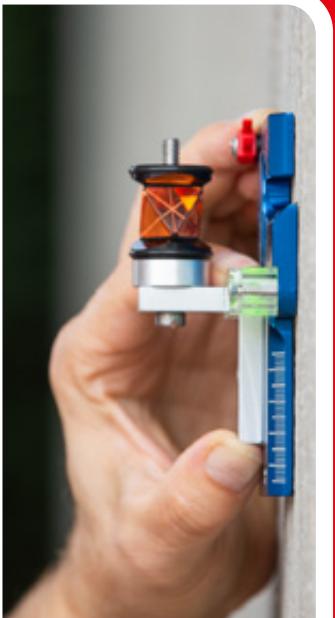
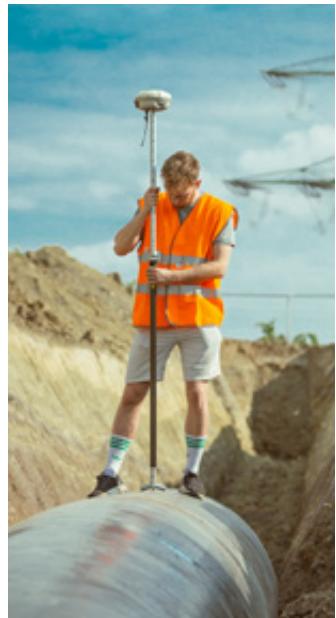




Bohnenstingl

Surveying Tools & Accessories



2025

Product Catalog - English
Version 240915



Content

Navigation

Instead of a printed catalogue we offer you the option to work with a **fully linked catalogue**.

We recommend using the **free** PDF software **Adobe Acrobat Reader DC** for a perfect experience.

Every time you find a **page number** **marked turquoise (this color)**, you can jump to this page by clicking on it.

So you can quickly find related content and additional accessories.

The "JUMP " icon takes you back to the starting point. This makes it possible at any time to provide brief intermediate information, without losing sight of the context. Also you can use the other **icons** on the bottom of each page, which help you with the navigation through the catalogue.

JUMP

BACK NEXT

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Products

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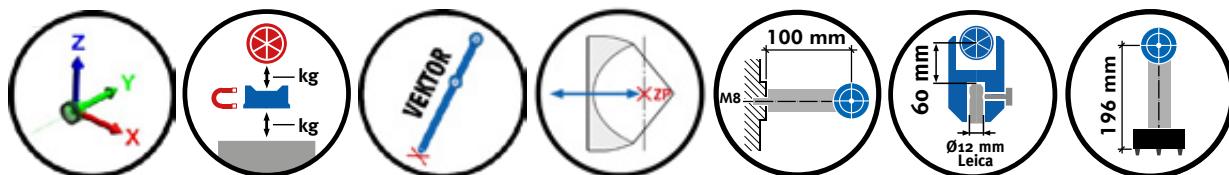
- Computer holders are found in a separate catalog:
<https://bohnenstingl.de/bohnenstingl-katalog/?lang=en>
- Sewer survey system Vektor is found in a separate catalog:
<https://bohnenstingl.de/bohnenstingl-katalog/?lang=en>

Surveying Standards and Basics

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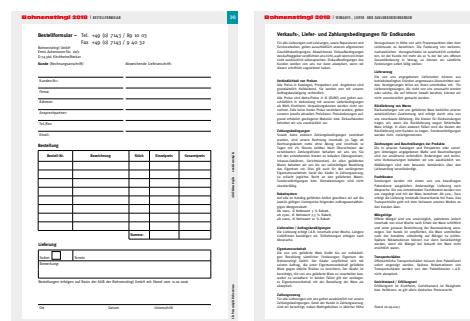
In surveying there are official (normed) standards on the one hand and basics on the other hand. Although there are no official standards for them, they have developed into a quasi standard in the course of time.

The product descriptions include logos that refer to such standards. A click on the logo jumps to the corresponding explanations. The "JUMP " icon takes you back to the starting point. This makes it possible at any time to provide brief intermediate information, without losing sight of the context.



Terms of sale, delivery and payment / Order form

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Prisms & Accessories

- Prism series HIP
- Prism holder ONRT for MP 24
 - Cylinder prism ZP11
 - 360° prisms
 - circular bubbles
 - Stakeout tips
 - articulated tripod
 - beam clamp
 - edge adapters
- Prisms to measure buildings
 - PtW marker
 - Ground Tripod Triangle

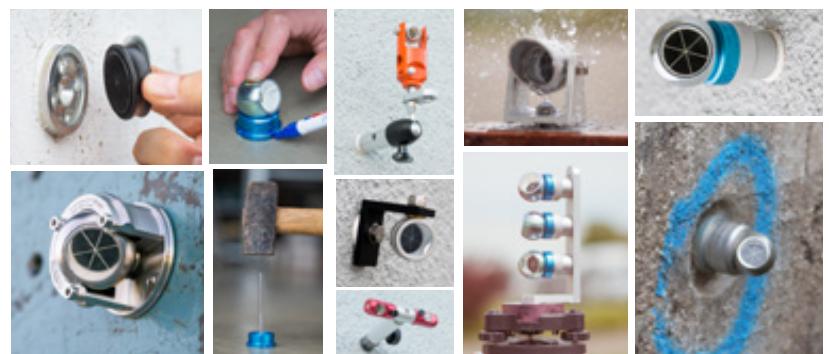


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B

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 - L-Bar prisms
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 - Nail holder HIT
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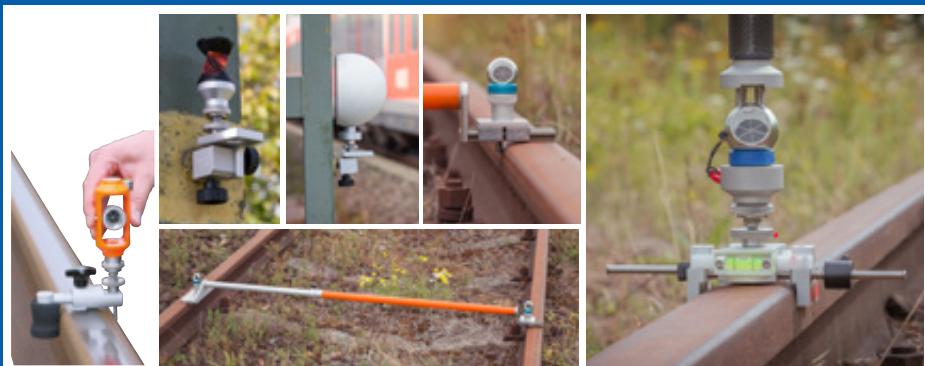


F

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- Rail Angle SW Pro
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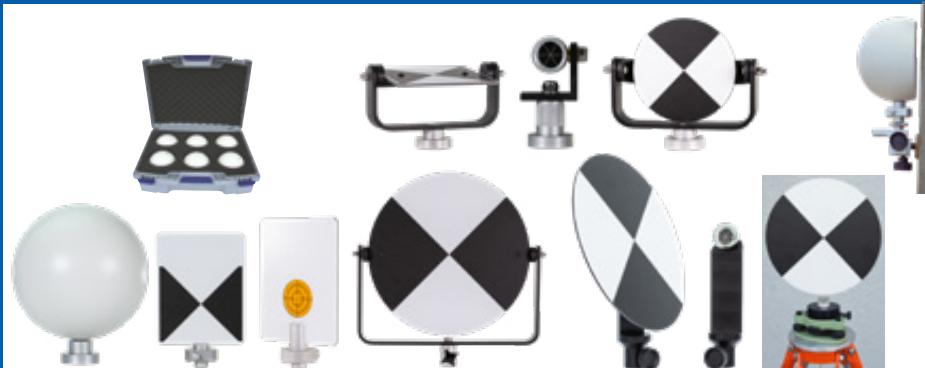


G

Laser Scanning

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- Laserscanning sphere target
 - Scan Segment Sphere
- Circular targets with centered magnetic connection
 - Holder for tribrach inserts
- Ø270 mm circular scanning targets
 - Small scanning targets "pocket"
 - Prisms with heights same as scanning spheres



H

General Surveying Accessories

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- Mounting tribrachs to desk plates
 - Tribrachs and inserts
 - Tripod rubber feet
 - Wall instrument tripod
 - Mini Instrument Tripod
- Magnetic / suction holder
- Universal Transport case
 - Pole accessories





Products

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I Adapter & Extensions

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- Computer Holders [SEPARATE CATALOG]



You can find computer mounts in a separate catalog:
<https://bohnenstingl.de/bohnenstingl-katalog/?lang=en>

- Sewer Surveying System [SEPARATE CATALOG]

Sewer measuring system Vektor can be found in a separate catalog: <https://bohnenstingl.de/bohnenstingl-katalog/?lang=en>

- System Vektor
- Boom for measuring inlets and outlets
- Tripod for sewer measuring pole





Prisms & Accessories

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A.1. Mini Prism Series HIP

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- Holder with 5/8" thread
- Holder with Leica socket
- Offset Spikes



A.2. Holder series ONRT for MP 24

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- Mini Prism MP 24
- Holder with 5/8" thread / Leica
- Offset Spikes



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A.4. 360°-Prism & Accessories

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- „RUNDUM“-Prism 6x60° & Accessories
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Prisms & Accessories

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A.5. Accessories for Prisms

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- Circular level
- Extension 50 mm
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A.6. Edge / Corner Adapters for prisms

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A.8. Tools for measuring buildings

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A.10.

Marker PtW for tachymetric height transfer

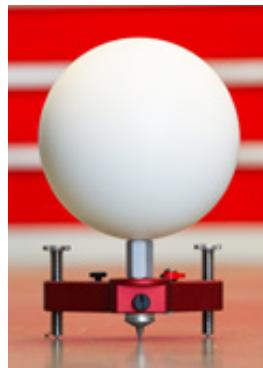
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A.11.

Ground Tripod „Triangle“ for precise point measurements

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Prism Series HIP

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A.1.1. General Information - Series HIP

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- Prism Setup
- Option: Red marked prism center
- Option: Tilting axis covers
- Option: Protective cap



A.1.2. Prism holders with 5/8" threads

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A.1.3. Prism holders with Leica sockets

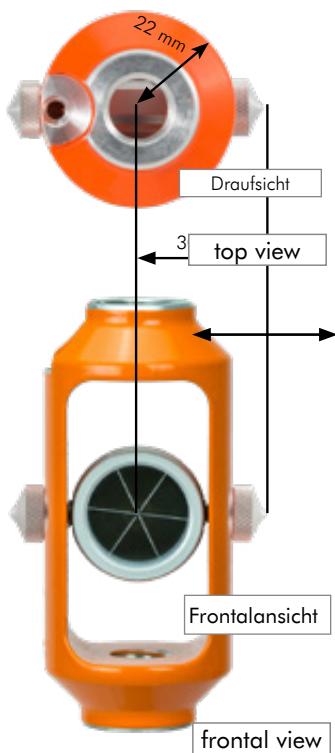
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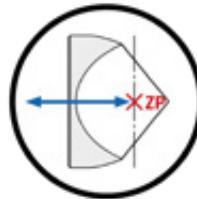
A.1.4. Offset spikes for Series HIP

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Prism Series HIP



The Prism HIP (Highly-Integrated-Prism) is characterised as follows:

- Adjustable tilting resistance of the prism
- Low space requirement of the prism carrier (radius only 22 mm)
- Glass Ø = 25 mm, except with prism constant K = -11,3 mm: glass Ø = 17,5 mm
- Distance measurement range up to more than 1000 m depending on device and weather conditions
- Mirrored reflective surfaces; no „tarnishing“ of the prism in the housing
- Highest precision due to complete CNC machining (no mould)
- Various matching accessories
- Target plate with reflective foil (26 x 40 mm) as an inexpensive alternative to glass prisms
- The prism holder is standardly equipped with tilt axis caps (lateral axis center 30 mm), which can be unscrewed to adjust the tilt resistance or to mount longer tilt axis pins (see below)

INFO

The tilting and standing axis runs exactly through the target center: at K = 0 through the centre of the printed target sign, at all other constants through the visible prism center (centrally symmetrical point).



Options

■ Tilting axis covers / pins

- To screw on
- For use as horizontal offset excenter (50 mm)
- For better targeting / visibility

Description	Order-No.	Euro
Tilting axis covers / pins for HIP prisms (2 pieces)	1615.2	26,-

■ Red marked prism center

For a better manual targeting with the tachymeter we deliver the series HIP optionally with a red marked prism center. Additional charge:

10,50 € / prism

Please contact us for this option.

■ Circular Level

Various circular levels are available on [38](#).

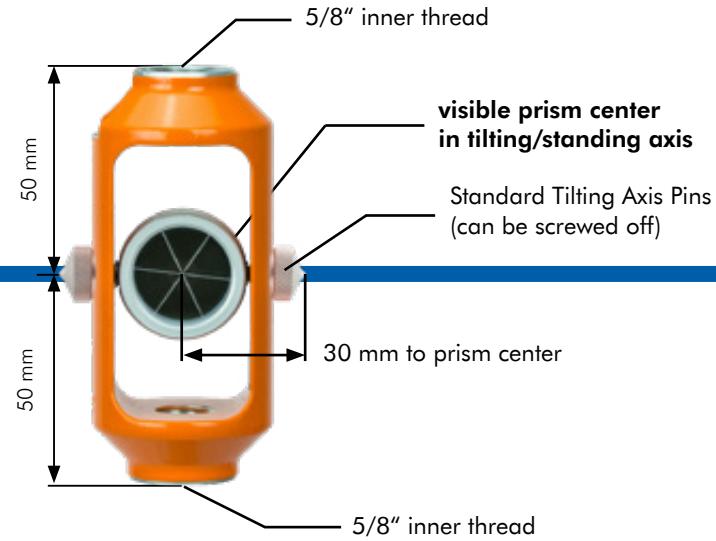
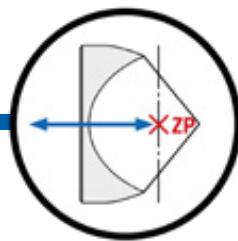
■ DB-GV-Target-compliant

For using with laser scan targets for track bolt marking [177](#).

Prisms with 5/8" thread connection

Prism HIP 2 x 5/8"

■ Prism Holder with closed design



Description	\varnothing glass prism	prism constant K	Order-No.	Euro
Prism HIP 2 x 5/8"	17,5 mm	-11,3 (Leica = +23,1) mm	1610.11	221,-
	25 mm	-16,9 (Leica = +17,5) mm	1610.17	221,-
	25 mm	-30 (Leica = +4,4) mm	1610.30	252,-
	25 mm	-34,4 (Leica = +0) mm	1610.34	257,-
	25 mm	-35,0 (Leica = -0,6) mm	1610.35	257,-

Information on prism constants can be found at [261](#)



Description	prism constant K	Order-No.	Euro
Holder HIP 2 x 5/8" with reflective foil	0 (Leica = +34,4 mm)	1615.0	134,-

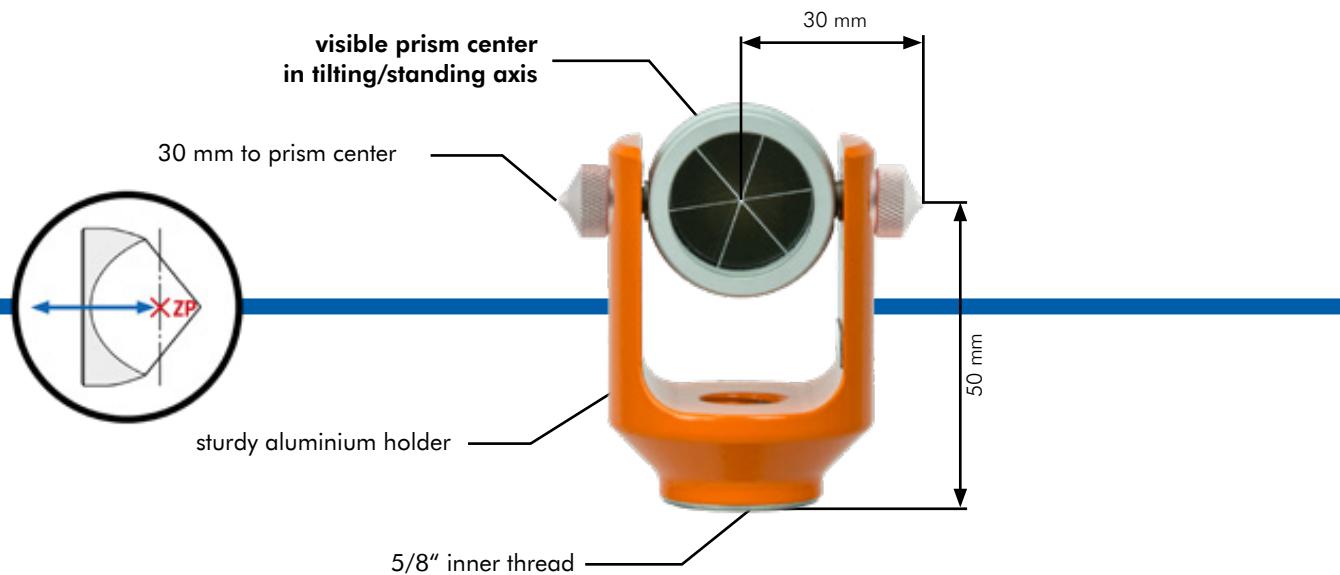
MORE OPTIONS

- Protective cap [16](#)
- Tilting axis pins [10](#)
- Red marked prism center [10](#)
- Offset spikes
- Circular Level [38](#)



Prism HIP-U 5/8"

■ Prism holder with U-Design



Description	Ø glass prism	prism constant K	Order-No.	Euro
Prism HIP-U 5/8"	17,5 mm	-11,3 (Leica = +23,1) mm	1620.11	168,-
	25 mm	-16,9 (Leica = +17,5) mm	1620.17	168,-
	25 mm	-30 (Leica = +4,4) mm	1620.30	210,-
	25 mm	-34,4 (Leica = +0) mm	1620.34	215,-
	25 mm	-35,0 (Leica = -0,6) mm	1620.35	215,-

Information on prism constants: [261](#)

Description	prism constant K	Order-No.	Euro
Holder HIP-U 5/8" with reflective foil	0 (Leica = +34,4 mm)	1625.0	94,-



MORE OPTIONS



■ Protective cap

[16](#)

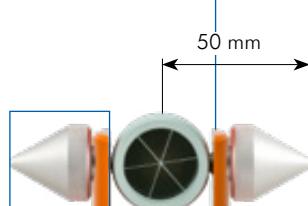
■ Tilting axis pins

[10](#)



■ Red marked prism center

[10](#)



■ Offset spikes

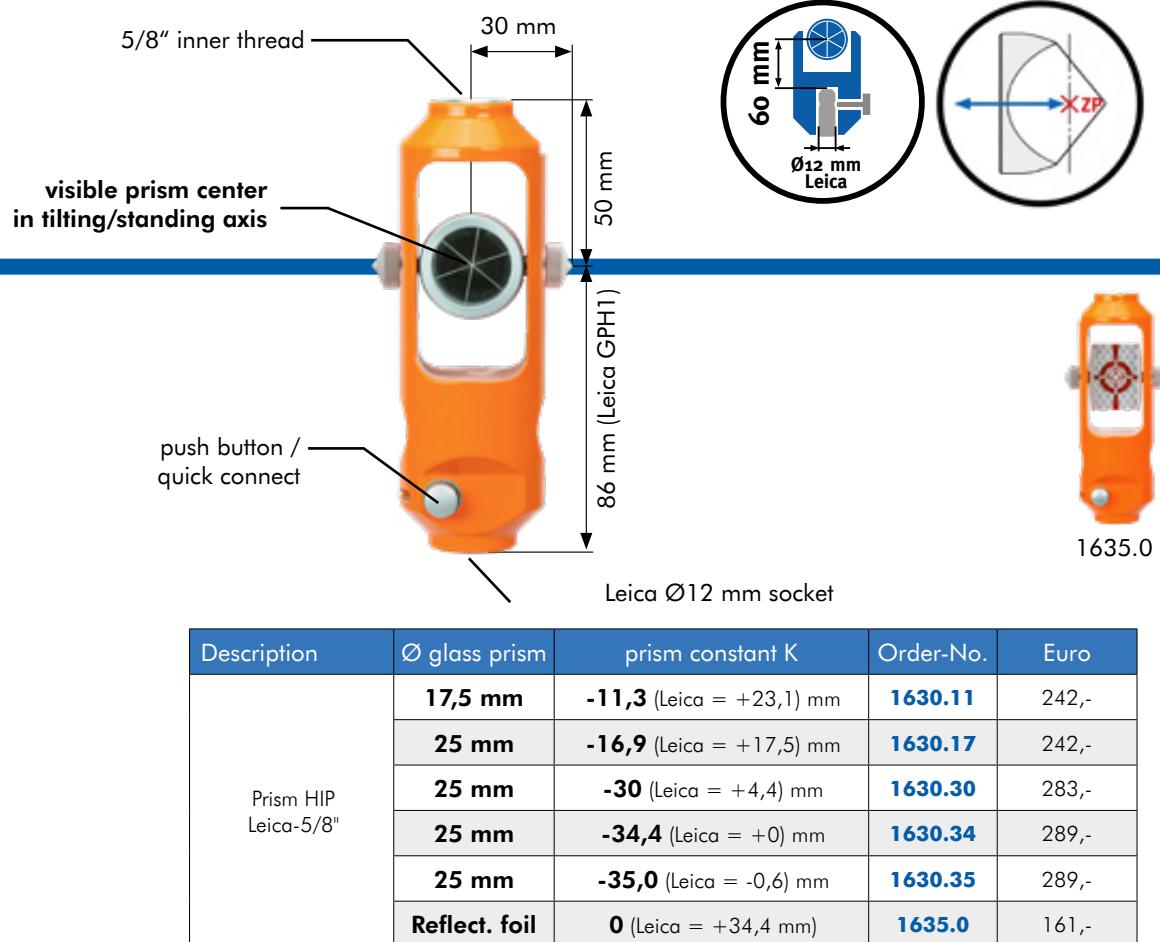
[15](#)





Prism HIP with Leica socket

■ Prism HIP Leica - 5/8": Holder with closed design



Information on prism constants: [261](#)

■ DB compliant track prism

The installation of GV targets (laser scan targets for track marking bolts) is carried out according to the guidelines of Deutsche Bahn (Ril 883.3000A2, Ril 883.3000A03). Accordingly, a usable length of at least 25 mm must remain for the mast bolts, among other requirements. The design is without tilt axis pin covers and with shortened axle bearings. The prism can rotate 360 degrees.

Description	prism constant K	Order-No.	Euro
Prism HIP Leica-5/8": DB compliant	-34,4 (Leica = +0) mm	1630.34.DB	289,-



1630.34.DB

MORE OPTIONS



■ Protective cap

[16](#)



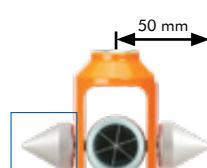
■ Red marked prism center

[10](#)



■ Circular Level

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■ Tilting axis pins

[10](#)



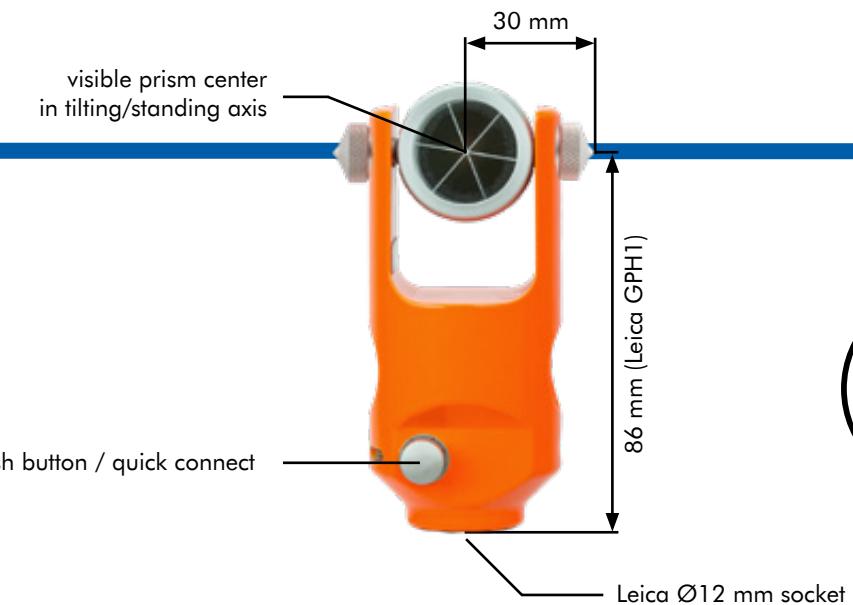
■ Offset spikes

[15](#)



Prism HIP-U Leica

■ Prism holder with U-Design



Description	Ø glass prism	prism constant K	Order-No.	Euro
Prism HIP-U Leica	17,5 mm	-11,3 (Leica = +23,1) mm	1640.11	194,-
	25 mm	-16,9 (Leica = +17,5) mm	1640.17	194,-
	25 mm	-30 (Leica = +4,4) mm	1640.30	236,-
	25 mm	-34,4 (Leica = +0) mm	1640.34	241,-
	25 mm	-35,0 (Leica = -0,6) mm	1640.35	241,-

Information on prism constants: [261](#)

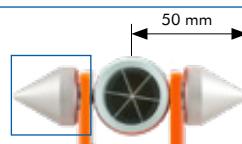
Description	prism constant K	Order-No.	Euro
HIP-U Leica with reflective foil	0 (Leica = +34,4 mm)	1645.0	121,-



MORE OPTIONS

■ Tilting axis pins

[10](#)



■ Red marked prism center

[10](#)



■ Offset spikes

[15](#)



■ Protective cap

[16](#)





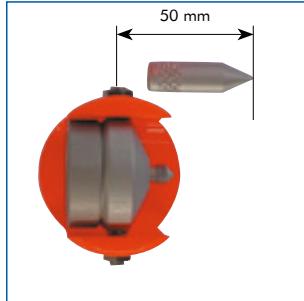
Offset spikes

For HIP prisms with glass prism

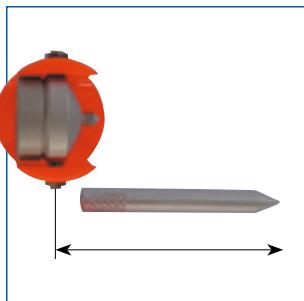
HD 50 and HD 100 for measuring vertical points, e.g. building facades, etc.

Can be screwed onto the rear thread of the prism housing.

Available for each system constant to achieve a round distance (= longitudinal eccentricity) to the mandrel tip (object point).



Longitudinal eccentricity/improvement +50 mm				
Description	Inner thread	prism constant set on the tachymeter	Order-No.	Euro
Offset spike / tip HD50/11	M8	-11,3 (Leica = +23,1) mm	1650.39	8,-
Offset spike / tip HD50/16	M6	-16,9 (Leica = +17,5) mm	1415.34	8,-
Offset spike / tip HD50/30	M6	-30,0 (Leica = +4,4) mm	1650.20	8,-
Offset spike / tip HD50/34	M6	-34,4 (Leica = 0) mm	1650.16	8,-
Offset spike / tip HD50/35	M6	-35,0 (Leica = -0,6) mm	1650.15	8,-



Longitudinal eccentricity/improvement +100 mm				
Description	Inner thread	prism constant set on the tachymeter	Order-No.	Euro
Offset spike / tip HD100/11	M8	-11,3 (Leica = +23,1) mm	1650.89	8,50
Offset spike / tip HD100/16	M6	-16,9 (Leica = +17,5) mm	1415.84	8,50
Offset spike / tip HD100/30	M6	-30,0 (Leica = +4,4) mm	1650.70	8,50
Offset spike / tip HD100/34	M6	-34,4 (Leica = 0) mm	1650.66	8,50
Offset spike / tip HD100/35	M6	-35,0 (Leica = -0,6) mm	1650.65	8,50

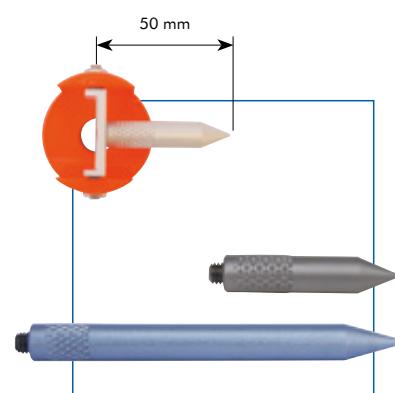
For holder HIP with reflective foil

The offset spike is screwed into the back of the tiltable target mark carrier.

When measuring a point with the offset spike, a **longitudinal eccentricity (improvement) of +50 mm / + 100 mm** is to be considered.

With **M6 outer thread**.

Description	Order-No.	Euro
Offset spike / tip RD 50, Longitudinal eccent. + 50 mm	1029.50	10,-
Offset spike / tip RD 100, Longitudinal eccent. + 100 mm	1029.100	10,-





Protective Cap for HIP Prisms

To protect the triple prism from weather conditions such as rain, snow, dust, etc. a protective cap can be mounted on all prisms of the HIP series. Secure hold in wind and weather.

- Aluminum sleeve Ø 35 x 50 mm
- Optimized light incidence through bright anodized material
- Good water drainage during rain
- For assembly of the cap a slotted screwdriver can be helpful
- Weight: 11 g



Description	Order-No.	Euro
Protective cap / visor for HIP prisms	1003	15,-





Holder series ONRT for MP24

1/1

A.2.1. Mini Prism MP 24

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A.2.2. Holder with 5/8" threads

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A.2.3. Holder with Leica socket

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A.2.4. Offset spikes for series TOP and ONRT

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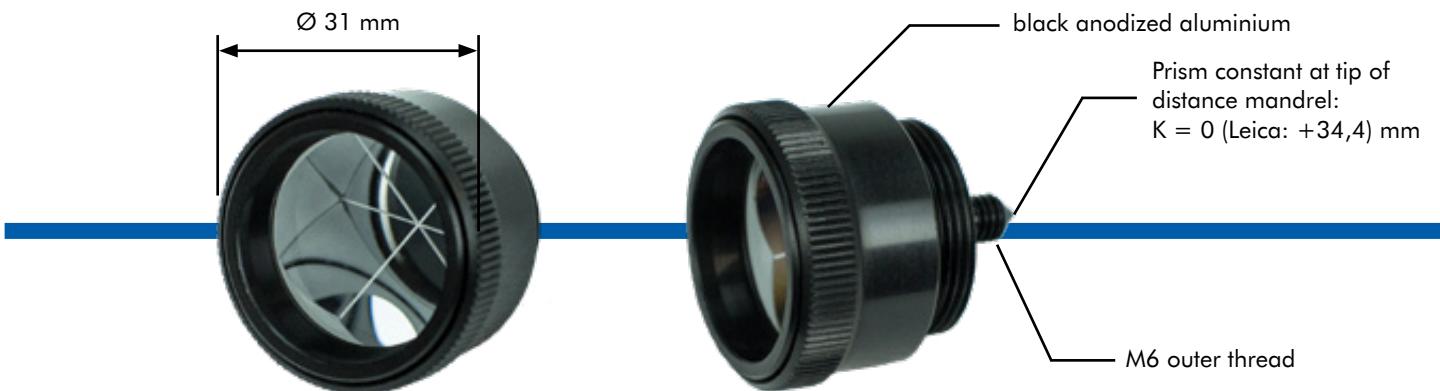




Mini Prism MP 24

With Ø 25 mm glass prism (grinding accuracy 2", reflective surfaces silvered)

- Distance measurement range: up to over 1000 m (depending on device and weather)
- shockproof & waterproof
- Weight: 30 g

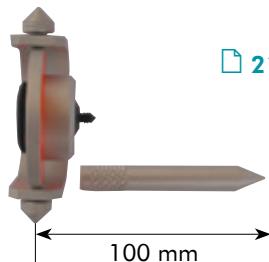


Description	Order-No.	Euro
Mini Prism MP 24	1400	92,-

INFO

The MP24 is identical in construction to OMNI and CST mini prisms.

Offset spikes



MP24 in closed design holder



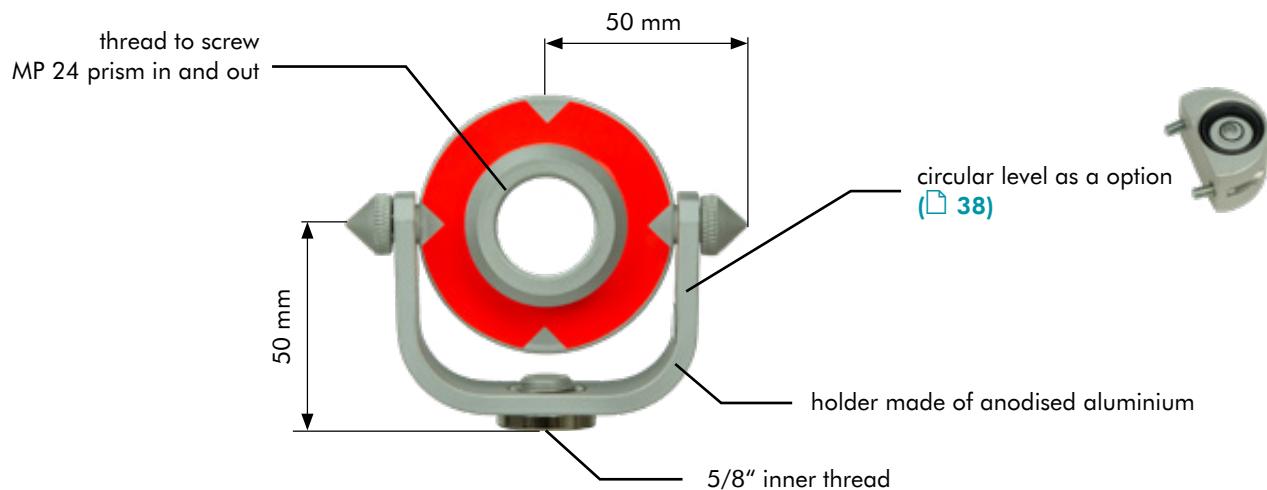
ON REQUEST

Closed holders for the MP24 are still available as remaining stock.

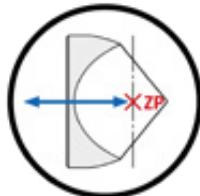


Prism Holder Type ONRT 50

■ U-shaped prism holder with 50 mm tilting axis height



Description	prism constant K	Order-No.	Euro
Holder ONRT 50, for MP 24 prism (without prism)	0 (Leica = +34,4 mm)	0625.0	88,-
	-11,3 (Leica = +23,1) mm	0625.11	88,-
	-16,9 (Leica = +17,5) mm	0625.17	88,-
	-30,0 (Leica = +4,4) mm	0625.30	88,-
	-34,4 (Leica = 0) mm	0625.34	88,-
	-35,0 (Leica = -0,6) mm	0625.35	88,-

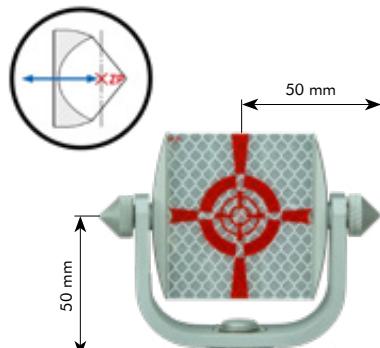


INFO

The tilting and standing axis runs through the visible prism centre (central symmetrical point) only when choosing prism constant **K = -16.9 mm**.



18



■ With reflective foil 52 x 60 mm

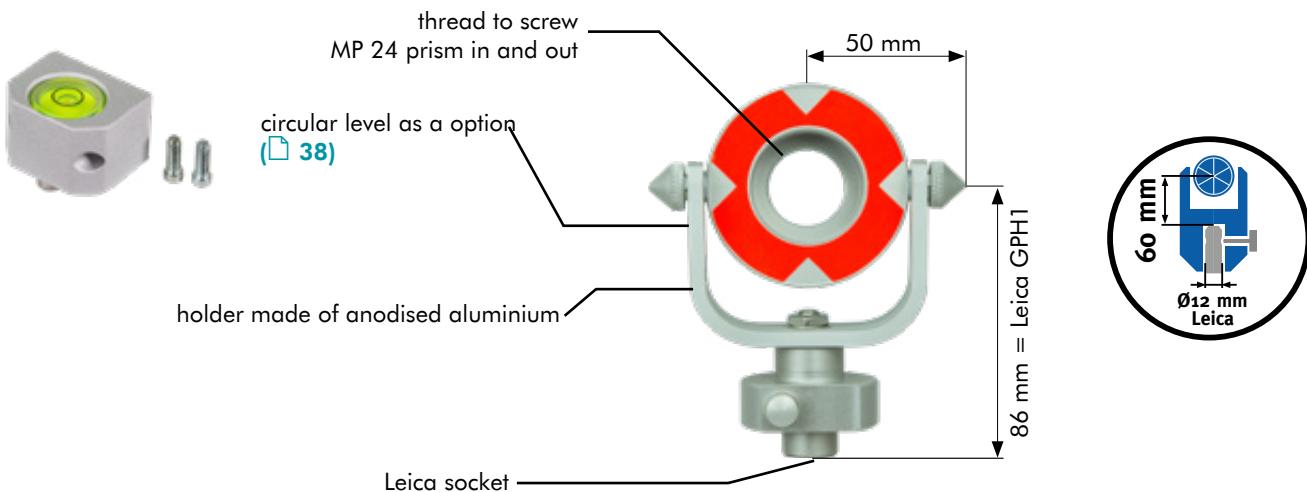
Integrated target plate with bright red target ring and target wedges optimized in standing and tilting axis. This minimizes targeting errors even when the prism is misaligned.

Description	prism constant K	Order-No.	Euro
Holder ONRT 50, with reflective foil	0 (Leica = +34,4 mm)	0628	82,-

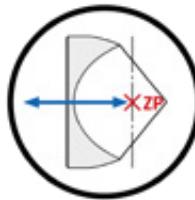


Prism Holder Type ONRT L

■ U-shaped prism holder

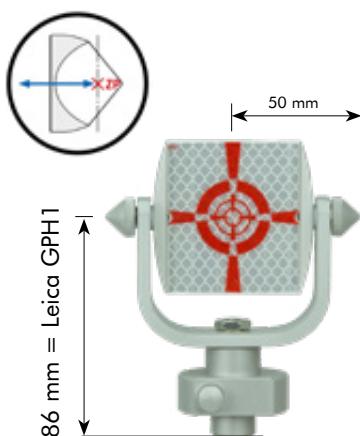


Description	prism constant K	Order-No.	Euro
Holder ONRT L, for prism MP 24 (without prism)	0 (Leica = +34,4 mm)	0655.0	117,-
	-11,3 (Leica = +23,1) mm	0655.11	117,-
	-16,9 (Leica = +17,5) mm	0655.17	117,-
	-30,0 (Leica = +4,4) mm	0655.30	117,-
	-34,4 (Leica = 0) mm	0655.34	117,-
	-35,0 (Leica = -0,6) mm	0655.35	117,-



INFO

The tilting and standing axis runs through the visible prism centre (central symmetrical point) only when choosing prism constant **K = -16.9 mm**.



■ With reflective foil 52 x 60 mm

Integrated target plate with bright red target ring and target wedges optimized in standing and tilting axis. This minimizes targeting errors even when the prism is misaligned.

Description	prism constant K	Order-No.	Euro
Holder ONRT L, with reflective foil	0 (Leica = +34,4 mm)	0658	108,-



Accessories for series Type ONRT

Offset spikes for prism MP24

For measuring vertical points, e.g. building facades, etc.

The offset spike can be screwed onto the rear M6 distance mandrel of the MP24.

Available for each system constant to achieve a round distance (= longitudinal eccentricity) to the mandrel tip (object point).



INFO

When measuring points directly with the mandrel tip of the MP24 (without extension), the prism constant must be set to K=0 or a positive longitudinal eccentricity at the level of the set (negative) prism constant must be taken into account.

Longitudinal eccentricity/improvement: **+50 mm**

Description	prism constant K	Order-No.	Euro
Offset spike MPV50/0	0 (Leica = +34,4) mm	1415.50	8,-
Offset spike MPV50/11	-11,3 (Leica = +23,1) mm	1415.39	8,-
Offset spike MPV50/16	-16,9 (Leica = +17,5) mm	1415.34	8,-
Offset spike MPV50/30	-30,0 (Leica = +4,4) mm	1415.20	8,-
Offset spike MPV50/34	-34,4 (Leica = 0) mm	1415.16	8,-
Offset spike MPV50/35	-35,0 (Leica = -0,6) mm	1415.15	8,-

Longitudinal eccentricity/improvement: **+100 mm**

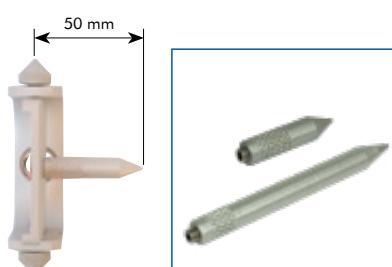
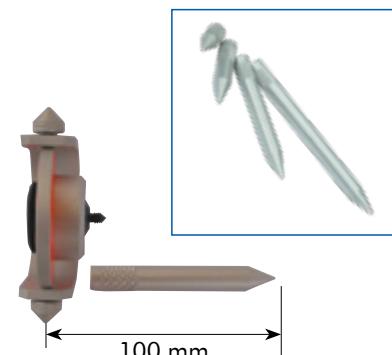
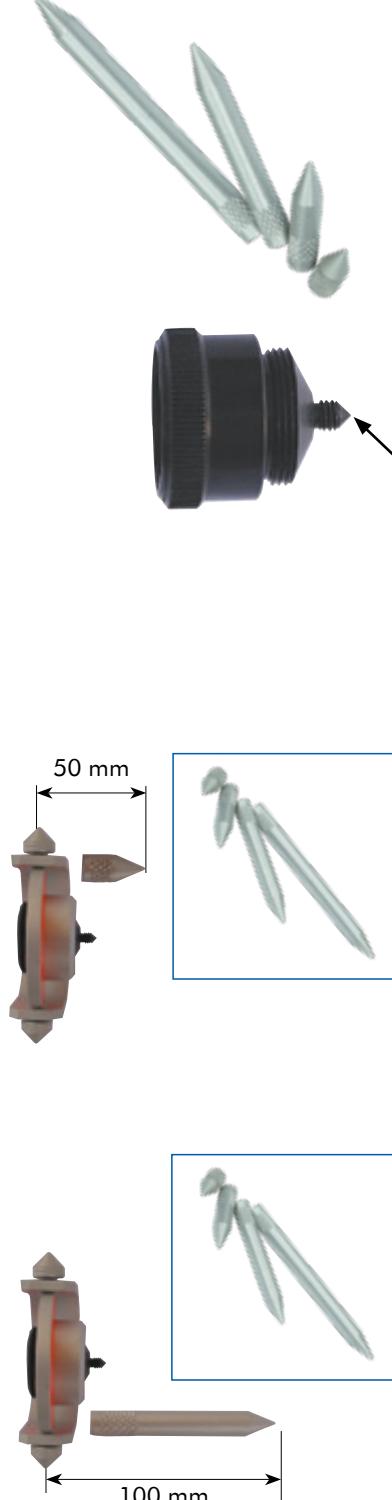
Description	prism constant K	Order-No.	Euro
Offset spike MPV100/0	0 (Leica = +34,4) mm	1415.100	8,50
Offset spike MPV100/11	-11,3 (Leica = +23,1) mm	1415.89	8,50
Offset spike MPV100/16	-16,9 (Leica = +17,5) mm	1415.84	8,50
Offset spike MPV100/30	-30,0 (Leica = +4,4) mm	1415.70	8,50
Offset spike MPV100/34	-34,4 (Leica = 0) mm	1415.66	8,50
Offset spike MPV100/35	-35,0 (Leica = -0,6) mm	1415.65	8,50

For holder with reflective foil

The offset spike is screwed into the back of the tiltable target mark carrier.

When measuring a point with the offset spike, a **longitudinal eccentricity (improvement) of +50 mm / + 100 mm** is to be considered.

Description	Order-No.	Euro
Offset spike RD 50, Longitudinal eccentricity +50 mm	1029.50	10,-
Offset spike RD 100, Longitudinal eccentricity +100 mm	1029.100	10,-





Cylinder Prism ZP11

Compact, precise, sturdy, multifunctional, inexpensive



- Aluminium cylinder Ø25 x 50 mm, red anodized. Or, on request: Also available grey anodized
- Glass-Triple prism Ø17,5 mm, grinding accuracy 2"
- Shockproof and waterproof
- Prism constant $K = -11,3$ (Leica = +23,1) mm
- Reflective surfaces silver mirrored on rear side
- Range Distance measurement: Up to and over 500 m (device and weather dependent)
- Mounting of the visible prism center in cylinder axis $\pm 0,1$ mm
- Quick connection system with bolt B1216 (Ø12x16 mm)



Connection bolt B1216

Alternative: M6 inner thread

back side

Securing option 1:
Plastic knurled screw

Securing option 1:
Allen screw (SW3)



Combination: Mini-Vektor
[119](#)

Available in two designs:

With socket B1216 and bolt

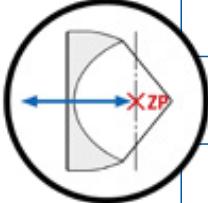
- Bottom: Socket for Bolt B1216
- Top: Stainless steel bolt B1216
- Weight: 70 g

Description	Order-No.	Euro
Cylinder Prism ZP11 B, socket + bolt B1216	6611	158,-

With socket B1216 and M6 inner thread

- Bottom: Socket for Bolt B1216
- Top: M6 inner thread (comes with cover)
- Weight: 53 g

Description	Order-No.	Euro
Cylinder Prism ZP11 M, socket B1216 + M6 inner thread	6611.M6	142,-





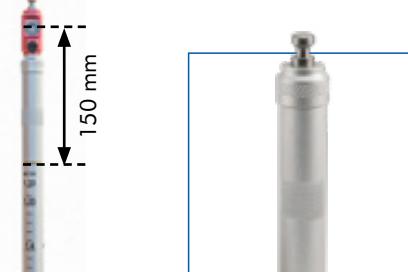
Accessories for ZP11 prisms

Cylinder prism ZP11 on prism pole

For prism poles with 5/8" inner thread and 150 mm target height

- Bottom: 5/8" outer thread for screwing into prism pole
- Top: Bolt B1216 stainless steel
- Effective adapter length: 120 mm

Description	Order-No.	Euro
Adapter 5/8" outer thread on bolt B1216, Ø25x120 mm	6622	39,-

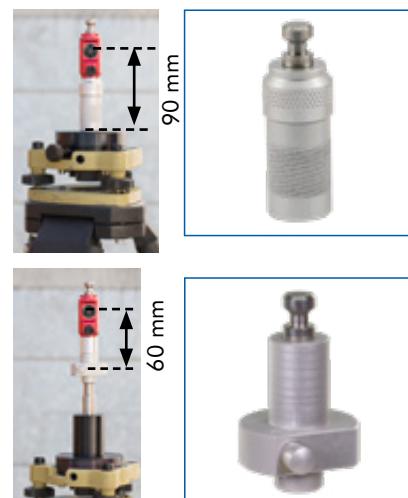


Adapter for prism poles with Leica bolt and target height 86 mm



- Bottom: Leica socket Ø12 mm with quick connection to attach to prism pole
- Top: Bolt B1216 stainless steel
- Effective adapter length: 30 mm, Nominal size adapter + ZP11: 86 mm

Description	Order-No.	Euro
Adapter Leica socket to bolt B1216	0697	63,-



Cylinder Prism ZP11 on instrument tribrachs

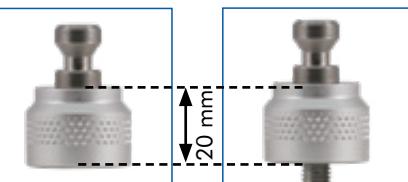
Adapter tribrach inserts with 5/8" outer thread

- Bottom: 5/8" inner thread to screw onto into tribrach insert
- Top: Bolt B1216 stainless steel
- Effective adapter length: 60 mm
- Overall height to prism centre ZP11 (without tribrach height): 90 mm

Description	Order-No.	Euro
Adapter 5/8" inner thread to bolt B1216, Ø25x60 mm	6621	34,-

Adapter for tribrach inserts with Leica bolt

Description	Order-No.	Euro
Adapter Leica socket to bolt B1216	0697	63,-



M8 Adapter - B1216 Bolt

Description	Order-No.	Euro
Adapter M8 inner thread to B1216 bolt	6620	24,-
Adapter M8 outer thread to B1216 bolt	6620.A	26,-

More Accessories



Circular level for Cylinder Prism ZP11 [120](#)



Stakeout spikes for Cylinder Prism ZP11 [120](#)



Sector Cap for Cylinder Prism ZP11

To avoid incorrect measurements when using several prisms on top of each other at the simultaneously

With the ZP11, the central symmetrical point (visible prism center) lies exactly in the axis of the cylindrical housing and is therefore predestined for precision measurements.

For individual measurements, the prism is rotated onto the total station. If monitoring is to be carried out from different total station positions, several ZP11s can be plugged on top of each other and aligned individually. If the total stations are so close together that 2 prism centers are visible at the same time, measurements with automatic target setting (Autolock, ATR) may result in incorrect measurements.

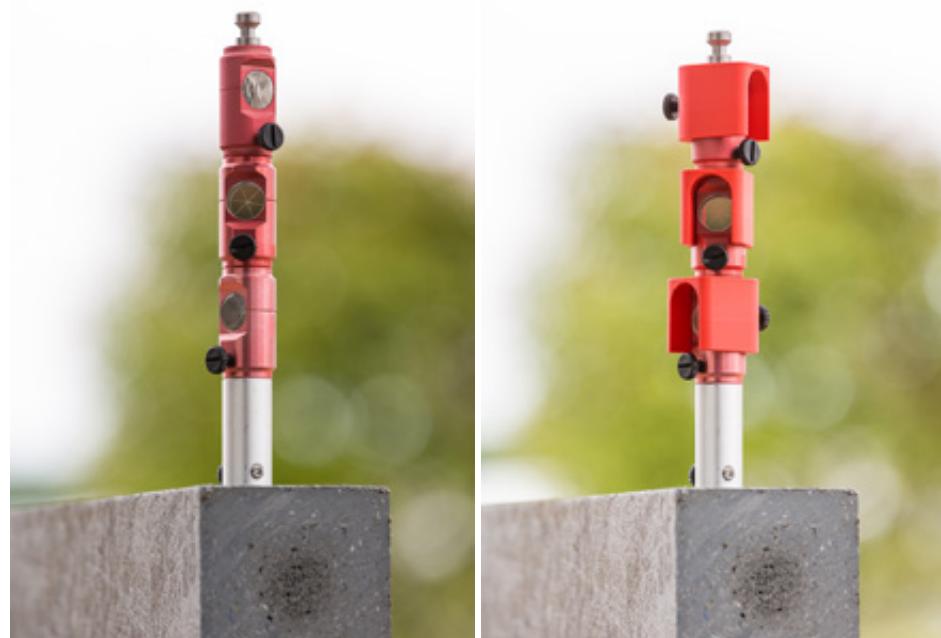
The sector cap can be used to effectively reduce the area in which the prism center is visible horizontally. This does not restrict the vertical aiming range or the performance of the prism.

- Red plastic cap (PLA)
- Knurled screw on the back that automatically aligns the attachment to the prism when tightened
- If required, the attachment can be rotated completely in front of the prism to protect against dirt/weather or unintentional automatic aiming [1]

Description	Order-No.	Euro
Sector Cap for Zylinder Prism ZP11	6612	9,-



[1]





Modular System & Securing Options

Several ZP11 cylinder prisms can be combined as required with distance parts, tips and circular levels and aligned in different directions. An adapter between the prisms is not necessary. The B1216 plug-in system enables fast assembly, and locking screws secure the selected position. CNC production ensures high accuracy: All prism centres are in one axis and have a vertical distance of exactly 50 mm (without distance pieces).

Two securing options:

- Plastic knurled screw for easy installation and adjusting without tools
- Screw for long-term fixing with Allen key (SW3)

Allen key (SW3)



Application Possibilities

As a Monitoring Prism on a L-Carrier

file 104



As a Twin-Prism

file 107



As a modular mini vector

file 119



As monitoring point vertically above a point

file 108



360° Prisms & Accessories

1/1

A.4.1. 360° Prism „Bo Medium Format“

27



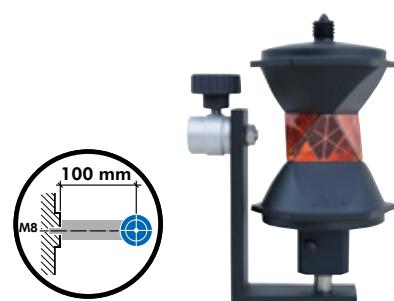
A.4.2. Accessories for Leica 360° Mini Prism GRZ101

33



A.4.3. Accessories for Leica 360° prisms GZR4, GRZ121, GRZ122

36



A.4.4. RUNDUM-Prism 6x60°

54





360°-Prisma Bo Medium Format

■ Powerful 360° prism

- Prism constant K = -6,0 (Leica = +28,4) mm
- Good compromise between size and max. range (depending on tachymeter/weather conditions)
- Ø 40,5 x 52 mm - Weight: 110 g (90 g without end cap)
- 6 triple prism, copper-coated on the back side
- Centering accuracy with automatic targeting = 1.5 mm



Description	Order-No.	Euro
360°-Prism Bo Medium Format	5670	473,-

INFO

The 360° prism does not have a continuous steel core. It is therefore not suitable for screwing on heavy accessories and devices (e.g. GNSS antennas). The bonding of the individual prisms does not withstand the resulting leverage.

Tip: Use the sturdy protective CAGE adapter [28](#)



Accessories

■ Adapter

Description	Order-No.	Euro
5/8"-Adapter for 360°-Prism Bo Medium Format	5676	37,-
M8 Inner thread adapter for 360°-Prism Bo Medium Format	5674	33,-
M8 Outer thread Adapter for 360°-Prism Bo Medium Format	5674.A	35,-

Description	Order-No.	Euro
Leica quick change adapter for 360°-Prism Bo Medium format	5673.LS	79,-

■ Stake-Out spikes



Stake-Out spikes
M8 connection

[35](#)



Stake-Out spikes
Ø12 mm Leica
connection

[43](#)



Stake-Out spikes
5/8" threads

[41](#)



■ Central circular level with 1/4" outer thread

- Big glass level Ø 20 mm, pre-adjusted to the screw-in surface

Description	Order-No.	Euro
Circular level, 1/4" outer thread, sensitivity 30'	5672	47,-

INFO

For measurements with large target heights, a circular level attached to the prism pole should be used.



Protective cage CAGE for 360° prism Bo Medium Format and ball prism

To expand the application possibilities of the prisms

The 360° Prism Bo medium format is a relatively inexpensive 360° prism with good performance data and aiming accuracies. However, adapters are necessary to use it with existing 5/8" standard connectors. It also does not have an axially continuous steel core, so it cannot be used for work that involves high leverage forces, such as a 360° prism under a GNSS antenna.

The Cage eliminates these disadvantages. By screwing in the prism with the existing 1/4" thread, it sits exactly centered in a very robust prism carrier with 5/8" standard threads at the top and bottom.

The Ø1.5" ball prism can also be used in the CAGE. A special base with integrated magnet is fixed in the prism carrier with the 1/4" screw. When the Ø1.5" ball prism is placed on the base, the prism center sits exactly in the standing axis centered in the carrier. The ball prism is used whenever high targeting accuracy is required rather than simultaneous observation from all directions.

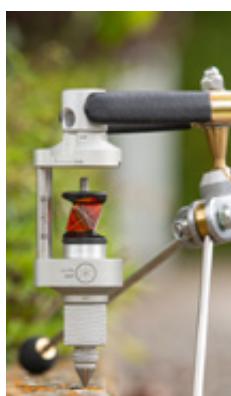
As with the 360° prism, the 5/8" threads increase the application possibilities enormously.

- Top and bottom made of aluminum, 2 stainless steel connecting rods
- Top and bottom 5/8" inner thread, height 100 mm
- Construction identical with HIP prism 2 x 5/8", thus all accessories can be used
- Aiming accuracy: ± 1.5 mm with 360° prism, ± 0.2 mm with ball prism
- Weight: 200 g



Description	Order-No.	Euro
Prism holder Cage for 360° prism Bo medium format and ball prism	5668	154,-

Note: When used with 360° prism Bo medium format:
Virtually no restrictions due to the two connection-rods,
both for automatic target finding and for distance measurement.



Adapter for Leica GRZ101 and Ball Prism

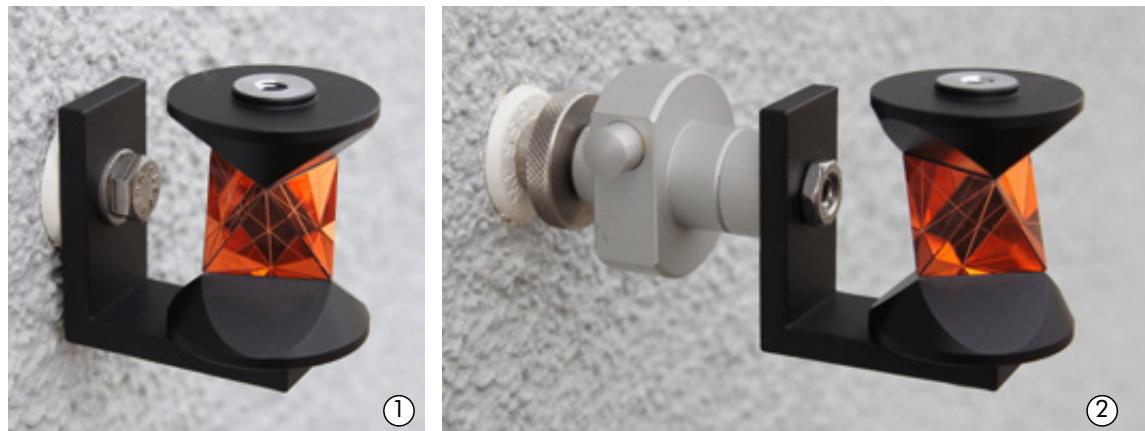
Description	Order-No.	Euro
Adapter CAGE: For Leica GRZ101	5666	28,-



Description	Order-No.	Euro
Special base CAGE for ball prisms Ø38.1mm	5667	46,-

Use of ball prism with CAGE s. [94](#)

L-Holder for 360° Prism Bo Medium Format



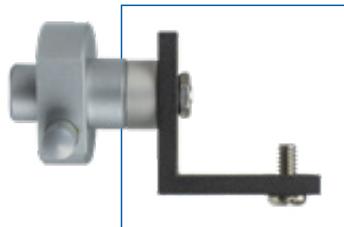
With M8 screw [Fig. 1]



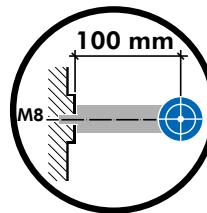
- Minimum distance to the wall
- L-Holder made of aluminium with M8 hexagon head screw and washer
- 1/4" outer thread for screwing on the 360° prism
- Target height (distance to wall bolt) 40 mm

Description	Order-No.	Euro
L-Holder with M8 screw, 1/4" thread, target height = 40 mm	5677.M8	54,-

With Leica push-button socket [Fig. 2]

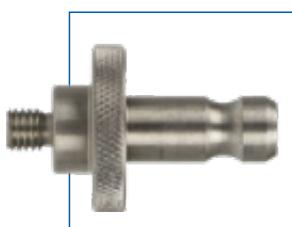


- L-Holder made of aluminium with Leica socket Ø 12 mm
- Push button for quick change and securing on the bolt
- 1/4" outer thread for screwing on the 360° prism
- **Distance to wall bolt = 100 mm** (when using the wall adapter WA Leica)
- Target height = 86 mm



Description	Order-No.	Euro
L-Holder, Leica socket, 1/4" thread, target height 86 mm	5677.LS	79,-

Wall adapter WA Leica (stainless steel) 40



- **To use with L-Holder with Leica socket**
- Leica spigot Ø 12 x 27 mm, M8-outer thread, stainless steel
- Total length 40 mm (without M8 thread)

Description	Order-No.	Euro
Wall adapter WA Leica, spigot Ø 12 x 27 mm, M8 thread	0830	18,-

INFO

Wall bolt  111



L-Holder with magnetic base Ø 33 / Ø 40 mm

- L-Holder made of aluminium
- For centering plates with Ø 33 / Ø 40 mm
- For quick application / removal of the prism in seconds
- Centering accuracy in connection with centering plates: ± 0.05 mm
- 1/4" outer thread for screwing on the 360° prism



Distance to centering plate: 50 mm

Description	Order-No.	Euro
L-Holder with magnetic base Ø 33 mm, target height 50 mm	5671.M33	72,-
L-Holder with magnetic base Ø 40 mm, target height 50 mm	5671.M40	72,-

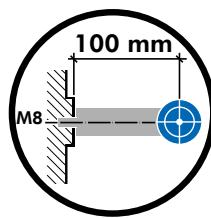


Distance to centering plate: 97 mm

Description	Order-No.	Euro
L-Holder with magnetic base Ø 33 mm, target height 97 mm	5678.M33	93,-
L-Holder with magnetic base Ø 40 mm, target height 97 mm	5678.M40	93,-



Quick change system
97/100 mm see overview
[192](#)



INFO

M8-centering plates Ø 33 and Ø 40 mm and quick change adapters

[207](#)

Protective cover for Bo 360° Prism



When is a protective sleeve useful:

- When transporting between two jobs
- When the 360° prism is fixed to a point for a longer period of time, but measurements have to be taken only very rarely
- When the 360° prism is used near busy roads or even railroad lines.

The plastic sleeve protects the prism:

- In case of light stone chips (pebbles, gravel, etc.)
- From transport damage
- From rain/dust/dirt



Description	Order-No.	Euro
Protective cover for Bo 360° prism (with screw)	5669	40,-

INFO

Since April 2023 the 360° prism is sold including an end cap. This end cap includes the possibility to screw on the protective cover 5669 without having to purchase 5672 or 5676.



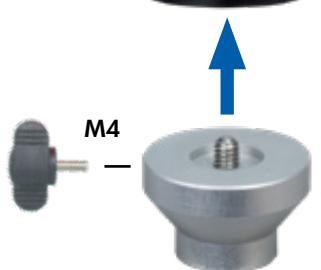
5669



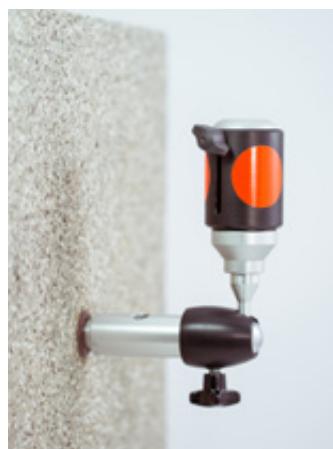
5672
27



5670
27



5676
27



■ Stainless Steel Tip



- Ø 12 x 50 mm, stainless steel
- 1/4" outer thread to screw in 360° prism or extensions

Description	Order-No.	Euro
spike tip Ø12 x 50 mm, 1/4" ext. thread, stainless steel	5670.S	13,-

■ Circular Level

To clamp to tip or extension



- Aluminium casing with bore hole Ø 12 mm
- Knurled screw for fixing the level to poles with Ø 12 mm
- Adjustable level Ø 12 mm, sensitivity 30'

Description	Order-No.	Euro
Circular level, glass, 30', adjustable for Ø12 mm extensions	5670.D	16,-

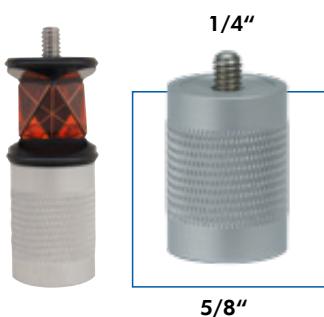
INFO

Due to the relatively small diameter of 12 mm, several screwed extensions are not suitable for high-precision measurements.



Accessories for Leica 360° Prism GRZ101

For universal use of the 360° prism with standard and special accessories



5/8"-Adapter

- Target height (to prism center): 50 mm
- Anodised aluminium, 25 x 35 mm

Description	Order-No.	Euro
5/8"-Adapter for Leica 360° Mini Prism GRZ101	5686	29,-



Leica-Adapter with Push-Button

- Bottom: Socket connection for all Leica spigots Ø 12 mm
- Target height (to prism center): 86 mm
- Anodised aluminium
- Push button for quick change and securing on Leica spigot



Description	Order-No.	Euro
Leica-Adapter for Leica GRZ101, Leica quick connection	5683.LS	68,-



Circular Level - Sensitivity 50'

- Aluminium casing Ø 26 x 20 mm
- Plastic circular level Ø 15 mm, adjusted to the screw-in surface

Description	Order-No.	Euro
Circular level, 1/4" inner thread, sensitivity 50'	5682.Ki	29,-
Circular level, 1/4" outer thread, sensitivity 50'	5682	32,-

INFO

For measurements with large target heights, a circular level mounted on the prism pole should be used.

GRZ101 with protective frame CAGE

Enables the use of 5/8" standard connections. By screwing in the prism with the 1/4" thread via the 5666 adapter, it sits exactly in the center of a very robust prism holder and can therefore also be subjected to high leverage forces, e.g. as a 360° prism under a GNSS antenna.

More information about protective frame CAGE **28**



Description	Order-No.	Euro
Prism holder Cage for 360° prism Bo medium format and ball prism	5668	154,-
Height adapter CAGE for Leica GRZ101 to be used with 5668	5666	28,-



L-Holder for GRZ101

With M8 screw

- Minimum distance to wall
- Aluminium L-holder with M8 hexagon head screw and washer
- 1/4" outer thread to screw on 360° prism
- Target height (distance from wall bolt) = 40 mm



Description	Order-No.	Euro
L-holder w. M8 screw, 1/4" thread, target height 40 mm	5687.M8	62,-

INFO

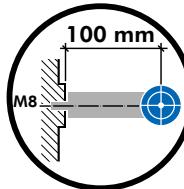
Wall bolts [111](#)

Mit Leica Druckknopf-Anschluss

- Aluminium L-holder with Leica socket connection Ø 12 mm
- Push button for quick change and securing on Leica spigot
- 1/4" outer thread to screw on 360° prism
- Target height = 86 mm
- Distance from wall bolt = 100 mm (when using the WA Leica adapter)



Description	Order-No.	Euro
L-holder, Leica push button socket, 1/4" thread, target height 86 mm	5687.LS	87,-



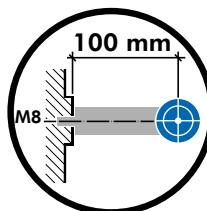
Wall adapter WA Leica [40](#)

- **To use with L-holder with Leica connection**
- Stainless steel Leica spigot Ø 12 x 27 mm, M8 outer thread
- Total length 40 mm (without M8 thread)



Description	Order-No.	Euro
Wall adapter WA Leica, spigot- Ø 12 x 27 mm, M8 thread	0830	18,-

L-Holder with magn. base - Wall distance 97/100 mm



INFO

M8-centering plates Ø 33 and Ø 40 mm and quick change adapters

[209](#)



Stainless steel tip for Leica GRZ101

For positioning and capturing points. Various lengths for variable use. An adapter is required to connect GRZ101 and the stainless steel tips.

Adapter 1/4" - M8

Serves as an adapter between the 1/4" inner thread of the GRZ101 prism and the stainless steel tips (M8 inner thread)

- Aluminum, Effective height: 15 mm
- Stainless steel external threads



Description	Order-No.	Euro
Adapter: 1/4" thread, M8 thread, Ø25 x 15 mm	5689.015	22,-

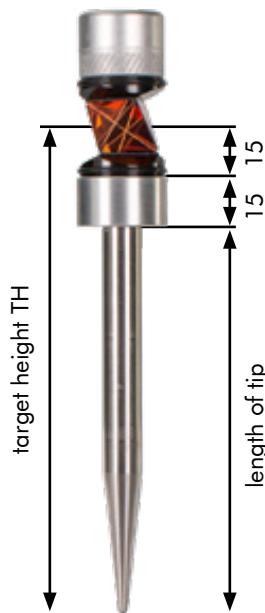
M8 Stainless steel spike/tip

- Varying tip finish, depending on the length
- Material: Ø12 mm stainless steel
- M8 inner thread



Description	Length	Target height (TH)	Order-No.	Euro
Stainless steel tip with M8 inner thread	20 mm	50 mm	1863.020	14,-
	43 mm	73 mm	1863.043	15,-
	70 mm	100 mm	1863.070	16,-
	93 mm	123 mm	1863.093	17,-
	120 mm	150 mm	1863.120	18,-
	143 mm	173 mm	1863.143	19,-
	170 mm	200 mm	1863.170	20,-

Setup



Accessories



Screw-on Circular level

[33](#)



Circular level for poles with Ø12 mm

Usable from length 70 mm
[32](#)



Joint arm

[46](#)

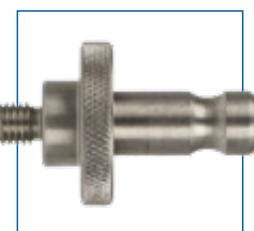


Accessories: Leica 360°- Prisma GRZ 4, 121, 122

L-Holder

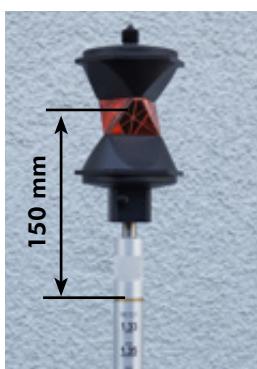
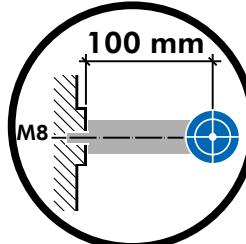
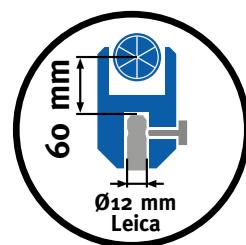
- Sturdy aluminium L-holder with Leica socket Ø 12 mm
- Large horizontal screw with star grip for securing to the spigot
- Leica spigot Ø 12 x 40 mm to mount 360° prism
- Axis of the socket runs through the centre of the prism
- Cardanic mounting
- Aluminium black coated
- **Distance to wall bolt = 100 mm (when using WA Leica wall adapter)**

Description	Order-No.	Euro
L-holder, Leica socket with securing screw, Leica spigot Ø 12 x 40 mm	5690	152,-

**■ Wall Adapter WA Leica (stainless steel)  40**

- Leica spigot Ø 12 x 27 mm, M8 outer thread
- Total length 40 mm (without M8 thread)

Description	Order-No.	Euro
Wall adapter WA Leica, spigot- Ø 12 x 27 mm, M8 thread	0830	18,-

**INFO**

To reach the target height of 150 mm we offer a suitable adapter for the prism pole. Adapter 0378.90 you will find on  248



Prism Accessories

1/1

A.5.1. Circular Levels

38



A.5.2. Adapter Leica, 5/8"

39



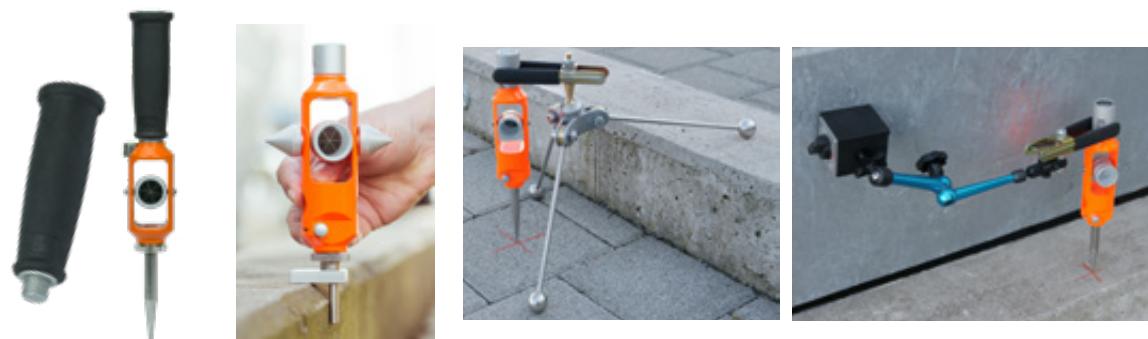
A.5.3. Stakeout-spikes Leica, 5/8"

41



A.5.4. 50 mm-Adapter, Chamfer adapter, Handle, Mini / Joint Tripod

44



Circular Levels

Circular Level Integral (for Series HIP and TOP)

Can be screwed to the side of the prism holder at the top.
Thus free availability of the 5/8" connection for further applications.
(Cannot replace the circular level of a prism pole).



- Level Ø 14 mm in metal casing
- Sensitivity 50'
- Adjusted in stainless steel housing (no adjusting screws)
- Horizontal drilling as screw-on and screw-off support
- Dimensions: Ø 16,5 mm, Height 13 mm, M5 outer thread



Description	Order-No.	Euro
Circular Level Integral	1580	24,-



- High-quality glass level Ø 20 mm in aluminium casing
- Delivered adjusted, without further adjustment options
- Dimensions: Ø 27 x 20 mm

Description	Order-No.	Euro
Circular level, not adjustable, 5/8" inner thread, sensitivity 30'	1584	33,-



Circular Level Central - 5/8" outer thread

- High-quality glass level Ø 20 mm in aluminium casing
- Delivered adjusted, without further adjustment options
- Dimensions: Ø 27 mm, Height (without thread): 25 mm
- Horizontal drilling as screw-on and screw-off support



Description	Order-No.	Euro
Circular level, not adjustable, 5/8" outer thread, sensitivity 30'	1585.30	36,-



Adjustable

- Circular level can be adjusted with Allen key (2.5 mm)
- Dimensions: Ø 30 mm, Height (without thread): 43 mm
- Supplied with Allen key



Description	Order-No.	Euro
Circular level, adjustable, sensitivity 30'	1587.30	51,-
Circular level, adjustable, sensitivity 10'	1587.10	54,-



Circular level for Prism Type ONRT

- Adjustable
- Sensitivity: 25'
- Circular level Ø 14 mm in aluminium casing
- Comes with 2 mounting screws



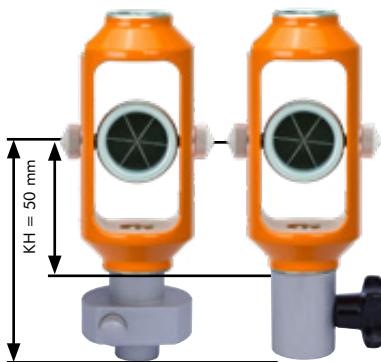
Description	Order-No.	Euro
Circular level JDL 14	1850	36,-



Adapter Leica auf 5/8"

By screwing the Leica-5/8" adapters into the 5/8" thread of a holder with 50 mm tilting axis height (e.g. our series HIP, HIP-U, TOP and ONRT 50) results in the same tilting axis height as the Leica GPH1 reflector.

This makes it ideal for use on Leica prism poles and with our WA Leica wall adapter [40](#).



PRO-Leica-Adapter

- Push button for attaching the prism within seconds
- Can be rotated around spigots with slight resistance
- Secured against falling out
- For all Leica spigots Ø 12 mm**

Description	Top thread	KH	Order-No.	Euro
PRO-Leica-Adapter PLA 5/8"	5/8"	50 mm	0690	50,-



Simple adapter Leica - 5/8"

- Fixing by tightening a locking screw
- When using prism holders with 5/8" thread and 50 mm tilting axis height, the same possibilities arise as with the PRO-Leica adapter PLA 5/8"

Description	Order-No.	Euro
Adapter Leica St 27 - 5/8" (for 27 and 40 mm spigot)	0291.10	29,-
Adapter Leica St 40 - 5/8" (only for 40 mm spigots)	0306.10	30,-



Adapter 5/8" - Leica

Connection between 5/8" inner and outer threads to Leica spigots

- Precisely manufactured stainless steel construction
- Milling surfaces for fork wrench (SW 22) as screw-in and screw-out support

with 5/8" **inner thread**

Description	Lenght Leica spigot Ø 12 mm	effective total length	Order-No.	Euro
Adapter 5/8"-Leica	27 mm	47 mm	0377.27	30,-
	40 mm	60 mm	0377.40	33,-



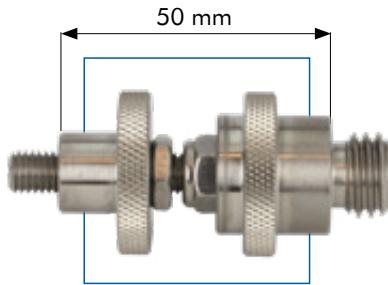
with 5/8" **outer thread**

Description	Lenght Leica spigot Ø 12 mm	effective total length	Order-No.	Euro
Adapter 5/8"-Leica	27 mm	40 mm	0378.27	30,-
	40 mm	60 mm	0378.40	33,-



Adapter M8 – 5/8"

- Side 1: 5/8" outer thread to connect prism holders
- Side 2: M8 outer thread to screw in common wall bolts
- One common axis -> independently rotatable around this axis
- Rotation resistance can be adjusted with self-locking hexagon nut (SW 13)
- Large knurls for safe insertion without tools
- Screwing-in can be supported with a fork wrench (SW 13)
- Stainless steel



Length 50 mm

Description	Order-No.	Euro
Adapter WA 50, M8 - 5/8", L = 50 mm	0810	43,-

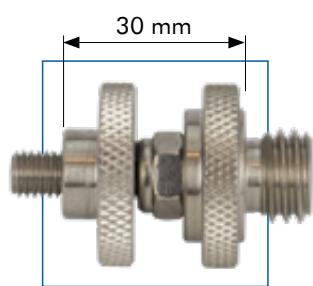
Examples

When using a prism with a tilting axis height of 50 mm, a wall distance of 100 mm results (for example our prism series HIP or ONRT).



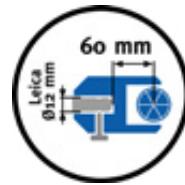
Length 30 mm

Description	Order-No.	Euro
Adapter WA 30, M8 - 5/8", L = 30 mm	0820	43,-



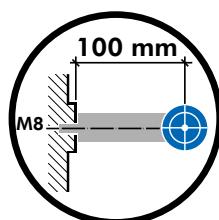
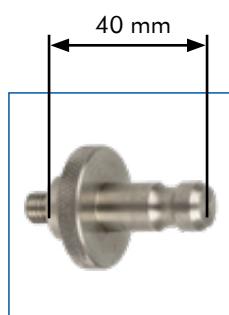
Adapter M8 – Leica Ø 12 mm

For tiltable reflector holders with Leica spigot Ø 12 mm.



- Distance to wall bolt = 100 mm when using prism holders with tilting axis height 86 mm (= Leica GPH1)
- Knurl Ø 30 mm for easy screwing into wall bolts
- Spigot Ø 12 x 27 mm, total length (without M8 thread): 40 mm
- Stainless steel

Description	Order-No.	Euro
Adapter WA Leica, M8 – Leica Ø 12 x 27 mm	0830	18,-



Series HIP-U Leica [14](#)



L-holder Leica [102](#)

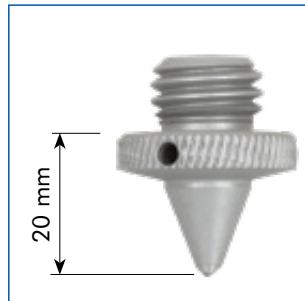
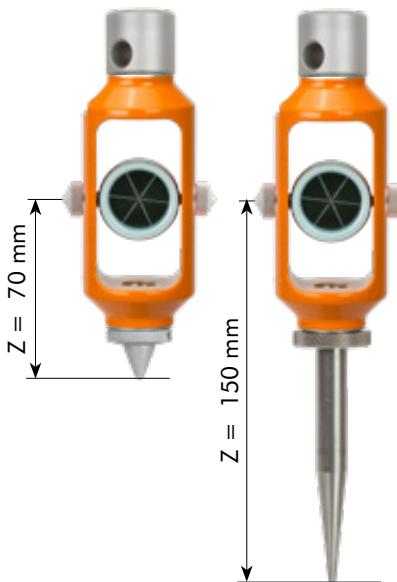


Stakeout spikes

For all reflector holders with 5/8" inner thread or Leica spigot. Due to the small distance between prism center and stakeout tip, points (in conjunction with a circular level) can be staked out or measured with great accuracy.

The long, slim tips in stainless steel design are excellently suited for precise piercing in soil.

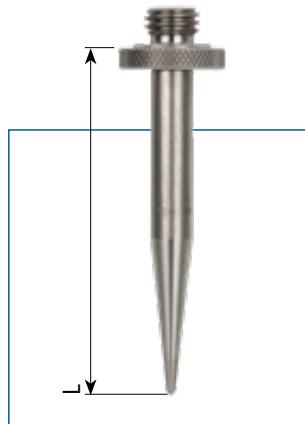
Stakeout spikes 5/8"



The shortest tip

Knurled grip made of aluminium and conical tip with hardened steel insert.

Description	Order-No.	Euro
Stakeout tip 5/8", L = 20 mm	1852	21,-



Spikes made of stainless steel

5/8" outer thread and cylindrical tip Ø 12 mm made of stainless steel. Also ideal for precise insertion into soil.

When using 5/8" reflector holders with tilting axis height = 50 mm, the target heights Z from the centre of the prism to the tip of the staking out point given in the table are obtained.

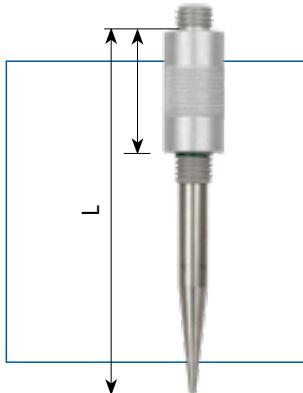
Description	Z	Order-No.	Euro
Stakeout spike 5/8", steel, L = 50 mm	100 mm	1859.100	34,-
Stakeout spike 5/8", steel, L = 100 mm	150 mm	1859.150	37,-
Stakeout spike 5/8", steel, L = 150 mm	200 mm	1859.200	42,-



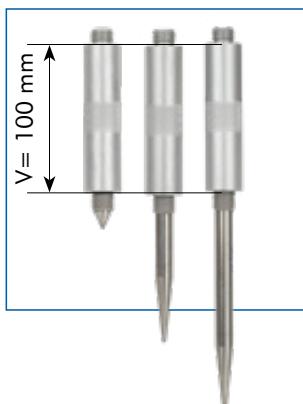
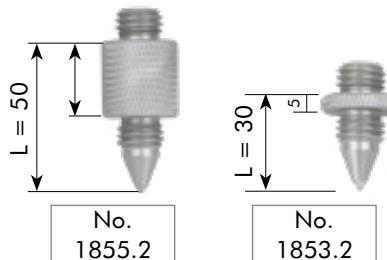


With additional 5/8" outer thread

Additional 5/8" external thread on the tip side for screwing the insertion tip into extensions or prism poles with 5/8" internal thread (tip protected and always at hand). All extensions are made of aluminium. The lengths up to 50 mm have a conical tip with hardened steel insert. From 75 mm they have a long slender stainless steel tip. When using 5/8" reflector carriers with tilting axis height = 50 mm (e.g. series HIP, HIP-U, TOP and ONRT 50), the target heights Z from prism centre to stake-out tip given in the table are obtained.

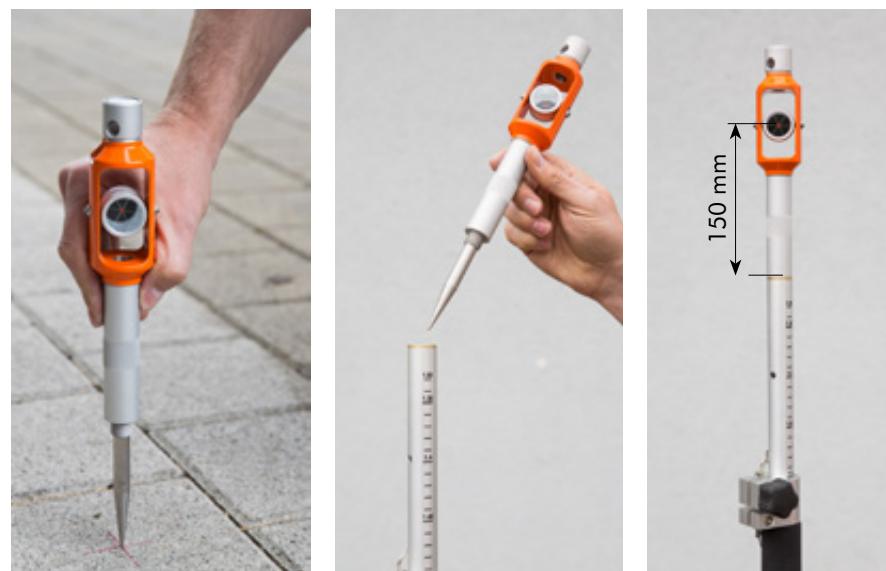
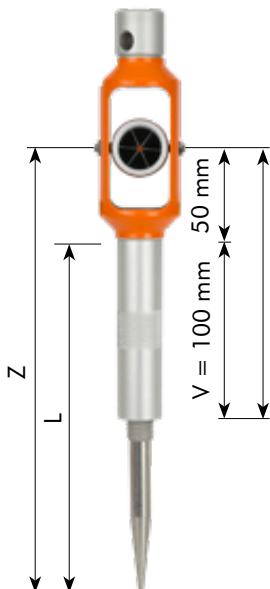


Description	Extension V	Z (KA = 50 mm)	Order-No.	Euro
Stakeout spike 5/8", L = 30 mm	5 mm	80 mm	1853.2	23,-
Stakeout spike 5/8", L = 40 mm	15 mm	90 mm	1854.2	25,-
Stakeout spike 5/8", L = 50 mm	25 mm	100 mm	1855.2	27,-
Stakeout spike 5/8", L = 75 mm	50 mm	125 mm	1856.75	32,-
Stakeout spike 5/8", L = 150 mm	50 mm	200 mm	1856.150	42,-
Stakeout spike 5/8", L = 200 mm	50 mm	250 mm	1856.200	47,-



Matched to prism poles with 150 mm target height

Description	extension V	Z (KA = 50mm)	Order-No.	Euro
Stakeout spike 5/8", L = 125 mm	100 mm	175 mm	1851.125	47,-
Stakeout spike 5/8", L = 200 mm	100 mm	250 mm	1851.200	53,-
Stakeout spike 5/8", L = 250 mm	100 mm	300 mm	1851.250	58,-



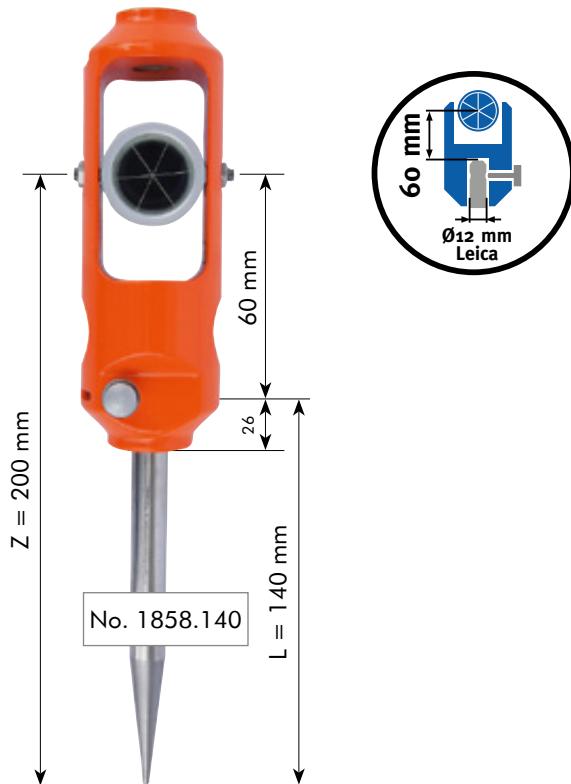


Stakeout spike Leica Ø 12 mm

All lengths are made of stainless steel. The tip of No. 1857.2H has a hardened steel insert. When using reflector holders with Leica spigot mounting and 86 mm tilting axis height (Leica GPH 1, our reflector holders of the series HIP, HIP-U, TOP, ONRT L and RUNDUM 6 x 60°), the following target heights Z from prism center to stake-out tip result:



Description	Z bei KA = 86 mm	Order-No.	Euro
Stakeout spike Leica, L = 40 mm, hardend	100 mm	1857.2H	29,-
Stakeout spike Leica, L = 90 mm	150 mm	1858.90	38,-
Stakeout spike Leica, L = 140 mm	200 mm	1858.140	40,-
Stakeout spike Leica, L = 190 mm	250 mm	1858.190	45,-





Handgrip

With 5/8" outer thread, length approx. 130 mm. For use on the upper 5/8" thread of the HIP, TOP and RUNDUM 6x60° series prism holders.

Description	Order-No.	Euro
Handgrip 5/8"	0700	43,-

INFO

Any 5/8" extensions can be screwed between the handgrip and the prism.
Extensions [248](#).





Mini tripod with pole clamp

For simple and stable assembly of short prism poles

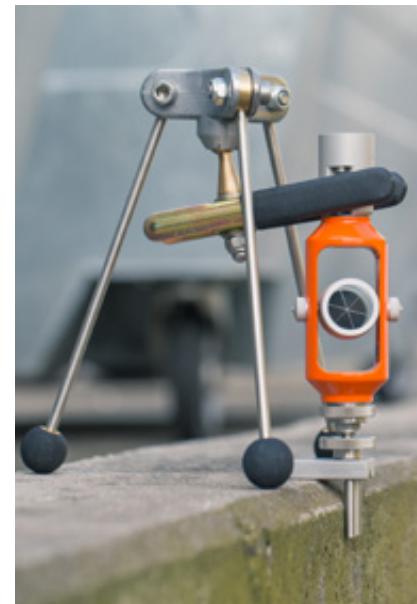


- High-quality materials and workmanship
- Tripod legs can be folded out individually and remain in the selected position, adjustable resistance
- Interchangeable balls as tripod feet for secure standing and low sinking on soft surfaces
- Ball head with freely adjustable position
- Pole clamp with straight legs for rods up to Ø 38 mm, clamping length 80 mm
- Height of pole clamp with tripod legs folded in: 28 cm
- Weight: 750 g (with stainless steel balls), 600 g (with rubber balls)

Description	Order-No.	Euro
Mini tripod with pole clamp and stainless steel balls	6270	103,-
Mini tripod with pole clamp and rubber balls	6272	103,-



The pole clamp can be aligned downwards for lower positions.





Articulated tripod with pole clamp

For universal positioning of prisms on short pole close to the object point

Depending on the surface, various tripod feet are available, into which the joint tripod is screwed via an M8 thread.

Joint tripod

- One central star grip screw clamps all moving parts of the joint tripod
- Articulated arms made of anodised aluminium
- Action radius: 270 mm
- Tilting and rotating ball head

Pole clamp:

- Spring clamp with straight legs for poles up to Ø 38 mm, clamping length 80 mm
- Total weight: 350 g

Description	Order-No.	Euro
Joint tripod with pole clamp	6280	158,-



Tripod bases

Depending on the application, the joint tripod can be screwed onto different bases using an M8 thread:

Description	Order-No.	Euro
Universal sturdy clamp for joint tripod (127)	6884	79,-
Claw clamp for joint tripod (127)	5934	63,-
Steel ring for joint tripod (125)	5932	37,-
Magnetic base for joint tripod (126)	5931	38,-
Suction holder, without vacuum indicator (128)	5936	48,-
Suction holder, with vacuum indicator (128)	5938	80,-



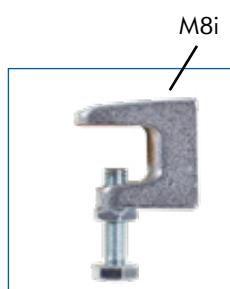


Beam clamp M8

Compact, sturdy, quick-fit metal clamp. M8 inner thread offers possibility to screw on prisms and scanning targets (directly or via adapter).

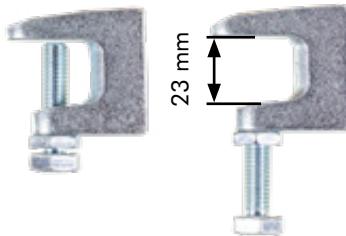
Features and benefits:

- M8 inner thread
- Clamping range: 1 - 23 mm
- Screw plug M10 with wrench size SW17
- Additional nut for securing (SW17)



Attachment examples:

- Overhead line masts/catenary masts
- Steel beams (T-beams, H-beams, etc.)
- Table tops, balconies, ledges, steel plates etc.



Description	Order-No.	Euro
Beam clamp M8, clamping range: 1 - 23 mm	6886	5,60





Corner and Edge adapter M8

For track support plates, walls, ledges, platform edges, precast concrete parts, etc.

An adapter with a corresponding M8 outer thread is screwed into the M8 thread. Then all prisms can be used that have a 5/8" inner thread or a Leica mount.

- Effective leg length: 37 mm
- M8 inner thread for screwing in the adapter
- Rubber support for easier alignment by means of circular bubble
- Height offset 20 mm (including rubber support)
- Integrated circular bubble: Sensitivity 30'



Edge adapter

- Two cylindrical pins L = 40 mm as stop
- Weight: 130 g

Description	Order-No.	Euro
Edge adapter for chamfered concrete parts, walls, etc.	1755	89,-

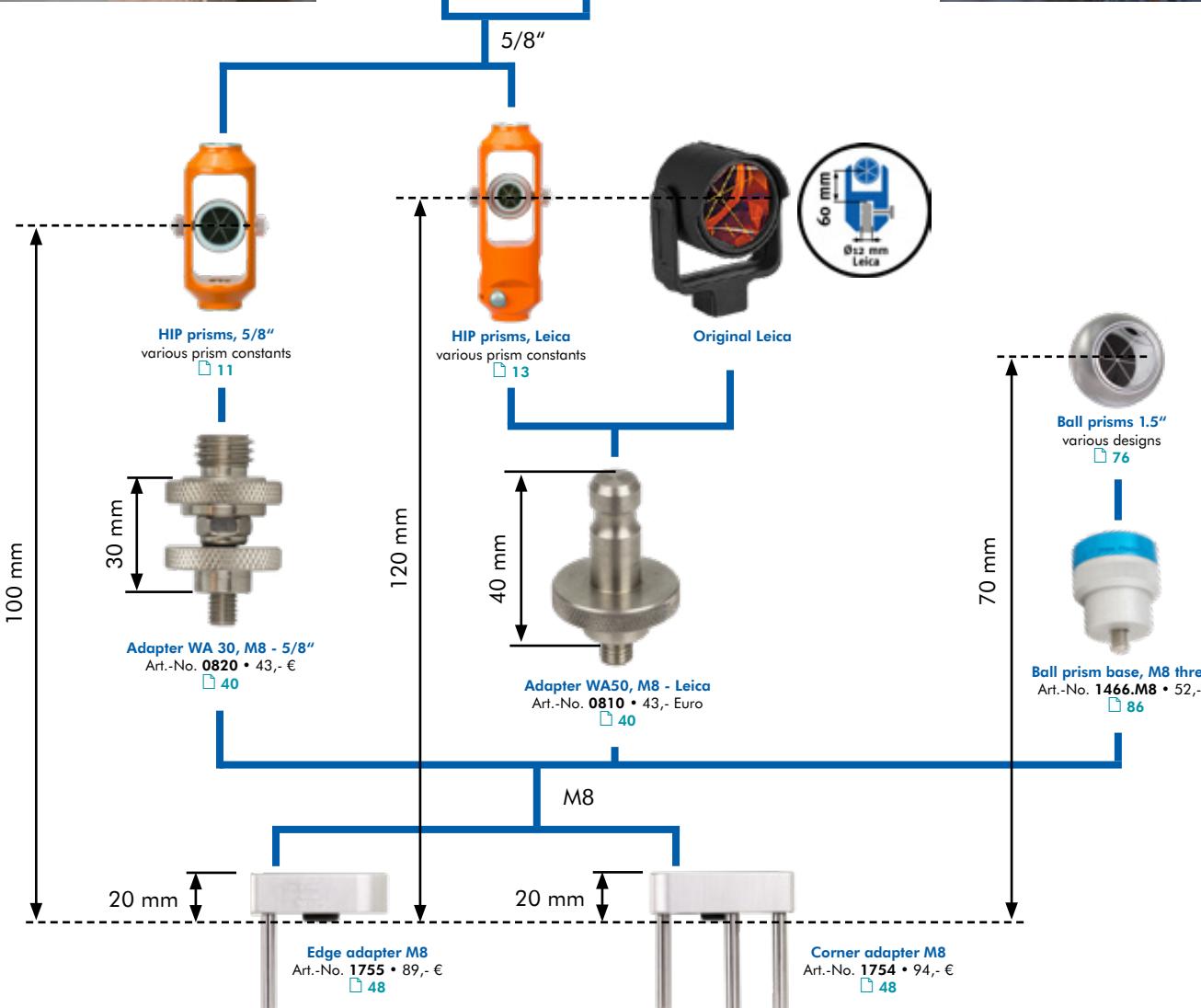
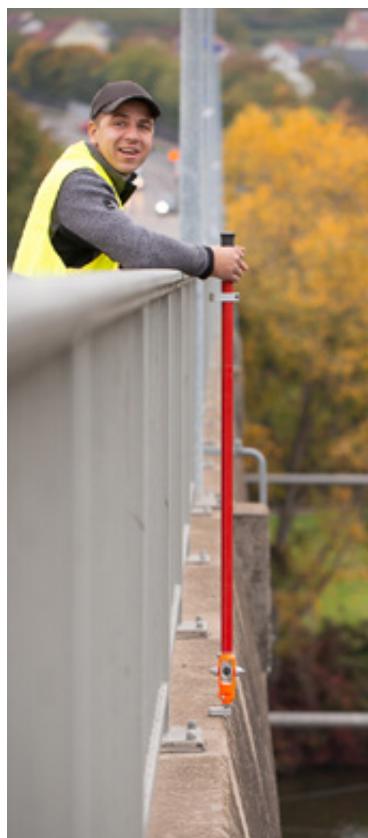


Corner adapter

- Three cylindrical pins L = 40 mm as stop
- Weight: 142 g

Description	Order-No.	Euro
Corner adapter for chamfered concrete parts, walls, etc.	1754	94,-





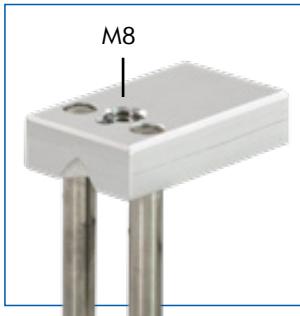


M8 Edge / Chamfer / Wall Adapter

For wall edges, also chamfered concrete parts

An adapter with a corresponding M8 external thread is screwed into the M8 thread. Then all prisms can be used that have a 5/8" internal thread or a Leica mount as well as an **integrated circular bubble**.

- Angle length 30 mm for chamfers up to 25 mm width
- M8 inner thread to screw in the adapter
- Height: 10 mm
- Notch for the reliable positioning of a line marking on the object
- Weight: 44 g



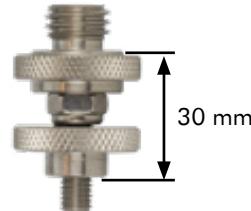
Description	Order-No.	Euro
M8 edge adapter for wall chamfers	6810	37,-



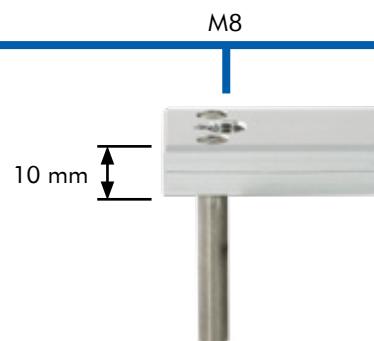
Examples



Adapter WA 30, M8
Art.-No. 0820 • 43,- €
 40



Adapter WA Leica, M8
Art.-No. 0830 • 18,- €
 40





Universal Mini Prism Pole

For measuring points close to the ground and building corners with longitudinal or latitudinal eccentricity

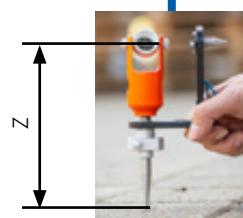
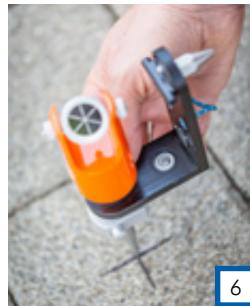
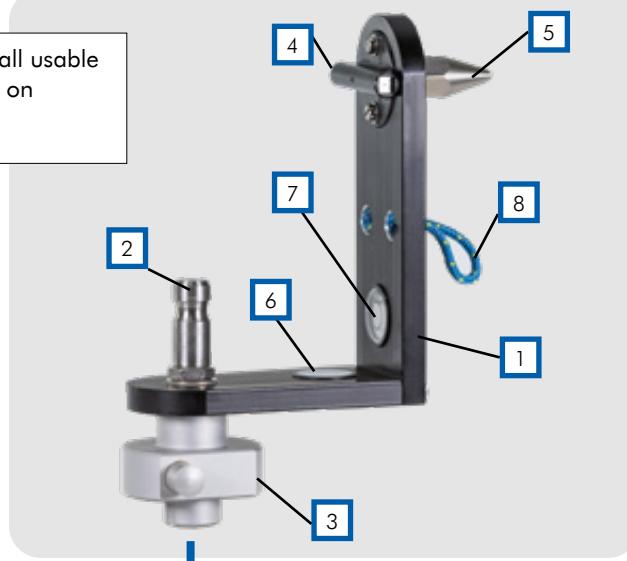
Features of the prism pole

- **L-profile** (1) made of sturdy aluminum
- **Stud bolt Ø12 mm** (2) for attaching commercially available prisms and reflectors (for selection, see [53](#))
- **Leica quick connector** (3) for attaching stainless steel tips of different lengths or corner adapter No. 5801 for eccentric mounting of building corners.
- **Target collimator** (4) for exact right-angled alignment of the prism to the total station when measuring with transverse eccentric
- **Tilting axis mandrel** (5) made of stainless steel with exact distance 100 mm from mandrel tip to prism center
- **1. circular level** (6), sensitivity 30', for plumb alignment when used with interchangeable stainless steel tips. Glued in adjusted position.
- **2. circular level** (7), sensitivity 30', for plumb adjustment when measuring a ground point with tilt axis mandrel (target height 100 mm). Glued in adjusted position.
- **Transport strap** (8) for hanging the mini prism pole on the belt.

Description	Order No.	Euro
Universal Mini Prism Pole	5801	195,-

INFO

You can find an overview of all usable prisms with Leica connection on [53](#).



Stainless steel tip
[52](#)

Building corner eccentric
[52](#)



Belt holder with snap hook

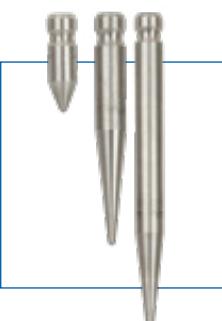
- For quick hooking of the short prism pole
- Attachment to belts up to 5 cm wide with sturdy Velcro fastener

Description	Order No.	Euro
Belt holder with snap hook, see [8]	5809	9,-

Stainless steel tips for mini prism pole

Ø12 mm for insertion into the Leica quick connector.

Available in 4 lengths:



Description	Target height Z	Order No.	Euro
Stainless steel tip Leica, L = 40 mm	150 mm	1857.2H	29,-
Stainless steel tip Leica, L = 90 mm	200 mm	1858.90	38,-
Stainless steel tip Leica, L = 140 mm	250 mm	1858.140	40,-
Stainless steel tip Leica, L = 190 mm	300 mm	1858.190	45,-

Outer corner adapter

Right-angled stop for measuring building corners by means of longitudinal and latitudinal eccentrics with a distance dimension of 200 mm.

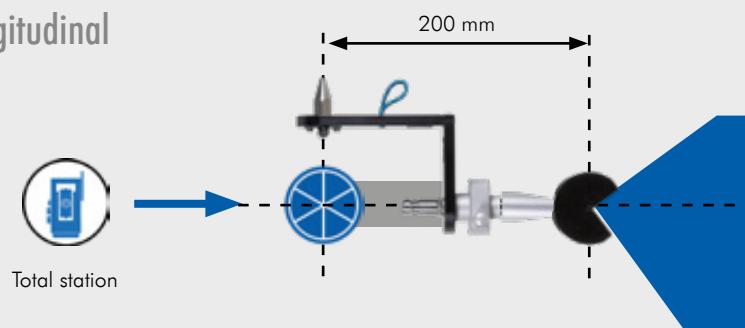
When measuring lateral eccentrics, the large contact surfaces enable wobble-free stopping at the building corner and safe setting of the right angle to the total station with the target collimator.



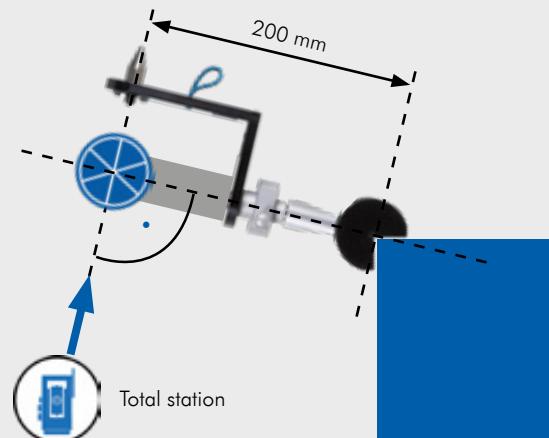
With Ø 12 mm stainless steel bolt for insertion into the Leica quick connector.

Description	Order No.	Euro
Corner adapter for eccentrics distance 200 mm	5810	89,-

Longitudinal



Latitudinal

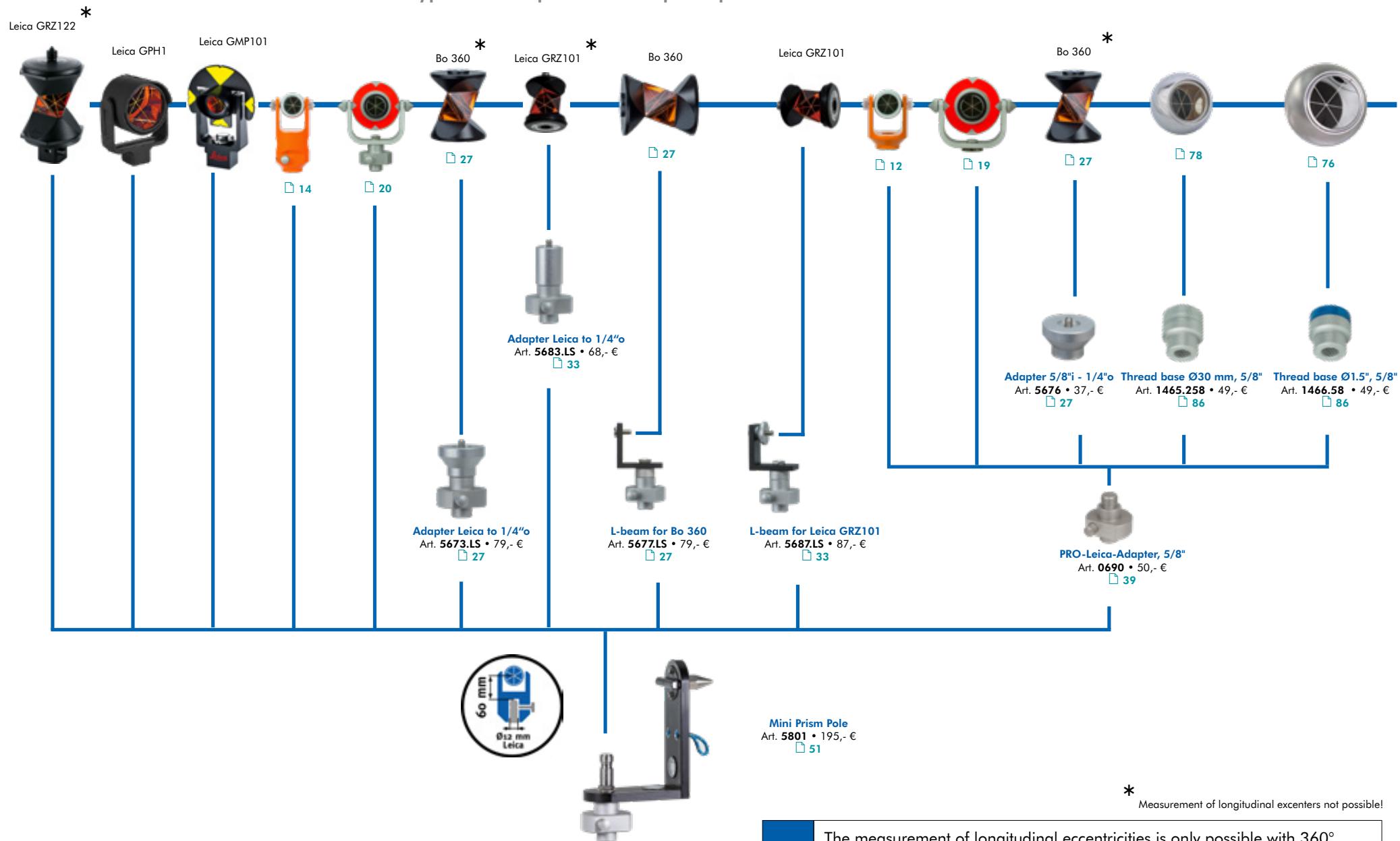


Mini Tripod

For easy and stable setup of the mini prism pole

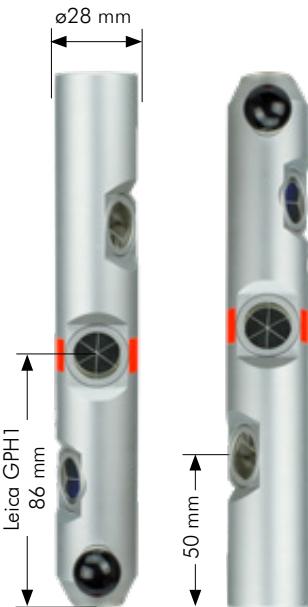
Description	Order No.	Euro
Mini tripod with clamp and rubber feet	45	103,-

■ Prism types and adapters for mini prism pole



* Measurement of longitudinal excenters not possible!

The measurement of longitudinal eccentricities is only possible with 360° prisms if an L-beam is used (e.g. Art. 5677.LS or Art. 5687.LS).



RUNDUM-Prism 6x60°

With an „RUNDUM“ / all-round prism (also known as a 360° prism), a reflection surface is always available for electro-optical distance measurement with the tachymeter, regardless of its orientation. It also enables the reliable and thus economical use of special functions such as automatic target acquisition (ATR), target tracking (LOCK mode) and target search (Power-search).

The RUNDUM prism allows all these applications. 6 triple prisms are offset (in angle) by 60° in each case in a slim aluminium cylinder.

This means that 1 prism centre always points in the direction of the total station. The prisms are installed vertically offset. Thus, each of the 6 prisms is built in the centrally symmetrical point, i.e. the axis of the cylindrical prism holder runs through the visible prism centre for all prisms.

The 6x60° prism is therefore also available for precision measurements in which the horizontal angle is measured exactly on the vertical axis of the prism holder!

Construction and properties of the 6x60° prism in detail

Prism constant K = **-11,3 mm** (Leica = +23,1 mm), therefore identical with the Leica-360°-prisms GRZ4, GRZ121 and GRZ122

- 6 precision prisms (not tiltable), Ø 17,5 mm, mirrored reflection surfaces, each prism installed offset by 60° in a circle
- Two connection options: Leica socket and 5/8" thread connection
- Locking of the Leica spigot by compression spring lock
- Vertical tuning of certain prisms for exact height measurements:
 - On the side of the Leica connection, the 3rd prism is located exactly at the height of the Leica Standard Prism GPH1
 - On the side of the 5/8" thread the 2nd prism is located exactly at 50 mm

INFO

If, in addition to an exact position measurement, also a correct height measurement has to be performed, the corresponding prism must be rotated in the direction of the total station.



With Leica bolt holder Ø 12 mm (for bolt lengths 27 and 40 mm) and 5/8" inner thread, total length 179 mm, weight: 220 g.

Description	Order-No.	Euro
RUNDUM prism 6x60°, Leica socket – 5/8" inner thread	5660.27	662,-

Accessories

Description	Order-No.	Euro
Adjustable circular level 5/8", accuracy 30' Other circular levels 38	1587.30	51,-

Description	Order-No.	Euro
Stakeout tip Leica, Ø 12 x 140 mm, Höhe 200 mm	1858.140	40,-

Other stakeout tips [43](#)



Building / Structure Surveying

A.8.1. Precision Prism 17.5 & Chamfer Prism Angle

56



A.8.2. Flexible Prism Holder „gooseneck“

58



A.8.3. Measurements of Building Dimensions

253





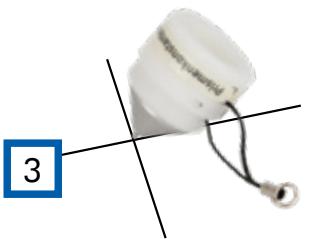
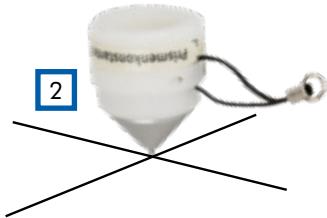
Precision Prism 17.5

For the survey and staking out of points on walls/buildings

Facade points are usually measured without reflectors (laser / direct reflex). If this is not possible or too imprecise (e.g. abrasive cuts), the PP 17.5 can be used. The point to be measured is positioned with the mandrel tip, whereby the distance from the mandrel tip to the visible prism center is only 11 mm. This means that not only measurements in two-person operation can be carried out very precisely. Even in one-person operation, errors due to inaccurate alignment with the total station remain in the millimeter range.

Features of the PP17.5

- Glass prism: Ø 17,5 mm (Grinding accuracy: 2")
- Reflection surfaces: silver mirrored at the back
- Casing: Outer-Ø 22 mm made of anodized aluminium
- The distance from the visible prism center to the mandrel tip is only 11.3 mm
- Range distance measure. Up to over 500 m (depending on device / weather conditions)
- Hardened steel pin as end-piece (no wear ergo no change in length)
- Prism can be inclined by 45° in any direction after being placed vertically on a flat surface and thus aligned to the tachymeter (Figs. 2 and 3)
- **Prism constant K = 0 (Leica = +34,4) mm** (when using the steel tip)



Visor and protective cap

- It serves for exact alignment of the prism to the tachymeter.
- If the cap is not exactly aligned with the total station, it covers part of the prism (Fig. 5). If the prism is exactly aligned, the circular front side of the prism is completely visible, and thus points exactly to the tachymeter (Fig. 6)
- Prism can be gripped more securely over the cap (Fig. 1) and is protected against damage and weather influences
- Can be removed to clean the prism (Fig. 4)



Description	Order-No.	Euro
Precision Prism PP 17.5 – with steel tip, mit visor/protective cap	1470	142,-

Carrying strap

Description	Order-No.	Euro
Carrying strap, red	1390.R	5,50





Surveying of concrete components and chamfers

Concrete construction elements usually have a chamfer for structural and aesthetic reasons. Their measurement with the tachymeter is often not quite easy, since the constructive edge of the component (intersection of the 2 planes - without chamfer) cannot be stopped exactly with a standard prism.

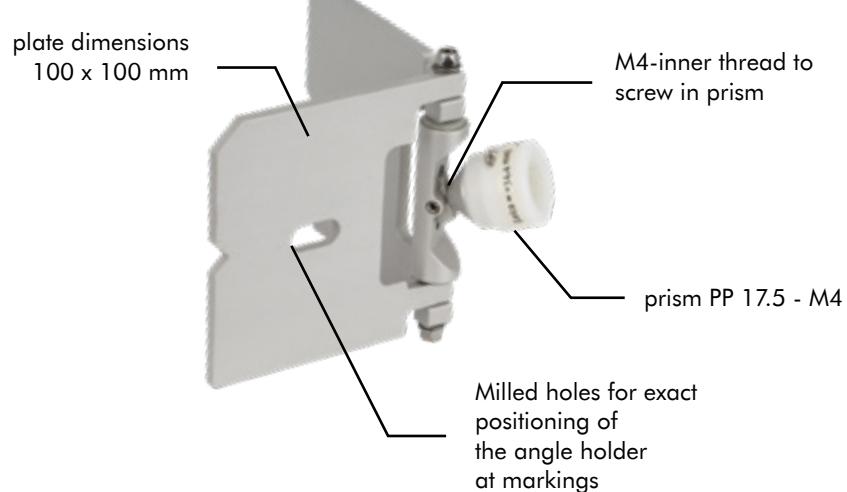
For these cases we developed the special **holder for concrete components with chamfers SBF**. It can be used for all components with a chamfer width of 20 mm or more and is ideally suited for the positioning of precast concrete elements as well as for the inspection of elements concreted on site.

SBF Flexible Prism Holder for Edges

- Two flat aluminium plates, connected by a hinge joint
- Angle holder can be used on all components with a chamfer from 20 mm and adapts to the angle of the component
- The hinge axis lies exactly in the intersection line of the two bearing surfaces
- The precision prism PP 17.5 is screwed into the center of the hinge via an M4 inner thread
- The prism can be rotated in all directions in the carrier, independent of the flex angle, and aligned over a range of 180° to the total station
- Inclination resistance is adjustable
- Weight (without prism): around 250 g



Alignment limits of prism



Description	Order-No.	Euro
SBF Flexible prism holder for concrete chamfers (without prism)	1474	142,-

Precision Prism PP 17.5 – M4



- Backside: M4 outer thread (stainless steel)
- **Prism constant** if used with SBF flex prism holder: $K = 0$ (Leica = +34,4) mm

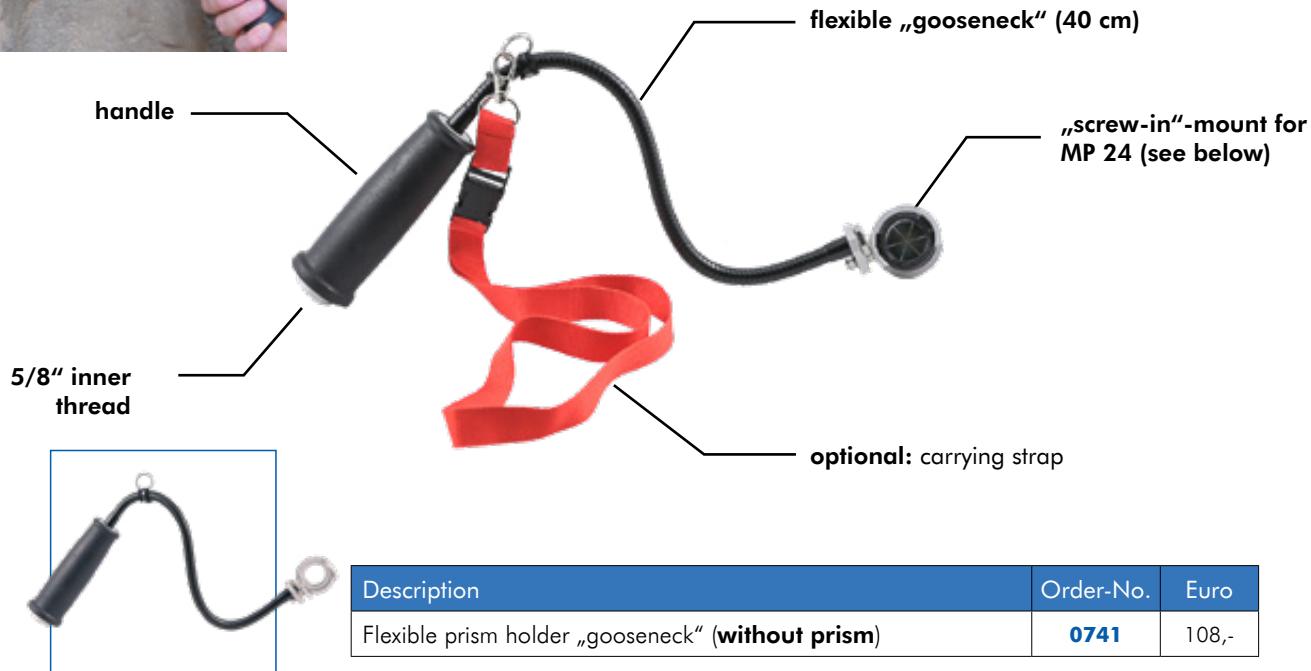
Description	Order-No.	Euro
Precision Prism PP 17.5 – M4 with visor and protective cap	1474	142,-

General information about the prism PP17.5 and its protective cap can be found on 56



Flexible Prism Holder „gooseneck“

- Direct measurements of points: Wall surfaces, inner and outer corners
- Flexible gooseneck makes it possible to measure unfavorably located points
- No obstruction of view to the reflector, unlike when holding the prism just between the fingers
- Measurement without application of cross eccentricities / offsets
- Possible use of mandrel extensions



Description	Order-No.	Euro
Flexible prism holder „gooseneck“ (without prism)	0741	108,-



Accessories

Description	Order-No.	Euro
Mini Prism MP24 (17)	1400	92,-



Description	Order-No.	Euro
carrying strap, red	1390.R	5,50

INFO

Special equipment: Mandrel extensions 21.



Extension

With the 5/8" internal thread on the bottom of the handle, all poles with 5/8" external threads can be used as extensions.

With a simple „ProLeica“ adapter, the use of poles with Leica stud connection is also possible (39).



Marker PtW for tachymetric height transfer

For marking the reflector height on vertical objects (walls, luminaire masts, etc.)

Height information in engineering surveys (e.g., meter marks) can be carried out using leveling or tacheometry. Tachymeters with automatic target tracking enable one-person operation (tracking mode).

With our Klimax [129](#), very precise height measurements using tacheometry are possible (e.g., meter marks). A disadvantage of the Klimax solution is the relatively small point used to mark the height. Drawing a horizontal line through the point must be done in an additional step. Additionally, the Klimax can only be used with the ball prism and not with prisms that the customer already has in their inventory.

Precision

With the PtW (Prism to Wall), the heights of almost any prisms can be easily transferred to vertical objects. There are differences in the accuracy and in the targeting option of the prisms. Single prisms with storage at the central symmetrical point, such as our ball and HIP prisms, exhibit centering and aiming accuracies of less than 0.5 mm. A disadvantage of these single prisms is that when measuring with tracking total stations, the prism must always remain aligned with the instrument.

For RUNDUM or 360° prisms, this is inherently provided due to their design. However, they only have a centering or aiming accuracy of up to 2-3 mm.

Due to the short distance of the prism, it is not necessary to plumb the PtW perpendicular to the wall. The same way if used on streetlight poles.

Inaccuracies that may occur due to slightly conical poles can generally be disregarded, as lower precision is required in this case..

Application of Height Marker Tool

- For tachymeters with automatic targeting/tracking (AutoLock, ATR, etc.), targeting is always performed on the visible prism center. To get a correct result, the target height must be set to 'zero'.
- In tracking mode (one-person operation), continue moving until the prism is at the target height.
- Adjust the Tube level to the height with a line on the horizontal edge..

Structure and Advantages

- Basic construction 120x100x9 mm made of anodized aluminium.
- Tube level for horizontal alignment of the marker on the wall. Horizontal edge for marking the height with a line on the wall/at the pole. Possibly a line on the vertical edge for additional identification of the height marking.
- M8-internal thread for screwing in an M8-ball base or a centering plate. Since the horizontal edge runs through the axis of the M8 thread, using a ball prism is the most precise method.
- Easy mounting option of adapter for using of holder with many other commercially available single and 360° prisms (Leica connection, 1/4", 5/8""). The prism centers are always aligned with the height of the axis of the M8 thread or the horizontal edge due to the design.

Description	Order-No.	Euro
PtW: Height Marker Tool, M8 internal thread	2822	XX,-

adapter for
Standard prisms
see the next Page





Adapter with Leica bolt Ø12 mm

- For all prisms with Leica-socket (System height 60 / 86 mm)
- Leica bolt Ø12x40 mm optionally mountable with a distance of 40 or 60 mm from the prism's vertical axis to the PtW.
- A cross screwdriver is required for mounting on the PtW and for changing the Leica bolt



Description	Order-No.	Euro
PtW-Adapter Leica	2823.L	48,- €



Adapter with 5/8"-Thread

- For all prisms with 5/8"- Internal thread and Center height 50 mm
- 5/8"- Knurled screw without height adjustment rotatable around the axis, adjustable Rotation resistance
- Optionally mountable with a distance 40 or 50 mm from vertical axis prism to PtW
- or mounting on the PtW and for changing of 5/8"- A cross screwdriver is required for the position of the knurled screws

Description	Order-No.	Euro
PtW-Adapter 5/8"	2823.58	48,- €



Adapter with 1/4"-Thread

- 1/4"-External thread for screwing on the 360° prism BO medium format
- With an adapter, also usable with the Leica 360° mini prism GRZ101 (see below)
- Distance 30 mm from vertical axis prism to PtW
- A cross screwdriver is required for mounting on the PtW

Description	Order-No.	Euro
PtW-Adapter 1/4"	2823.14	38,- €

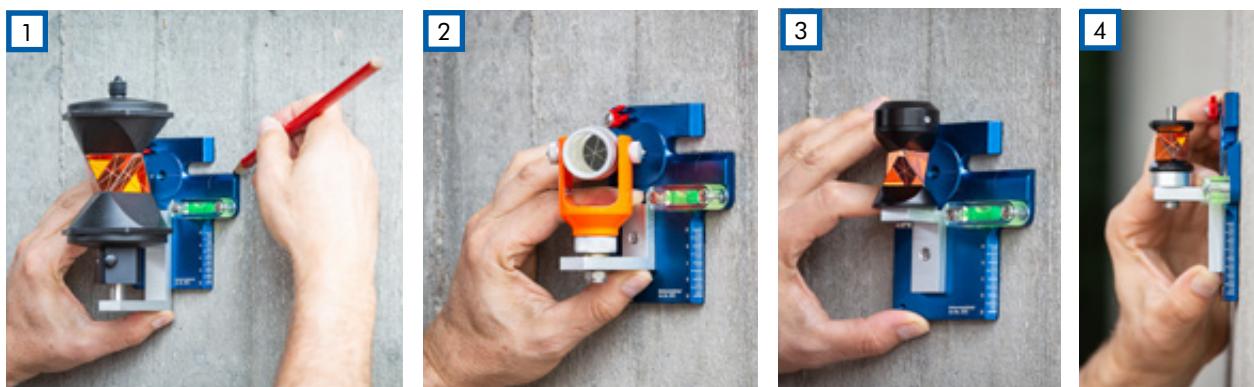


Adapter for Leica 360°-Mini prism GRZ101

- For maintaining the correct height when using the PtW adapter 1/4" No. 2823.14
- Incl. Screw 1/4" x 19 mm, which must be used instead of the 1/4" standard screw For mounting on the PtW is required on cross screwdriver , for changing the 1/4"-screws a slotted screwdriver

Description	Order-No.	Euro
PtW-Adapter 1/4" for Leica GZR101	5666	28,- €

With example -
Prisms in use



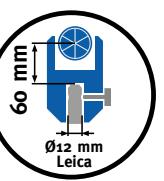
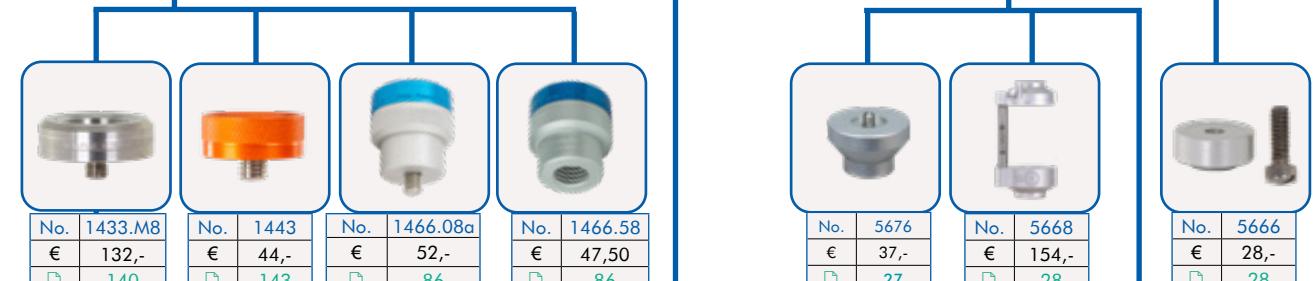


Using of PtW with different prisms

PRISMS



ADAPTER

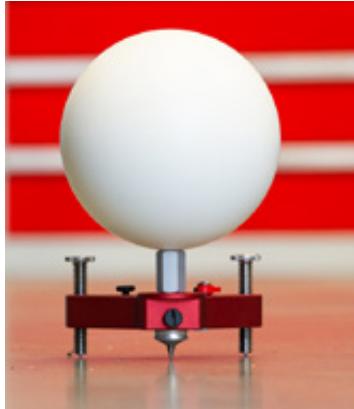
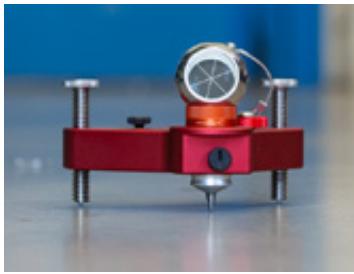


L-ADAPTER



PtW

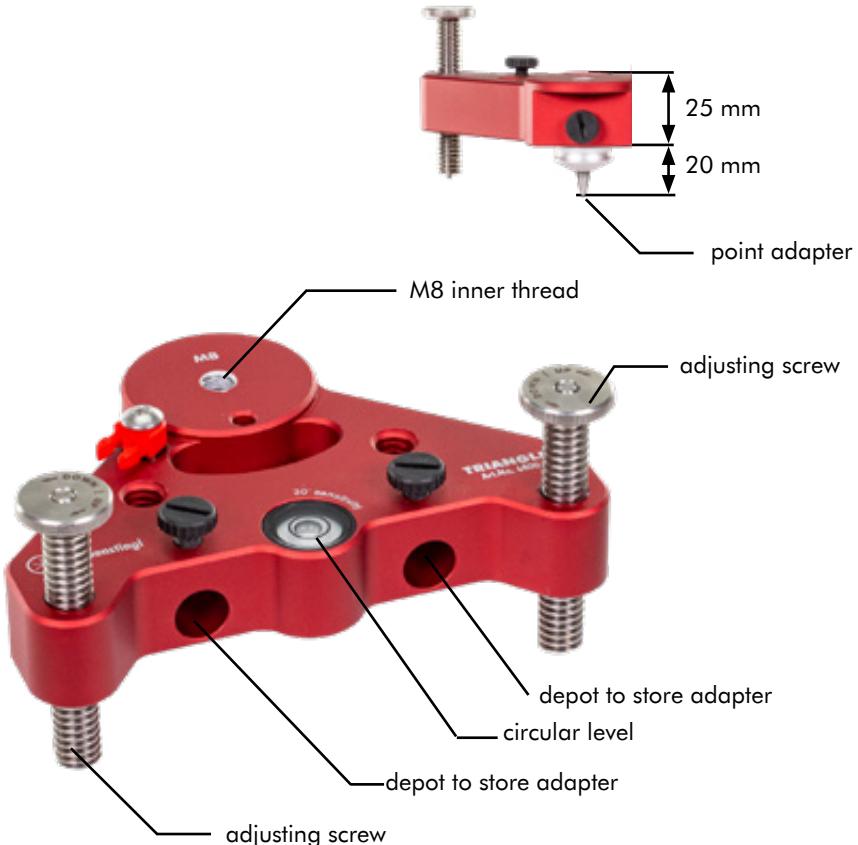




Ground tripod „triangle“ for ground level point measurements

Exact and fast vertical positioning of prisms and aiming marks on points

- Sturdy construction made of anodised aluminium
- 2 adjusting screws for quick levelling of the ground tripod
- Stainless steel adjusting screws with knurled head and hardened contact points. If space is limited at the object point, they can also be screwed in closer to the centre
- Fixed level glass bubble, sensitivity 30'
- M8 internal thread for adaptation of any prisms and targets
- B1216 socket for quick change of point adapters for different measuring tasks
- 2 depots for storing point adapters when not in use (see pictures below)
- Effective height (without point adapter): 25 mm
- Weight: 450 g



Description	Order-No.	Euro
Ground tripod „triangle“, M8 thread, without point adapters	6800	273,-





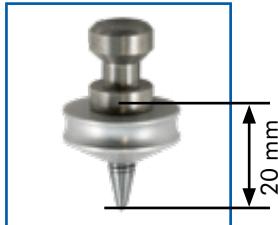
Point adapters

For exact positioning of the triangle on different ground points.
B1216 bolt for quick exchange



Centering tip

- **For line crosses or measuring points with centering etc.**
- Slender tip with hardened mandrel
- Results in total height from mandrel tip to screw-in surface M8 thread: 45 mm



Description	Order-No.	Euro
Centering tip for ground tripod, hardened mandrel, B1216 bolt	6804	29,-

Cone

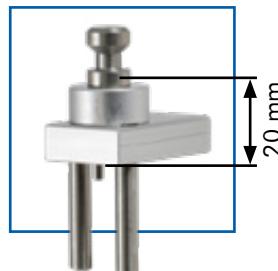
- **For bolts with round head**
- Centering of the bolt head through conical intake
- Effective length of 20 mm for bolts with head Ø 18-20 mm
- Results in total height from bolt top edge to screw-in surface M8 thread: 45 mm



Description	Order-No.	Euro
Cone for ground tripod, B1216 bolt	6806	29,-

Angular stop

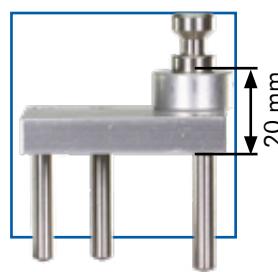
- **For wall edges, also chamfered concrete parts**
- Angle length 30 mm for chamfers up to 25 mm width
- Results in total height of bearing surface angle stop up to screw-in surface M8 thread: 45 mm



Description	Order-No.	Euro
Angular stop for ground tripod triangle, B1216 bolt	6808	44,-

Corner stop adapter

- **For wall corners, also chamfered concrete parts**
- Angle length 30 mm for chamfers up to 25 mm wide
- Total height from surface of corner stop to screw-in surface M8 thread: 45 mm
- Attention: Only compatible with triangle tripod shipped after Sept. 2024



Description	Order-No.	Euro
Corner stop for ground tripod triangle, B1216 bolt	6812	66,-

Transport case

- **For storage and transport of 1x ground stand and prism**
- Made of red plastic with 2 click fasteners. Outer dimensions: 275 x 230 x 80 mm
- Upper and lower part are foam inlays. Weight: approx. 420 g

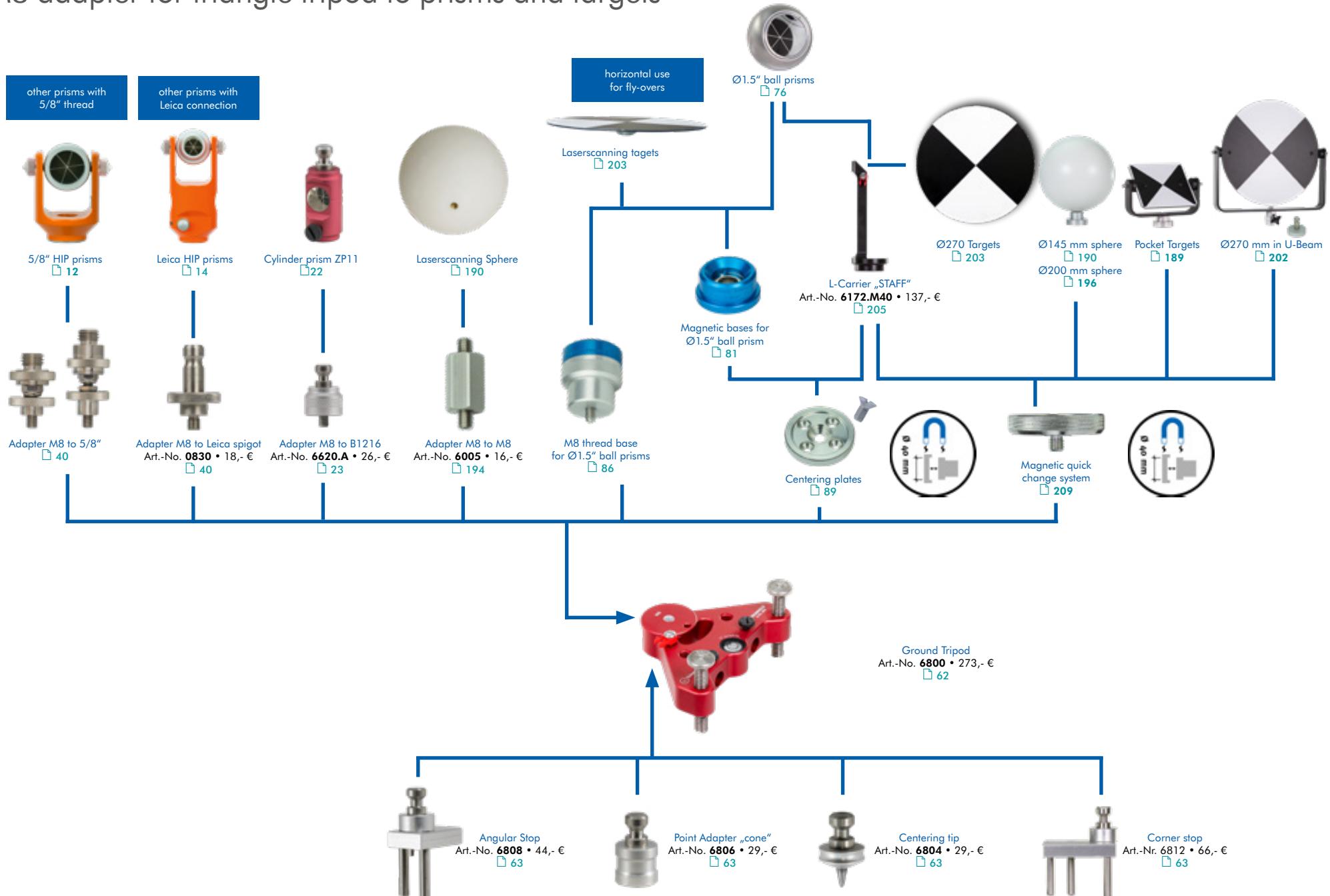


Description	Order-No.	Euro
Transport case for ground tripod „triangle“	1468.2	34,-





M8 adapter for triangle tripod to prisms and targets





Monitoring / Tunneling

B.1. General information about our Monitoring Systems

67



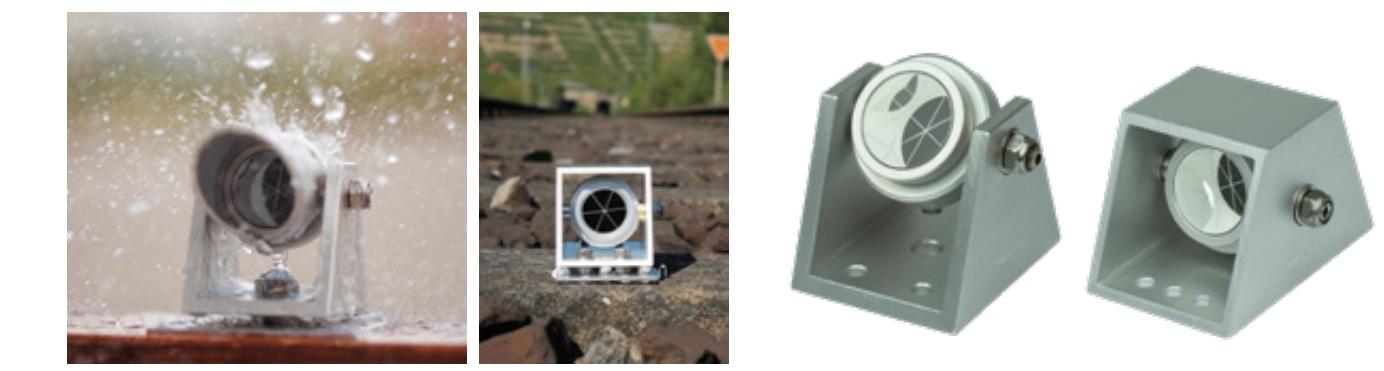
B.2. Ball Prism - Monitoring System

69



B.3. Rugged MoniPro System

98



B.4. L-Bar Prisms

102





Monitoring / Tunneling

2/2

B.5. Twin-Prism-System (two prisms)

105



B.6. Perpendicular over measuring point - 1 or more prisms

108



B.7. M8 wall bolts as surveying points

111





Monitoring Systems in comparison



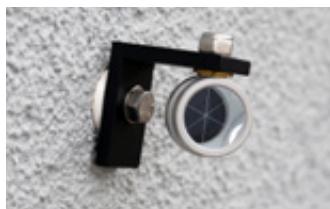
Ball Prism System

- High-precision and inexpensive
- Ball prism can also be used alternatively for numerous other applications: e.g. Klimax system, 3D stainless steel bases, on pendulum holders, etc.
- Available with two prism constants
- Cost-effective solutions possible by mounting several survey points (magnet bases/centering plates), but using only one ball prism
- System can be put together project-based and then extended with time



Bunker prism / Bunker base

- For long-term observations and harsh environments: Robust, durable, accurate
- Sturdy bunker housing and spherical prism made from high-quality, non-magnetic V4A stainless steel
- Prism can be aligned to any point in the hemisphere
- Attachment to the object by screwing or gluing
- Theft of the ball prism is not possible without tools, i.e. "in passing"



L-Bar Prisms

- Attachment to object with M8 thread or via Leica wall bolt
- Advantage over the competition: Choose from 6 commercially available prism constants
- Turning and tilting resistance adjustable via wrench



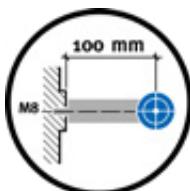
MoniPro System

- Designed for extreme conditions (full metal carrier)
- Tilt and rotation resistance adjustable via wrench
- Prisms can be glued or screwed to the object



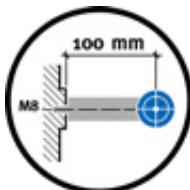
Perpendicular above wall bolt

- Use of already existing prisms possible
- Several prisms can be combined on top of each other for simultaneous observation from different tachymeter positions
- Wall offset: 100 mm



Twin-Systems

- For monitoring points from two different tachymeter positions
- Use our ball prisms or cylindrical prisms
- Available with two prism constants
- Attachment to object with M8 thread or via Leica wall bolt
- Wall offset: 100 mm



Stacking

- For monitoring points from different tachymeter positions
- Use our ball prisms, HIP prisms or cylindrical prisms
- Available with several prism constants
- Can be mounted hanging or standing

Prism Stacking (Prism Towers)

For simultaneous observation of one point from several total station positions

On a 360° prism, measurement is basically possible from any direction. However, if these prisms do not meet the accuracy requirements, a single prism must be used. The disadvantage is that the prism must be aligned in the respective direction of the total station for each measurement.

Below are some examples of how this problem can be solved by stacking several prisms of the same type on top of each other. The prisms can be **rotated independently** of each other and can thus be aligned to different total stations. The „tower“ is levelled by means of the tribrach. The position of the prisms is (X, Y) identical for all measurements. The heights (Z) differ by the distance between the prism centers. If an adjustment calculation requires a height for all prisms, the height offset in the target height must be taken into account in the measurement.

In all examples the standing axis runs exactly through the prism centers.
The result: higher targeting accuracy than with a 360° prism.

Tower of Cylinder Prisms ZP11

- Use of cylindrical prisms with constant -11.3 mm [22](#)
- Very slim, space-saving, yet stable construction
- Prisms are individually rotatable by 360°
- Cylinder prisms can also be used for other versatile applications
- Tightening screws for fixing the selected direction
- Theoretically any number of prisms possible



L-Carrier with Ball Prisms

- Use of thread bases with ball prisms with constants -11.3 mm or -16,9 mm [86](#)
- Protective visor for ball prisms available (as rain/weather protection and to avoid influence on measurement of reflections from other prisms)
- Up to three prisms in a space-saving space
- Maximum coverage (depending on use and orientation): Approx. 300° horizontal and 180° vertical

INFO The shown L-Carrier with three M8 threads is available on request.

Stacking of HIP prisms

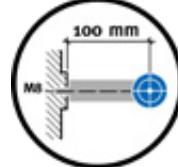
- Use of all HIP prisms 2x5/8" possible (5 different constants) [11](#)
- Connecting elements between the prisms allow individual 360° rotation [256](#)
- A U-prism can be selected as the top prism, so that it can be aligned up to the zenith
- Weather protection visor/alignment aid available [16](#)
- Adapters can be fixed and thus secured against inadvertent rotation
- Theoretically any number of prisms possible



Hanging variants

All examples shown above can also be used as hanging versions. Instead of the tribrach a ball head and a circular bubble level are required.

If you are interested, we will be happy to advise you.





Ball Prism System

B.2.1. Information / Ball Prism

72



B.2.2. Magnet base / nest / thread base

79



B.2.3. Centering plate

88



B.2.4. Adhesive, transport case, protective caps and other accessories

90





Ball Prism System

2/2

B.2.5.

Bunker base and bunker prism

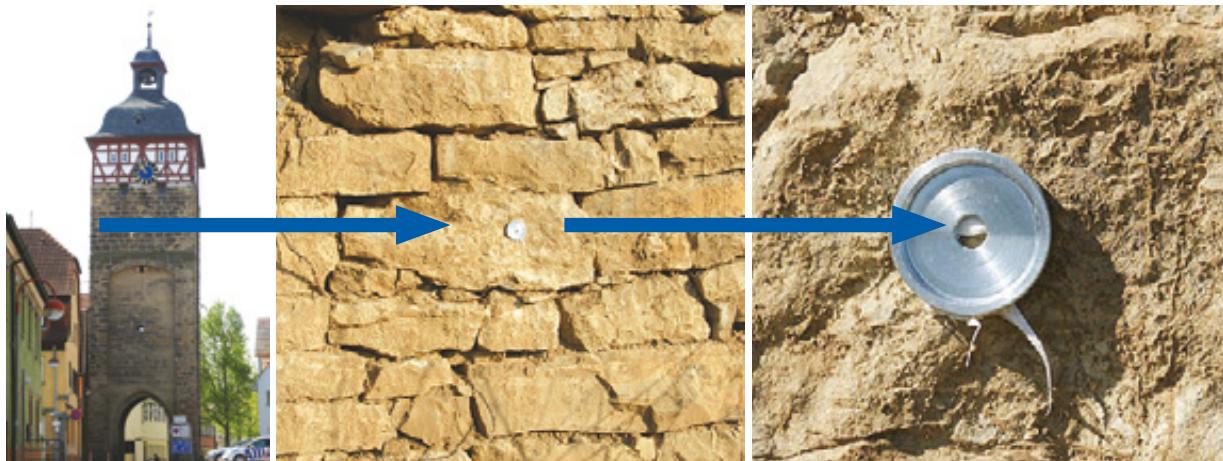
96



APPLICATION EXAMPLE FLOODGATE RENOVATION

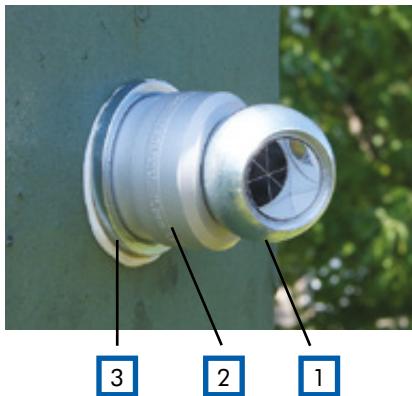


APPLICATION EXAMPLE MONUMENT MONITORING



APPLICATION EXAMPLE TRACK/RAIL MONITORING



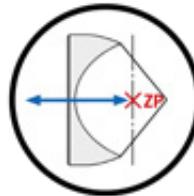


Monitoring: Ball Prism System

Precise - universal - inexpensive

Tachymetric monitoring of buildings, structures, bridges, tunnels, railway tracks etc. with the Bönenstingl Monitoring System

- Economic monitoring of points by means of automated target detection
- Cost-effective solutions through the use of centering plates
- Very high repetition accuracy due to forced centering



■ Ball prisms / balls with reflective foil [1]

The **ball prism** is a precisely manufactured steel ball with a triple prism / reflective foil mounted very precisely in the centre of the ball.

Available in two sizes: Outer ball-Ø30 mm and Ø1.5" (38,1 mm), which is also widely used in laser tracker applications. Ball-Ø30 mm is available with prism constant $K = 11,3$ mm, Ø1.5" additionally with $K = -16,9$ mm.

The triple prism with its centrally symmetrical point (= visible prism centre) is ideally located in the centre of the steel ball. If the prism is inaccurately aligned with the tachymeter, only the smallest inaccuracies will occur.



1

■ Base / nest with integrated magnet [2]

On the cylindrical ball base with cone-shaped upper part, the ball prism comes to rest in a force-centred position and can be aligned in all directions over a 180° range.

The steel ball is kept reliable in the base by an integrated permanent magnet. **The point indicated by the visible prism center is always exactly on the centre axis of the base and has a distance (height offset HO) of 30.8 mm (or 25 mm for stainless steel bases) from its underside.**

This ensures the highest accuracy for repeat measurements, far better than the specified measurement accuracy of electro-optical total stations.



2

■ Centering plate [3]

For a variety of monitoring tasks it is not necessary to permanently equip each point with a prism. If the observation points are easily accessible, it's often enough to attach centering plates before doing the zero measurement.

Only during the measurement itself is the ball prism (together with the magnetic base) or the L-bar prism (with the magnetic base) inserted into the **centering plate and aligned and force-centered**.

Instead of the centering plate, the base can also be attached directly to the object point. This can achieve a further increase in accuracy. However, this is usually far below the measurement accuracy that can be achieved with a tachymeter.

With a centering plate, exact repeat measurements can be carried out at the same point - over many years. Particularly with a large number of points to be checked, it is much cheaper to attach centering plates to the object. Depending on the surface, they are screwed on or glued on (non-destructively).

The ball base with magnet sticks reliably to the stable plates made of galvanised steel or magnetic stainless steel.



3



The choice is yours

Base / nest: strength of magnetic holding force

Most of our ball bases (which serve as support cones for the ball and at the same time as attachment to the object to be measured) are available with different magnetic holding forces. A weak holding force makes sense if the ball is placed on the base and removed again within a short time.

The use of bases with weak magnets in practice however has shown that although the prism remains reliably attached to the ball base, in certain applications the set direction towards the tachymeter can change when left unsupervised.

For example during long-term monitoring on railroad-tracks. When a train drives by, the rail is subjected to strong vibrations. These vibrations are transmitted to the ball base. For this we recommend bases with strong magnetic forces, so the ball prism does not change its set alignment towards the total station.

Base / nest: Base diameter

Our bases for the ball prisms with Ø1.5" are available in two diameters Ø33 mm and Ø40 mm. The diameter describes the circular contact surface of the base in the direction of the object. The diameter itself has no effect on the measurement.

Only thing that should be noted is, we offer one universal centring plate for the Ø40 mm bases and three different centring plates for the bases with Ø 33 mm. Please refer to the subchapter „Centering plates“ for the most appropriate centering plate for your application. Info: The Ø40 mm is based on existing products from the laser scanning industry. We have also developed the Ø33 mm in order to be able to offer a system that saves as much space as possible.

Base / nest: Offsets

A spherical prism mounted on a spherical base results in a certain height (offset) between the prism center and the bottom surface of the base.

For most monitoring points, the offset to the wall is not relevant, since only a change over a certain period of time of the monitored object is what you are looking for.

However, if the monitoring points are to have a „round“ offset dimension, you can easily achieve a wall distance of 50 mm with our thread bases, for example. And with further adapters also the distance 100 mm according to AdV version (German norm).

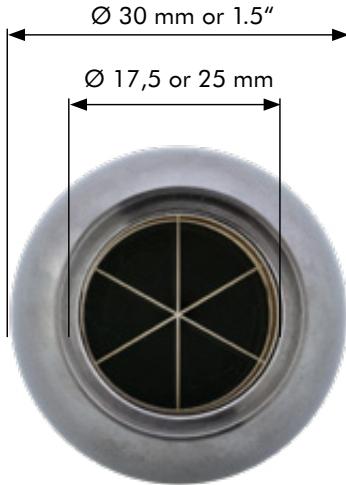


Centering plates: Mounting options

A combination of ball base and ball prism works as a unit theoretically without further accessories. Examples: Either the unit is placed on a smooth magnetic metal surface where it sticks to. Or the ball base can be glued to the object to be monitored using mounting adhesive. The ball can then still be removed. Of course, the base can no longer be removed. To avoid this, we offer so-called centering plates. The inexpensive plates are screwed or glued to the object. The ball base can then be placed on these with an accuracy of tenths of a millimeter by means of forced centering. High-precision repeat measurements are thus guaranteed even over a long period of time.

Ball prism: Diameters of the steel-sphere-body and of the glass prism

We offer two ball diameters. The larger diameter of 1.5" (38.1 mm), is based on reflector balls from laser tracking applications. It makes it possible to accommodate both a glass prism with Ø17.5 mm and a glass prism with Ø25 mm. Thus, the choice results in two different prism constants. The small ball prism with Ø30 mm is somewhat cheaper and takes up less space, but due to the smaller Ø it also only offers space for the small glass prism. Here you are bound to one prism constant.



Ball prism: Magnetic stainless steel

As our ball monitoring system finds more and more applications, the demands change as well. For this reason, we offer our ball prism casings only in stainless steel design starting in September 2024. These have increased weather resistance and are also magnetic. There might be some stock in galvanized steel left for some time though.

General: Accuracies

The diameters of the balls are manufactured with an accuracy of ± 0.05 mm. Other geometries, such as the position of the prism centre to the ball centre, height offsets and centering fits, have an accuracy of ± 0.1 to ± 0.2 mm.

The ball prism monitoring system thus enables highly accurate tachymetric precision measurements.

Please refer to the next section for information on the prism constant.

Ball prisms with test certificate

■ Highest accuracy - with tested prism constant

In order to ensure the accuracy of the constant specification, we measure each triple prism individually and install it in the steel ball.

To examine the accuracy of the prism constant and the position of the central reflection point, we have a series of our ball prisms tested by the **Karlsruhe Institute of Technology (KIT)**.

For this purpose, ball prisms are taken from the current series / batch and a unique serial number is engraved into each ball casing. They are then measured by KIT. As a result, a test certificate is issued for each prism with serial number.

Since then, the **deviations from the nominal values** have been better than ± 0.1 mm for **90% of the tested prisms**. The maximum deviation was 0.3 mm.

The test certificate refers to the ball prism with the serial number which is engraved on the back of the ball. In addition to the prism constant K, which was determined from several comparison measurements with a high-precision reference prism, the position of the centre of the prism relative to the centre of the sphere is also indicated.

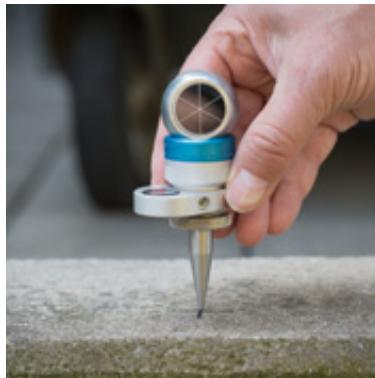
■ Purchase ball prism with test certificate

Would you like to buy tested ball prisms? Just send us an email:

info@bohnenstingl.de

Additional application examples: Ball prism

Although our ball prism was developed for the monitoring market, its accuracy and compact size mean that it can also be used in numerous other applications. Here are just a few examples:



■ With stake-out tip and level

Our thread bases with 5/8" internal thread (86) can easily be supplemented with any positioning tip/spike (41). Use 1466.B as circular bubble. If you want to use the pendulum head as a stake-out point, choose 0140 (167).



■ With ground tripod „Triangel“

62



■ Holding directly on surfaces

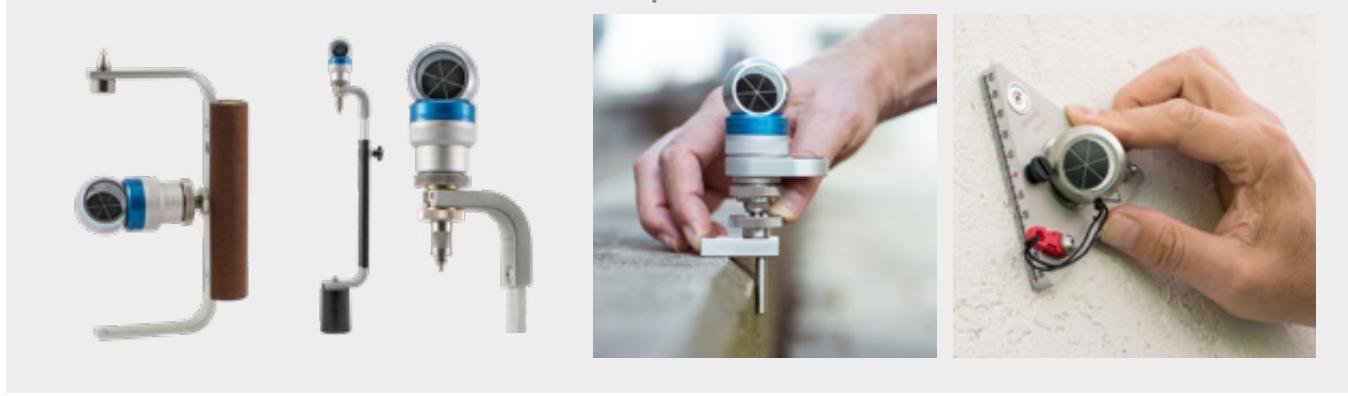
The diameter of 38.1 mm results in an offset to the wall of approx. 19 mm. We recommend our prism 1448 (76). We also offer a version of the prism with drop safety. So you can simply wear the ball prism around your neck (1444 and 1454, 132).



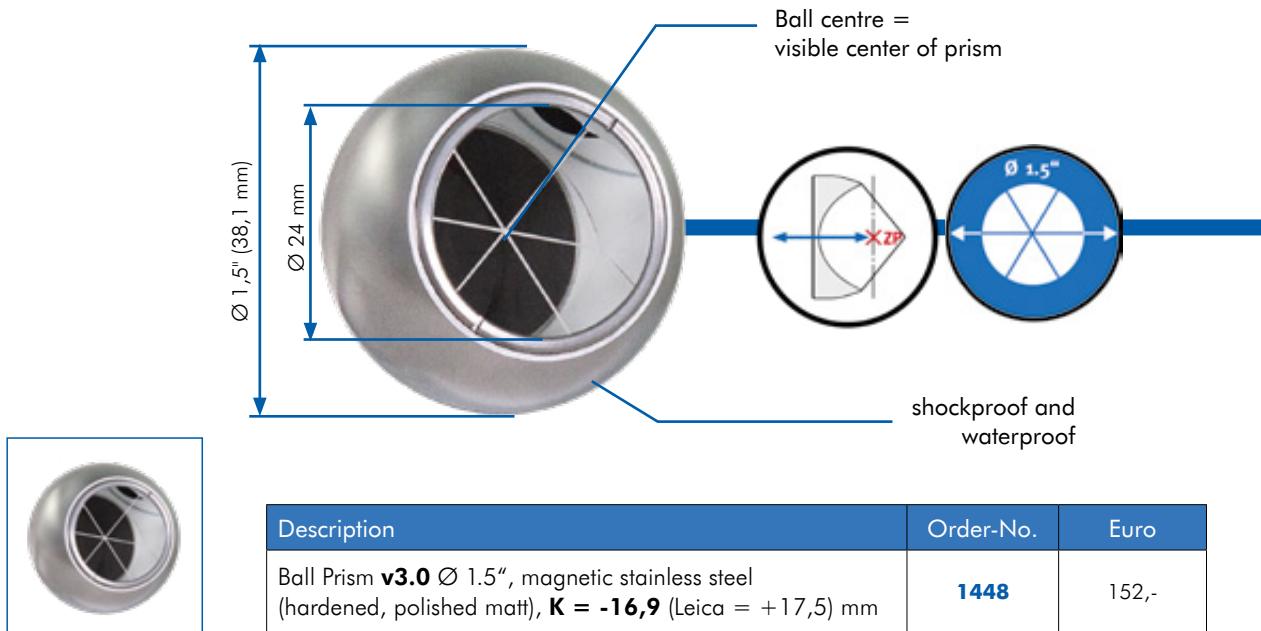
■ Two ball prisms in Twin-System

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■ More possibilities



The Ball Prism Ø 1.5" (38,1 mm) - v3.0



Our ball prism has become the standard for tachymetric monitoring with its outstanding price/performance ratio has become the standard.

In 2024, we made further improvements, including the design of the modified and standardized the design of the ball prism with triple prism Ø 25 mm:

- Spherical housing only available in magnetic stainless steel
- Triple prism secured by screwed cover ring
- No hole Ø 2 mm on the back
- Engraving on the back with indication of prism constants and manufacturer information
- With new no. 1448, the previous nos. 1445, 1445.S, 1445.SP are no longer required

Properties:

- Housing material: Magnetic stainless steel (\varnothing 38.1 mm \pm 0.03 mm)
- Surface: Hardened, matt polished
- Prism constant: K = -16.9 (Leica = +17.5) mm
- Reflective surfaces: Silver mirrored triple prism on the back (\varnothing 25 mm)
- Grinding accuracy of the triple prism: 2"
- Bearing of the prism center: \pm 0.1 mm
- Distance measurement range: 500 to 1000 m (depending on device and weather conditions)
- Weight: 160 g

■ Other Ø1.5" ball prisms, see next page ([77](#)).





More Ball Prisms Ø1.5"

With drop protection

When holding the ball prism, slipping out of your fingers cannot be completely ruled out. The drop protection can be used to prevent the prism from falling or being lost. For example, the prism can be worn around the neck on a lanyard or clipped to a variety of our products, e.g. Klimax, Triangle, HEMI etc.

Description	Order-No.	Euro
Ball Prism Ø1.5" (38,1 mm), magnet. stainless steel, $K = -16,9$ (Leica = +17,5) mm, drop protection with clip connector	1444	179,-

Description	Order-No.	Euro
Carrying strap, red	1390.R	5,50

With test certificate

Further information on the tested ball prisms [74](#)

Description	Order-No.	Euro
Ball Prism Ø 1.5", polished stainless steel, With test certificate, $K = -16,9$ (Leica = +17,5) mm	1445.SN	247,-

Bunker prism made of steel V4A

Further information on the bunker ball prism [96](#)

Description	Order-No.	Euro
Bunker Ball Prism Ø1.5" (38,1 mm), non-magnetic , $K = -16,9$ mm	1322	220,-

Ball target sign Ø 1.5" with reflective foil

For measurements at shorter distances and without automatic target detection

Description	Order-No.	Euro
Ball target sign Ø 1.5", stainless steel, K = 0 (Leica = +34,4) mm	1447.S	121,-

Prism Constant: $K = -11,3$ (Leica = +23,1) mm

- Triple prism made of glass Ø 17,5 mm
- Distance measurements: 300 up to 500 m (device and weather dependent)
- Weight about 180 g

Description	Material	Attributes	Order-No.	Euro
Ball Prism Ø 1.5", K = -11,3 (Leica = +23,1) mm	galvanized steel	-	1453	152,-
	stainless steel	-	1453.S	168,-
	galvanized steel	Test Certificate	1453.SN	247,-
	galvanized steel	Drop Protection	1454	179,-



1454

1453



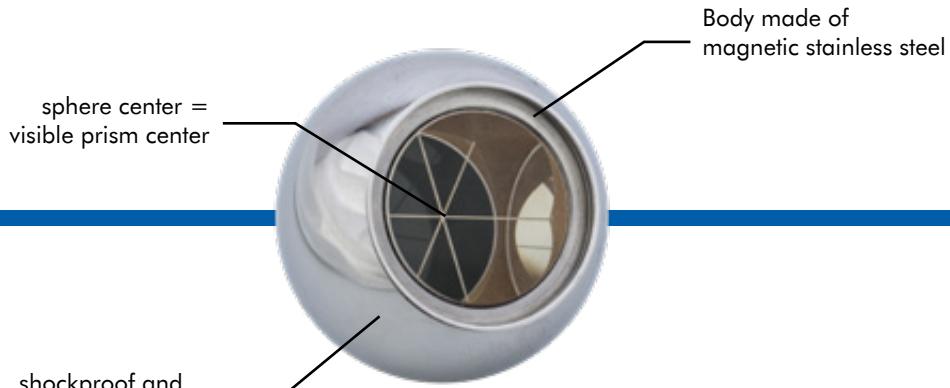
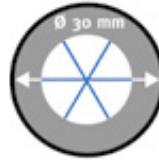
1453.S

1453.SN

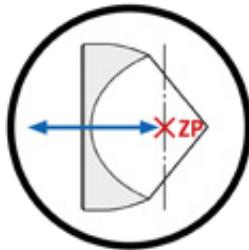


Ball Prism Ø 30 mm

- Sphere: Ø 30 mm \pm 0,05 mm
- Glass prism: Ø 17,5 mm (grinding accuracy: 2'')
- Reflective surfaces: silver mirrored on the rear side
- Mounting of the prism in sphere: \pm 0,1 mm
- Prism constant K = -11,3 (Leica = +23,1) mm
- Range: Up to more than 500 m (depending on device and weather conditions)
- Weight: 80 g
- On request also available with test certificate

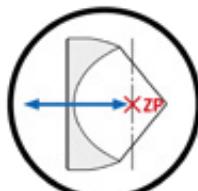


Description	Material	Order-No.	Euro
Ball prism Ø 30 mm, K = -11,3 (Leica = +23,1) mm	polished stainless steel	1451.SP	129,-



Protective cap

A protective cap can be clipped onto the ball prisms. Info: [92](#).

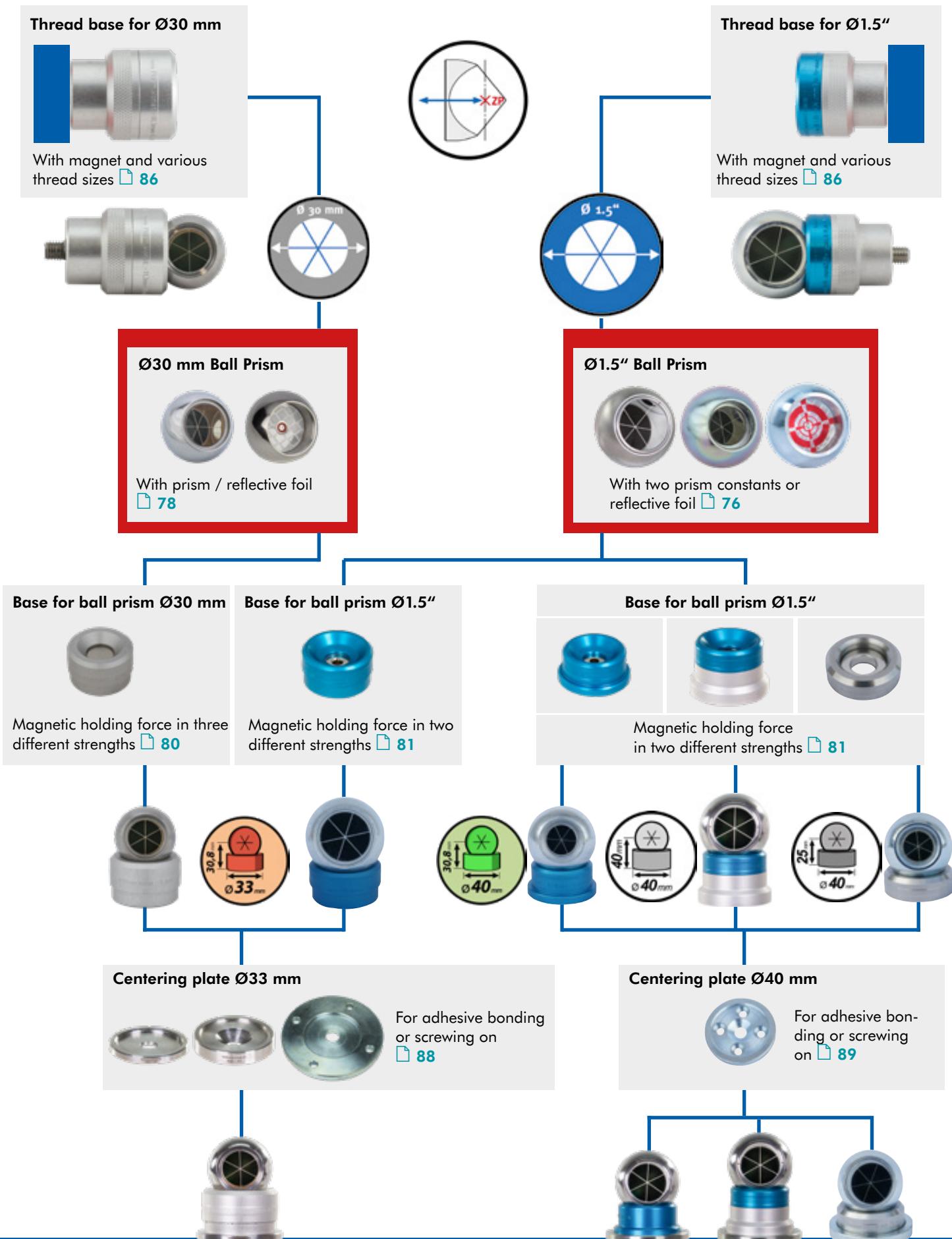


Ball target Ø 30 mm with reflective foil

- For measurements at shorter distances and without automatic target acquisition
- Reflective foil applied in the axis / level of the ball centre
- Prism constant of K = 0 (Leica = +34,4) mm
- Target mark is exactly in center of the ball for highly accurate angle measurement
- Outer Ø reflective foil: 20 mm
- With M6 inner thread at back
- Outer Ø Target for angle measurement: 5 mm
- Inner Ø target for angle measurement: 0.5 mm
- (other designs possible on request)
- Weight: 75 g

Description	Material	Order-No.	Euro
Ball target Ø 30 mm, reflective foil, K = 0 (Leica = +34,4) mm	stainless steel	1455.SP	108,-

Magnetic Ball Prism Monitoring System



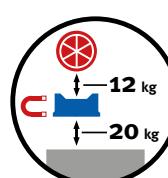
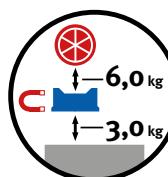
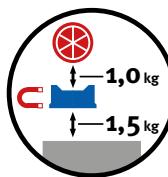
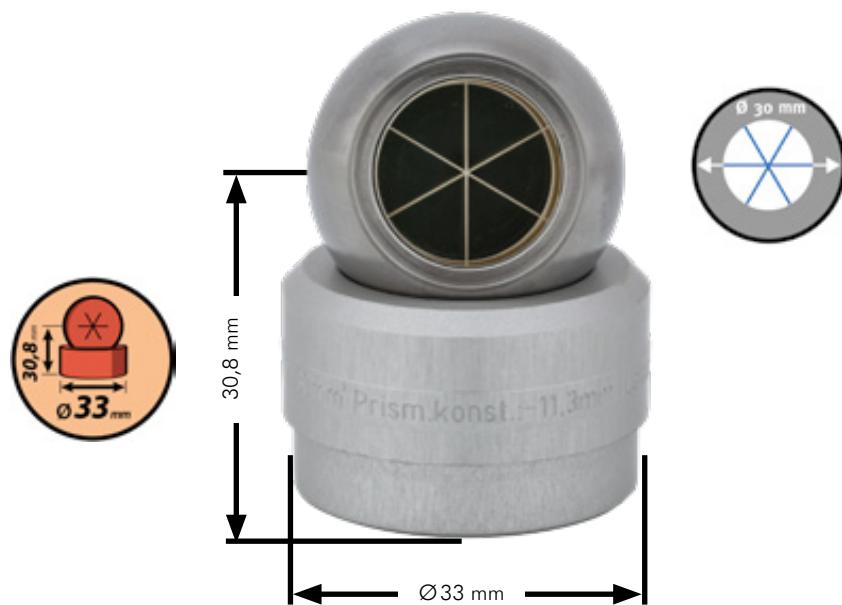


Base with integrated magnet for ball-Ø 30 mm

- Turned part made of hard anodised aluminium with integrated permanent magnet
- For mounting on magnetic surfaces, e.g. railway rails, machines, vehicles and centring plates
- Each base is supplied with a protective cover plate

Protective cover plate

The base can be fitted with a cover plate during the period no measurements are taking place. It is also held magnetically and protects the ball base / nest from dirt and weather influences.



Description	magnetic holding force	Order-No.	Euro
Base Ø 33 mm for ball prism Ø 30 mm, with integrated magnet and protective cover plate	approx. 1,0/ 1,5 kg	1460	29,-
	approx. 6,0/3,0 kg	1460.S	34,-
	approx. 12,0/20,0 kg	1460.S2	38,-

TIP

When a train passes over the rail, it is subjected to strong vibrations. These vibrations are transferred to the ball base. The use of magnetic bases with weaker magnetic forces has shown in practice that although the prism adheres reliably to the ball base, the set direction of the prism to the tachymeter can become distorted in the long term.

We therefore recommend using the ball base with the strongest magnet for rail track monitoring.

INFO

Due to the very high holding force of the strong magnets of the bases 1460.S and 1460.S2, the use of a „remover“-tool is recommended. Further information can be found on [87](#).



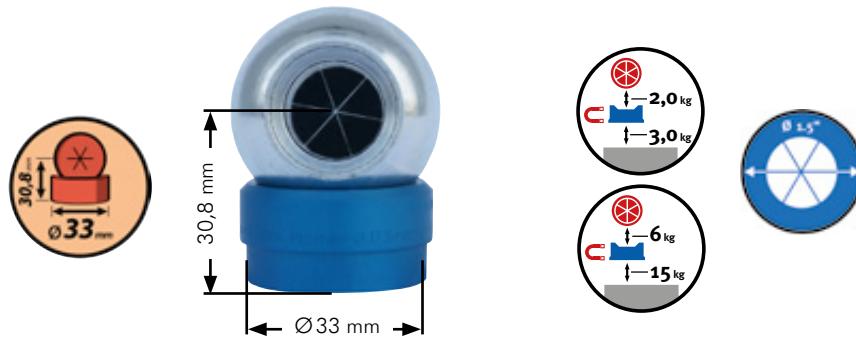


Base with magnet for ball-Ø 1.5" (38,1 mm)

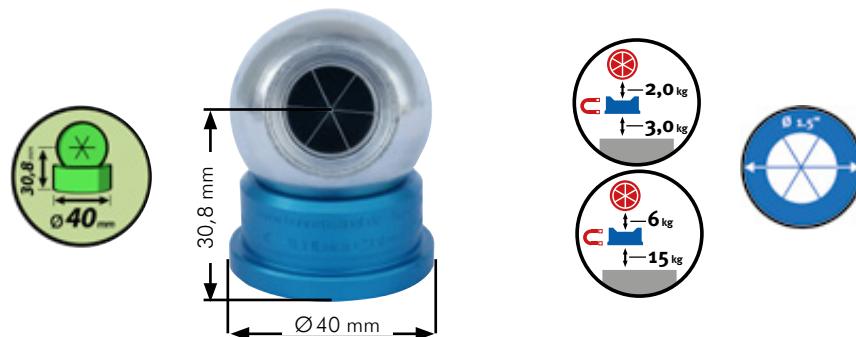
- Turned part made of hard anodised aluminium with integrated permanent magnet
- For mounting on magnetic surfaces, e.g. railway rails, machines, vehicles and centring plates
- Each (magnet) base is supplied with a protective cover plate

Protective cover plate

The base can be fitted with a cover plate during the period no measurements are taking place. It is also held magnetically and protects the ball base / nest from dirt and weather influences.



Description	magnet. force	Order-No.	Euro
Base Ø 33 mm for ball prism Ø 1.5", with integrated magnet and protective plate	approx. 2,0/3,0 kg	1457.S	34,-
	approx. 6,0/15,0 kg	1457.S2	37,-



Description	magnet. force	Order-No.	Euro
Base Ø 40 mm for ball prism Ø 1.5", with integrated magnet and protective plate	approx. 2,0/3,0 kg	1458.S	34,-
	approx. 6,0/15,0 kg	1458.S2	37,-



TIPP For rail track monitoring, we recommend using the Ø30 mm ball prism and the base with the highest magnetic force 1460.S2 [80](#).

INFO Due to the very high holding force of the strong magnets of the bases 1460.S and 1460.S2, the use of a „remover“-tool is recommended. Further information can be found on [87](#).





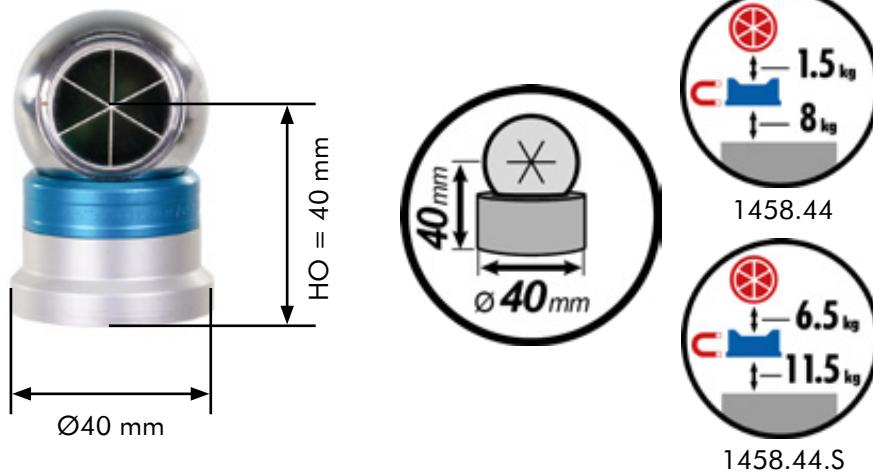
Magnet Base Ø40 mm with height offset 40 mm

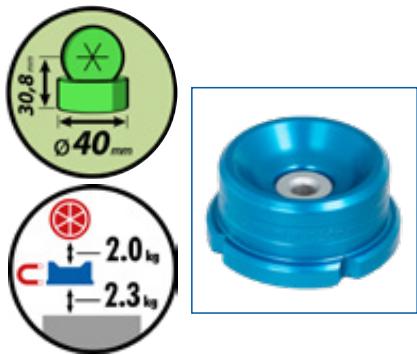
Base with height offset 40 mm. Basic properties and application options like standard bases 1457.X / 1458.X (81).

Centering pin 1458.ZS can be used with both magnetic holding forces.



Description	Order-No.	Euro
Base Ø 40 mm, HO: 40 mm, for Ø1.5" ball prism	1458.44	82,-
Base Ø 40 mm, HO: 40 mm, for Ø1.5" ball prism - strong	1458.44.S	88,-





Centering Base ,Compact'

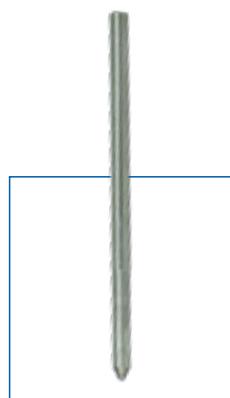
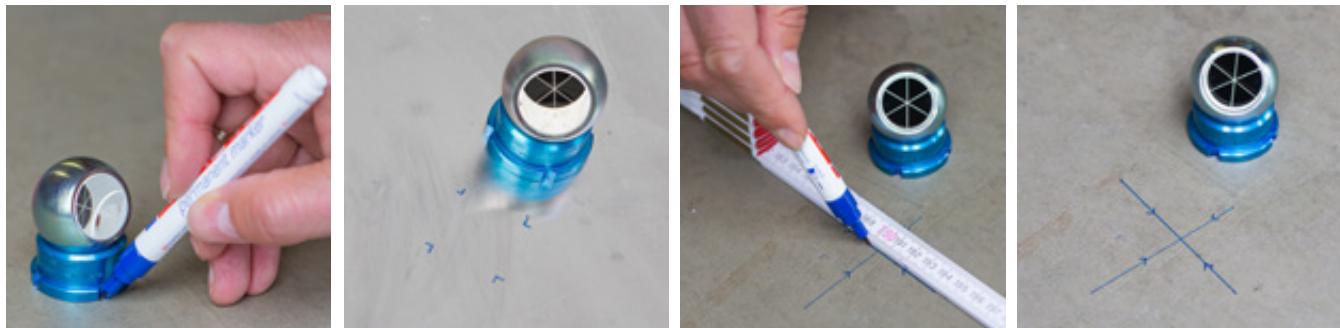
For staking out and measuring object points

Additional features extend the application possibilities of the classic magnet base 1458.S ([81](#)) by further practical functions:

Four notches

- for staking out points. After determining the correct position, the four notches are marked. After removing the base and connecting the respective diametrical markings with ruler and pen, the target point is staked out quickly and precisely. The thickness of the pen can be selected according to the accuracy requirements.
- for measuring points. For this purpose, a cross line must be drawn over the point to be able to be measured. The centering base is then positioned using the notches and the position of the ball prism is determined. If the base is used on horizontal surfaces, an exact height is also obtained. For this, the height offset of 30.8 mm in the Z coordinate must be taken into account.

Description	Order-No.	Euro
Centering Base ,Compact' (without centering pin) - for Ø1.5" ball	1458.A	88,-



Centering Pin

Instead of or in addition to the 4 notches, a centering pin can also be used to stake out or measure the points.

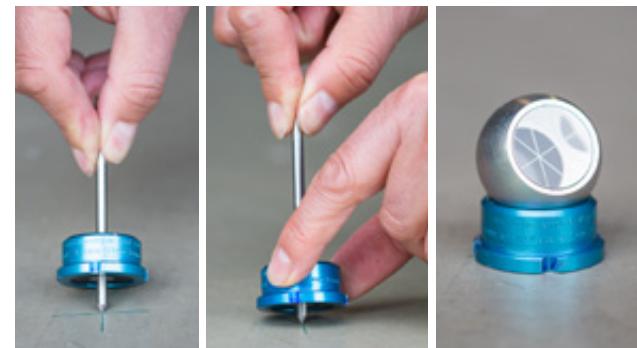
- Stakeout of points. After correct positioning, the ball is removed. Use the pin to mark the point to be staked out with a light hammer blow, if necessary.
- Measuring of points. Using the centering pin, the base can be placed at a point that is already marked on the object (e.g. cross, grain).

Description	Order-No.	Euro
Centering pin Ø 5 x 100 mm, stainless steel, hardened tip	1458.ZS	19,-

Staking out a point



Measuring a point





Stainless steel base for ball-Ø 1.5" (38,1 mm)

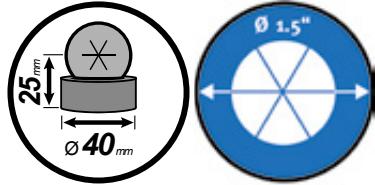
Design and function of the stainless steel ball base corresponds to that of the aluminium ball bases.

With permanent magnet

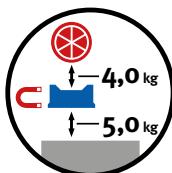
The integrated permanent magnet allows the ball base to be attached to all magnetic surfaces, e.g. railway rails, machines, vehicles and centering plates. [89](#).

Special features:

- Casing made of stainless steel (V2A)
- Integrated ring magnet with centric bore Ø 14 mm
- Height-Offset HO of prism center to bottom surface of base: $25 \pm 0,1$ mm
- Bottom surface-diameter of base: $\varnothing 40 \pm 0,01$ mm
- Fits to centering plate No. 6009 [89](#)
- Ring marking with engraved ball Ø and height offset HO 25 mm
- Each base is shipped with a cover plate



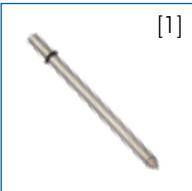
If there is no ball prism on the base, it can be covered with a protective plate made of galvanised sheet steel. This has a Ø of 40 mm, is also held by the base magnet and protects the base from dirt and weather influences (see picture).



Description	Order-No.	Euro
Stainless steel base Ø 40 mm for ball prisms Ø 1.5", with magnet (holding force approx. 4,0/5,0 kg) , with cover plate	1430	61,-
Stainless steel base Ø 40 mm for ball prism Ø 1.5" (38,1 mm), without magnet	1431	49,-



[1]



Centering pin / center punch for base 1430 and 1431

For staking out, registering and controlling points.

For detailed information on the features and the application of the centering pin and bearing insert, see [136](#).



[2]

Description	Order-No.	Euro
Centering pin with hardend tip [1]	1498.S	23,-
Bearing-insert for centering pin, for base C and CM [2]	1498	29,-

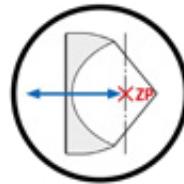


PLEASE
NOTE

Please also note our special bases made of stainless steel for industrial 3-D measurements [138](#)



Nutshell Adapter: Ø30 mm to Ø1.5"



Ball prisms are available with outer Ø 30 mm and Ø1.5".

With the nutshell adapter, the small Ø30 mm balls can now also be inserted into the „large“ bases for Ø1.5" balls:

- **Standard bases for 1.5" balls** with base-Ø 33 and 40 mm [81](#)
- Bases / nests with various **bases with threads** [86](#)
- **Magnetic quick change system** for force-centered switching between ball prisms and laser scanning/lasertracker targets, e.g. for registration and georeferencing [209](#)

With Ø1.5", ball reflectors from other areas of surveying are also offered, including SMR angle mirrors for laser trackers used in industrial surveying.

To ensure compatibility between the various surveying disciplines, we have developed bases/nests which have since only been used in combination with Ø1.5" spheres.

Now these applications are also possible with the 30 mm balls:

- **3D stainless steel base** (for edges, corners, bore holes etc.)
- **System Klimax:** Measuring and finding points on walls and floors



The outside of the adapter is spherical with Ø1.5". After inserting the Ø30 mm ball on the conical inner part, the ball centre (= visible prism centre) is at the same height as the centre of a directly inserted Ø1.5" ball. On stainless steel bases the height is therefore 25 mm (see picture 1) and on blue bases 38.1 mm (see picture 2).

Description	Order-No.	Euro
Nutshell adapter: Ø30 mm to Ø1.5"	1437	39,-



Properties of the nut shell adapter:

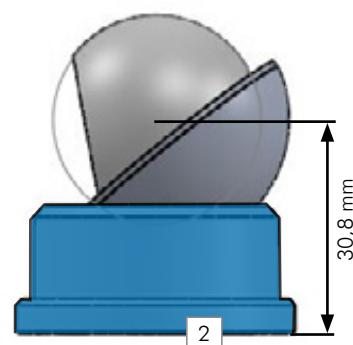
- Made of non-magnetic stainless steel
- Since the magnetic holding force of the base is weakened due to the greater distance to the magnetic ball, we recommend using bases with higher holding force
- A central bore Ø5 mm makes the use of the centering pin No. 1458.ZS possible ([83](#))
- Even if the adapter is placed on the base at a slight angle, there will be no inaccuracies. The ball centre maintains the same 3D position x, y, z



Insertable balls Ø30 mm
1450 s. page 78
1450.S s. page 78
1451.SP s. page 78



Now usable Ø1.5" bases
Standard Ø1.5" bases 81
3D stainless steel bases 138
Klimax-Bases 134
Bases with threads 86

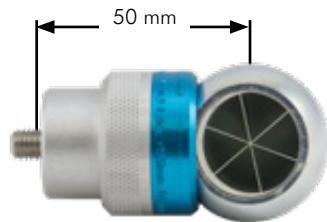
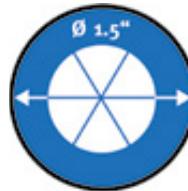




Example: Mounted to a wall bolt

Ball base with magnet and thread connections

- The distance of the ball center from the base underside to the center of the prism is always exactly $50 \pm 0,1$ mm (without thread)
- All bases are shipped including cover plate for protection against dirt (80)
- On request many of the bases are also available with weaker or stronger magnets



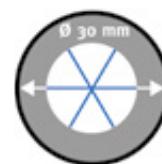
For ball prism Ø 1.5" (38,1 mm)

With inner thread

Description	thread connection	magn. holding force	Order-No.	Euro
Base for ball prism Ø 1.5", inner thread	1/4"	approx. 3 kg	1466.14	49,-
	M8	approx. 3 kg	1466.08	49,-
	5/8"	approx. 3 kg	1466.58	49,-

With outer thread

Description	thread connection	magn. holding force	Order-No.	Euro
Base for ball prism Ø 1.5", outer thread	1/4" x 8 mm	approx. 3 kg	1466.14a	52,-
	M8 x 8 mm	approx. 1 kg	1466.08aL	46,-
		approx. 3 kg	1466.08a	52,-
	5/8" x 11 mm	approx. 3 kg	1466.58a	52,-



For ball prism Ø 30 mm

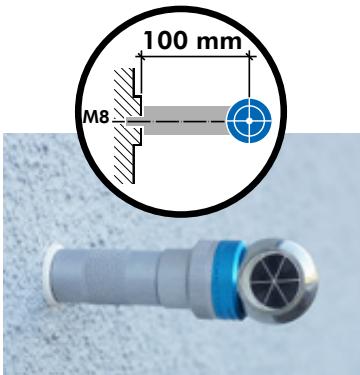
With inner thread

Description	thread connection	magn. holding force	Order-No.	Euro
Base for ball prism Ø 30 mm, inner thread	1/4"	approx. 4,5 kg	1465.214	49,-
	M8	approx. 4,5 kg	1465.208	49,-
	5/8"	approx. 4,5 kg	1465.258	49,-

With outer thread

Description	thread connection	magn. holding force	Order-No.	Euro
Base for ball prism Ø 30 mm, outer thread	1/4" x 8 mm	approx. 4,5 kg	1465.214a	52,-
	M8 x 8 mm	approx. 0,5 kg	1465.08a	46,-
		approx. 4,5 kg	1465.208a	52,-
	5/8" x 11 mm	approx. 4,5 kg	1465.258a	52,-





■ Extension for thread bases - Wall offset 100 mm

With the following adapters, the ball bases with M8 thread (86) can be extended to the wall offset of 100 mm (AdV version, German norm).



Description	Thread 1st side	Thread 2nd side	Order-No.	Euro
Extension, Aluminum, Ø 25 x 50 mm	M8 inner thread	M8 inner thread	0372.050	24,-
	M8 outer thread	M8 inner thread	0373.050	25,-
	M8 outer thread	M8 outer thread	0374.050	26,-

NOTE

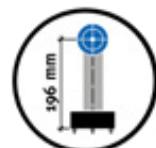
We can supply the ball base and adapter „glued“ together so that an exclusive use of 100 mm distance is possible.



■ Ball base with bolt adapter (height offset = 60 mm)

In order to be able to attach a circular level (see 109), the adapter is shipped screwed but not glued. However, we can also deliver the screw connection glued on request. Magnetic holding force in the direction of the ball: approx. 3 kg

Description	Order-No.	Euro
Ball base Ø1.5" with Leica adapter (tilting axis height = 60 mm)	1440.060	87,-
Ball base Ø30 mm with Leica adapter (tilting axis h. = 60 mm)	1441.060	87,-



233
for information on
combining the adapter
with system 196 mm

■ Remover Tool

Bases with strong magnets (1457.S2, 1458.S2, 1460.S2) cannot easily be pulled off „by hand“ due to their very high magnetic holding force. It is therefore recommended to use a remover-tool.

- Sturdy, break-proof plastic
- Suitable for all ball bases (**not for stainless steel bases**)
- With carrying strap
- Dimensions: Ø 45 x 100 mm
- Weight: ca. 120 g

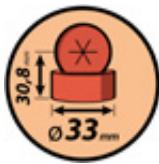


Description	Order-No.	Euro
Remover tool with carrying strap	1460.Z	26,-



Centering plate for Ø 33 mm

To use with adhesive



- Galvanized steel plate Ø 40 x 4 mm, magnetic
- To use with **assembly adhesive** (90)
- Accuracy of centering fit Ø 33 mm: $\pm 0,1$ mm
- Bore hole Ø 8 mm in center for exact fixation of the plate during gluing

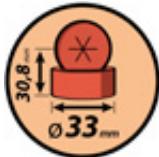
Description	Order-No.	Euro
Centering plate (use with adhesive), centering Ø 33 mm, stainless steel	1461.VA	8,-



To use with adhesive and / or to screw on

- Steel plate Ø 40 x 7 mm
- Accuracy of centering fit: Ø 33 $\pm 0,1$ mm

Mounting options:

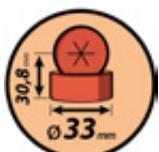


Galvanized steel (magnetic) or stainless steel (magnetic)

Description	Order-No.	Euro
Centering plate Ø 33 mm, countersunk bore 8 mm, stain. steel	1464.VA	11,-



To screw on and / or nail to object



- Steel plate Ø 60 x 4 mm, galvanized, with 4 bore holes Ø 4,5 mm
- For screwing onto a wide variety of surfaces
- Accuracy of centering fit: Ø 33 $\pm 0,1$ mm
- Center bore hole Ø 8 mm for exact positioning of the plate when screwing on

Description	Order-No.	Euro
Centering plate Ø 33 mm to screw on object, center bore hole Ø 8 mm + 4 x Ø 4,5 mm eccentric bore hole	1463	9,50



Universal centering plate for base Ø 40 mm

To use with adhesive and / or to screw on

- Steel plate Ø 50 x 7 mm, galvanized
- Accuracy of centering fit: $\varnothing 40 \pm 0,1$ mm
- Effective height to centering level: 5,5 mm



Mounting options

- To use with assembly adhesive [90](#)
- Center borehole Ø 8 mm for a countersunk screw
- Eccentric holes Ø 5 mm for 2 to 4 countersunk screws



Description	Order-No.	Euro
Centering plate for base Ø 40 mm, to use with adhesive or to screw onto object	6009	12,-



Assembly Adhesive

For non-destructive attachment of the ball base or the centering plates to the object over a prolonged period of time.

Characteristics of the adhesive

- Bonding of metals, wood, plastic with and to each other (stone, concrete, natural stone, gypsum, polycarbonate, PSPU, PVC, plastic, copper, aluminium, steel, wood, glass)
- Very high initial adhesion
- Bonding of heavy parts, also in vertical places
- Odourless and solvent-free, Fungus-inhibiting
- Resistant to weathering, UV radiation, water, chlorine, etc.
- Processing temperature: +5/+40°C
- For use with commercially available hand cartridge guns

Application



The parts to be bonded must be clean and free of oil and grease. Apply adhesive on one side, position parts and press them firmly on. The adhesion is immediate.

If the ball base is used on magnetic iron parts (e.g. tracks), the adhesion of the adhesive is additionally supported by the permanent magnet until it hardens.

Description	Order-No.	Euro
Assembly adhesive, white, 1 cartridge à 290 ml	1462	16,50



Cover plate for centering plates Ø33 mm and Ø40 mm

- To protect the centering plate from dust and weather when the base/prism is not in use
- Made of weather resistant plastic
- 2 heels that fit exactly into either the Ø33 mm or Ø40 mm centering of the centering plate
- Due to an integrated permanent magnet, the cover plate adheres reliably
- Made of subtle black plastic. Top side can be provided with sticker if required (desired visibility, labeling option, etc.)
- Waisted for secure gripping of the cover plate
- Weight: 42 g

INFO

Not suitable for centering plate No. 1463.

Description	Order-No.	Euro
Cover plate for centering plates Ø33 and 40 mm, with permanent magnet	1429	5,50



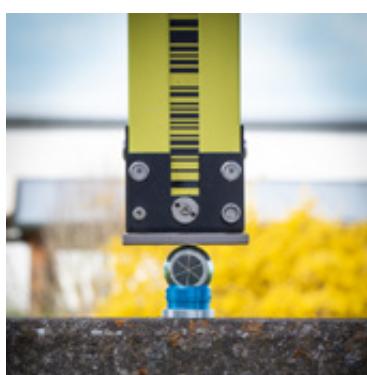
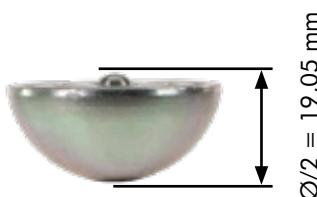
Levelling-Adapter Ø1.5" (38,1 mm)

For combining levelitic height measurement with tachymetric 3D measurement

The adapter is inserted on a horizontally mounted base for ball Ø1.5". The contact point of the levelling staff on the adapter is exactly at the same height as the center of an inserted ball prism Ø1.5" (38.1 mm).

- Hemisphere Ø38.1 mm galvanized
- Center made of stainless steel for placing the leveling rod on top
- Adapter height = $\varnothing/2 = 19.05$ mm

Description	Order-No.	Euro
Levelling-Adapter Ø1.5" (38,1 mm), H=19,05 mm	6155.41	37,-



The leveling staff can also be placed directly on a ball prism. Then the radius (19.05 mm) must be taken into account mathematically.



Protective Caps for ball prisms

For ball prisms Ø30 mm and Ø1.5" with glass-Ø17,5 mm

To use with ball prisms with glassbody- Ø17,5 mm (1451.SP, 1450.S, 1453, 1453.S, 1454, 1453.SN).

- For clip onto the ball prism
- Made of resistant white plastic
- Cap protects prism from dust, rain, snow, etc.
- Due to the „tunnel effect“, a more precise alignment to the tachymeter is required when using the cap. The center of the prism must be visible.

Description	Order-No.	Euro
Protective cap Ø 25 mm, white plastic, to clip on	1469	9,-



For ball prisms Ø1.5" with glass-Ø25 mm

To use with ball prisms 1.5" with glassbody- Ø25 mm (1448, 1445.S, 1444, 1445.SN).

- For clipping (via three integrated magnets) to the ball prism and the ball target
- Made of durable white plastic
- Cap helps to protect the prism against dust, rain, snow
- Due to the „tunneling“ effect, more precise alignment with the total station is required when using the cap. The center of the prism must be visible
- A cut-out serves as a drain for rain / water accumulations in the inner diameter



Description	Order-No.	Euro
Protective cap for Ø1.5" ball prisms (with glass prism Ø25 mm), white plastic, can be clipped on magnetically	1502	22,-



■ Next page: Further protection options for ball prisms



Protective roof for magnetic bases

To protect bases with or without prism from weather conditions such as rain, snow, dust, dew, etc.



For plugging onto bases on vertical walls

- Made of anodized aluminum
- Suitable for all bases
- Roof is secured to base with a knurled screw
- Weight: 47 g

Description	Order-No.	Euro
Protective roof for plugging onto vertically mounted bases	1503	22,-

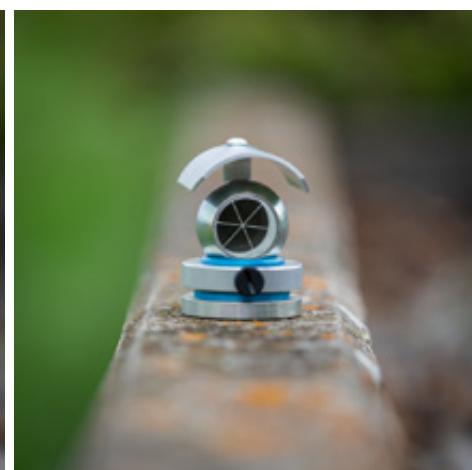


For plugging onto bases on horizontal surfaces



- Made of anodized aluminum
- Suitable for all bases
- Roof is secured to base with a knurled screw
- Weight: 63 g

Description	Order-No.	Euro
Protective roof to be attached to horizontally mounted bases	1504	26,-





Protective CAGE for ball prism Ø1.5"

To extend the application possibilities of the ball prism

The Ø1.5" ball prism can be inserted into the CAGE. A special base with integrated magnet is attached to the prism carrier using the 1/4" screw. When the Ø1.5" ball prism is placed on the base, the prism center is positioned exactly in the center of the standing axis in the carrier. The spherical prism is always used when high aiming accuracy is required rather than simultaneous observation from all directions.

As with the 360° prism (□ 28), the two 5/8" threads increase the application possibilities enormously.

- Top and bottom made of aluminum, 2 stainless steel connecting rods
- Top and bottom 5/8" inner thread, height 100 mm
- Construction identical with HIP prism 2 x 5/8", thus all accessories can be used
- Aiming accuracy: ± 1.5 mm with 360° prism, ± 0.2 mm with ball prism
- Comes with 1/4" screw, to connect 360° prism
- Weight: 200 g

Description	Order-No.	Euro
CAGE prism carrier for 360° prism Bo medium format and ball prism	5668	154,-

■ Special base CAGE for 1.5" ball prisms

- Anodized base with integrated magnets
- Comes with clip connector to use with ball prisms with fall protection
- 1/4" screw for mounting the base in the CAGE included in delivery

Description	Order-No.	Euro
Special base CAGE for ball prisms Ø38.1mm	5667	43,-





Transport case

- Outer dimensions: ca. 275 x 230 x 80 mm
- Weight: 450 g
- Made of red plastic
- 2 Click fasteners
- Hard foam in the lid



For base with standard magents

- In the lower part hard foam with 15 separate compartments
- For bases with holding force 1.5 to 4 kg



Description	Order-No.	Euro
Transport case, monitoring, 15 compartments	1468.15	44,-



For bases with strong magnets

- In the lower part hard foam with 15 separate compartments
- For bases with holding force 15 kg to 20 kg



Description	Order-No.	Euro
Transport case for strong magnets, monitoring, 6 compartments	1468.6	42,-



Bunker Prism

The fixed point even for harsh environments: robust, durable, precise

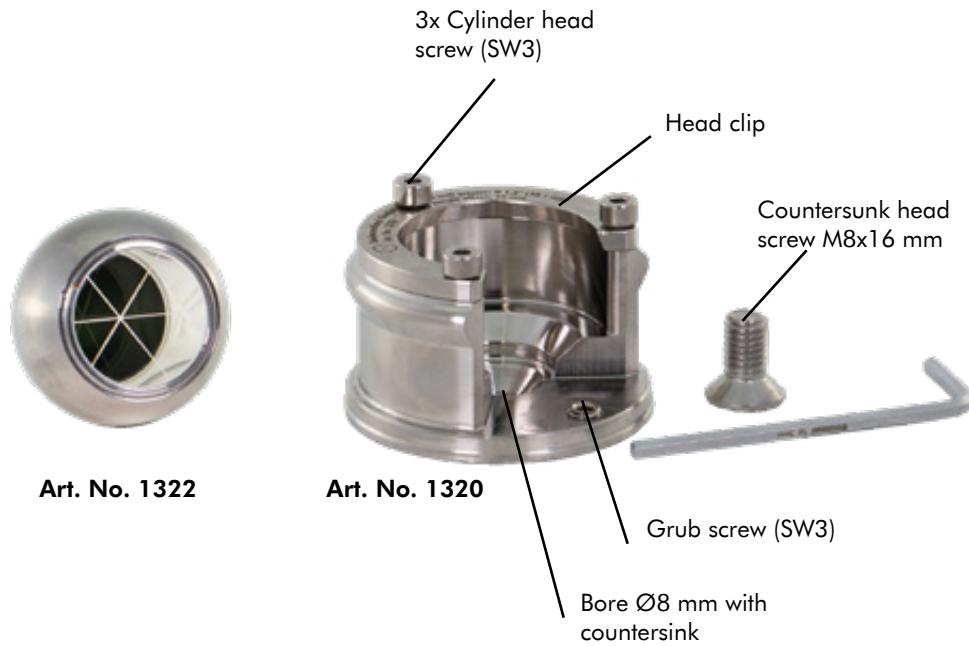
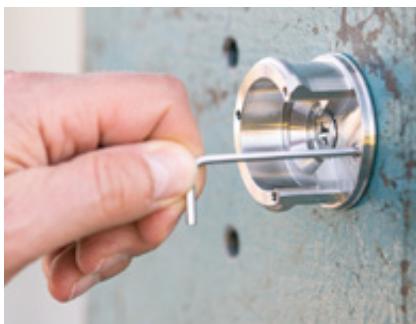
In traditional monitoring, target markers are installed on the object and measured at regular intervals using the measuring instrument (typically a total station).

With the obtained 3D coordinates, positional shifts of the object point between measurements. Alternatively, they are used as fixed points for the stationing of the total station.

Our ball prisms with magnetic bases have proven to be very effective as target markers (76), and they have been further developed with the bunker prism for long-term observations and harsh environments.

Application and advantages of the bunker prism

- Sturdy bunker base made of high-quality, non-magnetic V4A stainless steel
- Special ball prism, prism mount also made of non-magnetic V4A, particularly waterproof and shock-resistant
- Alternatively, all of our other ball prisms with a diameter of 1.5" can also be used
- Instead of a magnet, a screw-on head clip ensures secure fixation of the ball prism in the bunker housing after insertion and alignment. Accidental rotation is prevented
- Very high centering (targeting) accuracy of $\pm 0.1 - 0.2$ mm
- In automatic target finding by the total station, the optimally mounted glass body ensures precise automatic centering on the centrally symmetric point of the prism (visible center).
- Prism adjustable to any point on the hemisphere
- In the event of damage to the glass body, the ball prism can be easily replaced. The precise positional identity of the reference point remains intact
- Stealing the ball prism is not possible without tools, meaning it cannot be done „on the go“
- Attachment to the object by screwing or gluing (see mounting adhesive) 90
- Set screw for additional securing of the bunker base against rotation
- Optional: A sturdy protective cover can be attached between measurements, providing additional protection for the bunker prism against weather and vandalism
- The height offset between the bottom of the housing and the center of the prism is only 25 mm.





Bunker Base



- Material: V4A stainless steel, non-magnetic, Ø55x33 mm
- Incl. M8x16 mm countersunk screw for attachment to the object
- Head clamp made of V4A, includes 3 pieces of M4 x 10 mm cylinder head screw (hex 3 mm)
- M6 Grub screw (hex 3 mm) in the lower part of the bunker housing
- Weight: 260 g

Description	Order-No.	Euro
Bunker Base, incl. M8-countersunk head screw	1320	148,-

INFO As an alternative to screwing into an M8-thread, the bunker base can also be anchored using a suitably sized countersunk head screw.

Ball Prism for Bunker Base



- Ø1.5" (38,1 mm) ± 0,03 mm,
- Material: V4A stainless steel, **non-magnetic**
- Screwed socket - waterproof and shockproof
- Prism constant K = -16,9 (Leica = +17,5) mm
- Weight: 158 g

Description	Order-No.	Euro
Ball Prism for Bunker Base made of V4A, K = -16.9 mm (Leica = +17,5)mm	1322	220,-

INFO Bunker Base can be used also with the all other ball prisms Ø1.5"

Protective cover for bunker prism

For protection against weather and vandalism

The protective cover is placed over the bunker prism/bunker base and then secured with a screw. If good visibility or labeling is desired, the front panel can be fitted with an appropriate sticker (please inquire!)



- Material: POM black, Ø60 x 48 mm
- Locking screw SW 3 mm
- Weight: 86 g

Description	Order-No.	Euro
Protective cover vor bunker prism / bunker base	1321	36,-





Monitoring Prism Series MoniPro

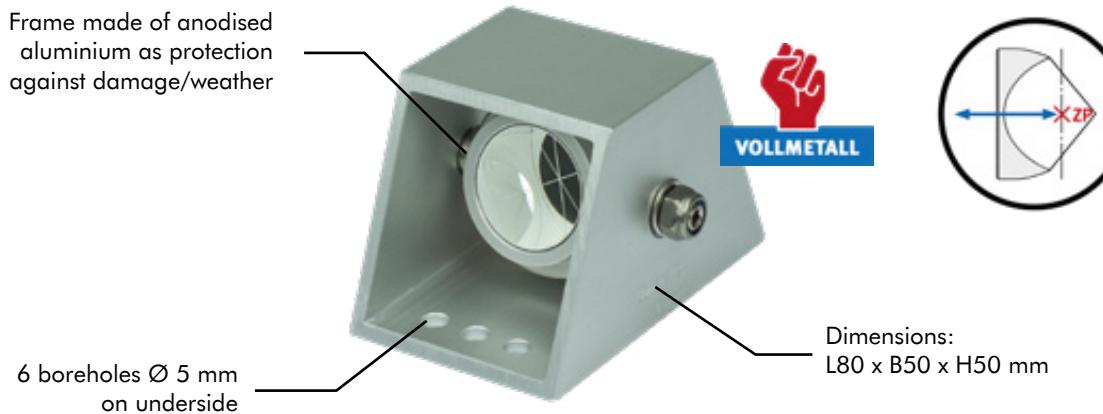
- Prism mounted in central symmetric point
- Waterproof and dustproof
- Shockproof
- Full metal version



Prism in protective frame

Ideal for monitoring of ground points from one total station position

- Prism Ø 25 mm in aluminium frame, $K = -16,9$ (Leica = +17,5) mm, 2-side mount
- Max. height angle 45°, prism can be turned 180° within frame
- Tilting resistance adjustable with key (SW10) up to unchangeable fixation
- Weight: 160 g



Description	Order-No.	Euro
Prism in protective frame, Series MoniPro	1202	152,-

Due to the conical design of the frame, the 6 holes on the large underside of the frame can be easily reached for fastening.

To screw onto object



Non-destructive fixing: Assembly adhesive





Monitoring Prism Series MoniPro

- Prism mounted in central symmetric point
- Waterproof and dustproof
- Shockproof
- Full metal version

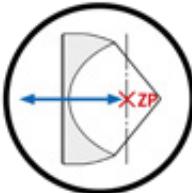
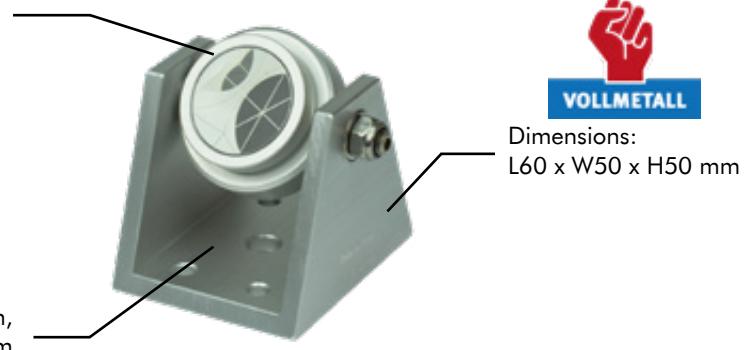


Prism in U-Frame

Ideal for monitoring from one or more tachymeter positions

- Prism Ø 25 mm in aluminium casing, $K = -16,9$ (Leica = +17,5) mm, 2-side mount
- Aligns to any tachymeter position when attached
- Tilting resistance adjustable with key (SW10) up to unchangeable fixation (picture)
- Conical frame made of anodised aluminium
- Weight: 150 g

Can be equipped with weather protection cap [101](#)



Description	Order-No.	Euro
Prism in U-Frame, MoniPro Series	1204	152,-

To screw on or to use with adhesive

Due to the conical design of the frame, the 4 eccentric holes on the large underside can be easily reached by a screw driver.

■ Non-destructive fixing with mounting adhesive



■ Screwed directly to the object with the 4 eccentric boreholes Ø 5 mm



■ Screwing onto the object with centric hole Ø 8 mm

The Ø 8 mm hole is located exactly in the vertical axis of the prism. A centering accuracy of ± 0.2 mm is given when removing and reattaching the support or when changing the orientation of the prism towards different tachymeter positions.



- Platform made of perforated sheet metal, hole Ø 5 mm, hole spacing 10 mm
- Cylindrical support Ø 30 x 13 mm with stainless steel thread M8 x 12 mm
- Dimensions perforated plate: L70 x W70 x H2 mm
- Is shipped with stainless steel hexagon nut (SW 13 mm)
- Weight: 60 g

Description	Order-No.	Euro
M8 mounting platform for prism in U-Frame	1210.7070	15,-

The hole pattern of the platform offers a variety of mounting options on the object to be observed (on walls and on the ground):

■ Screw / nail directly to object



■ Non-destructive fixing with mounting adhesive



On tracks (for steep views)



Magnetic base for Prism in U-Frame

The cylindrical magnetic base is screwed to the central bore of the U-Frame with a M8 hexagon nut. The prism can then be used reliably on any magnetic metal surface and with our centering plates.

- Distance from underside of magnetic base to prism center: 50 mm
- Centering accuracy of the M8 thread in the U-Frame: ± 0.2 mm
- Holding force of the magnet: approx. 5 kg
- Weight: 50 g



VOLLMETALL



Description	\varnothing	Order-No.	Euro
Magnetic base with M8 outer thread, incl. V2A hexagon nut	\varnothing 33 mm	1206.33	29,-
	\varnothing 40 mm	1206.40	29,-



Our centering plates are particularly suitable for monitoring tasks with precise repeat measurements (□ 88)



Weather protection cap for prism in U-Frame

To protect the triple prism from weather influences such as rain, snow, dust, dew, etc. Can be attached to the tiltable prism in the U-beam. Secure hold in wind and weather.

- Anodised aluminium sleeve $\varnothing 35 \times 50$ mm
- Optimized light exposure due to bright silver anodizing
- Very good water drainage in case of rain
- Weight: 20 g



VOLLMETALL



Description	Order-No.	Euro
Weather protection cap for prism in U-Frame Series MoniPro	1201	13,-

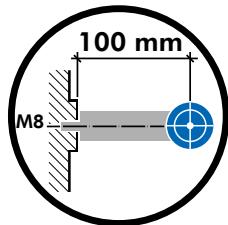




L-Bar-Prism with Leica socket

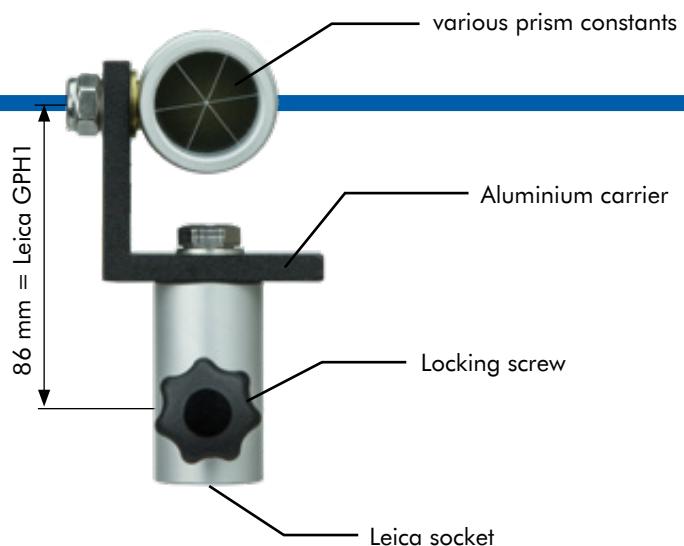
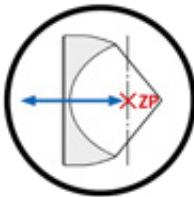
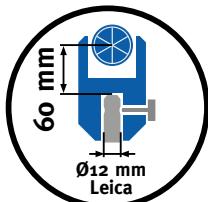
To mount Leica spigots Ø12 mm

- Tilting axis height = 86 mm (Leica Prism System)
- After mounting on the spigot and aligning it with the total station, the bar is fixed with a locking screw
- The tilting resistance can be adjusted with wrench (SW13)



INFO

With all prism constants, the tilting and standing axis runs exactly through the visible prism centre / target foil (central symmetrical point).



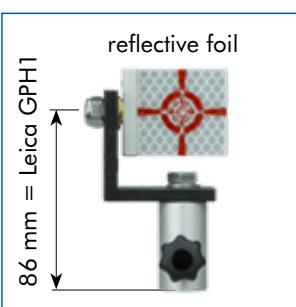
With Prism

Description	glass prism	prism constant K	Order-No.	Euro
L-Bar with Leica connection and prism	Ø 17,5 mm	-11,3 (Leica = +23,1) mm	1002.11	118,-
	Ø 25 mm	-16,9 (Leica = +17,5) mm	1002.17	118,-
		-30 (Leica = +4,4) mm	1002.30	170,-
		-34,40 (Leica = 0) mm	1002.34	170,-
		-35 (Leica = 0,6) mm	1002.35	170,-



Weather protection cap

s. □ 16



With reflective foil

Description	Order-No.	Euro
L-Bar with Leica connection and reflective foil (40 x 40 mm)	1022.0	50,-



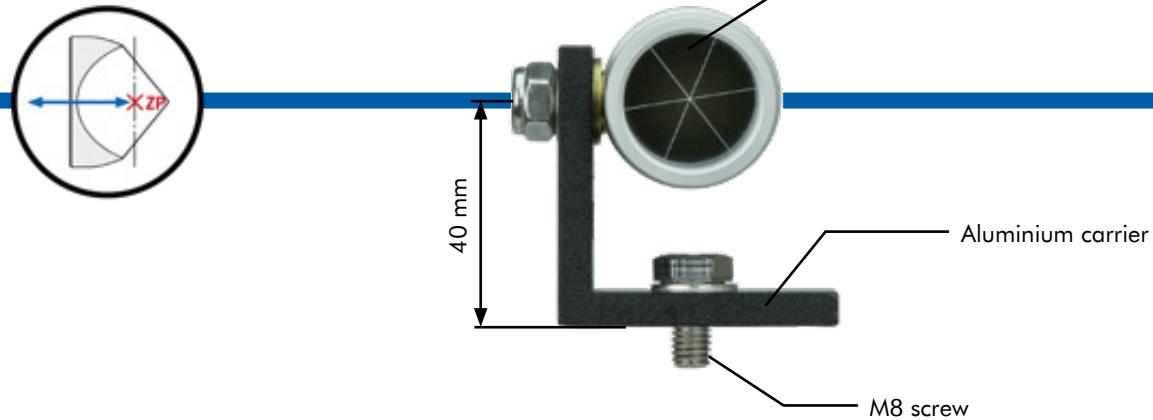
L-Bar-Prism with M8 screw

Fixing by M8 screw to bolts or dowels with M8 internal thread.

- Can be aligned in any direction thanks to cardanic mounting option
- Only **one** tool (wrench SW13) to fix the bar to the structure and to adjust / fix the tilting resistance
- Durable, robust fastening to the structure by large-scale fastening screw and manufacturing of the carrier in solid metal
- Offset distance 40 mm from target center to wall bolt
- Comes with M8 stainless steel screw and washer

INFO

With all prism constants, the tilting and standing axis runs exactly through the visible prism centre / target foil (central symmetrical point).



With prism



Description	glass prism	prism constant K	Order-No.	Euro
L-Bar with bore Ø 8 mm, with tiltable prism	Ø 17,5 mm	-11,3 (Leica = +23,1) mm	1005.11	124,-
		-16,9 (Leica = +17,5) mm	1005.17	113,-
	Ø 25 mm	-30,0 (Leica = +4,4) mm	1005.30	166,-
		-34,4 (Leica = 0) mm	1005.34	166,-
		-35,0 (Leica = -0,6) mm	1005.35	166,-

Weather protection cap

s. [16](#)



With reflective foil

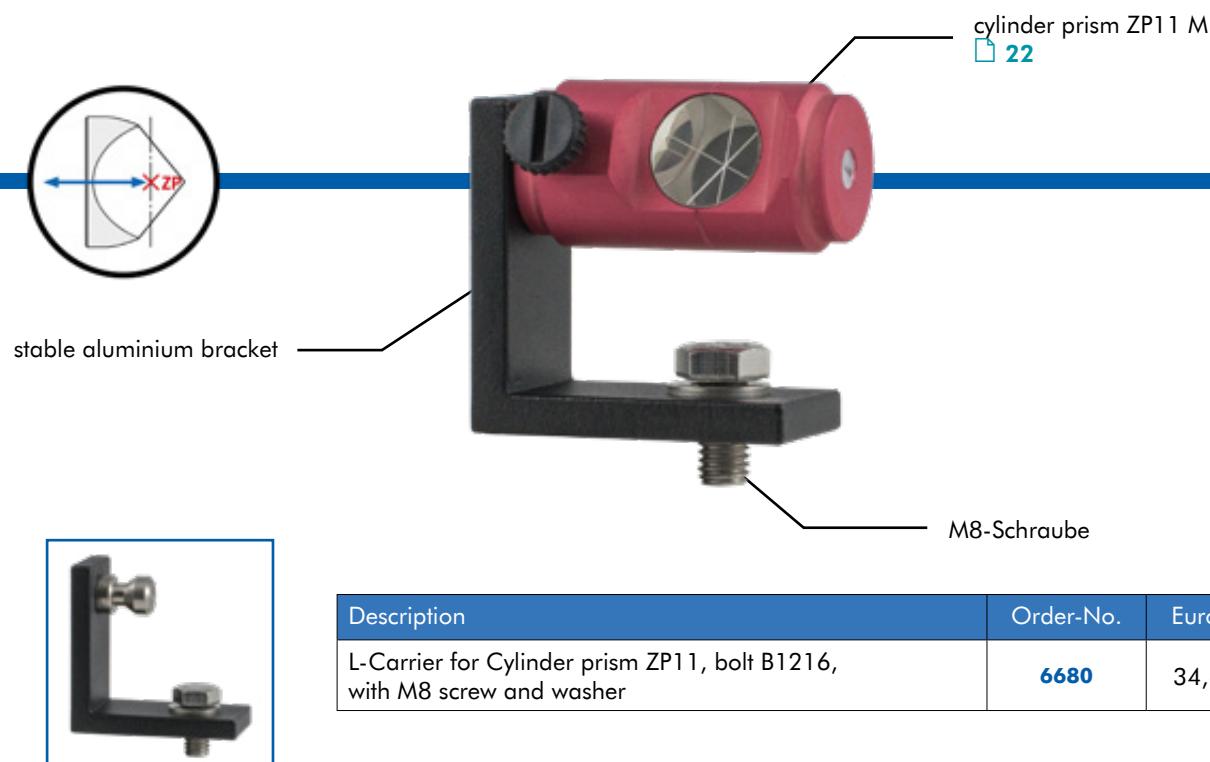
Description	Order-No.	Euro
L-Bar with reflective foil (40 x 40 mm) on tilting carrier, M8 bore, comes with M8 stainless steel screw and washer	1025.0	48,-

L-Carrier for Cylinder Prism ZP11



Fastening with M8 screw or with wood/plug screws

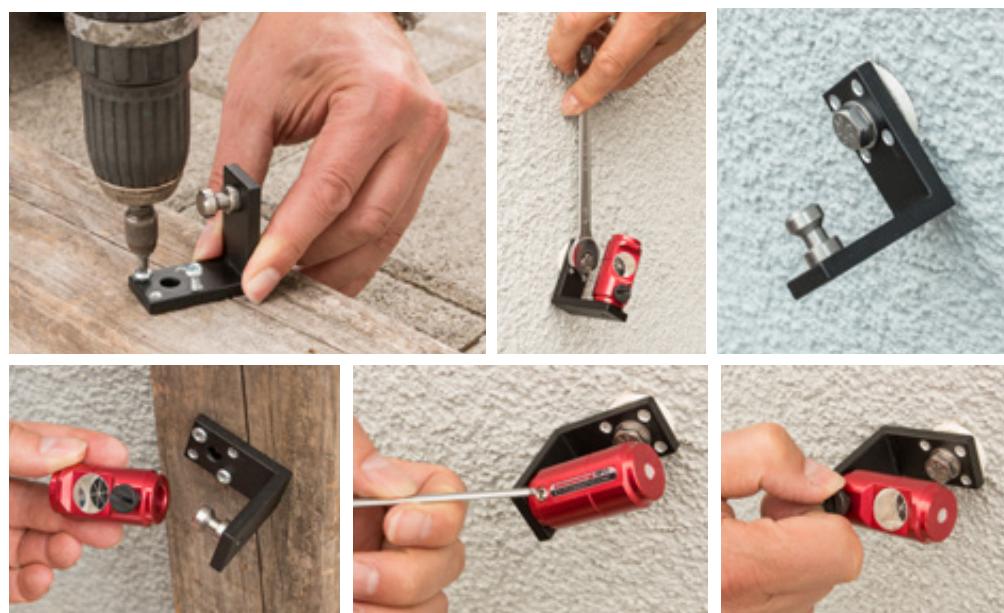
- Can be aligned in any direction due to cardanic mounting option
- With stainless steel bolt B1216 for quick mounting and removal (see pictures) of cylinder prism ZP11, without loss of accuracy
- Comes with M8 hexagon head screw (SW13) and stainless steel washer
- Various mounting options:
 - with M8 screw on bolts with M8 inner thread
 - non-destructive with mounting adhesive [90](#)
 - with up to 4 wood/plug screws up to Ø4 mm

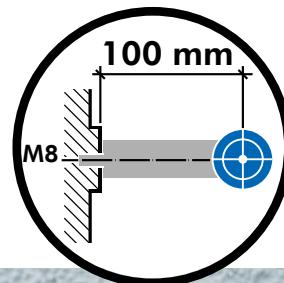


Description	Order-No.	Euro
L-Carrier for Cylinder prism ZP11, bolt B1216, with M8 screw and washer	6680	34,-

TIP

The B1216 quick connection offers numerous advantages: With the ZP11 removed, all screws are freely accessible when attaching the L-Carrier. The ZP11 can be removed during the measurement-free time for protection against destruction and theft at object points frequented by the public.





Twin-System

Simultaneous observation of an object point from several Tachymeter positions

In the AdV version (German norm) with an M8 wall bolt, the nominal point P0 is in the axis of the thread, 100 mm in front of the surface of the bolt.

If measurements from different tachymeter positions to this point do not have to be performed simultaneously, it can be equipped with a single prism and aligned one after the other. For a simultaneous measurement the use of commercially available 360° prisms would actually be appropriate. Unfortunately, due to their design, these do not provide the high accuracy often required.

The „Twin System“ consists of a holder with 2 triple prisms made of glass, which are installed very precisely in their sockets and can be aligned individually.

The two prism centers are exactly 100 mm apart. The centre of the connecting straight line between the two centres is exactly at point P0.

By averaging the X-, Y- and Z-coordinates of the measurements to the two prisms, the coordinates of point P0 are obtained with high precision. The averaged coordinate contains all changes of the object point in relation to the two tachymeter positions. Almost as if the point P0 had been measured with **one** triple prism; once aligned with the first tachymeter and once aligned with the second tachymeter.

The coordinates of P0 can thus be treated as a single point in a monitoring task or included in an adjustment.

The Twin Holder is available in different versions. On the one hand based on our ball prism system ([76](#)) and on the other on our **cylinder prism ZP11** ([22](#)).

When attaching to the wall, you can choose between a holder that can be screwed directly by an M8 outer thread into the bolt and a holder with a Ø12 mm socket that is plugged onto a Leica wall adapter (which has to be screwed onto the bolt).

Twin-Holder for Ball Prism System

- Flexible alignment of each ball prism to different tachymeters
- Distance between ball centres 100 mm
- Optionally available for screwing directly into the M8 wall bolt (see picture) or for attaching to a Leica wall bolt ([106](#))



Holder with M8 outer thread

- M8 outer thread for direct screwing in of the holder in M8 wall bolts
- Horizontal drilling to help with screwing-in and screwing-out
- Prism traverse rotatable mounted in point P0 = Center of the two prism centers
- Fixing with Allen key SW 5 (see picture)

Including 2 built-in centring plates M8 No. 6150.33



Description	Order-No.	Euro
Twin-Holder with M8 thread, for 2 thread bases Ø33 mm and 2 ball prisms Ø30 mm or Ø1.5"	6710.M33	126,-

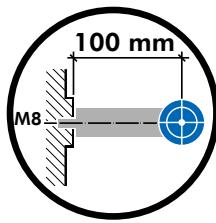
Including 2 built-in centring plates M8 No. 6150.40

Description	Order-No.	Euro
Twin-Holder with M8 thread, for 2 thread bases Ø40 mm and 2 ball prisms Ø30 mm or Ø1.5"	6710.M40	130,-



Holder with Leica socket

- 100 mm Distance from P0 when using a Leica wall bolt with effective length of 40 mm
- Big screw with knurl to secure the holder on the Leica bolt
- Holder can be rotated 360° around the Leica wall bolt



Including 2 built-in centring plates M8 No. 6150.33



Description	Order-No.	Euro
Twin-Holder with Leica socket, for 2 thread bases Ø33 mm and 2 ball prisms Ø30 mm or Ø1.5"	6705.M33	126,-

Including 2 built-in centring plates M8 No. 6150.40

Description	Order-No.	Euro
Twin-Halter mit Leica-Bolzenaufnahme, for 2 thread bases Ø40 mm and 2 ball prisms Ø30 mm or Ø1.5"	6705.M40	130,-

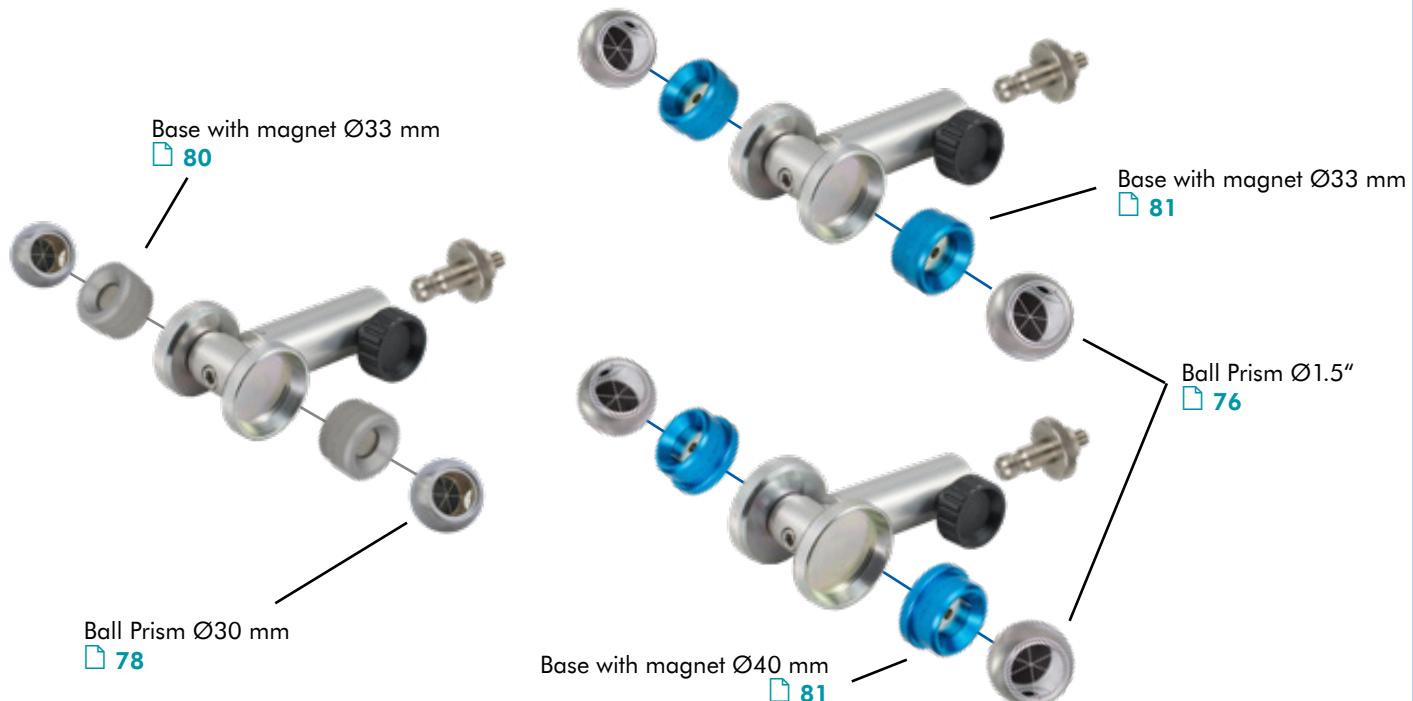


TIP

If the two prisms are aligned and fixed horizontally with a spirit level (see picture), the same Z-coordinates should result during the measurement.



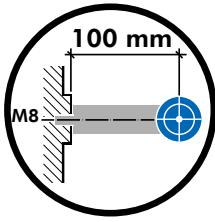
Leica Wall Adapter WA
□ 40





Twin-Holder for Cylinder Prism ZP11

The individual cylinder prisms can be rotated about their axis. For optimum alignment of the prisms towards the total stations, the prism traverse can also be rotated 360° and locked. For a monitoring task with tachymeter placement over the horizon, the traverse can be placed vertically, for vertical measurements, e.g. in a shaft, horizontally (see pictures).



- After axial alignment of the prisms to the tachymeter, the ZP11s can be secured in their position by locking screws
- Distance between prism centers 100 mm

Holder with M8 outer thread

- M8 outer thread for direct screwing in of the holder in M8 wall bolts
- Horizontal drilling to help with screwing-in and screwing-out
- 2x bolts B1216 to mount the cylinder prisms ZP11
- Prism traverse rotatable at point P0 = centre of both prism centers
- Fixing with Allen key SW 5 (s. picture, [105](#))

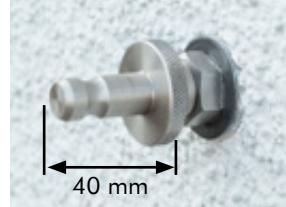
Description	Order-No.	Euro
Twin-Holder with M8 thread, for 2 cylinder prisms ZP11	6720	126,-



Holder with Leica socket

- 100 mm distance from P0 when using a Leica wall bolt with effective length of 40 mm
- Large knurled screw to secure the holder to the Leica bolt
- 2x bolt B1216 for mounting cylinder prisms ZP11
- Holder can be rotated 360° around the Leica wall bolt

Description	Order-No.	Euro
Twin-Holder with Leica socket, for 2 cylinder prisms ZP11	6715	126,-



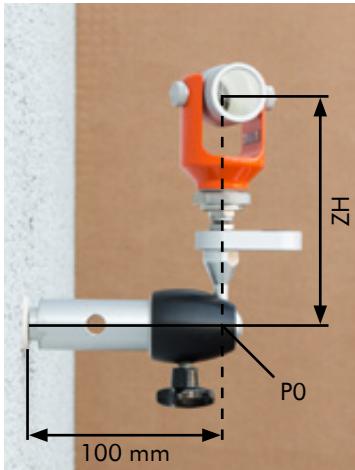
Accessories

Leica Wall Adapter WA [s. page 40](#)



Cylinder Prism ZP11 [s. page 22](#)



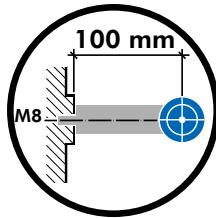


Prism holder with ball head for M8 wall bolts

Use of any prisms perpendicular or below to the nominal point P0, according to AdV version (German norm) 100 mm in front of the front face of the wall bolt

We offer prisms and reflectors which are force-centered at the set point after screwing them into the wall bolt [265](#).

This is not possible with many other prisms and targets due to their design or size. With the help of our prism holder with ball joint they can still be used. After screwing into the M8 wall bolt, the prism centre can be positioned vertically or below the target point using a circular bubble. The corresponding target height ZH must then be taken into account during the measurement.

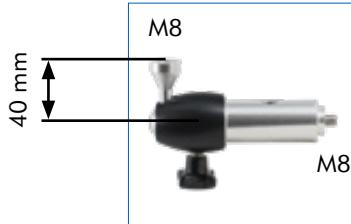


- The centre of the ball joint is located at the nominal point P0
- Quick and easy vertical positioning of the prism. After loosening the large star grip screw on the ball head, the prism holder is vertically positioned and fixed with the aid of a circular bubble.
- M8 inner thread on the ball head for screwing in the prism holders
- Ball head made of aluminium

Ball Head

Available in two designs:

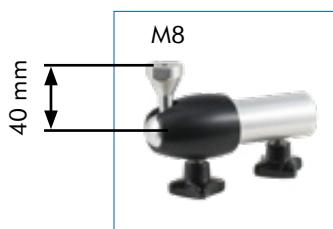
To screw directly into the wall bolt



- M8 outer thread made of stainless steel for screwing into the bolt
- Lateral bore Ø10 mm to help screwing in the holder
- Distance 40 mm from ball head center P0 to screw-in surface of **M8 internal thread**

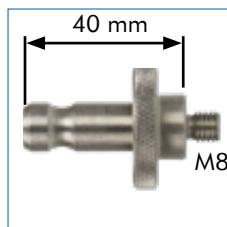
Description	Order-No.	Euro
Ball head for M8 wall bolt, M8 outer thread	6676.M	84,-

For mounting on a Leica spigot with Ø12 mm and 40 mm effective length



- Leica bolt socket Ø12x26 mm
- Large star grip screw for fixation on the Leica bolt
- Distance 40 mm from ball center P0 to screw-in surface of **M8 internal thread**

Description	Order-No.	Euro
Ball head for Leica spigot, with Leica socket	6676.L	84,-



Adapter WA Leica

[40](#)

Description	Order-No.	Euro
Adapter WA Leica, M8 – Leica Ø 12 x 27 mm	0830	18,-





M8 inner thread on ball joint

To screw in prism holders or adapters:

Thread base M8

- All of our ball bases with M8 outer thread [86](#) can be screwed in directly
- Distance from the base underside to the ball center is 50 mm
- Target height ZH between point P0 and prism center is thus 90 mm
- The perpendicular positions of the ball base are achieved by the circular bubble No. 1466.B (see below)



Circular level for thread base

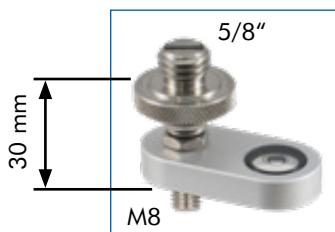
- Transparent glass bubble, sensitivity 30'. Also visible from below
- Can be attached to all our ball bases with thread connection

Description	Order-No.	Euro
See-through circular level (glass) for thread base, sensitivity 30'	1466.B	38,-



Prism adapter M8

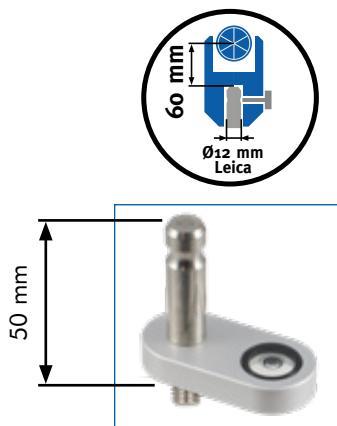
For prisms with 5/8" inner thread



- 5/8" outer thread, made of stainless steel
- Screwed-on prism can be rotated freely without changing height
- Rotation resistance adjustable with wrench (SW13)
- M8 outer thread (bottom) for screwing into the ball head
- Integrated transparent bubble made of glass, sensitivity 30'. Also visible from below
- Effective length = 30 mm. The height offset between nominal point P0 and the screw-on surface on the 5/8" thread is thus 70 mm

Description	Order-No.	Euro
Adapter M8 outer thread - 5/8" outer thread, circular level 30'	6677.58	50,-





For prisms with Leica socket

- Bolt Ø12x40 mm for attaching all prisms with Leica connection
- M8 outer thread (bottom) for screwing into the ball head
- Integrated transparent bubble made of glass, accuracy 30'.
- Also visible from below
- Effective length = 50 mm
- The height offset between the target point P0 and the upper side of the Leica bolt is 90 mm. When using a standard prism (distance top of Leica bolt to prism center = 60 mm), the target height ZH is 150 mm.

Description	Order-No.	Euro
Adapter M8 outer thread - Leica spigot Ø12 x 40 mm, see-through circular level 30'	6677.L	36,-



For our cylinder prism ZP11



- Bolt B1216 for mounting the ZP11
- M8 outer thread (bottom) for screwing into the ball head
- Integrated transparent bubble made of glass, accuracy 30'.
- Also visible from below
- The target height ZH between target point P0 and prism center of the ZP11 is 100 mm

Description	Order-No.	Euro
Adapter M8 outer thread - bolt B1216, transp. circular level 30'	6677.ZP	42,-



Adapter for GRZ101

- 1/4" outer thread for screwing on the Leica GRZ101 prism
- M8 outer thread (bottom) for screwing into the ball head joint
- A **circular bubble level 5682.Ki** must be screwed on [33](#)
- Target height ZH between target point P0 and prism center of the Leica GRZ101: 70 mm

Description	Order-No.	Euro
Adapter: M8 outer thread, 1/4" outer thread, 15 mm height	5689.015	22,-



M8 Wall Bolt as measuring point

Application

- The bolts have an M8 internal thread and are installed on buildings using the dowel or mortar method
- Marking of survey points in the wall instead of ground points
- As connection points in cadastral and engineering surveying
- For building control measurement/monitoring
- In terrestrial laser scanning (TLS) for georeferencing



Standard Wall Bolts with M8 inner thread

Wall bolt forged from brass, inscription „Messpunkt“, installation in mortar process.

Description	Order-No.	Euro
Mortar wall bolt, length 45 mm	0891	2,55



Wall bolt made of plastic with continuous brass core, which is spread by a threaded pin. Inscription „Messpunkt“. For spreading of the shaft an Allen key is required.

Description	Order-No.	Euro
Dowel wall bolt, white, length 30 mm	0893	1,10
Dowel wall bolt, white, length 40 mm	0895	1,16
Dowel wall bolt, brown, length 40 mm	0897	1,16



NOTE

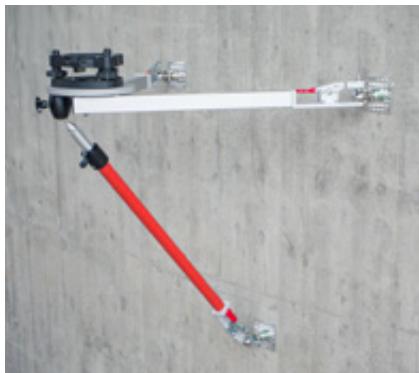
No minimum order quantity for our wall bolts.
We can also supply you with a suitable Allen key.



Special step drill for standard wall bolts

12 mm drill bit with integrated countersink for wall or ground installation of the wall bolt series

Description	Order-No.	Euro
Special step drill for standard wall bolts	0890	60,-



Fixed point with M8 thread on building / object to be measured

Non-destructive mounting with mounting adhesive

An M8 internal thread opens up a wide range of possibilities. Targets / prisms can be screwed in or a surveying instrument can be attached to it. By drilling a hole in the wall, it is possible to insert a standard M8 wall bolt (dowel or mortar).

However, it becomes problematic if the building must not be drilled or otherwise damaged. With the new „fix point“ platform, an M8 internal thread can also be realised non-destructively.

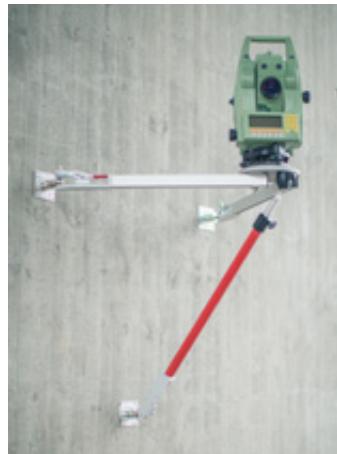
For this purpose, a steel cylinder, which has an M8 internal thread and is firmly screwed to a perforated plate, is fastened to the object with mounting adhesive (□ 90).

Optionally, the perforated plate can be fixed also with screws or steel pins.

- Aluminium plate with holes Ø5 mm and distance 10 mm
- Dimensions: L70 x W70 x H2 mm
- Steel cylinder with M8 internal thread with 10 mm usable thread depth, electrogalvanized
- Weight: 60 g
- Holding force on concrete (dry, free of grease and dust): ≥ 50 kg
- Supplied with round head screw with hexagon socket (SW 5) for protection of the M8 thread



Description	Order-No.	Euro
Perforated plate „fix point“ with M8 inner thread	6862	24,-



wall tripod □ 235

The fixed point can be removed effortlessly, almost residue-free, using a multifunction device with scraper.





Precision wall bolts with M8 internal thread

- Made of stainless steel
- Hexagon head
- Plane turned head surface exactly perpendicular to the M8 inner thread



with protective screw



Bolt for mounting by mortar

- Shaft with threaded grooves
- For bore holes $\varnothing \geq 14$ mm
- Shipped with round head screw with hexagon socket (SW 5) for protection of the M8 thread (when not in use)

Description	Order-No.	Euro
Wall bolt $\varnothing 12 \times 50$, M8 inner thread, hexagon head, stain. steel	0892.50	5,50
Wall bolt $\varnothing 12 \times 60$, M8 inner thread, hexagon head, stain. steel	0892.60	6,-



Screw for mounting with dowel

- For concrete and stone
- To be used with dowel size $\varnothing 14$ mm (see below)
- Screw into dowel with open-end wrench (SW19) until stop
- Supplied with round head screw with hexagon socket (SW 5) for protection of the M8 thread

Description	Order-No.	Euro
Wall screw $\varnothing 12 \times 70$, M8 inner thread, hexagon head, stain. steel	0898	6,-



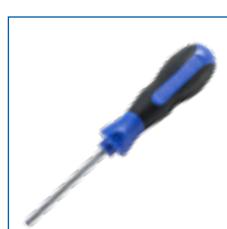
NOTE

The wall screw with dowel is not recommended for masonry made of brick or hollow block bricks etc.! Modern injection mortars on a 2-component basis have proven to be particularly effective for heavy-duty fastening.



Accessories

Description	Order-No.	Euro
Dowel $\varnothing 14 \times 75$, for screw- $\varnothing 10-12$ mm	0898.D	0,84
Allen key SW 5, straight, with plastic handle	0899.5	5,-
Masonry drill SDS-Plus $\varnothing 14 \times 160/100$ mm	0898.B	11,-



Precision Measurements

1/2

C.1. Mini-Vektor Classic, Modular and Telescopic

116



C.2. Accessories for Mini-Vektor

125



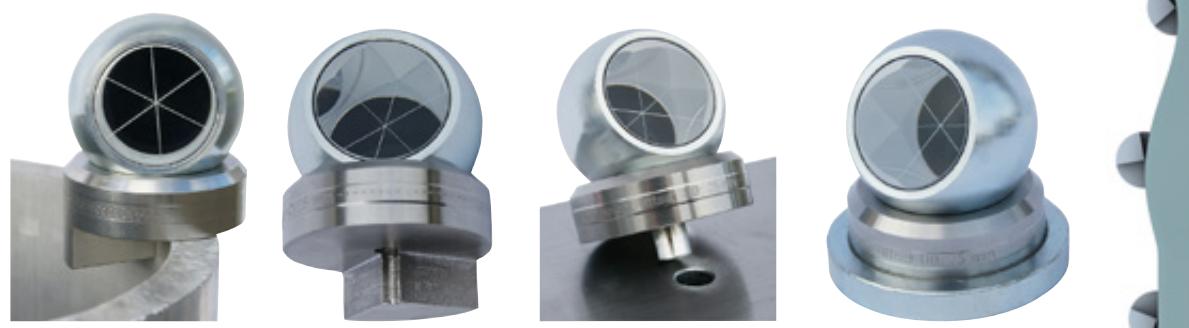
C.3. Triangle frame „Klimax“ for ground and wall points

129



C.4. Ball prism bases for industrial 3D-Measurements

138





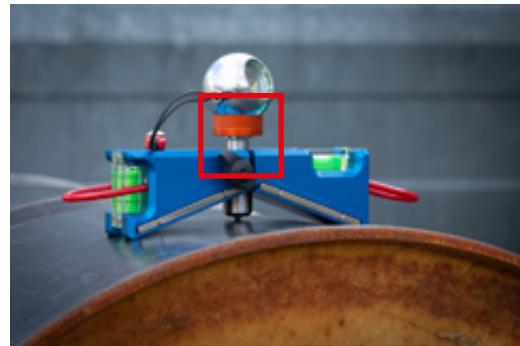
Precision Measurements

2/2

C.5. Base SECTION For recording horizontal 90° edges 142



C.6. Revolver Base M8 for Ø1.5" and Ø30 mm ball prisms 143





Mini vectors for tachymetric precision measurements

For the determination of hidden points (computational extension of a base).

The 2-prism method „Vector“ can be used for all points which cannot be measured exactly with the tachymeter in the classic way; i.e. neither electro-optically with a prism with a vertically positioned prism pole, nor reflectorless by means of a laser range finder.

With the „vector“ method, object points can be recorded with high accuracy.

Our product range includes three different types of mini-vectors:

Classic

- Prism spacing 100 mm
- „Rigid“ design of the two prisms ensures highest possible accuracy
- Small and compact
- Tip available with Leica connection or M6 thread



Mini-Vector
page 117

Modular

- Next to a two-prism setup, a setup with three or more ZP11 prisms is also possible
- Individually adjustable prism spacing and tip lengths
- Cylinder prisms ZP11 can also be used for other purposes



Modular Mini-Vector
page 119

Telescopic

- Prism spacing 200 mm
- Obstacles that prevent or impair visibility can be avoided by simply changing the prism height



Mini-Vector Teleskop (MVT)
page 121

Accessories overview



Joint tripod M8
Art.-No. 5920
page 125



Joint tripod M8, heavy design
Art.-No. 5921
page 125



Bipod mini tripod
Art.-No. 6640
page 124



Switchable magnet
page 126



Suction holder M8
page 128



steel ring M8
Art.-No. 5932
page 125



Lever clamp M8
Art.-No. 5934
page 127



Strong screw clamp
Art.-No. 5934
page 127



Mini-Vektor as a „rigid“ unit

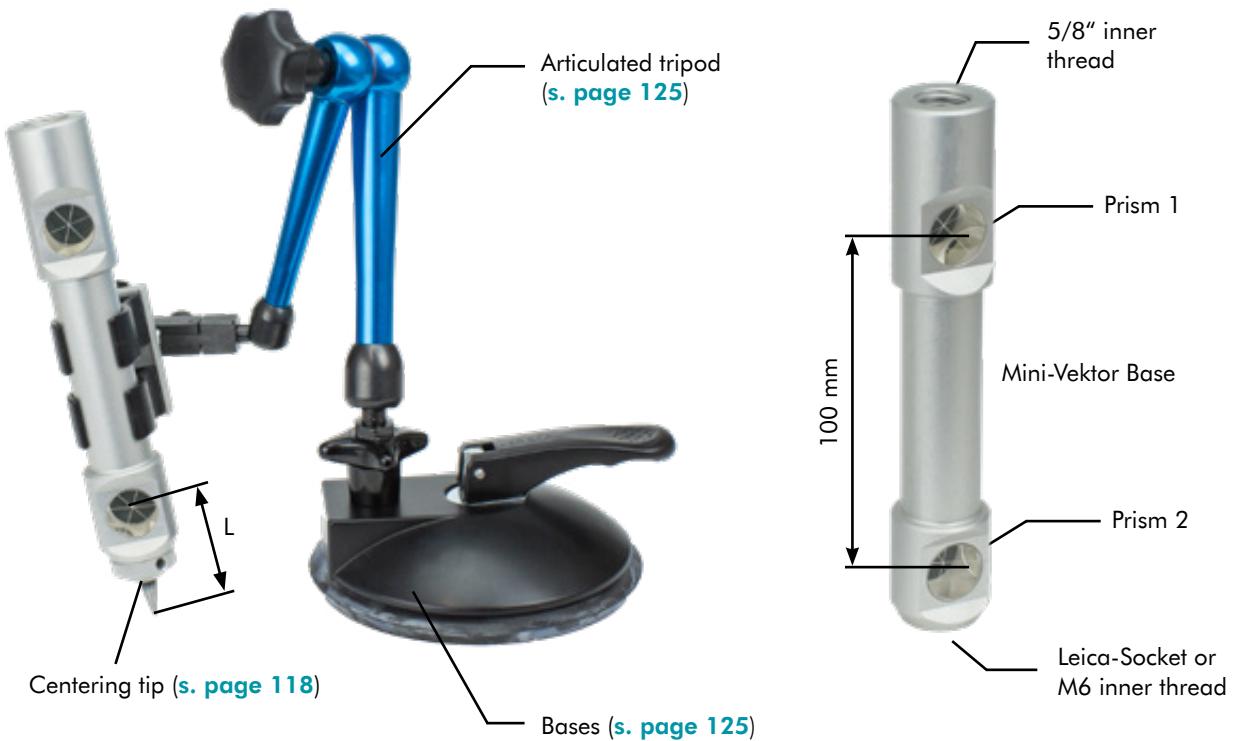


For the measurement of hidden points (mathematical extension of a base where 2 prisms are measured tachymetrically according to X, Y and Z).

The „2-prism method“ can be used very well for all points which cannot be measured or not measured exactly in the classical way, i.e. neither electrooptically with **one** prism or reflector, nor directly with a laser distance meter.

With a base length of 100 mm and the shortest possible extensions, our mini vector achieves very high centering accuracies at the object point.

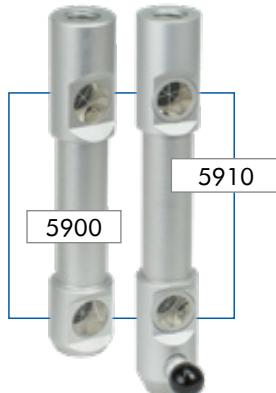
Usually already existing programs can be used to calculate hidden points ([s. page 270](#)).



Mini-Vektor, Base

The Mini-Vektor is available in 2 versions, which differ only in the type of connection for the extensions/tips: M6 female thread or Leica bolt socket.

- Prism constant: $K = -11,3$ (Leica = $+23,1$) mm
- Central symmetric point (= visible prism center) lies precisely in vector axis
- Waterproof and shockproof
- Robust construction made of anodised aluminium



Description	Order-No.	Euro
Mini-Vektor, Base, M6 inner thread	5900	284,-
Mini-Vektor, Base, Leica bolt socket Ø 12 mm	5910	305,-

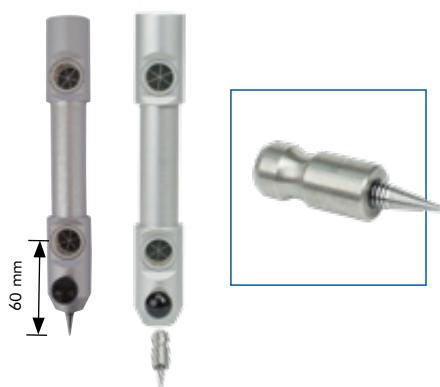


Extensions with hardend centering tip

With the **M6 extension**, the centring point is integrated in an aluminium ring which has a knurled knob and a horizontal hole as a screw-in aid.

The standard extension is L = 40 mm. Larger extensions are available on request.

Description	Order-No.	Euro
M6 extension, L = 40 mm	5901	30,-



The extension with **Leica spigot** is inserted into the Mini-Vektor and locked by a spring lock. Due to the length of the stud, the shortest possible extension dimension is L = 60 mm.

Longer extensions: [s. page 43](#)

Description	Order-No.	Euro
Leica extension, L = 60 mm	5911	30,-

Circular Level

Optionally, the mini vector can also be held vertically above the target point with a screwed-on circular level.

Then 2 prisms with different heights are available for the tachymeter aiming. The levels made of anodized aluminium have a 5/8" external thread for screwing onto the Mini-Vektor.



Description	Order-No.	Euro
Circular level „central“, glass bubble, sensitivity 30'	1585.30	36,-



Includes 2.5 mm Allen key.

Description	Order-No.	Euro
Adjustable circular level „central“, glass bubble, sensitivity 30'	1587.30	51,-

[s. page 38](#)



[s. page 125](#)



Modular Mini-Vektor with ZP11 Cylinder Prisms

By combining several ZP11s with various extensions and a centering tip, individual prism poles with a wide range of applications can be built up. The B1216 connection system, ensures fast and precise connection of the individual components.

The greatest advantage lies in the flexibility of the system. Thanks to the modular design, the individual elements can be used not only as a mini-vector, but also, for example, as a conventional stake-out prism.

■ Combinations for a variety of applications



Perpendicular with circular bubble, as setting prism, changeable tip length

Angled, as „classic mini-vector“ with prism spacing 100 mm

Angled, as mini-vector with longer prism spacing and long tip

Tilted, with any number of prisms, prism spacing and tip length interchangeable

Perpendicular with circular bubble, as aiming point from different tachymeter positions

■ Examples of use

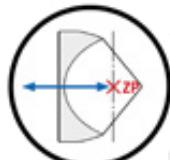


Elements for modular mini vector

Cylinder prism ZP11 s. page 22

- Bottom: Socket for Bolt B1216
- Top: Stainless steel bolt B1216 / M6 inner thread
- Weight: 70 g / 53 g

Description	Order-No.	Euro
Cylinder Prism ZP11 B, socket + bolt B1216	6611	158,-
Cylinder Prism ZP11 M, socket B1216 + M6 inner thread	6611.M6	142,-



Extensions / spacers

- Cylinder Ø 22 mm made of anodised aluminium
- Quick connection system B1216: V2A bolt Ø12x16 mm at the top, B1216 bolt socket on bottom
- Allen screw (SW3) for securing the extensions on the bolt B1216

Available in 3 lengths with accuracy $\pm 0,1$ mm:



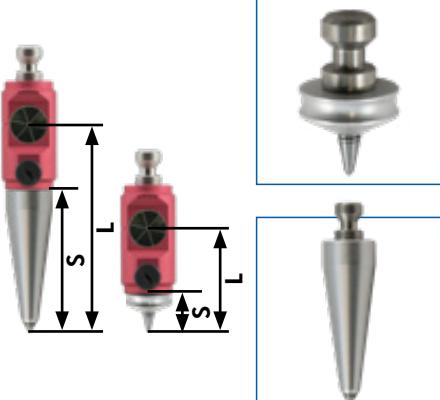
Centering tip for Mini-Vektor

- Conical tip in anodised aluminium with hardened mandrel
- B1216 bolt for quick exchange

Available in 2 lengths with accuracy $\pm 0,1$ mm:

For distance from tip to centre of prism L = 50 mm:

Description	Order-No.	Euro
Centering tip, length s = 20 mm, hardened mandrel, B1216 bolt	6804	29,-



For distance from tip to centre of prism L = 100 mm:

Description	Order-No.	Euro
Centering tip, length s = 70 mm, hardened mandrel, B1216 bolt	6665	43,-

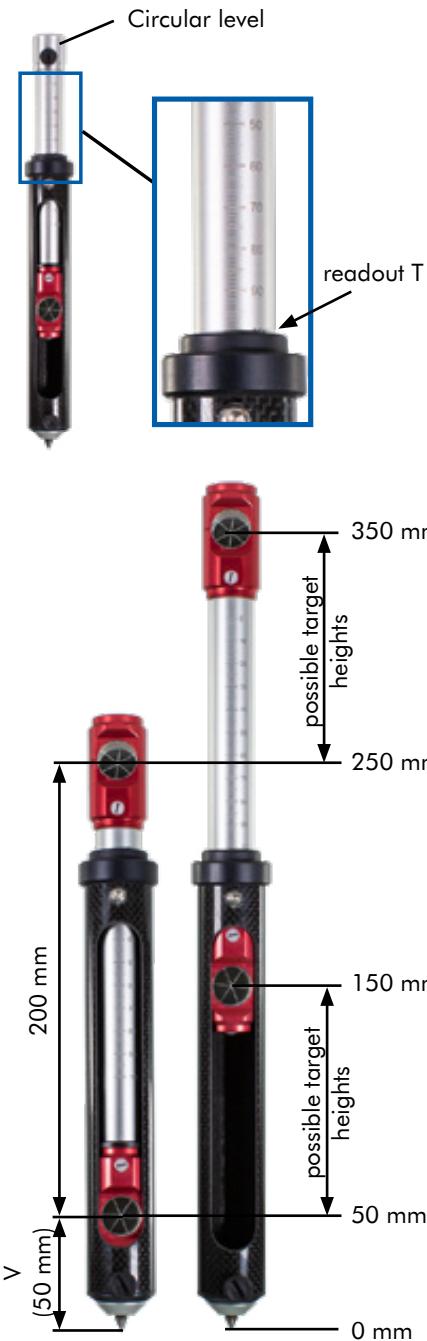
Circular level

For vertical positioning of the mini vector

- Cylinder Ø22x25 mm made of anodised aluminium
- Glass level Ø20 mm, accuracy 30'
- Design 1: M6 male thread for screwing onto ZP11 (No. 6611.M6)
- Design 2: B1216 socket for quick mounting on ZP11 (No. 6611)
- Allen screw (SW3) for securing the circular level on the bolt B1216

Description	Order-No.	Euro
Circular level for modul. Mini-Vektor, M6 outer thread	6670	27,-
Circular level for modul. Mini-Vektor, B1216 socket	6671	30,-





Mini Vector Telescope MVT

Without an upper 2nd prism, the MVT functions like a prism pole for target heights close to the ground. However, the prism does not sit on top of the extension like a „normal“ prism pole, but is guided in the milled telescopic tube. The travel distance is 100 mm. Together with the smallest tip and a circular bubble mounted on top, measurements can be made on the prism from a height of only 50 mm to 150 mm. The target/prism height results from the length of the tip used and the extension length T of the telescope.

With the upper 2nd prism ZP11, the MVT can be expanded to a mini-vector. It can then also be used in an inclined position to measure hidden points. The coordination is done with the „vector method“ (sewer pole system, [see page 270](#)). Compared to the „Mini-Vector“ ([see page 117](#)) and the „Modular Mini-Vector“ ([see page 119](#)), the telescopic extension provides a significant advantage: Obstacles that prevent or impair the view can be avoided by simply changing the prism height in 2 areas.

With the **MVT**, points can thus be determined as follows:

- With vertical vector (with the help of a circular bubble)
- With vector standing in an angle, where the object point coordinates are calculated with the help of the total station software „sewer pole system/hidde point method“.

Both methods require the dimension L from the extension tip to the lower prism.

But while with our other mini-vectors the extensions have a fixed dimension, with the MVT this is variably adjustable. A significant increase in flexibility!

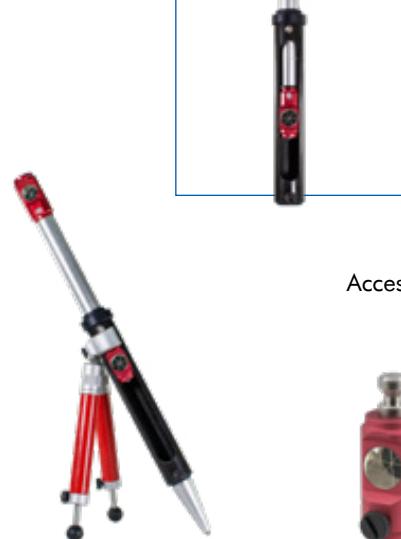
Measurements are only in the range between 150 and 250 mm bottom distance not possible.

Use of the MVT as a Mini-Vector:

- Unit of 2 cylinder prisms ZP11 and extension piece, telescopically mounted in carbon tube
- carbon tube outer Ø 30 mm
- prism distance AB = 200 mm
- Constant of prisms A and B: K = -11.3 (Leica = 23.1) mm
- Telescopically adjustable target heights L (when using the smallest tip with V = 50 mm): prism B: 50 to 150 mm, prism A: 250 to 350 mm
- Dimensional scale on intermediate piece for reading the telescope's extension length T
- Interchangeable tips with different lengths (connection system B1216)
- Optional: circular level for perpendicular use of the mini-vector (connection B1216 or M6 thread)
- Optional: Bipod with telescope quick adjustment system

Weight: 255 g

Description	Order-No.	Euro
Mini-Vector Telescope, basic equipment	6630	375,-



Accessories (upper prism, tip, circular level, bipod): [see next page](#)



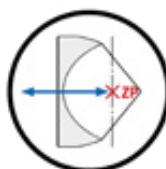


Complementary items & accessories

Cylinder prism ZP11 s. page 22

- Bottom: Socket for Bolt B1216
- Top: Stainless steel bolt B1216 / M6 inner thread
- Weight: 70 g / 53 g

Description	Order-No.	Euro
Cylinder Prism ZP11 B, socket + bolt B1216	6611	158,-
Cylinder Prism ZP11 M, socket B1216 + M6 inner thread	6611.M6	142,-



Centering tip for Mini-Vektor

- Conical tip in anodised aluminium with hardened mandrel
- B1216 bolt for quick exchange

Available in 2 lengths with accuracy $\pm 0,1$ mm:

For distance from tip to centre of prism $V = 50$ mm:

Description	Order-No.	Euro
Centering tip, length $s = 20$ mm, hardened mandrel, B1216 bolt	6804	29,-

For distance from tip to centre of prism $V = 100$ mm:

Description	Order-No.	Euro
Centering tip, length $s = 70$ mm, hardened mandrel, B1216 bolt	6665	43,-

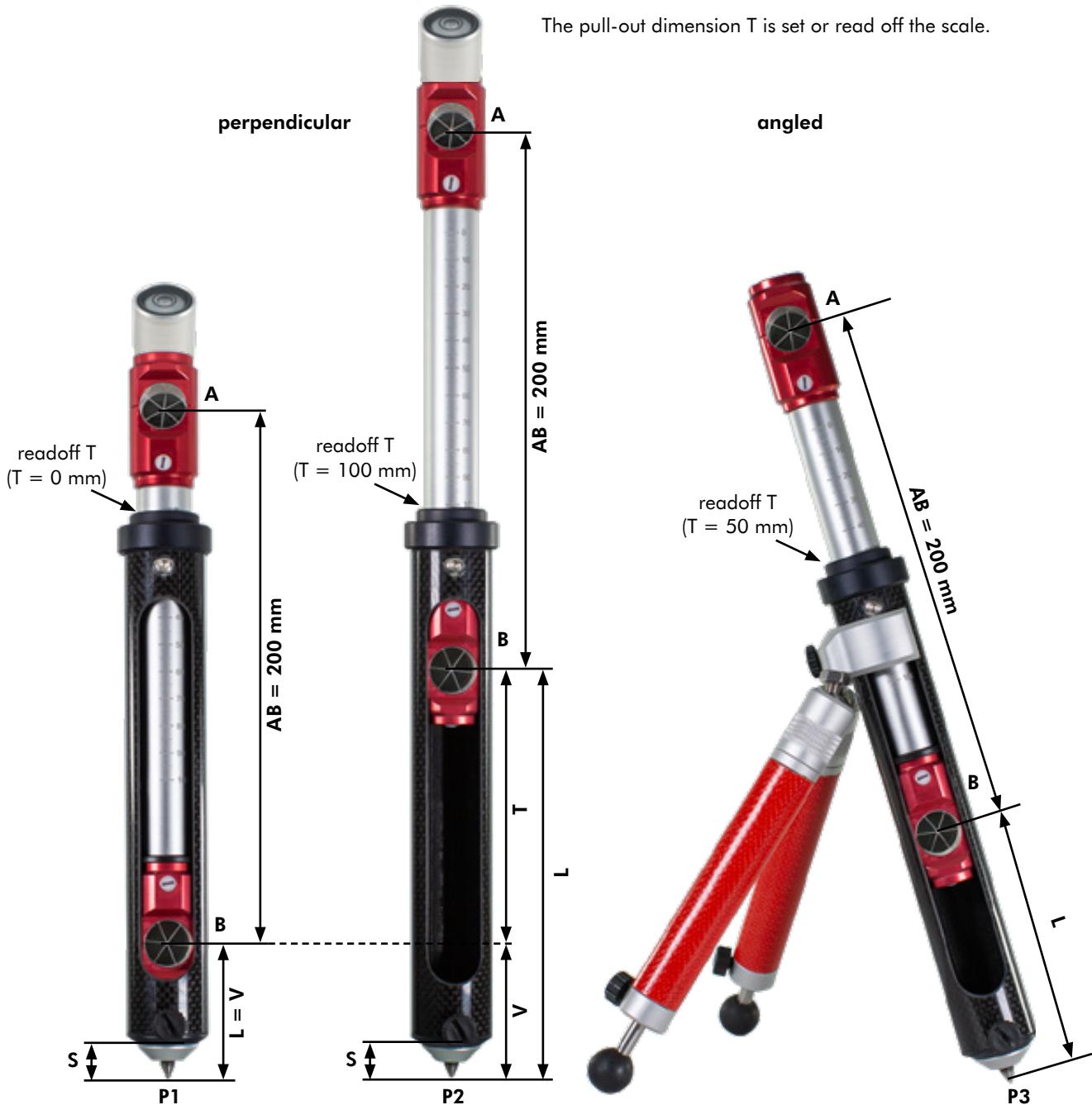
Circular level

For vertical positioning of the mini vector

- Cylinder $\varnothing 22 \times 25$ mm made of anodised aluminium
- Glass level $\varnothing 20$ mm, accuracy $30'$
- Design 1: M6 male thread for screwing onto ZP11 (No. 6611.M6)
- Design 2: B1216 socket for quick mounting on ZP11 (No. 6611)
- Allen screw (SW3) for securing the circular level on the bolt B1216

Description	Order-No.	Euro
Circular level for modul. Mini-Vektor, M6 outer thread	6670	27,-
Circular level for modul. Mini-Vektor, B1216 socket	6671	30,-




Target height:

$$H_B = V + T$$

$$H_A = V + T + 200$$

$$L = V + T$$

Telescope fully retracted

Target height H of prisms A and B in the example image:

$$H_B: 50 + 0 = 50 \text{ mm}$$

$$H_A: 50 + 0 + 200 = 250 \text{ mm}$$

Telescope fully extended

Target height H of prisms A and B in the example image:

$$H_B: 50 + 100 = 150 \text{ mm}$$

$$H_A: 50 + 100 + 200 = 350 \text{ mm}$$

Calculation X, Y, Z of P3 according to the „vector method“ with the program „sewer pole / hidden point“ by entering AB and L.



Bipod tripod for MVT

For precision measurements or longer lasting measurements on one point, a tripod is helpful. Especially when determining hidden points with the program „sewer pole / hidden points“, the mini-vector must not be changed during the measurements.

The bipod was developed especially for the mini-vector and offers some completely new features. Among other things, the mini-vector can be set perpendicular in a matter of seconds.



Bipod attributes

- Bipod to screw on Mini Vector Telescope at any height
- Telescopic leg made of composite material with stainless steel extension and rubber ball as base
- Leg length adjustable from 150 to 250 mm
- The leg can be spread in any direction by means of a ball-and-socket joint. The selected position remains fixed by a compression spring
- The telescopic length can be changed by simply pulling out the lower part. Here, too, the set length remains fixed by a spring-based pressure piece - again without tightening a clamping screw or the like
- A limit prevents the extension from being pulled out completely by mistake
- Flush folding of the tripod legs: For quick manual handling of the mini-vector without the bipod and for transportation

Description	Order-No.	Euro
Cripod for telescope mini-vector	6640	205,-



Transportation accessories for MVT

Bag

Ideal for carrying the mini-vector on the belt with quick access

- Suitable for carrying the MVT with or without tripod
- Bag made of durable black fabric Ø80 x 250 mm
- Cord with stopper to close the bag
- Various tabs for attaching the bag to the belt, etc.

Description	Order-No.	Euro
Transportation bag for MVT	6645	26,-



Case

For safe transport of the MVT we recommend our universal case 1468.2.

You can find other transport cases on [page 228](#).

Description	Order-No.	Euro
Universal transport case with bubble foam	1468.2	34,-



Accessories for Mini-Vektor

Articulated Tripod

The Mini-Vektor's tip can be moved into any desired position with the articulated tripod and fixed for measurement. This is done by tightening a central screw that clamps all moving parts of the articulated tripod.

Depending on the application, the articulated tripod is screwed onto different bases.

- Hydraulic clamping
- Articulated arms made of anodised aluminium
- Double plastic clip for mounting the Mini-Vektor
- radius of action: 270 mm
- Weight: 350 g

Description	Order-No.	Euro
Articulated tripod with M8 outer thread	5920	184,-

- Screw clamp for mounting of the Mini-Vector
- Action radius: 320 mm
- Weight: 820 g

Description	Order-No.	Euro
Articulated tripod with M8 outer thread, heavy design	5921	263,-

TIP

For vector lengths starting from 300 mm we recommend the heavy design of the articulated tripod.

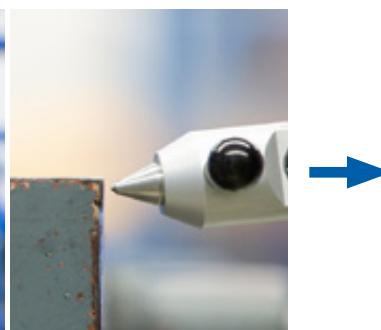


Compression Spring Adapter 5/8"

The mini vector can be moved to any desired position within the action radius using the articulated stand and then fixed in place with the central screw. To ensure that the tip reliably touches the object point after fixing, a compression spring adapter can be screwed onto the top of the mini vector. This allows a constant contact pressure of the tip on the object point to be built up via the articulated stand.

- 5/8" internal thread, 5/8" external thread
- Anodized aluminium
- With tightening aid for wrench SW17
- Spring travel approx. 14 mm

Description	Order-No.	Euro
Compression spring adapter 5/8" for prisms/GNSS poles	1736	96,-





Bases for articulated tripod

Depending on the application, the articulated tripod can be screwed onto different bases using the M8 thread.



The magnetic base is attached in such a way that the point to be measured lies within the radius of action of the articulated tripod. Due to the arbitrary position of the Mini-Vektor, it is also suitable for such points which could not be measured with previous methods or only with insufficient certainty/accuracy.

- On/Off switch
- M8 inner thread for screwing in the articulated tripod
- L80 x B50 x H70 mm
- Magnetic holding force: 800 N
- Weight: 1.000 g

Description	Order-No.	Euro
Magnetic base M8	5931	38,-



Steel ring

The ring is placed on the ground near the object and the centring tip of the Mini-Vektor is placed on the point to be measured with the help of the central clamp on the articulated arm. The object point can be anywhere within the radius of action of the articulated tripod (see picture examples).



- Galvanized steel ring with M8 inner thread for screwing in the articulated tripod
- 3 rubber feet for secure positioning of the ring
- Diameter: 155 mm
- Weight: 750 g

Description	Order-No.	Euro
Steel ring for articulated tripod	5932	37,-



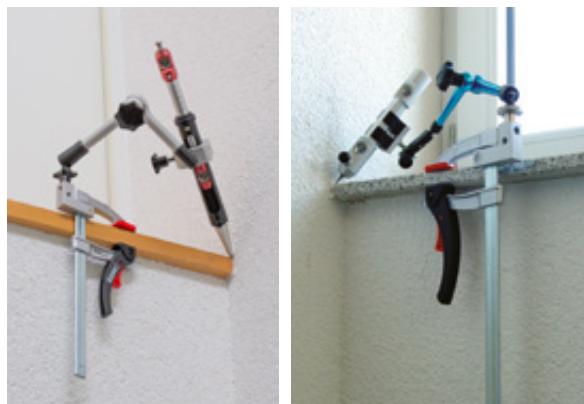
Clamp with M8 thread

For universal attachment of the articulated tripod to spatial objects up to a span of 250 mm: If the clamp is screwed on within the radius of action of the articulated tripod, every object point can be measured with the mini vector.

- Clamping lever made of die-cast magnesium, clamping mechanism made of high quality fibreglass-reinforced plastic
- Force build-up up to 1200 N, easily done with 2 fingers
- Easy to dose, for gentle clamping
- Secure clamping, lightning-fast release
- M8 inner thread for screwing in the articulated tripod
- Weight: 425 g



Description	Order-No.	Euro
Clamp M8 for articulated tripod	5934	63,-



Description	Order-No.	Euro
Uni. screw clamp M8, incl. screws and flat-insert-piece	6884	79,-





Suction Holder

For using the Mini-Vektor on all surfaces with gas-tight surface such as glass, plastic, metal, coated wood and marble.

- Housing material: Aluminium
- Suction disk: Ø 120 mm
- Load capacity of a suction holder: 15 kg
- M8 inner thread for screwing in the articulated tripod
- The suction effect is achieved by turning the lever
- The suction cup with the rubber disc relaxed must be pressed firmly onto the surface. The resistance of the vacuum must be clearly noticeable when the toggle lever is moved
- Weight: 320 g

Description	Order-No.	Euro
Suction holder M8 for articulated tripod, without vacuum indic.	5936	48,-



Suction Holder with vacuum indicator



The vacuum is continuously checked. If the warning rocker switch is recessed in the rocker arm (see Fig. 1), the required holding force has been achieved and the suction cup can be fully loaded. If the rocker over time moves out and the red edge becomes visible, the vacuum decreases. If the edge is clearly visible (see Fig. 2), the suction holder must be detached from the surface and sucked on again.

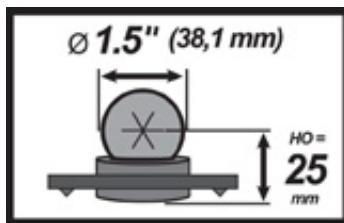
- Weight: 340 g

Description	Order-No.	Euro
Suction holder M8 for articulated tripod, with vacuum indicator	5938	80,-





Triangle-Frame „Klimax“ for high precision point measurement on floors, ceilings and walls



ball prisms \varnothing 1.5"
 129



bases
 130



triangle frame
 129



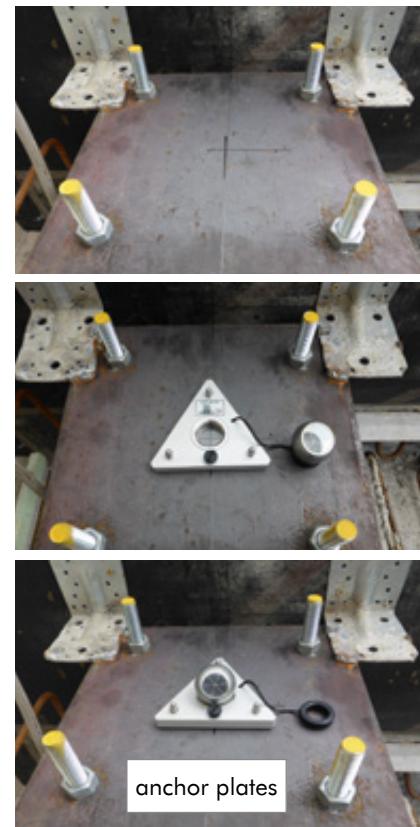
- Economical and fast
- Very accurate position and height measur.
- Reliable marking / identification of to be measured points
- Precise stake-out / control of already marked points on walls / ceiling / floors
- Solid, compact design

Setup

With the Klimax, our ball prism $\varnothing 1.5''$ can be, regarding the application, equipped with various stainless steel bases. These are movably mounted in the triangular frame.

The centre of the base is exactly below the centre of the ball and directly above the measuring point to stake out or measure.

For measurement, the ball prism is placed on the base and aligned with the total station.



anchor plates

APPLICATION EXAMPLE

Examples in practice





■ Overview: Klimax Product Series



Name	Klimax Base B	Klimax Base A	Klimax Base AM	Klimax Base AM2	Klimax Base P	Klimax Base PM	Klimax Base CM	Klimax Base CM2	Klimax Base C
Art.-No.	1497	1495	1495.M	1495.M2	1499.P	1499.PM	1499.M	1499.M2	1499
Price	78,-€	93,-€	104,-€	100,-€	71,-€	77,-€	72,-€	68,-€	62,-€
Magnetic Holding force	-	-			-				-
Marking options	-	Fine felt-tip pen, fineliner, pencil	Fine felt-tip pen, fineliner, pencil	Fine felt-tip pen, fineliner, pencil	Hole Ø 2 mm, can be enlarged Specify when ordering!	Pens with Ø2-5 mm (e.g. Edding)	Centering Pin	Centering Pin	Centering Pin
Usage on wall/ ceiling	-	-	suitable	-	-	suitable	suitable	-	-



Klimax

- Vertical and horizontal use
- Adjustable handle
- Magnetic ball rest

No.	1492
€	200,-
131	



Klimax PLUS

- Horizontal use
- Compensation of inclinations up to 3° (adjusting screws and circular level)

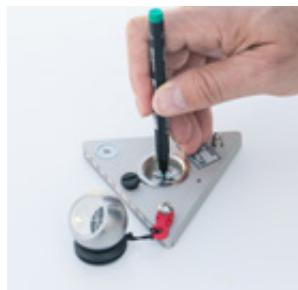
No.	1493
€	252,-
133	



Triangle Frames

- Triangular frame made of solid metal (aluminium) with edge lengths 120 mm
- Centric bore to put in the stainless steel base
- Screw to secure the inserted base against falling out
- Lateral scale strip (2 x 50 mm) as a help for quick displacement of the target distance while staking out a point
- Lateral horizontal screw (SW4) for measurement on ceilings and walls

Storage option 1 Prism on rubber ring



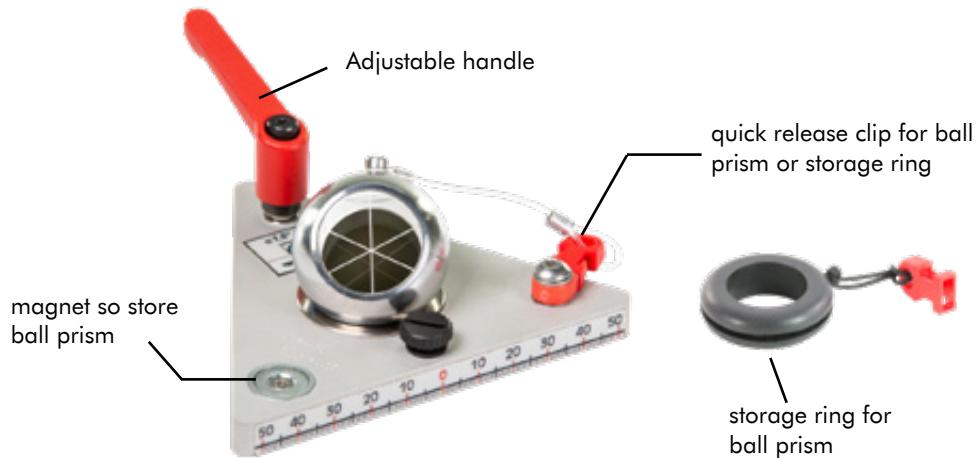
Storage option 2 Prism on magnet



Klimax

■ For floors such as screeds and industrial floors, etc. as well as ceilings and walls

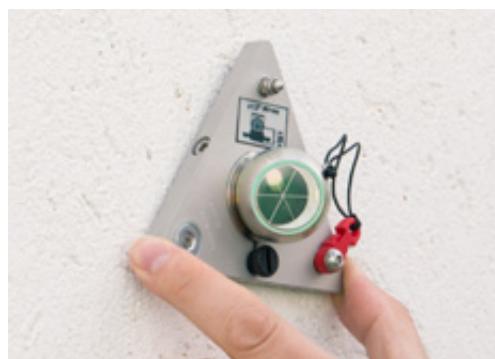
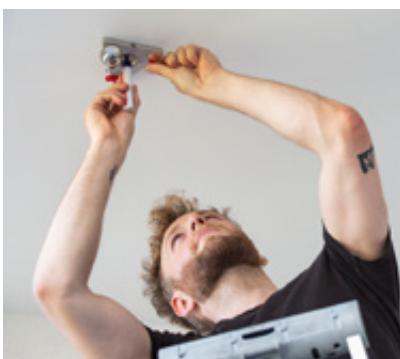
Due to the small height offset (distance of the ball centre from the ground) of 25 mm, slight unevenness of the surface has only very little effect. During test measurements on the mentioned floors, a stronger inclination of the triangular frame than 1° was never measured. This maximum inclination has an effect of 0.4 mm to the position accuracy. Weight: 178 g.



Description	Order-No.	Euro
Triangle frame Klimax (without base / ball prism)	1492	200,-

- **3 rubber feet** to protect Klimax to unintentional slip
- One corner of the frame is equipped with a **magnet** on which the ball prism can be „parked“ next to the base
- **Rubber ring** as an additional (non-magnetic) storage option for the ball when working on the floor. It is attached to the frame with a quick release clip
- On the wall and ceiling it is recommended to use a ball prism with fall protection ([s. page 132](#)). This can be clipped on the frame instead of the storage ring via the quick release

INFO Also ideal for tachymetric transfer of heights to walls (level marker).





Measurements with the Klimax on ceiling and wall

The Klimax can also be used to stake out and mark new points on the ceiling and wall or to measure existing points on the ceiling and wall.

For these measurements we recommend the Klimax standard frame no. 1492. Bases with an integrated magnet must be used and should be in the frame with the horizontal securing screw (SW 4) so the base underside still has a distance of approx. 0.5 to 1 mm to the wall. This gives the ball centre a constant distance of approx. 25 mm from the wall.

TIP

On the ground and the ceiling, the distance of 25 mm for the position measurement does not cause any problems, as the ball centre lies vertically above the measuring point. For the determination of the point height, the offset of 25 mm can be subtracted directly from the measured Z coordinate.

This is not so easy when working on the wall, since the angle between the target direction to the total station and the perpendicular to the wall is not defined for individual measurements. This problem can be solved by calculating the points to be determined or the measured points on a parallel plane with a distance of 25 mm to the starting wall. Then for each measurement with the climax the center of the sphere lies in the measuring plane, without parallaxes.

Point measurements on the wall are thus possible with high precision and are also economical for many points to be measured.

Ball prism with drop safety sling

Securing the ball prism when using the climax on the wall or ceiling

For wall measurements, the ball prism must always be removed from the base and reused for the measurement, as is the case for use on the floor.

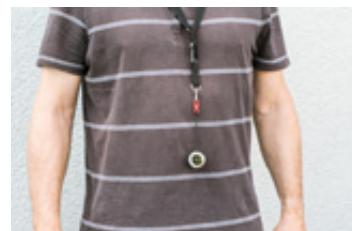
A base with integrated magnet should be used for working on walls and ceilings. This way, the ball prism is held securely in the base and can be adjusted accordingly.

After removing it from the base, it is „parked“ on the magnet integrated in the corner of the frame. So the ball prism does not have to be held in the hand. The following ball prisms are also available with a fall protection as standard to completely prevent an accidental fall. They are clipped onto the triangular frame with a quick connector.



Description	Order-No.	Euro
Ball prism Ø1.5" (38,1 mm), galvanized steel, K = -16,9 (Leica = +17,5) mm, string with quick connector for fall protection	1444	179,-

Description	Order-No.	Euro
Ball prism Ø1.5" (38,1 mm), galvanized steel, K = -11,3 (Leica = +23,1) mm, string with quick connector for fall protection	1454	179,-



Option: Ball prism with carrying strap

If you want to have the ball prism with you at all times and not only use it on the Klimax frame, you can also wear the prism around your neck on a lanyard.



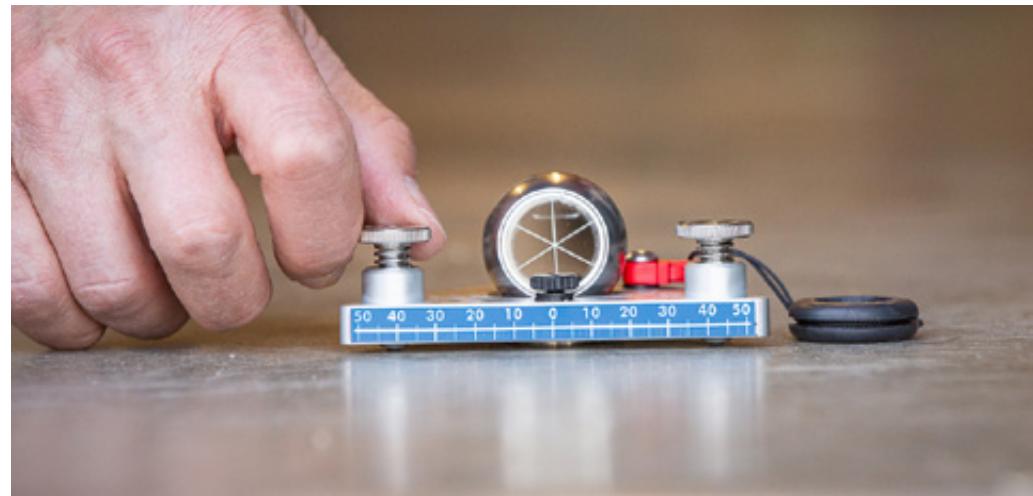
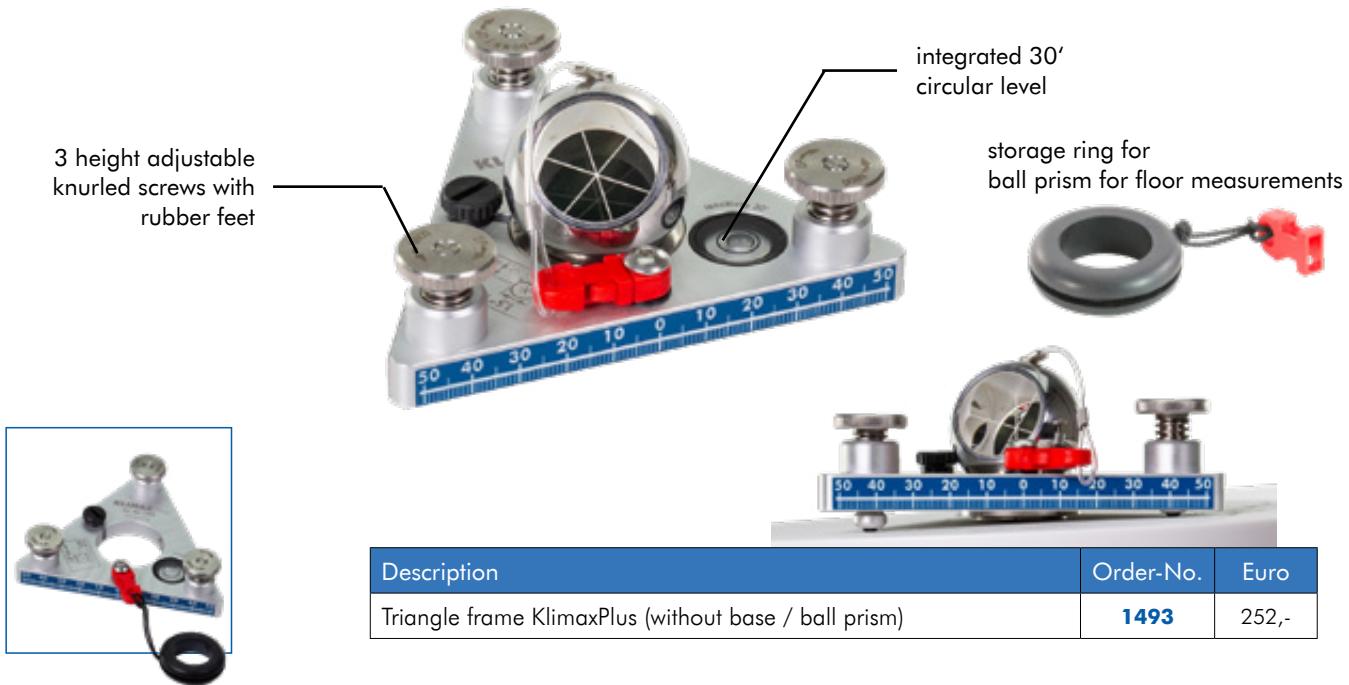
Description	Order-No.	Euro
Carrying strap (red)	1390.R	5,50

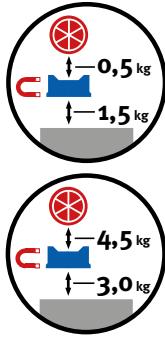
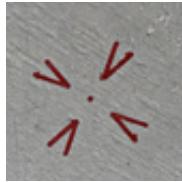
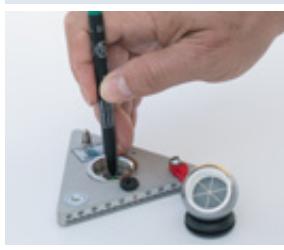
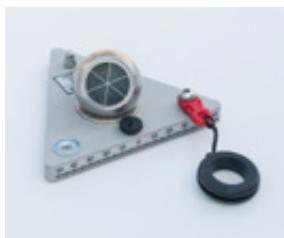
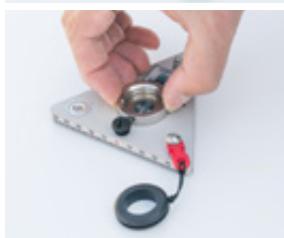


KlimaxPlus

■ For inclined floors up to 3° inclination

Three adjustment screws allow the triangular frame to be levelled. This allows very accurate measurements to be made even on slightly inclined surfaces. (e.g. soils with drainage gradients). Weight: 170 g.





Choice of bases according to application

For floor measurements, the interchangeable ball base (nest) can be moved up and down in the triangular frame with almost no play; it is therefore always in contact with the ground. The distance HO from the base lower edge/floor to the centre of the prism is exactly 25 mm. Thus, in addition to precise position measurement, very precise height measurements and checks can also be carried out.

- Cylindrical ring made of stainless steel with outer Ø 36 mm. exchangeable
- Lateral guide pin. It prevents unintentional twisting of the base in the frame and the base falling out of the frame.

Stakeout and control of ground, ceilings and wall points

Tachymetric measurement of the target position of the prism.
One-man method with tracking mode.

- Move the triangle frame with the ball prism until no more differences to the target coordinates are displayed
- Remove ball from base and “store” on tray ring or eccentric magnet
- Use a fineliner / edding or pencil to mark the centre point and 4 eccentric arrows. Hold pen vertically!
- If necessary, do a final control measurement
- Remove the triangular frame. The point to stake out is indicated by the marked centre point and the 4 eccentric arrows very precisely and identity assured

Existing points can be measured or checked with the transparent centre plate with crosshair.

■ Base A

Description	Order-No.	Euro
Base A for staking out and measuring points on the floor	1495	93,-

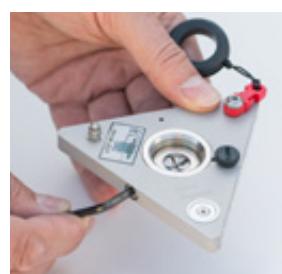
■ Base A with magnet

The integrated permanent magnet holds the ball securely in the base. This means that the triangular frame can also be used also on ceilings and walls.

The base can be fixed in the triangular frame with the horizontal screw (Allen screw SW4) in the Klimax (see pictures below).

Description	magnet. holding force	Order-No.	Euro
Base AM for staking out and measuring points, with magnet	around 4,5 / 3,0 kg	1495.M	104,-
	around 0,5 / 1,5 kg	1495.M2	100,-

Fixing the base in the frame should be done so that the underside of the base is just above the level the 3 rubber feet form. So all measurements are made with a constant distance to the wall.





■ Base P for rough surfaces

On surfaces which are not smooth it is often not possible to mark points sufficiently with a thin pencil. The base P has a conical recess. This means that thicker markers can also be used and clearly visible markings can be applied to rough and uneven surfaces (stone walls, non-smooth concrete floors, etc.).

Integrated weak magnet to protect ball prism from moving unintentionally (since Mid 2023).

Description	Order-No.	Euro
Base P for markers / pens with tips Ø 2 to 5 mm	1499.P	71,-

INFO

The bore hole has a Ø of 2 mm. It can be made wider by drilling by yourself if required. If you want to let us do the drilling of the bore hole please specify the desired Ø when ordering.

■ Base PM for rough surfaces, with magnet

To use the triangular frame on walls or overhead on the ceiling. The magnet integrated in the base holds the ball prism securely in place.

The base can be fixed in the frame with an Allen screw (SW4).

Description	Order-No.	Euro
Base PM for markers / pens with tips Ø 2 to 5 mm, with magnet	1499.PM	77,-

INFO

The hole in the magnet has a Ø of 3 mm. Making it bigger by drilling is not possible.



Measurement / control of points

■ Base B for measurement / control of marked points

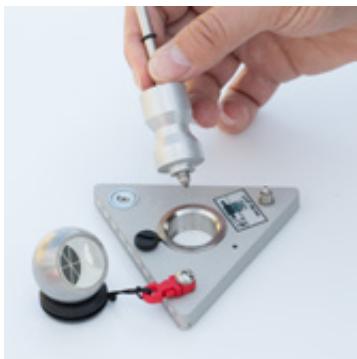
Circular, transparent centre plate with parallax-free crosshairs. The centre of a point marked on the ground, the ceiling or the wall can thus be found and measured very precisely. Weight: 50 g.

Description	Order-No.	Euro
Base B, for measurement	1497	78,-

INFO

The centre plate can be replaced by us in case of damage or wear. Please contact us.





Stakeout with centering pin

The center punch / centring pin is mounted in a cylindrical bearing-insert so it can move precisely in it. After setting out the target coordinates with the triangular frame, the ball prism is removed and the bearing-insert together with the centering pin is put into the base C / CM. The measured point can be marked (punched) on the ground by a light blow with a hammer.



Measure / control with centering pin

With the combination of Base C, bearing-insert and centering pin, the ball prism can also be centered over an already marked point.

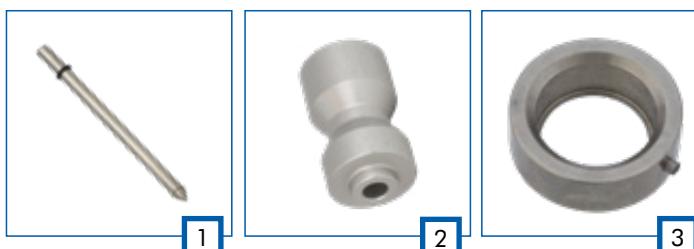
- Place the triangle frame over the point
- Push the centering pin several centimetres downwards out of the bearing-insert
- Locate the point with the tip of the centering pin, press the pin onto it
- Insert the bearing-insert into the base and center the triangular frame around the pressed-on pin
- Remove bearing-insert with pin
- Insert and measure the ball prism



Base C for use with centering pin

- Tolerance-free sliding of the centering pin in the bearing-insert
- Centering accuracy of the bearing-insert in the base $\pm 0,1$ mm
- Center-punch/centering pin $\varnothing 6 \times 100$ mm made of stainless steel (not magnetic)
- Hardened steel tip (magnetic)

Description	Order-No.	Euro
Centering pin with hardend tip [1]	1498.S	23,-
Bearing-insert for centering pin, for base C and CM [2]	1498	29,-
Base C for centering-pin / bearing-insert [3]	1499	62,-

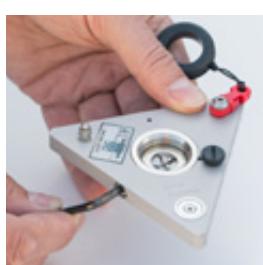
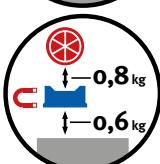
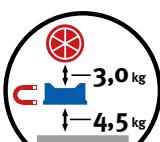


Base CM with magnet

The integrated permanent magnet holds the ball securely in the base. This means that the triangular frame can also be used on walls and ceilings

The base can be fixed in the frame with an Allen screw (SW4) (see picture).

Description	magnet. holding force	Order-No.	Euro
Base CM for bearing-insert, with magnet	around 4,5 / 3,0 kg	1499.M	72,-
	around 0,5 / 1,5 kg	1499.M2	68,-





Transport-Koffer

For storage and transport of triangular frames Klimax including accessories

- Outer dimensions: 275 x 230 x 80 mm
- Made of red plastic, with 2 click fasteners
- In the lower part hard foam with 7 recesses for
 - 2 x triangle frames
 - 4 x ball prism / bases
 - 1 x pens, centering-pin, etc.
- Hard foam in the lid
- Weight: ca. 470 g

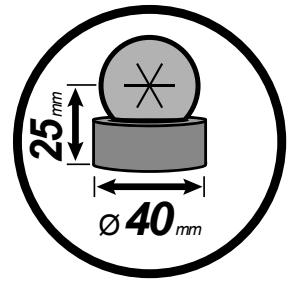
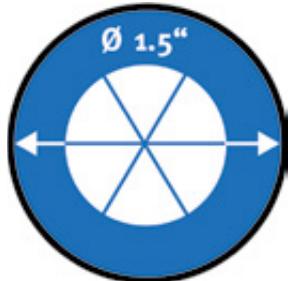


Description	Order-No.	Euro
Transport case, 7 recesses	1468.7	46,-





Ball prism bases for industrial 3D-Measurements



For the three-dimensional determination of points and geometries in industrial metrology. To be used with our 1.5" ball prisms [s. page 76](#).

System Information

Features

- Base made of stainless steel (V2A)
- Integrated permanent magnet (often available with two holding forces)
- Usable ball prisms: \varnothing 1.5" (38,1 mm) [s. page 76](#)
- Positional accuracy of the ball in the base: \pm 0,02 mm
- Height-Offset HO of prism center: $25 \pm 0,1$ mm
- The small distance to the object allows very accurate measurements
- Ring marking with engraved ball diameter 1.5" (38,1 mm) and Height-Offset HO 25 mm

Varying magnetic strengths

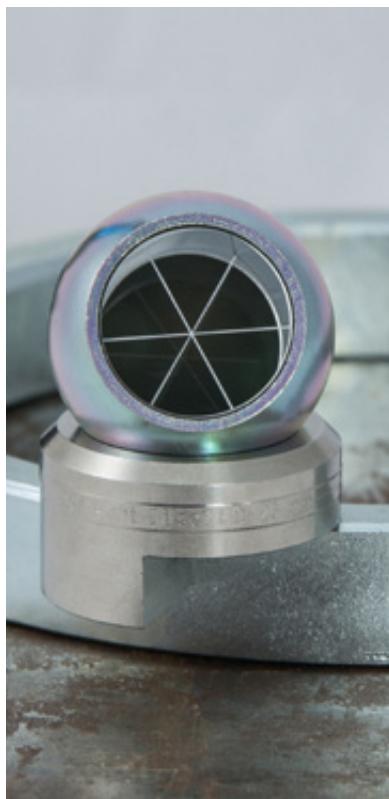
Some of our bases are available with two different magnetic strengths. Depending on the application, one or the other makes more sense. If you are uncertain about your choice, we will be happy to advise you. Here are the respective advantages:

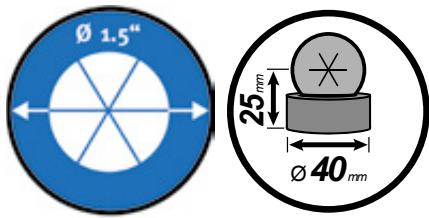
Weaker magnet:

- The base can be easily moved on the object. The ball can be aligned easily too.

Stronger magnet:

- The base (including the ball prism) sticks to the object by itself (even upside down)
- No additional securing necessary. Hands are free after application of the base





Base for measurement of corners & edges

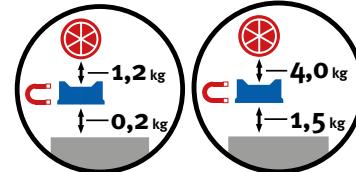
The base is placed on the corner/edge and the ball prism is aligned with the tachymeter for measurement. With magnetic surfaces, the integrated permanent magnet ensures that the base sticks automatically to the measuring object and does not have to be held by hand during the measurement. For measurements in the vertical or overhead position, we recommend the version with the strong magnet.



Outer corners [1]

- Lower part 270°

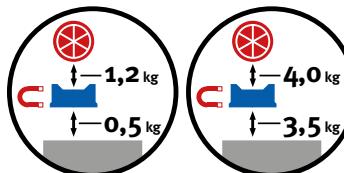
Description	magnet. holding force	Order-No.	Euro
Ball prism base for outer corners for ball with Ø 1.5", stainless steel	around 1,2 / 0,4 kg	1434.A	132,-
	around 4,0 / 2,6 kg	1434.AS	138,-



Inner corners [2]

- Lower part 90°

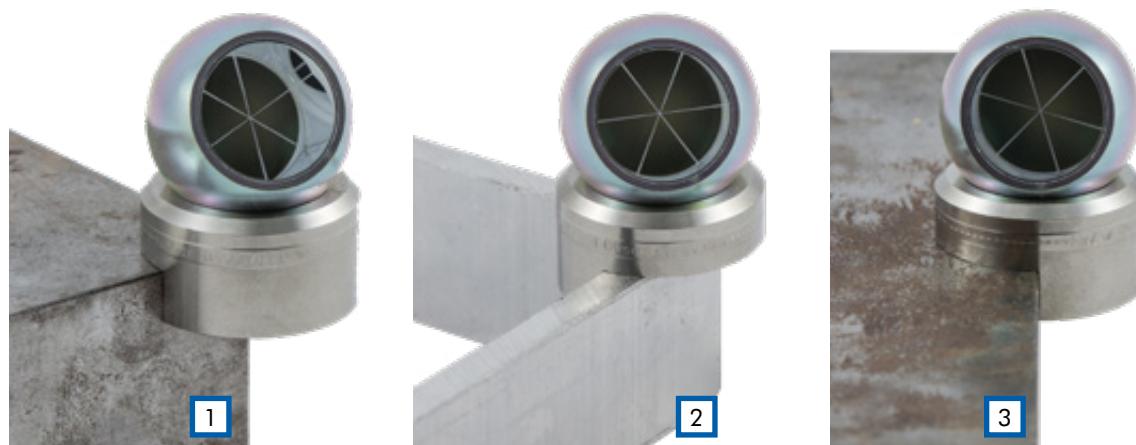
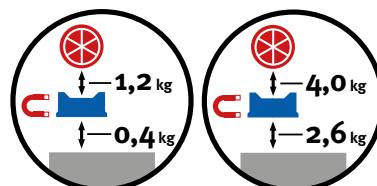
Description	magnet. holding force	Order-No.	Euro
Ball prism base for inner corners for ball with Ø 1.5", stainless steel	around 1,2 / 0,5 kg	1434	132,-
	around 4,0 / 3,5 kg	1434.S	138,-

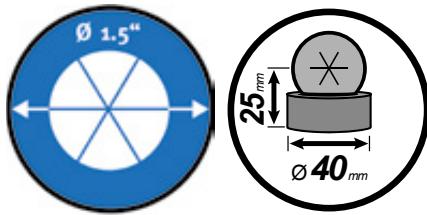


Kanten [3]

- Lower part exactly semi-circular

Description	magnet. holding force	Order-No.	Euro
Ball prism base for edges for balls with Ø 1.5", stainless steel	around 1,2 / 0,4 kg	1432	132,-
	around 4,0 / 2,6 kg	1432.S	138,-





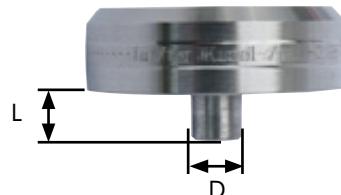
Base to measure bore holes

With this base the 3D coordinates of already existing bore holes of tools, fixtures etc. can be determined. For this purpose, the base is equipped with a concentric stud. The bolt diameters are manufactured with „h6 accuracy“. The ball centre is located exactly in the stud axis (=bore axis).

Features

- General information: [s. page 138](#)
- Bottom part with cylindrical studs with various diameters in g6 accuracy

Description	with bolt Diameter x Length	magnetic holding force towards ball	Order-No.	Euro
Stainless steel base for ball-Ø 1.5", to measure bore holes	Ø 6 x 8 mm	around 2 kg	1433.06	132,-
	Ø 8 x 10 mm		1433.08	132,-
	Ø 10 x 12 mm		1433.10	132,-
	Ø 12 x 14 mm		1433.12	132,-



Base with M8 outer thread

For screwing into M8 inner threads e.g. wall bolt [s. page 111](#).

Due to the small distance of only 25 mm, very accurate measurements are possible.

Features

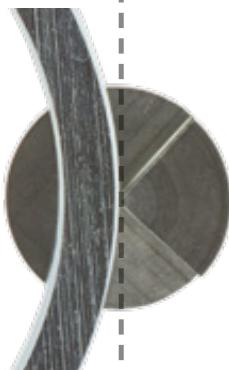
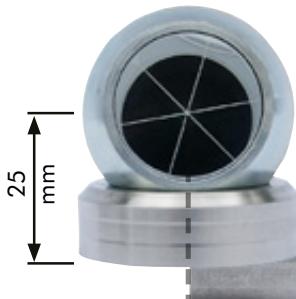
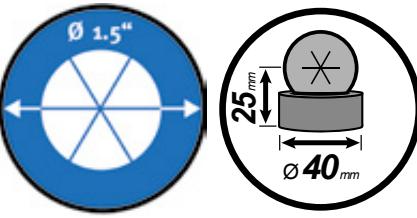
- General information: [s. page 138](#)
- Lower part with M8 outer thread, Länge 8 mm
- Holding force of the magnet: around 2 kg

Description	Order-No.	Euro
Stainless steel base for ball-Ø 1.5" (38,1 mm), with outer thread M8 x 8 mm, with magnet	1433.M8	132,-



TIP

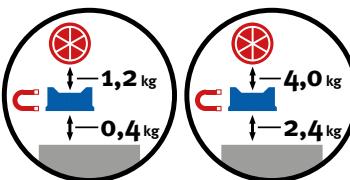
Outside of industrial 3D measurements, the inexpensive, universally applicable M8 revolver base can be used alternatively [s. page 143](#)



Features

- General information: [s. page 138](#)
- Cylindrical lower part designed as quadrant
- The tip of the quadrant lies exactly in the center of the base
- Positional accuracy of the quadrant tip to the center axis base / prism: $\pm 0,02$ mm

Description	magnet. holding force	Order-No.	Euro
Stainless steel base „contour“, for ball-Ø 1.5“, with magnet	around 1,2 / 0,4 kg	1434.K	152,-
	around 4,0 / 2,4 kg	1434.KS	158,-



TIP

To „follow“ a contour in tracking mode, we recommend using the base with the weaker magnet (No. 1434.K).



Basis SECTION

For recording horizontal 90° edges

90° edges with the tip pointing towards the zenith can be measured with a single prism; a vector is required for edges with an oblique tip. The 3D coordinates of the 90° tip are determined using the known dimension up to the prism center (see system sketches).

M8

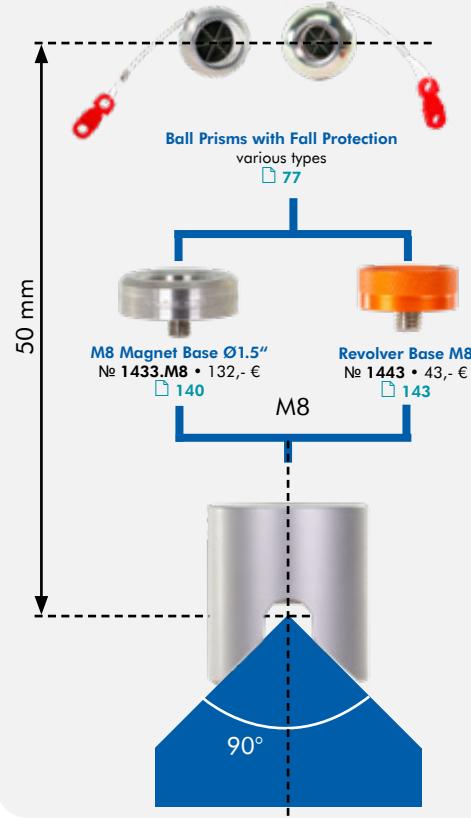


- Anodized aluminium cylinder Ø50 mm with prismatic 90° cut-out
- Integrated magnet
- M8 internal thread for screwing in bases / adapters / centering plates

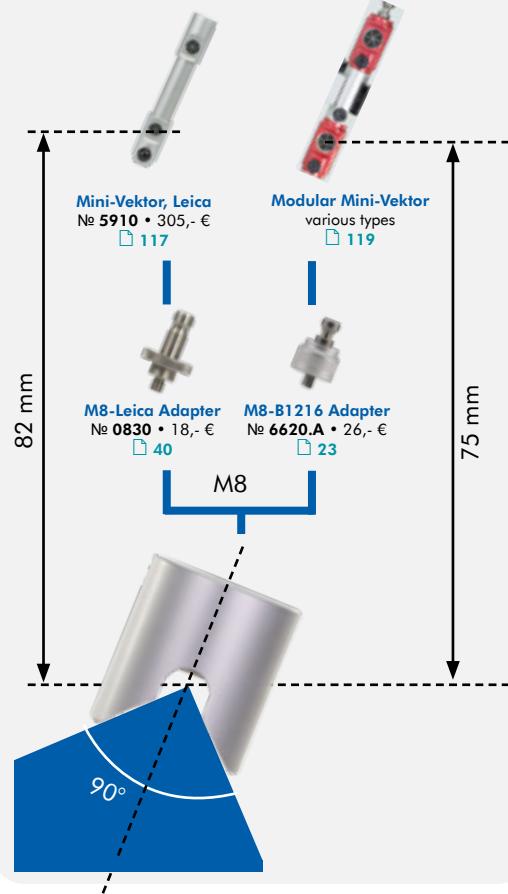
Description	Weight: 150 g	Order-No.	Euro
Magnetbasis SECTION zur Aufmessung von 90° Kanten		1740	128,-



90° edge with tip to the zenith



Slanted 90° edge



SECTION as a reference point for several total station locations

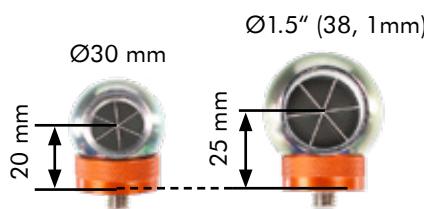
With its integrated magnet, the SECTION adapter can be easily attached to 90° edges made of magnetic material, e.g. a steel door frame. The inclined position of the SECTION adapter in conjunction with the ability to rotate the ball prism in all directions increases its targetability enormously. This means, for example, that the coordinates of the center of the sphere are precisely available in adjacent rooms. By replacing the ball prism with a scan sphere or a scan target, cross-room registration is also possible during scanning (see laser scanning chapter [213](#)).



Alternativ: APEX Mini

TIP

The tubular level built into the APEX-Mini means that horizontal cylinders can also be accommodated. It can also be used on chamfered edges. However, it is not the 3D position of the fictitious intersection point that is determined, but the top of the chamfer using the built-in probe.



„Revolver base“



Revolver Base M8

To use with ball prisms Ø30 mm and Ø1.5".

The revolver base is universal and compact. Although smaller than our standard bases, the base fits both Ø30 mm and Ø1.5" (38.1 mm) ball prisms. Built-in magnets (see picture on the left) ensure a reliable hold of the ball prism in the base. The M8 thread allows a wide range of applications together with surveying tools and accessories.

- Base Ø27 x 10 mm made of orange anodized aluminum
- M8 x 6 mm external thread made of stainless steel
- Knurl for safe screwing and unscrewing
- Distance from base bottom to ball/prism center: 20 mm resp. 25 mm ± 0.1 mm
- Use in a centering plate is not possible
- Magnetic holding force (ball direction): approx. 0.5 kg
- Weight: 18 g



Description	Order-No.	Euro
Revolver base M8 for ball prisms Ø30 mm and Ø1.5" (38,1 mm)	1443	43,-

Application examples

The revolver base can be used with all accessories/tools that have a internal M8 thread.

APEX



BOAXE



CONE Adapter



Accessories

If vertical adjustment is necessary, the see-through circular bubble can be attached to the revolver base [109](#)



Description	Order-No.	Euro
Transparent circular bubble for ball bases, sensitivity 30'	1466.B	38,-

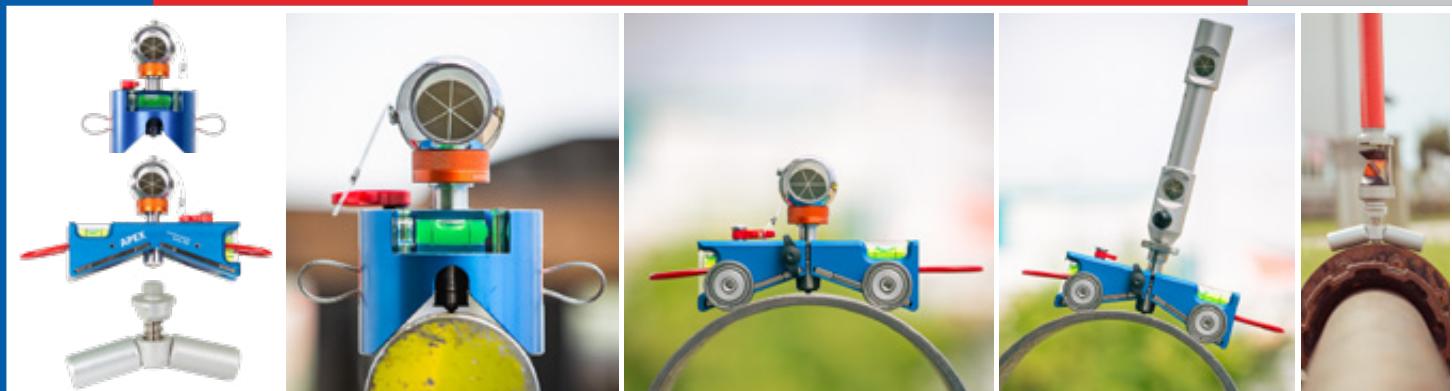


Cylinder Measuring Tools

1/1

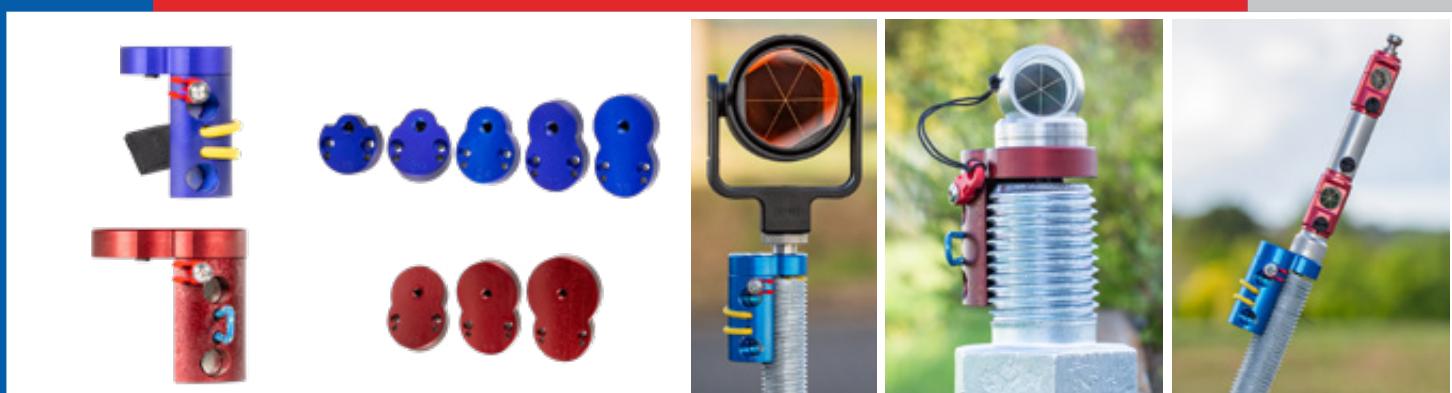
D.1. APEX and PIPE QUICK: Measurement of Cylinders

145



D.2. BOAXE: Measurement of bolt axis Ø16 - 56 mm

150



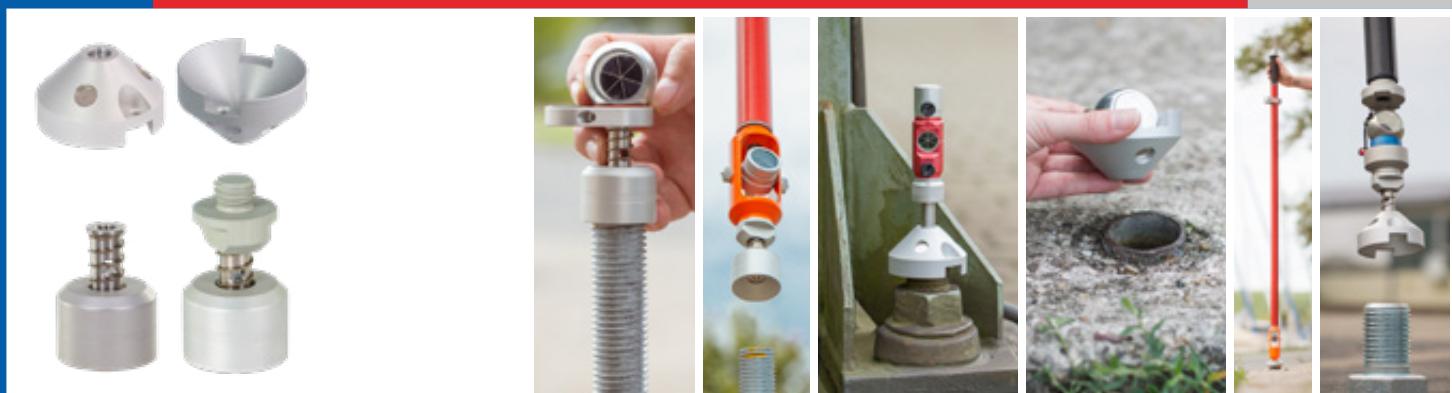
D.3. HEMI: Measurement of bore axis up to Ø95 mm

155



D.4. CONE: Cone adapter for measuring bolts and boreholes

157





APEX

Tool for tachymetric measurement of the axis of all types of cylinders, such as shafts, rollers, tubes, rolls, etc.

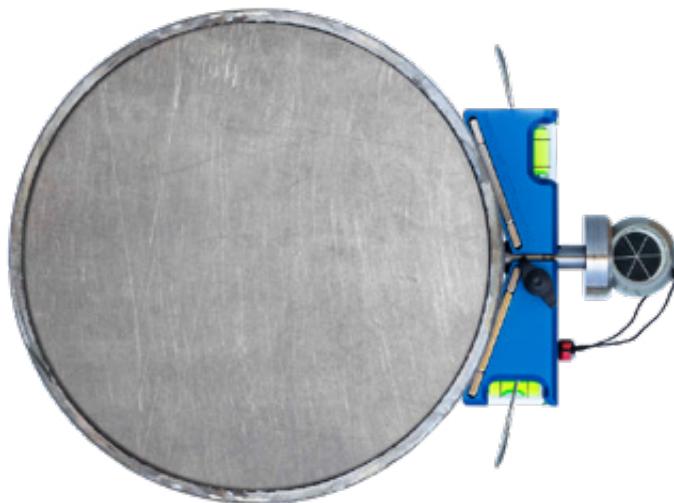
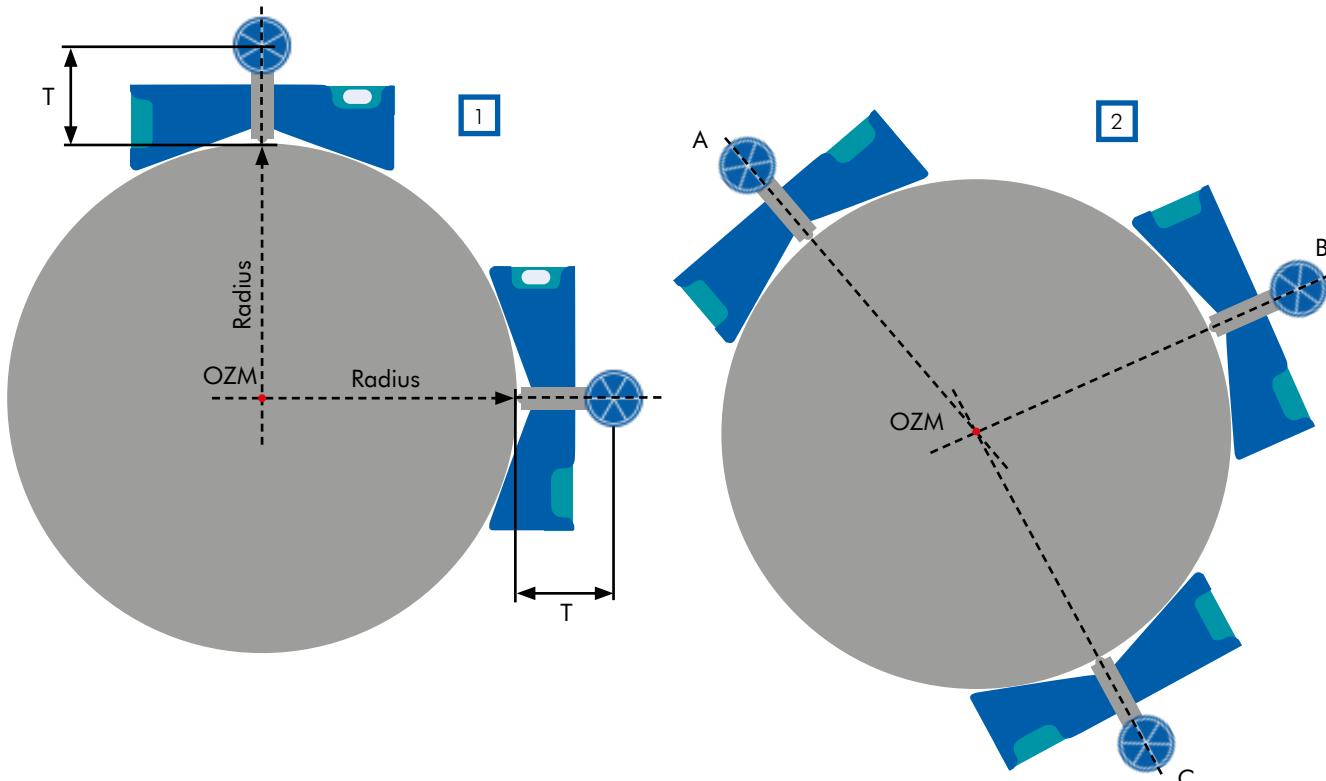


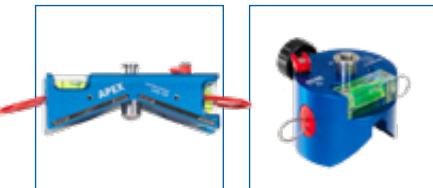
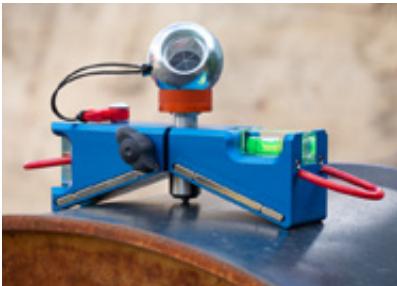
Measurement methods

The Apex consists of a prismatic attachment that is placed on/against the cylinder OZ to be measured and a movable probe that touches the cylinder surface. The axis of the probe passes through the cylinder center OZM and the prism center. The prism center, which is seated on the probe, also lies in this axis. This is determined tachymetrically.

Then the 3D coordinates of the point OZM can be calculated. Examples:

1. Apex is placed in the apex of the cylinder by inserting the tube level: The radius and the target height T are subtracted from the Z-coordinate of the prism center (see sketch 1). With a 2nd tube level (only available on the APEX, not on the APEX Mini), the Apex can also be attached to the side of the cylinder so that the prism center lies on a horizontal line which runs through the cylinder axis.
2. The coordinates of points A, B and C are determined one after the other with the APEX. The center point OZM lying in the cylinder axis can be calculated in the plane defined by the 3 points. The determination is most accurate if the measurements are carried out in the same cross-sectional plane.





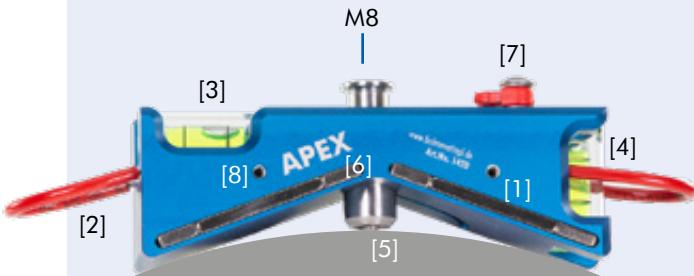
Features

- Integrated permanent magnets for holding on to cylinders made of magnetic steel (1)
- 2 eyelets for attaching rubber bands for cylinders made of non-magnetic material (2)
- Tubular bubble level for defined positioning of the apex vertically above the cylinder axis (3)
- Effective height of the probe: 45 mm
- Anodized aluminium profile



Description	Order-No.	Euro
APEX for cylinders with Ø 60 - 2000 mm	1420	445,-
APEX Mini for cylinders with Ø 20 - 60 mm	1741	224,-

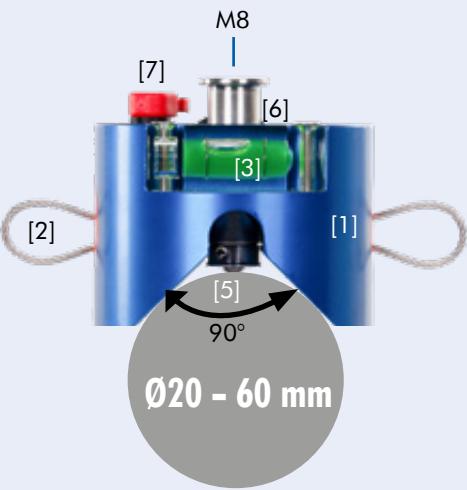
APEX



Ø60 - 2000 mm

- 2nd tubular level for defined positioning of the apex horizontally to the cylinder axis (4)
- Movable feeler (5) rests reliably on the cylinder surface due to spring pressure. The feeler can be fixed in a specific position using a wing screw (6)
- Dimensions of prismatic attachment: 140 x 45 x 38 mm
- Effective height of the push-button: 45 mm
- Total weight (without prism): 178 g
- 4x M6 hole [8] for optionally screwing in the attachment rollers [147](#).

APEX Mini



- Connection possibility ball prism with drop protection (7)
- Locking screw (6)
- horizontal tube level (3)
- Wire rope eyelet (2)
- Integrated permanent magnets (1)
- probe (5)
- vertical tube level (4)

- Movable touch probe (5) which can be fixed in a specific position by a knurled screw (6)
- Dimensions of the prismatic attachment: Ø65 X 50 mm
- Effective height of the probe: 45 mm
- Total weight (without prism): 330 g
- 90° edges, including chamfered edges, can also be measured (similar to 90° edge adapter [142](#))



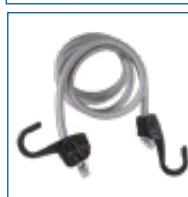
Elastic band

- For fixing the apex to cylinders made of non-magnetic material

Bezeichnung	Bestell-Nr.	Euro
Adjustable elastic band for cylinders Ø60 - 300 mm	1421	12,-
Adjustable elastic band for cylinders Ø300 - 700 mm	1422	16,-

INFO

For cylinders with a diameter of more than 0.7 m, the rubber band must be extended.





Attachment rollers for APEX

For using the APEX on stationary and rotating cylinders (pipes, rollers, etc.)



Bezeichnung	Bestell-Nr.	Euro
Kugelgelagerte Aufsetzrolle für APEX (1 Stk.)	1423.KL	38,-

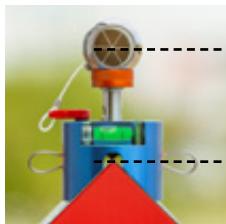
INFO 4 rollers are required to use the APEX.



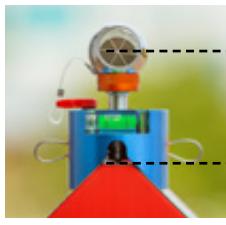
■ Accessories for APEX tool



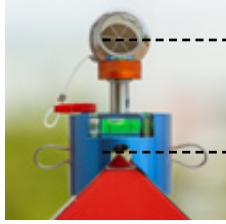
Transport case for APEX tool
Art.-No. 1468.09 • 54 Euro
s. page 229



70 mm



70 mm



70 mm



Stainless steel base, M8
Art.-Nr. 1433.M8 • 132,- €
page 140

70 mm

Revolver base M8
Art.-No. 1443 • 43,- €
page 143

70 mm

Mini-Vektor, Leica
Nr 5910 • 305,- €
□ 117



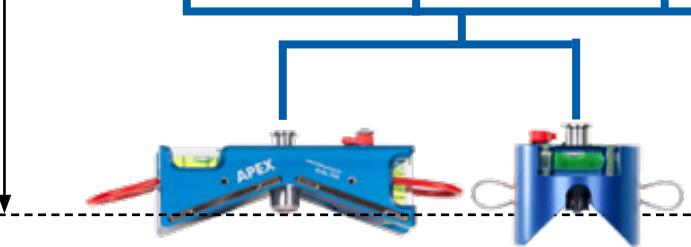
Modular Mini-Vector
various combinations
□ 119



M8-Leica Adapter
Nr 0830 • 18,- €
□ 40

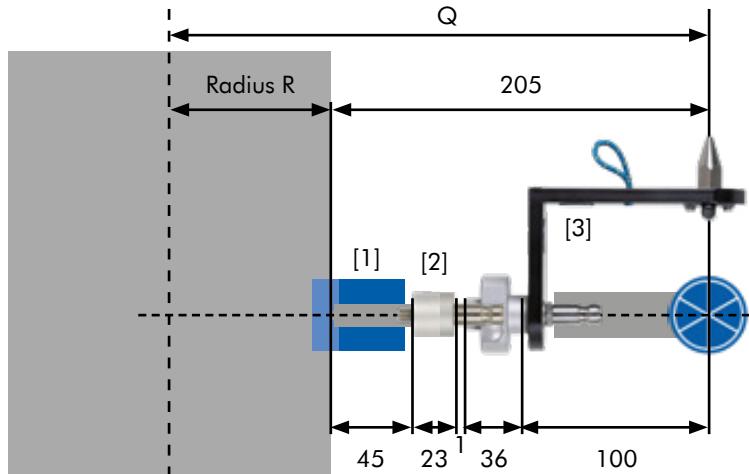
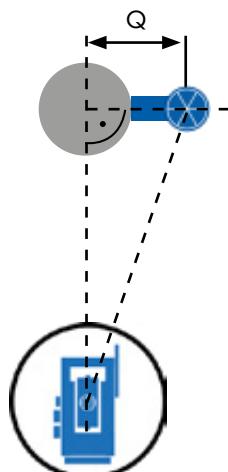


M8-B1216 Adapter
Nr 6620.A • 26,- €
□ 23



In addition to the APEX Mini, the somewhat simpler 90° adapter (Nr. 1740) □ 142 can also be used to measure 90° edges.

■ Measurement of vertical cylinders (columns, beams, etc.) with APEX and Mini Prism Pole with lateral eccentric Q with a measurement with lateral eccentric Q



$$Q = R + 205 \text{ mm}$$

■ Items

- APEX
- Mini Prism Pole □ 51
- Adapter (s. below)



M8 outer <-> Leica 27 mm bolt
Art. 0404.050 • 36,- €



CAGE adapter for ball prism [94](#), Bo 360° Prism [28](#) oder Leica GRZ101 [33](#)

Adapter sleeve Pipe-Quick for prisms-/ Antenna poles with pole tip L = 86 mm



Description

Adapter sleeve 5/8" inner thread on both sides, H = Ø32x36 mm

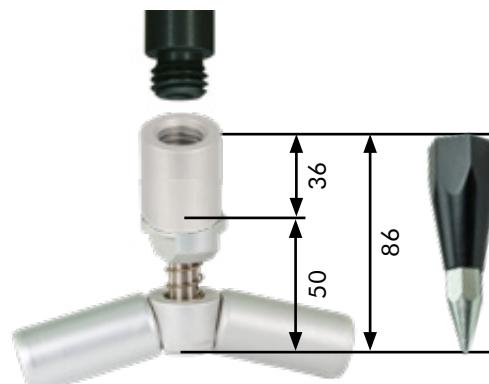
Order-No.

Euro

0295.036

24,-

SECO prism pole



BOAXE

Tool for determining the axis of vertical or inclined bolts with Ø 16 to 56 mm.



The BOAXE consists of a 90° attachment prism and a screwed-on „lid“ as upper part. These must be combined depending on the diameter of the bolt.

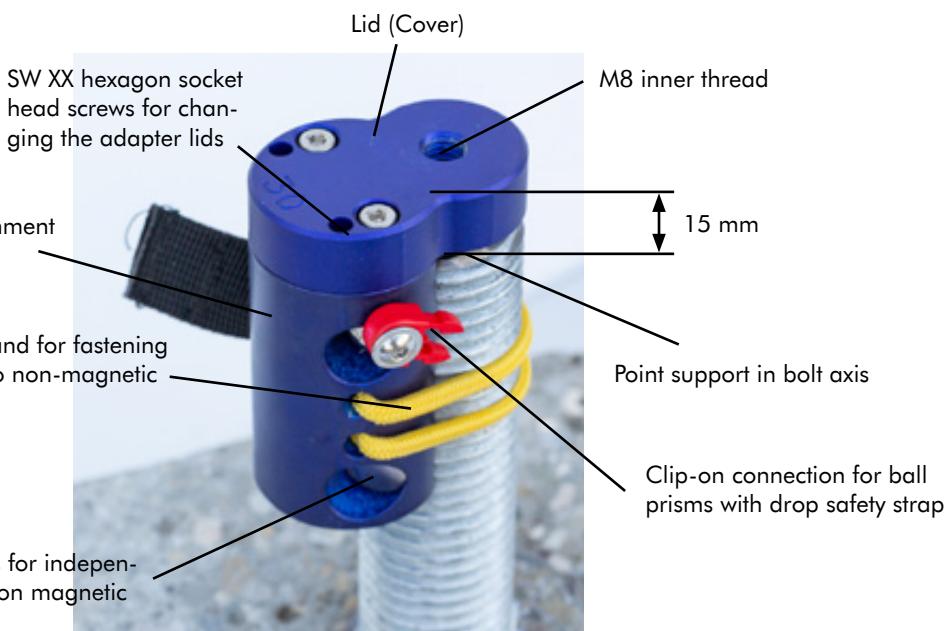
With the 90° attachment prism **BOAXE S**, lids with diameters of 16 mm to 36 mm can be used, and with the **BOAXE B**, lids with diameters of 42 to 56 mm.

90° attachment prism BOAXE S and BOAXE B

- Integrated permanent magnets for holding on magnetic bolts made of steel
- Elastic band for fastening to non-magnetic bolts made of stainless steel
- Including 2 screws M4 x 16 mm with hexagon socket and matching key SW XX for screwing on the lids

Lid Ø 16 to 56 mm

- Precisely screwed onto the 90° attachment prism
- M8 inner thread for screwing in the prisms/adapters
- The axis of the M8 thread lies exactly in the bolt axis
- The lid is manufactured with the respective nominal diameter carved in. So you have an optical control for each measurement that the correct top is used
- Overall height of the lids = height offset = 15 mm



**Ø16 - 36 mm****90° attachment prism BOAXE S**

Description	Order-No.	Euro
90° attachment prism BOAXE S	1721	175,-

INFO	The BOAXE S attachment prism cannot be used with Ø 42 to Ø 56 mm lids/bolts.
-------------	--

**Lid: BOAXE S16 to BOAXE S36**

Type	Description	For Ø	Thread bolt	Order-No.	Euro
BOAXE lid Type „S“	BOAXE S16	16 mm	M16	1720.16	27,-
	BOAXE S20	20 mm	M20	1720.20	28,-
	BOAXE S24	24 mm	M24	1720.24	29,-
	BOAXE S30	30 mm	M30	1720.30	30,-
	BOAXE S36	36 mm	M36	1720.36	31,-

**Ø42 - 56 mm****90° attachment prism BOAXE B**

Description	Order-No.	Euro
90° attachment prism BOAXE B	1731	195,-

INFO	The BOAXE S attachment prism cannot be used with Ø 16 to Ø 36 mm lids/bolts.
-------------	--

**Deckel BOAXE B42 bis BOAXE B56**

Type	Description	For Ø	Thread bolt	Order-No.	Euro
BOAXE lid Type „B“	BOAXE B42	42 mm	M42	1730.42	34,-
	BOAXE B48	48 mm	M48	1730.48	36,-
	BOAXE B56	56 mm	M56	1730.56	38,-

**Transport case for BOAXE accessories**

Description	Order-No.	Euro
Transport case for BOAXE accessories	1468.11	54,-

s. page 229

Vertical bolts

To determine the axis position, all you need is a prism and suitable adapter, which is screwed into the M8 inner thread of the BOAXE lid (s. [page 153](#)).

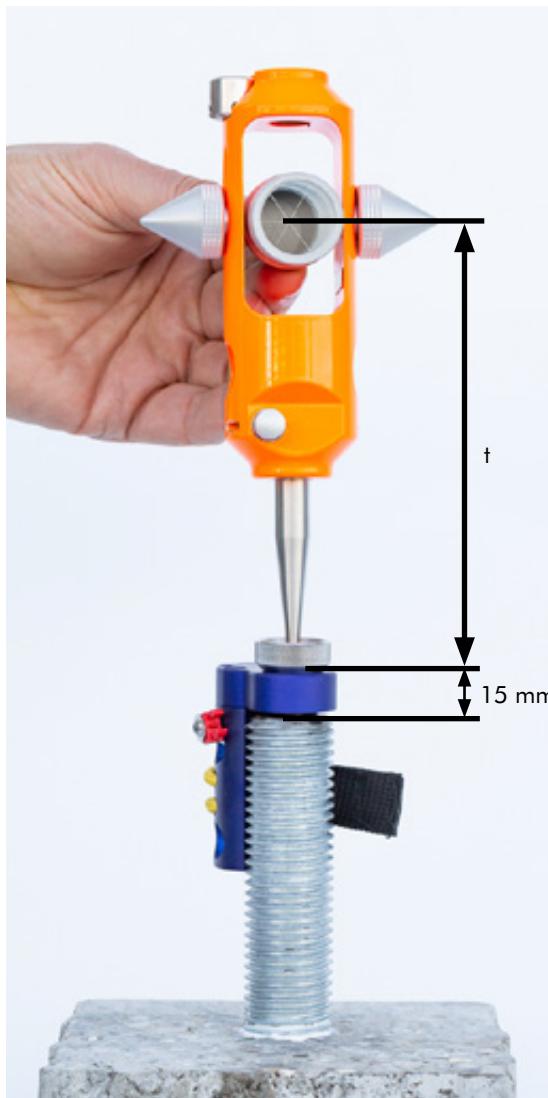


Centering adapter M8

Any existing prism with a positioning tip can be used. However, a circular level is required for plumb alignment.

- M8 outer thread for screwing into the BOAXE 16 to BOAXE 56 lids
- The tip is centered in the bolt axis by the adapter and comes to rest on the top of the BOAXE lid. To obtain the **total target height**, only the overall height of the BOAXE lid of 15 mm must be added to the distance „*t*“ (tip - prism center).

Description	Order-No.	Euro
Centering adapter M8	1723	14,-



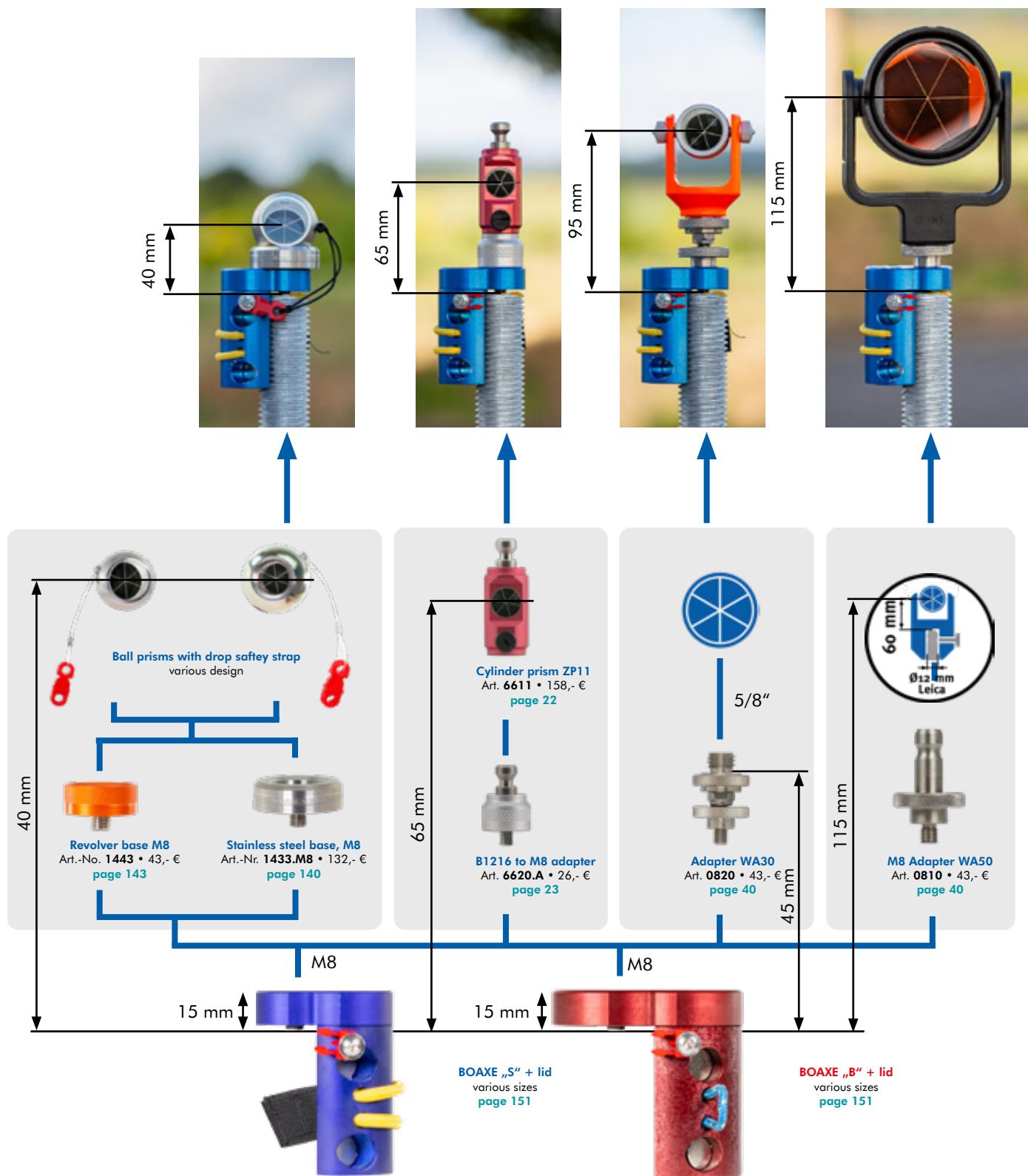


Adapter for axis extension M8

After screwing the adapters (see below) into the M8 thread of the BOAXE lid, the prism center is located in the bolt axis due to the design of the setup. It is not necessary/possible to set the prism plumb using a circular level.

If the bolts are not exactly plumb, a large prism height has a detrimental effect on the accuracy of the coordination.

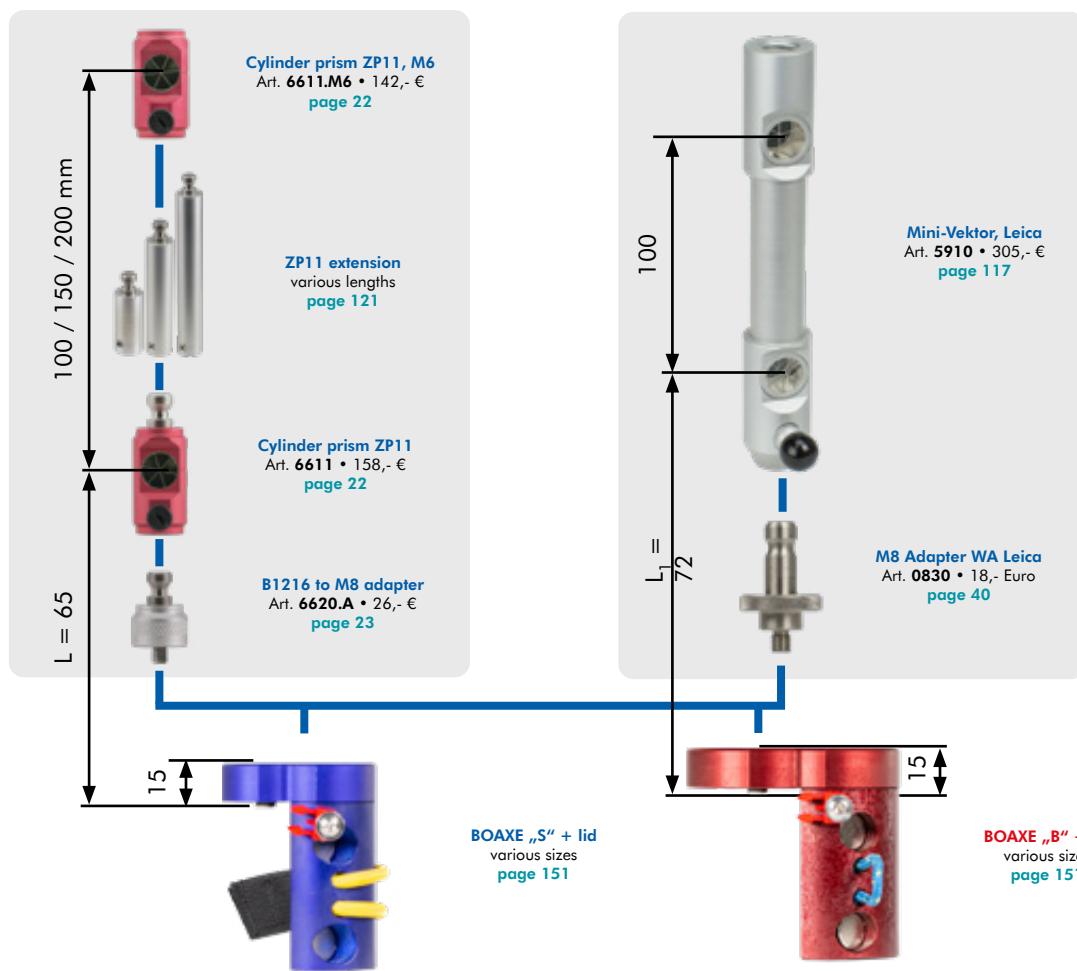
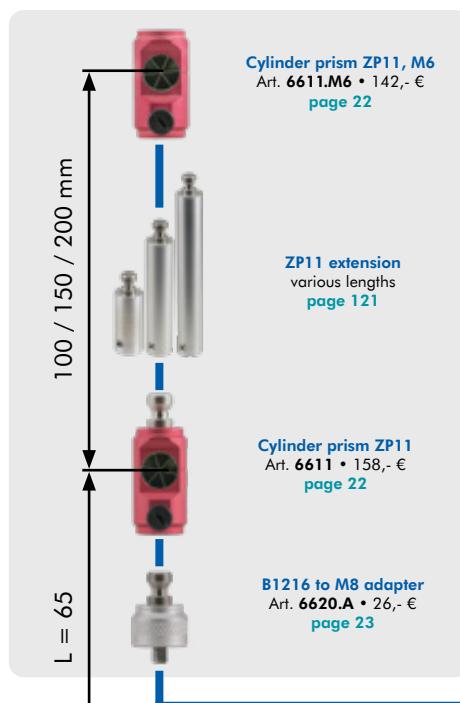
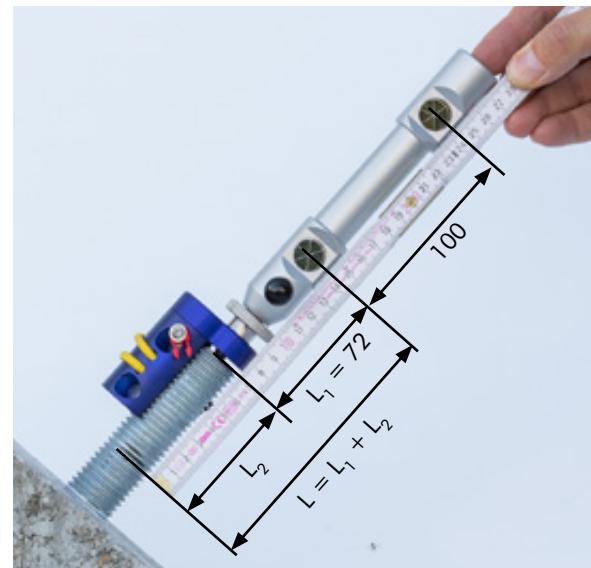
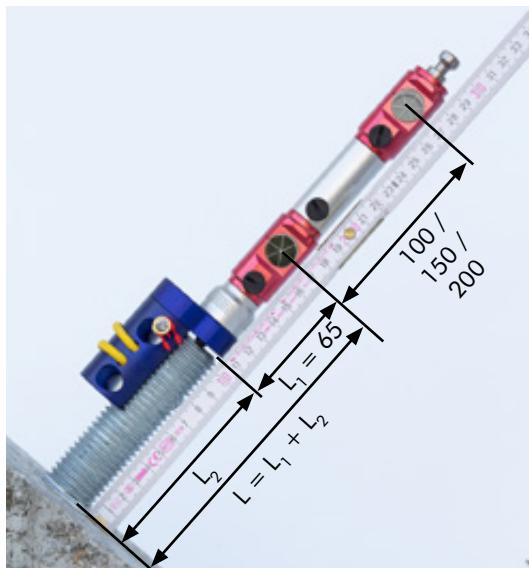
Very precise results can be achieved with our spherical prism (target height 40 mm) and with our cylindrical prism ZP11 (target height 65 mm).





Inclined Bolts

By using a vector with 2 prisms, the axis position of an inclined installed bolt can also be coordinated - both at the top of the bolt and at any other point. By entering the extension dimension L, the 3D coordinates of the desired point can be calculated with the help of a program for calculating hidden points („2 prism method“, „sewer measuring program“, etc.).





Borehole adapter Hemisphere

To determine the axes of circular openings / holes

The hemisphere adapter can be placed on all boreholes and circular openings with Ø35 to Ø95 mm. In combination with a Ø1.5" (38.1 mm) ball prism, the axis of the borehole can be measured with high precision.

The spherical prism is placed on the magnetic base integrated in the hemisphere adapter and aligned with the total station.

The centers of the hemisphere and the spherical prism are absolutely identical.

- Anodized hemispherical base body Ø 110 mm made of aluminum
- Permanently integrated magnetic base to hold the ball prism also overhead
- 20 integrated permanent magnets. These independently hold the borehole adapter on vertical openings made of magnetic material from a Ø of 60 mm and upwards
- With M8 thread for connection of handholds or pole extensions (see below and next page)
- Clip closure for attaching ball prisms with drop guards (see next page)
- Measuring accuracies: With Bohnenstingl ball prisms up to +0.1 mm achievable
- Weight: 412 g (without ball prism)



Description

Order-No.

Euro

Borehole adapter „Hemisphere“ Ø110 mm for boreholes Ø35 to 95 mm, for ball prisms 1.5" (38.1 mm)

1780.110

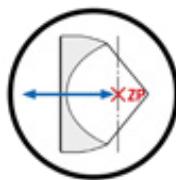
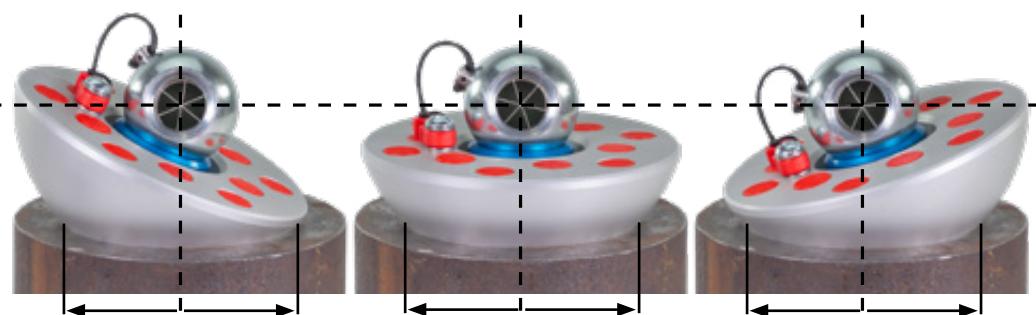
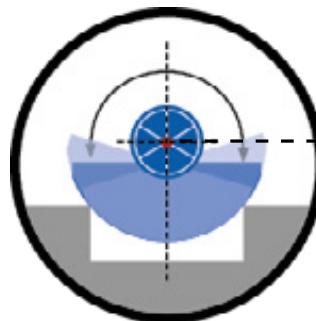
325,-

On request, the hemisphere adapter is also available for the small ball prisms with Ø30 mm.

INFO



Due to 20 integrated magnets, the adapter also holds in vertical holes in magnetic material.



No matter how the hemisphere adapter is placed, the center of the spherical prism always remains in the same position in the borehole axis.

INFO

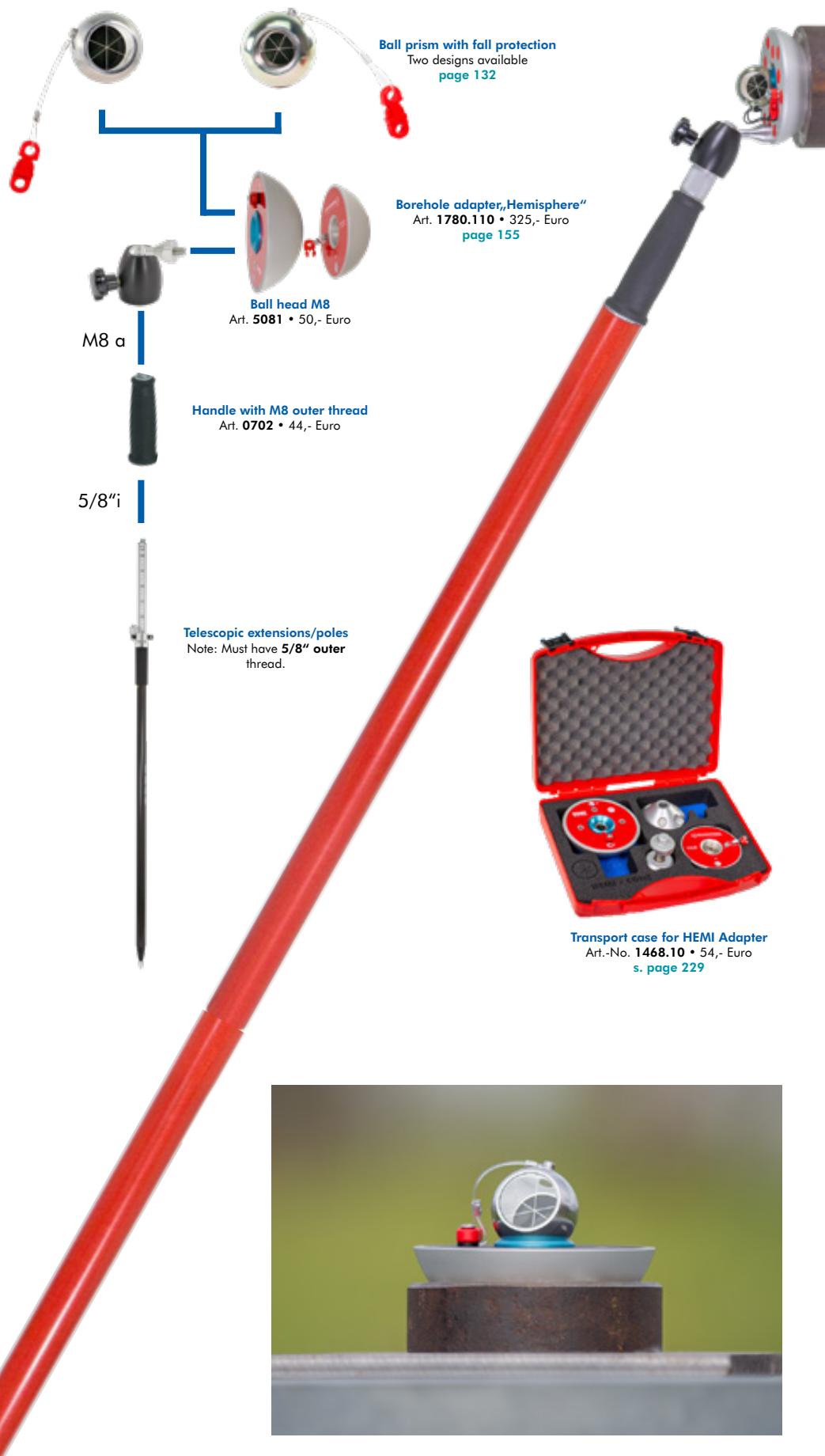
The sphere prism can be inserted directly (without hemisphere adapter) into holes smaller than Ø35 mm.





■ Accessories

We recommend to use a ball prism with drop protection (article no. 1444 / 1454 [page 132](#)). By means of a plug-in connector, the ball prism can be connected to the Hemisphere adapter and thus cannot fall down.





Cone Adapter B60

Measuring of bore holes, as well as bolts, bolt heads, nuts, etc.

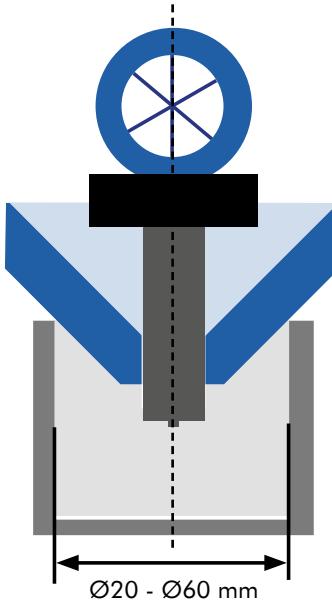
The exact tachymetric measuring of the axis position of circular objects is only possible with auxiliary means.

The cone adapter B60 can be used to precisely determine the position of both vertically drilled holes and vertically inserted bolts.

Depending on the application, the cone adapter B60 can be rotated 180°. An axial pin is inserted through the axial bore of the cone adapter, over which the prism sits.

Determine center of borehole

- Insert Ø12 mm stainless steel axis pin with prism into cone adapter
- Place adapter on drill hole
- Set perpendicular with the aid of the circular level
- Take measurement

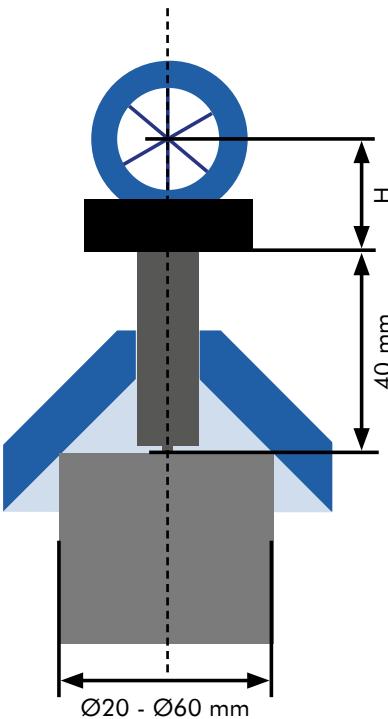


In the example shown here, the axis pin has been left out, since the ball prism can also be inserted without the cone adapter axis pin.

Determine bolt/cylinder center and height

- Insert Ø12 mm axis pin with prism into cone adapter
- Place adapter on cylinder/bolt
- Set perpendicular with the help of the circular level
- Take measurement

The length of the axis pin (40 mm) and the height H of the prism and adapter must be added to the measured Z coordinate.





Cone Adapter B60

- Anodized aluminum construction
- 3 integrated magnets give the cone adapter a hold on magnetic parts
- Axial bore Ø12 mm
- Recess on both sides for optional circular level No. 1580 (see below)

Description	No.	Euro
Cone adapter B60 for bore holes and bolts, Ø20 to 60 mm	1481	160,-
Weight: 110 g		



Circular level „integral“

If there is no circular level on the prism/carrier itself, the circular level integral (No. 1580) must be mounted on one or the other side of the cone adapter B60. It ensures that the entire unit is perpendicular.

Description	No.	Euro
Circular level „integral“	1580	24,-
Weight: 10 g		



Various axis pins are available for the cone adapter, which must be selected depending on the prism used and the application. See next [159](#)





Axis pins for cone adapter

When using the cone adapter, the axis pin is on the upper side of the bolt. By taking into account the length of the axis pin (40 mm or 50 mm) and the prism height H, the correct height from the top of the bolt is obtained in addition to the position of the bolt axis.

■ Axis pin M8, without flange

For quick and frequent switching between the measuring of drill holes and the measuring of bolts.

Depending on the application, the axis pin is inserted into the cone adapter from one side or the other.

- Stainless steel cylinder Ø12 x 40 mm
- Ball segment on underside to be placed on top of the bolt
- M8 inner thread for screwing on adapters/prisms
- Cross hole Ø 6 mm as tightening aid when screwing on

Description	No.	Euro
Axis pin Ø12x40 mm, M8, without flange, L = 40 mm	1482	26,-
Weight: 42 g		



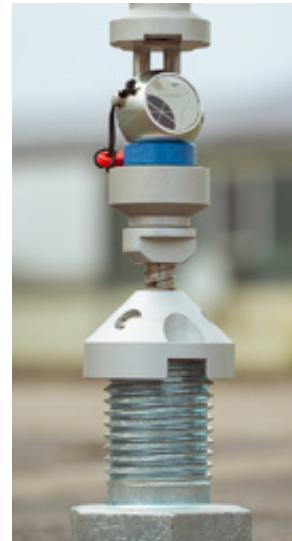
■ Axis pin M8, with flange

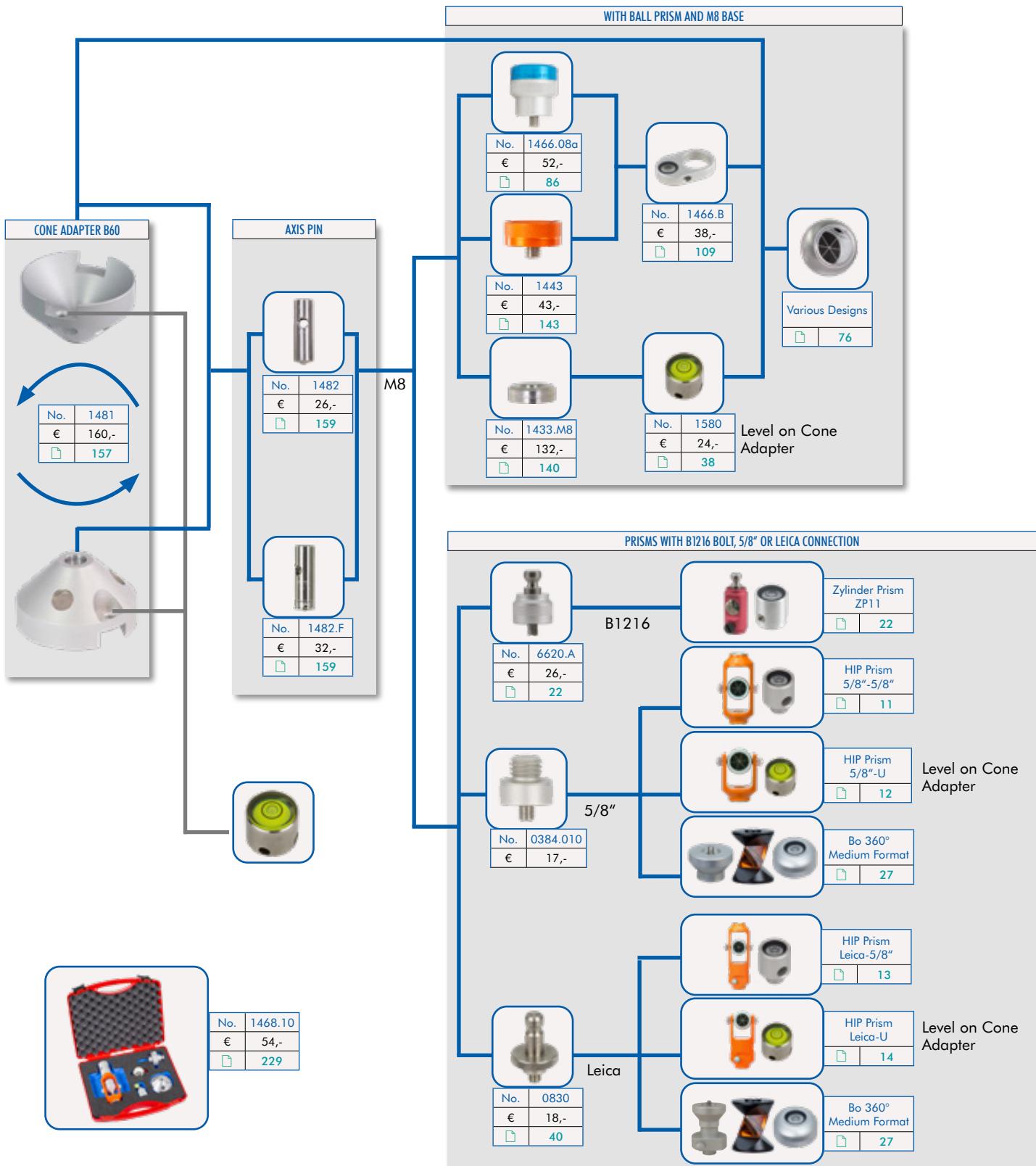
For rare change between the measuring of boreholes or bolts.

For the change, the axis pin on the M8 thread must be loosened from the prism adapter in order to be able to insert it from the other side. The advantage is that the entire unit can be held on the prism. Prism, cone adapter and axis pin are securely connected.

- Stainless steel cylinder Ø12 x 40 mm with flange Ø13 mm
- Flange prevents the axis pin from falling out
- Ball segment on underside to be placed on top of the pin
- M8 inner thread for screwing on adapters/prisms
- Cross hole Ø 6 mm as tightening aid when screwing on

Description	No.	Euro
Axis pin Ø12x40 mm, M8, with flange, L = 40 mm	1482.S	32,-
Weight: 42 g		







Cone Adapter B60: Use with prism pole

For bolts, bolt heads, nuts, etc. Ø15 - 60 mm.

For high accuracy, exact positioning in the axis of the bolt is first necessary. This is given by using the cone adapter. In addition, the distance of the prism center from the bolt to be picked up should be short in order to minimize the effects of the level error.

This can also be achieved when using a prism pole. The prism is attached to the underside of the pole and the cone adapter is attached underneath. The measurement can thus be carried out in an upright posture, constant bending is not necessary.

■ Approach

- Unscrewing the tip of the prism pole (5/8" thread).
- Screwing on a prism and below it the cone adapter „60“ or the S40. For possibilities see page [163](#)
- Placing the cone adapter on the bolt, automatic axial centering
- Perpendicular adjustment with the aid of the circular level on the prism pole
- Pressing down the pole against the resistance of the pressure spring until the axis pin rests on the bolt
- Starting the measurement
- By taking into account the distance from the upper edge of the pin to the center of the prism, the correct height of the pin is obtained in addition to the axial position.



■ Axis pin M8, with flange and compression spring

- Stainless steel cylinder Ø12 x 40 mm with flange Ø13 mm
- Flange prevents the axis pin from falling out
- Ball segment on underside to be placed on top of the pin
- M8 inner thread for screwing on adapters/prisms
- Ø6 mm cross hole as tightening aid when screwing on

Description	No.	Euro
Axis pin Ø12x40 mm, M8, with flange and compression spring, L = 40 mm	1482.SF	33,-
Weight: 29 g		



■ Axis pin 5/8", with flange and compression spring

- Stainless steel cylinder Ø12 x 40 mm with flange Ø13 mm
- Flange prevents the axle pin from falling out
- Ball segment on underside to be placed on top of the pin
- 5/8" outer thread for screwing on prism (carriers) with 5/8" inner threads
- Ø6 mm cross hole as tightening aid when bolting on
- Effective length of axis pin + 5/8" threaded connection: 50 mm

Description	No.	Euro
Axis pin Ø12x40 mm, 5/8", with flange and compression spring, L = 50 mm	1482.58	67,-
Weight: 56 g		





Cone Adapter S40

For bolts, bolt heads, nuts, etc. Ø15 - 40 mm.

The operation of the S40 cone adapter is the same as for the larger cone adapter (order no. 1481 + 148X), but it can only be used up to Ø40 mm instead of Ø60 mm.

Cone Adapter S40, M8

- Aluminum cylinder Ø40 mm with conical bottom part
- Captive axis pin Ø12 mm with collar and compression spring
- Ball segment at the bottom of the axis pin to be placed on the top of the bolt
- M8 inner thread for screwing on adapters/prisms
- Cross hole Ø6 mm in the axis pin as tightening aid when screwing on
- Effective length of axis pin: 45 mm

Description	No.	Euro
Cone adapter S40, M8	1734.M8	82,-
Weight: 115 g		



Cone Adapter S40, 5/8"

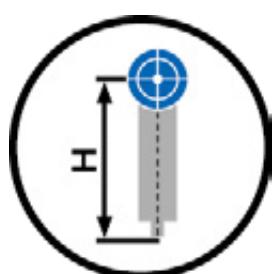
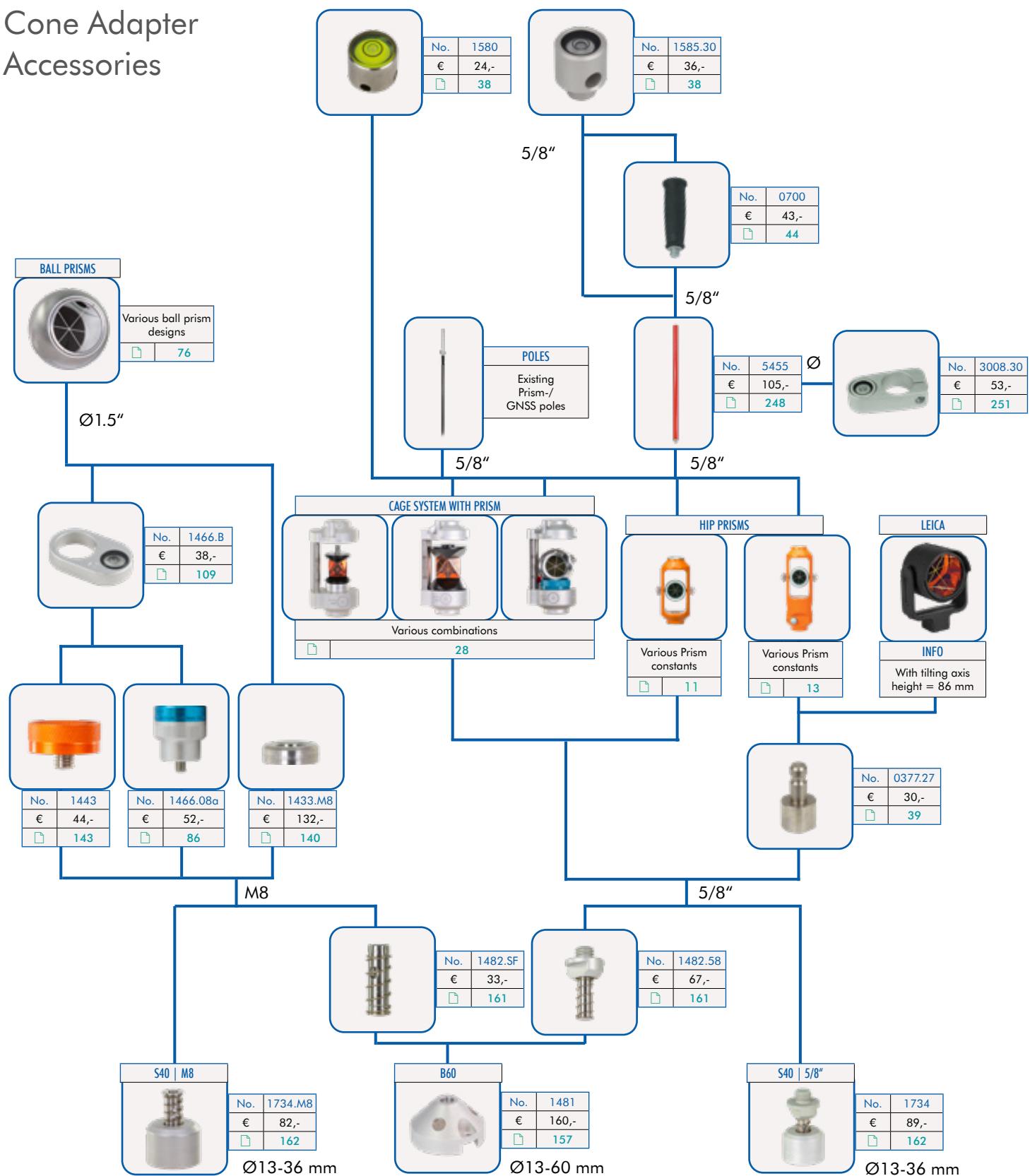
- Aluminum cylinder Ø40 mm with conical bottom part
- Captive axis pin Ø12 mm with collar and compression spring
- Ball segment at the bottom of the axis pin to be placed on the top of the bolt
- 5/8"-outer thread to screw on prisms with 5/8" inner thread
- Tightening aid on 5/8" thread: SW17
- Effective length axis pin + 5/8" threaded connection: 50 mm
- Usage with prism pole [163](#)

Description	No.	Euro
Cone Adapter S40, 5/8"	1734	89,-
Weight: 132 g		





Cone Adapter Accessories



	Adapter/Connection	Prism	Height H from top of bolt
1734.M8	1443 or 1433.M8	Ø1.5" ball prism	70 mm
1481 + 1482.SF	1443 or 1433.M8	Ø1.5" ball prism	65 mm
1734.M8	1466.08a	Ø1.5" ball prism	95 mm
1481 + 1482.SF	1466.08a	Ø1.5" ball prism	90 mm
1481 + 1482.58	-	Cage System o. HIP 5/8"	100 mm
1734	-	Cage System o. HIP 5/8"	100 mm
1481 + 1482.58	0377.27	HIP Leica	147 mm
1734	0377.27	HIP Leica	147 mm
1734	0377.27	Leica Prism with 86 mm	147 mm

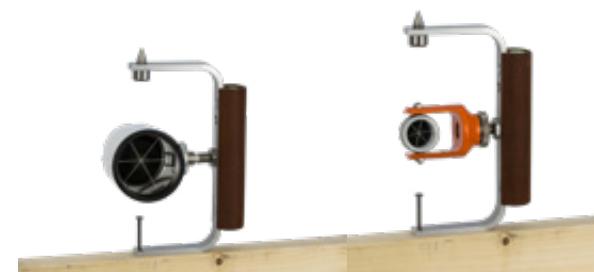
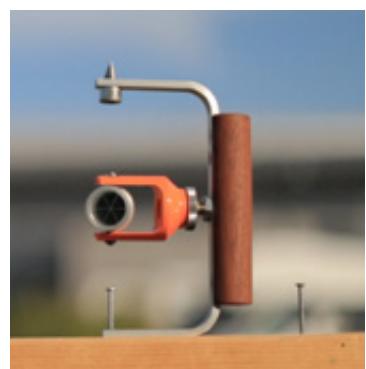


Batter Boards

1/1

E.1. Manual Reflector Holder

165



E.2. Pendulum holder for prisms / reflectors

166



E.3. Nail Prism Holder HIT

168



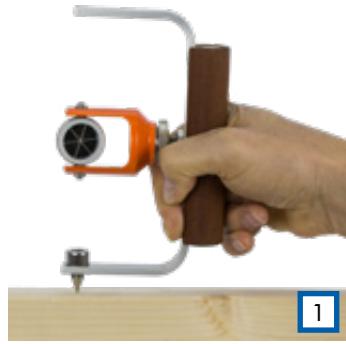
E.4. Instrument Holder 5/8"

170





Manual Prism Holder



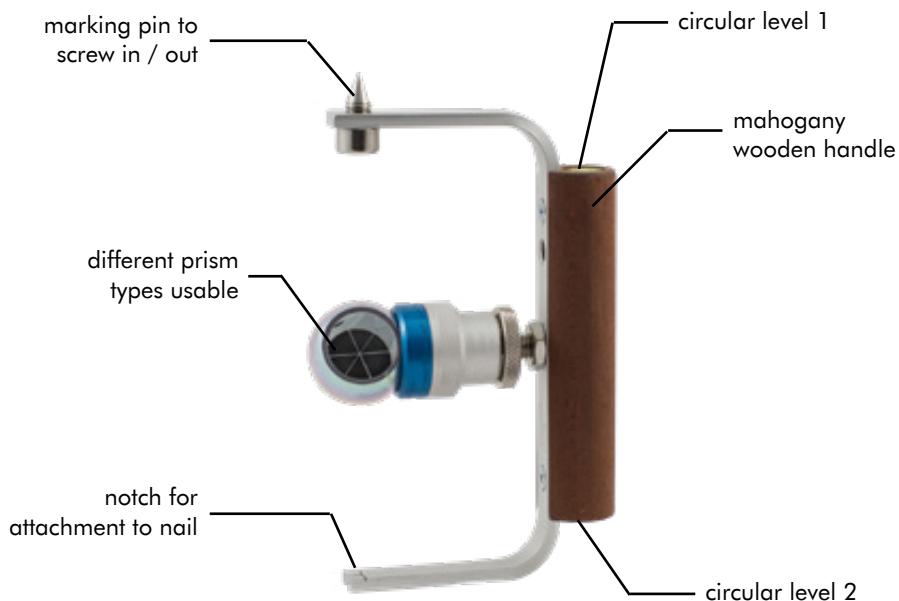
1



2



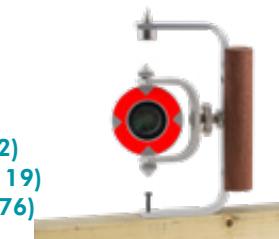
3



Type T

Special holder for prism / holders with 5/8" internal thread and 50 mm tilting axis height. For example:

- HIP-U with integrated mini prism/reflective foil ([s. page 12](#))
- ONRT 50 with mini prism MP24 or reflective foil ([s. page 19](#))
- Ball prism base 5/8" ([s. page 86](#)) + ball prism ([s. page 76](#))



Description	Order-No.	Euro
Manual Prism Holder Type T (without prism), 5/8"	0530	98,-



Type EZ

Special holder for Zeiss-Prism/Reflector **ETR1**

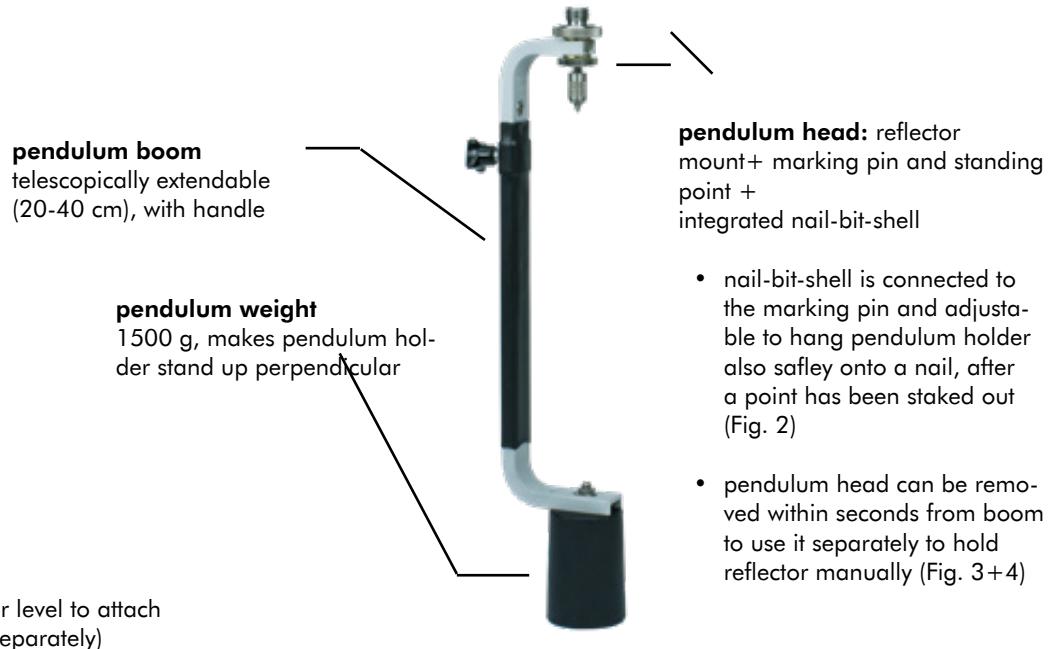
- No adjustment of the reflector holder required
- Prism constant K = -35 mm

Description	Order-No.	Euro
Manual Prism Holder Type EZ (without prism)	0550	98,-



Pendulum Prism Holder (patented)

- Suitable for common prisms and reflectors
- Sets itself perpendicular due to its design, after putting it onto the batter boards (directly or mounted on board nail)
- No uncertainties and sources of error of manual holding
- Batter boards stakeout possible without measuring assistant



- nail-bit-shell is connected to the marking pin and adjustable to hang pendulum holder also safely onto a nail, after a point has been staked out (Fig. 2)
- pendulum head can be removed within seconds from boom to use it separately to hold reflector manually (Fig. 3+4)



Pendulum Holder for reflectors with 5/8" internal thread

Description	Order-No.	Euro
Pendulum Holder with 5/8" external thread	0427	181,-



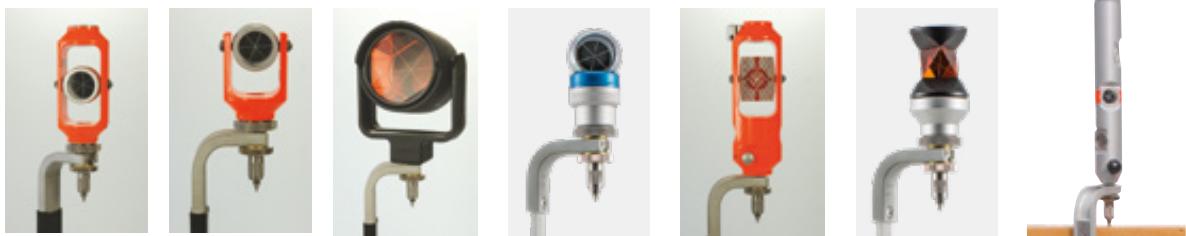
Pendulum Holder for reflectors with Leica spigot

Description	Order-No.	Euro
Pendulum Holder with Leica spigot, Ø 12 x 27 mm	0437	181,-
Pendulum Holder with Leica spigot, Ø 12 x 40 mm	0438	184,-



product video

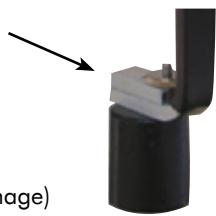


**APPLICATION EXAMPLES**

Accessories for Pendulum Holder

Circular Level

- To mount onto detached pendulum head
- To hold reflectors, which do not have an integrated level already, manually
- When not used level can be stored at pendulum weight (see image)



Description	Order-No.	Euro
Circular Level for pendulum holder / pendulum head	0140	21,-



Pendulum Head, singly

With integrated nail bit shell

Description	Order-No.	Euro
Pendulum head with 5/8" external thread	0121	43,-
Pendulum head with Leica spigot ø 12 x 27 mm	0181	43,-
Pendulum head with Leica spigot ø 12 x 40 mm	0181.4	47,-

Combine: Pendulum Head and Circular Level

- Ideal for measuring up points on the batter boards or on the ground
- For all prisms with 5/8" internal thread or Leica spigot connection
- Ideal for prism holders that have no integrated circular level
- Circular Level can be turned in every direction. Guaranteed optimal visibility of the level even in difficult measuring situations

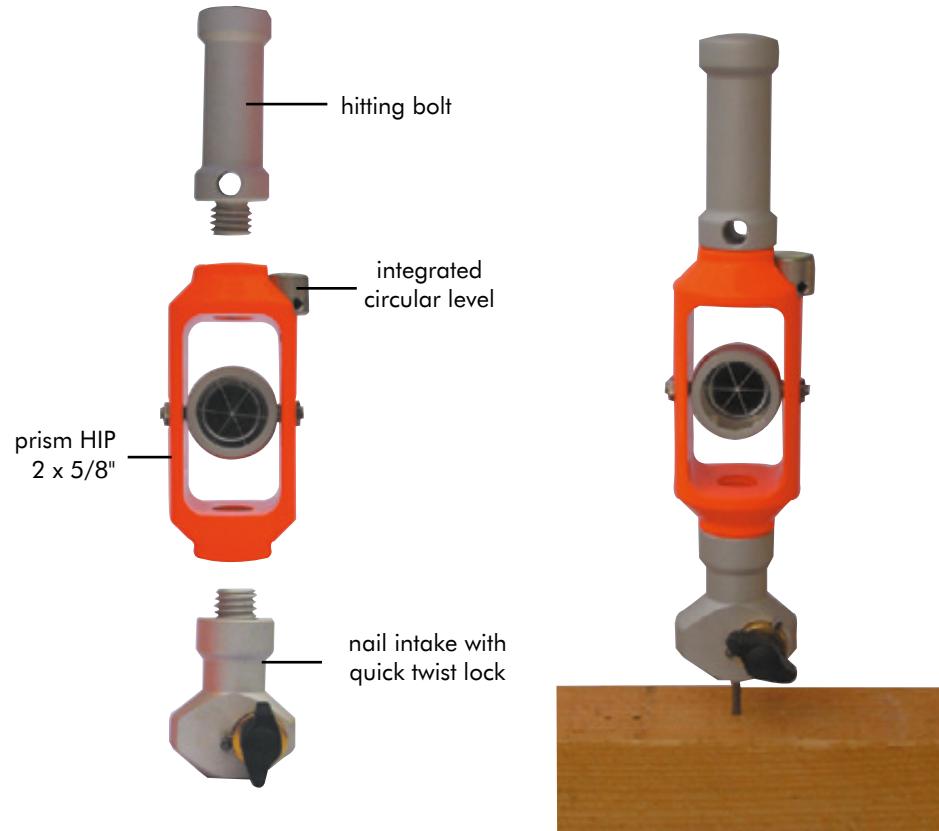




Nail Holder Prism HIT

■ Design and Function

- **Twist Lock:** The nail is securely fixed exactly in the vertical axis of the prism
- **Hitting-Bolt:** The nail is hammered into the board until the Nail Holder Prism stands by itself (Fig. 3)
- **Circular Level:** Holder is aligned perpendicular with the integrated level (Fig. 4)
- After removing the holder (Fig. 5) the nail is hammered into the board to the desired length, without having to hit directly onto the HIT holder



■ Advantages

- Can be used on all scaffold battens / batter boards, even when mounted without ground clearance
- Batter boards can be measured without assistant
- The nail to be measured immediately serves as a stakeout point. After correct measurement, the holder is removed – the nail itself remains unchanged at the measured position. A possible identity error is excluded, a further controll measurement unnecessary. After an approximation or auxiliary measurement, the nail can be pulled out of the board at any time together with the prism nail holder and placed elsewhere. Prism can be rotated together with the holder around the nail axis and aligned with the tachymeter (Fig. 1)
- Since nail and holder HIT form a solid unit during the measurement, the nail is perpendicular to the board even after removing the holder (Fig. 5)
- The nail holder HIT can also be clamped on nails already hammered. Therefore the nail has to have a visible length of at least 25 mm
- You can use all nails with a common head from a length of 50 mm up and with a Ø of 3,0 mm
- Modular design: nail holder, prism and hitting bolt can be easily separated. So the prism is also available for other applications by itself
- Available with all prism constants of common surveying systems



■ With 2 x 5/8" internal thread



Description	Prism	Prism Constant	Order-No.	Euro
Nail Holder Prism HIT 5/8"	glass Ø 17,5 mm	-11,3 (Leica = +23,1) mm	4610.11	357,-
	glass Ø 25 mm	-16,9 (Leica = +17,5) mm	4610.17	357,-
	glass Ø 25 mm	-30 (Leica = +4,4) mm	4610.30	383,-
	glass Ø 25 mm	-34,4 (Leica = 0) mm	4610.34	389,-
	glass Ø 25 mm	-35 (Leica = -0,6) mm	4610.35	389,-

■ With prism constant K = 0 (only available with reflective foil)

Description	Prism Constant	Order-No.	Euro
HIT, with reflective foil 26 x 40 mm, 5/8"	0 (Leica = +34,4) mm	4615.0	267,-

INFO

The tilting and standing axes run exactly through the center of the printed target mark or the visible prism center (center-symmetrical point).

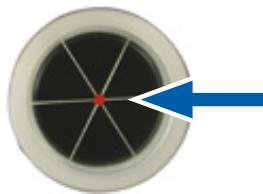


[product video](#)

■ With Leica spigot

INFO

For the discontinued series of HIT systems with Leica connection, we continue to offer spare parts on request.

MORE OPTIONS

■ Tilting axis cones

- see [s. page 10](#)



■ Red marked prism center

- see [s. page 10](#)





Instrument Holder

With automatic centering over the axis nail.

With the holder, any measuring instrument with 5/8" thread can be fixed quickly and stably on the batter board.

The holder consists of a base plate for the instrument and a clamping device. Both are screwed to each other and form a unit.

With the clamping device, a high-performance screw clamp, the holder can be attached to planks, boards or battens - extremely **fast and stable**.

When installing the holder over a vertical axle nail, an automatic centering takes place due to its design.

Of course clamping can be done on the batter boards without an axis nail. Due to the large span of the screw clamp of up to 290 mm, the surveying possibilities are almost unlimited.



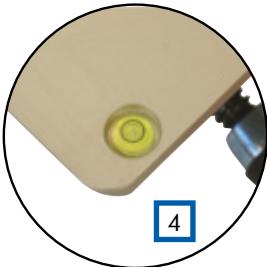
1



2



3



4



5



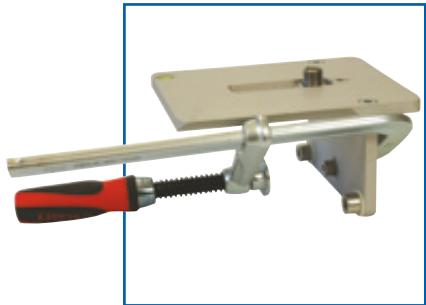
Handling

- Open screw clamp
- Mount holder on axis nail. By doing so the cross slide with the central bore of the 5/8" thread is slipped over the axis nail (Fig. 1+2)
- Tighten screw clamp. A circular level in the base plate allows a rough pre-horizontal alignment of the holder (Fig. 3+4). Since the cross slide can „move freely“ along a long-hole, no force is exerted on the axis nail when tightening the clamp.
Screw the instrument tribrach onto the 5/8" thread of the holder (Fig. 5). For devices without a separate tribrach they are screwed on directly
- Leveling the surveying instrument
- The instrument sits ready to measure, stable and nicely centered over the axis nail
- When dismounting, proceed in reverse order: First unscrew the instrument, then release the screw clamp and then remove the holder.
If a separate tribrach is used, it does not have to be unscrewed completely from the holder, but a slight release of the tribrach screw connection is necessary before the screw clamp is opened

Technical Data

- 5/8" external thread centeres over the axis nail on planks, battens and squared timbers etc. over a range of 60 mm width
- To use with nails with max. head-Ø 9,5 mm
- Dimensions: 180 (300) x 150 (180) x 100 mm (incl. screw clamp)
- Total weight of the holder No. 805: around. 2,1 kg

Description	Order-No.	Euro
Instrument Holder (5/8"), max. span: 190 mm	0805	194,-
Instrument Holder (5/8"), max. span: 290 mm	0806	205,-





Track and Rail Surveying

1/1

E.1. Measurement of track position (rail axis and edges)

172



E.2. Measurement of track position (outer edges)

175



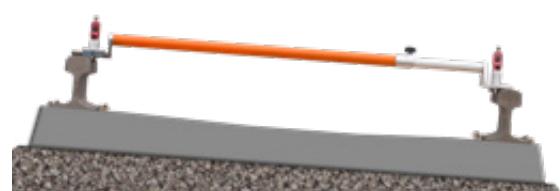
E.3. Surveying of Bolts (Catenary Supports)

177



E.4. Track Gauge

179





Rail Tool HUG

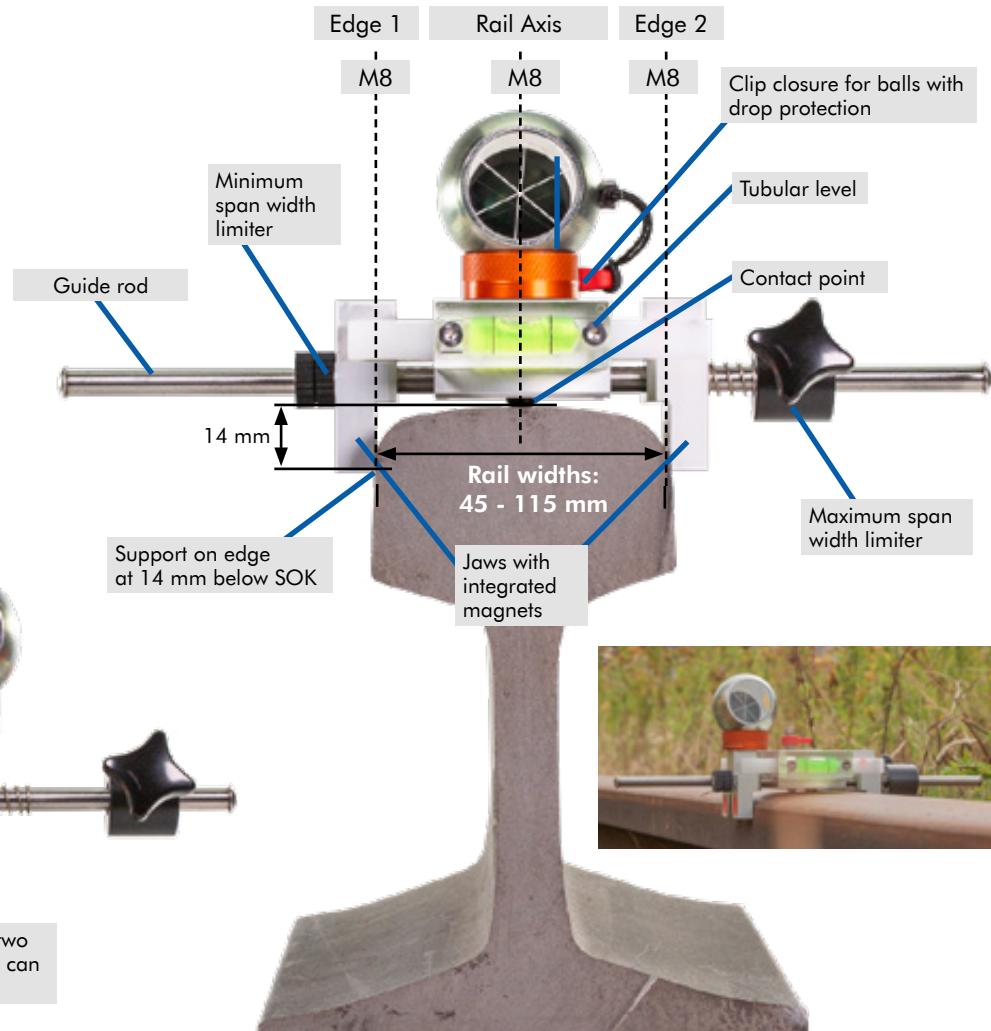
Tachymetric determination of the position and height of railroad and crane rails

The HUG is a tool that can be used to measure rails universally. After attaching the HUG, not only the **running edge** can be determined, as for example with our rail angle SW PRO, but also the opposite outer edge, as well as the **rail axis**.

Design and function of the HUG

- Distance of the jaws adjustable to rail widths 45 - 115 mm
- Both jaws always have the same distance to the center of the HUG
- Both edges are held **14 mm below the top edge of the rail [SOK]** or running surface
- Three M8 inner threads for screwing in adapters/prism holders above both edges and rail axis
- Adjustable stops for quick measurement of a rail type
- Magnets in jaws ensure reliable contact with the rail
- Tubular level for horizontal alignment of the HUG transverse to longitudinal axis
- Buckle for clipping in when using the drop guard on the ball prism
- Distance from wheel contact surface** to top of M8 thread: **25 mm**
- 2 possibilities to align the HUG (173)

Description	Item No.	Euro
Rail tool HUG for both edges as well as the rail axis	0807	452,-
Weight: 285 g		





HUG with prism pole

Comfortable recording of many points without bending down or crouching.

The main points on a rail can be determined tachymetrically with the HUG: Edge 1, Edge 2 and rail axis. By using a HIP or Cage prism with the center M8 thread, the HUG can be operated while standing. The prism pole is used to set up the HUG, set it perpendicular and align the prism with the total station.



Two alignment variants

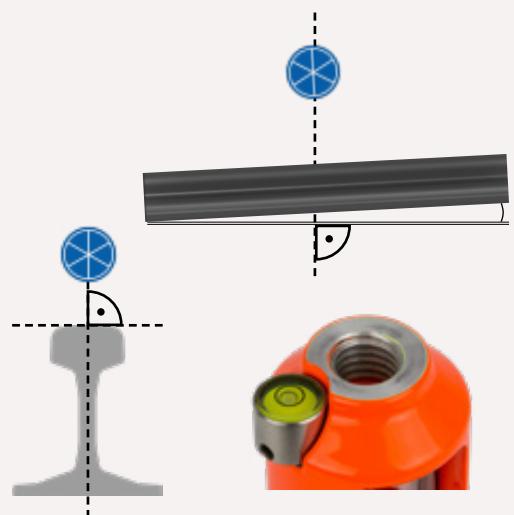
A

Perpendicular in longitudinal axis / in transverse direction of the rail

- Bottom side of the HUG: One pan head screw is screwed in centrally, the 2nd screw is „parked“ in a recessed position (each marked with „A“)
- The HUG rests on the rail with only one centric point.
- Perpendicular adjustment is performed with a circular level attached to the prism holder or with the circular level on the prism pole, if such a pole is used. The perpendicular adjustment in the transverse direction can be additionally assisted by observing the circular bubble on the HUG.



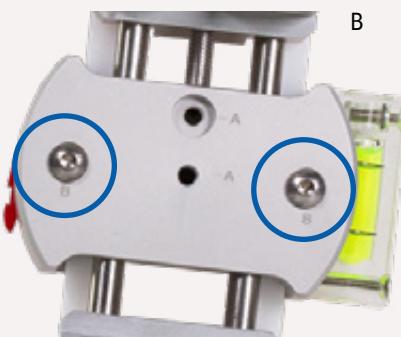
Bottom view



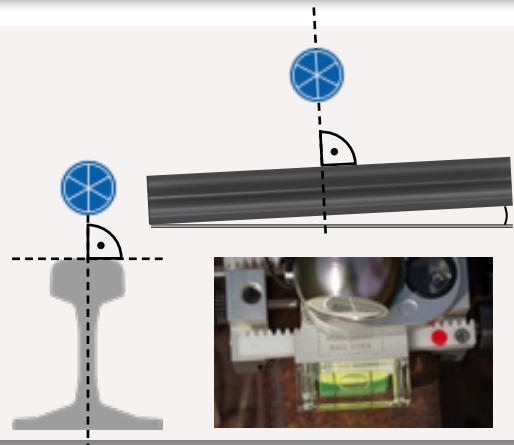
B

Perpendicular to the longitudinal axis / to the transverse direction of the rail

- Bottom side of the HUG: The two raised countersunk head screws are screwed into the threads marked „B“
- The HUG rests on the rail with 2 points. The prism axis is therefore perpendicular to the longitudinal axis of the rail.
- The perpendicular adjustment in the transverse direction is performed with the tubular level on the HUG.



Bottom view


INFO

For use with the prism pole, we recommend the first variant.

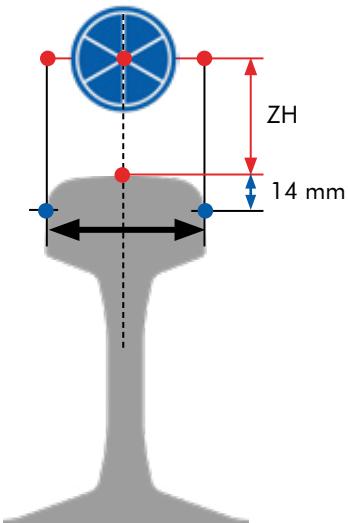
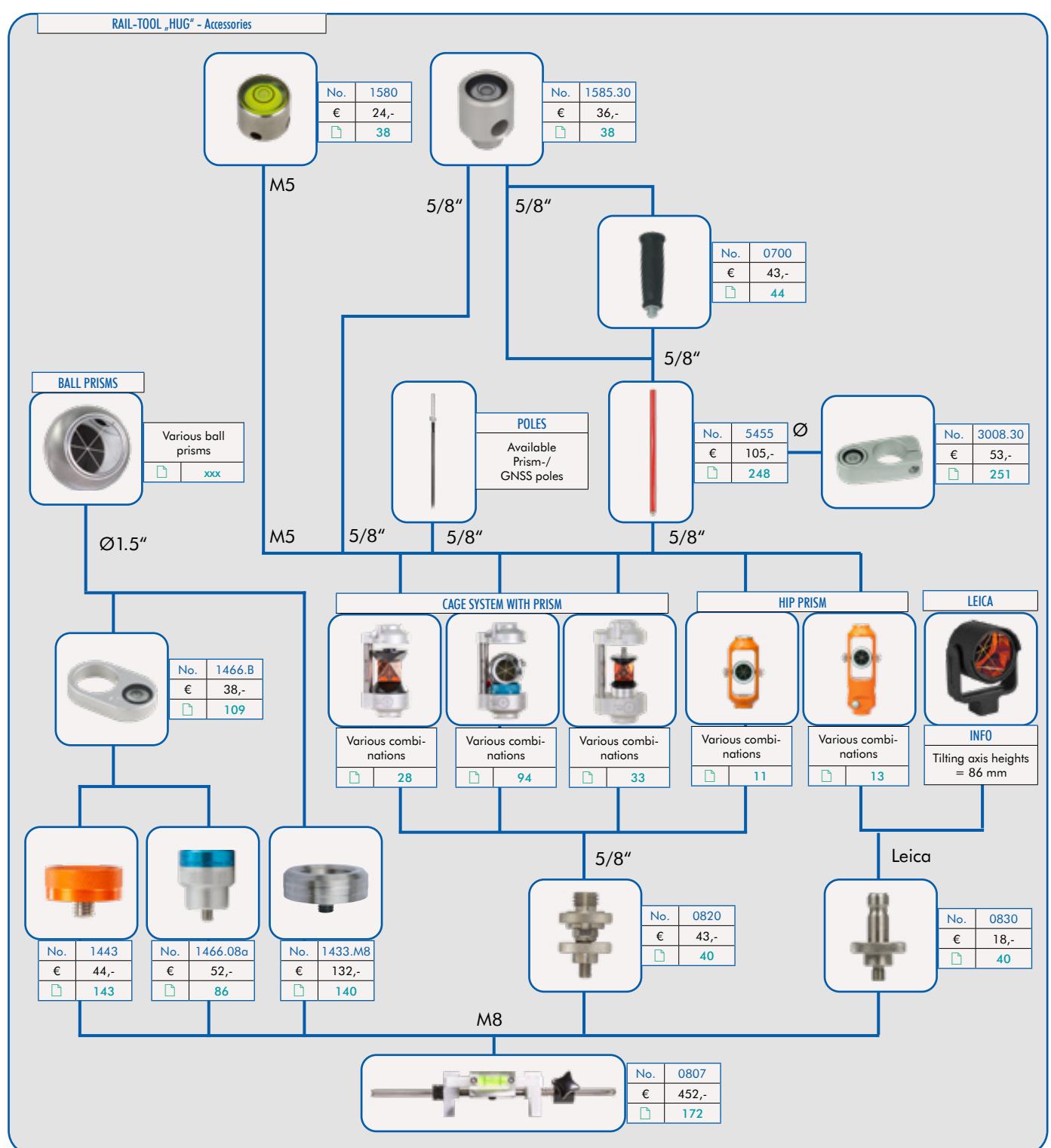


■ Transport case for HUG tool & accessories

Plastic case for storing and transporting the HUG, as well as accessories. Various recesses in the foam.

Description	Item No.	Euro
Transport case for rail tool HUG	1468.12	54,-
Weight: 420 g, Outer dimensions: 275 x 230 x 80 mm		





HUG	Adapter	Prism	Height offset	Working with prism pole possible
	1433.M8	Ball prism Ø1.5"	50 mm	-
	1466.08a	Ball prism Ø1.5"	75 mm	-
	1433.M8	Ball prism Ø1.5"	50 mm	-
	0820	Cage + Bo 360°	105 mm	✓
	0820	Cage + Ø1.5"	105 mm	✓
	0820	HIP 2 x 5/8"	105 mm	✓
	0830	HIP 5/8"-Leica	125 mm	✓
	0830	Other Leica prisms	125 mm	-

INFO: 360° prisms have a maximum targeting accuracy of 1.5 - 2 mm.



Rail angle SW PRO

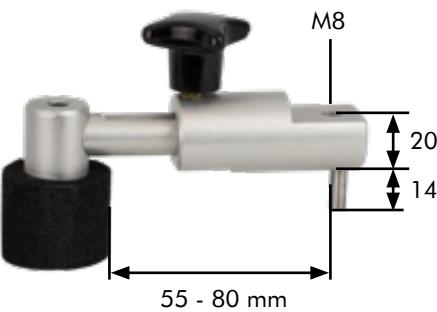
Rail angle for exact measurement of the track position. The reference point P (running edge) to be measured is located on the inside of the rail, 14 mm below the top edge of the rail SOK (running surface).

Exactly this point is realized by setting up the **SW PRO** rail angle.



Design and advantages

- Metal construction with hardened, 14 mm long cylindrical pin for precise contact at reference point P.
- Cylindrical support of the SW PRO on the rail. This ensures perpendicular use at a constant distance from the SOK even on tracks with inclines.
- Screw-in axis of the prism holder (M8 thread) is exactly above reference point P
- Prism can be rotated around the prism axis as required when the rail angle is fixed and aligned with the total station.
- Adjustable sponge rubber stop. Once the rail angle has been set, this ensures that the cylindrical pin is always pressed lightly against the reference point P. Adjustment of the track width is only necessary once. If a prism with an upward extension (e.g. prism pole) is used, the sponge rubber stop ensures safe and reliable positioning of the track angle at the reference point.
- The set-up can be carried out standing up, which is a great relief, especially when there are a large number of points to be measured.
- The slim cylindrical pin can be used to fix a marking that may have been made to the side of the rail.
- The plumb line of the rail angle together with the prism is set with the aid of a circular level, which can be attached either to the prism holder or to the prism pole.



Description	Item No.	Euro
Rail angle tool SW PRO	0800	123,-
Weight: 190 g		
Info: Applicable for rail widths from 55 - 80 mm		



All prism types on
next page [176](#)



Transport case for SWPro and Prism

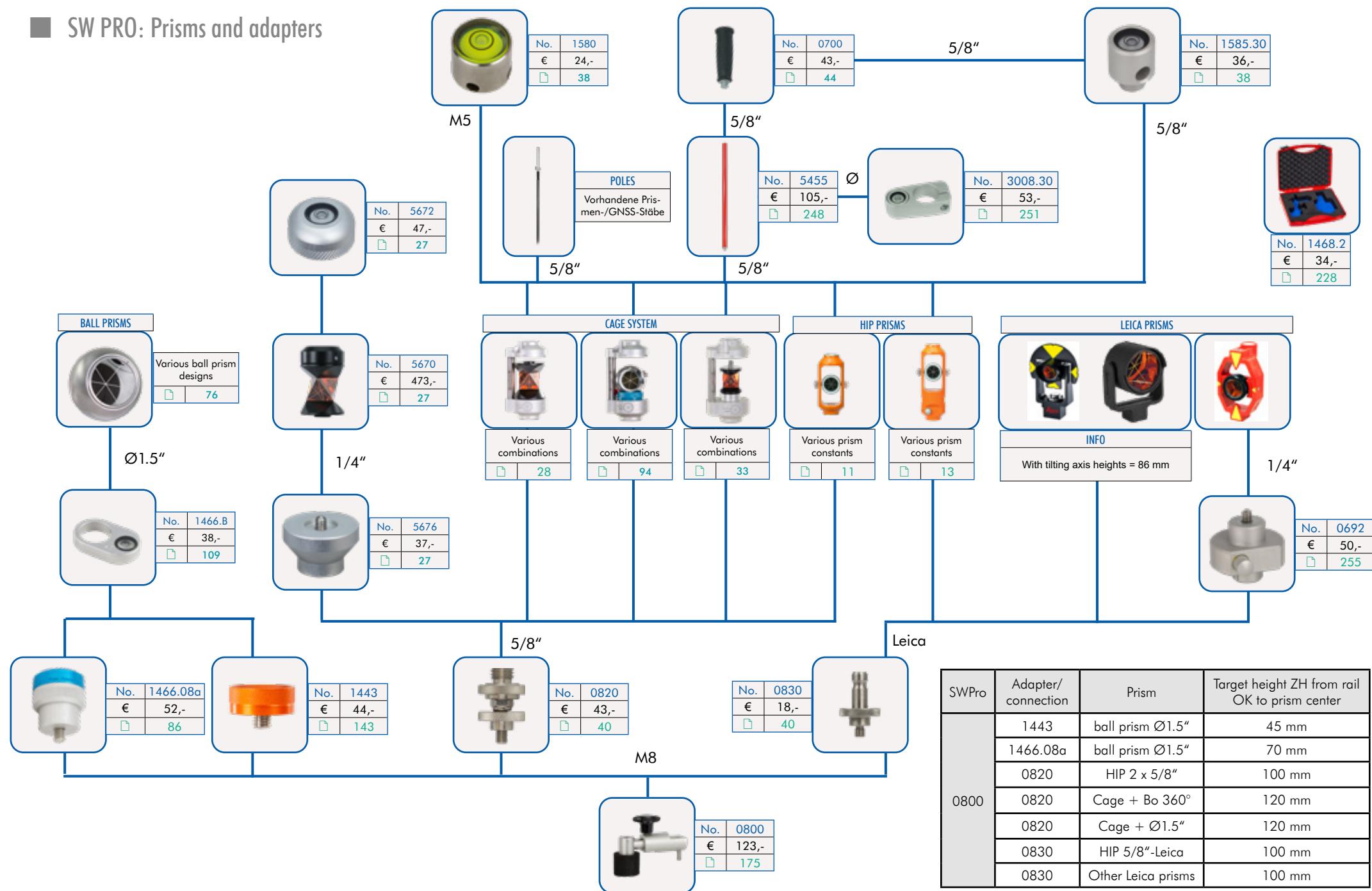
Plastic case for storing and transporting the SWPro, as well as a prism / accessories.

Description	Item No.	Euro
Transport case for rail tool SWPro	1468.12	54,-
Weight: 420 g, Outer dimensions: 275 x 230 x 80 mm		





■ SW PRO: Prisms and adapters





Prism holder for bolt surveying

The holder can be used on all horizontal bolts ($\varnothing 12$ mm or ÖBB: $\varnothing 20$ mm) found on overhead catenary poles made of steel or spun concrete.

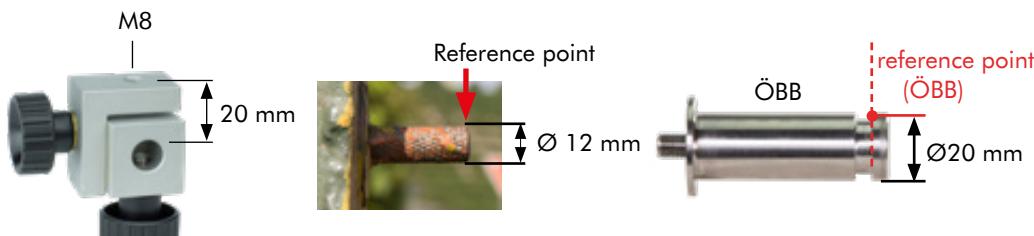
The prism center is at an exactly determined distance above the **reference point** (see pictures). If the prism does not have a circular level, the holder with integrated circular level can be used.

After placing the holder on the bolt, the prism is aligned on the tachymeter and set perpendicular. This position is fixed with the two knurled screws and the measurement is taken.

- Precisely machined metal construction made of anodized aluminum
- Ergonomic knurled screws
- Screw-in axis of the prism holder (M8 thread) lies exactly above the reference point (= center of front edge of bolt)
- For ÖBB bolts, the screw-in axis is 5 mm behind the leading edge of the bolt
- The circular level integrated in the 0852 and 0854 holders can be viewed from above or below. This makes work much easier, especially when bolts are mounted high up, as no time-consuming and dangerous climbing is required.
- Prism holders for $\varnothing 12$ mm bolts are DB-GV-Target-compliant (see below).

Description	Item No.	Euro
Prism holder for horizontal bolt ($\varnothing 12$ mm), without integrated level	0850	146,-
Prism holder for horizontal bolt ($\varnothing 12$ mm), with integrated (see-through) level	0852	163,-
Prism holder for horizontal bolt ÖBB ($\varnothing 20$ mm), with integrated (see-through) level	0854	163,-

Info: 0854 without integrated circular level is also available on request.



DB compliant track prism

Features as 1630.34 (13). However, the tilting axle pins have been removed and the threaded bearings shortened. Narrower profile enables problem-free use on the track measuring pin in conjunction with the DB plastic scanning plates.

Description	prism constant K	Order-No.	Euro
Prism HIP Leica 5/8": DB compliant	-34,4 (Leica = +0) mm	1630.34.DB	289,-



Transport case for Track prisms and prism holders

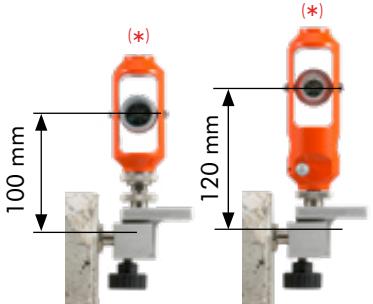
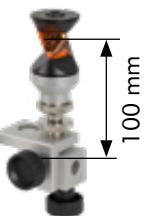
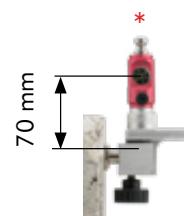
Plastic case for storing and transporting the 4 track prisms as well as prism holders. Note: Made for HIP-Prisms.

Description	Item No.	Euro
Transport case for rail prisms and bolt adapters	1467.50	64,-





Adapter for prism holders for bolt surveying



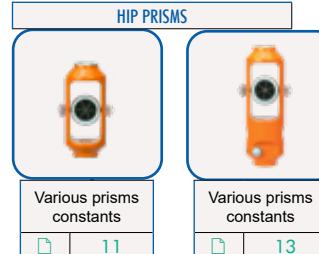
Various ball prism designs
76



No. 6611
€ 158,-
22



No. 5670
€ 473,-
27



Various prisms constants
11
13



No. 6050
€ 212,-
195



No. 0690
€ 50,-
39



No. 0692
€ 50,-
255



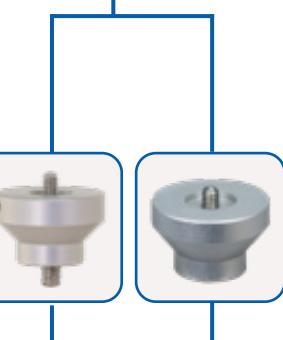
No. 0856.40
€ 36,-



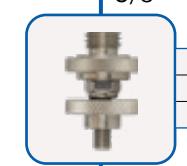
No. 1466.08a
€ 44,-
86



No. 6620.A
€ 26,-
22

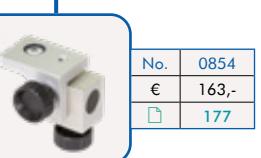


1/4"

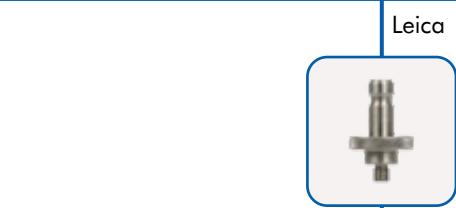


5/8"

No. 0820
€ 43,-
40

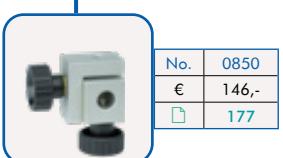


M8



Leica

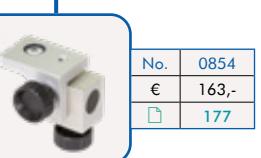
No. 0830
€ 18,-
40



No. 0850
€ 146,-
177



No. 0852
€ 163,-
177



No. 0854
€ 163,-
177



* DB-GV-Target-compliant
(*) HIP-Prisms 10

Track Gauge System TGS

Tachymetric determination of track gauges (950 to 1500 mm), superelevation and track axis.

With the track gauge system TGS, 2 prisms are positioned exactly above the running edges of the two rails. After tachymetric determination of the threedimensional coordinates of the prism centers, the following information can be calculated program-controlled:

- **track gauge (width)**
- **lateral inclination (superelevation)**
- **track centre / axis**

If the tachymeter is stationed accordingly, the coordinates of the track axis can be used with country or project systems. More about that: [180](#)

Attributes

- Telescopic pole made of GFK and aluminium
- Quick adjustment of the pole (950 mm to 1500 mm) to the desired track width
- High stability with low weight
- Cylindrical outer pole made of 100% GFK:
 - Easy handling
 - **Electrically non-conductive**
 - Comfortable carrying even at low temperatures
- Measurement of the track gauge 14 mm below the rail top edge (RT), optionally convertible to 10 mm
- 1. Prism on the 1. rail: Fixed stop with double pin [1]
 - The large distance of 180 mm between the two stop bolts ensures safe right-angled alignment to the variable stop on the opposite side (2nd rail)
 - Distance between the two bolts can be shortened to 90 mm, e.g. for narrow curve radii for trams
- 2. prism on the 2. rail: movable slide [2]
 - A spring with 20 mm spring travel reliably presses the slide with the stop bolt against the reference point on the inside of the rail
 - Backlash-free slide bearing
- M8 thread for screwing on the two prisms / adapters
- Distance from RT (rail top edge) to screw-in surface of the M8 thread: $30 \pm 0,1$ mm
- Approx. 35 mm clear height from RT to underside telescopic pole. Extendable to a clear height of 85 mm ([182](#))

Description	Item No.	Euro
Tachymetrischer Gleismessstab TGS, für Spurweiten von 950 bis 1500 mm	0802	1.260,-
Weight: around 2 kg (without prisms)		

INFO

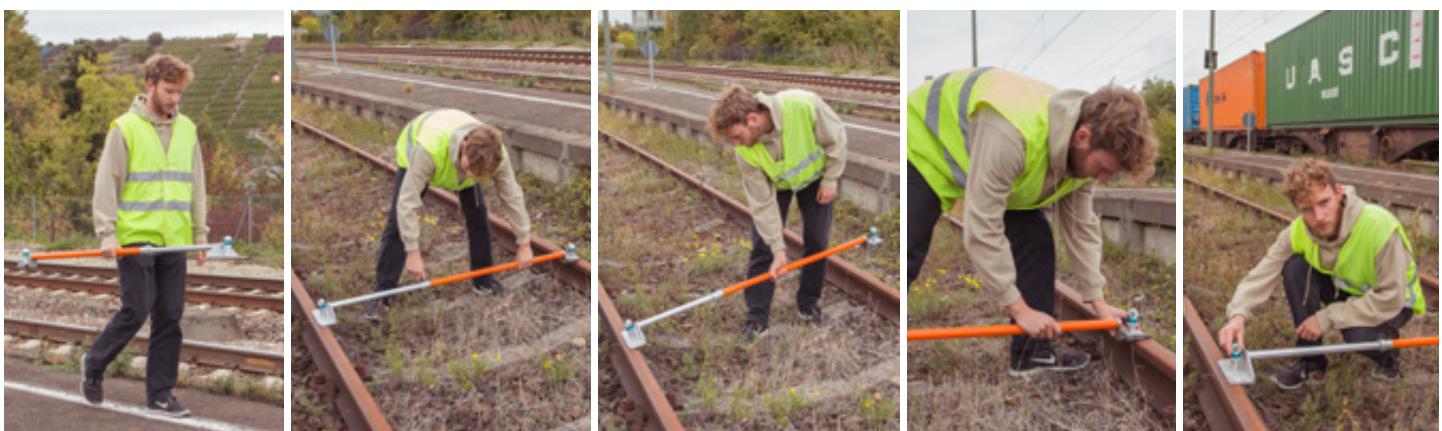
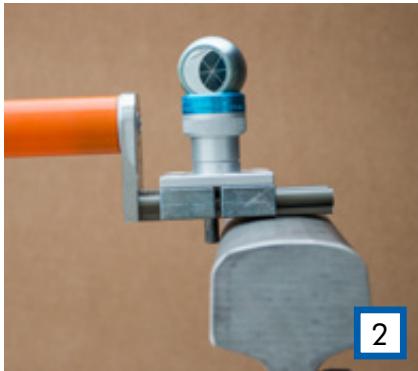
The track gauge system can be converted to measure running edges 10 mm below the top edge of the rail (instead of 14 mm). Please inquire.



1



2



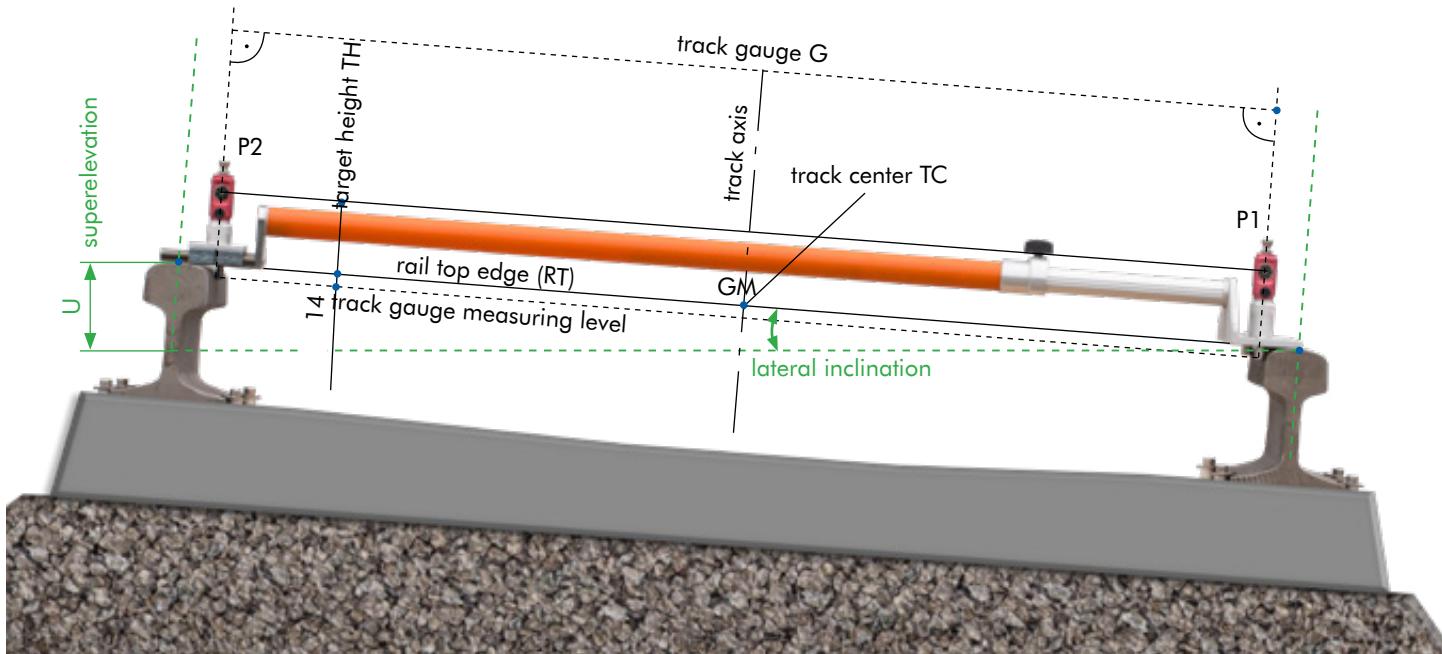


Track surveying with the tachymeter

With precision total stations, measurements in the differential range can be carried out with an accuracy in the submillimeter range.

In order to achieve this also for the indication of **track gauge**, lateral inclination (**superelevation**) and track centre (**track axis**), the exact reference to the relevant points must be given and the measurement must be carried out with precision reflectors.

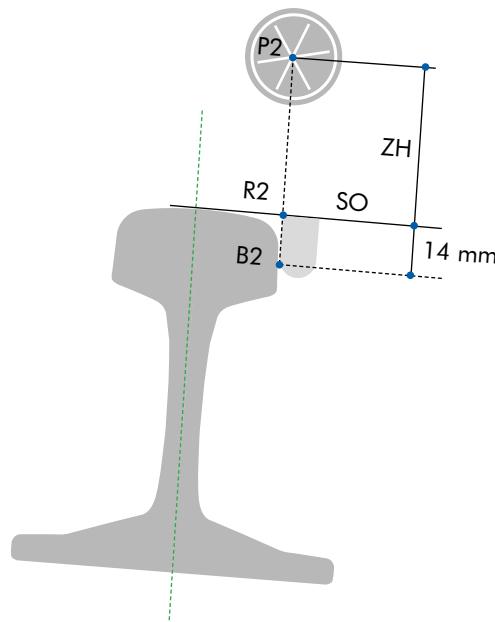
With the TGS track gauge system, the 3-D coordinates of the two **reference points R1 and R2** located on the top **edges of the rails RT** can be determined with high precision and the desired data calculated from them.



The basis of the track measurement is the definition of the track gauge within the relevant regulations.

INFO

The track gauge of the track is the distance between the running edges of the rails and **in Germany** is measured 14 mm below the connecting line of the highest points of the two rails (rail top edge = RT).



The **track gauge G** is thus the distance between the two **reference points B1 and B2**, which lie opposite each other on the inside of the two rails. The track gauge system is designed in such a way that the prism centres P1 and P2 lie on a parallel with a defined distance to the connecting line of points B1 and B2, in each case at an exact right angle to these.

After placing the pole at the inner rail edges, the two **prism centres P1 and P2** are measured tachymetrically. From their 3D coordinates, taking into account the target height TH, The **reference points R1 and R2** can be calculated, and from this, independent of the coordinate system, the actual **track gauge** and the **superelevation SE**.

If the tachymeter is stationed accordingly, the coordinates of the **track centre TC** in the desired system are additionally obtained by averaging the points R1 and R2.

The only requirement is software that can calculate the relatively simple geometric correlations.



Use of the TGS in the Gotthard Tunnel

M8 adapter for track gauge system for prisms and targets

The accuracy of the track measurement depends on the one hand on the tachymeter used and the stationing and on the other hand on the exact mapping of the track geometry by the track gauge system. The third essential factor is the reflectors used.

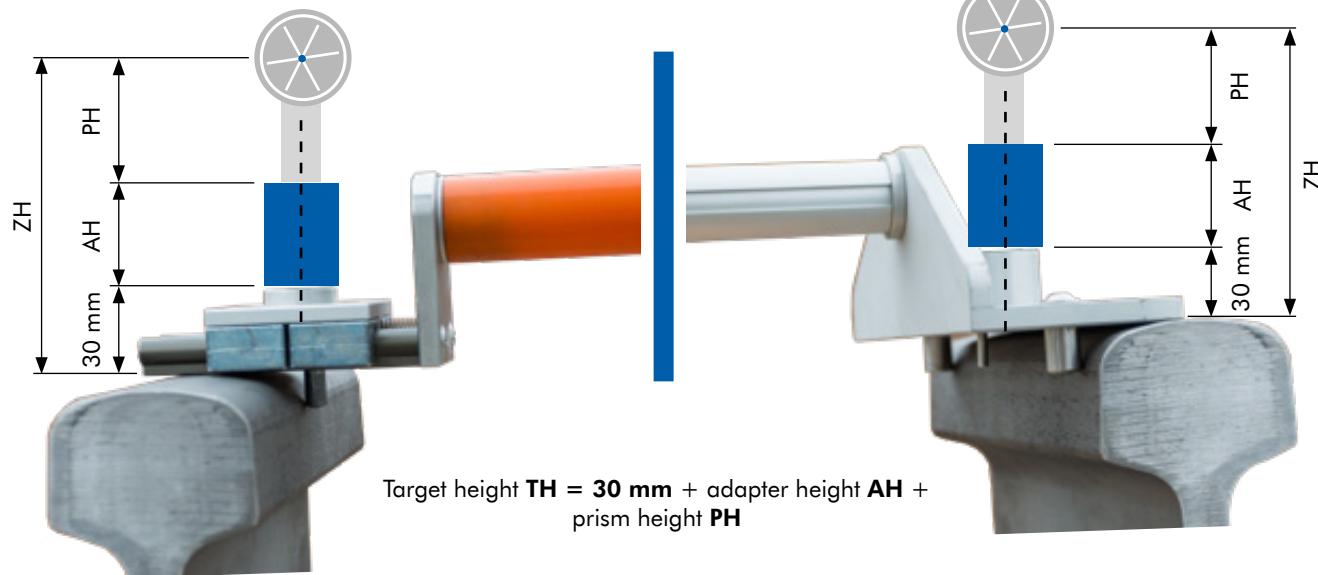
The track gauge system TGS has an M8 internal thread on both sides. So almost all commercially available prisms can be used with appropriate adapters.

For precision measurements, however, high-quality prisms or prism holders should be used. It is very important that the visible prism centre (centrally symmetrical point) runs through the vertical axis of the support. In

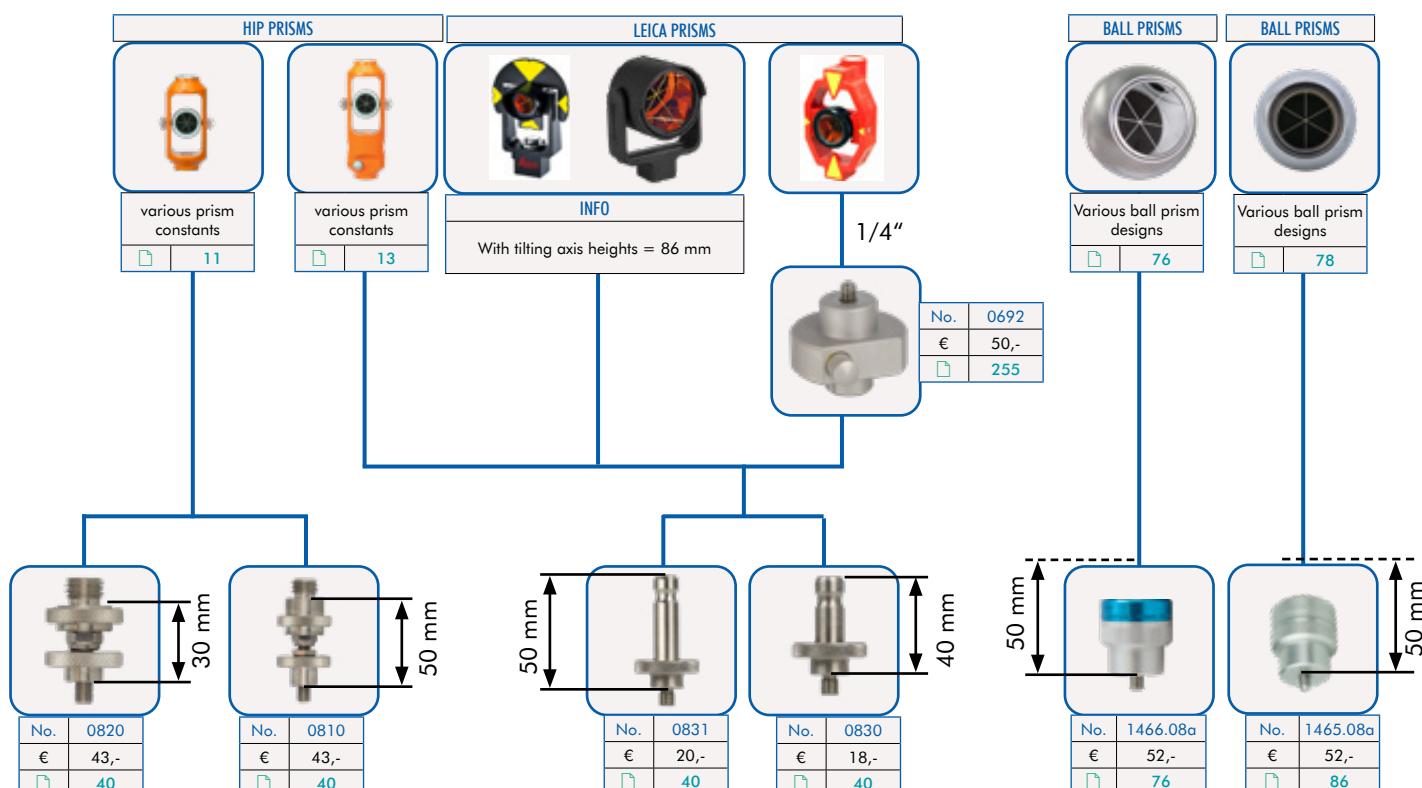
addition, the necessary stability must be taken into account; the best results are obtained with metal mounts and supports. It goes without saying that the prism constants must be clearly indicated. It is recommended to use the same prism type on both sides of the TGS, with identical constants checked by comparison measurements.

Our ball prism series and the ZP11 cylinder prism meet all these requirements. In addition, they have a very low overall height, which also increases accuracy.

Determination of the target height TH above rail top edge RT



M8 Adapter heights





Tracks with obstructions between the rails

Track systems, especially in inner-city areas, often have installations between the rails which protrude above the upper edge of the rail (SO). The standard version of the TGS track gauge system can be used for obstacles up to a height of 40 mm above RT.

For higher superstructures, the bases of the rail supports can be increased so that a clearance height of 85 mm above RT (rail top edge) is available.

A set for upgrading the TGS consists of three support extensions: Two for the side with the fixed stop and one for the side with the movable slide.

Support extension for fixed stop

- For insertion into bores at the double stop
- Fixation with M6 Allen screw (SW 4)
- Exact axial extension of the standard bolt Ø12 mm
- Bolt length 14 mm for stop at reference point
- Distance from TR to screw-in surface of the M8 thread
- for prism / adapter: $80 \pm 0,1$ mm
- Clearance height from RT to underside of telescopic pole: approx. 85 mm

Description	Order No.	Euro
Support extension 50 mm for fixed stop, 1 piece	0803.D	74,-
Weight: 140 g		
Info: Two pieces are required.		

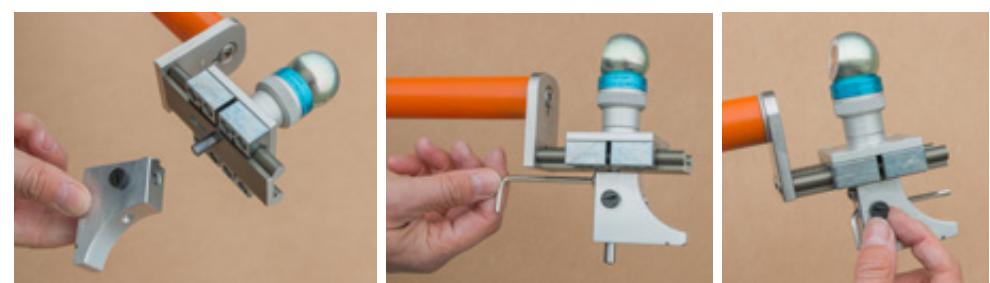


Support extension for movable slide

- To attach to the stop bolt of the slide
- Fasten with M6 Allen screw (SW 4). Key supplied
- Exact axial extension of the bolt Ø8 mm
- Bolt length 14 mm for stop at reference point
- Distance from TR to screw-in surface of the M8 thread
- for prism / adapter: $80 \pm 0,1$ mm
- Clearance height from RT to underside of telescopic pole: approx. 85 mm

Description	Order No.	Euro
Support extension 50 mm for movable slide	0803.E	74,-
Weight: 140 g		
Info: Only one piece is required.		

INFO The support extensions are also available with bolts for measuring running edges 10 mm below the upper edge of the rail. Please inquire.





■ Transport case for TGS

Safe protection of the track gauge system during transport.

Adapters, prisms and any support extensions can also be accommodated, but must be removed from the TGS before closing the case.

- Robust hard shell case with bubble foam in base and lid
- Outer dimensions LxWxH: approx. 118 x 29 x 12 cm
- 4 snap locks

Description	Order No.	Euro
Transport case for TGS	0802.K	74,-
Weight: 4,7 kg		





Laser Scanning

G.1. Systems in overview

188

Systems in overview & Info

- Georeferencing / Laser scanning
- Target height 60 mm (Leica)
- Wall distance 50 / 100 mm
- Target height 80.8 mm
- Target height: 97 / 100 mm
- Target height: 197 / 200 mm
(Ø200 sphere)

G.2. Scan sphere and segment sphere

193

Laserscanning Sphere

- Scan sphere Ø145 mm
- Scan sphere „segment“ Ø145 mm
- Scan sphere Ø200



G.3. Targets (target size: 110 x 110 mm)

197

Laser Scanning Targets

- with magnetic base Ø40
- with Leica connection, not tiltable
- tiltable
- U-beam for changing between prism and target plate
- with reflective foil on the back for total station measurements



G.4. Targets: Ø270 mm in U-Holder, tiltable

202

Circular Target in U-Holder

- Ø270 mm
- In U-Holder, tiltable
- With Leica connection
- With hemisphere on the back for magnetic connection
- With reflective foil on the back for tachymeter measurement
- SLAM Target with reflective foil
- With magnetic base Ø40 mm



Laser Scanning

2/3

G.5. Laser Scanning Targets Ø270 mm

203

Circular target with rear hemisphere

- Ø270 mm
- Rear hemisphere for connection to magnetic bases
- L-beam with 5/8"
- L-beam with magnetic base Ø40 mm
- Overviews System height 196 mm

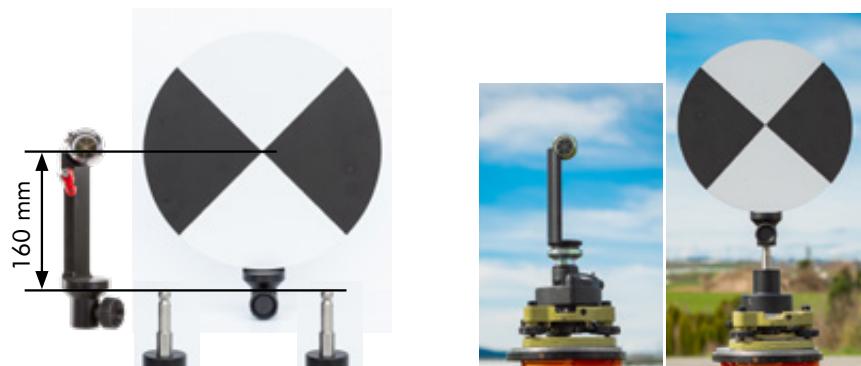


G.6. L-Carrier „STAFF“

204

Change between ball prism and Scanning target

- High accuracy georeferencing
- With Leica connector or magnetic base
- Switch between target and prism in seconds (magnetic connection)
- Suitable for drone control

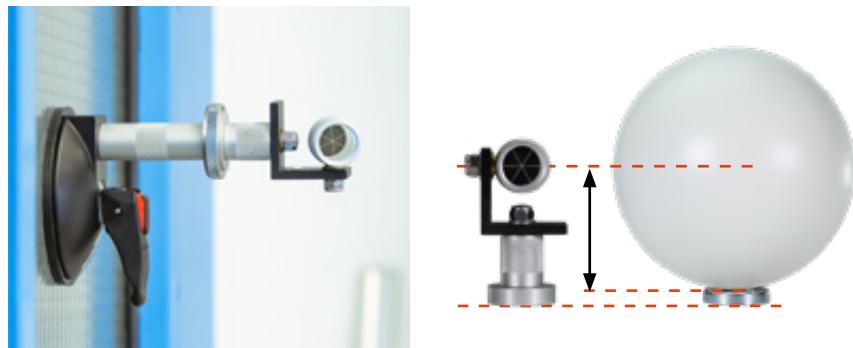


G.7. Prism for georeferencing

211

Prism for georeferencing

- Tilting axis with different system heights
- Magnetic base Ø40 mm
- For high-precision switch of laser scanning target and prism



G.8. Laser Scanning in free space

213

Laser scanning in free space

- With Leica connection
- With magnetic base, Ø40 mm
- Overview
- Suction/Magnet Holder
- Universal clamps
- Mini-Tripod M8
- Target holder for natural grounds



Laser Scanning

3/3

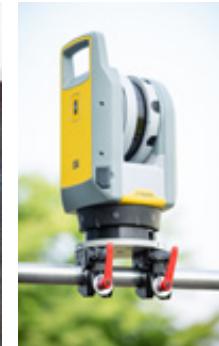
G.9. Targets für scanning with drones 218

Targets for scanning with drones



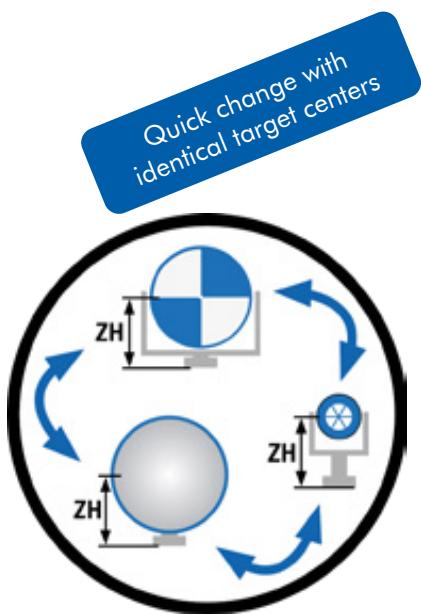
G.10. Tripods / adapter for laser scanners 222

- Tripod options for laser scanner
- Adapter plate 5/8" - 3/8
- Instrument tripod mini



Laserscanning

Targets and prisms for registration and georeferencing



Modern processing software allows the registration of point clouds even without targets (target plates/spheres). Nevertheless, targets still have their justification for:

- Registration possibility of point clouds with unclear point identities within the individual scans
- Increase of accuracy and reliability
- Accuracy estimation
- Georeferencing by replacing targets with prisms whose 3D coordinates can be determined tachymetrically with high accuracy

For terrestrial laser scanners we offer scanner spheres with Ø145 mm and Ø200 mm, target plates also in 2 different sizes, in general with a checkerboard pattern. For measuring points with total stations we offer various prism systems, such as the HIP prism series or the ball prisms. We offer target plates and prisms with four different target heights (see overviews on the next pages).

Within a target height, the 3D coordinates of the target centers are identical when targets and prisms are exchanged.

A condition for the exchange possibility is a forced centering of the target and prism holders. Here you can choose between:

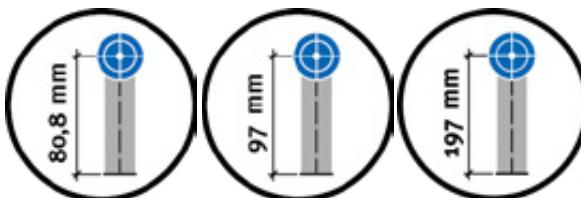
- Quick-change system with magnetic base for centering plate Ø40 mm
- Quick-change system with adapter for stud bolt Ø12 mm (Leica)
- Adapter for screwing into a bolt with M8 female thread on the specimen.

The following logos are used for quick orientation

■ Quick change with magnetic base for centering plate Ø40 mm

With target height ZH:

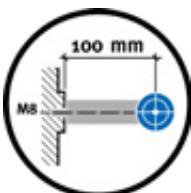
- 80,8 mm [s. page 189](#)
- 97 (100) mm [s. page 190](#)
- 197 (200) mm [s. page 191](#)



■ Quick change with mount for spigot Ø12 mm (Leica)

From top edge of bolt target height ZH = 60 mm [s. page 200](#),

With additional distance piece ZH = 160 mm [s. page 191](#)



■ Adapter for screwing into a bolt with M8 female thread on the object

With magnetic base Ø40 mm or Leica bolt

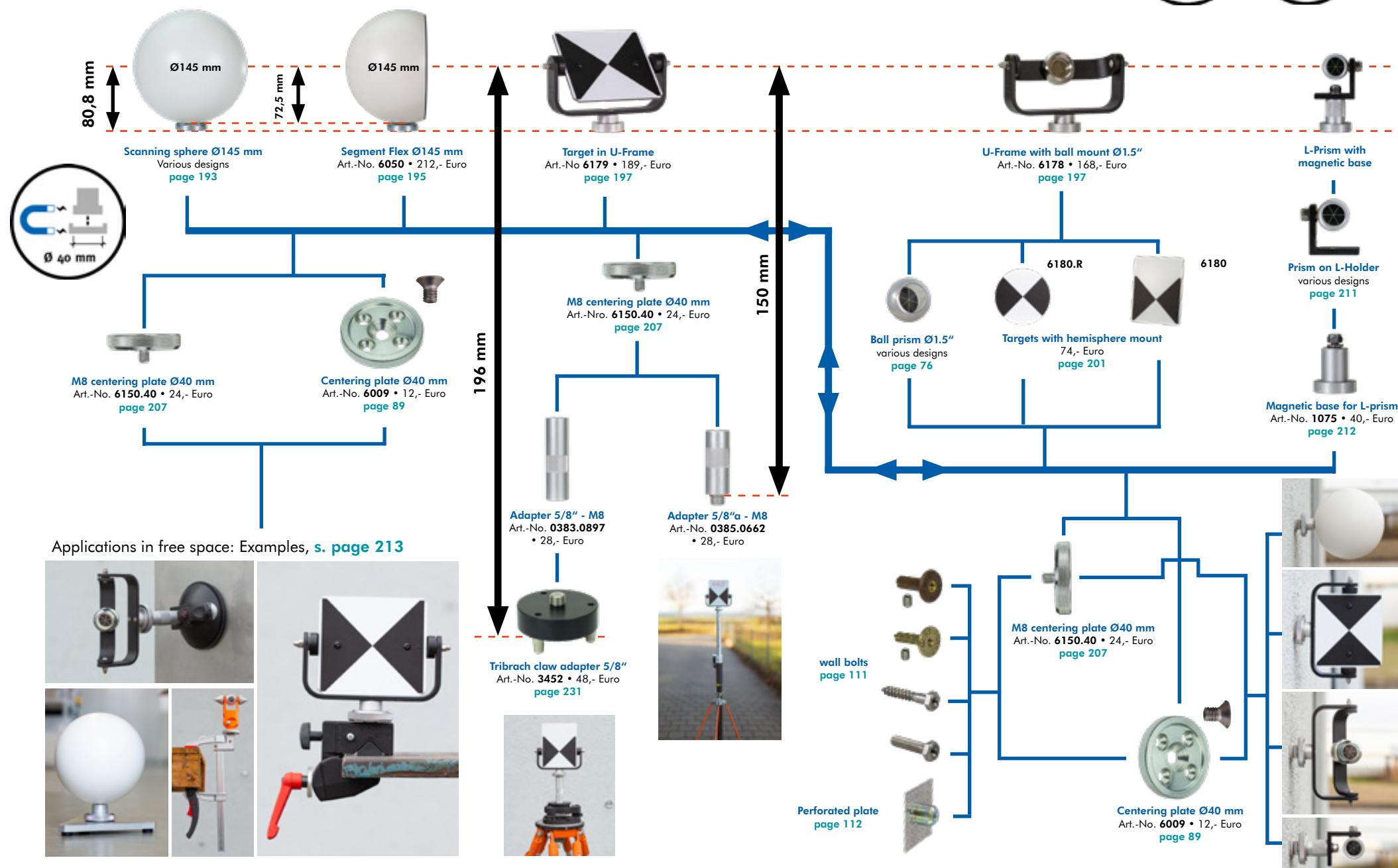
[265](#)



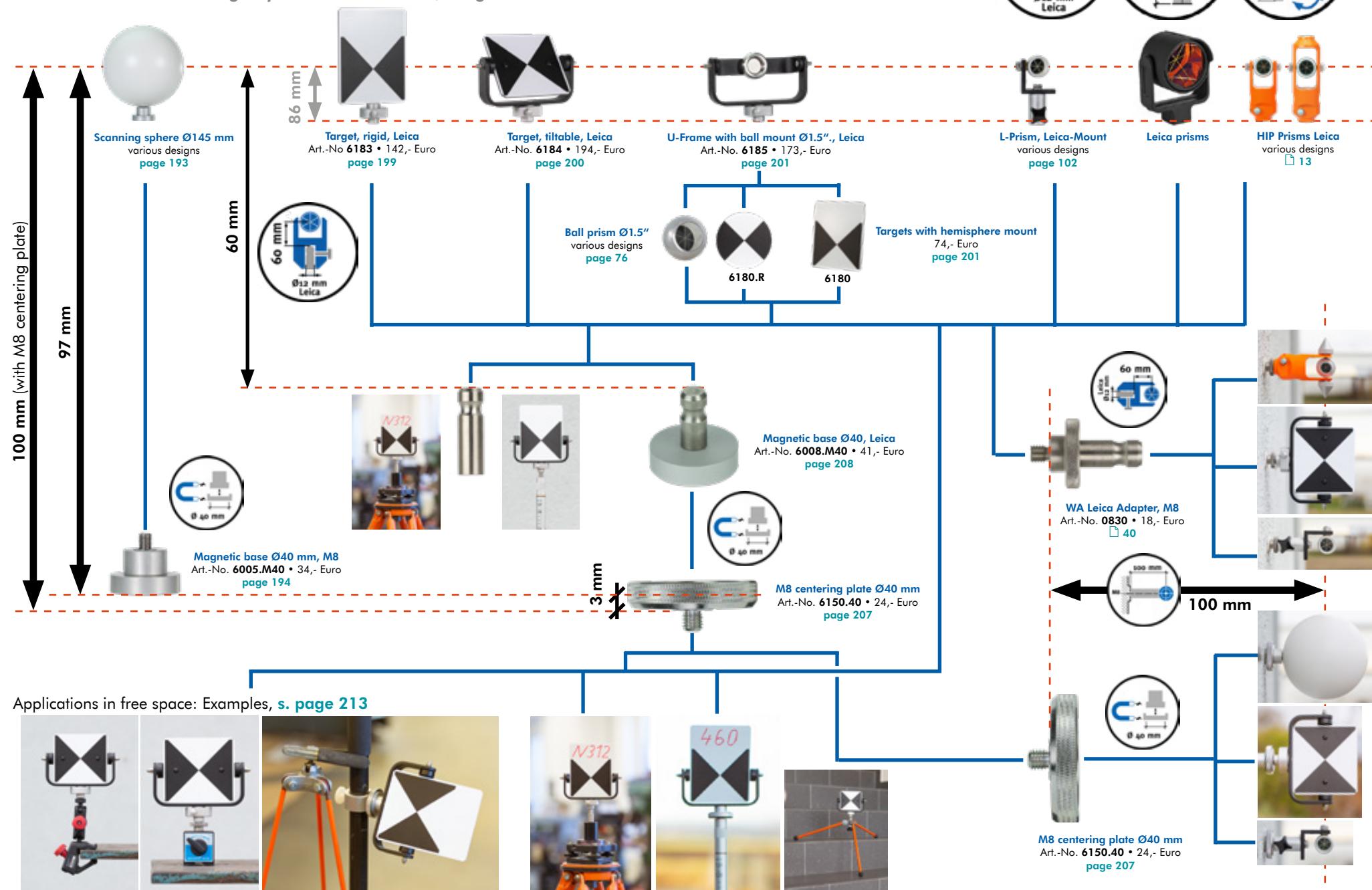
	Target height / Offset	Quick connection system	Laser Scann. sphere	Laser Scanning Target „Pocket“	Laser Scanning Target Ø270 mm	Total Station Prism/Reflector
86			—	198	203 Ø270 mm	76
189 / 213		194	194	197 198	—	211
190		—	194	200 201	—	211
190 / 192		194	194	201	203 Ø270 mm	211
266		194	194	200	203 Ø270 mm	211
212		196	196	—	—	211
191		196	196	201	202 204 Ø270 mm	211
191		196	196	201	202 204 Ø270 mm	211
233		—	194	200 201	—	210
209		—	194	197 198	—	210
209		196	196	197 198	203 Ø270 mm	210
191		—	—	—	205 Ø270 mm	210



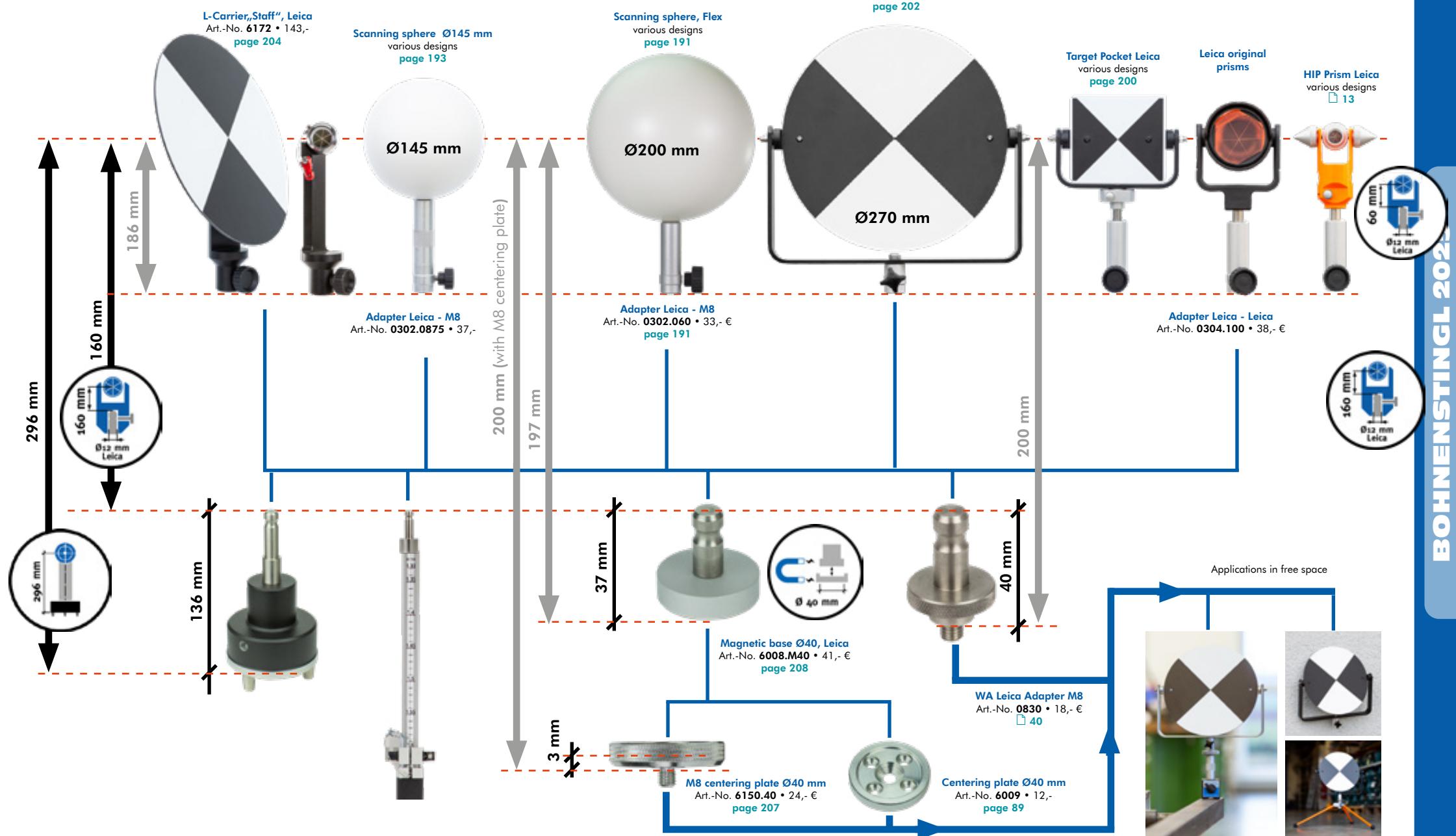
■ TLS - Magnetic quick change system, ZH = 80,8 mm

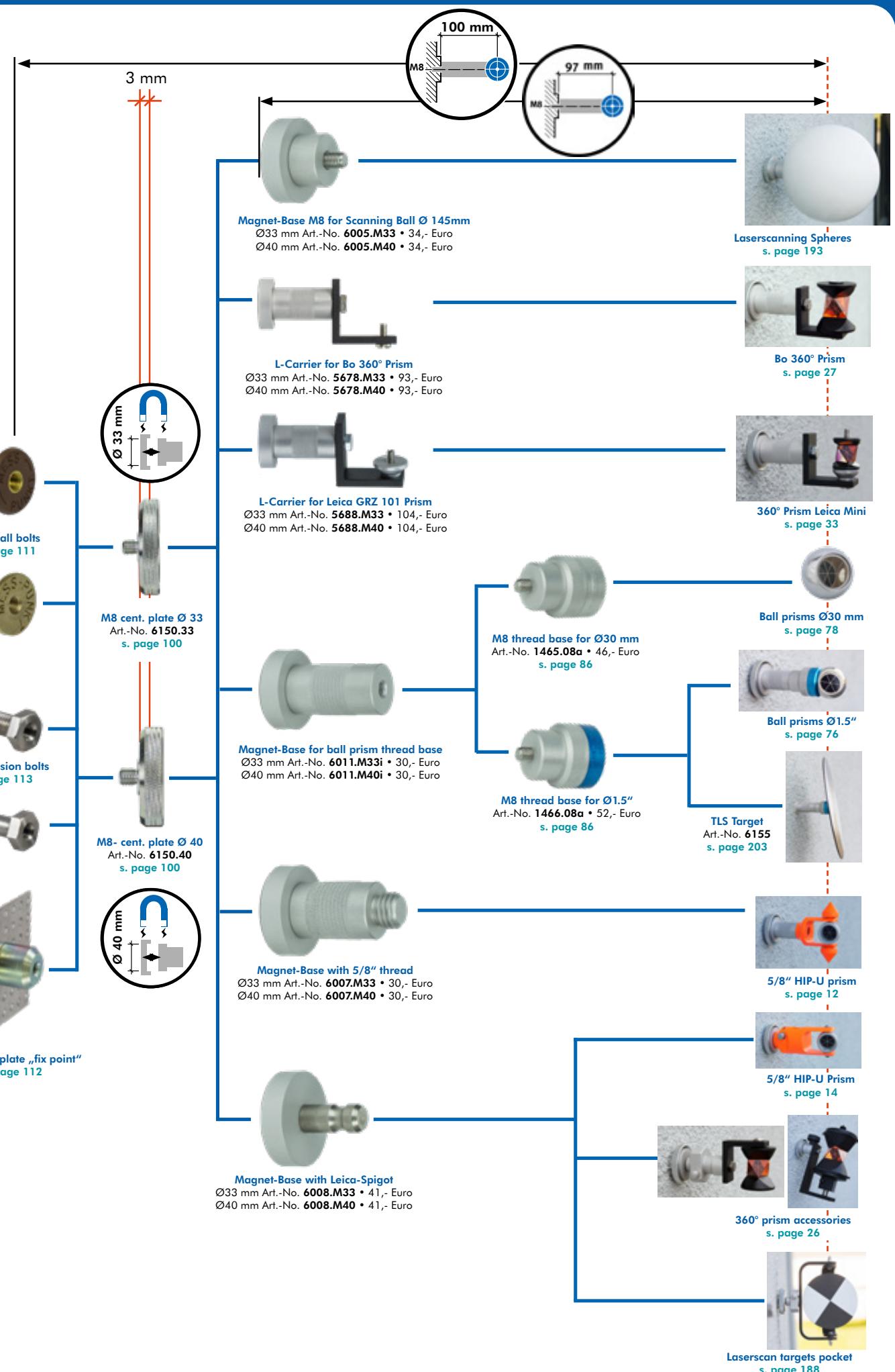


■ TLS - Quick Change System Leica 60 mm, magnetic ZH = 97/100 mm



■ TLS - Quick change system, Leica ZH = 160 mm, magnetic ZH = 197





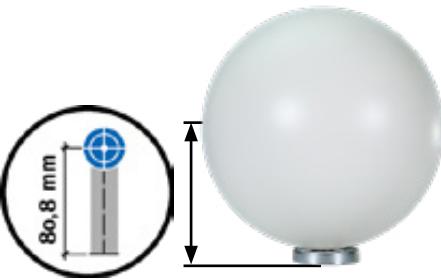
Laser scanning Sphere Ø 145 mm

Target height: 80.8 mm

For registration and georeferencing

Spheres can usually be scanned by all terrestrial laser scanners to be processed as a control or connection point. Optimal placement in the measuring range is therefore most important.

- Ø145 mm
- M8 inner thread
- With every sphere comes a magnet Ø40 x 8,3 mm and M8 x 13 mm outer thread
- Target height: 80.8 mm = 72.5 mm (ball radius) + 8.3 mm (height of magnet)
- Georeferencing prism with target height 80,8 mm [211](#)



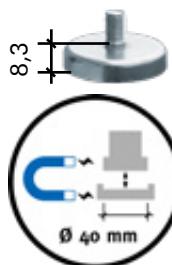
Model 1: Standard

- Operation: 0° bis +50° C
- Plastic, coated matt white
-

Model 2: Flex

- Operation: -20° bis +50° C
- Plastic with shock-absorbing surface coating

with M8 magnet
Ø40 x 8,3 mm



Single Scanning Sphere

Description	Order-No.	Euro
Sphere Standard , Ø 145 mm, with M8 Standard magnet	6000	120,-
Sphere Flex , Ø 145 mm, with M8 Standard magnet	6002	150,-

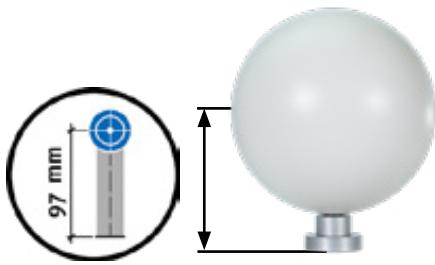
Set of 6 in transport case

with standard magnet(s)
Ø40 mm/M8

Sturdy plastic case (575 x 470 x 250 mm)

Description	Order-No.	Euro
Set of 6 spheres Standard , Ø 145 mm, with 6 magnets	6053	620,-
Set of 6 spheres Flex , Ø 145 mm, with 6 magnets	6054	875,-

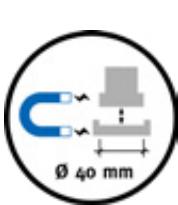




■ Magnetic base Ø40 mm for scanning sphere Ø 145 mm

Screws into the M8 thread of the ball instead of the standard magnet

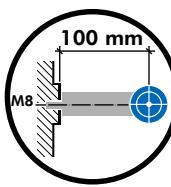
- Anodized aluminum, integrated permanent magnet, M8 external thread made of VA
- Magnetic base Ø 40 x 10 mm, holding force of the magnet approx. 5 Kg
- Effective height: 24,5 mm
- Target height ZH: 97 mm (from bottom of magnetic base to center of ball)



Description	Order-No.	Euro
Magnetic base Ø40 x 24,5 mm, M8 outer thread	6005.M40	34,-

INFO

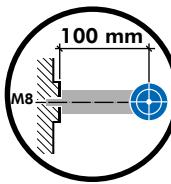
When using prisms/target marks with target height ZH 97 mm in conjunction with centering plates No. 6150 ([s. page 207](#)) results in the target height of 100 mm according to AdV version (German standard) ([s. page 265](#))



M8-Adapter: Offset 100 mm

- Aluminium hexagon with 2 x M8 outer thread (stainless steel)
- Effective length (without M8 threads) = 27,5 mm

Description	Order-No.	Euro
Adapter 2 x M8 for scanning sphere Ø 145 mm	6005	16,-





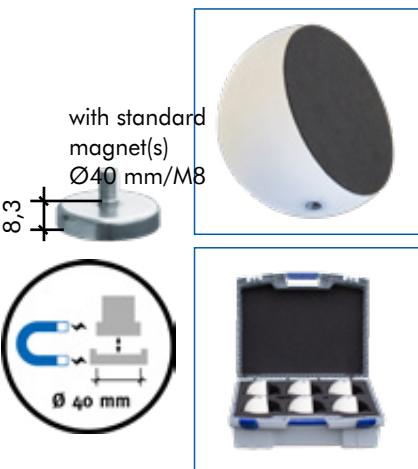
Scanning Sphere Segment

For installation in positions with little distance to the wall or other objects

- Cut-off scanning ball Flex Ø 145 mm, M8 inner thread
- Cutted surface weatherproofed
- Cutted surface is located approx. 25 mm behind the ball axis (M8 thread)
- Comes with Standardmagnet Ø40 mm/M8 outer thread

The scanning sphere **segment** is predestined for the signalization of connection points in railroad surveying. It can be attached to the standard bolts on the catenary masts (see picture).

Since the ball segment must be able to be aligned, the use of the standard magnet M8 or a Leica adapter is required (see bottom of this page).



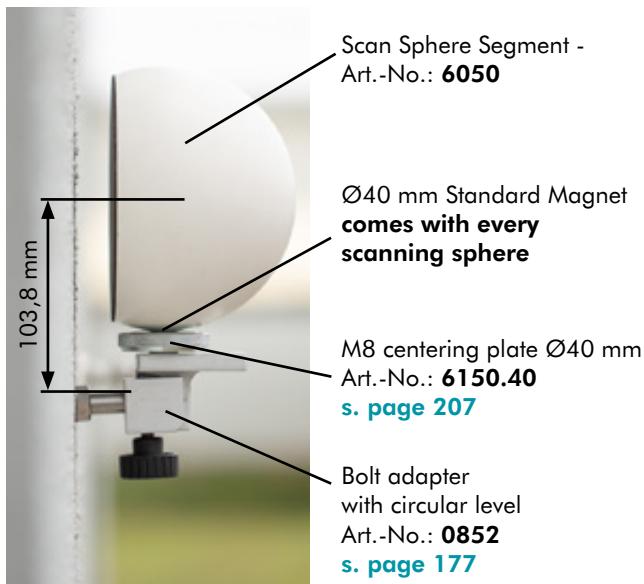
Description	Order-No.	Euro
Scanning Sphere Segment , Ø 145 mm, with Ø40, M8 magnet	6050	205,-

Description	Order-No.	Euro
6 pc. set flex sphere segments, Ø 145 mm, with M8 magnets	6051	1.205,-

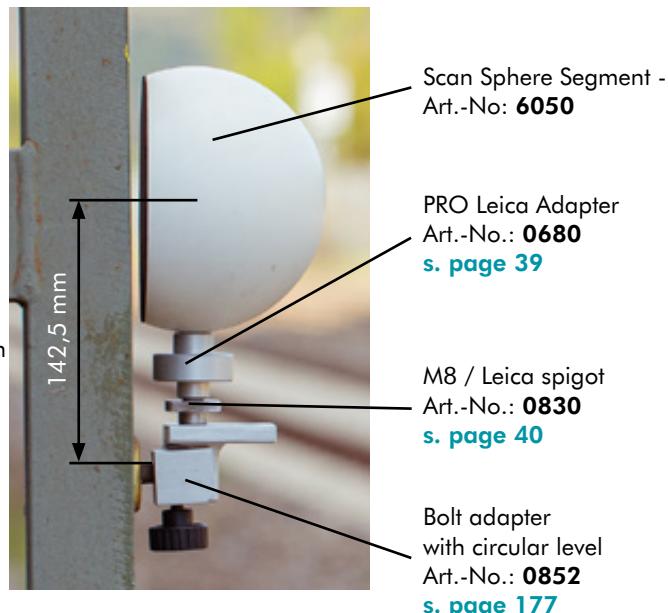
TIP For perfect results, the complete circular shape of the sphere should be visible in the scan.



Example: With standard magnets



Example: With Leica-Adapter

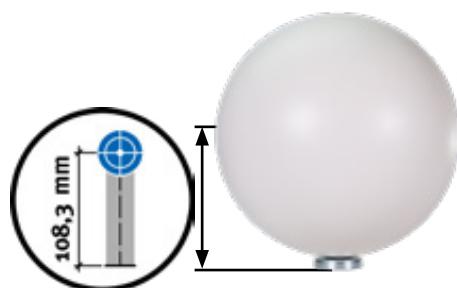


Scanning Sphere Ø200 mm

■ Standard magnet M8 (ZH = 108,3 mm)

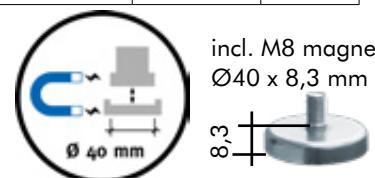
For registration and georeferencing with laser scanner at long distances

- Ø200 mm
- Flex design: plastic with shock-absorbing surface coating
- Use and storage: -20° to + 50° C
- M8 inner thread
- 2 standard magnets Ø40 mm with M8 male threads of different lengths are supplied with each sphere
- Target height ZH with standard magnet: 108.3 mm
- Georeferencing prism with target height 80,8 mm [211](#)



Single scanning sphere

Description	Order-No.	Euro
Scanning sphere Flex Ø200 mm, incl. standard magnet M8	6056.1	241,-



Set of 3 in transport case

Description	Order-No.	Euro
Set of 3 scan. sphere Flex Ø200 mm, with standard magnets	6056	735,-

INFO The Ø200 mm scanning spheres are not stock items.
Delivery times may be longer than usual.

■ Adapter Leica – M8 (ZH = 160 mm)

Screws into the M8 thread of the ball instead of the standard magnet

- Anodized aluminum Ø25 x 86 mm with mounting for Leica bolt
- Effective length from top of Leica bolt: 60 mm
- Horizontal screw with star grip to secure the ball
- Target height ZH to ball center: from top of Leicab bolt 160 mm =
- From underside of adapter 186 mm

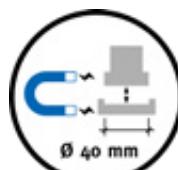


Description	Order-No.	Euro
Adapter Leica – M8, with locking screw	0302.060	35,-

■ Magnetic base – Leica Ø12 mm (ZH = 197 mm)

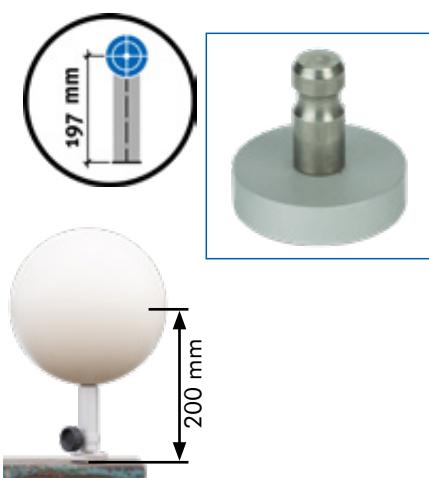
For use with magnetic quick-change system Ø40 mm

- Description - [s. page 208](#)
- Target height ZH to prism center from magnet bottom (with 6150.40): 197 mm



Description	Order-No.	Euro
Magnet base Ø40 mm with Leica bolts Ø12 x 27 mm	6008.M40	41,-

INFO When using a Ø200 mm scanning sphere (Nr. 6056.1) with adapter Leica-M8 (No. 0302.060), magnetic base Ø40 mm (No. 6008.M40) and M8 centering plate (No. 6150.40) -[s. page 207](#)- a target height ZH of 200 mm results [overview page 191](#)





Target for laser scanners & total stations, ZH = 80,8 mm

Tiltable target plate, magnetic base Ø40 mm

Target suitable for laser scanners and total stations at short to medium distances. Due to the gimbal suspension, perpendicular use is not necessary. The target plate can always be aligned to any instrument standpoint, with complete positional consistency of the center.

INFO

Rotating the target around its vertical axis may be necessary for registering wide-ranging scans. With rigid targets, the Leica bolt should be vertical during this process; with **tiltable** targets, this is not necessary.

- Stable aluminum construction of outer bracket and target board axle
- Target plate: plane, weatherproof composite plate 118 x 108 mm
- Fully tiltable target plate
- Tilt resistance adjustable with open-end wrench SW8
- Magnetic base Ø40 mm, magnetic holding force 5 kg
- Target height ZH (tilt axis height) from bottom of magnetic base: 80.8 mm
- Compatible with laser scanning ball Ø145 mm with standard magnet
- Weight: 267 g



Front side: For Laser Scanning

- Target sign: Checkerboard design diagonally: 150 mm = 6".
- Center of the target is exactly in standing and tilting axis of the holder

Back side: For total station measurements

- Target: Red-yellow reflective foil Ø45 mm with crosshairs.
- Prism constant K = +3 (Leica +37.4) mm

Description	Order-No.	Euro
Target Pocket, ZH= 80,8 mm, with magnet base Ø40 mm, with checkerboard design and reflective target, tiltable	6179	189,-

Overview target height ZH = 80,8 mm

s. page 189

Target height ZH = 97 / 100 mm

s. page 190

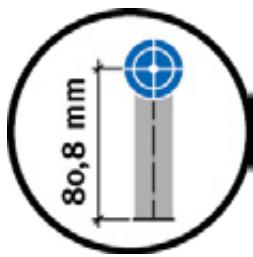
Application in „open space“

s. page 213

Transport case

s. page 228





Target for Laser Scanners & Total Stations, ZH = 80,8 mm

With magnetic base for changing between target and ball prism, magnet Ø40 mm

On the U-shaped inner bracket there is a magnetic base on which either a scanning target for laser scanners or a spherical prism Ø1.5" (38.1 mm) for total stations can be inserted. **High-precision matching of the two target centers.**

Due to the **gimbal suspension, perpendicular use is not necessary**. Target plate or ball prism can be aligned to any instrument standpoint even with an inclined standing axis, whereby the 3D position of the target center remains unchanged.

- Sturdy aluminum construction of inner and outer bracket
- Cardanically suspended magnetic base for ball Ø 1.5" (38.1 mm).
- **Holding force of ball mount: Around 2 kg.**
- Tilt resistance adjustable with open-end wrench SW8
- **Magnet base Ø 40 mm, holding force of base magnet approx. 5 kg**
- Target height ZH (tilt axis height): 80.8 mm from bottom of magnetic base to target center

Description	Order-No.	Euro
Target Pocket *, ZH= 80,8 mm, magnet base Ø40 mm, magnet base for ball-Ø 1.5", holding force ball: 2 kg	6178	168,-

*) **without** ball prism and scanning target

■ Target for laser scanning with ball connection Ø1.5" (38,1 mm)

Target plate suitable for laser scanners at short to medium distances.

- Plane, weatherproof composite panel 150 x 118 mm
- At back galvanized steel hemisphere Ø 1.5" (38.1 mm)
- Target: checkerboard design 112 x 102 mm (diagonal: 150 mm = 6")
- Center of the target is exactly in tilt and standing axis of the carrier
- Labeling field approx. 40 mm high

Description	Order-No.	Euro
Target 150 x 118 mm, with hemisphere Ø1.5" connection	6180	74,-

Like 6180 above, but:

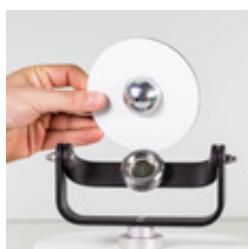
- Circular shape Ø108 mm (4.25")
- Without space for labeling

Description	Order-No.	Euro
Target Ø108 mm, with hemisphere Ø1.5" connection	6180.R	74,-

■ Ball prisms Ø1.5" (38,1 mm) for total station measurements

Available with prism constant K = -11.3 mm and -16.9 mm

[s. page 76](#)





Target for Laser Scanning & Total Station, ZH = 60 mm



Non-tilting target plate, Leica bolt connection Ø12 mm

Suitable for laser scanners and total stations at short to medium distances.

INFO

For rigid, non-tiltable target plates, the Leica bolt should be approximately vertical. For tiltable target plates in the U-shaped beam, its position is not important.

- Target plate: plane, weatherproof composite plate 150 x 118 mm
- Labeling space approx. 40 mm high
- Leica bolt quick connector with pushbutton, for all Leica bolts Ø12 mm
- Target height: from bottom 86 mm / from top Leica bolt 60 mm
- Weight: 143 g

Front side: For laser scanners

- Target: Checkerboard design 112 x 102 mm diagonal: 150 mm = 6".
- Center of the target is exactly in standing axis of the carrier

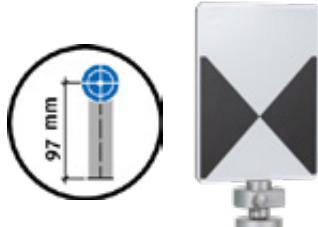


Back side: For total stations

- Reflective target: Red-yellow reflective foil Ø45 mm with crosshairs.
- Prism constant K = +3 (Leica +37.4) mm



Description	Order-No.	Euro
Target Pocket, ZH= 60 mm, with Leica connector, target plate with checkerboard design and reflective foil, non-tiltable	6183	142,-



With target height ZH = 97 / 100 mm

[s. page 190](#)

Application in „open space“

[s. page 213](#)



Transport case

[s. page 228](#)



Target for Laser Scanners & Total Stations, ZH = 60 mm

Titlable target with Leica bolt quick connection Ø12 mm

Target suitable for laser scanners and total stations at short to medium distances. Due to the gimbal suspension, perpendicular use is not necessary. The target plate can always be aligned to any instrument standpoint, with complete positional identity of the center.

INFO

For rigid, non-tiltable target plates, the Leica bolt should be approximately vertical. For tiltable target plates in the U-shaped beam, its position is not important.

- Stable aluminum construction of inner and outer bracket
- Target plate: Plane, weatherproof composite plate 118 x 108 mm
- Tiltable target plate, fully tiltable
- Tilt resistance adjustable with open-end wrench SW8
- Leica quick connector with push button, for all Leica bolts Ø12 mm
- Target height ZH (tilt axis height): from bottom 86 mm / from top of Leica bolt 60 mm.



Front side: For Laser scanning

- Target: Checkerboard design, diagonal: 150 mm = 6".
- Center of the target is exactly in standing and tilting axis of the carrier



Back side: For total station measurements

- Target: Red-yellow reflective foil Ø45 mm with crosshairs.
- Prism constant K = +3 (Leica +37.4) mm



Description

Target Pocket, ZH= 60 mm, with Leica bolt connection, target with checkerboard design and reflective target, tiltable

Order-No.

Euro

6184

194,-



With target height ZH = 97 / 100 mm

s. page 190

Application in „open space“

s. page 213

Transport case

s. page 228





Laser Scanning/Total Station Target, ZH = 60 mm

With magnetic base for switch between scanning target and ball prism, with Leica quick connector Ø12 mm



On the U-shaped inner bracket there is a magnetic base on which either a scanning target for laser scanners or a spherical prism Ø 1.5" (38.1 mm) for total stations can be inserted. **High-precision matching of the two target centers.**

Due to the **gimbal suspension, perpendicular use is not necessary**. Target plate or ball prism can be aligned to any instrument standpoint even with an inclined standing axis, whereby the 3D position of the target center remains unchanged.

- Sturdy aluminum construction of inner and outer bracket
- Cardanically suspended magnetic base for ball Ø 1.5" (38.1 mm)
- **Holding force of ball mount: Around 2 kg.**
- Tilt resistance adjustable with open-end wrench SW8
- Magnet base Ø 40 mm, holding force of magnet approx. 2 kg
- Target height ZH (tilt axis): From bottom 86 mm / from top Leica bolt: 60 mm



Description	Order-No.	Euro
Laserscan Target Pocket *, ZH= 60 mm, Leica-Anschluss Ø12 mm, Magnetbasis für Kugel-Ø 1.5", Haltekraft 2 kg	6185	173,-

*) **without** ball prism and scanning target

■ Target for laser scanning with ball connection Ø1.5" (38,1 mm)

Target plate suitable for laser scanners at short to medium distances.

- Plane, weatherproof composite panel 150 x 118 mm
- At back galvanized steel hemisphere Ø 1.5" (38.1 mm)
- Target: checkerboard design 112 x 102 mm (diagonal: 150 mm = 6")
- Center of the target is exactly in tilt and standing axis of the carrier
- Labeling field approx. 40 mm high

Description	Order-No.	Euro
Target 150 x 118 mm, with hemisphere Ø1.5" connection	6180	74,-

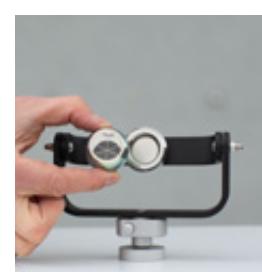
Like 6180 above, but:

- Circular shape Ø108 mm (4.25")
- Without space for labeling

Description	Order-No.	Euro
Target Ø108 mm, with hemisphere Ø1.5" connection	6180.R	74,-

■ Ball prisms Ø1.5" (38,1 mm) for total station measurements

Available with prism constant K = -11.3 mm and -16.9 mm
s. page 76





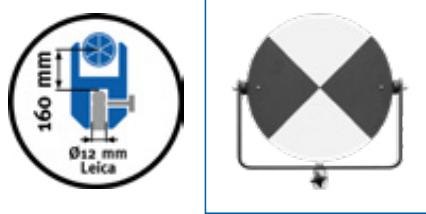
Circular target Ø 270 mm for laser scanning & total station in U-beam, Leica connection

Tititable scanning target, ZH = 160 mm

Target suitable for laser scanners at long distances.

Due to the gimbal suspension, perpendicular use is not necessary. The target plate can always be aligned to any scanner standpoint, even with the Leica bolt at an angle, with complete positional identity of the target character center.

- Stable aluminum construction of outer bracket and panel axle
- Circular panel: plane, weatherproof composite panel Ø 270 mm
- Target sign front side: checkerboard design for laser scanner
- Center of the target sign is in tilting and standing axis of the beam
- Target mark back side: Reflective foil for total station
- Prism constant K = +3 (Leica +37.4) mm
- Fully penetrable
- Tilt resistance adjustable
- Leica connection with locking screw, for all Leica bolts Ø12 mm
- Target height ZH (tilt axis h.): from bottom 186 mm = from top Leica bolt: 160 mm



Description	Order-No.	Euro
Laserscan circular target, tiltable, ZH= 160 mm, Leica bolt connection, checkerboard design, reflective foil on back	6154	236,-

Hemisphere on back side Ø1.5"

Target with dual fuction when **laser scanning**:

1. Use on U-Beam with Leica connection as no. 6154 (see above)

2. Use with magnet base, like article no. 6155 (s. [page 203](#))

- Magnetic hemisphere Ø1.5"
- Identical center of checkerboard target and hemisphere
- U-beam remains on circular target board, without functio



Description	Order-No.	Euro
Laserscan circular target, tiltable, ZH= 160 mm, Leica bolt connection, checkerboard design, hemisphere 1.5" on back	6154.B	236,-

SLAM target Ø270 mm in U-support, Leica and magnetic ball connection

Properties as no. 6154.B, but reflective foil instead of checkerboard pattern

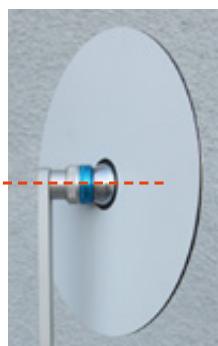
- Continuous reflective foil on the front side enables automatic target finding
- Additional centric target mark for tachymetric coordinate determination
- Dual function due to Leica connection on U-beam and magnetic ball connection on rear side
- Weight: 733 g

Description	Order-No.	Euro
SLAM-Target Ø270 mm, tiltable, reflective foil, ZH= 160 mm, Leia connection Ø12 mm, hemisphere Ø1.5" on backside	6154.RB	236,-





Scanning target



Ball prism

Circular Target with centric ball connection

For registration and georeferencing in terrestrial laser scanning

In the back center of the target plate a hemisphere is attached. Target plate and sphere center are identical. When stored in a magnetic ball base, the circular target can be exchanged with a ball prism very easily: within seconds and with high precision.

Due to the forced centering on the ball base, a positional identity in the range of tenths of a millimeter is given.

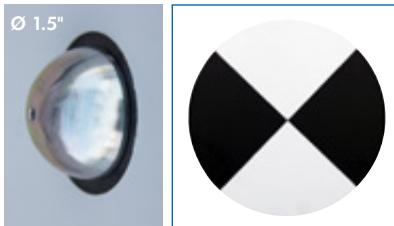
The target can be tilted in any direction without changing the 3D coordinates of the target center for optimal alignment to the total station / laser scanner position.

INFO

The center of the circular target / prism is always identical to the system point. So no eccentricities must be considered.

Circular Target with checkerboard design

- Torsionally rigid aluminum composite plate Ø 270 mm
- Weatherproof
- Temperature for use and storage: -10° to 50°
- To use with magnetic ball base
- Centric hemisphere Ø 1.5" (38,1 mm), galvanized



Description	Order-No.	Euro
circular target Ø 270 mm, checkerboard design, hemisphere Ø 1.5" connection in target center	6155	125,-

Ball base Ø 1.5" with magnet & M8-thread

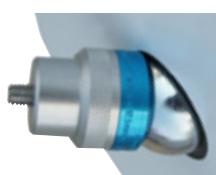
For alternating use of ball prism and circular target

- Magnetic holding force towards hemisphere: around. 6 kg
- Offset of ball center/target center from back of base (without M8 thread) = 50 mm
- Tilting range: $\pm 35^\circ$



Description	Order-No.	Euro
magnet. base, M8 outer thread, holding force 6 kg (s. page 86)	1466.08a	52,-

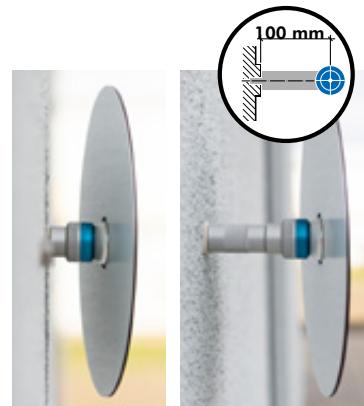
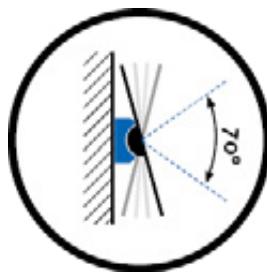
INFO Also available with Ø30 mm ball connection:
Scanning target Ø270 mm Order-No. 6150, Base Order-No. 1465.208a



To use with M8 wall bolts

- Direct screwing into the M8 inner thread of the wall bolt
- Distance 50 mm from wall stud to ball/target center [Fig. 1].
- With adapter (see [page 87](#)) Distance 100 mm from wall bolt to ball/target center [Fig. 2].
- Overview [s. page 265](#)

Wall bolts see [page 111](#)

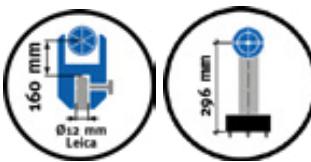
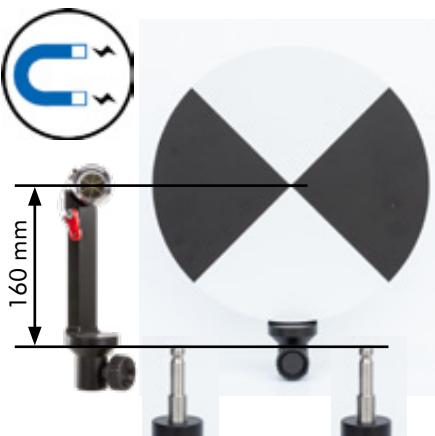


L-Carrier „STAFF“

For all ball prism with Ø1.5“ and scanning target with hemisphere Ø1.5“ (38,1 mm).

With Leica bolt connection

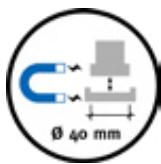
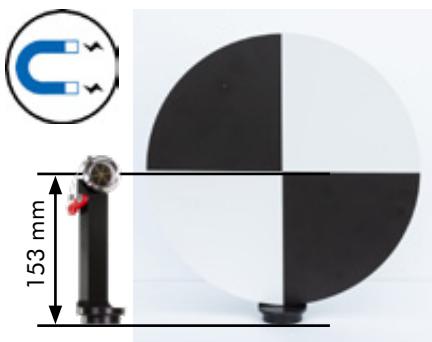
For use on all Leica bolts Ø12 mm



- Aluminum carrier anodized black
- Integrated magnetic base for inserting scanning targets or ball prisms
- Magnet holding force: ca. 10 kg
- Scanning targets (up to Ø270 mm) with hemisphere can be adjusted from vertical standing to horizontal alignment in all directions
- Securing on Leica bolt with horizontal locking screw
- Target height: 160 mm from top of bolt to ball/target center
- Center accuracy:
 - When changing between ball prism and scan plate: ± 0.1 mm,
 - With additional rotation around the vertical axis of the L-carrier: ± 0.3 mm
- Weight around: 404 g

Description	Order-No.	Euro
L-Carrier „STAFF“ with magnetic ball connection 1.5“ for scanning target + ball prism, Leica connection	6172	143,-





With magnetic base Ø40 mm

To use with centering plates Ø40 mm and quick change adapter

- Aluminum carrier anodized black
- Integrated magnetic base for inserting scanning targets or ball prisms
- Magnet holding force: ca. 5 kg
- Scanning targets (up to Ø270 mm) with hemisphere can be adjusted from vertical standing to horizontal alignment in all directions
- Holding force magnetic base: approx. 5 kg
- Target height: 153 mm from top of bolt to ball/target centers
- Center accuracy:
 - When changing between ball prism and scan plate: ± 0.1 mm,
 - With additional rotation around the axis of the L-carrier in plate: ± 0.1 mm
- Weight approx. 238 g

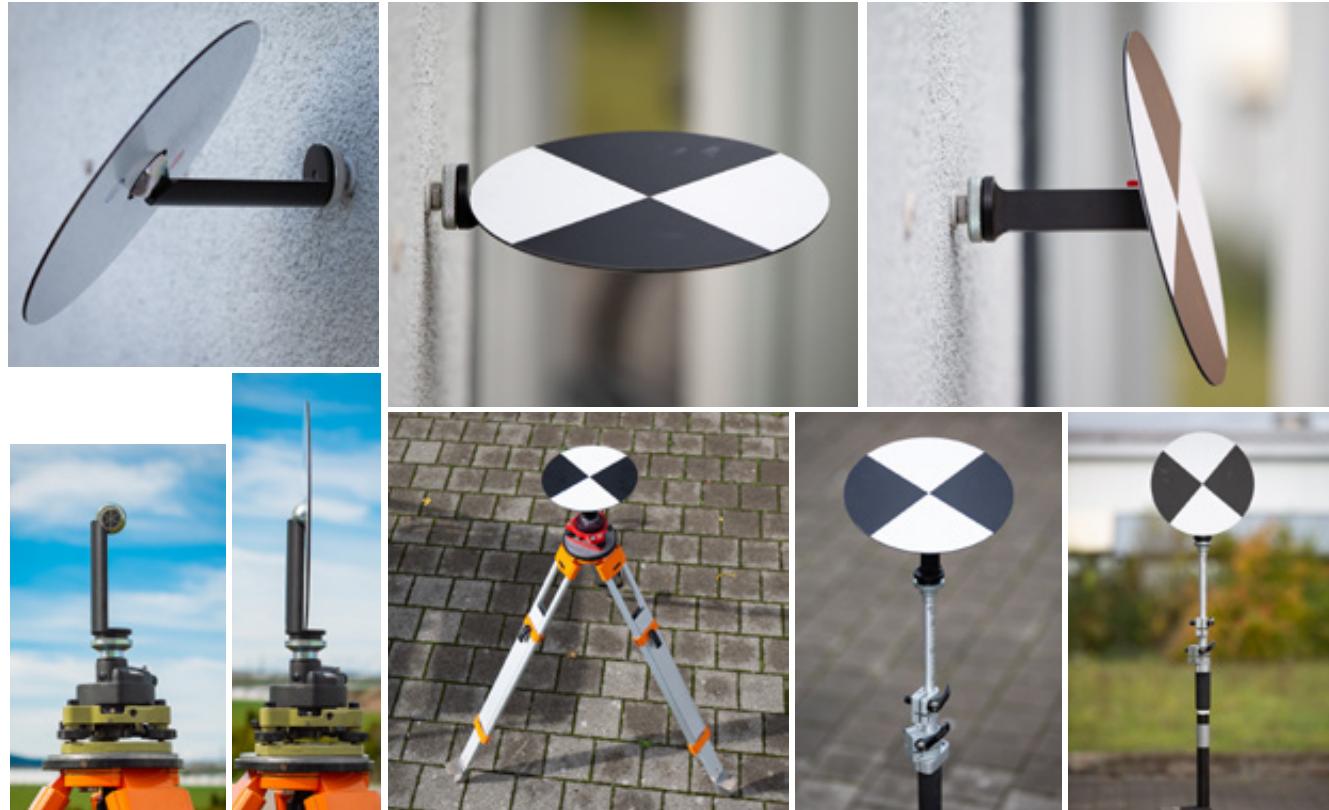
Description	Order-No.	Euro
L-Carrier „STAFF“ with magnetic Ø1.5" ball connection for scanning target + ball prism, magnet base Ø40 mm	6172.M40	137,-

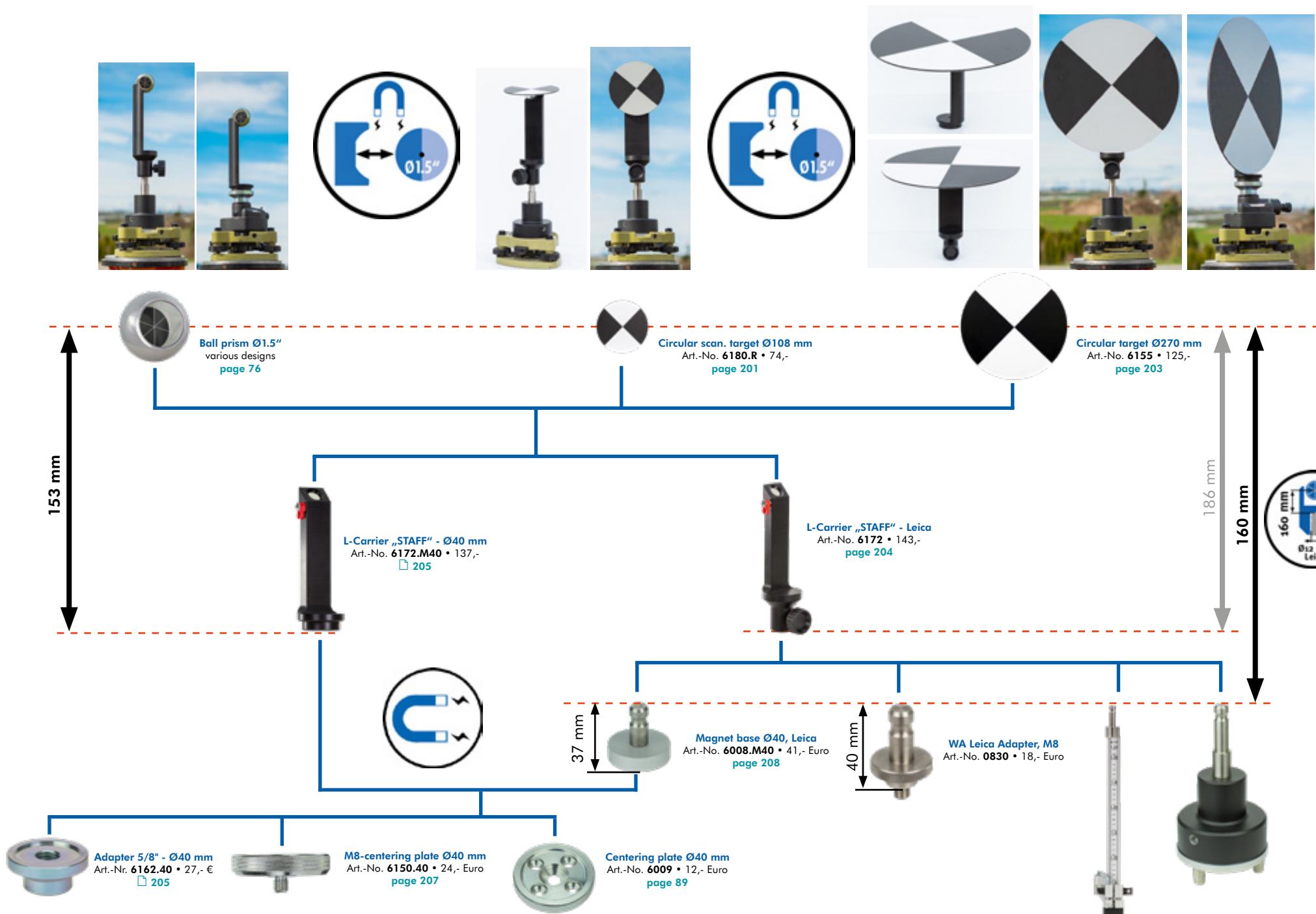
Quick-change adapter: 5/8"inner thread – Ø 40 mm

- Adapter to screw-in / out, with forced centering
- Bottom: 5/8" inner thread
- Top: centering for magnetic base Ø 40 mm
- Centering accuracy $\pm 0,1$ mm
- Galvanized steel, magnetic
- Effective length: 20,5 mm
- s. overview [206](#)



Bezeichnung	Bestell-Nr.	Euro
Centering adapter 5/8" - Ø40 mm	6162.40	27,-





Magnetic Quick Change System M8-Centering-Plate



- Exchange of different targets/prisms within seconds
- Full metal materials: Anodized aluminium, galvanized steel, stainless steel V2A
- Robust and weatherproof
- High-precision forced centring



How it works

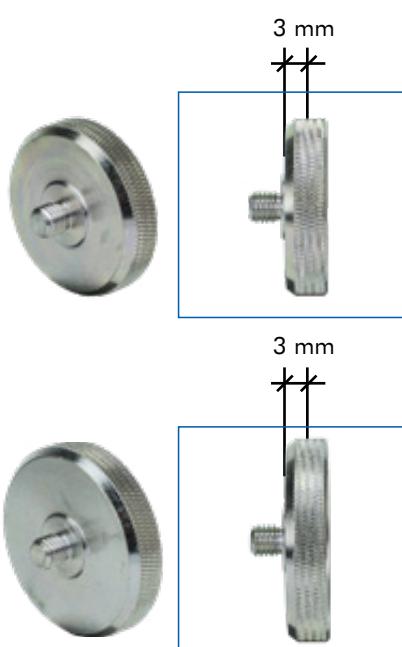
A centering plate with M8 external thread is screwed into the wall bolts with M8 internal thread. A tool is not necessary here.

The targets (reflectors, prisms, scan balls, target plates, etc.) are equipped with a cylindrical base with integrated permanent magnet, the length of which is adapted to the distance of 100 mm from the wall bolt to the center of the target.

The targets stick securely and force-centered in the centering plate with an repeat accuracy of ± 0.05 mm.

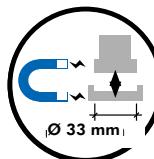
M8 Centering Plate

- Outer thread M8 x 8 mm
- Galvanized steel
- Knurled grip for tool-free screwing into M8 wall bolts
- Effective length 3 mm



M8 centering plate Ø 33 mm

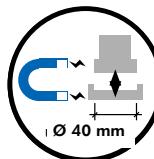
- Centering Ø 33 mm to mount bases with integrated magnets
- Outer-Ø 43 mm



Description	Order-No.	Euro
M8 centering plate Ø 33 mm, effective length 3 mm	6150.33	23,-

M8 centering plate Ø 40 mm

- Centering Ø 40 mm to mount bases with integrated magnets
- Outer-Ø 50 mm



Description	Order-No.	Euro
M8 centering plate Ø 40 mm, effective length 3 mm	6150.40	24,-

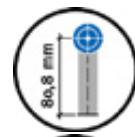
INFO

Attention 6150.40 **can not** be combined with item 6160.M40.

Applied target heights

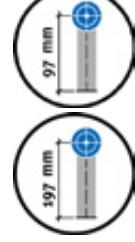
Target height ZH 80,8 mm

s. page 189



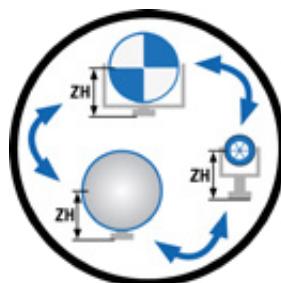
Target height ZH 97 / 100 mm

s. page 190



Target height ZH 197 / 200 mm

s. page 191

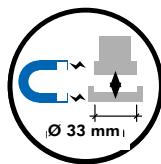
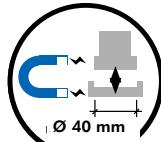




Magnetic base - Leica Ø12 mm

For tiltable reflector holders with Leica connection Ø12 mm

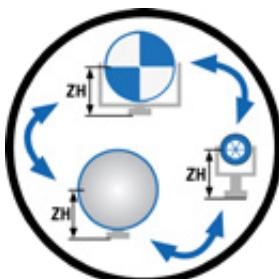
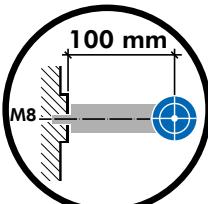
- Cylindrical base with integrated magnet
- Magnet holding force approx. 5 kg
- Leica bolt Ø12 x 27 mm, stainless steel
- Anodized aluminum
- Total length = 37 mm
- Centering accuracy in conjunction with centering plates: ± 0.05 mm



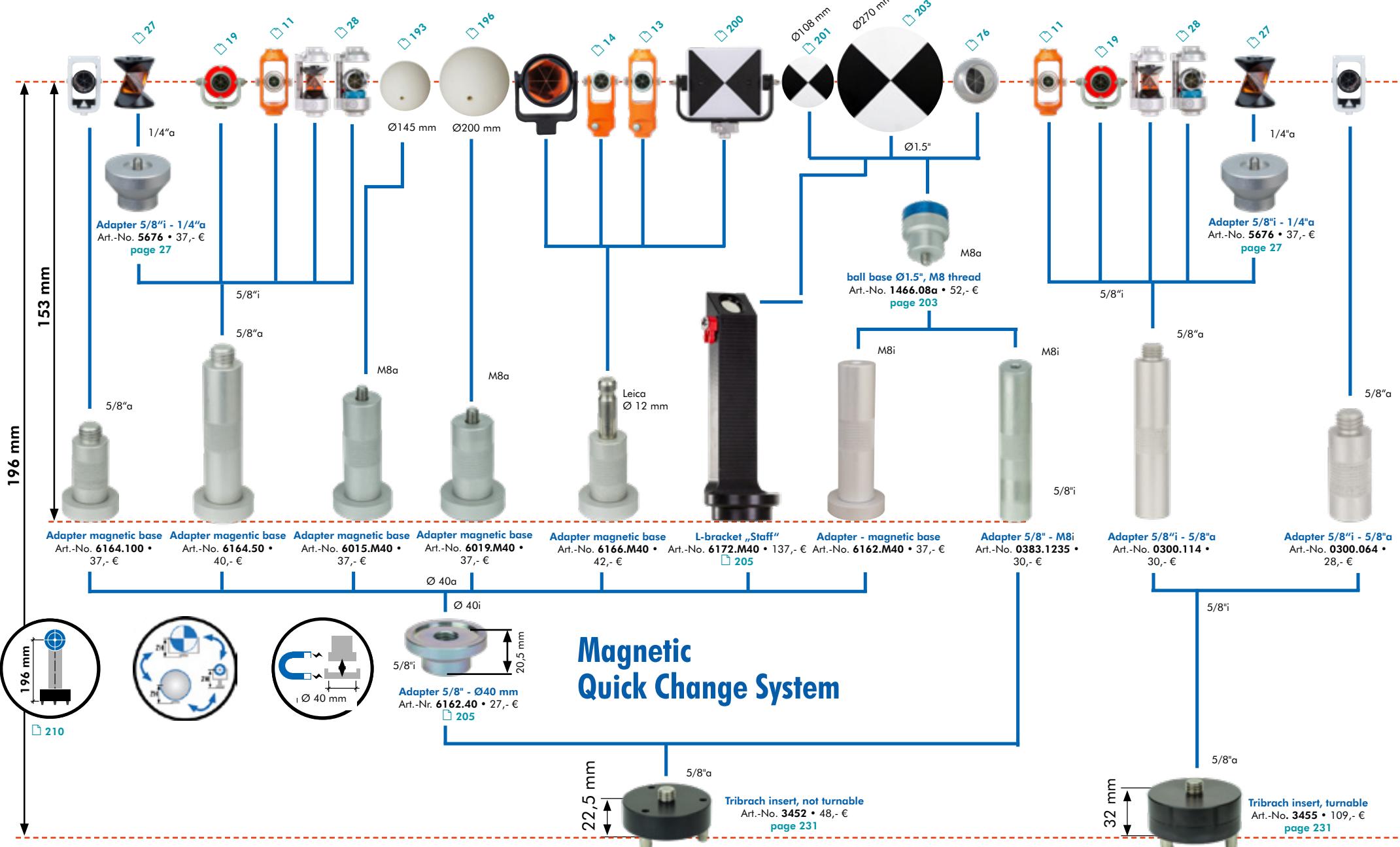
Description	Order-No.	Euro
Magnetic base Ø40 mm with Leica bolt Ø12 x 27 mm	6008.M40	41,-
Magnetic base Ø33 mm with Leica bolt Ø12 x 27 mm	6008.M33	41,-

INFO

For laser scanning applications the Ø40 mm is well established.
Centering plates Ø40 mm [s. page 207](#) (also: Plates with Ø33 mm).



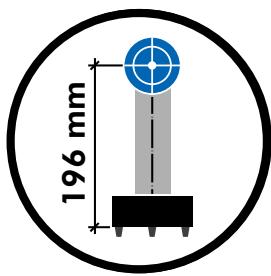
■ TLS quick change system [s. page 187](#)





Tilting Axis Height 196 mm

Various adapters in use

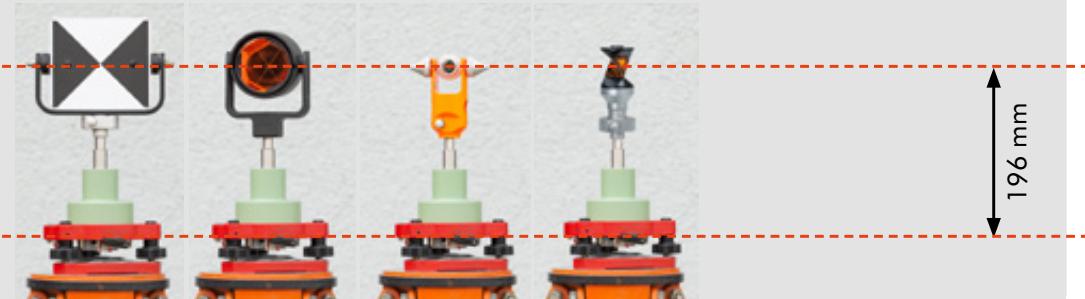


INFO

We are happy to help you in choosing the right adapter. An overview of all available adapters can be found on page **209**.



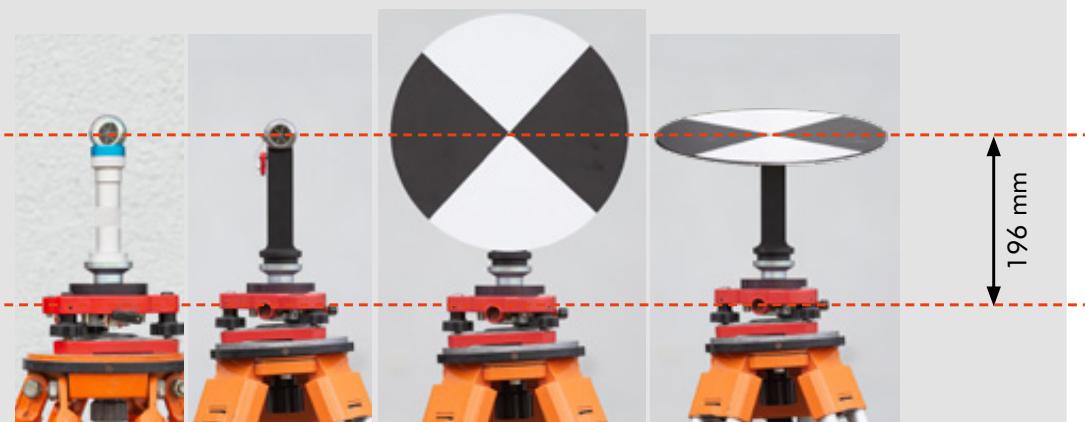
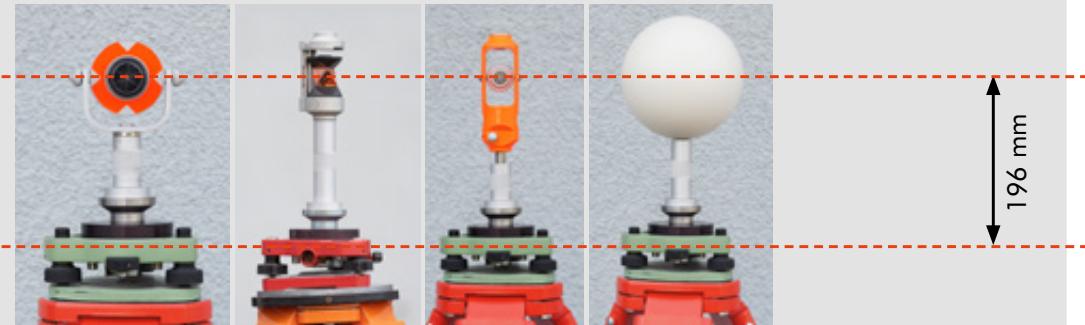
Tribach insert, Leica
Art.-No. 3463.S • 81,- €
[page 231](#)



Adapter 5/8" - Ø40 mm
Art.-Nr. 6162.40 • 27,- €
[page 205](#)



Tribach insert, not turnable
Art.-No. 3452 • 48,- €
[page 231](#)

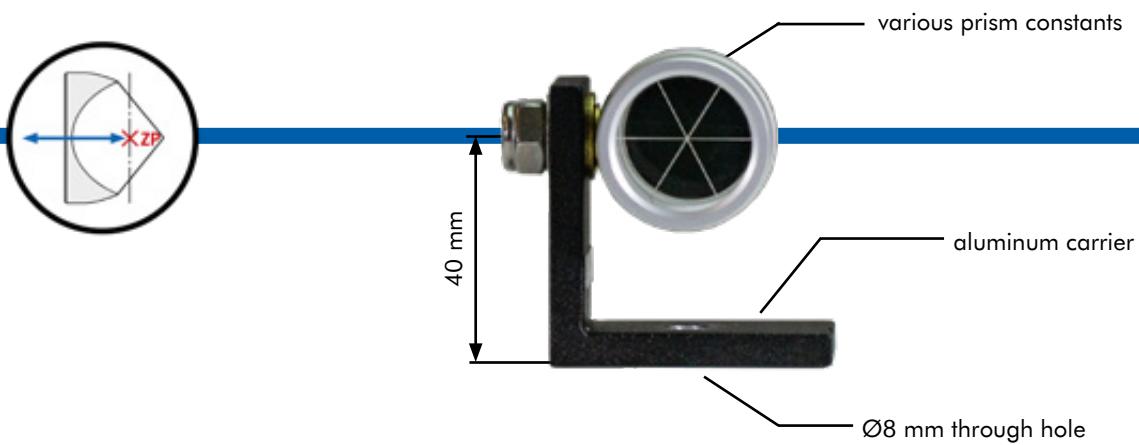




L-Prism

To screw on magnetic base (s. page 212)

- Can be aligned in any direction due to gimbal mounting
- Adjustable tilt resistance with open-end wrench SW13
- Robust manufacturing from full metal
- Distance 40 mm from bottom to prism center
- Target height 80.8 mm or 108.3 mm in combination with magnetic base
- Supplied with M8 stainless steel screw and washer (for alternative use on a wall bolt) s. page 111



Description	glass prism	prism constant K	Order-No.	Euro
Tilttable prism on L-Carrier with Ø 8 mm hole	Ø 17,5 mm	-11,3 (Leica = +23,1) mm	1005.11	124,-
		-16,9 (Leica = +17,5) mm	1005.17	113,-
	Ø 25 mm	-30,0 (Leica = +4,4) mm	1005.30	166,-
		-34,4 (Leica = 0) mm	1005.34	166,-
		-35,0 (Leica = -0,6) mm	1005.35	166,-

■ Magnetic base for target heights 80,8 mm and 108,3 mm

s. page 212

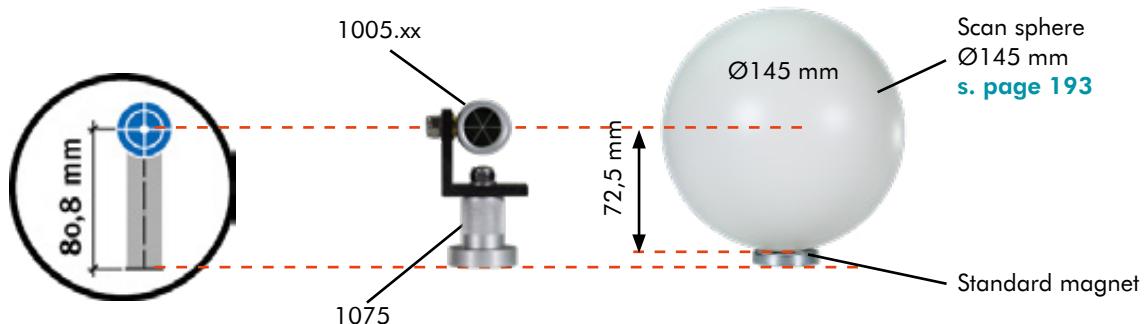
INFO

When ordering an L-prism and a magnetic base, both are delivered as an assembled unit.



Magnetic base Ø40 mm for L-Prism, ZH = 80,8 mm

For use with prism on L-beam 1005.XX
The combination results in the system height 80.8 mm.

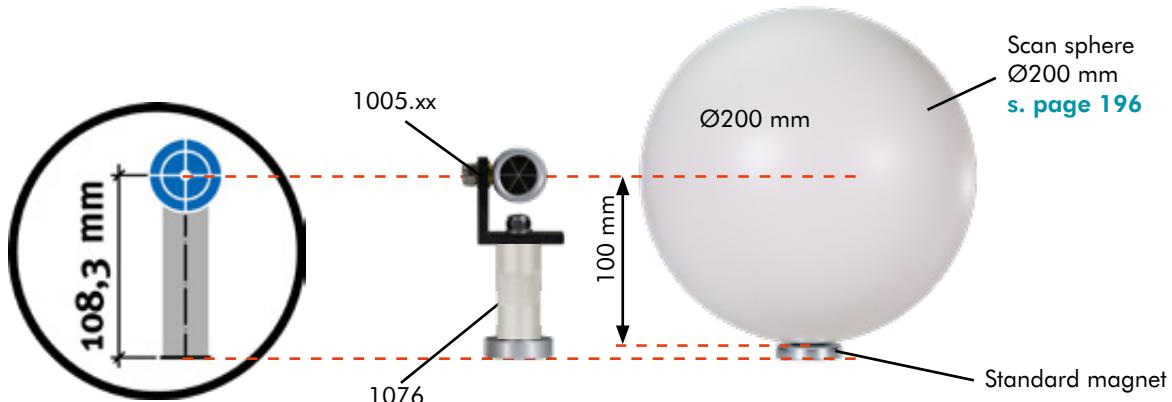


- Magnetic base Ø 40 mm, holding force of the magnet: approx. 5 Kg
- Effective height: 40.8 mm
- Target height ZH: 80.8 mm (from the bottom of base to the tilt axis of the prism)
- Cardanic suspension of the prism: The L-beam can be rotated axially on the magnetic base, the prism can be tilted (360° each)
- Rotation and tilting resistance are adjustable with open-end wrench SW13
- Magnetic base and L-prism are supplied as an assembled unit

Description	Order-No.	Euro
Magnetic base Ø 40 x 40,8 mm for L-prism	1075	40,-

Magnetic base Ø40 mm for L-Prism, ZH = 108,3 mm

For use with prism on L-beam 1005.XX
The combination results in the system height 108.3 mm.

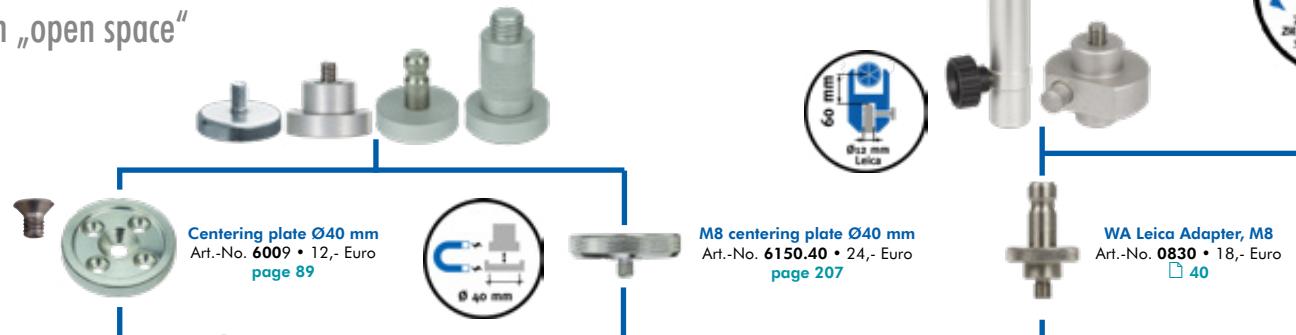
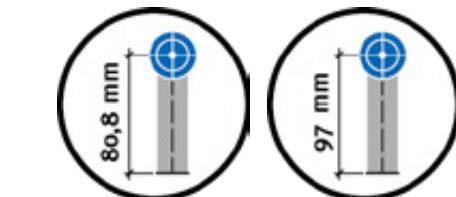


- Magnetic base Ø 40 mm, holding force of the magnet: approx. 5 Kg
- Effective height: 68.3 mm
- Target height ZH: 108.3 mm (from the bottom of base to the tilt axis of the prism)
- Cardanic suspension of the prism: The L-beam can be rotated axially on the magnetic base, the prism can be tilted (360° each)
- Rotation and tilting resistance are adjustable with open-end wrench SW13
- Magnetic base and L-prism are supplied as an assembled unit

Description	Order-No.	Euro
Magnetic base Ø 40 x 68.3 mm for L-prism	1076	44,-



■ TLS - Leica / Quick change system, in „open space“



M8 Adapter Ø25 x 70 mm
Art.-No. 0373.070 • 25,- Euro

Suction holder M8
Art.-No. 5938 • 80,- Euro
page 128



Triangle plate M8
Art.-No. 6114.M8i • 51,-



Lever clamp M8
Art.-No. 5934 • 63,- Euro
page 127

Joint clamp M8
Art.-No. 6176.M8 • 48,-
page 214

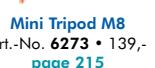


Strong M8 clamp
Art.-No. 6884 • 79,-
page 127

Magnet Base „SECTION“
Art.-Nr. 1740 • 128,-
□ 142



Pole clamp Ø18-32 mm
Art.-No. 2290.80 • 63,-



Joint clamp Leica
Art.-No. 6176.L • 48,-
page 214





Universal Screw Joint Clamp

For attaching instruments, prisms and other targets to tubes and surfaces such as scaffolding struts, table tops, steel beams, floorboards, etc.

Leica



M8 i



- Quality clamp made of plastic
- Rubberized clamping surfaces to protect the material
- Clamping range on cylinders and surfaces, Ø or thickness: 10 - 60mm
- Double joint for aligning and, if necessary, perpendicular setting of the target sign
- 1. rotary knob for screwing on the clamp
- 2. rotary knob for loosening and locking the double joint

Description	Order-No.	Euro
Universal screw clamp with joint arm M8 inner thread	6176.M8	48,-
Universal screw clamp Leica-Bolt Ø12 x 27 mm	6176.L	48,-



■ Sturdy M8 screw clamp

Very robust metal alternative to this screw clamp
you can find on [page 127](#)



■ Beam clamp M8

- Simple alternative made of galvanized steel
- Clamping range up to 23 mm
- Particularly suitable for attachment to steel beam structures

See for more information [page 47](#).





Universal tripod for laser scanning targets

For targeting with scanner and total station from different directions

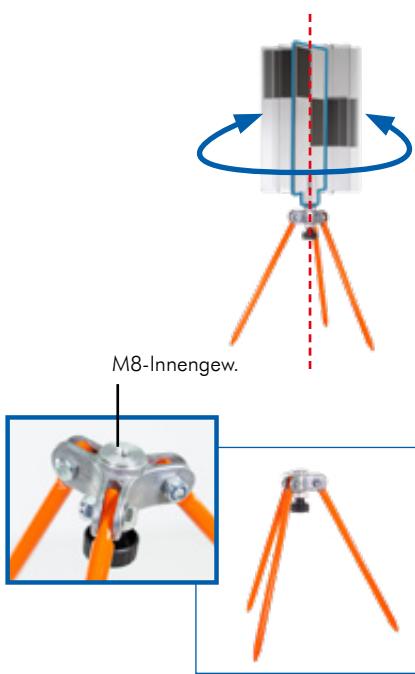
Laser scanning requires multiple scans to be linked together (registration) to capture as much information as possible. Targets that are visible from every point of view can be used either for registration itself or for accuracy control of the scans.

With the **TALASCA PRO** universal tripod, targets of any kind can be freely positioned in space, with a firm stand on almost any surface.

Target plates can be rotated around the standing axis on the tripod. Without changing the position of the target centre, even if the standing axis is not vertical.

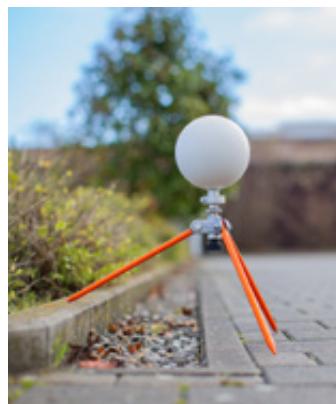
Ideal for use with our dual-function targets: Checkerboard pattern on one side and reflective tape on the opposite side. After targeting the reflective tape with the total station, the generated 3D coordinates can be used for georeferencing the laser scans.

- Robust tripod
- High weight ensures stable stand
- Backlash-free joints with adjustable resistance for spreading the legs
- Interchangeable insert with inner M8 thread for holding targets/adapters
- Insert rotates around standing axis with adjustable resistance
- Tripod length with legs attached: 30 cm, weight: 1.000 g



Description	Order-No.	Euro
Universal Tripod TALASCA PRO, M8 inner thread	6273	139,-

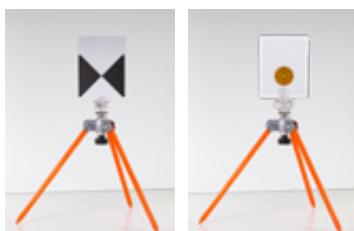
Solid ground



Natural ground



Smooth and sensitive surfaces



INFO

Our Pocket Targets (page 188) and Ø270 mm Targets in U-beam have aiming marks for both laser scanners and total stations. They can be aimed from all directions by rotating them around the standing axis.

■ Accessories and adapters on the next page

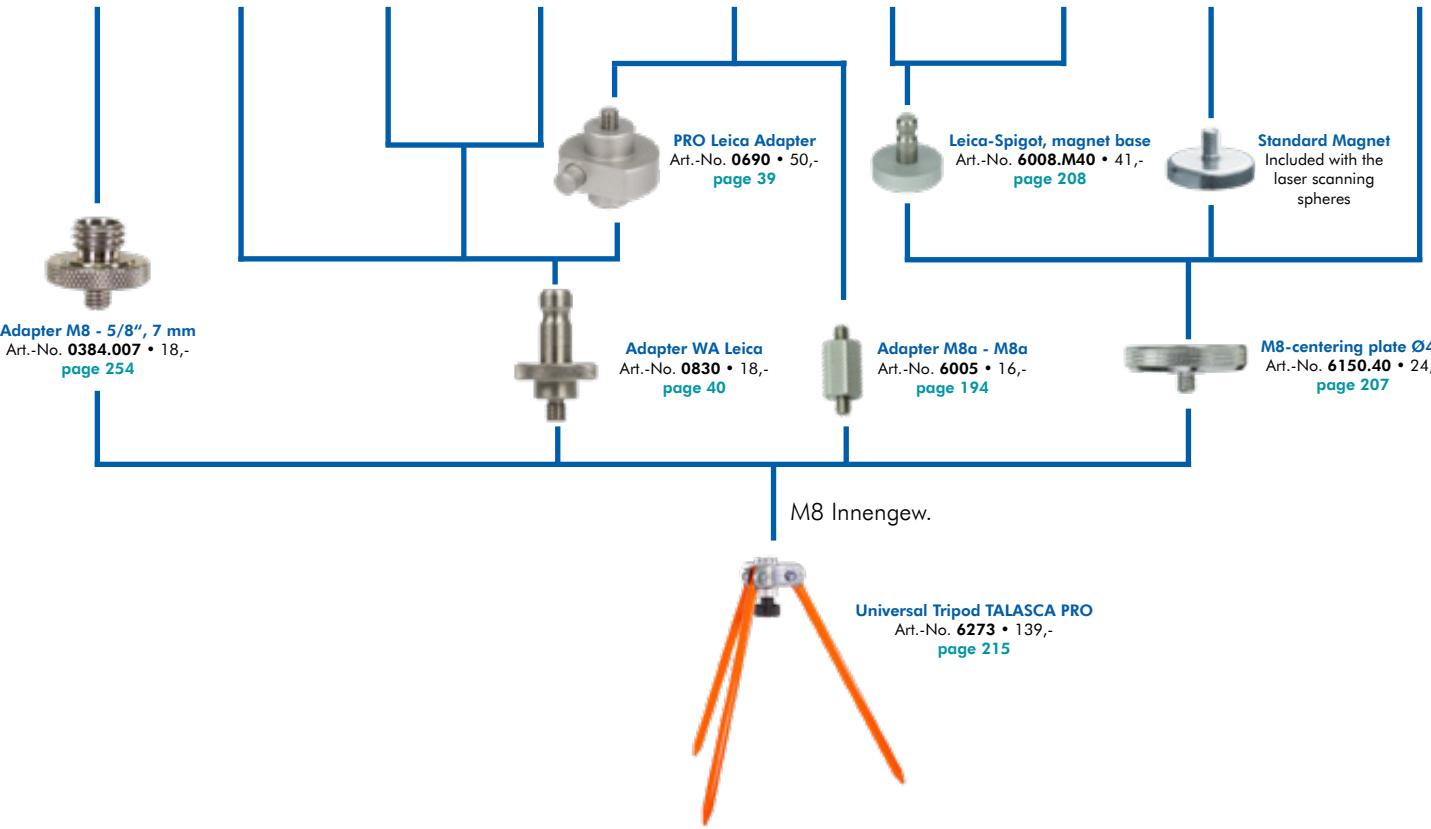
Accessories & Adapters for Mini Tripod



Targets with 5/8" thread connection

L-Carrier STAFF Leica Ø12 mm connection [page 204](#)Tilttable Ø270 mm Targets with Leica-socket [page 202](#)Pocket Targets with Leica-socket [page 200](#)Scanning Spheres with M8 inner thread [page 193](#)Tilttable Ø270 mm Targets with Leica-socket [page 202](#)Pocket Targets with Leica-socket [page 200](#)Scanning Spheres with M8 inner thread [page 193](#)L-Carrier STAFF with magnet base Ø40 mm [page 205](#)

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Rubber Ball for Mini Tripod



- Ball Ø25 mm made of high-quality rubber
- Hole for attaching to the leg of the TALASCA PRO
- Safe standing of the tripod on sensitive or slippery surfaces

Description	Order-No.	Euro
Rubber ball to plug on (1 piece)	5356.06	3,20



Target spike for natural grounds



A simple solution to get a reference point in soil is the combination of our M8 centering plates and our stainless steel spikes.

The earth spike is simply inserted into the ground and a scanning sphere is attached with the magnetic quick release.



Description	Order-No.	Euro
M8 centering plate Ø40 mm, effective offset 3 mm, s. page 207	6150.40	24,-



M8 stainless steel spikes

- Material: Ø12 mm stainless steel
- M8 inner thread

Description	length	Order-No.	Euro
stainless steel spike with M8 inner thread	120 mm	1863.120	18,-
	143 mm	1863.143	19,-
	170 mm	1863.170	20,-



Example with
Pocket Target
[s. page 197](#)



Example with
Scan-Sphere:
[s. page 193](#)



Example:
Target Ø270 mm
[page 203](#) &
Thread base M8
[page 86](#)

Attention: Rotating/turning the target between scans is not recommended. Often natural soils do not provide enough „grip“ to ensure an accurate second measurement (with identical 3D coordinates) after touching the target.



Targets for measuring with drones

Our UAV targets for scanning and photogrammetry.

■ Tiltable targets

Targets in the U-beam can easily be aligned upwards.



■ Circular targets with ball connection on back

With a magnetic base with 5/8" or M8 thread, the circular Ø270 mm target with rear hemisphere connection can be easily placed on a mini tripod, ground spike, tribrach or prism pole.



■ Target directly above prism

With the help of an adapter, the above targets can be screwed directly onto prisms. The center of the target and prism are always in the standing axis.

[page 219](#)



■ Square target plate with pole centering

For re-coordinating the center of the target or for positioning on known points.

[page 220](#)



■ Swap between scanning target and ball prism

With the high-precision STAFF L-Beam, ball prisms and scan panels can be used alternately with the aid of an integrated magnetic base.

s. [page 204](#)

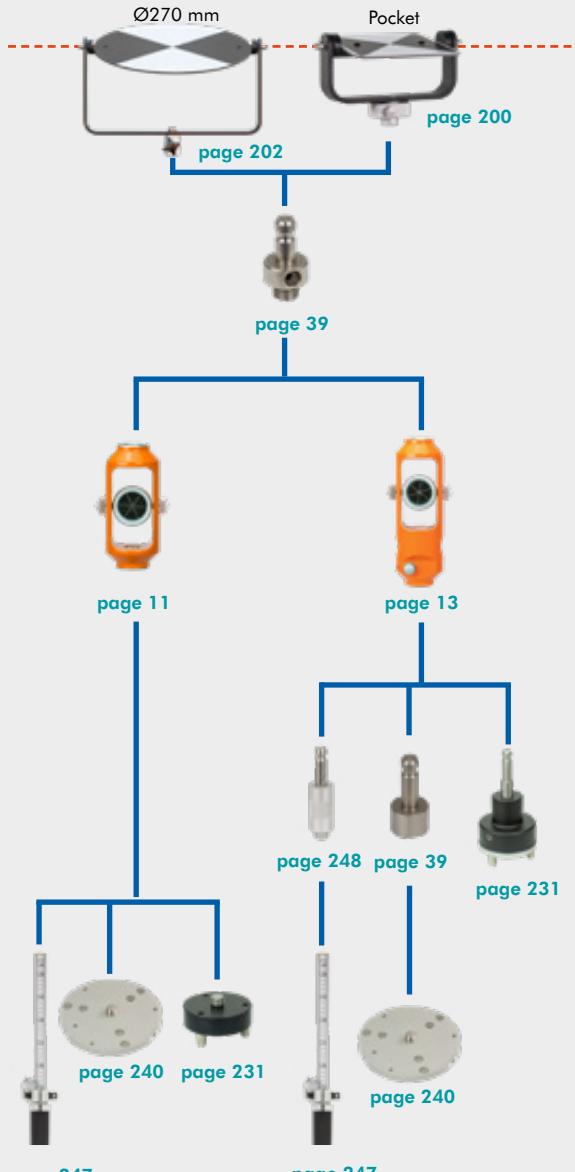




Laser Scanning: Linking drone scans and terrestrial measurements

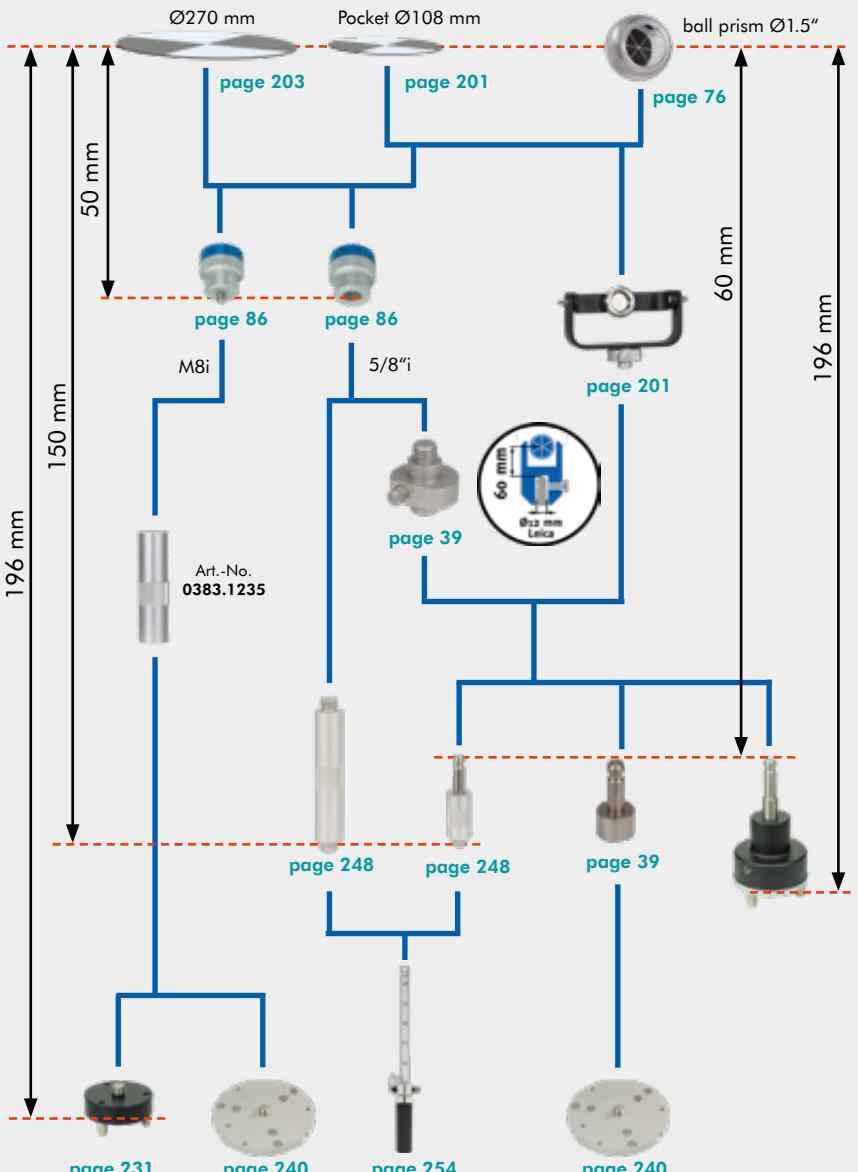
■ Prism below target in standing axis

(Target usable with drone and terrestrial)



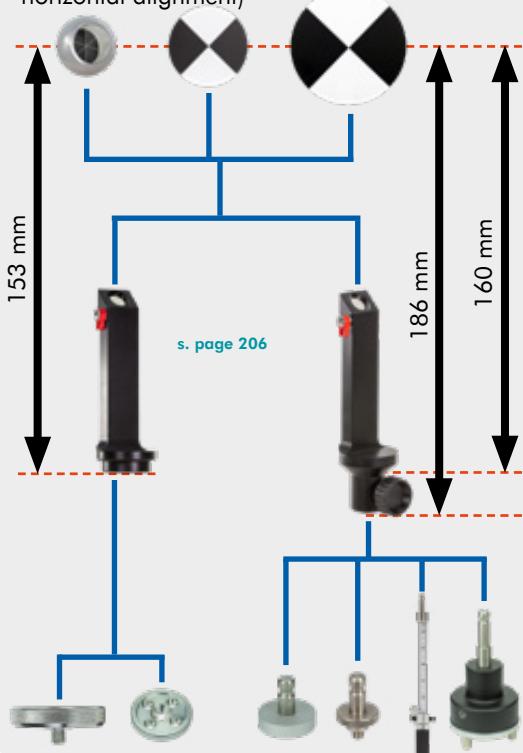
■ Target and ball prism, magnetic quick change

(Target Ø270 mm in this combination can only be used with drone)

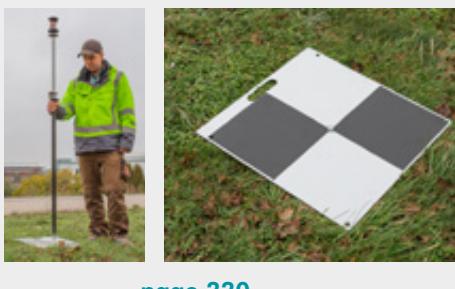


■ Target & ball prism - L-Carrier

(Scanning target can be tilted from vertical to horizontal alignment)



■ Square target 400 x 400 mm



Target plate for drone photography



Checkerboard target plates/targets are suitable for photogrammetric surveys with drones. Depending on the application, they can be used for georeferencing and as a control or pass point.

- Torsion resistant aluminum composite panel
- Plane surface
- Weatherproof
- Checkerboard pattern white/black 200 x 200 mm
- Panel size: 450 x 420 mm
- Handle for panel lifting
- 5 holes Ø 10 mm: 1x centrically, 4 x in the corners
- Weight: 875 g
- **Comes with two nails Ø 9 x 90 mm with centering**

Description	Order-No.	Euro
Target for drone recordings, checkerboard pattern, 450 x 420 mm	6076	48,-

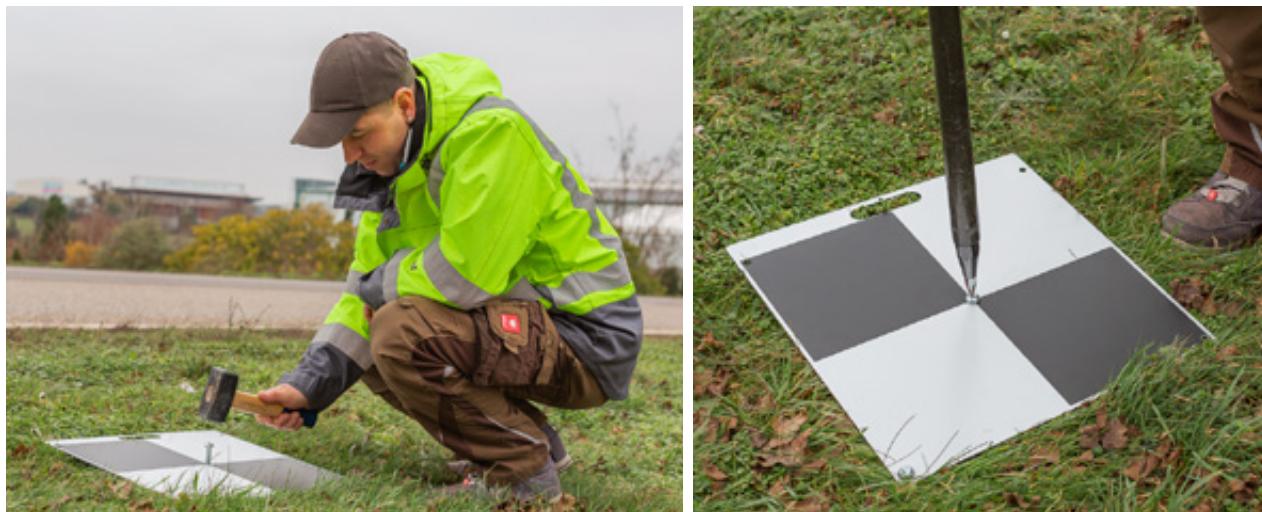
■ Positioning of the target board on known point

The board is placed with the center hole on the already coordinated point. On natural soil, the board can be secured against slipping with nails in the corner holes.



■ Coordination of panel center

On natural soil, driving a centering nail into the center hole of the panel has proven effective against slippage. The center of the plate is then coordinated by holding the GNSS/prism pole on the center nail.





Holder for drone targets

For storage and transport of max. 10 target plates no. 6076

The target boards are hooked into the stand at the center hole.
The handle in the boards allows comfortable carrying along with holding stand.

- Quick release fastener for fixing the boards on the stand
- Fold-out cross strut for safe parking when deploying / collecting the target boards
- Weight: 530 g



Description	Order-No.	Euro
Holder stand for up to 10 target boards	6076.H	78,-





Tripod for Laser Scanners

Laser scanners are delivered with tripods for standard applications. For exceptional conditions special accessories are required. Such as our **Mini Instrument Tripod**. This allows measurements to be carried out even in confined spaces. It can also be attached to a wide variety of objects and vertical surfaces. Targets such as scanning spheres and scanning targets can also be used on the Mini tripod.

Laser Scanner Examples



Example:
Leica BLK360
(with Leicas BLK360
tripod adapter)

Brand-owned quick
change systems



Brand-owned
adapter plates

INFO

Laser scanners are often equipped
with a 3/8" thread or a bolt quick
release. An adapter to the standard
5/8" thread is required here.

3/8"

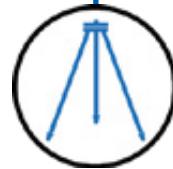


Adapter plate 5/8" to 3/8" outer
Art.-No. 3035.1 • 44,- Euro

5/8"

5/8"

5/8"



Surveying tripod with 5/8"



Instrumenten Tripod Mini „Base“
+ various tripod feet / applications
page 240





Surveying Accessories

1/2

H.1. Instrument Tripod, Tribrachs, Transport Case

225



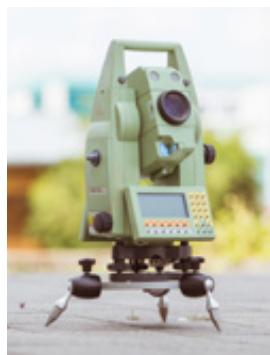
H.2. Wall Tripod

235



H.3. Mini Instrument Tripod

240



H.4. Prism/GNSS pole, strud tripod & accessories

247





Surveying Accessories

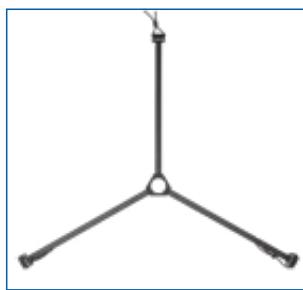
2/2

H.5. Holder for distance laser meter 252





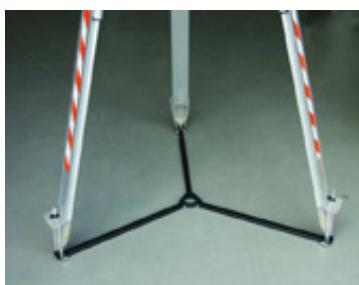
Tripod star for Measurements indoors



The tripod star was specially developed for measurements on smooth surfaces or indoors. There it is also suitable for the use of motorized tachymeters and laser scanners, if no special tripod is to be purchased.

- Borehole (1x per leg) for mounting the tripod feet
- Secure the tripod feet with rubber bands. The length of these can be adjusted so all common tripod types can be used
- The single tripod foot lies optimally between 2 hard rubber buffers. This guarantees a shake-free stand and prevents the tripod from slipping
- Foldable for transport
- Side length: 51 cm, therefore diameter of the installation circle: 102 cm
- Weight: 900 g

Description	Order-No.	Euro
Tripod star, with 3 rubber bands and 6 hard rubber buffers	1975	96,-





Tripod-Leg Shoes

- Can be used with all instrument tripods
- Mounting with variable rubber cords
- Centric mounting of the tripod-leg shoe with even distribution of the weight on the tripod foot plates
- Automatic levelling of the tripod-leg shoe when the stand is placed on the floor
- No bending over - the tripod foot plates remain at the tripod during the point of view change
- No cumbersome and time-consuming positioning as when using a tripod star
- The possibility of variable spreading of the tripod remains unchanged

Dual Function

In summer on hot, soft asphalt surfaces

- Even distribution of the instrument weight on the 3 large-surface tripod foot plates
- Minimized sinking in

On smooth surfaces

- 3 slip-resistant hard rubber buffers per tripod-leg shoe
- Uniform distribution of the instrument weight over a total of 9 hard rubber buffers

Description	Order-No.	Euro
Tripod-leg shoe with rubber-buffers (1 piece)	1973	44,-

INFO

Despite the 9 rubber buffers, the tripod should not be set up too wide on very smooth floors.



Universal Transport Case
s. page 228



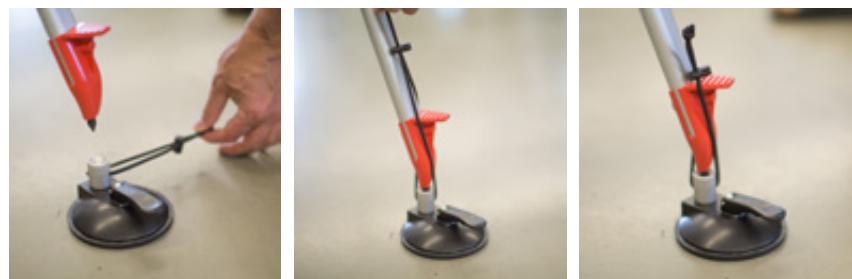


Tripod stand adapter for special floors

The measuring possibilities reach their limits on extremely smooth surfaces if even the rubber buffers on the tripod star (No. 1975) or on the tripod stand plate (No. 1973) do not provide sufficient stability or safety against slipping.

A tripod stand adapter acts as an intermediate element between a standard tripod and 3 suction holders or 3 magnetic holders (see below).

- Can be used with all instrument tripods
- Variable rubber cord attachment
- Secure centering of the tripod foot tip
- Cylinder Ø25 x 32 mm made of anodised aluminium with M8 stainless steel thread
- Knurling as screwing and unscrewing support
- Weight: 50 g



Description	Order-No.	Euro
Tripod stand adapter with M8 thread (1 piece)	1976	35,-

The tripod foot adapters can be screwed in easily:



■ In suction holder

For extremely smooth floors such as waxed or polished industrial floors, glass, stone or plastic surfaces
[page 128](#)



■ In magnet holder

For magnetic surfaces such as ships, rail vehicles, industrial plants, tanks etc.
[page 126](#)





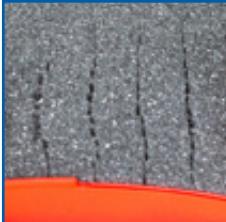
Universal Transport Case



For the safe transport of various surveying accessories.

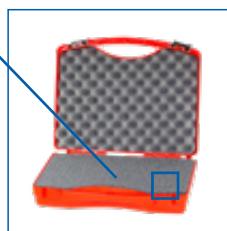
- Outer dimensions (plastic): Approx. 275 x 230 x 80 mm
- Weight: 420 g
- 2 Click fasteners

Description	Bubble Foam	Order-No.	Euro
Universal Transport Case	medium (30 mm)	1468.2	34,-



Case with grid foam 10 x 10 mm for individual cutting out

Foam in the bottom part with pre-cut grid foam. 10 x 10 mm grid parts can be quickly and easily cut out for individual use.



- Same features as universal case above
- **Lid:** bubble foam (already glued in)
- **Bottom:** grid foam (to be cut out by yourself as required)



Description	Order-No.	Euro
Transport case Universal with 1 x 1 cm grid foam	1468.R	48,-



Paint outlines of the accessories on grid foam, taking into account the slightly pre-cut 1 cm squares.



If possible, always leave 2 grids (20 mm) free between compartments to ensure sufficient stability.



Cut out grid foam using cutter / parcel knife. Tip: Use a sharp knife. Do not „tear“ but cut.



Insert foam in the bottom of the case and glue into case with craft glue or double-sided tape (carpet tape).

Special transport cases

For the safe transport of surveying accessories.

- Plastic housing: approx. 275 x 230 x 80 mm
- Weight: approx. 450 g
- 2 click closures
- CNC milled cut-outs in stable foam material



■ Transport case for APEX accessories

Description	Order-No.	Euro
Transport case for APEX accessories	1468.09	54,-



Cut-Outs for:

- 1x APEX
- 1x APEX Mini
- 1x SECTION Adapter
- Ball prism and magnetic base
- Rubber band (1421)
- Pens and centering pins



■ Transport case for CONE/HEMI-Adapter or HIP-Prism

Description	Order-No.	Euro
Transport case for CONE/HEMI-Adapter or HIP-Prism	1468.10	54,-

Examples



HEMI90, HEMI110,
CONE Adapter, Bolt
stud adapter, other
Accessories

1x HIP Leica-Prism
Cone adapter
Ball prism
More accessories

HEMI-Adapter
Cone adapter
Ball prism
More accessories

Bo 360° Prism
PLA-Leica-Adapter
Ball prism
More accessories



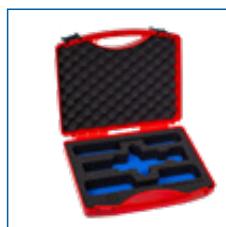
■ Transport case for BOAXE accessories

Description	Order-No.	Euro
Transport case for BOAXE accessories	1468.11	54,-



Cut-Outs for:

- BOAXE S and BOAXE B
- All cover/lid sizes (each 1x)
- Ball prism and magnetic base
- Mini-Vektor /pens



■ Transport Case Nail Holder HIT

Description	Order No.	Euro
Transport Case for Nail Holder HIT	1468.20	54,-



■ Transport Case Klimax

Description	Order No.	Euro
Transport Case for Klimax	1468.7	46,-



■ Transport Case PtW

Description	Order No.	Euro
Transport case for PtW	1468.19	54,-



■ Transport Case Tripod Feet

Description	Order No.	Euro
Transport Case Tripod Feet	1468.18	54,-



■ Transport Case Rail Tool HUG

Description	Order No.	Euro
Transport Case Rail Tool HUG	1468.12	54,-



■ Transport Case Triangle Tripod

Description	Order No.	Euro
Transport Case Triangle Tripod	1468.13	54,-



■ Transport Case Rail Tool SWPro

Description	Order No.	Euro
Transport Case Rail Tool SWPro	1468.17	54,-



■ Transport Case Manual Prism Holder

Description	Order No.	Euro
Transport Case Manual Prism Holder	1468.16	54,-



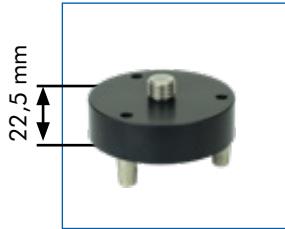
Tribrach with Claw System

Tribrach

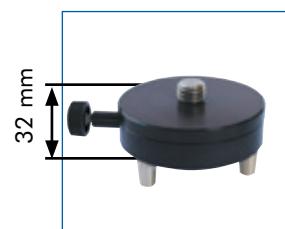


Description	Order-No.	Euro
Tribrach, claw system, black, without optical plummet	3366.S	147,-

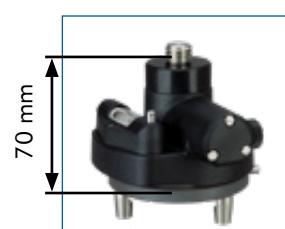
Tribrach-Insers



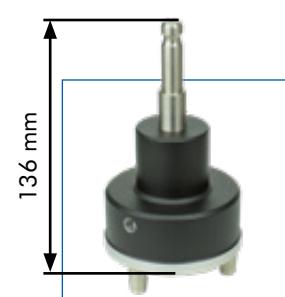
Description	Order-No.	Euro
Tribrach-insert, 5/8" outer thread, not turnable, H = 22,5 mm	3452	48,-



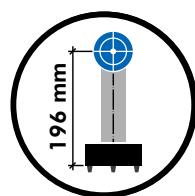
Description	Order-No.	Euro
Tribrach-insert, 5/8" outer thread, turnable, H = 32 mm	3455	109,-



Description	Order-No.	Euro
Tribrach-insert with level 5/8", not turnable, H = 70 mm	3486	236,-

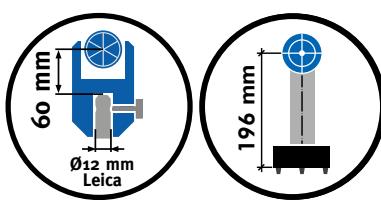


Description	Order-No.	Euro
Tribrach-insert, Leica stud bolt	3463.S	81,-



INFO

Adapter to reach the target / tilting axis height of 196 mm
[s. next page 232](#)



Adapter for Tribrach claw inserts

- To reach target / tilting axis height: 196 mm
- Made of anodized aluminium and stainless steel
- See also adapter table on the next page

Description	bottom	top	effective length	Order-No.	Euro
Adapter 5/8"- Leica for tribrach inserts H = 70 mm	5/8" inner thread	Leica stud bolt Ø 12 x 40 mm	66 mm	0366.066	36,-
Adapter 5/8"- Leica for tribrach inserts H = 32 mm			104 mm	0366.104	36,-
Adapter 5/8"- Leica for tribrach inserts H = 22,5 mm			113,5 mm	0366.1135	36,-

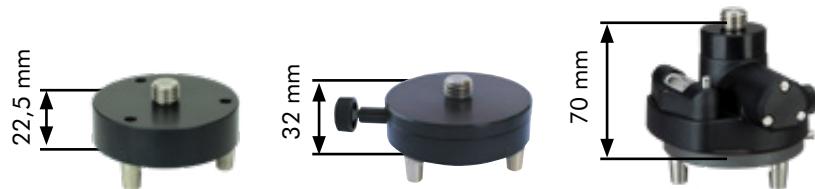
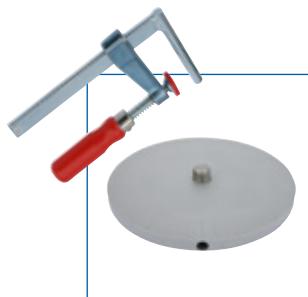


Plate holder to mount tribrachs on desks

For safe mounting of measuring instruments on tables, workbenches etc.



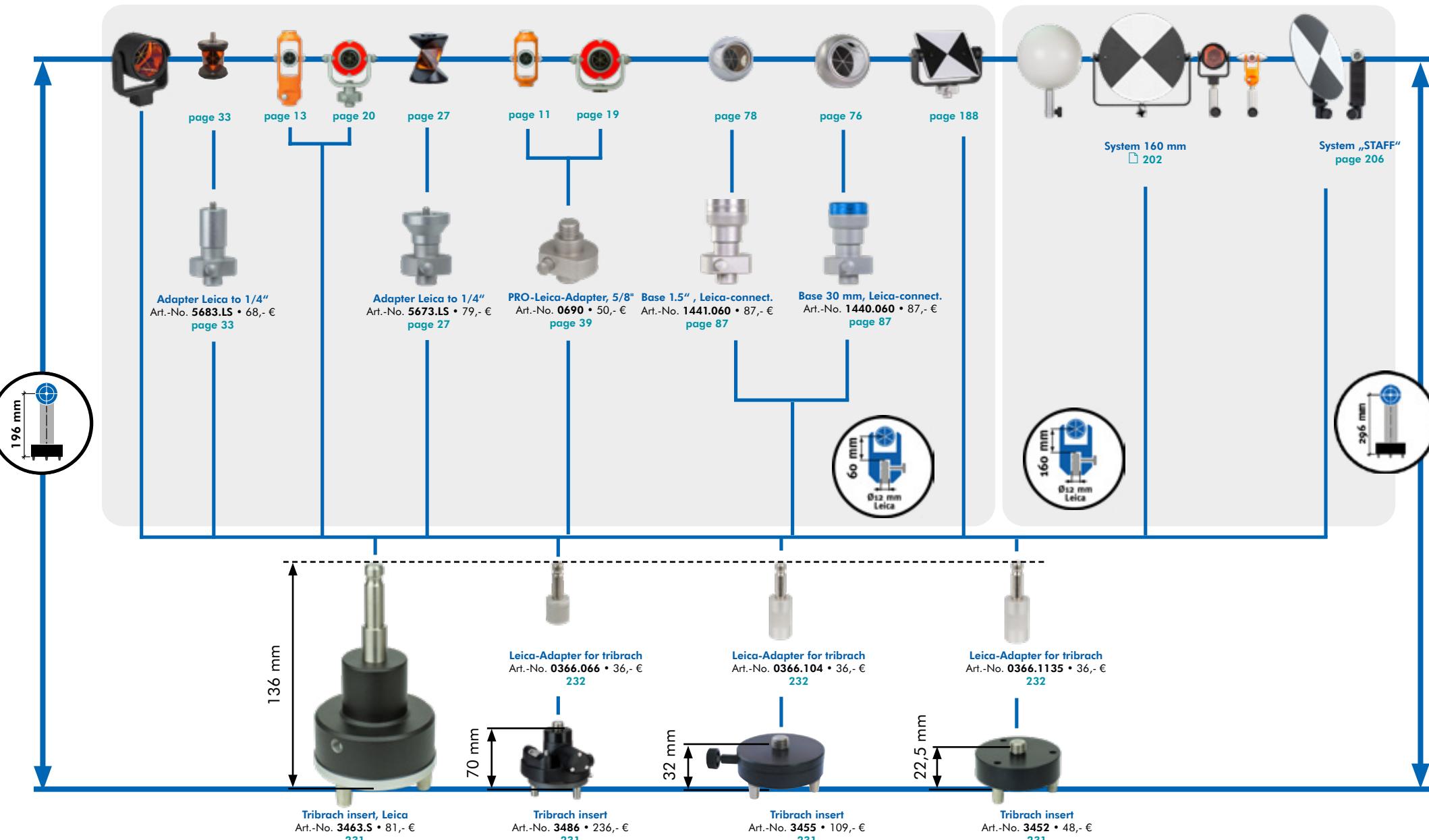
Description	Order-No.	Euro
Cylindrical plate with 5/8" outer thread and screw clamp	3350	79,-





Tribrach Claw Insert with Leica spigot Ø12 mm (Leica)

To reach a target / tilting axis height of 196 mm or 296 mm



DIN spigots with 10 mm flange

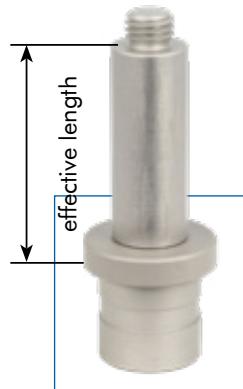
Outer threads: 5/8" made of aluminium, all others of stainless steel



Description	bottom	top	effective length	Order-No.	Euro
DIN spigot Ø 34 mm with flange 10 mm	5/8" inner thread	M8 outer thread	10 mm	0360	30,-
		5/8" outer thread	10 mm	0340	23,-
		Leica spigot Ø 12 x 40 mm	50 mm	0367.40	38,-

INFO

Other top connections are available on request. For example: 1/4", 3/8", Leica spigot Ø 12 x 27 mm, etc.



Description	bottom	top	effective length	Order-No.	Euro
DIN spigot Ø 34 mm with flange 10 mm and extension	5/8" inner thread	5/8" outer thread	58 mm	0305.58	36,-
			75 mm	0305.75	38,-
			108 mm	0305.108	42,-
			125 mm	0305.125	44,-

INFO

Other lengths are available on request.



Wall tripod for instruments

Surveying point on the wall: Fast, accurate, universal, stable, light and compact.
If required, non-destructive mounting without drilling.

Installation of surveying instruments within seconds without ground contact on walls, buildings, tunnel tubes, other structures.

The tripod is fastened at 3 points, which are attached in a triangular shape. Two at approximately the same height, the third below in between. When reassembled for repeat measurements, the position of the instrument is identical in tenths of a millimetre. This also applies to the height, if the tubular bubble built into one of the arms is aligned precisely and a height-stable instrument tripod is used.

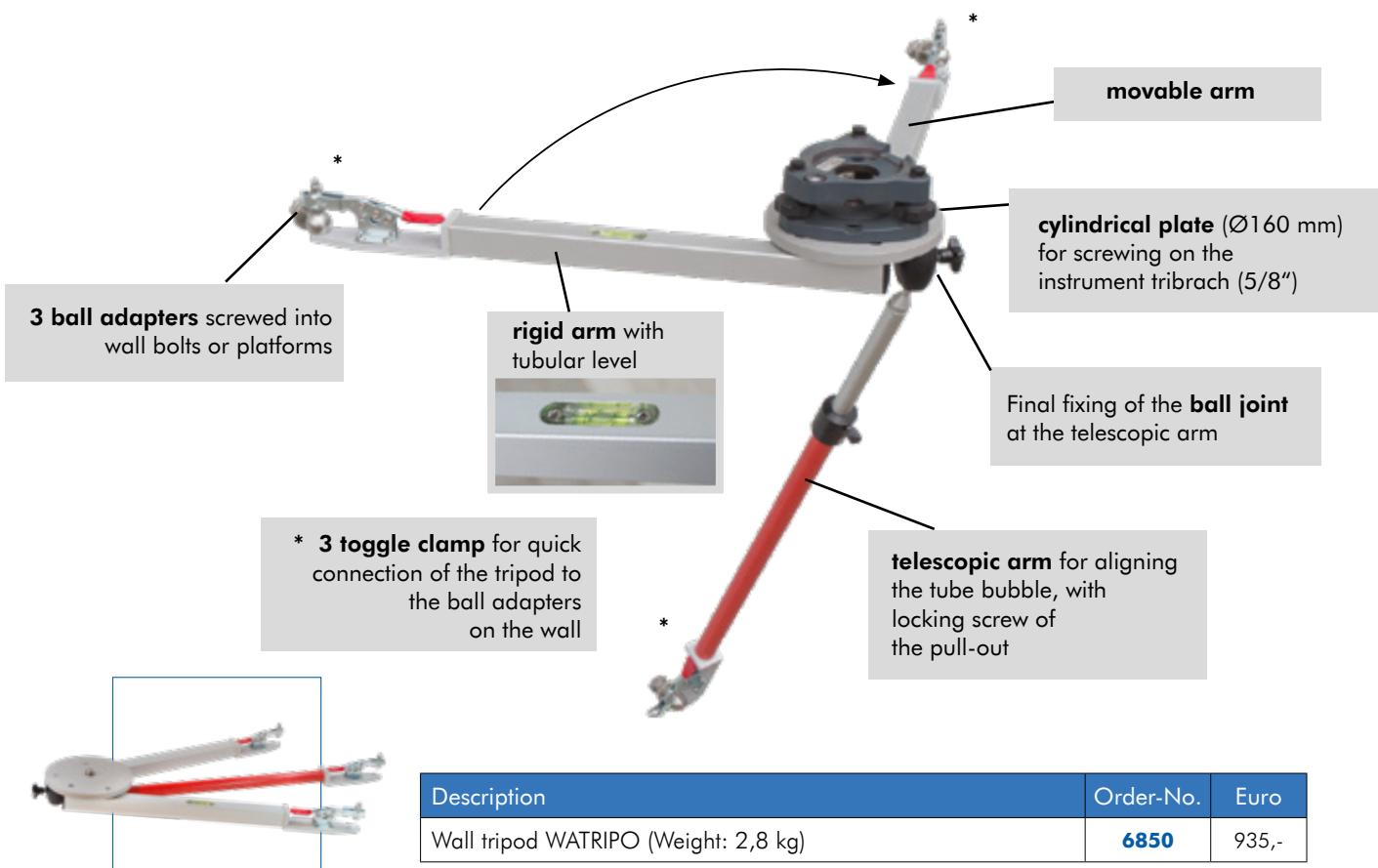
Setup

Two fixed length arms and a telescopic arm are attached to the cylindrical support plate for the instrument. One of the fixed length arms is rigidly screwed on, the other can be moved via a joint. The arms are fixed to the two upper wall points with quick-releases. The telescopic brace is connected to the lower wall point and supports the tripod. With the telescopic pull-out, a tubular bubble can be aligned, which is embedded in the rigid leg. The height of the wall tripod is therefore always fixed at the same point on the top right of the wall.

To fix the tripod to the object, either wall bolts with M8 internal thread or alternatively platforms with steel cylinders, which also have an M8 internal thread, are attached. While holes have to be drilled in the object for the wall bolts, the platforms can be glued non-destructively.

After screwing ball adapters into the M8 thread, the wall stand can be docked in a matter of seconds using toggle clamps.

The 3-point fixing in connection with the M8 ball adapters enables the use of the tripod not only on walls, but also on buildings, equipment, containers, towers, vehicles, etc.

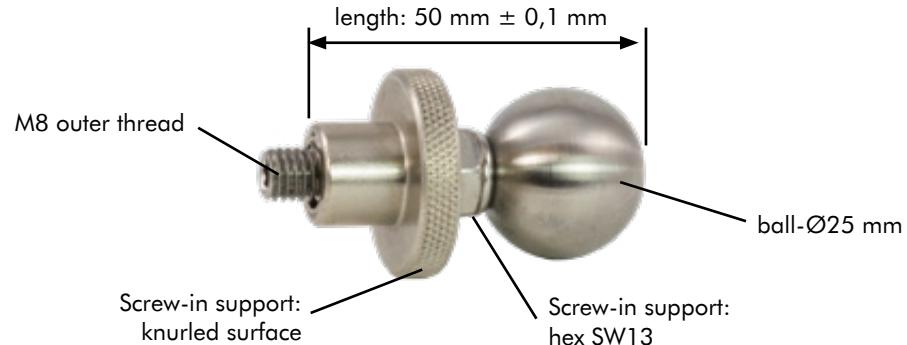




Wall tripod: Accessories

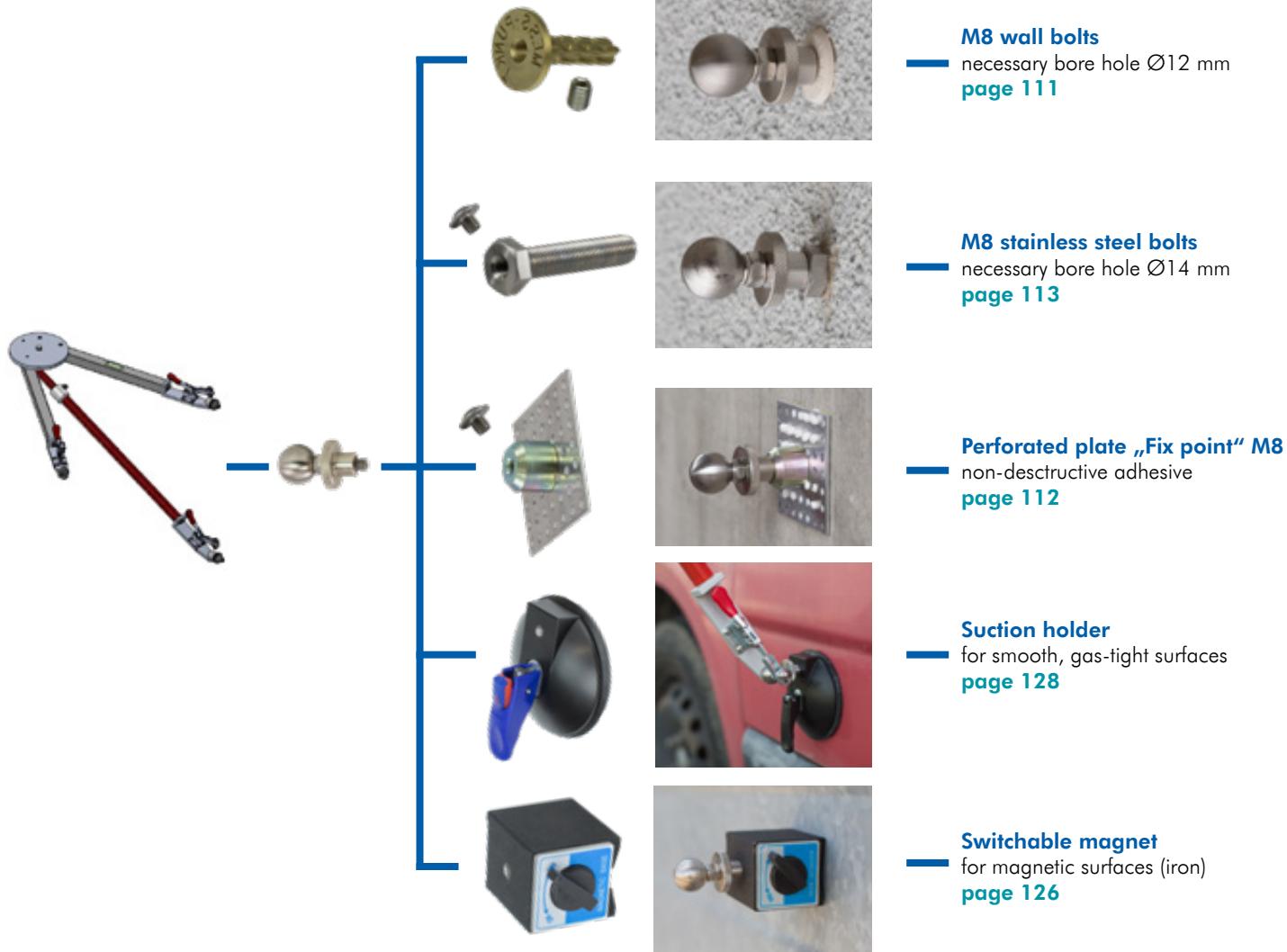
M8 ball adapter

- for connecting the tripod to the object
- uniform length for accurate repeat measurements
- stainless steel
- Weight: 120 g



Description	Order-No.	Euro
M8 ball adapter	6860	33,-

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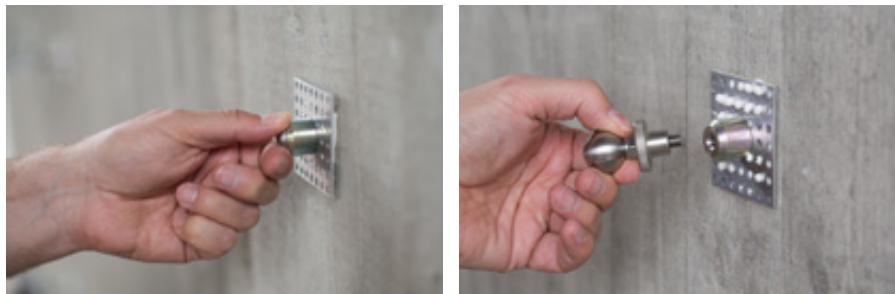
Mounting of the tripod without drilling bore holes

Fixing of the 3 platforms „fix point“ to the wall

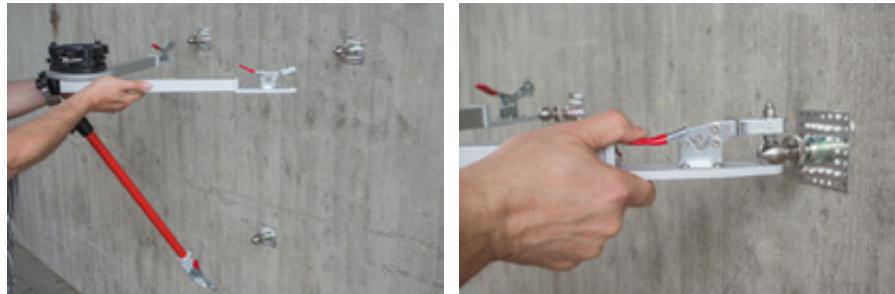
Tip: Mount the upper two points at approximately the same height.



After hardening of the adhesive: Screw in the 3 ball adapters.



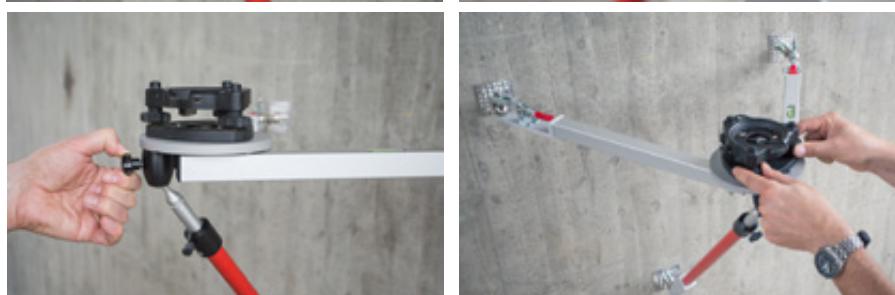
Wall tripod docking with 3 quick releases (toggle clamps)



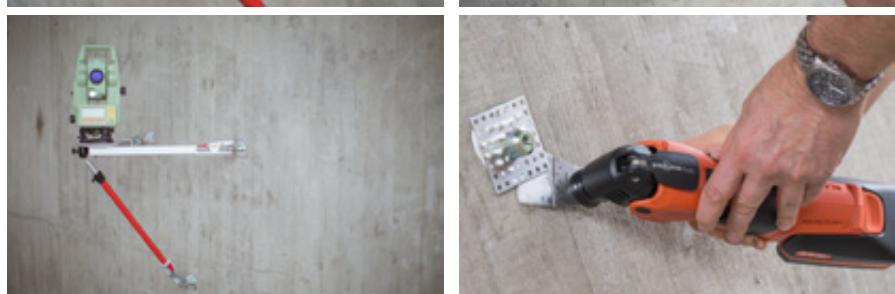
Aligning the tube bubble which is to be found in the right arm



Fixing the ball joint of the telescopic arm



Measurement and subsequent removal of the platforms with a multifunction device





■ Transport case

Safe protection of the wall stand during transport.
If necessary, space for a spirit level (max. 80 cm) and some ball adapters.
But not for the tribrach.



- Robust hard shell case with nap foam in base and lid
- External dimensions L x W x H: approx. 81 x 23 x 10 cm
- 4 sliding closures
- Weight: 1.8 kg

Description	Order-No.	Euro
Transport case: Wall tripod (fixed height), 81 x 23 x 10 cm	6890	96,-



■ Spirit level

For attaching the fix points to the wall/structure



- LxWxH: 80 x 5 x 2 cm
- aluminium, yellow lacquered
- 3 levels (180°, 90°, 45°), level accuracy 1 mm/m,
- milled bottom side
- weight: 350 g

Description	Order-No.	Euro
Spirit level 80 cm	6854	21,-



■ Assembly adhesive

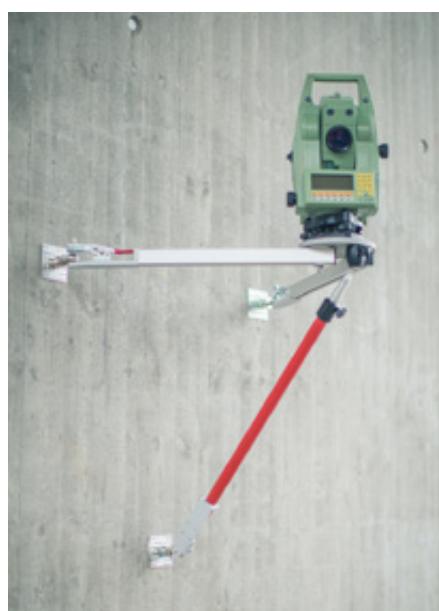
For attaching the perforated plate „fix point“. More information: [90](#)



Description	Order-No.	Euro
Assembly adhesive, white, 1 cartridge à 290 ml	1462	16,50



■ Application examples





Mini Instrument Tripod

For the use of laser scanners and total stations in confined spaces.

Surveying instruments cannot be used with the common standard tripods in all areas of application. Often they are too large, too heavy, too bulky. Our Mini Instrument Tripod on the other hand is reduced to the bare essentials.

Stainless steel cap nuts can be screwed into the circular plate with the aid of cylinder head screws (supplied) and used as support tips. In this way, the lowest design can be achieved (see pictures to the right).



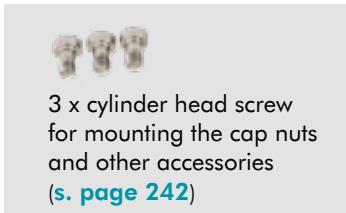
Features:

- Stable circular plate with the possibility to screw in various short legs (see next page)
- Positioning close to the ground
- 5/8" male thread to screw on instrument tribrachs
- Weight: 650 g

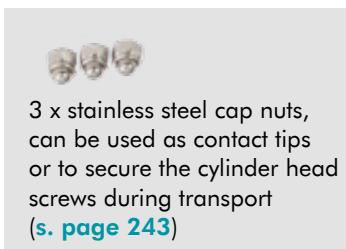


Description	Order-No.	Euro
Mini Instrument Tripod (without ball heads)	6880	130,-

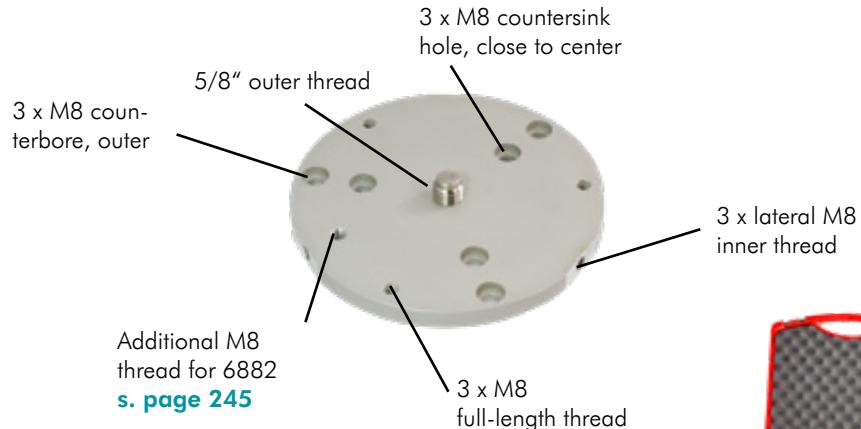
Scope of delivery and equipment



3 x cylinder head screw for mounting the cap nuts and other accessories (s. page 242)



3 x stainless steel cap nuts, can be used as contact tips or to secure the cylinder head screws during transport (s. page 243)



Carrying case (not suitable for magnets and suction holders)
s. page 228

■ Ball heads / joints see page 241

■ Overview of complete accessories s. page 242





Functional extension using ball joints

Three ball joints extend the range of use enormously and can be attached to the tripod plate as required.

Stable ball joint with tightening screw

- Uneven ground can be compensated
- Alignment of the ball joint possible in virtually all directions
- Wider, more stable installation possible
- Can either be screwed directly into the M8 through-hole threads from below or onto the lateral M8 threads (see picture examples)
- M8 external thread on both sides
- Very stable fixation by star grip tightening screw
- With adapter 6882 (s. page 245) the instrument stand can also be attached vertical surfaces using magnets or suction holders
- Weight: 135 g



Description	Order-No.	Euro
Ball joint with tightening screw - M8 outer threads (1 pc.)	5089	51,-

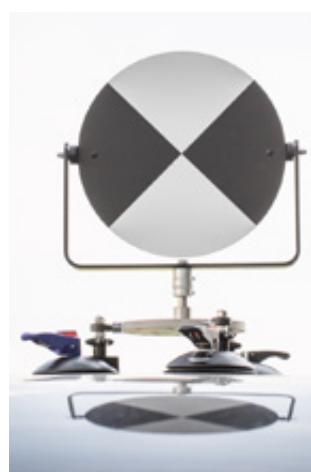
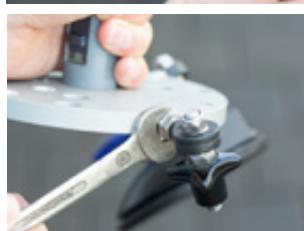


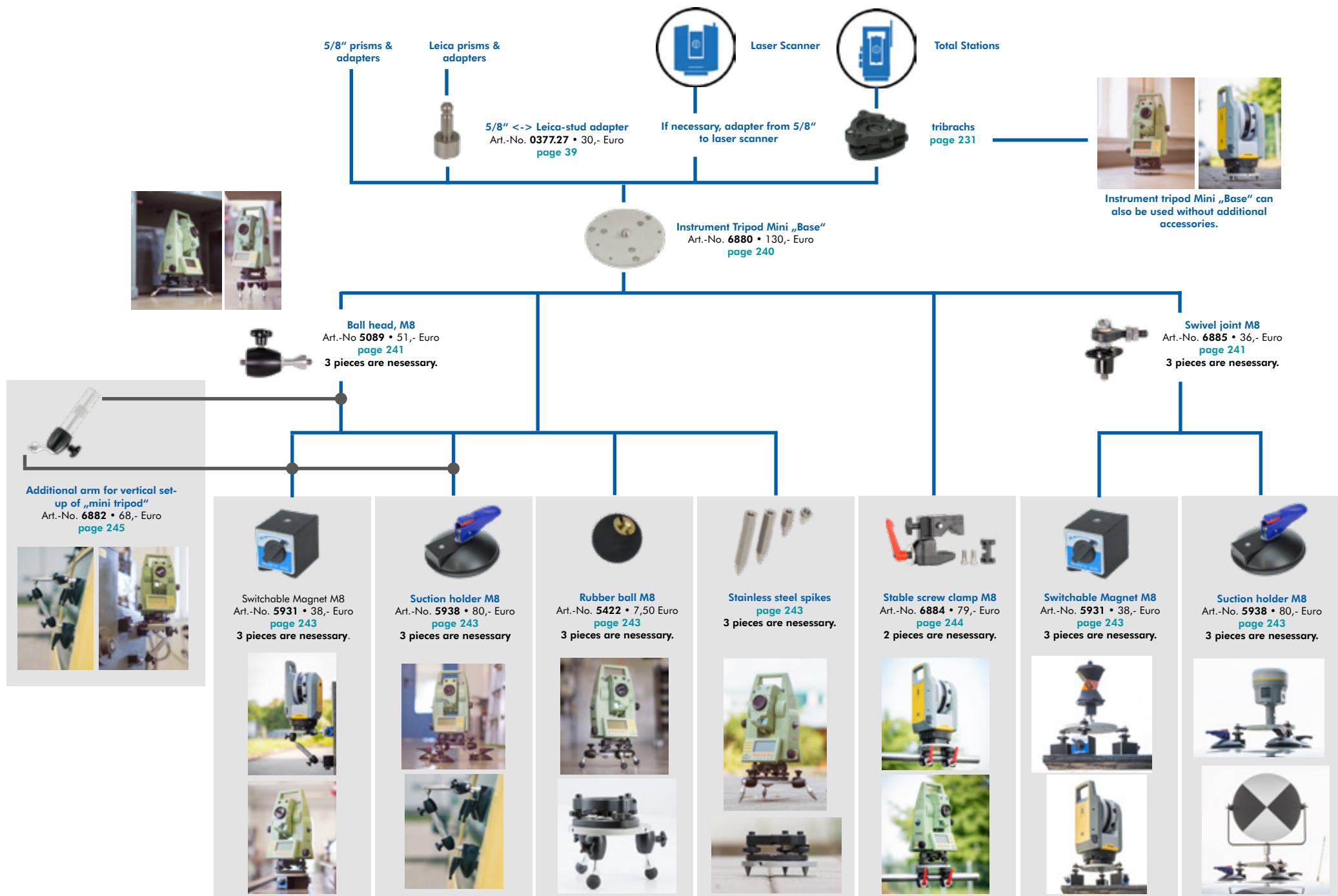
Lightweight flex swivel head

- **Slight** curvature of the ground can be compensated
- Wider, more stable set-up possible
- Space-saving and lightweight design
- M8 external thread on both sides
- To secure swivel head fork spanner SW13 is needed
- Weight: 62 g



Description	Order-No.	Euro
Ball joint with swivel bearing - M8 outer threads (1 Stk.)	6885	36,-







Further setup options

Depending on the type and condition of the ground, the ball heads (or the circular plate directly) can be equipped with further types of feet.



Please note that you need the respective foot **three times**:



Spikes for various undergrounds

Description	Length	Order-No.	Euro
Spike, stainless steel, M8 internal thread	20 mm	2059.20	14,-
	34 mm	2059.34	15,-
	70 mm	2059.70	18,-
	84 mm	2059.84	19,-



Rubber balls for smooth floors



Description	Order-No.	Euro
Rubber ball foot with M8 inner thread	5422	7,50



Switchable magnets for magnet. surfaces



Description	Order-No.	Euro
Switchable magnet (s. page 126)	5931	38,-

Magnetic holding force depends on the properties and thickness of the metal ground.



Suction holder for gastight surfaces



Description	Order-No.	Euro
Suction holder with vacuum indicator s. page 128	5938	80,-



Stable universal screw clamp M8

For attaching the „Instrument Tripod Mini“, prisms and targets to poles and surfaces, such as scaffold struts, table tops, steel beams, floorboards, etc.

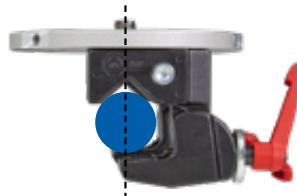


- Very stable quality clamp made of full metal
- Rubberized clamping surfaces to protect the material
- Clamping range on cylinders and surfaces, Ø/thickness: 13 - 55 mm
- Two M8 inner threads
- Clamping lever with latching function, i.e. lever direction can still be aligned even after tightening
- Insertable insert for flat surfaces (plates, table edges, boards, etc.)
- Incl. two cylinder screws M8x20 mm for attachment to tripod plate 6880 (see below)

Description	Order-No.	Euro
Uni. Screw clamp M8, with screws and flat piece	6884	79,-



Clamping range (diameter or flat material): **13-55 mm**.



Pressure range of the clamp is exactly in the center axis of the instrument tripod.



With optional usable flat pressure piece.



Use with instrument tripod Mini

For this purpose, 2 screw clamps are screwed to the tripod plate 6880 ([s. page 240](#)):



Clamping levers can still be aligned after tightening.

NOTE	For use with tripod plate 2 pieces are needed.
------	--

Alternative application possibilities



With joint arm [s. page 116](#)



With scanning targets [s. page 188](#)



Extension: Support arm

For using the mini tripod on vertical walls and surfaces

The support arm consists of a additional ball head with attached extension. It is particularly suitable for using the mini tripod vertically, with switchable magnets on steel constructions, or with suction holders on gas-tight surfaces.

- M8 inner thread for screwing to one of the 3 ball heads of the circular plate
- M8 outer thread for fastening the switchable magnet or the suction holder
- Extension (incl. ball head) approx. 160 mm

Description	Order-No.	Euro
Vertical arm, with ball joint for Mini Tripod	6882	68,-

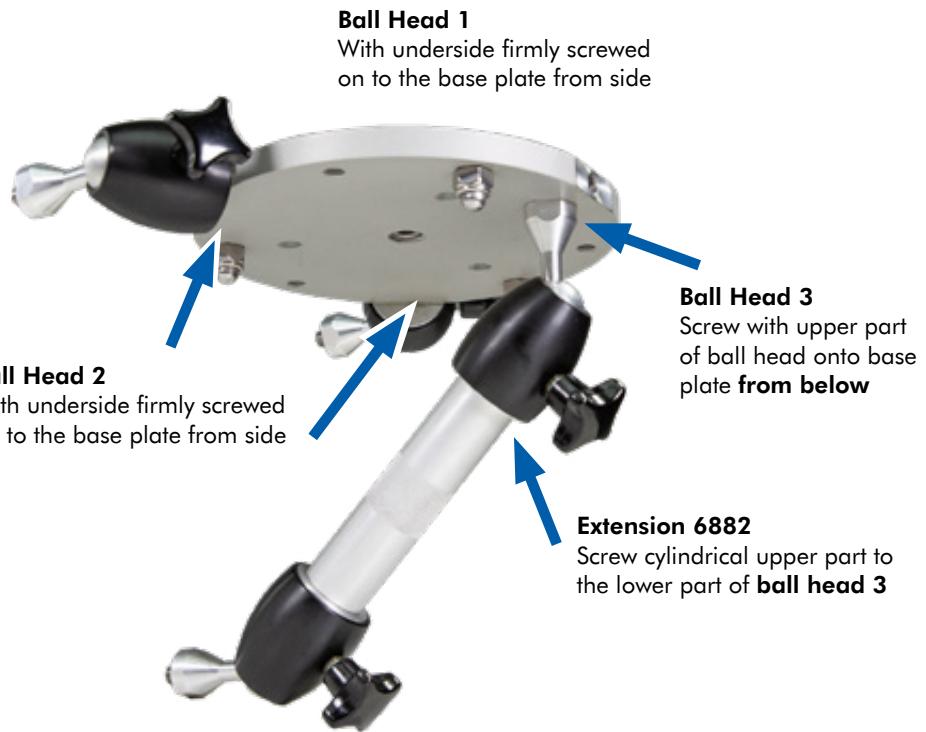
INFO

For this application, one of the three ball heads of the Mini Instrument Tripod must be screwed into the circular plate from below instead of from the side ([see setup, page 246](#)).





Manual: Instrument Tripod Mini - Vertical



Procedure

- Attach the 3 switchable magnets (or suction holders) to the object with the ball head **locking screws loosened**. Make sure that the tripod base plate is approximately horizontal.
- Flip magnetic switch / flip suction holder lever.
- When the magnetic surfaces (suction surfaces) rest flat on the object, **lock all 4 ball heads** with star grip screws

Notes: Switchable magnets

- Full holding power is only guaranteed on solid, magnetic surfaces, such as solid steel plates, tanks, ships, trains, oil rigs, etc.
The strength of car roof material is usually not sufficient.

Notes: Suction holder

- Full adhesion is only guaranteed on clean, gas-tight surfaces.
- Check suction holders regularly if they have become porous (due to solar radiation). Only use the suction holders if they are in perfect condition.
- Check the vacuum display at regular intervals after mounting (if the red marking of the lever is clearly visible, the vacuum holding force has decreased. Therefore the holder must be reattached).



Prism pole with eccentric lever

Stable, lightweight 2-part prism pole

- Outer shell made of Carbon, Ø 32 mm
- Inner rod made of aluminium with cm-scale, 5/8" inside thread
- Adjustable 20' circular level
- Soft rubber handle for comfortable handling even in winter
- Optional: Stainless steel latching pins for particularly secure fixing of the tilting axes or antenna height at 20 cm intervals from 1.60 m. The locking pin is secured with a steel cord and can be stored in the clamping element when not in use
- Exchangeable tip with 5/8" inside thread
- Length of pole:
 - without prism / adapter: 1,18 – 2,05 m,
 - with adapter & prism (to prism center): 1,33 – 2,20 m (= scale)
- Weight (without adapter / prism): 1,1 kg

Special Feature

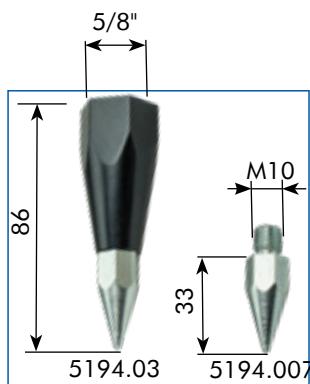
The inner rod is not clamped with a screw clamp (as with other prism rods), but with an eccentric lever (Figs. 1 and 2).

- High clamping forces can be generated with smooth operation
- The clamping force can be adjusted with an adjusting ring
- The risk of unintentional „sinking in“ of the inner tube, which may well occur with regular screw clamping, is reduced

Description	Order-No.	Euro
Prism pole S_10 with eccentric lever, 1,33 – 2,20 m	5612	355,-

INFO

An adapter and a prism with an effective height of 150 mm up to the prism centre must be screwed into the 5/8" internal thread. Then the scale on the inner tube indicates the correct target height.



Wear and spare parts

Description	Order-No.	Euro
Tip for prism pole, complete	5194.03	16,-
Tip for prism pole, only steel base part	5194.007	5,-



Prism Pole Accessories

Adapter for Prism Pole

Our prism pole S_10 comes with a 5/8" female thread in the inner tube. The adapters required for the respective prism system are screwed into this thread. The scaling on the inner pole is matched to the adapters.

- 5/8" outside thread to screw onto prism pole
- **150 mm** from upper edge of prism pole to prism/target centre



For prisms with:

■ 5/8" inside thread and 50 mm tilting axis heights

z.B. our prism series HIP

Description	Order-No.	Euro
Extension 2 x 5/8" outside thread, effective length 100 mm	0297.100	30,-

■ 5/8" inside thread and 100 mm tilting axis heights

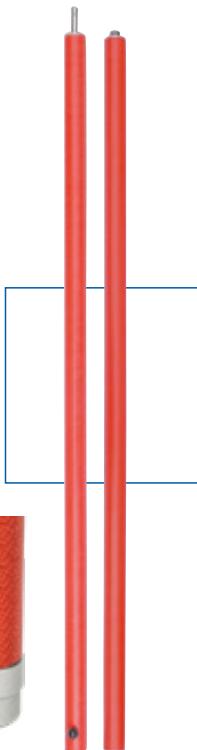
Works with prism KTR1 (for example)

Description	Order-No.	Euro
Extension 2 x 5/8" outside thread, effective length 50 mm	0297.050	28,-

■ Leica socket Ø 12 mm

For Leica prisms with distance of 60 mm from top edge of bolt to centre of the prism.

Description	Order-No.	Euro
Extension with Leica spigot Ø 12 x 40 mm, stainless steel	0378.90	30,-



Extensions 0,5 m and 1 m

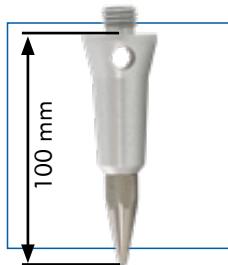
Made of GFK/CFK. Very light and durable. The extensions are designed so they can be used **between adapter and prism / target**.

5/8" Extensions						
Ø	bottom	top	length	weight	Order-No.	Euro
32 mm	5/8" inside thread	5/8" outside thread	0,5 m	350 g	5455.2	84,-
			1,0 m		5455	105,-

Leica Extensions						
Ø	bottom	top	length	weight	Order-No.	Euro
32 mm	Leica socket	Leica spigot, 40 mm	0,5 m	400 g	5455.2L	110,-
			1,0 m		5455.L	131,-



Tip for prism/GNSS pole



- Ø32 x 100 mm
- 5/8" male thread
- Aluminium with exchangeable V2A-tip
- Weight: 100 g

Description	Order-No.	Euro
Prism pole tip, 5/8", Ø32 x 100 mm	5502	37,-

Strut Tripods / Bipods

For quick and easy installation of prism poles in any terrain.



Bipod (Seco)

- Top pushbutton clamp
- Adjustable range of legs: 1,05 – 1,80 m
- Open clamp for lateral insertion of the poles
- Suitable for poles with Ø : 25 – 38 mm



Description	Order-No.	Euro
Strut bipods, 2 legs, Alu, red, 1,8 kg	2091.R	208,-

Protective sleeve for poles with Ø32 mm

Modern materials, such as GRP and CFRP, allow the production of light yet stiff prism and GNSS rods. The disadvantage of the often thin wall of the pole is its high sensitivity to punctiform pressure.

For this reason, accessories such as computer holders or computer holders should be screwed on using clamps that fit exactly to the cylindrical shape of the pole.

Alternatively, a sleeve can be pushed onto the pole for the use of clamps that generate punctiform pressure. This protects the pole surface and allows the use of accessories that either have a high weight (e.g. large field computers) or develop high lever forces (e.g. 2-leg tripods).

We offer sleeves for the common pole standard Ø 32 mm.



- Sleeve inner Ø 32 mm, outer Ø 35 mm
- Length 60 mm
- Anodised aluminium
- Can be used on already damaged pole
- Weight: 24 g

Description	Order-No.	Euro
Protective sleeve for Ø32 mm poles, length 60 mm	5610.B	20,-





Compass with Velcro fastener

Compass for GNSS and prism poles for approx. indication of the cardinal direction.

- Very fast alignment to „North“
- Reduced tendency of bubbles occurring
- Velcro fastener with redirection for reliable and quick attachment to the pole
- Weight: 20 g, Compass-Ø: 20 mm

Description	Order-No.	Euro
Compass with Velcro fastener, for poles Ø 18 - 32 mm	5475	18,-
Compass with Velcro fastener, for poles Ø 40 mm	5476	21,-

Description	Order-No.	Euro
Compass (single) as spare part, with adhesive foil	5475.E	1,50

Replacing a defective compass (single):



Compass in Aluminium-Holder

- Robust aluminium construction
- For mounting on all prism/GNSS antenna poles with Ø 32 mm (1 1/4")
- Simple screwing/height adjustment of the compass holder with Allen key (5 mm)

Description	Order-No.	Euro
Holder with compass for poles with Ø 32 mm	3008.K	38,-

For other poles with Ø 20 to 32 mm we offer a reduction sleeve made of plastic. It ensures a firm fit of the compass holder and protects the pole surface.

Description	Order-No.	Euro
Pole-Ø reduction sleeve (Ø32 mm): For poles Ø20 mm (POM)	3008.3220	11,-
Pole-Ø reduction sleeve (Ø32 mm): For poles Ø23 mm (POM)	3008.3223	11,-
Pole-Ø reduction sleeve (Ø32 mm): For poles Ø25 mm (POM)	3008.3225	11,-
Pole-Ø reduction sleeve (Ø32 mm): For poles Ø26 mm (POM)	3008.3226	11,-
Pole-Ø reduction sleeve (Ø32 mm): For poles Ø27 mm (POM)	3008.3227	11,-
Pole-Ø reduction sleeve (Ø32 mm): For poles Ø30 mm (PLA)	3008.3230	7,-

INFO

Other diameters available on request.

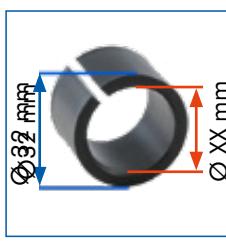


Simple circular level with Velcro fastener

- For attachment to all poles up to Ø 35 mm with Velcro fastener
- Plastic level with sensitivity 50'
- Delivered adjusted (not adjustable)
- Weight: 25 g

Description	Order-No.	Euro
Circular level with Velcro fastener	5425	21,-





Adjustable circular level in Aluminium-Holder

- Sturdy aluminium construction
- For mounting on all prism/GNSS antenna poles with Ø 32 mm (1 1/4")
- Easy screwing/height adjustment of the holder with Allen key (5 mm)
- Level adjustment with 2,5 mm-hex wrench
- Glass level in aluminium frame
- Level sensitivity: 10' or 30'

Description	Order-No.	Euro
Holder with circular level 10', for poles with Ø 32 mm	3008.10	56,-
Holder with circular level 30', for poles with Ø 32 mm	3008.30	53,-

For other poles with **Ø 20 to 32 mm** we offer a reduction sleeve made of plastic. It ensures a firm fit of the compass holder and protects the pole surface.

Description	Order-No.	Euro
Pole-Ø reduction sleeve (Ø32 mm): For poles with Ø20 mm	3008.3220	11,-
Pole-Ø reduction sleeve (Ø32 mm): For poles with Ø23 mm	3008.3223	11,-
Pole-Ø reduction sleeve (Ø32 mm): For poles with Ø25 mm	3008.3225	11,-
Pole-Ø reduction sleeve (Ø32 mm): For poles with Ø26 mm	3008.3226	11,-
Pole-Ø reduction sleeve (Ø32 mm): For poles with Ø27 mm	3008.3227	11,-

INFO

Other diameters available on request.



■ Second Level

If only one circular level is used on the pole, its adjustment should be checked daily. To increase the reliability of the measurement, we therefore recommend the use of a second level for high accuracy applications. It is screwed to the pole independently of the 1st level. After careful adjustment of both vials, the correct vertical position of the pole is ensured, if both levels are being used simultaneously. The two levels virtually control each other.

Only when the levels no longer correspond, an adjustment is obligatory.

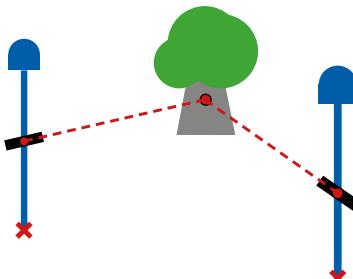


Holder KiLas-Geo



The KiLas-Geo requires a 1/4" internal thread on the underside of the laser odometer and the possibility to set an offset of -65 mm from the rear edge of the device.

- Suitable for laser distance meters of various manufacturers and generations
- Precise results because the tilting axis of the holder is perpendicular to the axis of the laser beam
- Ergonomic handling: Setting of the target point while the thumb/finger is already on the button to trigger the measurement
- Sturdy aluminium construction with 1/4" knurled screw for mounting the laser distance meter
- Bolt Ø 12 mm for insertion into the pole adapter. Can be mounted on the left or right side of the KiLas-Geo
- M8 internal thread on both sides to screw in the optional GFK/CFK pole for building measurements [s. page 253](#)
- Weight: 240 g



Description	Order-No.	Euro
Holder KiLas-Geo (without laser distance meter)	2800	142,-

The following laser distance meters can be used with the KiLas-Geo:
Leica DISTO D410, D5, D510, D8, D810 touch, S910 and more.

INFO

With the KiLas-Geo other laser distance meters can also be used.
Please contact us.



Pole Adapter

To use the KiLas-Geo holder with cylindrical poles of all kinds

The 12 mm bolt of the KiLas-Geo tilting mount is inserted into the plastic bearing on the pole adapter. A star grip screw secures the adapter and adjusts the tipping resistance. With all pole adapters, the tilting axis runs through the pole axis at right angles due to the design. This ensures correct measurement results.

- Weight approx. 150 g

Description	Order-No.	Euro
Pole clamp for poles Ø 18-32 mm, with bolt socket Ø 12 mm	2810	68,-
Pole clamp for poles Ø 30-45 mm, with bolt socket Ø 12 mm	2811	68,-
Pole clamp for poles Ø 32 mm, with bolt socket Ø 12 mm	2812	68,-

Laser odometer without inclination sensor

- Offsets of -65 mm with measuring plane adjustment from trailing edge
- Horizontal distances: Set the tube level horizontally and secure the tilting device



Description	Order-No.	Euro
Tube level for KiLas Geo with 2 fixing screws	2808	8,50

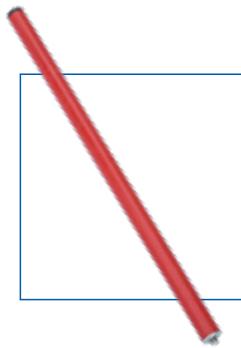




Pole to extend building lines

A 40 cm long pole is screwed into the KiLas-Geo (possible on both sides). By placing the pole against the building wall, the building alignment is constructively extended so that it runs through the defined reference point of the distance measurement; even when the support is tilted.

The laser distance meter is aligned on a target plate that extends the opposite building alignment. It can be stopped at a distance of up to 30 cm from the corner of the building and can also be tilted (see picture).



INFO

By using the extension pole in conjunction with the building target panel, building lengths can be measured exactly at a parallel distance of up to 30 cm. Thus the KiLas-Geo can also be used on building sides, which could not be measured since then due to obstacles, e.g. down pipes of gutters etc.

- Pole-Ø 20 mm, made of GFK/CFK, red
- M8 outer thread made of stainless steel
- Weight: 90 g

Description	Order-No.	Euro
Extension pole for KiLas-Geo, Ø 20 x 400 mm (GFK/CFK, red)	2806	44,-



Target-Plate for poles

For distance measurement, the target plate is placed vertically on the ground point.

- Composite panel with white surface: DIN A4-sized (21 x 30 cm)
- Front of the panel is in the axis of the connecting thread / the pole axis
- Weight: 360 g

Description	Order-No.	Euro
Target-Plate ZA4, white, 21 x 30 cm, 5/8" internal thread	6062	50,-
Target-Plate LA4, white, 21 x 30 cm, Leica socket Ø12 mm	6064	56,-



Thread connection Adapters

Made of stainless steel with cross knurl

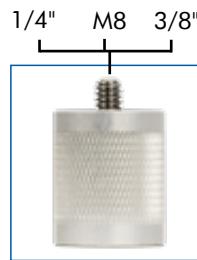


Description	1. side	2. side	Effective length	Order-No.	Euro
Short adapter, stainless steel	5/8" outer	M8 inner	7 mm	0385.007	18,-
		M8 outer		0384.007	18,-
		1/4" outer		0392.007	21,-

Made of aluminium with stainless steel external thread



Description	bottom	top	Effective length	Order-No.	Euro
Adapter M8 - M8	M8 inner	M8 inner	50 mm	0372.050	24,-
		M8 outer	50 mm	0373.050	25,-

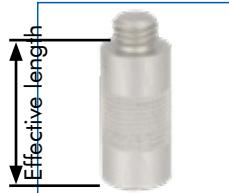


Made of aluminium with stainless steel external thread

Description	bottom	top	Effective length	Order-No.	Euro
Extensions Ø 25 mm, 5/8" thread	5/8" inner	M8 outer	40 mm	0381.040	26,-
		1/4" outer	30 mm	0390	23,-
		3/8" outer	30 mm	0382	26,-

5/8" Extensions

Made of aluminium

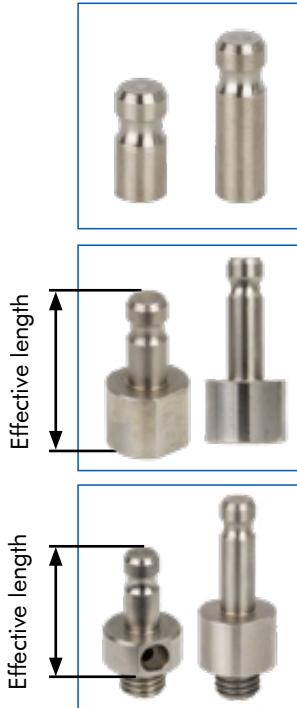


Description	bottom	top	Effective length	Order-No.	Euro
Extension Ø 25 mm, 5/8" thread	5/8" inner	5/8" outer	30 mm	0300.030	26,-
			40 mm	0300.040	26,-
			50 mm	0300.050	27,-
			64 mm	0300.064	27,-
			65 mm	0300.065	28,-
			75 mm	0300.075	28,-
			86 mm	0300.086	29,-
			86,5 mm	0300.0865	29,-
			100 mm	0300.100	30,-
			114 mm	0300.114	30,-
			115 mm	0300.115	30,-
			136 mm	0300.136	31,-
			150 mm	0300.150	31,-
			175 mm	0300.175	32,-
			200 mm	0300.200	32,-

Other lengths are available as special designs under the number 0300.L (s. page 257).

Adapter: Thread connection to Leica spigot

- Stainless steel design

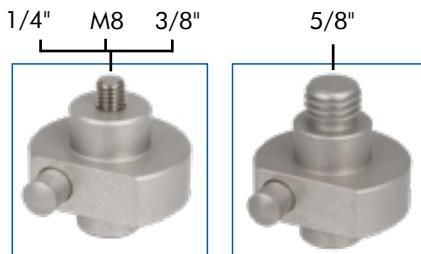


Description	bottom	top	Effective length	Order-No.	Euro
Adapter M8 - Leica	M8 inner	Leica spigot Ø 12 x 27 mm	27 mm	0180.25	13,-
		Leica spigot Ø 12 x 40 mm	40 mm	0180.30	15,-

Description	bottom	top	Effective length	Order-No.	Euro
Adapter 5/8" - Leica	5/8" inner	Leica spigot Ø 12 x 27 mm	47 mm	0377.27	30,-
		Leica spigot Ø 12 x 40 mm	60 mm	0377.40	33,-
	5/8" outer	Leica spigot Ø 12 x 27 mm	40 mm	0378.27	30,-
		Leica spigot Ø 12 x 40 mm	60 mm	0378.40	33,-

Adapter: Leica mount to thread connection

- With push button for one-hand operation
- Made of anodised aluminium



Description	bottom	top	Effective length	Order-No.	Euro
Adapter, Leica - Threads	Leica socket Ø 12 x 26 mm	M8 outer	10 mm	0680	50,-
		1/4" outer	10 mm	0692	50,-
		3/8" outer	10 mm	0693	50,-
		5/8" outer	10 mm	0690	50,-

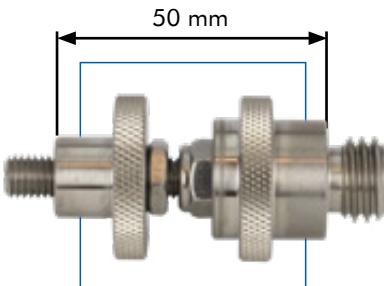
- With horizontal locking screw
- No. **0291.10** can be used for all Leica spigot sØ 12 mm, for No. **0306.10** the spigot has to be 40 mm long
- Made of anodised aluminium



Description	bottom	top	Effective length	Order-No.	Euro
Adapter Leica - Thread	Leica socket Ø 12 x 26 mm	M8 outer	10 mm	0302.10	29,-
		Leica socket Ø 12 x 26 mm	10 mm	0291.10	29,-
		Leica socket Ø 12 x 40 mm	10 mm	0306.10	30,-

Adapter: M8 – 5/8" - rotateable

- Side 1: M8 outer thread to screw in common wall bolts
- Side 2: 5/8" outer thread to connect prism holders
- One common axis -> independently rotatable around this axis
- Rotation resistance can be adjusted with self-locking hexagon nut (SW 13)
- Large knurls for safe insertion without tools
- Stainless steel design



Length 50 mm

- Screwing-in can be supported with a fork wrench (SW 13)

Description	Order-No.	Euro
Adapter WA 50, M8 - 5/8", L = 50 mm	0810	43,-

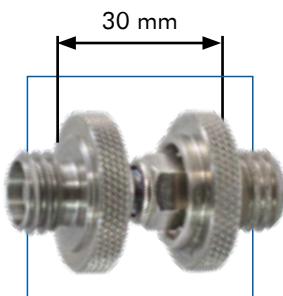
Example: Wall offset system 100 mm with HIP prisms [see page 40](#)

Length 30 mm

Description	Order-No.	Euro
Adapter WA 30, M8 - 5/8", L = 30 mm	0820	43,-

Adapter: 5/8" – 5/8" - rotateable

- Side 1: 5/8" thread for connecting poles, extensions, etc.
- Side 2: 5/8" thread for connecting the reflector supports
- One axis -> independently rotatable around this axis
- Rotational resistance can be adjusted with self. hexagon nut (SW 13)
- Large knurl for safe screwing in without tools
- Stainless steel design



Description	Order-No.	Euro
Adapter 2 x 5/8" external thread, rotatable	0824	47,-

Example: Using HIP-Prisms for stacking [see page 68](#)

Adapter: M8 – Leica Ø 12 mm

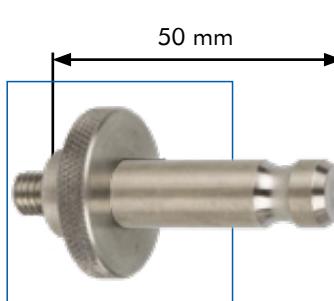
- Side 1: M8 outer thread to screw in common wall bolts
- Side 2: Leica Ø12 mm spigot to put on any prism with Leica connection
- Knurl Ø 30 mm for easy screwing into wall bolts (without tools)
- Spigot Ø 12 x 27 mm, total length (without M8 thread): 40 mm
- Stainless steel design

Description	Order-No.	Euro
Adapter WA Leica, M8 – Leica Ø 12 x 27 mm	0830	18,-

Example: Series HIP-U Leica in Wall offset system 100 mm [see page 40](#)

Same features as adapter 0830 (see above). But:

- Bolt Ø 12 x **40 mm**, total length (without M8 thread): **50 mm**



Description	Order-No.	Euro
Adapter WA Leica 40, M8 – Leica Ø 12 x 40 mm	0831	20,-



Custom Length Aluminium extensions

■ up to 100 or 200 mm length (see below)

NOTE

When ordering please state Order-No. + effective length in mm

- Made of aluminium Ø 25 mm
- Leica spigot made of stainless steel
- Leica socket with horizontal locking screw



Example: 0377.L

1. Side	2. Side	max. Length	Order-No.	Euro
5/8" inner thread	5/8" inner thread	200	0295.L	34,-
5/8" inner thread	5/8" outer thread	200	0300.L	36,-
5/8" inner thread	Leica-27-mm bolt	100	0377.L	41,-
5/8" inner thread	Leica-40-mm bolt	100	0366.L	39,-
5/8" inner thread	1/4" outer thread	100	0365.L	35,-
5/8" inner thread	1/4" inner thread	100	0390.L	33,-
5/8" inner thread	M8 inner thread	200	0383.L	33,-
5/8" inner thread	M8 outer thread	200	0381.L	35,-



Example: 0300.L

5/8" outer thread	1/4" outer thread	100	0392.L	37,-
5/8" outer thread	5/8" outer thread	200	0297.L	39,-
5/8" outer thread	Leica-27-mm bolt	100	0376.L	42,-
5/8" outer thread	Leica-40-mm bolt	100	0378.L	43,-
5/8" outer thread	M8 inner thread	200	0385.L	35,-
5/8" outer thread	M8 outer thread	200	0384.L	37,-

Leica socket 27	5/8" inner thread	100	0290.L	47,-
Leica socket 27	5/8" outer thread	100	0291.L	49,-
Leica socket 27	Leica-27-mm bolt	100	0304.L	53,-
Leica socket 27	M8 outer thread	100	0302.L	43,-
Leica socket 27	1/4" outer thread	100	0405.L	44,-
Leica socket 40	5/8" outer thread	100	0306.L	49,-



Example: 0291.L

M8 inner thread	M8 inner thread	200	0372.L	32,-
M8 inner thread	M8 outer thread	200	0373.L	34,-
M8 outer thread	M8 outer thread	200	0374.L	36,-
M8 outer thread	3/8" inner thread	100	0344.L	38,-
M8 outer thread	1/4" outer thread	100	0403.L	38,-
M8 inner thread	1/4" outer thread	100	0402.L	38,-
M8 outer thread	Leica-27-mm bolt	100	0404.L	40,-
3/8" inner thread	3/8" outer thread	100	0288.L	39,-
other adapters		-	0298.L	at cost



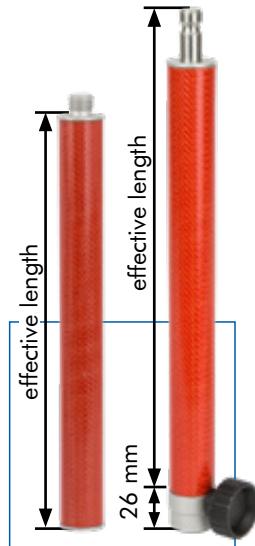
Extensions GFK/CFK - Custom Length

NOTE

When ordering please state Order-No. + effective length in mm

NOTE

The longer the material, the less straightness is guaranteed. The extensions are therefore not suitable for measuring in the sub-millimeter range.

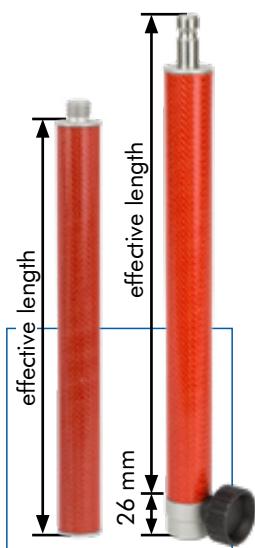


Ø26 mm - 200 - 500 mm Length

Description	bottom	top	Order-No.	Euro
Extension Ø 26 mm	5/8" inner-thread	5/8" inner thread	5630.L	86,-
		5/8" outer thread	5631.L	89,-
		Leica spigot Ø 12 x 27 mm	5632.L	95,-
	5/8" outer-thread	5/8" outer thread	5633.L	89,-
		Leica spigot Ø 12 x 27 mm	5634.L	98,-
	Leica socket Ø 12 x 26 mm	5/8" inner thread	5635.L	112,-
		5/8" outer thread	5636.L	116,-
		Leica spigot Ø 12 x 27 mm	5637.L	121,-
	M8 inner thread	M8 inner thread	5650.L	86,-

Ø32 mm - 200 - 1000 mm Length

Description	bottom	top	Order-No.	Euro
Extension Ø 32 mm	5/8" inner-thread	5/8" inner thread	5456.L	91,-
		5/8" outer thread	5457.L	94,-
		Leica spigot Ø 12 x 27 mm	5458.L	99,-
	5/8" outer-thread	5/8" outer thread	5459.L	94,-
		Leica spigot Ø 12 x 27 mm	5461.L	103,-
	Leica socket Ø 12 x 26 mm	5/8" inner thread	5462.L	117,-
		5/8" outer thread	5463.L	121,-
		Leica spigot Ø 12 x 27 mm	5464.L	126,-
	M8 inner thread	M8 inner thread	5468.L	91,-

**INFO**

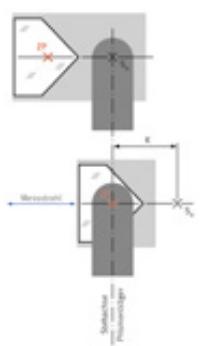
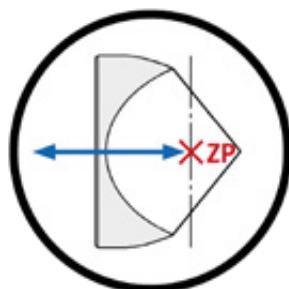
Fixed lengths 0.5 m and 1.0 m with Ø32 mm 248

Appendix

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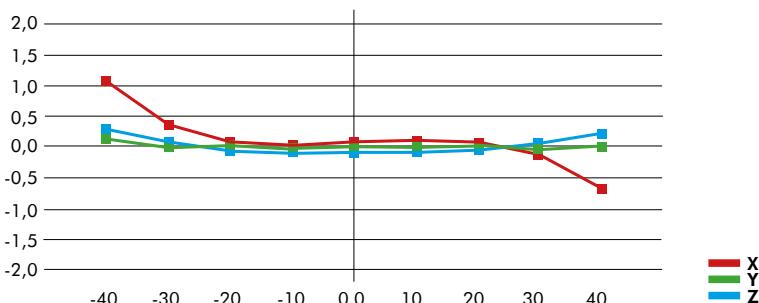
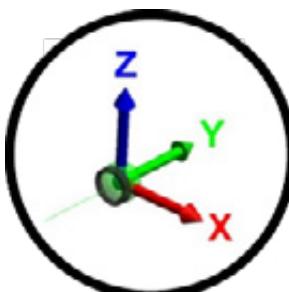
I.1. Info: Prism contents

262



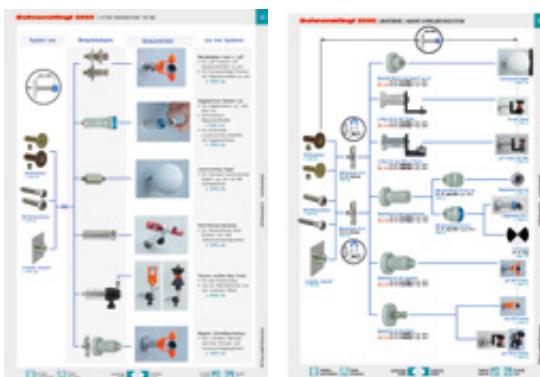
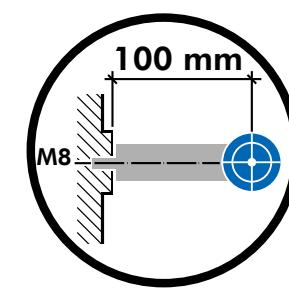
I.2. Info: Alignment of prism towards total station

264



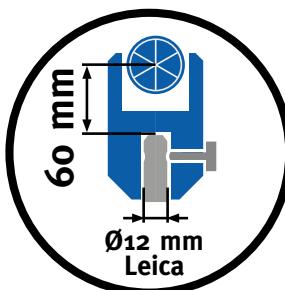
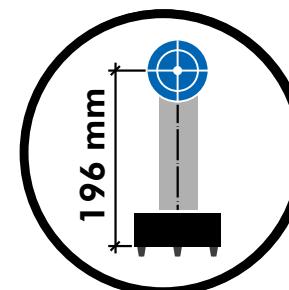
I.3. Info: System 100 mm Wall Offset

265



I.4. Info: Leica Tiltring axis height and stud connection

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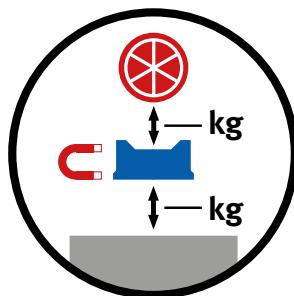


Appendix

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I.5. Info: Magnetic holding force

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I.6. Info: Two prism / Vector method

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I.7. Order Form

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I.8. Terms of sale, delivery and payment

272

Prism constant and central symmetric point

In the current tachymeter generation, 2 definitions of the prism constants (offset) have to be distinguished.

The manufacturers **Nikon, Pentax, Sokkia, Spectra Precision, Topcon, Trimble** (in the past Geodimeter, Zeiss) and more now define the prism constant without exception as an „improvement“, i.e. as correct-sign correction of the measured distance based on the physical and design properties of the measured prism or reflector. With the triple prism, these are the type and length of the glass body and the mechanical mounting of the prism on the carrier / holder. The size of the prism constants results from the distance between the vertical axis of the prism holder and the (theoretical) reversal point S_0 of the measuring beam. If the standing axis is realized exactly in this point S_0 (e.g. this was the case for early Geodimeter prisms - see upper drawing) the prism constant is = 0. With commercially available prisms (except some prism rings), the vertical axis is always in front of the reversal point S_0 . A distance is therefore measured too long and the improvement (= prism constant K) is therefore negativ. If the vertical axis runs through the visible center of the prism as shown in the drawing below, also known as **central symmetric point ZP**, this is the most error-theoretically favourable mounting of the reflector. A prism that is inaccurately aligned with the tachymeter then has the least effect on the angle and distance measurement.

The range of constants of glass prisms varies from -11.3 mm to -35 mm, depending on the length of the glass.

Only the company **Leica** has another definition of the prism constant. It refers the specification of the prism constant to its standard round prism (GPH1 + GPR1). According to the above calculation, this has a true prism constant (improvement) of -34.4 mm. Leica defines this prism in its system with a constant of 0.0 mm.

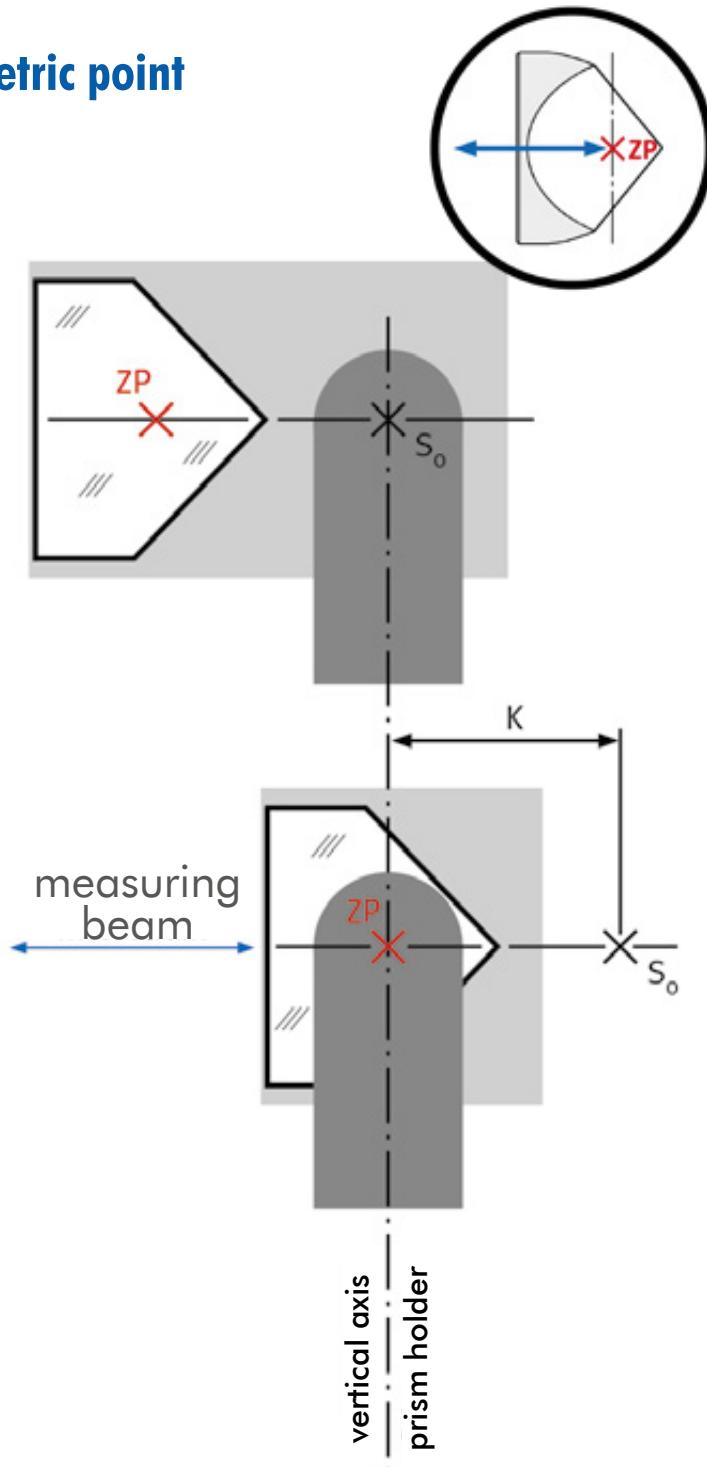
Therefore, the constants of Leica prisms and non-Leica prisms must be converted into the other system as follows when used in conjunction with each other:

If a non-Leica prism, where the true prism constant is given, is to be used with a Leica total station, 34.4 mm must be added. Example of a non-Leica prism with a true constant of $K = -30$ mm:
 $-30.0 \text{ mm} + 34.4 \text{ mm} = +4.4 \text{ mm}$. This must be set on the Leica total station.

However, if a Leica prism, where the prism constant is specified in the Leica system, is to be used with a non-Leica total station, 34.4 mm has to be subtracted.

Example for the Leica 360°-Prism GRZ122 with the Leica constant of +23.1 mm:
 $+23.1 \text{ mm} - 34.4 \text{ mm} = -11.3 \text{ mm}$. This must be set on the non-Leica total station (rounded if necessary).

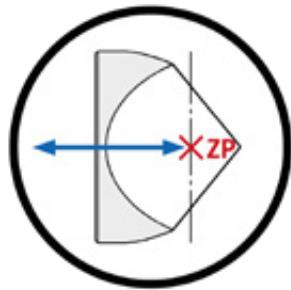
The following table (next page) takes the above facts into account and shows the constants of the most commonly used prisms and reflectors for the non-Leica systems and the Leica system. With modern total



stations, the individual constants can be entered directly as values and called up via hotkeys. Each measured distance is thus automatically corrected.

If it is to be avoided that the setting of the constants on the total station must be changed during a prism change, standard prisms or prisms from other manufacturers with identical constants must be used.

Standard prisms and small prisms with adapted prism constant



The purchase of a tachymeter usually involves the purchase of a standard prism. Small prisms or 360° prisms from the same manufacturer have constants that differ from this standard prism and therefore it is necessary to change the set prism constants on the total station. If you forget to change the setting (often only by pressing a key), the measurement result will be significantly falsified. This source of error can only be eliminated if the prisms used have a constant adapted to the standard prisms.

For this reason, we have developed small prisms with identical prism constants for all important standard prisms of the large manufacturers. By using high-quality glass material in combination with high grinding accuracy, these prisms are completely adequately dimensioned for today's high-performance tachymeters. In addition, they have been designed to be optimized in terms of error theory.

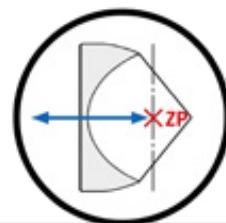
All prisms available by us (with prism constant) are listed in the table below.

Prism-/Reflector Type Standard	prism constant K in mm		● ○ available by Bohnenstingl Prisms and Reflectors											
	physic. constant, used by all manufacturers except LEICA	constant as defined by LEICA	Prism Series HIP	Prism and reflec. foils on L-carrier	Prism Series ONRT	„Rundum“ Prism 6x60°	360°-Prism Medium Format	Precision Prism 17.5	PP 17.5 for concrete bevels	Ball prism Ø 30 mm and 1.5"	Prism on L-holder with magn. base	Ball prism, indust. 3D-Measurements	Ball prism, Ground points	Monitoring Prism Series MoniPro
Trimble Multi Track Prism MT1000	+10	+44,4												
Trimble 360°-Prism (passiv)	+2	+36,4												
Reflective foil, Prisms by Nikon, Sokkia, Topcon etc., Leica CPR 105	0	+34,4	●	●	○					○	○			
Topcon 360°-Prism A7	-2	+32,4												
Trimble 360°-Prism for Zeiss S10	-3	+31,4												
Leica 360° Mini GRZ101	-4,4	+30												
360°-Prism Medium Format	-6	+28,4								○				
Leica MPR122 360°-Prism	-6,3	+28,1												
TOPCON/Sokkia 360°-Prism ATP1/ATP1 S	-7	+27,4												
Leica 360°-Prism GRZ4, GRZ121, GRZ122	-11,3	+23,1	●	●	○	●				●	●	●	●	●
Leica Mini GMP101, GMP 111	-16,9	+17,5	●	●	●					●	●	●	●	●
Prisms by Nikon, Sokkia, Topcon etc.	-30	+4,4	●	●	○						●			
Leica Standard prism GPH1P, GPR121, GPR1, GPH1	-34,4	0	●	●	○						●			
Trimble (Zeiss ETR, KTR, KTO, KTM)	-35	-0,6	●	●	○						●			

● = Mounting of the prism/reflector at the centrally symmetrical point (visible center). A prism that is not aligned accurately with the total station has the minimum effect on angle and distance measurements. This is of great advantage if only the prism center is available as a target for measurements or if automatic target determination is carried out on it.

With these prisms precision measurements can be performed.

○ = No mounting of the prism/reflector in the centrally symmetrical point (visible center)

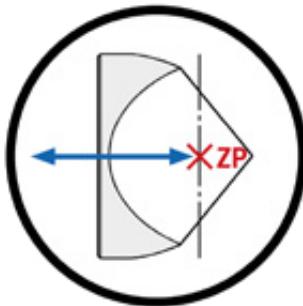




Leica GRZ4 Leica GRZ122



Leica GRZ122



Only for measurements on reflective foil and of points on facades a second prism with prism constant $K = 0$ mm (Leica definition = +34.4 mm) is still required.

- Single tiltable prism HIP
- Single tiltable prism TOP/ONRT
- Single tiltable prism on L-carrier
- Ball prism
 - Monitoring-System
 - Industrial 3D Measurements
 - Surveying of wall and ground points
- Universal prism pole (sewer measuring pole) System Vektor
- Mini-Vektor for precision measurements
- RUNDUM-Prism 6x60°
- Twin-Systems
- Cylidner prism ZP11

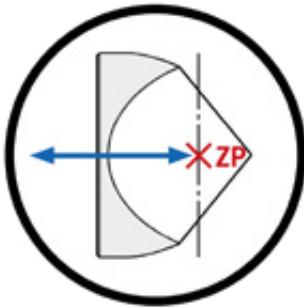


Error when aligning prism towards total station

If the prism is not exactly aligned to the tachymeter, errors occur in the angle and distance measurement. These errors are lowest if the vertical axis of a prism carrier runs through the central symmetrical point of the prism, or if the centre of the sphere and the central symmetrical point of the prism are identical in the case of a prism built into a sphere.

This is the case with all our ball prisms. The Institute of Technology Karlsruhe has used a laser tracker to analyze the effects of a ball prism that is not exactly aligned with the instrument (ball \varnothing 38.1 mm, triple prism \varnothing 25 mm). It was placed in a base (nest) and precisely aligned with the laser tracker. The ball was then rotated around the zenith axis (Z axis). The following diagram shows the deviations depending on the degree of rotation.

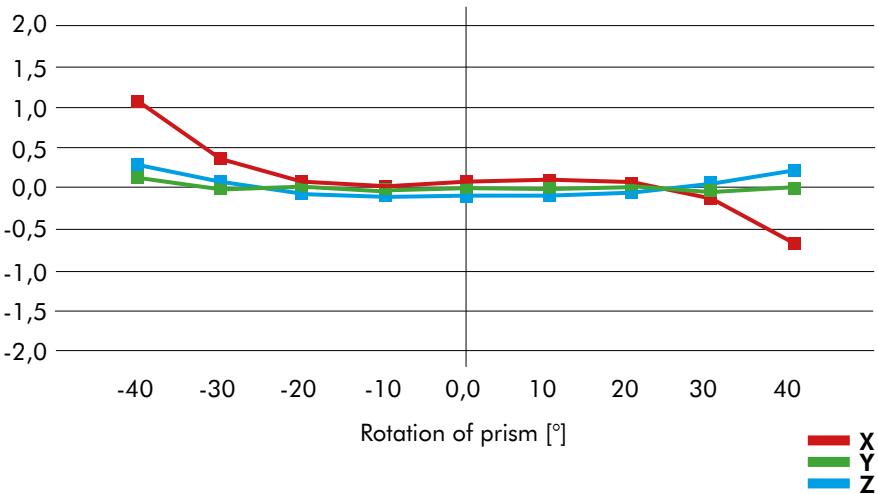
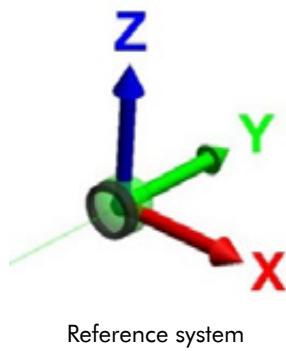
The coordinate system of the positions has its origin in the absolute center of the sphere, the X-axis points from the tracker to the right, the Y-axis to the target direction, the Z-axis to the top.



Prism "zero-point" when rotating the prism around Z-axis (horizontal) [mm]

[mm]

Source of graphic: Festschrift zur 150-Jahr-Feier des Geodätischen Instituts (1868 - 2018), 2018, 2 (KIT Scientific Publishing) - page 159

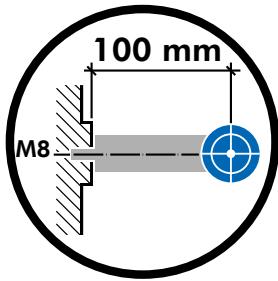


The Y-value shows the effect of the rotation on the **distance measurement**. It is marginal even with a misalignment of up to 40° and remains below 0.1 mm.

For the **angle measurement**, however, this only applies to a rotation of up to 20°. With a larger rotation, the ball centre "wanders" disproportionately strongly. In the case of an extreme misalignment of approx. 45° (shortly before the prism centre is no longer visible and therefore measurement is no longer possible), deviations of the order of 1 mm occur.

M8 wall bolt / target distance 100 mm

Application



- Marking of survey points with wall bolts (M8 inner thread):
- In cadastral and engineering surveying as connection points instead of ground points
- For building control measurements as object points to be tested or for fastening surveying instruments to the wall/structure

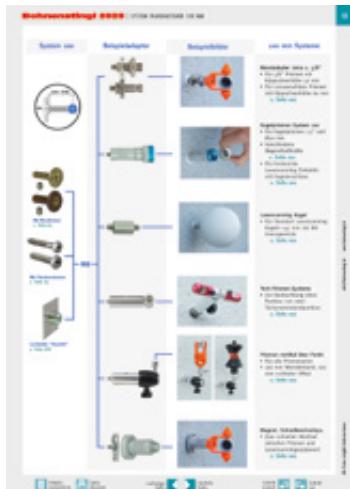
Concept

- By screwing the wall adapter with the corresponding target (including prism) into the M8 wall bolt, the prism is **force-centred in position** (X, Y) and height (Z) at the nominal point

AdV Version (Germany)

- The points have an **M8 internal thread**. A hole must be drilled for bolts. Then they can be inserted into the building using the dowel or mortar method. Modern injection mortars (2-component basis) have also proven their worth. Without drilling, i.e. non-destructively, steel cylinders with M8 internal threads can be fastened to the building structure on platforms made of perforated sheet metal using assembly adhesive
- The measurement setpoint P0 is according to definition in the axis of the M8 thread, **100 mm in front of the wall surface at the wall bolt**
- The prism/target is freely rotatable around the screw-in axis of the M8 thread and the tilting axis of the reflector. Due to this **gimbal suspension**, the prism/target can be aligned to any instrument position

Helpful overviews



■ Adapters in M8 thread □ 266



■ Quick change system with M8-centering-plates, s. page 192

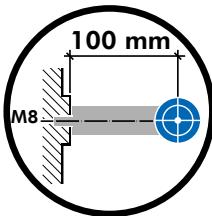
System 100

Example Adapters

Example Images

Overview
System 100 mm

AdV-version



see □ 40



s. □ 19



s. □ 20



s. □ 19



s. □ 19



s. □ 29



s. □ 34



s. □ 36



s. □ 79



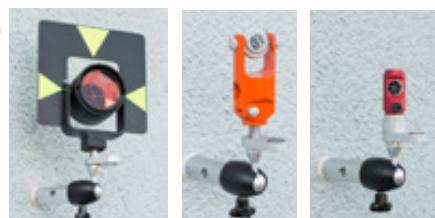
s. □ 190



s. □ 180



s. □ 180



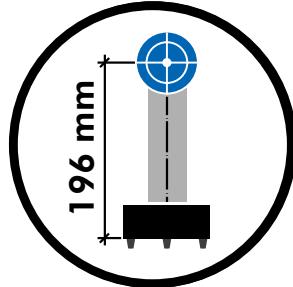
all pictures s. □ 102



Tribrachs for surveying instruments / tilting axis and target height

The tribrach is the connecting element between the tripod and the surveying instrument or target and enables a quick exchange between each other.

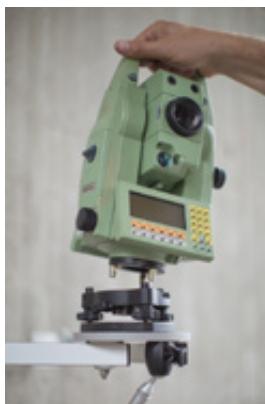
It fulfills several functions:



- **Secure hold:** After insertion of the instrument/target sign into the tripod, securing is achieved by means of a clamping screw or locking lever. This ensures that the instrument/target sign is held reliably in the tribrach so that it can also be transported overhead if necessary
- **Compatibility:** Possibility to use instruments and targets of different manufacturers in one tripod type
- **Levelling:** The upper part of the tribrach and thus the instrument or the target holder can be leveled with 3 adjusting screws.
- **Forced centering:** After removing the instrument or the target from the tribrach and reinserting it, they are again in exactly the same position on the tripod. The standing axes of different devices are identical within very small limits.

Different types: The tripod with claw system of the former company WILD has found the largest spreading. On the underside of the instrument/target sign there is a cylinder with 3 claws which are inserted and secured in the tribrach.

In addition, there are tribrachs with the so-called DIN pin Ø34 mm (formerly ZEISS) or, very rarely still, tribrachs from the former KERN company.



Tilting axis/target height 196 mm with the claw system

The **tilt axis height** is the distance from the underside of the instrument to the tilt axis of the tachymeter telescope. In the claw system it is measured from the cylindrical underside of the tachymeter resting on the tripod. The 3 claws are disregarded.

-

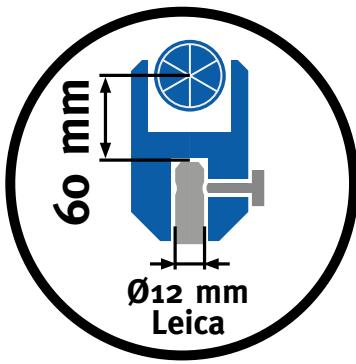
The **tilting axis height** of the tachymeters of many manufacturers is **196 mm** (e.g. Leica, Trimble etc.).

The advantage of a tribrach is the possibility of levelling the horizon as well as the very fast, force-centered exchange of tachymeter and target. If the centre of the aiming point also has a distance of 196 mm to the underside of the claw insert, height transmissions can be carried out very precisely without having to take an offset into account.

When using tachymeters with other tilting axis heights, appropriate height compensation adapters must be used or the difference in height must be taken into account mathematically.

Thread connections and Quick connections Ø12 mm (LEICA)

There are also quasi standards for the assembly of surveying accessories. The 5/8" thread has become established for threaded connections. While it was initially mainly known for screwing tribrachs onto the instrument stand, it can now be found in all types of screw connections. The main advantage of the relatively coarse thread is its stability and robustness. Furthermore, M6 and M8 metric threads as well as smaller inch threads can be found, like 3/8" and 1/4".



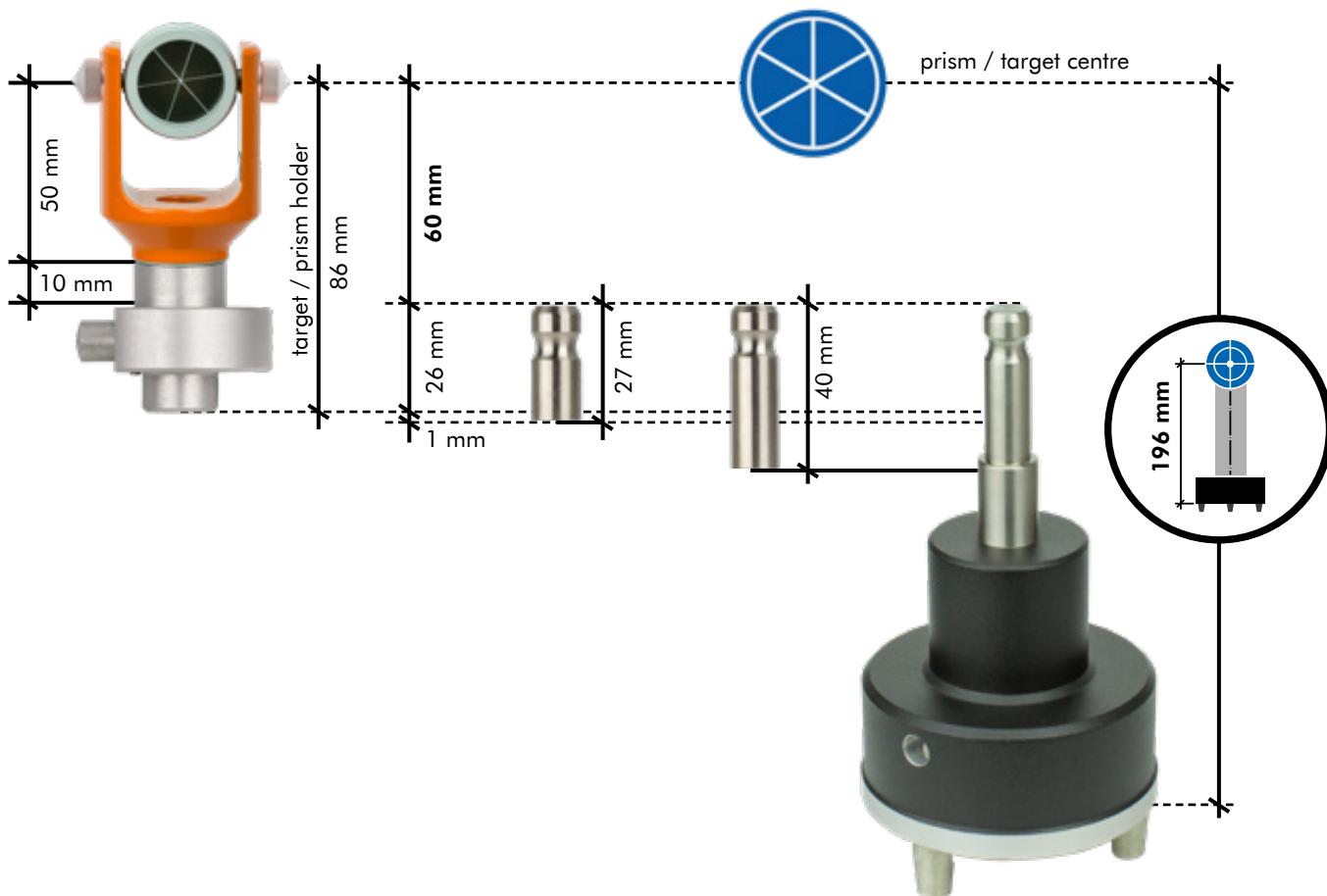
The Leica quick-release fastener has established itself as a screwless connection. On a Ø12 mm stud bolt (spigot) with a conical notch, a bolt receptacle is inserted, the stop surface of which rests on the top of the stud bolt. The sleeve and accessories are secured against falling out by means of a screw or a spring-loaded transverse pin which puts pressure on the notch. The advantage of this fastener is the quick change between different add-on and body parts and the possibility to rotate around the standing axis without changing the height.

For a correct height measurement with a prism or other target, the height of the target centre must be known. This consists of the height to the top of the stud and the distance of the stud support surface to the target center.

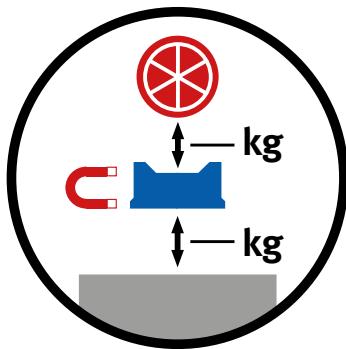
The Ø12 stud is available in different lengths, usually 27, 40 or 60 mm long. It has to be clarified whether the mounting in the target/prism carrier requires a length greater than 27 mm in order to guarantee the functionality of the fastener. If the manufacturer specifies a target/tilting axis height of 86 mm, the short stud bolt is sufficient. Then the hole in the sleeve has a depth of 26 mm up to the stop. The distance from this stop to the target/prism center is 60 mm (see logo). The standard dimension of 60 mm also applies to accessories that have a deeper hole in the stud bolt holder.

The correct height display on the scale of a prism pole is therefore not dependent on the length of the stud but on the 60 mm dimension in the prism holder.

All our products with this logo comply with this standard.



Ball bases with magnet - Two holding forces



When bases with a magnet are used, the magnetic force always acts in two directions. Once in the direction of the steel housing of the ball prism and once in the direction of the centering plate. Or, in an application without a centering plate, directly to the metallic (magnetic) surface. The holding forces in kilograms indicate how strongly the ball is pulled towards the base and how strongly the base is pulled towards the object / centering plate.



Your choice: Strength of the magnetic holding force

Most of our ball bases (which serve as support cones for the ball and at the same time as attachment to the object to be measured) are available with different magnetic holding forces. A weak holding force makes sense if the ball is placed on the base and removed again within a short time.

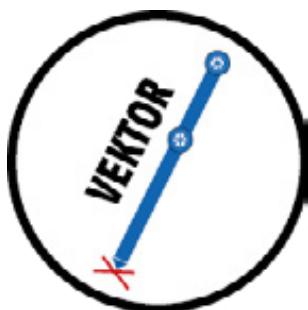
The use of bases with weak magnets in practice however has shown that although the prism remains reliably attached to the ball base, in certain applications the set direction towards the tachymeter can change when left unsupervised.

For example during long-term monitoring on railroad-tracks. When a train drives by, the rail is subjected to strong vibrations. These vibrations are transmitted to the ball base. For this we recommend bases with strong magnetic forces, so the ball prism does not change its set alignment towards the total station.





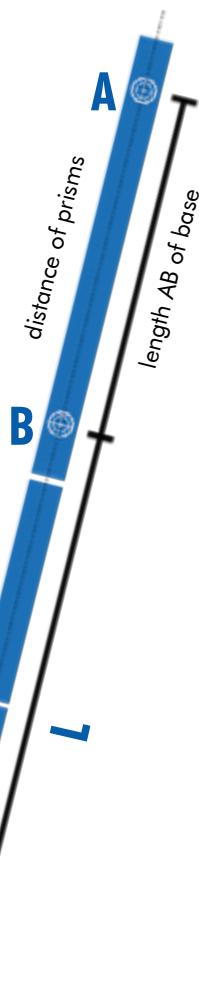
Determination of hidden points with the Two-prism method aka. "Vector" method



Explanation vector method

The coordinates X, Y, Z of the prisms A and B are determined tachymetrically. With the distance L from the object point P to the lower prism B, the 3-D coordinates of point P can be calculated.

The prism pole can be inclined at will. Only the tip must come to rest on the object point P and the two prisms must be aligned with the total station. Of course, the position of the prism pole must not be changed between the measurement of prism A and B.



Vector systems in our catalog

Sewer pipe system [separate catalog](#)

- Survey of manhole low points
- (manhole bottoms, inlets, etc.)
- Object points hidden by obstacles
- Inside corners of rooms
- etc.



Mini-Vectors

- Accurate determination of not directly visible object points
- Industrial surveying
- Precision surveying

 **One-unit-Vector** [s. page 116](#)



 **Modular Mini-Vector** [s. page 116](#)

 **Mini-Vector Telescope** [s. page 116](#)

Software solutions for vector method

Many electronic total stations already have a program for measuring concealed points (often called: sewer measuring pole) integrated as standard.

It does not matter whether the vector system for sewer measurements or the small mini-vectors are used - the principle is always the same.

Required parameters for the calculation of 3D coordinates are:

- Prism constant K
- Base length AB (distance between the two prisms)
- Extension dimension L (distance from the lower prism to the pole tip)

Please note that "pole length" may be defined differently by different total station manufacturers or software providers. To increase the accuracy, it is often possible to determine the base with 3 prisms instead of 2. For this purpose, we offer corresponding expansion options for the channel measuring system Vektor and the "Mini-Vektor Modular".

**Order Form – Tel. +49 (0) 7143 / 89 10 03**

Bohnenstingl GmbH
Ernst-Ackermann-Str. 20/1
D-74366 Kirchheim/Neckar

Customer (Invoice Address)

Delivery Address:

Customer-No.:

Company:

Address:

Contact Person:

Tel.:

E-Mail:

Order

Order-No.	Description	Quantity	Unit Price	Total Price
Total:				

Delivery

Instant <input type="checkbox"/>	Date
Notes:	

Orders are placed on the basis of the general terms and conditions of the Bohnenstingl GmbH (15.09.2024)

Location

Date

Signature



Terms of sale, delivery and payment for end customers

For all deliveries and services, as well as repairs and service work, our general terms and conditions apply exclusively. Differing purchase conditions of the customer do not bind us, even if we do not expressly contradict them. We will only accept the customer's terms and conditions of purchase if we have agreed to them in writing.

Liability of prices

All prices in catalogues, brochures and offers are subject to change without notice. They only become binding with our order confirmation.

All prices are net prices in € (EURO) and apply exclusively in connection with our delivery conditions ex works Kirchheim. Packaging costs will not be charged. If no fixed prices have been agreed, our current price lists shall apply. We expressly reserve the right to change prices due to considerably increased material or purchasing costs.

Terms of payment

Unless other terms of payment have been agreed, our invoices are payable net without deduction within 30 days of the invoice date and with 2% discount within 10 days. After the agreed payment periods have been exceeded, we reserve the right to charge you with the costs incurred (interest on arrears, collection fees, court costs). We retain title to all delivered goods until full payment has been made. This also applies to the extended retention of title. If the buyer is in default of payment, any right to the delivered goods expires. Custom-made products or services are not discountable.

Discount System

We grant the following order value-dependent quantity discount on all articles listed in the catalogue on the list prices valid at the time:

From 1000,- € net value 5 % discount,
from 1500,- € net value 7,5 % discount,
from 2000,- € net value 10 % discount

Delivery times / order confirmations

The delivery usually takes place within one week. We confirm longer delivery periods. Partial deliveries are made by arrangement.

Retention of ownership

The goods delivered by us remain the property of Bohnenstingl GmbH until full payment of all claims. The buyer agrees with his order to insure the goods delivered under retention of title against usual risks. The purchaser is entitled to process or resell the goods delivered by us. In both cases, the extended retention of title shall be deemed accepted upon ordering the goods.

Delay in payment

For all deliveries from us only our terms of payment apply. If the customer is in default of payment, we shall be entitled to charge default interest in the amount of eight percentage points above the base rate in addition to reminder fees in the usual amount. We expressly reserve the right to claim further verifiable damages caused by default. If the customer is in delay with more than 10 % of the total claim outstanding with us, we can make all claims due immediately.

Delay in delivery

The delivery times stated by us may be reasonably exceeded for operational reasons. We will inform you immediately of any delays. We cannot be held responsible for delays in delivery which are not caused by us or which are due to force majeure.

Return of goods

Returns of goods delivered by us require our explicit consent and are made by a collection arranged by us. We shall bear the costs for returns if the return delivery is due to defective goods. In all other cases, the costs of the return delivery shall be paid by the customer. Custom-made products will not be taken back.

Drawings and descriptions of the products

The dimensions and descriptions stated in our catalogues and brochures or other documents are only approximately binding. We expressly reserve the right to make changes and technical improvements. Illustrations are completed for a better understanding of the scope of delivery.

Freight charges

Shipments are delivered with a parcel service commissioned by us. Other delivery after arrangement. The freight costs incurred by us are presented by us and charged with the goods. The transport risk is transferred to the customer when leaving our factory.

Notice of defects

Obvious defects must be reported to us immediately, at the latest within one week of receipt of the goods, in writing and with an exact description of the complaint. The customer is obliged to check the goods for defects immediately after acceptance. Later complaints can only be considered if the defects were not apparent upon arrival of the goods.

Transport damages

Obvious transport damage must be reported to the parcel service immediately. Subsequent complaints about transport damage will generally not be accepted by the parcel services.

Place of Jurisdiction / Place of Performance

Place of performance is Kirchheim, place of jurisdiction is Besigheim or Heilbronn, only German procedural law applies.

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