



M1 STAR

M1 Star is an innovative line of manual gauges for measuring the diameters of bores.

The application experience gained through the **M1 Electron**, a product that boasts an extremely extensive diffusion, with more than 100,000 units present in all sorts of industrial environments, Marposs presents the **M1 Star EBG (Electronic Bore Gauge)** as the ideal manual electronic gauge for measuring the diameter, ovality and taper of bores, wherever a high-precision performance is required.

The robust construction and high degree of resistance to external agents, makes the **M1 Star EBG**

particularly suitable for use in the harshest production environments.

MAIN CHARACTERISTICS

- **Application range**
Diameters from 3 to 300 mm, with a measurement section depth up to more than 500 mm.
- Marposs' completely friction-free measurement reading system, ensures **M1 Star EBG** repeatability within 0.5 microns, constant over the entire application range. Each plug is delivered with a certificate of individual testing of the product.
- **Electrical compatibility**
The transducer, available both in LVDT and HBT version, makes it

possible to connect the **M1 Star EBG** to any Marposs measurement amplifier system. An expressly devised compensation circuit integrated in the gauge's extension cable makes it possible to achieve compatibility with other widespread electronic units.

- **Versatility of application**

The plug gauge of the **EBG** can quickly be replaced, because it is equipped with a connector that makes it independent of its handle or an extension component to which it is attached. The extensive linearity range of the transducers used in the **EBG** requires only one zero-setting ring.

- **Sturdiness and resistance to environmental factors**

The **M1 Star EBG** has been designed to be used in the harshest conditions, without its performance being affected.

Guaranteed IP67 protection (waterproofed, dirt and dust sealed) with excellent resistance to impacts and accidental falls, plus replaceable tear resistant cable makes the **EBG** sturdy and reliable.

These robust characteristics reduce your maintenance costs and down times to a minimum, while guaranteeing very high degrees of precision.

- **Supply conditions**

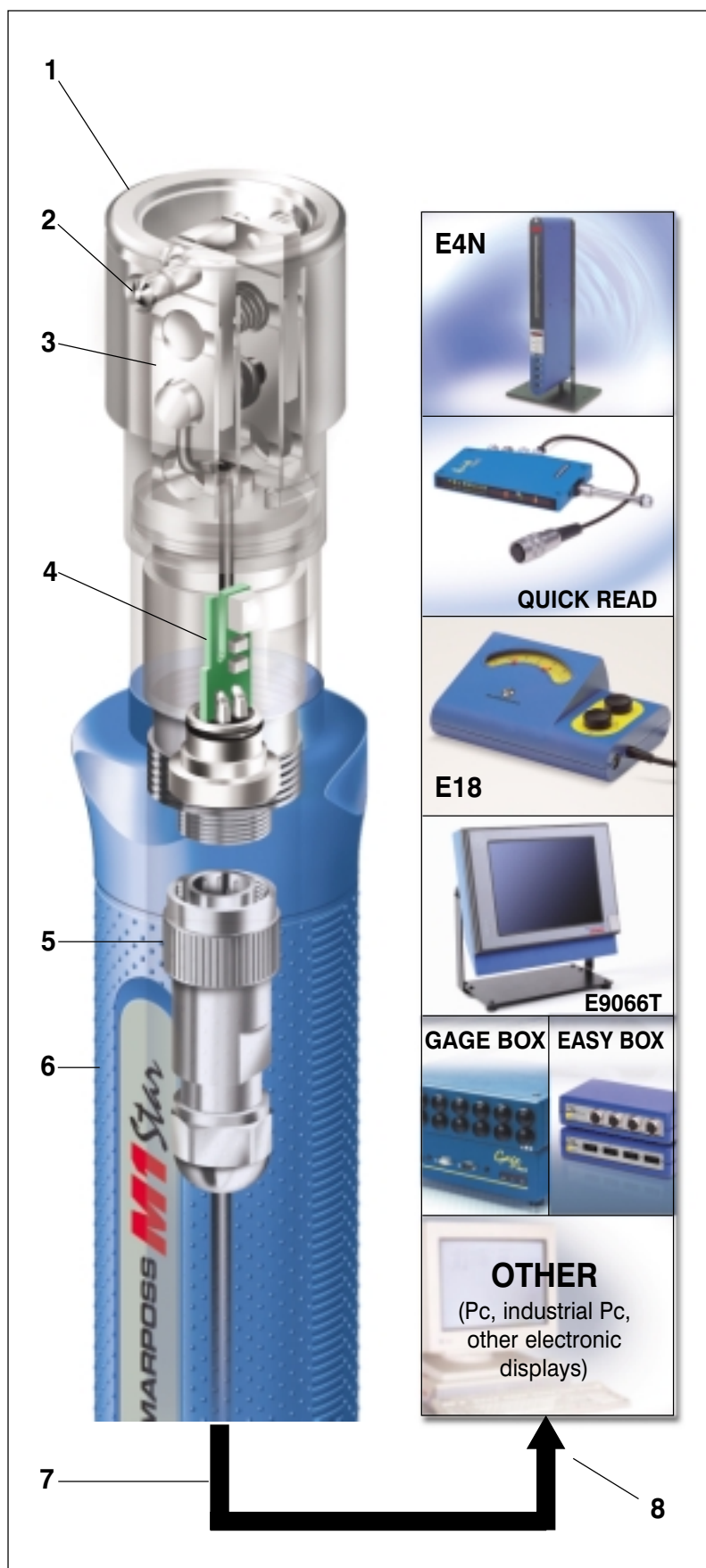
Marposs' advanced engineering of its production processes and use of state-of-the-art technology, offers the **EBG** with extremely competitive pricing and fast delivery times. The **M1 Star EBG** is also available for customized OEM supplies.



M1 STAR EBG ELECTRONIC BORE GAUGE

COMPONENTS OF PRODUCT

- 1 **NOSEPIECE:** this is the guiding element that ensures that the result of the measurement is independent of the operator's ability.
- 2 **MEASURING CONTACTS:** they are available in various radii and materials (carbide, diamond and amorphous carbon), depending on the type of part to be measured.
- 3 **MEASURING ARMSET:** this element carries out the measurement and is formed of 2 or 4 fingers with a fulcrum (depending on the diameter range). It contains an electronic differential LVDT or HBT transducer that is extremely precise, reliable and durable (IP67 waterproofed, frictionless) and mechanically transduces the acquired measurement into an electrical signal proportional to the movement.
- 4 **SIGNAL - PROCESSING ELECTRONIC UNIT:** it is an embedded electronic circuit inside the M1 Star EBG. It normalizes the signal and makes it possible to perform a fine adjustment of the sensitivity.
- 5 **CONNECTOR:** it allows the independence of the plug gauge from the cable extension, making retooling more simple and repairs more inexpensive.
- 6 **HANDLE:** physical support of the measuring plug. The ergonomic design respects the anatomy of the human hand.
- 7 **CABLE EXTENSION:** it complies with EMC standards for manual-type application. Its characteristics have been devised expressly to ease replaceability and help lower the running costs of the product.
- 8 **CONNECTOR ON ELECTRONIC UNIT SIDE:** it is a Lumberg SV50/6 or S3, and allows connection to the electronic display unit. Extensions with dedicated connectors can be supplied, making it possible to achieve compatibility with many of the electronic display units available on the market.



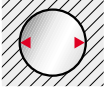
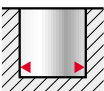
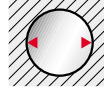
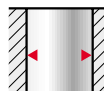
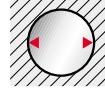
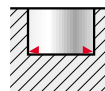
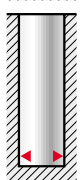
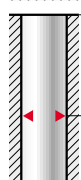
EXAMPLES OF APPLICATIONS



GAUGES FOR INTERNAL MEASUREMENT



SUGGESTIONS FOR THE IDENTIFYING SOLUTION TO BE ORDERED

	  BLIND BORES	  THROUGH BORES	  SUPER-BLIND BORES	  DEEP BORES	  MEASUREMENT AT A DEFINITE DEPTH
PLUG GAUGE TYPE B (PAG. 6)	•				
PLUG GAUGE TYPE T (PAG. 8)		•		•	•
PLUG GAUGE TYPE SB (PAG. 10)			•		
EXTENSIONS (PAGE 12-13)				•	
DEPTH STOPS (PAGE 14)					•

THE EBG PLUG GAUGE

The measuring element of the bore gauge comprises of a nosepiece, measuring armset and contacts. It can easily be interchanged by simply unscrewing it from the handle and disconnecting the cable.

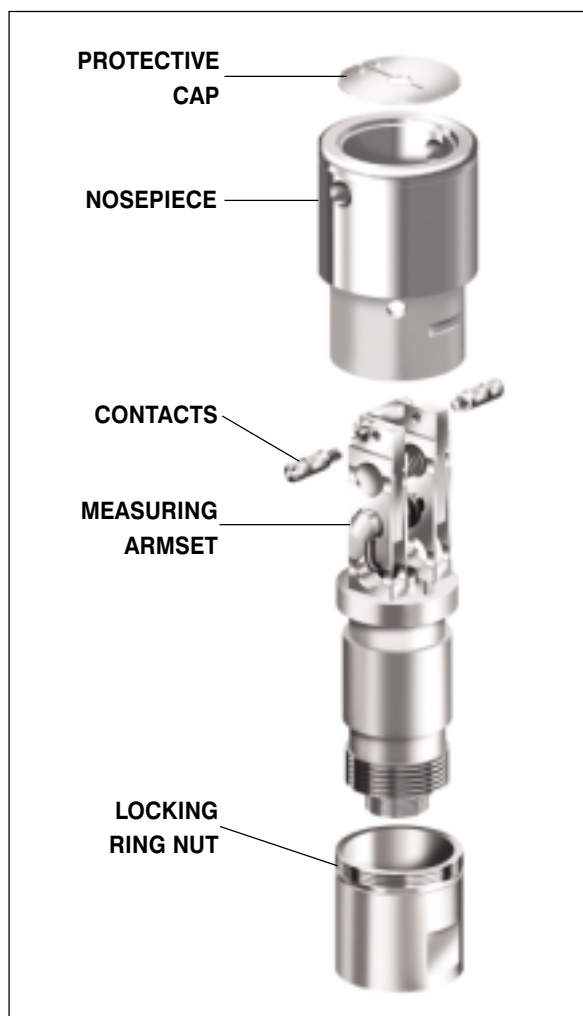
NOSEPIECE: made out of X30 stainless steel, hardened and ground, with a hardness of the order of 52–56 HRC, it is the element that guides the plug gauge. The extreme accuracy with which Marposs S.p.A makes the nosepiece body cuts down to a minimum any measurement error due to a clearance between the nosepiece and the part to be measured.

CONTACTS: they are the actual position where the bore is measured. They are entirely made out of carbide in their standard configuration, but are also available in diamond or coated with amorphous carbon, in order to meet all measurement needs on any material. They are placed in the plug gauge at a definite distance, C, from the top of the nosepiece, in relation to the type of bore to be measured (B/T/SB). They are produced with two different radii, depending on the surface roughness of the part to be measured:

R1: standard radius, recommended for surfaces with a $Ra \leq 2 \mu m$ roughness.

R2: recommended for bores with a diameter up to 26 mm and $Ra \leq 4 \mu m$ roughness; recommended also for 26 to 300 mm bores with $Ra \leq 8 \mu m$ roughness.

MEASURING ARMSET: this element carries out the measurement and is formed of 2 or 4 fingers with a fulcrum (depending on the diameter range). It contains an electronic differential LVDT or HBT transducer that is extremely precise, reliable and durable (IP67 waterproofed), frictionless, and mechanically transduces the acquired measurement into an electrical signal proportional to the movement of the contacts.



HOW TO ORDER THE PLUG GAUGE

STANDARD PLUG GAUGE

Plug Gauge Type:
F = LVDT transd., marking in mm
G = LVDT transd., marking in inches
H = HBT transd., marking in mm
I = HBT transd., marking in inches

Minimum Bore Diameter:

- expressed in μm if the plug gauge type is **F** or **H**;
 - in inches if it is **G** or **I**

See table 1

"C" dimension and contacts radius

3	T								
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DEEP PLUG GAUGE RANGE 10,5 - 26

Plug Gauge Type:
O = LVDT transd., marking in mm
P = LVDT transd., marking in inches
Q = HBT transd., marking in mm
R = HBT transd., marking in inches

Minimum Bore Diameter:

- expressed in μm if the plug gauge type is **O** or **Q**;
 - in inches if it is **P** or **R**

See table 1

"C" dimension and contacts radius

See table 2

"Depth extension length"

3	T								
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Table 1

EBG standard					
Plug gauge type	C dimension	ø _{min} Bore		Contact radius	
		mm	inch	R1	R2
EBG-B	2,5 0.0984"	3 - 10,5	0.1181" - 0.4134"	A	B
	3 0.1181"	10,5 - 13	0.4134" - 0.5118"	C	D
		13 - 15	0.5118" - 0.5905"		
		15 - 20	0.5905" - 0.7874"		
		20 - 26	0.7874" - 1.0236"		
	3,5 0.1378"	26 - 74	1.0236" - 2.9134"	E	F
74 - 300		2.9134" - 11.811"			
EBG-T	6 0.2362"	3 - 10,5	0.1181" - 0.4134"	Q	R
		10,5 - 13	0.4134" - 0.5118"		
		13 - 15	0.5118" - 0.5905"		
		15 - 26	0.5905" - 1.0236"		
	8 0.3150"	26 - 40	1.0236" - 1.5748"	S	T
		40 - 74	1.5748" - 2.9134"		
EBG-SB	1 0.0394"	74 - 300	2.9134" - 11.811"	O	I
		10,5 - 13	0.4134" - 0.5118"		
		13 - 15	0.5118" - 0.5905"		
		15 - 26	0.5905" - 1.0236"		
		26 - 74	1.0236" - 2.9134"		
EBG DEEP (10,5 - 26)mm					
EBG-B	3 0.1181"	10,5 - 20	0.4134" - 0.7874"	C	D
	3,5 0.1378"	20 - 26	0.7874" - 1.0236"	E	F
EBG-T	6 0.2362"	10,5 - 26	0.4134" - 1.0236"	Q	R
EBG-SB	1 0.0394"	10,5 - 26	0.4134" - 1.0236"	Y	Z

Table 2

	Depth extension length	
	mm	inch
A	20	0.7874"
C	30	1.1811"
E	40	1.5748"
G	50	1.9685"
I	65	2.5591"
K	80	3.1496"
M	100	3.9370"
O	125	4.9213"
Q	250	9.8425"
S	500	19.685"

Examples of ordering codes:

1. To order an EBG plug gauge LVDT to measure a blind diameter 29 mm + 0.002 / +0.011 with roughness $R_a \leq 2\mu\text{m}$ and C = 3,5 mm:

• **3TF029002E**

2. To order an EBG Deep plug gauge HBT with depth extension of 3.9370" to measure a blind diameter 0.6693" 0 / +0.0007 with roughness $\geq 2\mu\text{m}$ and C = 1 mm:

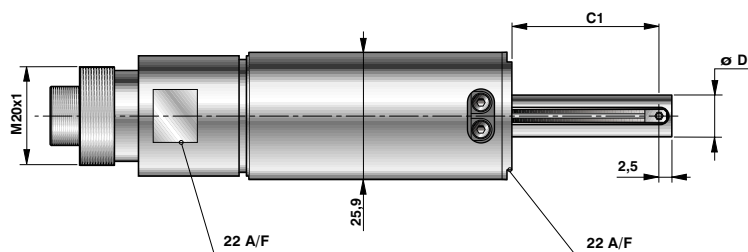
• **3TR06693ZM**

To order a special plug gauge please contact your nearest MARPOSS office or visit our web-site:

www.marposs.com **www.testar.com**

PLUG GAUGE EBG-B - BLIND BORES 3-300 mm (0.1181" - 11.811")

B 3 - 10,5



$3 \text{ mm} \leq \varnothing_{\text{min}} \text{ bore} < 10,5 \text{ mm}$

$\varnothing D = \varnothing D_{\text{nominal}}^{0}_{-0,015} (*)$

THREAD: M 20 x 1

WORKING RANGE:

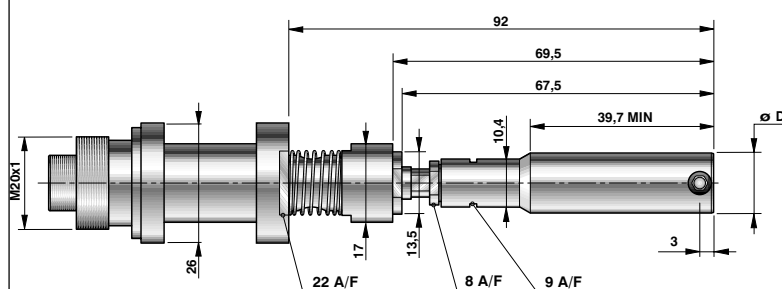
SEE DIMENSIONAL TABLE

CONTACTS:

SEE DIMENSIONAL TABLE

DIMENSIONAL TABLE		DIAMETRAL RANGE						
CHARACTERISTICS:	REF.:	3 - 4 mm	4 - 5 mm	5 - 6 mm	6 - 7 mm	7 - 8 mm	8 - 9 mm	9 - 10,5 mm
STANDARD WORKING RANGE (mm)		0,070	0,070	0,070	0,070	0,070	0,100	0,100
STANDARD MEASURING DEPTH (mm)	C1	7	10	15	20	30	40	50
STANDARD CONTACT RADIUS (mm)	Ri	Tungsten carbide	R1 = 0,5 R2 = 1	R1 = 0,5 R2 = 1	R1 = 0,5 R2 = 1	R1 = 0,5 R2 = 1	R1 = 1,5 R2 = 2,5	R1 = 1,5 R2 = 2,5
		Amorphous carbon	R1 = 0,5 R2 = 1	R1 = 0,5 R2 = 1	R1 = 0,5 R2 = 1	R1 = 0,5 R2 = 1	R1 = 1,5 R2 = 2,5	R1 = 1,5 R2 = 2,5
		Diamond	-	-	-	R1 = 0,4	R1 = 0,4	R1 = 0,4

B 10,5 - 13



$10,5 \text{ mm} \leq \varnothing_{\text{min}} \text{ bore} < 13 \text{ mm}$

$\varnothing D = \varnothing D_{\text{nominal}}^{0}_{-0,015} (*)$

THREAD: M 20 x 1

WORKING RANGE: 120 μm

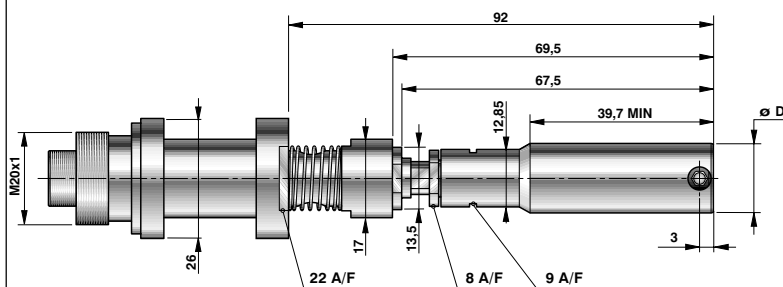
CONTACTS:

Tungsten carbide: R1 = 2 mm; R2 = 3,5 mm

Amorphous carbon: R1 = 2 mm; R2 = 3,5 mm

Diamond: R1 = 0,75

(*) $\varnothing D_{\text{NOMINAL}}$ = nominal nosepiece diameter = $\varnothing_{\text{MIN}} \text{ BORE} - [0,0007 * (\varnothing_{\text{MIN}} \text{ BORE} + 12)]$

B 13 - 15
 $13 \text{ mm} \leq \varnothing_{\text{min bore}} < 15 \text{ mm}$
 $\varnothing D = \varnothing D_{\text{nominal}}^{0}_{-0.015} (*)$

THREAD: M 20 x 1

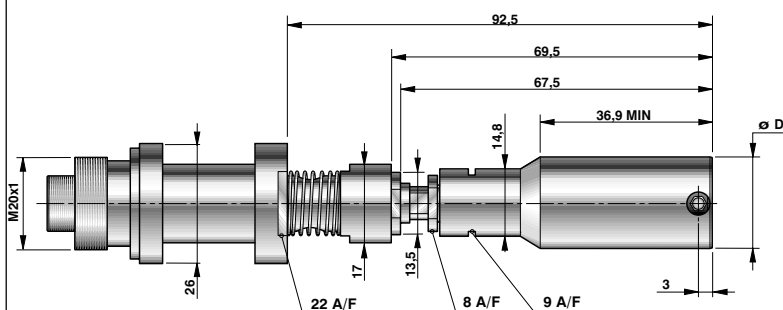
WORKING RANGE: 120 μm

CONTACTS:

Tungsten carbide: R1 = 2 mm; R2 = 3,5 mm

Amorphous carbon: R1 = 2 mm; R2 = 3,5 mm

Diamond: R1 = 2

B 15 - 20
 $15 \text{ mm} \leq \varnothing_{\text{min bore}} < 20 \text{ mm}$
 $\varnothing D = \varnothing D_{\text{nominal}}^{0}_{-0.015} (*)$

THREAD: M 20 x 1

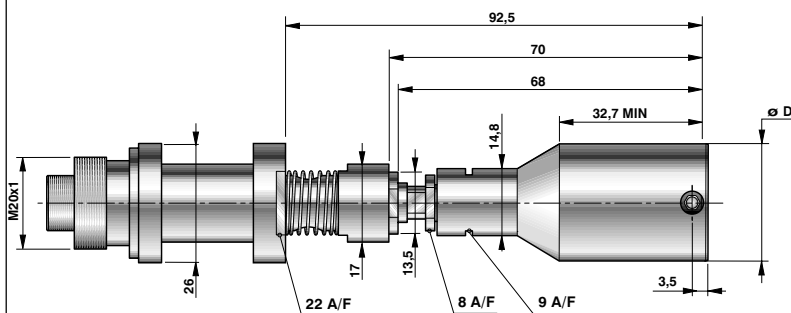
WORKING RANGE: 120 μm

CONTACTS:

Tungsten carbide: R1 = 2 mm; R2 = 5 mm

Amorphous carbon: R1 = 2 mm; R2 = 5 mm

Diamond: R1 = 2

B 20 - 26
 $20 \text{ mm} \leq \varnothing_{\text{min bore}} < 26 \text{ mm}$
 $\varnothing D = \varnothing D_{\text{nominal}}^{0}_{-0.015} (*)$

THREAD: M 20 x 1

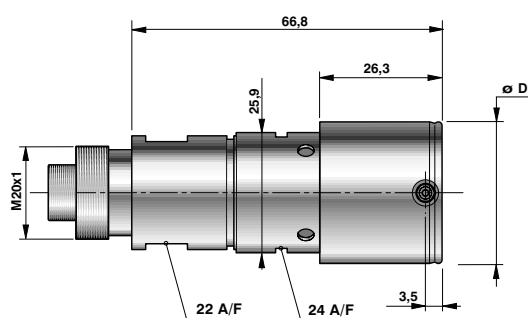
WORKING RANGE: 120 μm

CONTACTS:

Tungsten carbide: R1 = 2 mm; R2 = 5 mm

Amorphous carbon: R1 = 2 mm; R2 = 5 mm

Diamond: R1 = 2 mm; R2 = 5 mm

B 26 - 74
 $26 \text{ mm} \leq \varnothing_{\text{min bore}} < 74 \text{ mm}$
 $\varnothing = 26+50: = \varnothing D_{\text{nominal}}^{0}_{-0.020} (*)$
 $\varnothing = 50+74: = \varnothing D_{\text{nominal}}^{0}_{-0.030} (*)$

THREAD: M 20 x 1

WORKING RANGE: 150 μm

CONTACTS:

Tungsten carbide: R1 = 4 mm; R2 = 10 mm

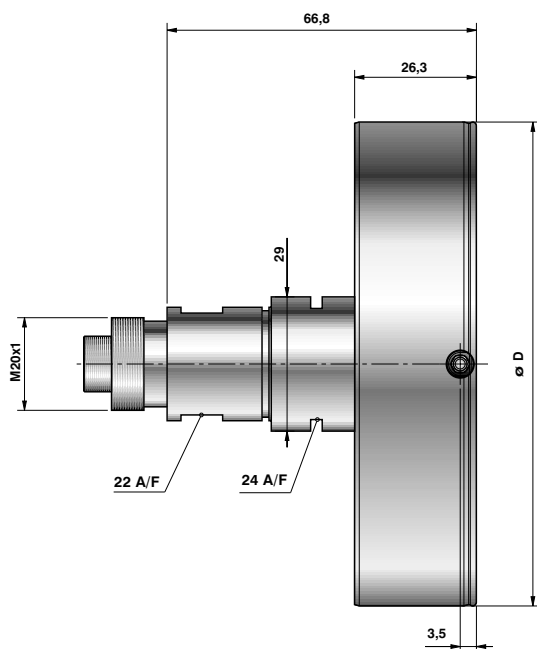
Amorphous carbon: R1 = 4 mm; R2 = 10 mm

Diamond:

RANGE 26+ 32 R1 = 2 mm

RANGE 32+ 74 R1 = 4 mm; R2 = 10 mm

(*) $\varnothing D_{\text{NOMINAL}}$ = nominal nosepiece diameter = $\varnothing_{\text{MIN BORE}} - [0,0007 * (\varnothing_{\text{MIN BORE}} + 12)]$

B 74 - 300
 $74 \text{ mm} \leq \varnothing_{\text{min bore}} \leq 300 \text{ mm}$
 $\varnothing D = \varnothing D_{\text{nominal}}^{t+}_{t-} (*)$

$\varnothing_{\text{MIN}}$ BORE	t-	t+
74+ 104	-0,03	0
104+ 150	-0,05	-0,01
150+ 300	-0,06	-0,01

THREAD: M 20 x 1

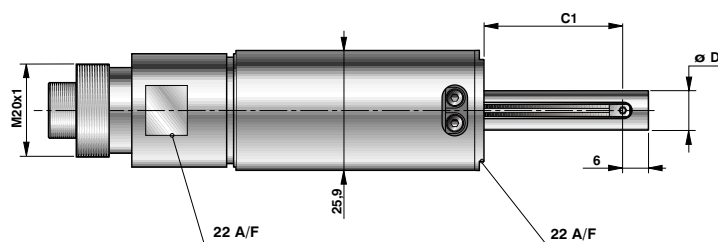
WORKING RANGE: 150 μm

CONTACTS:

Tungsten carbide: R1 = 4 mm; R2 = 10 mm

Amorphous carbon: R1 = 4 mm; R2 = 10 mm

Diamond: R1 = 4 mm; R2 = 10 mm

PLUG GAUGE EBG-T - THROUGH BORES 3-300 mm (0.1181" - 11.811")**T 3 - 10,5**
 $3 \text{ mm} \leq \varnothing_{\text{min bore}} < 10,5 \text{ mm}$
 $\varnothing D = \varnothing D_{\text{nominal}}^{0}_{-0,015} (*)$

THREAD: M 20 x 1

WORKING RANGE:

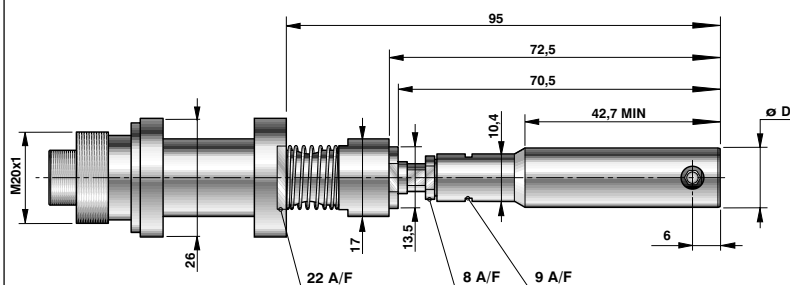
SEE DIMENSIONAL TABLE

CONTACTS:

SEE DIMENSIONAL TABLE

DIMENSIONAL TABLE		DIAMETRAL RANGE						
CHARACTERISTICS:	REF.:	3 - 4 mm	4 - 5 mm	5 - 6 mm	6 - 7 mm	7 - 8 mm	8 - 9 mm	9 - 10,5 mm
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STANDARD MEASURING DEPTH (mm)	C1	7	10	15	20	30	40	50
STANDARD CONTACT RADIUS (mm)	Ri	Tungsten carbide	R1 = 0,5 R2 = 1	R1 = 0,5 R2 = 1	R1 = 0,5 R2 = 1	R1 = 0,5 R2 = 1	R1 = 1,5 R2 = 2,5	R1 = 1,5 R2 = 2,5
		Amorphous carbon	R1 = 0,5 R2 = 1	R1 = 0,5 R2 = 1	R1 = 0,5 R2 = 1	R1 = 0,5 R2 = 1	R1 = 1,5 R2 = 2,5	R1 = 1,5 R2 = 2,5
		Diamond	-	-	-	R1 = 0,4	R1 = 0,4	R1 = 0,4

(*) $\varnothing D_{\text{NOMINAL}}$ = nominal nose piece diameter = $\varnothing_{\text{MIN BORE}} - [0,0007 * (\varnothing_{\text{MIN BORE}} + 12)]$

T 10,5 - 13
 $10,5 \text{ mm} \leq \varnothing_{\text{min}} \text{ bore} < 13 \text{ mm}$
 $\varnothing D = \varnothing D_{\text{nominal}}^{0}_{-0,015} (*)$

THREAD: M 20 x 1

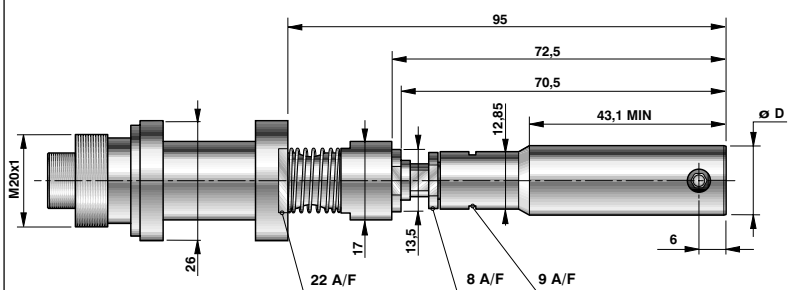
 WORKING RANGE: 120 μm

CONTACTS:

Tungsten carbide: R1 = 2 mm; R2 = 3,5 mm

Amorphous carbon: R1 = 2 mm; R2 = 3,5 mm

Diamond: R1 = 0,75

T 13 - 15
 $13 \text{ mm} \leq \varnothing_{\text{min}} \text{ bore} < 15 \text{ mm}$
 $\varnothing D = \varnothing D_{\text{nominal}}^{0}_{-0,015} (*)$

THREAD: M 20 x 1

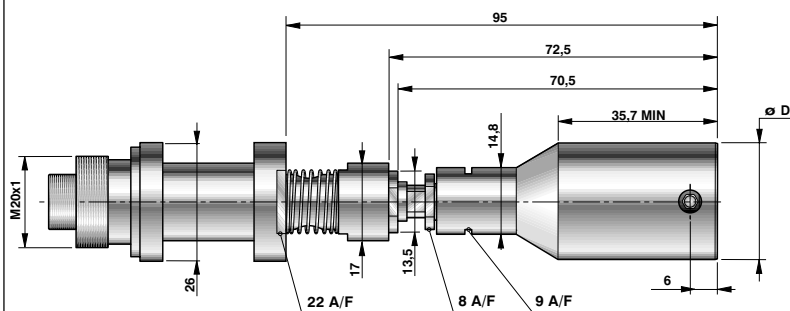
 WORKING RANGE: 120 μm

CONTACTS:

Tungsten carbide: R1 = 2 mm; R2 = 3,5 mm

Amorphous carbon: R1 = 2 mm; R2 = 3,5 mm

Diamond: R1 = 2 mm

T 15 - 26
 $15 \text{ mm} \leq \varnothing_{\text{min}} \text{ bore} < 26 \text{ mm}$
 $\varnothing D = \varnothing D_{\text{nominal}}^{0}_{-0,015} (*)$

THREAD: M 20 x 1

 WORKING RANGE: 120 μm

CONTACTS:

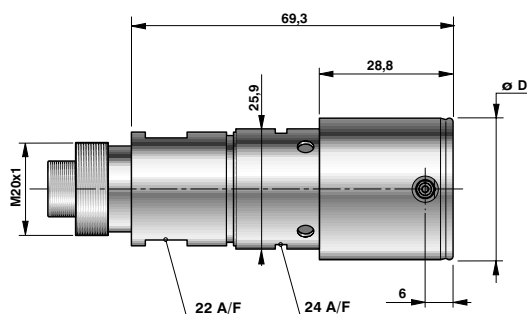
Tungsten carbide: R1 = 2 mm; R2 = 5 mm

Amorphous carbon: R1 = 2 mm; R2 = 5 mm

Diamond:

RANGE 15+ 16 R1 = 2 mm

RANGE 16+ 26 R1 = 2 mm; R2 = 5 mm

T 26 - 40
 $26 \text{ mm} \leq \varnothing_{\text{min}} \text{ bore} < 40 \text{ mm}$
 $\varnothing D = \varnothing D_{\text{nominal}}^{0}_{-0,015} (*)$

THREAD: M 20 x 1

 WORKING RANGE: 150 μm

CONTACTS:

Tungsten carbide: R1 = 4 mm; R2 = 10 mm

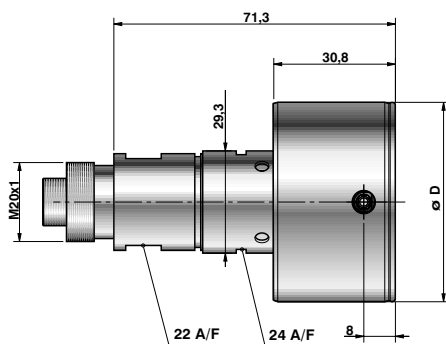
Amorphous carbon: R1 = 4 mm; R2 = 10 mm

Diamond:

RANGE 26+ 32 R1 = 2 mm

RANGE 32+ 40 R1 = 4 mm; R2 = 10 mm

 (*) $\varnothing D_{\text{NOMINAL}}$ = nominal nosepiece diameter = $\varnothing_{\text{MIN}} \text{ BORE} - [0,0007 * (\varnothing_{\text{MIN}} \text{ BORE} + 12)]$

T 40 - 74
 $40 \text{ mm} \leq \varnothing_{\min} \text{ bore} < 74 \text{ mm}$
 $\varnothing = 40+50: = \varnothing D_{\text{nominal}}^0_{-0,020} (*)$
 $\varnothing = 50+74: = \varnothing D_{\text{nominal}}^0_{-0,030} (*)$

THREAD: M 20 x 1

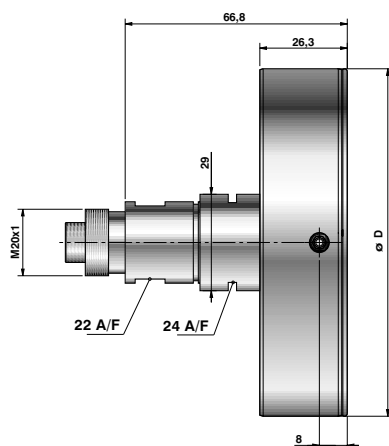
WORKING RANGE: 150 μm

CONTACTS:

Tungsten carbide: R1 = 4 mm; R2 = 10 mm

Amorphous carbon: R1 = 4 mm; R2 = 10 mm

Diamond: R1 = 4 mm; R2 = 10 mm

T 74 - 300
 $74 \text{ mm} \leq \varnothing_{\min} \text{ bore} \leq 300 \text{ mm}$
 $\varnothing D = \varnothing D_{\text{nominal}}^{t+}_{t-} (*)$

$\varnothing_{\min}$ BORE	t-	t+
74+ 104	-0,03	0
104+ 150	-0,05	-0,01
150+ 300	-0,06	-0,01

THREAD: M 20 x 1

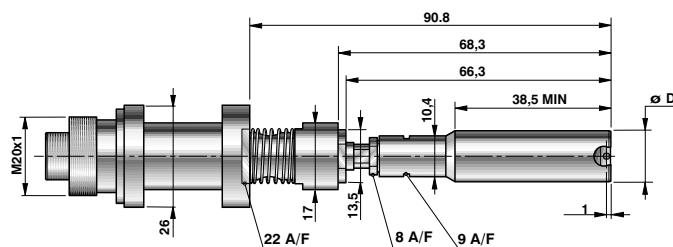
WORKING RANGE: 150 μm

CONTACTS:

Tungsten carbide: R1 = 4 mm; R2 = 10 mm

Amorphous carbon: R1 = 4 mm; R2 = 10 mm

Diamond: R1 = 4 mm; R2 = 10 mm

PLUG GAUGE EBG-SB**SB 10,5 - 13**
 $10,5 \text{ mm} \leq \varnothing_{\min} \text{ bore} < 13 \text{ mm}$
 $\varnothing D = \varnothing D_{\text{nominal}}^0_{-0,015} (*)$

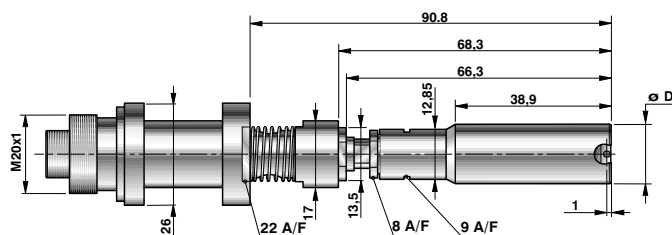
THREAD: M 20 x 1

WORKING RANGE: 120 μm

CONTACTS:

Tungsten carbide: R1 = 2 mm; R2 = 3,5 mm

Amorphous carbon: R1 = 2 mm; R2 = 3,5 mm

SB 13 - 15
 $13 \text{ mm} \leq \varnothing_{\min} \text{ bore} < 15 \text{ mm}$
 $\varnothing D = \varnothing D_{\text{nominal}}^0_{-0,015} (*)$

THREAD: M 20 x 1

WORKING RANGE: 120 μm

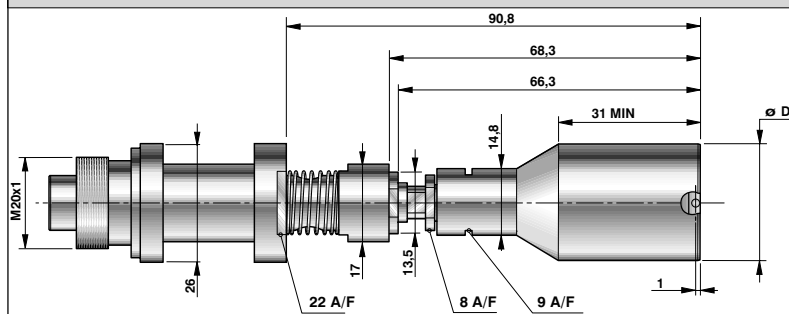
CONTACTS:

Tungsten carbide: R1 = 2 mm; R2 = 3,5 mm

Amorphous carbon: R1 = 2 mm; R2 = 3,5 mm

(*) $\varnothing D_{\text{NOMINAL}}$ = nominal nosepiece diameter = $\varnothing_{\min} \text{ BORE} - [0,0007 * (\varnothing_{\min} \text{ BORE} + 12)]$

SB 15 - 26



15 mm ≤ $\phi_{\min}$ bore < 26 mm

$\phi D = \phi D_{\text{nominal}}^{+0}_{-0,015} (*)$

THREAD: M 20 x 1

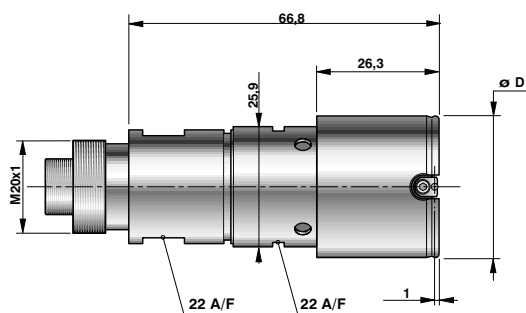
WORKING RANGE: 120 μm

CONTACTS:

Tungsten carbide: R1 = 2 mm; R2 = 5 mm

Amorphous carbon: R1 = 2 mm; R2 = 5 mm

SB 26 - 74



26 mm ≤ $\phi_{\min}$ bore < 74 mm

$\phi = 26 \div 50: = \phi D_{\text{nominal}}^{+0}_{-0,020} (*)$

$\phi = 50 \div 74: = \phi D_{\text{nominal}}^{+0}_{-0,030} (*)$

THREAD: M 20 x 1

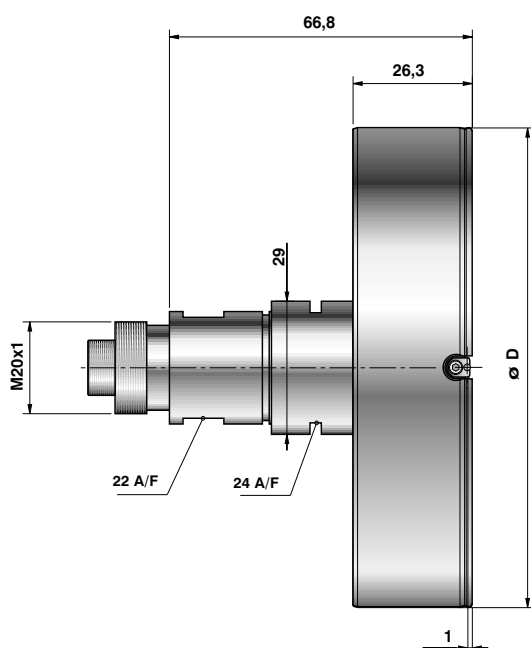
WORKING RANGE: 150 μm

CONTACTS:

Tungsten carbide: R1 = 4 mm; R2 = 10 mm

Amorphous carbon: R1 = 4 mm; R2 = 10 mm

SB 74 - 300



74 mm ≤ $\phi_{\min}$ bore ≤ 300 mm

$\phi D = \phi D_{\text{nominal}}^{+t}_{-t} (*)$

$\phi_{\min}$ BORE	t-	t+
74 ÷ 104	-0,03	0
104 ÷ 150	-0,05	-0,01
150 ÷ 300	-0,06	-0,01

THREAD: M 20 x 1

WORKING RANGE: 150 μm

CONTACTS:

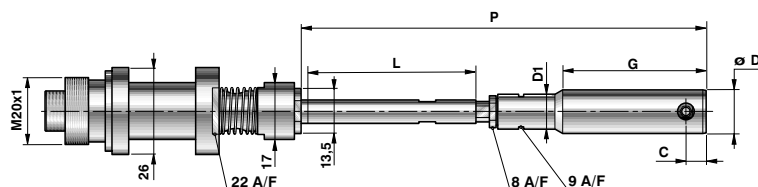
Tungsten carbide: R1 = 4 mm; R2 = 10 mm

Amorphous carbon: R1 = 4 mm; R2 = 10 mm

(*) ϕD_{NOMINAL} = nominal nosepiece diameter = $\phi_{\min}$ BORE - [0,0007* ($\phi_{\min}$ BORE + 12)]

PLUG GAUGE EBG-DEEP - DEEP BORES 10,5-26 mm

DEEP 10,5 - 13


 $10,5 \text{ mm} \leq \varnothing_{\min} \text{ bore} < 13 \text{ mm}$
 $\varnothing D = \varnothing D_{\text{nominal}}^{0}_{-0,015} (*)$

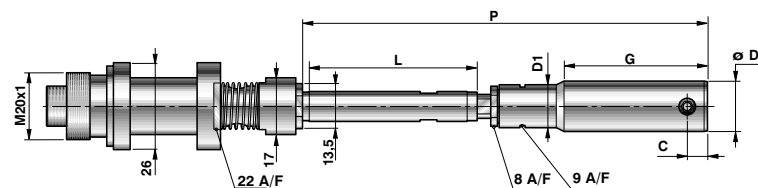
THREAD: M 20 x 1

 WORKING RANGE: 120 μm

CONTACTS:

SEE DIMENSIONAL TABLE

DEEP 13 - 26


 $13 \text{ mm} \leq \varnothing_{\min} \text{ bore} < 26 \text{ mm}$
 $\varnothing D = \varnothing D_{\text{nominal}}^{0}_{-0,015} (*)$

THREAD: M 20 x 1

 WORKING RANGE: 120 μm

CONTACTS:

SEE DIMENSIONAL TABLE

FUNCTIONAL DIMENSIONS				CONTACTS			
				TUNGSTEN CARBIDE / AMORPHOUS CARBON		DIAMOND	
RANGE	C	G min	D1	R1	R2	R1	R2
$10,5 \leq \varnothing < 13$	B: 3 T: 6 SB: 1	B: 32,7 T: 35,7 SB: 31	10,40	2	3,5	0,7 5	-
$13 \leq \varnothing < 15$			12,85	2	3,5	2	-
$15 \leq \varnothing < 20$			14,80	2	5	2	5*
$20 \leq \varnothing < 26$	B: 3,5 T: 6 SB: 1		14,80	2	5	2	5

 * = Only available for **T** configuration

Extension length "L" (mm)	P (mm)
20	B/T: 84,5 + C SB: 86,3
30	B/T: 94,5 + C SB: 96,3
40	B/T: 104,5 + C SB: 106,3
50	B/T: 114,5 + C SB: 116,3
65	B/T: 129,5 + C SB: 131,3
80*	B/T: 144,5 + C SB: 146,3
100	B/T: 164,5 + C SB: 166,3
125	B/T: 189,5 + C SB: 191,3
250	B/T: 314,5 + C SB: 316,3
500	B/T: 564,5 + C SB: 566,3

OTHER COMPONENTS (OPTIONAL)

COMPLETE HANDLE

The functionality of the handle is ensured by its ergonomic shape, and a spring cable guide preserves the cable from torsion. The handle is equipped with a metal number plate on to which the tool number/operation number or significant code of the application can be marked, by the customer if wished.

CODE	2THS000000
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EXTENSIONS

The stainless steel extensions, when inserted between the plug gauge 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÷ 300	20	1TX0S00020
	30	1TX0S00030
	40	1TX0S00040
	50	1TX0S00050
	65	1TX0S00065
	80	1TX0S00080
	100	1TX0S00100
	125	1TX0S00125
	250	1TX0S00250
	500	1TX0S00500



HANGING DEVICE

In order to make it possible to hang the M1 Star EBG and to avoid the hindrance of the cable on the worktable. The handle can be equipped with an eye or T-hook (shown in the figures).

	ORDER CODE
EYE	1T0JHS0810
T-HOOK	1T0JHS0811

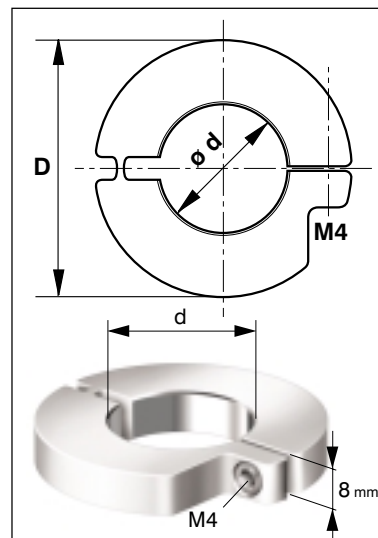
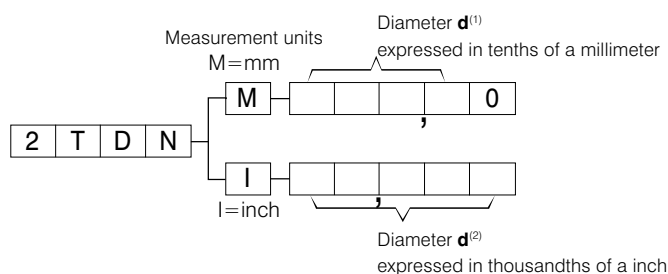


DEPTH STOPS

The depth stops are used to precisely define the depth of the measuring section. They are made out of stainless steel and can be fastened, in a longitudinal position, on the nosepiece or on the extensions.

DEPTH STOPS WITH FASTENING ON NOSEPIECE

$\varnothing$ min Bore (mm)	$\varnothing$ D (mm)	$\varnothing$ min Bore (mm)	$\varnothing$ D (mm)
$8 \leq \varnothing < 11$	33	$40 \leq \varnothing < 45$	71
$11 \leq \varnothing < 15$	37	$45 \leq \varnothing < 50$	76
$15 \leq \varnothing < 20$	42	$50 \leq \varnothing < 60$	86
$20 \leq \varnothing < 25$	51	$60 \leq \varnothing < 70$	96
$25 \leq \varnothing < 30$	56	$70 \leq \varnothing < 80$	106
$30 \leq \varnothing < 35$	61	$80 \leq \varnothing < 90$	116
$35 \leq \varnothing < 40$	66	$90 \leq \varnothing \leq 100$	126



Examples of ordering codes:

⁽¹⁾ $d = \varnothing_{\min}$ Bore rounded up +0,1 mm

Examples:

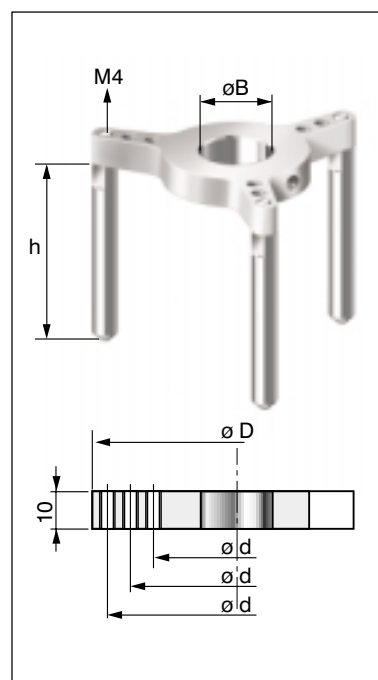
$\varnothing_{\min}$ Bore = 9,503 mm $\rightarrow d = 9,6 + 0,1 = 9,7$ mm $\rightarrow$ 2TDNM00970

$\varnothing_{\min}$ Bore = 28 mm $\rightarrow d = 28 + 0,1 = 28,1$ mm $\rightarrow$ 2TDNM02810

DEPTH STOPS WITH FASTENING ON EXTENSIONS

The order codes are the followings:

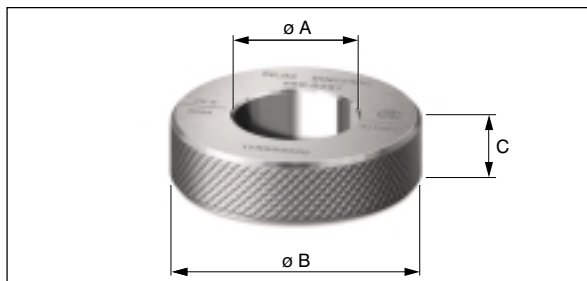
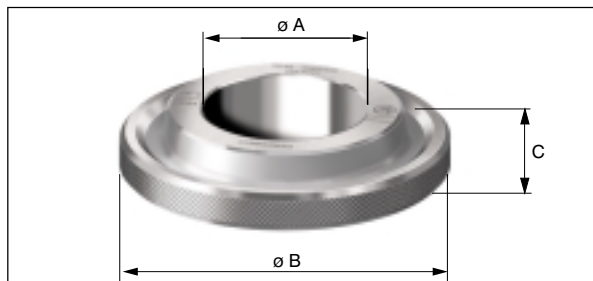
$\varnothing$ B (mm)	$\varnothing$ D (mm)	h (mm)	$\varnothing$ d (mm)				ORDER CODE
7	42	63,8	26				2TDEE070A0
9	42	63,8	36				2TDEE090A0
22	45	63,3	38				2TDEE220A0
	75		44	56	68		2TDEE220B0
	110		79	91	103		2TDEE220C0
	160		117	129	141	153	2TDEE220D0
	220		177	189	201	213	2TDEE220E0



SETTING RINGS - DIN 2250-C

The setting rings are used to zero-set the plug gauge on the basis of one or more preselected diameters (minimum, maximum, tolerance center and/or nominal bore diameter).

Material: 18 NiCrMo5 Hardness: 62-64 HRc



Ø A (mm)	Ø B (mm)	C (mm)
100 ≤ Ø < 110	170	28
110 ≤ Ø < 120	180	
120 ≤ Ø < 130	190	
130 ≤ Ø < 140	200	
140 ≤ Ø < 150	212	
150 ≤ Ø < 160	224	
160 ≤ Ø < 170	236	32
170 ≤ Ø < 180	250	
180 ≤ Ø < 190	265	
190 ≤ Ø < 200	280	
200 ≤ Ø < 212	300	
212 ≤ Ø < 224	315	
224 ≤ Ø < 236	335	36
236 ≤ Ø < 250	355	
250 ≤ Ø < 265	375	
265 ≤ Ø < 280	400	
280 ≤ Ø ≤ 300	425	

Ø A (mm)	Ø B (mm)	C (mm)
3 ≤ Ø < 5	22	5
5 ≤ Ø < 10	32	8
10 ≤ Ø < 15	38	10
15 ≤ Ø < 20	45	12
20 ≤ Ø < 25	53	14
25 ≤ Ø < 32	63	16
32 ≤ Ø < 40	71	18
40 ≤ Ø < 50	85	20
50 ≤ Ø < 60	100	
60 ≤ Ø < 70	112	24
70 ≤ Ø < 80	125	
80 ≤ Ø < 90	140	
90 ≤ Ø < 100	160	

HOW TO ORDER THE SETTING RING

Measurement unit:
R = mm
U = inch

Nominal value of diameter selected for zero-setting:

· in µm for type R
· in thousandths of an inch for U type

1	T								
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If nominal value selected 3 ≤ Ø A < 100 mm { C = without calibration certificate
V = with calibration certificate

If nominal value selected 100 ≤ Ø A ≤ 300 mm { D = without calibration certificate
W = with calibration certificate

Examples of ordering codes:

1. To order a center tolerance setting ring for a bore Ø 30^{+0.03}₀ mm without calibration certificate:

• 1TR030015C

2. To order a minimum tolerance setting ring for a bore Ø 28.026^{+0.026}_{-0.026} mm with calibration certificate:

• 1TR028000V

2. To order a maximum tolerance setting ring for a bore Ø 4.1885^{+0.001}_{-0.001} mm with calibration certificate:

• 1TU041895W

TECHNICAL SPECIFICATION

DESCRIPTION	unit	DIAMETER RANGE				
		3 - 10,5 mm		10,5 - 26 mm		26 - 300 mm
		3 - 8 mm	8 - 10,5 mm	10,5 - 13 mm	13 - 26 mm	
WORKING RANGE ⁽¹⁾	mm	Standard: 0,070	Standard: 0,100	Standard: 0,100 (Max*: 0,200)	Standard: 0,120 (Max*: 0,200)	Standard: 0,150 (Max*: 0,300)
MEASURING FORCE	N	[0,6 ± 0,1]		[0,7 ± 0,2]	[0,7 ± 0,2]	[0,9 ± 0,2]
REPEATABILITY (2,77σ)	μm	≤ 0,5				
ZERO THERMAL DRIFT	μm/C°	≤ 0,3				

¹⁾ WORKING RANGE: it's the piece's tolerance range, measurable by the plug-gauge.

^(*) 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.

COMPLETE YOUR MEASURING APPLICATION WITH M1 STAR COMPANION PRODUCTS



E9066T

A highly compact yet extremely powerful all-in-one Industrial Computer, suited to withstand the abuse of severe shop floor environments. The industrial grade design makes it the ideal complement to the Easy Box and Gage-Box™ data acquisition systems, for metrological applications using analog sensors, serial input devices, manual data input and digital I/O signals with Quick SPC™ software.



QUICK READ

Compact electronic display unit with analog and digital display, available with built-in or remote probe or as Micro-column for connection of one or two HBT probes and dynamic measurement.



E4N

Microprocessor column with 1, 2 or 4 inputs for LVDT or HBT probes, capable to elaborate complex dimensional and geometric measurements and featuring a wide range of interfaces (RS232, Digimatic, analog, Relay/BCD).



EASY BOX

Interface box allowing easy and economical connection of LVDT or HBT probes and Digimatic devices to the E9066s Industrial PC or any commercial Personal Computer via USB port (Universal Serial Bus). Suitable for applications with:

- limited number of transducers
- static and manual dynamic measurement acquisition
- simple data collection and SPC requirement



GAGE BOX

Shop floor hardened, expandable Data Acquisition System allowing direct interfacing to the E9066s Industrial PC or any commercial Personal Computer and data collection from LVDT and HBT probes. Suitable for applications where:

- large numbers of transducers are used
- acquisition is manual or automatic using static/dynamic cycles
- demand for data collection and SPC is required.

For a full list of address locations, please consult the Marposs official website www.marposs.com - www.testar.com

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