



M1STAR

MBG AND EBG HAND HELD GAUGES FOR INNER DIAMETERS



Bore Gauges

M1Star is the premium line of manual variable gauges for high precision measuring of bores (\varnothing 3,0 mm to 375 mm) in any industrial environment, at a competitive price. They are the ideal solution for post-process and final control of diameters, ovality, taper and cilindricity.

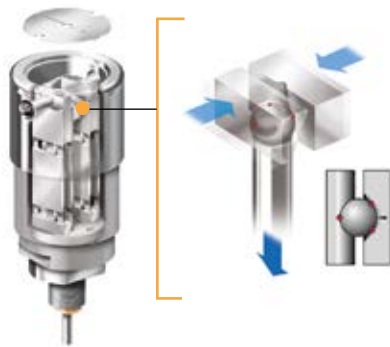
The Marposs **M1Star** variable gauge is composed by an interchangeable gauge head, the measuring element of the instrument, and by a handle, which controls the signal conversion and transmission. The gauge head can be mechanical (Mechanical Bore Gauge **MBG**) or with integrated transducer (Electronic Bore Gauge **EBG**).

Product features

The M1Star MBG is an extremely versatile solution that may also gauge deep or interrupted bores. The mechanical transmission measuring system provides both excellent metrological performance (repeatability <1 micron) and the lowest price range. The measurement is transduced to the display unit by a transfer rod with a spherical head that slides on a cradle formed of a V shaped guide and an inclined plane.

The M1Star EBG is the most advanced solution on the market for variables manual gauging. The gauging system includes an electronic differential LVDT or HBT transducer that transforms the measurement into an electronic signal. The system is completely friction free and guarantees a repeatability of less than 0,5 microns over the entire field of application. Both MBG and EBG bore gauges can be totally retooled or repaired by simply replacing nosepiece and contacts. The extensive linearity range of the transducers requires only one zero-setting ring.

Most advanced engineering and production processes guarantee fast delivery times.



M1STAR MBG

Measurable diameters: 3 to 300 mm (0.12"-11.81"). Special versions available for bigger diameters.

Maintenance free construction requires only periodic cleaning of the precision mechanism.

Extensive range of accessories to measure at more than 500 mm depth and to measure bores that are perpendicular to the axis of introduction.

Durable measuring transmission system, capable of more than 10.000.000 measuring cycles.

Mechanical transmission measuring system compatible with any pencil probe, dial or digital indicator.

Compatible with the bore gauge accessories of third parties.



M1STAR EBG

Measurable diameters: 3 to 375 mm (0.12"-14.76"), with a measurement section depth up to 500 mm.

Completely friction-free measurement reading system ensures repeatability within 0.5 microns, constant over the entire application range.

Available with Marposs standard LVDT or HBT transducer.

The compatibility to third party electronic units is obtained by means of special cables.

The connection between plug head and cable is made with a connector, allowing quick replacement of the plug head itself.

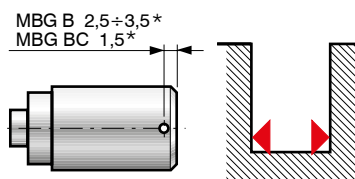
Designed to be used in the harshest production environments.

Guaranteed IP67 protection (waterproof, dirt and dust sealed) with excellent resistance to impacts and accidental falls, plus replaceable tear resistant cable make the EBG sturdy and reliable, thus reducing maintenance costs and downtimes to a minimum.

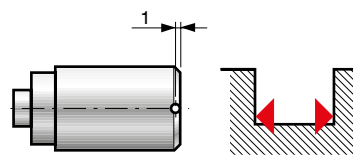
The M1Star EBG is also available for customized OEM supplies.

STANDARD VERSIONS

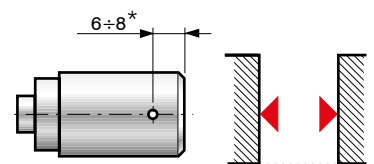
The M1Star plug head is available with 4 choices for the dimension "C" (distance between the contact axis and the top of the nosepiece), for blind, superblind or through bores:



MBG-B/BC Plug Heads
For blind bores.



MBG-SB Plug Heads
For superblind bores.



MBG-T Plug Heads
For through bores.

* the final dimension depends on the diameter and on the gauge type (please refer to page 4 and 5 for details)

Displacement
Sensors



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Bench
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Indicators and
Electronic
Display Units



Interface
Boxes for Data
Acquisition

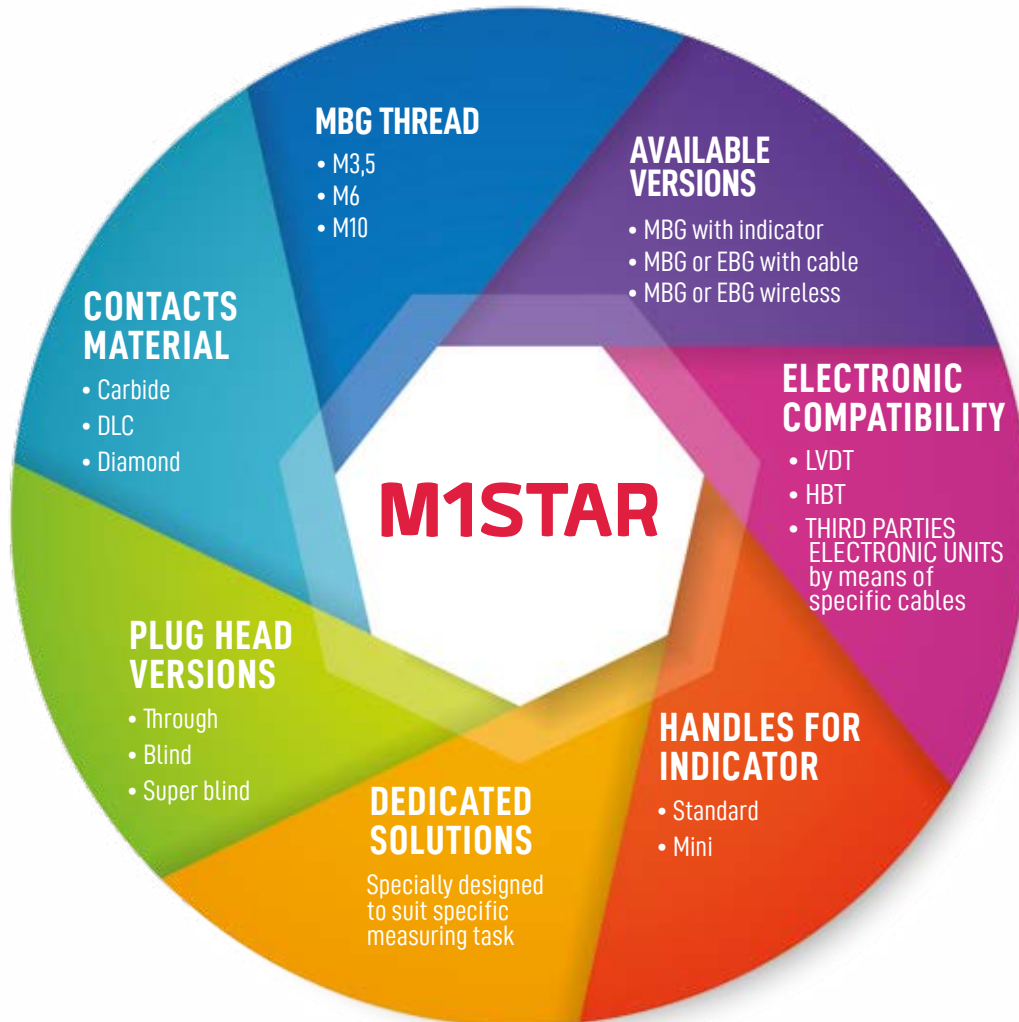


Software



Product mix

The below scheme shows the M1Star line product mix overview.



COMPATIBILITY WITH ELECTRONIC UNITS

M1Star with cable can be connected, through a Marposs data acquisition interface box such as Easy Box or Gage Pod, to any Marposs industrial PC or any commercial PC with Marposs software installed, as well as to E4N or Duo directly. The wireless M1Star can be connected, through its dongle, to Nemo, Merlin Line, E9066 Line or any commercial PC with Marposs software installed.



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Software



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Indicators and Electronic Display Units



Interface Boxes for Data Acquisition



Software



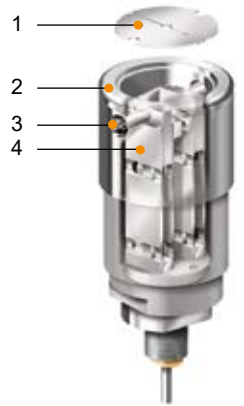
M1 STAR - MBC Mechanical Bore Gauge

GAUGE HEAD: it is the measuring element of the bore gauge. It can be replaced by simply unscrewing it from the handle, and is composed of:

- 1 CAP:** stainless steel disk protecting the internal mechanical elements from accidental damages.
- 2 NOSEPIECE:** made of tempered stainless steel, it is the guiding element that ensures the measurement results are not affected by the operator's manual skill.
- 3 MEASURING CONTACTS:** standard contacts are made of tungsten carbide and, in relation to the diameter range, come in two different radii chosen according to the bore surface roughness:
R1: standard radius for $Ra \leq 2 \mu m / Rz \leq 6,3$.
R2: bigger radius for $Ra > 2 \mu m / Rz > 6,3$.

Diamond or DLC-coated contacts are also available. Diamond contacts are suggested for soft aluminum or highly wearing applications; DLC-coated ones (3000 HV) for aluminum and relevant alloys.

- 4 MEASURING ARMSET:** it is made by either 2 or 4 fulcrum elements, depending on the diameter range. The measurement is transferred to the display device by a transfer rod with spherical head that slides on a cradle formed by a V-shaped guide and an inclined plane.



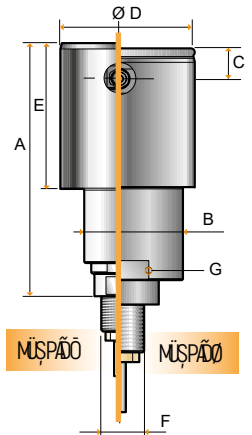
TECHNICAL SPECIFICATIONS

Description	WORKING RANGE							
Standard measuring range for type B and T [mm]	$3 \leq \varnothing < 4,5$	$4,5 \leq \varnothing < 5,5$	$5,5 \leq \varnothing < 26$			$26 \leq \varnothing \leq 300$		
Extended Measuring Range for type B and T [mm] (*)	$0,055$	$0,070$	$0,120$	$0,120 - 0,170$	$0,120 - 0,200$	$0,150 - 0,200$	$0,150 - 0,400$	$0,150 - 0,350$
Standard measuring range for type SB and BC [mm]	$3 \leq \varnothing < 4,5$	$4,5 \leq \varnothing < 5,5$	$5,5 \leq \varnothing < 26$			$26 \leq \varnothing < 60$	$60 \leq \varnothing < 150$	$150 \leq \varnothing \leq 300$
Repeatability (2,77 σ) [μm]	$0,055$	$0,070$	$0,120$	$0,150$	$0,120$	$0,150$	$0,120$	$0,080$

(*) By unscrewing the contacts fastened to the measuring armset by means of a screw with Heli-Coil, the measuring ranges can be extended up to the values indicated in the table.

MECHANICAL SPECIFICATIONS

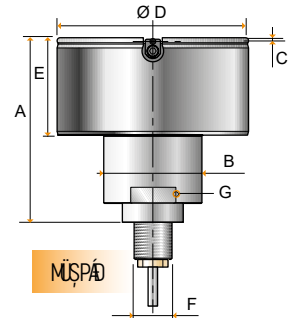
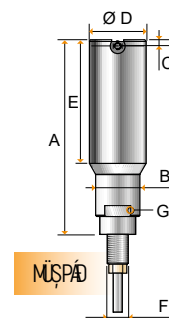
D=minimum bore diameter	$3 \leq D < 4$	$4 \leq D < 4,5$	$4,5 \leq D < 5,5$	$5,5 \leq D < 7,5$	$7,5 \leq D < 9,5$	$9,5 \leq D < 15$	$15 \leq D < 16$	$16 \leq D < 20$	$20 \leq D < 26$	$26 \leq D < 32$	$32 \leq D \leq 300$	$4,5 \leq D < 5,5$	$5,5 \leq D < 7,5$	$7,5 \leq D < 9,5$	$9,5 \leq D < 15$	$15 \leq D < 16$	$16 \leq D < 26$	$26 \leq D < 32$	$32 \leq D < 40$	$40 \leq D < 150$	$150 \leq D \leq 300$
gauge head type	B											T									
ref. drawing type	1	1	2a	2a	2a	2a	2a	2a	2b	2a	2a	2a	2a	2a	2a	2a	2b	2b	2b	2b	2b
A \varnothing [mm]	22,3	22,3	22,3	25,8	34,5	40,5	40,5	41	48,7	25,8	28,8	37,5	43,5	43,5	51,2	53,2	51,2	53,2	53,2	53,2	53,2
B [mm]	4,3	3,9	4,5	5,3	7,4	9,4*	11,8	11,8	25,9	4,5	5,3	7,4	9,4*	11,8	25,9	25,9	25,9	25,9	25,9	25,9	25,9
C [mm]	2,5	2,5	2,5	3	3	3	3	3,5	3,5	6	6	6	6	6	6	6	6	6	6	8	8
E min [mm]	15,8	14,4	14,8	17,4	22,6	22,6	22,6	22,5	27,3**	18,3	20,4	25,6	25,6	25	29,8	31,8	32,3	32,3	32,3	32,3	32,3
F [mm]	M3,5x0,35					M6x0,75					M10x1	M3,5x0,35					M6x0,75				
G [mm]	3 A/F					4 A/F					23 A/F	3,5 A/F					4 A/F				
Contact Radius [mm]	Carbide or DLC-coated					R1					R2	R1					R2				
	R1					0,25					0,75	0,25					0,75				
	R2					0,75					1	1					2,5				
	Diamond					R1					R2	R1					R2				
	R1					-					0,75	0,75					0,75				
	R2					-					10	10					10				



D=minimum bore diameter	$3 \leq D < 4$	$4 \leq D < 4,5$	$4,5 \leq D < 5,5$	$5,5 \leq D < 7,5$	$7,5 \leq D < 9,5$	$9,5 \leq D < 15$	$15 \leq D < 16$	$16 \leq D < 20$	$20 \leq D < 26$	$26 \leq D < 32$	$32 \leq D \leq 300$	$4,5 \leq D < 5,5$	$5,5 \leq D < 7,5$	$7,5 \leq D < 9,5$	$9,5 \leq D < 15$	$15 \leq D < 16$	$16 \leq D < 26$	$26 \leq D < 32$	$32 \leq D < 40$	$40 \leq D < 150$	$150 \leq D \leq 300$
gauge head type	BC											SB									
ref. drawing type	1	1	2a	2a	2a	2a	2a	2a	2b	2a	2a	2a	2a	2a	2a	2a	2b	2b	2b	2b	2b
A \varnothing [mm]	21,3	21,3	21,3	24,3	33	20,8	20,8	20,8	23,8	32,5	38,5	38,5	48,7	48,7	48,7	48,7	48,7	48,7	48,7	48,7	48,7
B [mm]	4,3	3,9	4,5	5,3	7,4	4,3	3,9	4,5	5,3	7,4	9,4*	11,8	25,9	25,9	25,9	25,9	25,9	25,9	25,9	25,9	25,9
C [mm]	1,5	1,5	1,5	1,5	1,5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
E min [mm]	14,8	13,4	13,8	15,9	21,1	14,3	12,9	13,3	15,4	20,6	20,6	20	27,3**	27,3**	27,3**	27,3**	27,3**	27,3**	27,3**	27,3**	27,3**
F [mm]	M3,5x0,35					3<D<9,5 F=M 3,5x0,35					M6x0,75	M10x1					M6x0,75				
G [mm]	3 A/F					4 A/F					23 A/F	3,5 A/F					4 A/F				
Contact Radius [mm]	Carbide or DLC-coated					R1					R2	R1					R2				
	R1					0,25					0,75	0,25					0,75				
	R2					0,75					1	1					2,5				
	Diamond					R1					R2	R1					R2				
	R1					-					0,75	0,75					0,75				
	R2					-					10	10					10				

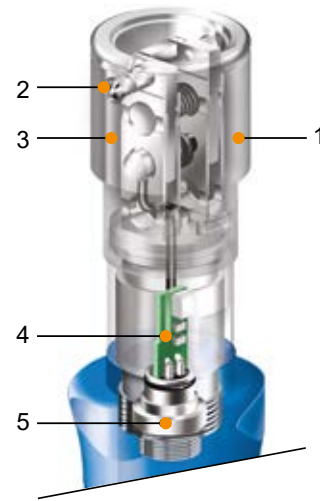
* $\varnothing 11,8$ for $12 \leq \varnothing < 15$ mm

** 27,8 for $150 \leq D < 300$



M1 STAR - EBG Electronic Bore Gauge

- NOSEPIECE:** it is the guiding element that ensures the measurement results are not affected by the operator's manual skill.
- MEASURING CONTACTS:** they are available in various radii and materials (carbide, diamond and DLC), depending on the type of part to be measured.
- MEASURING ARMSET:** this element is composed, depending on the measuring range, of two or four fingers with a fulcrum. The built-in LVDT or HBT transducer is extremely precise, reliable and durable (IP67 waterproof, frictionless) and mechanically transduces the acquired measurement into an electrical signal proportional to the movement.
- SIGNAL-PROCESSING ELECTRONIC UNIT:** the embedded electronic circuit allows to perform a fine adjustment of the sensitivity and is totally protected (IP67 protection degree).
- CONNECTOR:** it connects the plug head to the cable, making retooling a simple operation and reducing the cost for repairs.



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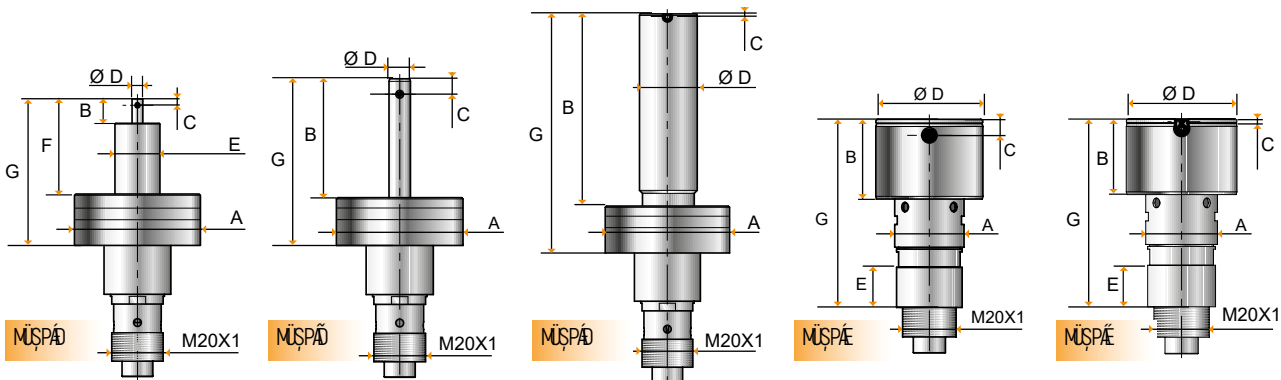


TECHNICAL SPECIFICATIONS

Description	WORKING RANGE						
Standard measuring range for type B and T [mm]	3≤Ø<8		8≤Ø<13	13≤Ø<26	26≤Ø<50	50≤Ø<150	150≤Ø<375
	0,050		0,060	0,060	0,070	0,070	0,080
Extended Measuring Range for type B and T [mm]	3≤Ø<6	6≤Ø<8	8≤Ø<13	13≤Ø<26	26≤Ø<38	38≤Ø<150	150≤Ø<375
	0,050 - 0,070	0,050 - 0,100	0,060 - 0,150	0,060 - 0,200	0,070 - 0,200	0,070 - 0,350	0,080 - 0,300
Standard measuring range for type SB [mm]				Ø 13 - 26	Ø 26 - 50	50≤Ø<150	150≤Ø<375
				0,060	0,070	0,070	0,080
Repeatability (2,77 σ) [μm]	≤ 0,5						
Thermal Drift [μm/°C]	≤ 0,3						

The working range can be further extended, on request, through a dedicated design of the bore gauge

MECHANICAL SPECIFICATIONS



D=minimum bore diameter		B												T												SB			
		1				2				4				1				2				4				3	5		
gauge head type																													
ref. drawing type																													
A Ø [mm]		49				49				25,9 *				49	49	49	49	49	49	49	49	49	49	25,9	25,9	25,9 *	49	25,9 *	
B [mm]		9,5	12,5	17,5	22,5	42,5	62,5	82,5	82,5	83	83,5	27,3	27,3	13	16	21	26	46	66	86	86	86	86	29,8	29,8	31,8	81,8	27,3	
C [mm]		2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	3	3,5	3,5	3,5	6	6	6	6	6	6	6	6	6	6	6	6	8	1	1	
E min [mm]		17,5	17,5	17,5	17,5	N/A								17,5	17,5	17,5	17,5	N/A								N/A			
F [mm]		37	37	57	57	N/A								40,5	40,5	60,5	60,5	N/A								N/A			
G [mm]		57	57	77	77	61	81	101	101	102,5	103	67,8	67,8	60,5	60,5	80,5	80,5	64,5	84,5	104,5	104,5	105,5	105,5	70,3	70,3	72,3	101,3	67,8	
Contact Radius [mm]	Carbide or DLC-coated	R1	0,25			0,5	0,5	1,5	1,5	1,5	2	2	4	4	0,25	0,25	0,25	0,5	0,5	1,5	1,5	1,5	2	2	4	4	4	2	4
		R2	-	-	-	1	1	2,5	2,5	2,5	5	5	10	10	-	-	-	1	1	2,5	2,5	2,5	5	5	10	10	10	5	10
	Diamond	R1	-	-	-	-	0,4	0,4	0,4	0,75	2	2	4	-	-	-	-	0,4	0,4	0,4	0,75	2	2	4	4	4	-	-	-
		R2	-	-	-	-	-	-	-	-	5	5	-	10	-	-	-	-	-	-	-	-	5	5	-	10	10	-	-

*T" handles available from Ø>200mm

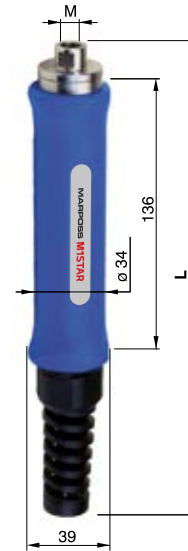
*29 for 74≤D≤375

PENCIL PROBE HANDLES

Thread M	L	Type	Order code
M3,5	237,5 [mm]	Without Pencil Probe - 8 mm h6 Clamping Diameter	B2TPL300000
		With RedCrown2 LVDT ± 2 mm, cable length L=2 m, Lumberg SV50/6 connector	B2TPL3F2000
		With RedCrown2 HBT ± 2 mm, cable length L=2 m, Lumberg SV50/6 connector	B2TPL3H2000
M6	237,5 [mm]	Without Pencil Probe - 8 mm h6 Clamping Diameter	B2TPL600000
		With RedCrown2 LVDT ± 2 mm, cable length L=2 m, Lumberg SV50/6 connector	B2TPL6F2000
		With RedCrown2 HBT ± 2 mm, cable length L=2 m, Lumberg SV50/6 connector	B2TPL6H2000
M10	239,5 [mm]	Without Pencil Probe - 8 mm h6 Clamping Diameter	B2TPLA00000
		With RedCrown2 LVDT ± 2 mm, cable length L=2 m, Lumberg SV50/6 connector	B2TPLAF2000
		With RedCrown2 HBT ± 2 mm, cable length L=2 m, Lumberg SV50/6 connector	B2TPLAH2000

A full range of pencil probe handles is available on request, such as for example:

- handle with 3/8" clamping diameter
- RedCrown2 probe with cable length L=4 m or 5 m
- RedCrown2 probe with Lumberg S3
- RedCrown2 unplugged probe compatible to amplifiers of other manufacturers (AirGage, Hommel/Etamic, Mahr Federal, Metrel, Metem, Mercer, Mitutoyo, Tesa, etc.)



Displacement
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HANDLES WITH WIRELESS TRANSMISSION

	Description	Order code
	I-Wave2 Handle with Direct-Lock for plug heads with M10 thread	B3TJ5SDI100
	I-Wave2 Handle with Direct-Lock for plug heads with M6 thread	B3TJ5SDI060
	I-Wave2 Handle with Direct-Lock for plug heads with M3,5 thread	B3TJ5SDI035
	I-Wave2 Handle with StarLock system for plug heads (one adapter for plug heads with M6 and M10 thread is included in the supply) (*)	B3TJ6SDI000
	I-Wave Handle with alkaline batteries and StarLock system for plug heads (one adapter for plug heads with M6 and M10 thread is included in the supply) (*)	B3TJ0SFB000
	I-Wave Handle with Li-Ion inductive batteries and StarLock system for plug heads (one adapter for plug heads with M6 and M10 thread is included in the supply) (*)	B3TJ0SFI000
	Mini I-Wave with Li-Ion inductive batteries and StarLock system for plug heads (one adapter for plug heads with M6 and M10 thread is included in the supply) (*)	B3TJ2SDJ000

(*) M3,5 and third party gauge heads adapters are available on request.
For chargers and other accessories please refer to the Wave Line catalogue.

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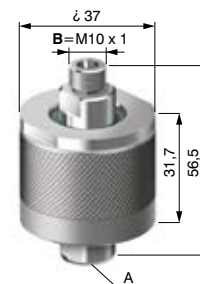


ROTARY SPACERS

Rotary spacers make it possible to have the indicator dial always facing the operator, even during dynamic measurements.

Plug gauge thread A ^(*)	Order code
M6X0,75	B2TR060S000
M10X1	B2TR100S000

^(*) NOTE: **Thread A**: plug head-side thread - **Thread B**: handle-side thread

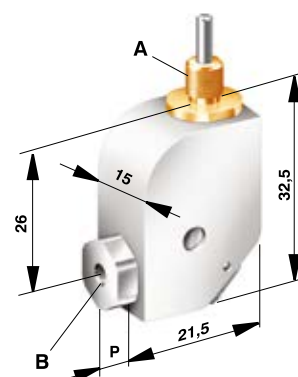


ANGLE ADAPTORS

The angle adaptors are needed when space is limited and the position of the bore is a 90° to the direction of insertion.

Thread B ^(*)	Thread A ^(*)	P [mm]	Order code
M3,5 X 0,35	M6 X 0,75	3,7	B2TAS630000
M6 X 0,75		4,2	B2TAS660000
M10 X 1		13,1	B2TAS6A0000
M3,5 X 0,35	M10 X 1	3,7	B2TASA30000
M6 X 0,75		4,2	B2TASA60000
M10 X 1		13,1	B2TASAA0000

^(*) NOTE: **Thread A**: handle-side thread - **Thread B**: plug head-side thread

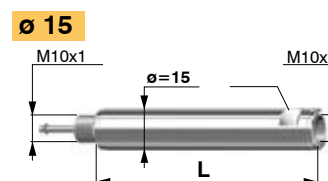
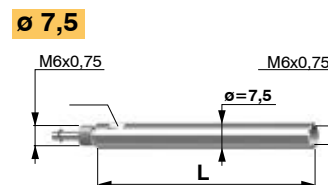
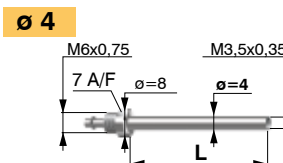


DEPTH EXTENSIONS

The extensions make it possible to reach the deeper measuring positions, when inserted between the plug head and the handle:

length	Order code		
L [mm]	ø 4 [mm]	ø 7,5 [mm]	ø 15 [mm]
20	2TXMS40020	2TXMS70020	-
30	2TXMS40030	2TXMS70030	-
40	2TXMS40040	2TXMS70040	-
50	2TXMS40050	2TXMS70050	B2TXMSF0050
65	2TXMS40065	2TXMS70065	B2TXMSF0065
80	2TXMS40080	2TXMS70080	B2TXMSF0080
100	2TXMS40100	2TXMS70100	B2TXMSF0100
125	2TXMS40125	2TXMS70125	B2TXMSF0125
250	-	2TXMS70250	B2TXMSF0250
500	-	-	B2TXMSF0500

^(*) NOTE: **Thread A**: handle-side thread - **Thread B**: plug head-side thread



SPECIAL DEPTH EXTENSIONS

For special applications and used where the extension diameter must not exceed the plug head size:

Ø [mm]	L [mm]	Order code	
3,8	20	B2TXMS30020	
	65	B2TXMS30065	
4,8	65	B2TXMS50065	
	80	B2TXMS50080	
5,3	65	B2TXMS60065	
	80	B2TXMS60080	
8	65	B2TXMS80065	
	80	B2TXMS80080	
	100	B2TXMS80100	
	125	B2TXMS80125	

Displacement
Sensors



Bore
Gauges



Forks and
Ring Gauges

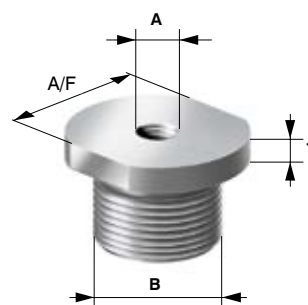


THREAD ADAPTORS

Thread adaptors improve applications capability and interchangeability of the accessories.

Standard thread adaptors:

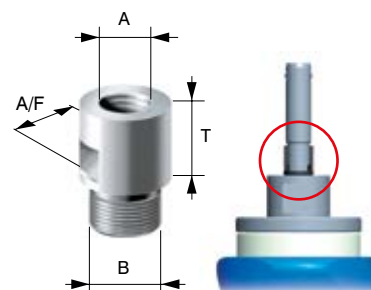
Range	Thread A (*)	Thread B (*)	A/F	T [mm]	Order code
3 - 9,5	M3,5X0,35	M6X0,75	7	1	B1TA0350600
3 - 9,5	M3,5X0,35	M10X1	13	2	B1TA0351000
9,5 - 26	M6X0,75	M10X1	13	2	B1TA0601000



Protective thread adaptors
(for plug heads with M3,5x0,35 thread)

Range	Thread A (*)	Thread B (*)	A/F	T [mm]	Order code
3 - 4	M3,5X0,35	M6X0,75	6	6	B1TAP350600
4 - 4,5			6	6	B1TAP350601
4,5 - 5,5			6	6	B1TAP350602
5,5 - 7,5			6	6	B1TAP350603
7,5 - 9,5			9	9	B1TAP350604

(*) NOTE: **Thread A**: plug head-side thread - **Thread B**: handle-side thread.
The dimension **T** is designed according to the required measuring depth.



Indicators and
Electronic
Display Units



Interface
Boxes for Data
Acquisition



Software



Displacement Sensors



Bore Gauges



Forks and Ring Gauges



Bench Gauges



Indicators and Electronic Display Units



Interface Boxes for Data Acquisition

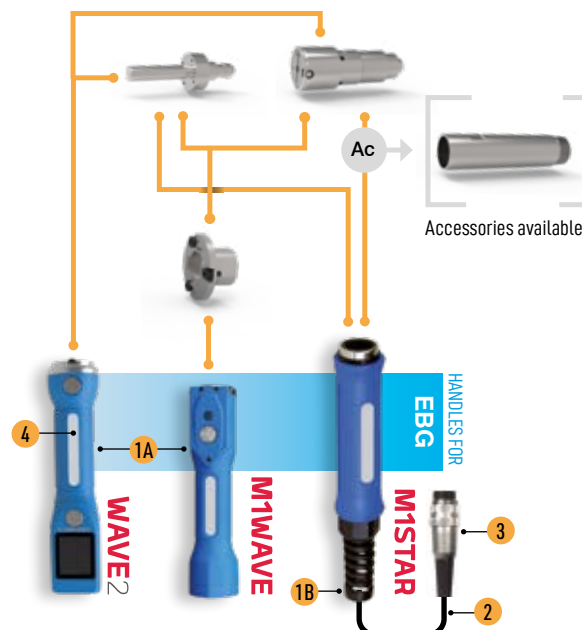


Software



HANDLES AND ACCESSORIES FOR EBG

- HANDLE:** The ergonomic design and the antislip surface allow a safe handling of the bore gauge. It can be:
 - a wireless transmission handle as Wave2, with color display and automatic orientation, or Wave (1A),
 - a handle with cable (1B).
- CABLE:** It is a special reinforced cable (Ø 4,7 mm) specifically developed for use in manual gauges, with considerably reduces the risk of damage and unintended torsion. It complies with EMC Standards for manual gauges.
- CONNECTION TO ELECTRONIC DISPLAY UNIT:** for connection to electronic display units the EBG is supplied with a Lumberg type SV50/6 or S3. Extensions with dedicated connectors can be supplied, making it possible to achieve compatibility with many of the electronic display units available on the market.
- NUMBER PLATE:** it can be marked with the bore gauge size or any other information required by the user.



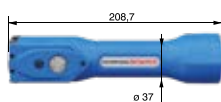
HANDLE FOR BORE GAUGE WITH CABLE

Description	Order code
Handle without cable	B2THS000000
Cable 2 m LVDT - connector SV50/6	B2TG0000026
Cable 3,5 m LVDT - connector SV50/6	B2TG0000356
Cable 5 m LVDT - connector SV50/6	B2TG0000056
Cable 2 m LVDT - connector S3	B2TG0000023
Cable 2 m TESA COMPATIBLE - connector SV50/6	B2TG00TS026
Cable 2 m HBT - connector SV50/6	B2TG0001026
Cable 3,5 m HBT - connector SV50/6	B2TG0001356
Cable 5 m HBT - connector SV50/6	B2TG0001056



HANDLES WITH WIRELESS TRANSMISSION

Description	Order code
Wave handle with alkaline batteries	B2TW0SFB000



Description	Order code
Wave handle with Li-Ion inductive batteries	B2TW0SFI000



Description	Order code
MiniWave with Li-Ion inductive batteries	B3TJ1SDJ000



For chargers and other accessories please refer to the Wave Line catalogue.

EXTENSIONS FOR BORE GAUGE WITH CABLE

The stainless steel extensions, when inserted between the plug head and the handle, make it possible to reach the correct position in a bore, where the measurement must be read. The following codes can be ordered:

Diameter Range [mm]	L [mm]	Order code
26<D≤375	20	B1TX0S00020
	30	B1TX0S00030
	40	B1TX0S00040
	50	B1TX0S00050
	65	B1TX0S00065
	80	B1TX0S00080
	100	B1TX0S00100
	125	B1TX0S00125
	250	B1TX0S00250
	500	B1TX0S00500



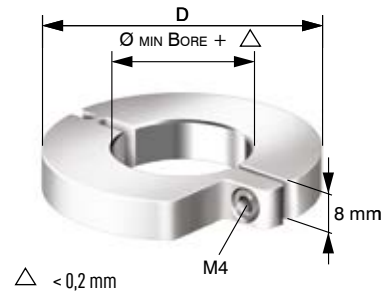
ACCESSORIES FOR BOTH MBG & EBG

DEPTH STOPS

The depth stops are used to accurately define the position of the measuring section and can be placed at a specific position on either the nosepiece or depth extension.

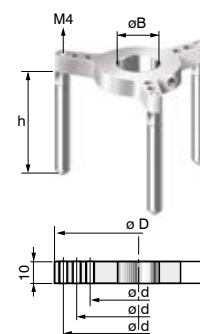
DEPTH STOPS FOR NOSEPIECE

Ø min Bore		Ø D		Ø min Bore		Ø D	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
8 < 11	0.3150" < 0.4331"	33	1.29"	40 < 45	1.5748" < 1.7716"	71	2.79"
11 < 15	1.7716" < 1.9685"	37	1.45"	45 < 50	1.7716" < 1.9685"	76	2.99"
15 < 20	0.5905" < 0.7874"	42	1.77"	50 < 60	1.9685" < 2.3622"	86	3.38"
20 < 25	0.7874" < 0.9842"	51	2.00"	60 < 70	2.3622" < 2.7559"	96	3.77"
25 < 30	0.9842" < 1.1811"	56	2.20"	70 < 80	2.7559" < 3.1496"	106	4.17"
30 < 35	1.1811" < 1.378"	61	2.40"	80 < 90	3.1496" < 3.5433"	116	4.56"
35 < 40	1.378" < 1.5748"	66	2.59"	90 < 100	3.5433" < 3.937"	126	4.96"



DEPTH STOPS FOR EXTENSION

Ø B [mm]	Ø D [mm]	h [mm]	Ø d [mm]			Order code
4	32	32,8	26			B2TDEM040A0
7,5	42	34,8	36			B2TDEM075A0
15	45	45	38			B2TDEM150A0
	75		44	56	68	B2TDEM150B0
	110		79	91	103	B2TDEM150C0
	160		117	129	141	B2TDEM150D0
	220		177	189	201	B2TDEM150E0
22	45	63,3	38			B2TDEE220A0
	75		44	56	68	B2TDEE220B0
	110		79	91	103	B2TDEE220C0
	160		117	129	141	B2TDEE220D0
	220		177	189	201	B2TDEE220E0



HOOKS

Hooks to hang the M1 Star MBG bore gauges are available in two versions, for all handle types as shown (see the figures).

Description	Order code
Eye hook for pencil probe handle	B1TOJHS0810
T-shaped hook for pencil probe handle	B1TOJHS0811
Eye hook for indicator handle	B1TOJHS0812



STAND

Used on the bench, this stand positions the gauge in vertical or horizontal position, or at any angle between -45° and $+45^\circ$ from vertical, allowing the workpiece to be referenced or located on the plug. With 1 or 2 extra plug support kit, it is possible to install up to 2 or 3 gauges on the same stand.

Description	Order code
Multiposition Stand for EBG and MBG	B2TS000111
Extra plug support kit for stand 2TS000111	B2TS000222



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MBG WITH 3 CONTACTS

The MBG with 3 contacts every 120° on the same plane is the ideal solution to measure squared shaped bores and trilobed shapes from 12 to 100mm (solutions for smaller or larger diameters are available on request).

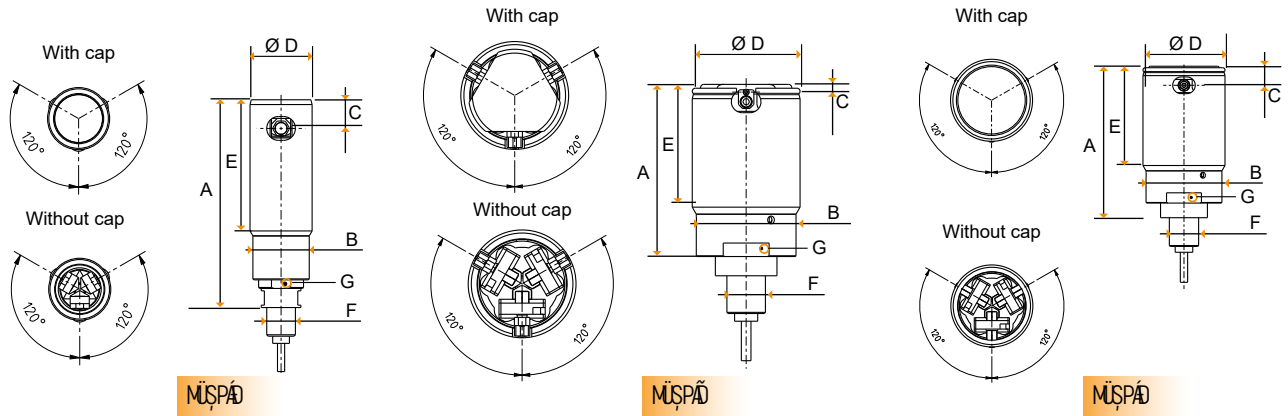
The 3 independent contacts are extremely capable of measuring even small tolerances.

The 3-contact MBGs are available with 3 different "C" values (distance between the contact axis and the top of the nosepiece) for blind, superblind or through bores and can be supplied with or without the protective cap.

TECHNICAL SPECIFICATIONS

Description	WORKING RANGE			
Standard measuring range for type B and T [mm]	Ø 12 - 26 0,120		Ø 26 - 300 0,150	
Extended Measuring Range for type B and T [mm] (*)	Ø 12 - 15 0,120 - 0,170	Ø 15 - 26 0,120 - 0,200	Ø 26 - 38 0,150 - 0,200	Ø 38 - 100 0,150 - 0,400
Standard measuring range for type SB	Ø 12 - 26 0,120		Ø 26 - 60 0,150	Ø 60 - 100 0,120
Repeatability (2,77 σ) [μm]	≤ 1,5			

MECHANICAL SPECIFICATIONS



D=minimum bore diameter	12 ≤ D < 16,5	16,5 ≤ D < 26	26 ≤ D < 30	30 ≤ D < 50	50 ≤ D < 100	26 ≤ D < 30	26 ≤ D < 30	30 ≤ D < 50	50 ≤ D < 100	12 ≤ D < 16,5	16,5 ≤ D < 26	26 ≤ D < 30	26 ≤ D < 30	30 ≤ D < 50	50 ≤ D < 100
Gauge head type	B					SB					T				
Drawing type	1	1	3	3	3	2	2	2	2	1	1	3	3	3	3
Cap	Yes/No	Yes/No	Yes	No	Yes/No	Yes	No	Yes/No	Yes/No	Yes/No	Yes/No	Yes	No	Yes/No	Yes/No
A [mm]	40,5	40,5	49,7	48,7	48,7	49,7	48,7	48,7	48,7	43,5	51,7	51,2	51,2	51,2	53,2
B Ø [mm]	11,8	11,8	25,9	25,9	25,9	25,9	25,9	25,9	25,9	11,8	11,8	25,9	25,9	25,9	25,9
C [mm]	3	3	4,5	3,5	3,5	2	1	1	1	6	6	6,5	6	6	6
E min [mm]	21,4	22	29,1	29,1	27,3	29,1	29,1	27,3	27,3	24,4	25	31,6	31,6	29,8	31,8
F [mm]	M6x0,75	M6x0,75	M10x1	M10x1	M10x1	M10x1	M10x1	M10x1	M10x1	M6x0,75	M6x0,75	M10x1	M10x1	M10x1	M10x1
G [mm]	CH 8.5	CH 8.5	CH 23	CH 23	CH 23	CH 23	CH 23	CH 23	CH 23	CH 8.5	CH 8.5	CH 23	CH 23	CH 23	CH 23

D=minimum bore diameter			12≤D<15	15≤D<16	16≤D<20	20≤D<26	26≤D<32	32≤D<100	32≤D<100	12≤D<15	15≤D<16	16≤D<26	26≤D<32	32≤D<40	40≤D<100
Gauge head type			B						SB	T					
Contact Radius	Carbide or DLC-coated	R1 [mm]	2	2		2	4	4	2	2		4		4	
		R2 [mm]	3,5	5		5	10	10	3,5	5		10		10	
	Diamond	R1 [mm]	0,75	0,75	2	2	2	4	-	0,7	0,75	2		2	4
		R2 [mm]	-	-		5	-	10	-	-	-	5	-	10	10

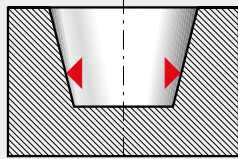
DEDICATED SOLUTIONS

Dedicated solutions complement the standard product line, and provide solutions for measuring conditions outside the capabilities of standard bore gauges. A wide range of special gauging solutions for particular applications is available on request, with our range of dedicated plug heads. Please include a workpiece drawing in your enquiry. Below are just a few examples of possible solutions.

Conical Nosepiece

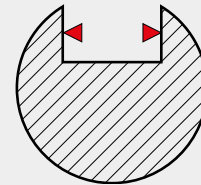
Usually supplied with a calibrated depth stop, it allows to measure the diameter of tapered bores in a specific position.

Example: knuckle joint.



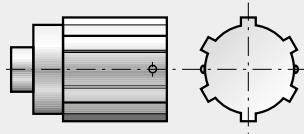
Squared Nosepiece

To be used for gap measurements, for example: keyways or splines.



Nosepiece with carbide bar inserts

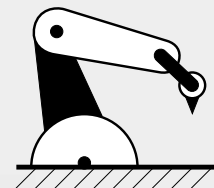
The carbide bars protect the nosepiece from wear and jamming caused by the presence of metal swarfs or debris, thus increasing the life of the gauge.



Nosepiece with DLC coating

The DLC coating improves the wear resistance of the nosepiece, increasing the surface hardness and reducing the surface friction coefficient.

This is the ideal choice for demanding applications.



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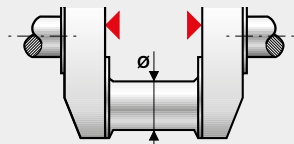


Software



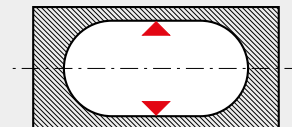
«V» Shaped Nosepiece

Gauges with V shaped nosepiece refer on the shaft and measure the distance between the faces of the counterweights, for the assembly of connecting rod bearing on crankshafts or camshafts.



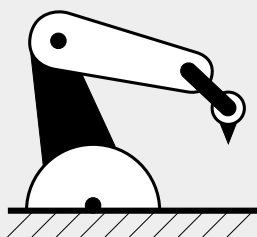
Oval Nosepiece

Designed for measuring oval bores or inter-connecting bores. Example: lobe pump designs in fuel and oil pumps.



Nosepiece with Pilot Cone

For CNC automatic applications, the cone helps the introduction of the nosepiece into the workpiece, reducing the possibility of accidental damages.



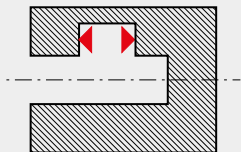
Gauge heads for bores with central hub

For the measuring of internal diameters where there is a central hub projection. Example: automatic transmission components.



Right angle plug head

For measuring bores with perpendicular axis to the direction of gage insertion, or for limited space applications. Example: differential carrier.



Plug head for Gears

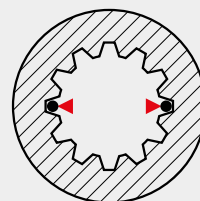
The toothed nosepiece is manufactured to engage with the workpiece. The HSS material ensures high durability.

The accurate choice of contacts allows measurement of
Over ball diameter

Major diameter

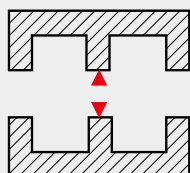
Minor diameter

The wide range of solutions for the choice of armset allows the measurement of both even and odd gears.



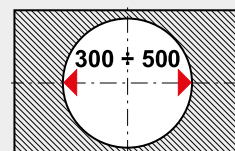
Long Nosepiece

The long nosepiece guides the plug head when measuring discontinuous or interrupted deep bores, improving ergonomics. It can be equipped with reference rings to help the user in the positioning.



Macrolight Nosepiece

For big size bores. The specific design allows to reduce the weight of the nosepiece.



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