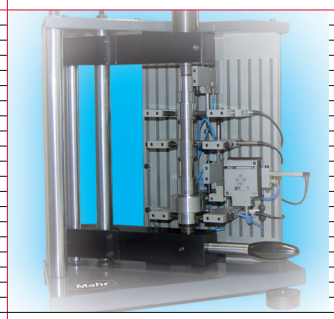
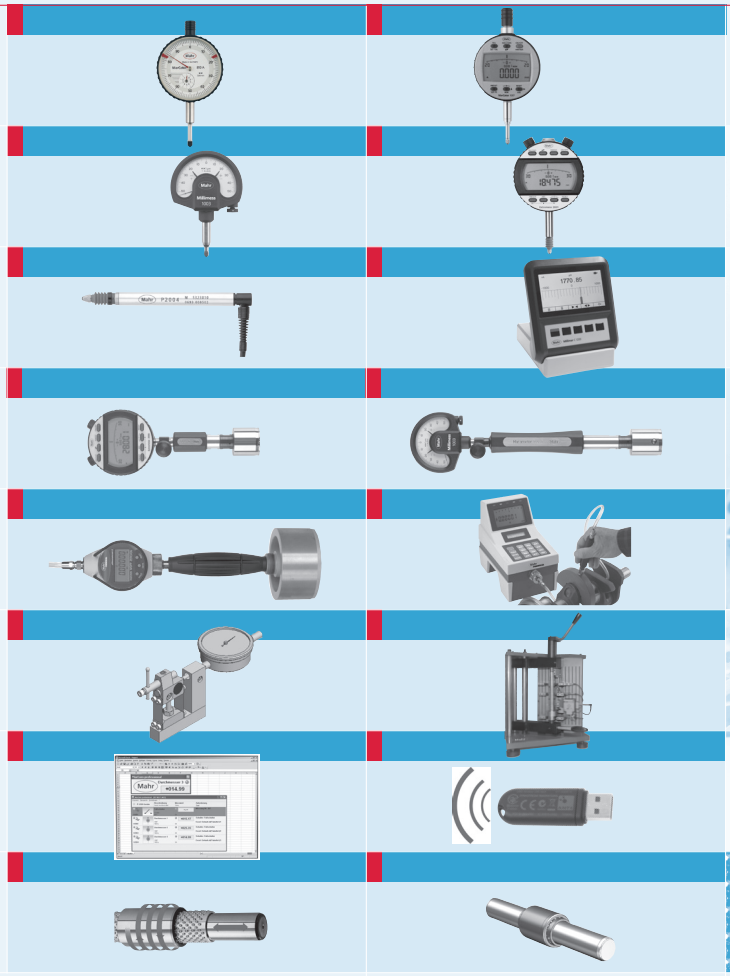
COMPONENTS FOR LENGTH METROLOGY

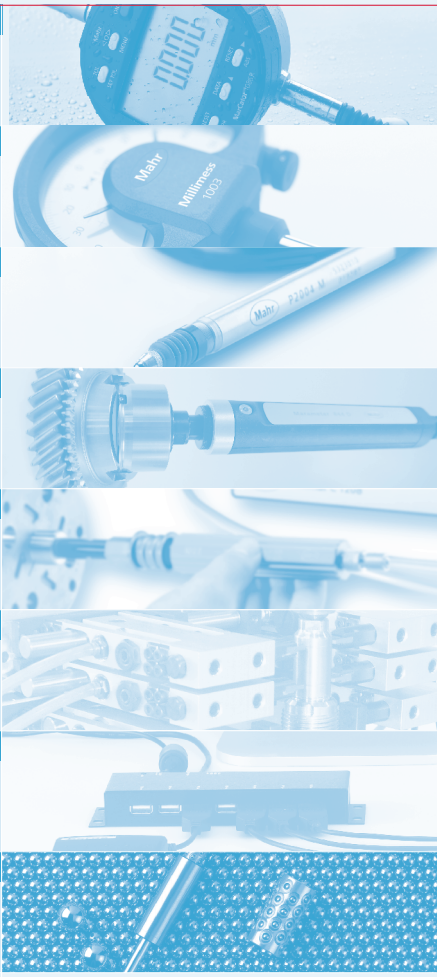


Mahr

EXACTLY

COMPONENTS FOR LENGTH METROLOGY





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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

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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"***	
	metric				0.01 mm	
	inch				***.0005"***	
Mounting shank		8h6	8h6	8h6	8h6	8h6
Protection class	IP class acc to IEC 60529	IP52	IP52	IP52	IP42	IP42
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

	1086 ZR	1086 ZR	1086 WR(i)	1086 WR(i)	1087 R(i)	1087 ZR	1087 BR(i)	1088	1088 W
									
	11	12	14	13	15	17	20	19	19
	12.5 / ***.5“***	12.5 / ***.5“***	12.5 / ***.5“***	12.5 / ***.5“***	12.5 / ***.5“***	12.5 / ***.5“***	12.5 / ***.5“***	12.5 / ***.5“***	
	25 / ***1“***	25 / ***1“***	25 / ***1“***	25 / ***1“***	25 / ***1“***			25 / ***1“***	50 / ***2“***
	0.0005 mm ***.00002“*** 0.001 mm ***.00005“*** 0.002 mm ***.0001“*** 0.005 mm ***.0002“*** 0.01 mm ***.0005“***	0.01 mm ***.0005“***	0.01 mm ***.0005“***	0.0005 mm ***.00002“*** 0.001 mm ***.00005“*** 0.002 mm ***.0001“*** 0.005 mm ***.0002“*** 0.01 mm ***.0005“***	0.0005 mm ***.00002“*** 0.001 mm ***.00005“*** 0.002 mm ***.0001“*** 0.005 mm ***.0002“*** 0.01 mm ***.0005“***	0.0005 mm ***.00002“*** 0.001 mm ***.00005“*** 0.002 mm ***.0001“*** 0.005 mm ***.0002“*** 0.01 mm ***.0005“***	0.0005 mm ***.00002“*** 0.001 mm ***.00005“*** 0.002 mm ***.0001“*** 0.005 mm ***.0002“*** 0.01 mm ***.0005“***	0.001 mm ***.00005“***	0.001 mm ***.00005“***
	3/8“	3/8“	8h6	8h6	8h6	3/8“	8h6	8h6	8h6
	IP42	IP42	IP54	IP54	IP42	IP42	IP42	IP42	IP54
	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●
					●	●	●	●	●
					●	●		●	●
							●		
	●	●	●	●	●	●	●	●	●
					●	●	●	●	●
					●	●	●	●	●
	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●		●
	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●
		●	●*	●*	●*		●*		
								●	●

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 with12 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

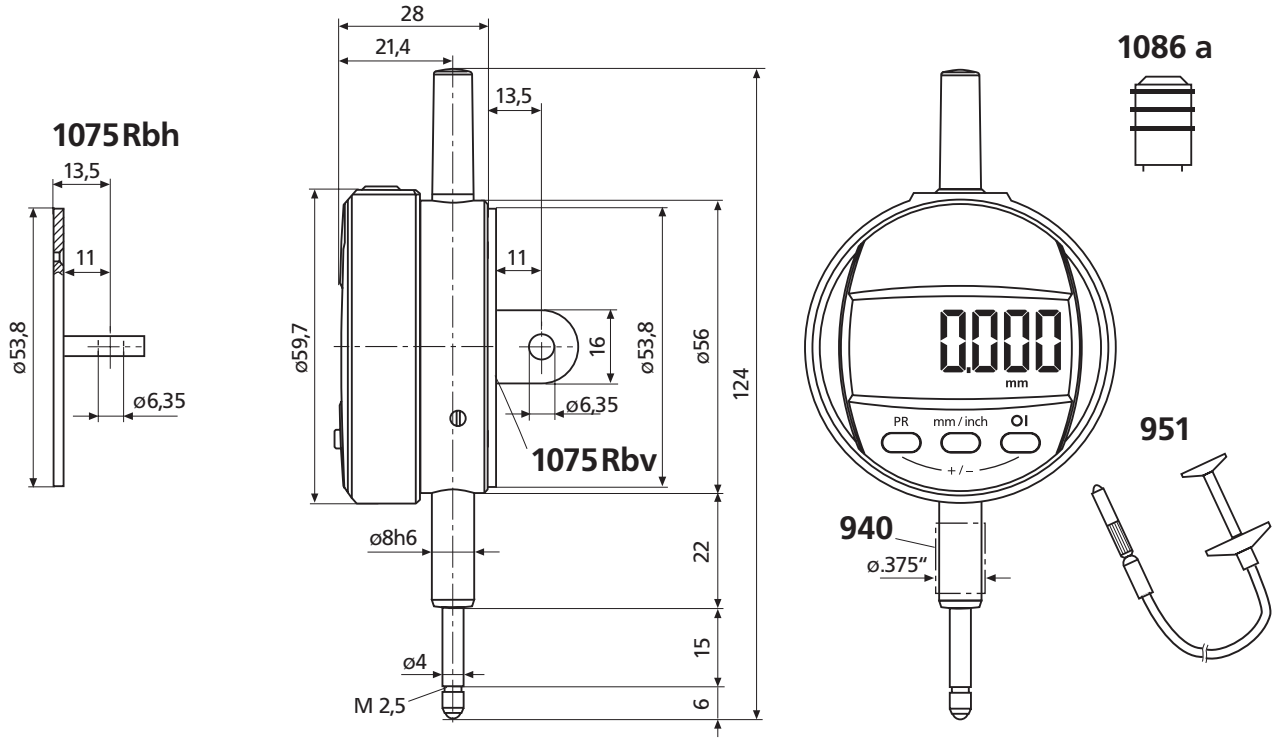
REFERENCE The new Digital Indicators 1075 R are equipped with the innovative Reference-System. The zero position only has to be set one time: once it is set, the zero remains stored for all further measurements. Therefore, when the indicator is switched ON or the measuring spindle is moved the indicator 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.
Battery 3V, Type CR 2032		**4102520**
Data Connection Cable USB (2 m)	**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**
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**

Additional Accessories

See Chapter **Millimar.** Standard Elements

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

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.

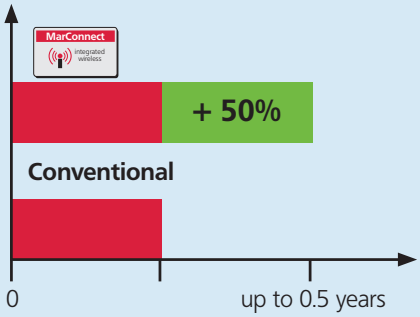


Secure data transmission

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.



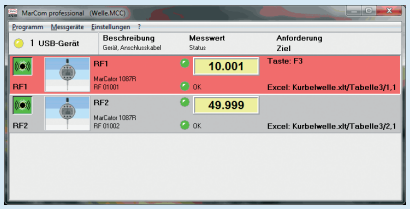




Simple data transmission

MarConnect integrated wireless

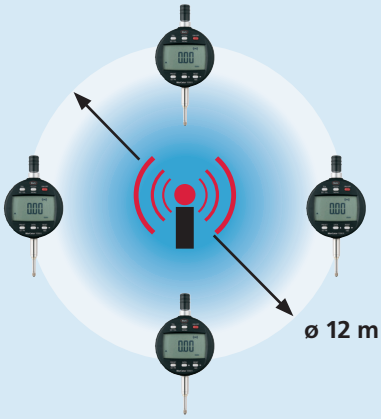
With the i-stick you can simply **transfer your measured values via integrated wireless to the PC**. The measured values are sent directly (as with a data cable) via the MarCom software to Microsoft Office Excel® or by a keyboard code into any other Windows program.



Large freedom of movement

MarConnect integrated wireless

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

MarConnect integrated wireless

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.

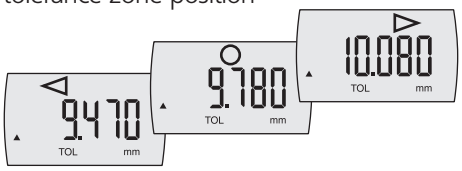
MarCator. Digital Indicators

DIGITAL INDICATORS WITH THE REFERENCE SYSTEM AND INTEGRATED WIRELESS

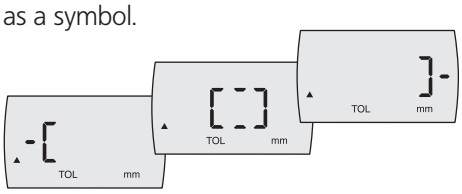
►| Once again Mahr sets a new standard in the Digital Indicator product segment with the new generation of Digital Indicators **MarCator** 1086 Ri / 1087 Ri Reference. With the new Reference system the MarCator Digital Indicators can be applied immediately as the zero-position only has to be set once 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.





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:

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

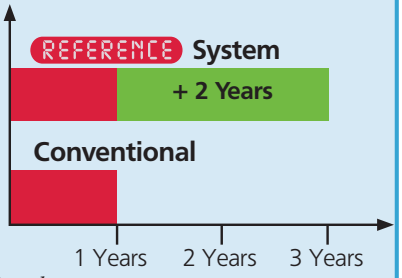
REFERENCE All our **MarCator** Digital Indicators from the 1086 R(i) and 1087 R(i) series are equipped with the **innovative Reference System.** For further information regarding our Reference System please refer to page 6.

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*

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

ABS · IP42 · TOL · MarConnect USB · MarConnect RS232C · Digimatic · MarConnect integrated wireless

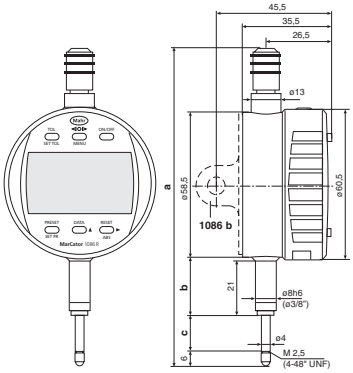
REFERENCE



12.5 mm



25 mm



Dimensions

Meas. range mm	(inch)	a mm	b mm	c 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

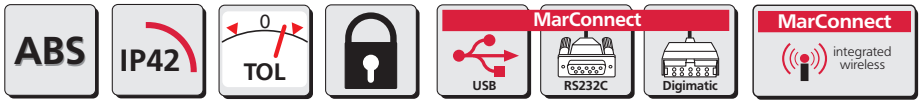
Supplied with:
Battery, operating instructions

Technical Data

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



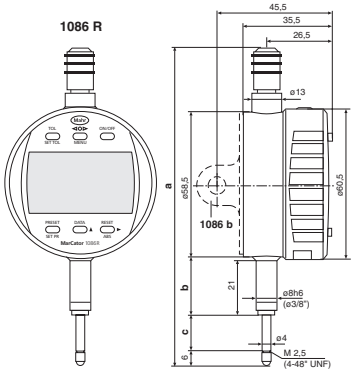




12,5 mm



25 mm



Dimensions

Meas. range mm	(inch)	a mm	b mm	c 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 mm	(inch)	Resolution mm / inch	Span of error* mm	MarConnect**	Measuring force N	Weight g	Mounting shank	Order no.
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







12.5 mm

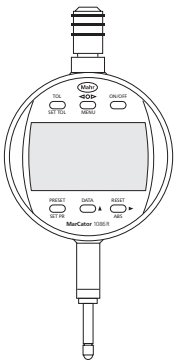


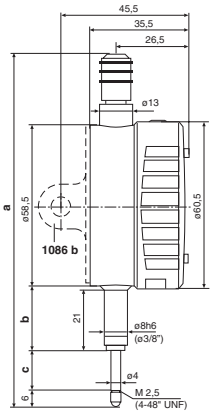
25 mm



50 mm

1086 R





Dimensions

Meas. range mm	(inch)	a mm	b mm	c 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 mm	*(inch)*	Resolution switchable mm *(inch)*	Span of error* mm	Repeatability mm	Measuring force N	Weight g	Mounting shank dia.	Order no.
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	130	8h6	**4337620**
25	*(1")*		0.004	0.001	0.65 - 1.15	140	8h6	**4337621**
50	*(2")*		0.007	0.001	1.25 - 2.70	190	8h6	**4337622**
100	*(4")*		0.008	0.001	1.60 - 3.50	235	8h6	**4337623**
12.5	*(.5")*		0.004	0.001	0.65 - 0.90	150	3/8"	**4337650**
25	*(1")*		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"







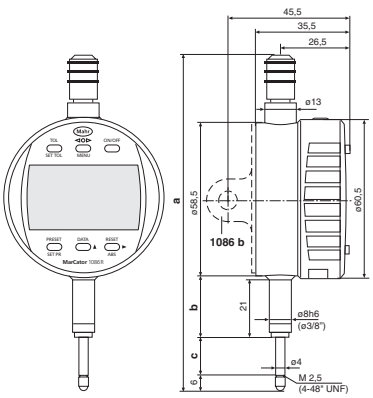
12.5 mm



25 mm



50 mm



Dimensions

Meas. range mm	(inch)	a mm	b mm	c 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 mm	(inch)	Resolution mm	/ inch	Span of error* mm	Repeatability mm	Measuring force N	Weight g	Mounting shank dia.	Order no.
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

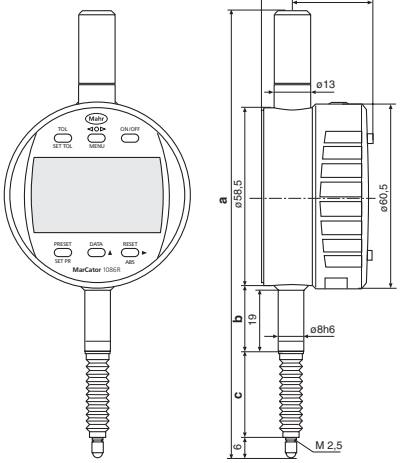




12,5 mm



25 mm



MarConnect integrated wireless

* *Only available in conjunction with 1086 WRi indicators*

Dimensions

Meas. range mm	(inch)	a mm	b mm	c 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 mm	(inch)	Resolution switchable mm (inch)	Span of error* mm	Repeatability mm	Measuring force N	Weight g	Order no. WRi**	Order no. WR
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 - 1.40	135	**4337142**	**4337640**
25	(1")		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"

ABS | IP54 | TOL | MarConnect: USB, RS232C, Digimatic

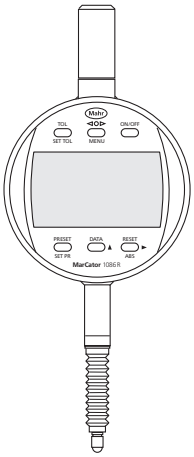
REFERENCE

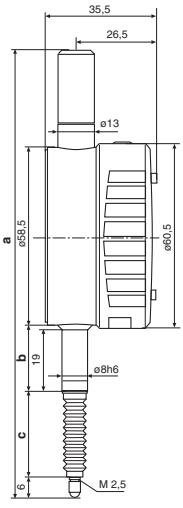


12.5 mm



25 mm





MarConnect integrated wireless

* *Only available in conjunction with 1086 WRi indicators*

Dimensions

Meas. range mm	(inch)	a mm	b mm	c 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 mm	(inch)	Resolution mm	/	inch	Span of error* mm	Repeatability mm	Measuring force N	Weight g	Order no. WRi**	Order no. 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

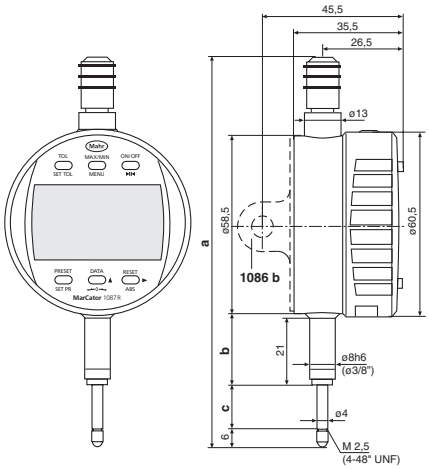
* *in any zero point*
** *To use the integrated wireless function an i-Stick Wireless Receiver is required, see page 24*

Digital Indicators MarCator 1087 Ri with analog display for dynamic measurements









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

Dimensions

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

Analog display

Readings mm	/	*inch*	Display range 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***

Technical Data

Measuring range mm	*(inch)*	Resolution switchable mm *(inch)*	Span of error* mm	MarConnect **	Measuring force N	Weight g	Mounting shank	Order no.
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	**4337663**
25	***(1")***		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



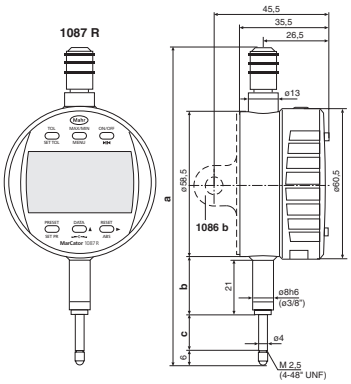




12.5 mm



25 mm



Dimensions

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

Analog display

Readings mm	/	*inch*	Display range 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

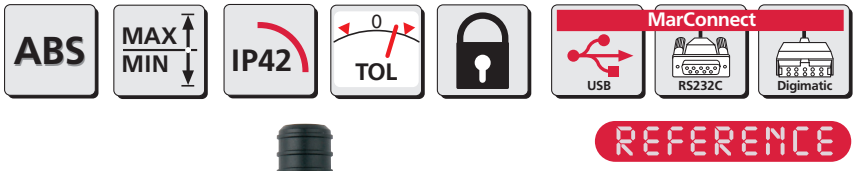
Supplied with:
Battery, operating instructions

Technical Data

Measuring range mm	*(inch)*	Resolution switchable mm *(inch)*	Span of error* mm	Repeatability mm	Measuring force N	Weight g	Mounting shank	Order no.
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	**4337660**
25	***(1")***		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

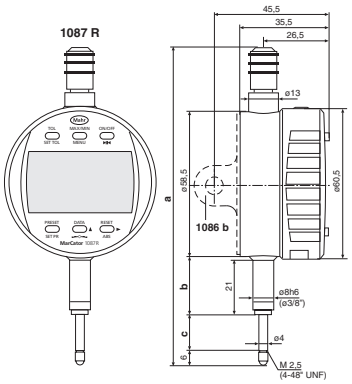




12.5 mm



25 mm



Dimensions

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

Analog display

Readings mm	/	*inch*	Display range 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 mm	*(inch)*	Resolution switchable mm *(inch)*	Span of error* mm	Repeatability mm	Measuring force N	Weight g	Mounting shank	Order no.
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	150	3/8"	**4337670**
25	***(1")***		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

MAX / MIN

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

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





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*	N	mm		**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

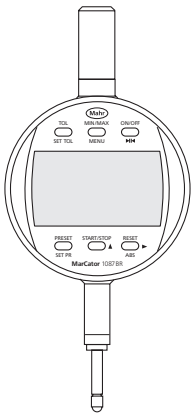
ABS | MAX MIN | IP42 | 0 TOL | MarConnect USB | MarConnect RS232C | MarConnect Digimatic | MarConnect integrated wireless

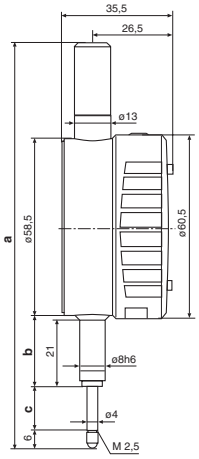
REFERENCE



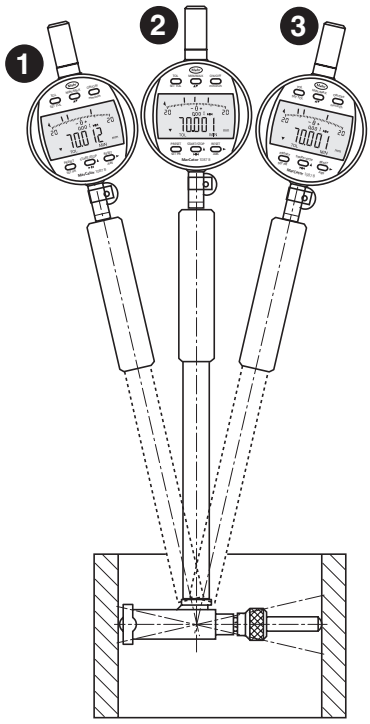
12.5 mm

1087 BR





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).

Dimensions

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

Analog display

Readings mm	/	inch	Display range 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 mm	(inch)	Resolution switchable mm (inch)	Span of error* mm	MarConnect **	Measuring force N	Weight g	Mounting shank	Order no.
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

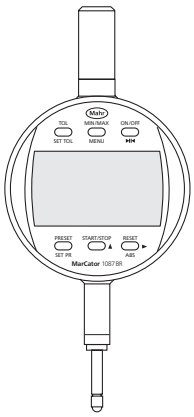
ABS | MAX MIN | IP42 | TOL | MarConnect: USB, RS232C, Digimatic

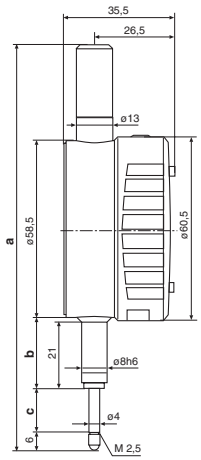
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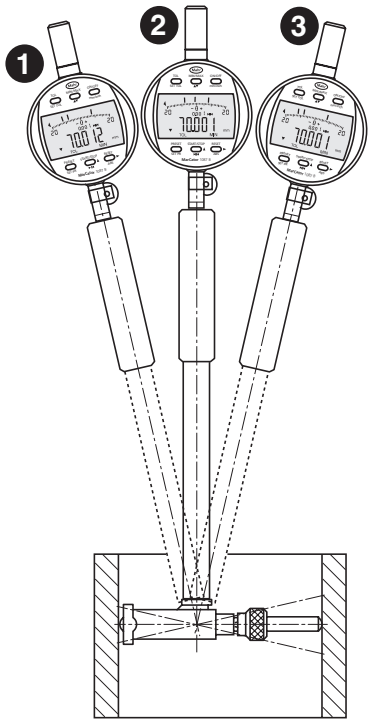
12.5 mm

1087 BR





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).

Dimensions

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

Analog display

Readings mm	/	*inch*	Display range 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 mm	*(inch)*	Resolution switchable mm *(inch)*	Span of error* mm	Repeatability mm	Measuring force N	Weight g	Mounting shank	Order no.
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*

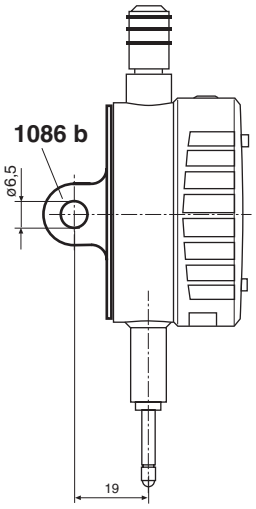
Accessories for MarCator 1086 R / Ri, 1087 R / Ri and 1088

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

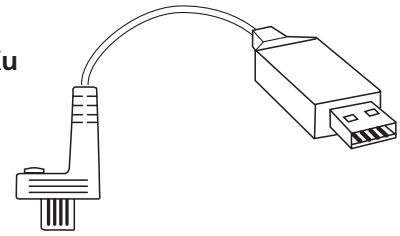
		Order no.
Battery 3V, Type CR 2450		**4884464**
Data Connection Cable USB (2 m) incl. MarCom Standard	**16 EXu**	**4102357**
Data Connection Cable Opto RS232C (2 m), with SUB-D jack 9-pin	**16 EXr**	**4102410**
Data Connection Cable Digimatic (2 m), Flat plug 10-pin	**16 EWd**	**4102915**
Mounting Lug	**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**

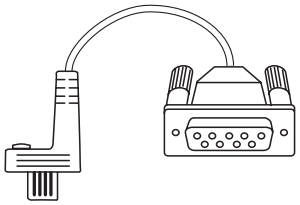
1086 b



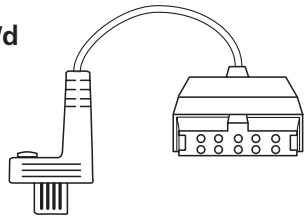
16 EXu



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

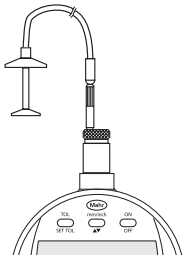
		Order no.
Cable Release for measuring ranges 12.5 and 25 mm	**1085 a**	**4336311**
Pneumatic Lifter for measuring ranges 12.5 and 25 mm	**1082 p**	**4336237**
Pneumatic Lifter for measuring ranges 50 and 100 mm	**1082 p**	**4336230**

Additional Accessories

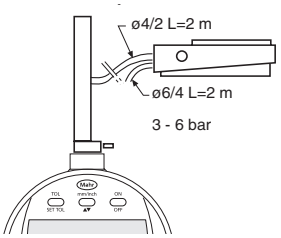
See Chapter **Millimar.** Standard Elements

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

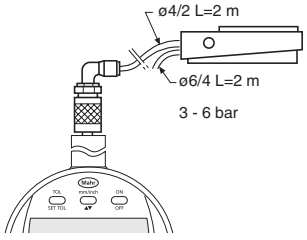
1085 a



1082 p (12.5/25)



1082 p (50/100)



MarCator ANSI/AGD Dial Indicators

OVERVIEW

Dial Indicators Selection Guide

Grad	Range per Rev.	Total Range	Dial Style w/o Rev	Dial Style with Rev	Order number w/o Rev Counter	Order number 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	Order number 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, hobbed 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

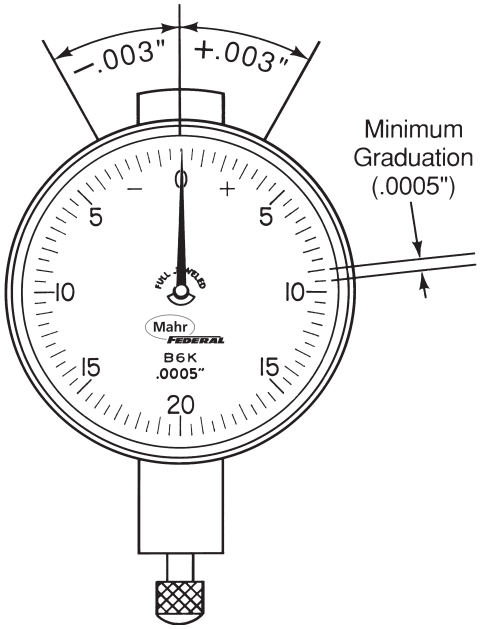
Since modern manufacturing involves a wide range of tolerances. choosing a dial indicator might be difficult, especially since the number of indicators available is so vast. The following guidelines were prepared to assist you in selecting the right model for your application.

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" (±.003"), then, the most suitable minimum graduation value is .0005".

TOLERANCE IS .006"



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:

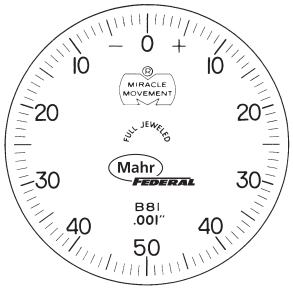
The American Society of Mechanical Engineers
ASME Order Desk
22 Law Drive
Fairfield, NJ 07007
(973)882-1167

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.

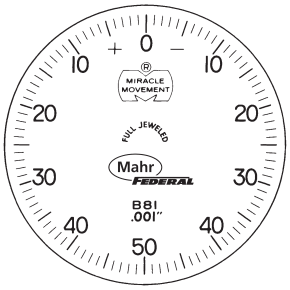
Note: If Revolution Counter models are ordered, counter dial numbered counterclockwise.



2. Balanced (+) on left.
Indicates decreasing values when contact is depressed as in comparison bore* and depth gages.

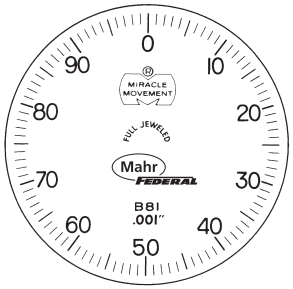
Note: With Revolution Counter models, counter dial numbered clockwise.

** Will vary as dictated by motion transfer design.*



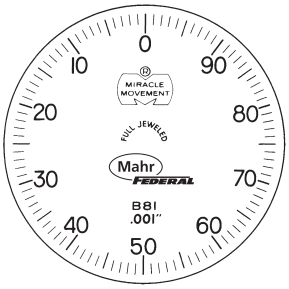
3. Continuous clockwise.
Normally furnished on Long and Extra Long Range Indicators, unless otherwise specified. Indicates an increasing value when contact is depressed as in direct-reading thickness gages.

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.



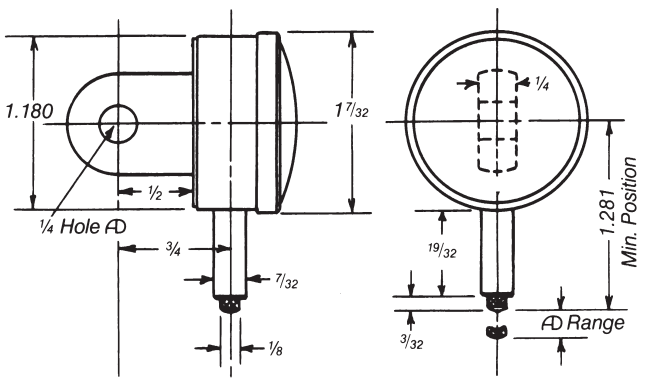
Technical Data

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

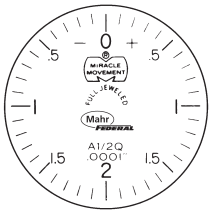
Measuring range	Graduation value	Dial style	Range per revolution	Accuracy	Order no.
0.250	0.002	0-5-0	0.100	± 0.002 mm	**N1/2O**
1.250	0.005	0-25-0	0.500	± 0.005 mm	**N3I**
2.500	0.010	0-50-0	1.00	± 0.010 mm	**N6I**



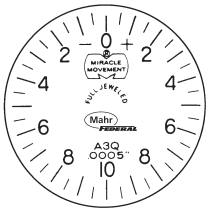
Backs can be rotated 90° and 180°

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

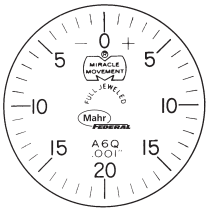
Mahr Federal Series A



A1/2Q



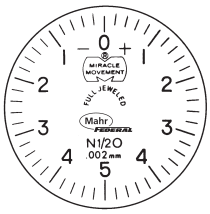
A3Q



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

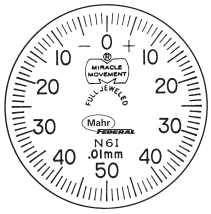
Mahr Federal Series N



N1/2O



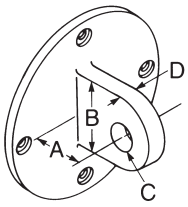
N3I



N6I

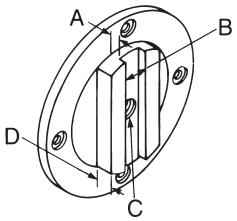
Backs for ANSI Group 0 - Series A and N

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



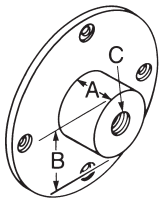
Vertical Lug (Centered)
BK-37

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



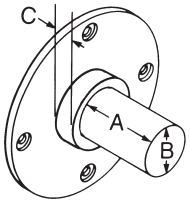
Adjustable
BK-45

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



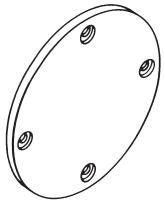
Screw Type
BK-88

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



Post
BK-38

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



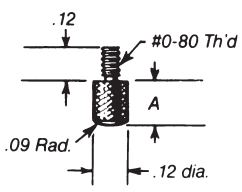
Flat
BK-32

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



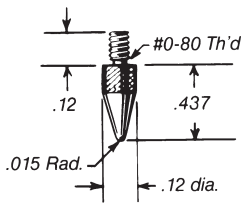
Points for ANSI Group 0 - Series A and N

Regular PT-43
normally furnished

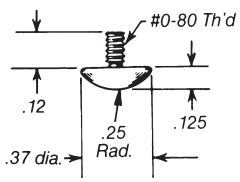


Dim. A	Style
3/32"	PT-43
1/4"	PT-204
3/8"	PT-205
1/2"	PT-207
5/8"	PT-208
3/4"	PT-209
7/8"	PT-210
1"	PT-211

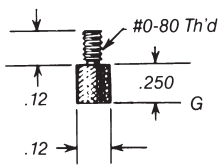
Taper
PT-119



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**

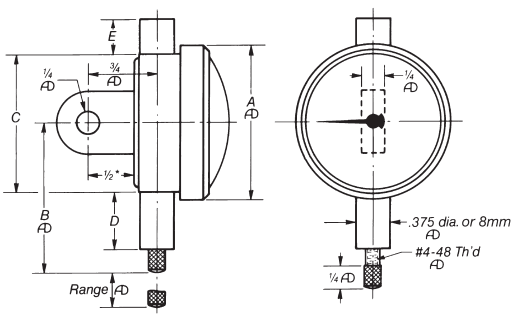
Mahr Federal Series O (Metric, mm)
Dial: approx. 45 mm dia. with yellow tint

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**

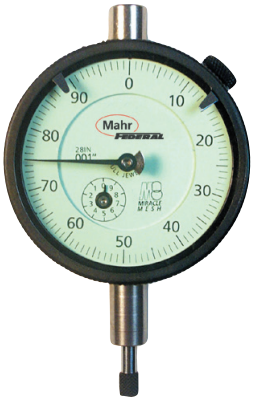
Dimensions

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.



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

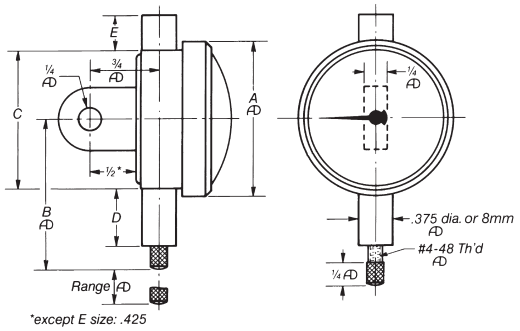
Measuring range	Graduation value	Dial style w/o Rev Counter	Dial style with Rev Counter	Range per revolution	Accuracy	Order no. w/o Rev Counter	Order no. with Rev Counter
.020"	***.0001"***	0-4-0	0-8	***.008"***	***± .0001"***	**E1K**	**E1K-RC**
.025"	***.0001"***	0-5-0	0-10	***.010"***	***± .0001"***	**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**

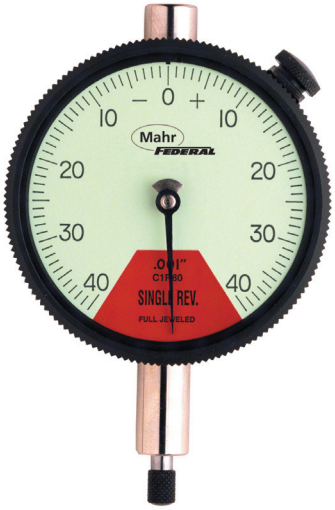
Dimensions

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**

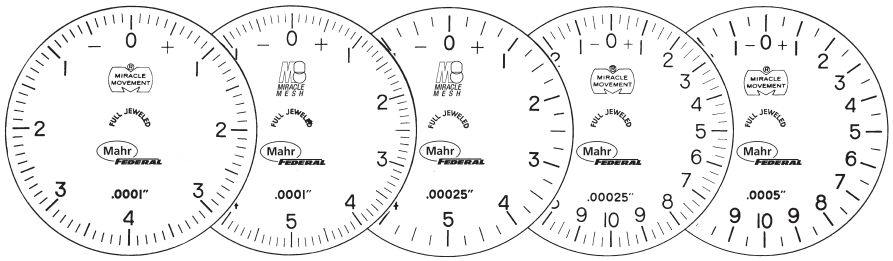
Accessories

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

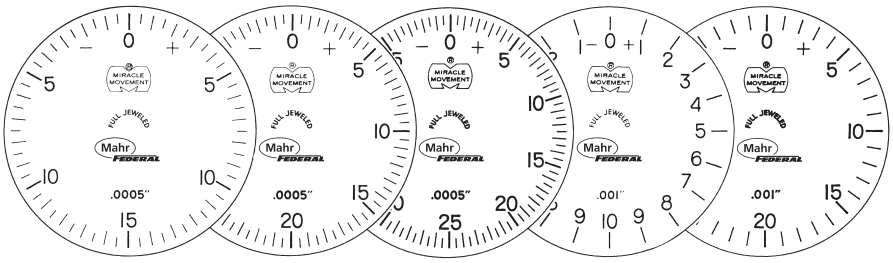
• Contact Points - see page 51

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

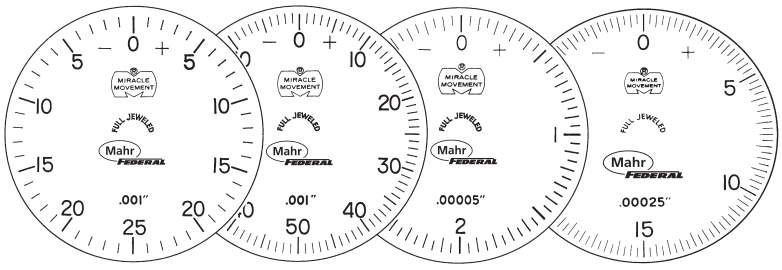
Mahr Federal Series B thru E



	12I	12Q	B3K	B3Q
C1K	2015781	2015782	2015783	2015784
D1K	32I	32Q	D3K	D3Q
E1K	42I		E3K	E3Q

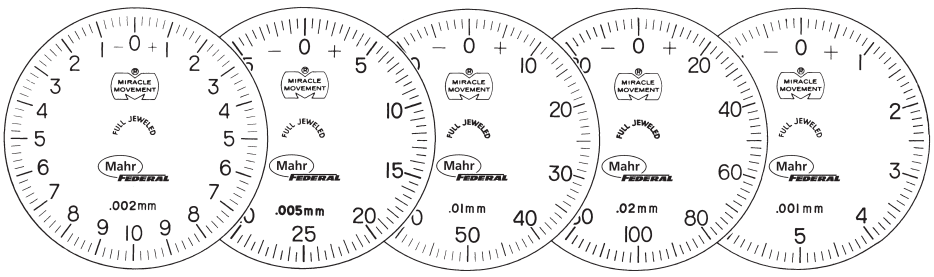


B5M	B6K	B7I	B3W	B6Q
2015786	2015787	2015790	2015785	2015789
D5M	D6K	D7I	D3W	D6Q
E5M		E7I	E3W	



B7O	B8I		
2015791	2015792	C1/2K	
D7O	D8I		D5G
E7O	E8I		E5G

Mahr Federal Series O thru R



O1I	O3I	O6I	Q8I	
P1I	2015793	2015794	2015795	P1/2I
Q1I	Q3I	Q6I	R8I	
R1I	R3I	R6I		

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**	

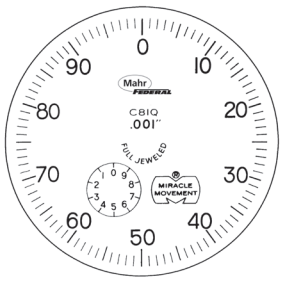
* *for first 2-1/2 revolutions only.*
** *hysteresis = .0003" for full range*
*** *for first 1 inch of travel.*

Long Range/Extra Long Range (Metric)
Dial: yellow tint

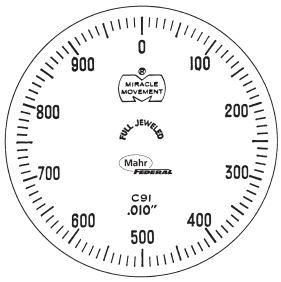
Measuring range	Graduation value	Dial style	Range per revolution	Accuracy	ANSI/AGD	Model no.	Order no.
25.000	0.010	0-100	1.000	0.020	2	**SP6IS**	
25.000	0.010	0-100	1.000	0.020	3	**SQ6IS**	
Extra Long Range							
50.000	0.025	0-25	2.500	0.025****	3	**Q8IT**	
75.000	0.025	0-25	2.500	0.025****	4	**R8IU**	

**** *for first 25 mm of travel.*

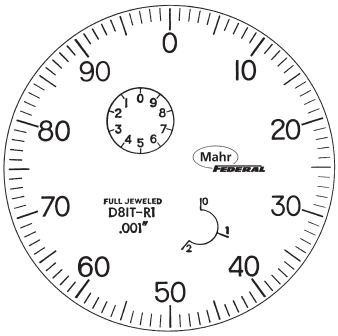
Dial Styles for Long Range and Extra Long Range Indicators



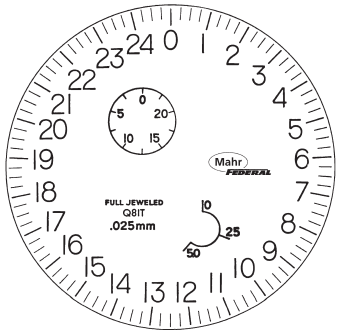
28IQN, 28ISN & D8IS



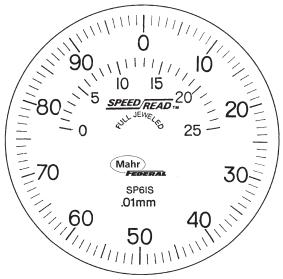
29I



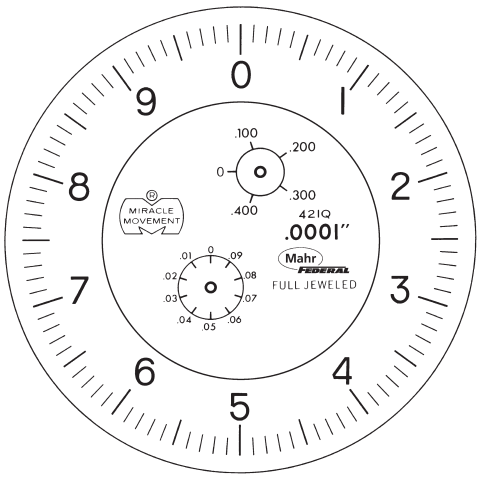
D8IT & E8IU



Q8IT & R8IU



SP6IS & SQ6IS



42IQ

Features

- Normally furnished: continuous clockwise dial; centered vertical lug back; regular contact point, .18" radiused, .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

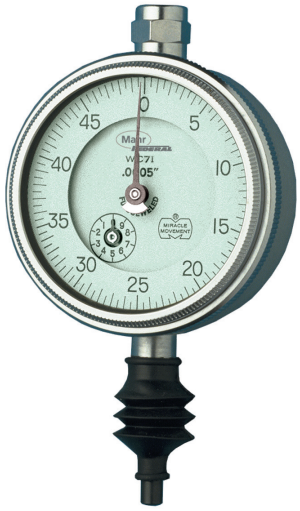
Ordering Information

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.



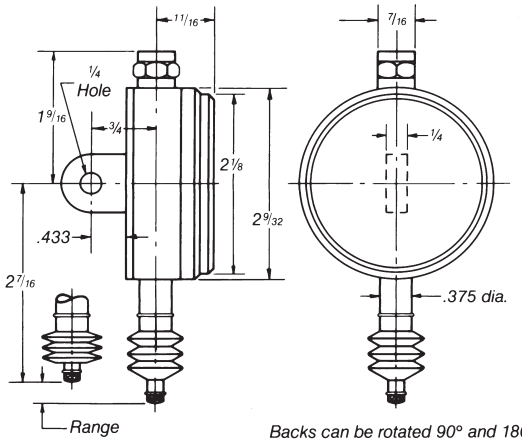
Technical Data

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

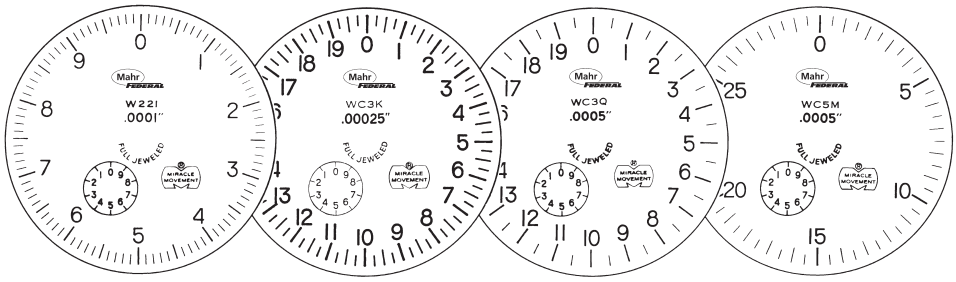
Measuring range	Graduation value	Dial style	Range per revolution	Accuracy	Order no.
0.500	0.002	0-20	0.200	0.004	**WP1I**
1.250	0.005	0-50	0.500	0.005	**WP3I**
2.500	0.010	0-100	1.000	0.010	**WP6I**



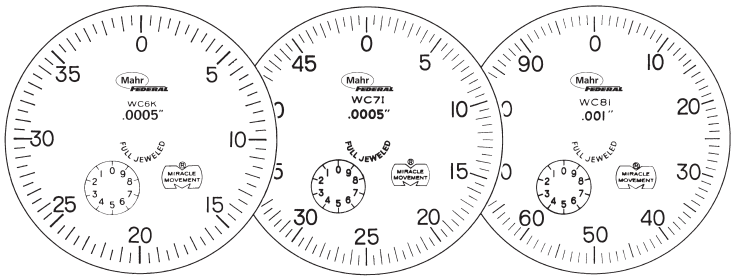
Backs can be rotated 90° and 180°

Dial Styles for WC and WP Wetproof Dial Indicators

Series WC indicators

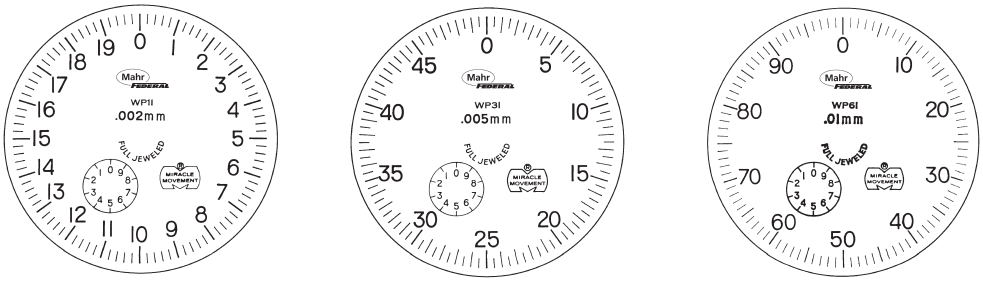


W22I WC3K WC3Q WC5M



WC6K WC7I WC8I/WC8IS

Series WP indicators



WP1I WP3I WP6I

Features

- Normally furnished: continuous clockwise dial with revolution counter; BK-63 centered vertical lug back; regular contact point, .18" radiused, .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.

Accessories

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

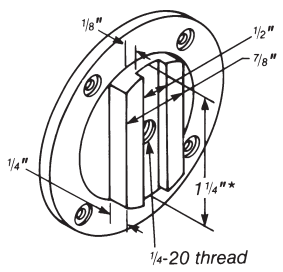
Ordering Information

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

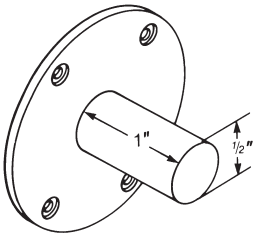
www.mahr.com

Backs for Wetproof Dial Indicators

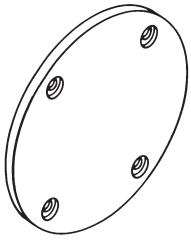
Vertical (centered) lug back is normally furnished and included in price of indicator. Back can be rotated 90° for horizontal lug mounting.



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.



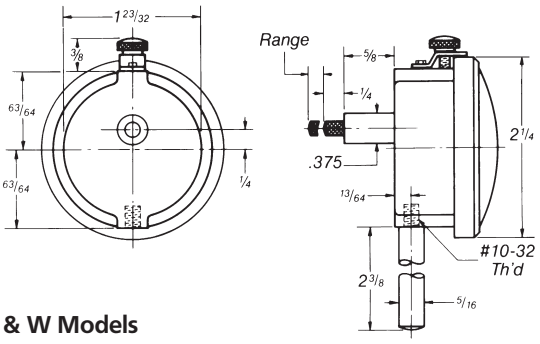
Technical Data

Series F, G, J, V (Inch)
Dial: soft-green tint

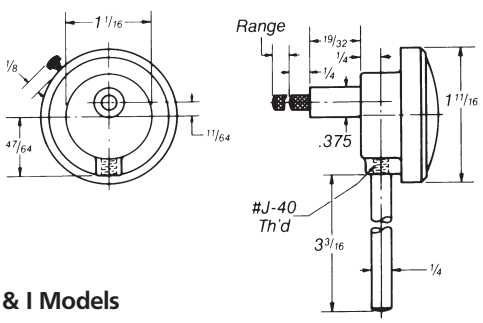
Measuring range	Graduation value	Dial style	Range per revolution	Accuracy	Gear type	Dial Dia. (approx.)	Order no.
.008"	***.0001"***	0-4-0	***.008"***	***.0001"***	crown	***2-1/4"***	**J1K**
.040"	***.0005"***	0-20-0	***.040"***	***.0005"***	crown	***2-1/4"***	**J6K**
.100"	***.0005"***	0-12-0	***.025"***	***.0005"***	spiral	***2-1/4"***	**G4O**
.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

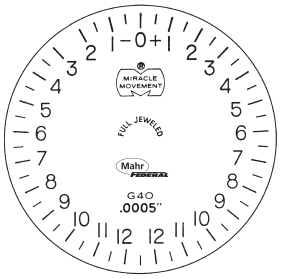
Series J, G, V, F



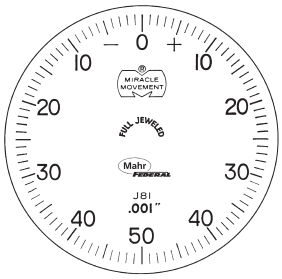
J1K



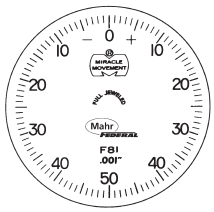
J6K



G4O

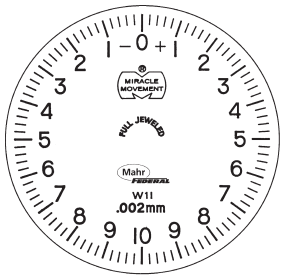


J8I & G8I

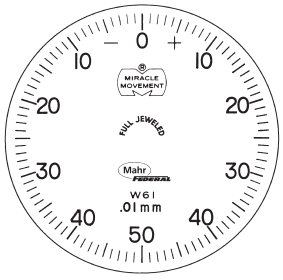


V8I & F8I

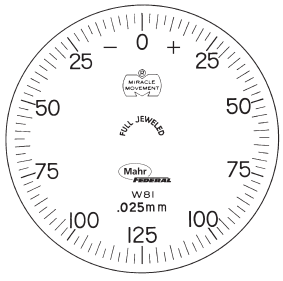
Series W, I



W1I



W6I



W8I & I8I

Features

- Normally furnished: balanced dial with + on right; mounting rod (see dimension drawings); regular contact point, .18" radiused, .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.

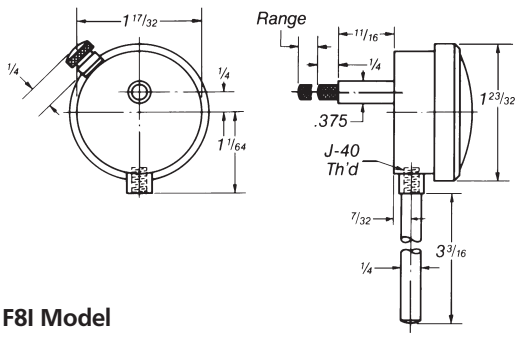
Accessories

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

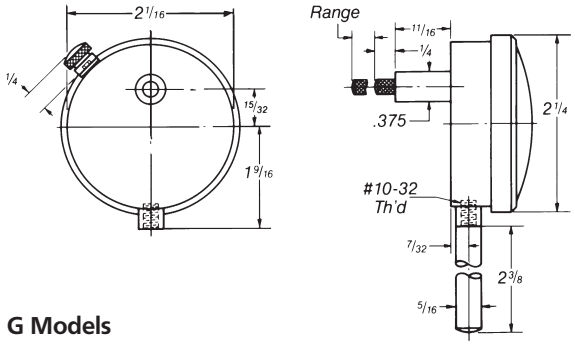
Ordering Information

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

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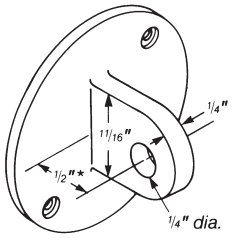
F8I Model



G Models

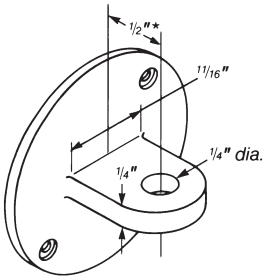
Backs for ANSI/AGD Group 1, 2, 3, and 4 Dial Indicators

Vertical Lug
(centered) normally furnished

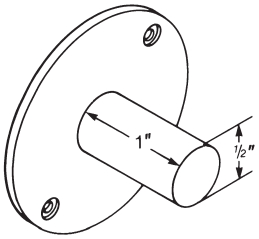


*$^{27}/_{64}$" for E/R size

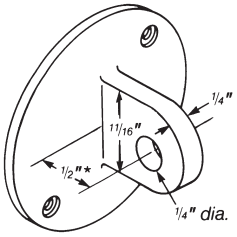
Horizontal Lug
(centered)



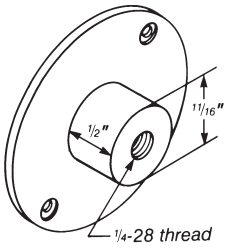
Post



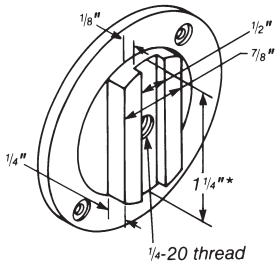
Vertical Lug
(offset) Left face of lug is on centerline of back



Screw Type

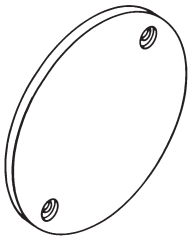


Adjustable



*$^{7}/_{8}$" for B/O size; no flats

Flat



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.

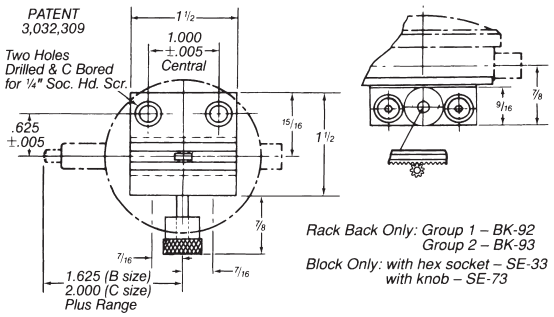
Ordering Numbers

	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

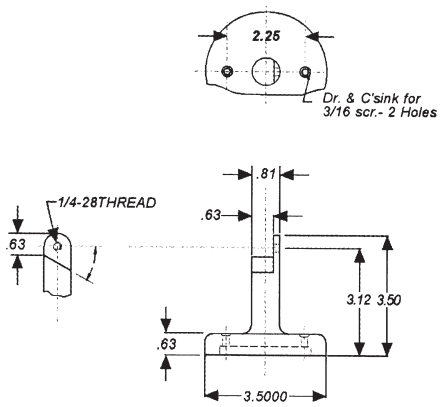
Mahr Federal Indicator	Used with	Order no.
Group 1	hex socket adjust	**AT-27**
Group 1	adjusting knob	**AT-115**
Group 2	hex socket adjust	**AT-28**
Group 2	adjusting knob	**AT-116**

Universal Mounting Base

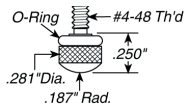
Features

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

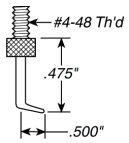
Order no. **BA-1051**



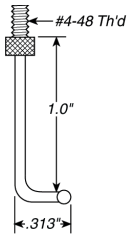
Added flexibility for your Mahr Federal Dial Indicators



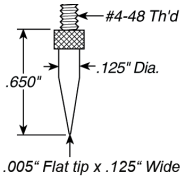
PT-2263



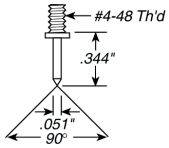
PT-2267



PT-2268



PT-2266



PT-2265

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.

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 FemaleThreaded Adapter	**2236519**

Indicator Accessories

Weights

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



Protective Housing

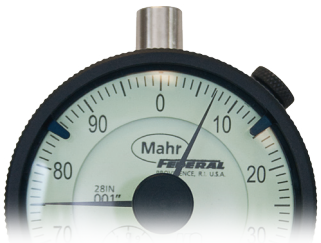
For ANSI/AGD Group 2 indicators. Opens at rear so indicator can be mounted by its back. Mounts to indicator stem using a .687" O.D. bushing (not included). Order **HG-100** for Indicator models with ranges up to 6.35 mm /.250", **HG-101** for ranges of 6.35 mm /.250" to 25 mm /1".
Recommended bushings: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

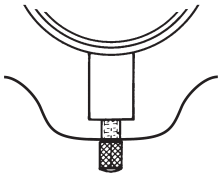
Used with ANSI/AGD type and long range indicators.



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.



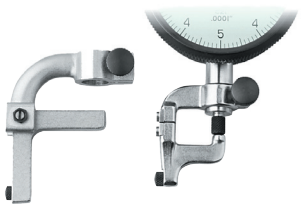
Split Bushings

Fits all ANSI/AGD type and perpendicular indicators, Permits safe, non-cramping stem mounting. Order **BU-94** without counter-bore, **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 intruments 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 displacemet 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
Inch	***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 H x W x D (approx)	***18" x 6" x 8"*** 460 x 153 x 204 mm
Readout H x W x D	**10" x 7" x 2.0"** 260 x 180 x 50 mm
Weight - Calibrator	37 lbs. / 17 kg
Weight - MarCheck	3 lbs. / 1.4 kg

Normally furnished:	**Order no.**
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



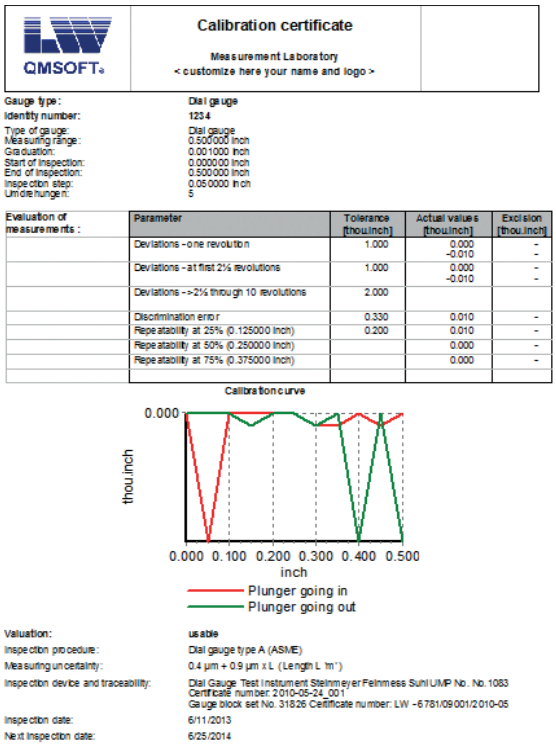
Dial Comparator

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**


Calibration certificate

Measurement Laboratory
< customize here your name and logo >

QMSOFT®

Gauge type: Dial gauge
Identity number: 1234
Type of gauge: Dial gauge
Measuring range: 0.500000 inch
Graduation: 0.001000 inch
Start of inspection: 0.000000 inch
End of inspection: 0.500000 inch
Inspection step: 0.050000 inch
Umdrehungen: 5

Evaluation of measurements :	Parameter	Tolerance [thou.inch]	Actual values [thou.inch]	Excision [thou.inch]
	Deviations - one revolution	1.000	0.000 -0.010	- -
	Deviations - at first 2½ revolutions	1.000	0.000 -0.010	- -
	Deviations - >2½ through 10 revolutions	2.000		
	Discrimination error	0.330	0.010	-
	Repeatability at 25% (0.125000 inch)	0.200	0.010	-
	Repeatability at 50% (0.250000 inch)		0.000	-
	Repeatability at 75% (0.375000 inch)		0.000	-

Calibration curve

Valuation: usable
Inspection procedure: Dial gauge type A (ASME)
Measuring uncertainty: 0.4 µm + 0.9 µm x L (Length L 'm')
Inspection device and traceability: Dial Gauge Test Instrument Steinmeyer Feinmess Suhl UMP No. No. 1083 Certificate number: 2010-05-24_001 Gauge block set No. 31826 Certificate number: LW -6781/09001/2010-05
Inspection date: 6/11/2013
Next inspection date: 6/25/2014

Accessories

	Order no.
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**

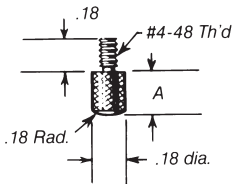
- Normally furnished:
  BU-112 Bushing (.218" I.D. to .375" O.D.)
  AD-58 Bushing (.275" I.D. to .375" O.D.)
  BU-197 Bushing (8 mm I.D. to .375" O.D.)

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

Contact Points

Used with ANSI/AGD Groups 1,2,3,4 Long Range Wetproof Perpendicular and *Maxμmill*® 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

Diamond

1/4"	PT-317

Set of 8 Steel

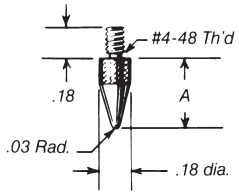
1/8" to *1"*	PT-116

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



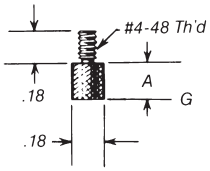
Hardened Steel (inch)

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

Tungsten Carbide (inch)

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.
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

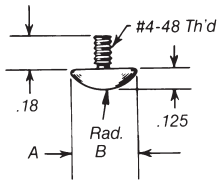
Tungsten Carbide

1/4"	AL-51

Set of 8 Steel

1/8" to *1"*	AL-55

Button



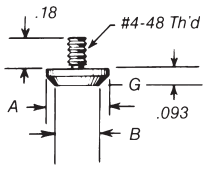
Hardened Steel (inch)

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

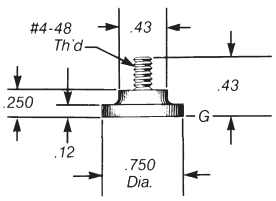
Tungsten Carbide (Metric***)

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

Extra Wide Face

Hardened Steel

	Order no.
(inch)	AL-291
(metric)	2252940



MarCator Dial Indicators (DIN Style)

OVERVIEW

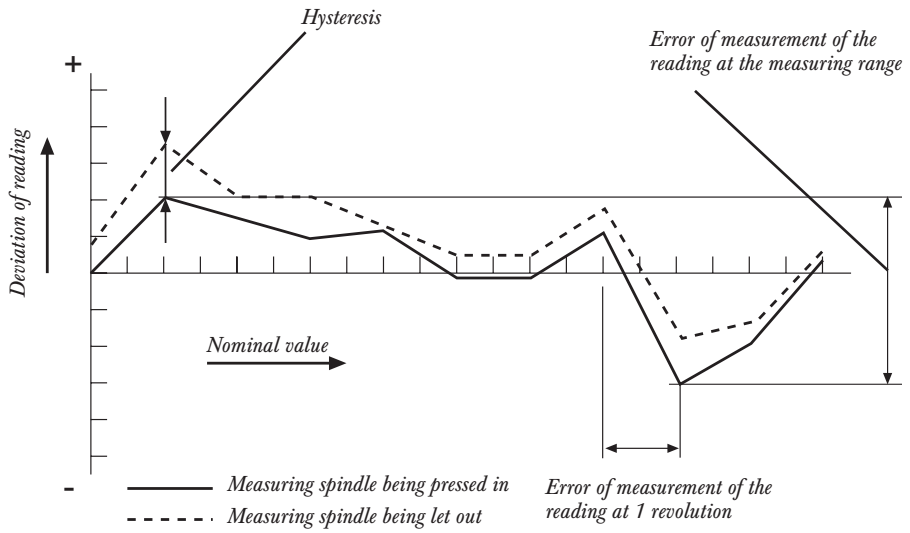
Precision Small Dial Indicators

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	10 µm	12 µm	10 µm	10 µm
		1 revolution	9 µm	9 µm	9 µm	9 µm
		1/2 revolution	8 µm	8 µm	8 µm	8 µm
		1/10 revolution	5 µm	5 µm	5 µm	5 µm
Limit value for		Repeatability	3 µm	3 µm	3 µm	3 µm
Limit value for		Hysteresis	3 µm	3 µm	3 µm	3 µm
Shockproof	SHOCK PROOF				●	●
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	15 µm	15 µm	15 µm	15 µm
		1 revolution	10 µm	10 µm	10 µm	10 µm
		1/2 revolution	9 µm	9 µm	9 µm	9 µm
		1/10 revolution	5 µm	5 µm	5 µm	5 µm
Limit value for		Repeatability	3 µm	3 µm	3 µm	3 µm
Limit value for		Hysteresis	3 µm	3 µm	3 µm	3 µm
Shockproof	SHOCK PROOF				●	●
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**

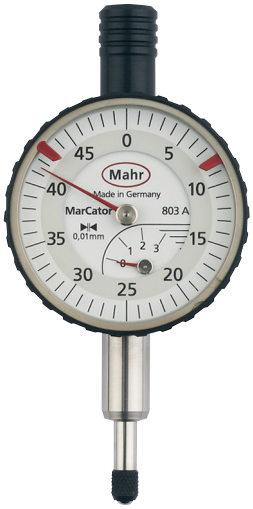
Metrological characteristics



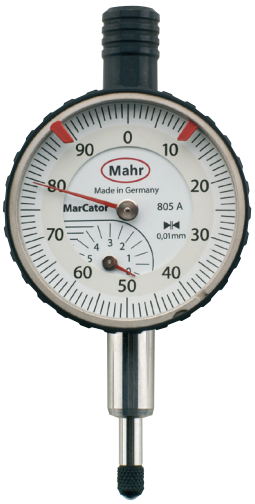
	803 SB	803 AZ
		
	0.4 mm (±0.2)	***.120"***
	0.01 mm	***.0005"***
	0-20-0	0-20
	DIN 878	Factory standard
	9 µm	***.0004"***
	8 µm	
	5 µm	***.0002"***
	3 µm	***.00012"***
	3 µm	***.00012"***
	●	
	0.9 - 1.1 N	0.7 - 1.1 N
	4324250	**4324900**

	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	5 µm		10 µm	50 µm	15 µm	15 µm
	6 µm	2 µm	3 µm		9 µm	30 µm	10 µm	10 µm
	5 µm	1 µm	2 µm	***.0002"***	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**

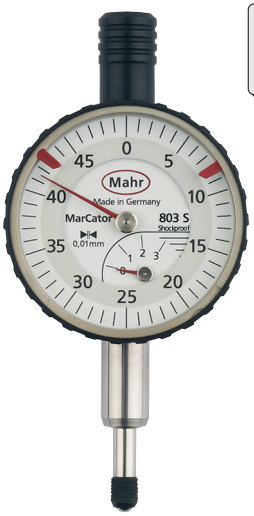
Precision Small Dial Indicators 803 / 805 DIN style



803 A



805 A



803 S

SHOCK PROOF

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

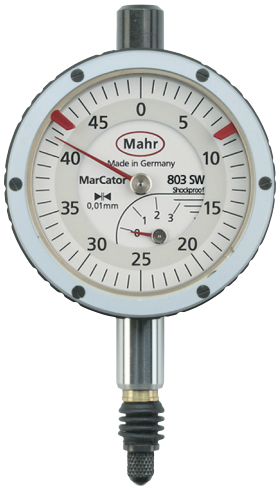
- High precision gears and pinions
- Lifter protection cap on the upper end of the measuring spindle
- Adjustable tolerance markers
- Chrome-plated housing

All indicators are delivered in plastic case

Technical Data

	Range	Readings	Dial face dia.	Overtravel	Mounting shank dia.	Measuring force			Accuracy DIN 878	Order no.
	mm	mm	mm	mm	mm	N				
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**

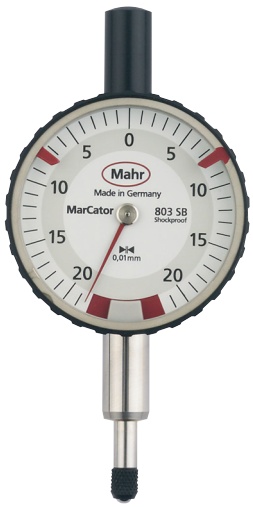
Precision Small Dial Indicators 803 / 805 DIN style



IP54

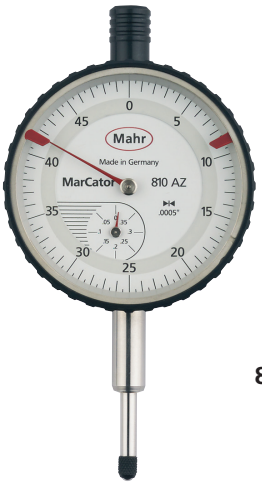
SHOCK PROOF

803 SW



SHOCK PROOF

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

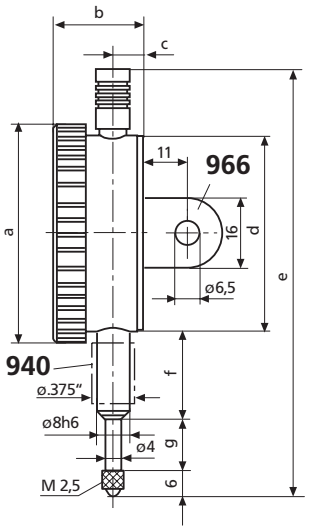
Design features identical to 803 S, with the following exceptions:
- Limited measuring range (0.4 mm) for error-free readings
- Large overtravel (ca. 4.5 mm), for easier insertion of test items in measuring devices
- Hermetically sealed upper protective measuring spindle cap

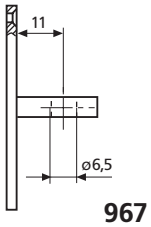
Small Dial Indicator 803 AZ
Inch version

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



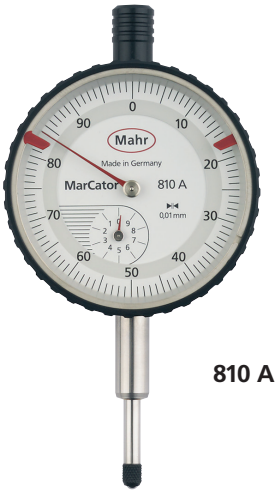


967

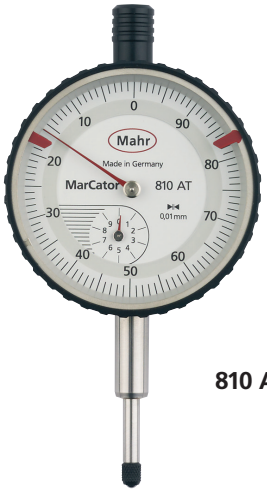
Accessories

		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**

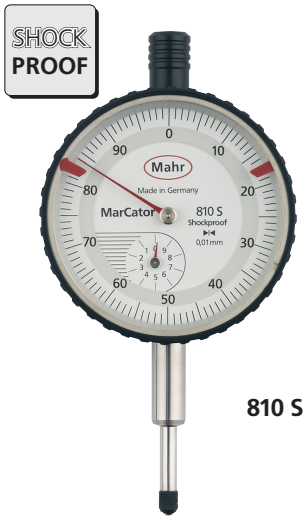
Precision Dial Indicators 810 DIN style



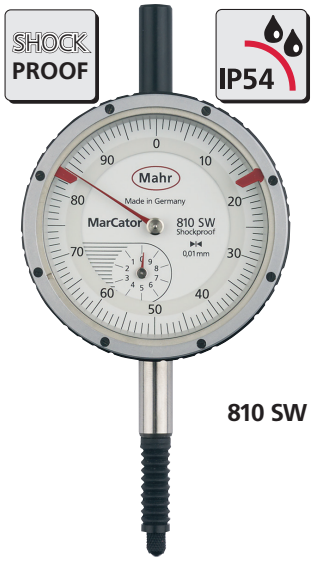
810 A



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

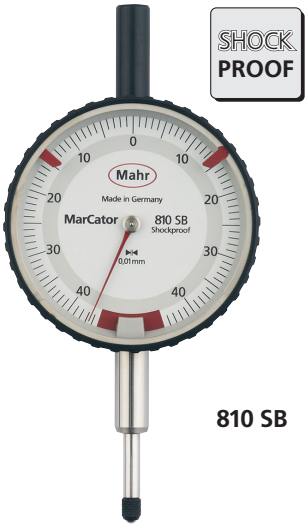
	Range	Readings	Dial face dia.	Overtravel	Mounting shank dia.	Measuring force	Accuracy DIN 878	Order no.
	mm	mm	mm	mm	mm	N		
810 A	10	0.01	50	0.1	8h6	0.7 - 1.3	●	**4311050**
810 AT	10	0.01	50	0.1	8h6	0.7 - 1.3	●	**4311060**
810 S	10	0.01	50	0.1	8h6	0.7 - 1.3	●	**4311000**
810 SW	10	0.01	50	0.1	8h6	0.7 - 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

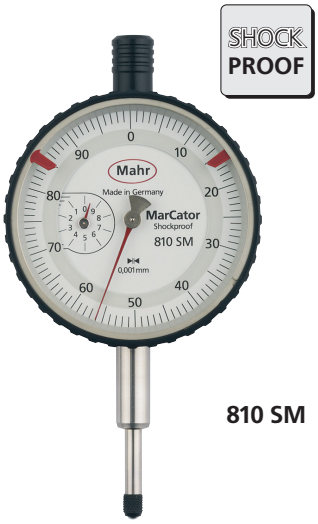
		Order no.
Adapter Bush for adapting mounting shank 8h6 mm to inch bore .375"	**940**	**4310103**
Splash Guard Cover for bezel dia. 58 mm	**955**	**4373020**

		Order no.
Mounting Lug		
Bore perpendicular to mounting shank	**961**	**4375010**
Bore parallel to mounting shank	**962**	**4375011**

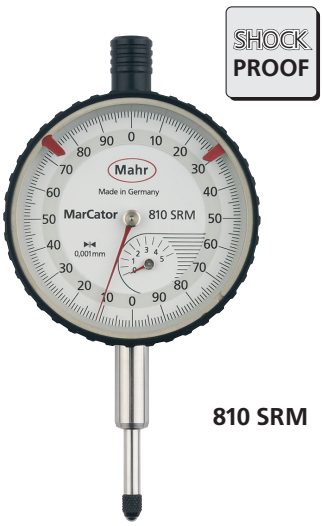
Precision Dial Indicators 810 DIN style



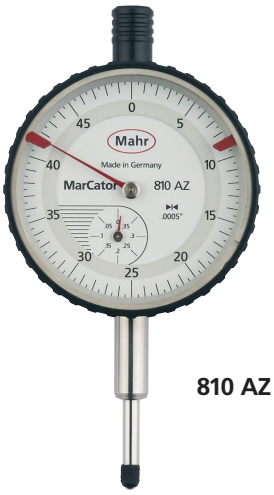
810 SB



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

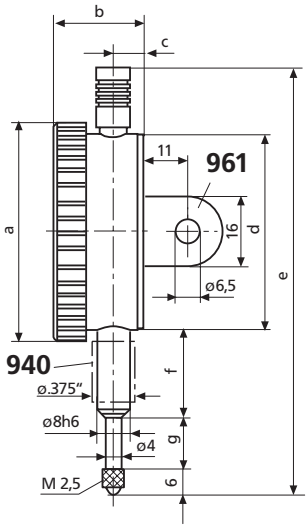
- High precision gears and pinions
- Lifter protection cap on the upper end of the measuring spindle
- Adjustable tolerance markers
- Chrome-plated housing

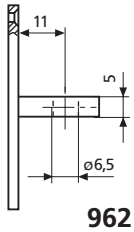
Dial Indicator 810 AZ
Inch version

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

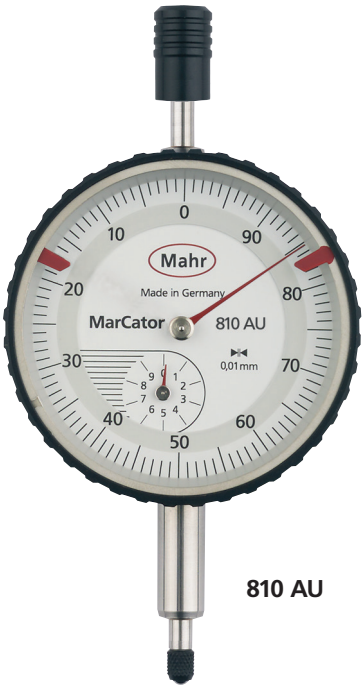
mm	a	b	c	d	e	f	g
810 A/AT	ø 58	23	7.5	52	112	21	16
810 S	ø 58	23	7.5	52	111.5	22	15
810 SW	ø 61	24.15	7.9	52	127.6	22	22.1
810 SB	ø 58	23	7.5	52	120	22	15
810 SM	ø 58	25	8.5	52	111.5	22	15
810 SRM	ø 58	23	7.5	52	111.5	22	15
810 AZ	ø 58	23	7.5	52	111.5	22	15



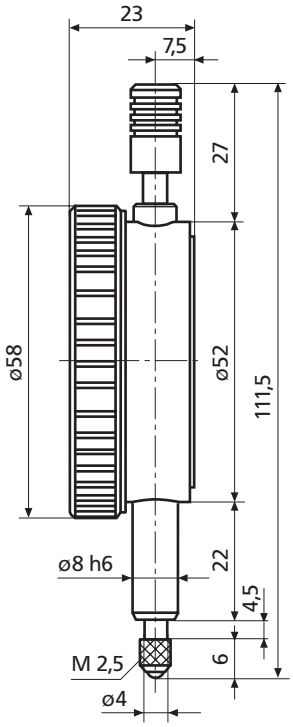


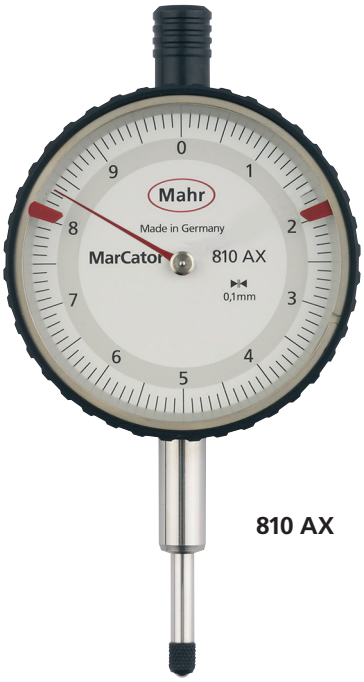
962

Precision Dial Indicators 810

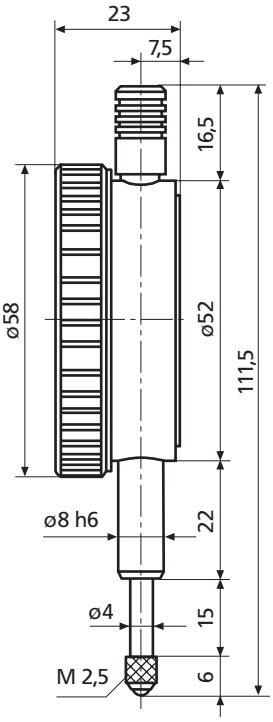


810 AU





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

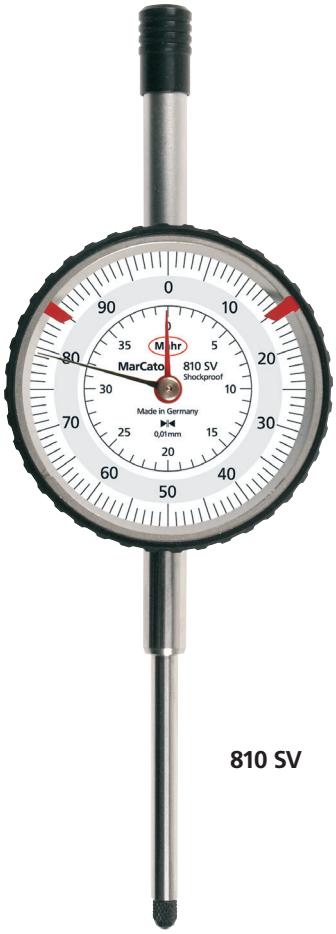
Dial Indicator 810 AX
with reading 0.1 mm

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

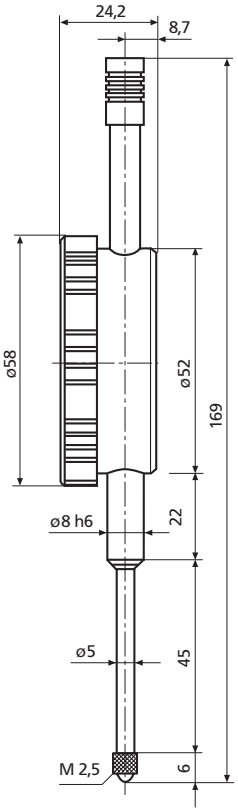
Technical Data

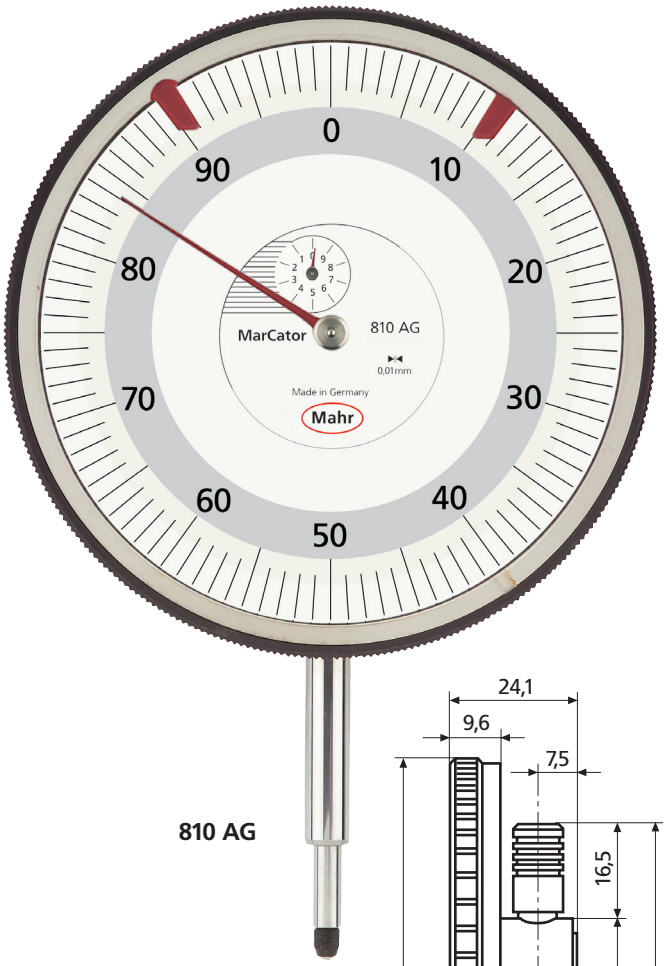
	Range	Readings	Dial face dia.	Overtravel	Mounting **shank** dia.	Measuring **force**	Order no.
	mm	mm	mm	mm	mm	N	
810 AU	10	0.01	50	0.1	8h6	1 - 1.8	**4329050**
810 AX	10	0.1	50	0.5	8h6	0.7 - 1.3	**4331000**
810 SV	40	0.01	50	0.1	8h6	0.8 - 1.8	**4321000**
810 AG	10	0.01	108	0.1	8h6	1.3 - 2.2	**4322000**

Precision Dial Indicators 810

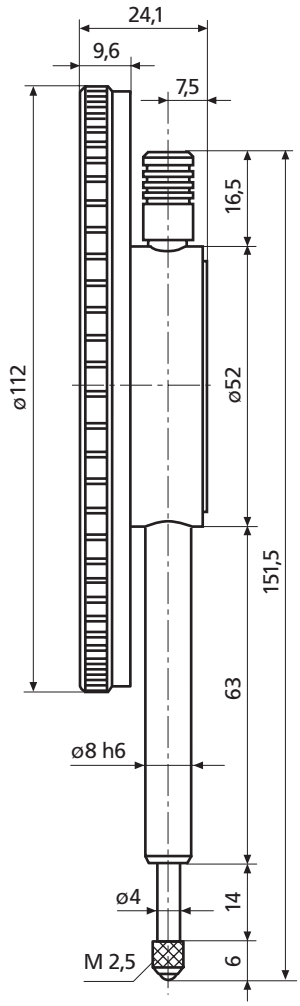


810 SV





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

		Order no.
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 µm/ 10 µinch 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® *II* 68
With digital display

Maxµm® *III* 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

Millimess. Digital Comparators (Short range)

OVERVIEW

Inductive Digital Comparators

		2100	2000
			
Catalog page		64	66
Measuring range		2.8 mm	1.8 mm
Resolution		mm / ***inch*** 0.0005 / ***.00002"*** 0.001 / ***.00005"*** 0.005 / ***.0002"*** 0.01 / ***.0005"***	mm / ***inch*** 0.0002 / ***.00001"*** 0.0005 / ***.00002"*** 0.001 / ***.00005"***
Mounting shank		8h6	8h6
Protection class	IP class according to IEC 60529	IP54	IP54
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 / ***inch***	mm / ***inch***	mm / ***inch***
0.0002 / ***.00001“***	0.0002 / ***.00001“***	0.0005 / ***.00002“***
0.0005 / ***.00002“***	0.0005 / ***.00002“***	0.001 / ***.00005“***
0.001 / ***.00005“***	0.001 / ***.00005“***	0.001 / ***.0001“***
	0.001 / ***.0001“***	0.005 / ***.0005“***
	0.005 / ***.0002“***	
	0.010 / ***.0005“***	
	0.020 / ***.001“***	
8h6	8h6 / ***3/8“***	8h6 / ***3/8“***
IP54	IP54	IP54
●	●	Auto
●	●	●
●	●	●
●	●	●
●	●	●
●	●	
	●	
●		
●	●	●
●	●	●
●	●	●
●	●	●
●	●	●
●	●	●
●	●	●
●	Optional	Optional
●	●	●
●	●	●
●	●	●
●		

Millimess 2100

►| The Inductive Digital Comparator **Millimess** 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

MAX / MIN

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

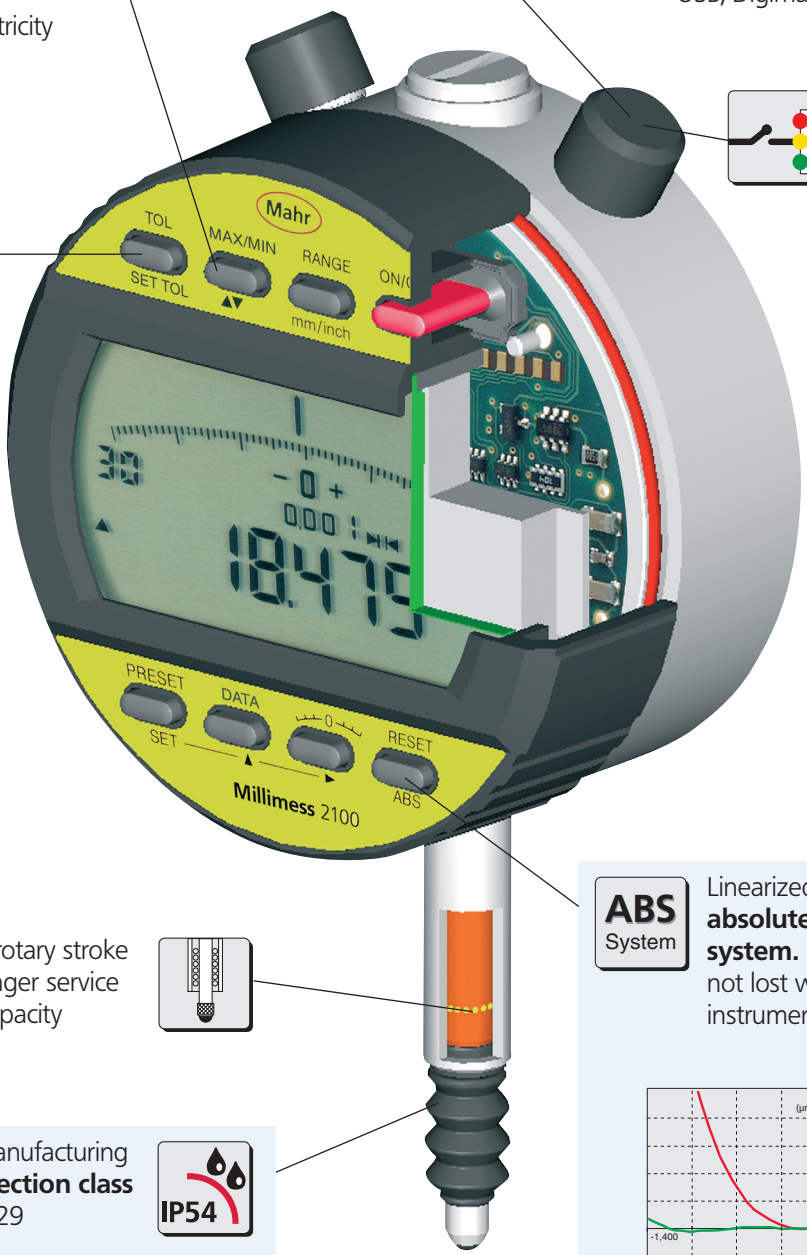
MarConnect: USB, RS232C, Digimatic

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.

TOL

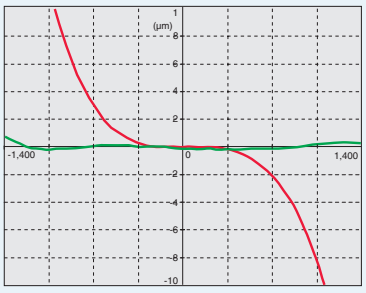




High precision rotary stroke bearings for a longer service life and higher capacity

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

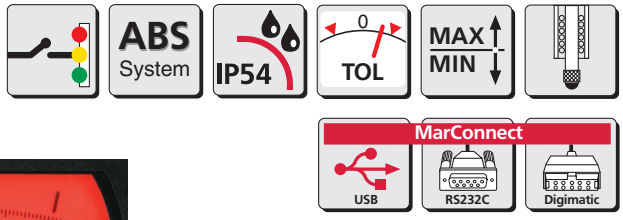
IP54

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

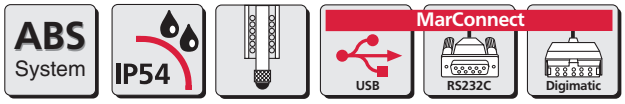
- Factor can be set / adjusted
- Linearized inductive absolute measuring system
- Measurement electronic is compensated for temperature
- Power supply via the mains power adapter
- MarConnect data output: choose either
  USB
  OPTO RS232C
  Digimatic
- Dial Comparator can be remotely operated via the 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 mm	*(inch)*	Resolution switchable mm	/ *inch*	Display range of the analog display mm	*(inch)*	Span of error* *G* within ±0.8mm	±1.4mm	Over-travel mm	Meas. force N	Order no. 230 V	Order no. 115 V
±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

Extrames 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

Extrames 2001

Features are identical to Extrames 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

- Block individual operating functions via Software (see accessories)
- Factor can be set / adjusted
- Control output compatible to Dial Comparators with limit contacts

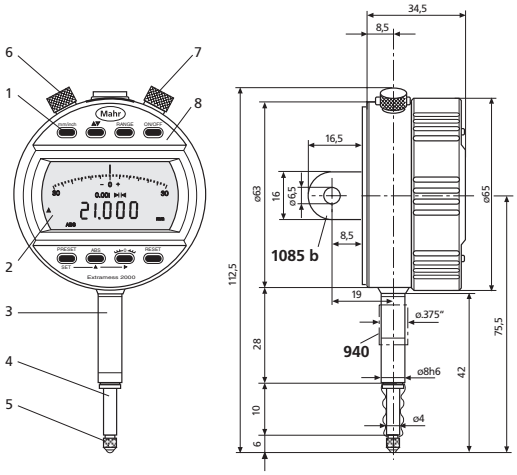
- Supplied with:
  Mains adapter, rubber bellows and spanner for preliminary stroke setting

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*

1 Operating buttons
2 Display
3 Mounting shank
4 Measuring spindle
5 Contact point 901H
6 Connection or mains power supply
7 Data output
8 Rotatable operating and display unit (bezel)



Control Instrument 2000sg



Features

- Remote control buttons:
  RESET
  PRESET
  RANGE*
- DATA-button for data transmission, option via foot switch
- Power is supplied by the Extramess
- Connect to the Extramess with the built-in control cable
- Data can be transferred to a PC with an optional data cable
- Splash waterproof according to IP54

Order no. **4346035**

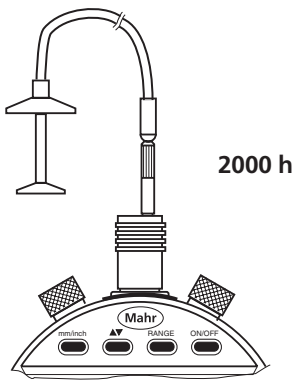
** Function is limited when used in conjunction with the 2100*

Accessories

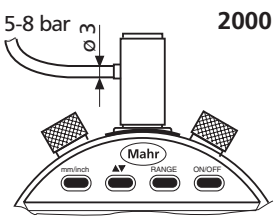
		Order no.
Data Connection Cable USB (2 m)	**2000 usb**	**4346023**
Data Connection Cable Opto RS232C (2 m), SUB-D jack 9-pin	**2000 r**	**4346020**
Data Connection Cable Digimatic (2 m), flat plug 10-pin	**2000 d**	**4346021**
Cable to connect control output to an SPS	**2000 sps**	**4346031**
Manual Lifter with cable release	**2000 h**	**4346010**
Pneumatic Lifter	**2000 p**	**4346011**
Measuring Force Adjuster	**2000 m**	**4346012**
Mounting Lug Horizontal/Vertical	**1085 b**	**4336310**
Adapter Bush for adapting mounting shank 8h6 mm to inch bore .375"	**940**	**4310103**

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

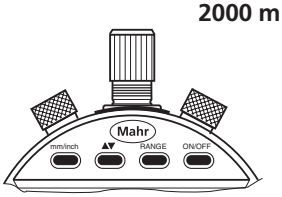
Measuring Force Springs	Order no.
0.25 N	**4346050**
0.5 N	**4346051**
0.75 N	**4882284**
1.0 N	**4346052**
1.5 N	**4346053**
2 N	**4346054**
2.5 N	**4346055**



2000 h

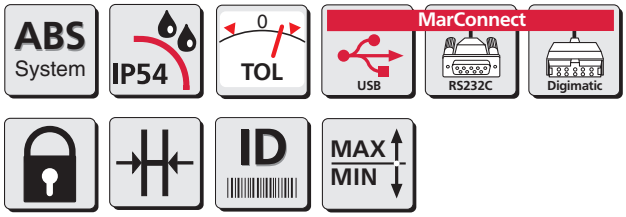


2000 p



2000 m

Inductive Digital Comparator *µMaxµm® II*





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 µinch) 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



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)

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 mm / *inch*	Resolution mm / *inch*	Accuracy % of digital range	Stem diameter	Stem Length mm / *inch*	Order no.
Standard				***.375"***	11.7 / ***.46"***	**2034101**
Standard				***.375"***	38.0 / ***1.50"***	**2034103**
Standard		0.0002 / ***.00001"***	±0.25% over	8 mm	11.7 / ***.46"***	**2034105**
Standard		0.0005 / ***.00002"***	±0.50 mm / ***±.020"***	8 mm	38.0 / ***1.50"***	**2034107**
Advanced	±1.00 / ***±0.040"***	0.001 / ***.00005"*** 0.002 / ***.0001"***	±0.50% from ±0.50 mm / ***±.020"***	***.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**

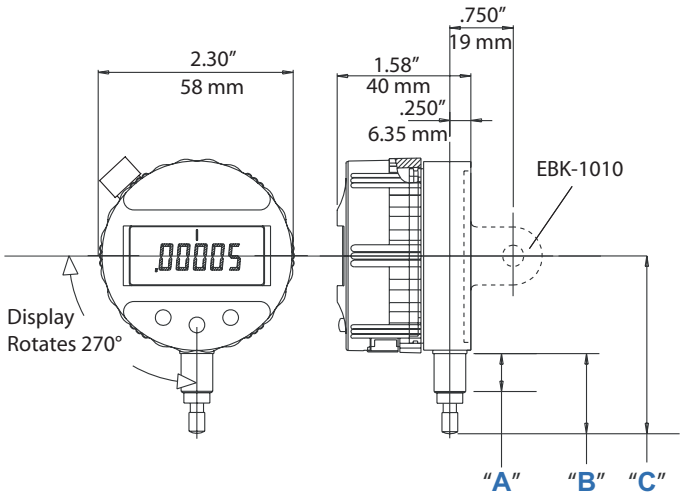
Technical Data

Display Range:	±1.067 mm / ***± .042"***
Spindle Range:	-1.25 to 1.50 mm / ***- .050 to + .060"***
Resolution:	0.0002 mm / ***.00001"***
Accuracy:	±0.5 mm range: 1.25µm (0.25%)
(% of range)	±1.0 mm range: 5.0µm (0.50%)
	± .020" range: 50µinch (0.25%)
	± .040" range: 200µinch (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:	± 1 LSD (Least Significant Digit)
Battery Life:	6000 hours
	~12 months normal usage*

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

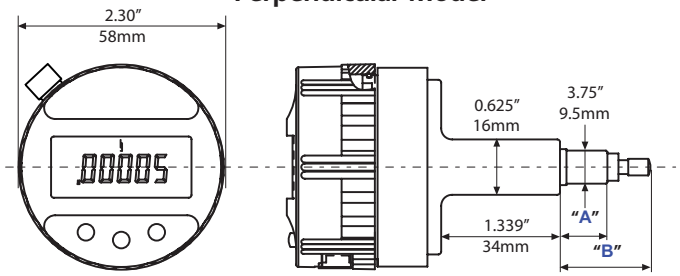
Contact Point:	(**PT-223** radiused tip, 4-48 thread, furnished on 0.375" dia. Stem model) **EPT-1037-W1** radiused tip, M2.5 thread furnished on 8 mm dia. stem model
Power:	3 volt lithium coin cell (2 per unit), type CR 2450. Order no. **EBY-1018**
Display:	Rotates through 270°

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.
Backs:	
Flat Black (Standard on all models)	**EBK-1018**
Post Back (.5" dia. x 1" long)	**EBK-1012**
Lug Back (Horizontal / Vertical)	**EBK-1010**
Screw Back (11/16" dia x .5", 1/4-28 thread)	**EBK-1013**
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 seperately.*

	Order no.
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**

	Order no.
Other Hardware:	
Splash Cover	**ECV-1307-W2**
Adaptor Bushing (8 mm to 3/8")	**BU-197**
Thread Adaptor (M2.5 to 4-48 thread)	**AD-185**
Spring (for lighter gaging force: 35g)	**SP-351**

Maxμm® /// Digital Comparator

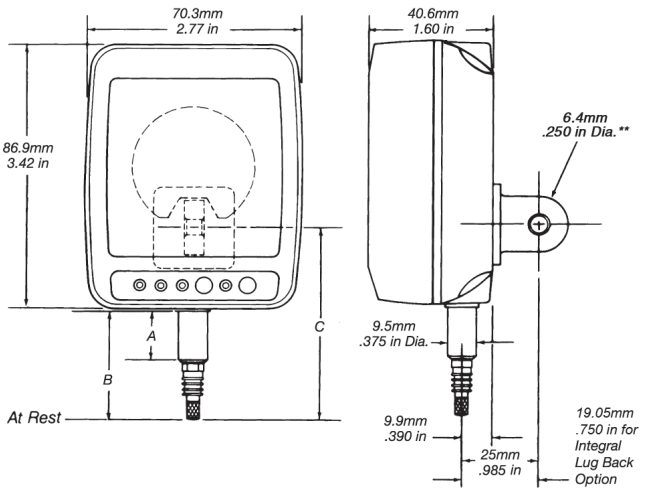
Features

- 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!



ABS System
TOL
MAX MIN
RS232C
Digimatic
USB
IP54

Technical Data



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

For short range indicators – Standard Stem Length (± 1.0 mm / ± .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 (± 1.99 mm / ± .100" range indicators)

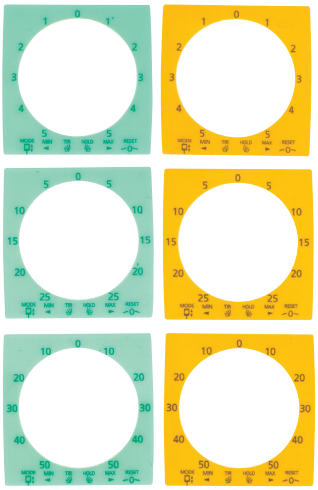
22 mm / ***.87"***	47 mm / ***1.84"***	73 mm / ***2.87"***

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*

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® /// Digital Comparator

Technical Data

Maxμm® /// 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 compaitible with traditional Remote Transducer models EAS-XXXX.*



Supplied with Lug back

Maxμm® /// Digital Transducer①

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 / *inch*	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-XXXXX 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 /// Remote Indicating units sold separately from Digital Transducer.
- Any Digital Transducer may be used with a Maxμm /// 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.



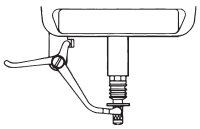
Pencil



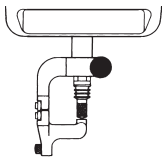
Canister

Accessories

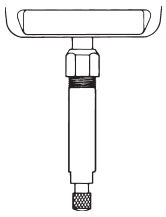
For Integral Maxμm® Indicators



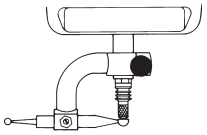
Lifting Levers[1)]
Furnished with washer and longer contact point. Left Hand (shown)
Order no. **EAS-1903***
Right Hand (not shown)
Order no. **EAS-1904***



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**

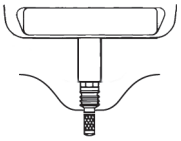


Auxiliary Plunger
3" long, .500" O.D.
Order no. **EAS-1912**



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**

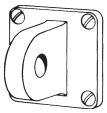
[1)] *(For use on .670" stem length only, DEI-XX1X1)*
** Not for (±.100" / 1.99 mm*



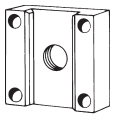
Ox-Bow Lifting Lever
Order no. **LR-40**

** 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.*

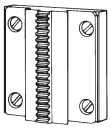
Backs for Maxμm® Indicators and Remote Indicating Units (Supplied with mounting screws)



Lug Back (.250" hole)
Mounts horizontally or vertically.
Order no. **EBK-1006**

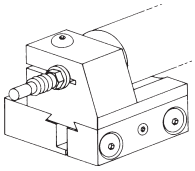


Adjustable Slide Back
(.500" slot, 1/4-20 thread)
Order no. **EBK-1007**



Rack Back
Fits SE-33 (shown) and SE-73. Adjustable Mounting Block (not shown).
Order no. **EBK-1005**

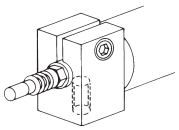
Replacement Screws
2-56 x .218"
Order no. **ESW-1252**



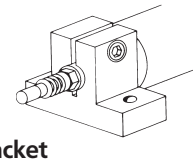
Rack Bracket (Shown mounted to SE-33 Adjustable Mounting Block.)

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 Accesssories	**Order no.**
Data Output Cables for Maxμm ///	
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 /// t, used w / FM 1 Receiver)	**2121368**
Mating Connectors – Maxμm /// 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 ///	**ECV-1307-W1**
Battery for Maxμm ///	**2239138**
Overlay Kit for Maxμm ///	**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 IP54			**4335005**	**4334005**

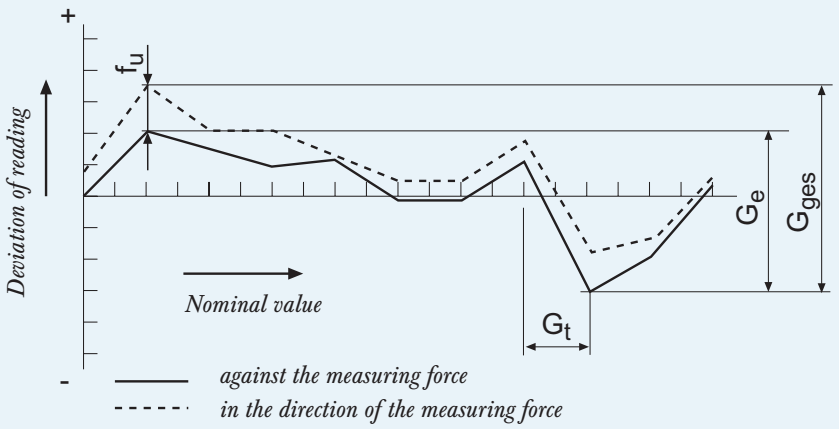
Inch			1002 Z	1003 Z
Measuring range			± .0010"	± .0020"
Readings			.00002"	.00005"
Dial style			.001-0-.001	.002-0-.002
Accuracy*			Factory standard	Factory standard
G_{ges}			.000025"	.00006"
G^e			.00002"	.00005"
f_u			.00001"	.000025"
G^t			.000014"	.000035"
r			.00001"	.000025"
Order no. Standard			**4335900**	**4334900**
Order no. Waterproof IP54			**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**

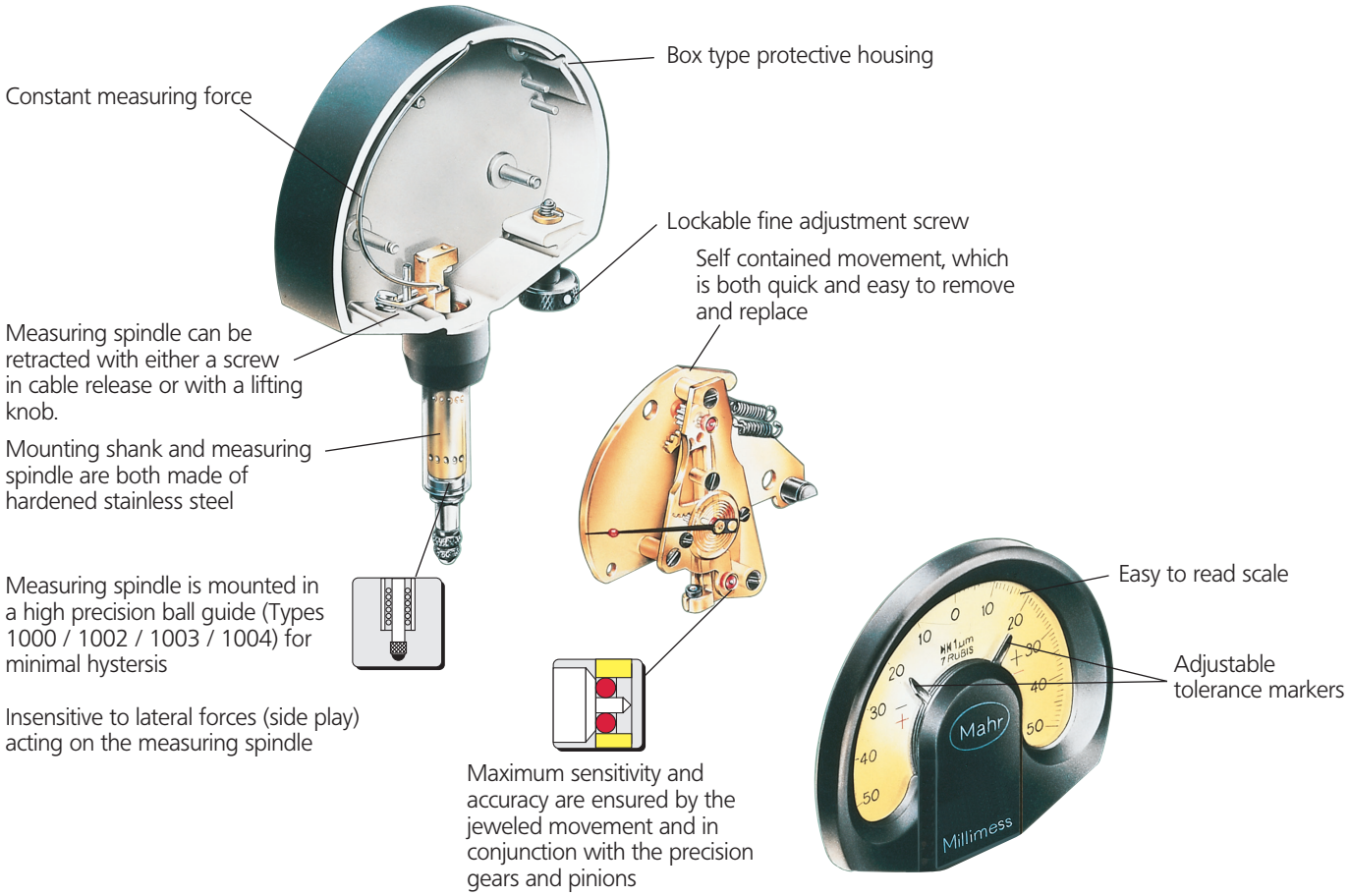
Metrological characteristics



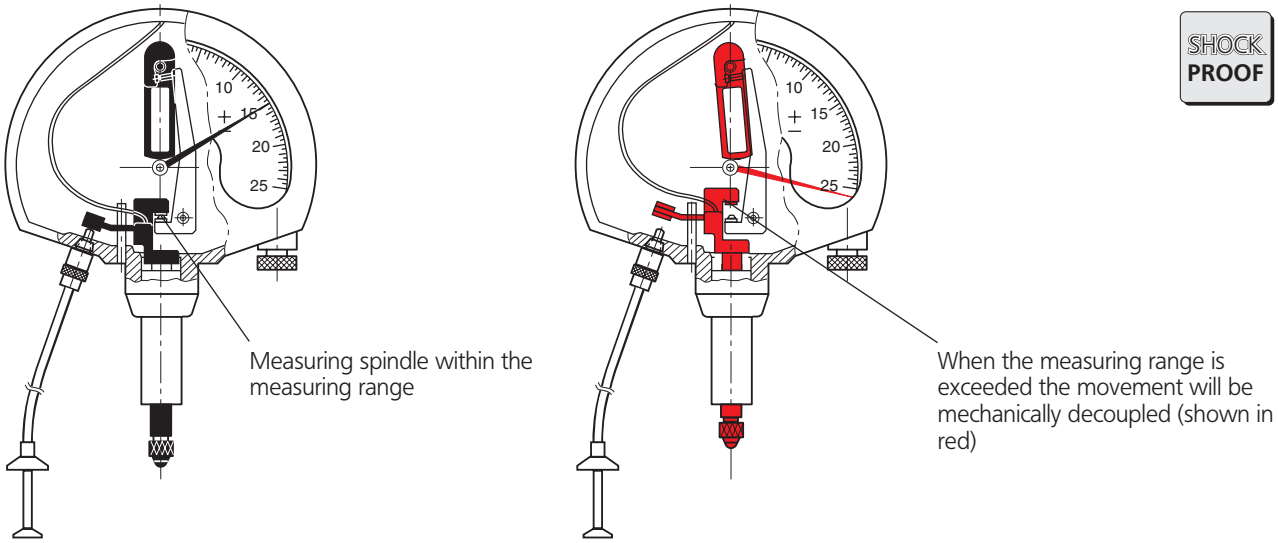
Millimess. Dial Comparators

OVERVIEW

Design Features



Shockproof Mechanism

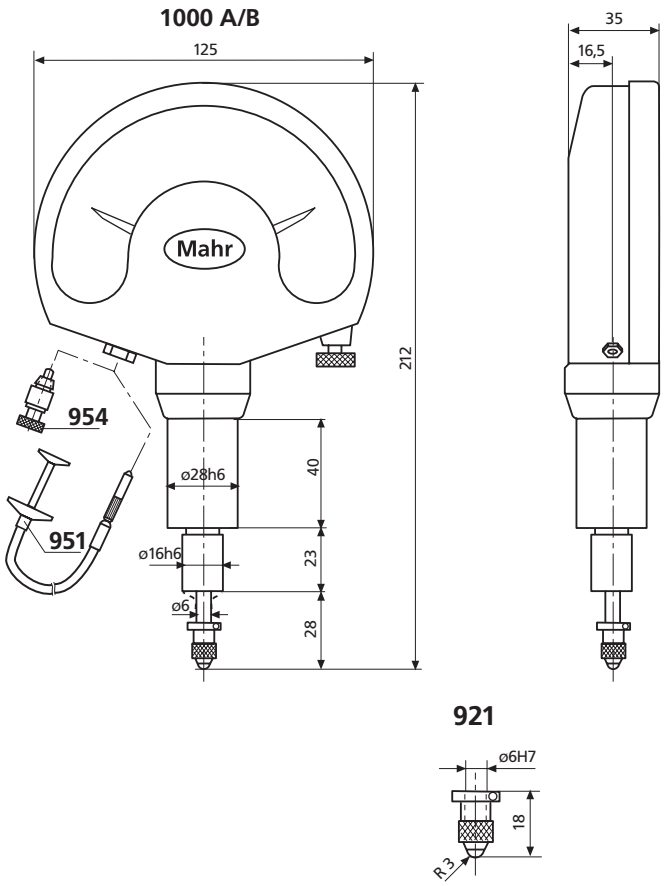


Mechanical Dial Comparator Large Type Millimess





1000 A



921

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

Metric	Measuring range	Reading	Over-travel	Measuring* force	Order no.
1000 A	± 120 µm	1 µm	4 mm	1.9 ± 0.3 N	**4338100**
1000 B	± 50 µm	1 µm	4 mm	1.9 ± 0.3 N	**4339100**

* *In the vertically mounted position*

Mechanical Dial Comparators





1003



1004



1002



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)*

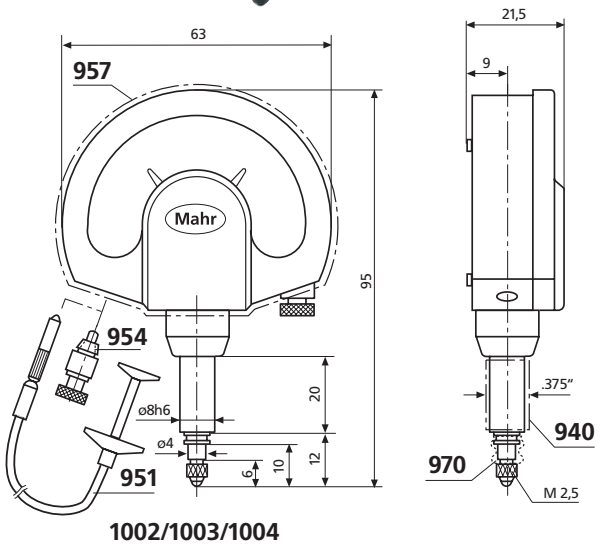


1010

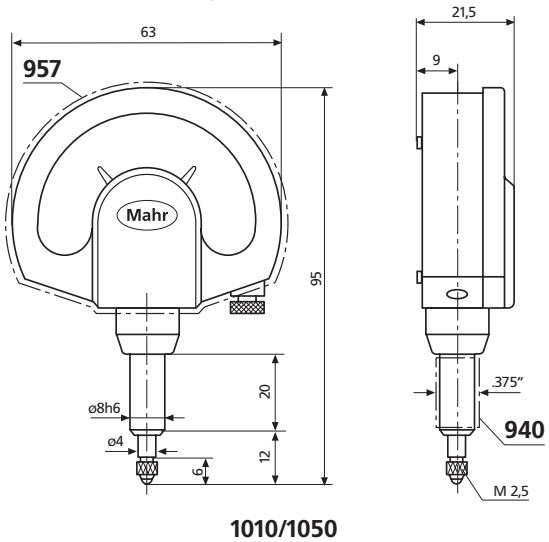


1050

SHOCK PROOF



1002/1003/1004



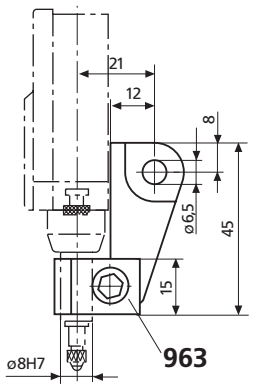
1010/1050

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

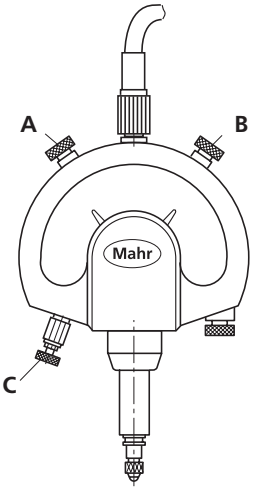
Technical Data

Metric		Measuring range	Readings	Over travel	Measuring force	Order no. Standard*	Order no. Water-proof**
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**

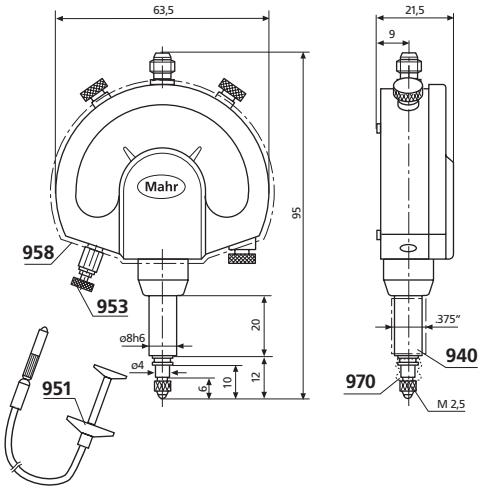
* *Incl. Plastic Case, Setting Knob 953, Cable (1.2m)*
** *IP54, Incl. Plastic Case, Splash Guard Cover 958, Rubber Bellows (only for 1110)*

Electrical Specifications

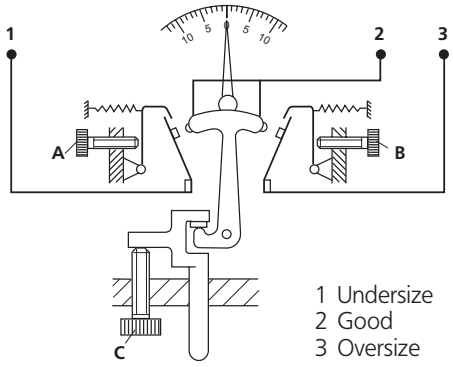
Contact uncertainty with non-inductive load of 10 mA/24V		max. contact rating	max. contact voltage	max. contact current
1110 N	+/- 1,5 µm	240 mW	24 V	100 mA
1150 N	+/- 7 µm			

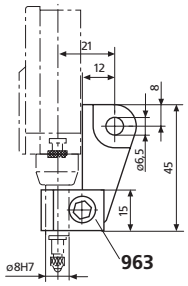


1110/1150



Wiring diagram





Zubehör

		Order no.
Connection Cable (1.2 m), axial		**4345695**
Connection Cable (5 m), axial		**4345694**
Adapter Bush for adapting mounting shank 8h6 mm to inch bore .375"	**940**	**4310103**
Cable Release to raise the measuring spindle	**951**	**4372000**
Setting Knob for setting the limit contacts without an additional setting standard	**953**	**4372020**
Lifting Knob for lifting the measuring spindle	**954**	**4372030**

		Order no.
Splash Guard Cover	**958**	**4373031**
Rubber Bellows 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

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

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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



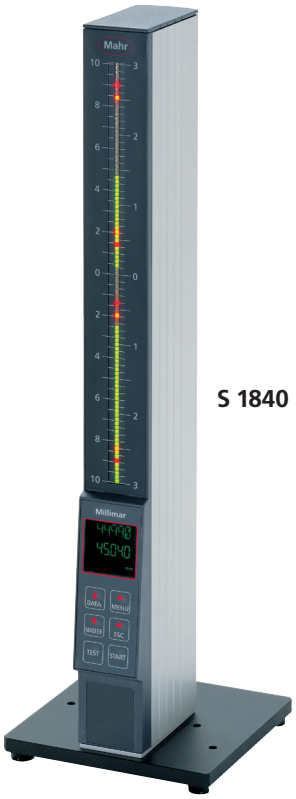
C 1200

- 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



C 1245

- 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



S 1840

- 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 hystersis
- 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

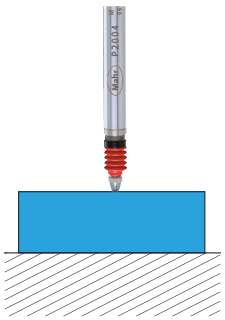
APPLICATIONS WITH INDUCTIVE PROBES

Single measurement with one probe

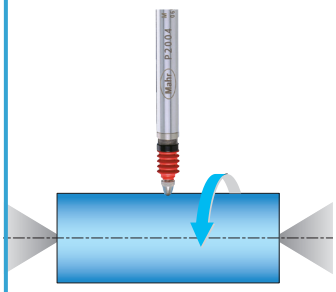
Indicating instrument instantly displays the measured value.

- 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

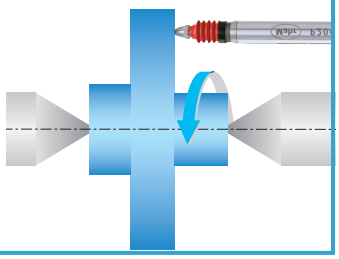
Thickness measurement



Radial run-out



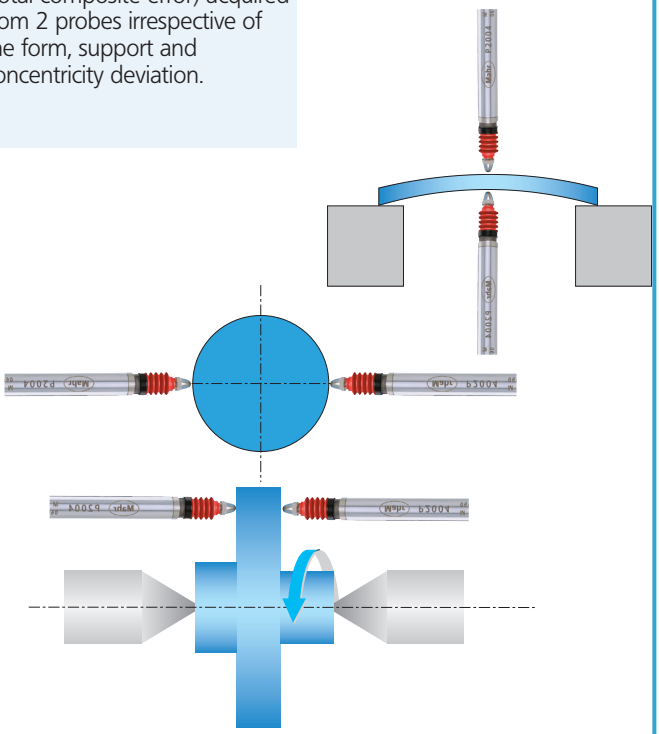
Axial run-out



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.

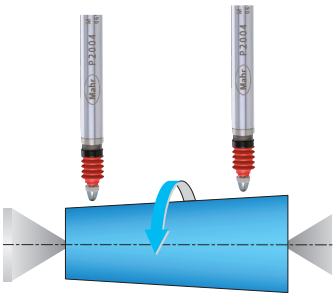
Thickness measurement



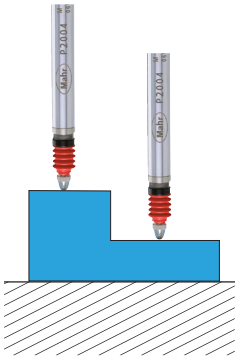
Difference measurement with 2 probes

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.

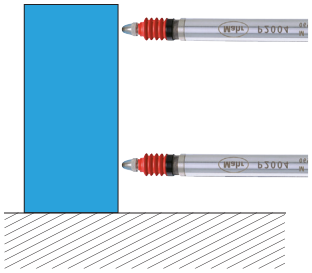
Form measurement of wedges or cones



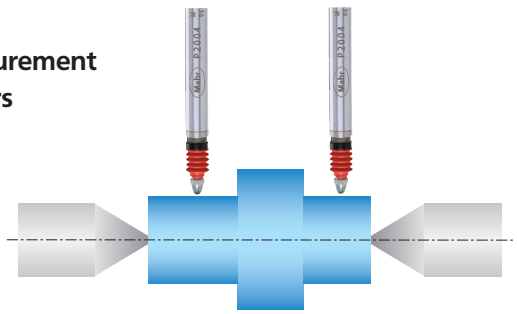
Height difference between 2 steps



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 seperated 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

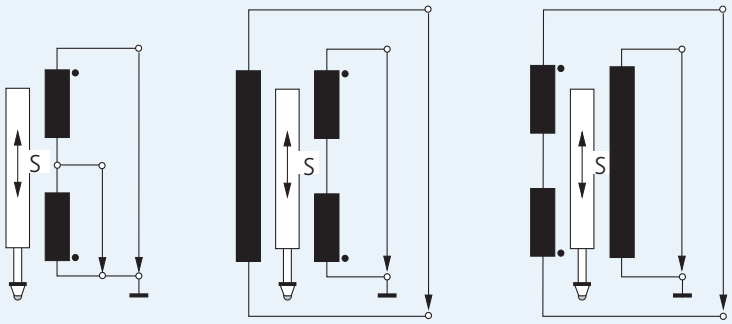
- To obtain the best results use in conjunction with Millitron 1240
- Unprecedented measuring accuracy and minimum linearity error < 0.01 %, i.e. 0.4 µm over the total measuring range

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.



Half Bridge HB (Differential Choke Coil)

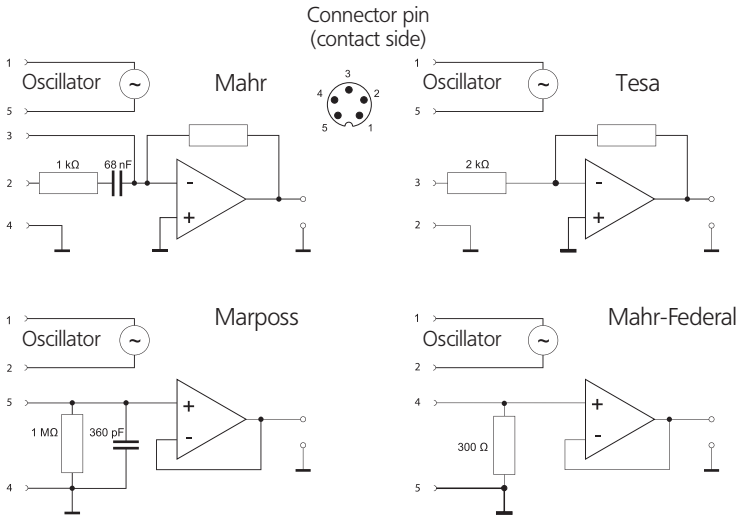
LVDT (Linear Variable Differential Transducer)

VLDT (Very Linear Differential Transducer)

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 seperated with the plug-in connector.

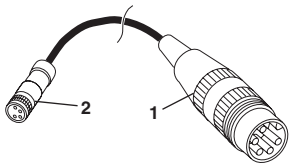


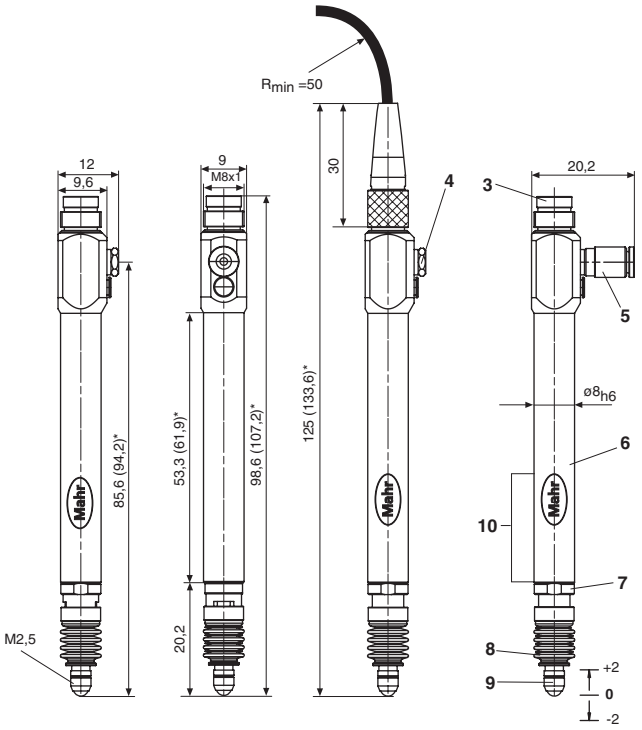
Technical Data

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 ± 0.5 mm	0.4 µm / ***16 µin***	1.0 µm / ***40 µin***	0.4 µm / ***16 µin***	1.0 µm / ***40 µin***
within range ± 1.0 mm	1.5 µm / ***60 µin***	3.0 µm / ***120 µin***	1.5 µm / ***60 µin***	3.0 µm / ***120 µin***
within range ± 2.0 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)*

1 Connection jack for an evaluation instrument
2 Connecting plug for the probe
3 Socket
4 Screw sealing plug SW 4.6
5 Hose connector for compressed air (external diameter 3 mm)
6 Mounting shank
7 Locking nut
8 Sealing bellows
9 Contact point 901 H
10 Preferred clamping area





* *Values shown in brackets apply to Tesa-compatibility*

Individual Components and Accessories P1300



P1300 . . A



P1300 . . B



Connector for the air hose (90°)



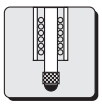
Connection cable 2.5 m

		Order no.
P1300 MA without cable		**4400182**
P1300 MB without cable		**4400183**
P1300 TA without cable		**4400192**
P1300 TB without cable		**4400193**
Hose connector for compressed air 90°		**4400238**
Cable for P1300 - 90°	2.5 m / 8 ft	**4885334**
Cable for P1300 - 90°	5 m / 16 ft	**4885335**
Cable for P1300 - 90°	10 m / 32 ft	**4885336**
Cable for P1300	2.5 m / 8 ft	**4885220**
Cable for P1300	5 m / 16 ft	**4885259**
Cable for P1300	10 m / 32 ft	**4885260**

	Order no.
Sealing bellows for	
P1300 . . A	**7021546**
P1300 . . B	**7028220**
Measuring force springs[1] for P1300 . . A	
0.25 N	**7026827**
0.50 N	**7026827**
0.75 N	**7026828**
1.00 N	**7026849**
1.25 N	**7025579**
1.50 N	**7025505**

[1] *All measuring forces (except 0.25 N) including the sealing bellows have a measuring spring force of ca 0.25 N at zero point.*

Inductive Probe Millimar P2000-Series











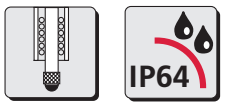
Technical Data

Probe type	**P2001**	**P2004**	**P2004 A**	**P2004 B**
Measuring range	± 0.5 mm / ***± 0.020"***	± 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	Compressed air (max. 1 bar)
Measuring force at the electrical zero point	0.75 N ± 0.15 N	0.75 N ± 0.15 N [2)]	0.75 N ± 0.15 N [2)]	depending on air pressure
Increase in measuring force	0.1 N / mm	0.2 N / mm	0.2 N / mm	–
Sensitivity deviation	0.3 %	0.3 %		
Repeatability f_w	0.15 µm / ***6 µin***	0.1 µm / ***4 µin***		
Hysteresis f_u	0.2 µm / ***8 µin***	0.5 µm / ***20 µin***		
Linearity deviation with corrected sensitivity				
within range ± 0.1 mm	0.6 µm / ***24 µin***	–		
within range ± 0.5 mm	1.5 µm / ***60 µin***	0.4 µm / ***16 µin***		
within range ± 1.0 mm	–	1.5 µm / ***60 µin***		
within range ± 2.0 mm	–	3.0 µm / ***120 µin***		
Protection class acc. to DIN VDE 0470 Part 1 / IEC 60529	IP40	IP64		
Cable length	2.5 m / 8 ft [3)]	2.5 m / 8 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 interhangeable, 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*

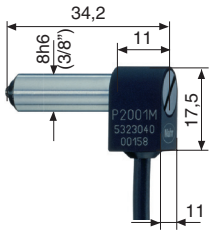
[1] *Relative to the electrical zero point. Adjustable; lower and upper stops are simultaneously adjusted*

[2] *Measuring force springs are interhangeable, additional measuring force springs are available (0.25; 0.5; 1; 1.25; 1.5 N)*

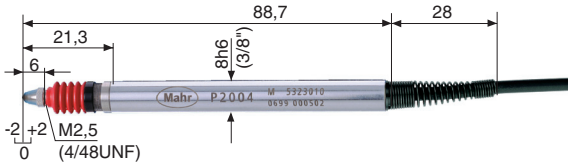
[3] *Extension cables are available, see accessories*

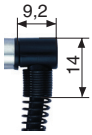
Inductive Probe Millimar P2000-Series

P2001



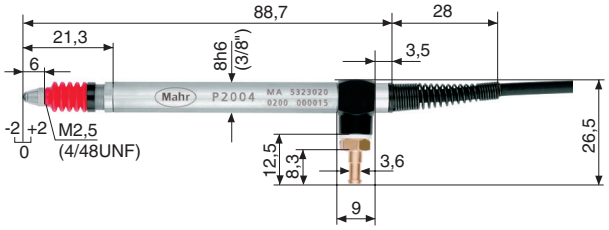
P2004

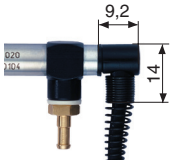




With the supplied slip-on cap, the cable can be flexed to 90° (vertical to horizontal)

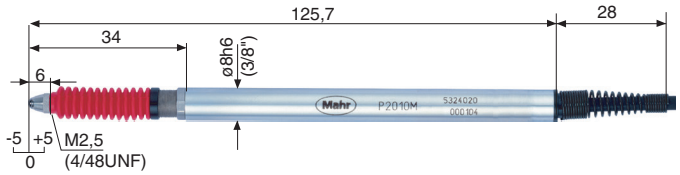
P2004 A / P2004 B





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

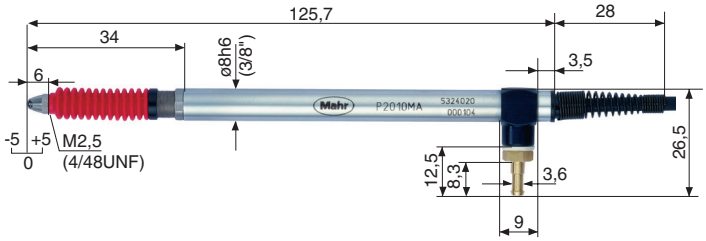
P2010

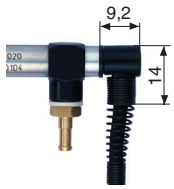




With the supplied slip-on cap, the cable can be flexed to 90° (vertical to horizontal)

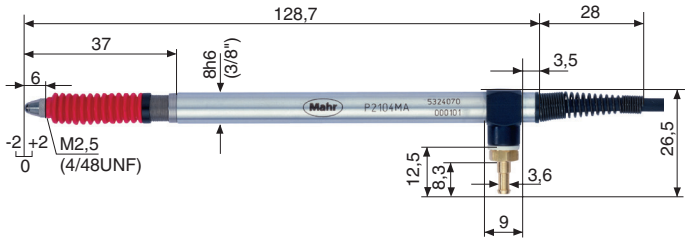
P2010 A / P2010 B

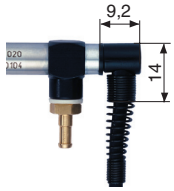




With the supplied slip-on cap, the cable can be flexed to 90° (vertical to horizontal)

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 Length	Description	Mahr M Order no.	Tesa T Order no.	Marposs U Order no.	Mahr Federal F 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.
Measuring force springs[1] for P2004 and 2004 A	
0.25 N	**7026827**
0.50 N	**7026827**
0.75 N	**7026828**
1.00 N	**7026849**
1.25 N	**7025579**
1.50 N	**7025505**

[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.
Measuring force springs[1] for 2010 and P2010 A	
0.25 N	**7028212**
0.50 N	**7028212**
0.75 N	**7027764**
1.00 N	**7028213**
1.25 N	**7028214**
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.*

	Order no.
Measuring force springs[1] for P2104 A	
0.25 N	**7028212**
0.50 N	**7027764**
0.75 N	**7028213**
1.00 N	**7028214**
1.25 N	**7028215**

[1] *All measuring forces include the sealing bellows*

	Order no.
Sealing bellows for	
2004, 2004 A	**7021546**
2004 B	**7028220**
2010, 2010 A, 2104 A	**7027758**
2010 B, 2104 B	**7028221**

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



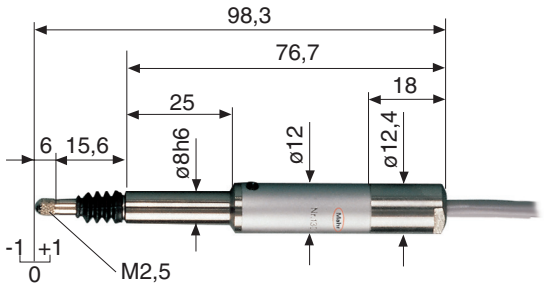
Technical Data

Probe type	**1301**	**1303**	**1304 K**	**1318**	**1340**
Measuring range	± 1.0 mm / ***± .039"***		± 1.0 mm / ***± .039"***	-0.3 . . . +1.0 mm / ***- .012 . . . + .039"***	± 2 mm / ***± .079"***
Distance of lower stop [1]	-1.1 . . . 0 mm / ***- .043 . . . 0"***		1.1 mm / ***- .043"***	-0.37 mm / ***- .0146"***	-2.2 mm / ***- .09"*** (adjustable)
Distance of upper stop [1]	+2.7 mm / ***+ .106"***		+1.1 mm / ***+ .043"***	+1.6 mm / ***+ .063"***	+3.0 mm / ***+ .118"***
Lifter/Retraction	Cable release		–	–	pneumatic
Measuring force at the electrical zero point	0.75 N ± 0.15 N		0.75 N ± 0.15 N	0.25 N ± 0.05 N	0.75 N ± 0.15 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 µm / ***4 µin***		0.15 µm / ***6 µin***	0.03 µm / ***1.2 µin***	≤ 0.08 µm / ***3.15 µin***
Hysteresis f_u	0.2 µm / ***8 µin***		0.2 µm / ***8 µin***	0.5 µm / ***20 µin***	0.08 µm / ***3.15 µin***
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**

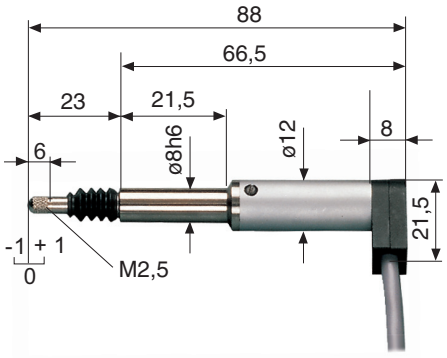
[1] *Relative to the electrical zero point*
[2] *Extension cables are available, see accessories*

M

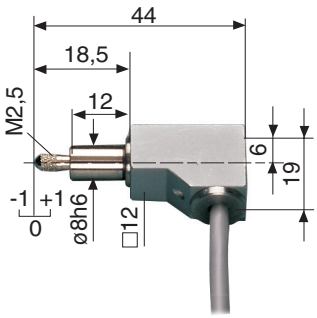
1301



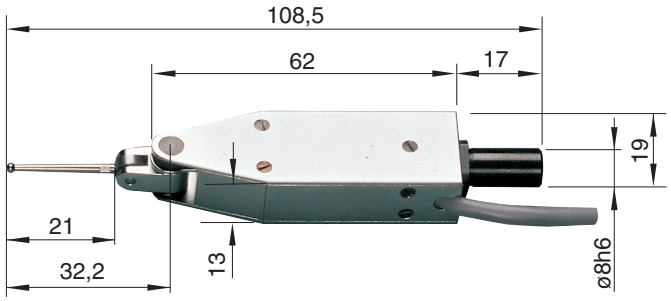
1303



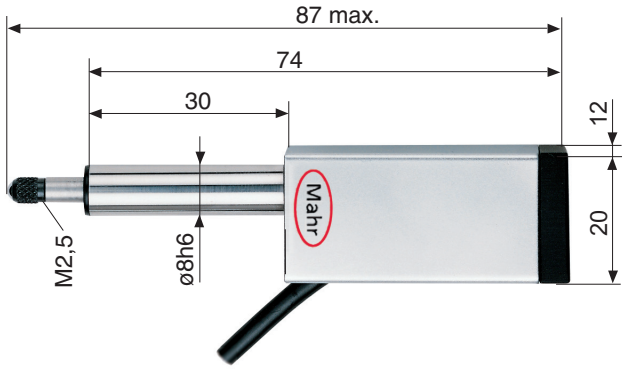
1304 K



1318



1340



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**
Styluses for 1318 with ruby ball		d = 2 mm; L = 21 mm	**8004231**
Pneumatic Lifter for 1340 Pneumatic hand pump with an plug-in hose ca. 1 m / 3 ft	**1340/1**		**5313420**
Pneumatic Foot Switch for 1340 for connecting up to 4 P1300 Probes	**1340/1F**		**5313419**

** 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 ±.2°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		**Order-no.**		**Ranges**	**Resolution**
Linear:	**120V**	**220V EU**	**240V UK**		
Standard Unit				±100 µm / ***±.004"***	5 µm / 200 µ"
830 F	**2121421**	**2121431**	**2121441**	±20 µm / ***±.001"***	1 µm / 50 µ"
830 M	**2121404**	**2121405**	**2121425**	±10 µm / ***±.0002"***	0.5 µm / 10 µ"
High Resolution – Inch				±200 µm / ***±.004"***	10 µm / 200 µ"
830 F	**2121424**	**2121434**	**2121444**	±50 µm / ***±.001"***	2.5 µm / 50 µ"
				±10 µm / ***±.0001"***	0.5 µm / 5 µ"
Angular:	**120V**	**220V EU**	**240V UK**		
Angular unit - ARCSEC (used with Mahr Federal Level Heads)				±1000 Sec / ***±.010"***	50 Sec / 500 µ"
830 F	**2121422**	**2121432**	**2121442**	±200 Sec / ***±.002"***	10 Sec / 100 µ"
				±20 Sec / ***±.0004"***	1 Sec / 20 µ"

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"*** .001 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	Automatically selects the smallest range for the best resolution, in both linear and angular units
Repeatability	±1 digit
Calibration Accuracy	±1 digit
Linear Error	Less than .025% of full scale
Response Time	42 msec.
Thermal Stability	.01% /C x full scale
Temperature Range:	
At Specified Accuracy	20°C / 68°F ±.2°C
Operating	5° to 45°C / 40° to 110°F, with a temperature coefficient of .02% change/°C x full scale range.
Storage	0° to 60°C / 0° to 140°F
Digital I/O	Five TTL opto-isolated outputs
Data Output	RS-232, transmits Channels A, B, or both, units, and tolerances
Analog Output	±5 VDC full scale for displayed value signal
Measuring Modes	Actual, Minimum, Maximum, T.I.R., Nominal
Tolerance Indicators	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	A, B or both at any time
Auto Power Off	User selectable, up to 99 minutes of non-use
Power Requirements	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

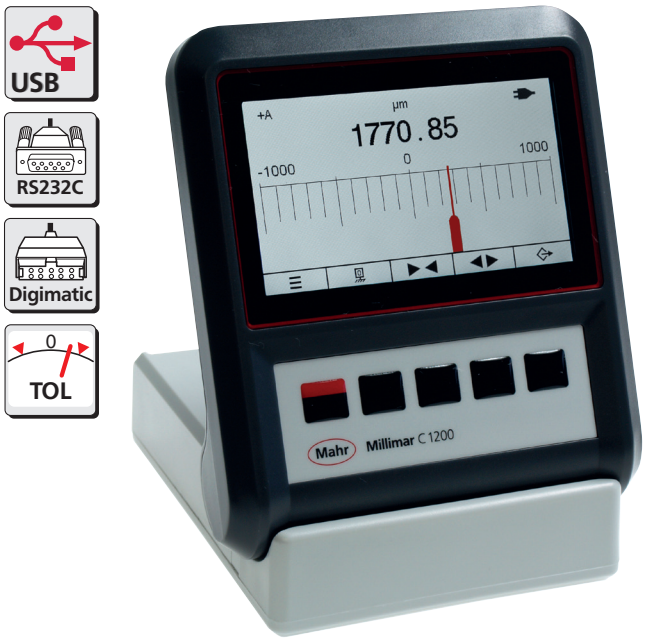
Power	832 F Mahr Federal probe type Order no.	832 M Mahr probe type Order no.
120VAC adapter	**2004005**	**2004000**
US battery/120VAC charger	**2004007**	**2004002**
EU/UK 220/240VAC adapter	**2004006**	**2004001**
EU battery/220VAC charger	**2004008**	**2004003**
UK battery/240VAC charger	**2004009**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

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

Technical Data

Display	TFT color display 11 cm (4,3"), 480 x 272 Pixel
Display range Digital display	± 5000 µm
Display range Analog display	± 5000 µm, ± 2000 µm, ± 1000 µm, ± 300 µm, ± 100 µm, ± 30 µm, ± 10 µm, ± 3 µm
Resolution	0,1 µm
Readings	200 µm, 100 µm, 20 µm, 10 µm, 2 µm, 0,2 µm
Probe inputs	1
Compatibility	Mahr
Measuring combinations	+A, -A
Features	1
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 ± A, ± 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 µm / 1µin at measuring ranges ± .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 ouput*
- Programable analog output voltage (max. ±5V)*

- 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
Analog scale	Pointer, 61 graduations
Range and text display	7 digit LCD, 5 x 7 dot matrix, alpha-numeric
Measured value display	7 digit LCD, 7 segments
Tolerance display	5 LEDs, 3 colors
Displayed ranges	± 3, 10, 30, 100, 300, 1000, 3000, 10000 µm ***± .0001; .0003; .001; .003; .01; .03; .1; .3 inch;*** or tolerance related
Meas. range inductive probe	4000 (±2000) µm, resolution 0.1µm ***± .08", resolution .000005"*** 400 (±200) µm, resolution 0.01µm ***± .008", resolution .000001" **
Response time	
- Meas. value memory	0.010s
- Digital display	0.100s
- Analog display	0.100s
- Outputs	0.020s

Error limit	
- 10 x analog display	2.5%
- Digital display	0.3% (min. 0.2 µm)
Temperature coefficient	0.005%/°C
Operating temperature	0°C . . . 45°C / 32°F . . . 113°F
Interfaces	
Computer, printer	RS232, 9 pin interface (PC-compatible assignment)
- Control outputs	3 Opto-coupler-outputs, 2 24V, 100mA
- Control inputs	3 Opto-coupler-inputs, 24V, 10mA
Power supply via	
Mains power pack	100V . . . 240V, 47Hz . . . 63Hz
Power consumption	10 VA
Protection class	IP54, with conductive dust IP43
Housing dimensions (H x W x D)	ca. 205 x 160 x 165 mm ***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 compatiblity)
- 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")
Analog scale	145 mm x 80 mm (5.709" x 3.149")
Range and Text display	7-point LCD, 5 x 7 dot matrix, alpha-numeric
Measured value display	7-point LCD. 7 Segment
Tolerance display	5 LEDs, 3-colors
Display ranges	± 10, 30, 100, 300, 1000, 3000, 10000 µm ***± .0003; .001; .003; .01; .03; .1; .3 inch***
Measuring range inductive probe	4000 (±2000) µm, resolution 0.1 µm (measured value display ***± .08", resolution .000005"***

Response time

- Meas. value memory	0.005s
- Digital display	0.300s
- Analog display	0.050s - 0.300s
- Outputs	0.020s

Error limits

- 10 x Analog display	2 %
- Digital display	0.3 % (min. 0.2 µm)
Temperature coefficient	± 0.005%/°C
Oper. temperature range	0°. . . 50°C

Interfaces

Computer, printer	RS232, 9 pin interface (PC-compatible layout)
- Control outputs	6 Optocoupler-outputs, 24V, 100mA
- Control inputs	3 Optocoupler-inputs, 24V, 10mA
Analog output. voltage	programmable
Power supply	90 V . . . 264 V, 47Hz . . . 63Hz
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.

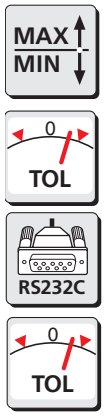
		Order no.
C 1245 M	Mahr compatible for 4 inductive probes	**5331250**
C 1245 M	Mahr compatible for 8 inductive probes	**5331291**
C 1245 F	Mahr-Federal compatible for 4 inductive probes	**5331253**

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: ±A, ±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
- Programable analog output voltage ± 5 V
- Supplied with: Operating instructions and a mains power supply plug

Technical Data

Analog display	101 LED elements, 3 colors
Range and Text display	7 point LCD, 14 Segment, alpha-numeric
Measured value display	7 point LCD, 7 Segments
Tolerance display	via color changes in the analog display
Display ranges	±10; 30; 100; 300; 1000; 3000; 10000 µm
	±.0003; .001; .003; .01; .03; .1; .3 inch
	or tolerance related
Meas. range inductive probe	4000 (±2000) µm, resolution 0.1µm
	±.08", resolution .000005"
	400 (±200) µm, resolution 0.01µm
	±.008", resolution .000001"
Response time	
- Meas. value memory	0.008 s
- Analog display	0.020 s
- Outputs	0.020 s

Error limits	
- 10 x Analog display	1% (101 LEDs)
- Digital display	0.3% (min. 0.2 µm)
Temperature coefficient	± 0.005% / °C
Operating temp. range	0 . . . 45°C / 32°F . . . 113°F
Interfaces	
Computer, printer	RS232, 9 pin. male (PC-compatible layout)
- Control outputs	3 Optocoupler Outputs, 24 V, 100 mA
- Control inputs	3 Optocoupler Inputs, 24 V, 10 mA
Analog output	Voltage ±5 V programable
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**

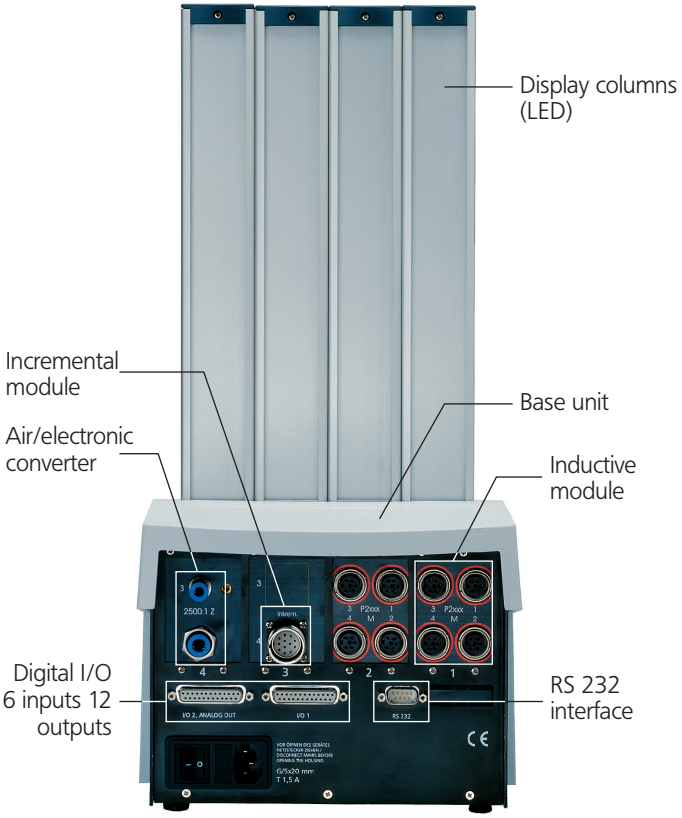
For appropriate Inductive probes please refer to pages 88 to 95

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

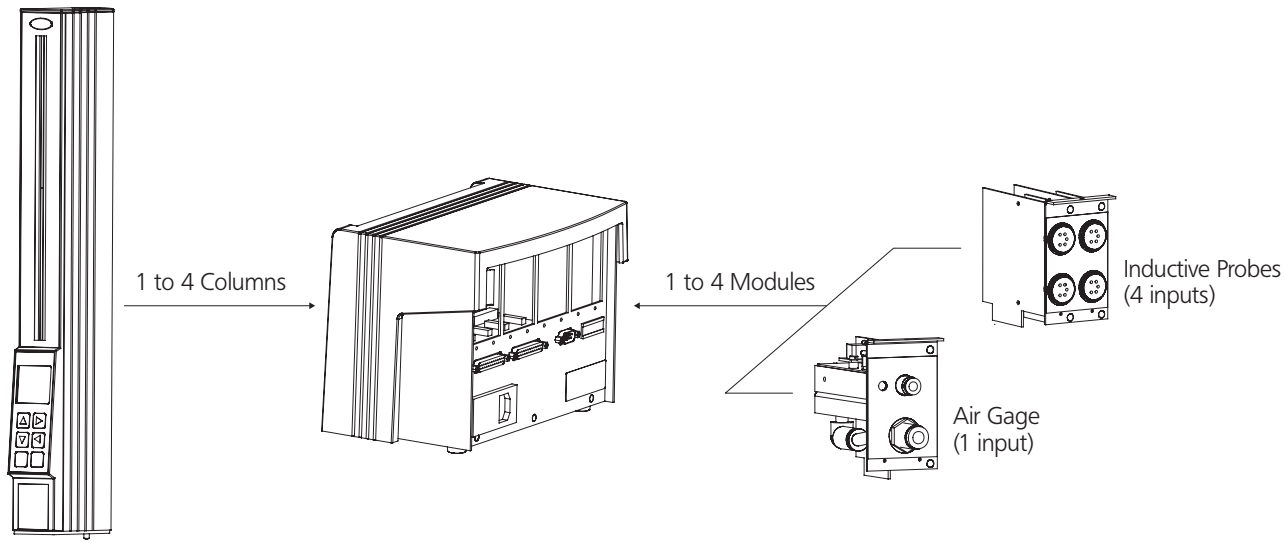
Functions
- 16 parameters may be defined
- A formula editor (80 characters) serves for the mathematical combination of input channels C1 to C16, suing the 4 basic arithmetic operations including functions and parentheses
- Static measurements: instantaneous value, square root, ARC tangent
- Dynamic measurements: 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

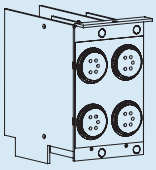
Application Examples:

- 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

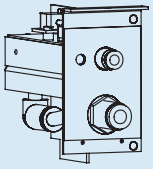


Indicating and operating column | Base unit | Base unit - input modules



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



X 1715



X 1741

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 processsing.

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. ***±.08"*** Resolution 0.1 µm. ***.000005"***
Response time	
- Meas. value memory	0.005s
- Outputs	0.020s
Error limits	
- 0.3% (min. 0.2 µm)	
Temperature coefficient	± 0.005%/°C
Operating temperature range	0°. . . 50°C / 32° F . . . 122° F
Interfaces	
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

Analog output voltage	programmable (2 outputs*)
Power supply	90 V . . . 264 V, 47Hz . . . 63Hz
Protection class	11 VA
Schutzart	IP53 IP43 with conductive dust
Dimensions (H x W x D)	
X 1715	ca. 160 x 205 x 165 mm ***ca. 6.30" x 8.07" x 6.49"***
X 1741	ca. 235 x 180 x 160 mm ***ca. 9.25" x 7.08" x 6.29"***
Weight	ca. 2 kg / 4.40 lbs

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

IP54



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 fequency 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)	± 125 µm ***(± .00492")***
	± 250 µm ***(± .00984")***
	± 500 µm ***(± .01968")***
	± 1000 µm ***(± .03937")***
	± 2000 µm ***(± .07874")***
Output voltage at end of measuring range	± 10 V
Option:	± 5 V / 0–5 V / 0–10 V
Current output at end of measuring range	± 5 mA
Linearity	± 0.3%
Supply voltage	24 V =

Connections	
Input	5 pin socket
Output	3 pin socket
Supply	3 pin plug
Response time	5-10 ms
Cut-off frequency	90 Hz
Protection class	IP54
Dimensions: (L x D x H)	43 x 100 x 170 mm ***(1.69" x 3.93" x 6.69")***

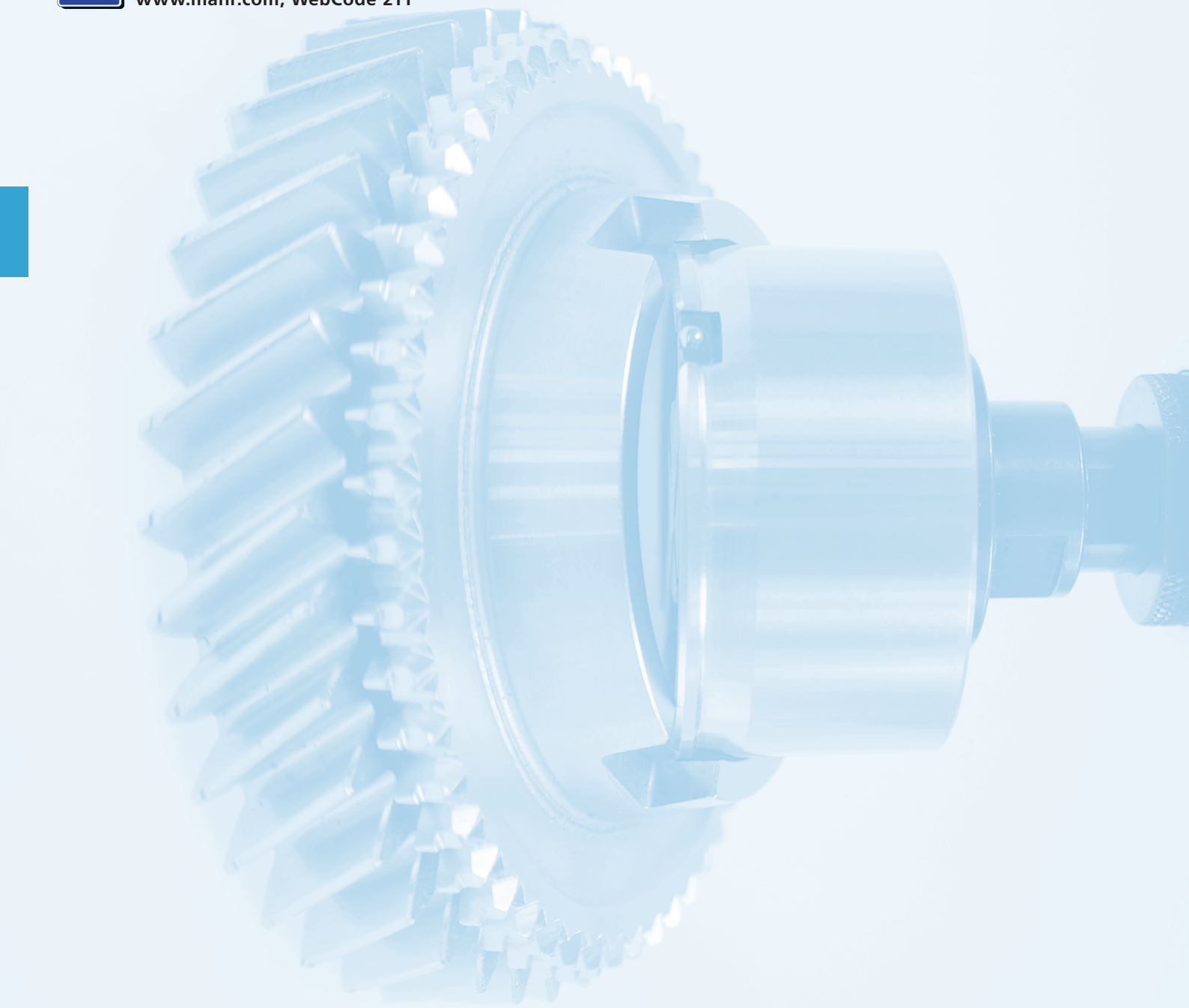
Order no.

		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



Dimentron Plug Assembly – shown with *Maxμm®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.

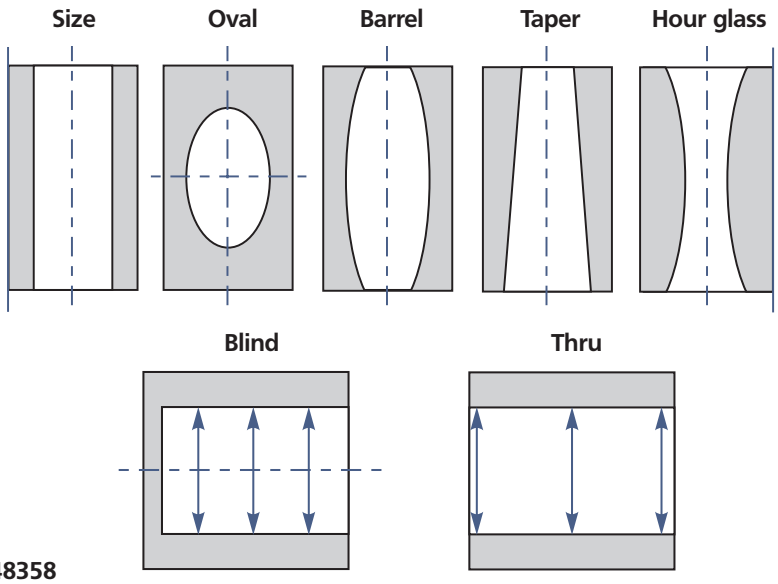
The **plug body** is made from through hardened 440 stainless steel, tempered and ground, with hardness 52-56 HRC, guides the plug gage; its easy entry guide facilitate introduction into the bore.

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 n 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.

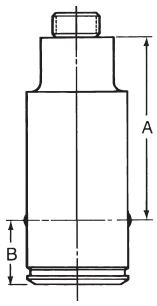
Technical Data

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 Maxμm® 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.*

Dimentron® Plug Inside Diameter Gages



Dimentron Plug Assembly
shown with 1087 Digital Indicator and Housing



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

Technical Data

Sizes above			To and include			Maximum Part Tolerance Metric M01 Inch 050			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	/	***.3750"***	12.7	/	**.500"**	±0.038	/	***±.0015"***	±0.058	/	**±.0023"**	±0.086	/	***±.0034"***	±0.137	/	***±.0054"***
12.7	/	***.5000"***	19.05	/	**.750"**	±0.038	/	***±.0015"***	±0.069	/	**±.0027"**	±0.102	/	***±.0040"***	±0.165	/	***±.0065"***
19.05	/	***.750"***	25.4	/	**1.000"**	±0.038	/	***±.0015"***	±0.076	/	**±.0030"**	±0.127	/	***±.0050"***	±0.180	/	***±.0071"***
25.4	/	***1.000"***	38	/	**1.500"**	±0.038	/	***±.0015"***	±0.076	/	**±.0030"**	±0.152	/	***±.0060"***	±0.221	/	***±.0087"***
38	/	***1.500"***	114.3	/	**4.50"**				±0.076	/	**±.0030"**	±0.152	/	***±.0060"***	±0.254	/	***±.0100"***
114.3	/	***4.50"***	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 Dimentron 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 Maxμm/// Indicators without Output. Requires in-line or pistol style grip Handle (**HA-88** Handle and **AT-124** Adaptor).
EHG-1198 For Maxμm/// Indicators with Output. Requires pistol style grip Handle (**HA-88** and **AT-124** Adaptor).

B-12668 For Maxμm/// Indicators with Output. Complete with in-line style handle. **AT-125** Bench Stand Adaptor permits the Maxμm 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

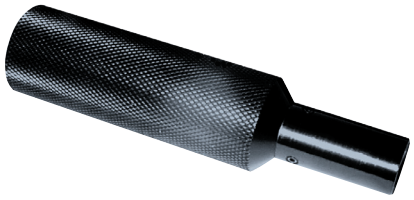
A 6.4 mm / .25" mounting hole allows permanent fastening to bench surface.



BA-100 (Dimentron Plug not included)



Right Angle Adaptor AT-155



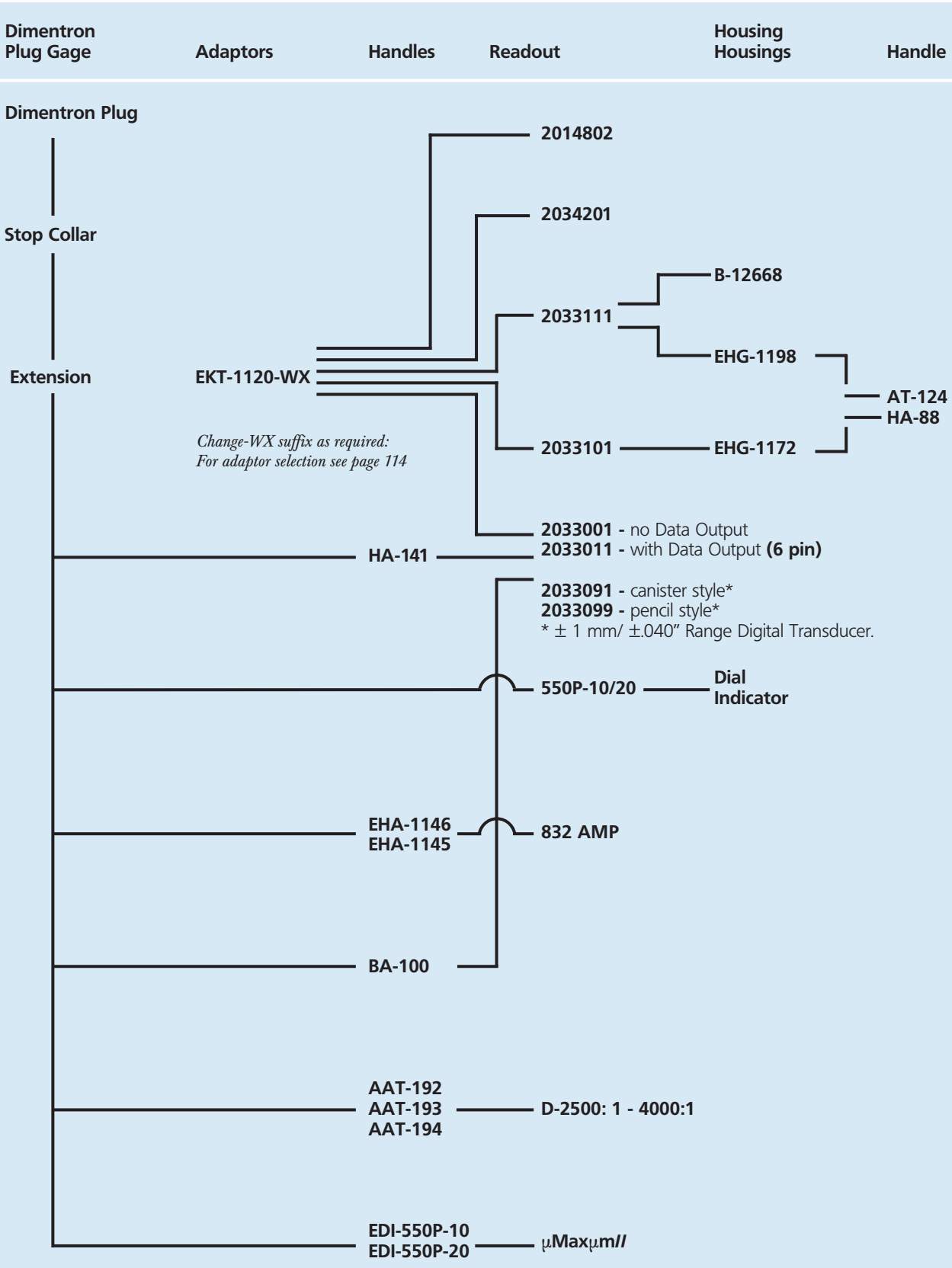
Remote Maxμm Transducer or Maxμm/// Digital Transducer Dimentron Plug Handle/ Adaptor: **HA-141**

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 Dimentron 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.



Indicating Plug Gages 844 D





Features

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

Technical Data of the Measuring Heads

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

Accuracy

Hystersis	f_u	≤ 0.4 µm
Repeatability	f_w	≤ 1 µm
Linearity		≤ 1 %
Linearity 844 Dks >8 mm		≤ 2 %

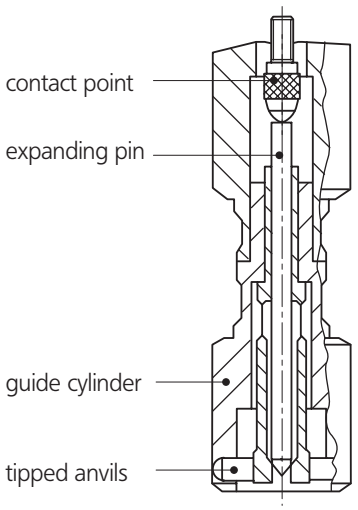
When placing an order please quote the nominal diameter and tolerances, for example:

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

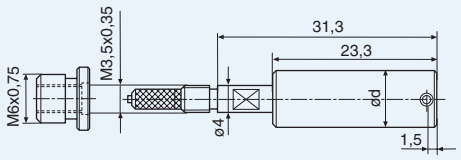
Nominal diameter:	35 mm
Minimum dimension:	35.080 mm
Maximum dimension:	35.105 mm
Meas. range:	35.050 - 35.280 mm

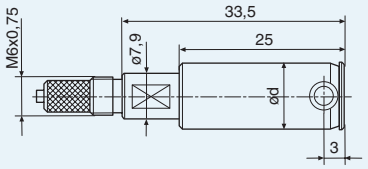


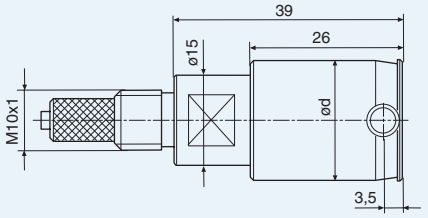
Plug Gages

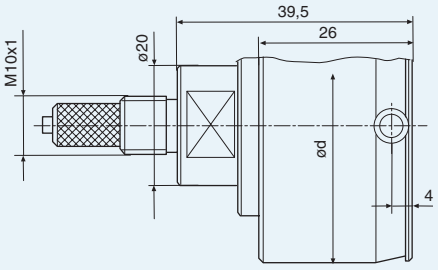
Measuring Head 844 Dk, Standard version

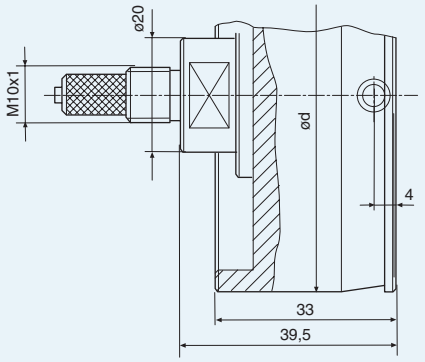
	Nominal① diameter mm	Manufacturing② tolerance dia. **d** mm	Meas. range③ mm	Order no.
	2.98 - 3.99	-0.02/-0.04	0.1	**4480184***
over	3.99 - 8	-0.02/-0.04	0.1	**4478200***
over	8 - 16	-0.02/-0.04	0.15	**4478201**
over	16 - 25	-0.02/-0.05	0.2	**4478202**
over	25 - 32	-0.02/-0.05	0.2	**4478204**
over	32 - 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**







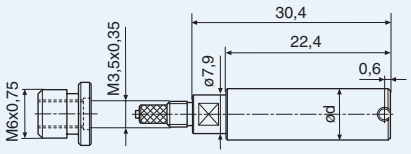
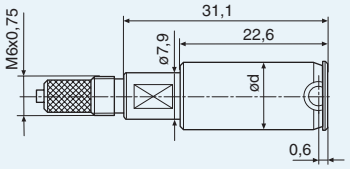
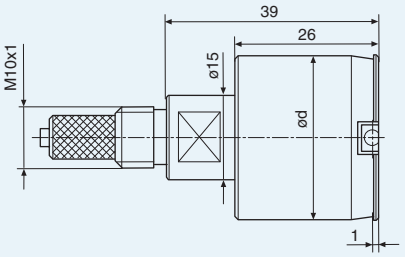
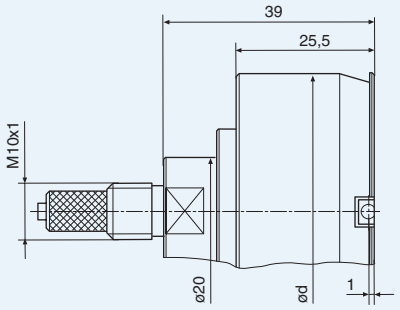
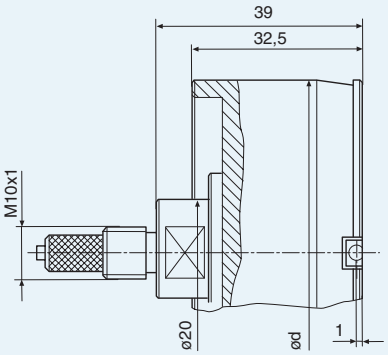




① *Nominal diameter =smallest bore diameter*
② *dia. d in reference to the smallest bore diameter*
③ *Measuring range refers to the nominal diameter*
* *With Adaptor for connection to the holder*

Plug Gages

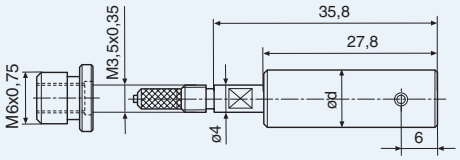
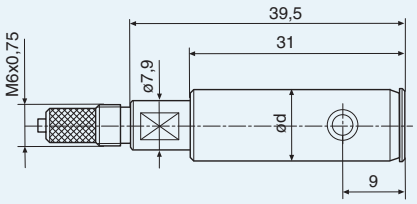
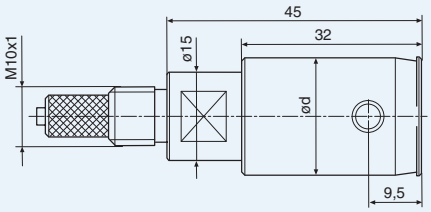
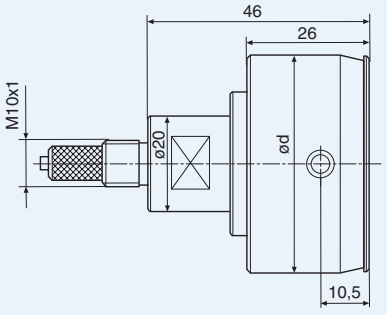
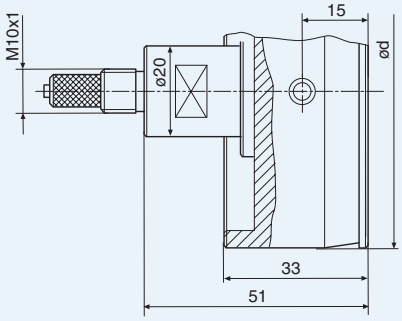
Measuring Head 844 Dks, for blind holes, to measure almost to the base of a bore

	Nominal① diameter mm	Manufacturing② tolerance dia. d mm	Meas. range③ 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

	Nominal① diameter mm	Manufacturing② tolerance dia. d mm	Meas. range③ mm	Order no.	
	2.98 - 3.99	-0.02/-0.04	0.1	**4478272***	
over	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*

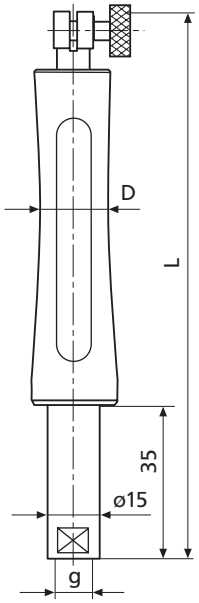
Modular Unit System 844 D

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**

844 Kg / 844 Dg

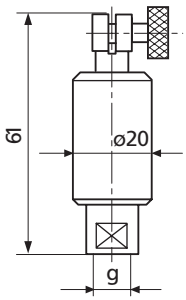


Short Holder 844 Dgk - Short version

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**

844 Dgk

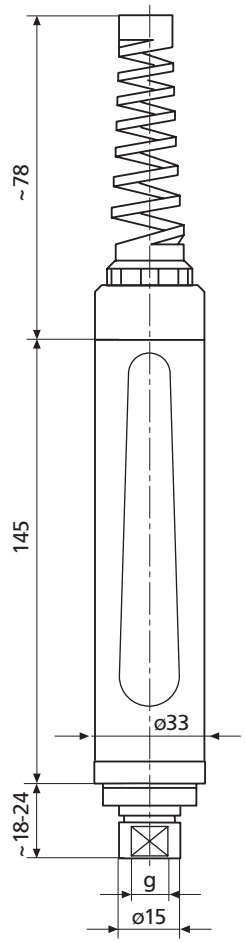


Holder 844 Dge for Inductive Measuring Probes

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**

844 Dge

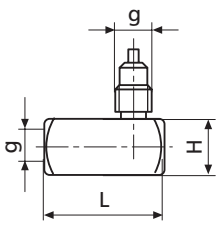


Right Angle (Elbow) Attachment

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

844 Kw / 844 Dw

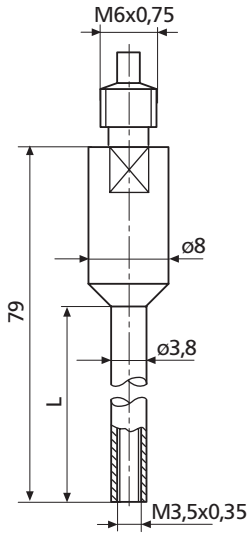


Extensions

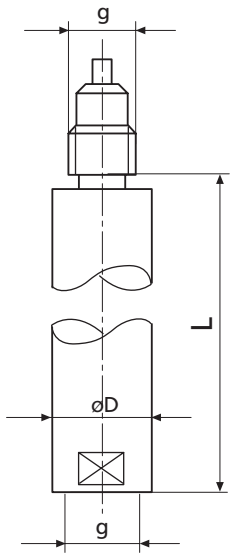
For extra-deep bores. Screws in between holder and measuring heads. Several extensions can be screwed together as of 8 mm. Models 844 Dv and 844 Dvk made of **Invar steel**.

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**

844 Dvk



844 Kv / 844 Dv

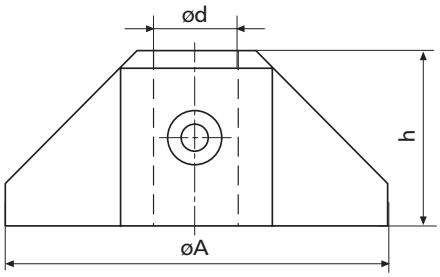


Depth Stops

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

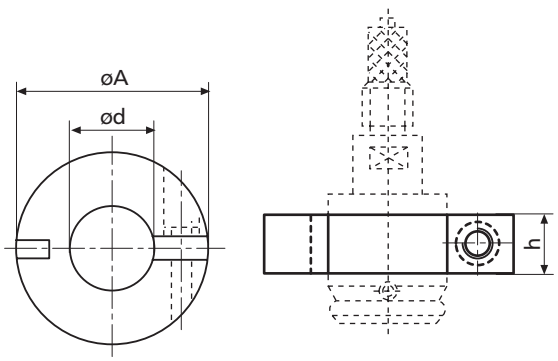


Depth Stop Rings

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**

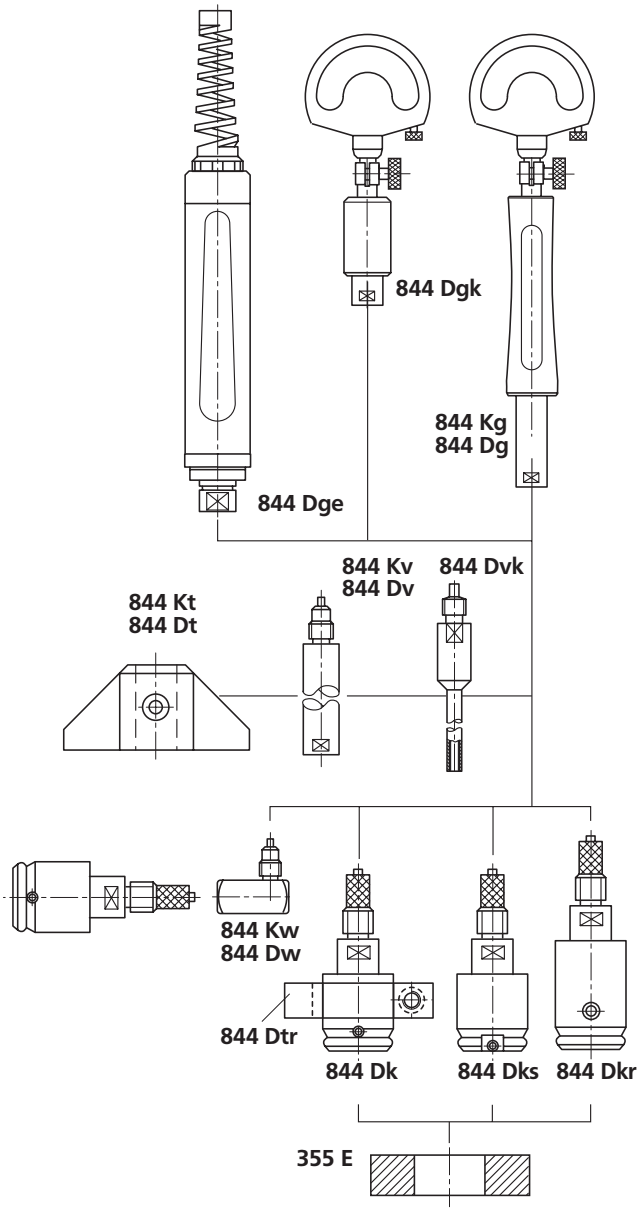
844 Dtr



Modular Unit System 844 D

Modular units	Diameter of Measuring Heads 2.98 - 8 mm	8 - 16 mm	over 16 mm
844 Kg	**4470851**		
844 Dg			**4478851**
844 Dgk			**4478050**
844 Dge	**4478020**		**4478021**
844 Dvk	**4478080**		
844 Kv		**4470070**	
844 Dv			**4478070** to **4478076**
844 Kt		**4470115**	
844 Dt			**4478115** to **4478119**
844 Kw	**4470110**		
844 Dw			**4478110**
844 Dk			
844 Dks			
844 Dkr			
355 E	see pages 126 / 127		

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



Indicating Instruments

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

Indicator		Readings	Order no.
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

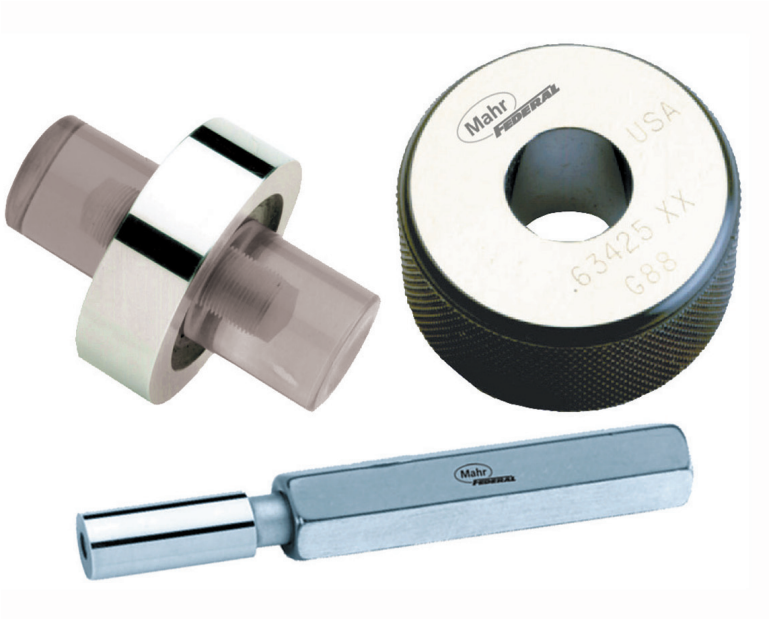
Ring Gage 355 E:

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

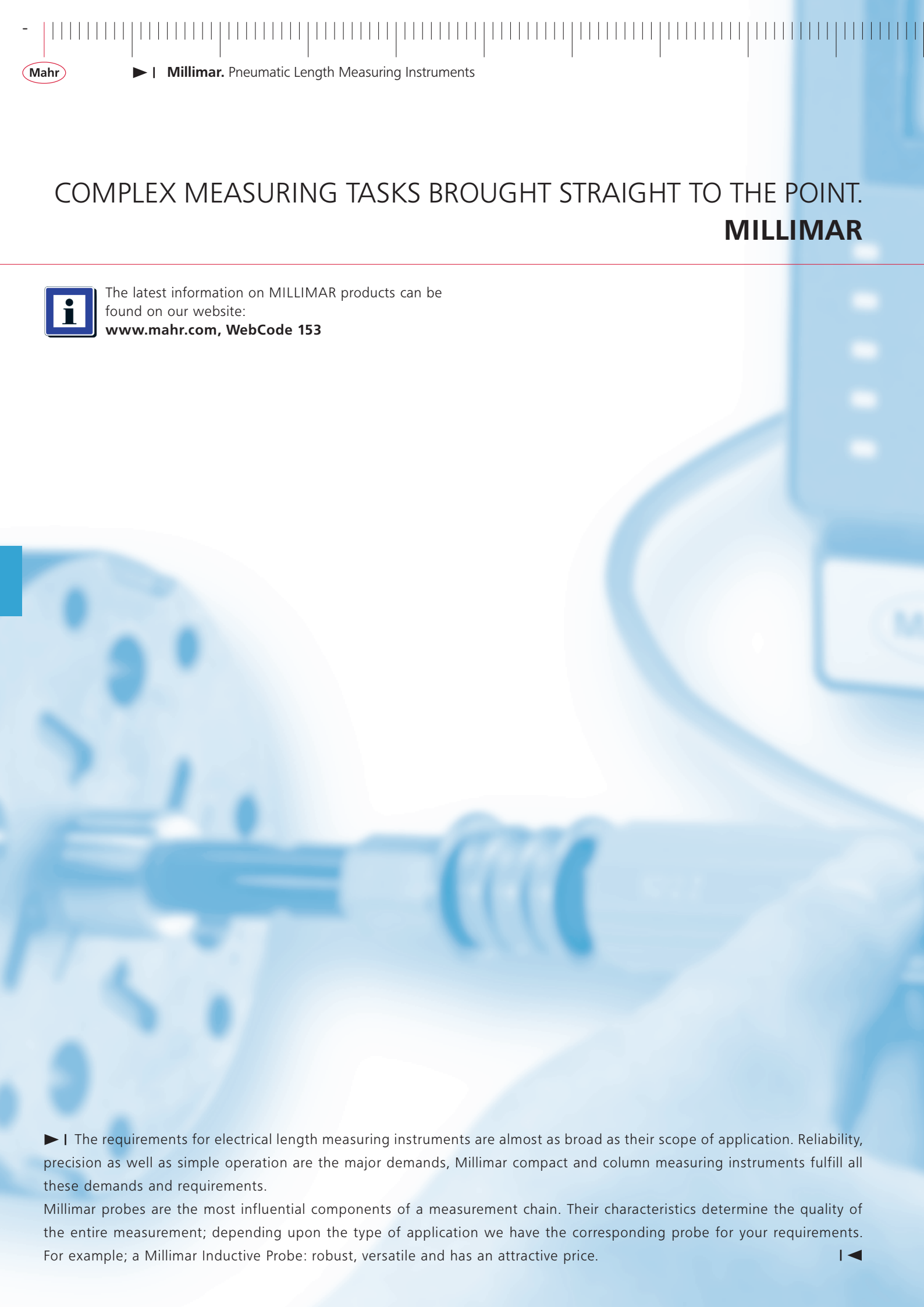
Diameter increments 0.001 mm

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
µ*Dimensionair® 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

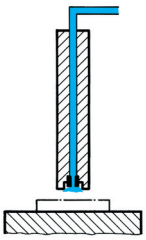
Air Gaging Instruments - Accessories 156

Millimar. Air Gages

PRECISION BEGINS AT THE START OF THE MEASURING PROCESS

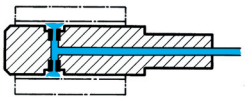
►| Air gages use the measuring effect of the change in pressure when a workpiece approaches a measuring jet. As the distance between jets and work surface decreases, the pressure increases while the velocity of flow and the respective volume flow decrease. The pneumatic measuring procedure has a realtively 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.



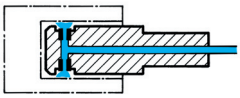
Thickness or wall thickness measurements with jet air gage.

2.



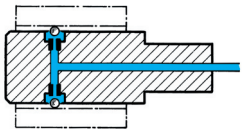
Diameter measurement of cylindrical through bores with jet air plug gage.

3.



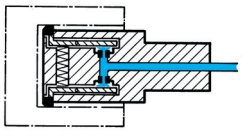
Diameter measurement of cylindrical blind bores with jet air plug gage.

4.



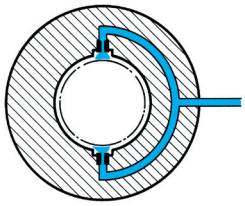
Diameter measurement of cylindrical through bores with ball contact plug gage.

5.



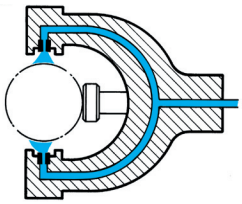
Diameter measurement of cylindrical blind bores with lever contact plug gage.

6.



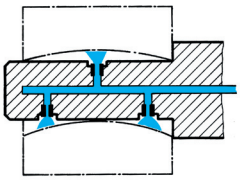
Diameter or thickness measurement with adjustable jet air caliper gage.

7.



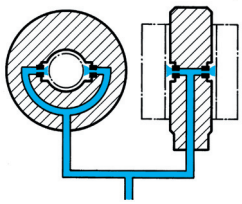
Diameter measurement of a cylindrical shaft with jet air rings.

8.



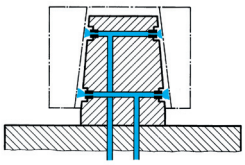
Straightness measurement of a cylindrical bore with special jet air plug gage.

9.



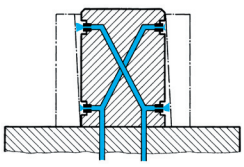
Mating measurement between bore and shaft with jet air plug gage and jet air ring gage.

10.



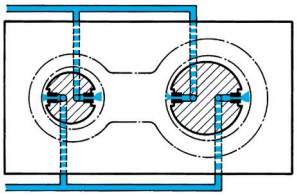
Taper-pitch measurement of an inside taper with taper jet air plug gage - measurement as per the differential measuring method.

11.



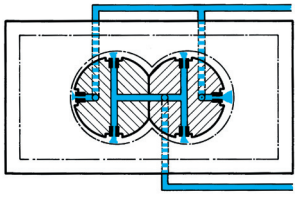
Measurement of a perpendicular position of a cylindrical bore to the front face with a special jet air plug gage - measurement as per the differential measuring method.

12.



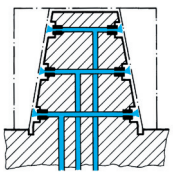
Measurement of hole distances of separated cylindrical bores with jet air plug gage - measurement as per the differential measuring method.

13.



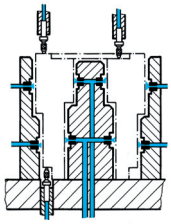
Measurement of hole distances of truncated cylindrical bores with jet air plug gages - measurement as per the differential measuring method.

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.



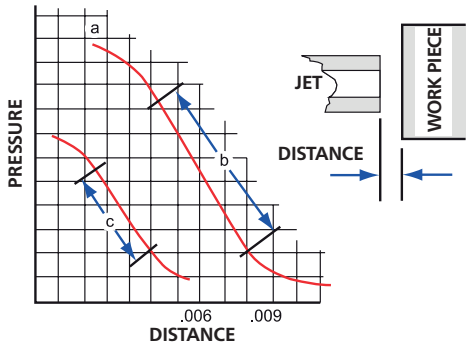
Metrological features

- Universal, relilable, 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: depnding upon the magnification 0.5 µm to 20 µm
- 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, excentricities, 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 colums and long scales
- Versatile measuring elements: jet air probes, jet air plugs gage, jet 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) µin / µm Ra	Part Tolerance (recommended)	Order no.
2500:1M	50	76 µm	1 µm	Diameter	***50*** / 1.27	± 25 µm	**2095191**
5000:1M	20	38 µm	0.5 µm		***20*** / 0.50	± 13.5 µm	**2095192**
2500:1	50	***.003"***	***.00005"***	Regular	***50*** / 1.27	***± .001"***	**2095184**
5000:1	20	***.0015"***	***.00002"***	82.6 mm / ***3.25"***	***20*** / 0.50	***± .0005"***	**2095185**
4000:1M	50	76 µm	0.5 µm	Diameter	***50*** / 1.27	± 25 µm	**2095199**
8000:1M	20	38 µm	0.2 µm		***20*** / 0.50	± 13.5 µm	**2095200**
4000:1	50	***.003"***	***.000025"***	Large	***50*** / 1.27	***± .001"***	**2095195**
8000:1	20	***.0015"***	***.000010"***	152.4 mm / ***6"***	***20*** / 0.50	***± .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

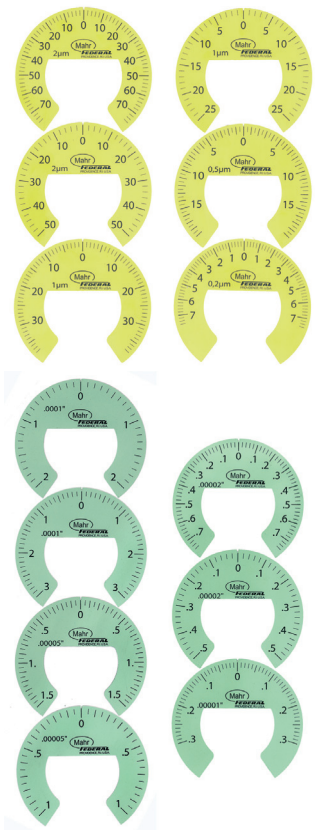
	Total Range	Range	Dial Graduations	Magnification	Order no.
Metric	152 µm	± 76 µm	2 µm	1260:1	**2242770**
	100 µm	± 50 µm	2 µm	1875:1	**2242771**
	76 µm	± 38 µm	1 µm	2500:1	**2242772**
	50 µm	± 25 µm	1 µm	3750:1	**2242773**
	38 µm	± 19 µm	0.5 µm	5000:1	**2242774**
Inch	***.006"***	***±.003"***	***.0001"***	***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**



µ*Dimensionair*® **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 µ*Dimensionair* are completely interchangeable and included with the gaging system — versatility is built-in.

All µ*Dimensionair* 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. µ*Dimensionair* 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.

µ*Dimensionair II* offers:
- Select Single and Min/Max mastering
- All other features of the Digital Indicator µ*Max*µ*m 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

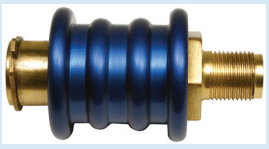
The ultimate in configuration — interchangeable handle allows for pistol grip or normal end-mount for easy application of the plug to the part. For large, heavy plugs, mount the handle between the tooling and the display — assures a well-balanced, ergonomic measuring system. Can also be mounted to a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

Accessories



Bench stand provides safe and secure µ*Dimensionair* 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.

µ*Dimensionair*® Air Gages (single or dual master system)

Technical Data

		µ*Dimensionair II*	
			
		Resolution	**Tooling I.D. Numbers**
Measuring range	± 0.080 mm	0.002 mm, 0.001 mm	60
	± 0.003"	***0.0001", 0.00005"***	
	± 0.040 mm	0.001 mm, 0.0005 mm	50
	± 0.0015"	***0.00002", 0.00005"***	
	± 0.020 mm	0.001 mm, 0.0005 mm	20
	± 0.00075"	***0.00002", 0.00005"***	
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

	µ*Dimensionair II* **Order no.**
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**

Optional Factory functions
Configured Features for µ*Dimensionair II*:

- 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 Single or Dual Input	±0.080 mm /***±.003"***	0.0002 mm /***10µ"***	0.004 mm /***150µ"***	60
	±0.040 mm /***±.0015"***		0.002 mm /***75µ"***	50
	±0.020 mm /***±.00075"***		0.001 mm /***38µ"***	20

Operating Temperature	5~35° C / 41~95° F
Storage Temperature	0~60° C / 32~140° F
Repeatability	±1 digit or ±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 ±A, ±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 Mains unit	100 V to 240 V, 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 D1000S

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)



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

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 Mains unit	90 V to 264 V, 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 avaialble upon request.

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

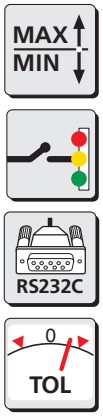
Order no.

			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)

S 1840 PE/M	2500:1	5000:1	10000:1
Measuring range	100 (±50) µm	50 (±25) µm	25 (±12) µm
Resolution	0.1µm ***(.000005")***	0.1µm ***(.000005")***	0.1µm ***(.000005")***
S 1840 PE/F	2500:1	5000:1	10000:1
Measuring range	76 (±38) µm	32 (±16) µm	16 (±8) µm
Resolution	0.1µm ***(.000005")***	0.1µm ***(.000005")***	0.1µm ***(.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 m^3 (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 Includes Filter 2201994 and Hose 2202076	**2121236**

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

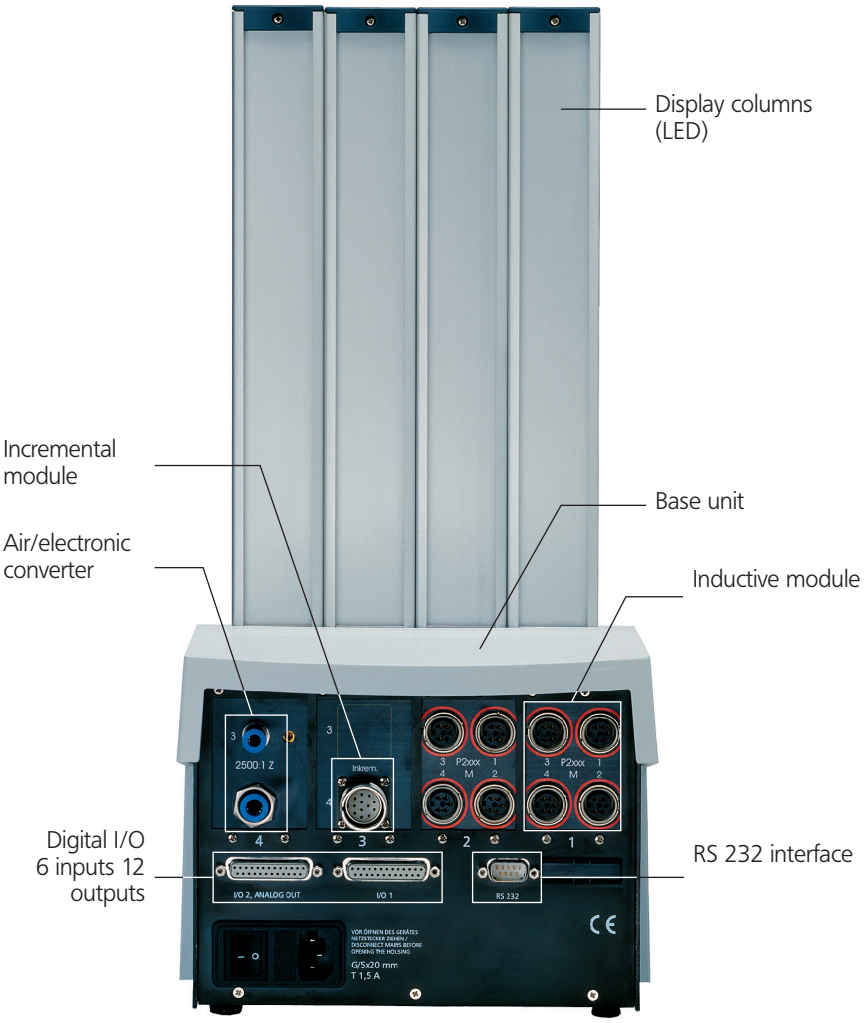
Functions
- 16 parameters may be defined
- A formula editor (80 characters) serves for the mathematical combination of input channels C1 to C16, suing the 4 basic arithmetic operations including functions and parentheses
- Static measurements: instantaneous value, square root, ARC tangent
- Dynamic measurements: 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 avaialble upon request.

Application Examples:

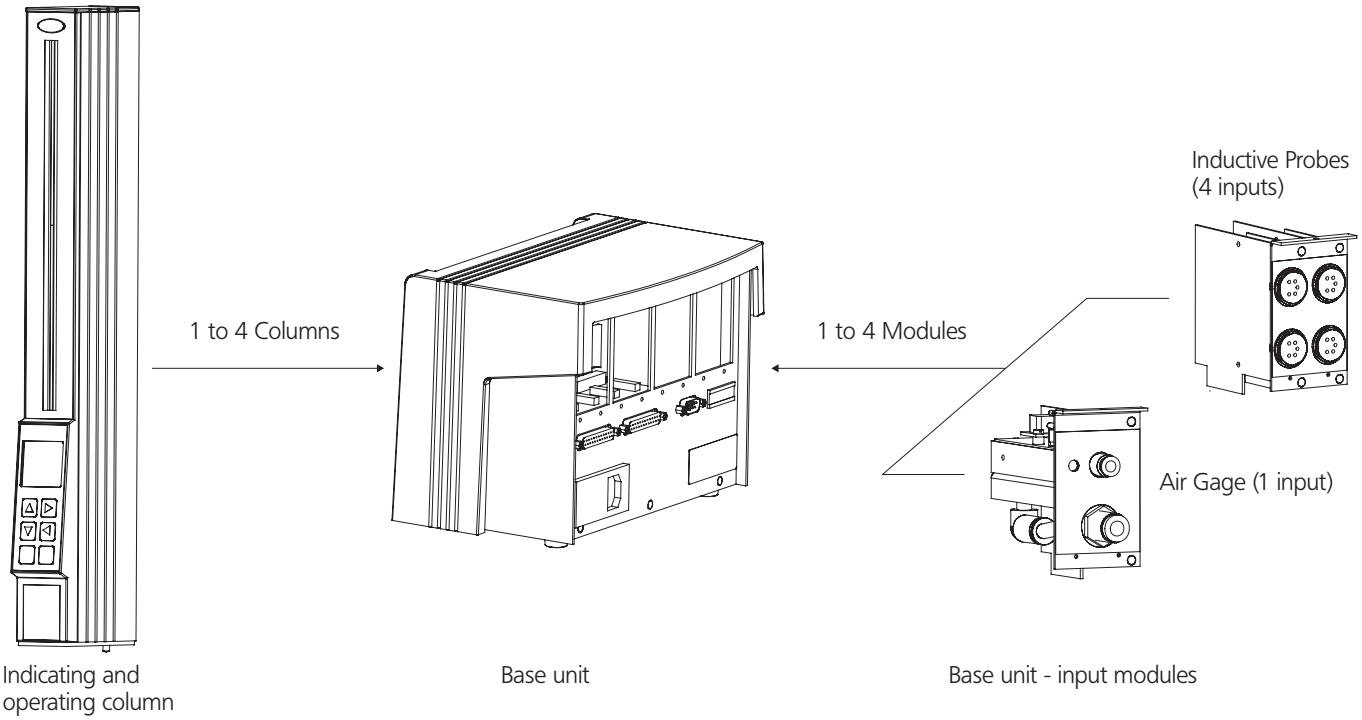
- Standard measuring units with up to 16 inductive probes for shaft measurements
- Measuring station for the inspection of workpieces with several electrical or air plug gages
- Customized multi-gaging units
- Taper jet plug gage or jet ring gage with 3 indicating columns and 2 air/electronic converter 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)

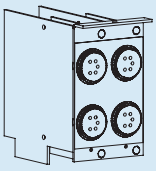
Technical Data



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

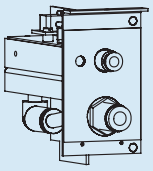
Technical Data





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	±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

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).

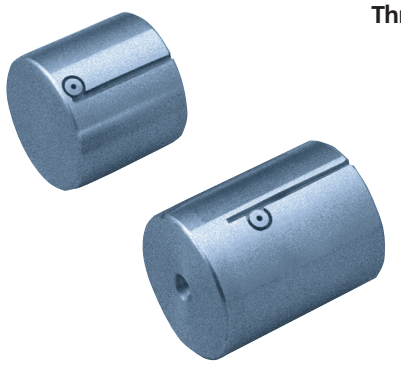
The number (50) which identifies the Dimensionair intended is marked on the plug and also appears on the dial of the Dimensionair to help in matching the tooling to its corresponding Dimensionair Model.

Ordering Information

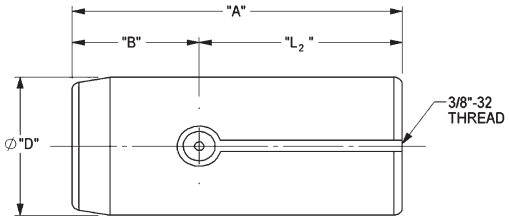
When ordering Air Plugs please specify:

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

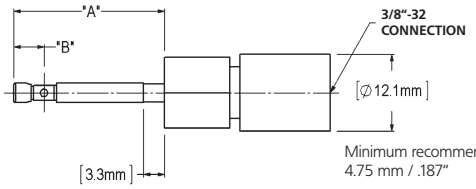
Nominal deviations from – to ø D		A		B		L2		Minimum length of bore		DP20 (5000:1) Measuring Range		Order no.	DP50 (2500:1) Measuring Range		Order no.
mm	*(inch)*	mm	*(inch)*	mm	*(inch)*	mm	*(inch)*	mm	*(inch)*	µm	*(inch)*		µm	*(inch)*	
3.124 -	3.553 *(0.1230 - 0.1399)*	23.80	*(.937)*	4.75	*(.187)*	19.05	*(.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		Order no.	DP50 (2500:1) Measuring Range		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**

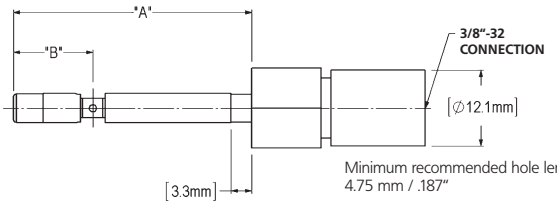
Through Hole Plugs (DP50 - DP20)

3.94-4.70 mm / .155-.185”



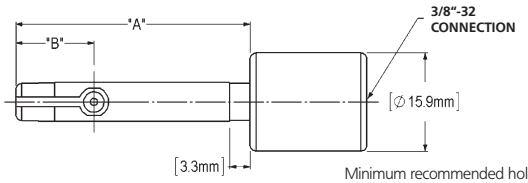
Minimum recommended hole length:
4.75 mm / .187”

4.70-6.30 mm / .185-.248”



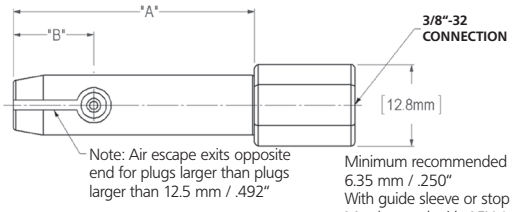
Minimum recommended hole length:
4.75 mm / .187”

6.30-9.49 mm / .248-.3735”



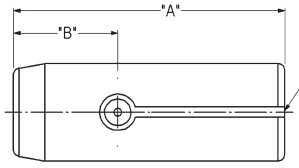
Minimum recommended hole length:
6.35 mm / .250”
With guide sleeve or stop collar 1.8 mm / .07”

9.49-11.86 mm / .3735-.467”



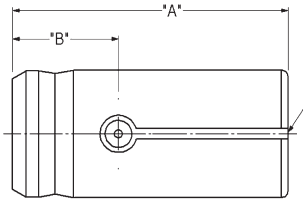
Minimum recommended hole length:
6.35 mm / .250”
With guide sleeve or stop collar 1.8 mm / .07”
May be used with AEX-1 or -2 Extensions for deep holes

11.86-14.94 mm / .467-.588”



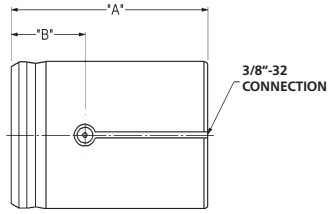
Minimum recommended hole length:
.35 mm / .250”
With guide sleeve or stop collar 1.8 mm / .07”
May be used with AHA-4 or -5 Extensions for deep holes

14.94-37.69 mm / .588-1.484”



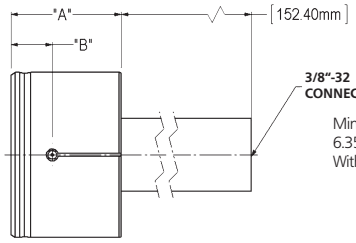
Minimum recommended hole length:
.35 mm / .250”
With guide sleeve or stop collar 1.8 mm / .07”
May be used with AHA-4 or -5 Extensions for deep holes

37.69-76.30 mm / 1.484-3.004”



Minimum recommended hole length:
.35 mm / .250”
With guide sleeve or stop collar 1.8 mm / .07”
May be used with AHA-4 or -5 Extensions for deep holes

76.30-114.30 mm / 3.004-4.500”



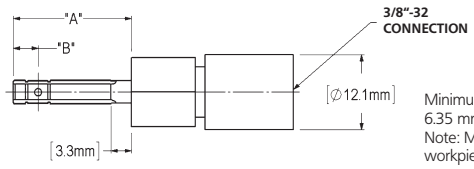
Minimum recommended hole length:
6.35 mm / .250”
With guide sleeve or stop collar 1.8 mm / .07”

Nominal Dimension mm / ***inch***				**Minimum Hole Length***	**Measuring range**	
Including & Above	**To**	**“A”**	**“B”**	mm / ***inch***	**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”.*

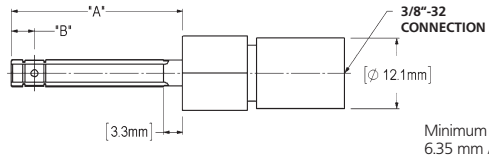
Blind Hole / Counterbore Plugs (DP50 - DP20)

3.94-4.70 mm / .155-.185"



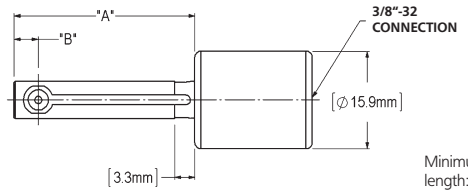
Minimum recommended hole length: 6.35 mm / .250"
Note: Masters must simulate workpiece for holes of this size

4.70-6.30 mm / .185-.248"



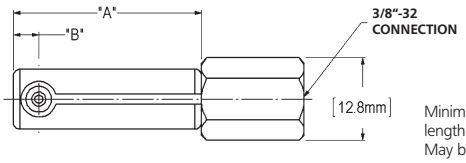
Minimum recommended hole length: 6.35 mm / .250"

6.30-9.49 mm / .248-.3735"



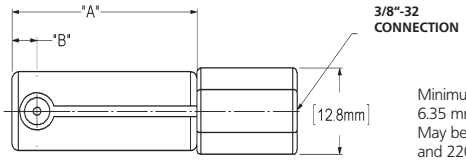
Minimum recommended hole length: 6.35 mm / .250"

9.49-11.86 mm / .3735-.467"



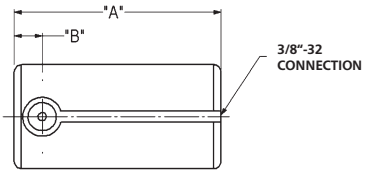
Minimum recommended hole length: 6.35 mm / .250"
May be used with Extension 2202009

11.86-14.94 mm / .467-.588"



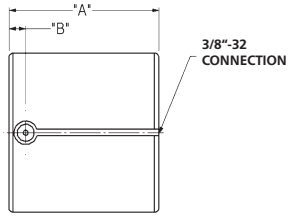
Minimum recommended hole length: 6.35 mm / .250"
May be used with Extensions 2201963 and 2201954

14.94-37.69 mm / .588-1.484"



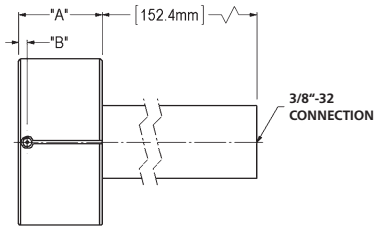
Minimum recommended hole length: 6.35 mm / .250"
May be used with Extensions 2202010 and 2202011

37.69-76.30 mm / 1.484-3.004"



Minimum recommended hole length: 6.35 mm / .250"
May be used with Extensions 2202010 and 2202011

76.30-114.30 mm / 3.004-4.500"



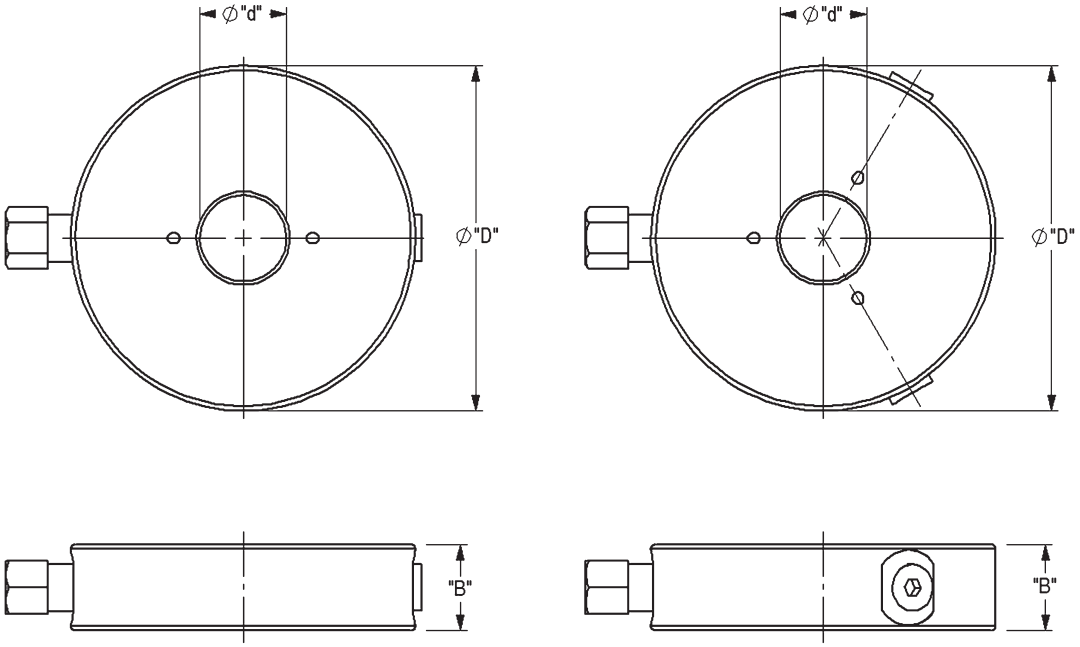
Super-blind Plugs

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".

Nominal Dimension mm / *inch*								Minimum Hole Length*		Measuring range	
Including & Above		To		"A"		"B"		mm / *inch*		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

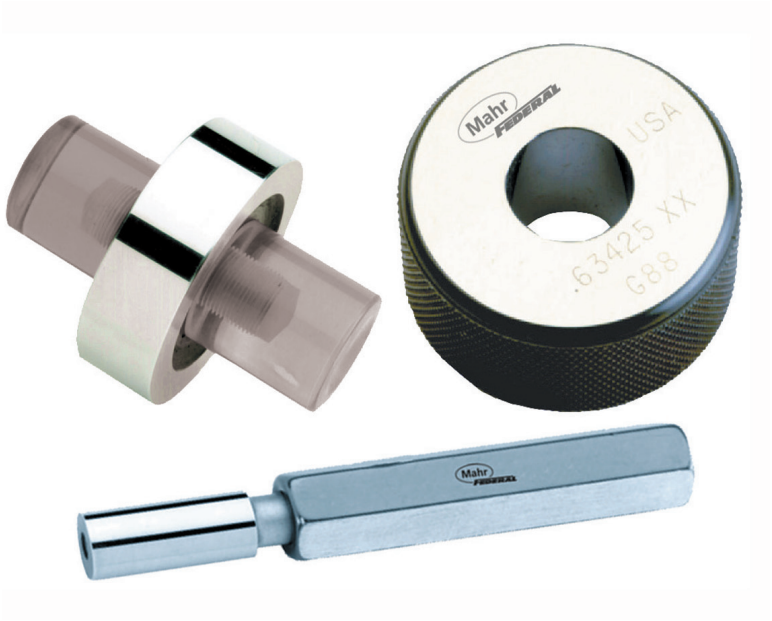


For every air gages an appropriate setting master can be ordered.

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

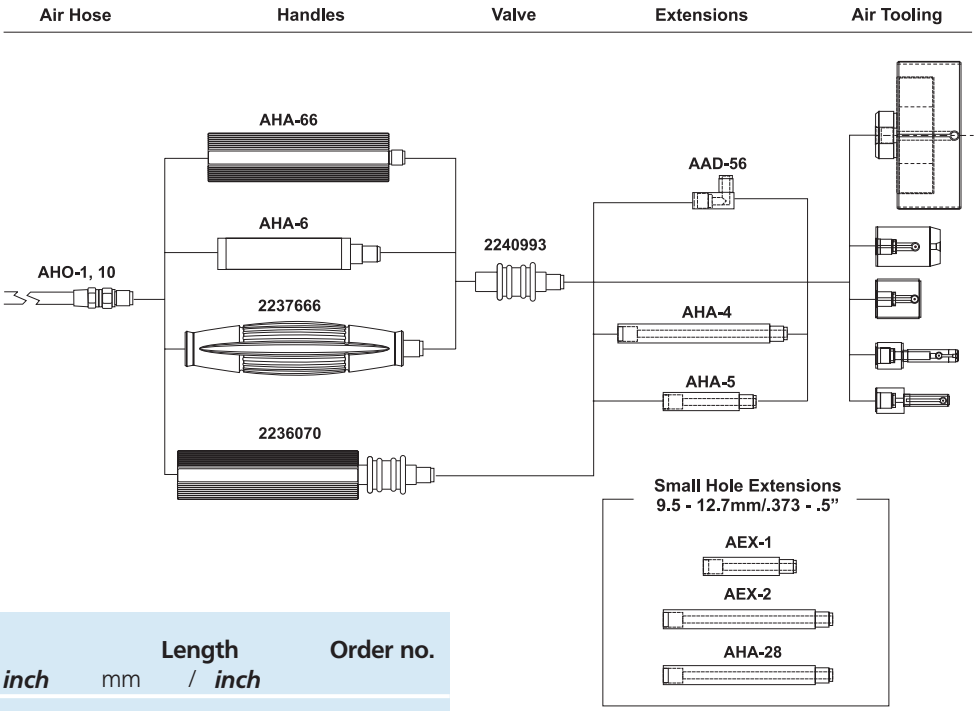
2093045 – light weight aluminum handles without or with air shutoff valve.

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.

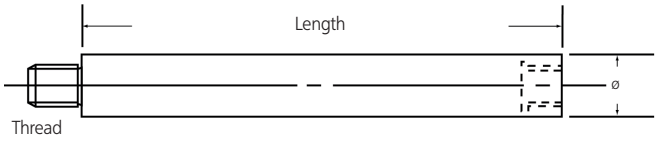
2201954 and **2201963 Extensions** – Used with 2500:1 thru 8000:1 through hole air plugs in the 9.47 mm / .3735" to 14.93 mm / .588" range and with 11.8 mm / .467" to 14.93 mm / .588" range blind hole plugs, using an Adaptor 2201601.

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



Thread	ø mm	/ *inch*	Length mm	/ *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**

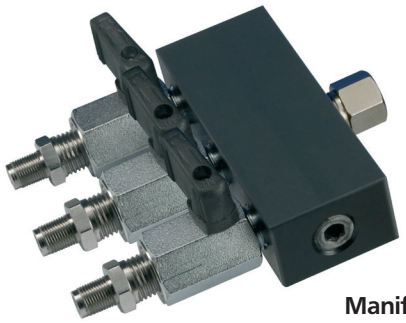


Setting Standards

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 m^3 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

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Accessories for Measuring Slides 218
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Carriages with Cross Roller Bearings 221

Linear Measuring Slides 222
(Micrometer slides, Accessories, . . .)

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Prisms and Accessories 228
(Prisms, Supports, Flanges)

Precision Rotary Unit 231

Equipment Accessories 232
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Additional Accessories 242
(Supports, Blocks, Clamping pieces)

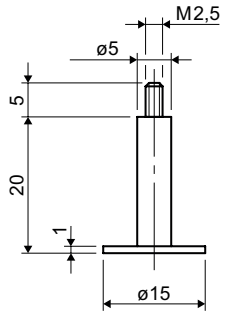
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Measuring Inserts

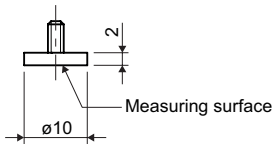
Flat Contact Points P19A

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



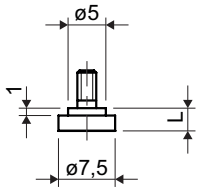
Flat Contact Points P2

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



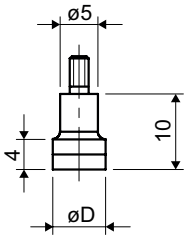
Flat Contact Points P7A

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



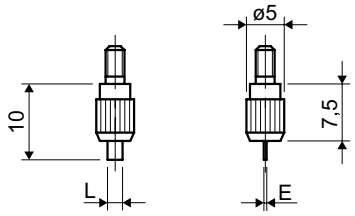
Flat Contact Points P28C

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



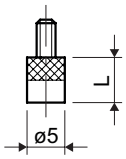
Flat Contact Points P38C

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

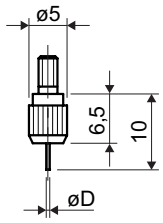
Catalog no.	dia. mm	Length mm	Material	Order no.
P26A	5	3	Steel	**5113010**
P26A	5	6	Steel	**5113011**
P26A	5	10	Steel	**5113012**
P26C	5	6	Carbide	**5113013**
P26C	5	10	Carbide	**5113014**



Measuring Inserts

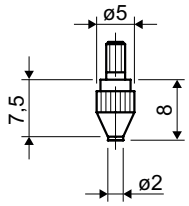
Flat Contact Points P35C

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



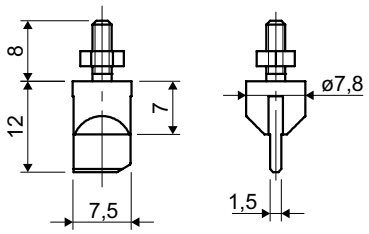
Flat Contact Points P32C

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



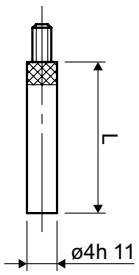
Flat Contact Points PTN8

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



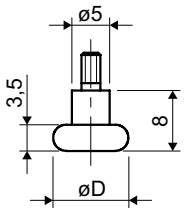
Flat Contact Points P21

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

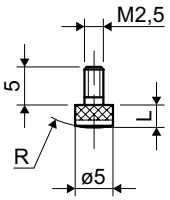
Catalog no.	⌀ mm	Length mm	Material	Order no.
P8A	10	8	Steel	**5113031**
P8A	20	8	Steel	**5113032**



Measuring Inserts

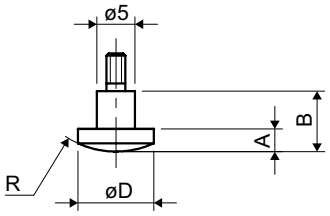
Spherical Contact Points P27

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**



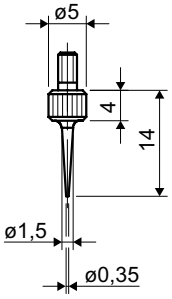
Spherical Contact Points P10

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**



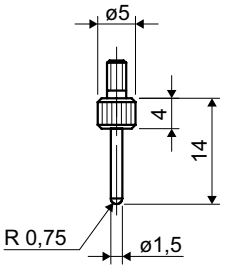
Spherical Contact Points P24A

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



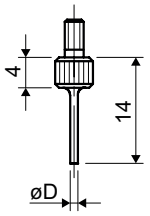
Spherical Contact Points P18A

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



Spherical Contact Points P3A

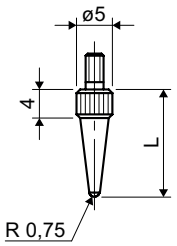
Catalog no.	dia. mm	Length mm	Material	Order no.
P3A	1	14	Steel	**5113043**
P3A	1.5	14	Steel	**5113044**
P3A	2	14	Steel	**5113045**



Measuring Inserts

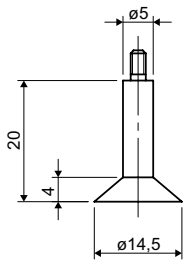
Tapered Contact Points P17A

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**



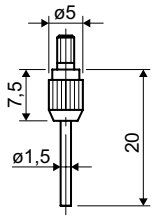
Flat Contact Points P13A

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



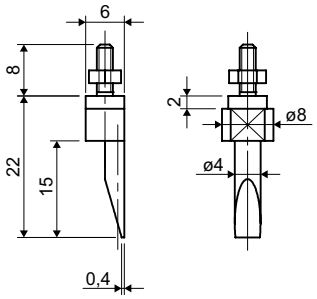
Tapered / Flat Contact Points P34

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



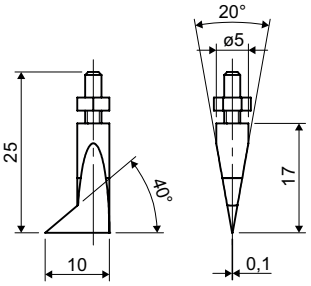
Wedge Shaped Contact Points P15A

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



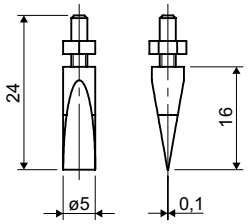
Wedge Shaped Contact Points P20A

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



Wedge Shaped Contact Points P22A

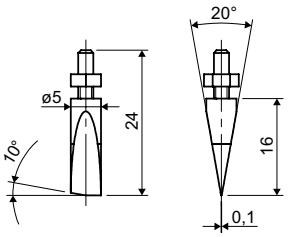
Catalog no.	Length mm	Material	Order no.
P22A	16	Steel	**5113057**



Measuring Inserts

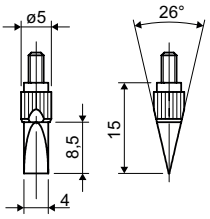
Wedge Shaped Contact Points P23A

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



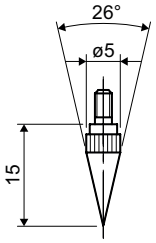
Wedge Shaped Contact Points P36C

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



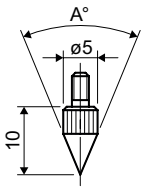
Taper Contact Points P37C

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



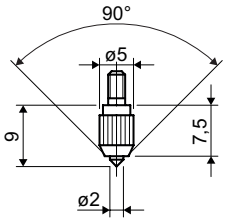
Taper Contact Points P1A

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**



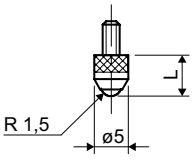
Taper Contact Points P33C

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



Ball Contact Points P11

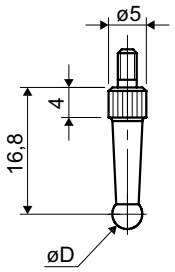
Catalog no.	Radius mm	Length mm	Material	Order no.
P11A	1.5	4	Steel	**5113069**
P11A	1.5	16	Steel	**5113070**
P11A	1.5	26	Steel	**5113071**
P11C	1.5	16	Carbide	**5113072**
P11C	1.5	26	Carbide	**5113073**
P11R	1.5	16	Ruby	**5113074**
P11R	1.5	26	Ruby	**5113075**
P11S	1.5	16	Sapphire	**5113076**
P11S	1.5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



Measuring Inserts

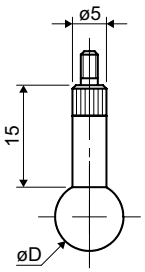
Ball Contact Points P4

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**



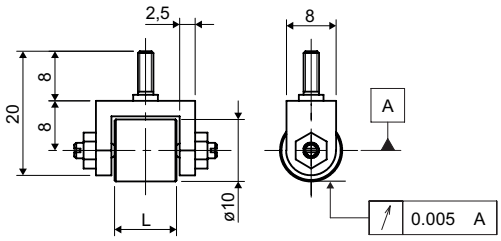
Ball Contact Points P14A

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**



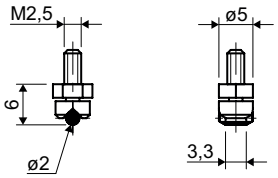
Contact Rollers P25A

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**



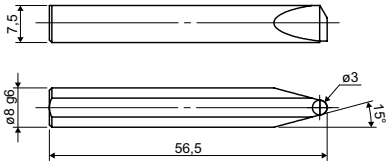
Cylindrical Contact Points P12C

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



Contact Points TOU8C

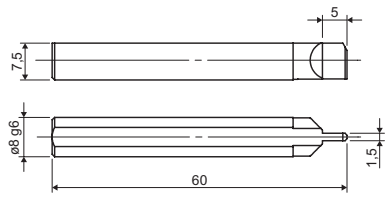
Catalog no.	Mount mm	dia. mm	Length mm	Material	Order no.
TOU8C	8	3	56.5	Carbide	**5113103**



Measuring Inserts

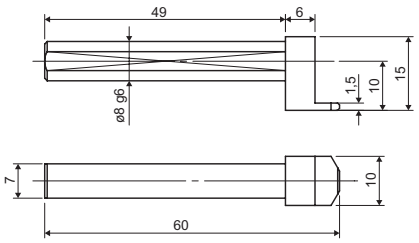
Contact Points TN8C

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



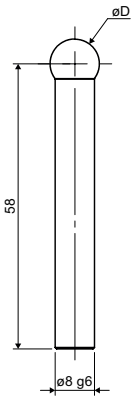
Contact Points TP8C

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



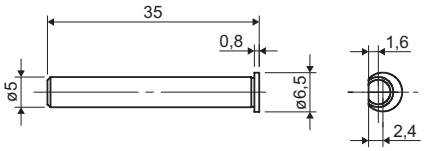
Ball Contact Points TR8

Catalog no.	Mount mm	⌀ 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**



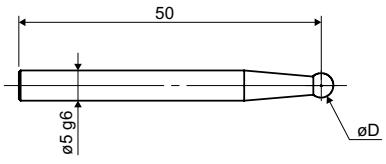
Contact Points T5A

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



Ball Contact Points TR5C

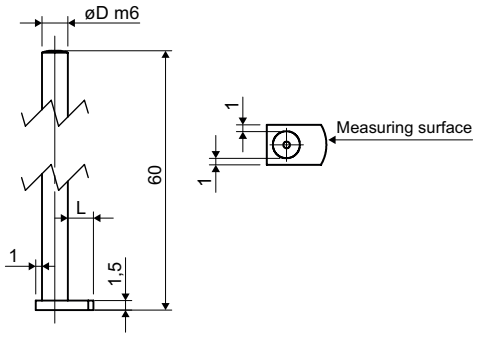
Catalog no.	Mount mm	⌀ mm	Length	Material	Order no.
TR5C	5	4	50	Carbide	**5113121**
TR5C	5	5	50	Carbide	**5113122**
TR5C	5	6	50	Carbide	**5113123**
TR5C	5	7	50	Carbide	**5113124**



Measuring Inserts

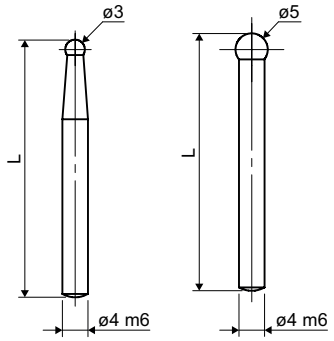
Contact Points TG4C

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**



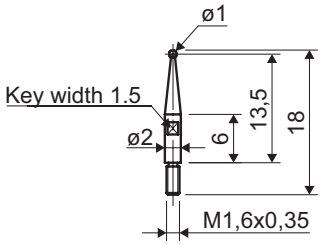
Ball Contact Points TC4C

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**



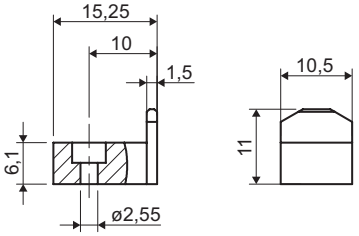
Contact Points PTB

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



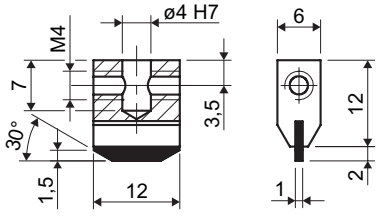
Measuring Attachment P39C

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



Measuring Attachment, centered MS1C

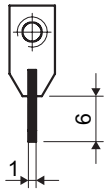
Catalog no.	Thickness mm	Length mm	Material	Order no.
MS1C	1	2	Carbide	**5113143**



Measuring Inserts

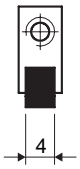
Measuring Attachment, centered MS2C

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



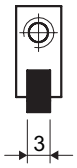
Measuring Attachment, centered MS3C

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



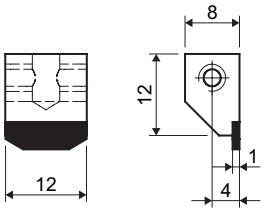
Measuring Attachment, centered MS4C

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



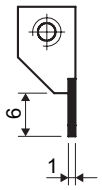
Measuring Attachment, offset MS5C

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

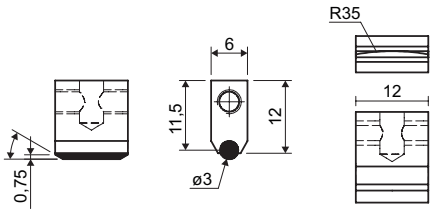
Catalog no.	Thickness mm	Material	Order no.
MS8C	4	Carbide	**5113150**



Measuring Inserts

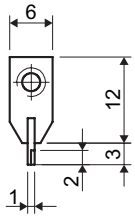
Measuring Attachment with cylinder centered MS9C

Catalog no.	Material	Order no.
MS9C	Carbide	**5113151**



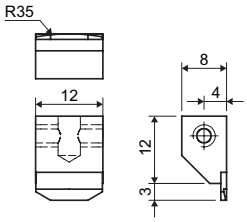
Measuring Attachment, centered flat MS10C

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



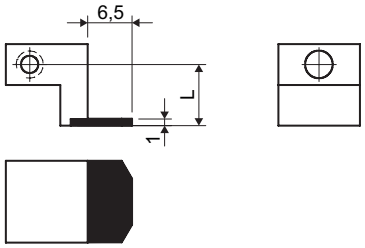
Measuring Attachment, offset flat MS11C

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



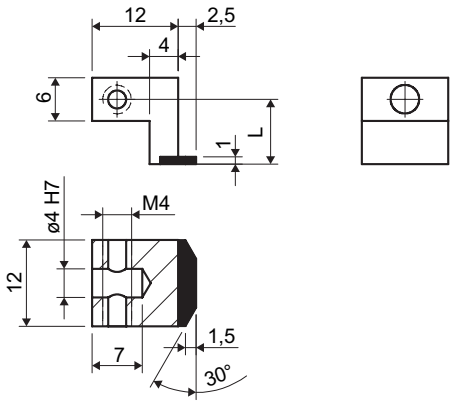
Measuring Attachment MS12C

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

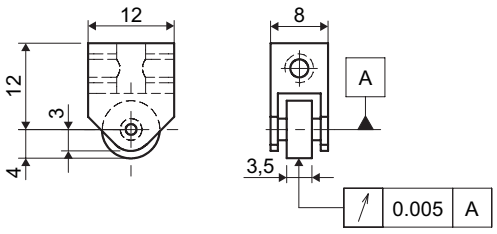
Catalog no.	Offset L mm	Length mm	Thickness mm	Material	Order no.
MS13C	9	2.5	1	Carbide	**5113157**
MS13C	15	2.5	1	Carbide	**5113158**
MS13C	27	2.5	1	Carbide	**5113159**



Measuring Inserts

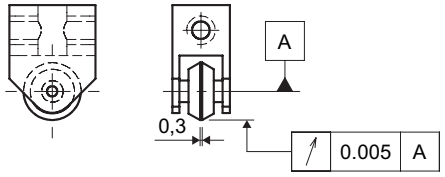
Contact Rollers MS14C

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



Contact Rollers MS15C

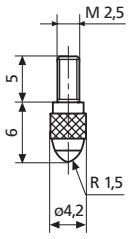
Catalog no.	Thickness mm	Material	Order no.
MS15C	0.3	Steel	**5113161**



Standard Contact Points 901

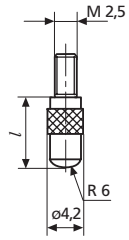
Ball dia. 3 mm

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

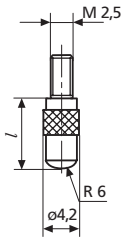
Catalog no.	Length mm	Material	Order no.
902	4	Steel	**4360007**
902	6	Steel	**4360009**
902	8	Steel	**4360010**
902	10	Steel	**4360011**
902	12	Steel	**4360012**
902	15	Steel	**4360013**
902	20	Steel	**4360014**
902	25	Steel	**4360015**
902	30	Steel	**4360016**
902	35	Steel	**4360017**
902	40	Steel	**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

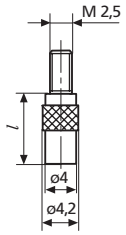
Spherical Contact Points 902 H

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**



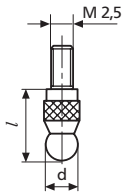
Flat Contact Points 903 H

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

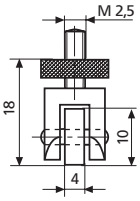
Ball Contact Points 906 H
with carbide ball, accuracy ball dia. 0/–6µm

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)

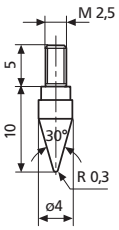
Catalog no.	Description	Order no.
909 A	Cylindrical Roller	**4360220**
909 B	Radiuesed Roller R = 5 mm	**4360221**



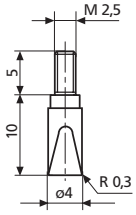
Special Contact Points

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**

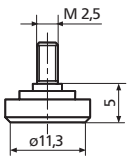
904



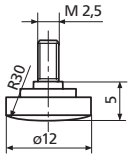
905



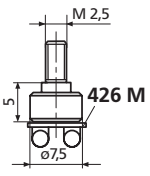
907



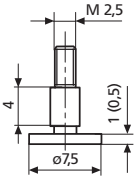
908 H



913



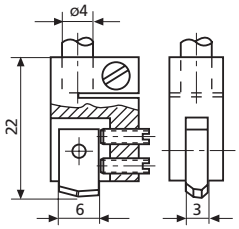
30 ENt



Measuring Inserts

Measuring Attachment 910 H

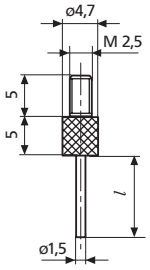
Catalog no.	Description	Order no.
910 H	with parallel adjustable carbide blades	**4360230**



Pin Contact Points 911

ø 1.5 mm, flat

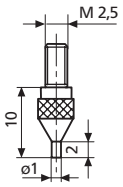
Catalog no.	Length *l* mm	Order no.
911	15	**4360280**
911	20	**4360281**
911	25	**4360282**
911	30	**4360283**
911	35	**4360284**
911	40	**4360285**
911	50	**4360286**



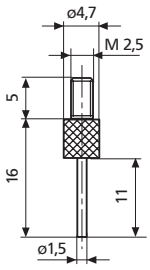
Pin Contact Points 911 H

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

911 H1

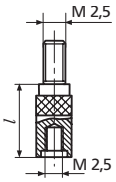


911 H2

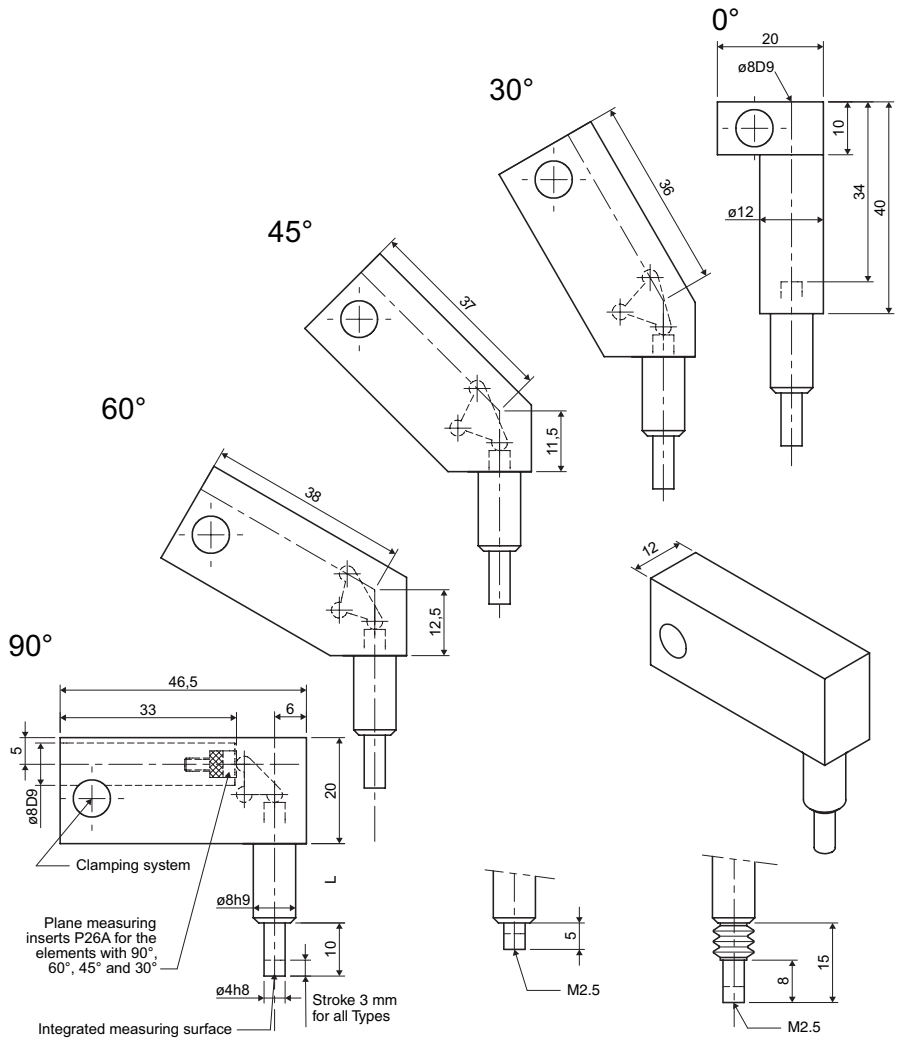


Measuring Spindle Extensions 912

Catalog no.	Length *l* 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



Type A **Type C** **Type F**

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**

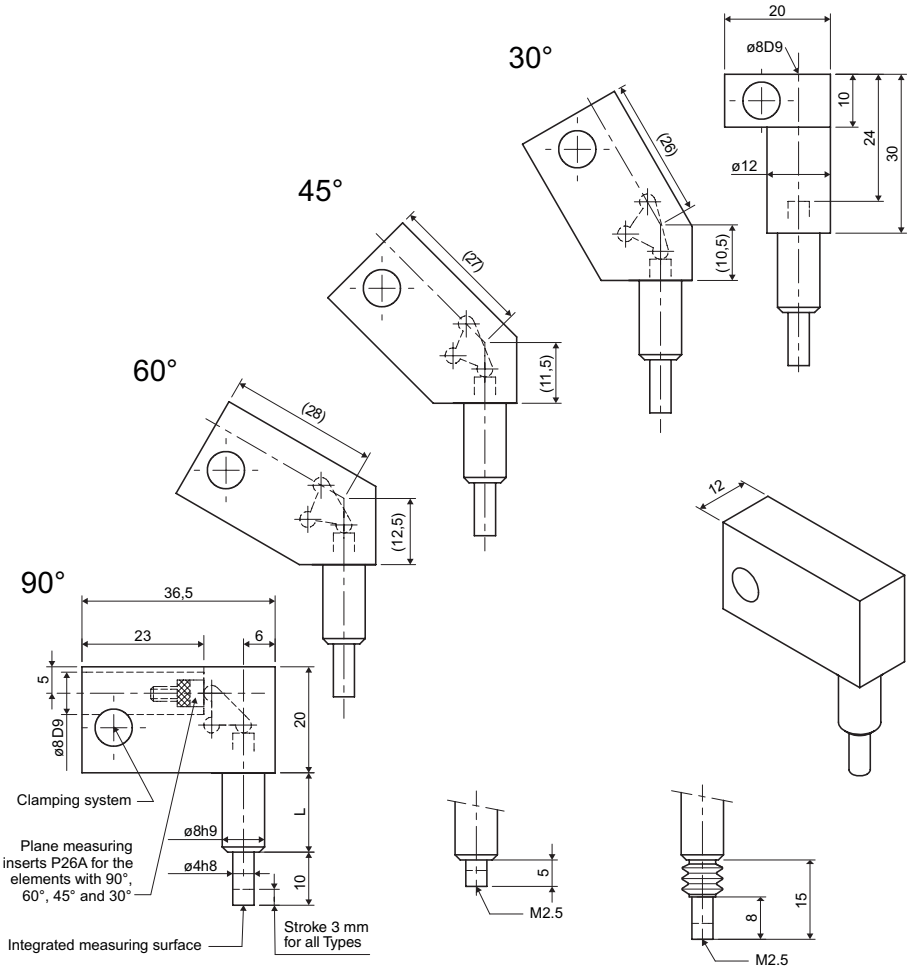
Swivel elements, long 45°

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



Type A **Type C** **Type F**

Swivel elements, compact 0°

Catalog no.	Length L mm	Type	Order no.
UK-A	15	A	**5113732**
UK-C	15	C	**5113733**
UK-F	15	F	**5113734**
UK-A	25	A	**5113738**
UK-C	25	C	**5113739**
UK-F	25	F	**5113740**
UK-A	50	A	**5113741**
UK-C	50	C	**5113742**
UK-F	50	F	**5113743**
UK-A	75	A	**5113744**
UK-C	75	C	**5113745**
UK-F	75	F	**5113746**

Catalog no.	Length L mm	Type	Order no.
UK-A	100	A	**5113723**
UK-C	100	C	**5113724**
UK-F	100	F	**5113725**
UK-A	125	A	**5113726**
UK-C	125	C	**5113727**
UK-F	125	F	**5113728**
UK-A	150	A	**5113729**
UK-C	150	C	**5113730**
UK-F	150	F	**5113731**
UK-A	200	A	**5113735**
UK-C	200	C	**5113736**
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**

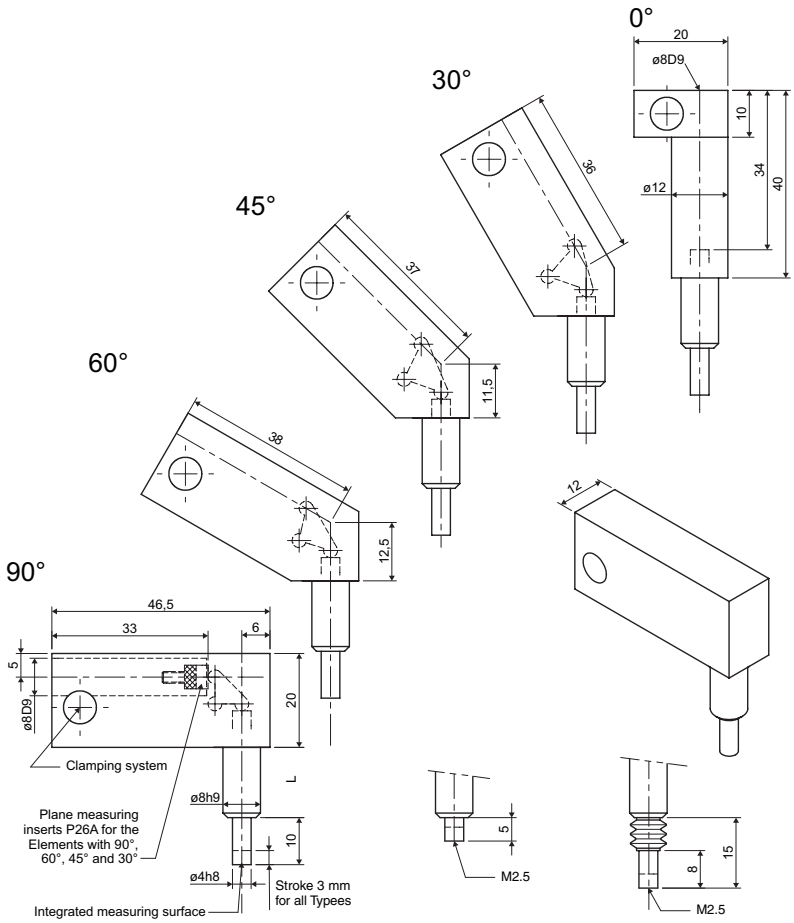
Swivel elements, compact 45°

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**

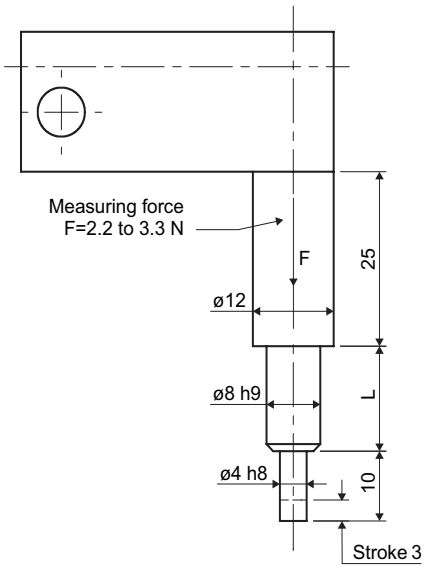
Swivel elements, compact 90°

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



Type A **Type C** **Type F**



Swivel elements, long with return spring

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**

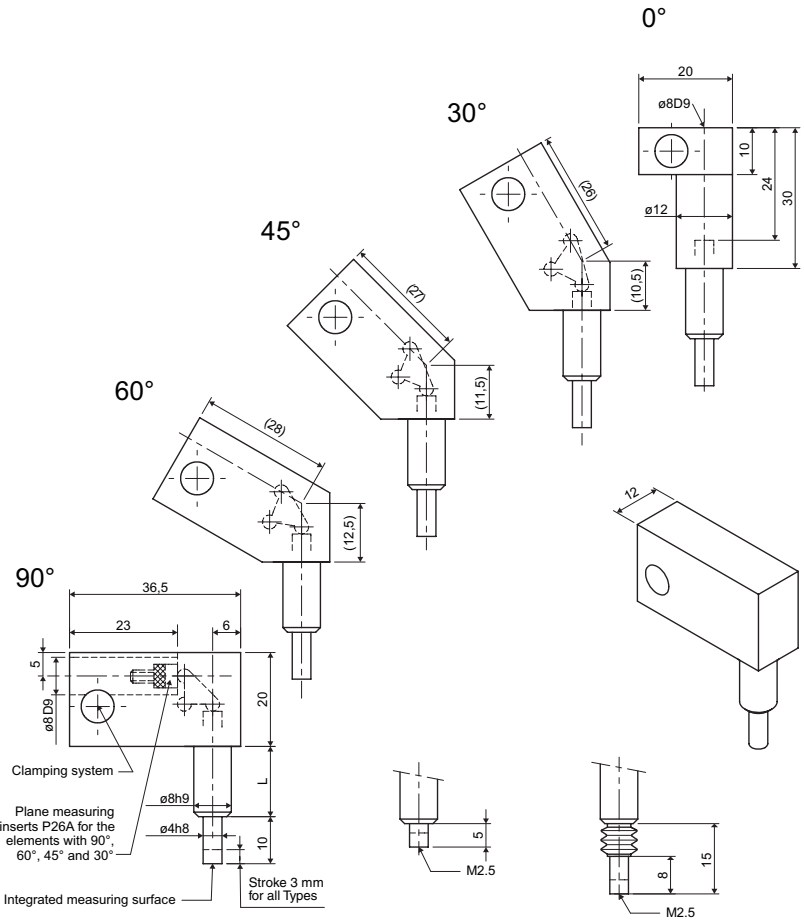
Swivel elements, long with return spring 45°

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**

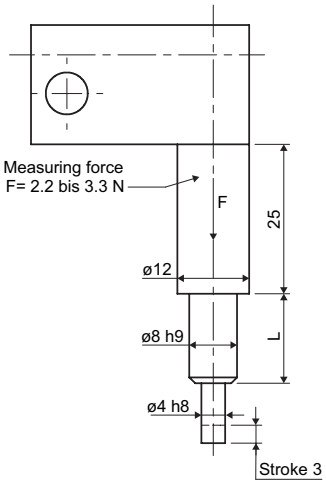
Swivel elements, long with return spring 90°

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



Type A **Type C** **Type F**



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**

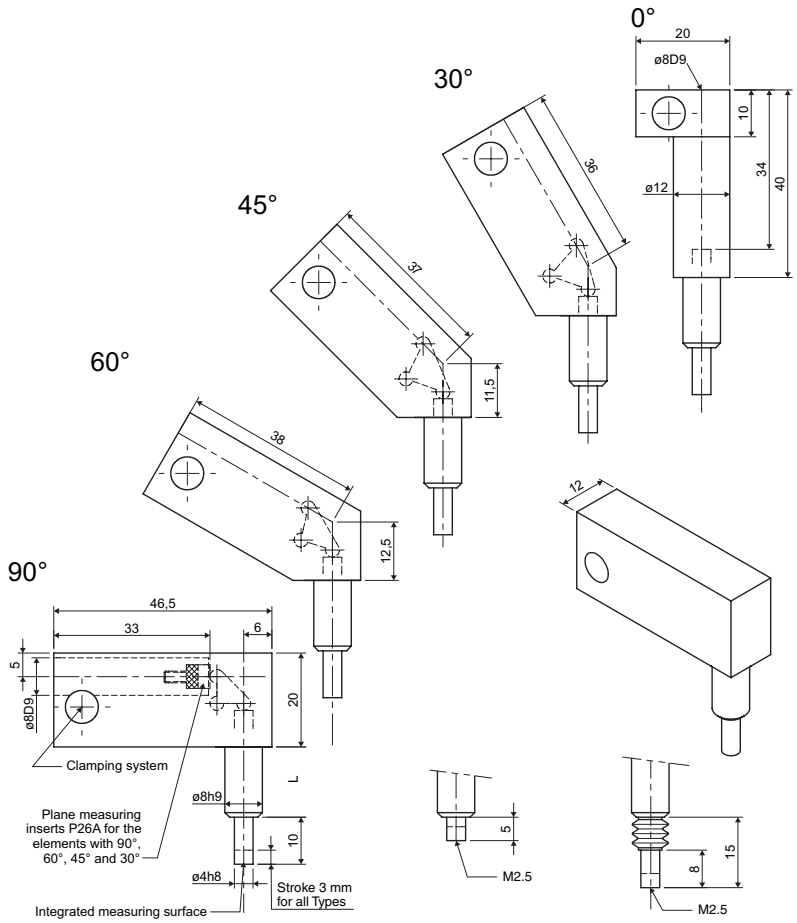
Swivel elements, compact with return spring 45°

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**

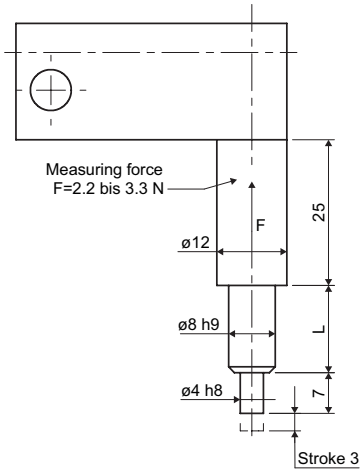
Swivel elements, compact with return spring 90°

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



Type A **Type C** **Type F**



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**

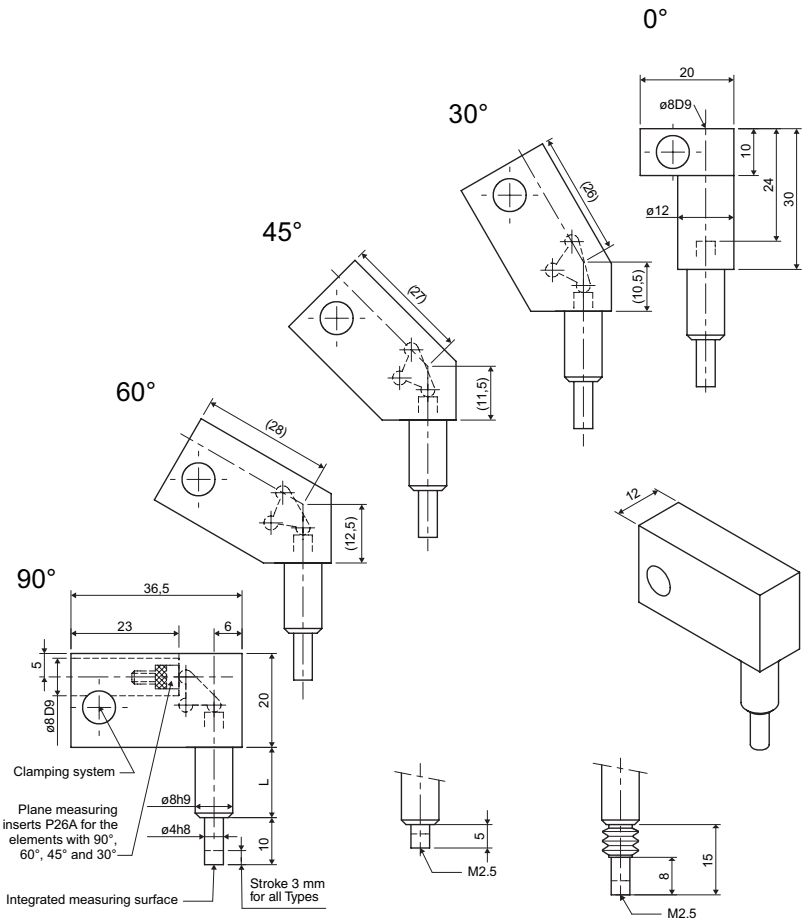
Swivel elements, long with return spring 45°

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**

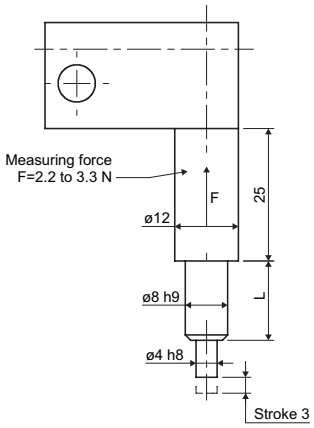
Swivel elements, long with return spring 90°

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



Type A **Type C** **Type F**



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°

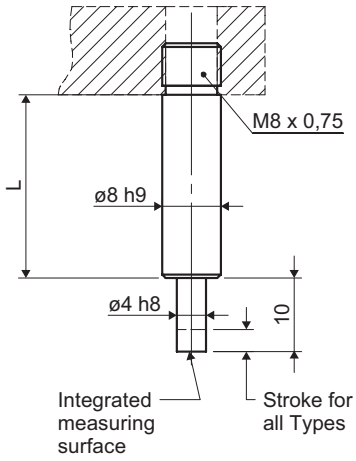
Catalog no.	Length L mm	Type	Order no.
UKR-A	15	A	**5114275**
UKR-C	15	C	**5114276**
UKR-F	15	F	**5114277**
UKR-A	25	A	**5114281**
UKR-C	25	C	**5114282**
UKR-F	25	F	**5114283**
UKR-A	50	A	**5114284**
UKR-C	50	C	**5114285**
UKR-F	50	F	**5114286**
UKR-A	75	A	**5114287**
UKR-C	75	C	**5114288**
UKR-F	75	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**

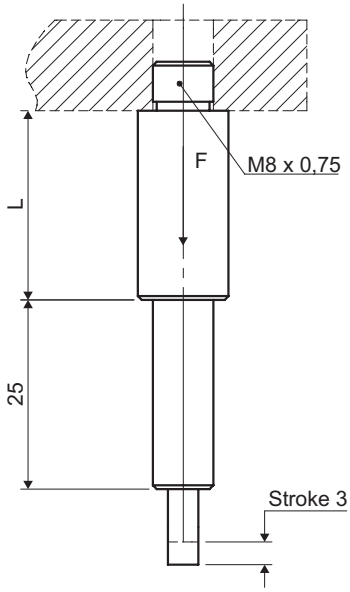
Swivel elements, long with return spring 90°

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**

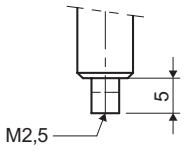
Swivel Elements and Extensions

Type A

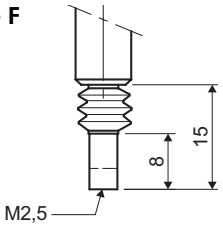




Type C



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**

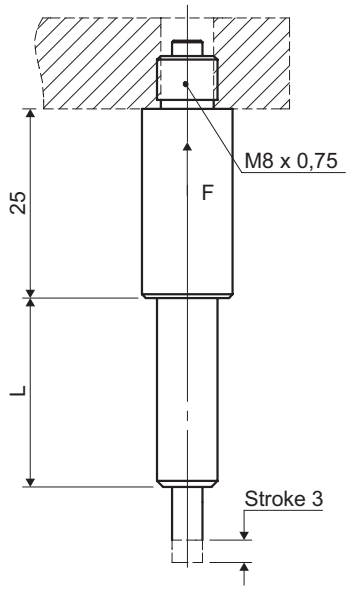
Insertion elements with return spring

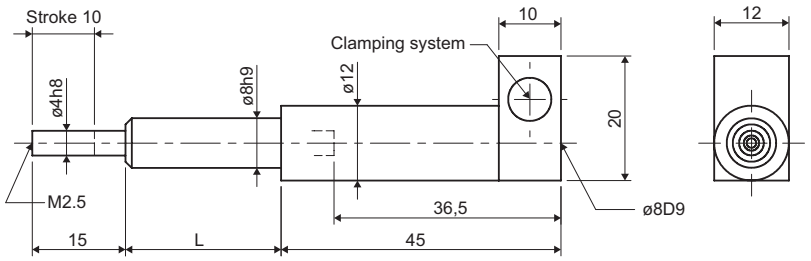
Catalog no.	Length L mm	Type	Order no.
EBV-A	15	A	**5114370**
EBV-C	15	C	**5114371**
EBV-F	15	F	**5114372**
EBV-A	25	A	**5114373**
EBV-C	25	C	**5114374**
EBV-F	25	F	**5114375**
EBV-A	50	A	**5114376**
EBV-C	50	C	**5114377**
EBV-F	50	F	**5114378**
EBV-A	75	A	**5114379**
EBV-C	75	C	**5114380**
EBV-F	75	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**

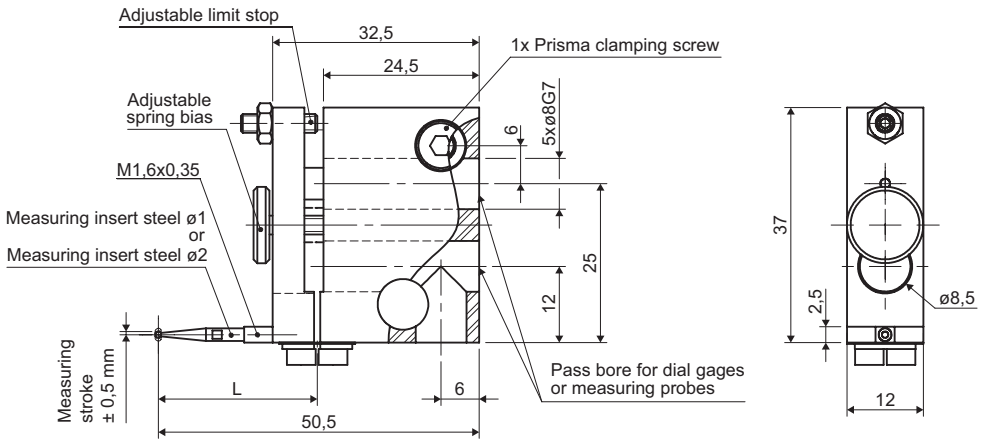




Measuring extensions with 10 mm stroke

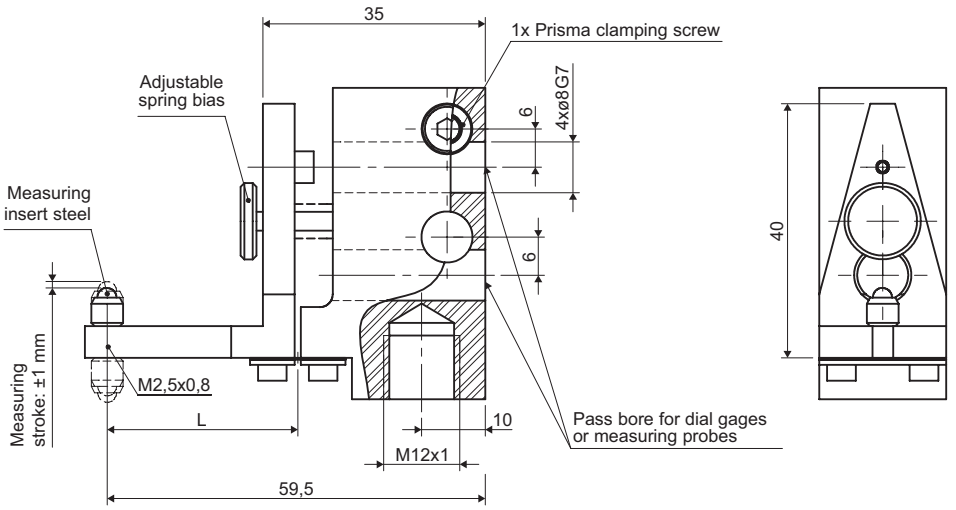
Catalog no.	Length L mm	Type	Order no.
MV 10	25	A	**5114426**
MV 10	50	C	**5114427**
MV 10	75	F	**5114428**
MV 10	100	A	**5114429**
MV 10	125	C	**5114430**
MV 10	150	F	**5114431**
MV 10	200	A	**5114432**

Swivel Elements and Extensions



Swivel REN 25 with Ball Contact Point

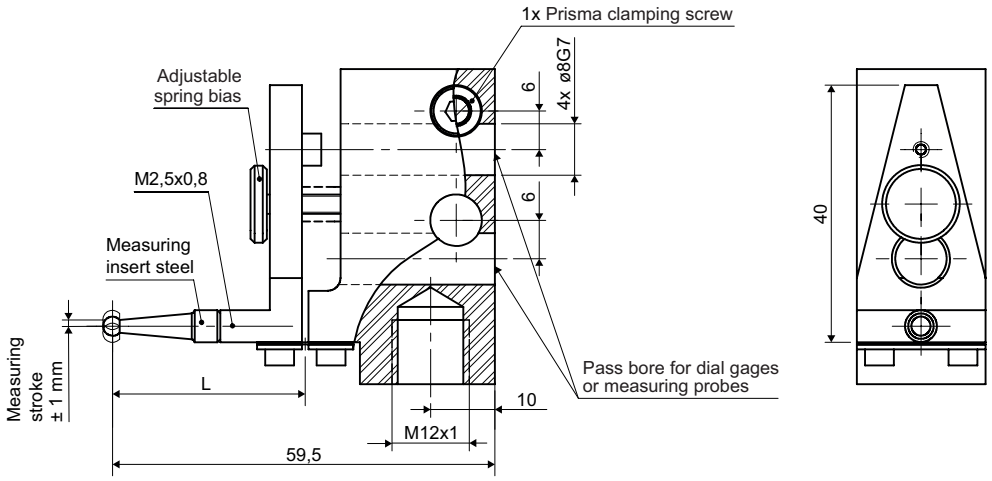
Catalog no.	Angle °	Length L mm	Meas. insert dia.	**Order no.**
REN	90	25	1	**5113200**
REN	90	25	2	**5113201**



Swivel REN 30A with Contact Point

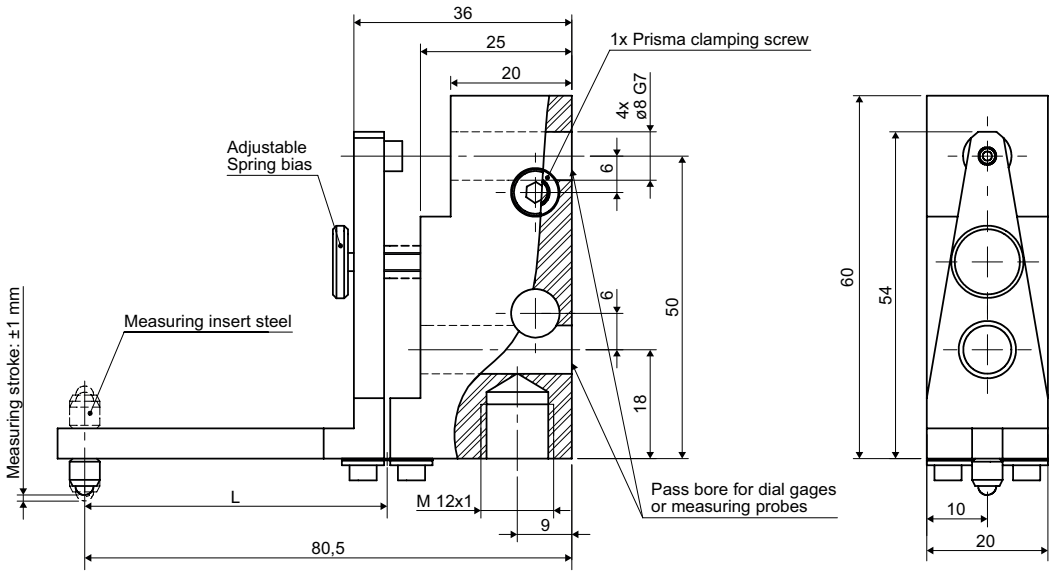
Catalog no.	Angle °	Length L mm	Contact point	**Order no.**
REN	90	30	P11A	**5113200**

Swivel Elements and Extensions



Swivel REN 30B with Ball Contact Point

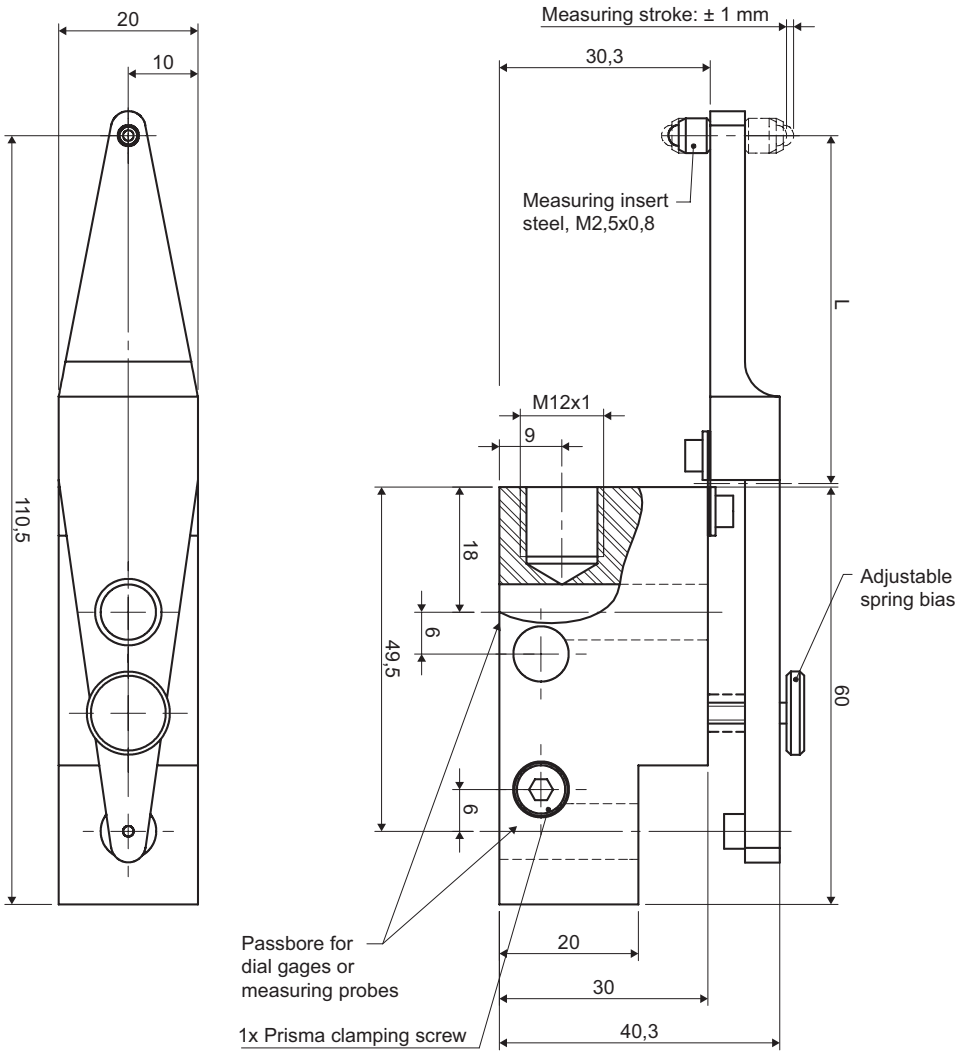
Catalog no.	Angle °	Length L mm	Meas. insert dia.	Order no.
REN	90	30	3	**5113203**



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**

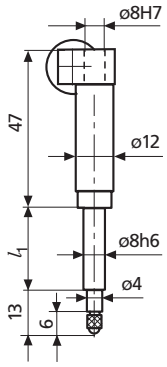
Swivel Elements and Extensions

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)

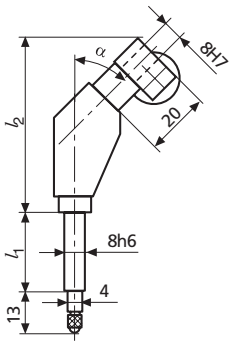
Straight Holder 941 G

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

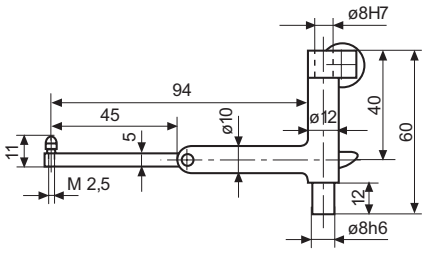
Catalog no.	Mounting shank length l_1 mm	l_2 mm	Angle α=	Order no.
941 W	25	53.7	45	**4365010**
941 W	50	53.7	45	**4365011**
941 W	75	53.7	45	**4365012**
941 W	25	49.3	60	**4365020**
941 W	50	49.3	60	**4365021**
941 W	75	49.3	60	**4365022**
941 W	25	34.5	90	**4365030**
941 W	50	34.5	90	**4365031**
941 W	75	34.5	90	**4365032**



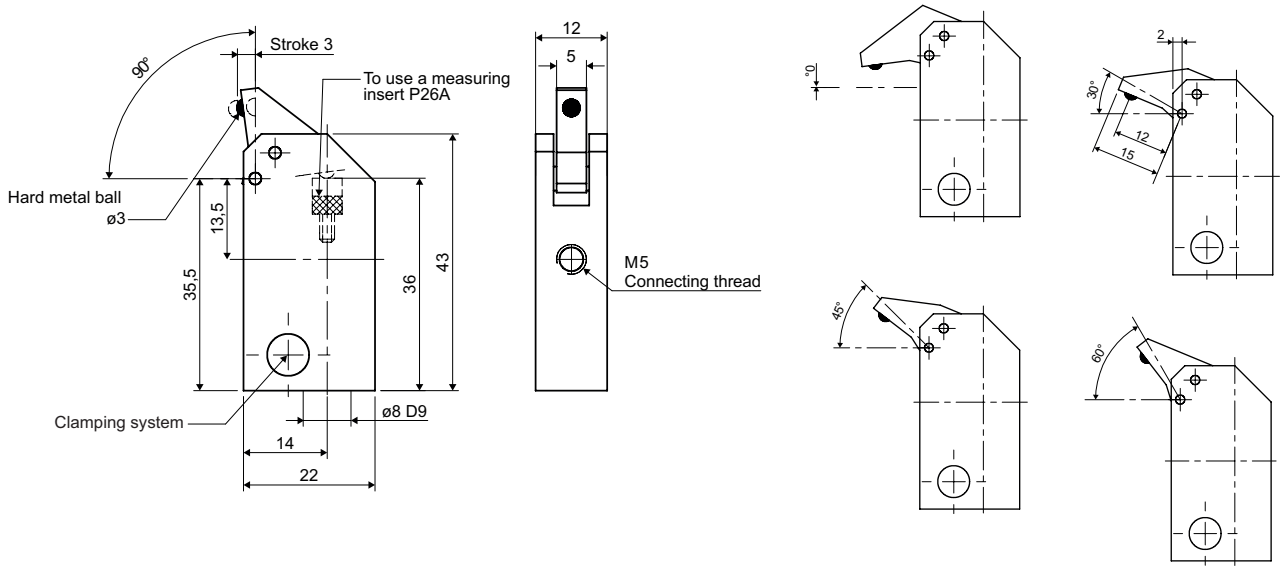
Transmission error with the 941 W max. 1%; for travel 3 mm = 0.03 mm

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**

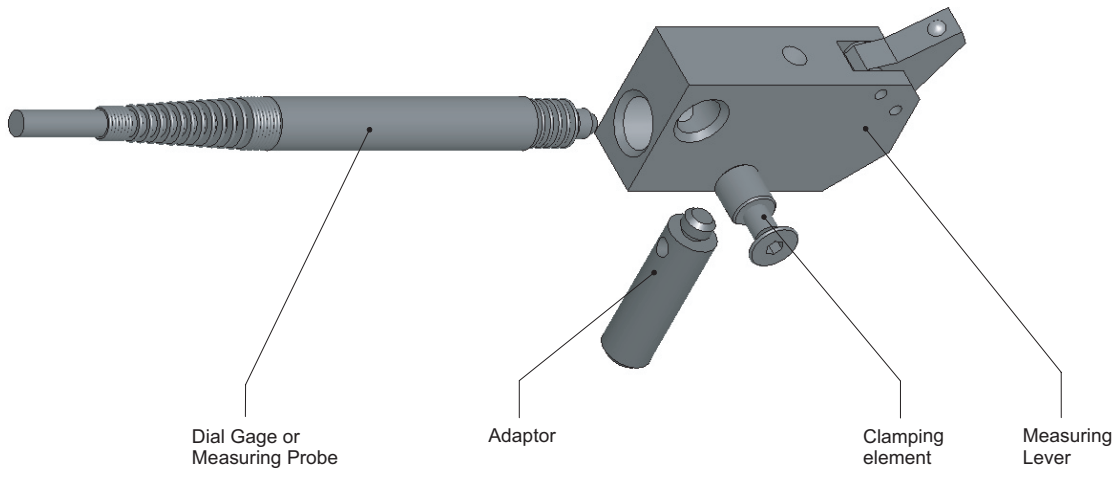


Measuring Levers

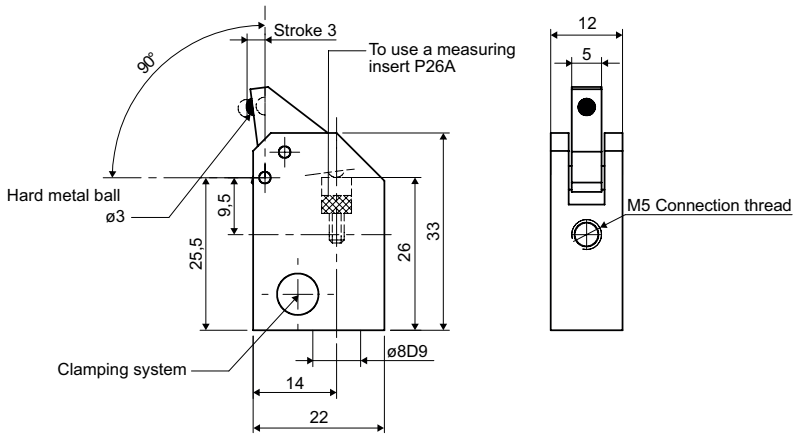


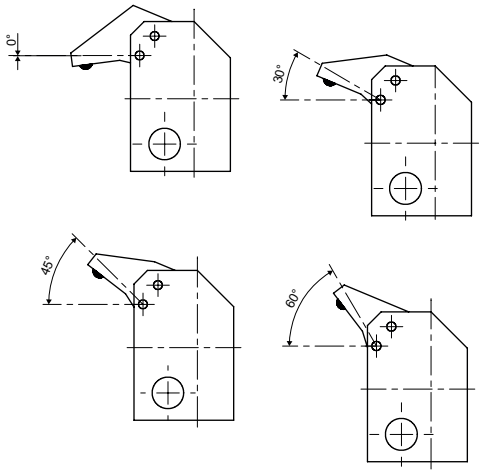
Measuring Lever, long

Catalog no.	Angle °	Order no.
MHL	0	**5113210**
MHL	30	**5113211**
MHL	45	**5113212**
MHL	60	**5113213**
MHL	90	**5113214**



Measuring Levers

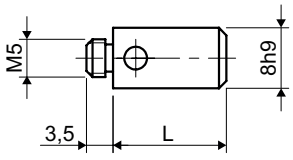




Measuring Lever, short

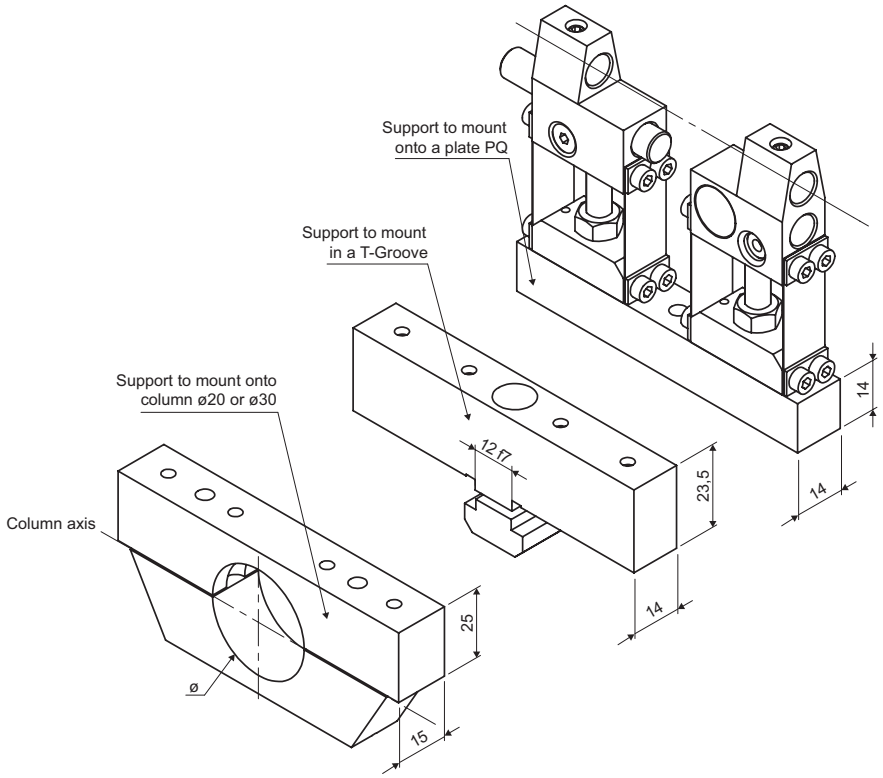
Catalog no.	Angle °	Order no.
MHK	0	**5113219**
MHK	30	**5113220**
MHK	45	**5113221**
MHK	60	**5113222**
MHK	90	**5113223**

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**

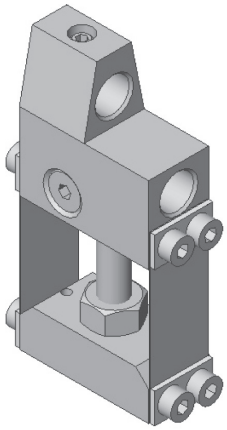
Support for mounting onto a plate PQ

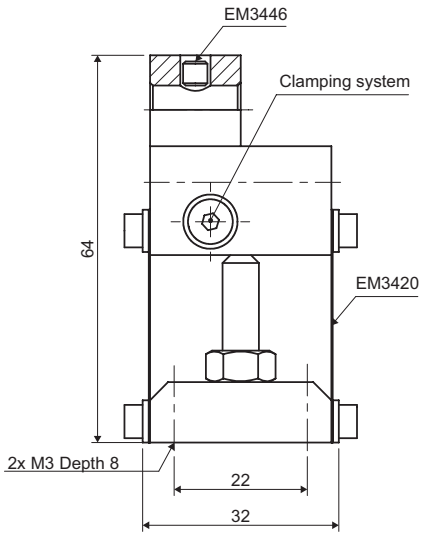
Catalog no.	Length mm	Order no.
ST14	136	**5113362**
ST14	160	**5113363**

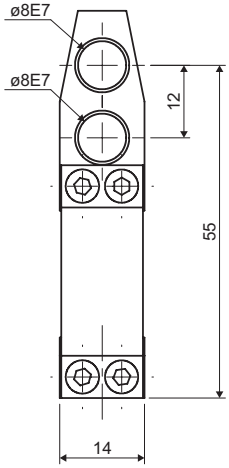
Support for mounting onto a plate PQ

Catalog no.	Length mm	Order no.
SD14	92	**5113351**
SD14	116	**5113350**

Measuring Spring Parallelograms

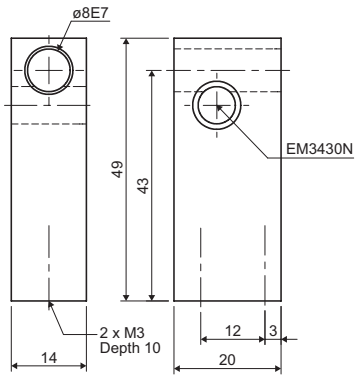


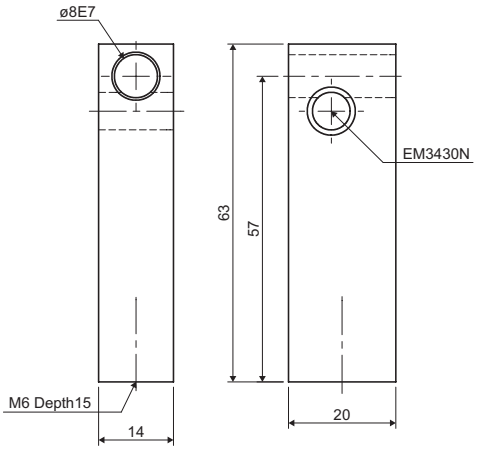




Measuring spring parallelogram EM34

Catalog no.	Order no.
EM34	**5113319**

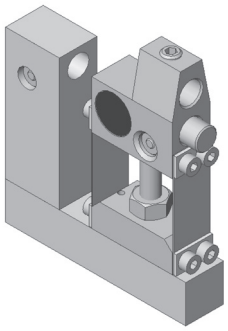


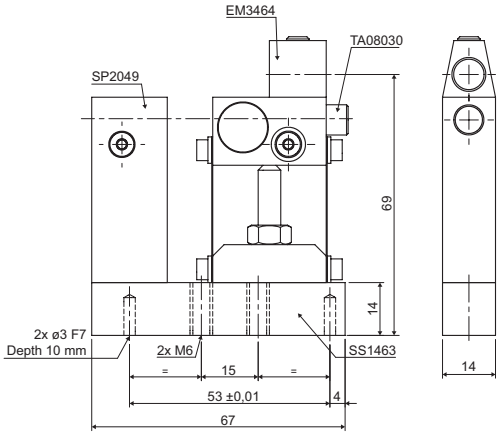


Holder for dial gage or electronic probe

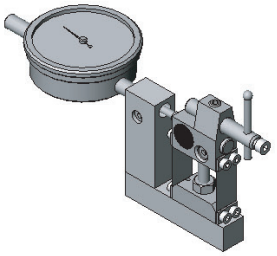
Catalog no.	Length mm	Order no.
SP20	49	**5113356**
SP20	63	**5113357**

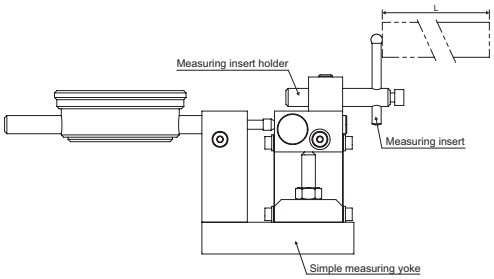
Measuring Spring Parallelograms





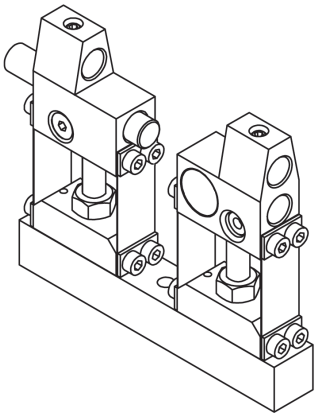
Application example:

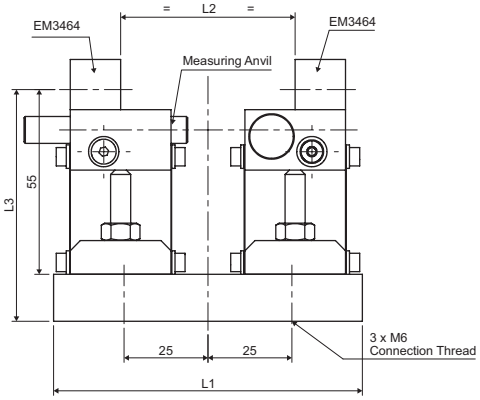




Single Measuring Fork FS10

Catalog no.	Description	Order no.
FS10	incl. TA08, SP20 and SS14SD14	**5113344**

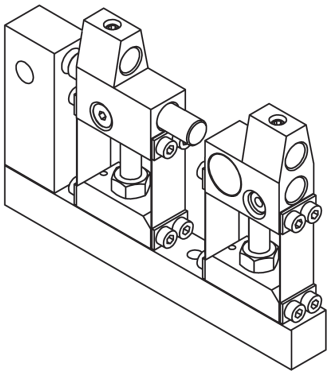


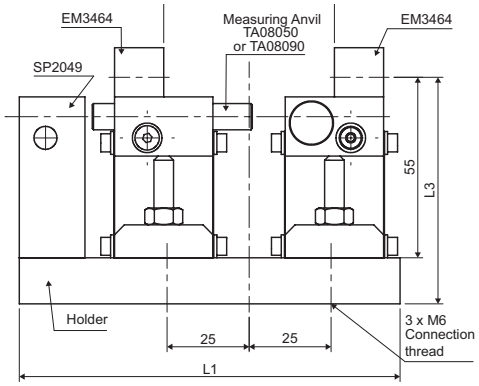


Double Measuring Fork FD26 / FD27

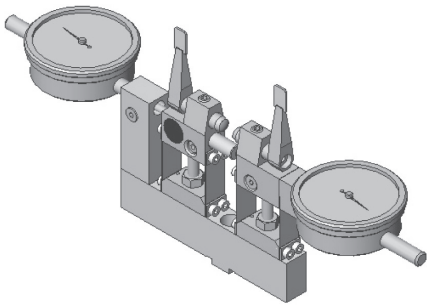
Catalog no.	Description	L1 mm	L2 mm	L3 mm	Order no.
FD26	incl. TA08 and SD14	92	52	69	**5113320**
FD26	incl. TA08 and AF12	92	52	78.5	**5113321**
FD26	incl. TA08 and AF20	92	52	75	**5113322**
FD26	incl. TA08 and AF30	92	52	75	**5113323**
FD27	incl. TA08 and SD14	136	96	69	**5113324**
FD27	incl. TA08 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



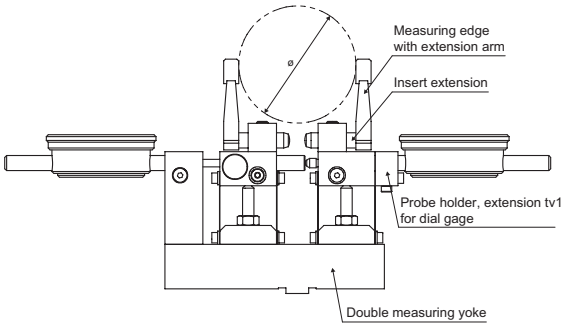


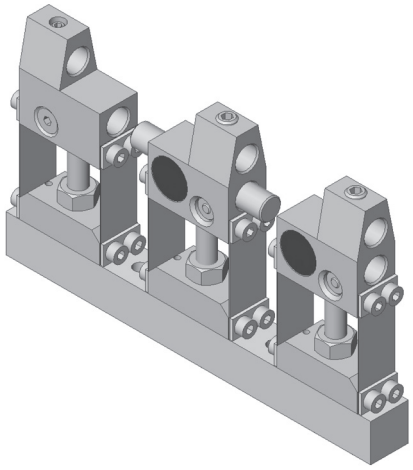
Application example:

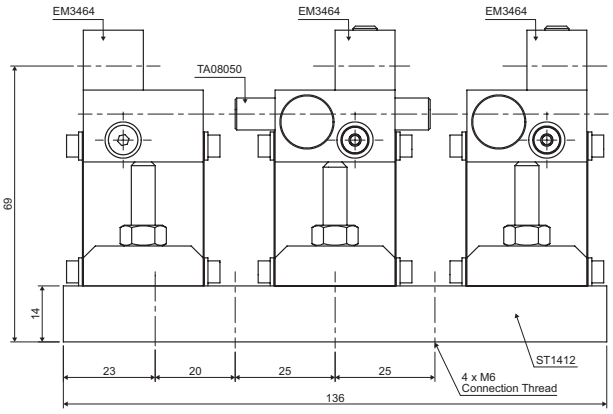


Double Measuring Fork with Excentrity FD40 / FD47

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

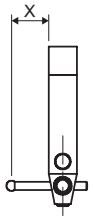
Catalog no.	Description	Order no.
FT30	incl. TA08 and ST14	**5113345**

Measuring Spring Parallelograms

Measuring force and Correction Factor

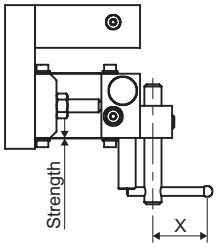
FS 10: TC…

X	St 0.2	St 0.25
20	1	1
40	1.09	1.09
60	1.21	1.37



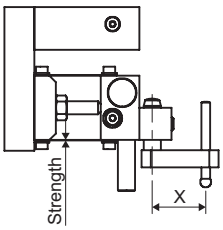
FS 10: TC…

X	St 0.2	St 0.25
20	1	1
40	1.05	1.08
60	1.13	1.28

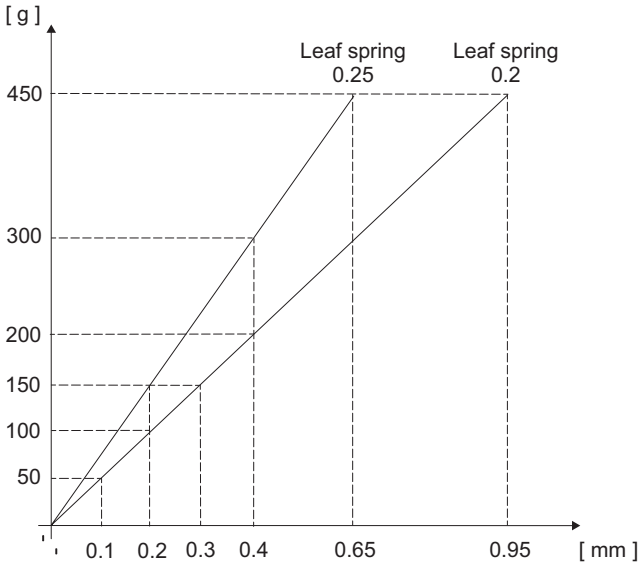


FS 10: TC…

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



The measuring force is a function of the displacement of the parallelograms and the spring force

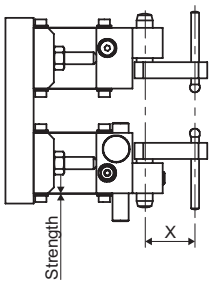


Measuring Spring Parallelograms

Measuring force and Correction Factor

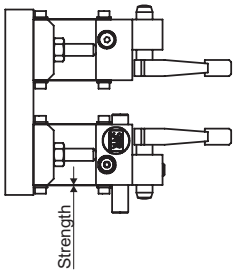
FD 26: TC…

X	St 0.2	St 0.25
20	1	1
40	1	1
60	1	1
80	1.03	1.05

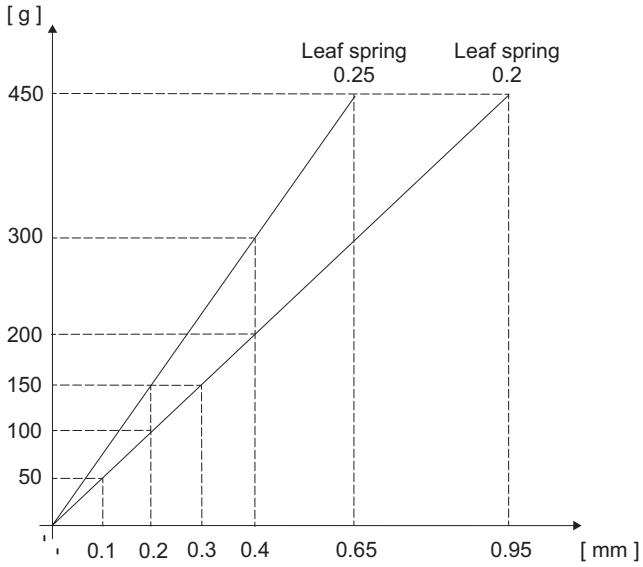


FD 26: BM…

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



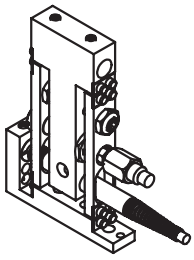
Block Measuring Elements

The measuring modules wtih integrated lifting simplifes 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.

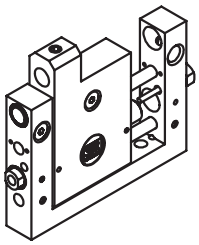
The correct measuring force is attained with adjustable measuring force springs suited to the purpose and function of the particular unit.

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 garantee reliable and precise measurements.



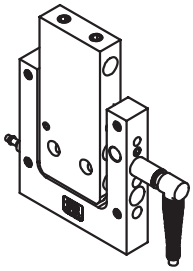
BM30:

- Adjustment using spring parallelogram
- Total stroke ±2.5 mm
- Measuring force: 50 to 300 g
- Repeatability: 0.5 µm
- Option: Pneumatic lifting



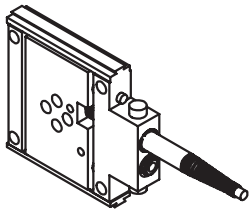
FP15:

- 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 µm
- Option: Pneumatic lifting



BM50:

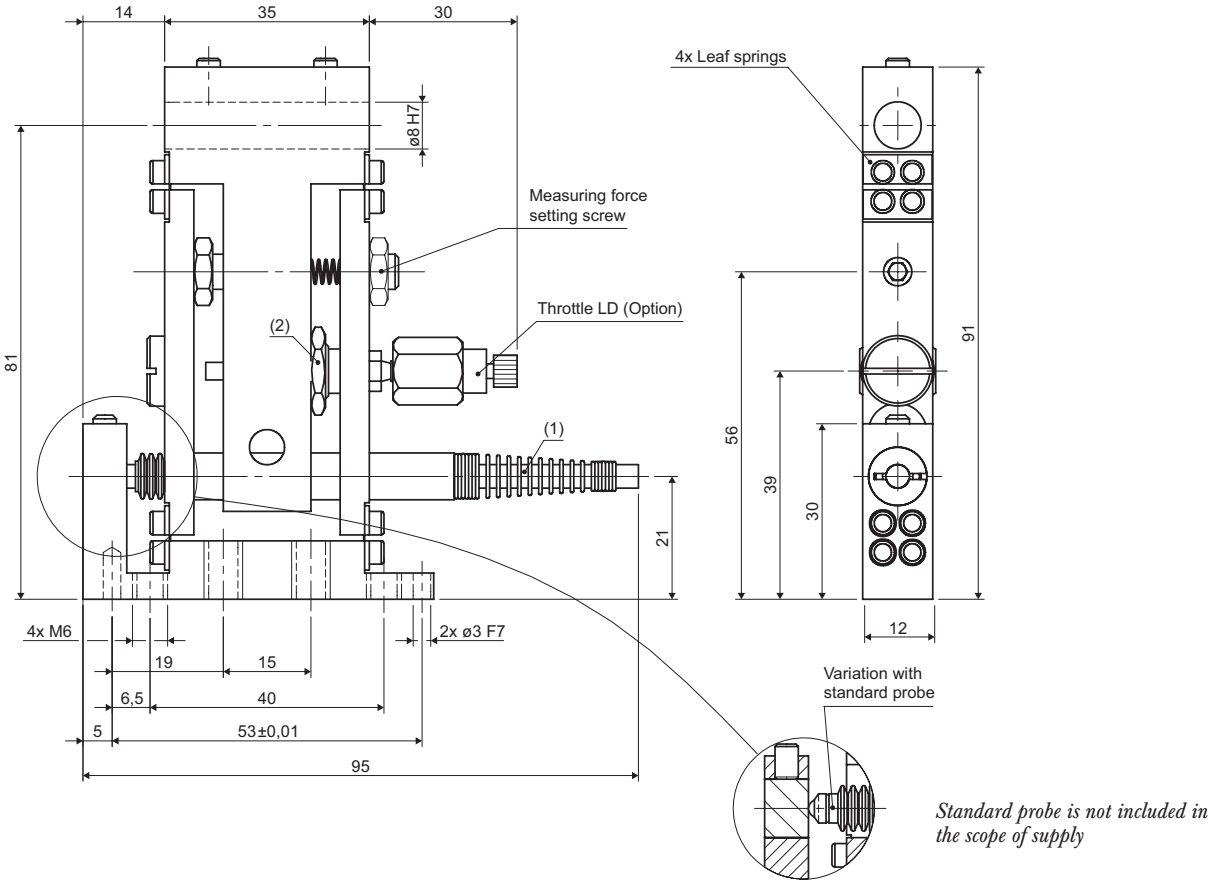
- A rotatry stroke bearing and an anti-twist measure
- Total stroke 5 mm and 10 mm
- Measuring force: 30 to 250 g
- Repeatability: 0.5 µm
- Option: Pneumatic lifting



BM100:

- Two rotary stroke bearings for high rigidity
- Total stroke 5 mm and 10 mm
- Measuring force: 40 to 200 g
- Repeatability: 0.5 µm
- Mounting of two modules as X-Y slide with special screws BMV
- Option: Pneumatic lifting

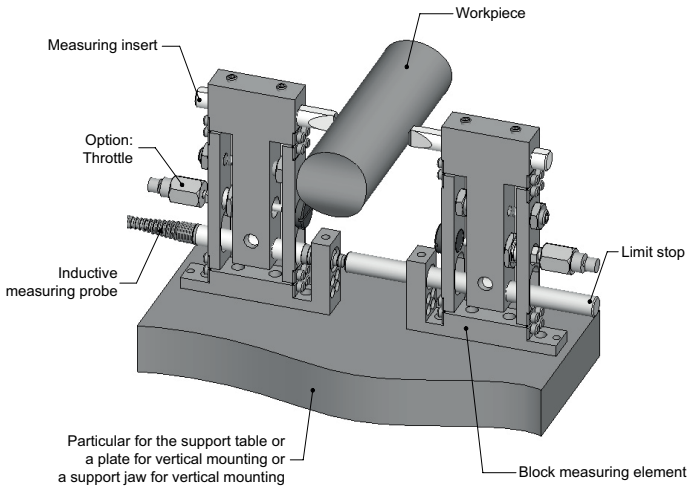
Block Measuring Elements



Standard probe is not included in the scope of supply

Block Measuring Element BM30

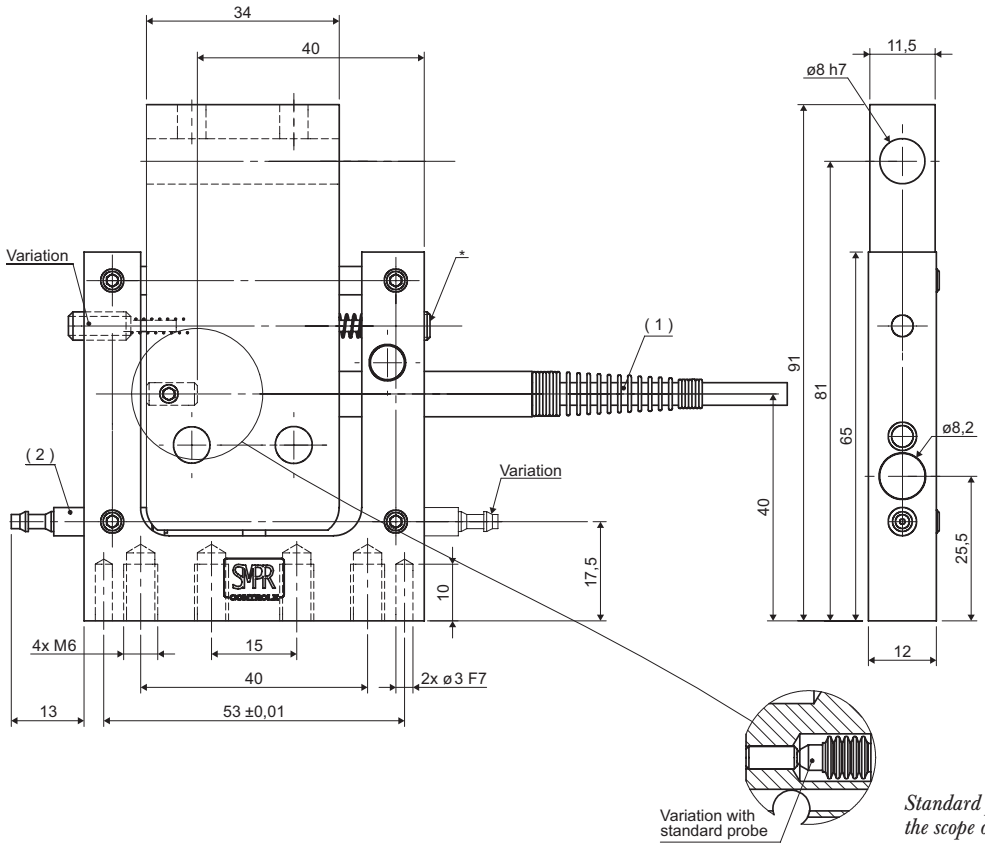
Catalog no.	Description	Total Stroke	Order no.
BM30		5 mm	**5113400**
BM30	with pneumatic lifting	5 mm	**5113401**



Option Pneumatic Choke

Catalog no.	M mm	Dia. mm	Order no.
LD	5	4	**5113400**

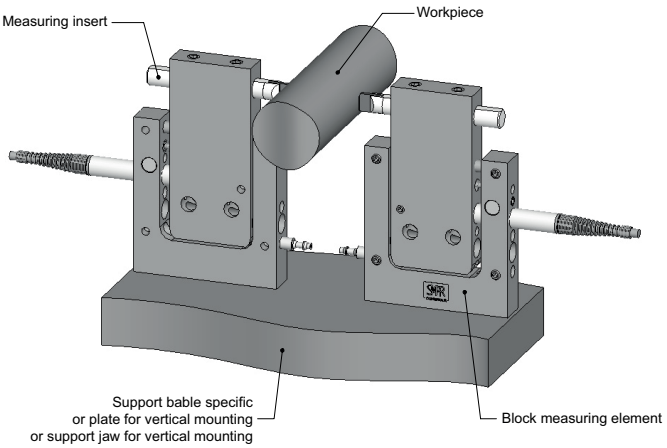
Block Measuring Elements



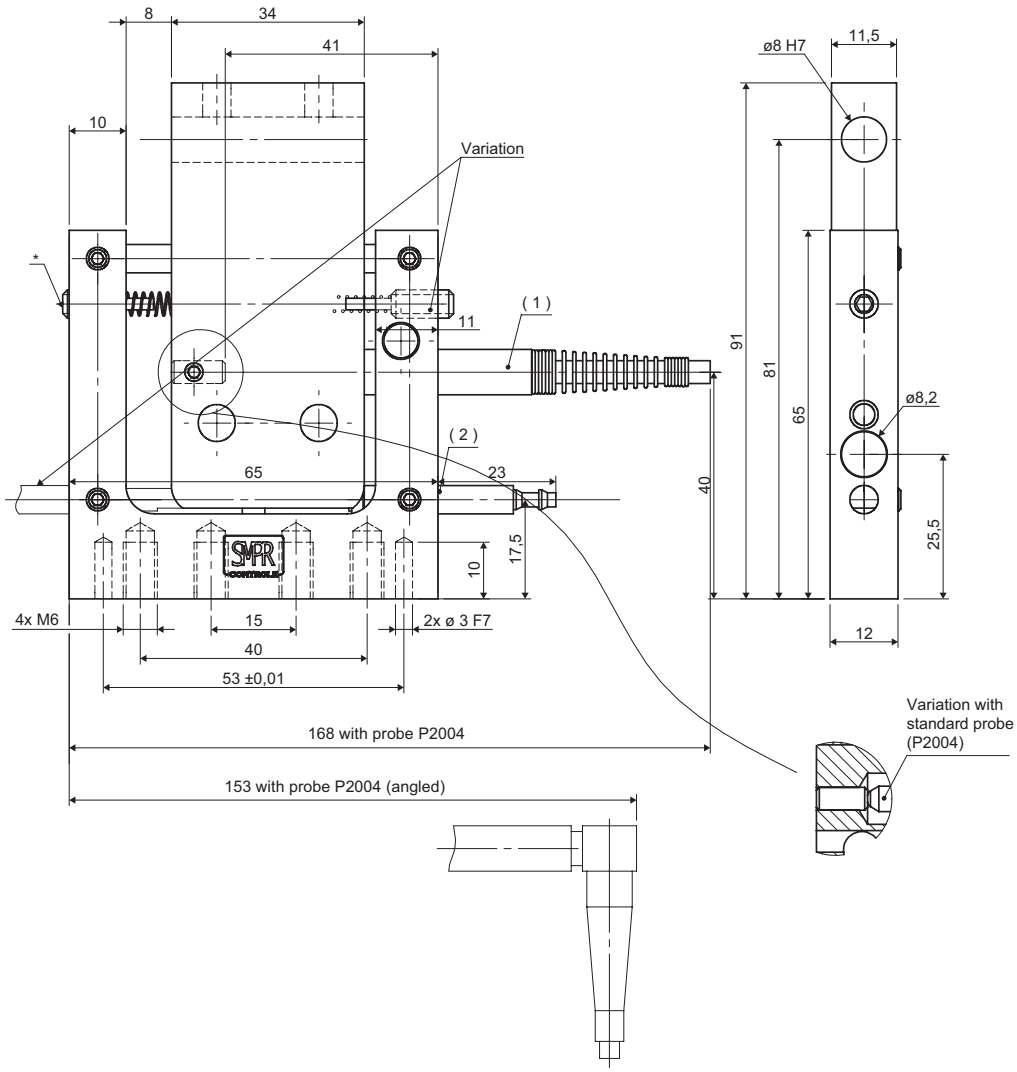
Standard probe is not included in the scope of supply

Block Measuring Element BM50

Catalog no.	Description	Total Stroke	Order no.
BM50		5 mm	**5113426**
BM50	with pneumatic lifting	5 mm	**5113427**

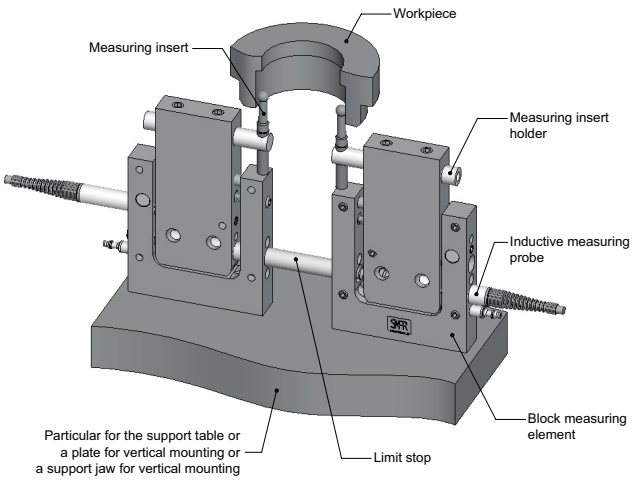


Block Measuring Elements

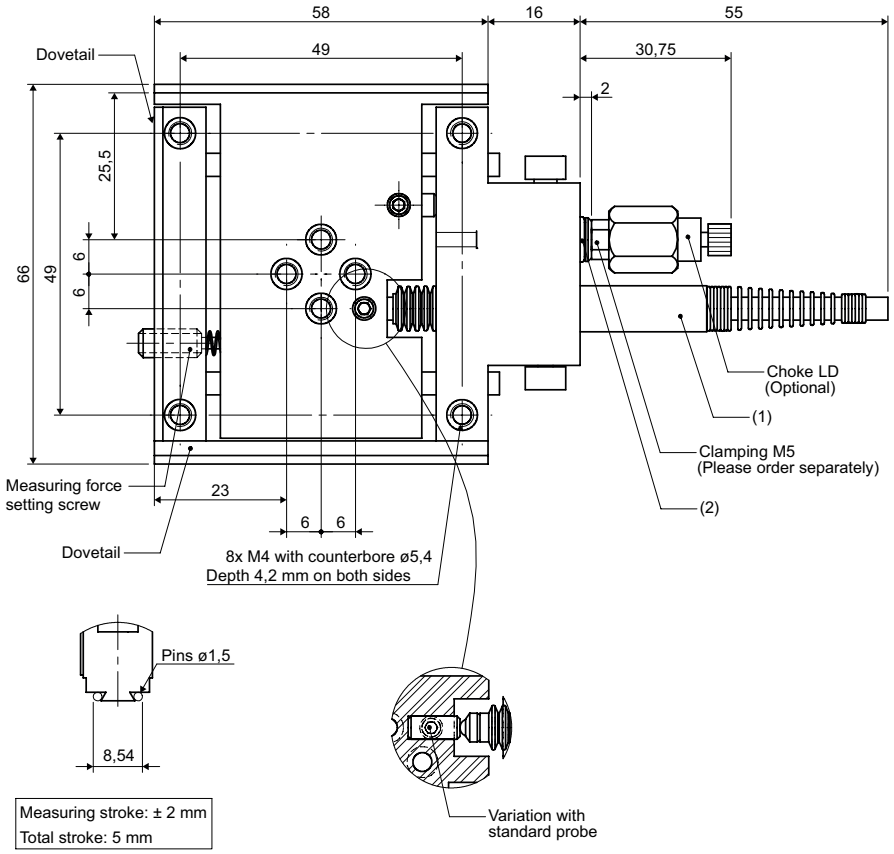


Block Measuring Element BM50

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



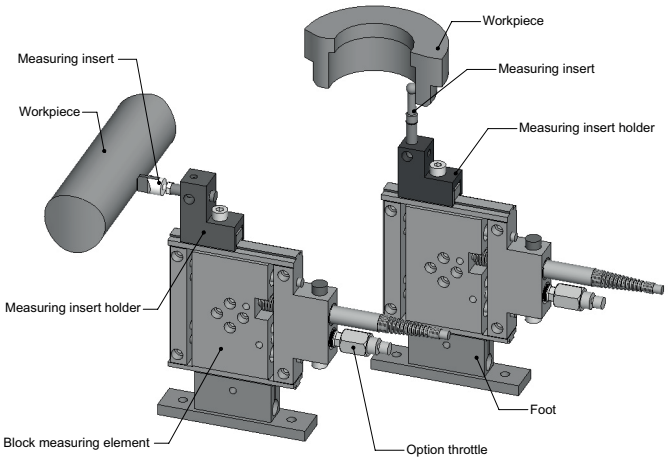
Standard probe is not included in the scope of supply

Block Measuring Element BM100

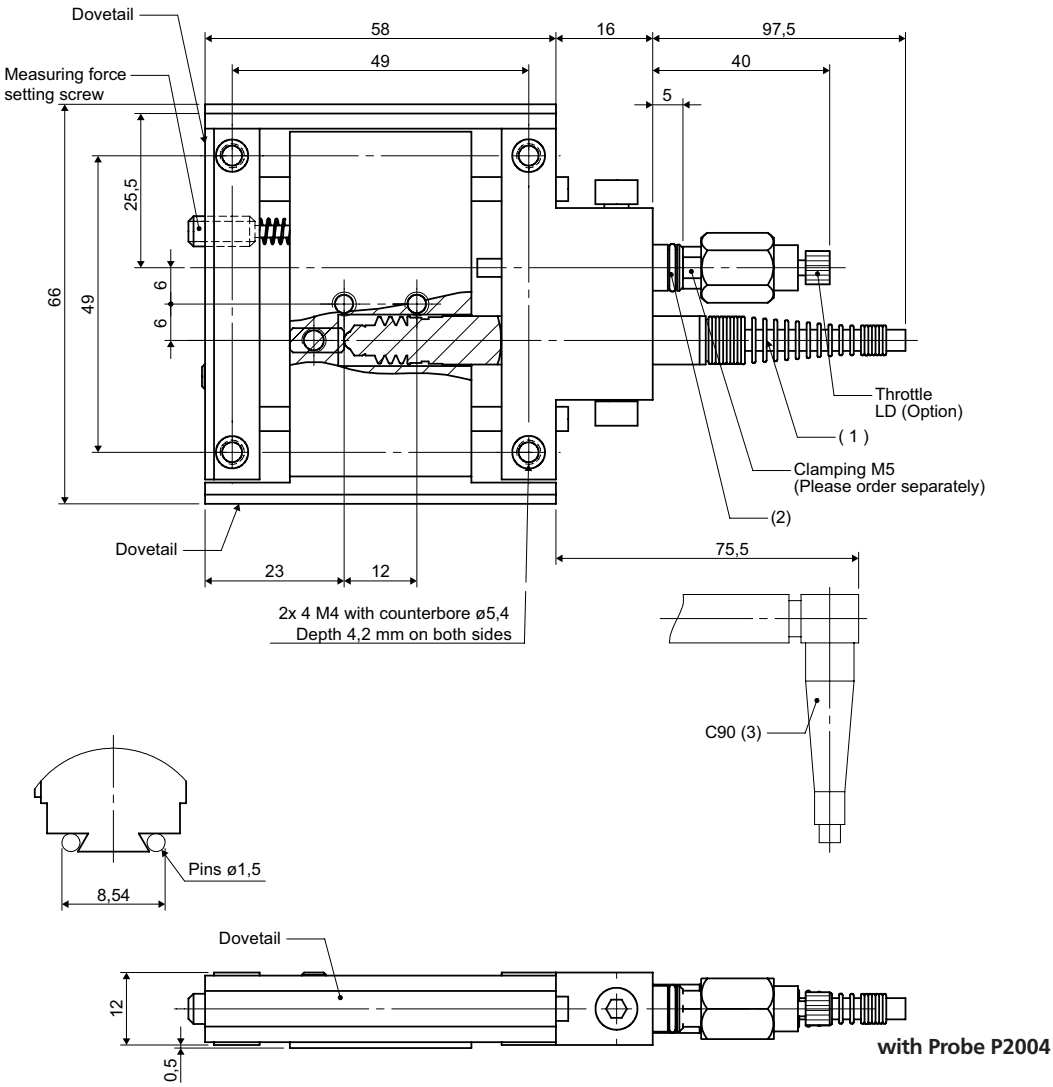
Catalog no.	Description	Total Stroke	Order no.
BM100		5 mm	**5113434**
BM100	with pneumatic lifting	5 mm	**5113435**

Option Pneumatic Choke

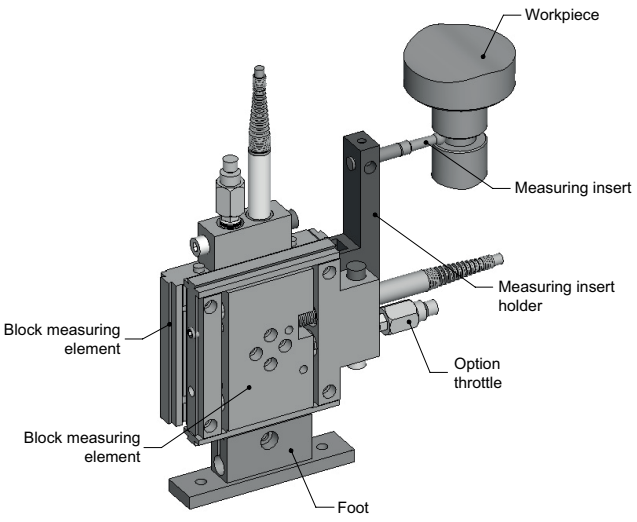
Catalog no.	M mm	Dia. mm	Order no.
LD	5	4	**5113448**



Block Measuring Elements



with Probe P2004



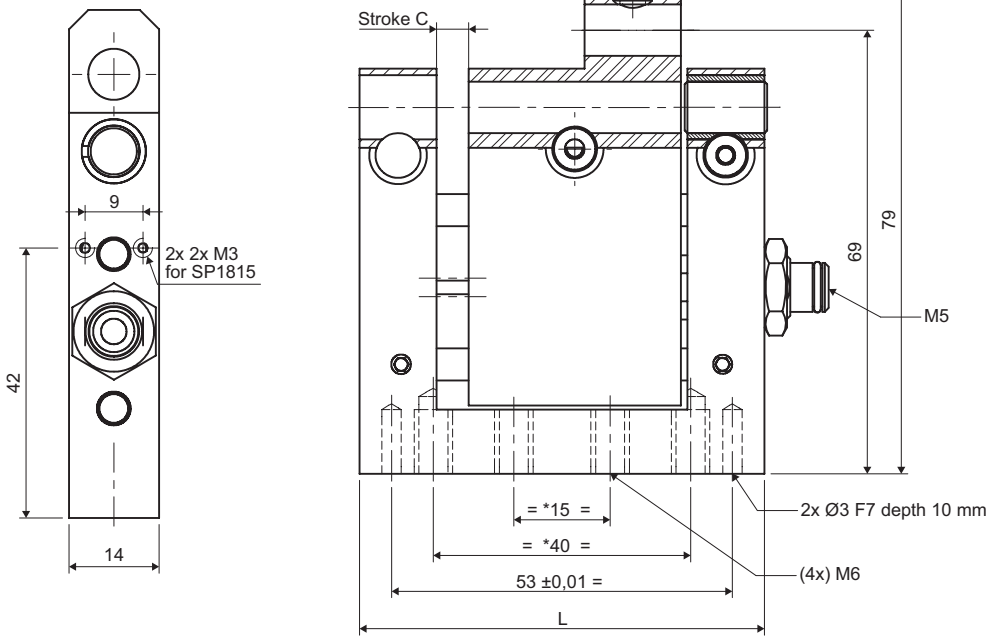
Block Measuring Element BM50

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**

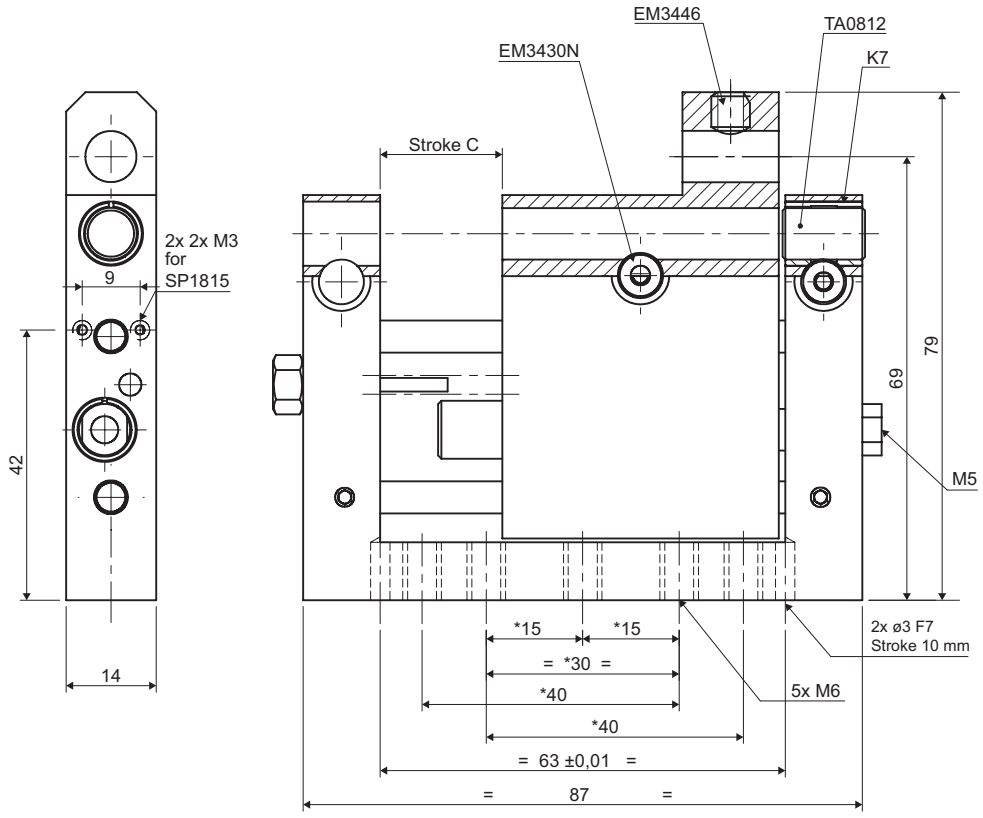
Block Measuring Elements

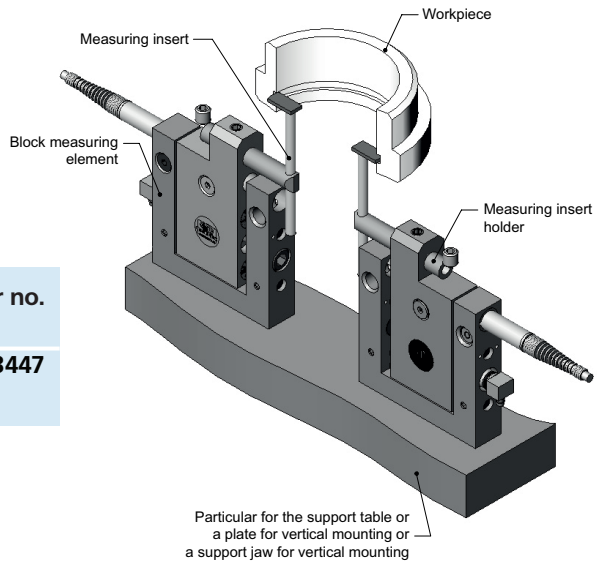


Block Measuring Element FP15

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**

Block Measuring Elements

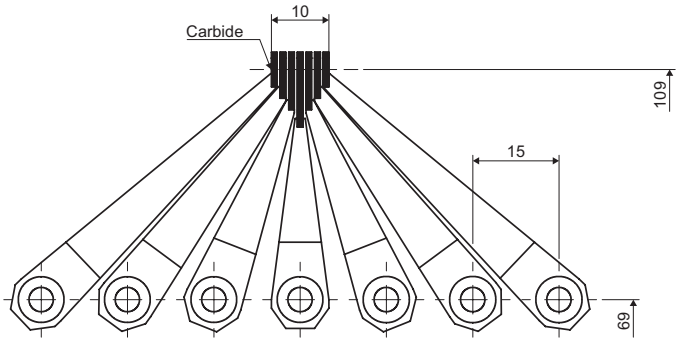


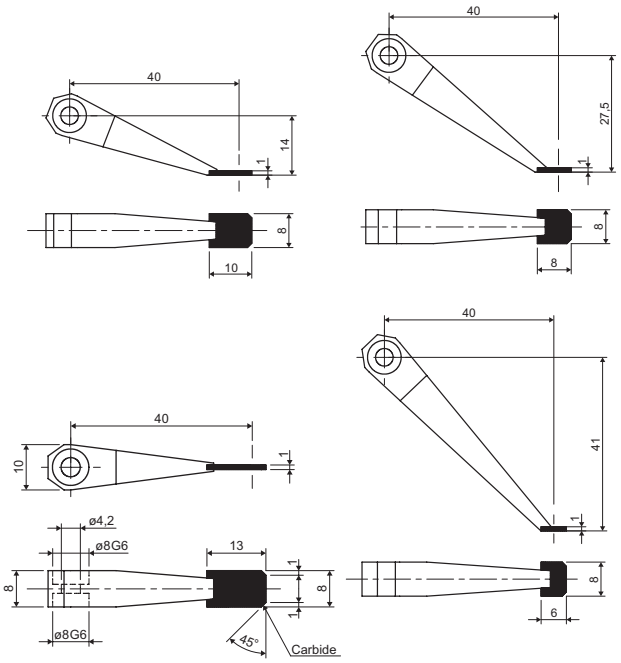


Block Measuring Element FP15

Catalog no.	Description	Stroke C mm	L mm	Order no.
FP15	with pneumatic lifting, 2 rotary stroke bearings	19	87	**5113447**

Accessories for Measuring Elements



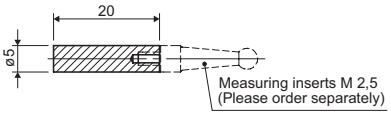


Measuring Arms BM84

Catalog no.	Dimensions mm	Order no.
BM84	40 × 0	**5114514**
BM84	40 × 14	**5114515**
BM84	40 × 27:5	**5114516**
BM84	40 × 41	**5114517**

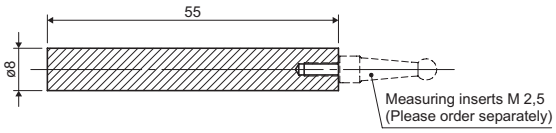
Mount BMPA for Measuring Inserts M2.5

Catalog no.	Order no.
BMPA	**5114714**



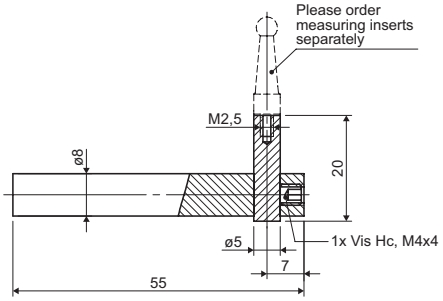
Mount SUPT8 for Measuring Inserts M2.5

Catalog no.	Order no.
SUPT8	**5114721**



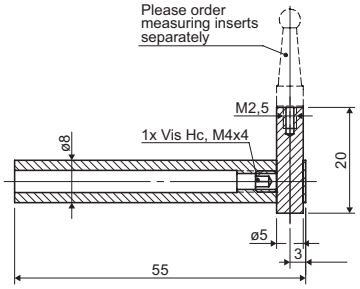
Mount BMST8A for Measuring Inserts M2.5

Catalog no.	Order no.
BMST8A	**5114697**



Mount BMST8B for Measuring Inserts M2.5

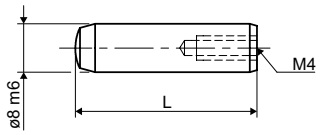
Catalog no.	Order no.
BMST8B	**5114698**



Accessories for Measuring Elements

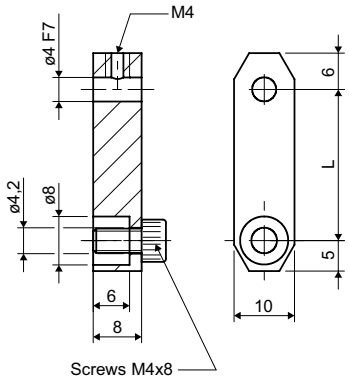
Mount SR10 for Measuring Extensions RT08

Catalog no.	L mm	Order no.
SR10	20	**5114625**
SR10	30	**5114626**
SR10	40	**5114627**
SR10	40	**5114628**
SR10	60	**5114629**



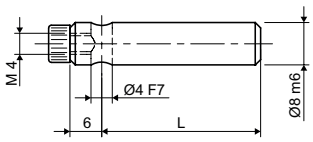
Measuring Extensions RT08

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**



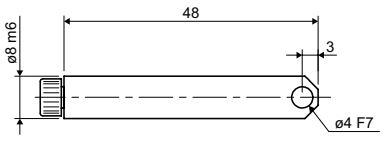
Mount PR7791 for Measuring Inserts

Catalog no.	L mm	Order no.
PR7791	30	**5114699**
PR7791	50	**5114701**
PR7791	70	**5114702**



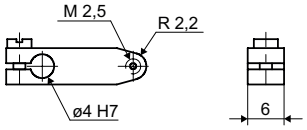
Mount PT08 for Measuring Inserts

Catalog no.	L mm	Order no.
PT08	45	**5114700**



Mount AM425 for Measuring Inserts

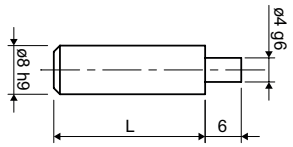
Catalog no.	L mm	Order no.
AM425	10	**5114703**
AM425	15	**5114704**
AM425	20	**5114705**
AM425	25	**5114706**



Accessories for Measuring Elements

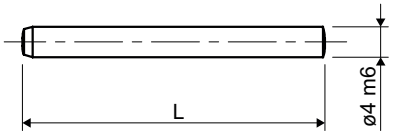
Mount AM48

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**



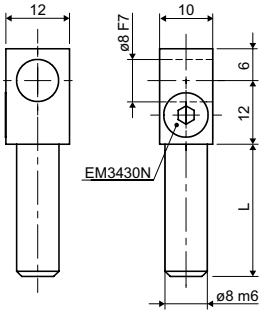
Measuring Inserts ST04

Catalog no.	L mm	Order no.
ST04	20	**5114652**
ST04	40	**5114653**
ST04	60	**5114654**



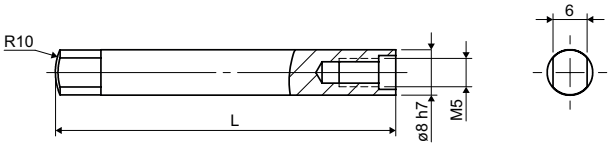
Mount AM88 for Measuring Inserts

Catalog no.	L mm	Order no.
AM88	25	**5114715**
AM88	50	**5114716**
AM88	75	**5114717**
AM88	100	**5114718**
AM88	150	**5114719**
AM88	150	**5114720**



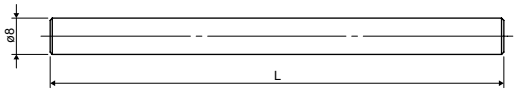
Measuring Extensions RMV

Catalog no.	L mm	Order no.
RMV	60	**5114618**
RMV	100	**5114619**
RMV	120	**5114620**



Measuring Limit Stop BUT

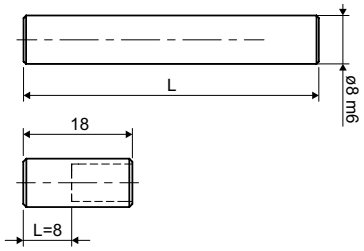
Catalog no.	L mm	Order no.
BUT	100	**5114525**
BUT	125	**5114522**
BUT	150	**5114523**
BUT	175	**5114524**



Accessories for Measuring Elements

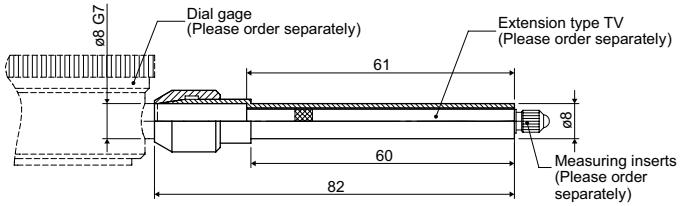
Measuring Limit Stop TA08

Catalog no.	L mm	Order no.
TA08	8	**5114664**
TA08	12	**5114665**
TA08	30	**5114666**
TA08	40	**5114667**
TA08	50	**5114668**
TA08	70	**5114669**
TA08	90	**5114670**



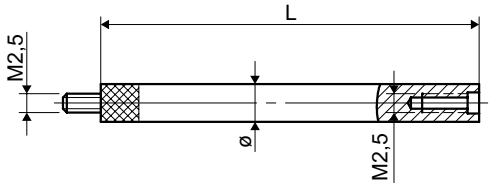
Dial Gage Extension PCA50

Catalog no.	L mm	Order no.
PCA50	82	**5114589**



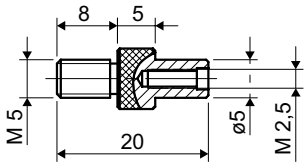
Measuring Extension TV4 / TV5

Catalog no.	L mm	ø mm	Order no.
TV4	10	4	**5114675**
TV4	15	4	**5114676**
TV4	20	4	**5114677**
TV4	30	4	**5114678**
TV5	40	5	**5114679**
TV5	50	5	**5114680**
TV5	60	5	**5114681**
TV5	70	5	**5114682**
TV5	80	5	**5114683**
TV5	90	5	**5114684**
TV4	100	4	**5114685**

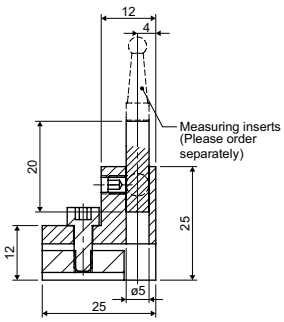


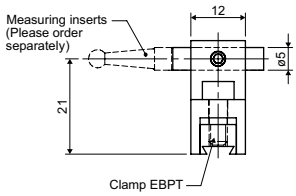
Adapter APM5

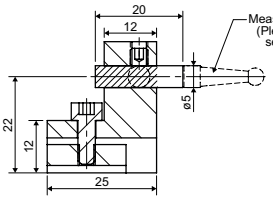
Catalog no.	Description	Order no.
APM5	Adaptor M5 × M2.5	**5114584**

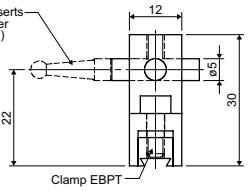


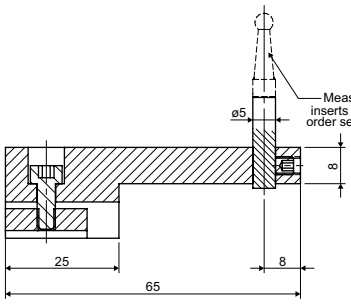
Accessories for Measuring Elements

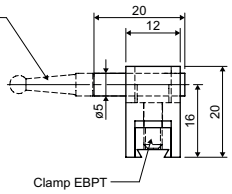










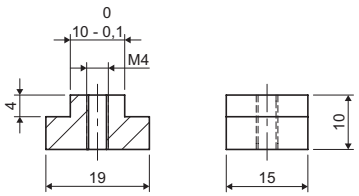


Probe Holder BMS

Catalog no.	L mm	Description	Order no.
BMS	25	for BM100	**5114652**
BMS	30	for BM100	**5114653**
BMS	65	for BM100	**5114654**

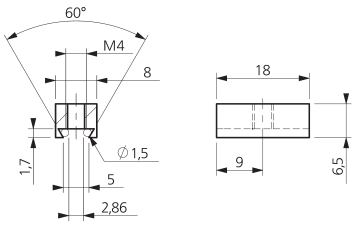
Adaptor BMT

Catalog no.	Description	Order no.
BMT	Adaptor for BM100	**5114508**



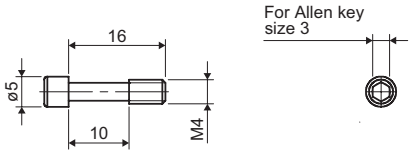
Clamp EBPT

EBPT	Description	Order no.
ST04	Clamp for BM100	**5114530**



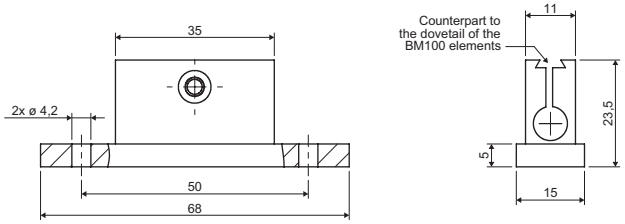
Special Screw BMV

Catalog no.	Description	Order no.
BMV	Special Screw for BM100	**5114509**



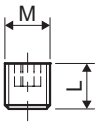
Foot / Base BMF

Catalog no.	Description	Order no.
BMF	for BM100	**5114500**



Set Screw for clamping

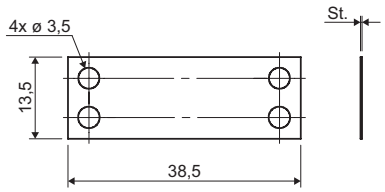
Catalog no.	L mm	Order no.
EM3444	4	**5114557**
EM3446	6	**5114558**



Accessories for Measuring Elements

Leaf Springs EM342X

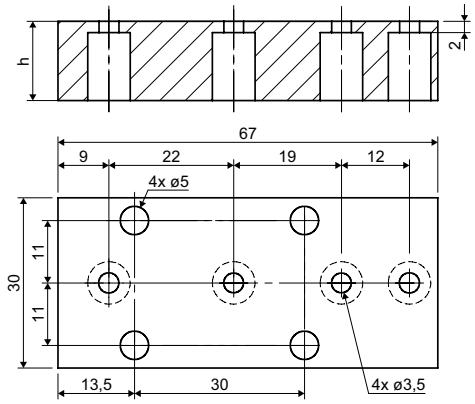
Catalog no.	Thickness mm	Order no.
EM3420	0.2	**5114551**
EM3425	0.25	**5114552**



Intermediate Plate SS14

Catalog no.	Thickness mm	Description	Order no.
SS14*	14	On PR7800 or PR7900	**5114644**
SS14*	5	On PR7800 or PR7900	**5114647**

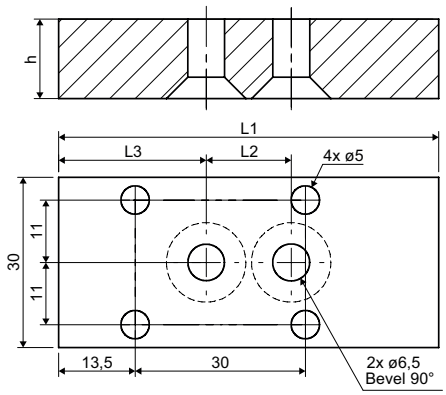
* *for EM3464 + SP2049*



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**

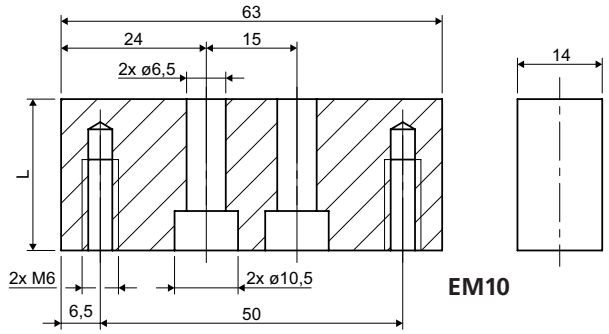
* *for FP1520 on to PR7800 or PR7900*
** *for FP1500 or FP1510 on to PR7800 or PR7900*

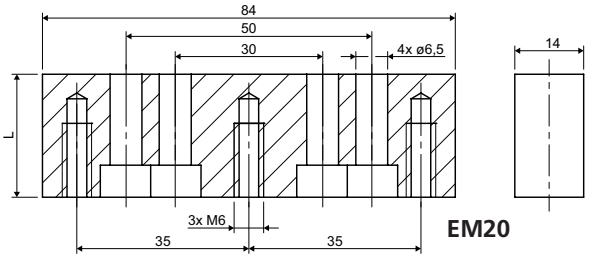


Intermediate Plate EM

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*

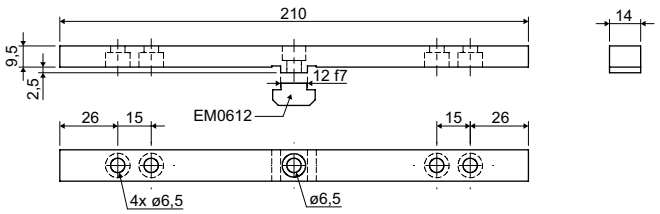




Accessories for Measuring Elements

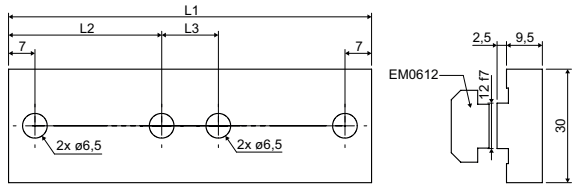
Carrier Plate for T-Groove 12 mm

Catalog no.	L mm	Order no.
SD12	210	**5114634**



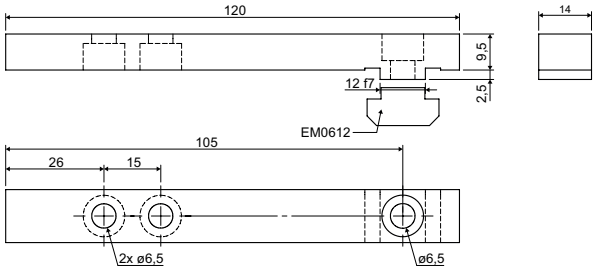
Carrier Plate for T-Groove 12 mm

Catalog no.	L1 mm	L2 mm	L3 mm	Order no.
SS12	96	40.5	15	**5114635**
SS12	115	42.5	30	**5114636**



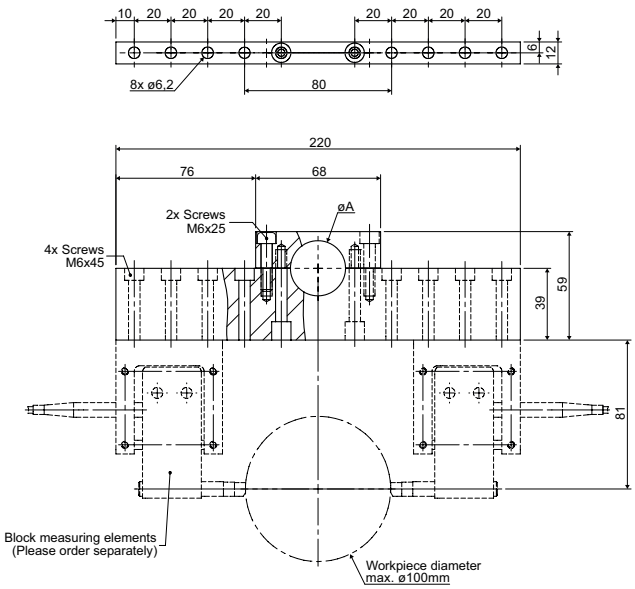
Carrier Plate for T-Groove 12 mm

Catalog no.	L mm	Order no.
SS 12	120	**5114637**



Support Yoke for Column Mounting

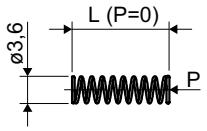
Catalog no.	dia. A mm	Order no.
SUP20	20	**5114659**
SUP30	30	**5114660**



Accessories for Measuring Elements

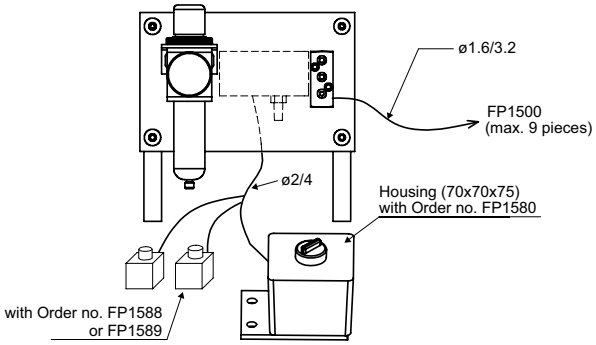
Measuring Springs RS15 for FP15

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**



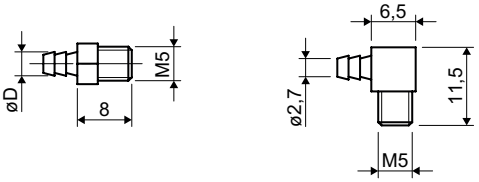
Pneumatic Supply Unit

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**



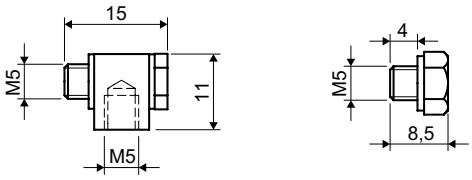
Pneumatic Connection FP15

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**



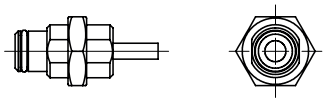
Pneumatic Accessories FP15

Catalog no.	Description	Order no.
FP15	Connecting Angle M5	**5114563**
FP15	Stopper M5	**5114564**



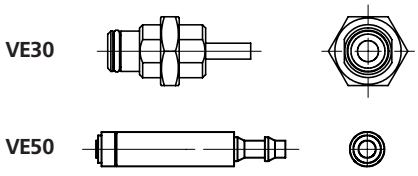
Pneumatic Cylinder FP15

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**

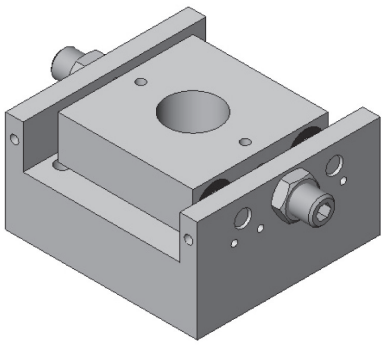


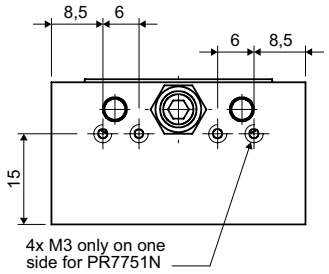
Pneumatic Cylinder FP15

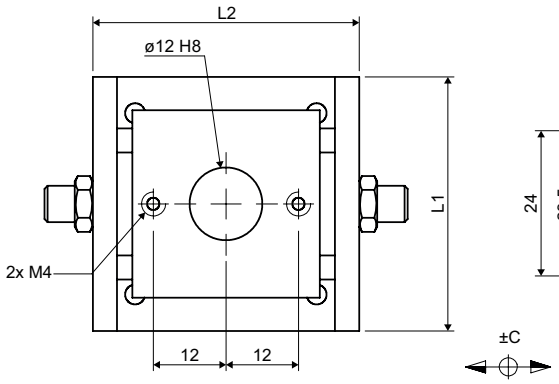
Catalog no.	Description	Stroke mm	Order no.
VE30	for BML30	5	**5114690**
VE30	for BM50-05	5	**5114691**
VE50	for BM50-10	10	**5114692**

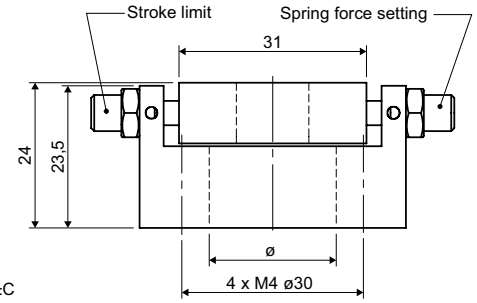


Coordinate Measuring Slides



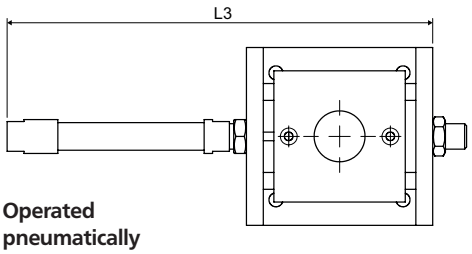






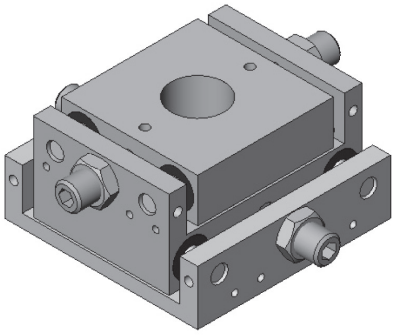
X-Coordinate Tables PR771

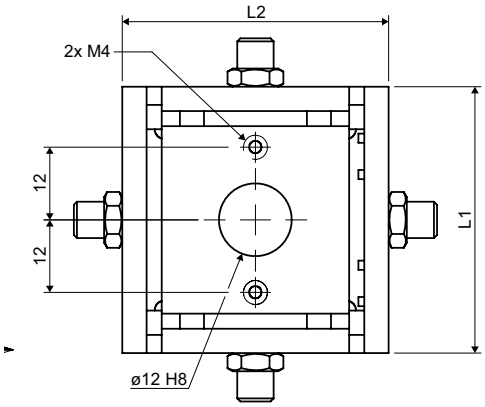
Catalog no.	Description	L1 mm	L2 mm	L3 mm	Order no.
PR771	±2.5 mm	42	44		**5114800**
PR771	±2.5 mm pneumatic	42	44	85.5	**5114801**
PR771	±5 mm	42	49		**5114802**
PR771	±5 mm pneumatic	42	49	90.5	**5114803**
PR771	±7 mm	42	53		**5114804**
PR771	±7 mm pneumatic	42	53	109.5	**5114805**

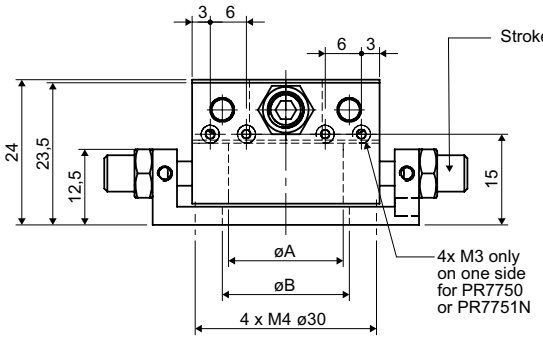


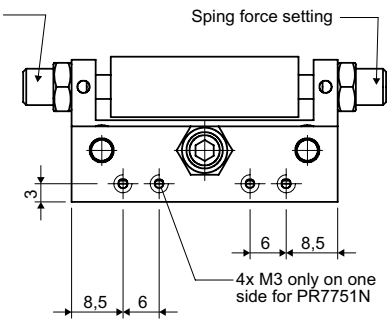
Operated pneumatically

Coordinate Measuring Slides



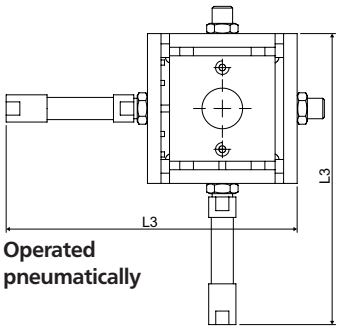






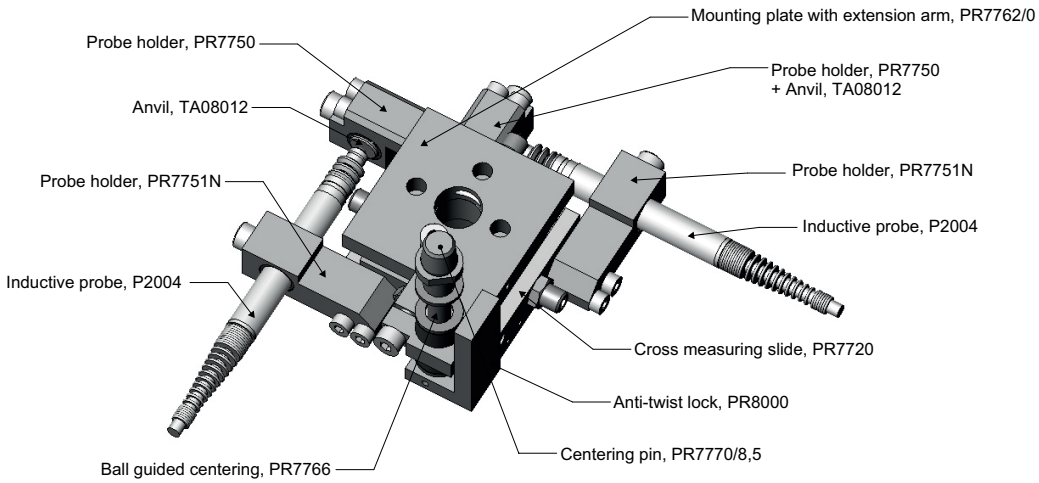
X-Coordinate Tables PR772

Catalog no.	Description	L1 mm	L2 mm	L3 mm	Ø A	Ø B	Order no.
PR772	±2.5 mm	42	44				**5114810**
PR772	±2.5 mm pneumatic	42	44	85.5	19	21	**5114811**
PR772	±5 mm	42	49				**5114812**
PR772	±5 mm pneumatic	42	49	90.5	23	28	**5114813**
PR772	±7 mm	42	53				**5114814**
PR772	±7 mm pneumatic	42	53	109.5	26	32	**5114815**



Operated pneumatically

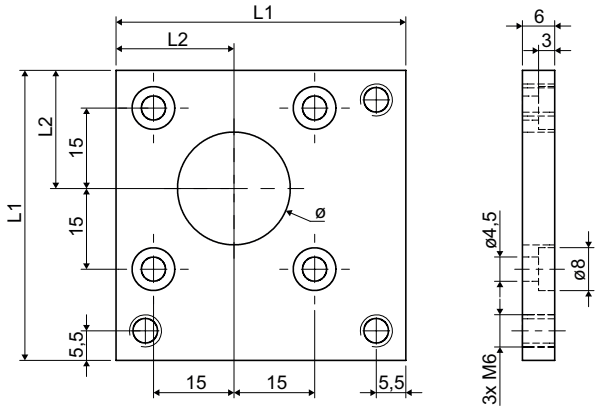
Application Example



Accessories for Measuring Slides

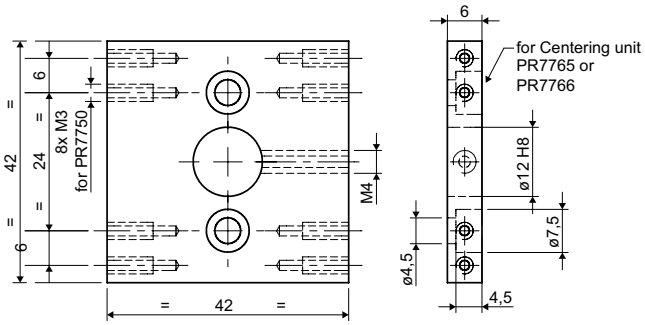
Base plate for Coordinate Tables PR774

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**



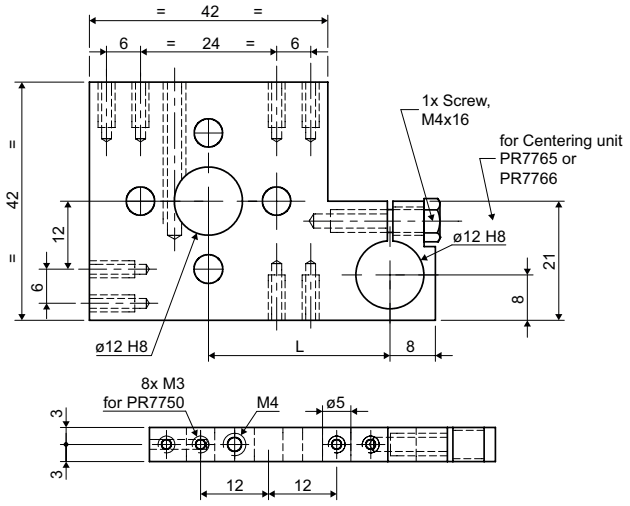
Adaptor Plate for Centering Unit

Catalog no.	Order no.
PR776	**5114907**



Excenter Adaptor Plate for Table Stroke

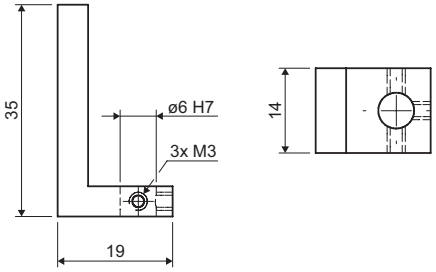
Catalog no.	Description	L1 mm	Order no.
PR776	±2.5 mm	32	**5114912**
PR776	±5 mm	37	**5114913**
PR776	±7 mm	41	**5114914**



Accessories for Measuring Slides

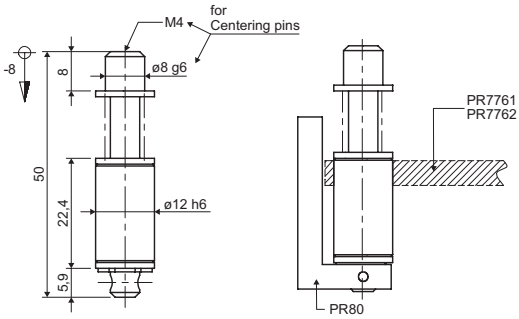
Anti-twist Lock PR80

Catalog no.	Description	Order no.
PR80	for Centering Unit PR776	**5114912**



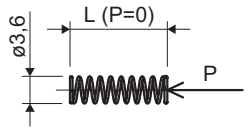
Centering Unit PR776

Catalog no.		Order no.
PR776		**5114918**



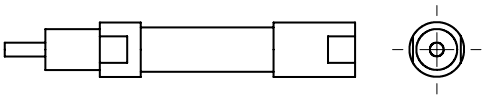
Measuring Force Springs RS77

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**

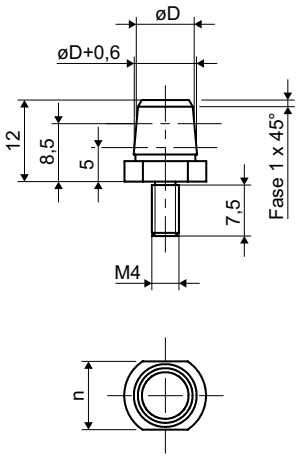


* *for PR771 or PR772*

Accessories for Measuring Slides

Centering Pin PR777

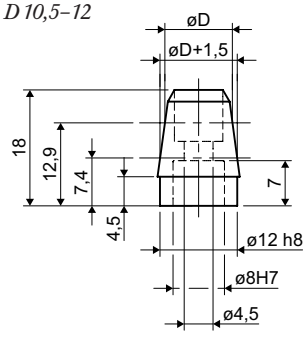
Catalog no.	Dia. D mm	n mm	Order no.
PR777	2	7	**5114923**
PR777	2.5	7	**5114924**
PR777	3	7	**5114925**
PR777	3.5	7	**5114926**
PR777	4	7	**5114927**
PR777	4.5	7	**5114928**
PR777	5	7	**5114929**
PR777	5.5	7	**5114930**
PR777	6	7	**5114931**
PR777	6.5	7	**5114932**
PR777	7	10	**5114933**
PR777	7.5	10	**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**

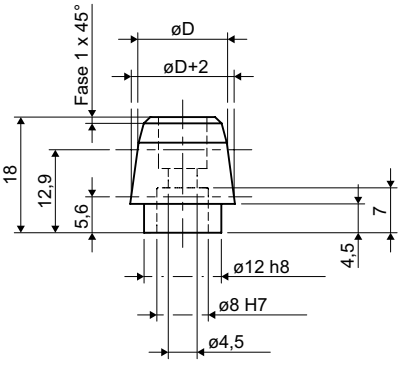


Centering Pin PR778

	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

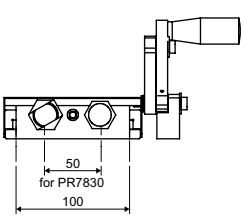


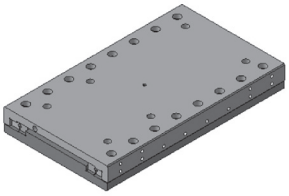


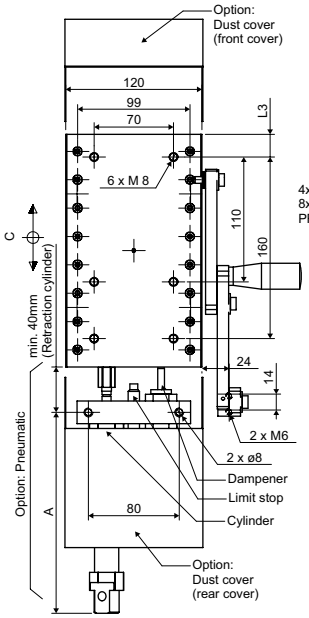
Slide with Cross Guide Rollers

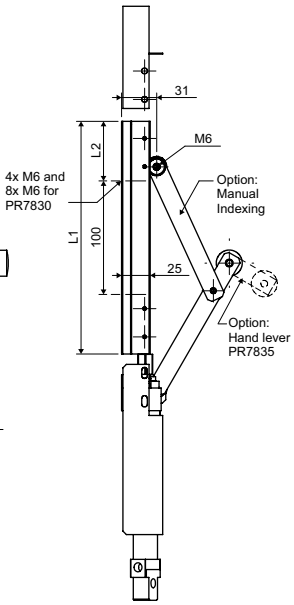
Cross Roll Tables

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

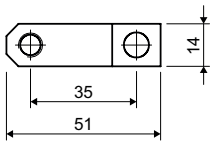
Catalog no.	Option: Manual Indexing	Order no.
PR785	for PR780	**5115000**
PR785	for PR781	**5115001**
PR785	for PR782	**5115002**
PR785	for PR783	**5115003**

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**

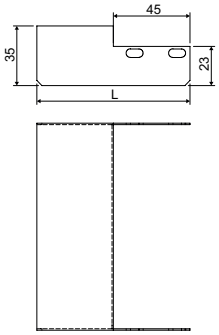
Lever Arm PR78

Catalog no.	Description	Order no.
PR78	Lever Arm	**5115008**

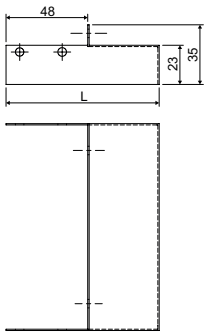


Dust Cover PR787

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**



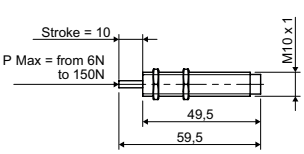
Front cover

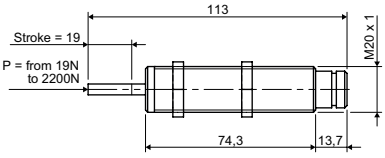


Rear cover

Hydraulic Dampener PR789

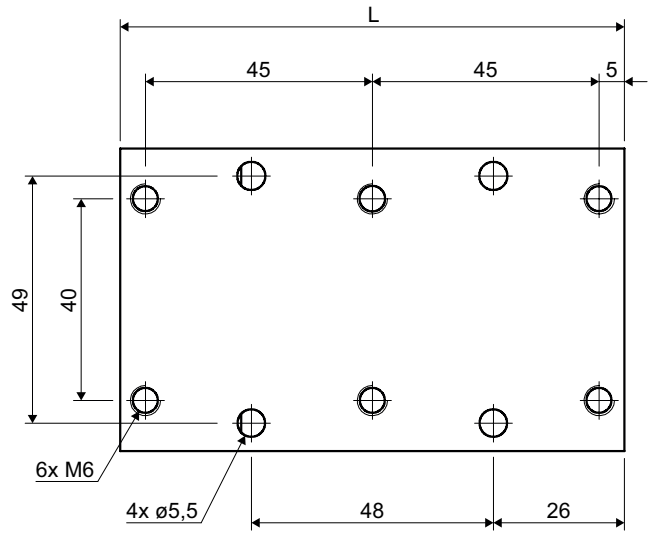
Catalog no.	Description	Order no.
PR789	Hydraulic Dampener, adjustable	**5115038**
PR789	Hydraulic Dampener	**5115039**

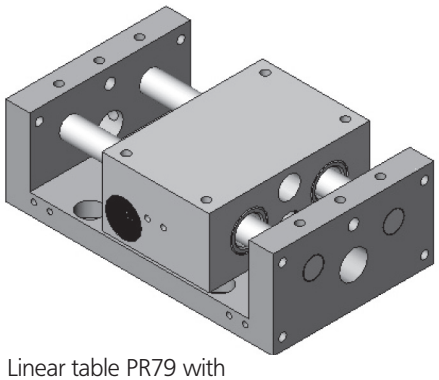




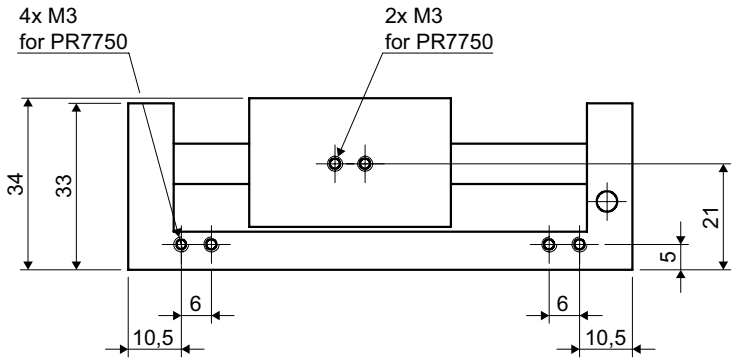
Adjustable

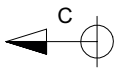
Linear Measuring Slides

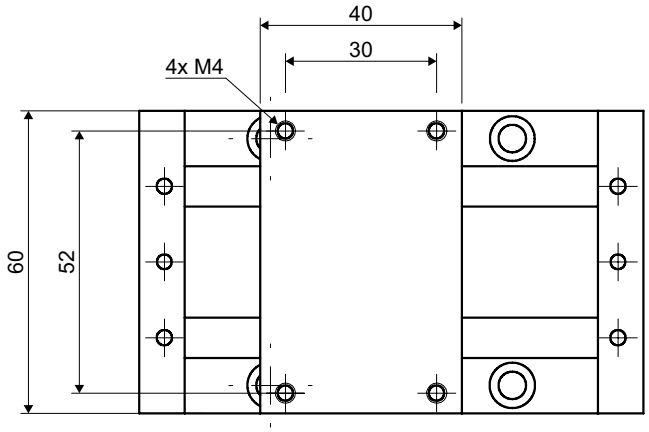


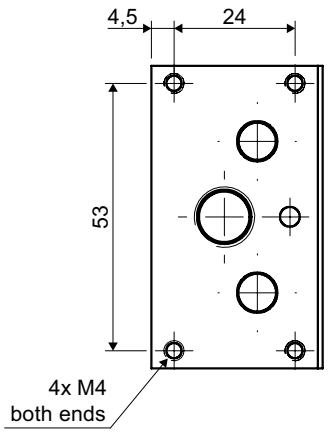


Linear table PR79 with
2 precision ball bushings



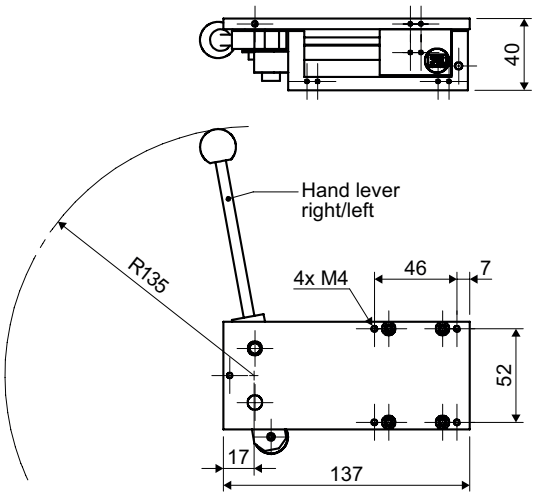




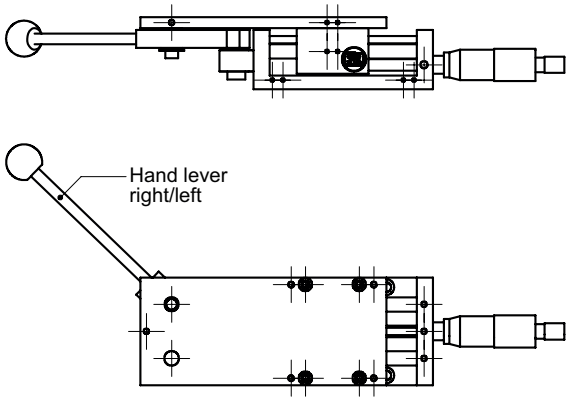


Linear Measuring Slides

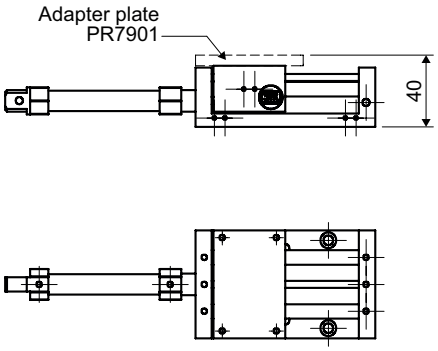
Linear Tables PR79 with Adjusting Units



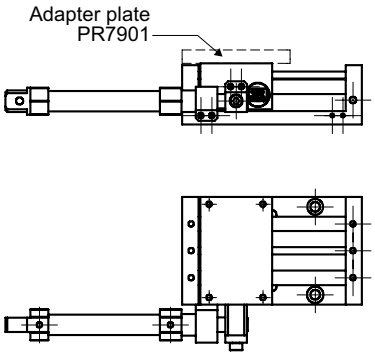
Manual adjustment



Manual adjustment + Limit Stop



Pneumatic cylinder in the middle



Pneumatic cylinder on the side

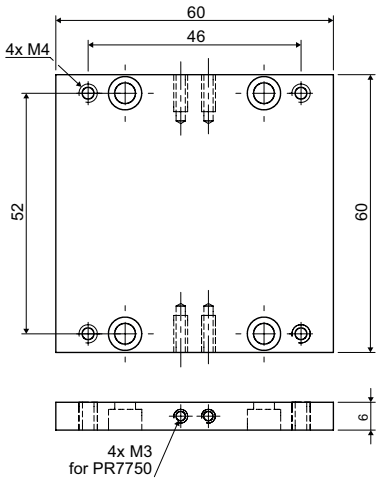
Linear Tables PR79

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

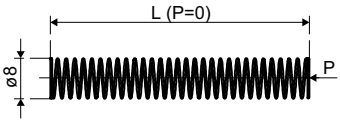
Adapter Plate PR7901

Catalog no.	Description	Order no.
PR7901	Adapter Plate for PR79	**5115122**



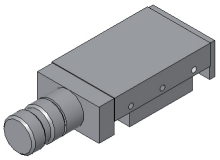
Measuring Force Springs for PR7901

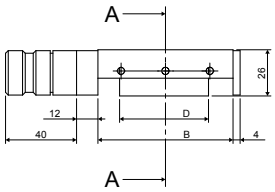
Catalog no.	L mm	Rigidity	Table Stroke mm	Order no.
RS79	80	0.023	40	**5115145**
RS79	100	0.018	50	**5115146**
RS79	120	0.014	40 - 50	**5115147**

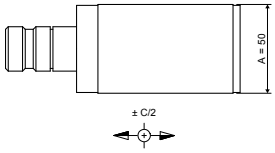


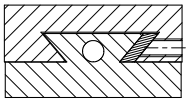
Micrometer Tables C50

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**





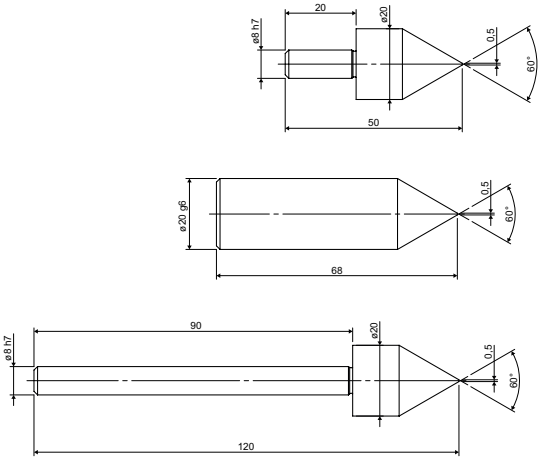




Centering Tips and Flanges

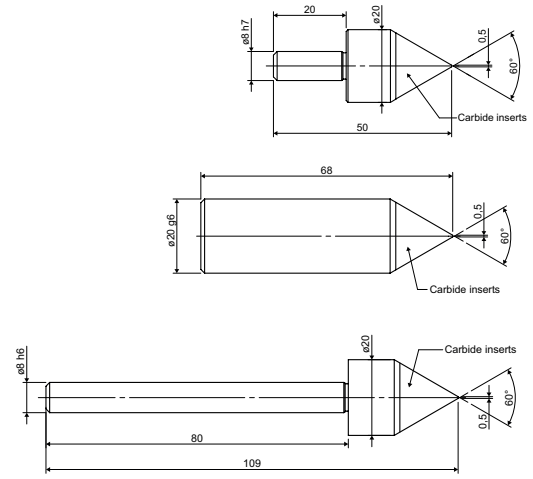
Centering Pin CD50

Catalog no.	Mount mm	L mm	Material	Order no.
CD50	8	50	Steel	**5115205**
CD50	20	68	Steel	**5115228**
CD50	8	120	Steel	**5115206**



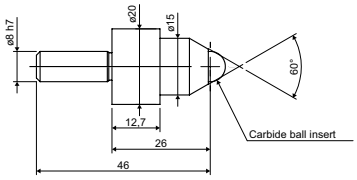
Centering Pin CD50C

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

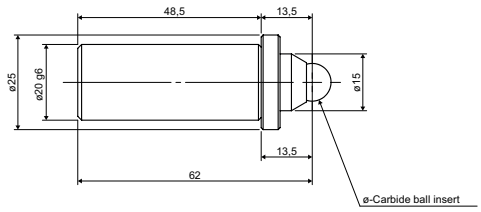
Catalog no.	Mount mm	Ball dia. mm	Material	Order no.
CD50B	8	6	Carbide	**5115212**
CD50B	8	7	Carbide	**5115213**
CD50B	8	8	Carbide	**5115214**
CD50B	8	9	Carbide	**5115215**
CD50B	8	10	Carbide	**5115216**
CD50B	8	11	Carbide	**5115217**
CD50B	8	12	Carbide	**5115218**
CD50B	8	13	Carbide	**5115219**
CD50B	8	14	Carbide	**5115220**
CD50B	8	15	Carbide	**5115221**
CD50B	8	16	Carbide	**5115222**



Centering Tips and Flanges

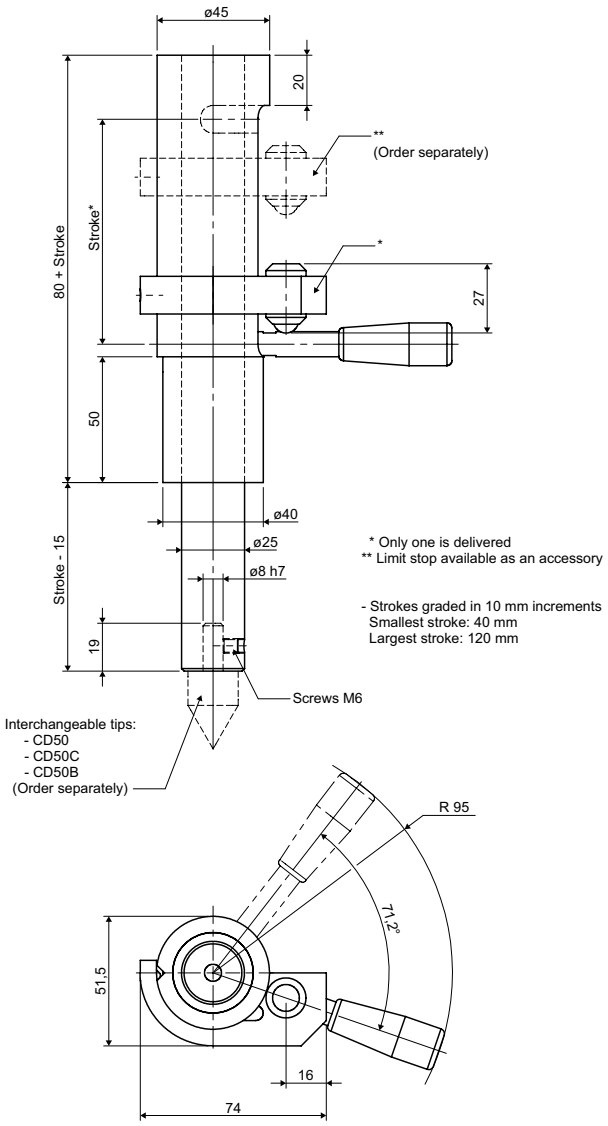
Centering Ball PF160

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**

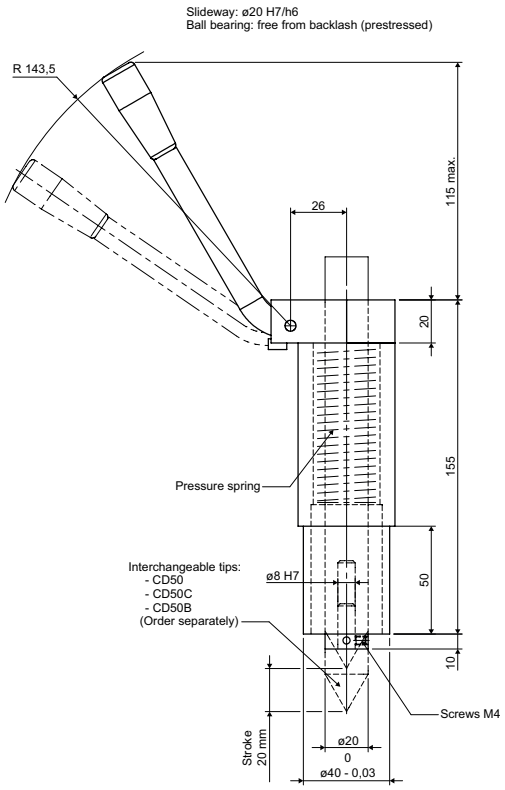


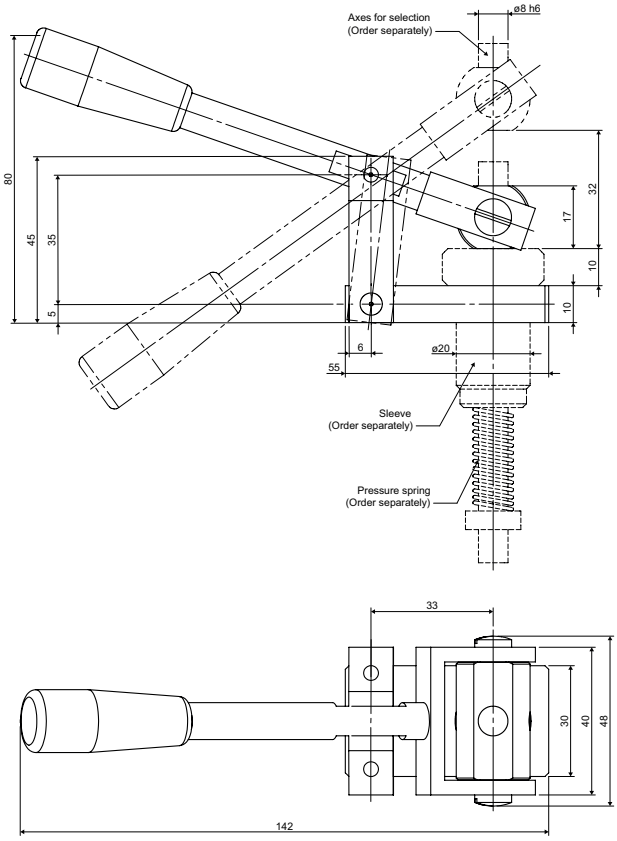
Tip with Large Stroke PGC160

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

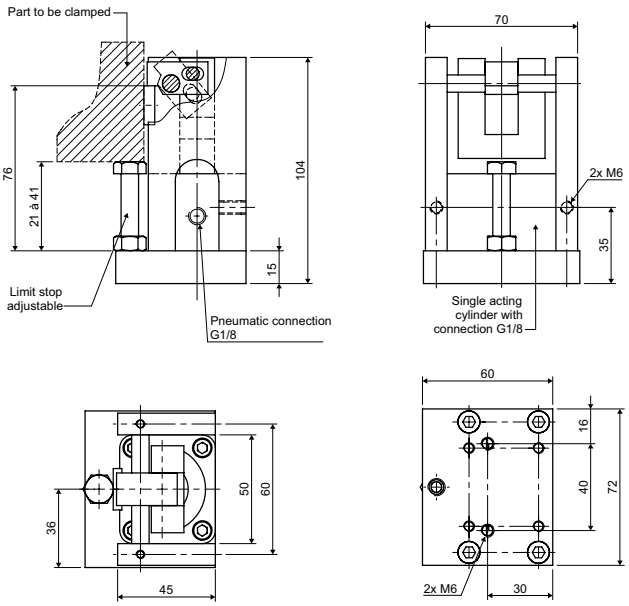
Catalog no.	Description	Order no.
PM160	with ball bushing	**5115262**
PM160	with sliding guideway	**5115263**

Lifter ST140

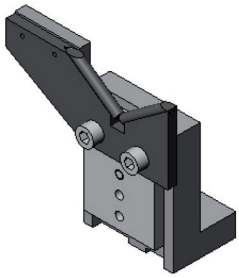
Catalog no.	Order no.
ST140	**5115268**

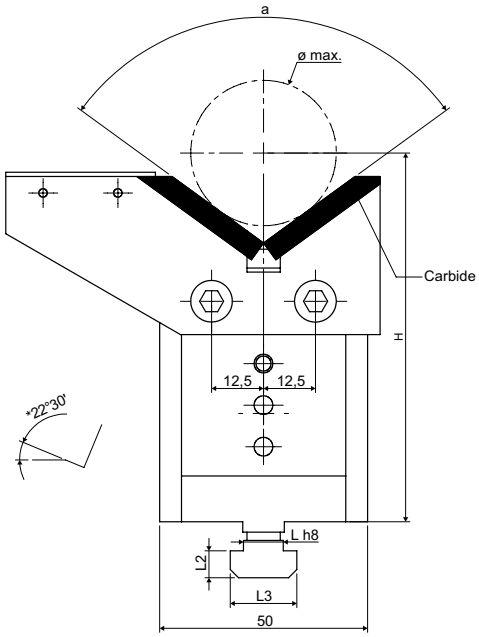
Pneumatic Clamp BR160

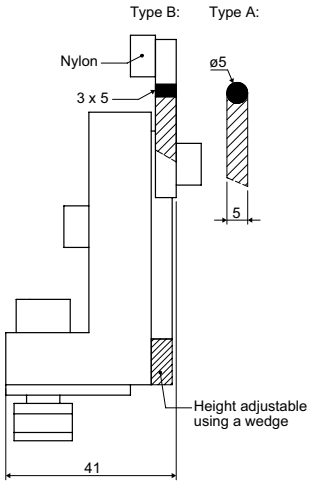
Catalog no.	Description	Order no.
BR160	Lock the slide in the measuring position	**5115262**



Prisms and Accessories



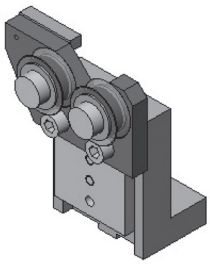


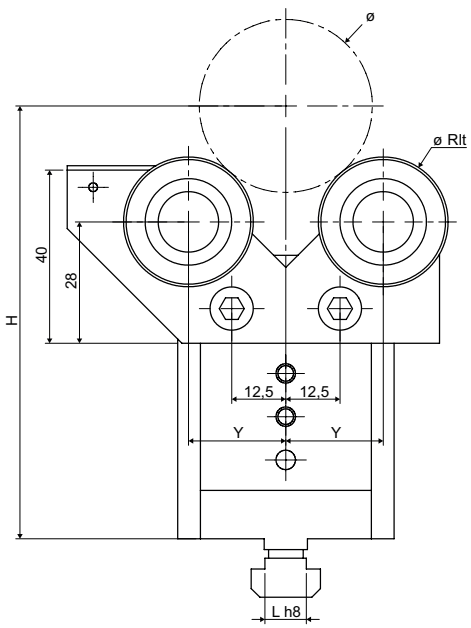


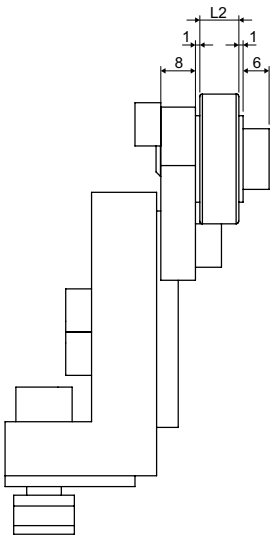
Support PV66 with Prism

Catalog no.	Dia. max mm	L mm	a max	Type	H mm	Order no.
PV66	8–45	12x7x19	60°	A	61–137	**5115300**
PV66	8–45	12x7x19	60°	B	61–137	**5115301**
PV66	8–60	12x7x19	90°	A	60.7–136.4	**5115302**
PV66	8–60	12x7x19	90°	B	60.7–136.4	**5115303**
PV66	8–60	12x7x19	108°	A	60.9–132.1	**5115304**

Catalog no.	Dia. max mm	L mm	a max	Type	H mm	Order no.
PV66	8–60	12x7x19	108°	B	60.9–132.1	**5115305**
PV66	8–80	12x7x19	120°	A	60.1–140.7	**5115306**
PV66	8–80	12x7x19	120°	B	60.1–140.7	**5115307**
PV66	8–60	12x7x19	90°	A	60.2–133.2	**5115308**
PV66	8–60	12x7x19	90°	B	60.9–133.2	**5115309**







Support PV66 with Roller Prism

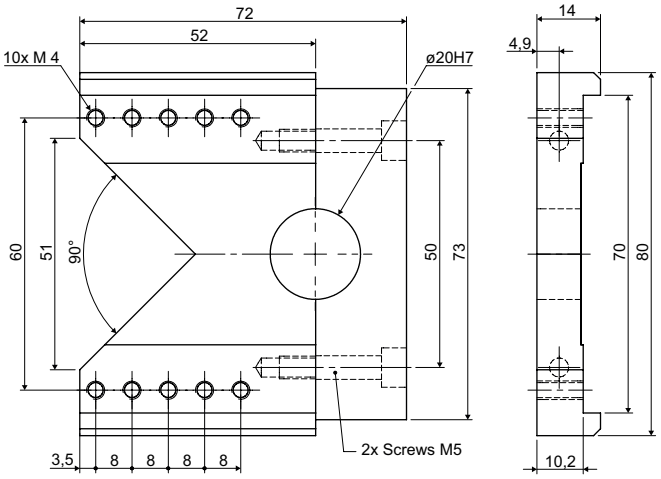
Catalog no.	L mm	Max- mm	H mm	Y mm	Dia.-R mm	L2 mm	Order no.
PV66	12	10–24	71.9–121	15	26	8	**5115314**
PV66	12	24–50	76.9–134.1	22.5	30	9	**5115315**

Catalog no.	L mm	Max- mm	H mm	Y mm	Dia.-R mm	L2 mm	Order no.
PV66	12	50–78	86.4–143.9	30	30	9	**5115316**
PV66	12	78–120	104.9–174	45	30	9	**5115317**

Prisms and Accessories

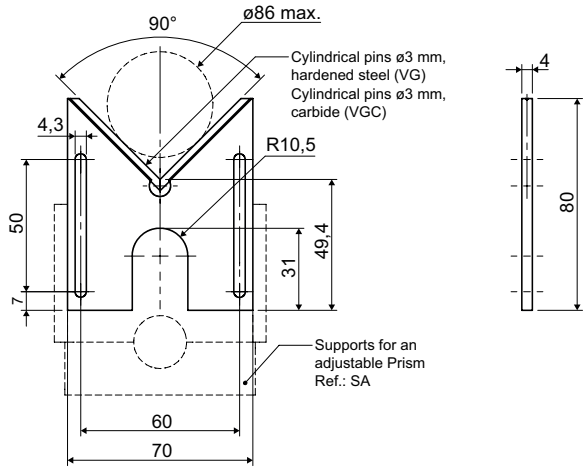
Support for Adjustable Prisms

Catalog no.	Order no.
SA	**5115322**



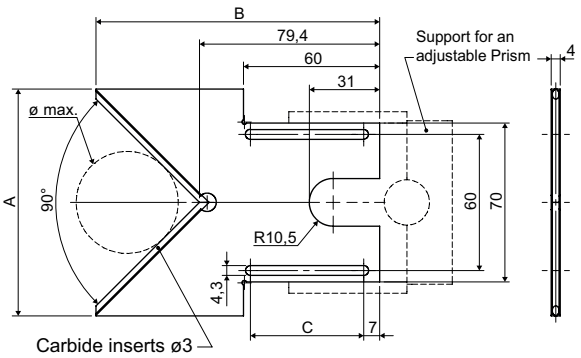
Prism 90° adjustable

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

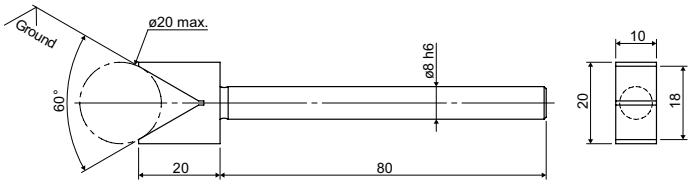
Catalog no.	Description	A mm	B mm	C mm	Dia. max	Order no.
VG		100	125	43	130	**5115327**
VGSA	with Support SA	100	125	43	130	**5115328**
VG		140	145	50	140	**5115329**
VGSA	with Support SA	140	145	50	140	**5115330**



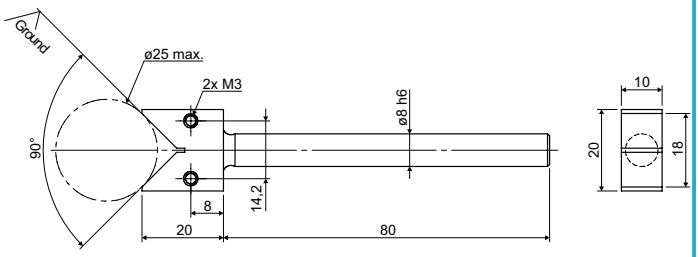
Prisms and Accessories

Prisma VM

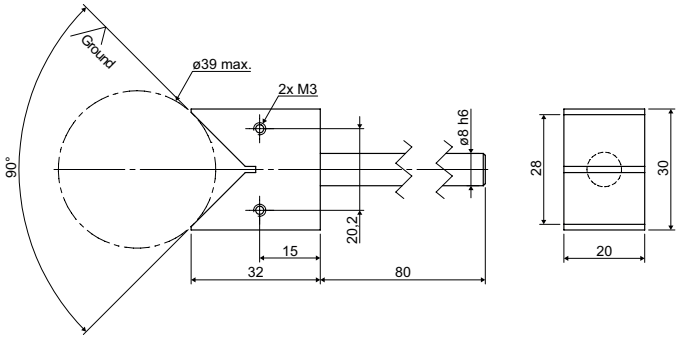
Catalog no.	Description	Order no.
VM	Prism on 8 mm axis	5115335



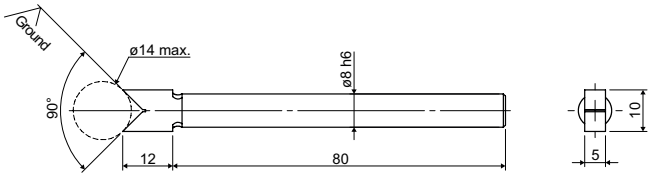
Catalog no.	Description	Order no.
VM	Prism on 8 mm axis	5115336



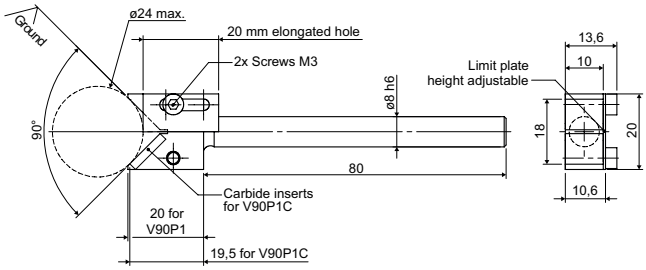
Catalog no.	Description	Order no.
VM	Prism on 8 mm axis, large model	5115337



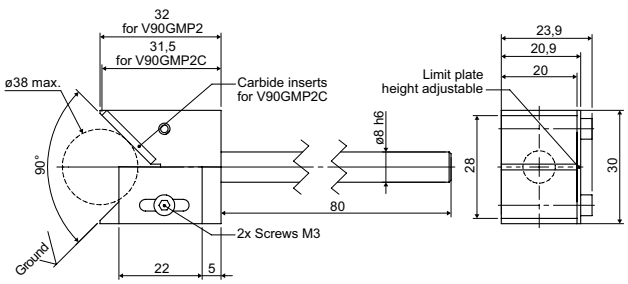
Catalog no.	Description	Order no.
VM	Prism on 8 mm axis, small model	5115338



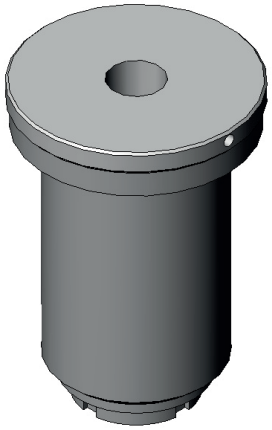
Catalog no.	Description	Order no.
VM	Prism with Stop Plate	5115339
VM	Prism with Carbide Inserts and Stop Plate	5115340

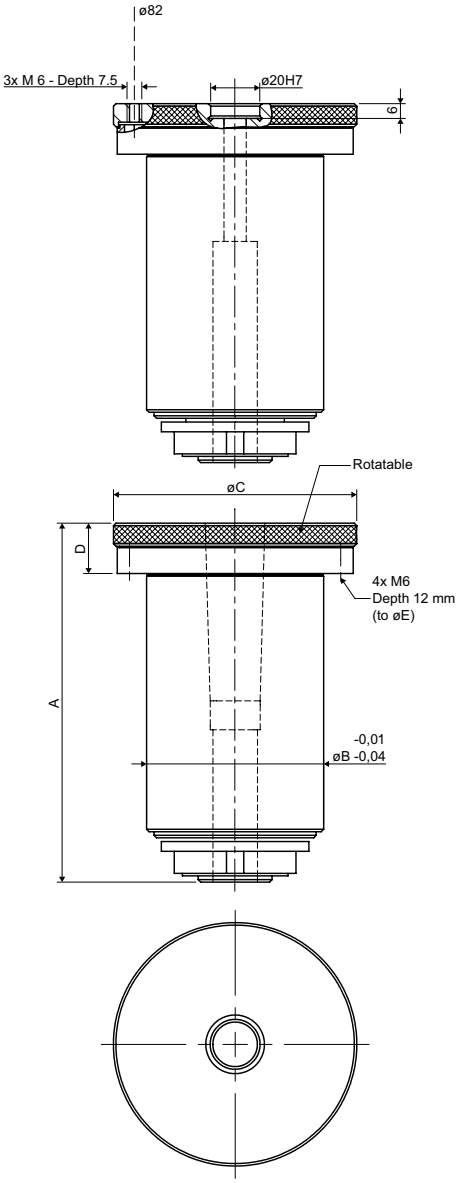


Catalog no.	Description	Order no.
VM	Prism, large model, with Stop Plate	5115341
VM	Prism with Carbide Inserts, large model and Stop Plate	5115342



Precision Rotary Unit





Features

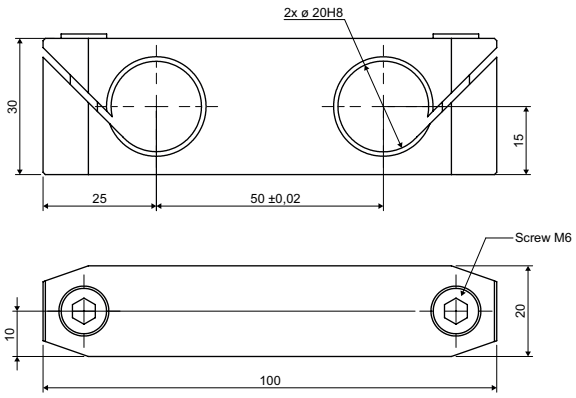
- Run-out 0.005mm
- Taper SK/SA 30, 40, 45, 50
- Centering smooth, dia. 20 with 3 x M6 to dia. 82

Options:
- Resetting Wheel
- Clamping Screw

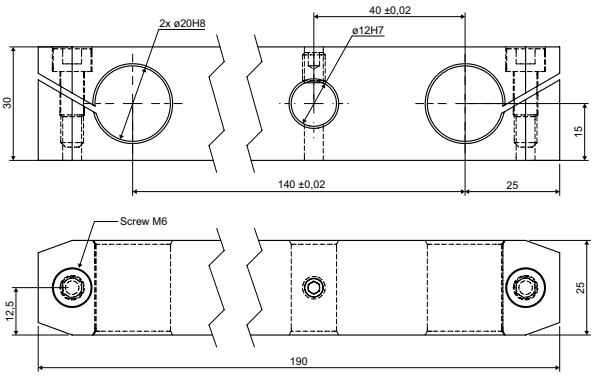
Precision Turning Unit ET90

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**

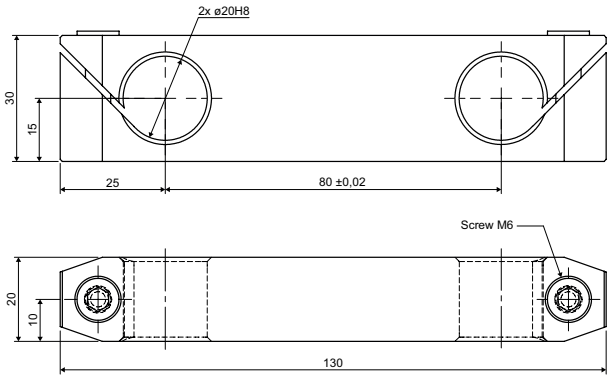
Equipment Accessories



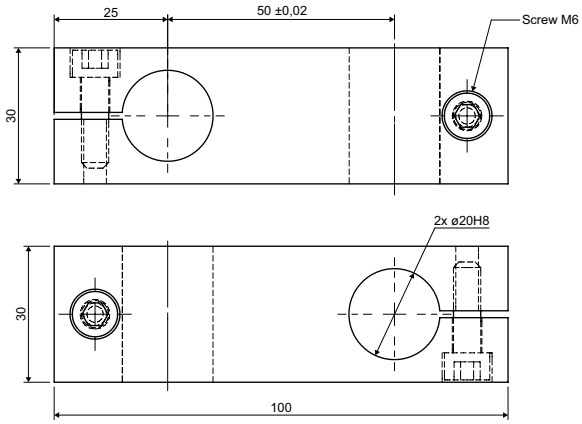
Catalog no.	Description	Order no.
BT	Extension Arm ø20 × ø20 × 50	5115518



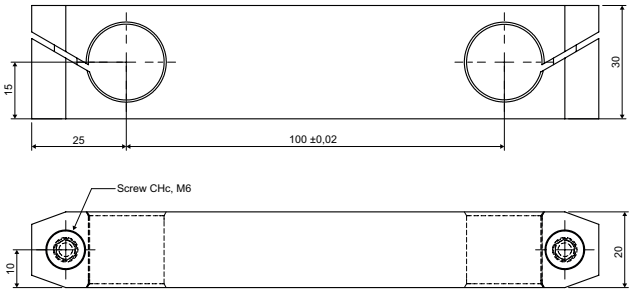
Catalog no.	Description	Order no.
BT	Extension Arm ø20 × ø20 × 140	5115521



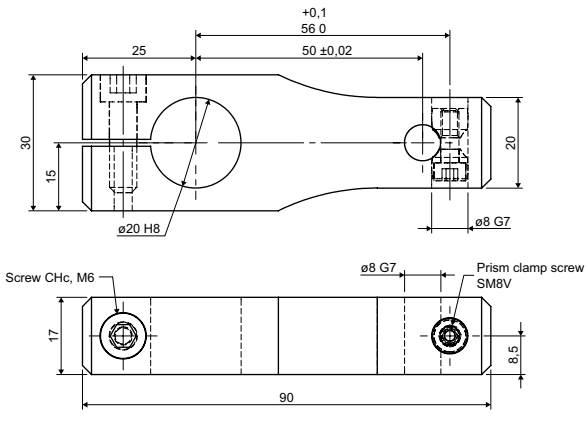
Catalog no.	Description	Order no.
BT	Extension Arm ø20 × ø20 × 80	5115519



Catalog no.	Description	Order no.
BT	Extension Arm ø20 × ø20 below 90°	5115515

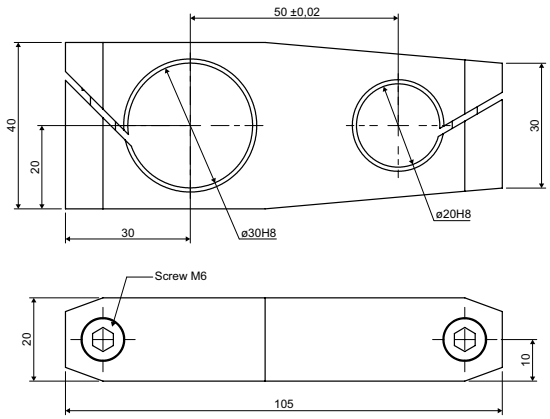


Catalog no.	Description	Order no.
BT	Extension Arm ø20 × ø20 × 100	5115520

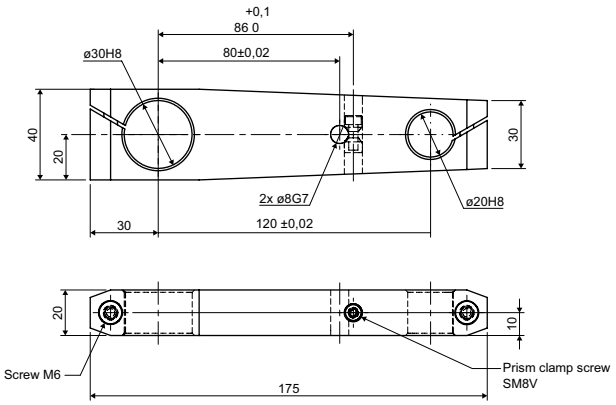


Catalog no.	Description	Order no.
BT	Extension Arm ø20 × ø8 × 50	5115522

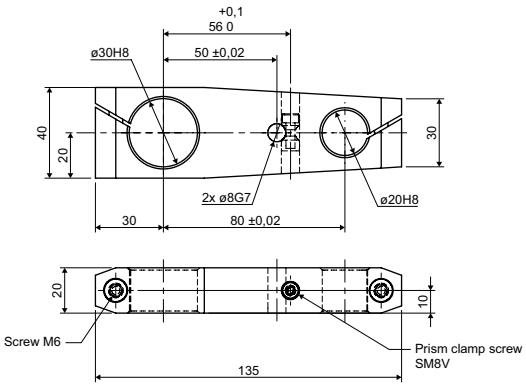
Equipment Accessories



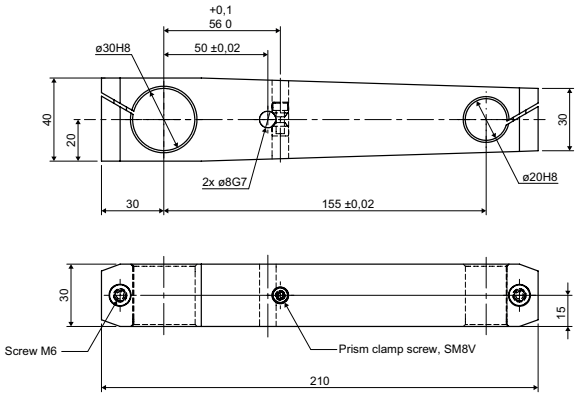
Catalog no.	Description	Order no.
BT	Extension Arm ø30×ø20×50	5115524



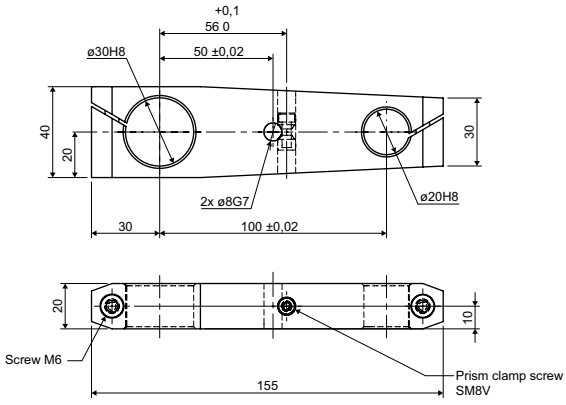
Catalog no.	Description	Order no.
BT	Extension Arm ø30×ø30×120	5115530



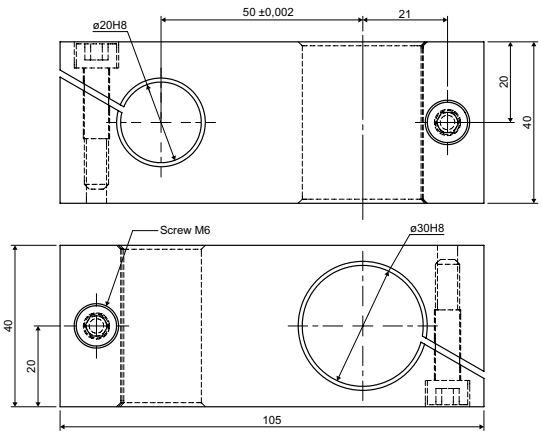
Catalog no.	Description	Order no.
BT	Extension Arm ø30×ø20×80	5115528



Catalog no.	Description	Order no.
BT	Extension Arm ø30×ø20×155	5115531

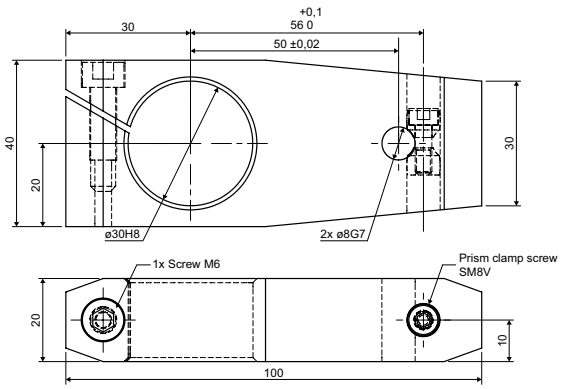


Catalog no.	Description	Order no.
BT	Extension Arm ø30×ø20×100	5115529

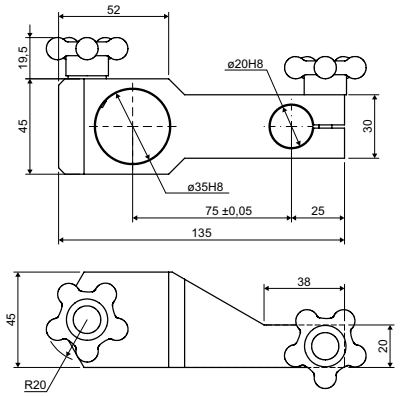


Catalog no.	Description	Order no.
BT	Extension Arm ø30×ø20×50 below 90°	5115517

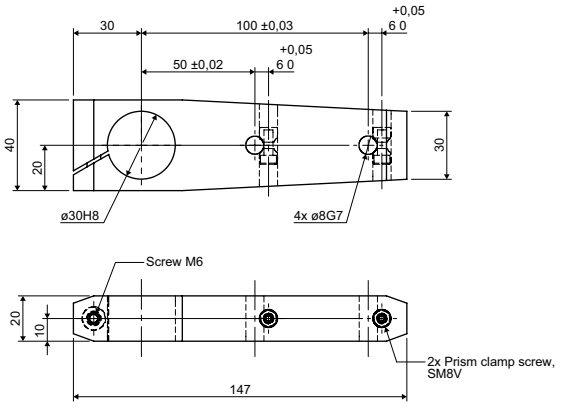
Equipment Accessories



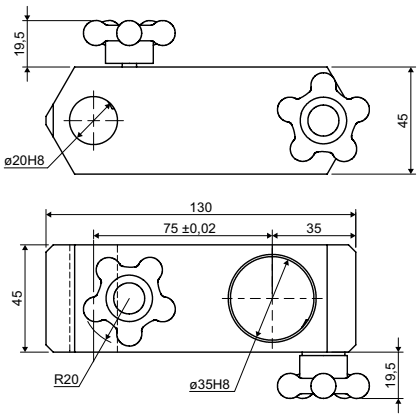
Catalog no.	Description	Order no.
BT	Extension Arm ø30×ø8×50	5115523



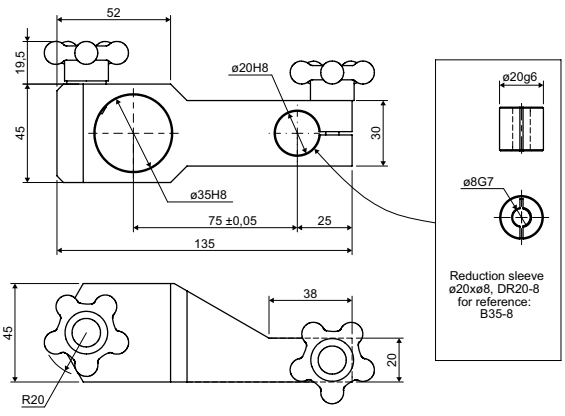
Catalog no.	Description	Order no.
BT	Extension Arm ø35×ø20×75	5115526



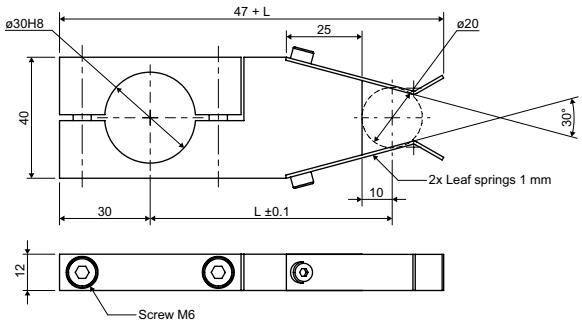
Catalog no.	Description	Order no.
BT	Extension Arm ø30×ø8×100	5115527



Catalog no.	Description	Order no.
BT	Extension Arm ø35×ø20×75 below 90°	5115516

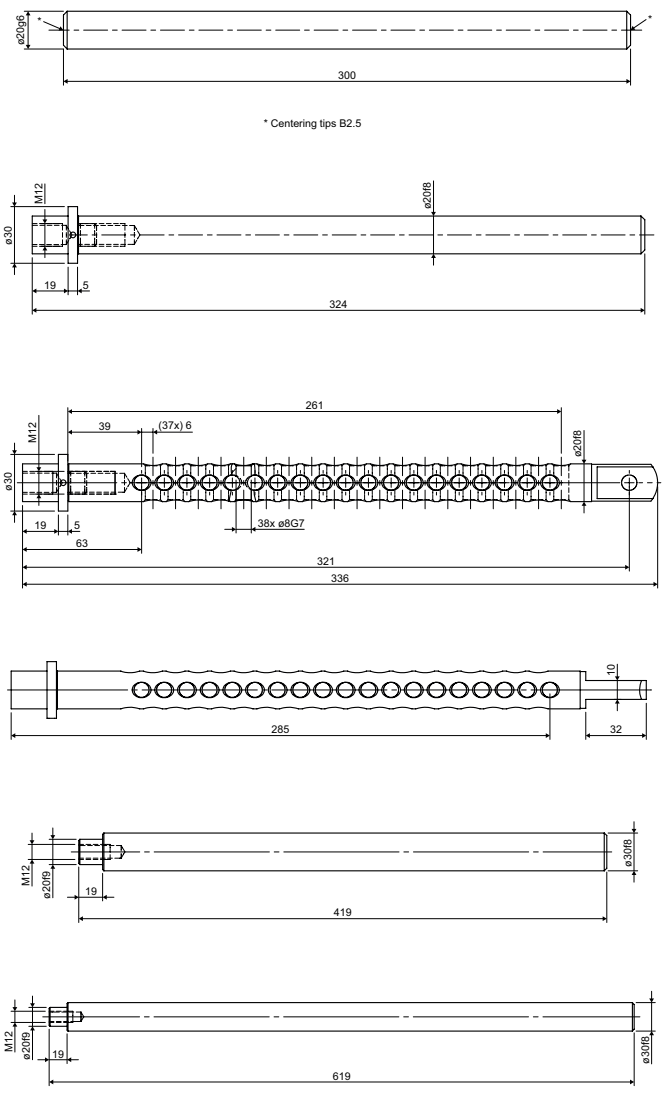


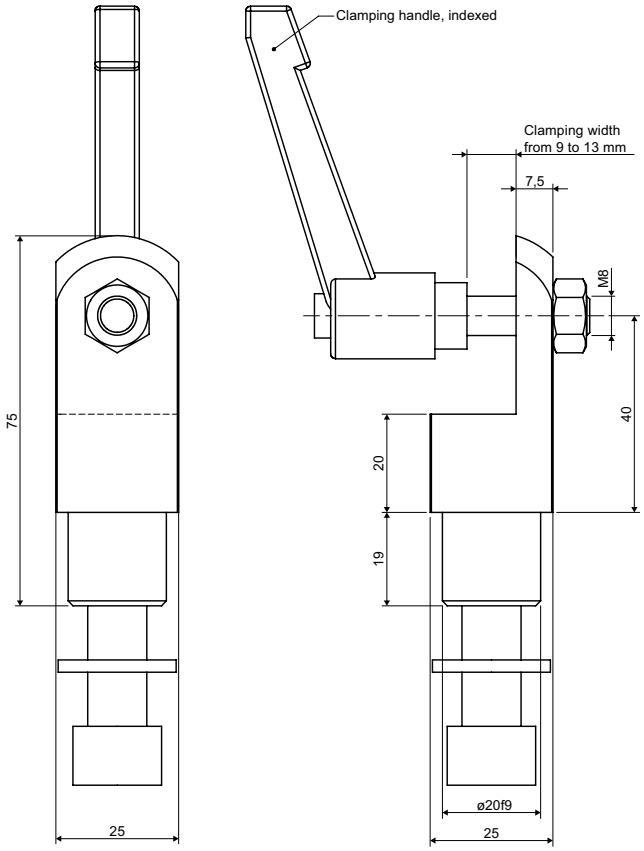
Catalog no.	Description	Order no.
BT	Extension Arm ø35×ø8×75	5115525



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





Column BC

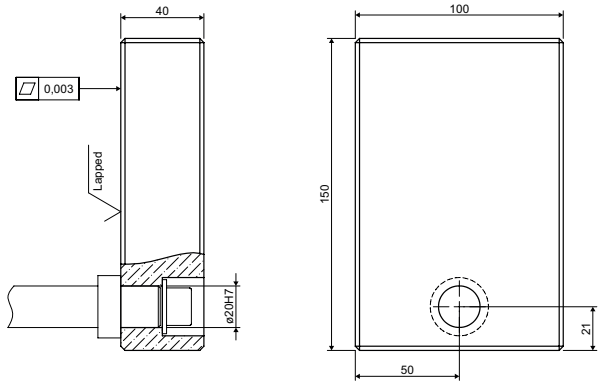
Catalog no.	Thread mm	Mount mm	Column mm	Order no.
BC	M12	20	ø20 x 300	**5115535**
BC			ø20 x 300	**5115536**
BC	M12	20	ø20 x 300*	**5115537**
BC	M12	20	ø30 x 400	**5115538**
BC	M12	20	ø30 x 600	**5115539**

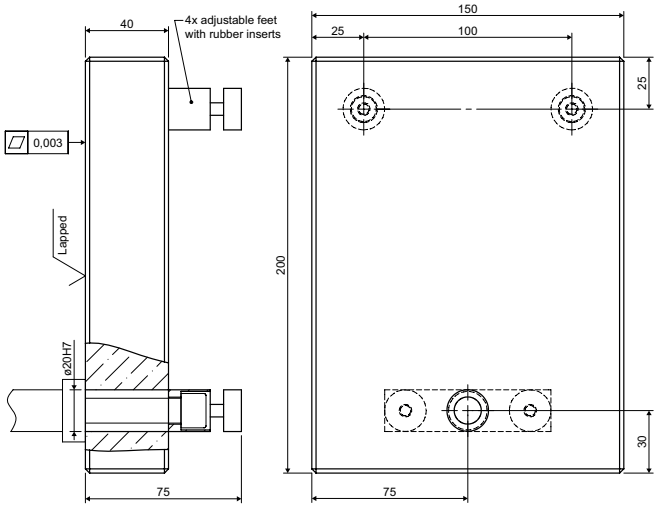
* *with bore holes*

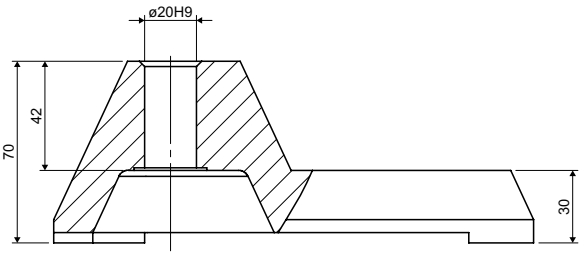
Foot C7

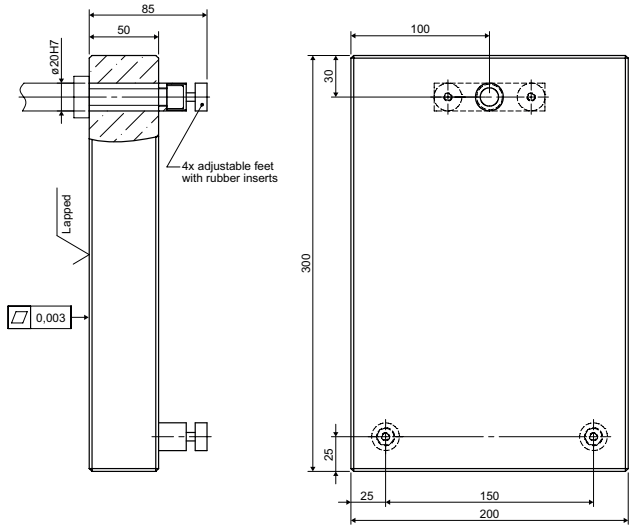
Catalog no.	Order no.
C7	**5115543**

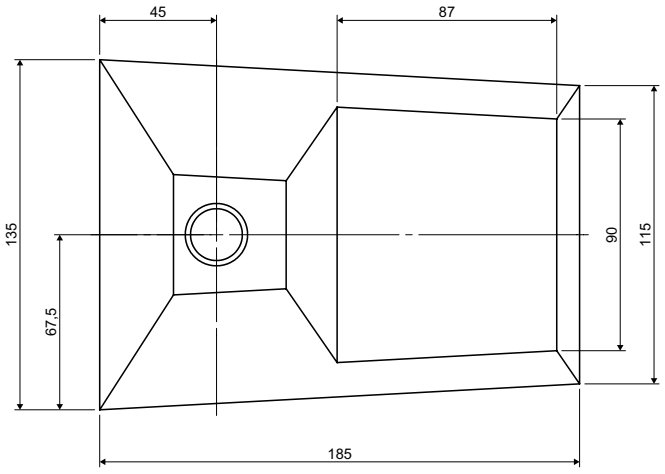
Equipment Accessories











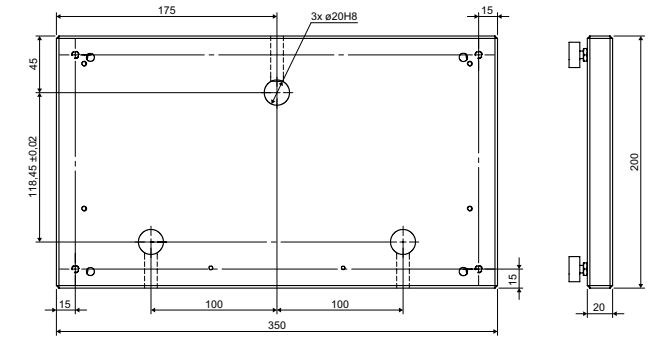
Granite Base MA

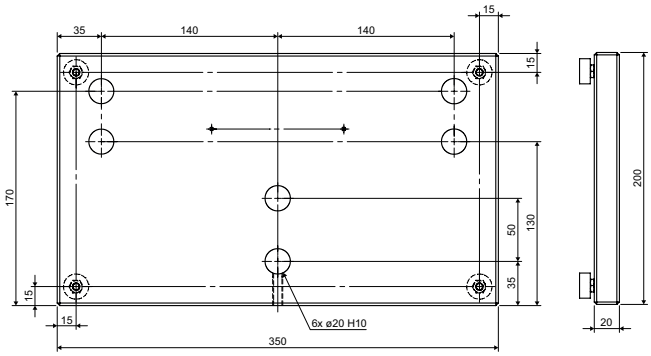
Catalog no.	Plate dimensions mm	Bore hole dia.	Order no.
MA	150 × 100 × 40	20H7	**5115552**
MA	200 × 150 × 40	20H7	**5115553**
MA	300 × 200 × 50	20H7	**5115554**

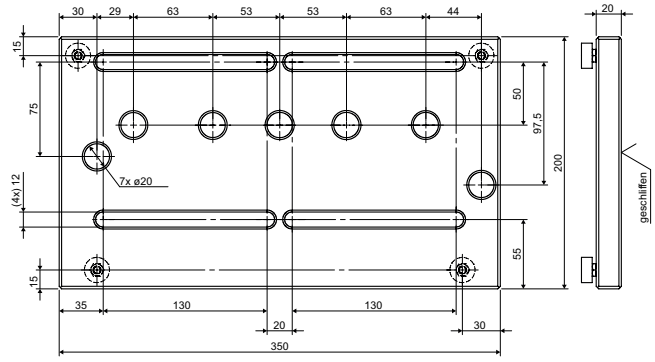
Base P3C

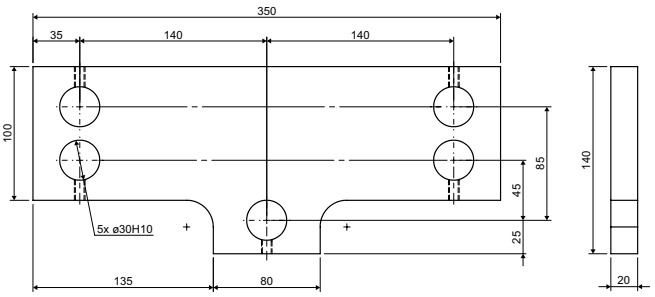
Catalog no.	Bore hole dia.	Order no.
C7	20H9	**5115576**

Equipment Accessories









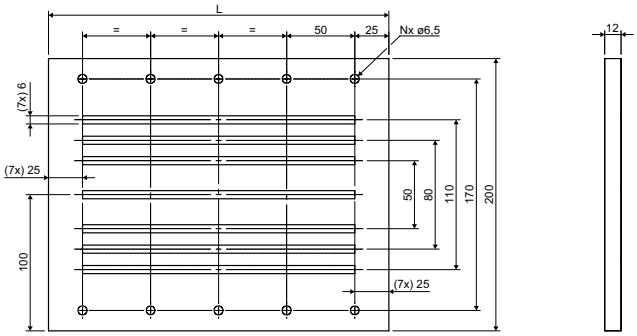
Base Plate T1 with Rubber Feet

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

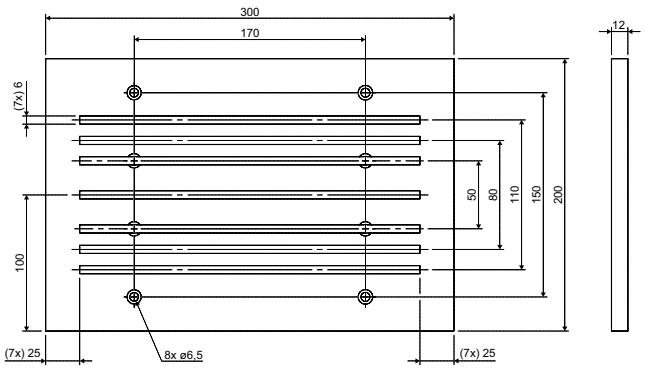
Catalog no.	Dimensions	Order no.
PVS	350 x 140 x 20	**5115574**

Equipment Accessories



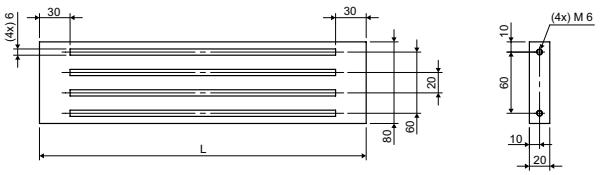
Groove Plates PQ

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**



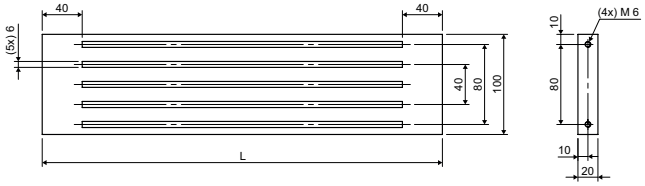
Groove Plates PQ

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**

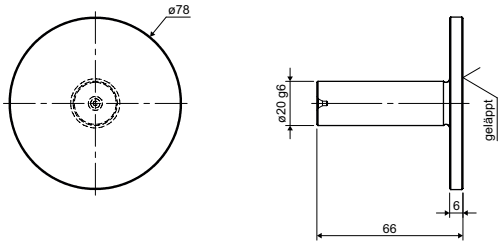


Table T78

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°

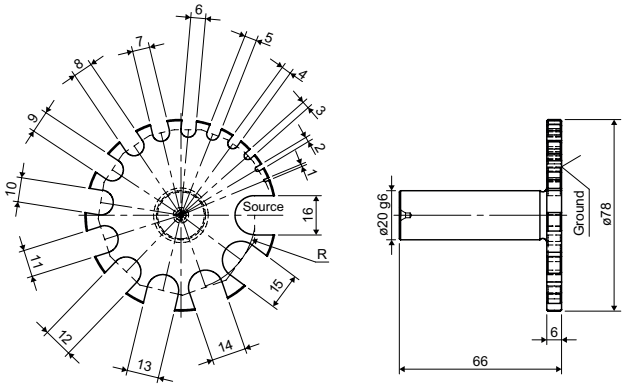


Table T78

Catalog no.	Dimensions mm	Description	Order no.
T78	ø 78	with bronze ball sleeve	**5115582**

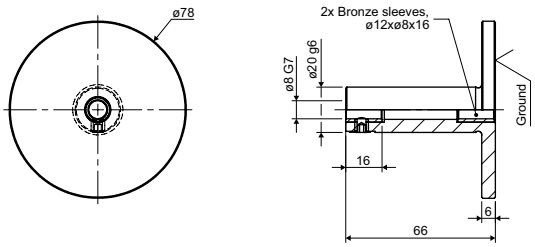
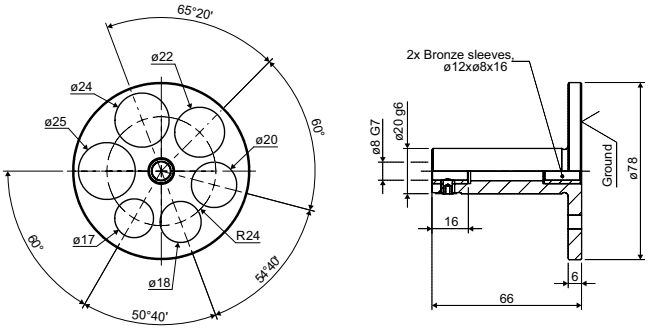


Table T78

Catalog no.	Dimensions mm	Description	Order no.
T78	ø 78	with sleeves and large through bores	**5115583**

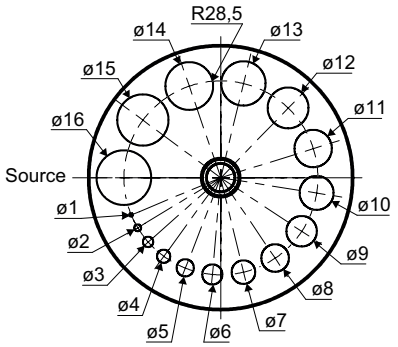


Equipment Accessories

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°



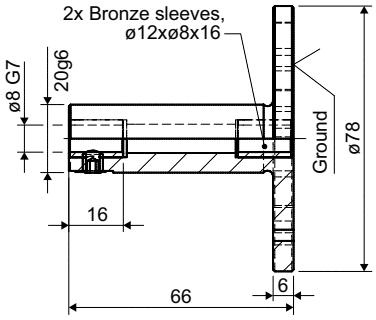
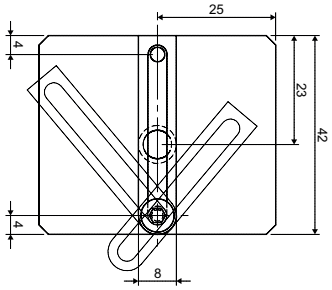
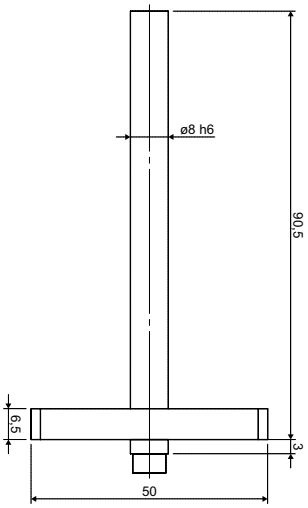


Table TA

Catalog no.	Description	Order no.
TA	Table with mounting pin dia. 8 and adjustable limit stop	**5115584**

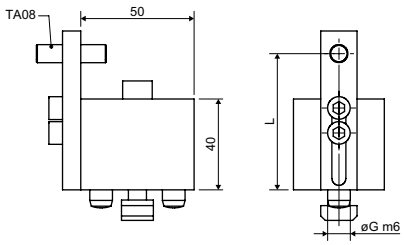




Equipment Accessories

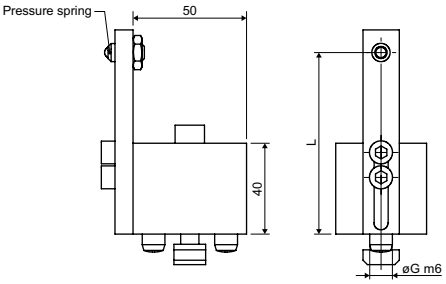
Adjustable Limit Stops BR30

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**



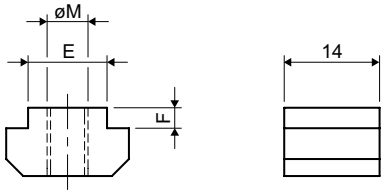
Adjustable Limit Stops with Pressure Spring BR30

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**



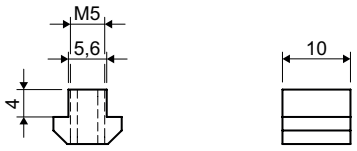
Special Groove EM0612 / EM0812

Catalog no.	M mm	E mm	F mm	Order no.
EM0612	6	12	3	**5115546**
EM0812	8	12	3	**5115547**



Special Groove EM3406

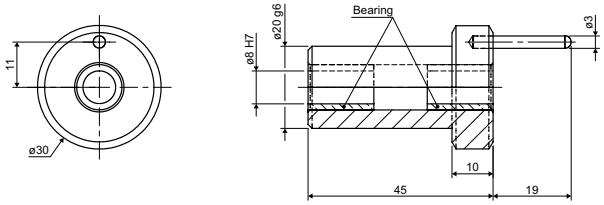
Catalog no.	M mm	Length mm	Description	Order no.
EM0612	5	6	for PQ Plates	**5115548**



Additional Accessories

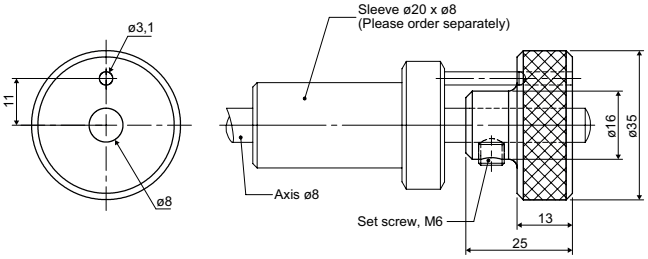
Buchse D20

Catalog no.	Dimensions	Order no.
D20	ø20 x ø8	**5115600**



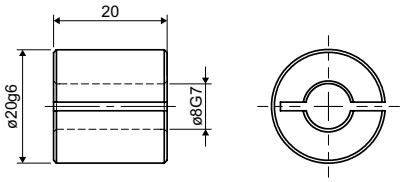
Retractor Button DEG8

Catalog no.	Order no.
DEG8	**5115614**



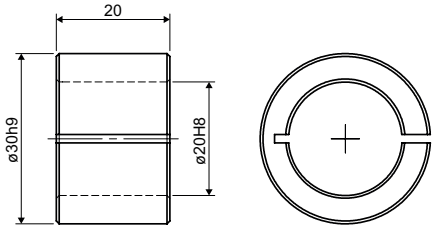
Reduction Sleeve DR20-8

Catalog no.	Dimensions	Order no.
DR20-8	ø20 x ø8	**5115612**



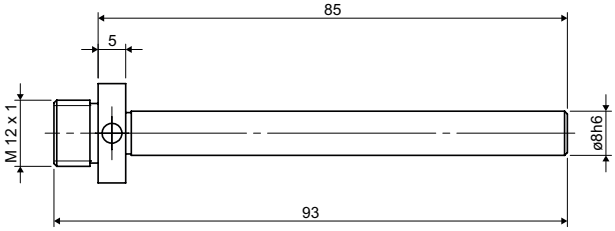
Reduction Sleeve DR30-20

Catalog no.	Dimensions	Order no.
DR30-20-8	ø30 x ø20	**5115613**



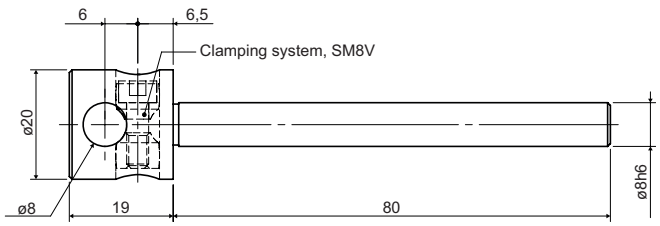
Rod N12100

Catalog no.	Dimensions	Order no.
N12100	M12 x 1 x ø8	**5115615**



Support P8

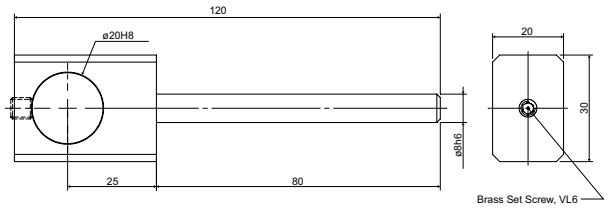
Catalog no.	Dimensions	Order no.
P8	ø8 x ø8 x 80	**5115622**



Additional Accessories

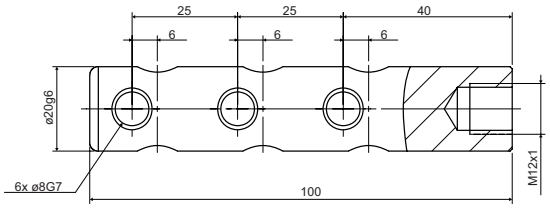
Support P20-8

Catalog no.	Dimensions	Order no.
P20-8	ø20 x ø8 x 80	5115621



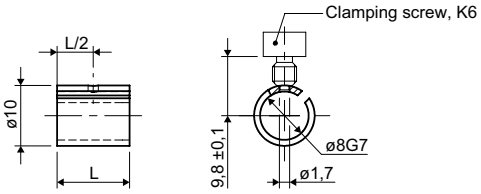
Support with bores P20HK

Catalog no.	Dimensions	Order no.
P20HK	ø8	5115620



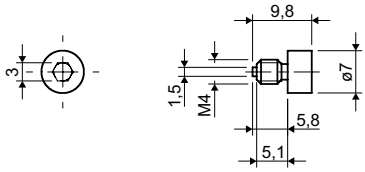
Clamping Sleeve K7 / MK7

Catalog no.	L mm	Order no.
K7	12	5115602
MK7	20	5115603



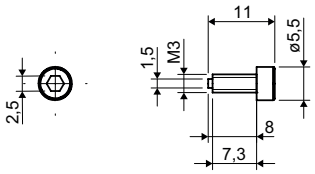
Clamping Screw K6

Catalog no.	Order no.
K6	5115604



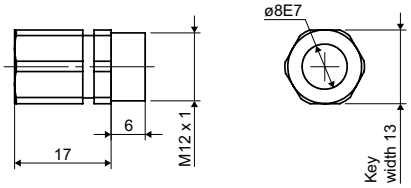
Clamping Screw VT0308

Catalog no.	Order no.
VT0308	5115605



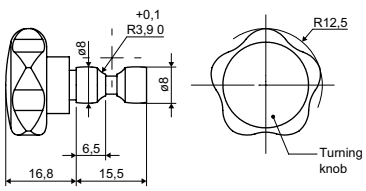
Clamp SP2312

Catalog no.	Order no.
SP2312	5115609



Clamping System SM8B

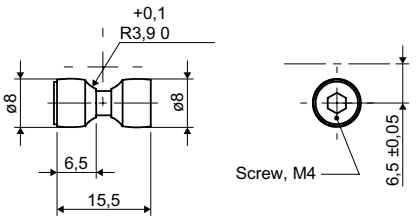
Catalog no.	Dimensions	Order no.
SM8B	ø8	5115607



Additional Accessories

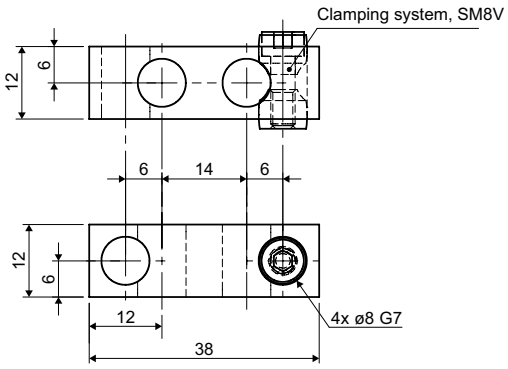
Clamping System SM8V

Catalog no.	Dimensions	Order no.
SM8V	ø8	**5115608**



Clamping Cube DOM49

Catalog no.	Dimensions mm	Order no.
DOM49	14	**5115620**



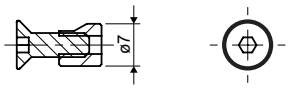
Brass Set Screw VL6

Catalog no.	Dimensions	Order no.
VL6	M6	**5115611**



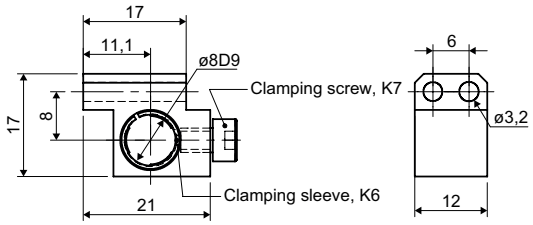
Clamping System EM3430N

Catalog no.	Order no.
EM3430N	**5115606**



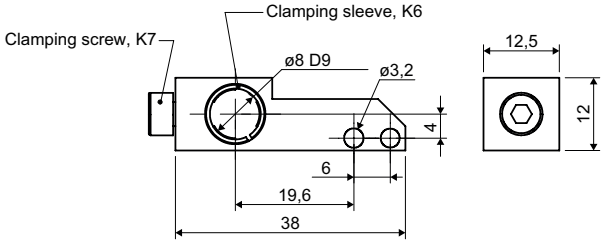
Probe Holder PR7750

Catalog no.	Order no.
PR7750	**5115616**



Probe Holder PR7751N

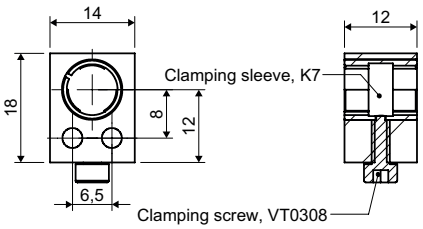
Catalog no.	Order no.
PR7751N	**5115617**



Additional Accessories

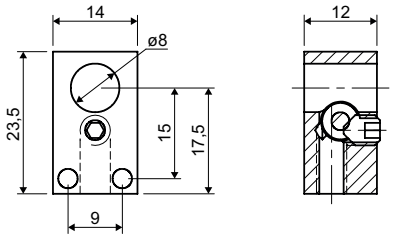
Probe Holder SP1812

Catalog no.	Order no.
SP1812	5115618



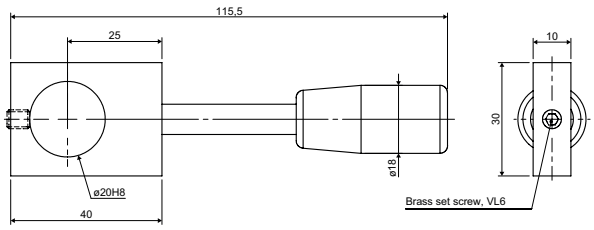
Probe Holder SP1815

Catalog no.	Order no.
SP1815	5115619

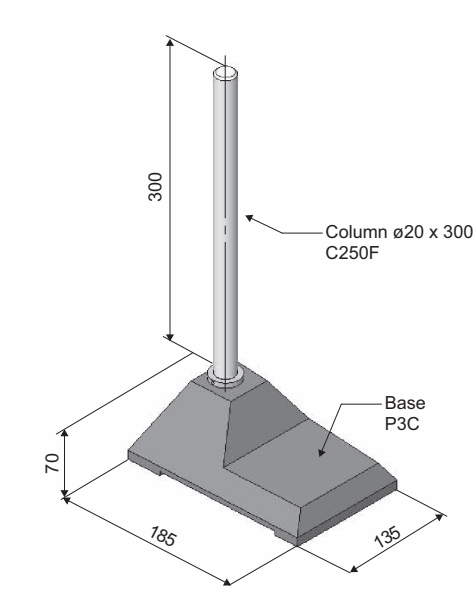


Handle LM20

Catalog no.	Order no.
LM20	5115601

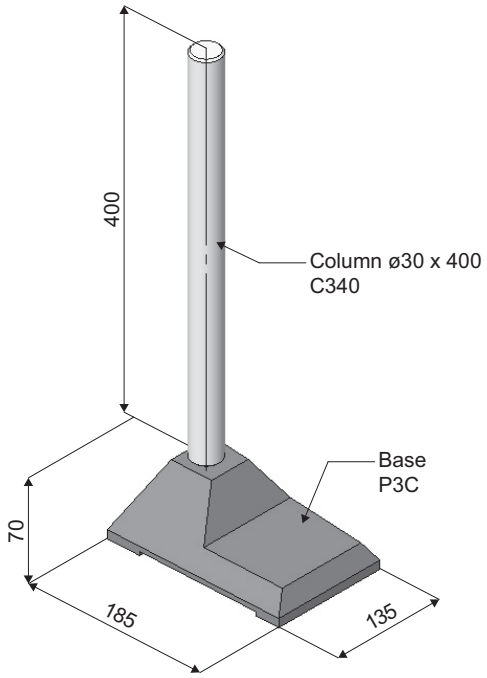


Vertical Measuring Stands



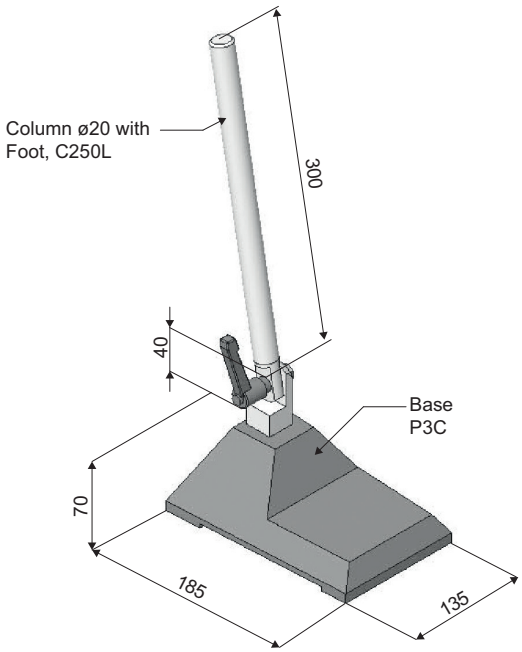
Base with Column P250

Catalog no.	Dimensions Column (mm)	Description	Order no.
P250	ø 20 x 300	Fixed	**5115717**



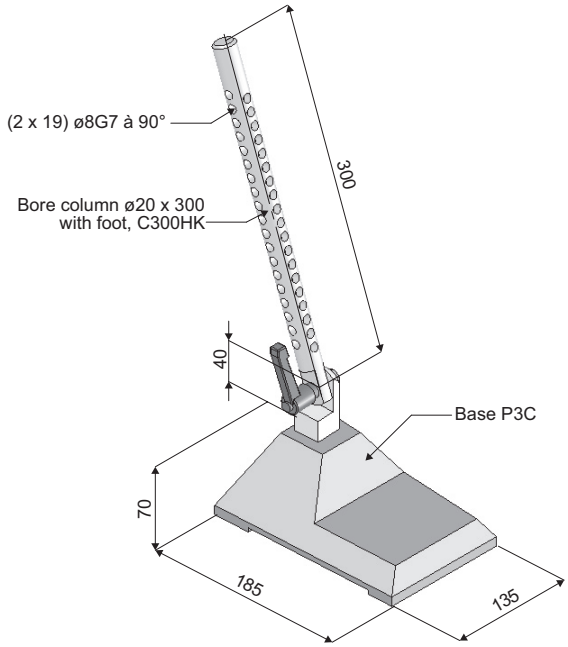
Base with Column P330

Catalog no.	Dimensions Column (mm)	Description	Order no.
P330	ø 30 x 400	Fixed	**5115720**



Base with Column P250

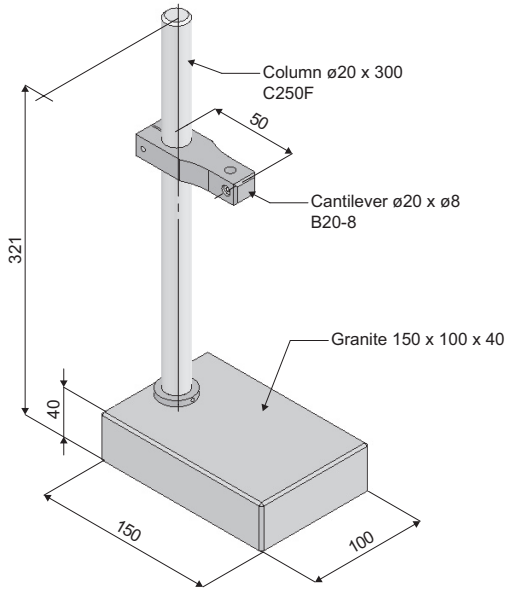
Catalog no.	Dimensions Column (mm)	Description	Order no.
P250	ø 20 x 300	Moveable	**5115718**



Base with Bored Column P330

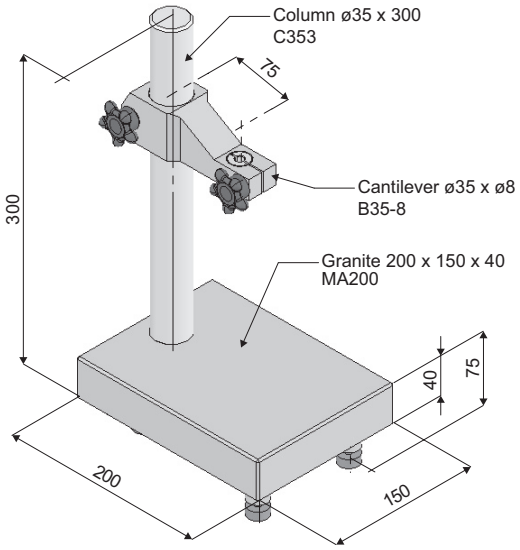
Catalog no.	Dimensions Column (mm)	Description	Order no.
P330	ø 30 x 400	Moveable	**5115719**

Vertical Measuring Stands



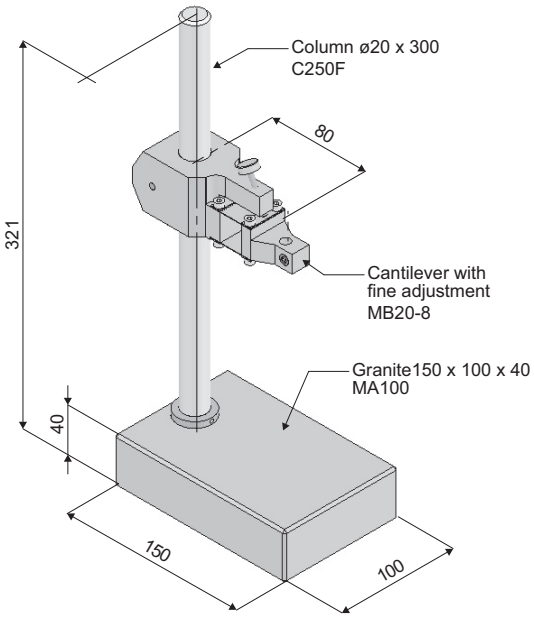
Measuring Table DIA

Catalog no.	Dimensions Plate (mm)	Order no.
DIA	150 × 100	**5115705**



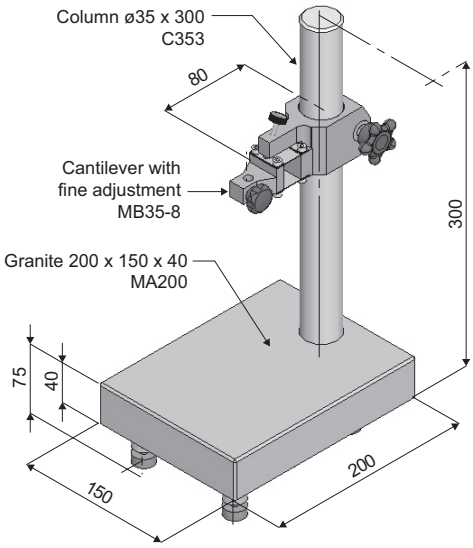
Measuring Table DIA

Catalog no.	Dimensions Plate (mm)	Order no.
DIA	200 × 150	**5115707**



Measuring Table DIA

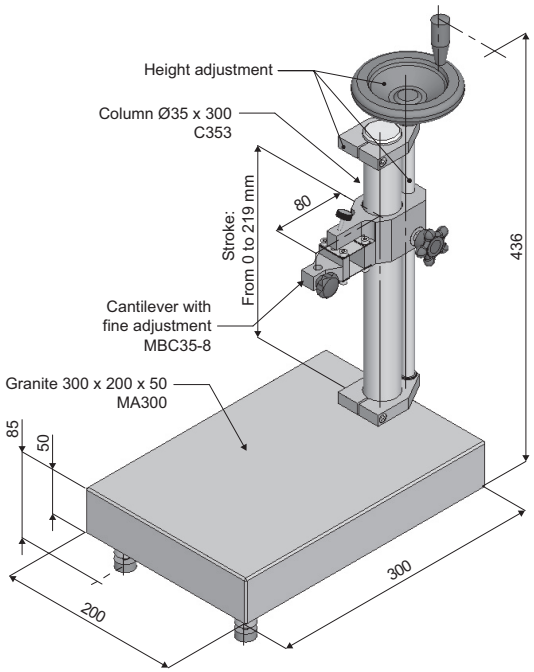
Catalog no.	Dimensions Plate (mm)	Order no.
P250	150 × 100	**5115706**



Measuring Table DIA

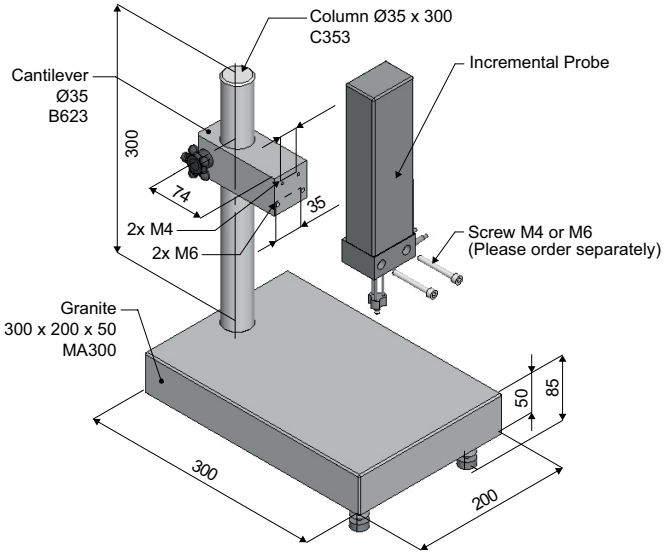
Catalog no.	Dimensions Plate (mm)	Description	Order no.
P250	200 × 150	with fine adjustment	**5115708**

Vertical Measuring Stands



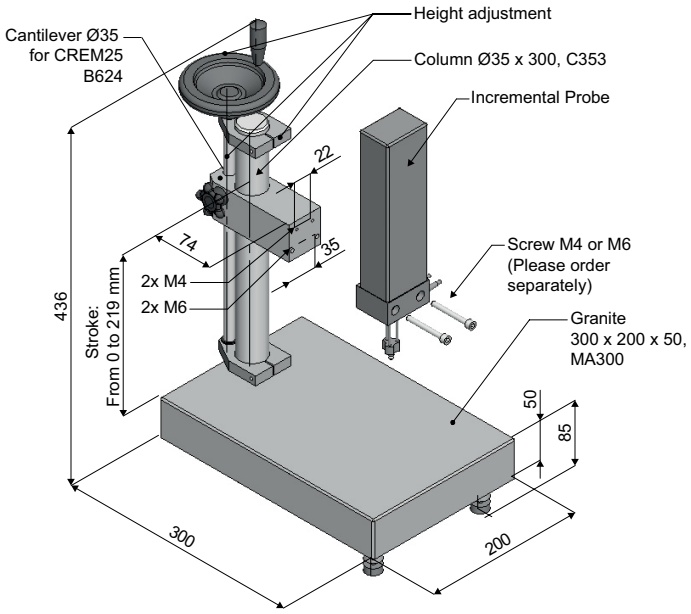
Measuring Table DIA

Catalog no.	Dimensions Plate (mm)	Description	Order no.
DIA	300 × 200	with height adjustment	**5115709**



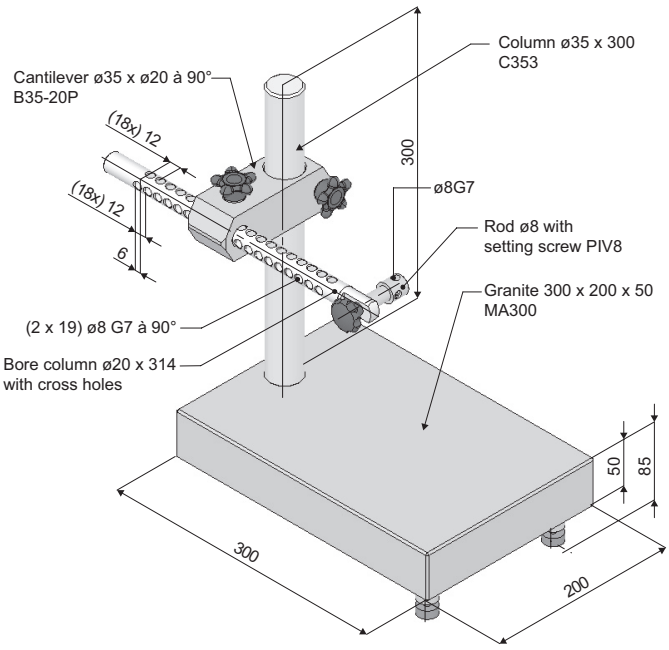
Measuring Table DIA

Catalog no.	Dimensions Plate (mm)	Description	Order no.
DIA	300 × 200	for MT Measuring Probe	**5115711**



Measuring Table DIA

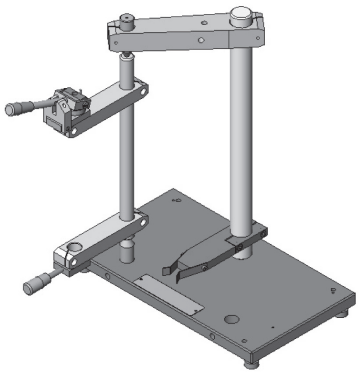
Catalog no.	Dimensions Plate (mm)	Description	Order no.
P250	300 × 200	for MT Measuring Probe and height adjustment	**5115712**

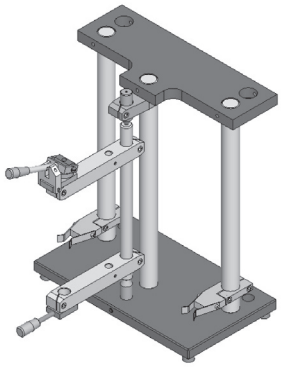


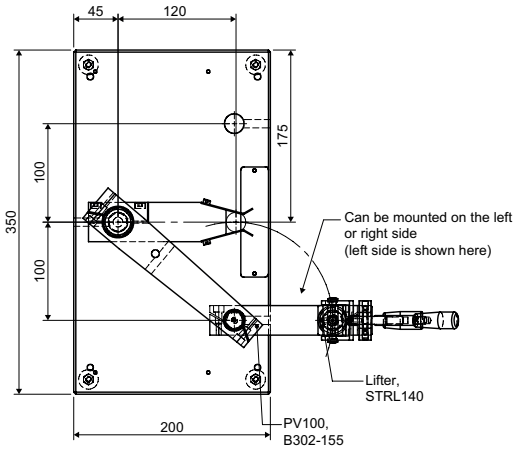
Measuring Table DIA

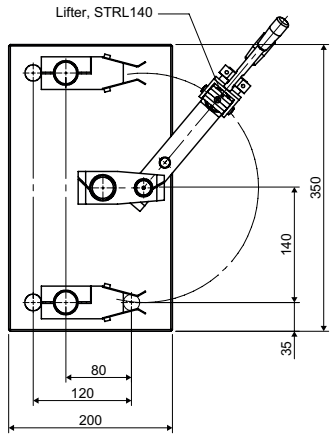
Catalog no.	Dimensions Plate (mm)	Description	Order no.
P250	300 × 200	mit horizontal column	**5115710**

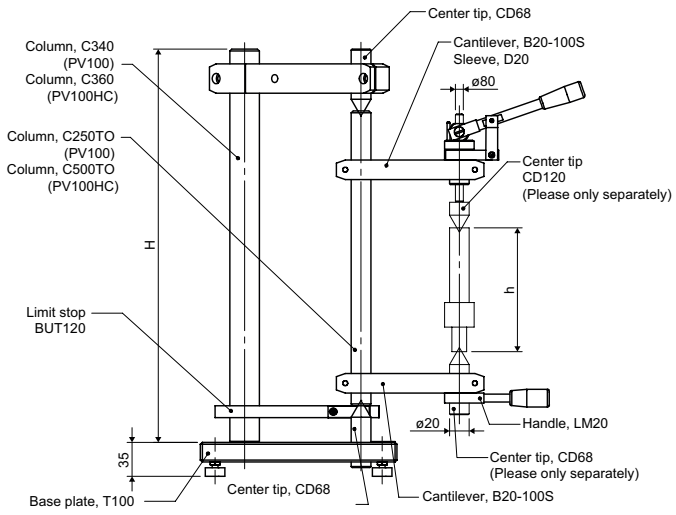
Vertical Measuring Stands

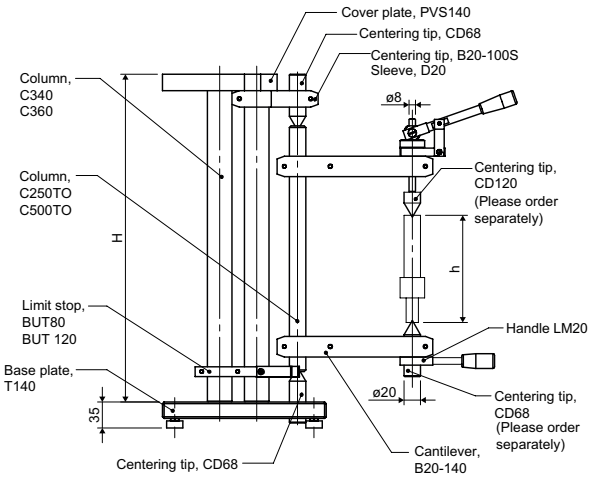












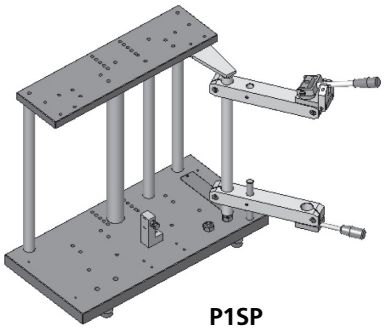
Vertical Measuring Stands PV100 mit Column

Catalog no.	Height H mm	h mm	Swivel radius mm	Order no.
PV100	400	150	100	**5115725**
PV100	600	380	100	**5115726**

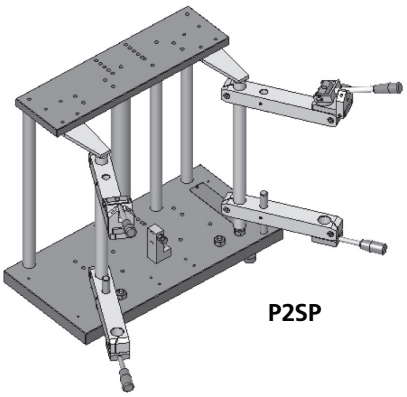
Vertical Measuring Stands PV140

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**

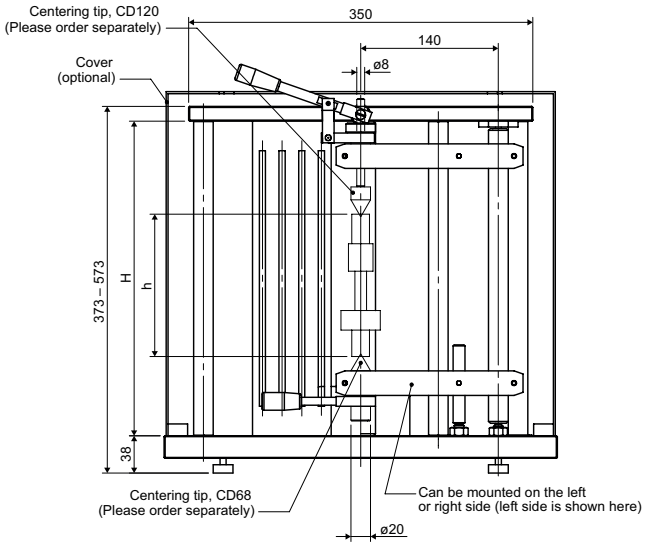
Vertical Measuring Stands

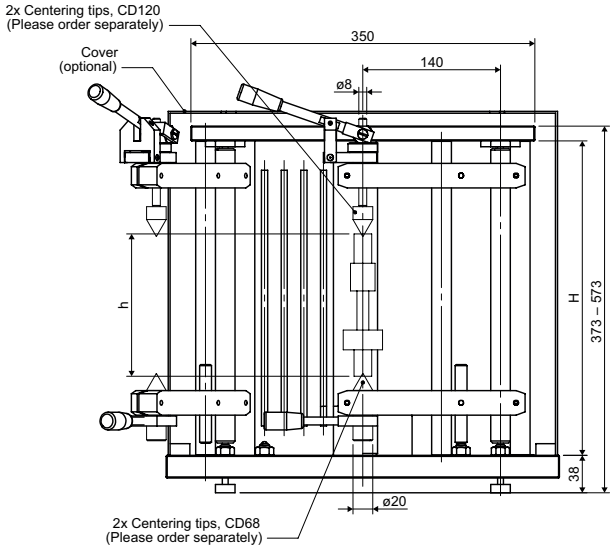


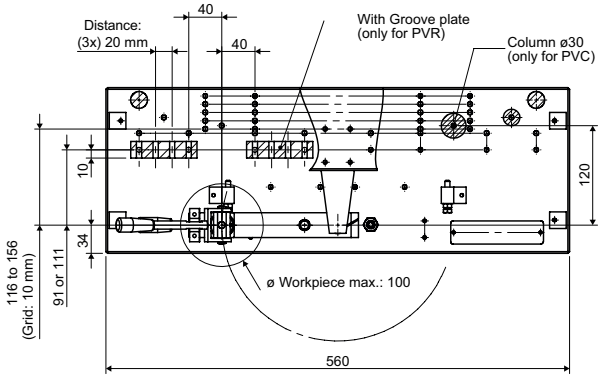
P1SP

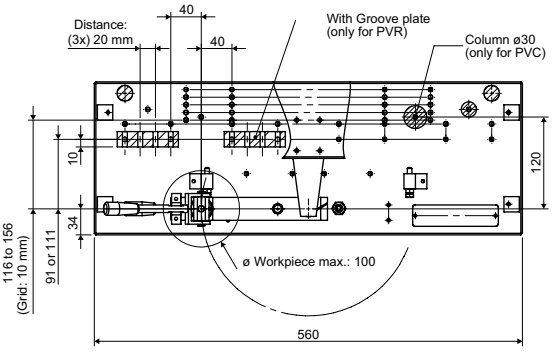


P2SP









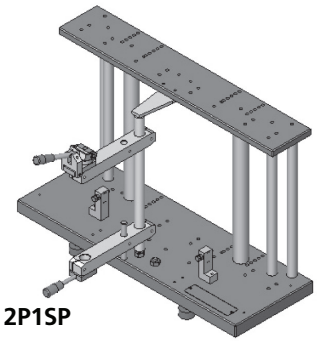
Vertical Measuring Stands PVC14 with Columnn

Catalog no.	Type	Height H mm	h mm	Order no.
PVC14	1P1SP	320	140	**5115731**
PVC14	1P1SP	520	340	**5115732**

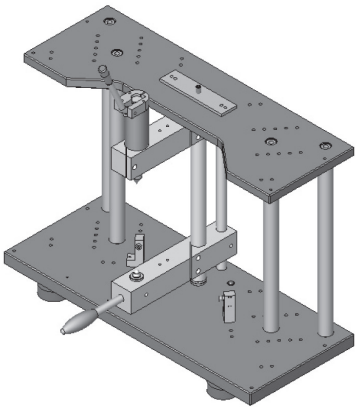
Vertical Measuring Stands PVC14 with Columnn

Catalog no.	Type	Height H mm	h mm	Order no.
PVC14	1P2SP	320	140	**5115733**
PVC14	1P2SP	520	340	**5115734**

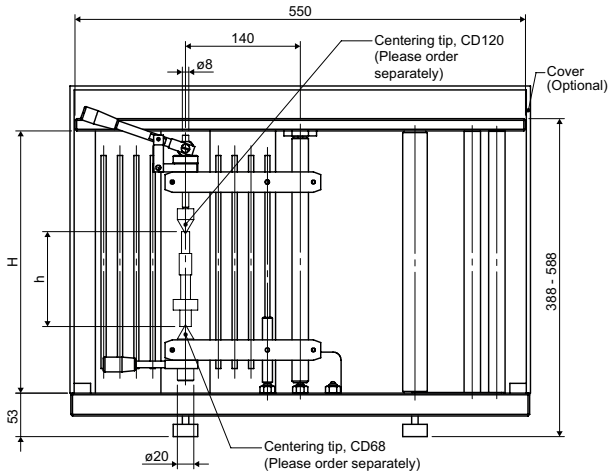
Vertical Measuring Stands

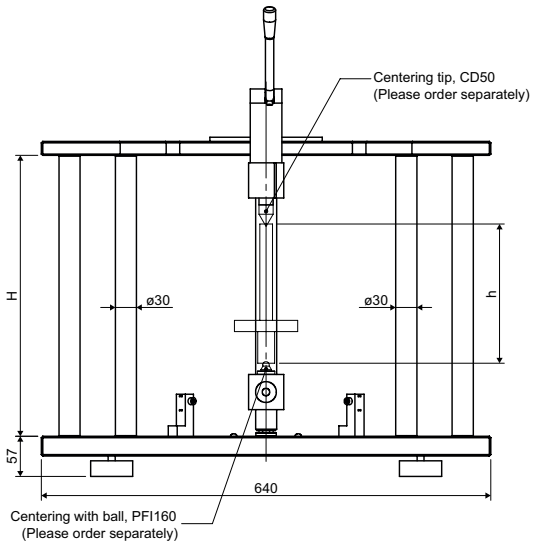


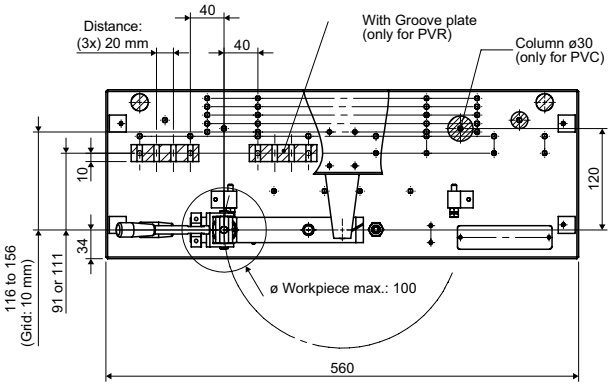
2P1SP

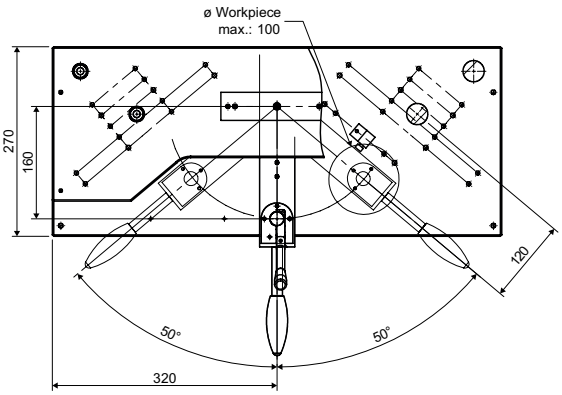


2P









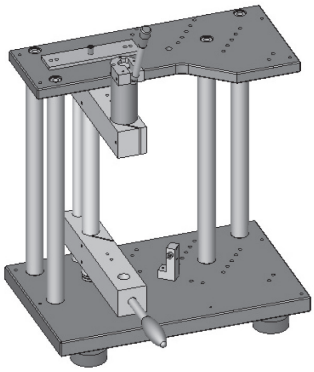
Vertical Measuring Stands PVC14 with Columnn

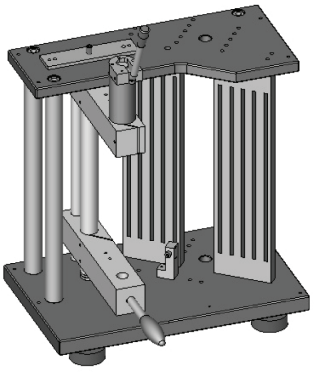
Catalog no.	Type	Height H mm	h mm	Order no.
PVC14	2P1SP	320	140	**5115735**
PVC14	2P1SP	520	340	**5115736**

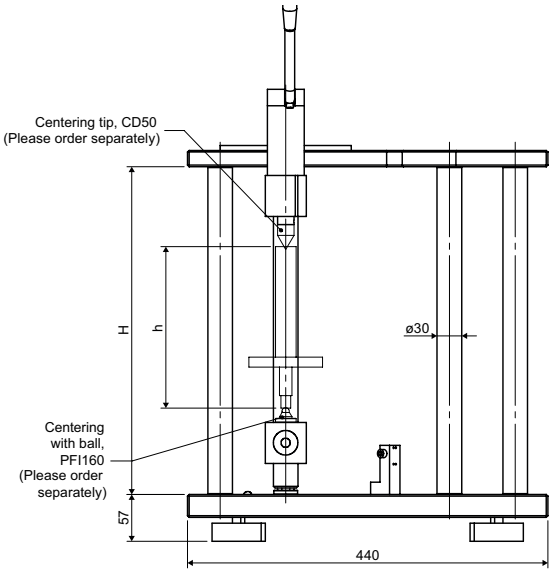
Vertical Measuring Stands PVC16 with Columnn

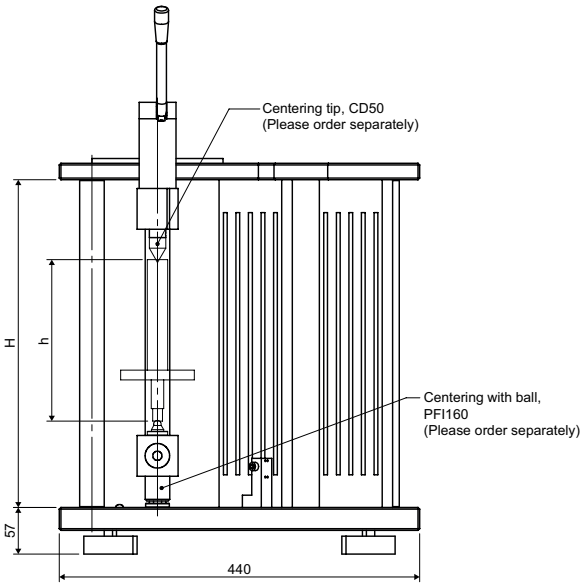
Catalog no.	Type	Height H mm	h mm	Order no.
PVC16	2P	400	250	**5115740**
PVC16	2P	600	160	**5115741**
PVC16	2P	800	160	**5115742**

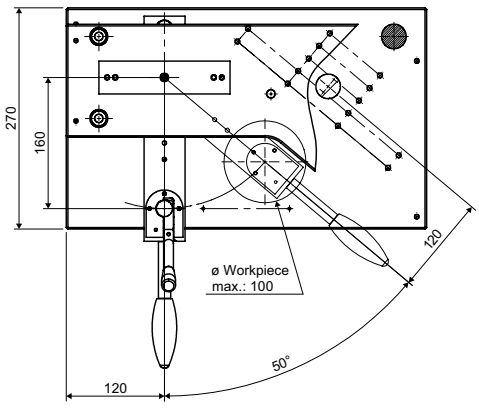
Vertical Measuring Stands

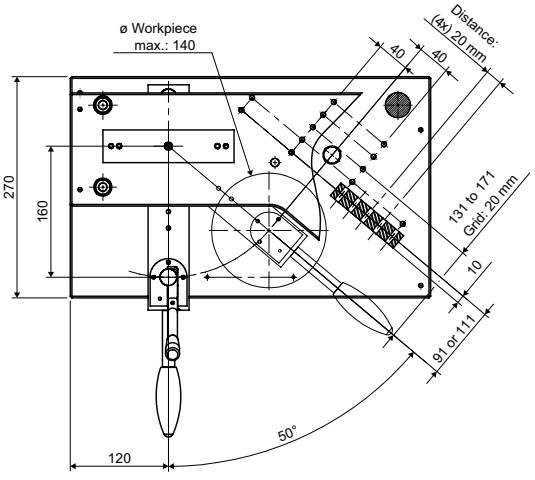












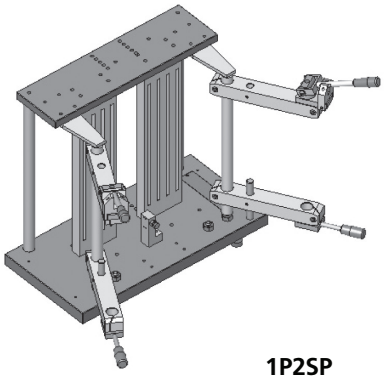
Vertical Measuring Stands PVC16 with Colunn

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**

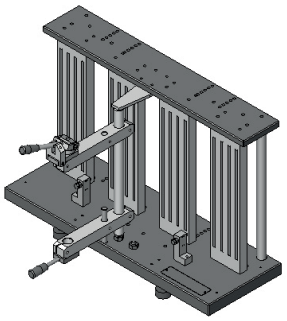
Vertical Measuring Stands PVR16 with Groove Plates

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**

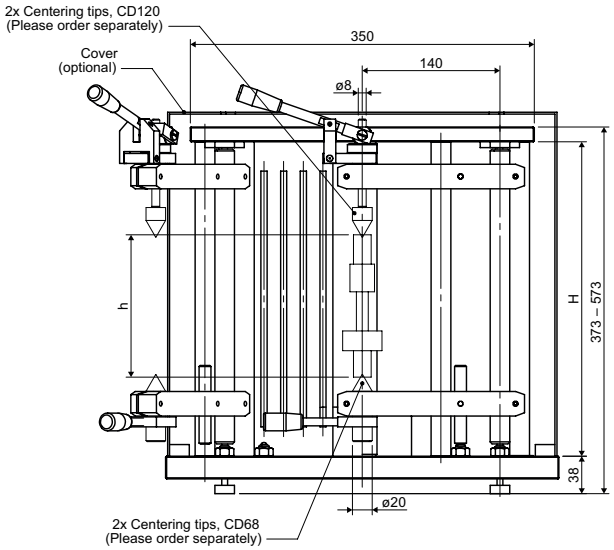
Vertical Measuring Stands

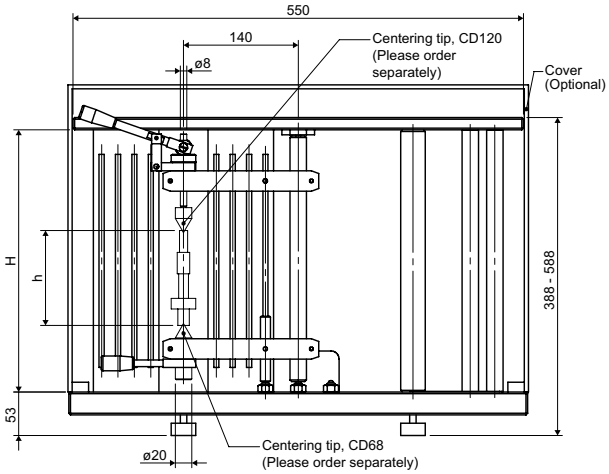


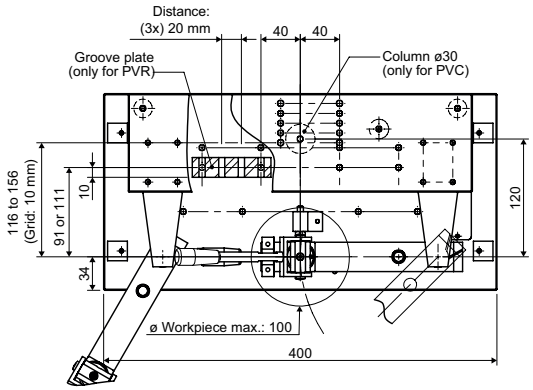
1P2SP

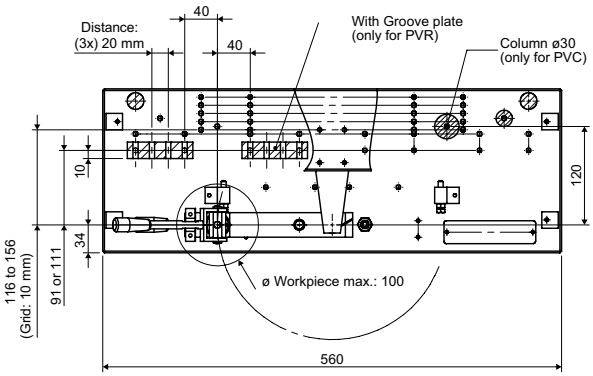


2P1SP









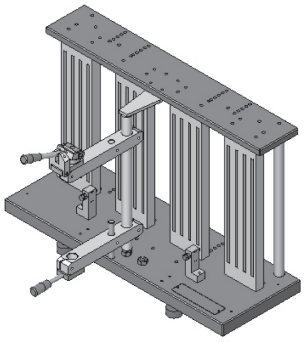
Vertical Measuring Stands PVR14 with Groove Plates

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**

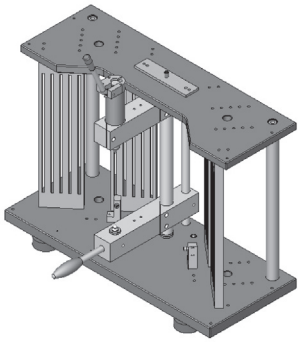
Vertical Measuring Stands PVR14 with Groove Plates

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**

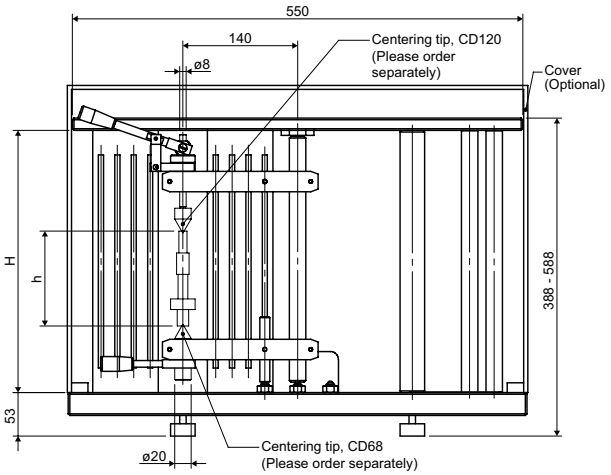
Vertical Measuring Stands

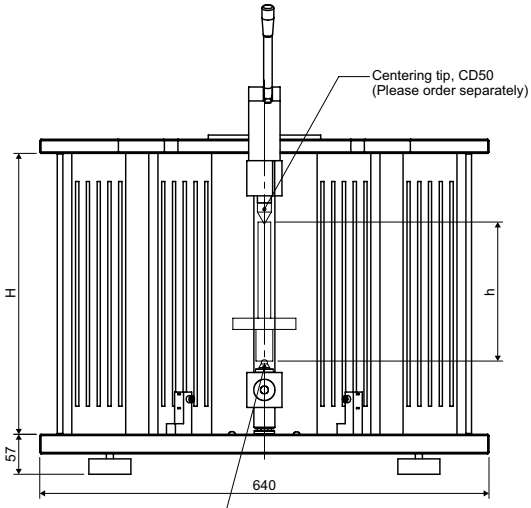


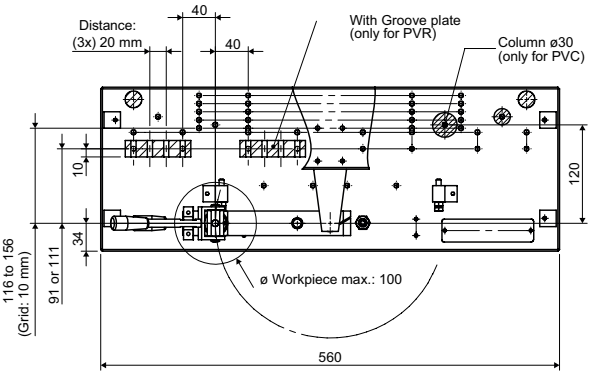
2P1SP

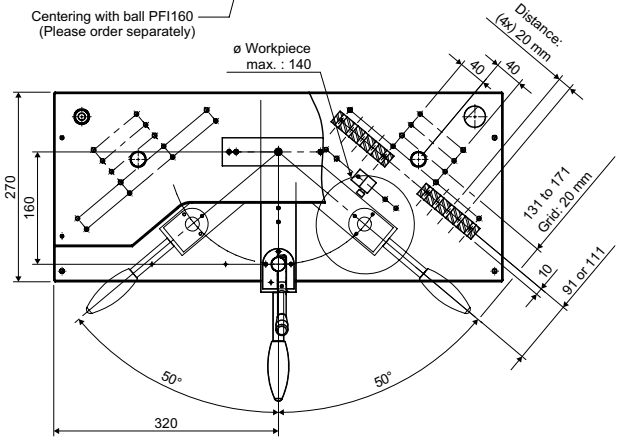


2P









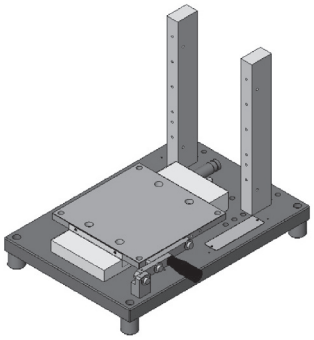
Vertical Measuring Stands PVR16 with Groove Plates

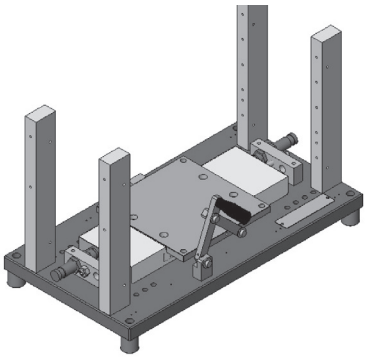
Catalog no.	Type	Height H mm	h mm	Order no.
PVR14	2P1SP	320	140	**5115747**
PVR14	2P1SP	520	140	**5115748**

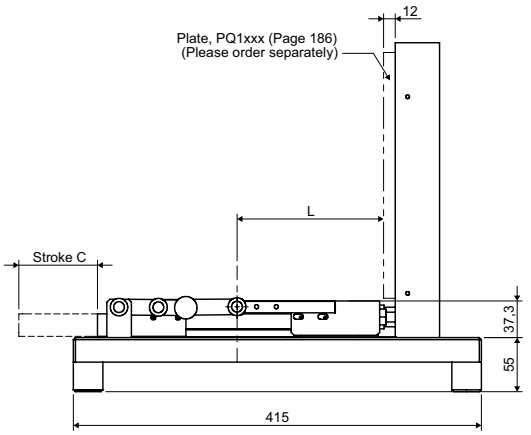
Vertical Measuring Stands PVR14 with Groove Plates

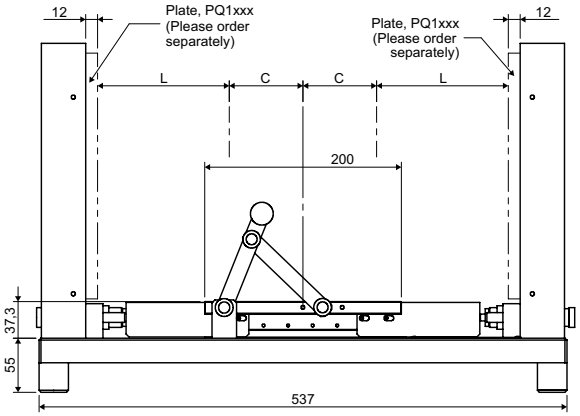
Catalog no.	Type	Height H mm	h mm	Order no.
PVR16	2P	400	250	**5115752**
PVR16	2P	600	450	**5115753**
PVR16	2P	800	650	**5115759**

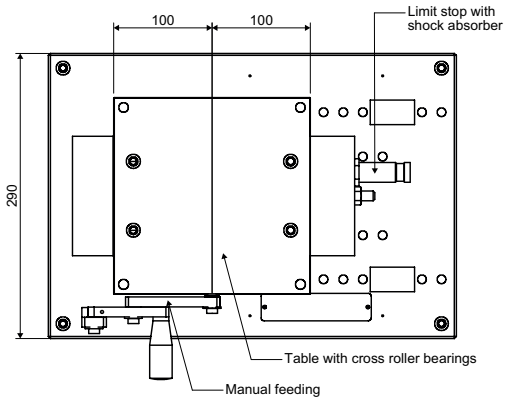
Vertical Measuring Stands

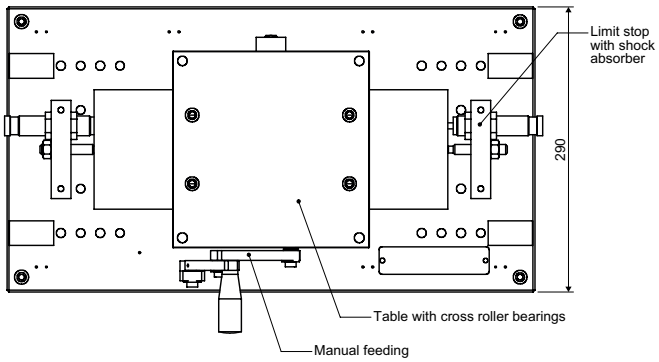












The upper guided plate is for the workpiece mount and moving into the measuring position.

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.

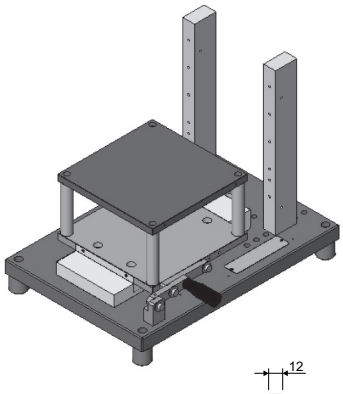
Vertical Measuring Stands MV52
One measuring postion for outside dimensions

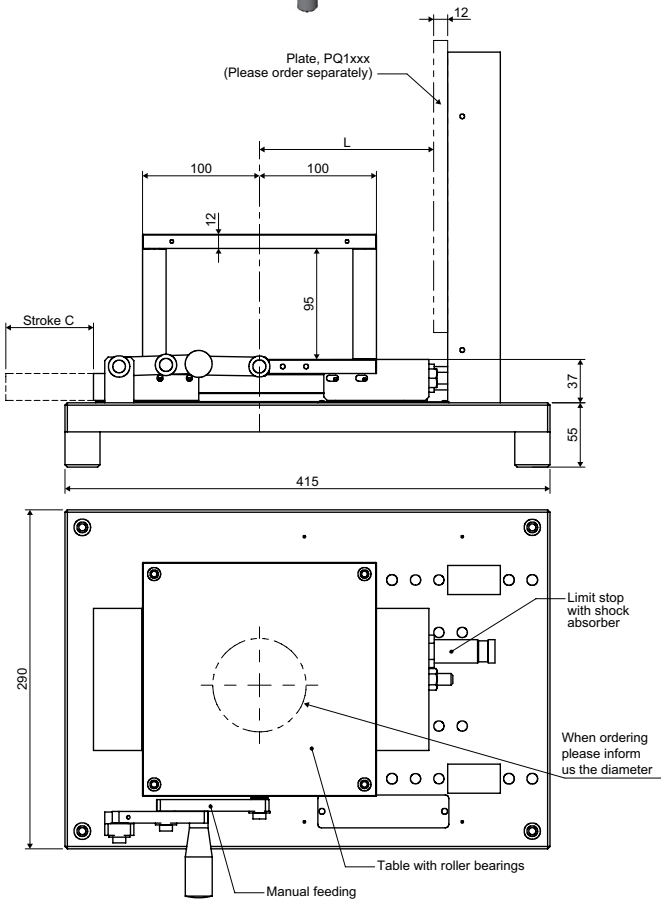
Catalog no.	Stroke C mm	L mm	Order no.
MV52	80	89-109-129-149	**5115760**
MV52	120	89-109-129	**5115761**
MV52	150	94-114	**5115762**

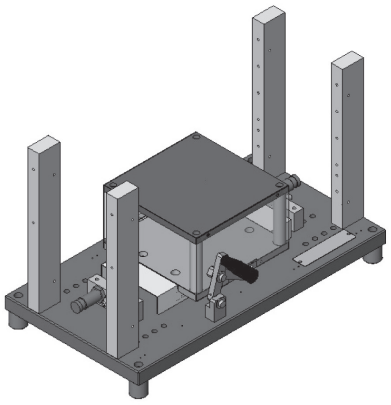
Vertical Measuring Stands MV52
Two measuring postions for outside dimensions

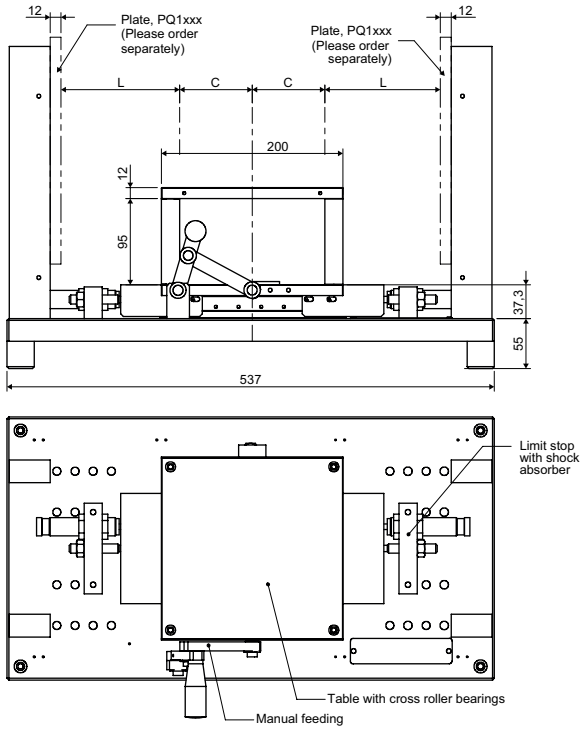
Catalog no.	Stroke C mm	L mm	Order no.
PVR16	40	89-109-129-149-169	**5115752**
PVR16	60	89-109-129-149	**5115753**
PVR16	75	95-114-134	**5115759**

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.

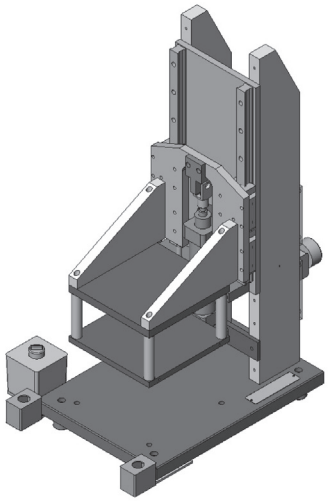
Vertical Measuring Stands MV53
Measuring mounts for inside / outside measurements

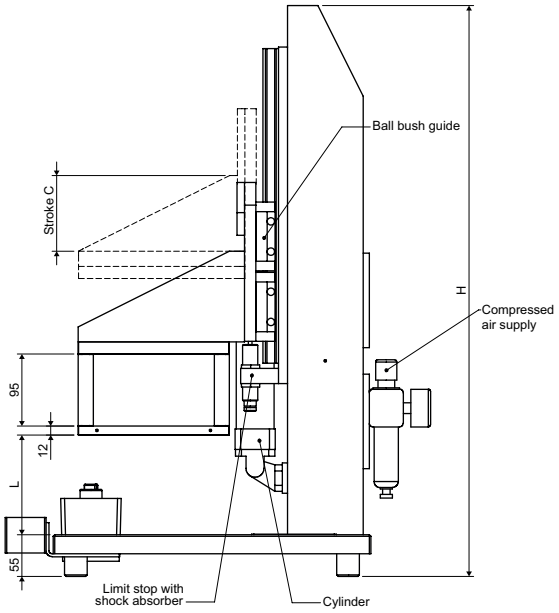
Catalog no.	Stroke C mm	Order no.
MV53	80	**5115769**
MV53	120	**5115770**
MV53	150	**5115771**

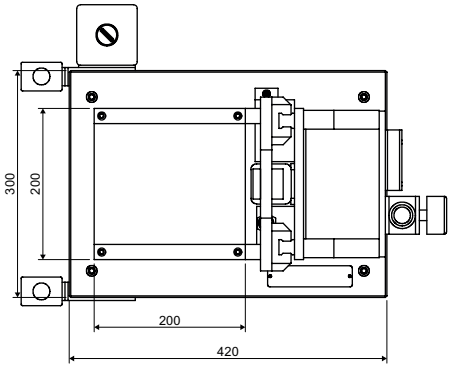
Vertical Measuring Stands MV53
Two measuring mounts for in- / outside measurements

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 seperately) 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.

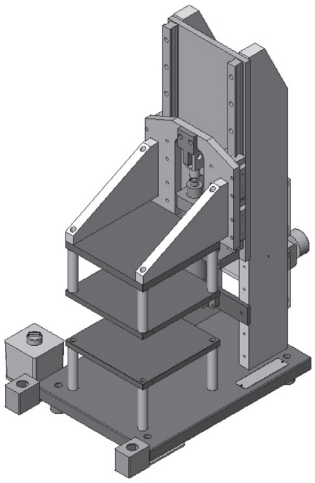
The two columns are for supporting the mounting plate PQ and measuring forks (see page 196).

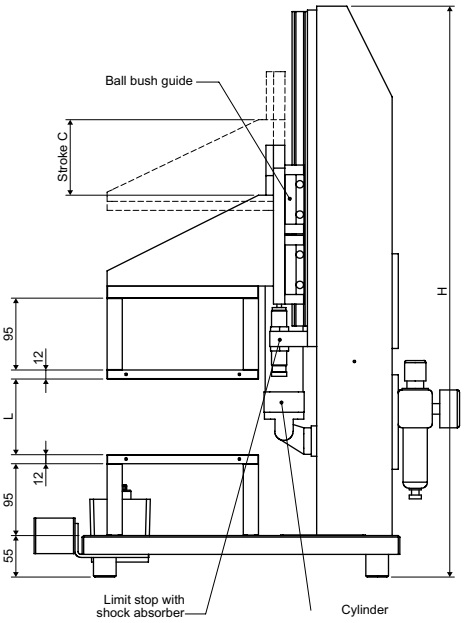
Suitable for pneumatic feeding PN5100.

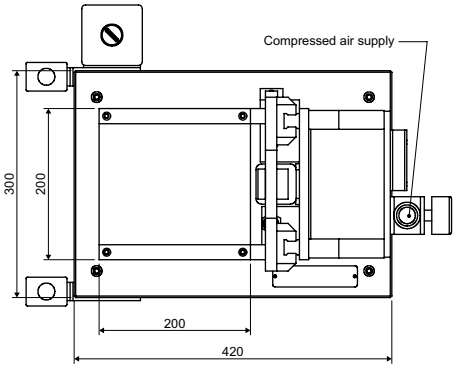
Vertical Measuring Stands MV52 for 1 × Inside

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 seperately) 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.

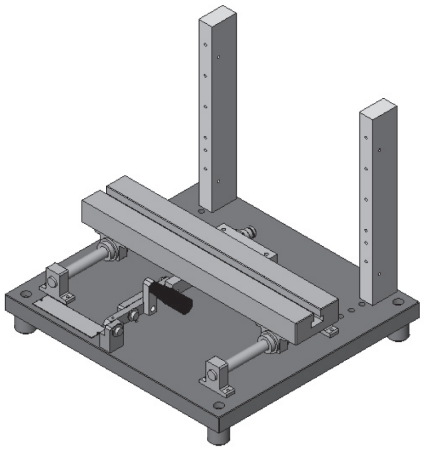
The upper plate of the moveable element can be retrofitted with measuring forks.

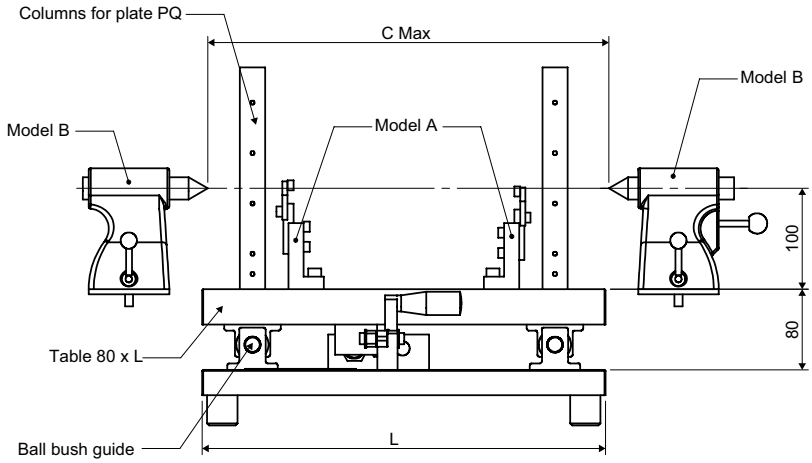
The lower plate can be equipped with workpiece supports.

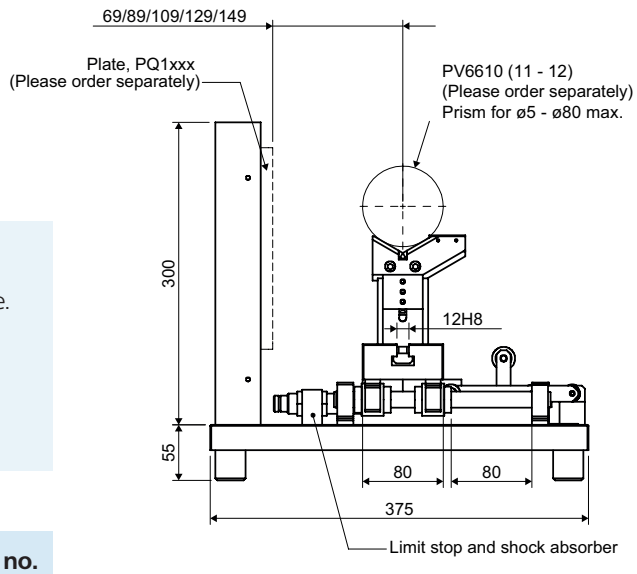
Vertical Measuring Stands MV53 for 2 × Inside

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.

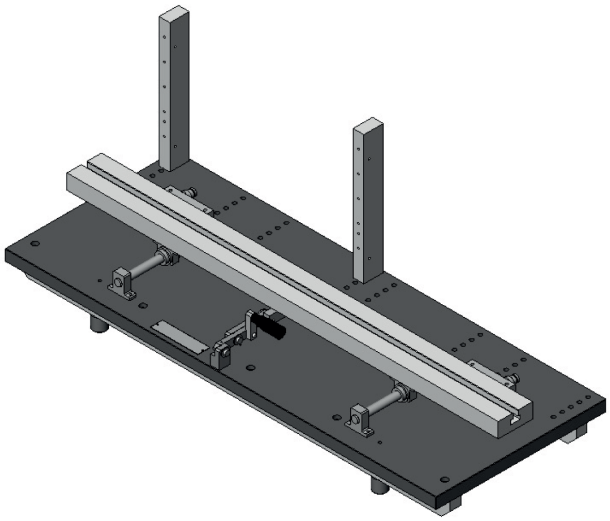
Model B includes two center supports mounting the workpiece.

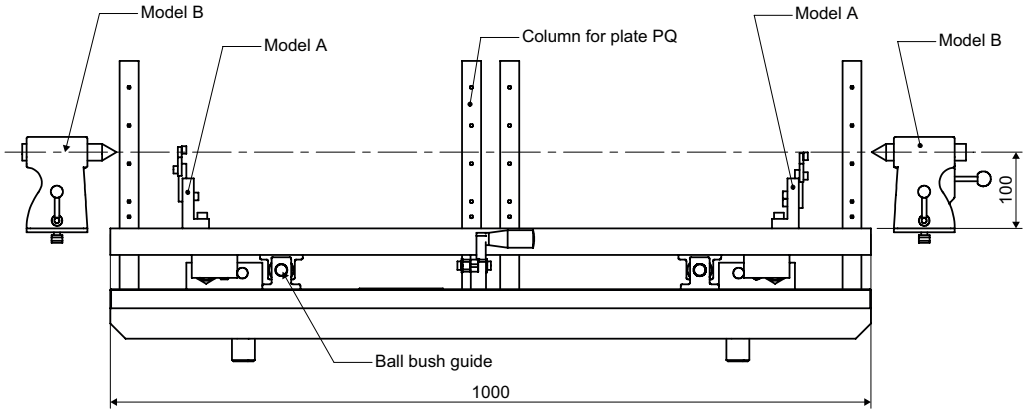
Option pneumatic:
- PN5140 for plates PQ1350
- PN5150 for plates PQ1500

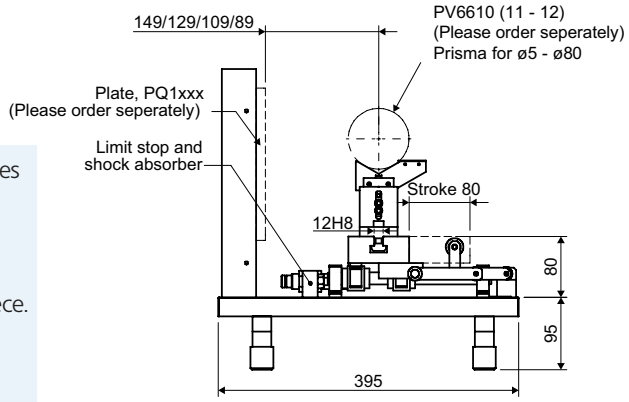
Horizontal Measuring Stands with T-Grooves

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 prismas for mounting the workpiece.

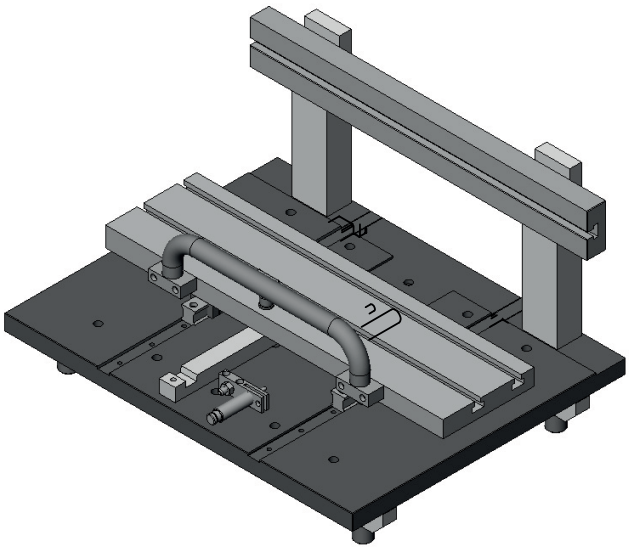
Model B contains two centre supports for mounting the workpiece.

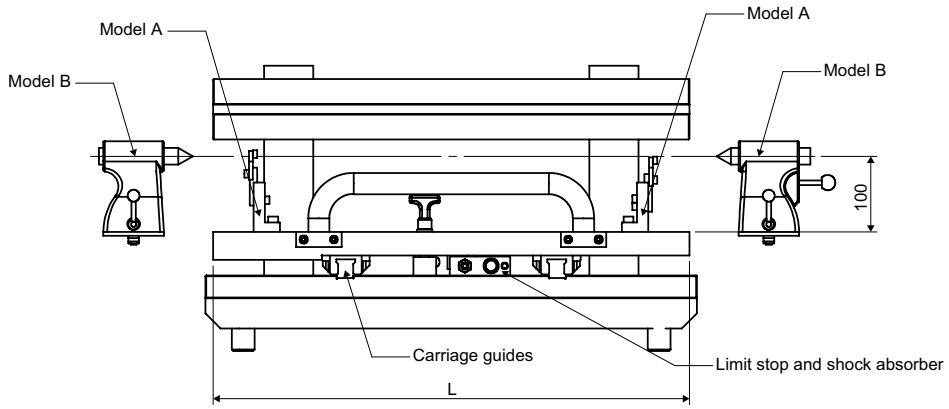
Option pneumatic:
- PN5140 for the plates PQ1350
- PN5150 for the plates PQ1500

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





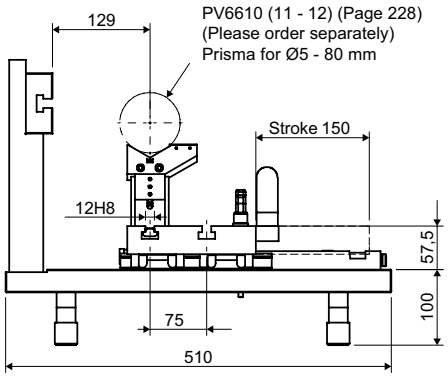
The MH6581 require one plate PQ; the MH6582 require two plates PQ.

Model A contains two prismas for mounting the workpiece.

Model B contains two centre supports for mounting the workpiece.

Option pneumatic:
- Feed PN5160.

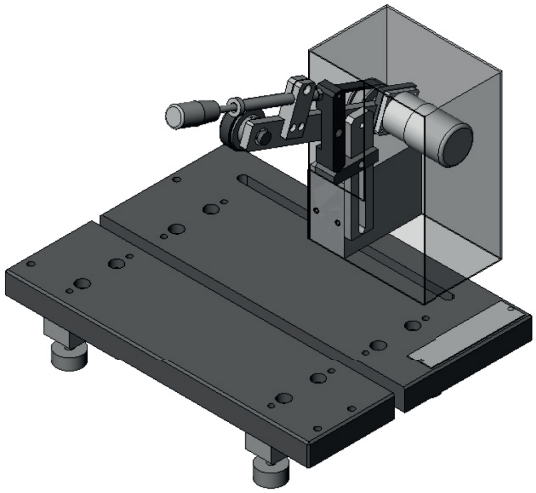
Option: (Upon request)
- Quick exchange of plates PQ1xxx with one complete group of measuring elements.

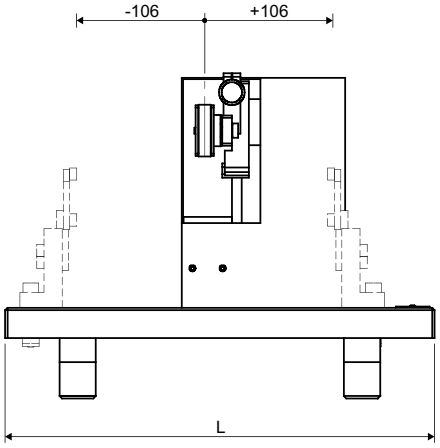


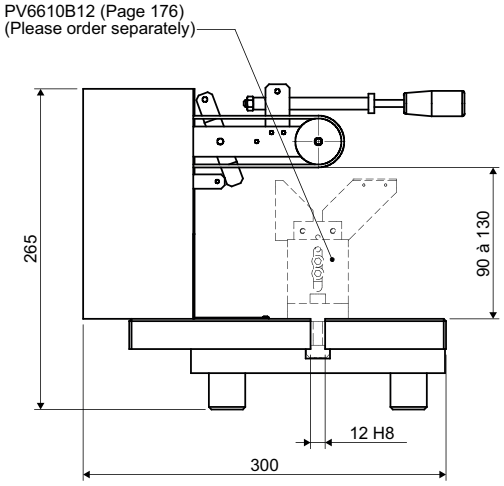
Horizontal Measuring Stands with double T-Groove

Catalog no.	L mm	Order no.
MH65	630	**5115805**

Horizontal Measuring Stands







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)

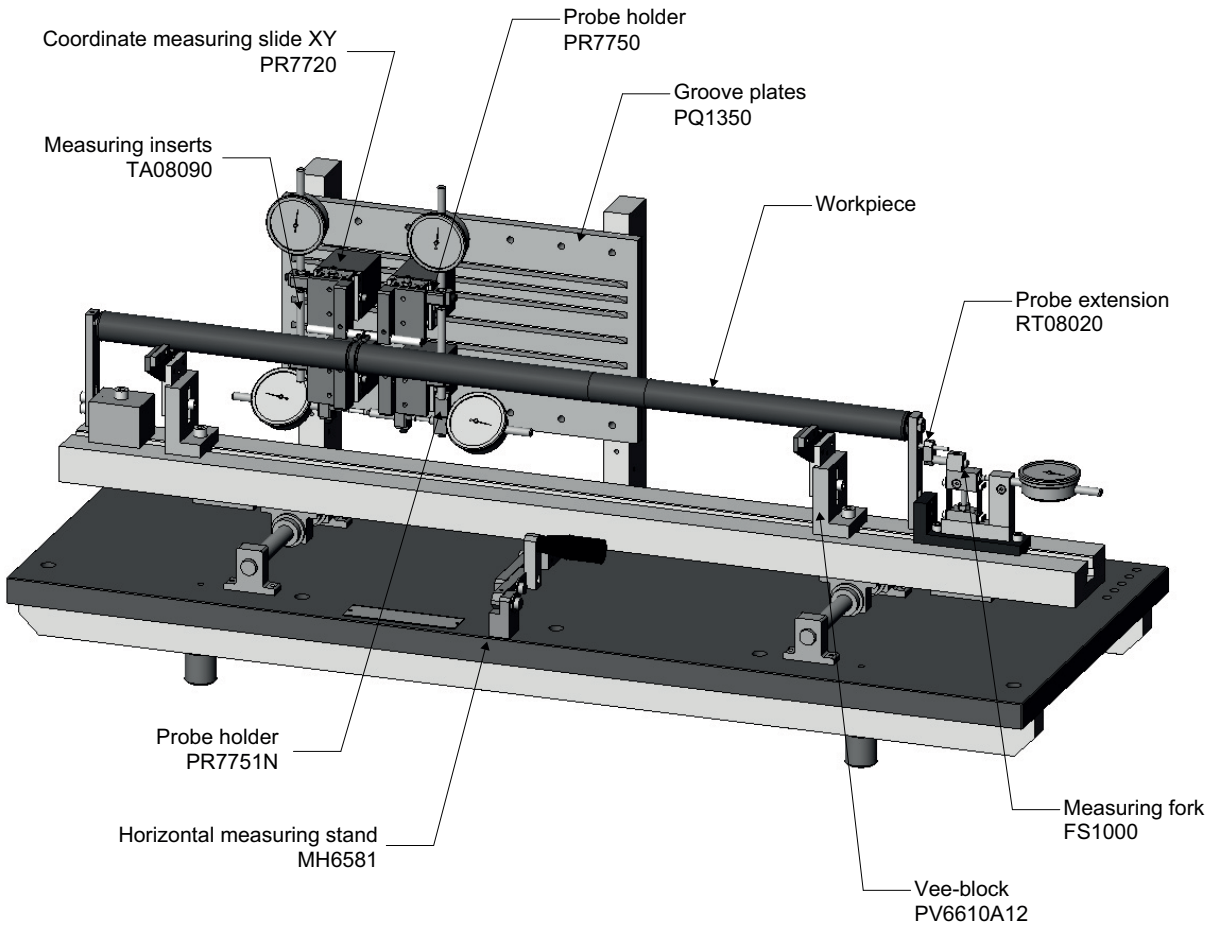
Option:
- Pneumatic supply unit FP1580

Motorized Horizontal Measuring Device

Catalog no.	L mm	C Max mm	Order no.
RPM	355	180	**5115810**
RPM	500	280	**5115811**

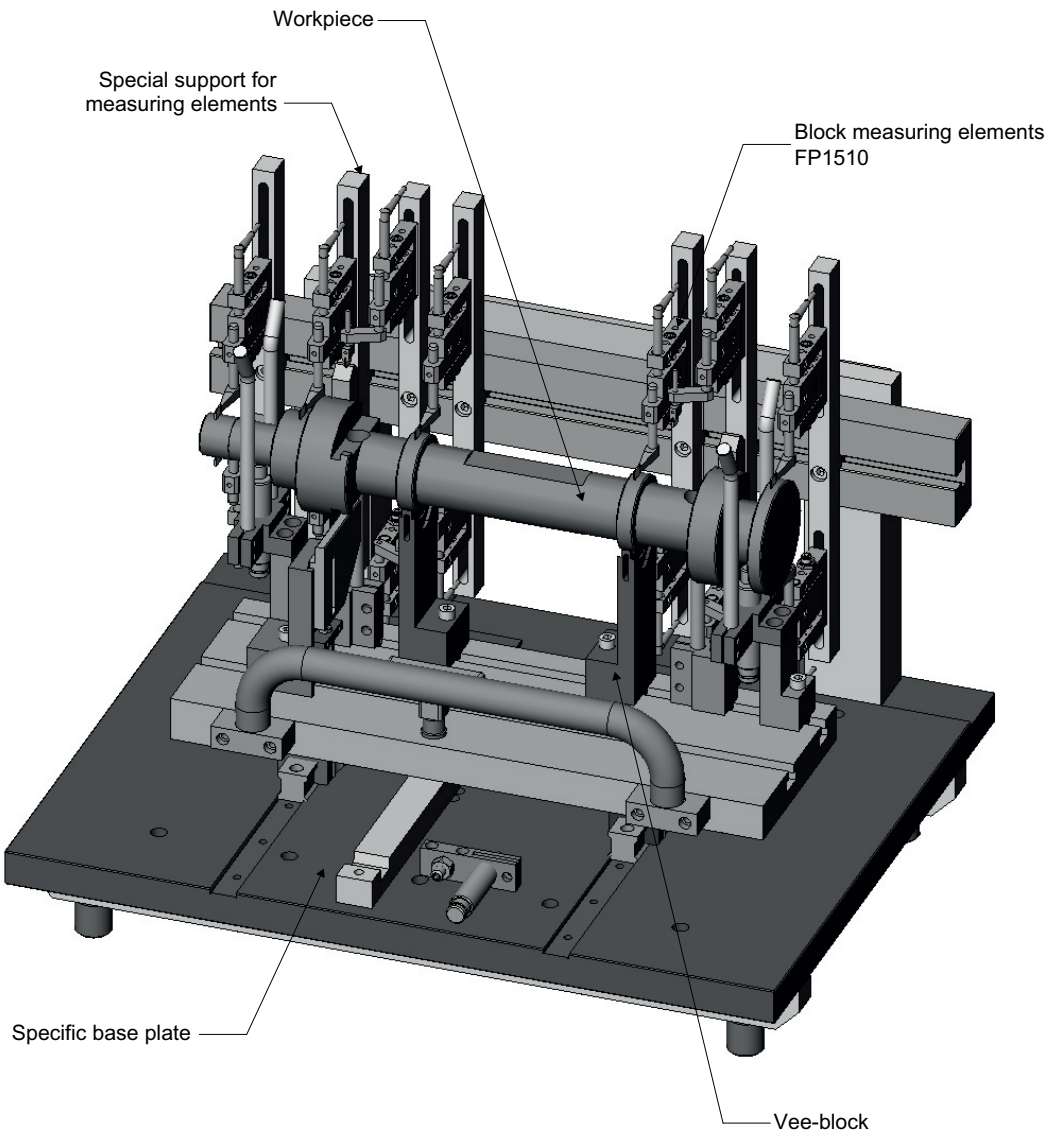
Horizontal Measuring Stands

Application Example MH 65



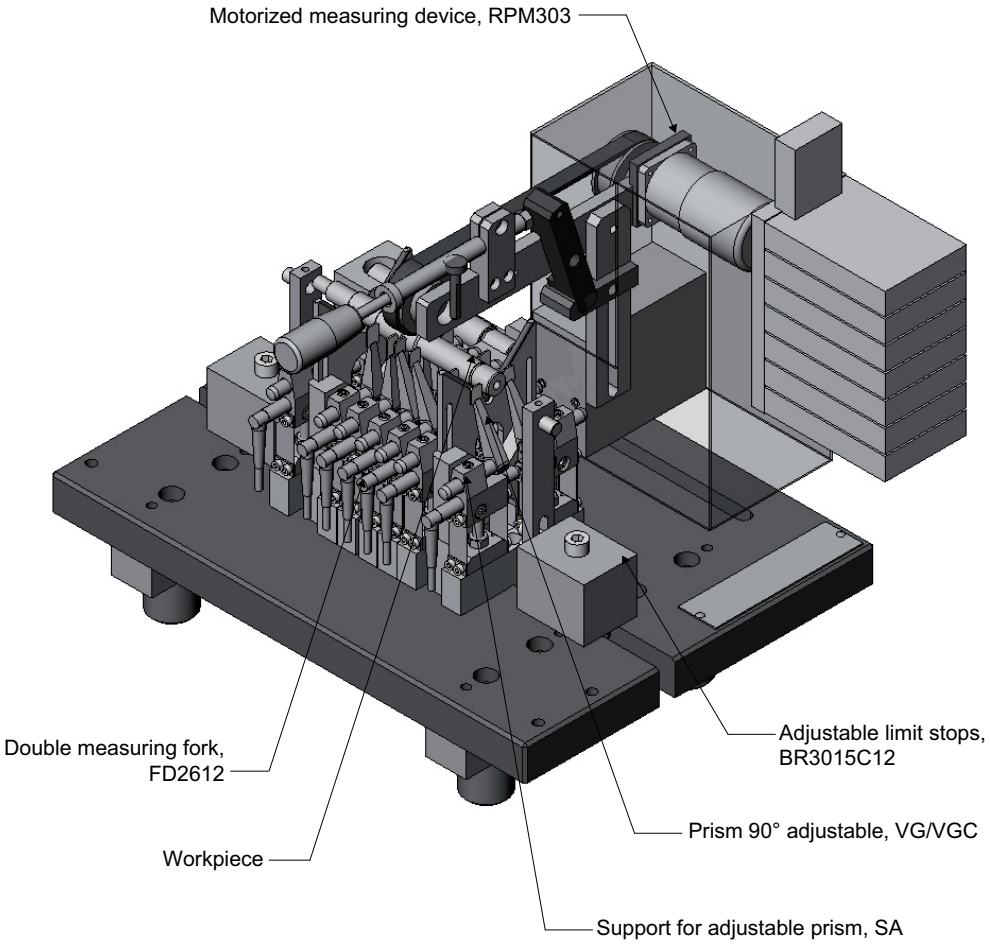
Horizontal Measuring Stands

Application Example MH 65



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



► | 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

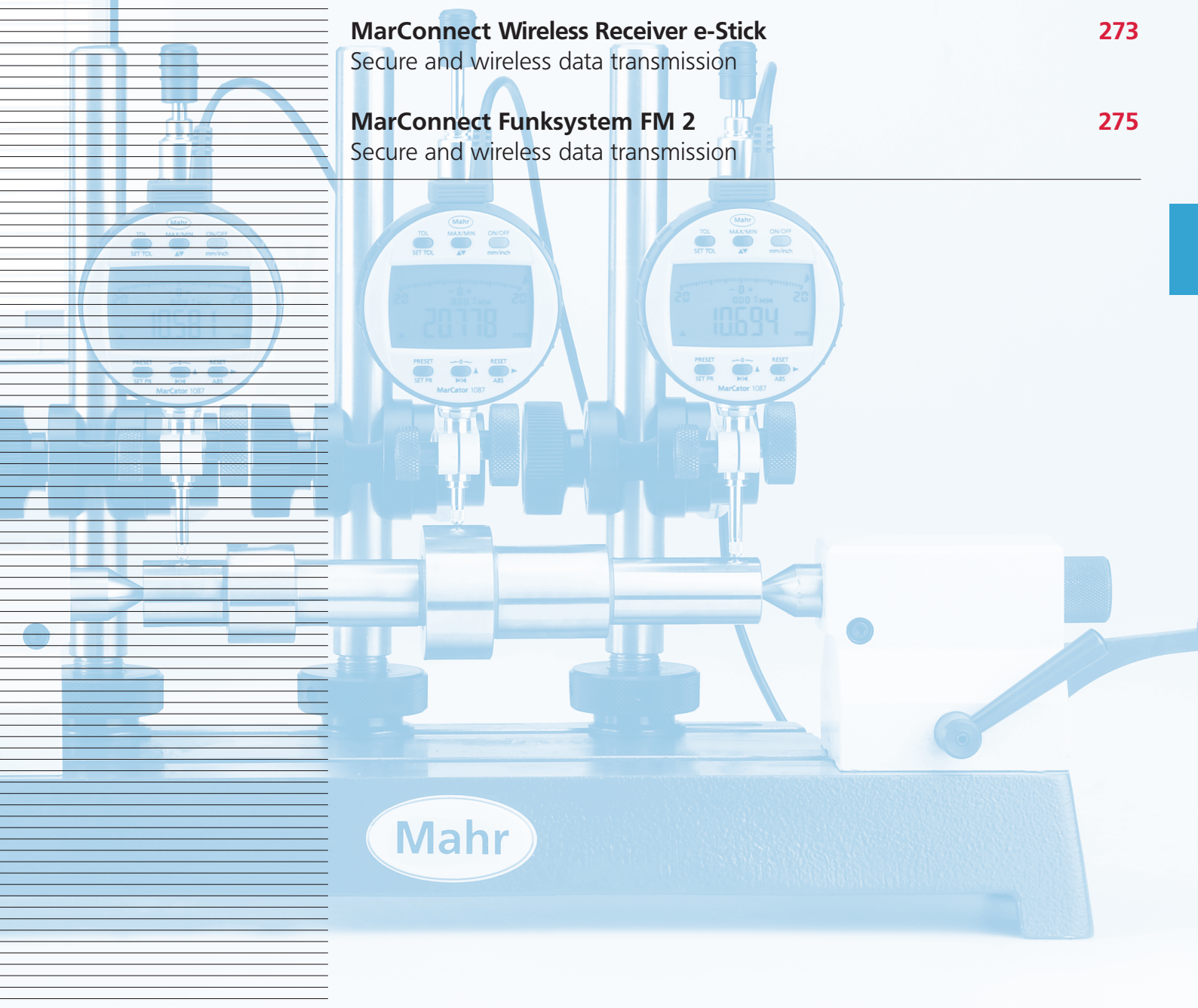
MarCom Professional 5.0 268
Clear and flexible data acquisition

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



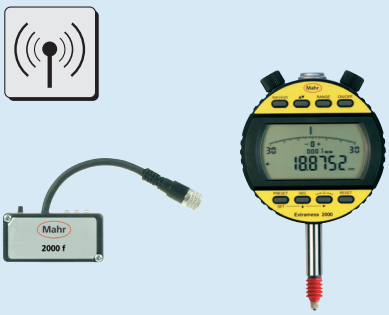
MarConnect MarCom Professional 5.0

►| 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

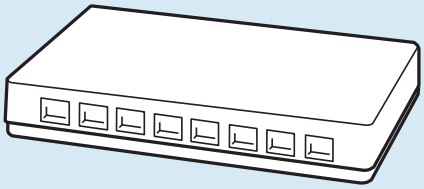
Interface on device: 4 x 8

Interface on device: Data cable USB 124, iStick 4 x 8

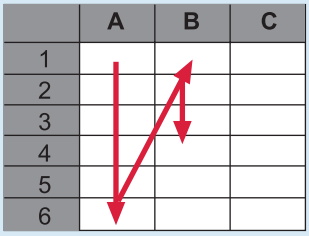
Interface on device: Data cable USB 124, iStick 4 x 8

Interface on device: Data cable USB 124, iStick 4 x 8

- Interface
al 5.0



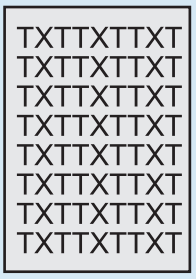
Virtual Interface Box



Intelligent Excel Interface



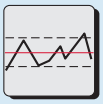
Keyboard Emulation



Text - File

Data Acquisition

SPC Software



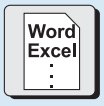
Simply choose a virtual Interface Box in your SPC Software and you can capture the measured values from all your connected Mahr Measuring Instruments.

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



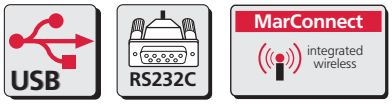
Do you use an application which does not support the integration of a measuring instrument? No Problem, with the MarCom keyboard emulation the measured values will be sent directly to the active cell of the program in use.

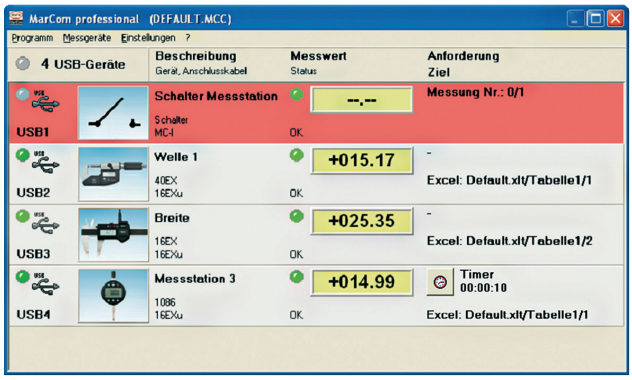
Flexible data transmission



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 EWV, 30 EWR, 30 EWN Digimar 814 SR Micromar 40 EWR, 40 EWS, 40 EWV, 44 EWR, 46 EWR	**4102231**
Transmitter for FM 2	**16 EXf**	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 Micromar 40 ER, 40 EWR, 40 EWV, 40 EWS, 44 EWR, 46 EWR	**4102357**
Data Connection Cable RS232C (2 m)	**16 EXr**	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**	Millimess 2000, 2001, 2100, *µMaxum II*	**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 Digimar 814 SR Micromar 40 EWR, 40 EWS, 40 EWV, 44 EWR, 46 EWR MarCator 1075 R, 1086 R, 1087 R, 1087 BR	**16 EWe**	**4102231**
Transmitter for e-Stick	Digimar 816 CL MarCator 1088 / 1088W Millimess 2000, 2001, 2100, *µMaxum II*	**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

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 Millimess 2000, 2001, 2100, *µMaxum II*	**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**

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

A FEELING FOR PRECISION
MARMOTION

The latest information on MARMOTION products can be found on our website:
www.mahr.com, WebCode 339

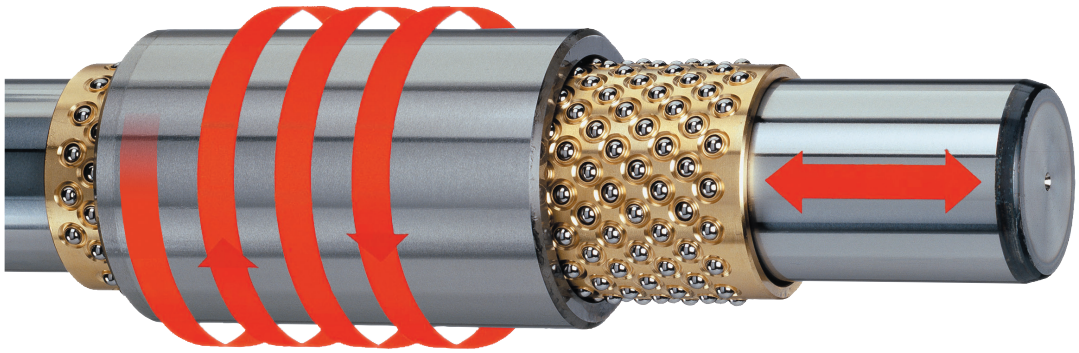
► | MarMotion High-Precision Rotary Stroke Bearings is a product line manufactured at Mahr. A combination of the tightest manufacturing tolerances, highest surface quality and individually matched sets of guide bushing, ball cage and guide shaft provide rotary stroke bearings with a quality superior to the rotary stroke bearings usually used in tool making die plates. | ◄

► | **MarMotion.** High Precision Rotary Stroke Bearing

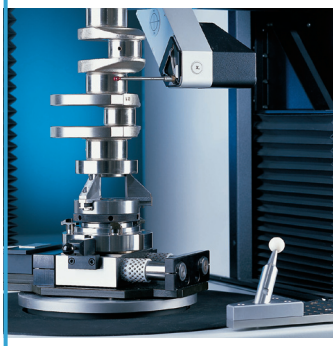
MarMotion – The guide for your application 278

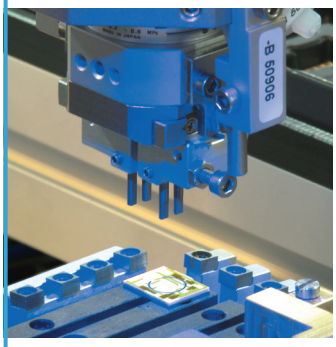
MarMotion. High-precision Rotary Stroke Bearings

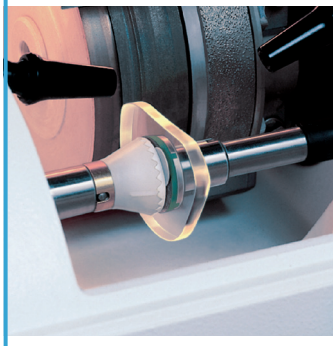
A FEELING FOR PRECISION



MarMotion – The guide for your application







- Maximum guiding accuracy
  Radial deviation 0.5 µm
- Backlash-free guiding
  bearing components are matched in the factory with optimum preloading
- Linear and rotary motion,
  combined motion
- Smooth running
  Coefficient of friction µ = 0.001 possible
- High loading capacity
- Guiding stiffness
  up to 0.005 µm/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)



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