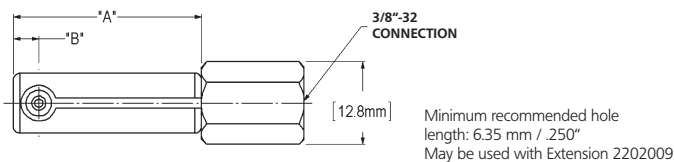
6.30-9.49 mm / .248-.3735"



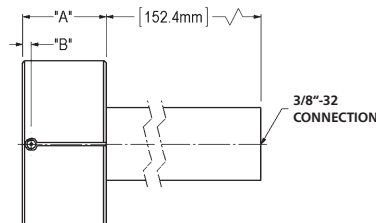
37.69-76.30 mm / 1.484-3.004"



9.49-11.86 mm / .3735-.467"



76.30-114.30 mm / 3.004-4.500"



Super-blind Plugs

Blind Hole Air Plugs can be furnished to check shorter holes than listed above, and can be furnished to check closer to the bottom of a hole. Holes must be at least 2.79 mm/.110" long, and the

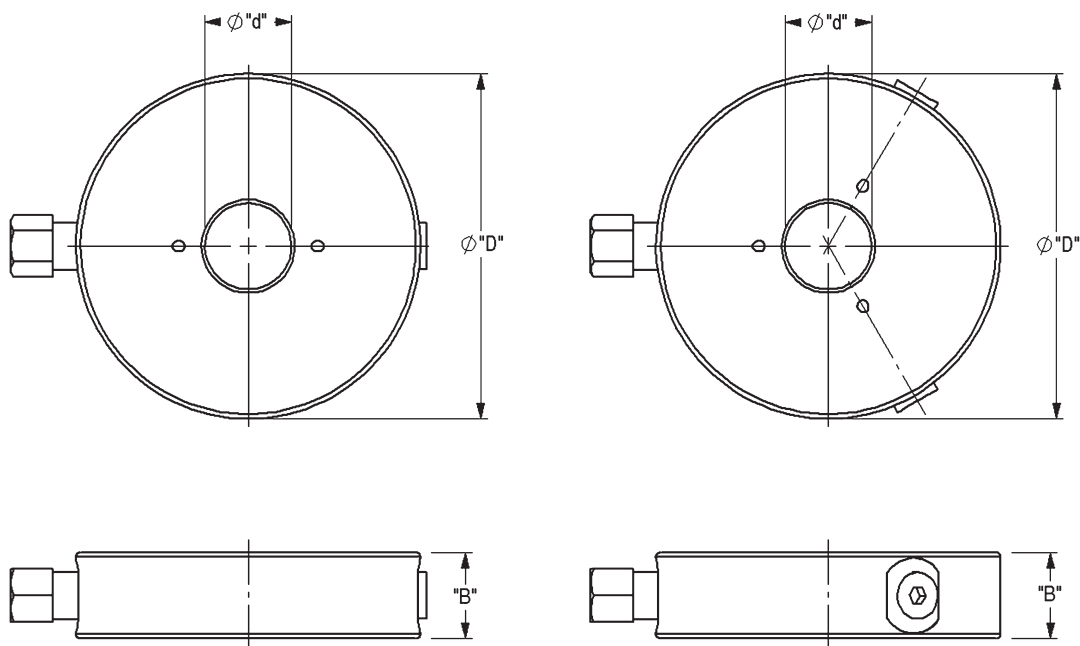
distance from the end of the plug to the center-line of the jets can be as short as 2.16 mm/.075" for plugs below 6.34 mm/.250" or 2.16 mm/.095" for plugs above 6.34 mm/.250".

Including & Above		Nominal Dimension mm / inch		"A"	"B"	Minimum Hole Length* mm / inch	Measuring range	
		To					DP50	DP20
3.94 / .155"	4.70 / .185"	19.10 / .750"	3.96 / .156"	6.35 / .250"	.038 / .0015"	.0200 / .00075"		
4.70 / .185"	6.30 / .248"	29.36 / 1.156"	3.96 / .156"	6.35 / .250"	.051 / .0020"	.025 / .0010"		
6.30 / .248"	9.49 / .3735"	29.36 / 1.156"	3.96 / .156"	6.35 / .250"	.076 / .0030"	.038 / .0015"		
9.49 / .3735"	11.86 / .467"	29.36 / 1.156"	3.96 / .156"	6.35 / .250"	.076 / .0030"	.038 / .0015"		
11.86 / .467"	14.94 / .588"	29.36 / 1.156"	3.96 / .156"	6.35 / .250"	.076 / .0030"	.038 / .0015"		
14.94 / .588"	37.69 / 1.484"	29.36 / 1.156"	3.96 / .156"	6.35 / .250"	.076 / .0030"	.038 / .0015"		
37.69 / 1.484"	76.30 / 3.004"	35.71 / 1.406"	3.96 / .156"	6.35 / .250"	.076 / .0030"	.038 / .0015"		
76.30 / 3.004"	114.30 / 4.500"	38.10 / 1.500"	3.96 / .156"	6.35 / .250"	.076 / .0030"	.038 / .0015"		

* If a guide sleeve or stop collar is used, minimum hole length can be as small as 1.78 mm / .070" for holes larger than 6.30 mm / .248".

** A handle 152 mm / 6" long and 33.3 mm / 1.31" diameter is supplied with plugs over 76.30 mm / 3.004".

Dimensionair® Air Rings

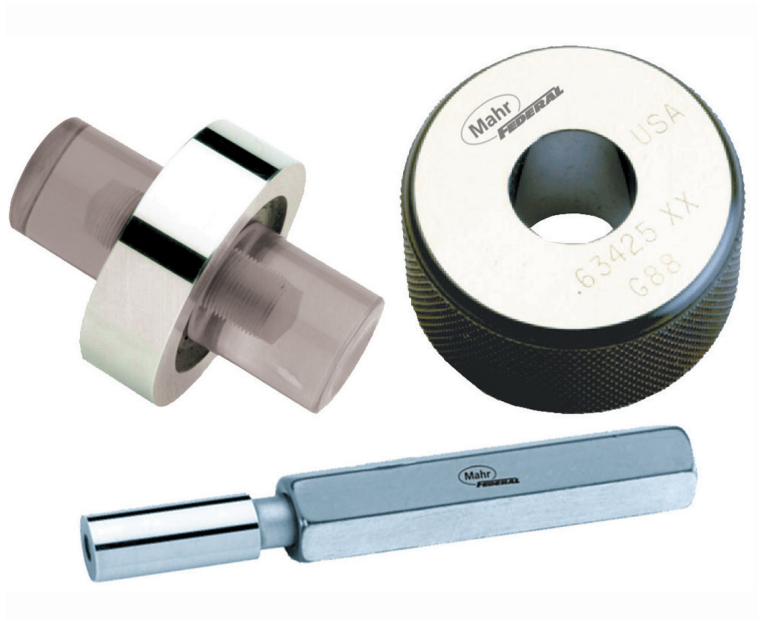


For every air gages an appropriate setting master can be ordered.

Nominal deviations from – to dia. D				2 Measuring Jets				3 Measuring Jets			
				Measuring Range/type				Measuring Range/type			
				38 μm (.0015")	76 μm (.003")	38 μm (.0015")	76 μm (.003")	38 μm (.0015")	76 μm (.003")	38 μm (.0015")	76 μm (.003")
				DR 20	DR 50	DR 20-3	DR 50-3	DR 20-3	DR 50-3	DR 20-3	DR 50-3
				5000:1	2500:1	5000:1	2500:1	5000:1	2500:1	5000:1	2500:1
6.299 - 7.592	(0.2480 - 0.2989)	76.20	(3.000)	25.40	(1.000)	2093025	2093005	2093035	2093015	2093035	2093015
7.595 - 9.294	(0.2990 - 0.3659)	76.20	(3.000)	25.40	(1.000)	2093026	2093006	2093036	2093016	2093036	2093016
9.296 - 13.002	(0.3660 - 0.5119)	76.20	(3.000)	25.40	(1.000)	2093027	2093007	2093037	2093017	2093037	2093017
13.005 - 21.003	(0.5120 - 0.8269)	76.20	(3.000)	25.40	(1.000)	2093028	2093008	2093038	2093018	2093038	2093018
21.006 - 25.400	(0.8270 - 1.0000)	76.20	(3.000)	25.40	(1.000)	2093029	2093009	2093039	2093019	2093039	2093019
25.403 - 38.351	(1.0001 - 1.5099)	101.60	(4.000)	25.40	(1.000)	2093030	2093010	2093040	2093020	2093040	2093020
38.354 - 44.450	(1.5100 - 1.7500)	101.60	(4.000)	25.40	(1.000)	2093031	2093011	2093041	2093021	2093041	2093021
44.453 - 50.797	(1.7501 - 1.9999)	127.00	(5.000)	25.40	(1.000)	2093032	2093012	2093042	2093022	2093042	2093022
50.800 - 63.500	(2.0000 - 2.5000)	127.00	(5.000)	25.40	(1.000)	2093033	2093013	2093043	2093023	2093043	2093023

Setting Standards for indicating measuring instruments

AGD Masters



Master Rings

- Traceable certification and calibration available on request.
- Lapped to size and polished.
- Non-gaging areas black oxidized — ring faces ground.
- Meet all requirements of ANSI Specification B47.1-1988
- Manufactured in accordance with ANSI Specification B89.1.6-1984.

Master Discs AGD Style 3

- Traceable certification and calibration available on request.
- Lapped to size and polished.
- Non-gaging areas black oxidized — ring faces ground.
- Meet all requirements of ANSI Specification B47.1-1988
- Manufactured in accordance with ANSI Specification B89.1.5.
- Furnished with clear insulators.
- All dimensions are AGD style 3.

Master Plugs

- Traceable certification and calibration available on request.
- Stabilized and hardened.
- 100 % usable gaging surface.
- Ends ground square
- Lapped finish.

Air Gaging Instruments, Setting Rings 6105 N / 6107 S, DIN Type B

**Millimar 6105 Setting Rings for jet air gage plugs and contact gage plugs.**

Millimar setting rings have been carefully hardened, aged, ground and lapped.

Quality	N
Manufacturing tolerance	JS3
Cylinder form tolerance	0.4 x numerical value of IT4

Millimar 6107 Setting Rings for jet air gage plugs.

Millimar setting rings have been carefully hardened, aged, ground and lapped.

Quality	S
Manufacturing tolerance	JS3
Cylinder form tolerance	0.1 x numerical value of IT4
Measuring uncertainty of the labeled nominal value	0.5 x numerical value of IT1

Setting Rings 6105 N

from mm	to & including mm	Order no.	from mm	to & including mm	Order no.	from mm	to & including mm	Order no.
2	3	2105300	60	65	2105316	105	110	2105332
3	4	2105301	65	68	2105317	110	115	2105333
4	6	2105302	68	70	2105318	115	120	2105334
6	7	2105303	70	72	2105319	120	125	2105335
7	10	2105304	72	75	2105320	125	130	2105336
10	11	2105305	75	78	2105321	130	135	2105337
11	18	2105306	78	80	2105322	135	140	2105338
18	21	2105307	80	82	2105323	140	145	2105339
21	28	2105308	82	85	2105324	145	150	2105340
28	32	2105309	85	88	2105325	150	155	2105341
32	40	2105310	88	90	2105326	155	160	2105342
40	47	2105311	90	92	2105327	160	165	2105343
47	50	2105312	92	95	2105328	165	170	2105344
50	55	2105313	95	98	2105329	170	175	2105345
55	58	2105314	98	100	2105330	175	180	2105346
58	60	2105315	100	105	2105331	180	185	2105347

Setting Rings 6107 S

from mm	to & including mm	Order no.	from mm	to & including mm	Order no.	from mm	to & including mm	Order no.
3	4	2105400	34	37	2105414	68	70	2105428
4	6	2105401	37	42	2105415	70	72	2105429
6	8	2105402	42	44	2105416	72	75	2105430
8	10	2105403	44	45	2105417	75	78	2105431
10	18	2105404	45	46	2105418	78	80	2105432
18	23	2105405	46	48	2105419	80	82	2105433
23	24	2105406	48	50	2105420	82	85	2105434
24	25	2105407	50	52	2105421	85	88	2105435
25	26	2105408	52	55	2105422	88	90	2105436
26	27	2105409	58	55	2105423	90	92	2105437
27	28	2105410	60	58	2105424	92	95	2105438
28	30	2105411	62	60	2105425	95	98	2105439
30	32	2105412	65	62	2105426	98	100	2105440
32	34	2105413	68	65	2105427	100	102	2105441

Air Gaging Instruments Plug Gage 6400 for jet air ring gages



Millimar 6400 Setting Plugs for Jet Air Measuring Rings.

Millimar setting gage plugs have been carefully hardened, aged, ground and lapped.

Manufacturing tolerance JS3

Cylinder form tolerance 0.1 x numerical value of IT3

Measuring uncertainty of

the labeled nominal value 0.5 x numerical value of IT1

Gage body dia mm	Order no.	Gage body dia mm	Order no.
2 - 3	5264020	50 - 55	5264009
3 - 4	5264021	55 - 60	5264010
4 - 6	5264022	60 - 65	5264011
6 - 12	5264001	65 - 70	5264012
12 - 18	5264002	70 - 75	5264013
18 - 24	5264003	75 - 80	5264014
24 - 30	5264004	80 - 85	5264015
30 - 35	5264005	85 - 90	5264016
35 - 40	5264006	90 - 95	5264017
40 - 45	5264007	95 - 100	5264018
45 - 50	5264008		

Air Gaging Instruments

Accessories

Handles and Extensions

When an Air Plug is used with a hose, it should be equipped with a Handle to avoid excessive strain on the air connection and corrosion on the polished plug body. Handles may be combined for gaging deep holes.

Selection of a handle or extension is determined by the bore itself and whether or not it is preceded by a larger C-bored diameter. Corresponding thread sizes of the handle or extension must also be considered.

If no portion of the handle or extension enters the part, only thread sizes must be considered. If the plug does enter the part, then both O.D. and thread size must be considered.

2202010 and 2202011 Extensions — accept Hose 2202074 on one end and the following plug sizes on the opposite end: all 8000:1 plugs up to 76.3 mm / 3.004".

2202012 Handle — accepts Hose 2202074 on one end and the following plug sizes on the opposite end: all 8000:1 plugs up to 76.3 mm / 3.004". Has Bakelite insulating cover. Recommended for 37.7 mm / 1.484" up to 76.3 mm / 3.004" diameters.

2237666 — High impact and coolant resistant, light weight composite handle — normally furnished with μ Dimensionair and air snaps

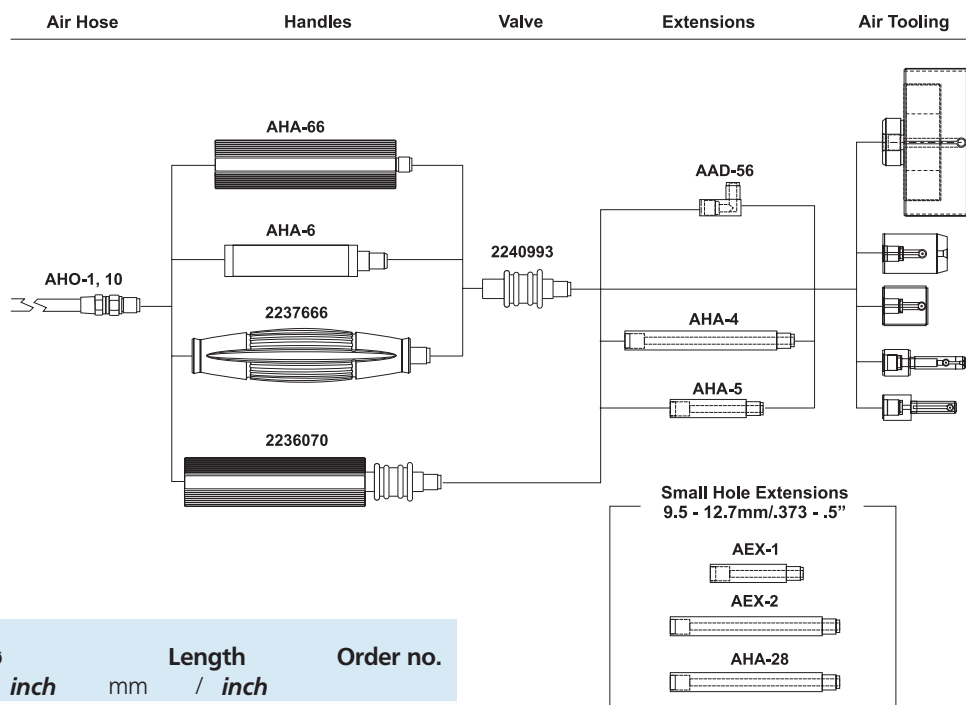
2093045 — light weight aluminum handles without or with air shutoff valve.

2202003 Handle — Used and furnished with 1250:1 thru 8000:1 through or blind hole plugs over 76.3 mm / 3.004".

2202009 Handle — Used with 2500:1 thru 8000:1 blind hole plugs in the 9.47 mm / .3735" to 11.8 mm / .467" range, using an Adaptor 2201588.

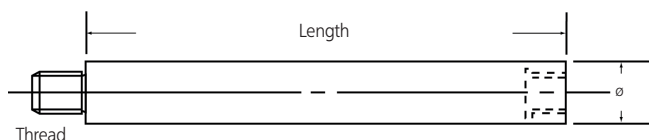
2201954 and 2201963 Extensions — Used with 2500:1 thru 8000:1 through hole air plugs in the 9.47 mm / .3735" to 14.93 mm / .588" range and with 11.8 mm / .467" to 14.93 mm / .588" range blind hole plugs, using an Adaptor 2201601.

2201975 — extension used with an Adjustable Base 2204599. Provides easily configured base for bench-mounted air tooling fixturing



Thread	mm	Ø / inch	Length mm	Length / inch	Order no.
3/8-32	12.07	/.475"	102	4"	2202010
3/8-32	12.07	/.475"	51	2"	2202011
3/8-32	19	/.750"	102	4"	2202012
1-1/8-18	33.4	/1.315"	152	6"	2202003
3/8-32	12.7	/.500"	133.3	5.25"	2202006
10-32	9.14	/.360"	102	4"	2202009
5/16-32	9.02	/.355"	51	2"	2201954
5/16-32	9.02	/.355"	102	4"	2201963
3/8-32	9.5	/.374"	61.7	2.43"	2201975*

* Use on 2204599



Air Gaging Accessories

Magnification Kits

Magnification Kits provide a means for checking Amplifier accuracy, traceable to the National Institute of Standards and Technology (NIST). Each Kit contains restrictors that provide pressure characteristics at zero and at both ends of the scale, a calibrated dial diagram and a Certification of Calibration.

Tooling	For use with:	Order no.
DP/DR50	2500:1/4000:1	2086960
DP/DR20	5000:1/8000:1	2086961

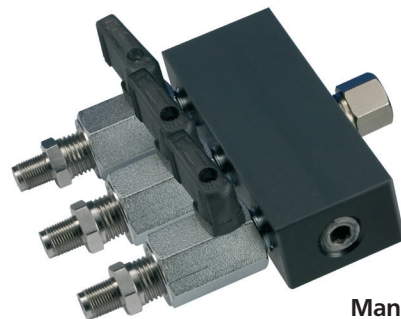


Setting Standards

Manifolds

Manifolds allow connecting multiple pieces of air tooling to one Dimensionair. Toggle valves allow activation of the selected tool. Manifolds are compatible with Dimensionairs 1250:1 through 8000:1M. Manifolds for use with other Dimensionairs, further Manifolds upon request.

Description	Order no.
2-way Manifold	2248282
3-way Manifold	2248283
4-way Manifold	2248284
5-way Manifold	2248285



Manifold 2248283

Hoses

Supply hoses and hoses between Dimensionair and air tooling.

Description	Thread	Order no.
1.5 m / 5 ft Air Supply Hose. Fits all Dimensionair models. (rubber)	7/16-20	2202076
0.9 m / 3 ft Air hose for tooling for Models 1250:1 – 8000:1. (Tygon)	3/8-32	2202074
1.5 m / 5 ft Air hose for tooling on Models 1250:1 – 8000:1. (Tygon)	3/8-32	2202094
1.8 m / 6 ft Air hose for Models 1250:1 – 8000:1. (Tygon)	3/8-32	2202075

Traps and Filters

Good gaging practice requires clean, dry air for gage performance. Dimensionair Models are furnished with a particle filter. Shop air contains water and oil, which should be removed, using an Oil and Water Separator Trap **2201994**.

Description	Order no.
Particle Filter (normally furnished on all Dimensionair Models). Filter size 5µm; Maximum pressure: 17.2 bar/ 250 p.s.i.; maximum working temperature: 79 °C/ 175°F.	2009183
Oil and Water Separator Trap , includes mounting hardware. Filtering capacity: 99.7% removal of oil and water; filter size: 3-6 µm; maximum pressure: 10.3 bar/150 p.s.i.; flow rate: 0.56 m³ 20 cubic feet of air/minute at 5.5 bar/ 80 p.s.i.	2201994
Replacement cartridge for 2201994.	2201993
Replacement cartridge for 2175001.	2201992
Retrofit Kit for AFL-9	2201560



Trap

COMPLEX MEASURING TASKS BROUGHT STRAIGHT TO THE POINT. **MILLIMAR**



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

www.mahr.com, WebCode 153

► | The use of Millimar standard elements allows multi-gage measuring devices to be designed and implemented for the widest possible range of workpieces, e.g. rotationally symmetrical and non-rotationally symmetrical parts. Rotationally symmetrical workpieces can be mounted between centers or on vee supports, whereas non-rotationally symmetrical workpieces often require a special holder.

Our extensive range includes Vertical and horizontal devices, Adapters, Coordinate test bench, Block elements, spring parallelograms, Swivel elements as well as many types of measuring inserts which can be used as components for your measuring task. | ◀

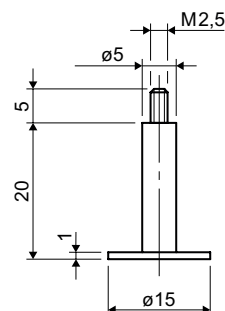
▶ | Millimar. Standard Elements

Measuring Inserts	160
Swivel Elements and Extensions	174
Measuring Lever	192
Measuring Spring Parallelograms	194
Block Measuring Elements (FP1500, BML30, BM50, BM100, ...)	200
Accessories for Measuring Elements	208
Coordinate Measuring Slides	216
Accessories for Measuring Slides (Centring aides, Adapters Plates, Tapers, ...)	218
Carriages with Cross Roller Bearings	221
Linear Measuring Slides (Micrometer slides, Accessories, ...)	222
Centre Tips and Flanges (BRI160, detachable tips)	225
Prisms and Accessories (Prisms, Supports, Flanges)	228
Precision Rotary Unit	231
Equipment Accessories (Columns, Plates, Cantilevers, Granite, ...)	232
Additional Accessories (Supports, Blocks, Clamping pieces)	242
Vertical Measuring Stands (Rotary units, Measuring benches, ...)	246
Horizontal Measuring Stands	259

Measuring Inserts

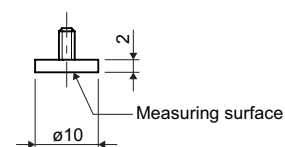
Flat Contact Points P19A

Catalog no.	dia. mm	Length mm	Material	Order no.
P19A	15	20	Steel	5113000



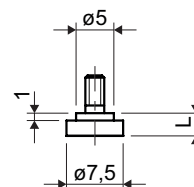
Flat Contact Points P2

Catalog no.	dia. mm	Length mm	Material	Order no.
P2A	10	2	Steel	5113001
P2C	10	2	Carbide	5113002



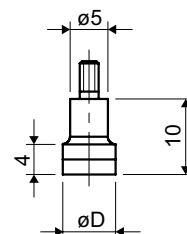
Flat Contact Points P7A

Catalog no.	dia. mm	L mm	Material	Order no.
P7A	7.5	3	Steel	5113003
P7A	7.5	10	Steel	5113004



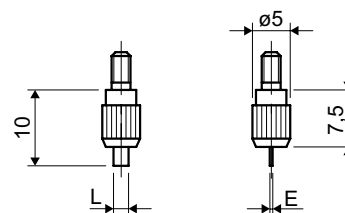
Flat Contact Points P28C

Catalog no.	dia. mm	Length mm	Material	Order no.
P28C	7	10	Carbide	5113005
P28C	10	10	Carbide	5113006



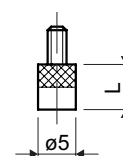
Flat Contact Points P38C

Catalog no.	E mm	L mm	Material	Order no.
P38C	0.5	2	Carbide	5113007
P38C	0.6	2	Carbide	5113008
P38C	1	4	Carbide	5113009



Flat Contact Points P26

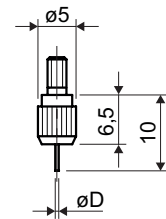
Catalog no.	dia. mm	Length mm	Material	Order no.
P26A	5	3	Steel	5113010
P26A	5	6	Steel	5113011
P26A	5	10	Steel	5113012
P26C	5	6	Carbide	5113013
P26C	5	10	Carbide	5113014



Measuring Inserts

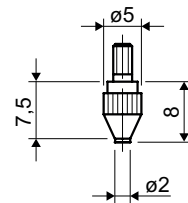
Flat Contact Points P35C

Catalog no.	dia. mm	Length mm	Material	Order no.
P35C	0.45	10	Carbide	5113015
P35C	1	10	Carbide	5113016



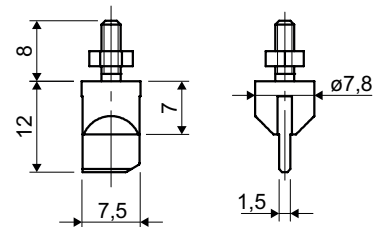
Flat Contact Points P32C

Catalog no.	dia. mm	Length mm	Material	Order no.
P32C	2	8	Carbide	5113017



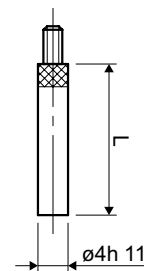
Flat Contact Points PTN8

Catalog no.	E mm	Length mm	Material	Order no.
PTN8	1.5	12	Carbide	5113018



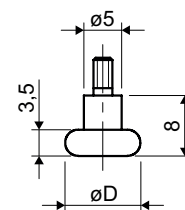
Flat Contact Points P21

Catalog no.	dia. mm	Length mm	Material	Order no.
P21A	4	10	Steel	5113019
P21A	4	15	Steel	5113020
P21A	4	20	Steel	5113021
P21A	4	25	Steel	5113022
P21A	4	30	Steel	5113023
P21A	4	40	Steel	5113024
P21C	4	10	Carbide	5113025
P21C	4	15	Carbide	5113026
P21C	4	20	Carbide	5113027
P21C	4	25	Carbide	5113028
P21C	4	30	Carbide	5113029
P21C	4	40	Carbide	5113030



Flat Contact Points P8A

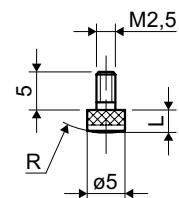
Catalog no.	∅ mm	Length mm	Material	Order no.
P8A	10	8	Steel	5113031
P8A	20	8	Steel	5113032



Measuring Inserts

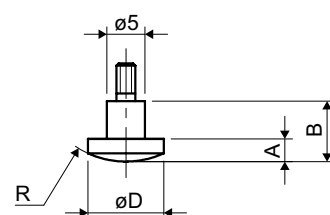
Spherical Contact Points P27

Catalog no.	Radius mm	Length mm	Material	Order no.
P27A	5	5	Steel	5113033
P27C	12.5	3	Carbide	5113034
P27C	5	5	Carbide	5113035
P27T	5	5	Teflon	5113036



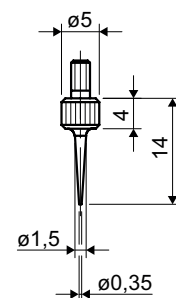
Spherical Contact Points P10

Catalog no.	dia. D mm	A mm	B mm	Radius mm	Material	Order no.
P10A	10	3	8	12	Steel	5113037
P10A	8	4	8	16	Steel	5113038
P10C	7	4	10	7	Carbide	5113039
P10C	10	4	10	10	Carbide	5113040



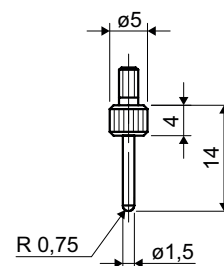
Spherical Contact Points P24A

Catalog no.	dia. mm	Length mm	Material	Order no.
P24A	0.35	14	Steel	5113041



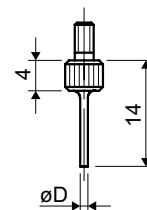
Spherical Contact Points P18A

Catalog no.	dia. mm	Length mm	Radius mm	Material	Order no.
P18A	1.5	14	0.75	Steel	5113042



Spherical Contact Points P3A

Catalog no.	dia. mm	Length mm	Material	Order no.
P3A	1	14	Steel	5113043
P3A	1.5	14	Steel	5113044
P3A	2	14	Steel	5113045



Measuring Inserts

Tapered Contact Points P17A

Catalog no.	Radius mm	Length mm	Material	Order no.
P17A	0.75	10	Steel	5113046
P17A	0.75	15	Steel	5113047
P17A	0.75	20	Steel	5113048

Flat Contact Points P13A

Catalog no.	dia. mm	Length mm	Material	Order no.
P13A	14.5	20	Steel	5113049

Tapered / Flat Contact Points P34

Catalog no.	dia. mm	Length mm	Material	Tip	Order no.
P34A	1.5	20	Steel	Tapered	5113050
P34C	1.5	20	Carbide	Plan	5113051

Wedge Shaped Contact Points P15A

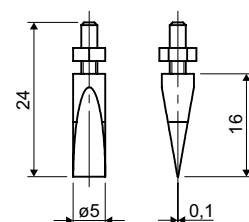
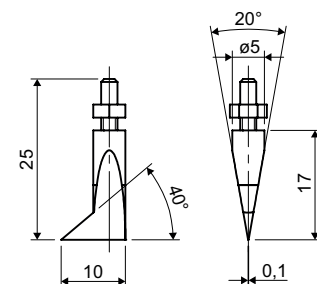
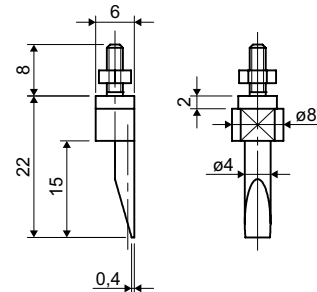
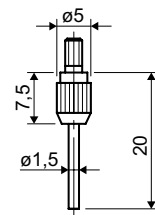
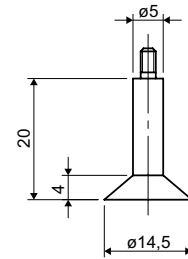
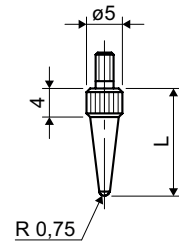
Catalog no.	Length mm	Material	Order no.
P15A	22	Steel	5113055

Wedge Shaped Contact Points P20A

Catalog no.	Length mm	Material	Order no.
P20A	17	Steel	5113056

Wedge Shaped Contact Points P22A

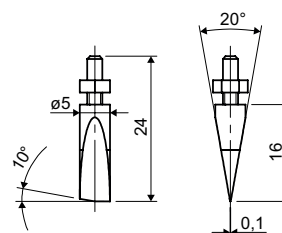
Catalog no.	Length mm	Material	Order no.
P22A	16	Steel	5113057



Measuring Inserts

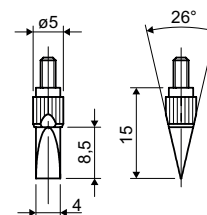
Wedge Shaped Contact Points P23A

Catalog no.	Angle °	Length mm	Material	Order no.
P23A	10	16	Steel	5113058



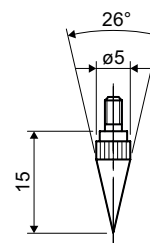
Wedge Shaped Contact Points P36C

Catalog no.	Length mm	Material	Order no.
P36C	15	Carbide	5113059



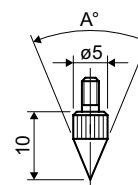
Taper Contact Points P37C

Catalog no.	Angle °	Length mm	Material	Order no.
P37C	26	15	Carbide	5113060



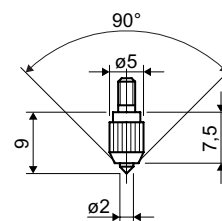
Taper Contact Points P1A

Catalog no.	Angle °	Length mm	Material	Order no.
P1A	45	10	Steel	5113061
P1A	60	10	Steel	5113062
P1A	90	10	Steel	5113063
P1A	120	10	Steel	5113064



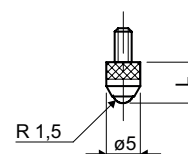
Taper Contact Points P33C

Catalog no.	Angle °	Length mm	Material	Order no.
P33C	90	9	Carbide	5113065



Ball Contact Points P11

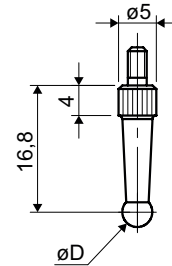
Catalog no.	Radius mm	Length mm	Material	Order no.
P11A	1.5	4	Steel	5113069
P11A	1.5	16	Steel	5113070
P11A	1.5	26	Steel	5113071
P11C	1.5	16	Carbide	5113072
P11C	1.5	26	Carbide	5113073
P11R	1.5	16	Ruby	5113074
P11R	1.5	26	Ruby	5113075
P11S	1.5	16	Sapphire	5113076
P11S	1.5	26	Sapphire	5113077



Measuring Inserts

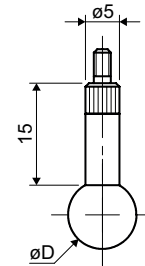
Ball Contact Points P4

Catalog no.	dia. mm	Length mm	Material	Order no.
P4A	2	16.8	Steel	5113078
P4A	3	16.8	Steel	5113079
P4A	4	16.8	Steel	5113080
P4A	5	16.8	Steel	5113081
P4A	6	16.8	Steel	5113082
P4C	2	16.8	Carbide	5113083
P4C	3	16.8	Carbide	5113084
P4C	4	16.8	Carbide	5113085
P4C	5	16.8	Carbide	5113086
P4C	6	16.8	Carbide	5113087



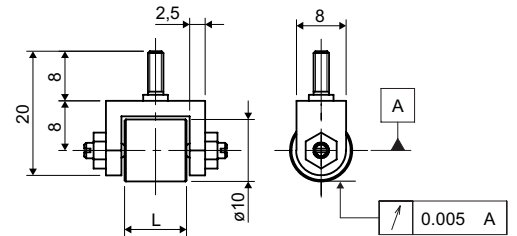
Ball Contact Points P14A

Catalog no.	dia. mm	Length mm	Material	Order no.
P14A	10	15	Steel	5113088
P14A	11	15	Steel	5113089
P14A	12	15	Steel	5113090
P14A	13	15	Steel	5113091
P14A	14	15	Steel	5113092
P14A	15	15	Steel	5113093



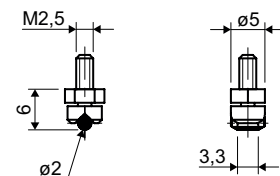
Contact Rollers P25A

Catalog no.	dia. mm	L mm	Material	Order no.
P25A	10	10	Steel	5113094
P25A	10	15	Steel	5113095
P25A	10	20	Steel	5113096
P25A	10	25	Steel	5113097



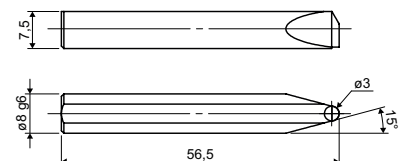
Cylindrical Contact Points P12C

Catalog no.	dia. mm	Length mm	Material	Order no.
P12C	2	6	Carbide	5113098



Contact Points TOU8C

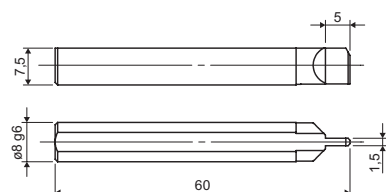
Catalog no.	Mount mm	dia. mm	Length mm	Material	Order no.
TOU8C	8	3	56.5	Carbide	5113103



Measuring Inserts

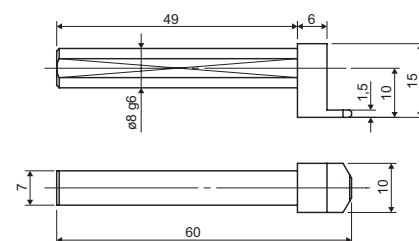
Contact Points TN8C

Catalog no.	Mount mm	E mm	Length mm	Material	Order no.
TN8C	8	1.5	60	Carbide	5113104



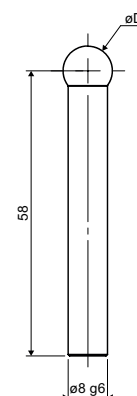
Contact Points TP8C

Catalog no.	Mount mm	E mm	Length mm	Material	Order no.
TP8C	8	1.5	61	Carbide	5113105



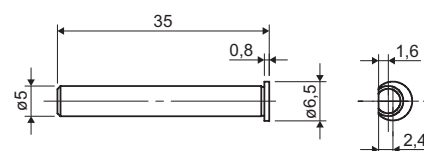
Ball Contact Points TR8

Catalog no.	Mount mm	Ø mm	Length mm	Material	Order no.
TR8A	8	8	58	Steel	5113106
TR8A	8	9	58	Steel	5113107
TR8A	8	10	58	Steel	5113108
TR8A	8	11	58	Steel	5113109
TR8A	8	12	58	Steel	5113110
TR8A	8	13	58	Steel	5113111
TR8A	8	14	58	Steel	5113112
TR8C	8	8	58	Carbide	5113113
TR8C	8	9	58	Carbide	5113114
TR8C	8	10	58	Carbide	5113115
TR8C	8	11	58	Carbide	5113116
TR8C	8	12	58	Carbide	5113117
TR8C	8	13	58	Carbide	5113118
TR8C	8	14	58	Carbide	5113119



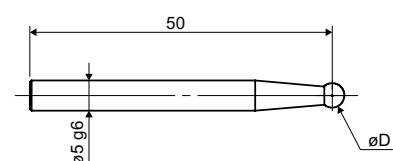
Contact Points T5A

Catalog no.	Mount mm	Ø mm	Ø mm	Length mm	Material	Order no.
T5A	5	6.5	5	35	Steel, hardened	5113120



Ball Contact Points TR5C

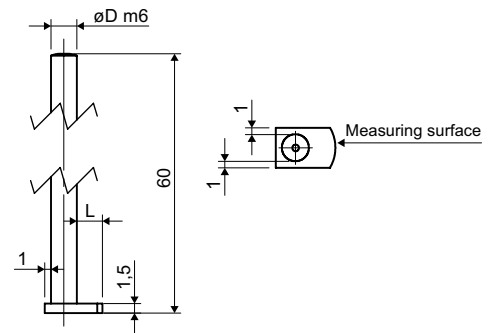
Catalog no.	Mount mm	Ø mm	Length mm	Material	Order no.
TR5C	5	4	50	Carbide	5113121
TR5C	5	5	50	Carbide	5113122
TR5C	5	6	50	Carbide	5113123
TR5C	5	7	50	Carbide	5113124



Measuring Inserts

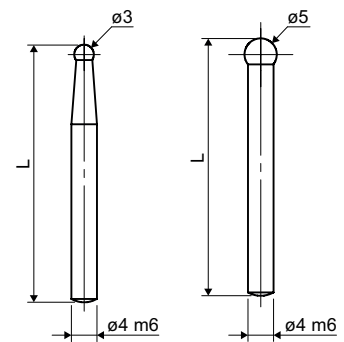
Contact Points TG4C

Catalog no.	Mount mm	L mm		Material	Order no.
TG4C	4	4	for max groove 3.5	Carbide	5113125
TG4C	4	8	for max groove 7.5	Carbide	5113126



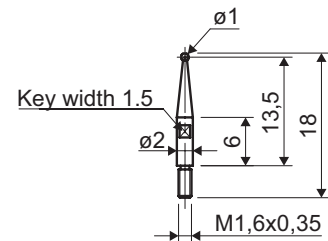
Ball Contact Points TC4C

Catalog no.	Mount mm	dia. mm	Length L mm	Material	Order no.
TC4C	4	3	40	Carbide	5113127
TC4C	4	3	60	Carbide	5113128
TC4C	4	3	100	Carbide	5113129
TC4C	4	5	40	Carbide	5113130
TC4C	4	5	60	Carbide	5113131
TC4C	4	5	100	Carbide	5113132



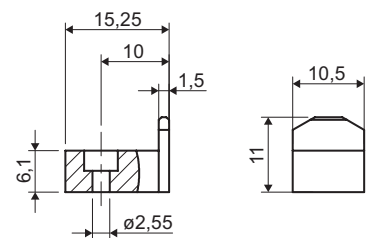
Contact Points PTB

Catalog no.	dia. mm	M mm		Material	Order no.
PTB1A	1	1.6		Steel, hardened	5113136
PTB2A	2	1.6		Steel, hardened	5113137



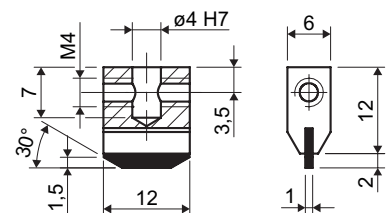
Measuring Attachment P39C

Catalog no.	Thickness mm	Length mm		Material	Order no.
P39C	1.5	4.9		Carbide	5113138



Measuring Attachment, centered MS1C

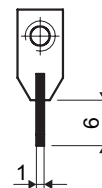
Catalog no.	Thickness mm	Length mm		Material	Order no.
MS1C	1	2		Carbide	5113143



Measuring Inserts

Measuring Attachment, centered MS2C

Catalog no.	Thickness mm	Length mm	Material	Order no.
MS2C	1	6	Carbide	5113144



Measuring Attachment, centered MS3C

Catalog no.	Thickness mm	Material	Order no.
MS3C	4	Carbide	5113145



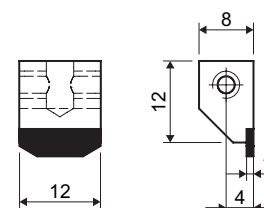
Measuring Attachment, centered MS4C

Catalog no.	Thickness mm	Material	Order no.
MS4C	3	Carbide	5113146



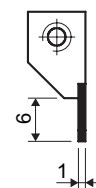
Measuring Attachment, offset MS5C

Catalog no.	Thickness mm	Length mm	Material	Order no.
MS5C	1	2	Carbide	5113147



Measuring Attachment, offset MS6C

Catalog no.	Thickness mm	Length mm	Material	Order no.
MS6C	1	6	Carbide	5113148



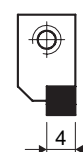
Measuring Attachment, offset MS7C

Catalog no.	Thickness mm	Material	Order no.
MS7C	3	Carbide	5113149



Measuring Attachment, offset MS8C

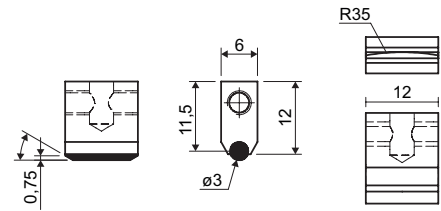
Catalog no.	Thickness mm	Material	Order no.
MS8C	4	Carbide	5113150



Measuring Inserts

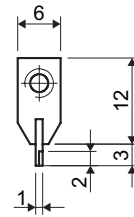
Measuring Attachment with cylinder centered MS9C

Catalog no.	Material	Order no.
MS9C	Carbide	5113151



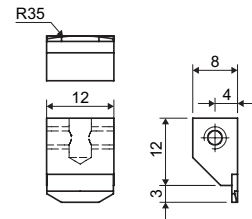
Measuring Attachment, centered flat MS10C

Catalog no.	Length mm	Thickness mm	Material	Order no.
MS10C	3	1	Carbide	5113152



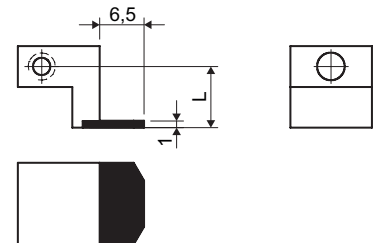
Measuring Attachment, offset flat MS11C

Catalog no.	Length mm	Thickness mm	Material	Order no.
MS11C	3	1	Carbide	5113153



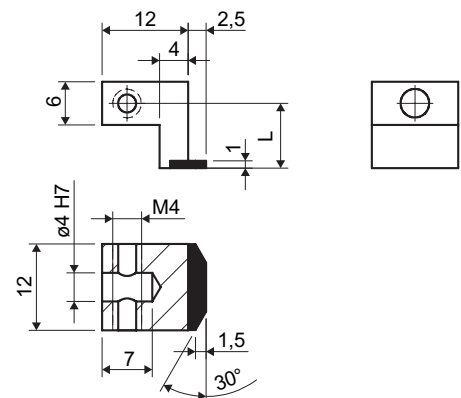
Measuring Attachment MS12C

Catalog no.	Offset L mm	Length mm	Thickness mm	Material	Order no.
MS12C	9	6.5	1	Carbide	5113154
MS12C	15	6.5	1	Carbide	5113155
MS12C	27	6.5	1	Carbide	5113156



Measuring Attachment MS13C

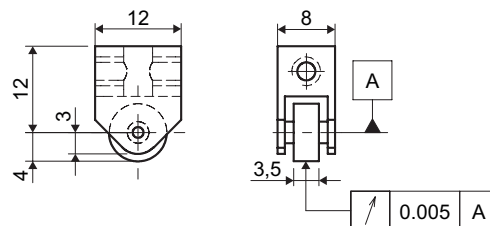
Catalog no.	Offset L mm	Length mm	Thickness mm	Material	Order no.
MS13C	9	2.5	1	Carbide	5113157
MS13C	15	2.5	1	Carbide	5113158
MS13C	27	2.5	1	Carbide	5113159



Measuring Inserts

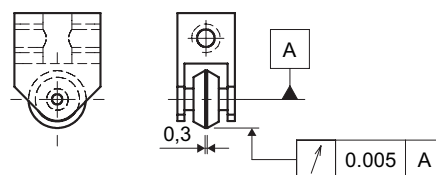
Contact Rollers MS14C

Catalog no.	Thickness mm	Material	Order no.
MS14C	3.5	Steel	5113160



Contact Rollers MS15C

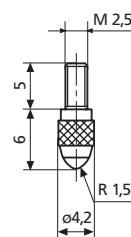
Catalog no.	Thickness mm	Material	Order no.
MS15C	0.3	Steel	5113161



Standard Contact Points 901

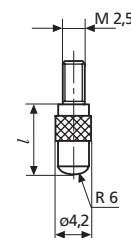
Ball dia. 3 mm

Catalog no.	Ball dia. mm	Description	Order no.
901	3	with steel ball	4360001
901 H	3	with carbide ball	4360002
901 R	3	with ruby ball	4360003



Spherical Contact Points 902

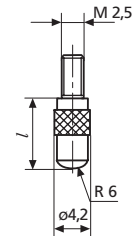
Catalog no.	Length mm	Material	Order no.
902	4	Steel	4360007
902	6	Steel	4360009
902	8	Steel	4360010
902	10	Steel	4360011
902	12	Steel	4360012
902	15	Steel	4360013
902	20	Steel	4360014
902	25	Steel	4360015
902	30	Steel	4360016
902	35	Steel	4360017
902	40	Steel	4360019
902	45	Steel	4360026
902	50	Steel	4360018
902	55	Steel	4360031
902	65	Steel	4360035
902	75	Steel	4360020
902	85	Steel	4360036
902	95	Steel	4360029



Measuring Inserts

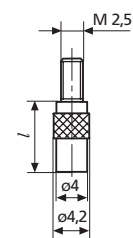
Spherical Contact Points 902 H

Catalog no.	Length mm	Material	Order no.
902 H	4	Carbide measuring faces	—
902 H	6	Carbide measuring faces	—
902 H	8	Carbide measuring faces	4360040
902 H	10	Carbide measuring faces	4360041
902 H	12	Carbide measuring faces	4360042
902 H	15	Carbide measuring faces	4360043
902 H	20	Carbide measuring faces	4360044
902 H	25	Carbide measuring faces	4360045
902 H	30	Carbide measuring faces	4360046
902 H	35	Carbide measuring faces	4360047
902 H	40	Carbide measuring faces	4360049
902 H	45	Carbide measuring faces	4360050
902 H	50	Carbide measuring faces	4360048



Flat Contact Points 903

Catalog no.	Length mm	Material	Order no.
903	4	Steel	4360070
903	6	Steel	4360071
903	8	Steel	4360072
903	10	Steel	4360073
903	12	Steel	4360074
903	15	Steel	4360075
903	20	Steel	4360076
903	25	Steel	4360077
903	30	Steel	4360300
903	35	Steel	4360078
903	40	Steel	4360310
903	50	Steel	4360079



Flat Contact Points 903 H

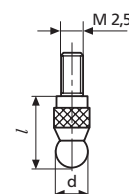
Catalog no.	Length mm	Material	Order no.
903 H	4	Carbide tipped	—
903 H	6	Carbide tipped	4360101
903 H	8	Carbide tipped	4360102
903 H	10	Carbide tipped	4360103
903 H	12	Carbide tipped	4360104
903 H	15	Carbide tipped	4360105
903 H	20	Carbide tipped	4360106
903 H	25	Carbide tipped	4360107
903 H	30	Carbide tipped	4360110
903 H	35	Carbide tipped	4360108
903 H	40	Carbide tipped	4360111
903 H	45	Carbide tipped	—
903 H	50	Carbide tipped	4360109

Measuring Inserts

Ball Contact Points 906 H

with carbide ball, accuracy ball dia. 0/-6µm

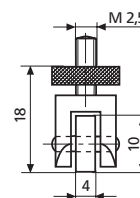
Catalog no.	Ball dia. d mm	l mm	Order no.
906 H	1	8.5	4360150
906 H	1.25	8.5	4360151
906 H	1.5	8.5	4360152
906 H	1.75	8.5	4360153
906 H	2	8.5	4360154
906 H	2.5	8.5	4360155
906 H	3	8.5	4360156
906 H	3.5	8.5	4360157
906 H	4	8.5	4360158
906 H	4.5	8.5	4360159
906 H	5	9	4360160
906 H	5.5	9	4360161
906 H	6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



Contact Rollers 909

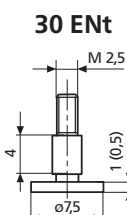
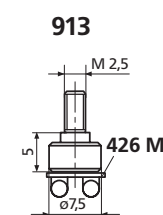
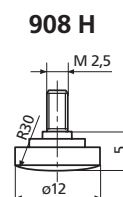
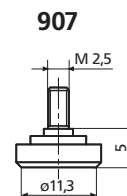
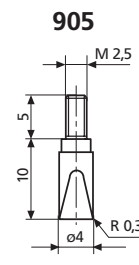
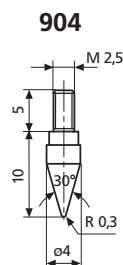
(Concentricity error 3 µm)

Catalog no.	Description	Order no.
909 A	Cylindrical Roller	4360220
909 B	Radiused Roller R = 5 mm	4360221



Special Contact Points

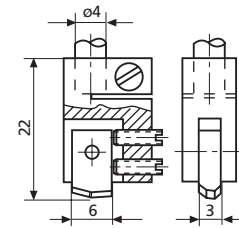
Catalog no.	Description	Order no.
904	Conical Contact Points, Steel	4360130
904 H	Conical Contact Points, Steel, Carbide tipped	4360131
905	Wedge Shaped Contact Points, Steel	4360140
905 H	Wedge Shaped Contact Points, Steel, Carbide tipped	4360141
907	Flat Contact Points, Steel. A = 1 cm²	4360200
907 H	Flat Contact Points, Steel, Carbide tipped dia. 7 mm	4360201
908	Spherical Contact Points, Steel	4360210
908 H	Spherical Contact Points, Carbide tipped	4360211
913	Flat Contact Points, for mounting Pin Holder Gage 426 M for measuring threads using 3 wire method	4360400
30 ENT	Disc type Anvil, thickness 0.5 mm, hardened	4126310
30 ENT	Disc type Anvil, thickness 1 mm, hardened	4882022



Measuring Inserts

Measuring Attachment 910 H

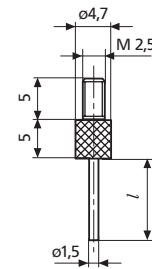
Catalog no.	Description	Order no.
910 H	with parallel adjustable carbide blades	4360230



Pin Contact Points 911

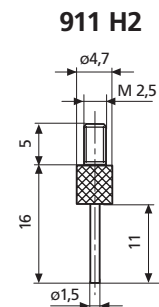
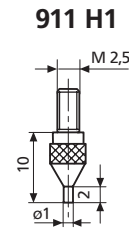
ø 1.5 mm, flat

Catalog no.	Length <i>l</i> mm	Order no.
911	15	4360280
911	20	4360281
911	25	4360282
911	30	4360283
911	35	4360284
911	40	4360285
911	50	4360286



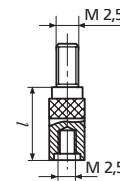
Pin Contact Points 911 H

Catalog no.	Description	Order no.
911 H1	Carbide tipped ø 1 mm, flat	4360240
911 H2	Carbide tipped ø 1.5 mm, flat	4360241

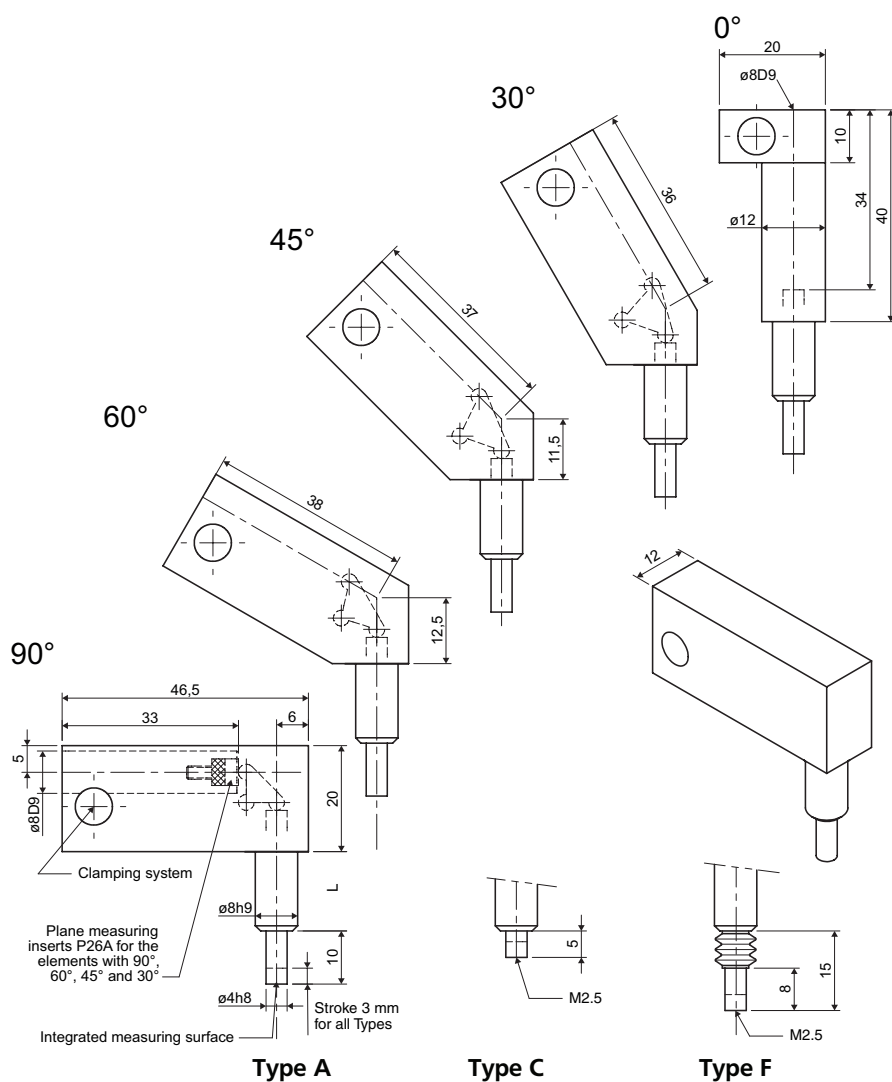


Measuring Spindle Extensions 912

Catalog no.	Length <i>l</i> mm	Order no.
912	10	4360250
912	15	4360251
912	20	4360252
912	25	4360253
912	35	4360254
912	50	4360255
912	75	4360256
912	100	4360257



Swivel Elements and Extensions



Swivel elements, long 0°

Catalog no.	Length L mm	Type	Order no.
UL-A	15	A	5113609
UL-C	15	C	5113610
UL-F	15	F	5113611
UL-A	25	A	5113615
UL-C	25	C	5113616
UL-F	25	F	5113617
UL-A	50	A	5113618
UL-C	50	C	5113619
UL-F	50	F	5113620
UL-A	75	A	5113621
UL-C	75	C	5113622
UL-F	75	F	5113623

Catalog no.	Length L mm	Type	Order no.
UL-A	200	A	5113612
UL-C	200	C	5113613
UL-F	200	F	5113614
UL-A	100	A	5113600
UL-C	100	C	5113601
UL-F	100	F	5113602
UL-A	125	A	5113603
UL-C	125	C	5113604
UL-F	125	F	5113605
UL-A	150	A	5113606
UL-C	150	C	5113607
UL-F	150	F	5113608

Swivel Elements and Extensions

Swivel elements, long 30°

Catalog no.	Length L mm	Type	Order no.
UL-A	15	A	5113633
UL-C	15	C	5113634
UL-F	15	F	5113635
UL-A	25	A	5113639
UL-C	25	C	5113640
UL-F	25	F	5113641
UL-A	50	A	5113642
UL-C	50	C	5113643
UL-F	50	F	5113644
UL-A	75	A	5113645
UL-C	75	C	5113646
UL-F	75	F	5113647
UL-A	100	A	5113624
UL-C	100	C	5113625
UL-F	100	F	5113626
UL-A	125	A	5113627
UL-C	125	C	5113628
UL-F	125	F	5113629
UL-A	150	A	5113630
UL-C	150	C	5113631
UL-F	150	F	5113632
UL-A	200	A	5113636
UL-C	200	C	5113637
UL-F	200	F	5113638

Swivel elements, long 60°

Catalog no.	Length L mm	Type	Order no.
UL-A	15	A	5113681
UL-C	15	C	5113682
UL-F	15	F	5113683
UL-A	25	A	5113687
UL-C	25	C	5113688
UL-F	25	F	5113689
UL-A	50	A	5113690
UL-C	50	C	5113691
UL-F	50	F	5113692
UL-A	75	A	5113693
UL-C	75	C	5113694
UL-F	75	F	5113695
UL-A	100	A	5113672
UL-C	100	C	5113673
UL-F	100	F	5113674
UL-A	125	A	5113675
UL-C	125	C	5113676
UL-F	125	F	5113677
UL-A	150	A	5113678
UL-C	150	C	5113679
UL-F	150	F	5113680
UL-A	200	A	5113684
UL-C	200	C	5113685
UL-F	200	F	5113686

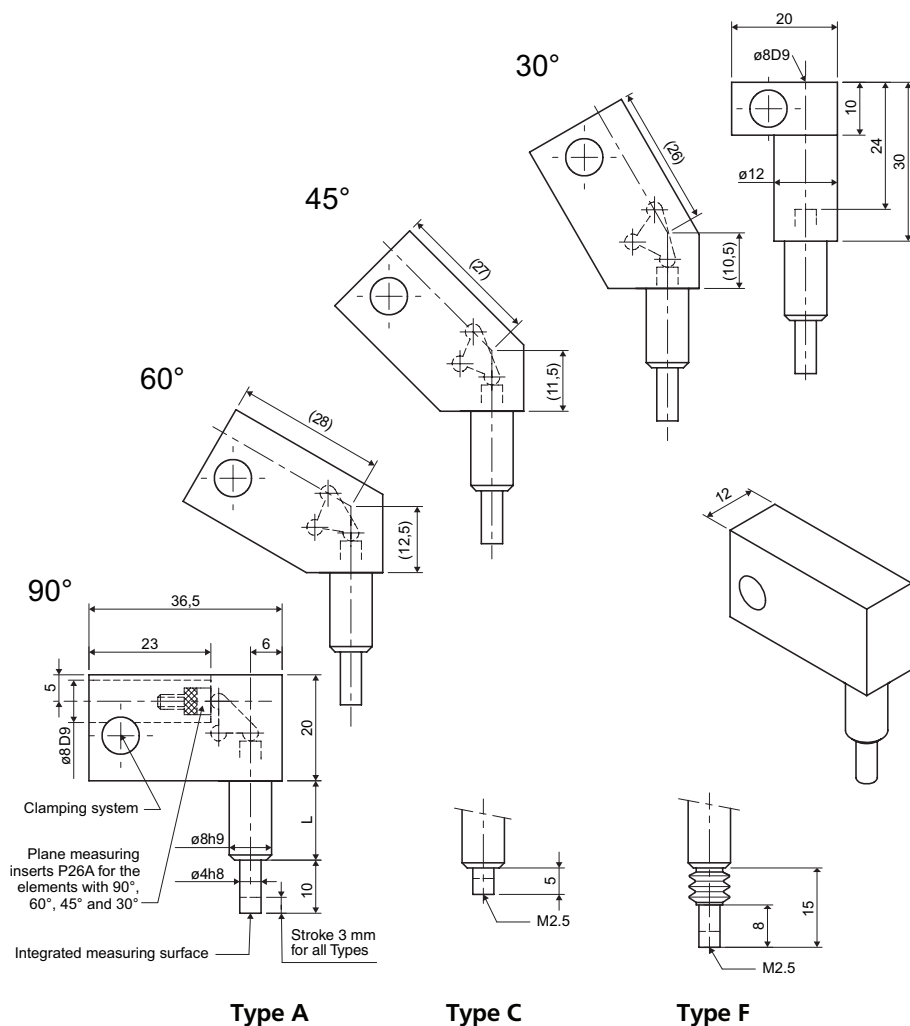
Swivel elements, long 45°

Catalog no.	Length L mm	Type	Order no.
UL-A	15	A	5113656
UL-C	15	C	5113657
UL-F	15	F	5113658
UL-A	25	A	5113662
UL-C	25	C	5113663
UL-F	25	F	5113665
UL-A	50	A	5113666
UL-C	50	C	5113667
UL-F	50	F	5113668
UL-A	75	A	5113669
UL-C	75	C	5113670
UL-F	75	F	5113671
UL-A	100	A	5113648
UL-C	100	C	5113649
UL-F	100	F	5113650
UL-A	125	A	5113651
UL-C	125	C	5113664
UL-F	125	F	5113652
UL-A	150	A	5113653
UL-C	150	C	5113654
UL-F	150	F	5113655
UL-A	200	A	5113659
UL-C	200	C	5113660
UL-F	200	F	5113661

Swivel elements, long 90°

Catalog no.	Length L mm	Type	Order no.
UL-A	15	A	5113705
UL-C	15	C	5113706
UL-F	15	F	5113707
UL-A	25	A	5113711
UL-C	25	C	5113712
UL-F	25	F	5113713
UL-A	50	A	5113714
UL-C	50	C	5113715
UL-F	50	F	5113716
UL-A	75	A	5113717
UL-C	75	C	5113718
UL-F	75	F	5113719
UL-A	100	A	5113696
UL-C	100	C	5113697
UL-F	100	F	5113698
UL-A	125	A	5113699
UL-C	125	C	5113700
UL-F	125	F	5113701
UL-A	150	A	5113702
UL-C	150	C	5113703
UL-F	150	F	5113704
UL-A	200	A	5113708
UL-C	200	C	5113709
UL-F	200	F	5113710

Swivel Elements and Extensions



Swivel elements, compact 0°

Catalog no.	Length L mm	Type	Order no.	Catalog no.	Length L mm	Type	Order no.
UK-A	15	A	5113732	UK-A	100	A	5113723
UK-C	15	C	5113733	UK-C	100	C	5113724
UK-F	15	F	5113734	UK-F	100	F	5113725
UK-A	25	A	5113738	UK-A	125	A	5113726
UK-C	25	C	5113739	UK-C	125	C	5113727
UK-F	25	F	5113740	UK-F	125	F	5113728
UK-A	50	A	5113741	UK-A	150	A	5113729
UK-C	50	C	5113742	UK-C	150	C	5113730
UK-F	50	F	5113743	UK-F	150	F	5113731
UK-A	75	A	5113744	UK-A	200	A	5113735
UK-C	75	C	5113745	UK-C	200	C	5113736
UK-F	75	F	5113746	UK-F	200	F	5113737

Swivel Elements and Extensions

Swivel elements, compact 30°

Catalog no.	Length L mm	Type	Order no.
UK-A	15	A	5113756
UK-C	15	C	5113757
UK-F	15	F	5113758
UK-A	25	A	5113762
UK-C	25	C	5113763
UK-F	25	F	5113764
UK-A	50	A	5113765
UK-C	50	C	5113766
UK-F	50	F	5113767
UK-A	75	A	5113768
UK-C	75	C	5113769
UK-F	75	F	5113770
UK-A	100	A	5113747
UK-C	100	C	5113748
UK-F	100	F	5113749
UK-A	125	A	5113750
UK-C	125	C	5113751
UK-F	125	F	5113752
UK-A	150	A	5113753
UK-C	150	C	5113754
UK-F	150	F	5113755
UK-A	200	A	5113759
UK-C	200	C	5113760
UK-F	200	F	5113761

Swivel elements, compact 60°

Catalog no.	Length L mm	Type	Order no.
UK-A	15	A	5113804
UK-C	15	C	5113805
UK-F	15	F	5113806
UK-A	25	A	5113810
UK-C	25	C	5113811
UK-F	25	F	5113812
UK-A	50	A	5113813
UK-C	50	C	5113814
UK-F	50	F	5113815
UK-A	75	A	5113816
UK-C	75	C	5113817
UK-F	75	F	5113818
UK-A	100	A	5113795
UK-C	100	C	5113796
UK-F	100	F	5113797
UK-A	125	A	5113798
UK-C	125	C	5113799
UK-F	125	F	5113800
UK-A	150	A	5113801
UK-C	150	C	5113802
UK-F	150	F	5113803
UK-A	200	A	5113807
UK-C	200	C	5113808
UK-F	200	F	5113809

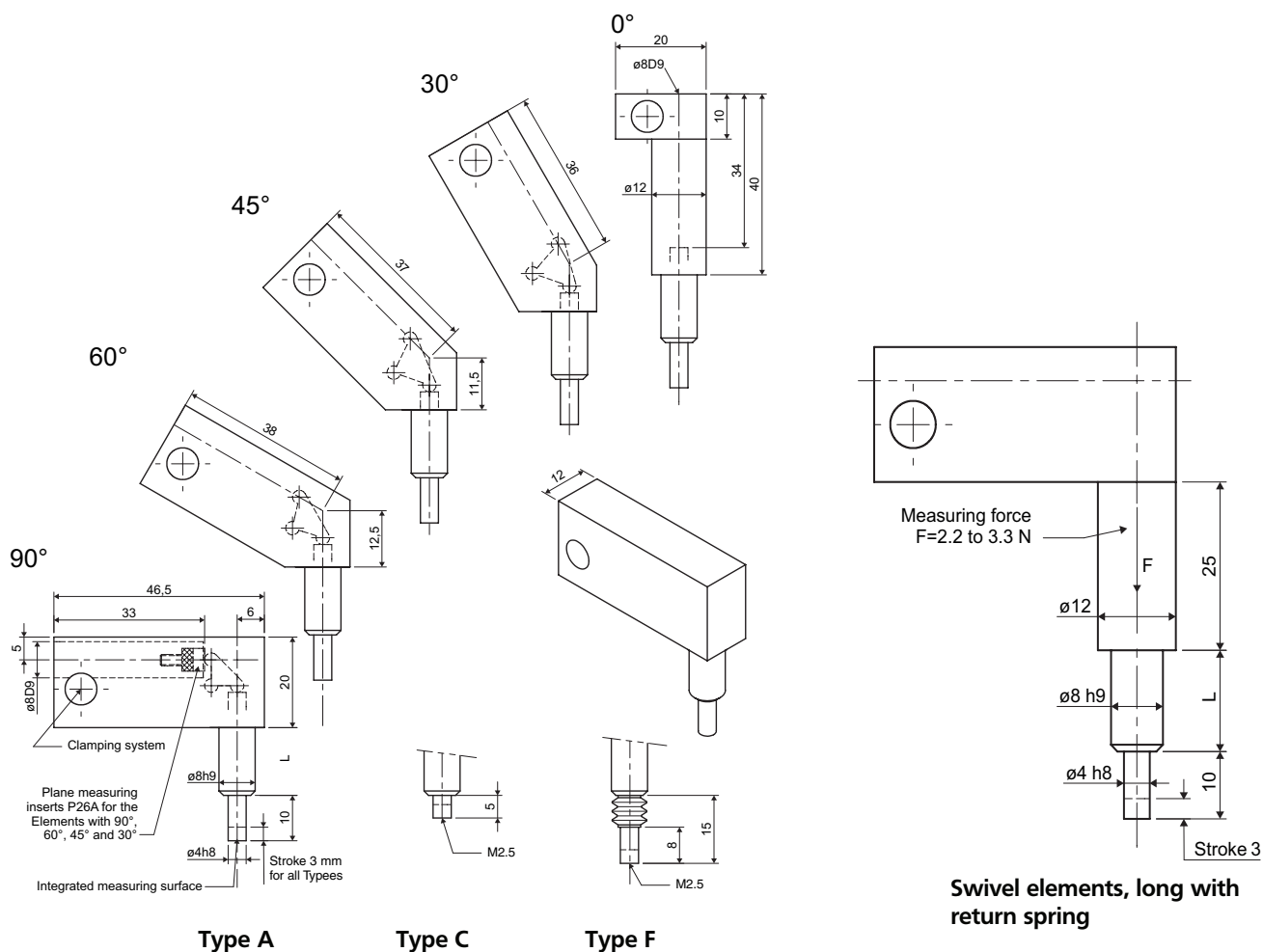
Swivel elements, compact 45°

Catalog no.	Length L mm	Type	Order no.
UK-A	15	A	5113780
UK-C	15	C	5113781
UK-F	15	F	5113782
UK-A	25	A	5113786
UK-C	25	C	5113787
UK-F	25	F	5113788
UK-A	50	A	5113789
UK-C	50	C	5113790
UK-F	50	F	5113791
UK-A	75	A	5113792
UK-C	75	C	5113793
UK-F	75	F	5113794
UK-A	100	A	5113771
UK-C	100	C	5113772
UK-F	100	F	5113773
UK-A	125	A	5113774
UK-C	125	C	5113775
UK-F	125	F	5113776
UK-A	150	A	5113777
UK-C	150	C	5113778
UK-F	150	F	5113779
UK-A	200	A	5113783
UK-C	200	C	5113784
UK-F	200	F	5113785

Swivel elements, compact 90°

Catalog no.	Length L mm	Type	Order no.
UK-A	15	A	5113828
UK-C	15	C	5113829
UK-F	15	F	5113830
UK-A	25	A	5113834
UK-C	25	C	5113835
UK-F	25	F	5113836
UK-A	50	A	5113837
UK-C	50	C	5113838
UK-F	50	F	5113839
UK-A	75	A	5113840
UK-C	75	C	5113841
UK-F	75	F	5113842
UK-A	100	A	5113819
UK-C	100	C	5113820
UK-F	100	F	5113821
UK-A	125	A	5113822
UK-C	125	C	5113823
UK-F	125	F	5113824
UK-A	150	A	5113825
UK-C	150	C	5113826
UK-F	150	F	5113827
UK-A	200	A	5113831
UK-C	200	C	5113832
UK-F	200	F	5113833

Swivel Elements and Extensions



Swivel elements, long with return spring 0°

Catalog no.	Length L mm	Type	Order no.
ULV-A	15	A	5113855
ULV-C	15	C	5113856
ULV-F	15	F	5113857
ULV-A	25	A	5113861
ULV-C	25	C	5113862
ULV-F	25	F	5113863
ULV-A	50	A	5113864
ULV-C	50	C	5113865
ULV-F	50	F	5113866
ULV-A	75	A	5113867
ULV-C	75	C	5113868
ULV-F	75	F	5113869

Catalog no.	Length L mm	Type	Order no.
ULV-A	100	A	5113846
ULV-C	100	C	5113847
ULV-F	100	F	5113848
ULV-A	125	A	5113849
ULV-C	125	C	5113850
ULV-F	125	F	5113851
ULV-A	150	A	5113852
ULV-C	150	C	5113853
ULV-F	150	F	5113854
ULV-A	200	A	5113858
ULV-C	200	C	5113859
ULV-F	200	F	5113860

Swivel Elements and Extensions

Swivel elements, long with return spring 30°

Catalog no.	Length L mm	Type	Order no.
ULV-A	15	A	5113879
ULV-C	15	C	5113880
ULV-F	15	F	5113881
ULV-A	25	A	5113885
ULV-C	25	C	5113886
ULV-F	25	F	5113887
ULV-A	50	A	5113888
ULV-C	50	C	5113889
ULV-F	50	F	5113890
ULV-A	75	A	5113891
ULV-C	75	C	5113892
ULV-F	75	F	5113893
ULV-A	100	A	5113870
ULV-C	100	C	5113871
ULV-F	100	F	5113872
ULV-A	125	A	5113873
ULV-C	125	C	5113874
ULV-F	125	F	5113875
ULV-A	150	A	5113876
ULV-C	150	C	5113877
ULV-F	150	F	5113878
ULV-A	200	A	5113882
ULV-C	200	C	5113883
ULV-F	200	F	5113884

Swivel elements, long with return spring 60°

Catalog no.	Length L mm	Type	Order no.
ULV-A	15	A	5113927
ULV-C	15	C	5113928
ULV-F	15	F	5113929
ULV-A	25	A	5113933
ULV-C	25	C	5113934
ULV-F	25	F	5113935
ULV-A	50	A	5113936
ULV-C	50	C	5113937
ULV-F	50	F	5113938
ULV-A	75	A	5113939
ULV-C	75	C	5113940
ULV-F	75	F	5113941
ULV-A	100	A	5113918
ULV-C	100	C	5113919
ULV-F	100	F	5113920
ULV-A	125	A	5113921
ULV-C	125	C	5113922
ULV-F	125	F	5113923
ULV-A	150	A	5113924
ULV-C	150	C	5113925
ULV-F	150	F	5113926
ULV-A	200	A	5113930
ULV-C	200	C	5113931
ULV-F	200	F	5113932

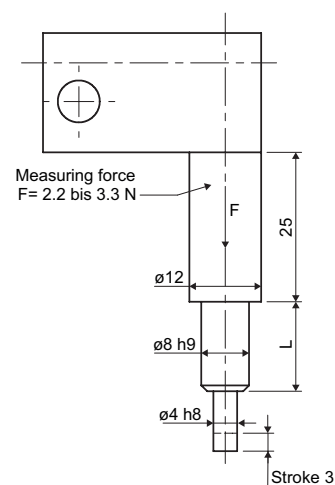
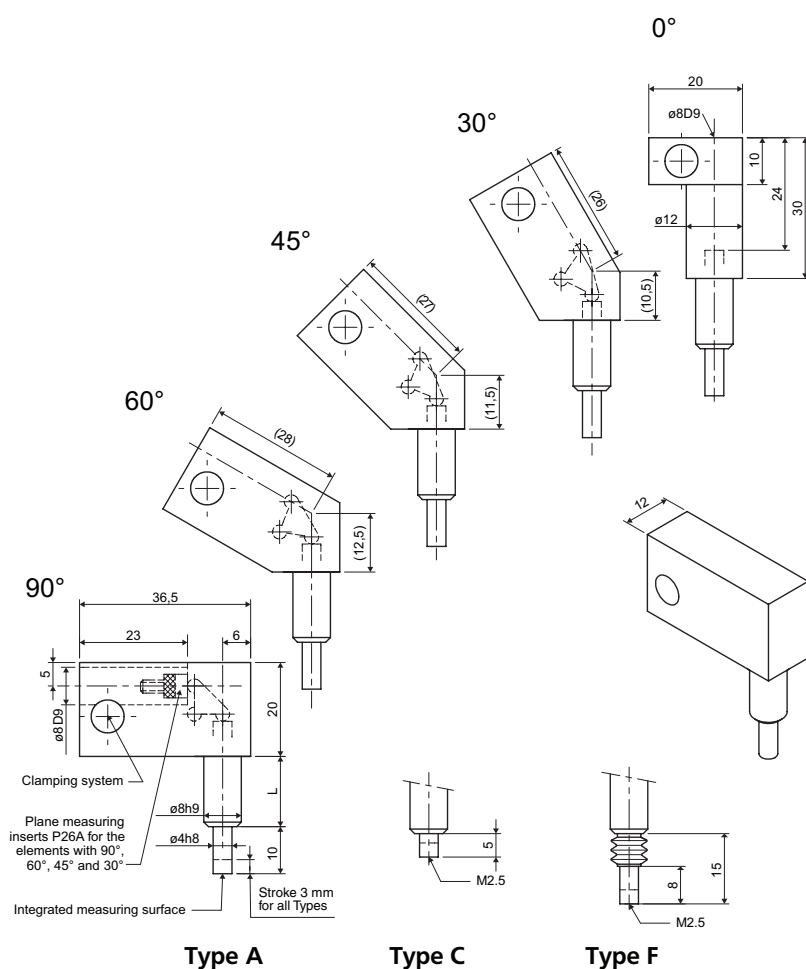
Swivel elements, long with return spring 45°

Catalog no.	Length L mm	Type	Order no.
ULV-A	15	A	5113903
ULV-C	15	C	5113904
ULV-F	15	F	5113905
ULV-A	25	A	5113909
ULV-C	25	C	5113910
ULV-F	25	F	5113911
ULV-A	50	A	5113912
ULV-C	50	C	5113913
ULV-F	50	F	5113914
ULV-A	75	A	5113915
ULV-C	75	C	5113916
ULV-F	75	F	5113917
ULV-A	100	A	5113894
ULV-C	100	C	5113895
ULV-F	100	F	5113896
ULV-A	125	A	5113897
ULV-C	125	C	5113898
ULV-F	125	F	5113899
ULV-A	150	A	5113900
ULV-C	150	C	5113901
ULV-F	150	F	5113902
ULV-A	200	A	5113906
ULV-C	200	C	5113907
ULV-F	200	F	5113908

Swivel elements, long with return spring 90°

Catalog no.	Length L mm	Type	Order no.
ULV-A	15	A	5113951
ULV-C	15	C	5113952
ULV-F	15	F	5113953
ULV-A	25	A	5113957
ULV-C	25	C	5113958
ULV-F	25	F	5113959
ULV-A	50	A	5113960
ULV-C	50	C	5113961
ULV-F	50	F	5113962
ULV-A	75	A	5113963
ULV-C	75	C	5113964
ULV-F	75	F	5113965
ULV-A	100	A	5113942
ULV-C	100	C	5113943
ULV-F	100	F	5113944
ULV-A	125	A	5113945
ULV-C	125	C	5113946
ULV-F	125	F	5113947
ULV-A	150	A	5113948
ULV-C	150	C	5113949
ULV-F	150	F	5113950
ULV-A	200	A	5113954
ULV-C	200	C	5113955
ULV-F	200	F	5113956

Swivel Elements and Extensions



Swivel elements, compact with return spring

Swivel elements, compact with return spring 0°

Catalog no.	Length L mm	Type	Order no.
UKV-A	15	A	5113979
UKV-C	15	C	5113980
UKV-F	15	F	5113981
UKV-A	25	A	5113973
UKV-C	25	C	5113974
UKV-F	25	F	5113975
UKV-A	50	A	5113976
UKV-C	50	C	5113977
UKV-F	50	F	5113978
UKV-A	75	A	5113979
UKV-C	75	C	5113980
UKV-F	75	F	5113981

Catalog no.	Length L mm	Type	Order no.
UKV-A	100	A	5113970
UKV-C	100	C	5113971
UKV-F	100	F	5113972
UKV-A	125	A	5113973
UKV-C	125	C	5113974
UKV-F	125	F	5113975
UKV-A	150	A	5113976
UKV-C	150	C	5113977
UKV-F	150	F	5113978
UKV-A	200	A	5113970
UKV-C	200	C	5113971
UKV-F	200	F	5113972

Swivel Elements and Extensions

Swivel elements, compact with return spring 30°

Catalog no.	Length L mm	Type	Order no.
UKV-A	15	A	5114003
UKV-C	15	C	5114004
UKV-F	15	F	5114005
UKV-A	25	A	5114009
UKV-C	25	C	5114010
UKV-F	25	F	5114011
UKV-A	50	A	5114012
UKV-C	50	C	5114013
UKV-F	50	F	5114014
UKV-A	75	A	5114015
UKV-C	75	C	5114016
UKV-F	75	F	5114017
UKV-A	100	A	5113994
UKV-C	100	C	5113995
UKV-F	100	F	5113996
UKV-A	125	A	5113997
UKV-C	125	C	5113998
UKV-F	125	F	5113999
UKV-A	150	A	5114000
UKV-C	150	C	5114001
UKV-F	150	F	5114002
UKV-A	200	A	5114006
UKV-C	200	C	5114007
UKV-F	200	F	5114008

Swivel elements, compact with return spring 60°

Catalog no.	Length L mm	Type	Order no.
UKV-A	15	A	5114051
UKV-C	15	C	5114052
UKV-F	15	F	5114053
UKV-A	25	A	5114057
UKV-C	25	C	5114058
UKV-F	25	F	5114059
UKV-A	50	A	5114060
UKV-C	50	C	5114061
UKV-F	50	F	5114062
UKV-A	75	A	5114063
UKV-C	75	C	5114064
UKV-F	75	F	5114065
UKV-A	100	A	5114042
UKV-C	100	C	5114043
UKV-F	100	F	5114044
UKV-A	125	A	5114045
UKV-C	125	C	5114046
UKV-F	125	F	5114047
UKV-A	150	A	5114048
UKV-C	150	C	5114049
UKV-F	150	F	5114050
UKV-A	200	A	5114054
UKV-C	200	C	5114055
UKV-F	200	F	5114056

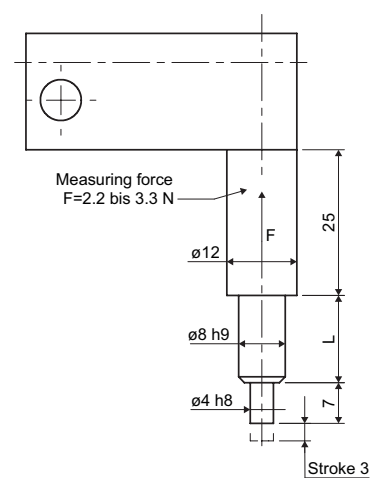
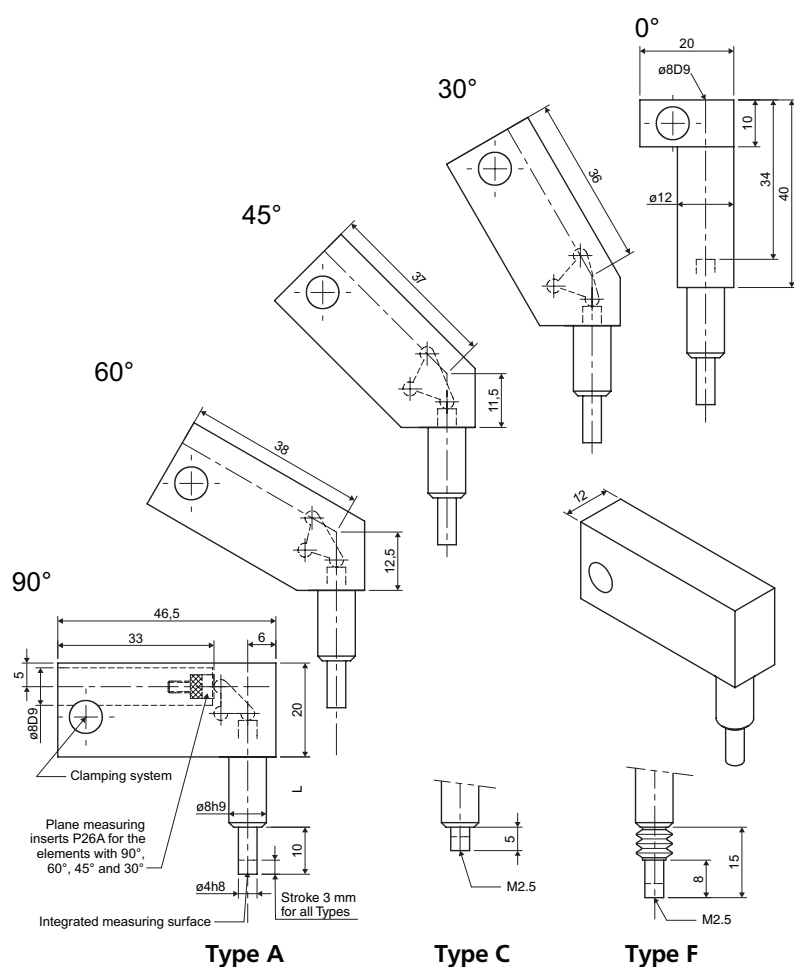
Swivel elements, compact with return spring 45°

Catalog no.	Length L mm	Type	Order no.
UKV-A	15	A	5114027
UKV-C	15	C	5114028
UKV-F	15	F	5114029
UKV-A	25	A	5114033
UKV-C	25	C	5114034
UKV-F	25	F	5114035
UKV-A	50	A	5114036
UKV-C	50	C	5114037
UKV-F	50	F	5114038
UKV-A	75	A	5114039
UKV-C	75	C	5114040
UKV-F	75	F	5114041
UKV-A	100	A	5114018
UKV-C	100	C	5114019
UKV-F	100	F	5114020
UKV-A	125	A	5114021
UKV-C	125	C	5114022
UKV-F	125	F	5114023
UKV-A	150	A	5114024
UKV-C	150	C	5114025
UKV-F	150	F	5114026
UKV-A	200	A	5114030
UKV-C	200	C	5114031
UKV-F	200	F	5114032

Swivel elements, compact with return spring 90°

Catalog no.	Length L mm	Type	Order no.
UKV-A	15	A	5114075
UKV-C	15	C	5114076
UKV-F	15	F	5114077
UKV-A	25	A	5114081
UKV-C	25	C	5114082
UKV-F	25	F	5114083
UKV-A	50	A	5114084
UKV-C	50	C	5114085
UKV-F	50	F	5114086
UKV-A	75	A	5114087
UKV-C	75	C	5114088
UKV-F	75	F	5114089
UKV-A	100	A	5114066
UKV-C	100	C	5114067
UKV-F	100	F	5114068
UKV-A	125	A	5114069
UKV-C	125	C	5114070
UKV-F	125	F	5114071
UKV-A	150	A	5114072
UKV-C	150	C	5114073
UKV-F	150	F	5114074
UKV-A	200	A	5114078
UKV-C	200	C	5114079
UKV-F	200	F	5114080

Swivel Elements and Extensions



Swivel elements, long with return spring

Swivel elements, long with return spring 0°

Catalog no.	Length L mm	Type	Order no.
ULR-A	15	A	5114103
ULR-C	15	C	5114104
ULR-F	15	F	5114105
ULR-A	25	A	5114109
ULR-C	25	C	5114110
ULR-F	25	F	5114111
ULR-A	50	A	5114112
ULR-C	50	C	5114113
ULR-F	50	F	5114114
ULR-A	75	A	5114115
ULR-C	75	C	5114116
ULR-F	75	F	5114117

Catalog no.	Length L mm	Type	Order no.
ULR-A	100	A	5114094
ULR-C	100	C	5114095
ULR-F	100	F	5114096
ULR-A	125	A	5114097
ULR-C	125	C	5114098
ULR-F	125	F	5114099
ULR-A	150	A	5114100
ULR-C	150	C	5114101
ULR-F	150	F	5114102
ULR-A	200	A	5114106
ULR-C	200	C	5114107
ULR-F	200	F	5114108

Swivel Elements and Extensions

Swivel elements, long with return spring 30°

Catalog no.	Length L mm	Type	Order no.
ULR-A	15	A	5114127
ULR-C	15	C	5114128
ULR-F	15	F	5114129
ULR-A	25	A	5114133
ULR-C	25	C	5114134
ULR-F	25	F	5114135
ULR-A	50	A	5114136
ULR-C	50	C	5114137
ULR-F	50	F	5114138
ULR-A	75	A	5114139
ULR-C	75	C	5114140
ULR-F	75	F	5114141
ULR-A	100	A	5114118
ULR-C	100	C	5114119
ULR-F	100	F	5114120
ULR-A	125	A	5114121
ULR-C	125	C	5114122
ULR-F	125	F	5114123
ULR-A	150	A	5114124
ULR-C	150	C	5114125
ULR-F	150	F	5114126
ULR-A	200	A	5114130
ULR-C	200	C	5114131
ULR-F	200	F	5114132

Swivel elements, long 60°

Catalog no.	Length L mm	Type	Order no.
ULR-A	15	A	5114175
ULR-C	15	C	5114176
ULR-F	15	F	5114177
ULR-A	25	A	5114181
ULR-C	25	C	5114182
ULR-F	25	F	5114183
ULR-A	50	A	5114184
ULR-C	50	C	5114185
ULR-F	50	F	5114186
ULR-A	75	A	5114187
ULR-C	75	C	5114188
ULR-F	75	F	5114189
ULR-A	100	A	5114166
ULR-C	100	C	5114167
ULR-F	100	F	5114168
ULR-A	125	A	5114169
ULR-C	125	C	5114170
ULR-F	125	F	5114171
ULR-A	150	A	5114172
ULR-C	150	C	5114173
ULR-F	150	F	5114174
ULR-A	200	A	5114178
ULR-C	200	C	5114179
ULR-F	200	F	5114180

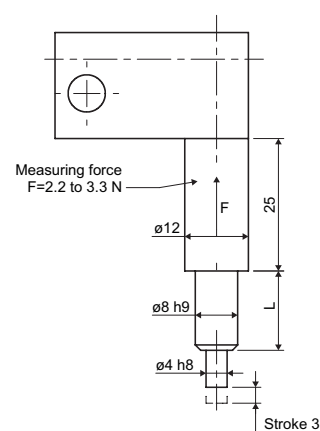
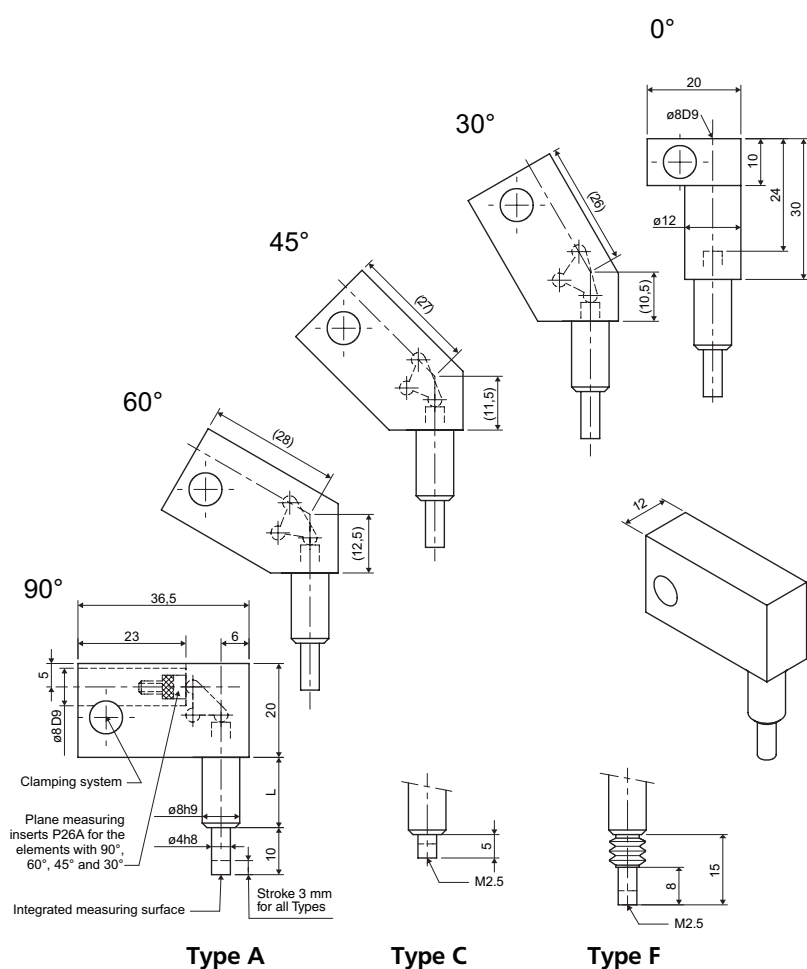
Swivel elements, long with return spring 45°

Catalog no.	Length L mm	Type	Order no.
ULR-A	15	A	5114142
ULR-C	15	C	5114143
ULR-F	15	F	5114144
ULR-A	25	A	5114145
ULR-C	25	C	5114146
ULR-F	25	F	5114147
ULR-A	50	A	5114148
ULR-C	50	C	5114149
ULR-F	50	F	5114150
ULR-A	75	A	5114154
ULR-C	75	C	5114155
ULR-F	75	F	5114156
ULR-A	100	A	5114151
ULR-C	100	C	5114152
ULR-F	100	F	5114153
ULR-A	125	A	5114157
ULR-C	125	C	5114158
ULR-F	125	F	5114159
ULR-A	150	A	5114160
ULR-C	150	C	5114161
ULR-F	150	F	5114162
ULR-A	200	A	5114163
ULR-C	200	C	5114164
ULR-F	200	F	5114165

Swivel elements, long with return spring 90°

Catalog no.	Length L mm	Type	Order no.
ULR-A	15	A	5114199
ULR-C	15	C	5114200
ULR-F	15	F	5114201
ULR-A	25	A	5114205
ULR-C	25	C	5114206
ULR-F	25	F	5114207
ULR-A	50	A	5114208
ULR-C	50	C	5114209
ULR-F	50	F	5114210
ULR-A	75	A	5114211
ULR-C	75	C	5114212
ULR-F	75	F	5114213
ULR-A	100	A	5114190
ULR-C	100	C	5114191
ULR-F	100	F	5114192
ULR-A	125	A	5114193
ULR-C	125	C	5114194
ULR-F	125	F	5114195
ULR-A	150	A	5114196
ULR-C	150	C	5114197
ULR-F	150	F	5114198
ULR-A	200	A	5114202
ULR-C	200	C	5114203
ULR-F	200	F	5114204

Swivel Elements and Extensions



Swivel elements, long with return spring

Swivel elements, compact with return spring 0°

Catalog no.	Length L mm	Type	Order no.
UKR-A	15	A	5114227
UKR-C	15	C	5114228
UKR-F	15	F	5114229
UKR-A	25	A	5114233
UKR-C	25	C	5114234
UKR-F	25	F	5114235
UKR-A	50	A	5114236
UKR-C	50	C	5114237
UKR-F	50	F	5114238
UKR-A	75	A	5114239
UKR-C	75	C	5114240
UKR-F	75	F	5114241

Catalog no.	Length L mm	Type	Order no.
UKR-A	100	A	5114218
UKR-C	100	C	5114219
UKR-F	100	F	5114220
UKR-A	125	A	5114221
UKR-C	125	C	5114222
UKR-F	125	F	5114223
UKR-A	150	A	5114224
UKR-C	150	C	5114225
UKR-F	150	F	5114226
UKR-A	200	A	5114230
UKR-C	200	C	5114231
UKR-F	200	F	5114232

Swivel Elements and Extensions

Swivel elements, compact with return spring 30°

Catalog no.	Length L mm	Type	Order no.
UKR-A	15	A	5114251
UKR-C	15	C	5114252
UKR-F	15	F	5114253
UKR-A	25	A	5114257
UKR-C	25	C	5114258
UKR-F	25	F	5114259
UKR-A	50	A	5114260
UKR-C	50	C	5114261
UKR-F	50	F	5114262
UKR-A	75	A	5114263
UKR-C	75	C	5114264
UKR-F	75	F	5114265
UKR-A	100	A	5114242
UKR-C	100	C	5114243
UKR-F	100	F	5114244
UKR-A	125	A	5114245
UKR-C	125	C	5114246
UKR-F	125	F	5114247
UKR-A	150	A	5114248
UKR-C	150	C	5114249
UKR-F	150	F	5114250
UKR-A	200	A	5114254
UKR-C	200	C	5114255
UKR-F	200	F	5114256

Swivel elements, compact with return spring 60°

Catalog no.	Length L mm	Type	Order no.
UKR-A	15	A	5114299
UKR-C	15	C	5114300
UKR-F	15	F	5114301
UKR-A	25	A	5114305
UKR-C	25	C	5114306
UKR-F	25	F	5114307
UKR-A	50	A	5114308
UKR-C	50	C	5114309
UKR-F	50	F	5114310
UKR-A	75	A	5114311
UKR-C	75	C	5114312
UKR-F	75	F	5114313
UKR-A	100	A	5114290
UKR-C	100	C	5114291
UKR-F	100	F	5114292
UKR-A	125	A	5114293
UKR-C	125	C	5114294
UKR-F	125	F	5114295
UKR-A	150	A	5114296
UKR-C	150	C	5114297
UKR-F	150	F	5114298
UKR-A	200	A	5114302
UKR-C	200	C	5114303
UKR-F	200	F	5114304

Swivel elements, compact with return spring 45°

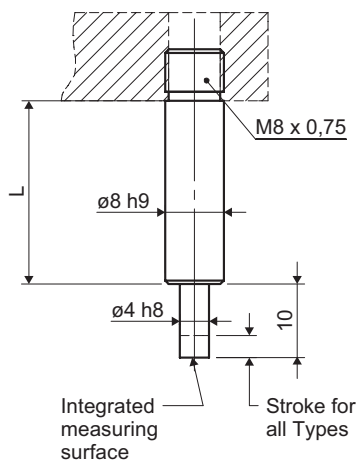
Catalog no.	Length L mm	Type	Order no.
UKR-A	15	A	5114275
UKR-C	15	C	5114276
UKR-F	15	F	5114277
UKR-A	25	A	5114281
UKR-C	25	C	5114282
UKR-F	25	F	5114283
UKR-A	50	A	5114284
UKR-C	50	C	5114285
UKR-F	50	F	5114286
UKR-A	75	A	5114287
UKR-C	75	C	5114288
UKR-F	75	F	5114289
UKR-A	100	A	5114266
UKR-C	100	C	5114267
UKR-F	100	F	5114268
UKR-A	125	A	5114269
UKR-C	125	C	5114270
UKR-F	125	F	5114271
UKR-A	150	A	5114272
UKR-C	150	C	5114273
UKR-F	150	F	5114274
UKR-A	200	A	5114278
UKR-C	200	C	5114279
UKR-F	200	F	5114280

Swivel elements, long with return spring 90°

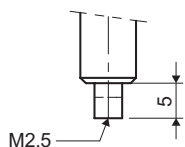
Catalog no.	Length L mm	Type	Order no.
ULR-A	15	A	5114324
ULR-C	15	C	5114325
ULR-F	15	F	5114326
ULR-A	25	A	5114330
ULR-C	25	C	5114331
ULR-F	25	F	5114332
ULR-A	50	A	5114333
ULR-C	50	C	5114334
ULR-F	50	F	5114335
ULR-A	75	A	5114336
ULR-C	75	C	5114337
ULR-F	75	F	5114314
ULR-A	100	A	5114315
ULR-C	100	C	5114316
ULR-F	100	F	5114317
ULR-A	125	A	5114318
ULR-C	125	C	5114319
ULR-F	125	F	5114320
ULR-A	150	A	5114321
ULR-C	150	C	5114322
ULR-F	150	F	5114323
ULR-A	200	A	5114327
ULR-C	200	C	5114328
ULR-F	200	F	5114329

Swivel Elements and Extensions

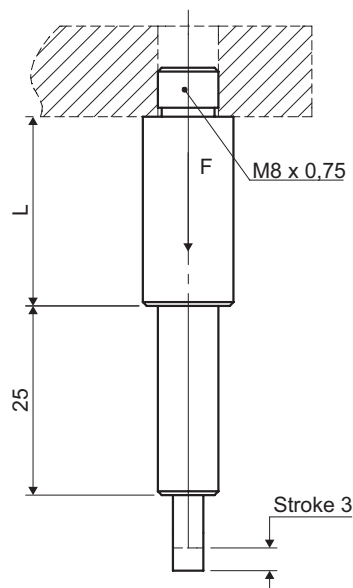
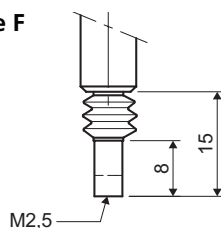
Type A



Type C



Type F



Insertion elements

Catalog no.	Length L mm	Type	Order no.
EB-A	15	A	5114342
EB-C	15	C	5114343
EB-F	15	F	5114344
EB-A	25	A	5114345
EB-C	25	C	5114346
EB-F	25	F	5114347
EB-A	50	A	5114348
EB-C	50	C	5114349
EB-F	50	F	5114350
EB-A	75	A	5114351
EB-C	75	C	5114352
EB-F	75	F	5114353
EB-A	100	A	5114354
EB-C	100	C	5114355
EB-F	100	F	5114356
EB-A	125	A	5114357
EB-C	125	C	5114358
EB-F	125	F	5114359
EB-A	150	A	5114360
EB-C	150	C	5114361
EB-F	150	F	5114362
EB-A	200	A	5114363
EB-C	200	C	5114364
EB-F	200	F	5114365

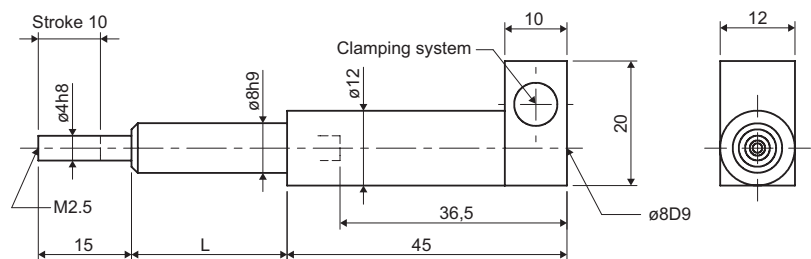
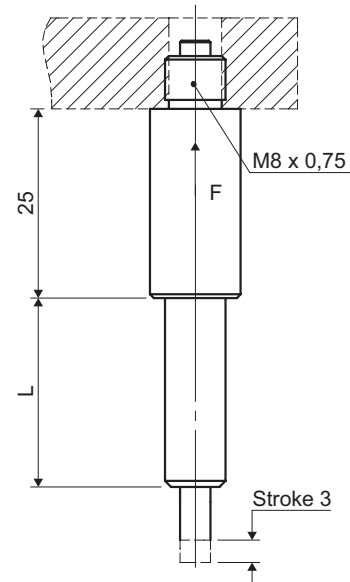
Insertion elements with return spring

Catalog no.	Length L mm	Type	Order no.
EBV-A	15	A	5114370
EBV-C	15	C	5114371
EBV-F	15	F	5114372
EBV-A	25	A	5114373
EBV-C	25	C	5114374
EBV-F	25	F	5114375
EBV-A	50	A	5114376
EBV-C	50	C	5114377
EBV-F	50	F	5114378
EBV-A	75	A	5114379
EBV-C	75	C	5114380
EBV-F	75	F	5114381
EBV-A	100	A	5114382
EBV-C	100	C	5114383
EBV-F	100	F	5114384
EBV-A	125	A	5114385
EBV-C	125	C	5114386
EBV-F	125	F	5114387
EBV-A	150	A	5114388
EBV-C	150	C	5114389
EBV-F	150	F	5114390
EBV-A	200	A	5114391
EBV-C	200	C	5114392
EBV-F	200	F	5114393

Swivel Elements and Extensions

Insertion elements with spring drive

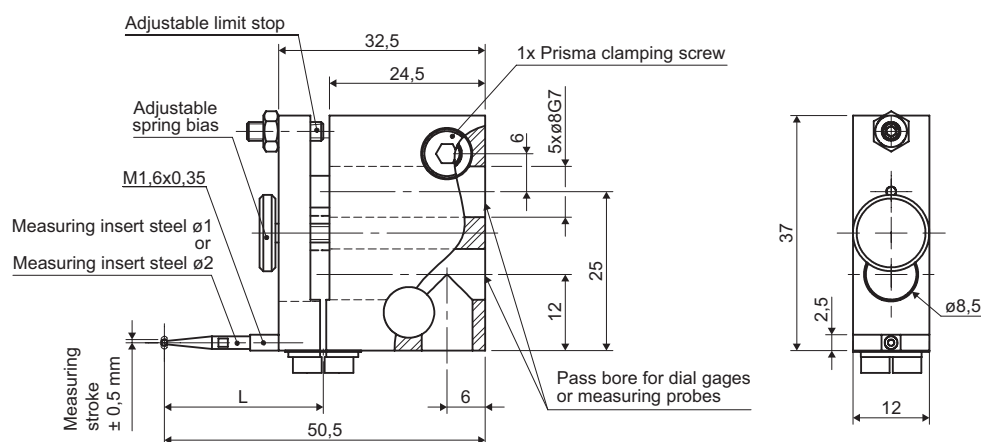
Catalog no.	Length L mm	Type	Order no.
EBR-A	15	A	5114398
EBR-C	15	C	5114399
EBR-F	15	F	5114400
EBR-A	25	A	5114401
EBR-C	25	C	5114402
EBR-F	25	F	5114403
EBR-A	50	A	5114404
EBR-C	50	C	5114405
EBR-F	50	F	5114406
EBR-A	75	A	5114407
EBR-C	75	C	5114408
EBR-F	75	F	5114409
EBR-A	100	A	5114410
EBR-C	100	C	5114411
EBR-F	100	F	5114412
EBR-A	125	A	5114413
EBR-C	125	C	5114414
EBR-F	125	F	5114415
EBR-A	150	A	5114416
EBR-C	150	C	5114417
EBR-F	150	F	5114418
EBR-A	200	A	5114419
EBR-C	200	C	5114420
EBR-F	200	F	5114421



Measuring extensions with 10 mm stroke

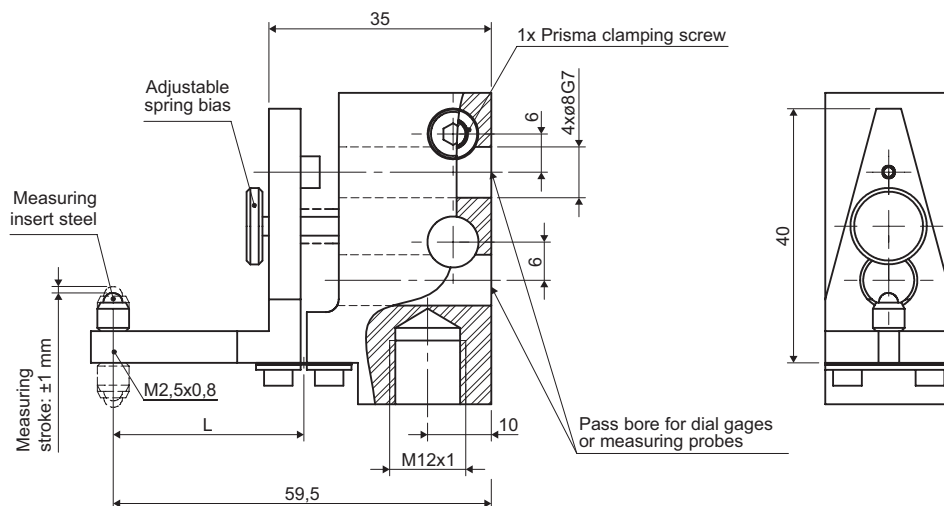
Catalog no.	Length L mm	Type	Order no.
MV 10	25	A	5114426
MV 10	50	C	5114427
MV 10	75	F	5114428
MV 10	100	A	5114429
MV 10	125	C	5114430
MV 10	150	F	5114431
MV 10	200	A	5114432

Swivel Elements and Extensions



Swivel REN 25 with Ball Contact Point

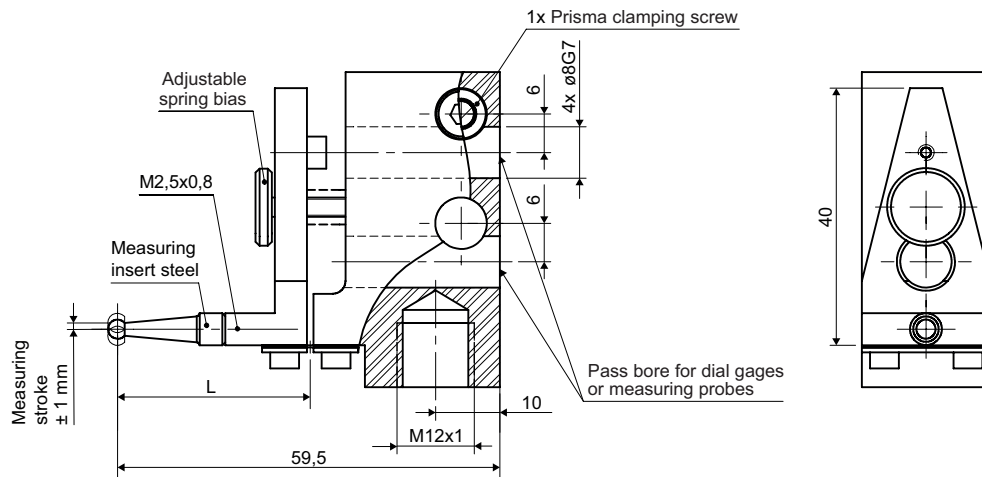
Catalog no.	Angle °	Length L mm	Meas. insert dia.	Order no.
REN	90	25	1	5113200
REN	90	25	2	5113201



Swivel REN 30A with Contact Point

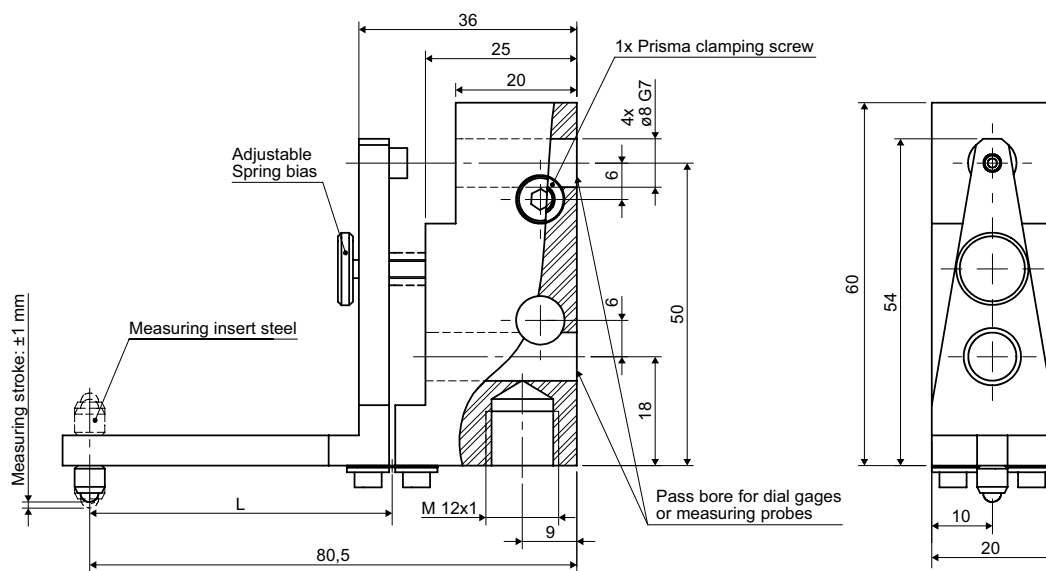
Catalog no.	Angle °	Length L mm	Contact point	Order no.
REN	90	30	P11A	5113200

Swivel Elements and Extensions



Swivel REN 30B with Ball Contact Point

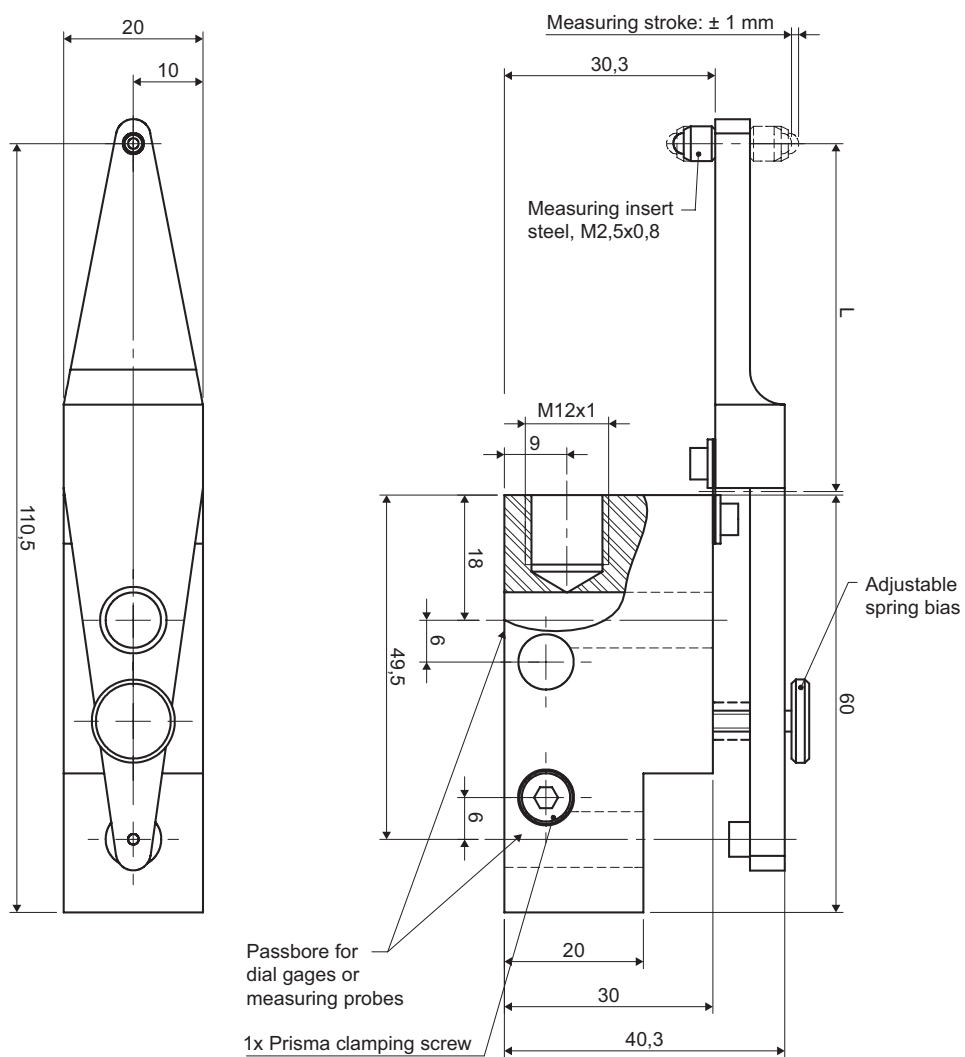
Catalog no.	Angle °	Length L mm	Meas. insert dia.	Order no.
REN	90	30	3	5113203



Swivel REN 50 with Contact Point

Catalog no.	Angle °	Length L mm	Contact point	Order no.
REN	90	50	P11A	5113204

Swivel Elements and Extensions



Swivel handle RED with Contact Point

Catalog no.	Length L mm	Order no.
REN	50	5113205

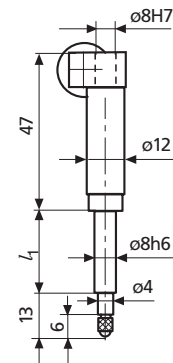
Swivel Elements and Extensions

Special Holder 941

For all types of measuring equipment
 For placing a dial indicator at a certain distance or angle
 Travel of the measuring spindle 3 mm
 Contact Point 901 (interchangeable)

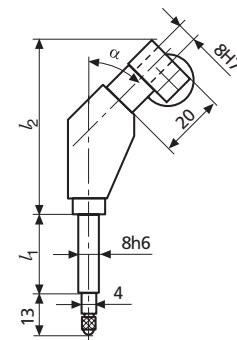
Straight Holder 941 G

Catalog no.	Mounting shank length l_1 mm	Order no.
941 G	25	4365000
941 G	50	4365001
941 G	75	4365002



Angular Holder 941 W

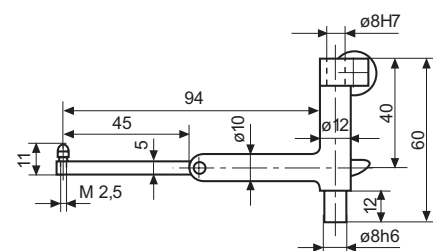
Catalog no.	Mounting shank length l_1 mm	l_2 mm	Angle $\alpha=$	Order no.
941 W	25	53.7	45	4365010
941 W	50	53.7	45	4365011
941 W	75	53.7	45	4365012
941 W	25	49.3	60	4365020
941 W	50	49.3	60	4365021
941 W	75	49.3	60	4365022
941 W	25	34.5	90	4365030
941 W	50	34.5	90	4365031
941 W	75	34.5	90	4365032



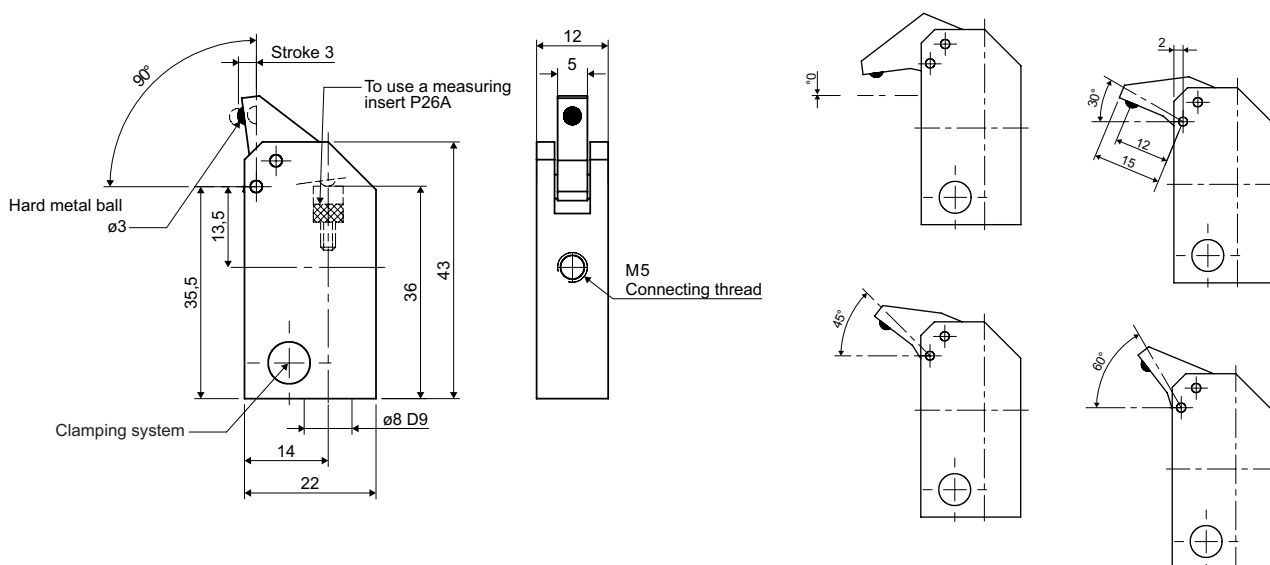
Transmission error with the 941 W max. 1%;
 for travel 3 mm = 0.03 mm

Sensor Level 943

Catalog no.	Description	Order no.
953	For testing concentricity in bore holes as well as difficult to reach outside diameters. To be inserted in a measuring stand with a lifting device. Contact Point 901 interchangeable. Travel ± 1 mm.	4367000

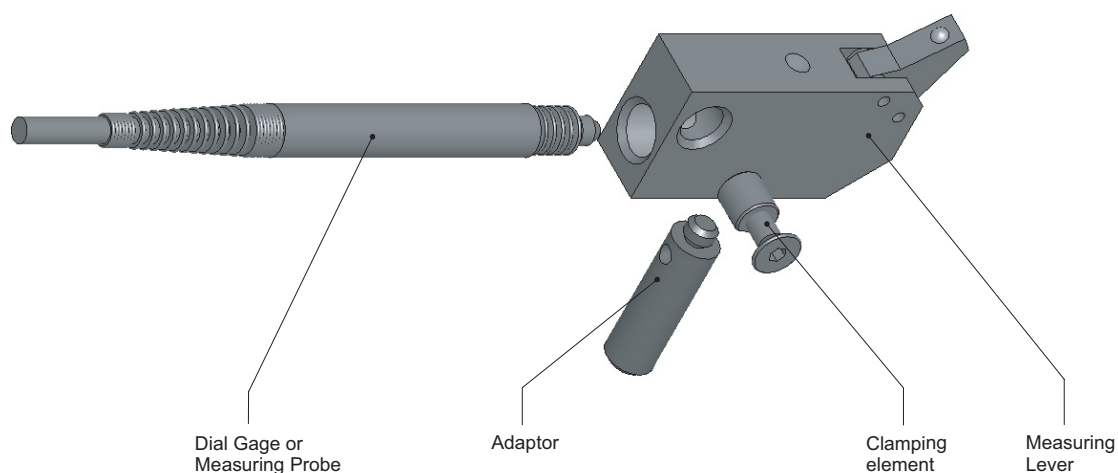


Measuring Levers

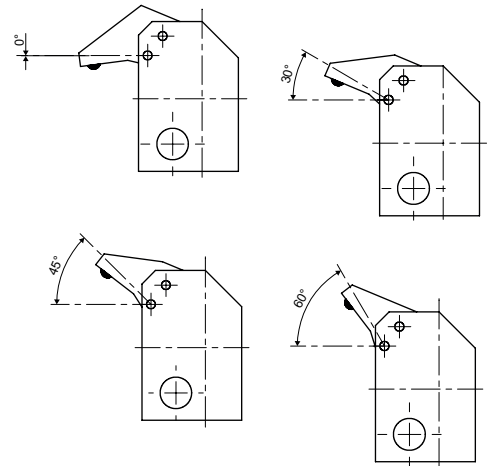
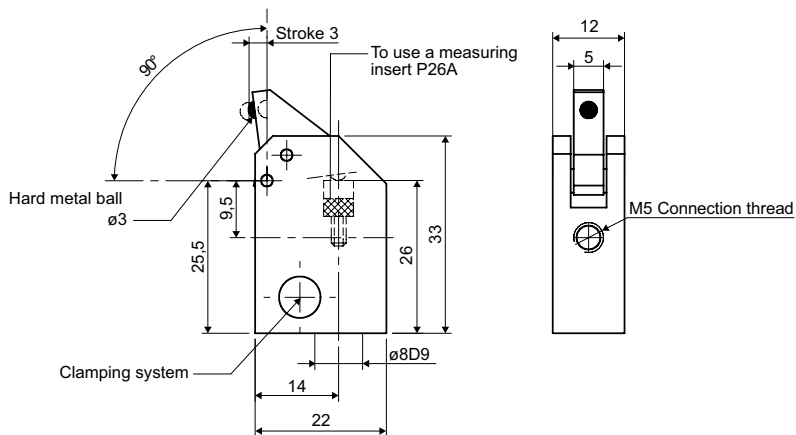


Measuring Lever, long

Catalog no.	Angle °	Order no.
MHL	0	5113210
MHL	30	5113211
MHL	45	5113212
MHL	60	5113213
MHL	90	5113214



Measuring Levers

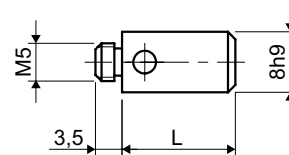


Measuring Lever, short

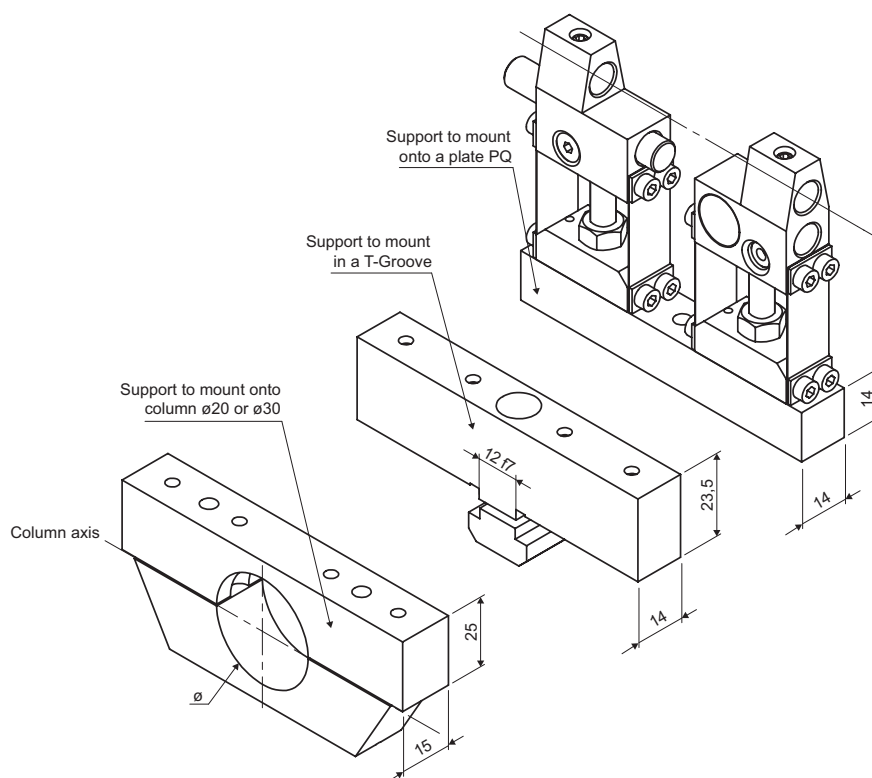
Catalog no.	Angle °	Order no.
MHK	0	5113219
MHK	30	5113220
MHK	45	5113221
MHK	60	5113222
MHK	90	5113223

Fastening bolt BB

Catalog no.	Length mm	Order no.
BB	10	5113228
BB	15	5113229
BB	20	5113230
BB	25	5113231
BB	50	5113232
BB	75	5113233



Measuring Spring Parallelograms



Support for mounting on a column

Catalog no.	ø mm	Length mm	Order no.
AF20	20	92	5113311
AF20	20	116	5113308
AF20	20	136	5113309
AF20	20	160	5113310
AF30	30	92	5113315
AF30	30	116	5113312
AF30	30	136	5113313
AF30	30	160	5113314

Support for mounting in a 12 mm T-groove

Catalog no.	Length mm	Order no.
AF21	92	5113303
AF21	116	5113300
AF21	136	5113301
AF21	160	5113302

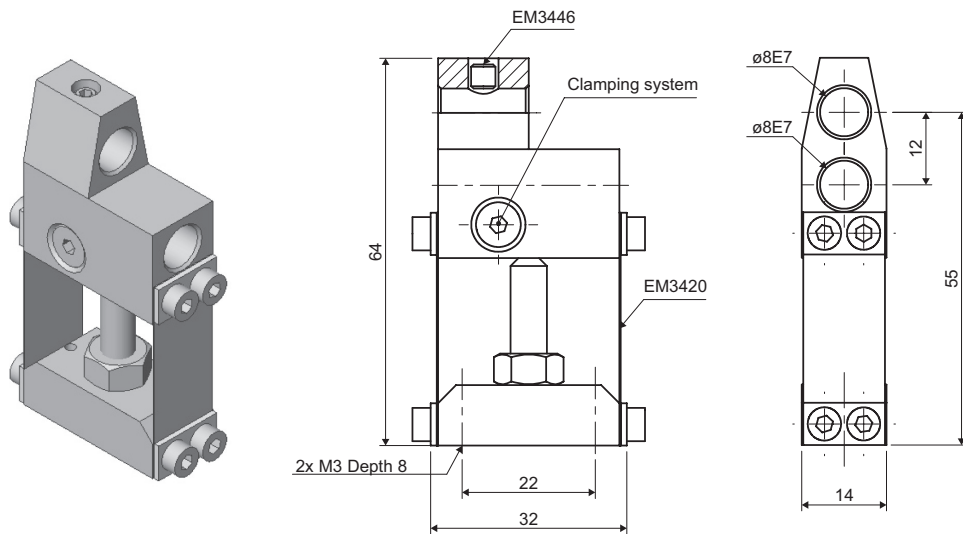
Support for mounting onto a plate PQ

Catalog no.	Length mm	Order no.
ST14	136	5113362
ST14	160	5113363

Support for mounting onto a plate PQ

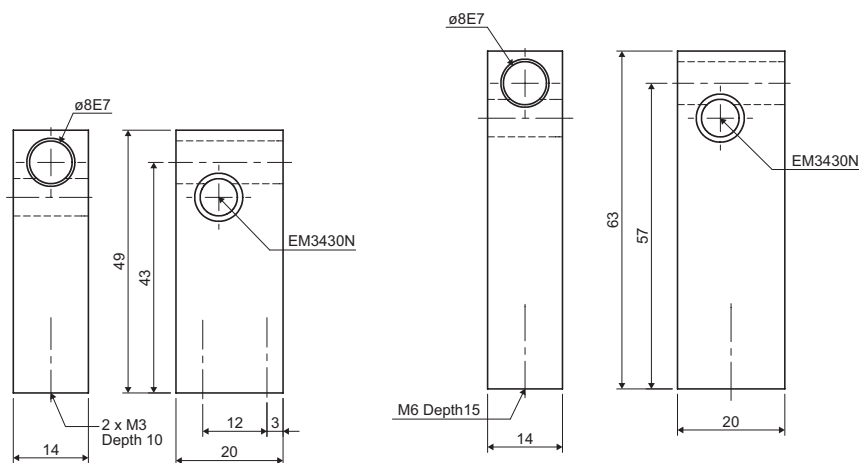
Catalog no.	Length mm	Order no.
SD14	92	5113351
SD14	116	5113350

Measuring Spring Parallelograms



Measuring spring parallelogram EM34

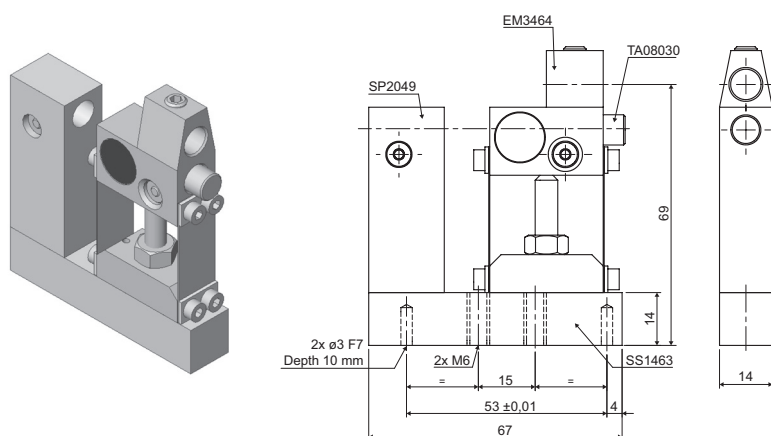
Catalog no.	Order no.
EM34	5113319



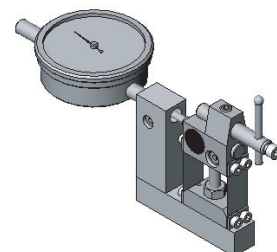
Holder for dial gage or electronic probe

Catalog no.	Length mm	Order no.
SP20	49	5113356
SP20	63	5113357

Measuring Spring Parallelograms

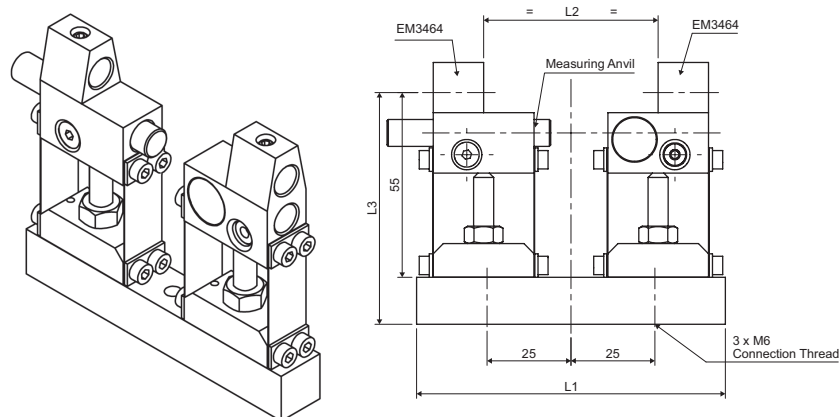
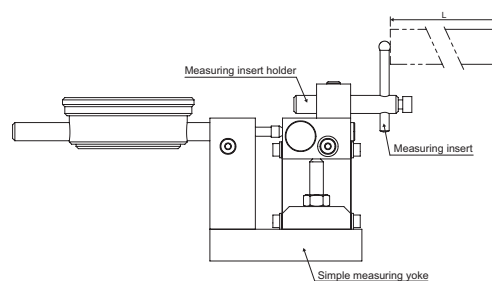


Application example:



Single Measuring Fork FS10

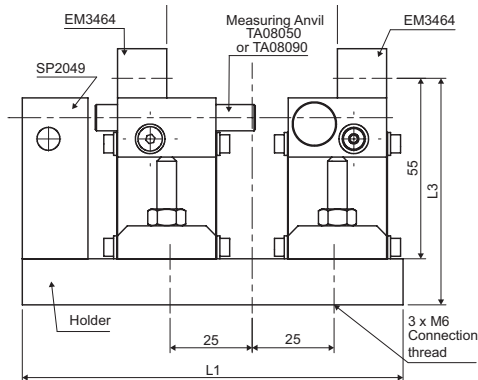
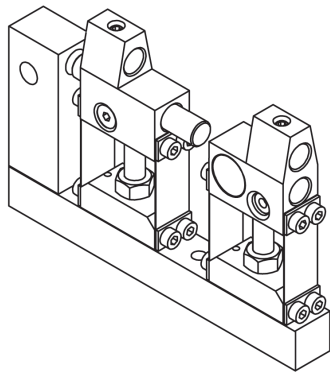
Catalog no.	Description	Order no.
FS10	incl. TA08, SP20 and SS14SD14	5113344



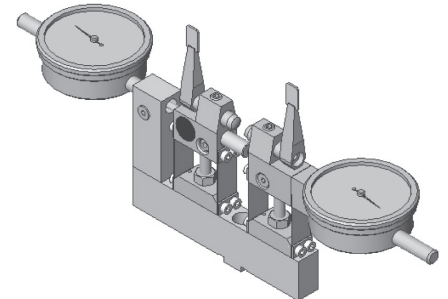
Double Measuring Fork FD26 / FD27

Catalog no.	Description	L1 mm	L2 mm	L3 mm	Order no.
FD26	incl. TA08 and SD14	92	52	69	5113320
FD26	incl. TA08 and AF12	92	52	78.5	5113321
FD26	incl. TA08 and AF20	92	52	75	5113322
FD26	incl. TA08 and AF30	92	52	75	5113323
FD27	incl. TA08 and SD14	136	96	69	5113324
FD27	incl. TA08 and AF12	136	96	78.5	5113325
FD27	incl. TA08 and AF20	136	96	75	5113326
FD27	incl. TA08 and AF30	136	96	75	5113327

Measuring Spring Parallelograms

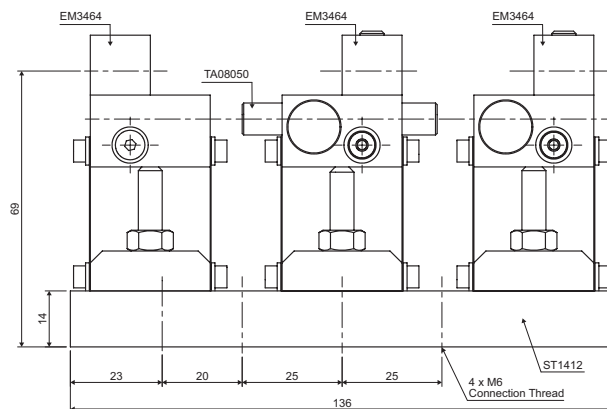
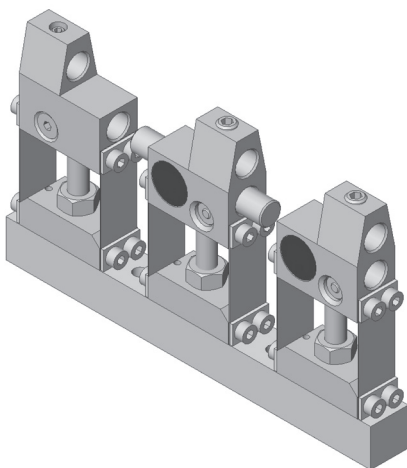
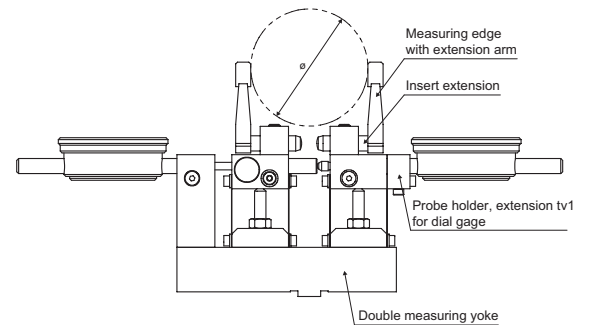


Application example:



Double Measuring Fork with Excentricity FD40 / FD47

Catalog no.	Description	L1 mm	L2 mm	L3 mm	Order no.
FD40	incl. TA08, SP20, SD14	116	52	69	5113332
FD40	incl. TA08, SP20, AF12	116	52	78.5	5113333
FD40	incl. TA08, SP20, AF20	116	52	75	5113334
FD40	incl. TA08, SP20, AF30	116	52	75	5113335
FD47	incl. TA08, SP20, SD14	160	96	69	5113336
FD47	incl. TA08, SP20, AF12	160	96	78.5	5113337
FD47	incl. TA08, SP20, AF20	160	96	75	5113338
FD47	incl. TA08, SP20, AF30	160	96	75	5113339



Triple Measuring Fork FT30

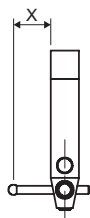
Catalog no.	Description	Order no.
FT30	incl. TA08 and ST14	5113345

Measuring Spring Parallelograms

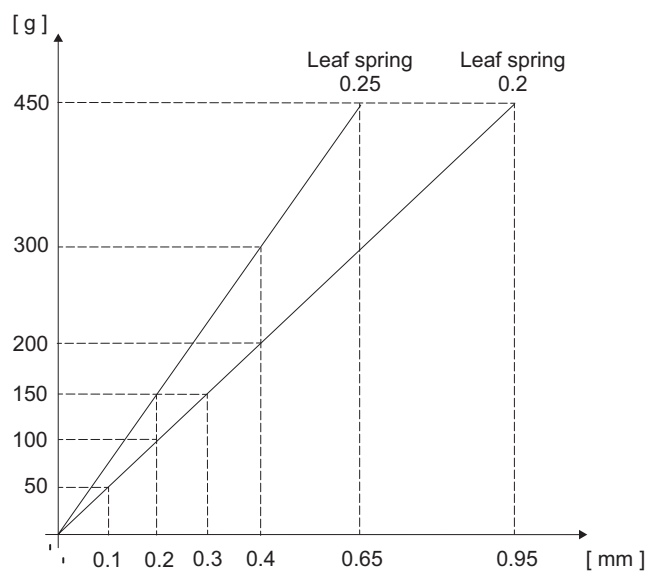
Measuring force and Correction Factor

FS 10: TC...

X	St 0.2	St 0.25
20	1	1
40	1.09	1.09
60	1.21	1.37

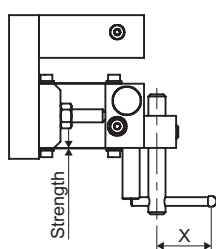


The measuring force is a function of the displacement of the parallelograms and the spring force



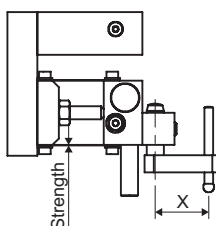
FS 10: TC...

X	St 0.2	St 0.25
20	1	1
40	1.05	1.08
60	1.13	1.28



FS 10: TC...

X	St 0.2	St 0.25
20	1	1
40	1.016	1.02
60	1.035	1.06
80	1.06	1.09

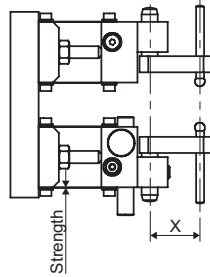


Measuring Spring Parallelograms

Measuring force and Correction Factor

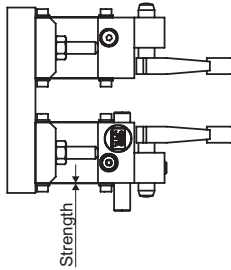
FD 26: TC...

X	St 0.2	St 0.25
20	1	1
40	1	1
60	1	1
80	1.03	1.05

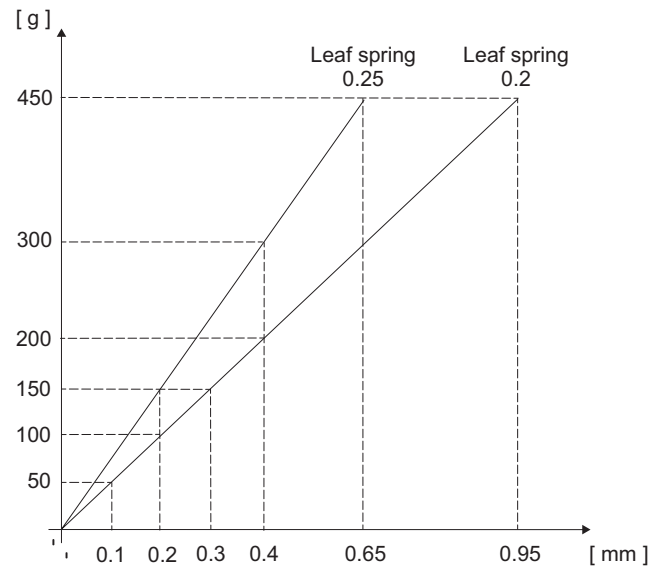


FD 26: BM...

X	St 0.2	St 0.25
20	1	1
40	1	1
60	1	1
80	1.03	1.05



The measuring force is a function of the displacement of the parallelograms and the spring force



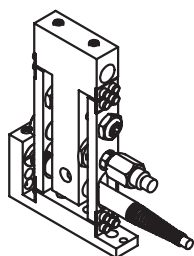
Block Measuring Elements

The measuring modules with integrated lifting simplifies the set up of (measuring concepts in the) multi-gage measuring devices.

The construction of the modules allows for the differential recording of length changes (e.g. outside diameters) with only one electronic probe.

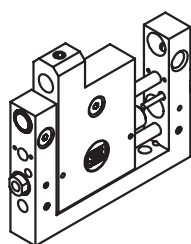
The correct measuring force is attained with adjustable measuring force springs suited to the purpose and function of the particular unit.

The lifting of the moveable elements is enabled by pneumatic micro cylinders integrated in the module of the body, these have been specially developed for industrial use. The modules use non-corrosive material and highly advanced technology that guarantee reliable and precise measurements.



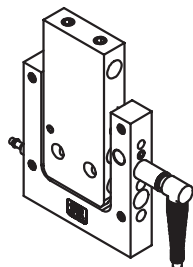
BM30:

- Adjustment using spring parallelogram
- Total stroke ± 2.5 mm
- Measuring force: 50 to 300 g
- Repeatability: $0.5 \mu\text{m}$
- Option: Pneumatic lifting



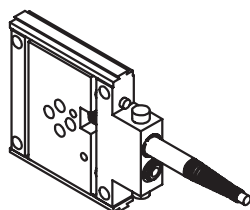
FP15:

- Two rotary stroke bearings for high rigidity
- Total stroke 6 mm, 10 mm and 19 mm
- Steel carrying frame
- Measuring force: 100 to 220 g
- Repeatability: $0.5 \mu\text{m}$
- Option: Pneumatic lifting



BM50:

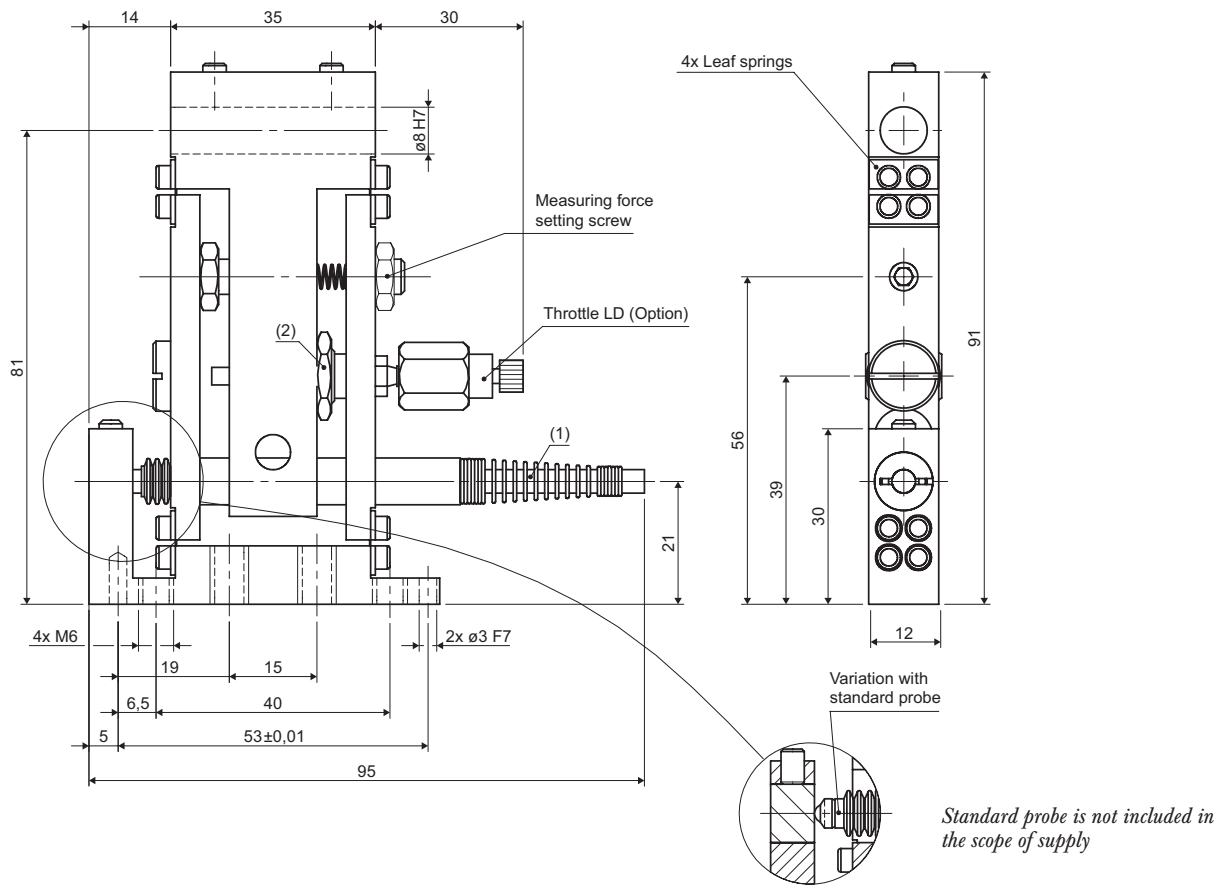
- A rotary stroke bearing and an anti-twist measure
- Total stroke 5 mm and 10 mm
- Measuring force: 30 to 250 g
- Repeatability: $0.5 \mu\text{m}$
- Option: Pneumatic lifting



BM100:

- Two rotary stroke bearings for high rigidity
- Total stroke 5 mm and 10 mm
- Measuring force: 40 to 200 g
- Repeatability: $0.5 \mu\text{m}$
- Mounting of two modules as X-Y slide with special screws BMV
- Option: Pneumatic lifting

Block Measuring Elements

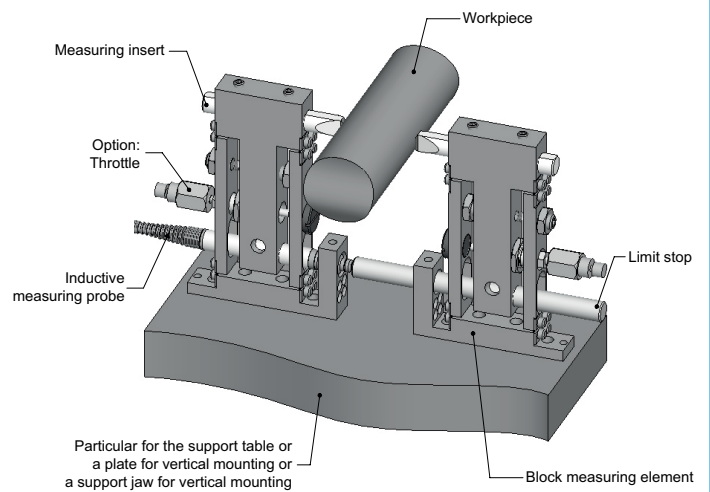


Block Measuring Element BM30

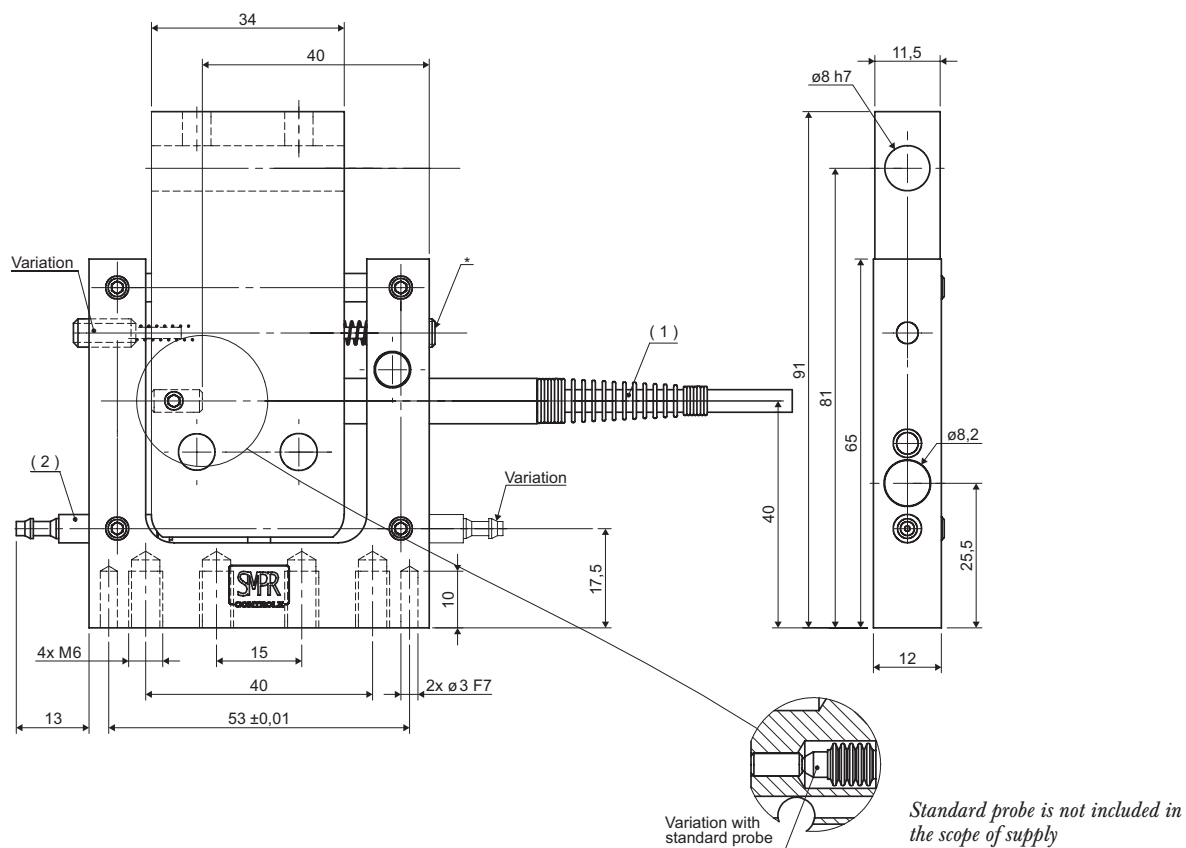
Catalog no.	Description	Total Stroke	Order no.
BM30		5 mm	5113400
BM30	with pneumatic lifting	5 mm	5113401

Option Pneumatic Choke

Catalog no.	M mm	Dia. mm	Order no.
LD	5	4	5113400

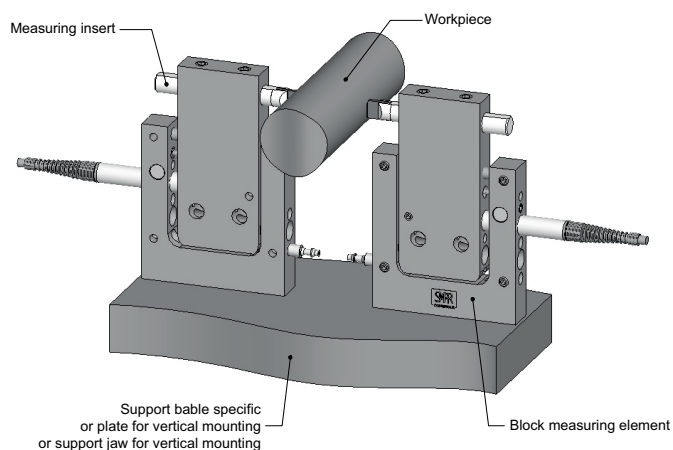


Block Measuring Elements

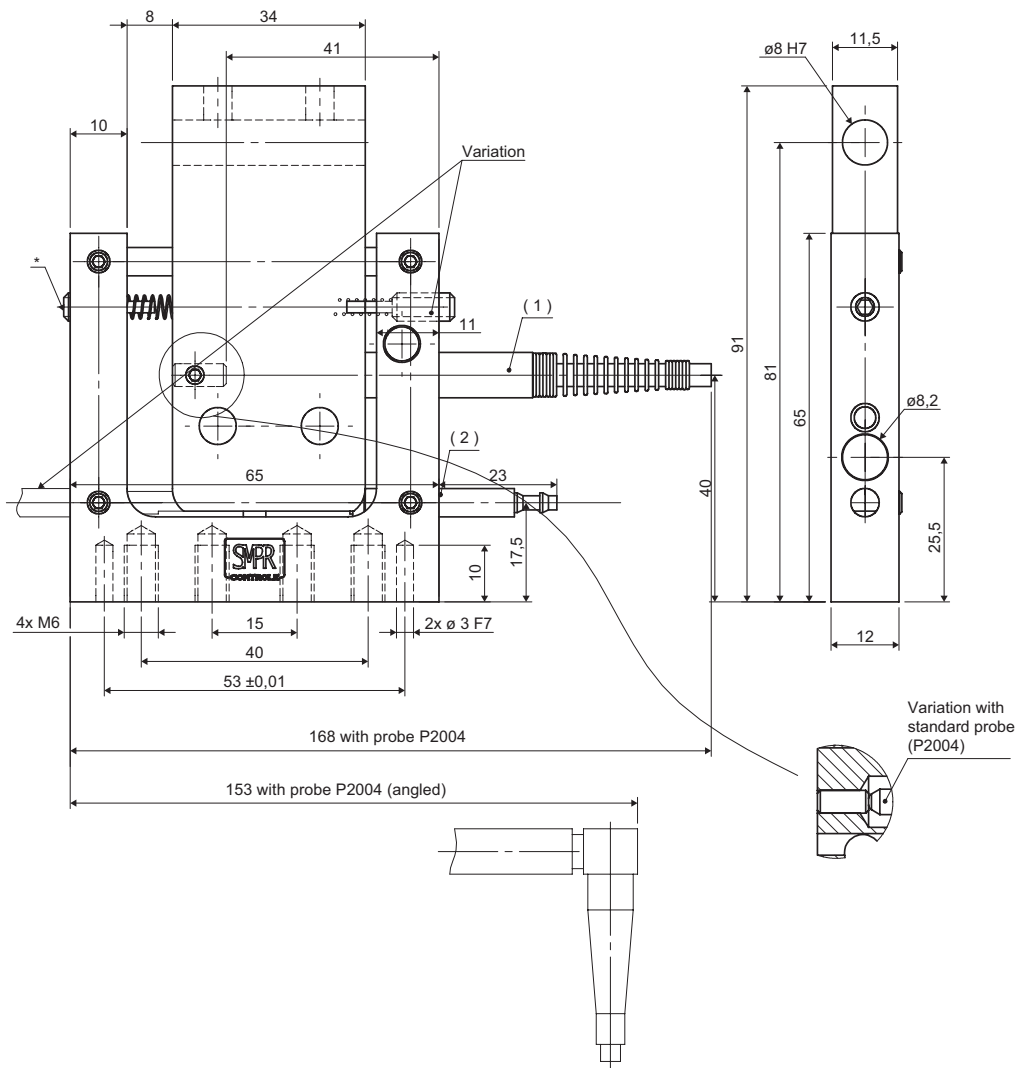


Block Measuring Element BM50

Catalog no.	Description	Total Stroke	Order no.
BM50		5 mm	5113426
BM50	with pneumatic lifting	5 mm	5113427

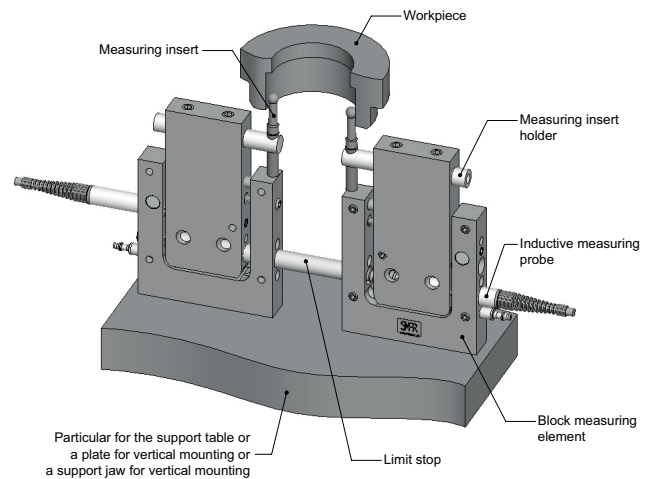


Block Measuring Elements

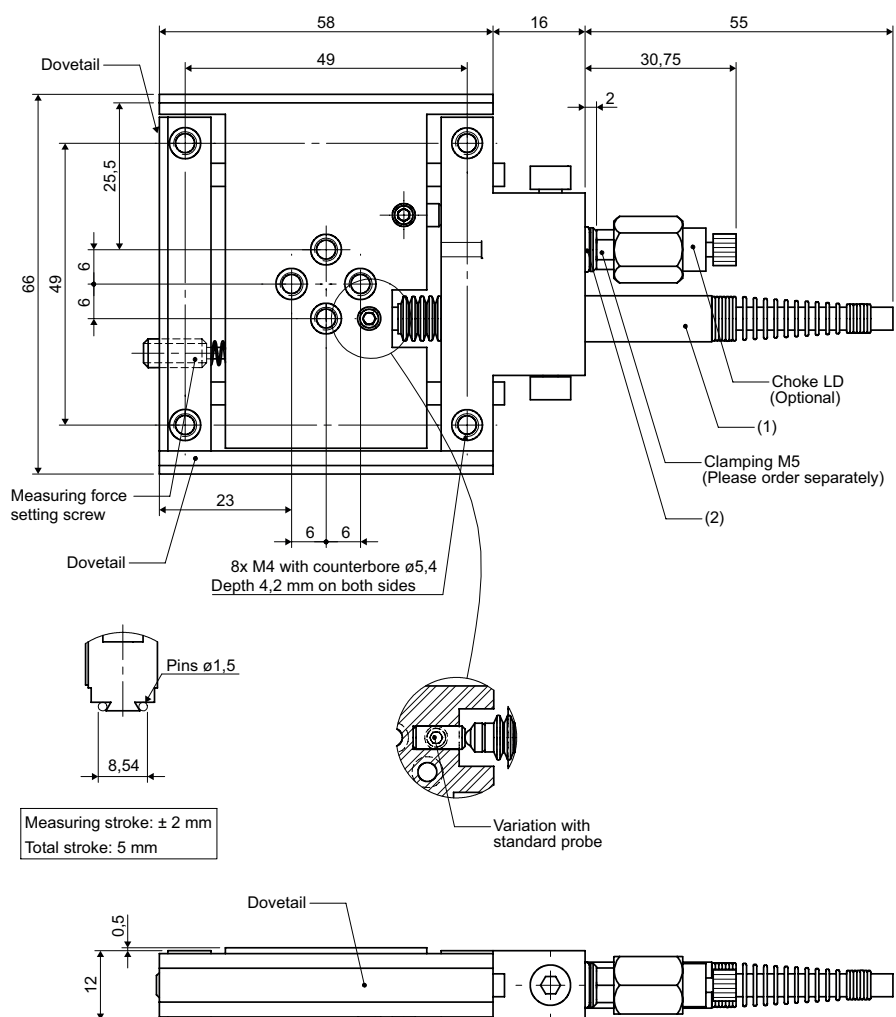


Block Measuring Element BM50

Catalog no.	Description	Total Stroke	Order no.
BM50		10 mm	5113434
BM50	with pneumatic lifting	10 mm	5113435
BM50	with Probe P2004	10 mm	5113436
BM50	with Probe P2004 and pneumatic lifting	10 mm	5113437



Block Measuring Elements



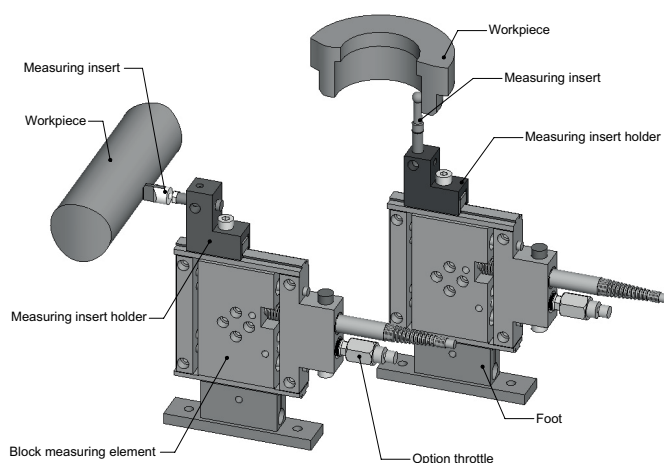
Standard probe is not included in the scope of supply

Block Measuring Element BM100

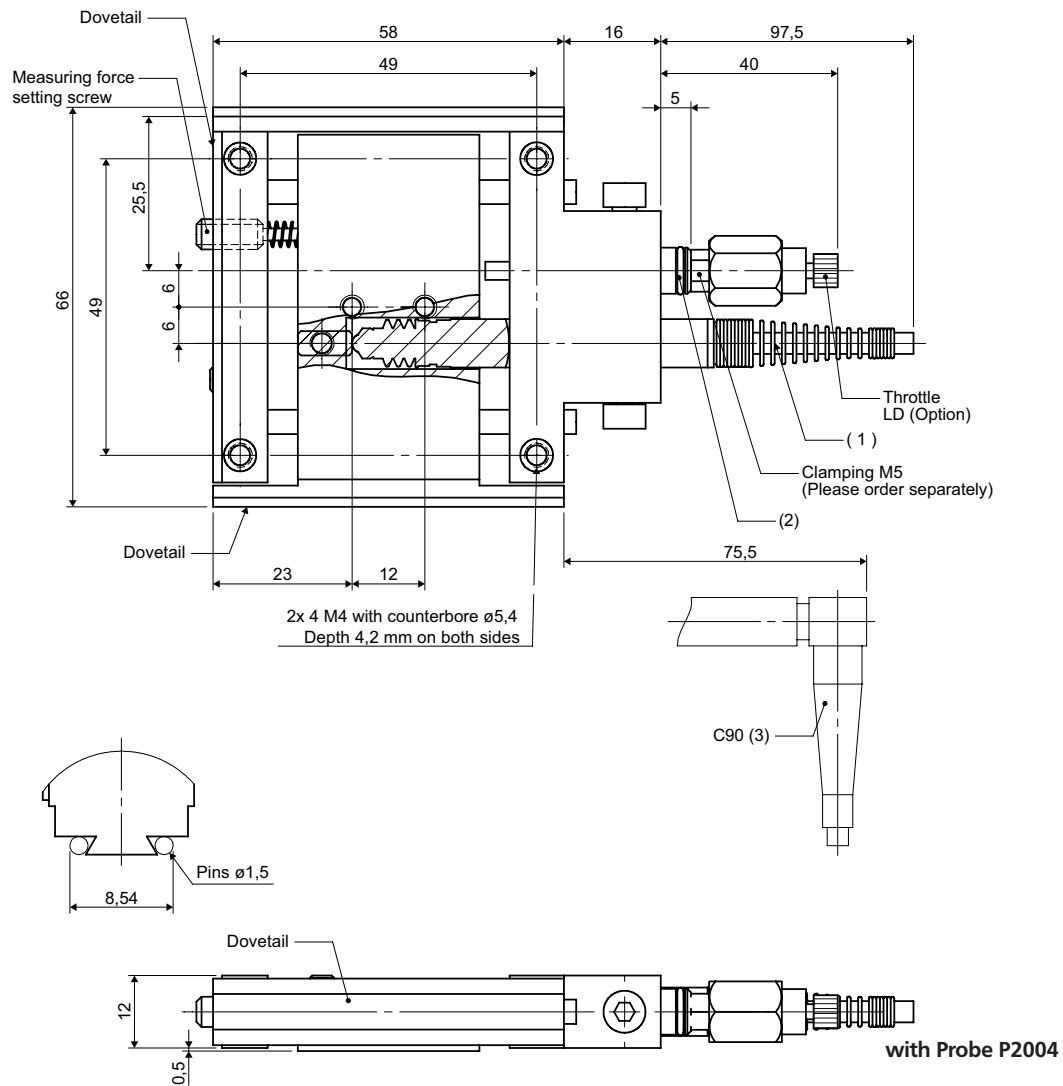
Catalog no.	Description	Total Stroke	Order no.
BM100		5 mm	5113434
BM100	with pneumatic lifting	5 mm	5113435

Option Pneumatic Choke

Catalog no.	M mm	Dia. mm	Order no.
LD	5	4	5113448



Block Measuring Elements

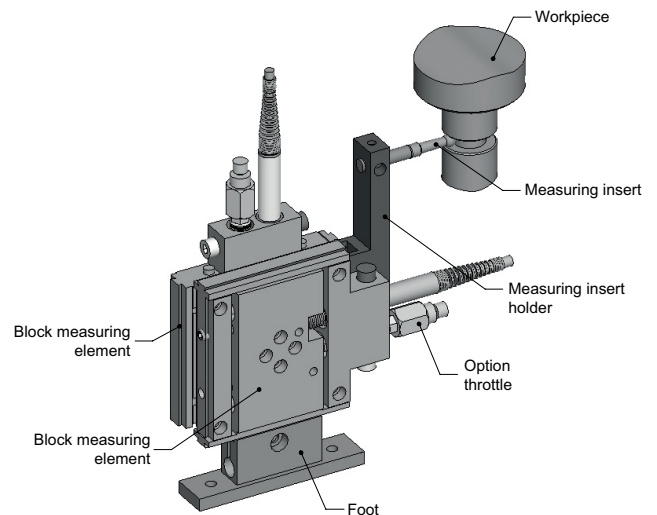


Block Measuring Element BM50

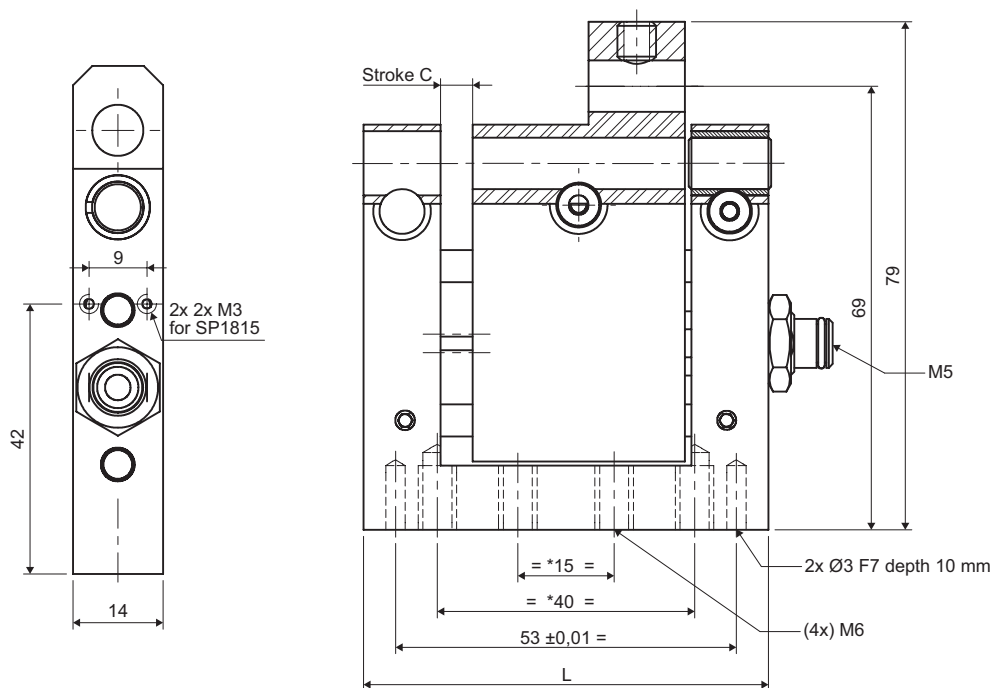
Catalog no.	Description	Total Stroke	Order no.
BM100		10 mm	5113416
BM100	with pneumatic lifting	10 mm	5113417
BM100	with Probe P2004	10 mm	5113419
BM100	with Probe P2004 and pneumatic lifting	10 mm	5113421

Option Pneumatic Choke

Catalog no.	M mm	Dia. mm	Order no.
LD	5	4	5113448



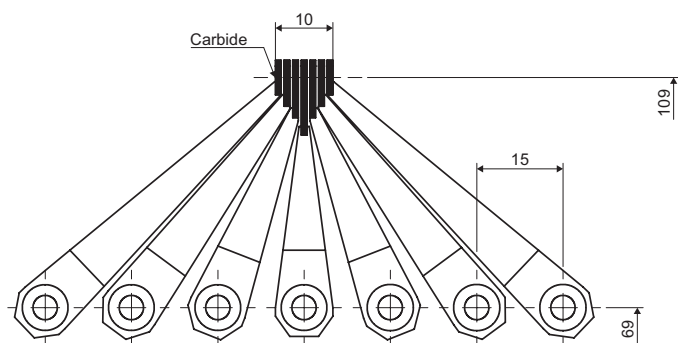
Block Measuring Elements



Block Measuring Element FP15

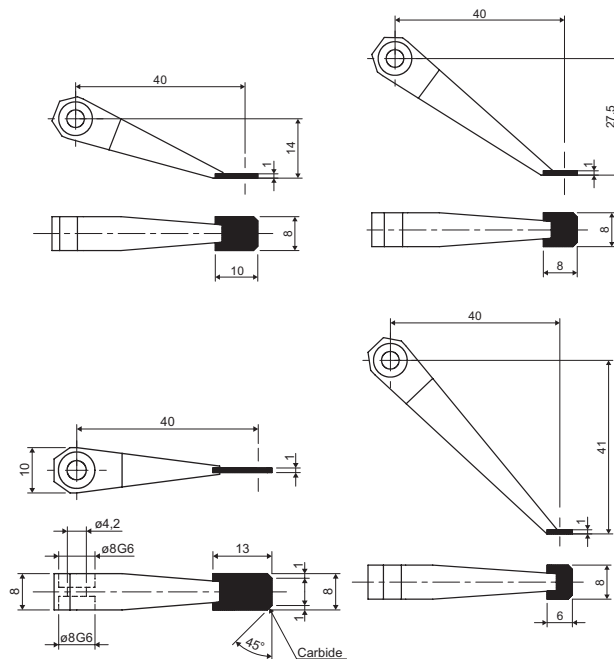
Catalog no.	Description	Stroke C mm	L mm	Order no.
FP15	with 2 rotary stroke bearings,	6	63	5113444
FP15	with pneumatic lifting, 2 rotary stroke bearings	6	63	5113445
FP15	with pneumatic lifting, 2 rotary stroke bearings	10	67	5113446

Accessories for Measuring Elements



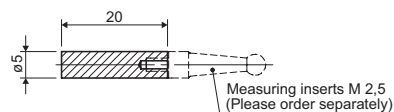
Measuring Arms BM84

Catalog no.	Dimensions mm	Order no.
BM84	40 × 0	5114514
BM84	40 × 14	5114515
BM84	40 × 27.5	5114516
BM84	40 × 41	5114517



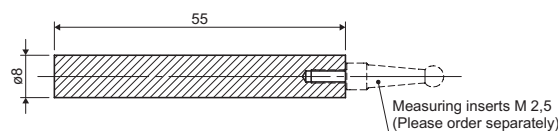
Mount BMPA for Measuring Inserts M2.5

Catalog no.	Order no.
BMPA	5114714



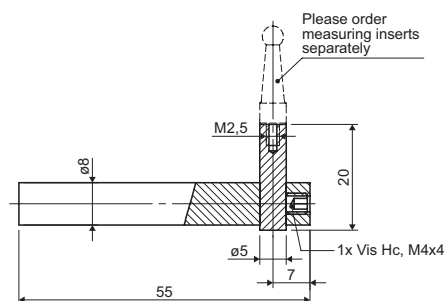
Mount SUPT8 for Measuring Inserts M2.5

Catalog no.	Order no.
SUPT8	5114721



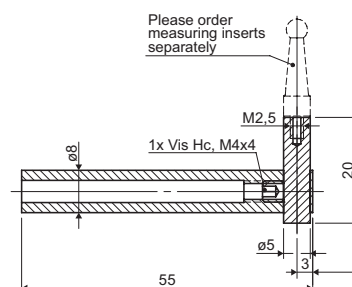
Mount BMST8A for Measuring Inserts M2.5

Catalog no.	Order no.
BMST8A	5114697



Mount BMST8B for Measuring Inserts M2.5

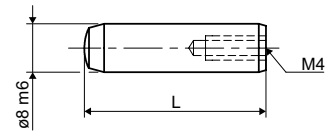
Catalog no.	Order no.
BMST8B	5114698



Accessories for Measuring Elements

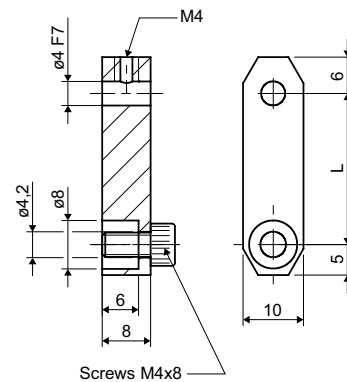
Mount SR10 for Measuring Extensions RT08

Catalog no.	L mm	Order no.
SR10	20	5114625
SR10	30	5114626
SR10	40	5114627
SR10	40	5114628
SR10	60	5114629



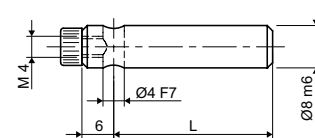
Measuring Extensions RT08

Catalog no.	L mm	Order no.
RT08	20	5114606
RT08	25	5114607
RT08	30	5114608
RT08	35	5114609
RT08	40	5114610
RT08	45	5114611
RT08	50	5114612
RT08	55	5114613
RT08	60	5114614
RT08	65	5114615
RT08	70	5114616
RT08	80	5114617



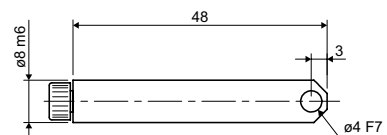
Mount PR7791 for Measuring Inserts

Catalog no.	L mm	Order no.
PR7791	30	5114699
PR7791	50	5114701
PR7791	70	5114702



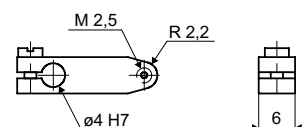
Mount PT08 for Measuring Inserts

Catalog no.	L mm	Order no.
PT08	45	5114700



Mount AM425 for Measuring Inserts

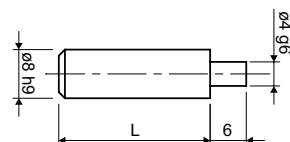
Catalog no.	L mm	Order no.
AM425	10	5114703
AM425	15	5114704
AM425	20	5114705
AM425	25	5114706



Accessories for Measuring Elements

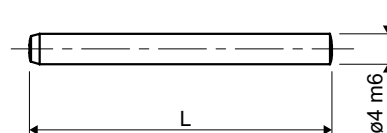
Mount AM48

Catalog no.	L mm	Order no.
AM48	25	5114707
AM48	50	5114708
AM48	75	5114709
AM48	100	5114710
AM48	125	5114711
AM48	150	5114712
AM48	200	5114713



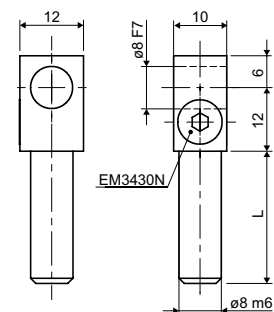
Measuring Inserts ST04

Catalog no.	L mm	Order no.
ST04	20	5114652
ST04	40	5114653
ST04	60	5114654



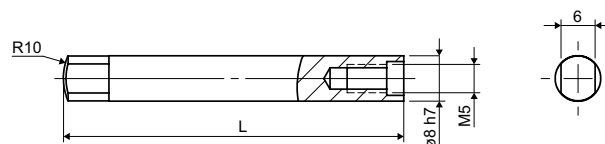
Mount AM88 for Measuring Inserts

Catalog no.	L mm	Order no.
AM88	25	5114715
AM88	50	5114716
AM88	75	5114717
AM88	100	5114718
AM88	150	5114719
AM88	150	5114720



Measuring Extensions RMV

Catalog no.	L mm	Order no.
RMV	60	5114618
RMV	100	5114619
RMV	120	5114620

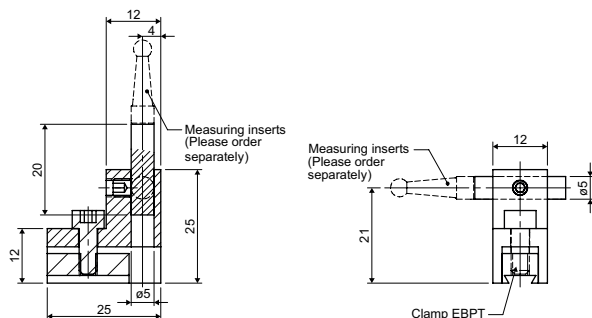


Measuring Limit Stop BUT

Catalog no.	L mm	Order no.
BUT	100	5114525
BUT	125	5114522
BUT	150	5114523
BUT	175	5114524



Accessories for Measuring Elements



Probe Holder BMS

Catalog no.	L mm	Description	Order no.
BMS	25	for BM100	5114652
BMS	30	for BM100	5114653
BMS	65	for BM100	5114654

Adaptor BMT

Catalog no.	Description	Order no.
BMT	Adaptor for BM100	5114508

Clamp EBPT

EBPT	Description	Order no.
ST04	Clamp for BM100	5114530

Special Screw BMV

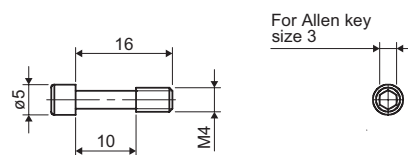
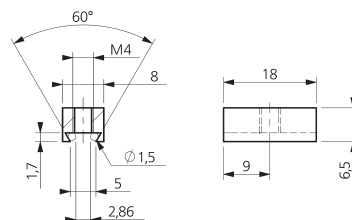
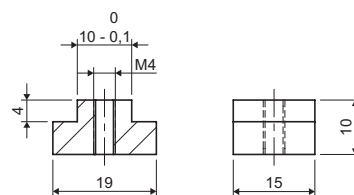
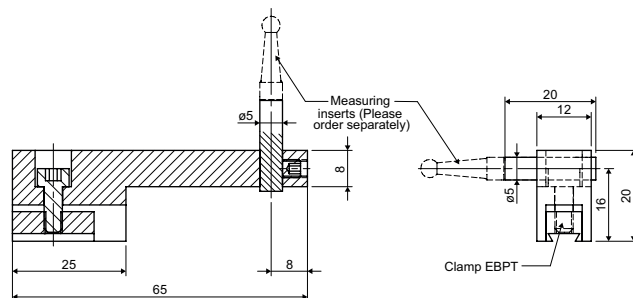
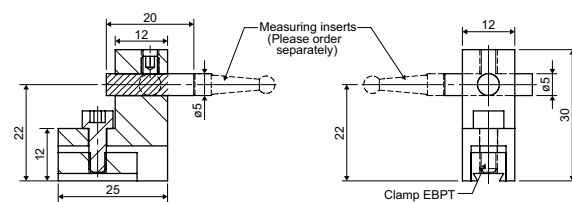
Catalog no.	Description	Order no.
BMV	Special Screw for BM100	5114509

Foot / Base BMF

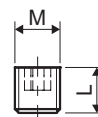
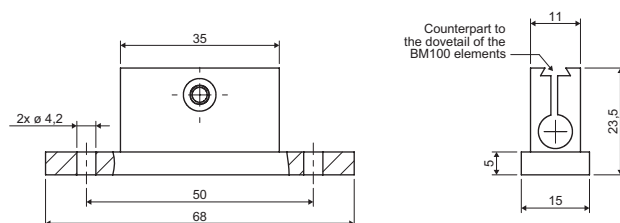
Catalog no.	Description	Order no.
BMF	for BM100	5114500

Set Screw for clamping

Catalog no.	L mm	Order no.
EM3444	4	5114557
EM3446	6	5114558



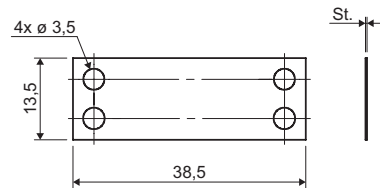
For Allen key size 3



Accessories for Measuring Elements

Leaf Springs EM342X

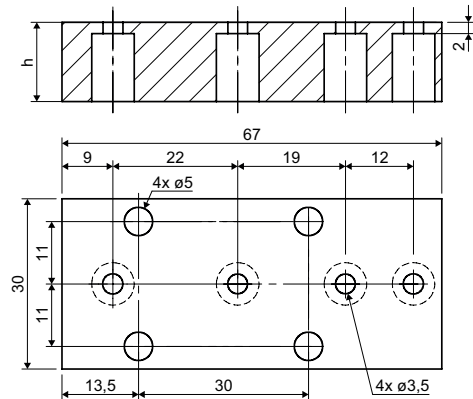
Catalog no.	Thickness mm	Order no.
EM3420	0.2	5114551
EM3425	0.25	5114552



Intermediate Plate SS14

Catalog no.	Thickness mm	Description	Order no.
SS14*	14	On PR7800 or PR7900	5114644
SS14*	5	On PR7800 or PR7900	5114647

* for EM3464 + SP2049

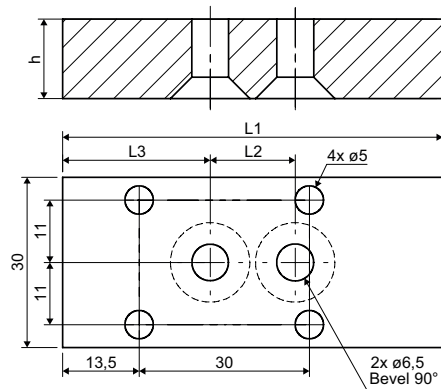


Intermediate Plate SS14

Catalog no.	h mm	L1 mm	L2 mm	L3 mm	Order no.
SS14**	14	67	15	26	5114642
SS14*	14	87	30	28.5	5114643
SS14**	5	67	15	26	5114645
SS14*	5	87	30	28.5	5114646

* for FP1520 on to PR7800 or PR7900

** for FP1500 or FP1510 on to PR7800 or PR7900

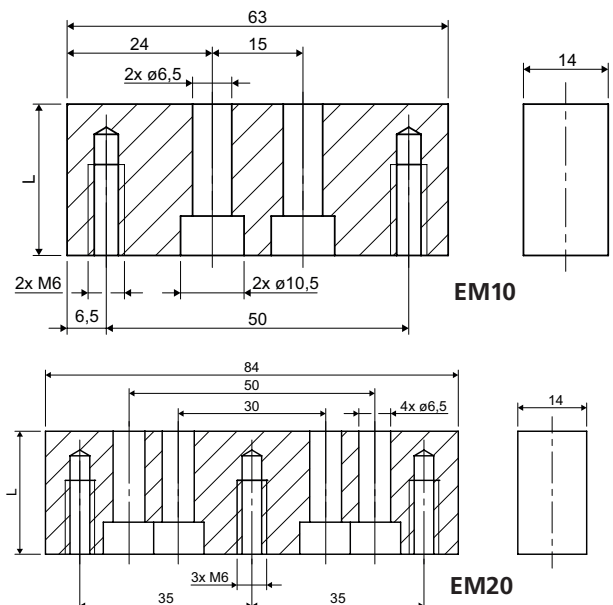


Intermediate Plate EM

Catalog no.	L mm	Order no.
EM10	10	5114535
EM10	16	5114536
EM10	20	5114537
EM10	30	5114538
EM10	40	5114539
EM10	50	5114540
EM20	10	5114541
EM20	16	5114542
EM20	20	5114543
EM20	30	5114544
EM20	40	5114545
EM20	50	5114546

* For mounting a measuring element FS10 or FP1500 or FP1510 on to a plate PQ

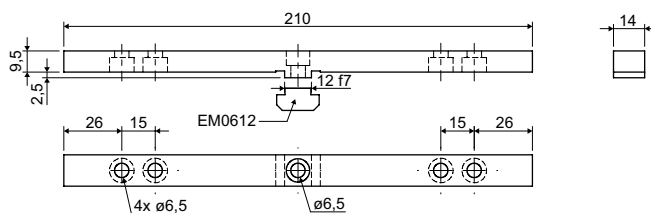
** for mounting a measuring element FD20 or FP1520 on to a plate PQ



Accessories for Measuring Elements

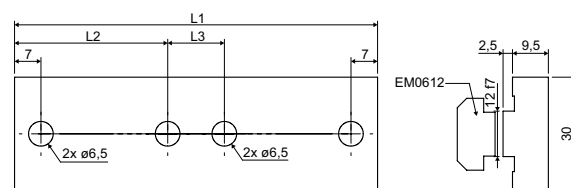
Carrier Plate for T-Groove 12 mm

Catalog no.	L mm	Order no.
SD12	210	5114634



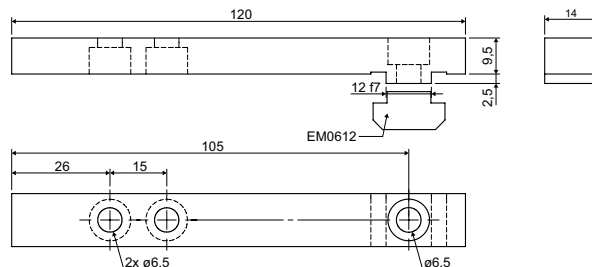
Carrier Plate for T-Groove 12 mm

Catalog no.	L1 mm	L2 mm	L3 mm	Order no.
SS12	96	40.5	15	5114635
SS12	115	42.5	30	5114636



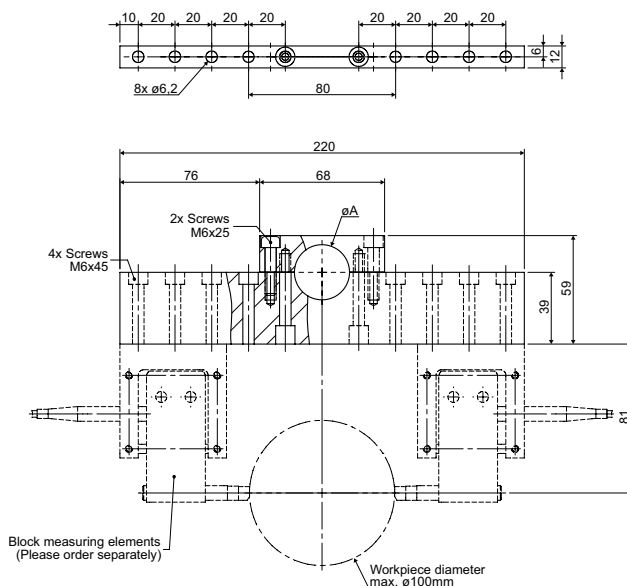
Carrier Plate for T-Groove 12 mm

Catalog no.	L mm	Order no.
SS 12	120	5114637



Support Yoke for Column Mounting

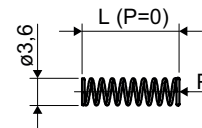
Catalog no.	dia. A mm	Order no.
SUP20	20	5114659
SUP30	30	5114660



Accessories for Measuring Elements

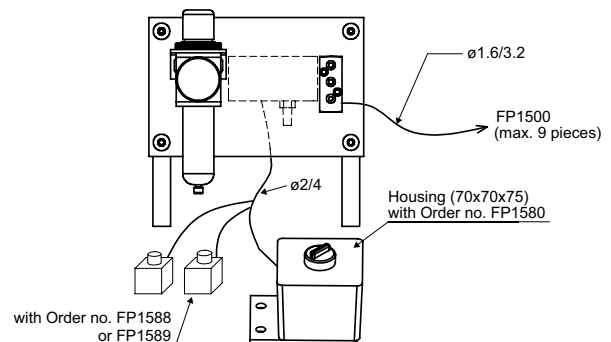
Measuring Springs RS15 for FP15

Catalog no.	FP1500 P (gr)	FP1510 P (gr)	FP1520 P (gr)	Order no.
RS15	100			5114594
RS15			100	5114595
RS15			250	5114596
RS15	160	50		5114597
RS15	230	160		5114598
RS15	380	260		5114599
RS15	450	300		5114600
RS15	700	500		5114601



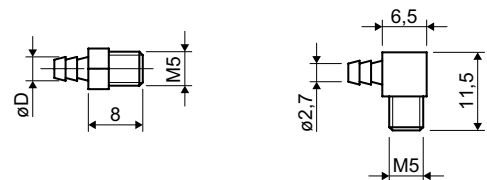
Pneumatic Supply Unit

Catalog no.	Description	Order no.
FP15	Small Pneumatic Controls with 2 push buttons	5114565
FP15	Pneumatic Supply Unit with flip switch	5114569
FP15	Pneumatic Controls with 2 push buttons	5114570
FP15	Supplement for Pneumatic Sensors	5114571



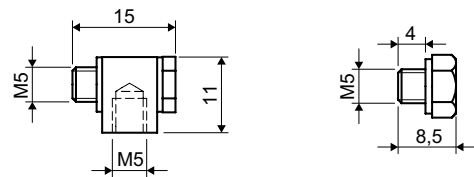
Pneumatic Connection FP15

Catalog no.	Connection	dia. D mm	Order no.
FP15	Straight M5	1.6	5114566
FP15	Straight M5	2.7	5114567
FP15	Angled M5	2.7	5114568



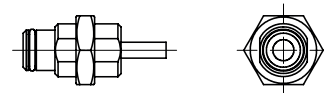
Pneumatic Accessories FP15

Catalog no.	Description	Order no.
FP15	Connecting Angle M5	5114563
FP15	Stopper M5	5114564



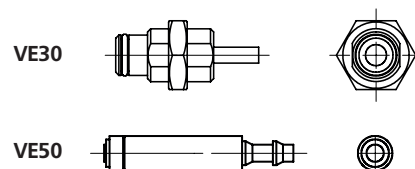
Pneumatic Cylinder FP15

Catalog no.	Description	Stroke mm	Order no.
FP15N	for FP1500 + BM100-05	5	5114576
FP15N	for FP1500/1510 + BM100-10	10	5114578
FP15	for FP1520	25	5114579

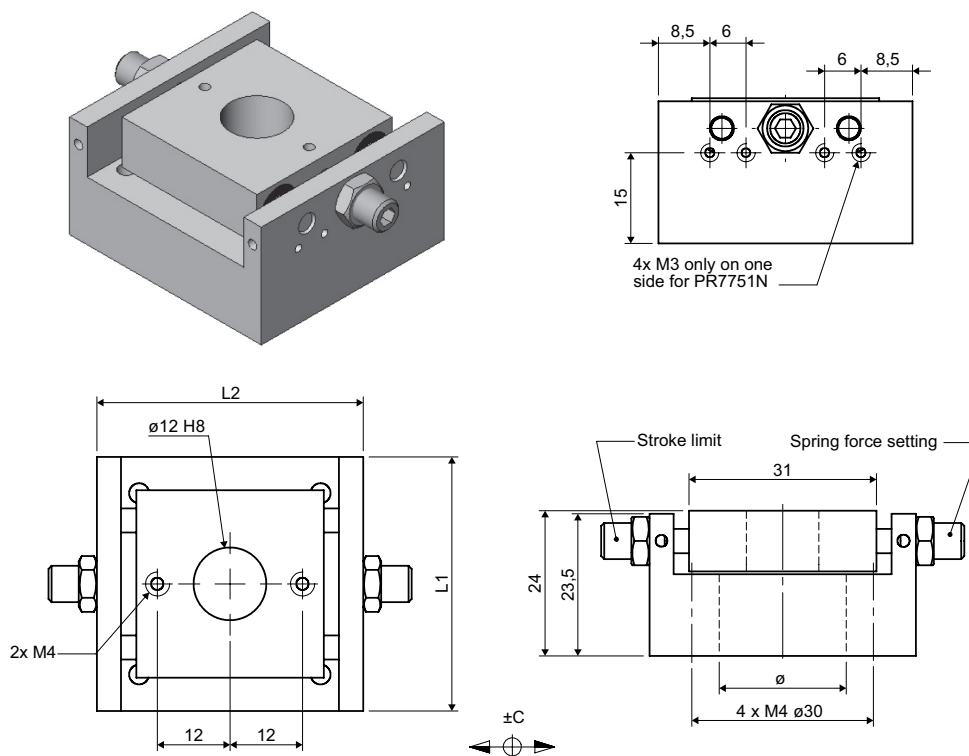


Pneumatic Cylinder FP15

Catalog no.	Description	Stroke mm	Order no.
VE30	for BML30	5	5114690
VE30	for BM50-05	5	5114691
VE50	for BM50-10	10	5114692

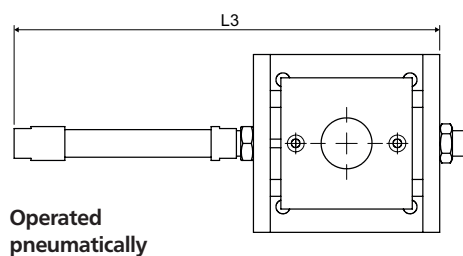


Coordinate Measuring Slides



X-Coordinate Tables PR771

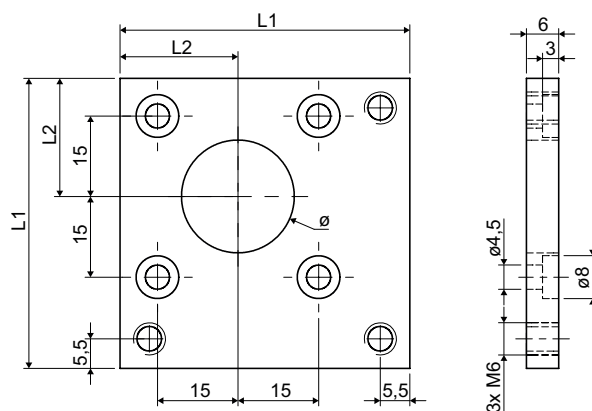
Catalog no.	Description	L1 mm	L2 mm	L3 mm	Order no.
PR771	±2.5 mm	42	44		5114800
PR771	±2.5 mm pneumatic	42	44	85.5	5114801
PR771	±5 mm	42	49		5114802
PR771	±5 mm pneumatic	42	49	90.5	5114803
PR771	±7 mm	42	53		5114804
PR771	±7 mm pneumatic	42	53	109.5	5114805



Accessories for Measuring Slides

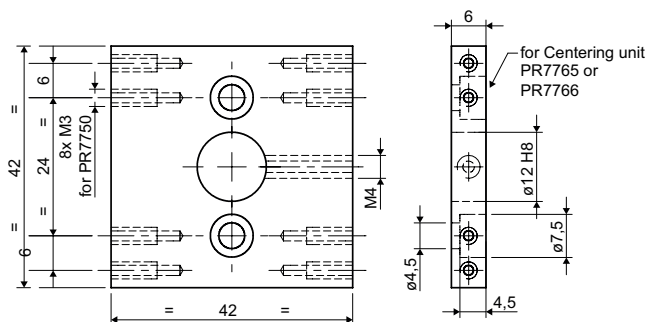
Base plate for Coordinate Tables PR774

Catalog no.	Description	L1 mm	L2 mm	L3 mm	Order no.
PR774	±2.5 mm	54	22	21	5114900
PR774	±5 mm	59	25.4	28	5114901
PR774	±7 mm	63	26.5	32	5114902



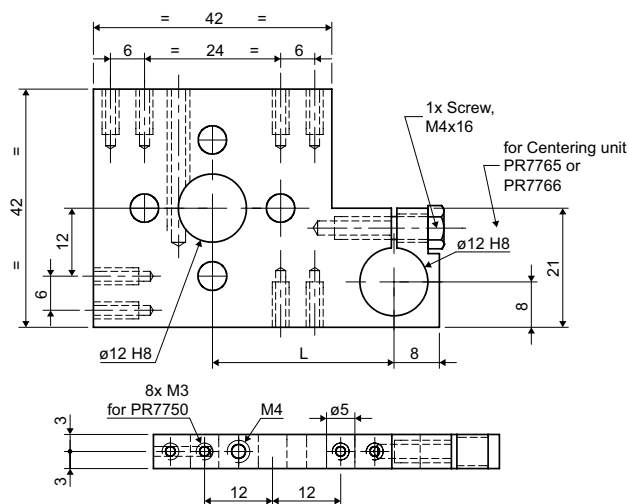
Adaptor Plate for Centering Unit

Catalog no.	Order no.
PR776	5114907



Excenter Adaptor Plate for Table Stroke

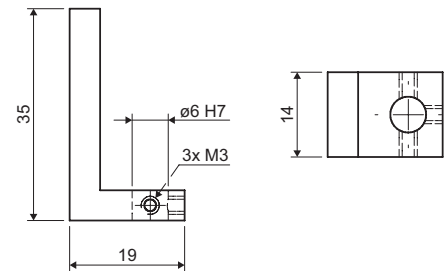
Catalog no.	Description	L1 mm	Order no.
PR776	±2.5 mm	32	5114912
PR776	±5 mm	37	5114913
PR776	±7 mm	41	5114914



Accessories for Measuring Slides

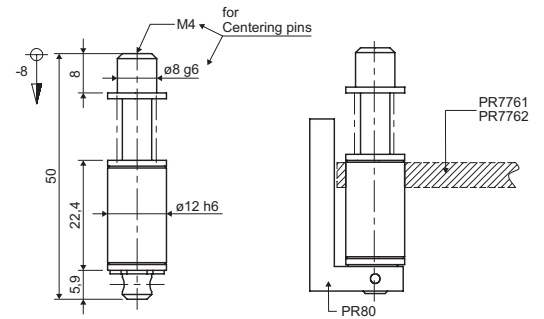
Anti-twist Lock PR80

Catalog no.	Description	Order no.
PR80	for Centering Unit PR776	5114912



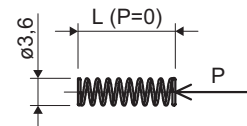
Centering Unit PR776

Catalog no.	Order no.
PR776	5114918



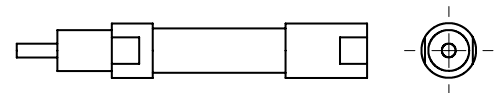
Measuring Force Springs RS77

Catalog no.	Description	L mm	Rigidity	Table stroke mm	Order no.
RS77	for PR771 or PR772	12.5	0.055	± 2.5	5114969
RS77	for PR771 or PR772	12.5	0.091	± 2.5	5114970
RS77	for PR771 or PR772	16	0.043	± 2.5 to 7	5114971
RS77	for PR771 or PR772	16	0.161	± 2.5 to 7	5114972
RS77	for PR771 or PR772	20	0.034	± 7	5114973



Pneumatic Cylinder FP15

Catalog no.	Description	Stroke mm	Order no.
FP15*	Pneumatic cylinder	10	5114577
FP15*	Pneumatic cylinder	25	5114579

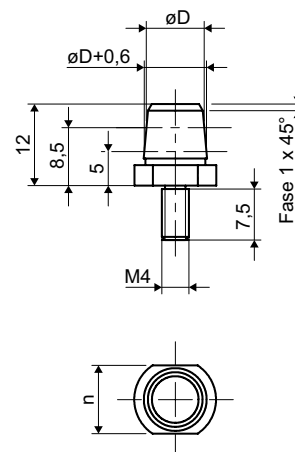


* for PR771 or PR772

Accessories for Measuring Slides

Centering Pin PR777

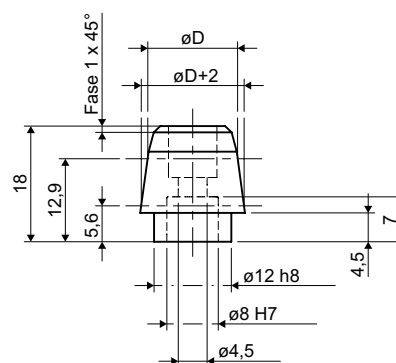
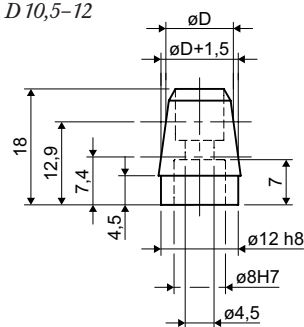
Catalog no.	Dia. D mm	n mm	Order no.
PR777	2	7	5114923
PR777	2.5	7	5114924
PR777	3	7	5114925
PR777	3.5	7	5114926
PR777	4	7	5114927
PR777	4.5	7	5114928
PR777	5	7	5114929
PR777	5.5	7	5114930
PR777	6	7	5114931
PR777	6.5	7	5114932
PR777	7	10	5114933
PR777	7.5	10	5114934
PR777	8	10	5114935
PR777	8.5	10	5114936
PR777	9	10	5114937
PR777	9.5	10	5114938
PR777	10	13	5114939
PR777	10.5	13	5114940
PR777	11	13	5114941
PR777	11.5	13	5114942
PR777	12	13	5114943



Centering Pin PR778

	Dia. D mm	Order no.
PR778	10.5 - 12	5114944
PR778	12 - 14	5114945
PR778	14 - 16	5114946
PR778	16 - 18	5114947
PR778	18 - 20	5114948
PR778	20 - 22	5114949
PR778	22 - 24	5114950
PR778	24 - 26	5114951
PR778	26 - 28	5114952
PR778	28 - 30	5114953
PR778	30 - 32	5114954
PR778	32 - 34	5114955
PR778	34 - 36	5114956
PR778	36 - 38	5114957
PR778	38 - 40	5114958
PR778	40 - 42	5114959
PR778	42 - 44	5114960
PR778	44 - 46	5114961
PR778	46 - 48	5114962
PR778	48 - 50	5114963

for D 10,5–12



Slide with Cross Guide Rollers

Cross Roll Tables

Catalog no.	C mm	L1 mm	L2 mm	L3 mm	Order no.
PR780	80	205	52.5	20	5115000
PR781	120	205	52.5	20	5115001
PR782	150	205	52.5	20	5115002
PR783	200	205	102.5	70	5115003

Manual Indexing PR785

Catalog no.	Option: Manual Indexing	Order no.
PR785	for PR780	5115000
PR785	for PR781	5115001
PR785	for PR782	5115002
PR785	for PR783	5115003

Pneumatic Indexing PR786

Catalog no.	Option: Pneumatic Indexing	A mm	Order no.
PR786	for PR780	170	5115021
PR786	for PR781	210	5115022
PR786	for PR782	250	5115023
PR786	for PR783	290	5115024

Lever Arm PR78

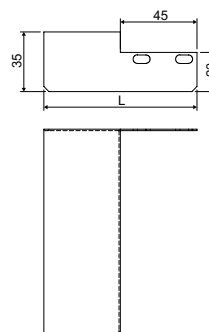
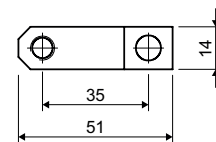
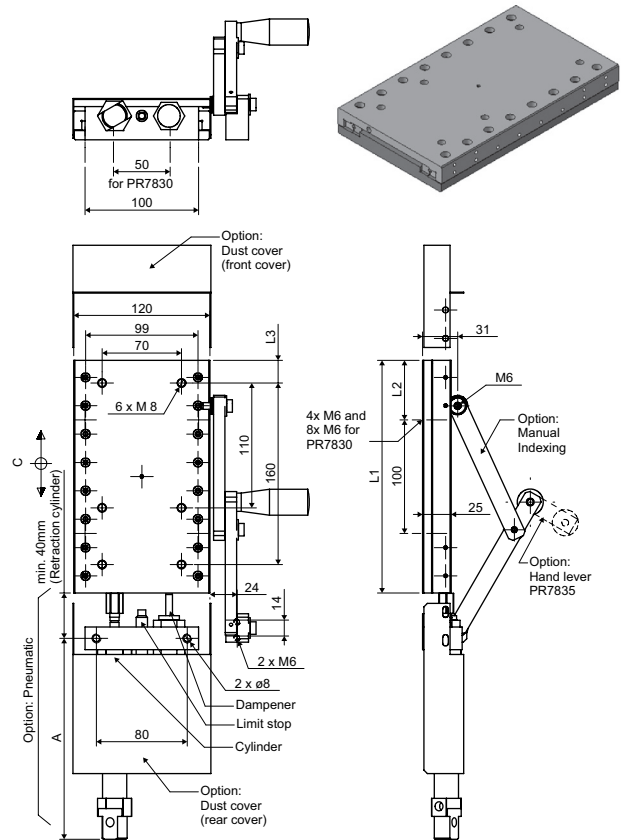
Catalog no.	Description	Order no.
PR78	Lever Arm	5115008

Dust Cover PR787

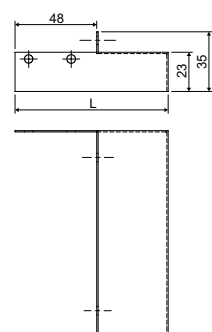
Catalog no.	Description	L mm	Order no.
PR787	Dust Covers for PR780	90	5115029
PR787	Dust Covers for PR781	110	5115030
PR787	Dust Covers for PR782	125	5115031
PR787	Dust Covers for PR783	150	5115032

Hydraulic Dampener PR789

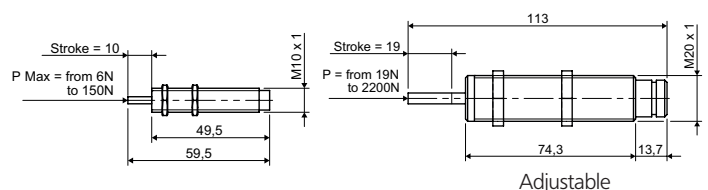
Catalog no.	Description	Order no.
PR789	Hydraulic Dampener, adjustable	5115038
PR789	Hydraulic Dampener	5115039



Front cover

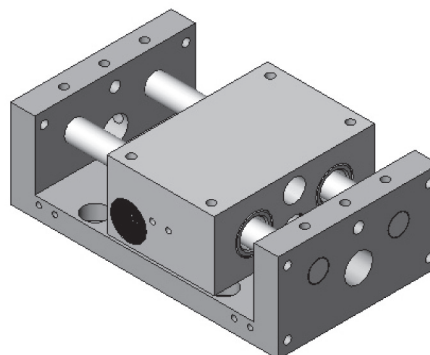
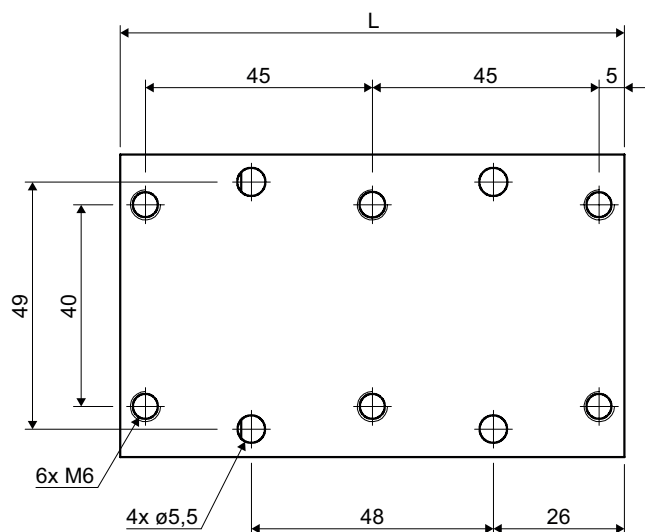


Rear cover

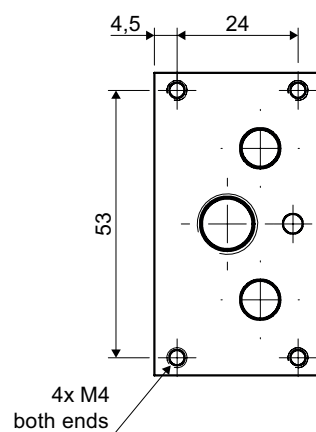
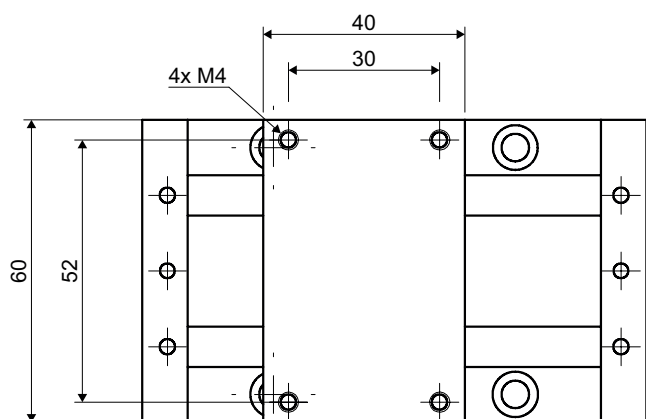
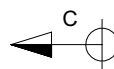
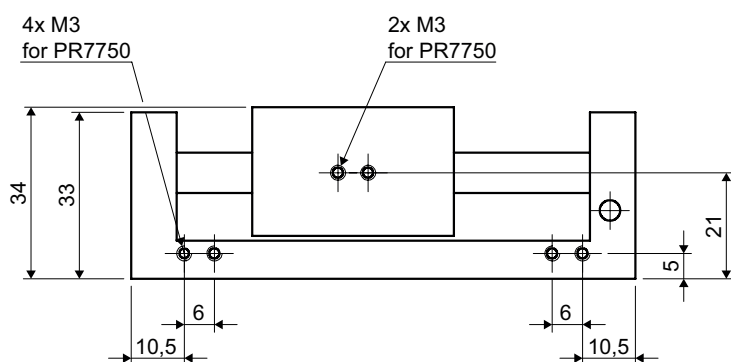


Adjustable

Linear Measuring Slides

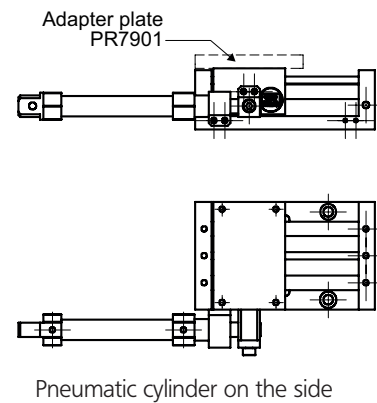
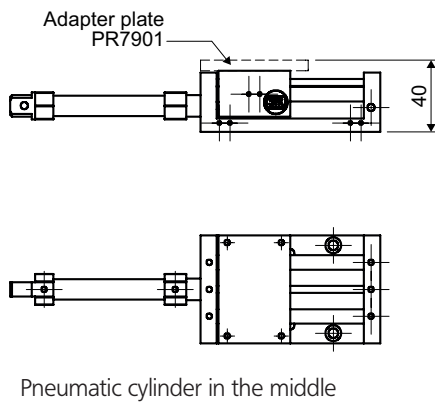
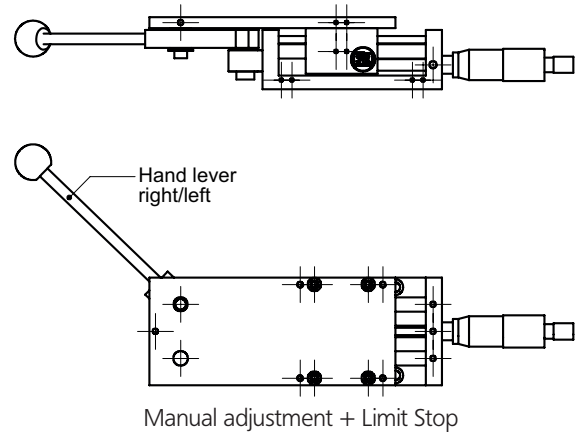
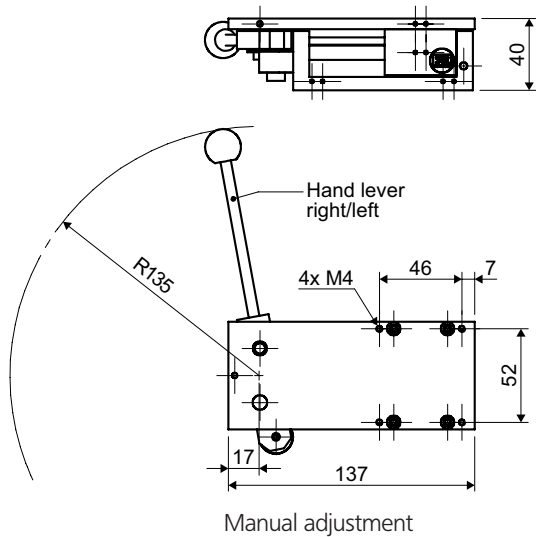


Linear table PR79 with
2 precision ball bushings



Linear Measuring Slides

Linear Tables PR79 with Adjusting Units



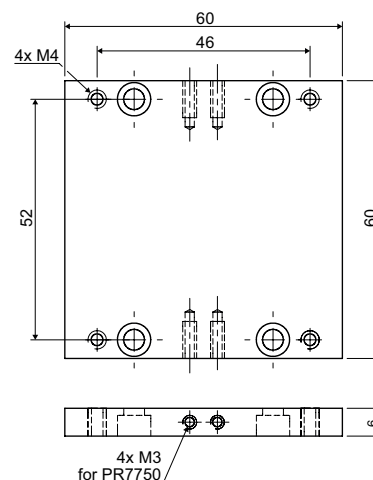
Linear Tables PR79

Catalog no.	Retraction C mm	Description	L mm	Order no.
PR79	40	—	100	5115127
PR79	40	with manual adjustment	100	5115128
PR79	40	with manual adjustment + axial stop	100	5115129
PR79	40	with manual adjustment + radial stop	100	5115130
PR79	40	with pneumatic axial adjustment, single	100	5115131
PR79	40	with pneumatic axial adjustment, double	100	5115132
PR79	40	with pneumatic radial adjustment unit	100	5115133
PR79	50	—	110	5115134
PR79	50	with manual adjustment	110	5115135
PR79	50	with manual adjustment + axial stop	110	5115136
PR79	50	with manual adjustment + radial stop	110	5115137
PR79	50	with pneumatic axial adjustment, single	110	5115138
PR79	50	with pneumatic axial adjustment, double	110	5115139
PR79	50	with pneumatic radial adjustment unit	110	5115140

Linear Measuring Slides

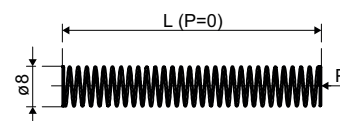
Adapter Plate PR7901

Catalog no.	Description	Order no.
PR7901	Adapter Plate for PR79	5115122



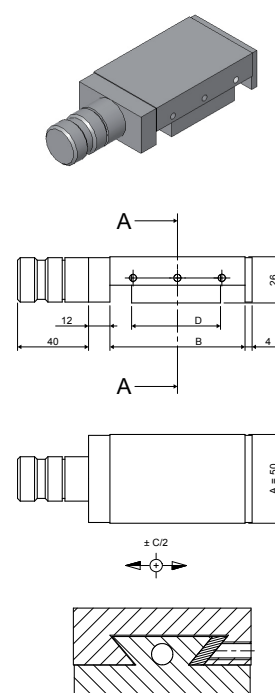
Measuring Force Springs for PR7901

Catalog no.	L mm	Rigidity	Table Stroke mm	Order no.
RS79	80	0.023	40	5115145
RS79	100	0.018	50	5115146
RS79	120	0.014	40 - 50	5115147



Micrometer Tables C50

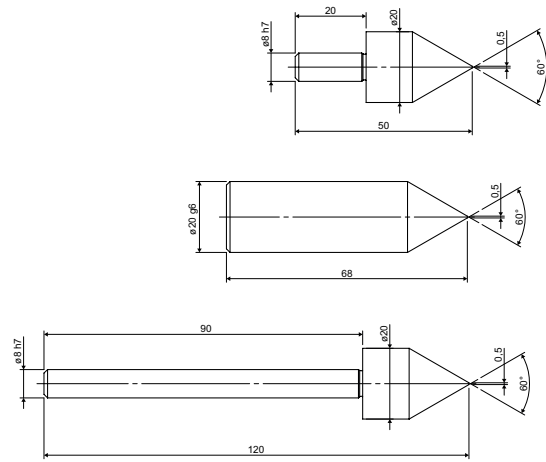
Catalog no.	Description	B mm	C mm	D mm	Order no.
C50	Micrometer Tables	76	25	50	5115100
C50	Micrometer Tables	101	25	75	5115101
C50	Micrometer Tables	126	25	100	5115102
C50	Micrometer Tables	151	25	125	5115103
C50	Micrometer Tables	101	50	50	5115104
C50	Micrometer Tables	126	50	75	5115105
C50	Micrometer Tables	151	50	100	5115106
C50	Micrometer Tables	176	50	125	5115107
C50	Micrometer Tables	126	75	50	5115108
C50	Micrometer Tables	151	75	75	5115109
C50	Micrometer Tables	176	75	100	5115110
C50	Micrometer Tables	201	75	125	5115111
C50	Micrometer Tables	151	100	50	5115112
C50	Micrometer Tables	176	100	75	5115113
C50	Micrometer Tables	201	100	100	5115114
C50	Micrometer Tables	176	125	50	5115115
C50	Micrometer Tables	201	125	75	5115116
C50	Micrometer Tables	201	150	50	5115117



Centering Tips and Flanges

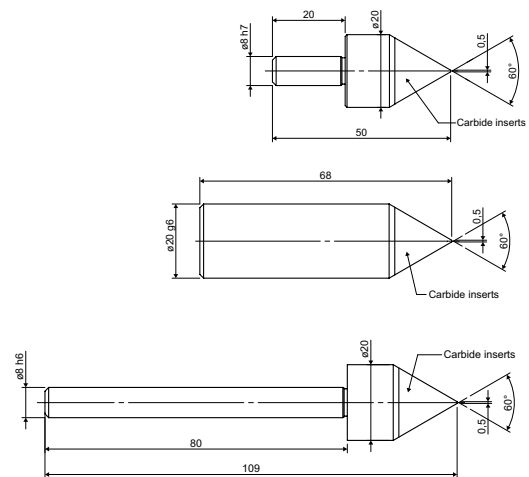
Centering Pin CD50

Catalog no.	Mount mm	L mm	Material	Order no.
CD50	8	50	Steel	5115205
CD50	20	68	Steel	5115228
CD50	8	120	Steel	5115206



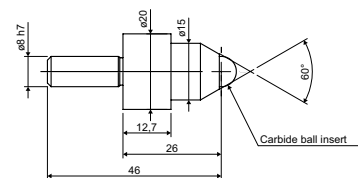
Centering Pin CD50C

Catalog no.	Mount mm	L mm	Material	Order no.
CD50C	8	50	Carbide	5115227
CD50C	20	68	Carbide	5115233
CD50C	8	120	Carbide	5115206



Centering Ball CD50B

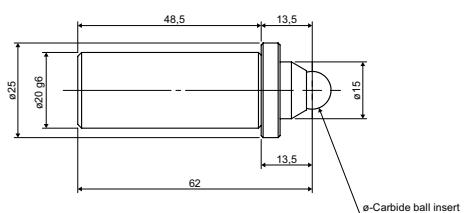
Catalog no.	Mount mm	Ball dia. mm	Material	Order no.
CD50B	8	6	Carbide	5115212
CD50B	8	7	Carbide	5115213
CD50B	8	8	Carbide	5115214
CD50B	8	9	Carbide	5115215
CD50B	8	10	Carbide	5115216
CD50B	8	11	Carbide	5115217
CD50B	8	12	Carbide	5115218
CD50B	8	13	Carbide	5115219
CD50B	8	14	Carbide	5115220
CD50B	8	15	Carbide	5115221
CD50B	8	16	Carbide	5115222



Centering Tips and Flanges

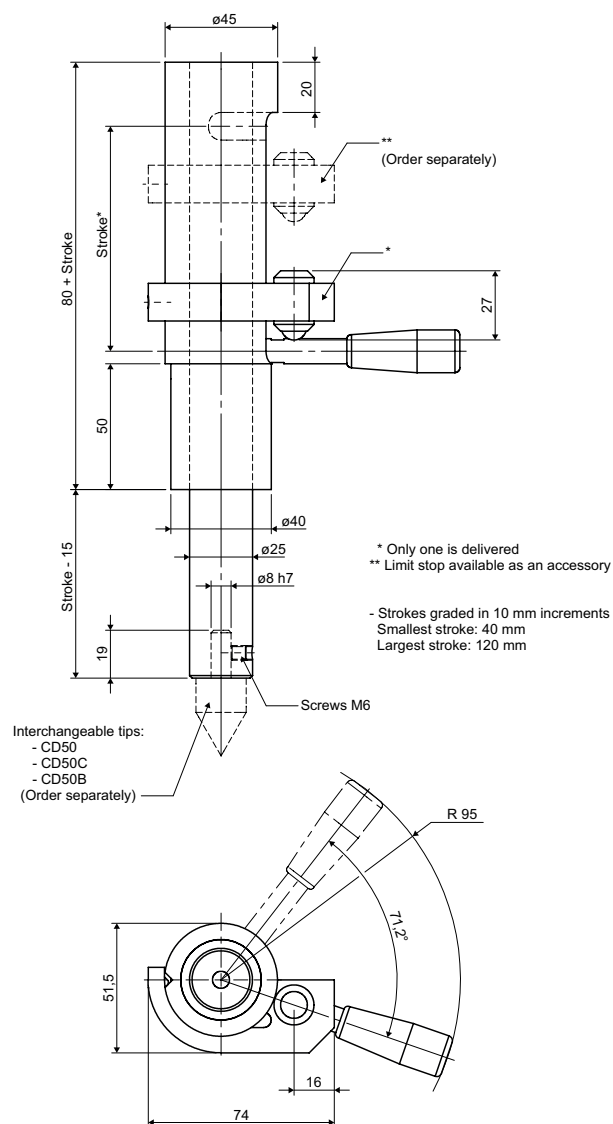
Centering Ball PF160

Catalog no.	Mount mm	Ball dia. mm	Material	Order no.
PF160	20	6	Carbide	5115234
PF160	20	7	Carbide	5115235
PF160	20	8	Carbide	5115236
PF160	20	9	Carbide	5115237
PF160	20	10	Carbide	5115238
PF160	20	11	Carbide	5115239
PF160	20	12	Carbide	5115240
PF160	20	13	Carbide	5115241
PF160	20	14	Carbide	5115242
PF160	20	15	Carbide	5115243
PF160	20	16	Carbide	5115244

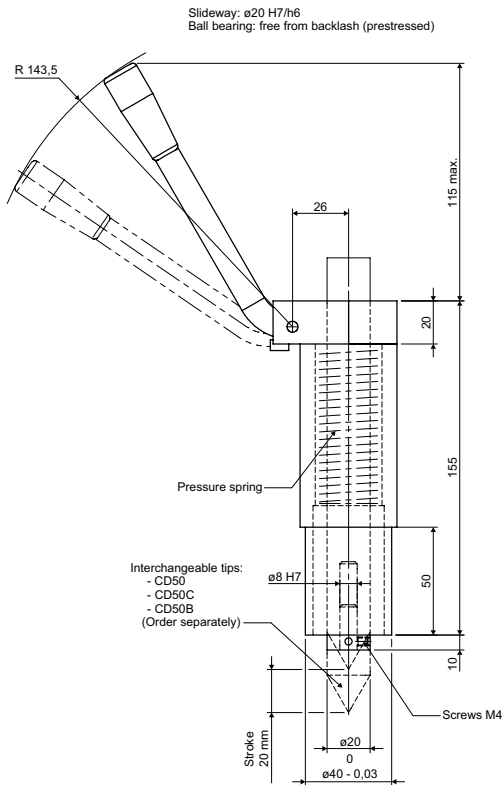


Tip with Large Stroke PGC160

Catalog no.	Stroke mm	Possible limit stops	Order no.
PGC160	40	1	5115249
PGC160	50	1	5115250
PGC160	60	1	5115251
PGC160	70	1	5115252
PGC160	80	2	5115253
PGC160	90	2	5115254
PGC160	100	2	5115255
PGC160	110	2	5115256
PGC160	120	3	5115257

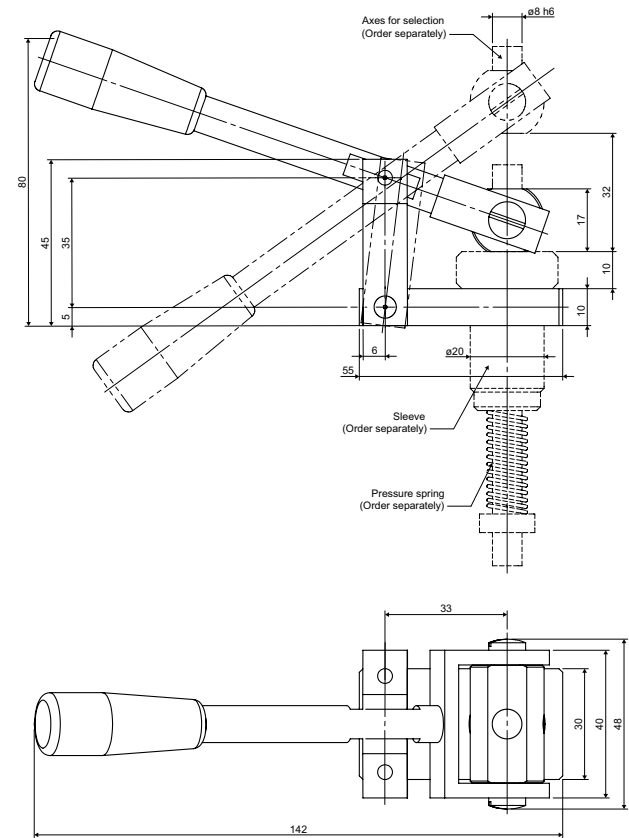


Centering Tips and Flanges



Liftable Tip PM160

Catalog no.	Description	Order no.
PM160	with ball bushing	5115262
PM160	with sliding guideway	5115263

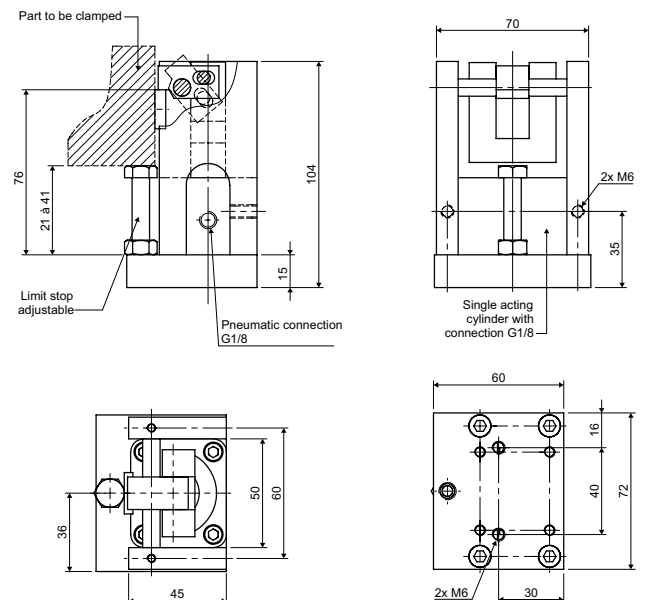


Lifter ST140

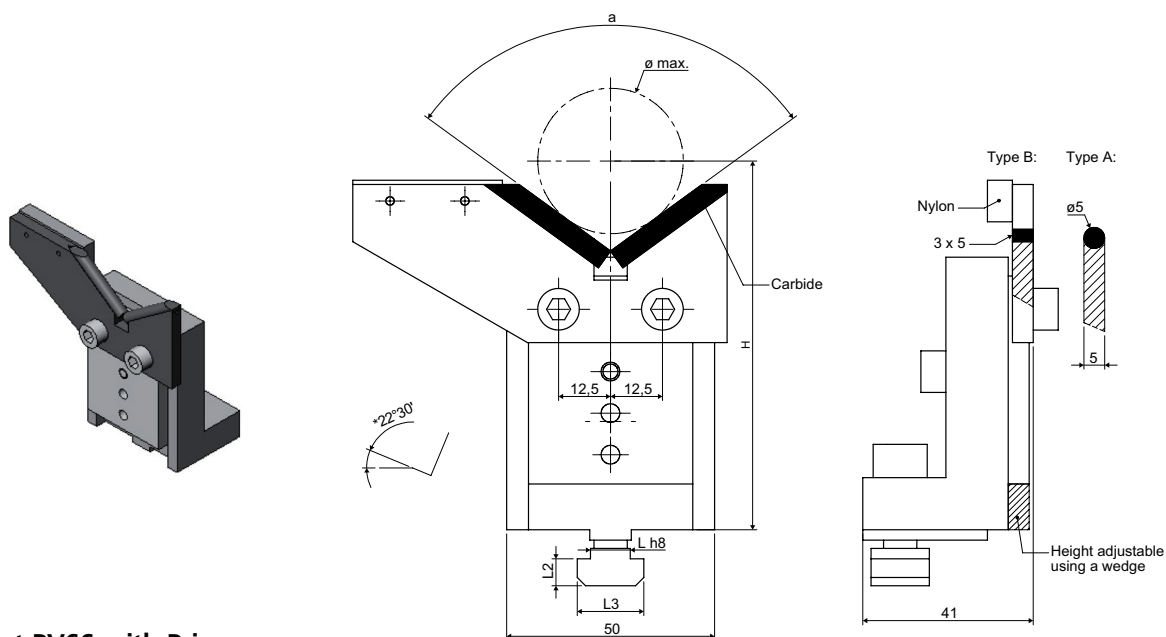
Catalog no.	Order no.
ST140	5115268

Pneumatic Clamp BR160

Catalog no.	Description	Order no.
BR160	Lock the slide in the measuring position	5115262

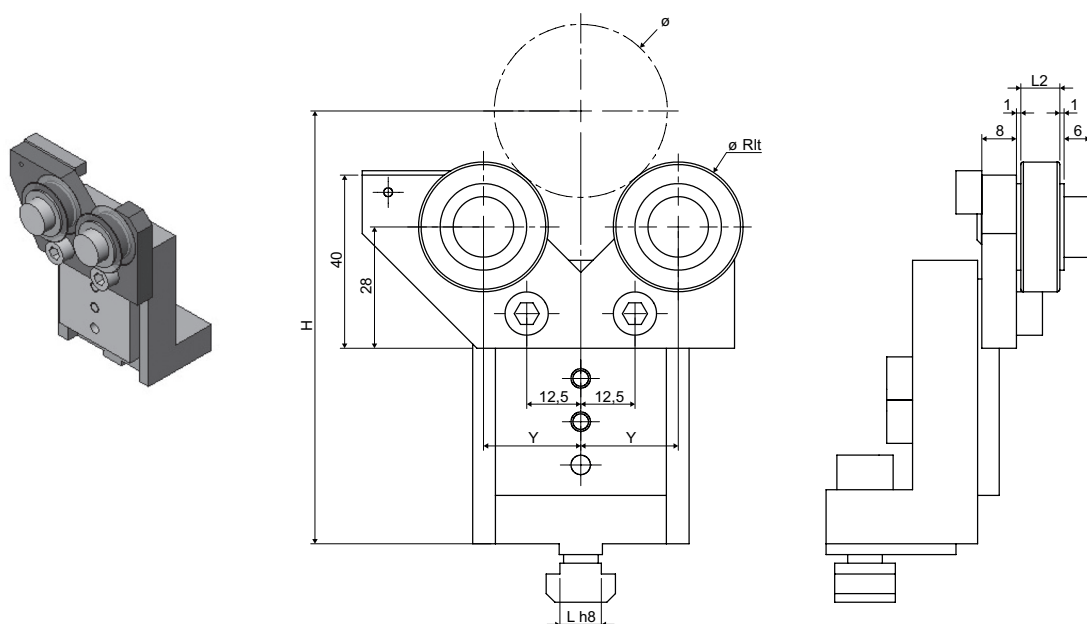


Prisms and Accessories



Support PV66 with Prism

Catalog no.	Dia. max mm	L mm	a max	Type	H mm	Order no.	Catalog no.	Dia. max mm	L mm	a max	Type	H mm	Order no.
PV66	8-45	12x7x19	60°	A	61-137	5115300	PV66	8-60	12x7x19	108°	B	60.9-132.1	5115305
PV66	8-45	12x7x19	60°	B	61-137	5115301	PV66	8-80	12x7x19	120°	A	60.1-140.7	5115306
PV66	8-60	12x7x19	90°	A	60.7-136.4	5115302	PV66	8-80	12x7x19	120°	B	60.1-140.7	5115307
PV66	8-60	12x7x19	90°	B	60.7-136.4	5115303	PV66	8-60	12x7x19	90°	A	60.2-133.2	5115308
PV66	8-60	12x7x19	108°	A	60.9-132.1	5115304	PV66	8-60	12x7x19	90°	B	60.9-133.2	5115309



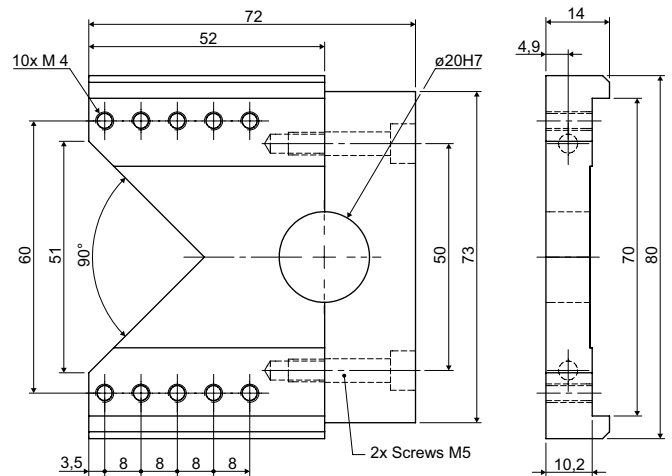
Support PV66 with Roller Prism

Catalog no.	L mm	Max-mm	H mm	Y mm	Dia-R mm	L2 mm	Order no.	Catalog no.	L mm	Max-mm	H mm	Y mm	Dia-R mm	L2 mm	Order no.
PV66	12	10-24	71.9-121	15	26	8	5115314	PV66	12	50-78	86.4-143.9	30	30	9	5115316
PV66	12	24-50	76.9-134.1	22.5	30	9	5115315	PV66	12	78-120	104.9-174	45	30	9	5115317

Prisms and Accessories

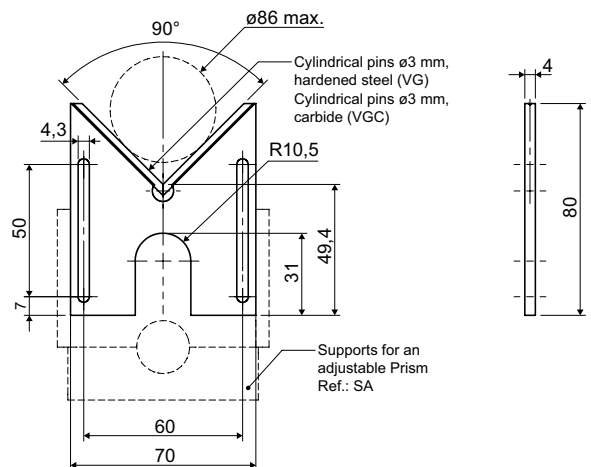
Support for Adjustable Prisms

Catalog no.	Order no.
SA	5115322



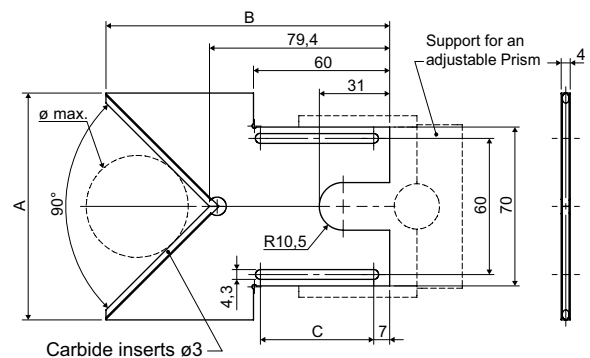
Prism 90° adjustable

Catalog no.	Description	Material	Order no.
VG			5115323
VGSA	with Support SA		5115324
VG		Carbide	5115325
VGSA	with Support SA	Carbide	5115326



Prism with Carbide Inserts 90° adjustable

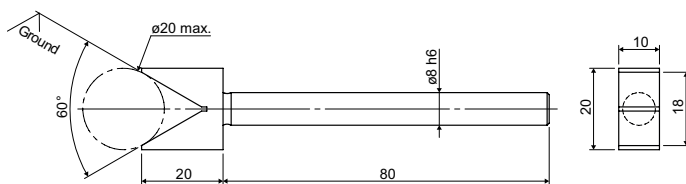
Catalog no.	Description	A mm	B mm	C mm	Dia. max	Order no.
VG		100	125	43	130	5115327
VGSA	with Support SA	100	125	43	130	5115328
VG		140	145	50	140	5115329
VGSA	with Support SA	140	145	50	140	5115330



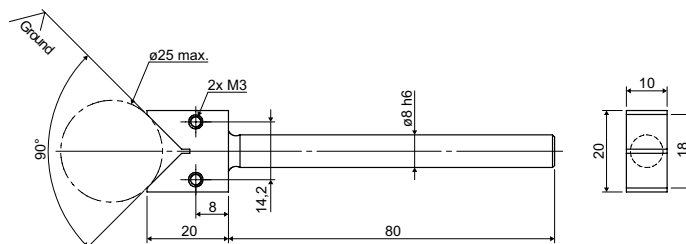
Prisms and Accessories

Prisma VM

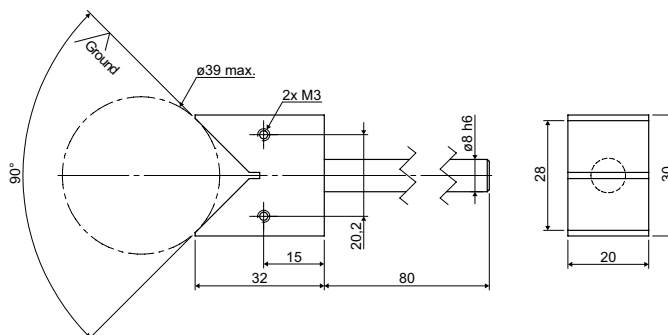
Catalog no.	Description	Order no.
VM	Prism on 8 mm axis	5115335



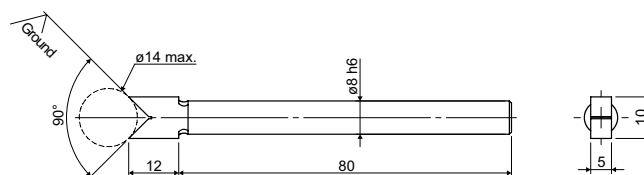
Catalog no.	Description	Order no.
VM	Prism on 8 mm axis	5115336



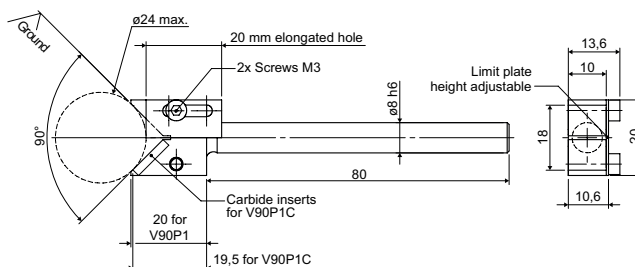
Catalog no.	Description	Order no.
VM	Prism on 8 mm axis, large model	5115337



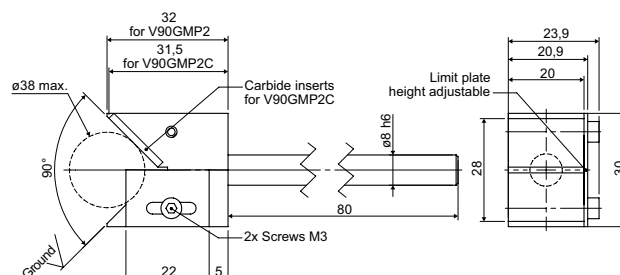
Catalog no.	Description	Order no.
VM	Prism on 8 mm axis, small model	5115338



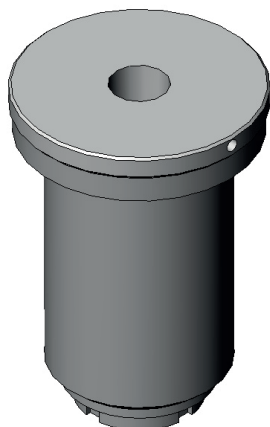
Catalog no.	Description	Order no.
VM	Prism with Stop Plate	5115339
VM	Prism with Carbide Inserts and Stop Plate	5115340



Catalog no.	Description	Order no.
VM	Prism, large model, with Stop Plate	5115341
VM	Prism with Carbide Inserts, large model and Stop Plate	5115342



Precision Rotary Unit



Features

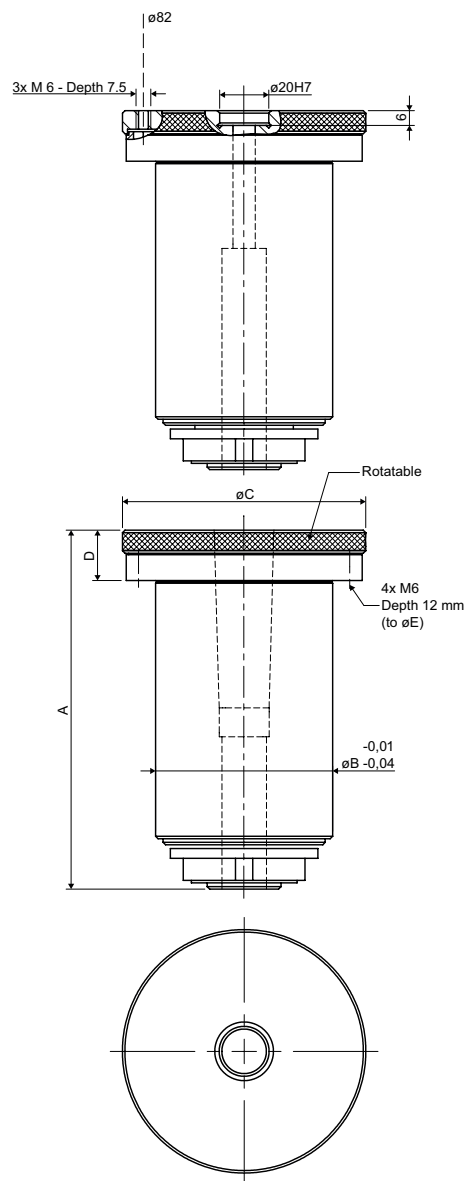
- Run-out 0.005mm
- Taper SK/SA 30, 40, 45, 50
- Centering smooth, dia. 20 with 3 x M6 to dia. 82

Options:

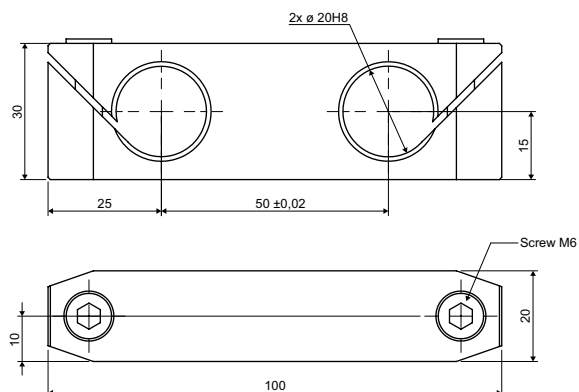
- Resetting Wheel
- Clamping Screw

Precision Turning Unit ET90

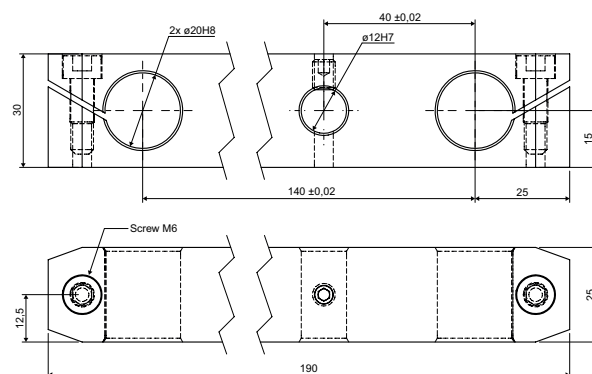
Catalog no.	Centering	A mm	B mm	C mm	D mm	E mm	Order no.
ET90	Dia. 20 smooth	146	72	98	20	86	5115400
ET90	Morse taper 1	146	72	98	20	86	5115401
ET90	Morse taper 2	146	72	98	20	86	5115402
ET90	Morse taper 3	146	72	98	20	86	5115403
ET90	Morse taper 4	146	72	98	20	86	5115404
ET90	SK/SA 30	173	72	98	47	86	5115405
ET90	SK/SA 40	173	72	98	47	86	5115406
ET90	SK/SA 45	216	110	138	55	126	5115407
ET90	SK/SA 50	216	110	138	55	126	5115408



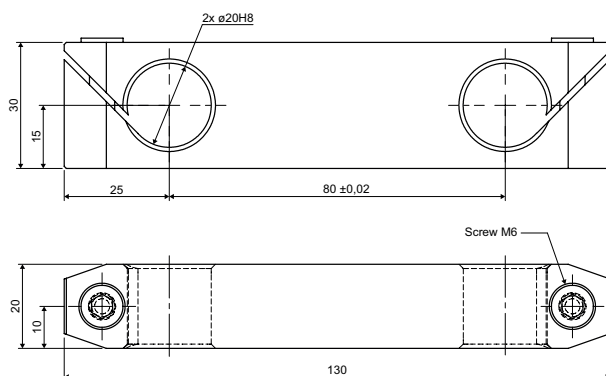
Equipment Accessories



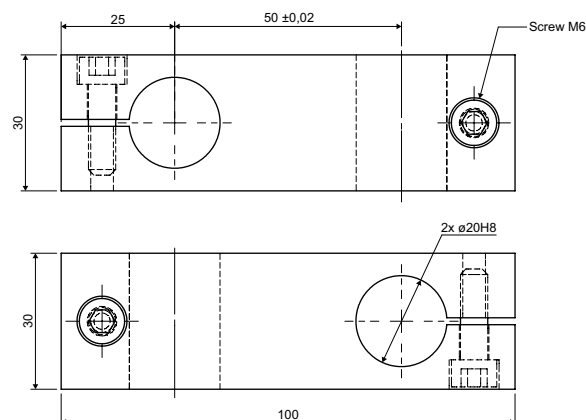
Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 20 \times \varnothing 20 \times 50$	5115518



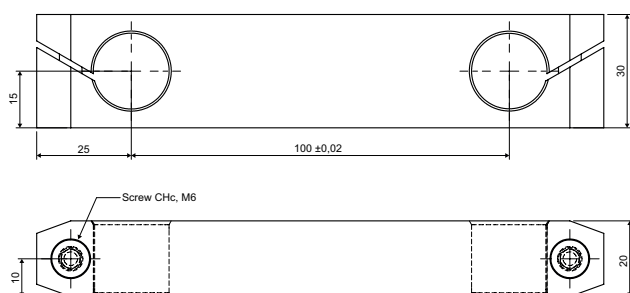
Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 20 \times \varnothing 20 \times 140$	5115521



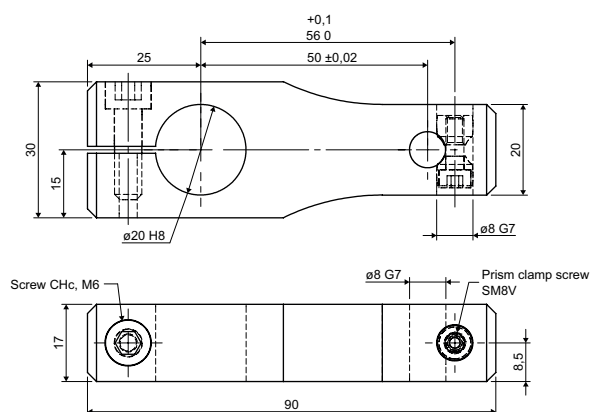
Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 20 \times \varnothing 20 \times 80$	5115519



Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 20 \times \varnothing 20$ below 90°	5115515

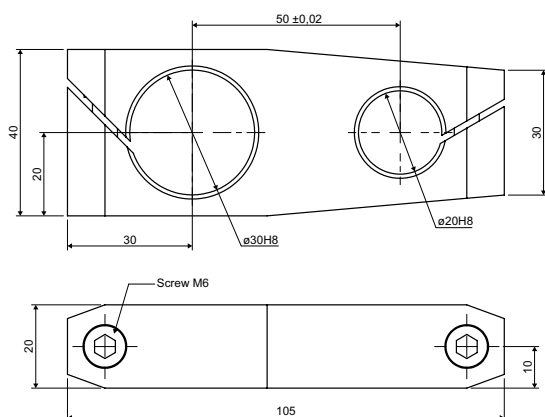


Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 20 \times \varnothing 20 \times 100$	5115520

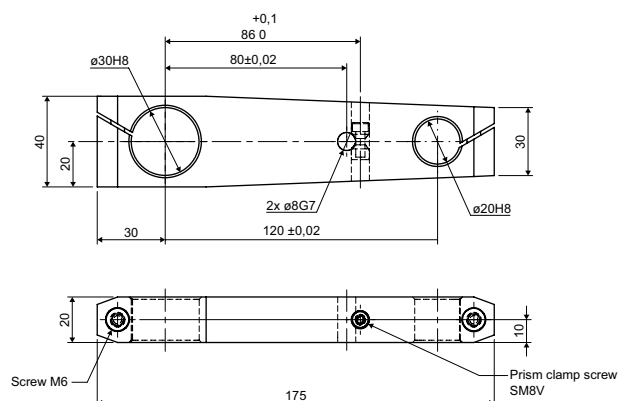


Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 20 \times \varnothing 8 \times 50$	5115522

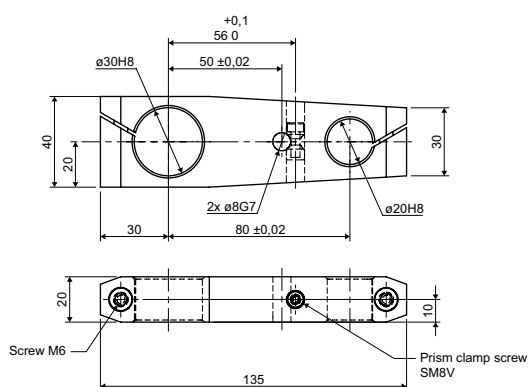
Equipment Accessories



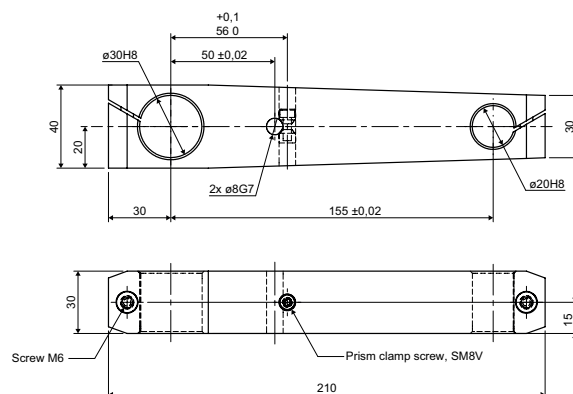
Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 30 \times \varnothing 20 \times 50$	5115524



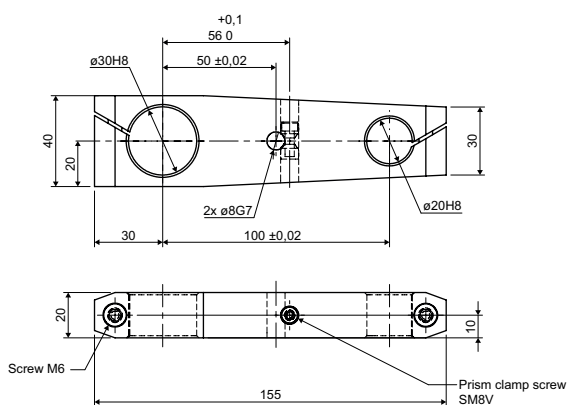
Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 30 \times \varnothing 30 \times 120$	5115530



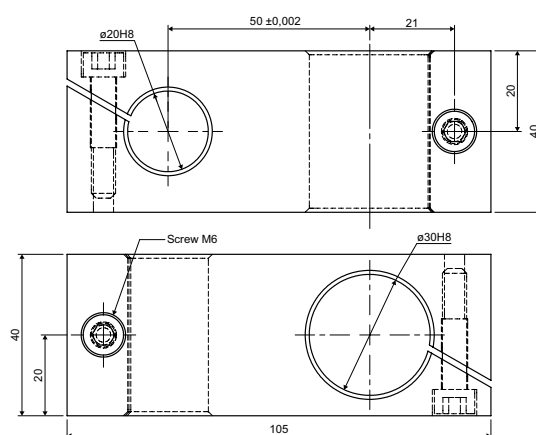
Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 30 \times \varnothing 20 \times 80$	5115528



Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 30 \times \varnothing 20 \times 155$	5115531

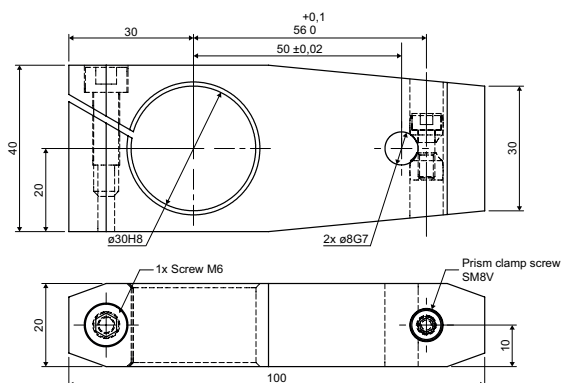


Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 30 \times \varnothing 20 \times 100$	5115529

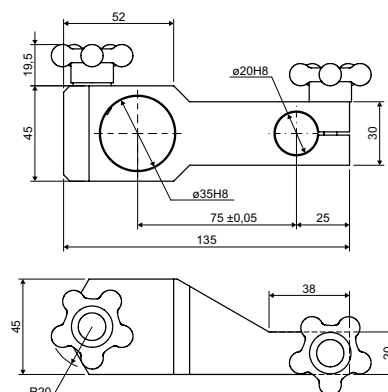


Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 30 \times \varnothing 20 \times 50$ below 90°	5115517

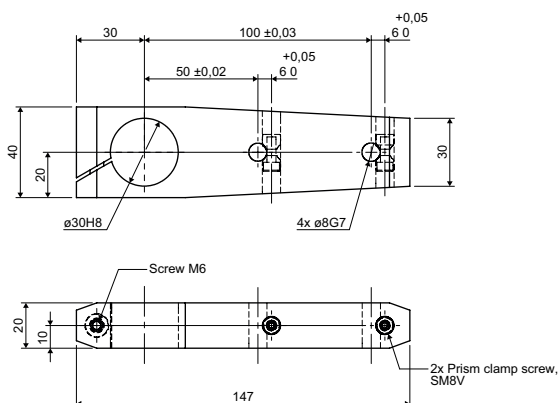
Equipment Accessories



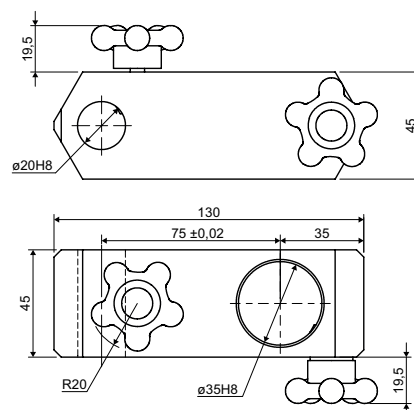
Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 30 \times \varnothing 8 \times 50$	5115523



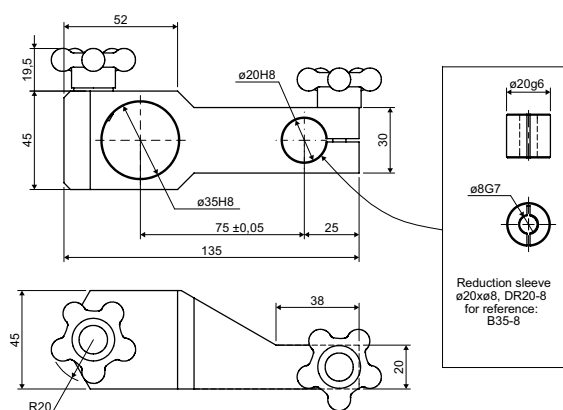
Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 35 \times \varnothing 20 \times 75$	5115526



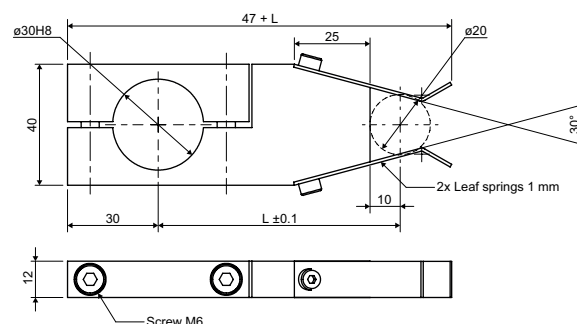
Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 30 \times \varnothing 8 \times 100$	5115527



Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 35 \times \varnothing 20 \times 75$ below 90°	5115516

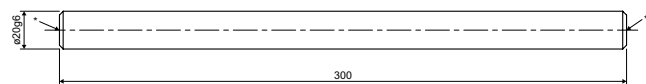


Catalog no.	Description	Order no.
BT	Extension Arm $\varnothing 35 \times \varnothing 8 \times 75$	5115525

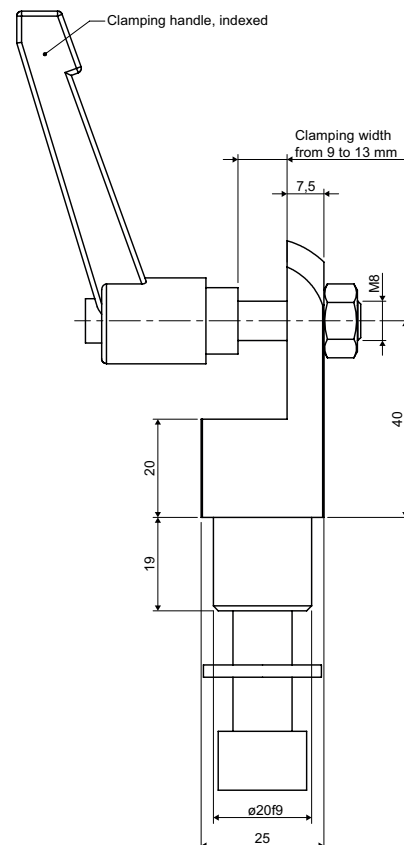
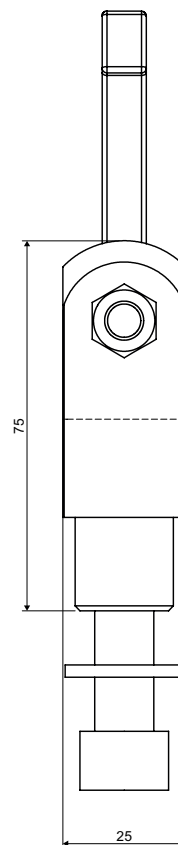
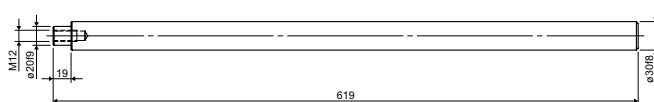
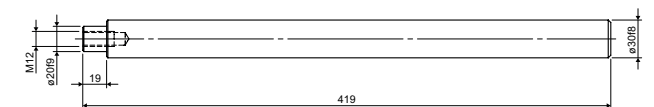
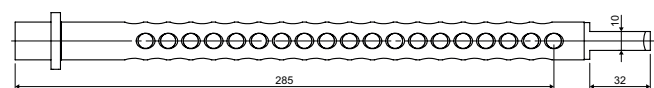
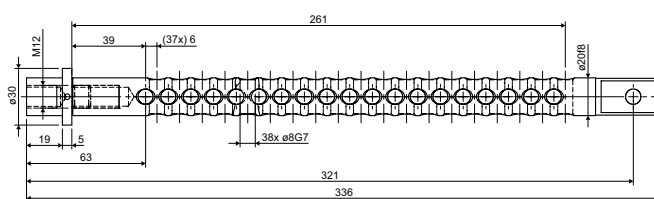


Catalog no.	Description	L mm	Order no.
BT	Extension Arm with Clamp	80	5115509
BT	Extension Arm with Clamp	120	5115510
BT	Extension Arm with Clamp	150	5115511

Equipment Accessories



* Centering tips B2.5



Column BC

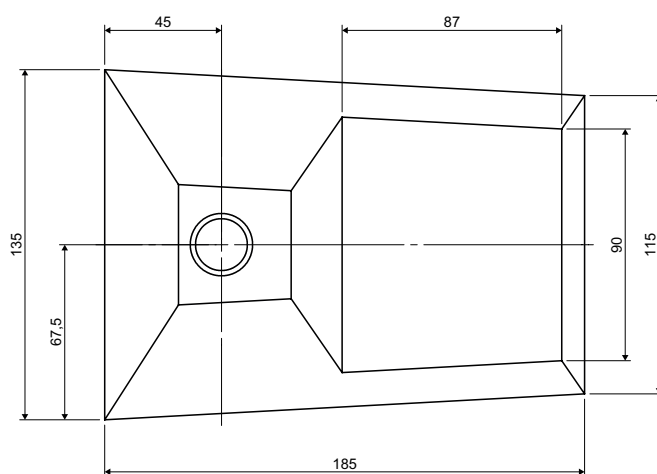
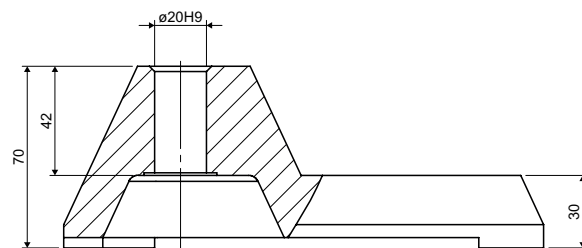
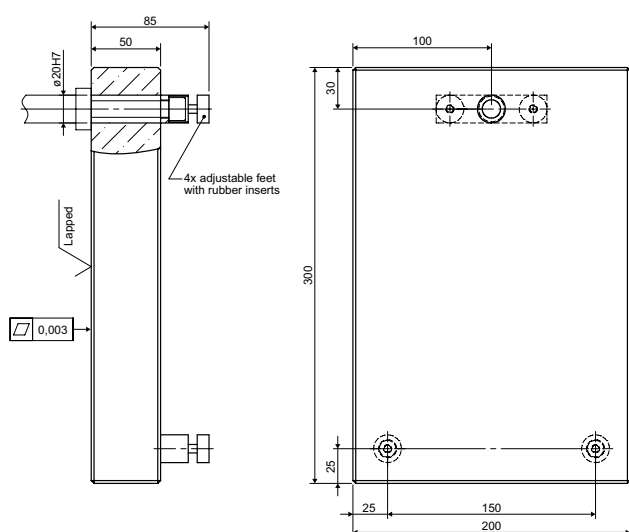
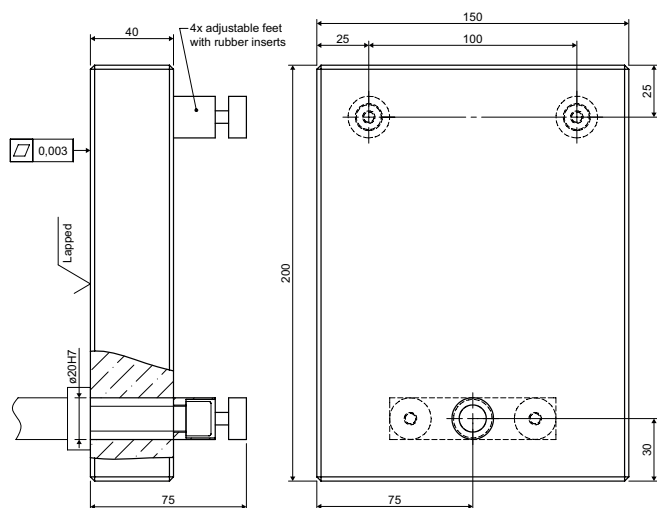
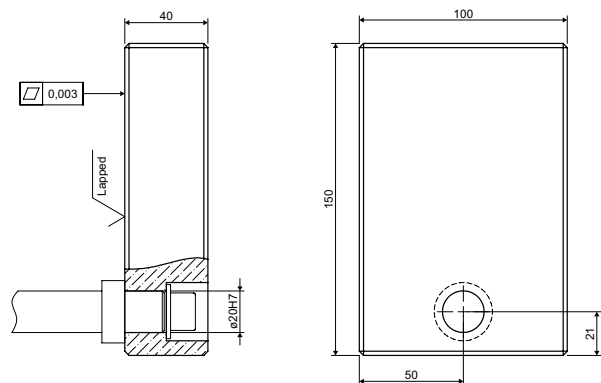
Catalog no.	Thread mm	Mount mm	Column mm	Order no.
BC	M12	20	∅ 20 x 300	5115535
BC	M12	20	∅ 20 x 300	5115536
BC	M12	20	∅ 20 x 300 *	5115537
BC	M12	20	∅ 30 x 400	5115538
BC	M12	20	∅ 30 x 600	5115539

* with bore holes

Foot C7

Catalog no.	Order no.
C7	5115543

Equipment Accessories



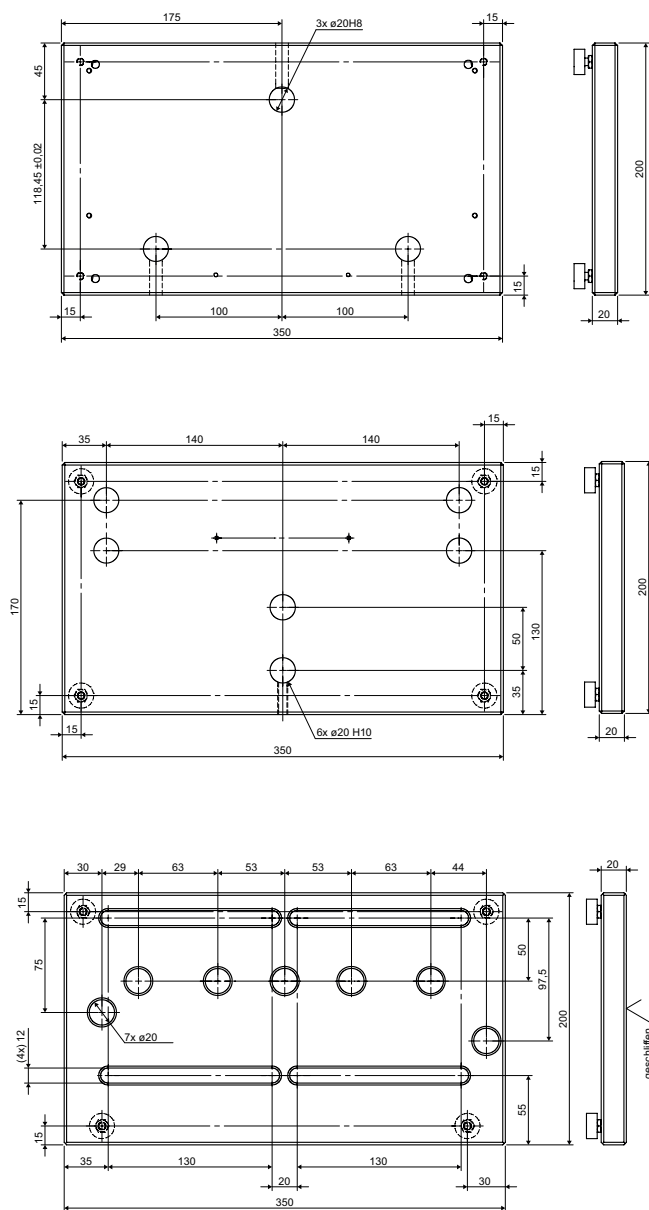
Granite Base MA

Catalog no.	Plate dimensions mm	Bore hole dia.	Order no.
MA	150 × 100 × 40	20H7	5115552
MA	200 × 150 × 40	20H7	5115553
MA	300 × 200 × 50	20H7	5115554

Base P3C

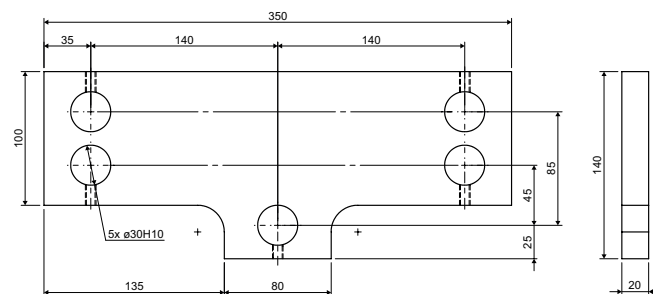
Catalog no.	Bore hole dia.	Order no.
C7	20H9	5115576

Equipment Accessories



Base Plate T1 with Rubber Feet

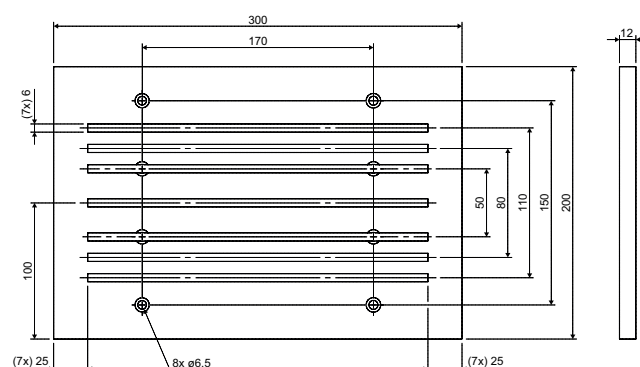
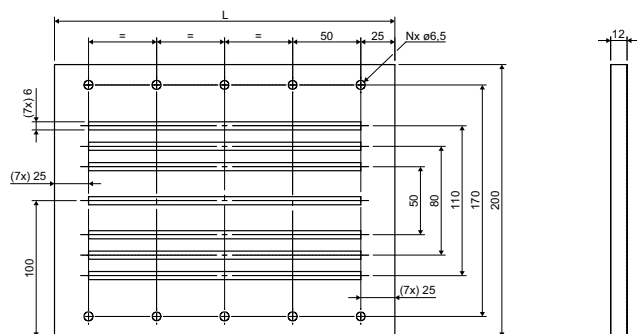
Catalog no.	Plate dimensions mm	Bore holes	Order no.
T1	350 × 200 × 20	3	5115589
T1	350 × 200 × 20	6	5115590
T1	350 × 200 × 20	7 grounded	5115591



Cover Plate PVS

Catalog no.	Dimensions	Order no.
PVS	350 x 140 x 20	5115574

Equipment Accessories

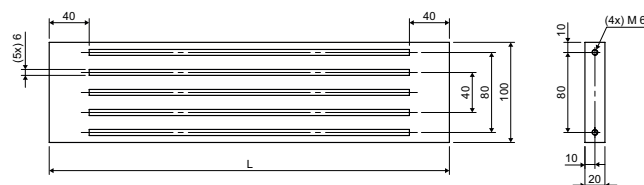
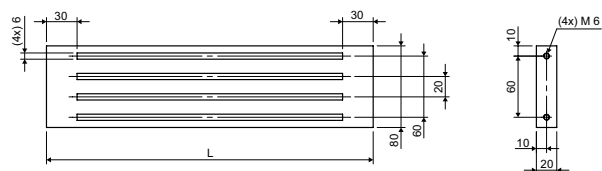


Groove Plates PQ

Catalog no.	L mm	Bore holes N	Order no.
PQ	250	2 x 5	5115558
PQ	350	2 x 7	5115560
PQ	500	2 x 10	5115561

Groove Plates PQ

Catalog no.	L mm	Order no.
PQ	300	5115559



Groove Plates PRA

Catalog no.	L mm	Description	Order no.
PRA	320	for Measuring Stand PVR14	5115565
PRA	520	for Measuring Stand PVR14	5115566

Groove Plates PRA

Catalog no.	L mm	Description	Order no.
PRA	400	for Measuring Stand PVR16	5115567
PRA	600	for Measuring Stand PVR16	5115568
PRA	800	for Measuring Stand PVR16	5115569

Equipment Accessories

Table T78

Catalog no.	Dimensions mm	Order no.
T78	ø 78	5115596

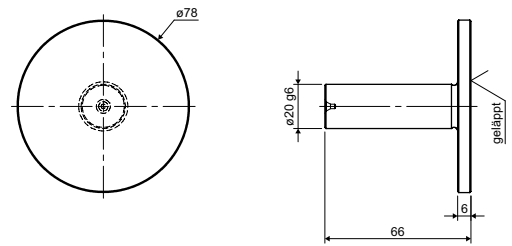


Table T78

Catalog no.	Dimensions mm	Description	Order no.
T78	ø 78	with templates (side)	5115597

dia.	Radius / Source	dia.	Radius / Source	dia.	Radius / Source	dia.	Radius / Source
16	0°	12	134°	8	236°	4	306°
15	36.5°	11	162.5°	7	256°	3	318.5°
14	71°	10	189°	6	275°	2	329°
13	103.5°	9	213°	5	291.5°	1	337.5°

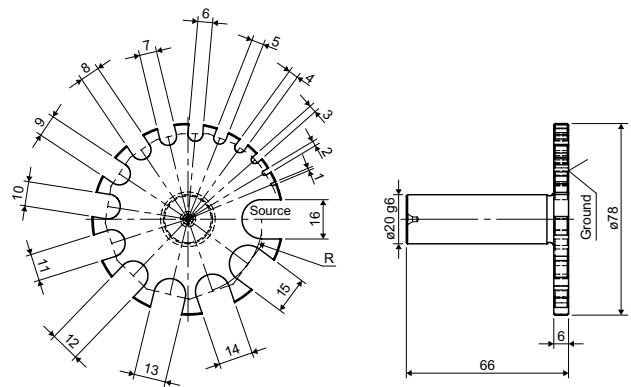


Table T78

Catalog no.	Dimensions mm	Description	Order no.
T78	ø 78	with bronze ball sleeve	5115582

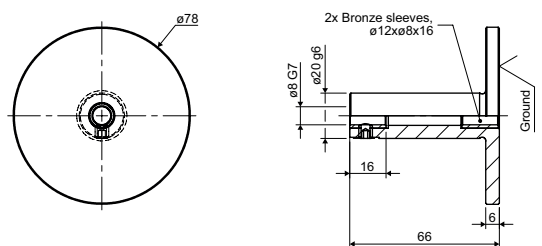
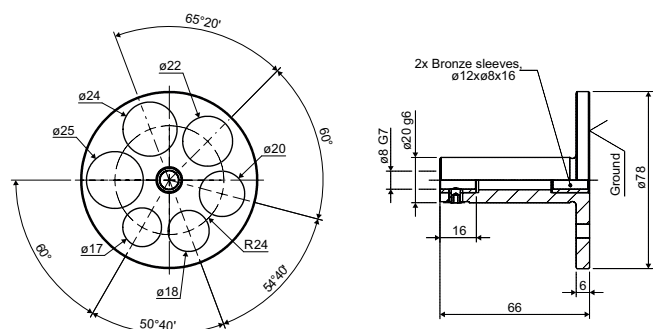


Table T78

Catalog no.	Dimensions mm	Description	Order no.
T78	ø 78	with sleeves and large through bores	5115583



Equipment Accessories

Table T78

Catalog no.	Dimensions mm	Description	Order no.
T78	ø 78	with sleeves and large through bores	5115584

Groove width	Radius	Angle / Source dia. 16	Groove width	Radius	Angle / Source dia. 16
16	30	0°	8	34	236°
15	30.5	36.5°	7	34.5	256°
14	31	71°	6	35	275°
13	31.5	103.5°	5	35.5	291.5°
12	32	134°	4	36	306°
11	32.5	162.5°	3	36.5	318.5°
10	33	189°	2	36.5	329°
9	33.5	213°	1	37	337.5°

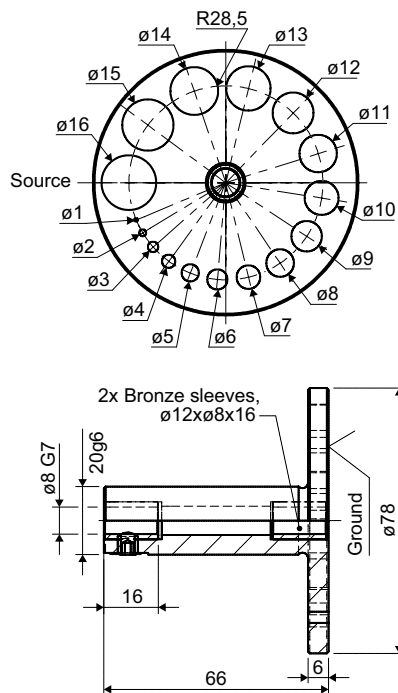
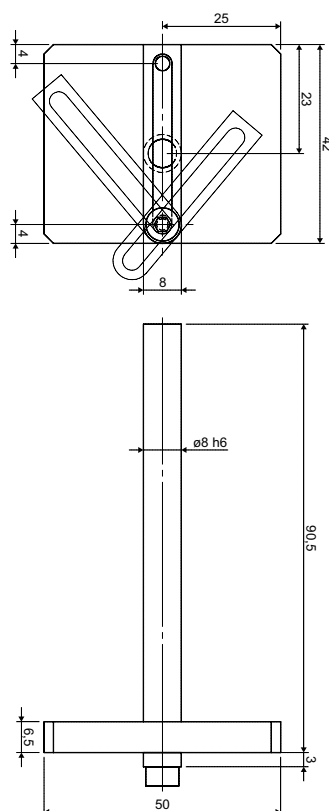


Table TA

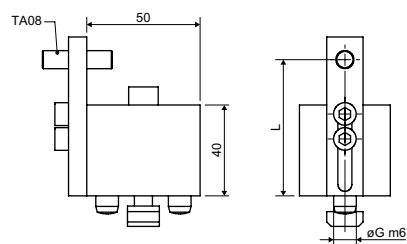
Catalog no.	Description	Order no.
TA	Table with mounting pin dia. 8 and adjustable limit stop	5115584



Equipment Accessories

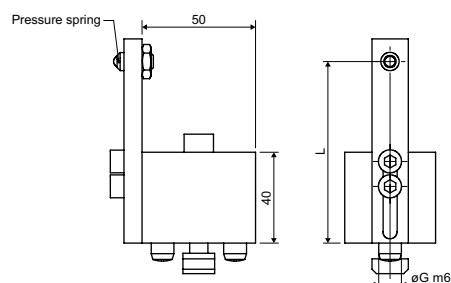
Adjustable Limit Stops BR30

Catalog no.	Range L mm	T-Groove mm	Description	Order no.
BR30	60 - 80	12	with TA08	5115500
BR30	80 - 100	12	with TA08	5115501
BR30	100 - 120	12	with TA08	5115502



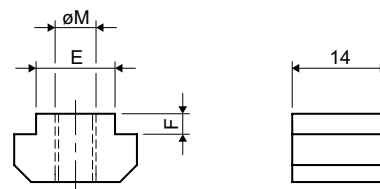
Adjustable Limit Stops with Pressure Spring BR30

Catalog no.	Range L mm	T-Groove mm	Description	Order no.
BR30	60 - 80	12	w. Pressure Spring	5115503
BR30	80 - 100	12	w. Pressure Spring	5115504
BR30	100 - 120	12	w. Pressure Spring	5115505



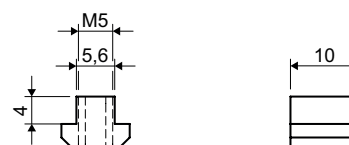
Special Groove EM0612 / EM0812

Catalog no.	M mm	E mm	F mm	Order no.
EM0612	6	12	3	5115546
EM0812	8	12	3	5115547



Special Groove EM3406

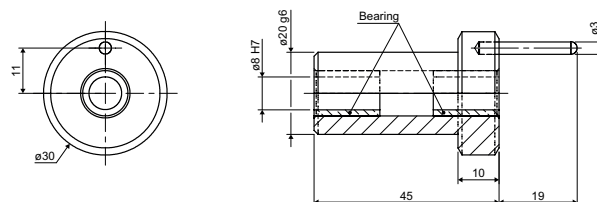
Catalog no.	M mm	Length mm	Description	Order no.
EM0612	5	6	for PQ Plates	5115548



Additional Accessories

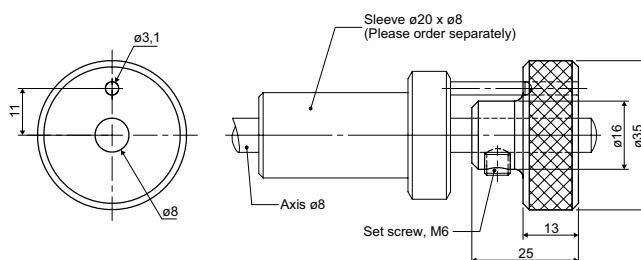
Buchse D20

Catalog no.	Dimensions	Order no.
D20	ø20 x ø8	5115600



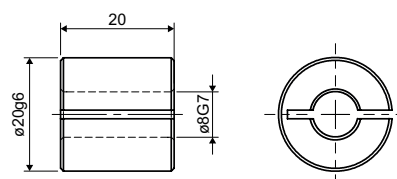
Retractor Button DEG8

Catalog no.	Order no.
DEG8	5115614



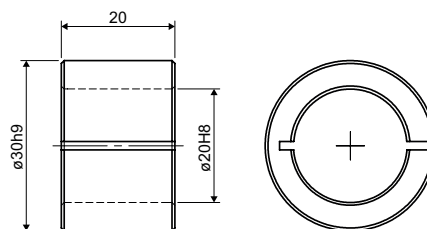
Reduction Sleeve DR20-8

Catalog no.	Dimensions	Order no.
DR20-8	ø20 x ø8	5115612



Reduction Sleeve DR30-20

Catalog no.	Dimensions	Order no.
DR30-20-8	ø30 x ø20	5115613



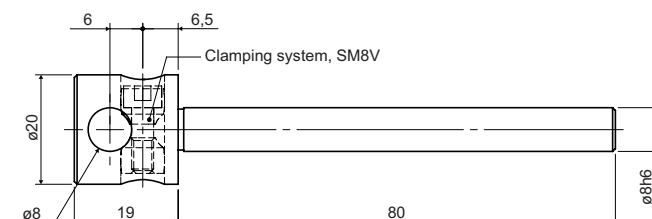
Rod N12100

Catalog no.	Dimensions	Order no.
N12100	M12 x 1 x ø8	5115615



Support P8

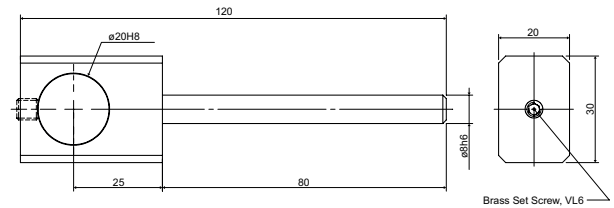
Catalog no.	Dimensions	Order no.
P8	ø8 x ø8 x 80	5115622



Additional Accessories

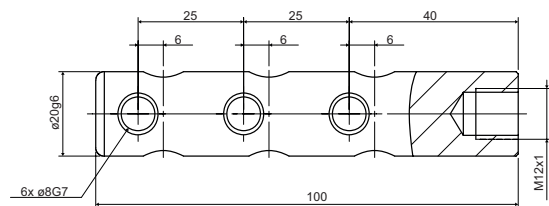
Support P20-8

Catalog no.	Dimensions	Order no.
P20-8	ø20 x ø8 x 80	5115621



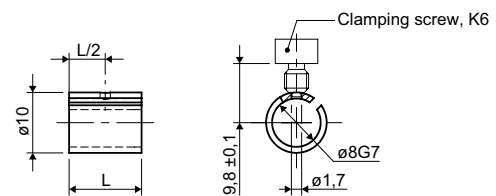
Support with bores P20HK

Catalog no.	Dimensions	Order no.
P20HK	ø8	5115620



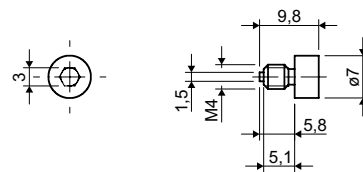
Clamping Sleeve K7 / MK7

Catalog no.	L mm	Order no.
K7	12	5115602
MK7	20	5115603



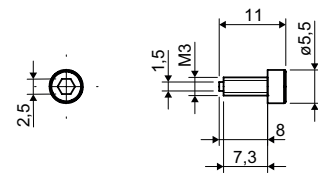
Clamping Screw K6

Catalog no.	Order no.
K6	5115604



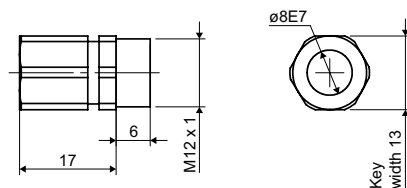
Clamping Screw VT0308

Catalog no.	Order no.
VT0308	5115605



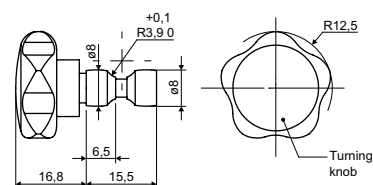
Clamp SP2312

Catalog no.	Order no.
SP2312	5115609



Clamping System SM8B

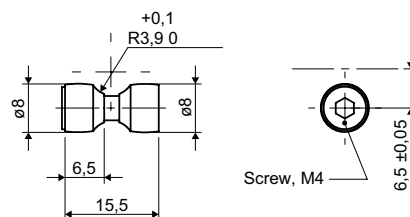
Catalog no.	Dimensions	Order no.
SM8B	ø8	5115607



Additional Accessories

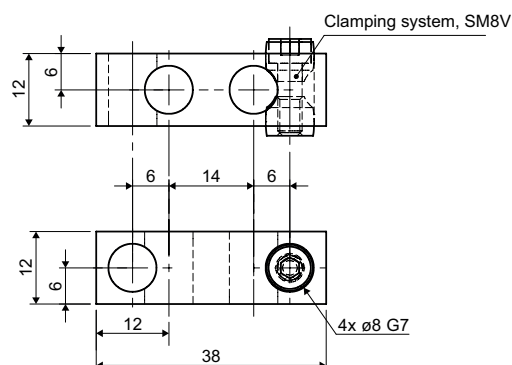
Clamping System SM8V

Catalog no.	Dimensions	Order no.
SM8V	ø8	5115608



Clamping Cube DOM49

Catalog no.	Dimensions mm	Order no.
DOM49	14	5115620



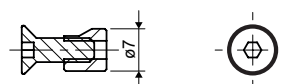
Brass Set Screw VL6

Catalog no.	Dimensions	Order no.
VL6	M6	5115611



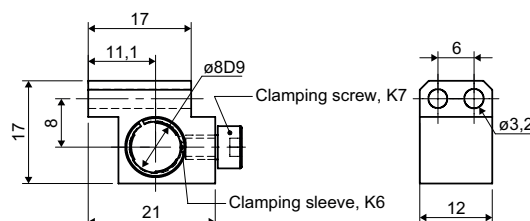
Clamping System EM3430N

Catalog no.	Order no.
EM3430N	5115606



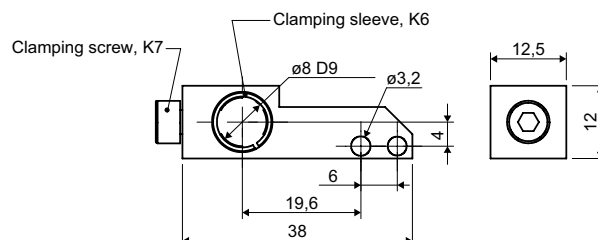
Probe Holder PR7750

Catalog no.	Order no.
PR7750	5115616



Probe Holder PR7751N

Catalog no.	Order no.
PR7751N	5115617



Additional Accessories

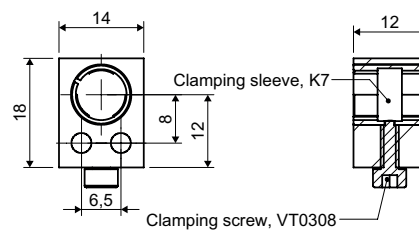
Probe Holder SP1812

Catalog
no.

Order no.

SP1812

5115618



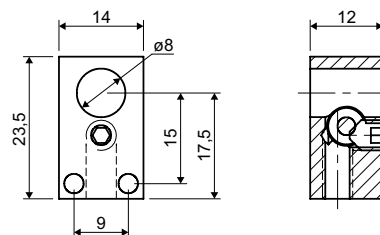
Probe Holder SP1815

Catalog
no.

Order no.

SP1815

5115619



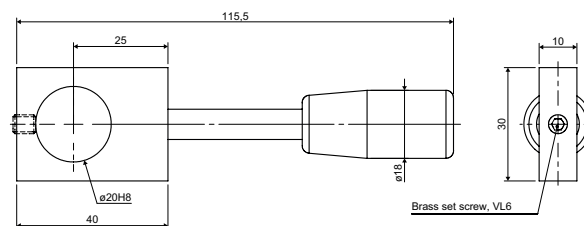
Handle LM20

Catalog
no.

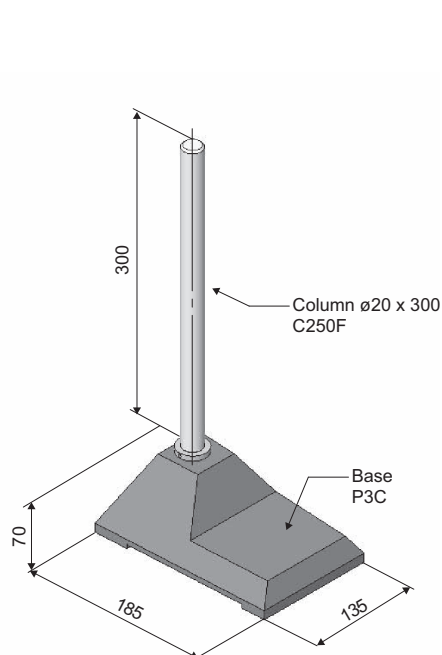
Order no.

LM20

5115601

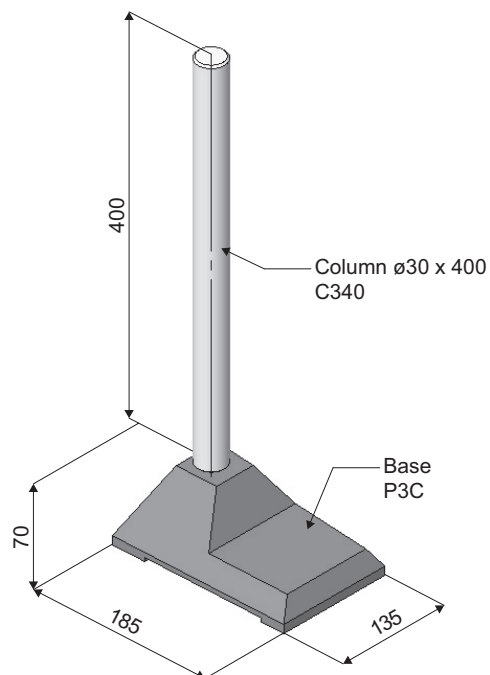


Vertical Measuring Stands



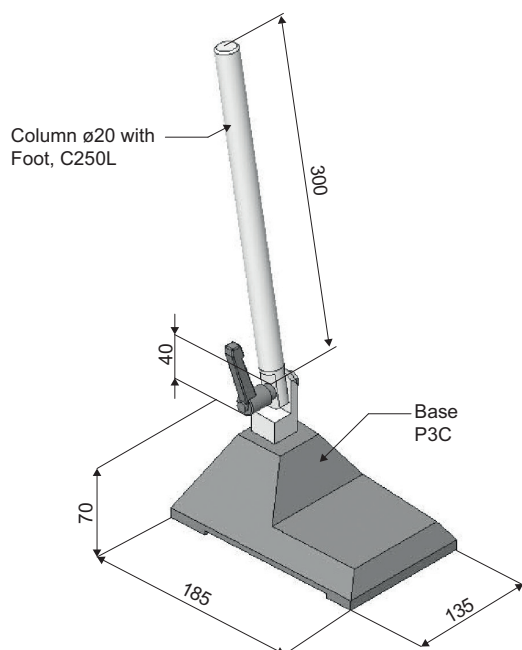
Base with Column P250

Catalog no.	Dimensions Column (mm)	Description	Order no.
P250	ø 20 x 300	Fixed	5115717



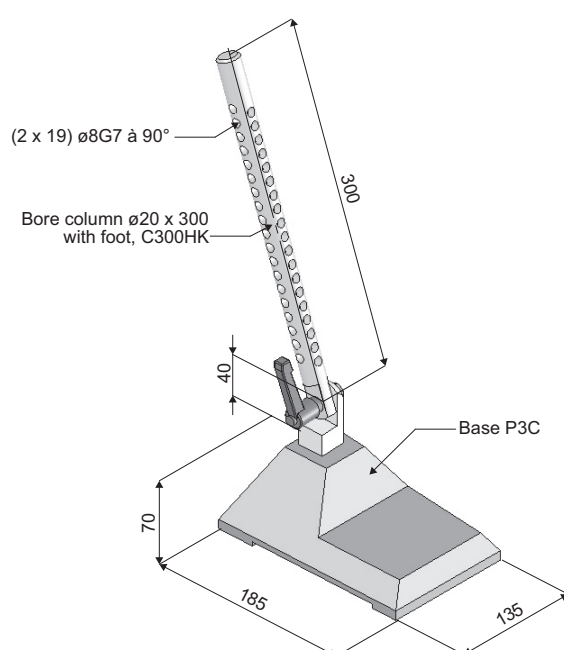
Base with Column P330

Catalog no.	Dimensions Column (mm)	Description	Order no.
P330	ø 30 x 400	Fixed	5115720



Base with Column P250

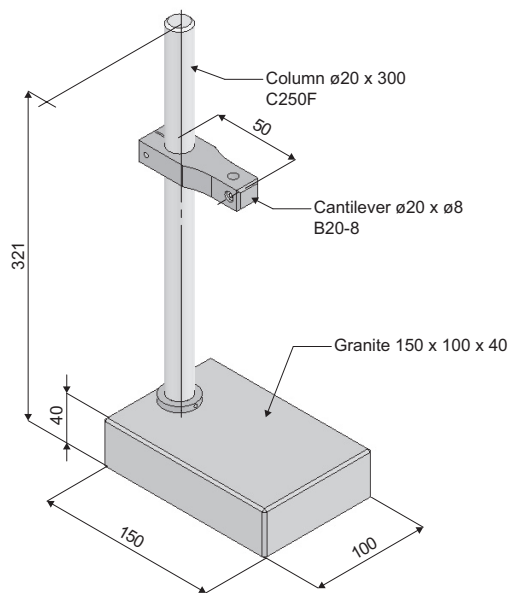
Catalog no.	Dimensions Column (mm)	Description	Order no.
P250	ø 20 x 300	Moveable	5115718



Base with Bored Column P330

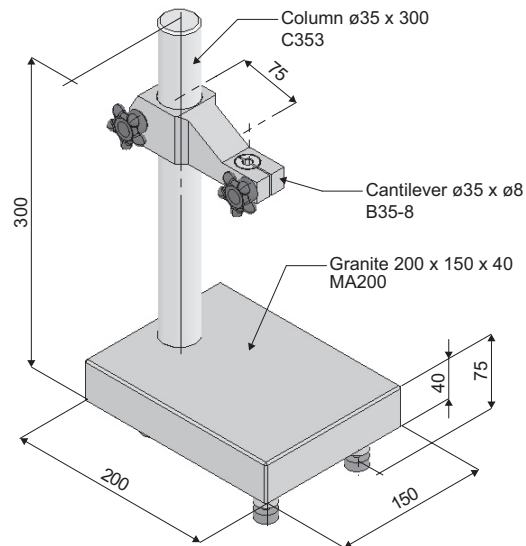
Catalog no.	Dimensions Column (mm)	Description	Order no.
P330	ø 30 x 400	Moveable	5115719

Vertical Measuring Stands



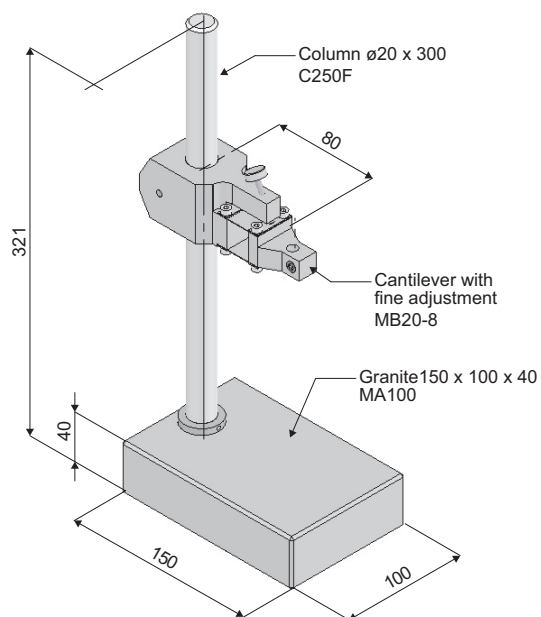
Measuring Table DIA

Catalog no.	Dimensions Plate (mm)	Order no.
DIA	150 x 100	5115705



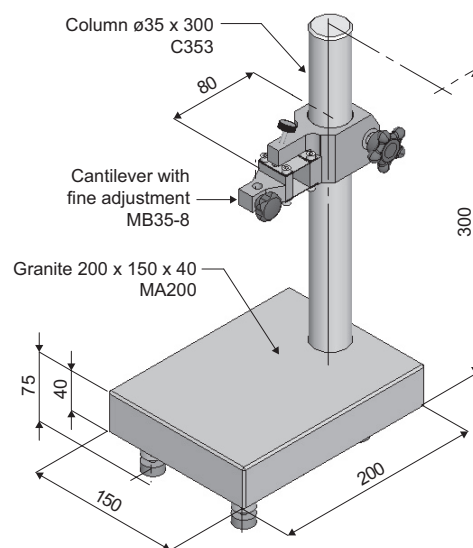
Measuring Table DIA

Catalog no.	Dimensions Plate (mm)	Order no.
DIA	200 x 150	5115707



Measuring Table DIA

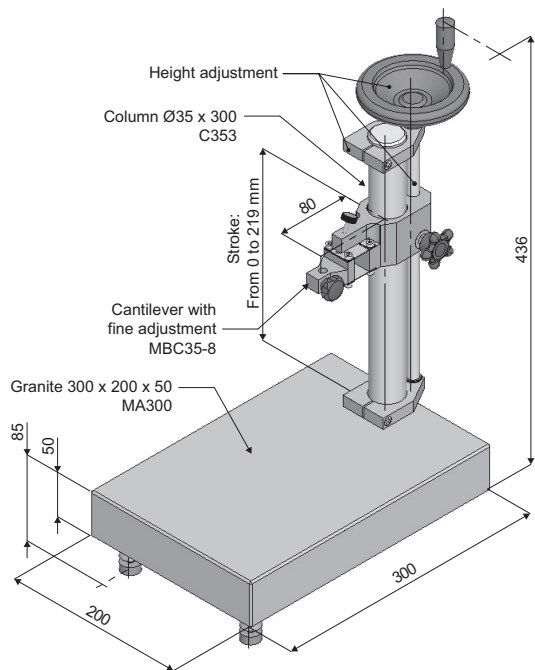
Catalog no.	Dimensions Plate (mm)	Order no.
P250	150 x 100	5115706



Measuring Table DIA

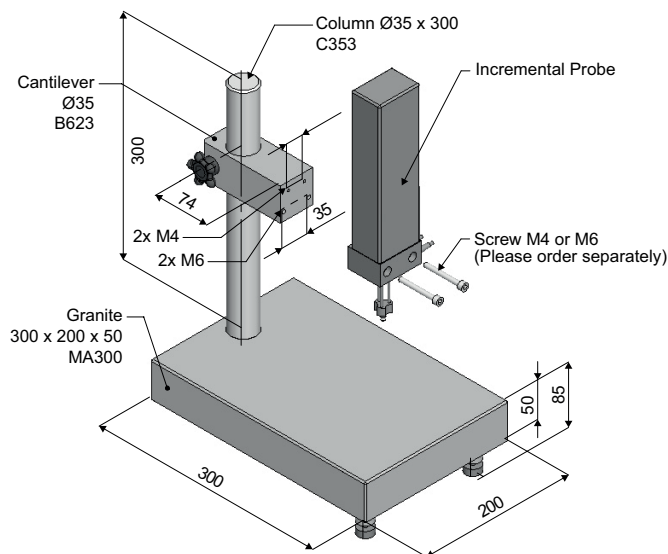
Catalog no.	Dimensions Plate (mm)	Description	Order no.
P250	200 x 150	with fine adjustment	5115708

Vertical Measuring Stands



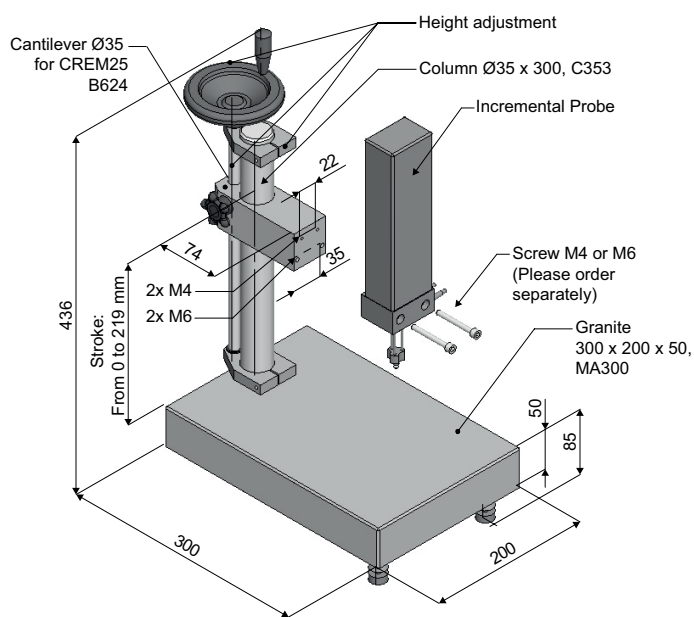
Measuring Table DIA

Catalog no.	Dimensions Plate (mm)	Description	Order no.
DIA	300 x 200	with height adjustment	5115709



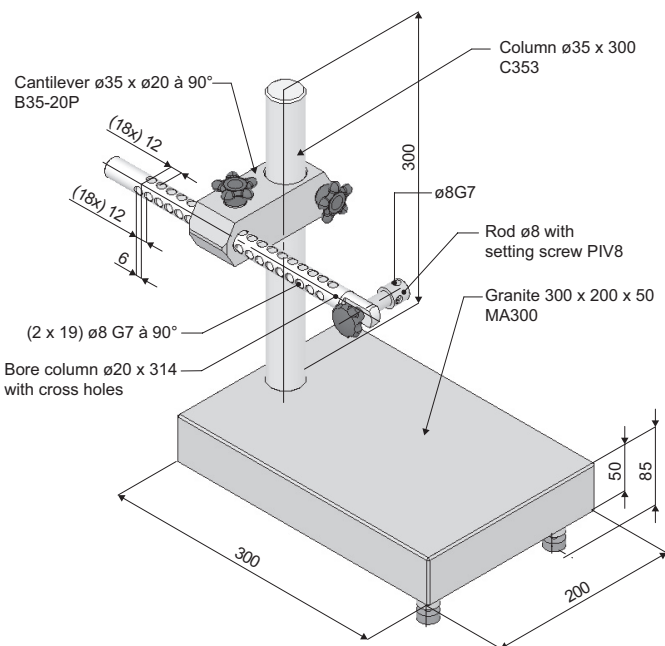
Measuring Table DIA

Catalog no.	Dimensions Plate (mm)	Description	Order no.
DIA	300 x 200	for MT Measuring Probe	5115711



Measuring Table DIA

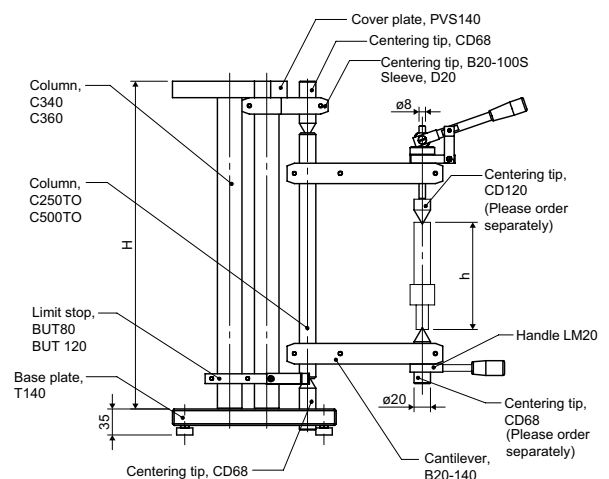
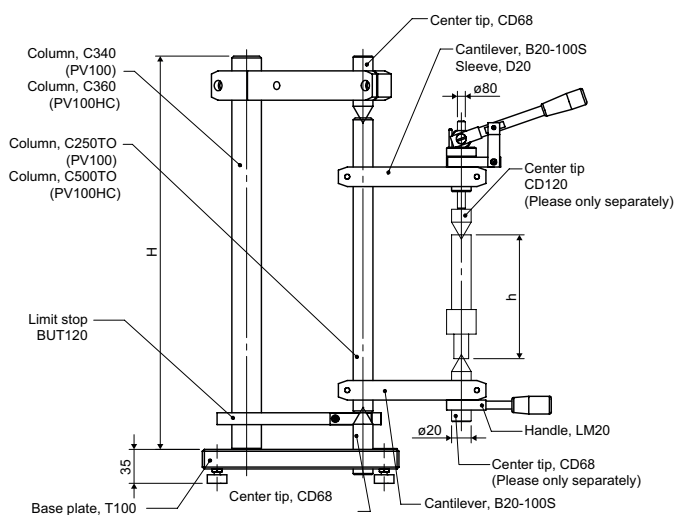
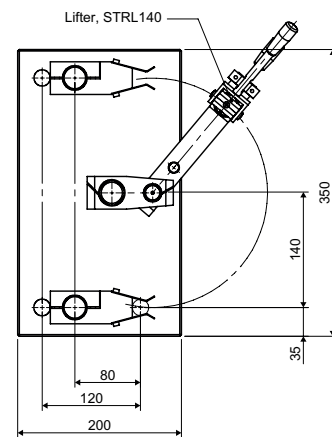
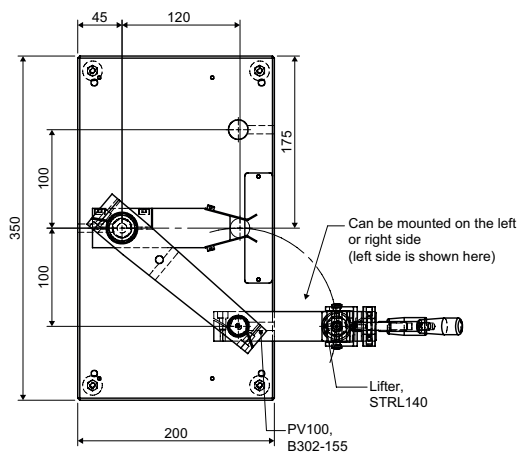
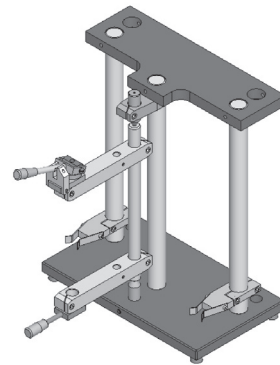
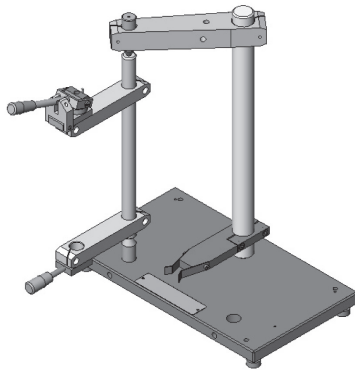
Catalog no.	Dimensions Plate (mm)	Description	Order no.
P250	300 x 200	for MT Measuring Probe and height adjustment	5115712



Measuring Table DIA

Catalog no.	Dimensions Plate (mm)	Description	Order no.
P250	300 x 200	mit horizontal column	5115710

Vertical Measuring Stands



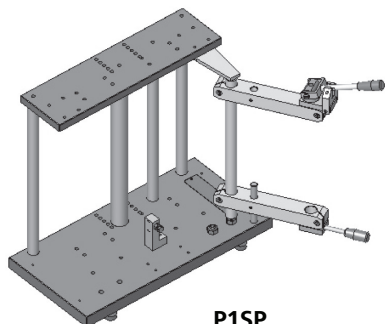
Vertical Measuring Stands PV100 mit Column

Catalog no.	Height H mm	h mm	Swivel radius mm	Order no.
PV100	400	150	100	5115725
PV100	600	380	100	5115726

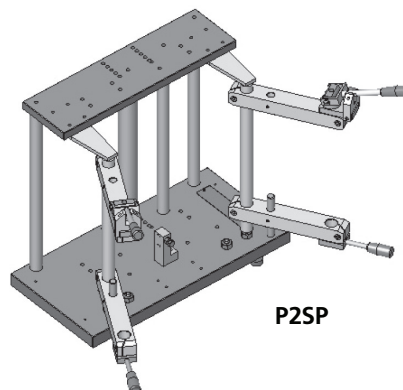
Vertical Measuring Stands PV140

Catalog no.	Height H mm	h mm	Swivel radius mm	Stop mm	Order no.
PV140	400	80	140	80	5115727
PV140	600	80	140	80	5115728
PV140	400	120	140	120	5115729
PV140	600	120	140	120	5115730

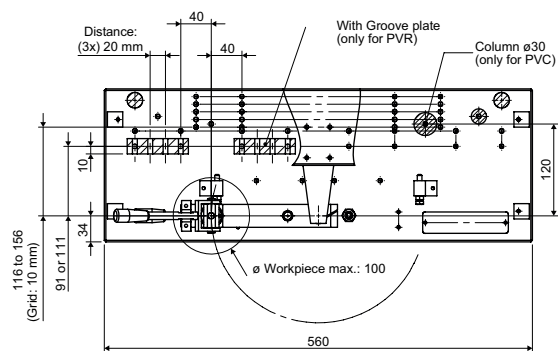
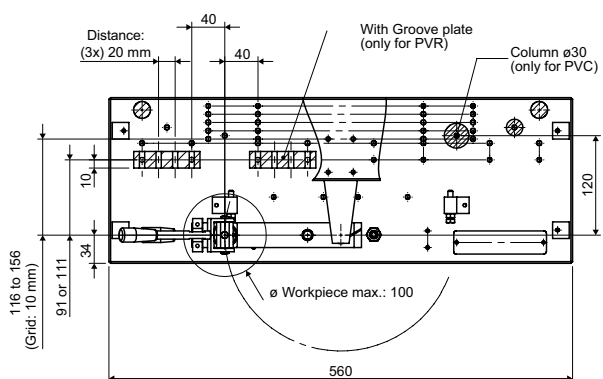
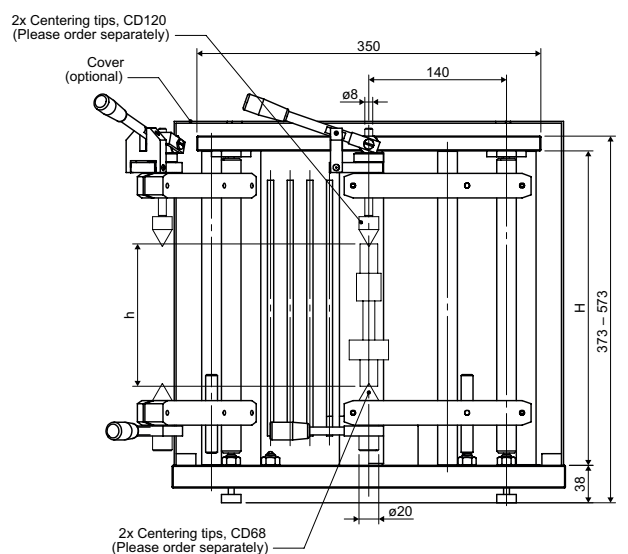
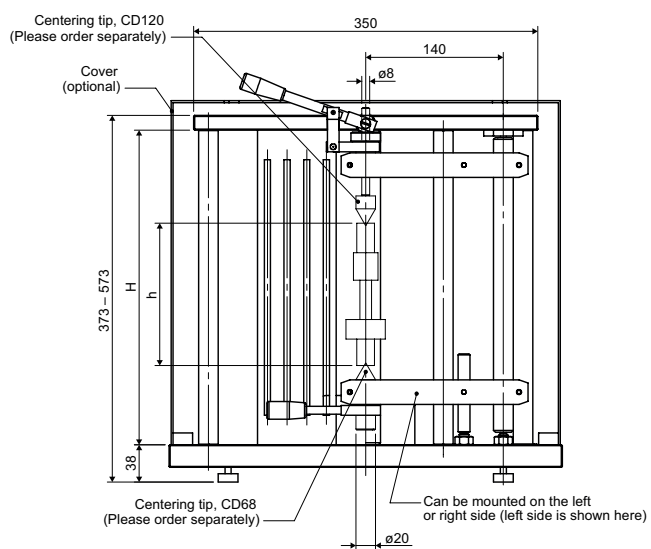
Vertical Measuring Stands



P1SP



P2SP



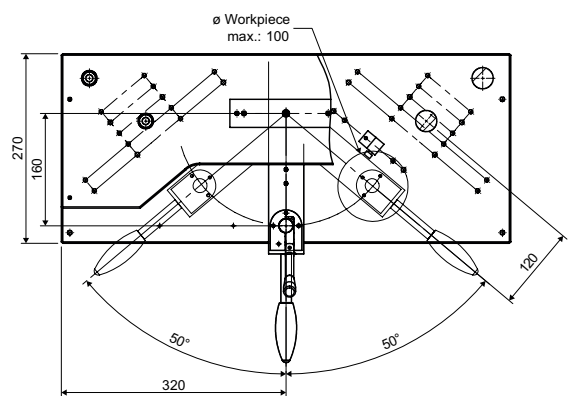
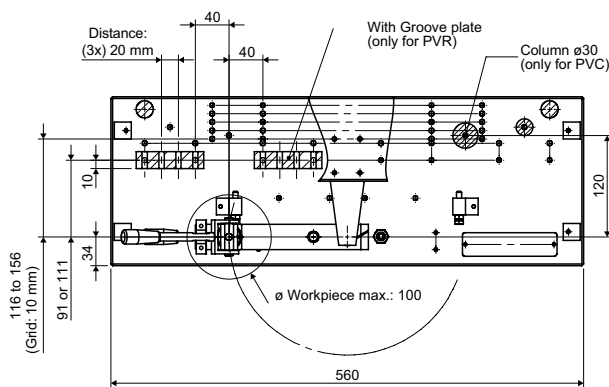
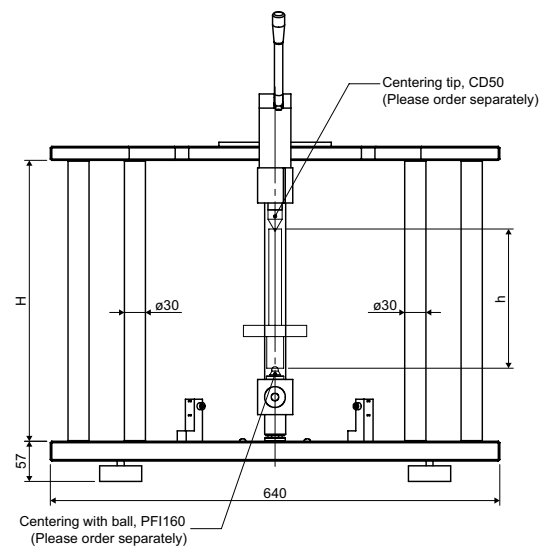
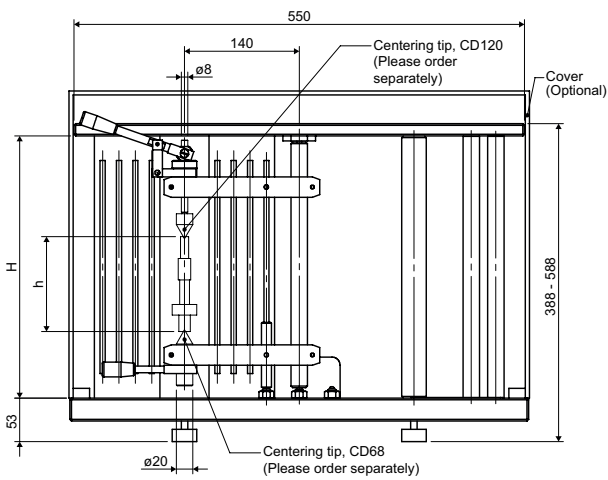
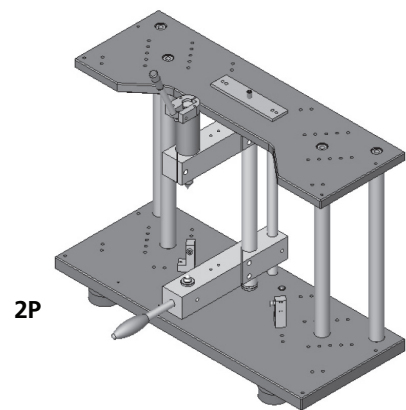
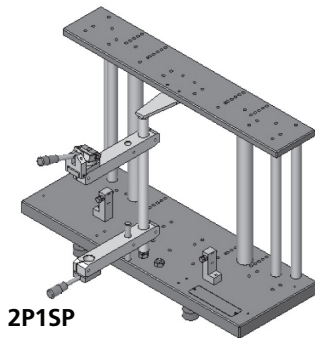
Vertical Measuring Stands PVC14 with Columnn

Catalog no.	Type	Height H mm	h mm	Order no.
PVC14	1P1SP	320	140	5115731
PVC14	1P1SP	520	340	5115732

Vertical Measuring Stands PVC14 with Columnn

Catalog no.	Type	Height H mm	h mm	Order no.
PVC14	1P2SP	320	140	5115733
PVC14	1P2SP	520	340	5115734

Vertical Measuring Stands



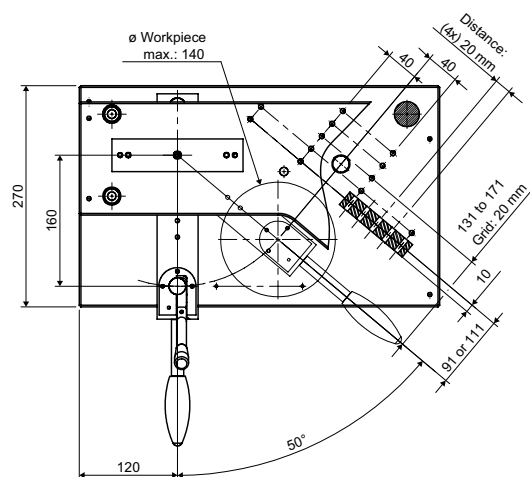
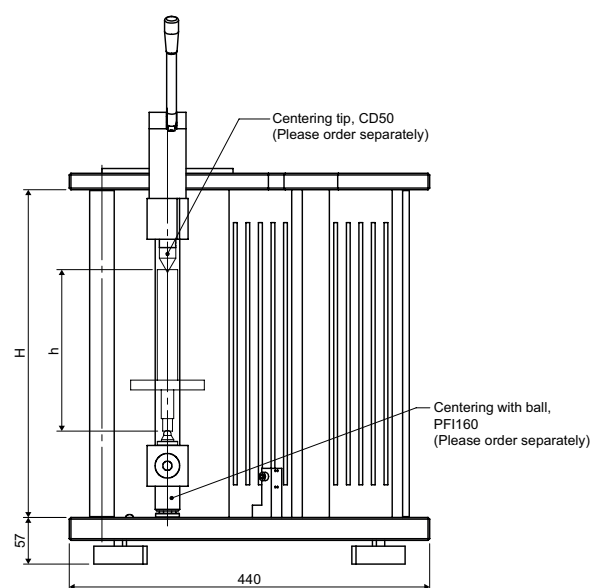
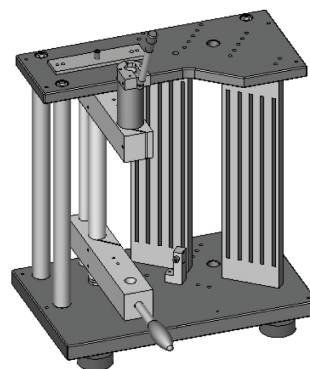
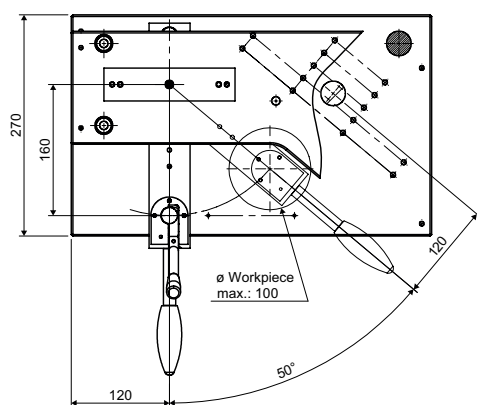
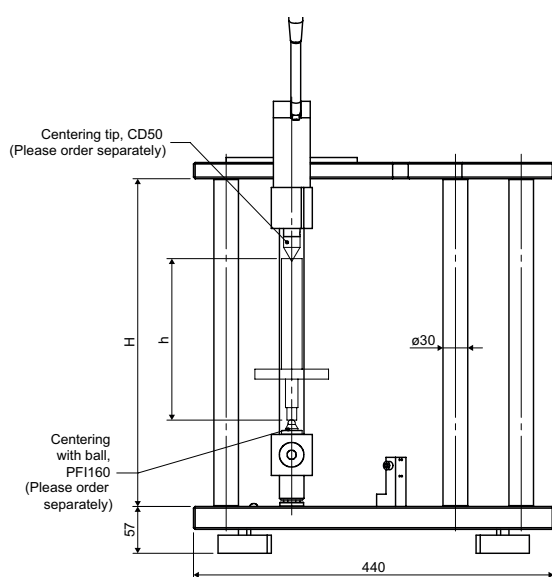
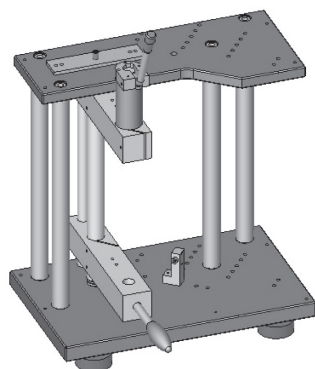
Vertical Measuring Stands PVC14 with Columnn

Catalog no.	Type	Height H mm	h mm	Order no.
PVC14	2P1SP	320	140	5115735
PVC14	2P1SP	520	340	5115736

Vertical Measuring Stands PVC16 with Columnn

Catalog no.	Type	Height H mm	h mm	Order no.
PVC16	2P	400	250	5115740
PVC16	2P	600	160	5115741
PVC16	2P	800	160	5115742

Vertical Measuring Stands



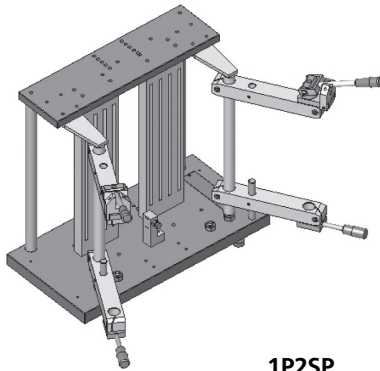
Vertical Measuring Stands PVC16 with Column

Catalog no.	Type	Height H mm	h mm	Order no.
PVC16	1P	400	250	5115737
PVC16	1P	600	450	5115738
PVC16	1P	800	650	5115739

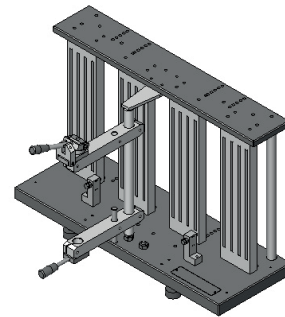
Vertical Measuring Stands PVR16 with Groove Plates

Catalog no.	Type	Height H mm	h mm	Order no.
PVR16	1P	400	250	5115749
PVR16	1P	600	450	5115750
PVR16	1P	800	650	5115751

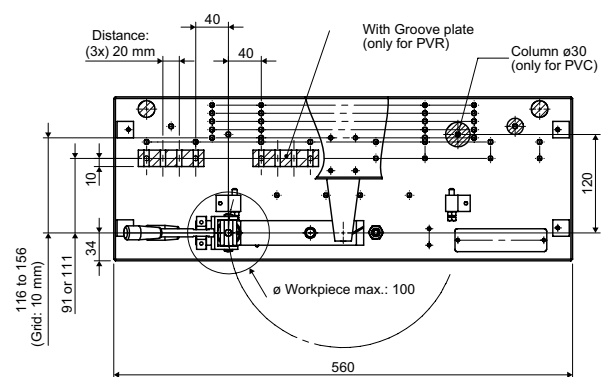
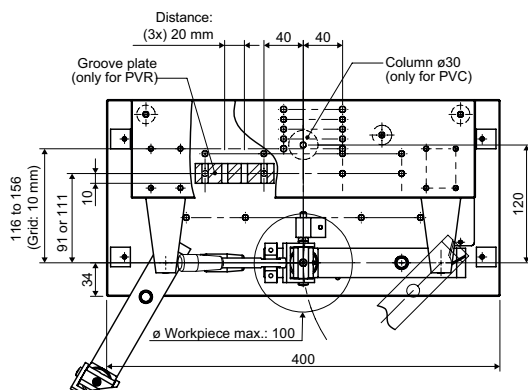
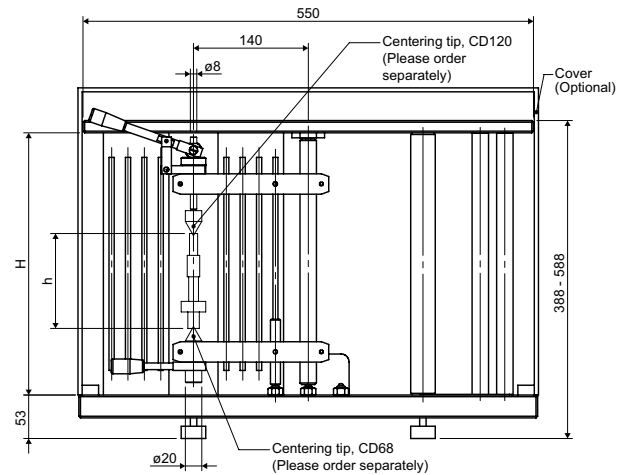
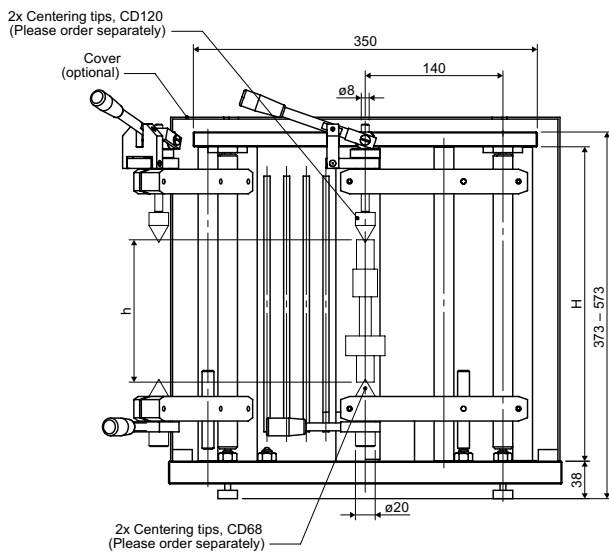
Vertical Measuring Stands



1P2SP



2P1SP



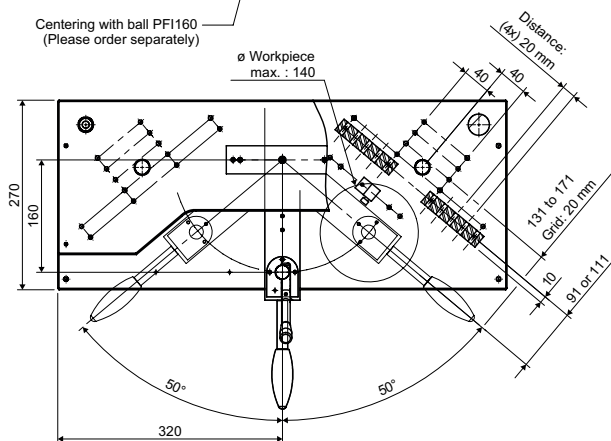
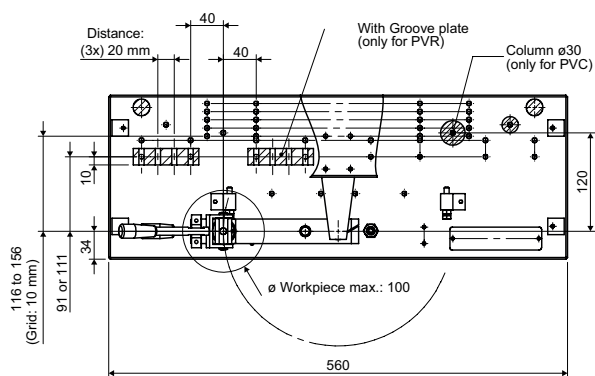
Vertical Measuring Stands PVR14 with Groove Plates

Catalog no.	Type	Height H mm	h mm	Order no.
PVR14	1P1SP	320	140	5115743
PVR14	1P1SP	520	340	5115744
PVR14	1P2SP	320	140	5115745

Vertical Measuring Stands PVR14 with Groove Plates

Catalog no.	Type	Height H mm	h mm	Order no.
PVR14	1P2SP	520	340	5115746
PVR14	2P1SP	320	140	5115747
PVR14	2P1SP	520	140	5115748

Vertical Measuring Stands



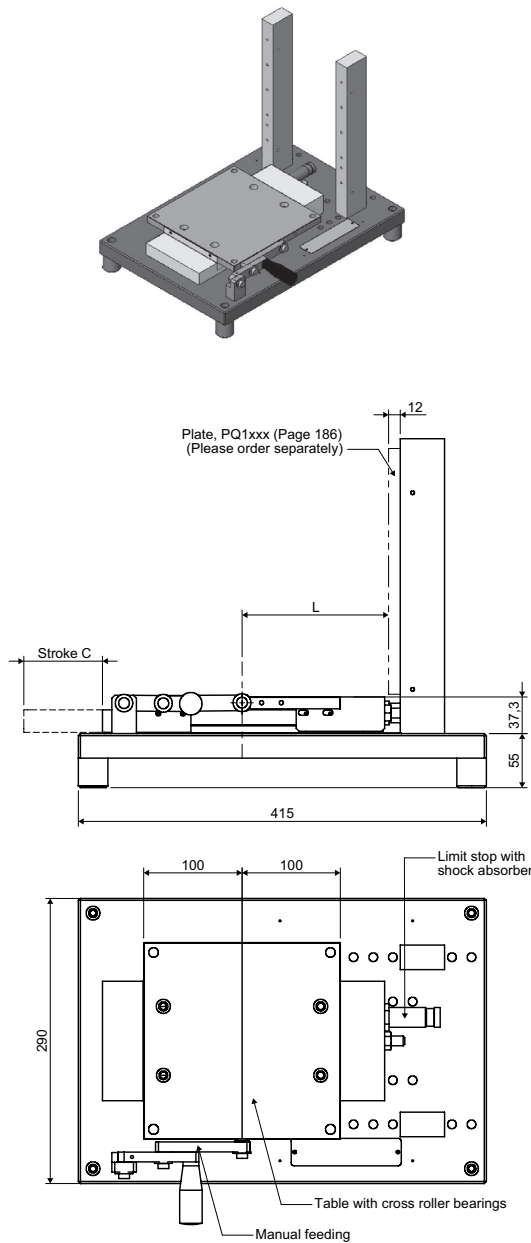
Vertical Measuring Stands PVR16 with Groove Plates

Catalog no.	Type	Height H mm	h mm	Order no.
PVR14	2P1SP	320	140	5115747
PVR14	2P1SP	520	140	5115748

Vertical Measuring Stands PVR14 with Groove Plates

Catalog no.	Type	Height H mm	h mm	Order no.
PVR16	2P	400	250	5115752
PVR16	2P	600	450	5115753
PVR16	2P	800	650	5115759

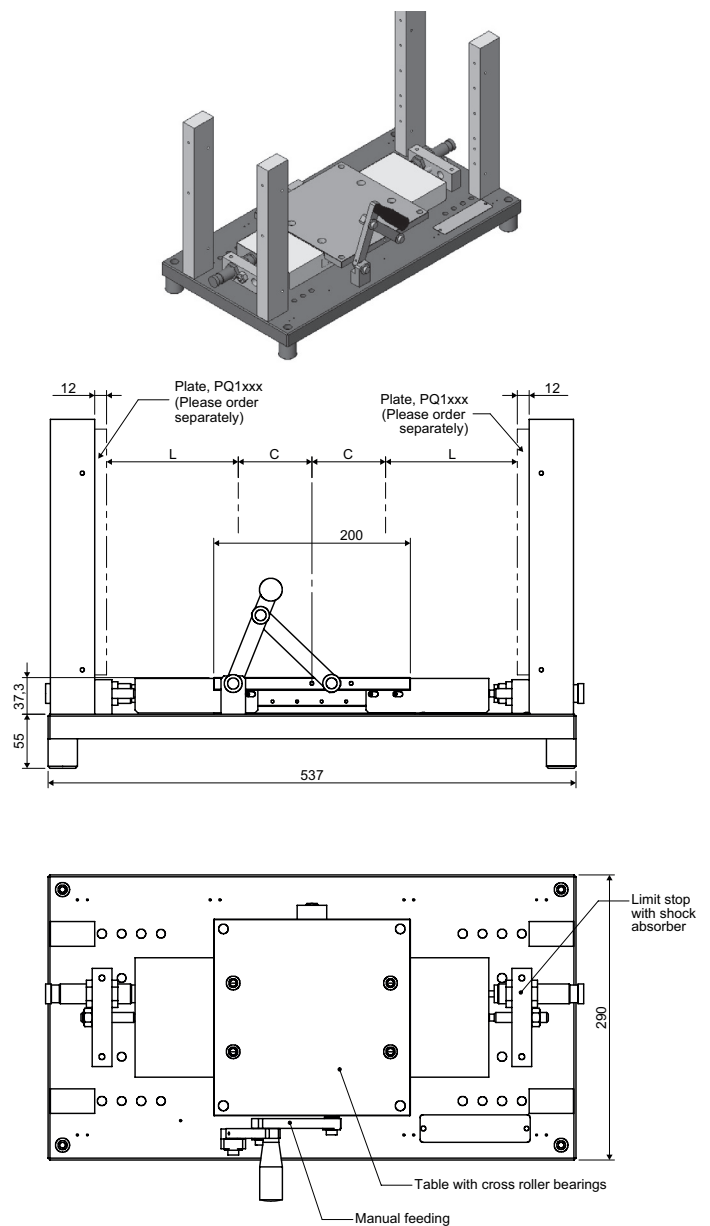
Vertical Measuring Stands



The upper guided plate is for the workpiece mount and moving into the measuring position.

The two columns are for supporting the mounting plate PQ and measuring forks (see page 196).

Suitable for pneumatic feeding PN5100.



The upper guided plate is for the workpiece mount and moving into the measuring position.

The two columns are for supporting the mounting plate PQ and measuring forks (see page 196).

Suitable for pneumatic feeding PN5100.

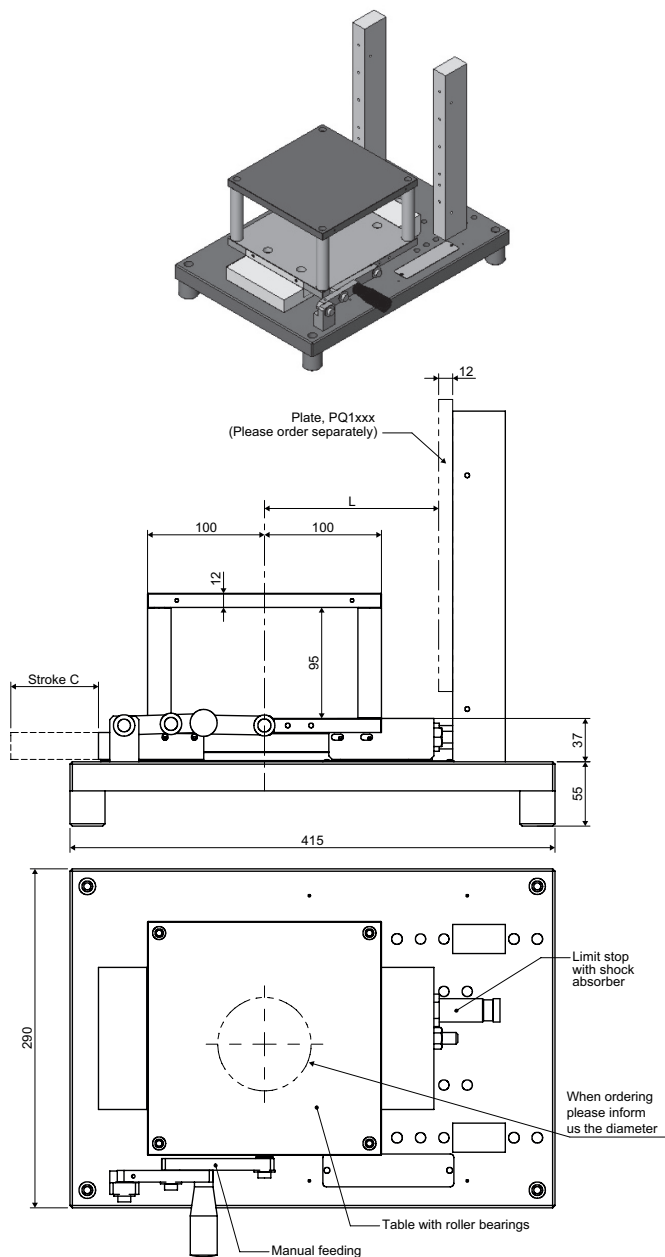
Vertical Measuring Stands MV52 One measuring position for outside dimensions

Catalog no.	Stroke C mm	L mm	Order no.
MV52	80	89-109-129-149	5115760
MV52	120	89-109-129	5115761
MV52	150	94-114	5115762

Vertical Measuring Stands MV52 Two measuring positions for outside dimensions

Catalog no.	Stroke C mm	L mm	Order no.
PVR16	40	89-109-129-149-169	5115752
PVR16	60	89-109-129-149	5115753
PVR16	75	95-114-134	5115759

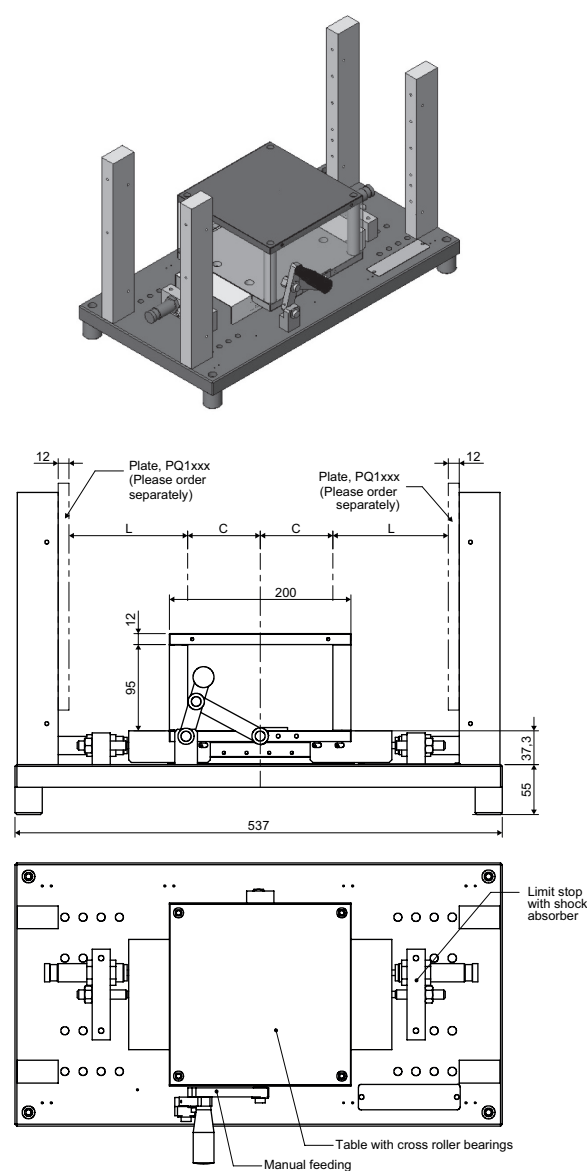
Vertical Measuring Stands



The upper guided plate is for the workpiece mount and moving into the measuring position.

The two columns are for supporting the mounting plate PQ and measuring forks (see page 196).

Suitable for pneumatic feeding PN5100.



The upper guided plate is for the workpiece mount and moving into the measuring position.

The two columns are for supporting the mounting plate PQ and measuring forks (see page 196).

Suitable for pneumatic feeding PN5100.

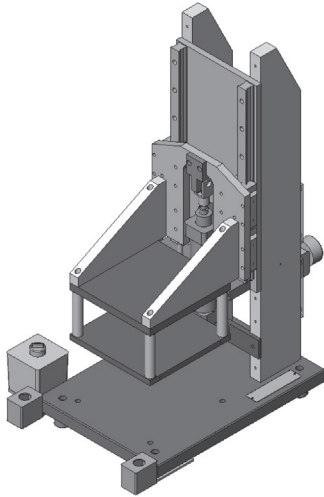
Vertical Measuring Stands MV53 Measuring mounts for inside / outside measurements

Catalog no.	Stroke C mm	Order no.
MV53	80	5115769
MV53	120	5115770
MV53	150	5115771

Vertical Measuring Stands MV53 Two measuring mounts for in- / outside measurements

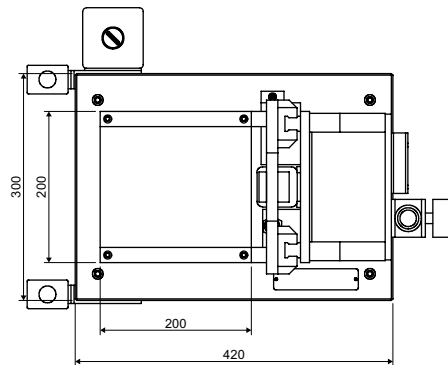
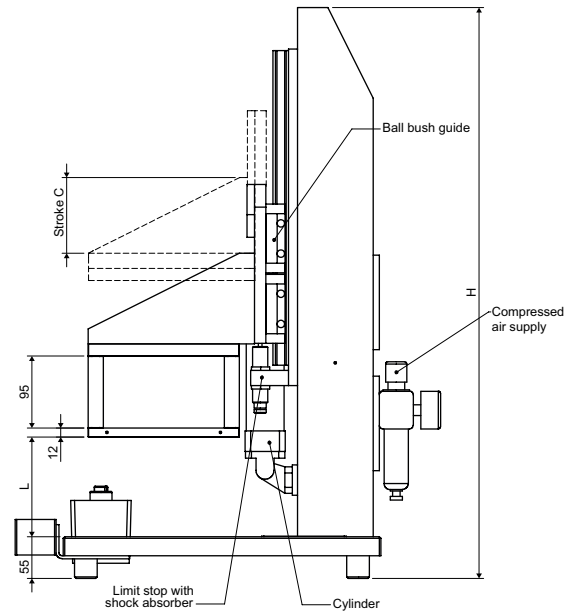
Catalog no.	Stroke C mm	Order no.
MV53	80	5115772
MV53	120	5115773
MV53	150	5115774

Vertical Measuring Stands



Operation:

- 1) Start position:
 - Table in the "upright" position
 - The measuring inserts (please order separately) are not to be placed in the measuring position
- 2) Insert workpiece
- 3) Lower the measuring table:
 - Turn the rotary switch to position "1"
- 4) Operate the two-handed safety device until the measuring table is in its final position:
 - Activate the lowering of the measuring table
 - Move the measuring inserts into the measuring position
- 5) Turn the rotary switch to position „0“:
 - Activate the lifting of the measuring table
- 6) Operate the two-handed safety device until the measuring table is in its final position:
 - Do not place the measuring inserts in to the measuring position
 - Lift the measuring table



The upper guided plate is for the workpiece mount and moving into the measuring position.

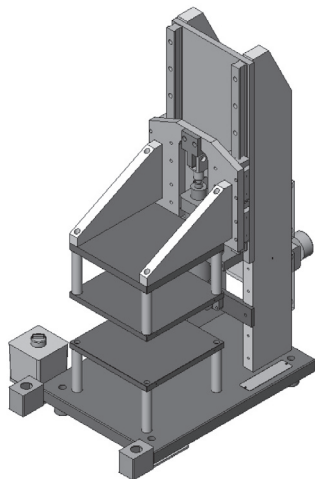
The two columns are for supporting the mounting plate PQ and measuring forks (see page 196).

Suitable for pneumatic feeding PN5100.

Vertical Measuring Stands MV52 for 1 × Inside

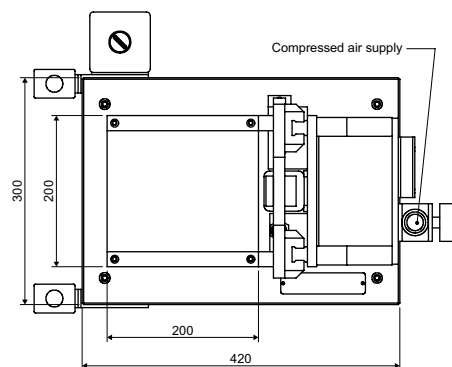
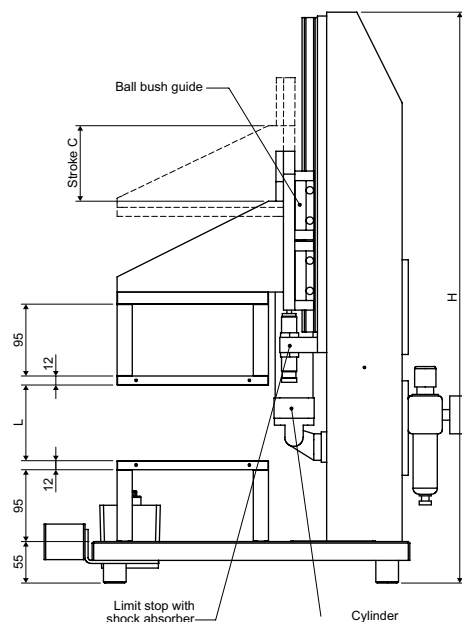
Catalog no.	Stroke C mm	L mm	H mm	Order no.
MV52	100	82-107-132-157-207-232-257	780	5115766
MV52	150	132-157-182-207-232-257	780	5115767
MV52	200	182-207-232-257-282-307	880	5115768

Vertical Measuring Stands



Operation:

- 1) Start position:
 - Table in the "upright" position
 - The measuring inserts (please order separately) are not to be placed in the measuring position
- 2) Insert workpiece
- 3) Lower the measuring table:
 - Turn the rotary switch to position "1"
- 4) Operate the two-handed safety device until the measuring table is in its final position:
 - Activate the lowering of the measuring table
 - Move the measuring inserts into the measuring position
- 5) Turn the rotary switch to position „0“:
 - Activate the lifting of the measuring table
- 6) Operate the two-handed safety device until the measuring table is in its final position:
 - Do not place the measuring inserts in to the measuring position
 - Lift the measuring table



Upon request it is possible to retrofit the base plate with other workpiece supports.

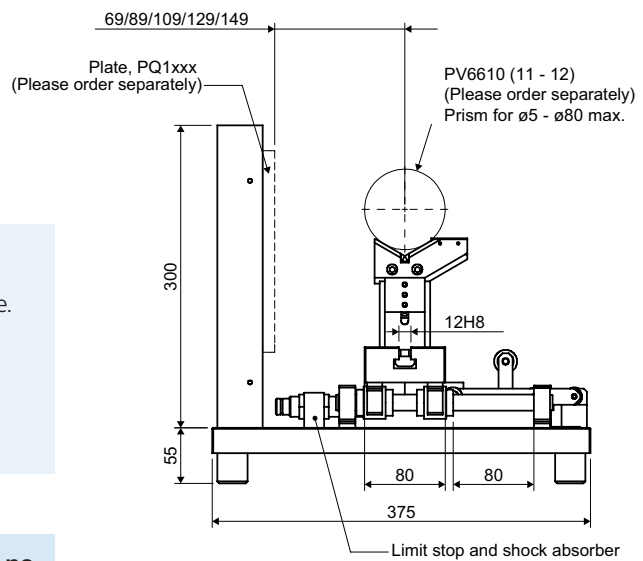
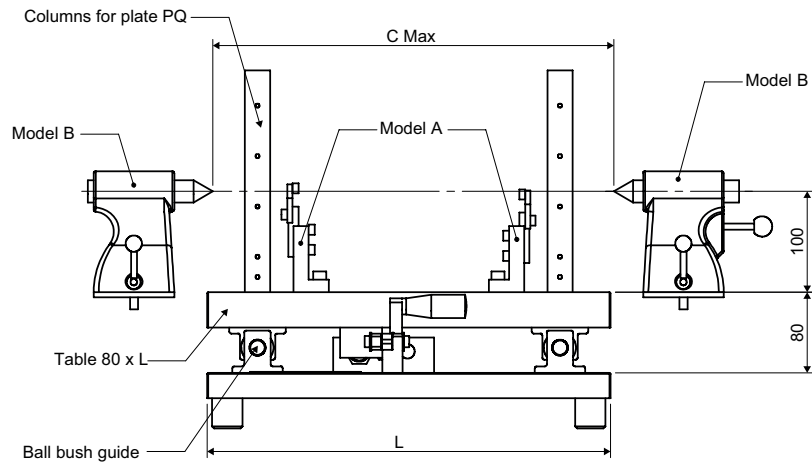
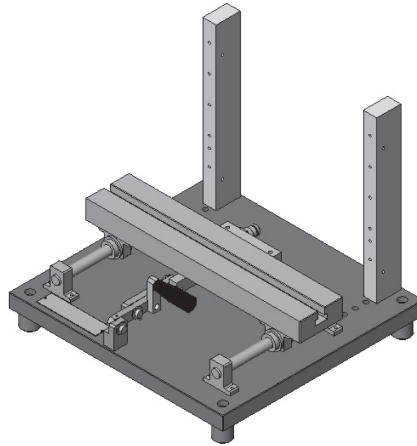
The upper plate of the moveable element can be retrofitted with measuring forks.

The lower plate can be equipped with workpiece supports.

Vertical Measuring Stands MV53 for 2 × Inside

Catalog no.	Stroke C mm	L mm	H mm	Order no.
MV53	100	25-50-75-100-125-150	780	5115775
MV53	150	25-50-75-100-125-150	780	5115776
MV53	200	75-100-125-150-175-200	880	5115777

Horizontal Measuring Stands



Model A includes two prisms for mounting the workpiece.

Model B includes two center supports mounting the workpiece.

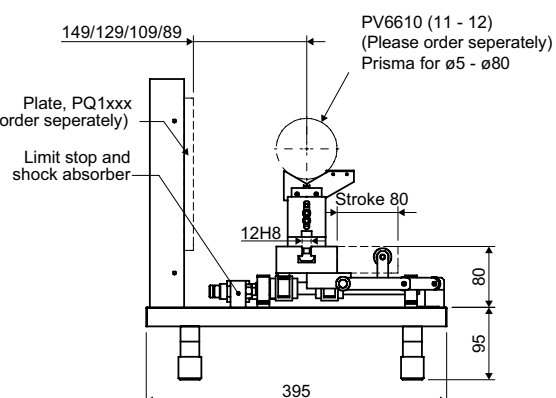
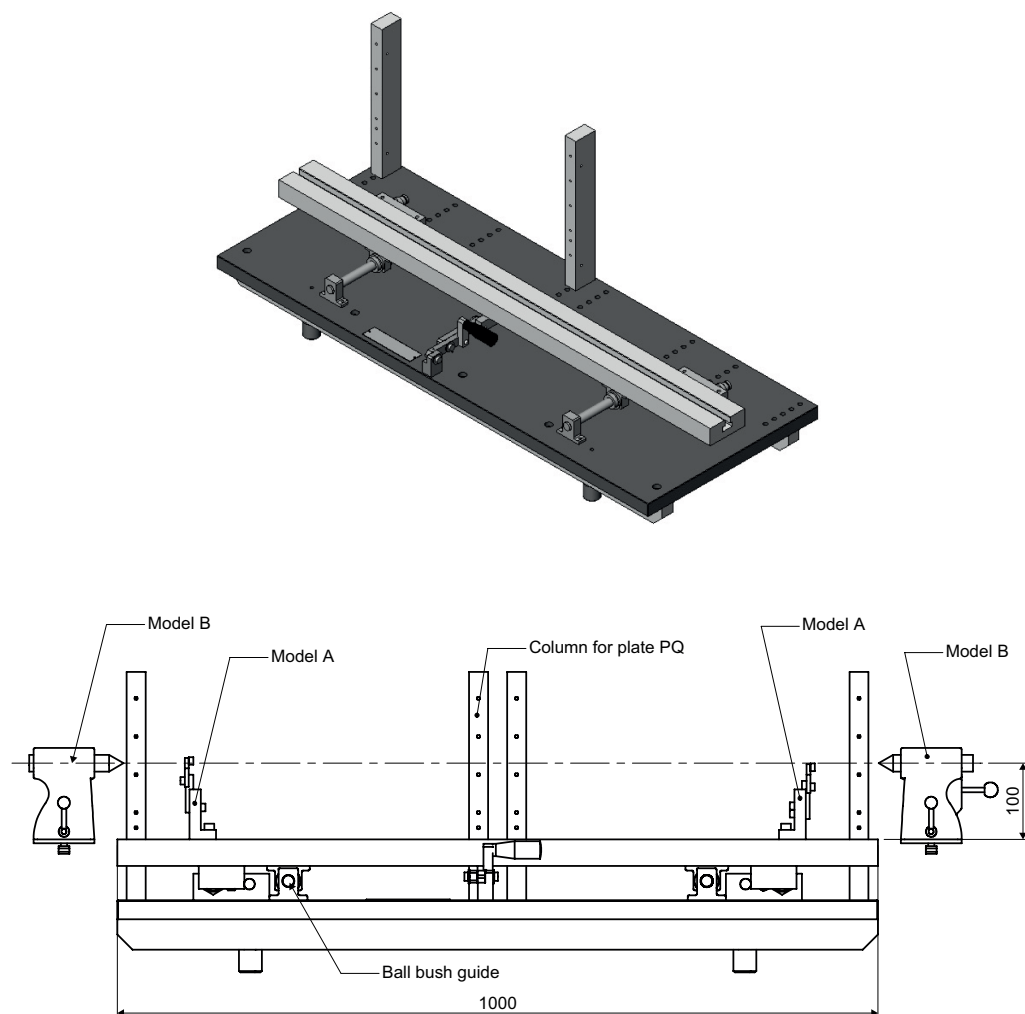
Option pneumatic:

- PN5140 for plates PQ1350
- PN5150 for plates PQ1500

Horizontal Measuring Stands with T-Grooves

Catalog no.	L mm	C Max mm	Order no.
MH65	400	180	5115800
MH65	500	280	5115801
MH65	630	210	5115802

Horizontal Measuring Stands



The MH6581 require one plate PQ; the MH6582 require two plates PQ.

Model A contains two prisms for mounting the workpiece.

Model B contains two centre supports for mounting the workpiece.

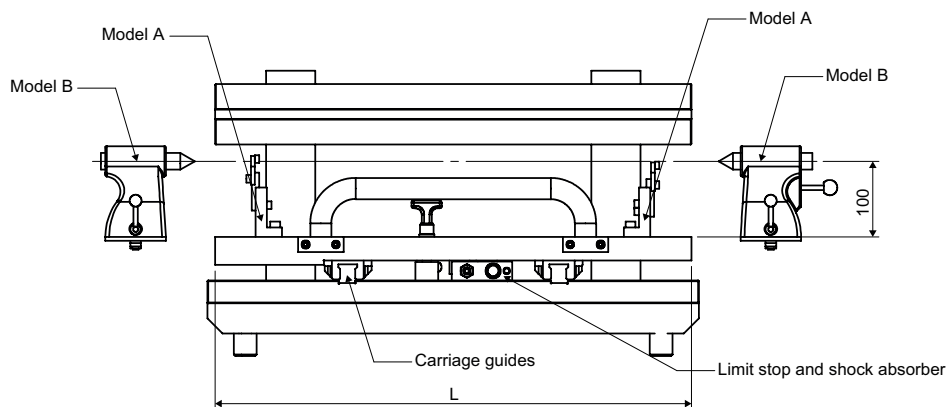
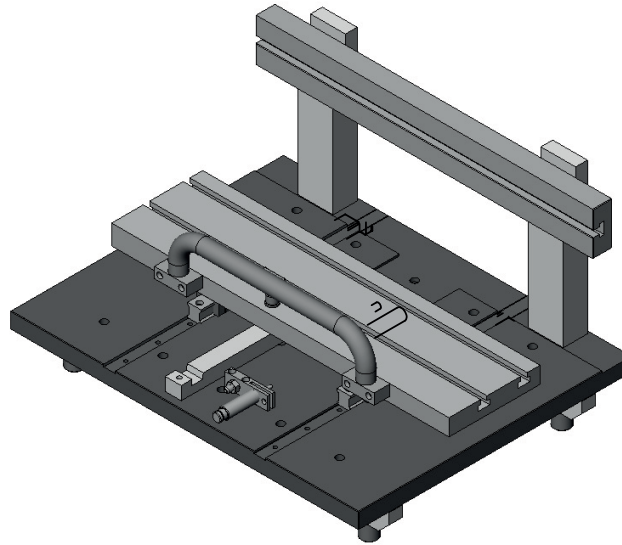
Option pneumatic:

- PN5140 for the plates PQ1350
- PN5150 for the plates PQ1500

Horizontal Measuring Stands with T-Grooves and 1 or 2 pairs of columns

Catalog no.	L mm	Description	Order no.
MH65	1000	1× Groove 1× pair of columns	5115803
MH65	1000	1× Groove 2× pair of columns	5115804

Horizontal Measuring Stands



The MH6581 require one plate PQ; the MH6582 require two plates PQ.

Model A contains two prisms for mounting the workpiece.

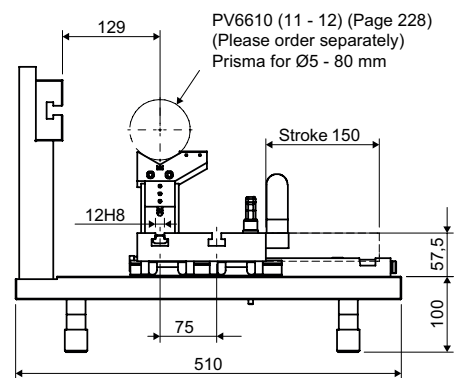
Model B contains two centre supports for mounting the workpiece.

Option pneumatic:

- Feed PN5160.

Option: (Upon request)

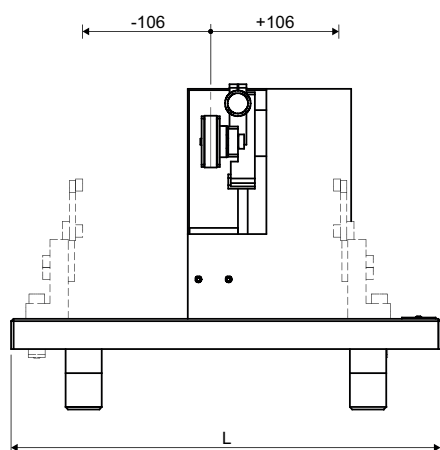
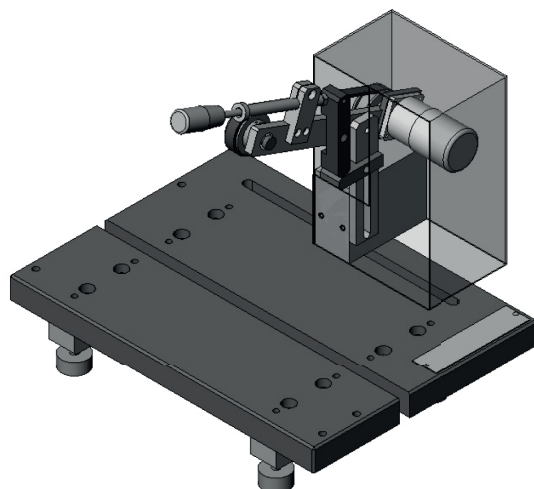
- Quick exchange of plates PQ1xxx with one complete group of measuring elements.



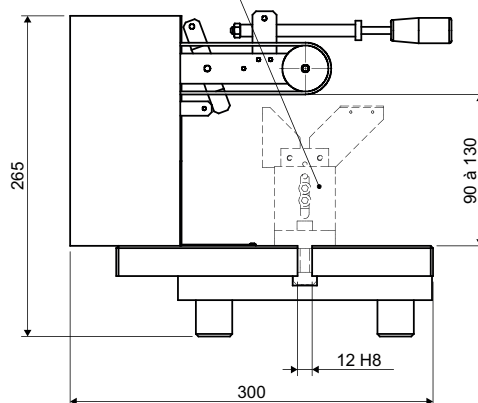
Horizontal Measuring Stands with double T-Groove

Catalog no.	L mm	Order no.
MH65	630	5115805

Horizontal Measuring Stands



PV6610B12 (Page 176)
(Please order separately)



Features

- Diameter to be measured: 2 to 25 mm (>25 mm upon request)
- Even rotation of the workpiece due to rubber drive belt
- Rotation speed due to potentiometer from 3 to 10 U/mn adjustable
- Voltage supply: 220V - 50Hz (110 V - 60 Hz upon request)

Option:

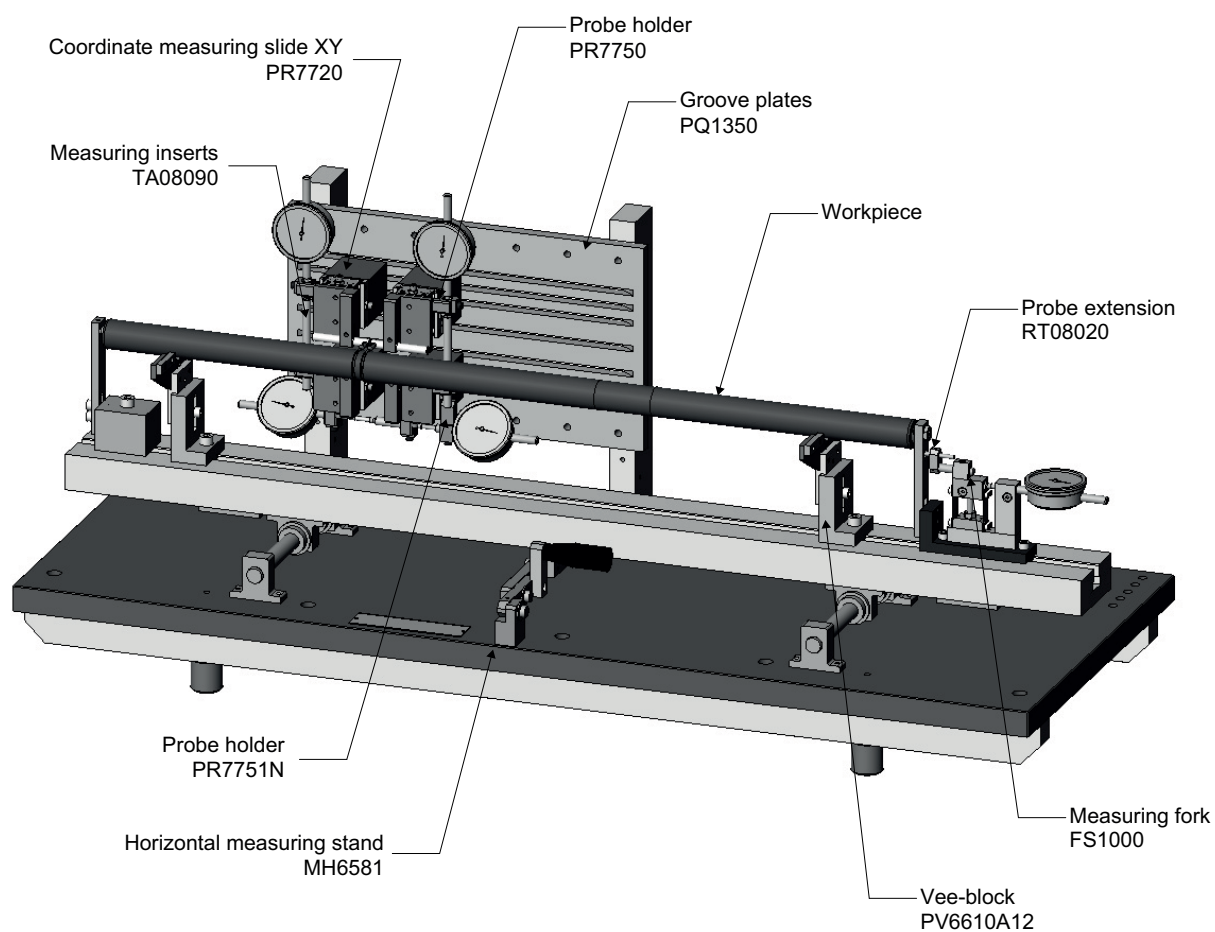
- Pneumatic supply unit FP1580

Motorized Horizontal Measuring Device

Catalog no.	L mm	C Max mm	Order no.
RPM	355	180	5115810
RPM	500	280	5115811

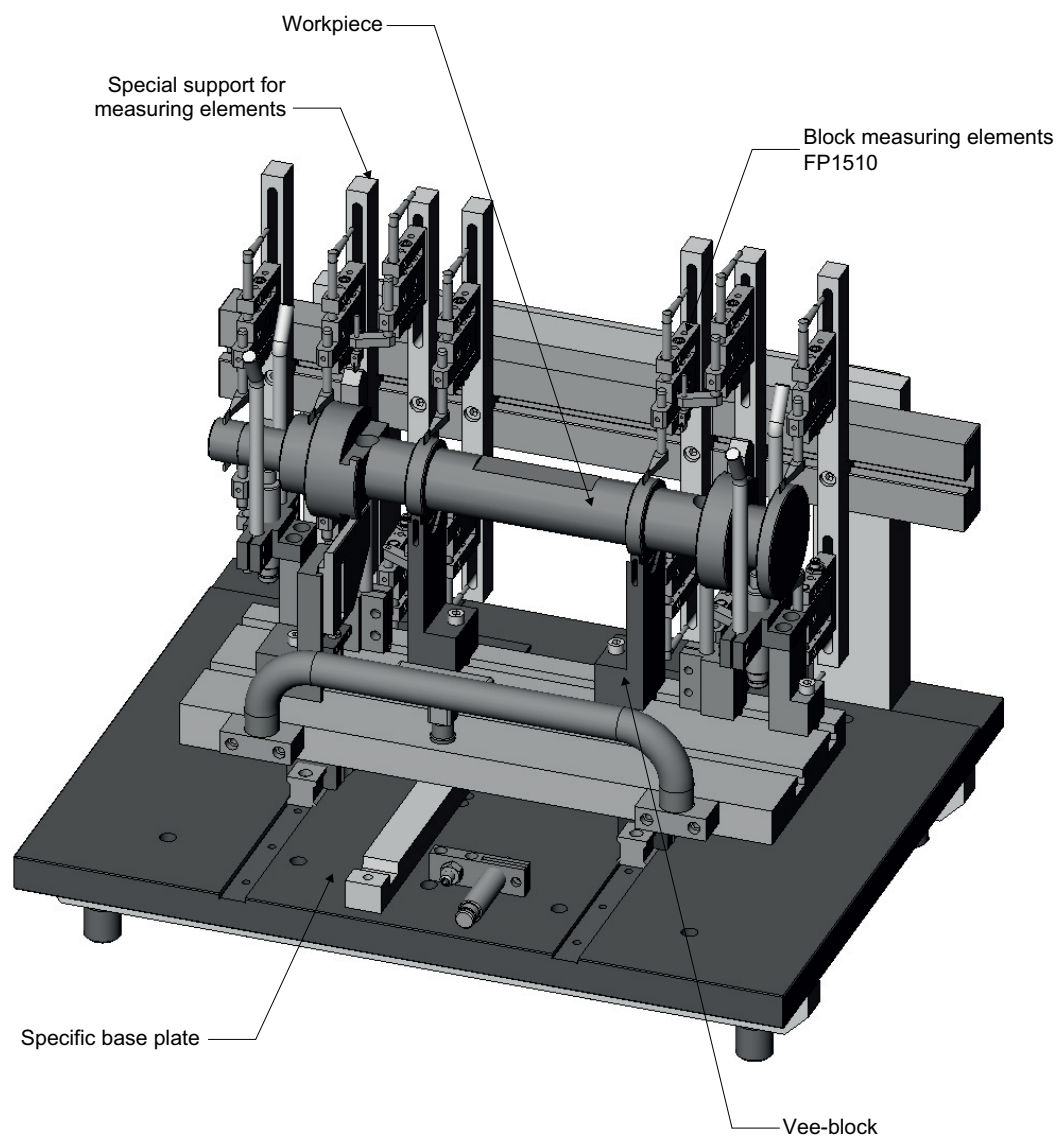
Horizontal Measuring Stands

Application Example MH65



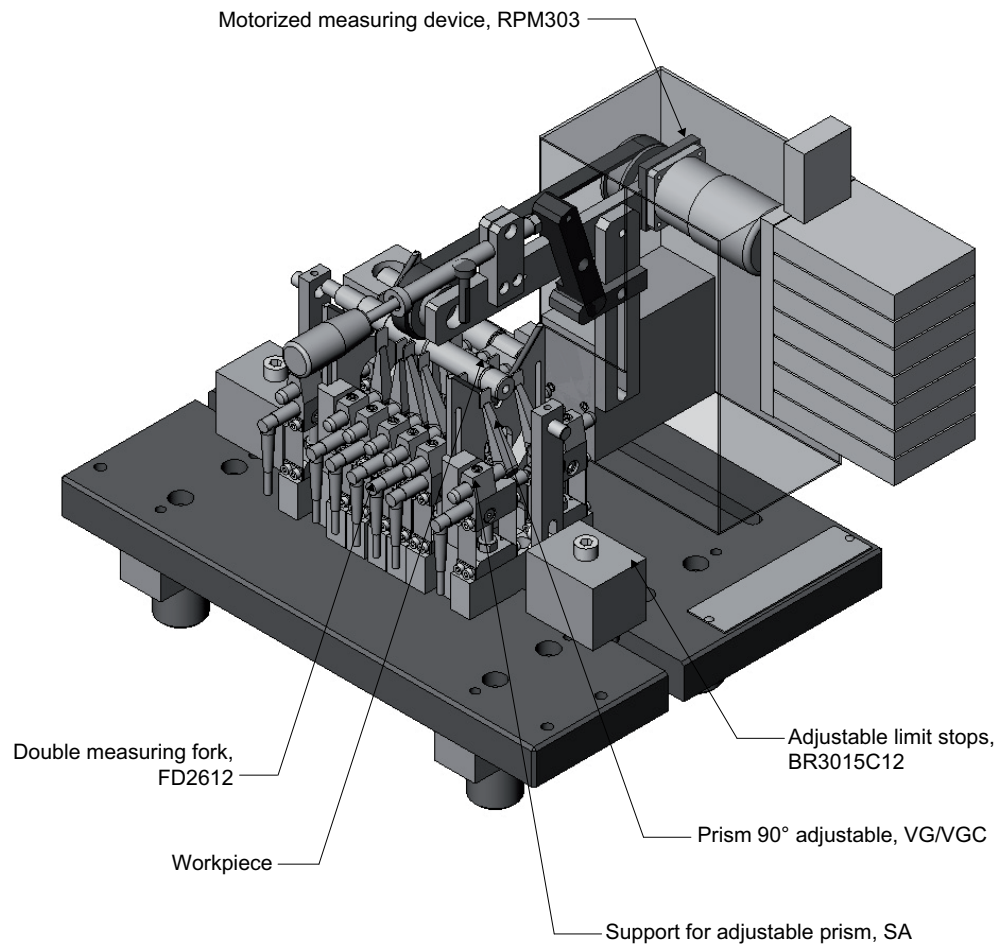
Horizontal Measuring Stands

Application Example MH65



Horizontal Measuring Stands

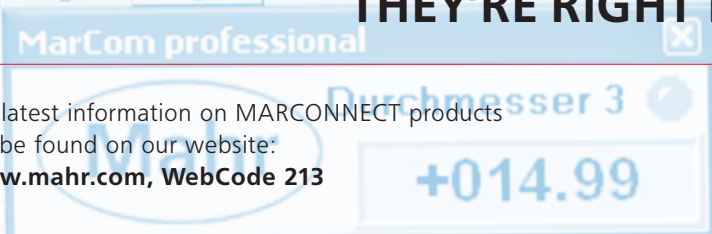
Application Example RPM



ARE YOU SEARCHING FOR THE RIGHT CONNECTIONS? THEY'RE RIGHT HERE AT MARCONNECT.



The latest information on MARCONNECT products can be found on our website:
www.mahr.com, WebCode 213



MarCom professional (DEFAULT.MCC)			
Programm Messgeräte Einstellungen ?			
4 USB-Geräte		Beschreibung	Messwert
		Gerät, Anschlusskabel	Status
			Anforderung Ziel
USB1		Fußschalter	--.--
		Schalter MC1	OK
USB2		Durchmesser 1	+015.17
		1087 16Exu	OK
USB3		Durchmesser 2	+025.35
		1087 16Exu	OK
USB4		Durchmesser 3	+014.99
		1087 16Exu	OK
			Schalter: Fußschalter
			Excel: Default.xlt/Tabelle1/1
			Schalter: Fußschalter
			Excel: Default.xlt/Tabelle1/2
			Schalter: Fußschalter
			Excel: Default.xlt/Tabelle1/3

► | Our new digital hand held measuring instruments are equipped with MarConnect interface capability. Regardless of which interface standard you use, whether Intergrated Wireless, USB, Opto RS232 or Digimatic; MarConnect will always provide you with the optimal connection.

► | MarConnect. Data Processing

Overview

MarCom Professional 5.0

268

Clear and flexible data acquisition

Software-Interface MarCom Standard /Professional 5.0

270

Radio Transmission

Wireless Receiver MarConnect i-Stick

272

MarConnect Wireless Receiver e-Stick

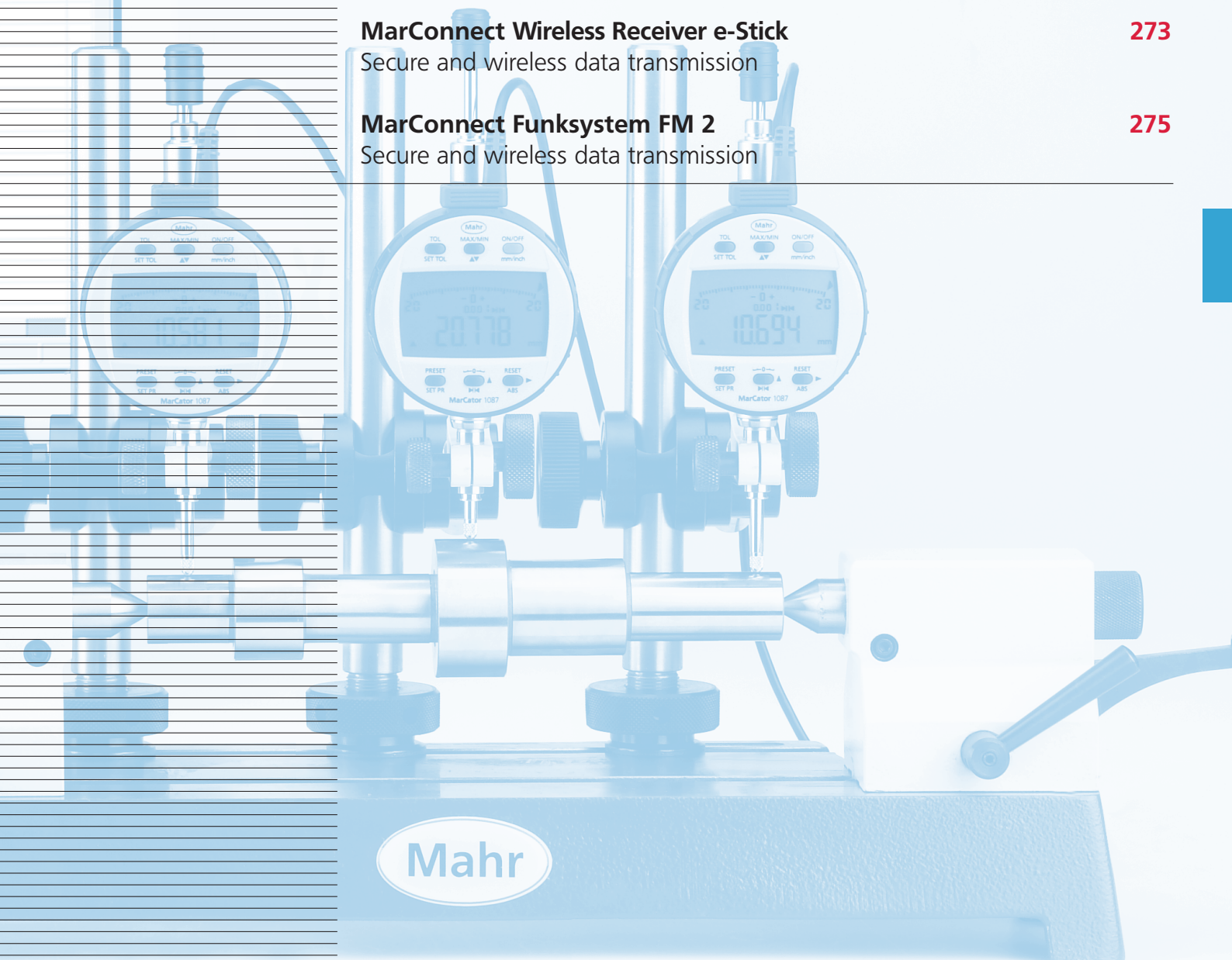
273

Secure and wireless data transmission

MarConnect Funksystem FM 2

275

Secure and wireless data transmission



MarConnect MarCom Professional 5.0

► | Whether you are using the tried and tested MarConnect interface or the new wireless data transmission Integrated Wireless, the MarCom software enables you to transmit data quickly and easily from a measuring station to a PC.

Measuring Instruments

Integrated Wireless








Data Transmission via cable








Trigger a sending command via:



- the Measuring instrument



- Remote control

Data Transmission



- Footswitch



- Keyboard



- Timer function

Universal Software MarCom Profession

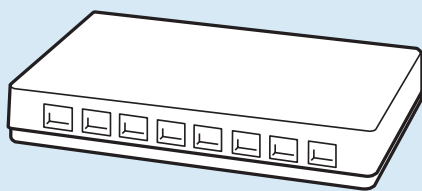
Interface on device: 4 x 8

Interface on device:
Data cable USB 124,
iStick 4 x 8

Interface on device:
Data cable USB 124,
iStick 4 x 8

Interface on device:
Data cable USB 124,
iStick 4 x 8

- Interface al 5.0



**Virtual
Interface Box**

	A	B	C
1			
2			
3			
4			
5			
6			

**Intelligent
Excel Interface**



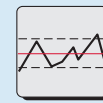
**Keyboard
Emulation**

TXTTXTTXT
TXTTXTTXT
TXTTXTTXT
TXTTXTTXT
TXTTXTTXT
TXTTXTTXT
TXTTXTTXT
TXTTXTTXT

Text - File

Data Acquisition

SPC Software



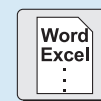
Simply choose a virtual Interface Box in your SPC Software and you can capture the measured values from all your connected Mahr Measuring Instruments.

Microsoft Office Excel®



Irrespective of whether you are using existing Excel templates or those designed for your requirements, the MarCom cell controller is highly flexible.

Any Windows Software



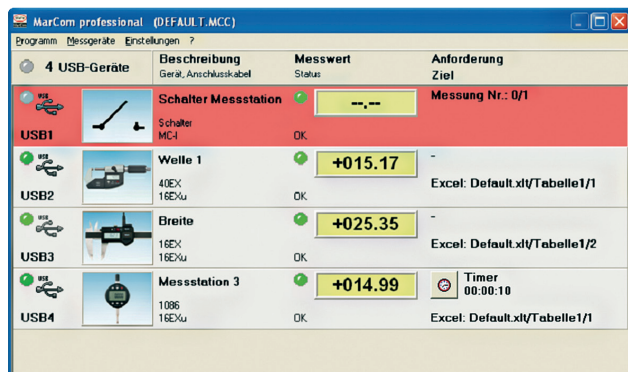
Do you use an application which does not support the integration of a measuring instrument? No Problem, with the MarCom keyboard emulation the measured values will be sent directly to the active cell of the program in use.

Flexible data transmission



MarCom is extremely flexible and enables freely configurable measuring cycle; regardless of whether you are sending data using a foot switch, on the measuring instrument, a Timer function or a Keyboard

Software-Interface MarConnect MarCom Standard / Professional 5.0



Features

- Directly transfer measuring values into Microsoft Office Excel® (from Verison 97), **into SPC-Software using virtual interface box (MUX50 format)** (Professional), a text file or key code
- Measured values from each device can be sent to a different column, table or folder in Excel
- USB hub is also suitable as a measuring instrument interface
- Clear portrayal of selected measuring devices with the aid of icons
- Freely definable / configurable measurement cycles
- Data transmission via Data-button on the measuring devices or on the data cable; via a PC, timer, keyboard, remote control or a foot switch connected to a USB interface
- Languages available: German, English, French, Italian, Dutch, Polish, Portugese, Russian, Czech, Chinese
- System Requirements: Microsoft Windows 8, Microsoft Windows 7, USB ,interface from version 1.1, minimum 10 MB free hard disk space, Microsoft Office Excel® from version 97 onwards
- Scope of delivery: Driver, Instruction manual

Technical Data

	MarCom Standard 5.0	MarCom Professional 5.0
Number of connected wireless receivers i-Stick	1	4
Number of connectable measuring instruments with Integrated Wireless	1	32
Number of connected wireless receivers e-Stick		1
Number of connectable Sender modules for the e-Stick	1	100
Number of connected wireless receivers FM		1
Number of connectable Sender modules for the wireless receivers FM	1	100
Number of devices to be connected with a USB interface	1	127
Number of USB foot switches that can be connected	1	127
Number of devices to be connected with a RS232C interface	1	2
Number of virtual Interface boxes (8 inputs)	—	4
Order no.	4102211	4102212

Accessories

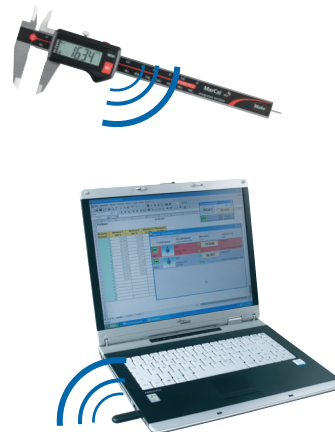
		For measuring instruments	Order no.
Receiver incl. Software MarCom Std.	i-Stick	MarCal 16 EWRi / 30 EWRi MarCator 1086 Ri / 1087 Ri / 1087 BRi	4102220
Receiver incl. Software MarCom Std.	e-Stick	Transmitters 16 EWe, 2000 e, RS232 e, 1082 e	4102230
Receiver incl. Software MarCom Std.	FM 2	Transmitters 16 EXf, 1082 f, 2000f, 817 f, RS232 f	4102305
Transmitter for e-Stick	16 EWe	MarCal 16 ER, 16 EWR, 16 EWW, 30 EWR, 30 EWN Digimar 814 SR	4102231
Transmitter for FM 2	16 EXf	Micromar 40 EWR, 40 EWS, 40 EWW, 44 EWR, 46 EWR MarCator 1075 R, 1086 R, 1087 R, 1087 BR	4102306
Data Connection Cable USB (2 m)	16 EXu	MarCal 16 ER, 16 EWR, 18 EWR, 30 EWR, 30 EWN Digimar 814 SR	4102357
Data Connection Cable RS232C (2 m)	16 EXr	Micromar 40 ER, 40 EWR, 40 EWW, 40 EWS, 44 EWR, 46 EWR MarCator 1075 R, 1086 R, 1086 Ri, 1087 R, 1087 Ri, 1087 BR, 1087 BRi MarSurf PS1, M300, M300C	4102410
Transmitter for e-Stick	2000 e		4102232
Transmitter for FM 2	2000 f	Digimar 816 CL MarCator 1088 / 1088W	4102309
Data Connection Cable USB (2 m)	2000 usb	Millimes 2000, 2001, 2100, <i>µMaxum II</i>	4346023
Data Connection Cable RS232C (2 m)	2000 r		4346020
Data Connection Cable RS232C (3 m)		Digimar 817 CLM Millimar C1208, C1216, 1240, C1245, S1840, S1841, X1715, X1745	7024634
Transmitter for e-Stick	RS232 e	Millimar C1208, C1216, C1245, S1840 Digimar 817 CLM	4102233
Adaptor Cable RS232-USB (1 m)		Millimar C1208, C1216, 1240, C1245, S1840, S1841, X1715, X1745 (in conjunction with Data Cable 7024634)	4102331
Transmitter for FM 2	817 f	Digimar 817 CLM	4102310
Adaptor Cable RS232-USB (1 m)	817 usb	Digimar 817 CLM (in conjunction with Data Cable 7024634)	4102333
Transmitter for FM 2	RS232 f	Millimar C1208, C1216, C1245, S1840	4102311
Transmitter for e-Stick	1082 e		4102235
Transmitter for FM 2	1082 f	Digimar M814 N/G Multimar 25 ES	4102307
Data Connection Cable RS232C (2 m)	16 ESv	MarTool 106 ES	4102510
Adaptor Cable RS232-USB (1 m)	Opto usb*		4102330
Data Connection Cable USB (2 m)	800 EWu	MarCal 31 EW	4305121
Data Connection Cable RS232C (2 m)	800 EWr	MarTest 800 EW, 800 EWL	4305122
Data Connection Cable USB (1.5 m)	838 usb	Marameter 838 EI, 838 EA	4495079
USB-Hub 7-fold industrial model	USB-Hub		4102553
Data Connection Cable USB (0.1 m)	MC-I	Foot Switch 16 ESf	4102782
Foot Switch to trigger data transmission	16 ESf		4102058
Remote Control for MarCom	MC-R		4102221

* in conjunction with Data Cable 4102510)

Receiver MarConnect i-Stick



Application



Features

- Measure without being hampered by any additional modules: Compared to a bulky conventional radio transmission which has a large external transmitter with a separate battery; the integrated wireless transmitter is integrated in the instrument.
- Freedom of Movement: Integrated Wireless offers you considerably more freedom of movement. Whether at a measuring station, measuring directly on or at the machine or on large workpieces you are not obstructed by any cables.
- Simple data transmission: With the i-Stick you can simply transfer your measured values via the Integrated Wireless to a PC. The measured values are sent directly (as with a data cable) via the MarCom software to Microsoft Office Excel® or by a keyboard code into any other Windows program.
- Secure data transmission: With the Integrated Wireless your data will be transferred from the digital measuring instrument to the i-Stick, thus computer. This is confirmed with a message in the display of the measuring instrument to whether the sent data has been transferred correctly, and/or whether you are in the reception range of the i-Stick.
- Long battery life span: The wireless interface is integrated in the digital measuring instruments, these measuring instruments are extremely energy efficient. In addition contrary to conventional wireless data transmission systems no additional battery is needed.
- Inexpensive: With the Integrated Wireless receiver up to 8 measuring instruments can be connected per i-Stick, therefore expensive interface boxes are no longer required. When just attaching a measuring instrument with the Integrated Wireless function you have already a wireless data transmission for the price of a data cable.
- System Requirements: IBM AT compatible PC, CD- / DVD-drive, Microsoft Office Excel® from version 97 onwards, Microsoft Windows XP, Microsoft Windows Vista, Microsoft Windows 7, USB-interface from version 1.1, minimum 10 MB free hard disk space.
- Scope of delivery: Software MarCom Standard, Driver

Technical Data

Number of channels		3
Number of transmitters		8 per Stick
Frequency band	MHz	2400
Radio range		up to 6 m
For measuring instruments	MarCal 16 EWRi / 30 EWRi MarCator 1086 Ri / 1087 Ri / 1087 BRi	
Order no.		4102220

Accessories

		Order no.
Software-Interface MarCom Professional 5.0		4102212
Digital Caliper , 0.01 mm, 0 – 150 mm	16 EWri	4103400
Digital Caliper , 0.01 mm, 0 – 150 mm	16 EWri	4103401
Digital Caliper , 0.01 mm, 0 – 150 mm	16 EWri	4103402
Digital Caliper , 0.01 mm, 0 – 150 mm	16 EWri	4103403
Digital Caliper , 0.01 mm, 0 – 200 mm	16 EWri	4103404
Digital Caliper , 0.01 mm, 0 – 200 mm	16 EWri	4103405
Digital Caliper , 0.01 mm, 0 – 300 mm	16 EWri	4103406
Digital Caliper , 0.01 mm, 0 – 300 mm	16 EWri	4103407
Digital Depth Gage , 0.01 mm, 0 – 150 mm	30 EWri	4126755
Digital Depth Gage , 0.01 mm, 0 – 300 mm	30 EWri	4126756
Digital Depth Gage , 0.01 mm, 0 – 500 mm	30 EWri	4126757
Digital Indicator , 0.0005 mm, 12.5 mm	1086 Ri	4337624
Digital Indicator , 0.0005 mm, 25 mm	1086 Ri	4337625
Digital Indicator , 0.0005 mm, 50 mm	1086 Ri	4337626
Digital Indicator , 0.0005 mm, 100 mm	1086 Ri	4337627
Digital Indicator , 0.0005 mm, 25 mm	1086 Ri	4337628
Digital Indicator , 0.01 mm, 12.5 mm	1086 Ri	4337134
Digital Indicator , 0.01 mm, 25 mm	1086 Ri	4337135
Digital Indicator , 0.01 mm, 50 mm	1086 Ri	4337136
Digital Indicator , 0.01 mm, 100 mm	1086 Ri	4337137
Digital Indicator , 0.0005 mm, 12.5 mm	1086 WRi	4337142
Digital Indicator , 0.0005 mm, 25 mm	1086 WRi	4337143
Digital Indicator , 0.01 mm, 12.5 mm	1086 WRi	4337147
Digital Indicator , 0.01 mm, 25 mm	1086 WRi	4337148
Digital Indicator , 0.0005 mm, 12.5 mm	1087 Ri	4337663
Digital Indicator , 0.0005 mm, 25 mm	1087 Ri	4337665
Digital Indicator , 0.0005 mm, 12.5 mm	1087 BRi	4337664



16 EWri



30 EWri



1086 Ri



1086 Ri



1087 Ri

Receiver MarConnect e-Stick



Features

- Wireless data transmission from a measuring instrument to a PC
- Scope of delivery: Software MarCom Standard, Driver

Technical Data

Frequency band	MHz	2400
Radio range		up to 10 m
For measuring instruments	Transmitters 16 EWe, 2000 e, RS232 e, 1082 e	
Order no.	4102230	

Accessories

			Order no.
Transmitter for e-Stick	MarCal 16 ER, 16 EWR, 16 EWV, 30 EWR, 30 EWN	16 EWe	4102231
	Digimar 814 SR Micromar 40 EWR, 40 EWS, 40 EWV, 44 EWR, 46 EWR MarCator 1075 R, 1086 R, 1087 R, 1087 BR		
Transmitter for e-Stick	Digimar 816 CL MarCator 1088 / 1088W Millimes 2000, 2001, 2100, <i>µMaxum II</i>	2000 e	4102232
Transmitter for e-Stick	Millimar C1208, C1216, C1245, S1840 Digimar 817 CLM	RS232 e	4102233
Transmitter for e-Stick	Digimar M814 N/G Multimar 25 ES MarTool 106 ES	1082 e	4102235

Receiver MarConnect FM2



FM 2



16 EXf



2000 f

Application:

- Wireless data transmission from a measuring instrument to a PC

Features

- Secure data transmission due to the acknowledgement dialog of the received data from the PC to the measuring instrument
- Optical confirmation of received data on the transmitter
- TWIN receiver for USB and RS232 interfaces
- Basic Software consists of a software for a keyboard interface and the software to save data in a Excel column
- Compact transmitter without an external antenna
- Theoretically unlimited amount of measuring instruments can be connected to a receiver
- Distance of radio wave up to 100 m (depending on the working environment)
- Radio frequency is 433 MHz (further frequencies upon request)
- Up to 69 channels are available per receiver, several receivers can be used at any one time
- Bi-directional radio link (remote control from measuring instruments)
- Triggering data via a hand switch is possible
- System Requirements: IBM AT compatible PC, CD- / DVD-drive, Microsoft Windows 2000, Microsoft Windows XP
- Scope of delivery: USB-cable, Driver, Basic software

Technical Data

Number of channels	69
Number of transmitters	unlimited
Frequency band	MHz 433
Radio range	up to 100 m (depending on the working environment)
Dimensions W x H x D	mm 60 x 120 x 25
For measuring instruments	Transmitters 16 EXf, 1082 f, 2000f, 817 f, RS232 f
Order no.	4102305

Accessories

		Order no.
Software to store measured data from several transmitters	Softwarepaket Plus	4102315
Transmitter for FM 2	MarCal 16 ER, 16 EWR, 16 EWV, 30 EWR, 30 EWN Digimar 814 SR Micromar 40 EWR, 40 EWS, 40 EWV, 44 EWR, 46 EWR MarCator 1075 R, 1086 R, 1087 R, 1087 BR	16 EXf 4102306
Transmitter for FM 2	Digimar M814 N/G Multimar 25 ES MarTool 106 ES	1082 f 4102307
Transmitter for FM 2	Digimar 816 CL MarCator 1088 / 1088W Millimes 2000, 2001, 2100, <i>µMaxum II</i>	2000 f 4102309
Transmitter for FM 2	Digimar 817 CLM	817 f 4102310
Transmitter for FM 2	Millimar C1208, C1216, C1245, S1840	RS232 f 4102311
Hand Switch for remote control	HTF 1	4102314

A FEELING FOR PRECISION **MARMOTION**



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

www.mahr.com, WebCode 339

► | MarMotion High-Precision Rotary Stroke Bearings is a product line manufactured at Mahr. A combination of the tightest manufacturing tolerances, highest surface quality and individually matched sets of guide bushing, ball cage and guide shaft provide rotary stroke bearings with a quality superior to the rotary stroke bearings usually used in tool making die plates.

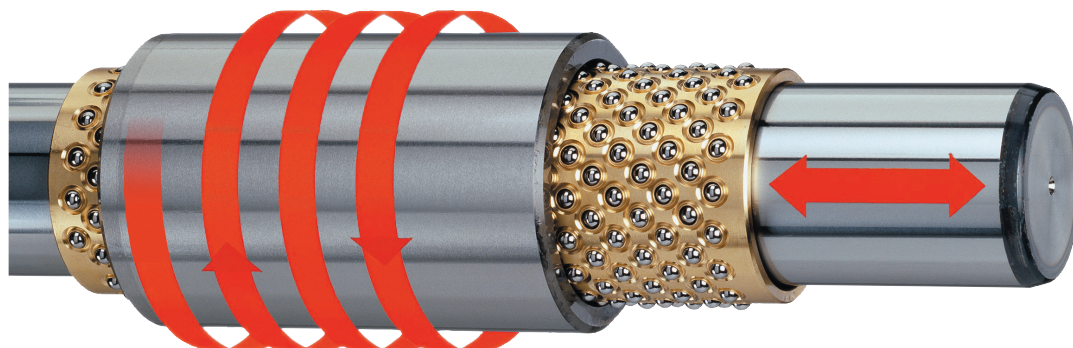
▶ | MarMotion. High Precision Rotary Stroke Bearing

MarMotion – The guide for your application

278

MarMotion. High-precision Rotary Stroke Bearings

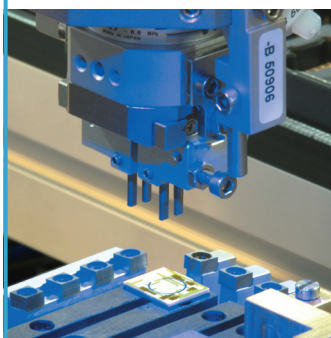
A FEELING FOR PRECISION



MarMotion – The guide for your application



- Maximum guiding accuracy
Radial deviation $0.5 \mu\text{m}$
- Backlash-free guiding
bearing components are matched in the factory with optimum preloading
- Linear and rotary motion,
combined motion
- Smooth running
Coefficient of friction $\mu = 0.001$ possible
- High loading capacity
- Guiding stiffness
up to $0.005 \mu\text{m}/\text{N}$
- Long service life
Low maintenance

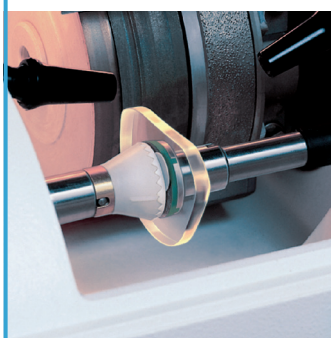


You can find the complete product range of rotary stroke bearings in the MarMotion High-precision Rotary Stroke Bearings catalog and online at the Mahr website. We would be pleased to give you individual advice on design and installation of our bearings in your design project.

As a manufacturer of precision measurement devices, Mahr has to decide about the best guiding solution in our measuring tools and devices. Ball splines, profile rails or air bearings: all types are possibilities. But often a rotary stroke bearing is the first choice.

MarMotion High-Precision Rotary Stroke Bearings is a product line manufactured at Mahr. A combination of the tightest manufacturing tolerances, highest surface quality and individually matched sets of guide bushing, ball cage and guide shaft provide rotary stroke bearings with a quality superior to the rotary stroke bearings usually used in die sets.

At Mahr, MarMotion high-precision rotary stroke bearings are used in inductive measuring probes, mechanical dial comparators, center points of shaft measuring devices or the precision rotational axes of form testers. The combination of high guiding precision, low friction and high loading capacity cannot be reached by any other type of guiding. Further, rotary stroke bearings from Mahr have an extremely long service life and require low maintenance.



www.mahr.de/marmotion
marmotion@mahr.de

MarMotion – Our service for you

- Individual Solutions
Single-piece or serial production
- Computation
Determination of loading capacity and rigidity
- Design and Installation
Advice on assembling and maintenance
- Wide range of components available from stock
for shaft diameter from 2.5 mm to 100 mm
- Optimized solutions, standard or customized components
Designed to follow your drawings, even alternative materials are possible (e.g. stainless steel)











AMERICA

USA

Mahr Federal Inc.

Headquarters:
1144 Eddy Street,
Providence, RI 02905
Phone: +1 401 784-3100
+1 800 343-2050 (toll-free)
Fax: +1 401 784-3246
e-mail: information@mahr.com

Mahr Federal Inc.
4450 Olympic Blvd.,
Erlanger, KY 41018
Phone: +1 859 525-6116
Fax: +1 859 525-0481
e-mail: information@mahr.com

Los Angeles Resource Center:
11145 Knott Avenue, Suite G
Cypress, CA 90630
Phone: +1 714 379-7051
Fax: +1 714 379-0468
e-mail: information@mahr.com

Mahr Metering Systems Corporation

1415 A Cross Beam Dr.
Charlotte, NC 28217
Charlotte, NC 28241
Phone: +1 704 525-7128
+1 800 459-7867 (toll-free)
Fax: +1 704 525-8290
e-mail: Info@MahrMeteringSystems.com
info@mmuscusa.com

México

Mahr Corp. de Mexico S.A. de C.V.

Francisco Garza Sada #690,
Col. Chepevera
C.P. 64030 Monterrey,
Nuevo León, México
Phone: +52 81 8333-2010
Fax: +52-81 8347-2793
e-mail: ventasMexico@mahr.com

Brazil

Mahr do Brasil Ltda.

Av. Washington Luis, 703
Santa Amaro, 04662-001 São Paulo, SP
Brazil
Phone: +55 11 6687-5566
Fax: +55 11 6687-5550
e-mail: apoio.vendas@mahr.com.br

EUROPE

Germany

Mahr GmbH

P.O. Box 1853
37008 Göttingen
Carl-Mahr-Str. 1
37073 Göttingen
Phone: +49 551 7073-800
Fax: +49 551 7073-888
e-mail: info@mahr.de

Mahr GmbH

Site Esslingen
Reutlinger Straße 48
73728 Esslingen
Phone: +49 711 9312-600
Fax: +49 711 9312-725
e-mail: mahr.es@mahr.de

Mahr GmbH

Site Jena
Carl-Zeiss-Promenade 10
07745 Jena
Phone: +49 3641 64-2696
Fax: +49-3641 64-3368
e-mail: info-okm@mahr.de

Poland

Mahr Polska Sp. z o.o. Przedstawicielstwo w Polsce

ul. Pulawska 5/4
02-515 Warsaw
Phone: +48 792 665 446
Fax: +48 607 665 446
e-mail: arkadiusz.kolakowski@mahr.com

Russian Federation

Mahr Representative Office

Business centre "Ochakovo"
Bolshaja Ochakovskaja street, 47A
119361 Moscow, Russia
Phone: +7 499 707 12 20
eMail: igor.lutsenko@mahr.de

St. Petersburg

Phone: +7 921 331 05 03
eMail: sergey.bolshakov@mahr.com

Rybinsk

Phone: +7 930 117 71 33
eMail: nikolai.sinitcyn@mahr.com

Yekaterinburg

Phone: +7 922 168 19 69
eMail: Oleg.Lebedenko@mahr.de

Czech Republic

Mahr spol. s.r.o.

Ulice Kpt. Jaroše 552
41712 Proboštov
Czech Republic
Phone: +420 417 816 711
Fax: +420 417 560 237
e-mail: Info-cz@mahr.com

Austria

Mahr Austria GmbH

Hirschstettnerstraße 19-21
1220 Wien, Austria
Phone: +43 1 204 36 73-0
Fax: +43 1 204 36 73-15
e-mail: info-austria@mahr.com

France

Mahr France

6, rue Lavoisier-Z.I.
91430 Igny, France
Phone: +33 1 69351-919
Fax: +33 1 69351-900
e-mail: info@mahr.fr

Switzerland

Mahr AG Schweiz

Zürcherstrasse 68
8800 Thalwil, Switzerland
Phone: +41 44 723 39 99
Fax: +41 44 723 39 98
e-mail: ch@mahr.com

United Kingdom / Ireland

Mahr U.K. Plc.

19 Drakes Mews
Crownhill, Milton Keynes
MK 8 0ER, Great Britain
Phone: +44 1908-563700
Fax: +44 1908-563704
e-mail: info@mahr.uk.com

ASIA

China

Mahr Ltd.

Unit G, 14F., CDW Building,
388 Castle Peak Road,
Tsuen Wan, N.T.
Hong Kong
Phone: +85 2 2357 9683
Fax: +85 2 2763 9613
e-mail: info@mahr.com.hk or
sales@mahr.com.hk

Mahr Trading Co., Ltd.

Beijing Office:
Room 1706A, Gui Du Tower
No. 27 Nan Bin He Road
Xuanwu District
Beijing 100055, China
Phone: +86 10 6332 448-1/-2/-3
Fax: +86 10 6332 4492
e-mail: info@mahr.com.hk or
sales@mahr.com.hk

Shanghai Office:
1/F., No. 1146 Jia,
West Yan An Road, Changning District,
Shanghai 200052, China
Phone: +86 21 5238 5353
Fax: +86 21 5238 6012
e-mail: info@mahr.com.hk or
sales@mahr.com.hk

Guangzhou Office:
Unit 1203, East Tower,
Guangzhou International Commercial Center,
No. 122 Ti Yudong Road,
Guangzhou 510620, China
Phone: +86 20 3887-1132/-1173
Fax: +86 20 3887-1172
e-mail: info@mahr.com.hk or
sales@mahr.com.hk

Mahr Precision Metrology (Suzhou) Ltd.

#399 Su Hong Road
Suzhou, Industrial Park
Suzhou 215122, P.R. China
Phone: +86 512 62585-862
Fax: +86 512 62585-870
e-mail: info-suzhou@mahr.com

Korea

Mahr Korea Ltd.

Panwon B/D 6 F
38-30 Jangchung-dong 1-ga,
Chung-ku, Seoul 100-391
South Korea
Phone: +82 2 579-4981
Fax: +82 2 579-498-6/-7
e-mail: sales@mahr.co.kr

Japan

Mahr Japan Co., Ltd.

712-4-1, Mamedo-cho, Kohoku-ku,
222-0032 Yokohama, Japan
Phone: +81 45 540-3591
Fax: +81 45 540-6252
e-mail: info@mahr.jp

Malaysia

Mahr Malaysia Sdn. Bhd.

No. 130, Block B 1,
Leisure Commerce Square
No. 9, Jalan PJS 8/9,
46150 Petaling Jaya, Selangor
Malaysia
Phone: +60 3 7877-2060
Fax: +60 3 7877-2040
e-mail: mahr@tm.net
sales@mahr.com.my

Thailand

Mahr S.E.A. Co. Ltd.

719 KPN Tower, 20th Floor
Rama 9 Rd., Bangkok, Huaykwang
Bangkok 10310, Thailand
Phone: +66 2 717 1050-2
Fax: +66 2 717 1055
e-mail: Valeerut.Amadtirut@mahr.com

Pakistan

Global Tech Co-Ord Ltd

280A Whitton Avenue East
Greenford Middx UB6 0JP
London United Kingdom
Phone: +44 (0) 20 3475-6819
Fax: +44 (0) 20 3475-6829
e-mail: info@globaltcltd.com

Consolidated Engineers

CE House, 108 E-1 Gulberg III,
Lahore – Pakistan
Phone: +92 (0) 42 3576-4907/-08
Fax: +92 (0) 42 3576-1247
e-mail: info@cedefense.com

India

Mahr Metrology India Private Ltd.

Chennai (Corporate office):
J-16, 7th Street, Anna Nagar East
Chennai 600 102, India
Phone / Fax: +91 44 4217 0531
e-mail: mahrindia@mahr.com

Pune office:
RH No. 5, Clover Mews,
Park Street, Viman Nagar
Pune 411 014, India
Phone / Fax: +91 20 6520 0367

Bangalore office:
No. 180, Ground Floor, „Kyaswar Mansion“,
16th Main Road, 4th T Block, Jayanagar
Bangalore 560 041, India
Phone / Fax: +91 80 2665 1396

Delhi / NCR Region:
Mahr Metrology India Pvt. Ltd
Nr. 1117, 11th Floor, Pearl Omaxe,
Tower-2, Netaji Subhash Place,
Pitampura, New Delhi 110 034, India
Phone / Fax: +91 11 4231 6372
Mobile: +91 98180 21113

Ahmedabad office:
Mobile: +91 (0) 909 909 4080

Please refer to our website www.mahr.com
for addresses of our worldwide Sales Partners
(not included in the Mahr Group)

WWW.MAHR.COM

|
- 0 +



E X A C T L Y



CONSOLIDATED
ENGINEERS

Mahr GmbH

Standort Esslingen
Reutlinger Straße 48, 73728 Esslingen
Tel. +49 711 9312 600, Fax +49 711 9312 756
mahr.es@mahr.de, www.mahr.com

© by Mahr GmbH

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