

STYLI and ACCESSORIES



REFERENZKUGELN ***REFERENCE SPHERES***

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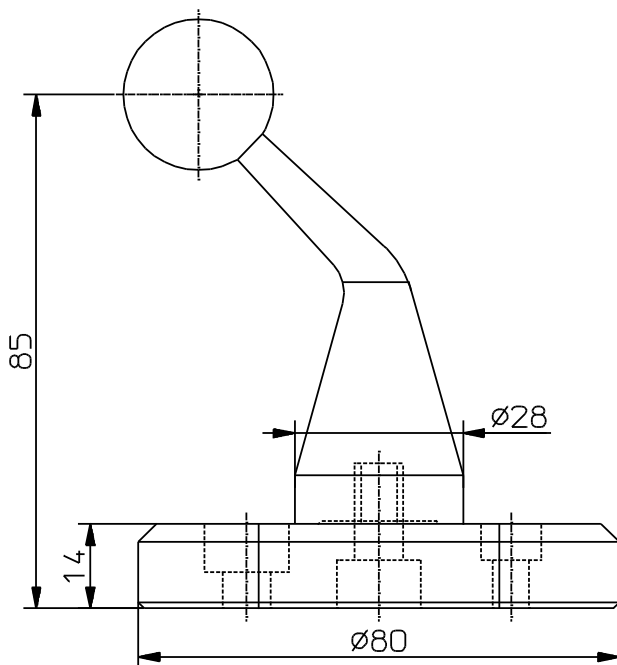
REFERENZKUGELN

REFERENCE SPHERES

Referenzkugeln / Reference spheres	Bestell-Nr. Order No.	Kugel Material Ball material	Kugel-Ø Ball-Ø
Referenzkugel mit Grundsockel (Typ A) Reference spheres with base plate (Type A)	15 NRKA	Keramik / Ceramic	15mm
	20 NRKA	Keramik / Ceramic	20mm
	25 NRKA	Keramik / Ceramic	25mm
	30 NRKA	Keramik / Ceramic	30mm
	25 NRSA	Stahl / Steel	25mm

Antasten aus allen 6 Halbachsen

Probing from all 6 semi-axes



Lieferumfang:

- Kugelhalter gebogen 45° mit Referenzkugel L=85mm
- Grundsockel (Seite 89)
- Verlängerung L=70mm (Seite 89)
- Befestigungs-Schrauben: je 1 Stück M6, M8, M10
- Werkzertifikat der Referenzkugel

Supplied equipment:

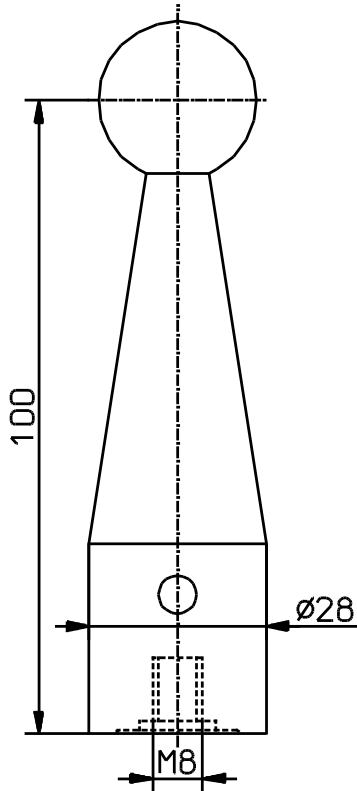
- Ball holder bent 45° with reference sphere L=85mm
- Base plate (Page 89)
- Extension L=70mm (Page 89)
- Fixing screws 1x M6, 1x M8, 1x M10
- Test certificate

Material Material	Formabweichung Form deviation
Keramik Al ₂ O ₃ Ceramic Al ₂ O ₃	< 0.2µm
Stahl AISI 440C Steel AISI 440C	< 0.2µm

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Referenzkugeln / Reference spheres	Bestell-Nr. Order No.	Kugel Material Ball material	Kugel-Ø Ball-Ø
Referenzkugel (Typ B) / Reference spheres (Type B)	15 NRKB	Keramik / Ceramic	15mm
	20 NRKB	Keramik / Ceramic	20mm
	25 NRKB	Keramik / Ceramic	25mm
	30 NRKB	Keramik / Ceramic	30mm
	25 NRSB	Stahl / Steel	25mm



Lieferumfang:

- Kugelhalter mit Referenzkugel L=100mm
- Werkzertifikat der Referenzkugel

Den zu Ihrer Messmaschine passenden **Befestigungsbolzen** bitte bestellen (Seite 89).

Verlängerungen auf Seite 89.

Supplied equipment:

- Ball holder with reference sphere L=100mm
- Test certificate

Please order the appropriate size **Fixing bolt** to your CMM (Page 89).

Extensions see Page 89.

Material Material	Formabweichung Form deviation
Keramik Al ₂ O ₃ Ceramic Al ₂ O ₃	< 0.2µm
Stahl AISI 440C Steel AISI 440C	< 0.2µm

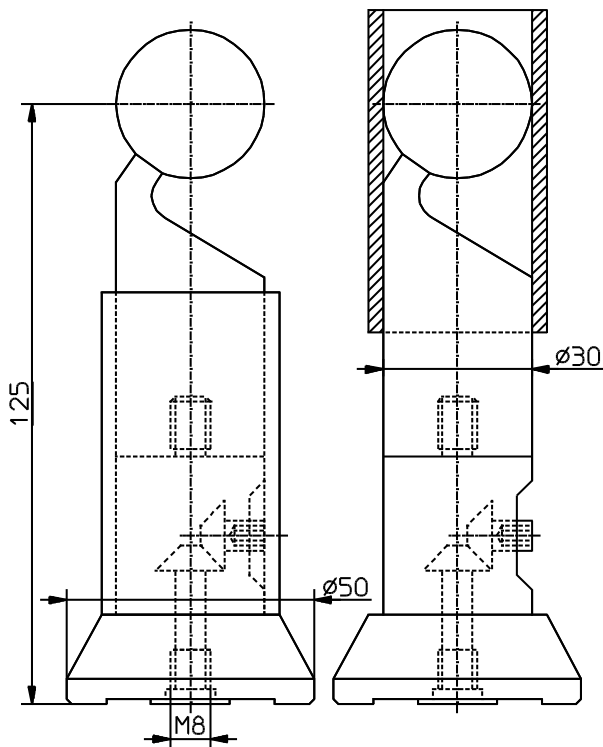
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Referenzkugeln / Reference spheres	Bestell-Nr. / Order No.	Kugel Material / Ball material	Kugel-Ø / Ball-Ø
Referenzkugel mit Winkelgetriebe (Typ C) Reference spheres (Type C)	15 NRKC	Keramik / Ceramic	15mm
	20 NRKC	Keramik / Ceramic	20mm
	25 NRKC	Keramik / Ceramic	25mm
	30 NRKC	Keramik / Ceramic	30mm
	25 NRSC	Stahl / Steel	25mm

Antasten aus allen 6 Halbachsen.
Befestigung auf der Messplatte mittels Winkelgetriebe.

Probing from all 6 semi-axes.
Can be fixed to the surface plate with angle gear.



Lieferumfang:

- 1) Kugelhalter gebogen 30° mit Referenzkugel L=125mm
- 2) Grundsockel mit Winkelgetriebe
- 3) Schiebehülse zum Schutz der Referenzkugel
- 4) Verlängerung L=50mm (Seite 89)
- 5) Sechskantschlüssel SW 3.0mm
- 6) Stiftschlüssel Ø 2.9mm (Seite 75)
- 7) Befestigungsbolzen: je 1 Stück M6, M8, M10 (Seite 89)

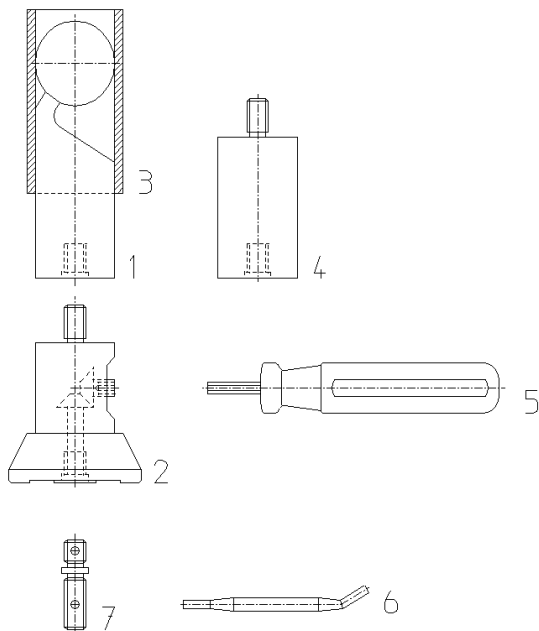
- Werkzertifikat der Referenzkugel

Supplied equipment:

- 1) Ball holder bent 30° with reference sphere L=125mm
- 2) Base plate with angle gear
- 3) Sliding sleeve to protect the reference sphere
- 4) Extension L=50mm (Page 89)
- 5) Hexagon key 3.0mm
- 6) Pin key Ø 2.9mm (Page 75)
- 7) Fixing bolts 1x M6, 1x M8, 1x M10 (Page 89)

- Test certificate

Material / Material	Formabweichung / Form deviation
Keramik Al ₂ O ₃ Ceramic Al ₂ O ₃	< 0.2µm
Stahl AISI 440C Steel AISI 440C	< 0.2µm



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Dimensional measurement technology : Styli for coordinate measuring machines (CMM), machine tools, height gauges

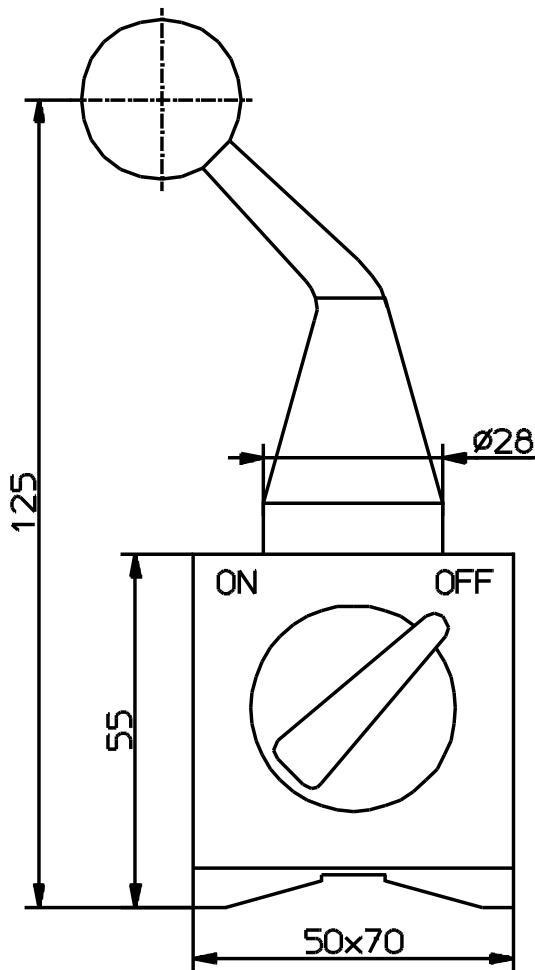
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Referenzkugeln / Reference spheres	Bestell-Nr. Order No.	Kugel Material Ball material	Kugel-Ø Ball-Ø
Referenzkugel mit Magnetsockel (Typ D) Reference spheres with magnetic base (Type D)	15 NRKD	Keramik / Ceramic	15mm
	20 NRKD	Keramik / Ceramic	20mm
	25 NRKD	Keramik / Ceramic	25mm
	30 NRKD	Keramik / Ceramic	30mm
	25 NRSD	Stahl / Steel	25mm

Antasten aus allen 6 Halbachsen

Probing from all 6 semi-axes



Lieferumfang:

- Kugelhalter gebogen 45° mit Referenzkugel L=125mm
- Magnetsockel (Ein/Aus)
- Verlängerung L=70mm (Seite 89)
- Werkzertifikat der Referenzkugel
- Lieferung im Holzetui

Supplied equipment:

- Ball holder bent 45° with reference sphere L=125mm
- Magnetic base (on/off)
- Extension L=70mm (Page 89)
- Test certificate
- Delivery in a wooden case

Material Material	Formabweichung Form deviation
Keramik Al ₂ O ₃ Ceramic Al ₂ O ₃	< 0.2µm
Stahl AISI 440C Steel AISI 440C	< 0.2µm

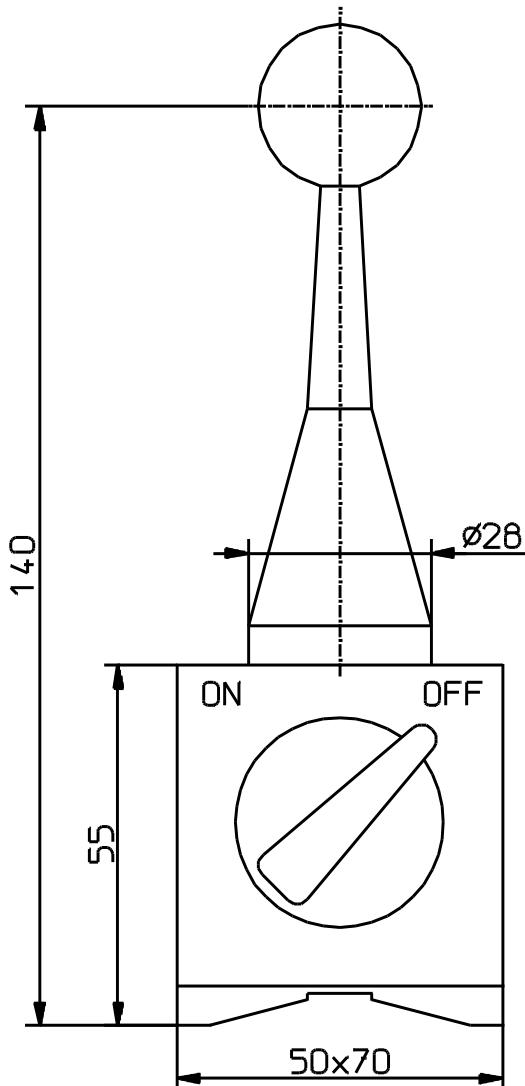
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Referenzkugeln / Reference spheres	Bestell-Nr. Order No.	Kugel Material Ball material	Kugel-Ø Ball-Ø
Referenzkugel mit Magnetsockel (Typ E) Reference spheres with magnetic base (Type E)	15 NRKE	Keramik / Ceramic	15mm
	20 NRKE	Keramik / Ceramic	20mm
	25 NRKE	Keramik / Ceramic	25mm
	30 NRKE	Keramik / Ceramic	30mm
	25 NRSE	Stahl / Steel	25mm



Lieferumfang:

- Kugelhalter mit Referenzkugel L=140mm
- Magnetsockel (Ein/Aus)
- Verlängerung L=70mm (Seite 89)
- Werkzertifikat der Referenzkugel
- Lieferung im Holzetui

Supplied equipment:

- Ball holder with reference sphere L=140mm
- Magnetic base (on/off)
- Extension L=70mm (Page 89)
- Test certificate
- Delivery in a wooden case

Material Material	Formabweichung Form deviation
Keramik Al ₂ O ₃ Ceramic Al ₂ O ₃	< 0.2µm
Stahl AISI 440C Steel AISI 440C	< 0.2µm

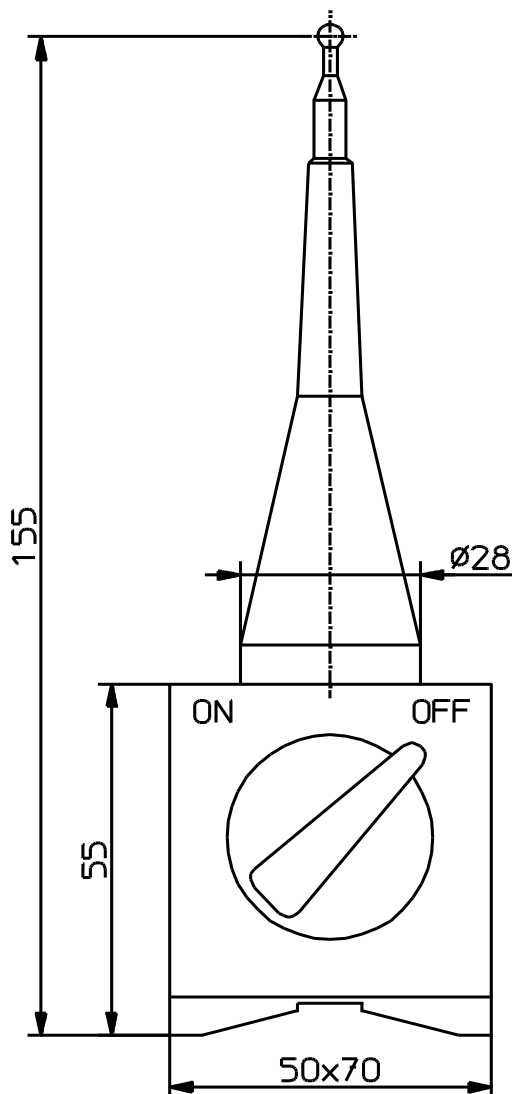
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Referenzkugeln / Reference spheres	Bestell-Nr. Order No.	Kugel Material Ball material	Kugel-Ø Ball-Ø
Referenzkugel für Erodiermaschinen (Typ F) Reference spheres for Electrical Discharge Machine EDM (Type F)	245 NRKF	Hartmetall / TC	2mm 4mm 5mm

Elektrisch leitende Referenzkugeln

Electrically conductive reference spheres



Lieferumfang:

- Kugelhalter mit Referenzkugeln L=155mm
- 3 Stück Referenzkugeln: Ø2mm, Ø4mm, Ø5mm (auswechselbar)
- Magnetsockel (Ein/Aus)
- Verlängerung L=70mm (Seite 89)
- Lieferung im Holzetui

Technische Daten der Referenzkugeln:

Durchmesser Toleranz: $\pm 1\mu\text{m}$
Formabweichung: $< 0.25\mu\text{m}$

Supplied equipment:

- Ball holder with reference sphere L=155mm
- 3 pcs reference spheres: Ø2mm, Ø4mm, Ø5mm (exchangeable)
- Magnetic base (on/off)
- Extension L=70mm (Page 89)
- Delivery in a wooden case

Technical data of reference spheres:

Diameter tolerance: $\pm 1\mu\text{m}$
Form deviation: $< 0.25\mu\text{m}$

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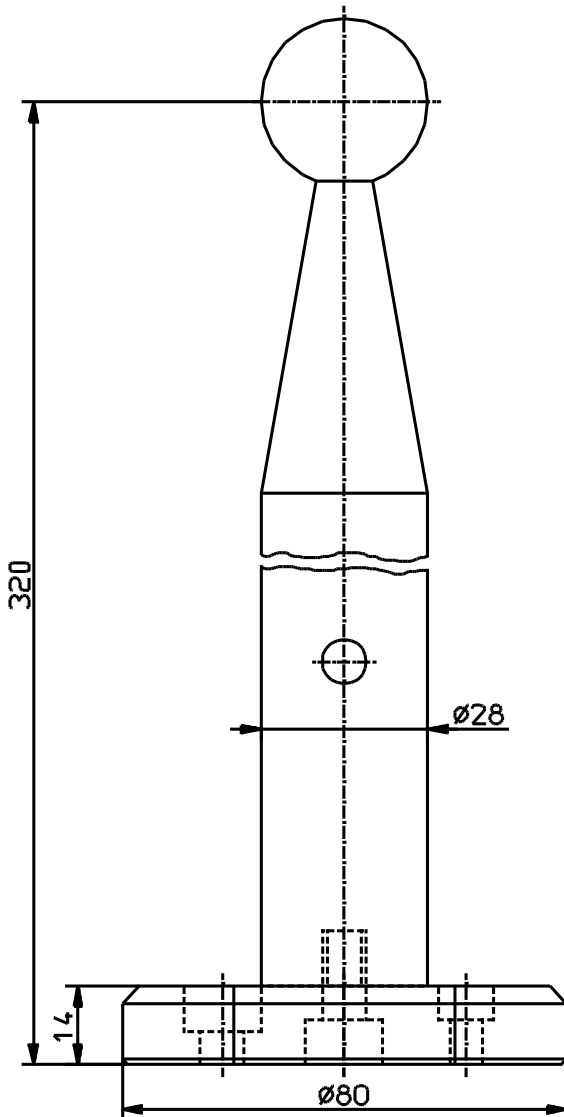
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Referenzkugeln / Reference spheres	Bestell-Nr. Order No.	Kugel Material Ball material	Kugel-Ø Ball-Ø
Referenzkugel mit Grundsockel (Typ G) Reference spheres with base plate (Type G)	20 NRKG	Keramik / Ceramic	20mm
	25 NRKG	Keramik / Ceramic	25mm
	30 NRKG	Keramik / Ceramic	30mm
	50 NRKG	Keramik / Ceramic	50mm
	25 NRSG	Stahl / Steel	25mm

Grosse Ausführung / Large design



Lieferumfang:

- Kugelhalter mit Referenzkugel L=320mm
- Grundsockel (Seite 89)
- Verlängerung L=200mm (Seite 89)
- Befestigungs-Schrauben: je 1 Stück M6, M8, M10
- Werkzertifikat der Referenzkugel

Supplied equipment:

- Ball holder with reference sphere L=320mm
- Base plate (Page 89)
- Extension L=200mm (Page 89)
- Fixing screws 1x M6, 1x M8, 1x M10
- Test certificate

Material Material	Formabweichung Form deviation
Keramik Al ₂ O ₃ Ceramic Al ₂ O ₃	< 0.2µm
Stahl AISI 440C Steel AISI 440C	< 0.2µm

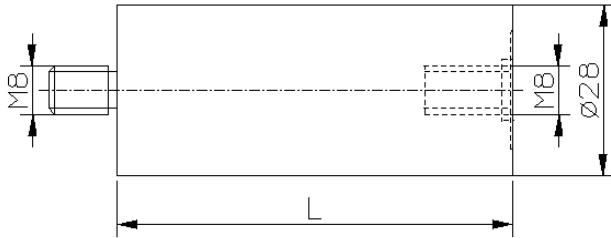
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Zubehör / Accessories	Bestell-Nr. Order No.	Material Material	L mm
Verlängerung / Extensions	70 NVRA	Stahl / Steel	70.0
	100 NVRA	Stahl / Steel	100.0
	200 NVRA	Stahl / Steel	200.0

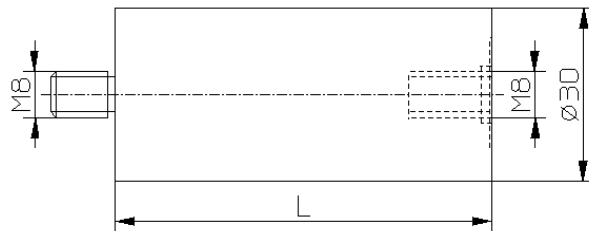


Verlängerung passend zu
Referenzkugel (Typ A, B, D, E, F, G).

For use with *Reference spheres*
(Type A, B, D, E, F, G).

Bestell-Nr. Order No.	Material Material	L mm
50 NVRC	Aluminium eloxiert Aluminium anodized	50.0
100 NVRC	Aluminium eloxiert Aluminium anodized	100.0

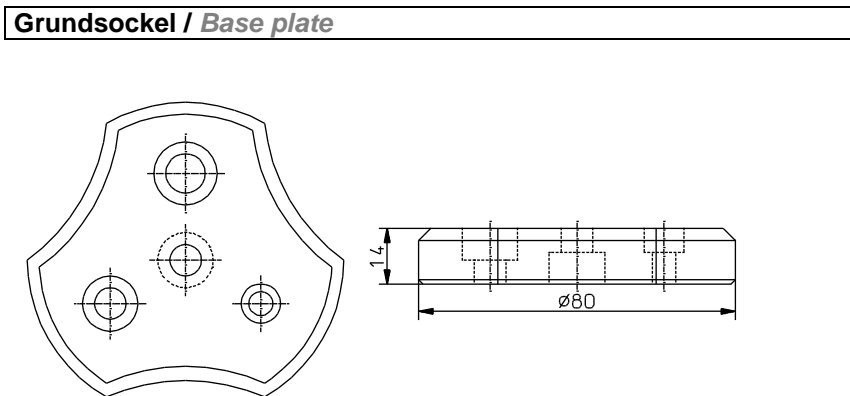
Verlängerung / Extensions



Verlängerung passend zu
Referenzkugel (Typ C).

For use with *Reference spheres*
(Type C).

Bestell-Nr. Order No.	Material Material
80 NGRA	Aluminium eloxiert Aluminium anodized



Grundsockel passend zu **Referenzkugel (Typ A, B, G).**

Lieferung mit Befestigungsschrauben
M6, M8, M10.

For use with *Reference spheres*
(Type A, B, G).

Delivery with fixing screws M6, M8, M10.

Befestigungsbolzen / Fixing bolts	Bestell-Nr. Order No.	Gewinde G Thread G
	60-6 NBB	M6
	60-8 NBB	M8
	60-10 NBB	M10
	60-1-4 NBB	1/4-20 UNC
	60-3-8 NBB	3/8-16 UNC

Befestigungsbolzen passend zu **Referenzkugel (Typ B, C).**

Andere Gewindegrößen sind auf Anfrage
erhältlich.

For use with *Reference spheres* (Type B, C). Other thread sizes are available.

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