

BOHNENSTINGLSurveying Tools & Accessories



















2024

Product Catalog - English Version 240130



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 imarked 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 Id" 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 14

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PRINT

Products





- 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



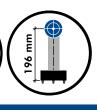
In surveying there are official (normed) standards on the one hand and basics on the other hand. Although there are no official standards for them, they have developed into a quasi standard in the course of time.

The product descriptions include logos that refer to such standards. A click on the logo jumps to the corresponding explanations. The "JUMP Id" 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



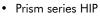






Products

Prisms & Accessories



- Prism holder ONRT for MP 24
- Cylinder prism ZP11
- 360° prisms
- circular bubbles
- Stakeout tips
- articulated tripod
- beam clamp
- edge adapters
- Accessories for prisms
- Prisms to measure buildings



Monitoring & Tunneling В

- Ball prism System
- L-Bar prims
- MoniPro System
- Prisms vertically above measuring point











Precision Measurements

- Industrial 3D measurement: Stainless steel bases
- Klimax: Measurement of ground and wall points
- Modular Mini-Vektor
- Mini-Vektor
- Ground tripod "triangle"

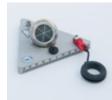
























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Cylinder / Pipe / Roll / Bore hole - Measurement Tools D

APEX: Cylinder surveying

BOAXE: Bolt axis tool

HEMI: Borehole axis adapter

CONE: Cone adapter for bolts and holes





















Products 2/3

Batter boards



- Pendulum holder
- Nail holder HIT
- Manual prism holder
- Instrument batter board holder







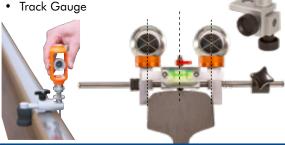




Track and Rail Surveying

- Surveying of bolts
- Rail Angle SW Pro
- **HUG Rail Tool**











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G Laser Scanning

- 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



General Surveying Accessories

- Mounting tribrachs to desk plates
- Tribrachs and inserts
- Tripod rubber feet

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- Wall instrument tripod
- Mini Instrument Tripod
- Magnetic / suction holder
- Universal Transport case
- Pole accessories

















Adapter & Extensions





Computer Holders [SEPARATE CATALOG]

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



> JUMP

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



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



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









- "RUNDUM"-Prism 6x60° & Accessories
- 360°-Prism Bo Medium Format
- Accessories for Leica GRZ 4/101/121/122









- Circular level
- Extension 50 mm
- Extension 50 mm
 Adapter Leica, 5/8"
 Stakeout tips Leica, 5/8"
 Prism Handgrip
 Beam clamp M8
 Mini/Joint Tripod



























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









Prism Series HIP

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

- · Adjustable tilting resistance of the prism
- Low space requirement of the prism carrier (radius only 22 mm)
- Glass $\emptyset = 25$ mm, except with prism constant K = -11,3 mm: glass $\emptyset = 17,5$ 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



top view

frontal view

30 mm

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).



Since 2018, our prism holders have been equipped with tilting axis covers (cross eccentric 30 mm) as standard (see pictures). These can be unscrewed to adjust the tilting resistance of the prism. Optionally, longer tilting axis pins can also be screwed on (see below).



Options



- To screw or
- 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 37.



Protective cap for heavy weather conditions 15.



50 mm



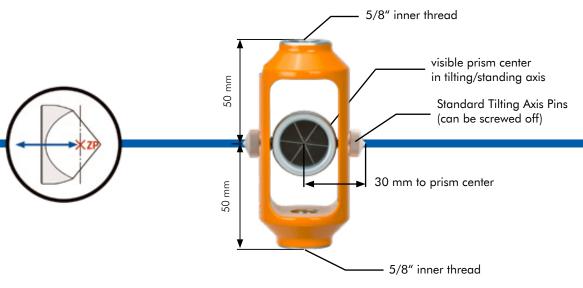




Prisms with 5/8" thread connection

Prism HIP 2 x 5/8"

Prism Holder with closed design



Description	Ø glass prism	prism constant K	Order-No.	Euro
	17,5 mm	-11,3 (Leica = +23,1) mm	1610.11	221,-
	25 mm	-16,9 (Leica = +17,5) mm	1610.17	221,-
Prism HIP 2 x 5/8"	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,-

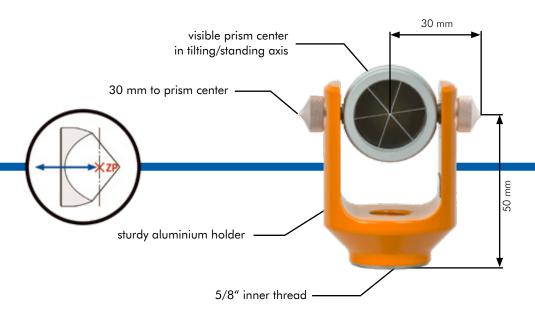
Information on prism constants can be found at 🗋 247

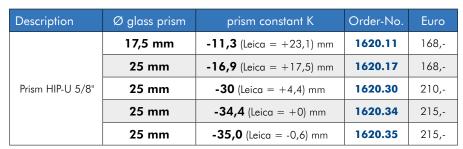
Description	prism constant K	Order-No.	Euro
Holder HIP, 2 x 5/8" with reflective foil	0 (Leica = +34,4 mm)	1615.0	134,-



Prism HIP-U 5/8"

Prism holder with U-Design

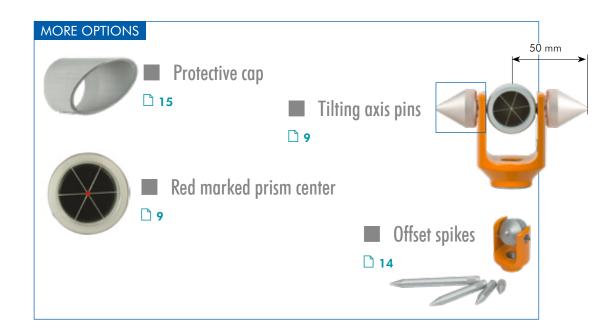






Information or	n prism	constants:	247
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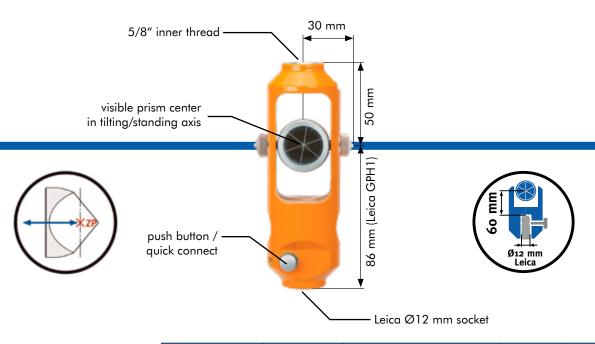
Description	prism constant K	Order-No.	Euro
Holder HIP-U 5/8" with reflective foil	0 (Leica = +34,4 mm)	1625.0	94,-



Prism HIP with Leica socket

Prism HIP Leica - 5/8"

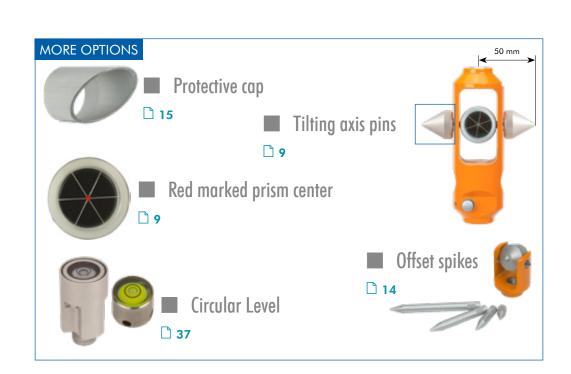
Prism Holder with closed design



Description	Ø glass prism	prism constant K	Order-No.	Euro
	17,5 mm	-11,3 (Leica = +23,1) mm	1630.11	242,-
	25 mm	-16,9 (Leica = +17,5) mm	1630.17	242,-
Prism HIP Leica-5/8"	25 mm	-30 (Leica = +4,4) mm	1630.30	283,-
	25 mm	-34,4 (Leica = +0) mm	1630.34	289,-
	25 mm	-35,0 (Leica = -0,6) mm	1630.35	289,-

Information on prism constants: 🗋 247

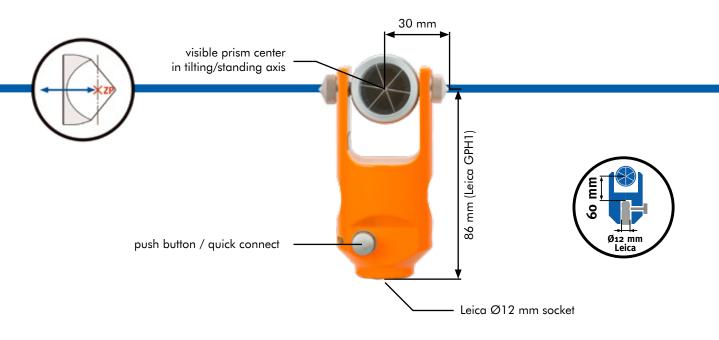
Description	prism constant K	Order-No.	Euro
Holder HIP Leica-5/8", with reflective foil	0 (Leica = +34,4 mm)	1635.0	161,-





Prism HIP-U Leica

Prism holder with U-Design



Description	Ø glass prism	prism constant K	Order-No.	Euro
	17,5 mm	-11,3 (Leica = +23,1) mm	1640.11	194,-
	25 mm	-16,9 (Leica = +17,5) mm	1640.17	194,-
Prism HIP-U Leica	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: 247

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







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.

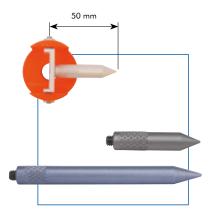
Available for each system constant to achieve a round distance (= longitudinal eccentricity) to the mandrel tip (object point).



Longitu	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 (improvment) 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

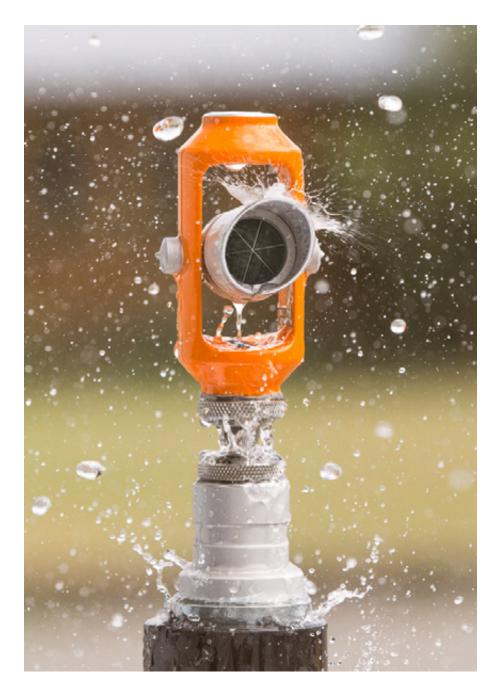
To protect the triple prism from weather conditions such as rain, snow, dust, etc. a protective cap can be mounted on all prisms of the HIP series.

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 assemly of the cap a slotted screwdriver can be helpful
- Weight: 11 g



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







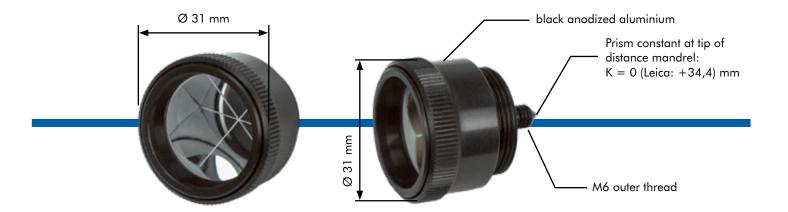




Mini Prism MP 24

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

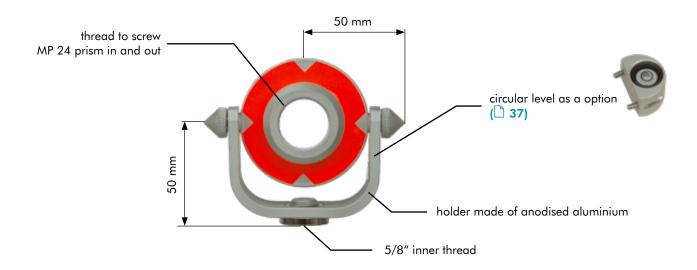


ON REQUEST

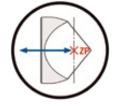
Closed holders for the MP24 are still available as remaining stock.

Prism Holder Type ONRT 50

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



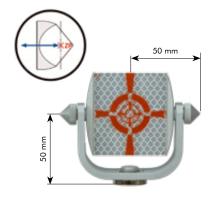
Description	prism constant K	Order-No.	Euro
	0 (Leica = +34,4 mm)	0625.0	88,-
	-11,3 (Leica = +23,1) mm	0625.11	88,-
	-16,9 (Leica = +17,5) mm	0625.17	88,-
	-30,0 (Leica = +4,4) mm	0625.30	88,-
	-34,4 (Leica = 0) mm	0625.34	88,-
	-35,0 (Leica = -0,6) mm	0625.35	88,-



INFO

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





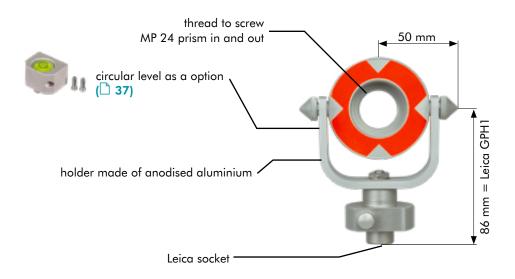
■ With reflective foil 52 x 60 mm

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,-

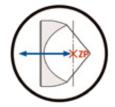
Prism Holder Type ONRT L

U-shaped prism holder



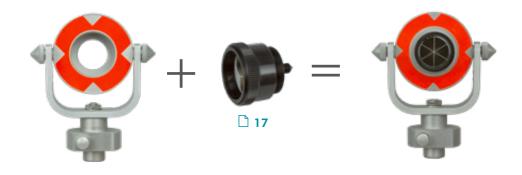


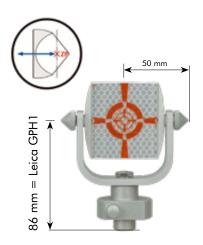
Description	prism constant K	Order-No.	Euro
Holder ONRT L, for prism MP 24 (without prism)	0 (Leica = +34,4 mm)	0655.0	117,-
	-11,3 (Leica = +23,1) mm	0655.11	117,-
	-16,9 (Leica = +17,5) mm	0655.17	117,-
	-30,0 (Leica = +4,4) mm	0655.30	117,-
	-34,4 (Leica = 0) mm	0655.34	117,-
	-35,0 (Leica = -0,6)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

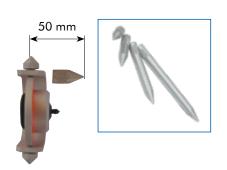
Offset spikes for prism MP24

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

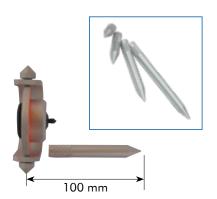
The offset spike can be screwed onto the rear M6 distance mandrel of the MP24. Available for each system constant to achieve a round distance (= longitudinal eccentricity) to the mandrel tip (object point).

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** (improvment) 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 ±0,1 mm
- Quick connection system with bolt B1216 (Ø12x16 mm)





Combination: Mini-Vektor

Securing option 1: Plastic knurled screw

Securing option 1: Allen screw (SW3)

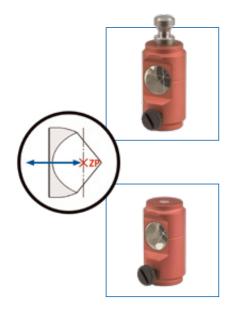


With socket B1216 and bolt

Bottom: Socket for Bolt B1216Top: Stainless steel bolt B1216

• Weight: 70 g

Des	scription	Order-No.	Euro
Cyl	inder 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

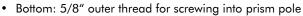
Description	Order-No.	Euro
Cylinder Prism ZP11 M, socket B1216 + M6 inner thread	6611.M6	142,-



Accessories for ZP11 prisms

Cylinder prism ZP11 on prism pole

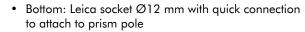
Adapter for prism poles with 5/8" inner thread and 150 mm target height



• 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,-





• 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

• s. top of page, Order-No. 0697

More Accessories

Circular level for Cylinder Prism ZP11 1 108











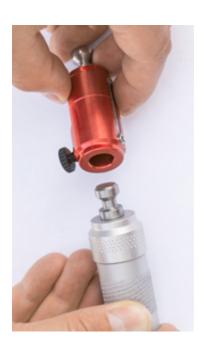












Modular System & Securing Options

Several ZP11 cylinder prisms can be combined as required with distance parts, tips and circular levles 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





As a Twin-Prism

As a modular mini vector





As monitoring point vertically above a point \$\textstyle{1}\text{96}\$













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 (Powersearch).

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



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
Adjustbale circular level 5/8", accuracy 30'	1587.30	51,-

Other circular levels 137

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

Other stakeout tips 🗋 42



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.









Adapter

- 5/8" inner thread to 1/4" outer thread
 - Target height (to prism center): 50 mm
- Anodised aluminium, Ø 40/25 x 26 mm

Description	Order-No.	Euro
5/8"-Adapter for 360°-Prism Bo Medium Format	5676	37,-

Leica socket to 1/4" outer thread

- Target height (to prism center): 86 mm
- Push button for quick change and securing on the bolt

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



Stake-Out spikes Ø12 mm Leica connection

42



Stake-Out spikes 5/8" threads

40



- Aluminium casing Ø 40 x 20 mm
- 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,-



For measurements with large target heights, a circular level attached to the **INFO** 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 $\frac{1}{4}$ " thread, it sits exactly centered in a very robust prism carrier with $\frac{5}{8}$ " standard threads at the top and bottom.

The \emptyset 1.5" ball prism can also be used in the CAGE. A special base with integrated magnet is fixed in the prism carrier with the $\frac{1}{4}$ " screw. When the \emptyset 1.5" 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: \pm 1.5 mm with 360° prism, \pm 0.2 mm with ball prism
- Comes with 1/4" screw, to connect 360° prism
- Weight: 200 g



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.







Use of ball prism with CAGE s. 283









L-Holder for 360° Prism Bo Medium Format



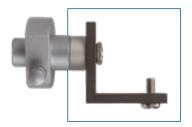




With M8 screw [Fig. 1]

- 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

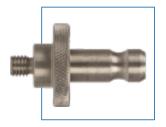
Description	Order-No.	Euro
L-Holder with M8 screw, 1/4" thread, target height = 40 mm	5677.M8	54,-



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) (2) 39

- 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,-



Wall bolt 🗋 99

INFO





100 mm

L-Holder with magentic 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: $\pm~0.05~\text{mm}$
- 1/4" outer thread for screwing on the 360° prism



■ Distance to centering plate: 50 mm

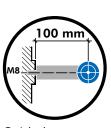
Description	Order-No.	Euro
L-Holder with magnetic base Ø 33 mm, target height 50 mm	5671.M33	72,-
L-Holder with magnetic base Ø 40 mm, target height 50 mm	5671.M40	72,-





■ 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 179



INFO

M8-centering plates Ø 33 and Ø 40 mm and quick change adapters \square 194



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.



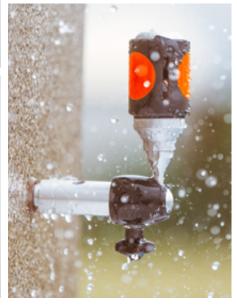


5669













5676 26

26



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 $12\ \text{mm}$, several screwed extensions are not suitable for high-precision measurements.





Accessories for Leica 360°-Mini Prism GRZ101

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



5/8"-Adapter

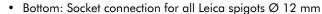
- Bottom: 5/8" inner thread
- Top: 1/4" stainless steel outer thread to screw in the GRZ101 prism
- Target height (to prism center): 50 mm
- Anodised aluminium, 25 x 35 mm
- Adapter also available with 1/4" inner thread: 5686i

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



Leica-Adapter

Push-Botton / Quick Connection



- Top: 1/4" stainless steel outer thread to screw in the GRZ101 prism
- Target height (to prism center): 86 mm
- Anodised aluminium
- Push button for quick change and securing on Leica spigot
- Adapter also available with 1/4" inner thread: 5683.LSi

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



Circular Level

Sensitivity 50¹

- Aluminium casing Ø 26 x 20 mm
- Plastic circular level Ø 15 mm, adjusted to the screw-in surface
- Bottom: 1/4" inner thread
- Adapter also available with 1/4" outer thread: 5682.K

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

INFO

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







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 🗋 99



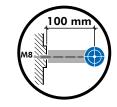




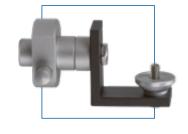




- Aluminium L-holder with Leica socket connection Ø 12 mm
- Push button for quick change and securing on Leica spigot
- 1/4" outer thread to screw on 360° prism
- Target height = 86 mm
- Distance from wall bolt = 100 mm (when using the WA Leica adapter)

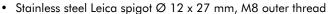


Description	Order-No.	Euro
L-holder, Leica push button scocket, 1/4" thread, target height 86 mm	5687.LS	87,-









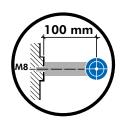
Total length 40 mm (without M8 thread)

90 mm	Ø12 mm Leica

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









INFO

M8-centering plates \varnothing 33 and \varnothing 40 mm and quick change adapters 🗋 179



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.



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



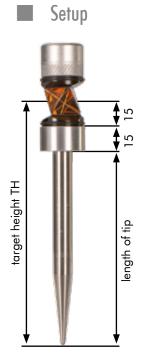
Description	Order-No.	Euro
Adapter: 1/4" thread, M8 thread, Ø25 x 15 mm	5689.015	22,-

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,-



Accessories



Screw-on
Circular level

32



Circular level for poles with Ø12 mm

Usable from length 70 mm

Joint arm

45





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

L-Holder



- 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,-

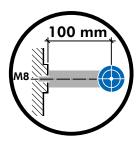


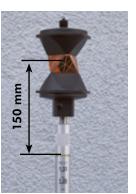
■ Wall Adapter WA Leica (stainless steel) 🗅 39

- 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,-









To reach the target height of 150 mm we offer a suitable adapter for the prism pole. Adapter 0378.90 you will find on 234

INFO











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,-



Circular Level Central - 5/8" inner thread

- 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, Heihgt (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 39.





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



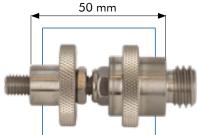
with 5/8"- inner thread				
Description	Lenght Leica spigot Ø 12 mm	effective total length	Order-No.	Euro
Adapter 5/8"-Leica	27 mm	47 mm	0377.27	30,-
	40 mm	60 mm	0377.40	33,-



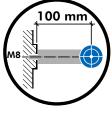
with 5/8"- outer thread				
Description	Lenght Leica spigot Ø 12 mm	effective total length	Order-No.	Euro
Adapter 5/8"-Leica	27 mm	40 mm	0378.27	30,-
	40 mm	60 mm	0378.40	33,-

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

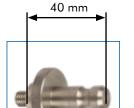
When using a prism with a tilting axis height of 50 mm, a wall distance of 100 mm results (for example our prism series HIP or ONRT).





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.



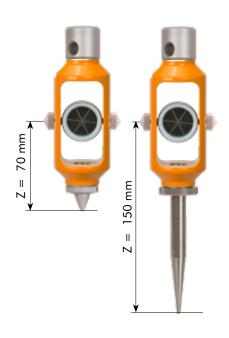
- Distance to wall bolt = 100 mm when using prism holders with tilting axis height 86 mm (= Leica GPH1)
- Knurl \varnothing 30 mm for easy screwing into wall bolts
- Spigot Ø 12 x 27 mm, total length (without M8 thread): 40 mm
- Stainless steel

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









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.

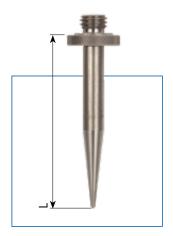
Stakeout spikes 5/8"



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.

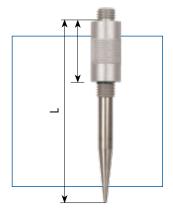
When using 5/8" reflector holders with tilting axis height = 50 mm, the target heights Z from the centre of the prism to the tip of the staking out point given in the table are obtained.

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

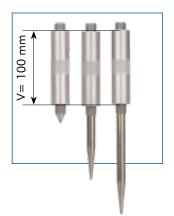
Additional 5/8" external thread on the tip side for screwing the insertion tip into extensions or prism poles with 5/8" internal thread (tip protected and always at hand). All extensions are made of aluminium. The lengths up to 50 mm have a conical tip with hardened steel insert. From 75 mm they have 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,-





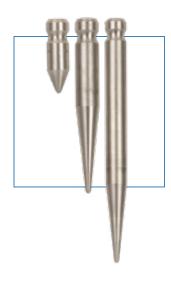


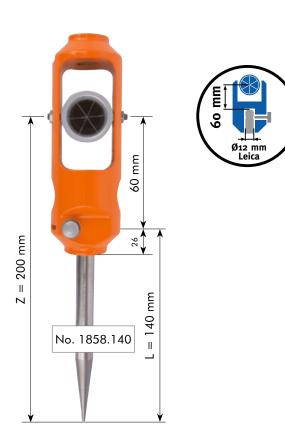




All lengths are made of stainless steel. The tip of No. 1857.2H has a hardened steel insert. When using reflector holders with Leica spigot mounting and 86 mm tilting axis height (Leica GPH 1, our reflector holders of the series HIP, HIP-U, TOP, ONRT L and RUNDUM 6 x 60°), the following target heights 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 $6x60^\circ$ 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 234.



Mini tripod with pole clamp

For simple and stable assembly of short prism poles



- Tripod legs can be folded out individually and remain in the selected position, adjustable
- 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)

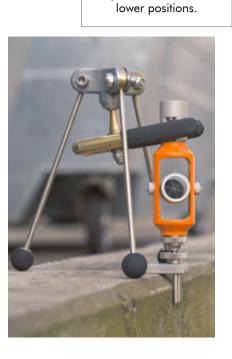
Description	Order-No.	Euro
Mini tripod with pole clamp and stainless steel balls	6270	103,-
Mini tripod with pole clamp and rubber balls	6272	103,-













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 (🗋 115)	6884	79,-
Claw clamp for joint tripod (115)	5934	63,-
Steel ring for joint tripod (113)	5932	37,-
Magnetic base for joint tripod (1114)	5931	38,-
Suction holder, without vacuum indicator (116)	5936	48,-
Suction holder, with vacuum indicator (116)	5938	80,-



Beam clamp M8

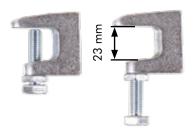
Compact, sturdy, quick-fit metal clamp. M8 inner thread offers possibility to screw on prisms and scanning targets (directly or via adapter).

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







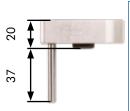


Corner and Edge adapter M8

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

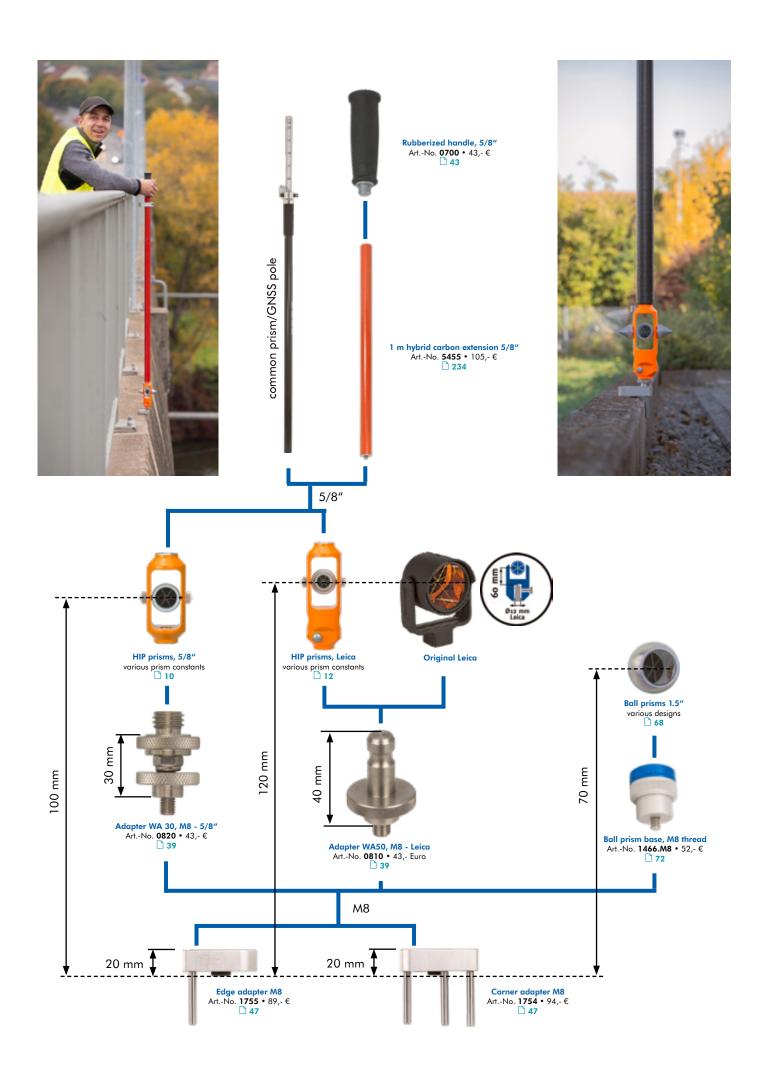
Description	Orde	er-No.	Euro
Corner adapter for chamfered concrete	parts, walls, etc.	754	94,-













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

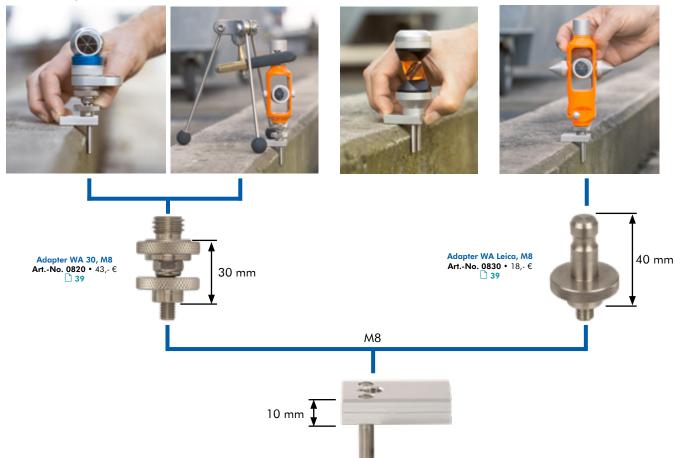


Description	Order-No.	Euro
M8 edge adapter for wall chamfers	6810	37,-















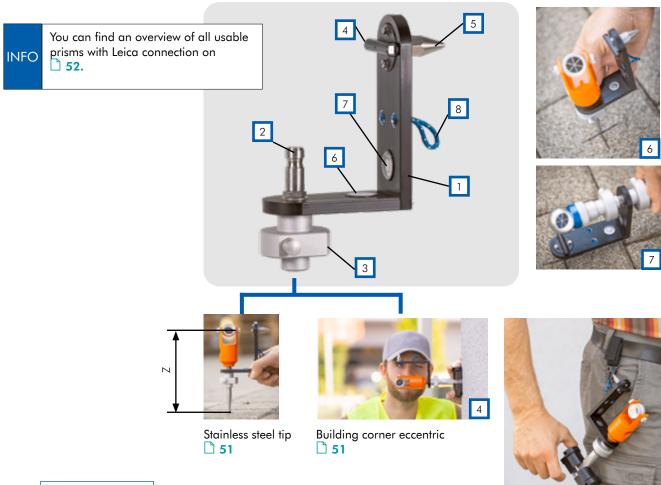
Universal Mini Prism Pole

For measruing 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 52)
- 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 eccenter
- 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,-





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,-



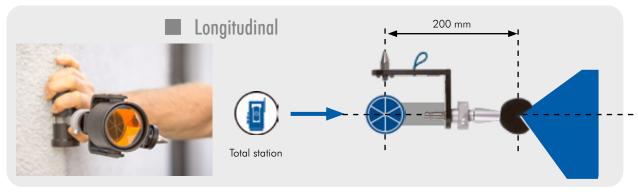


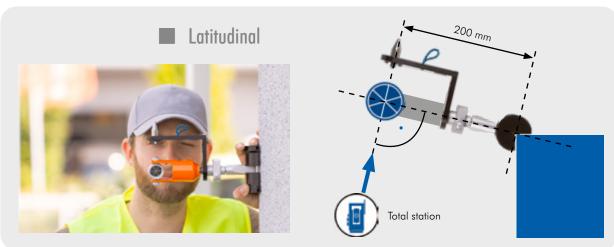
Right-angled stop for measuring building corners by means of longitudinal and latitudinal eccentrics with a distance dimension of 20 cm.

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.



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







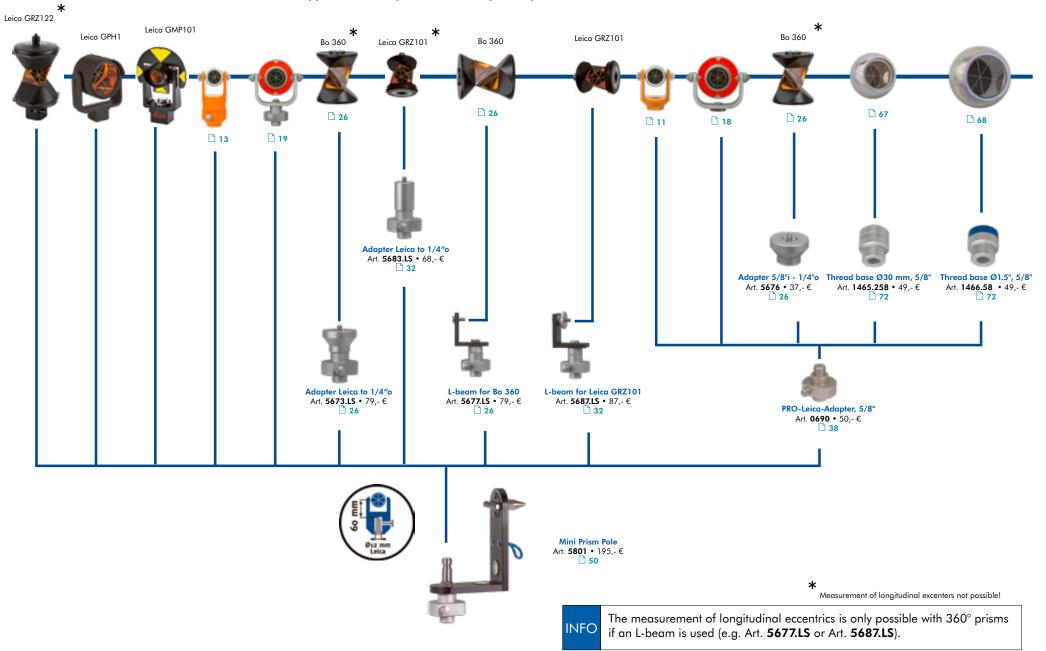


Mini Tripod

For easy and stable setup of the mini prism pole

Description	Order No.	Euro
Mini tripod with clamp and rubber feet 🗋 44	6272	103,-

Prism types and adapters for mini prism pole











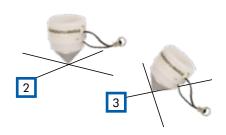




















Precision Prism 17.5

Surveying of object points on structures / buildings

Facade points are usually measured reflectorless (laser / direct reflection). If the tachymeter does not have this function or if the reflectorless measurement is not accurate enough, a prism must be used and a 2-stage procedure must be followed:

- 1. Aim at the object point with crosshairs.
- 2. Hold the prism in front of the object point with a known distance to the prism center.

Some commercially available mini prisms, e.g. our MP 24 mini prism, have a turned mandrel with a prism constant of K=0 mm (Leica = +34.4 mm) at the tip. If the object point is measured by using this tip, no additional eccentric offset must be considered.

This measuring method is problematic due to errors that occur when the prism is not precisely aligned to the total station. Especially the staking out of a target point on a facade is tedious, if high accuracies are required.

The quality of the prism housing also is important for precision measurements, in regards of:

- Accuracy of distance between prism center and object point
- Accuracy of the given prism constants
- Possible change in length of the rear offset tip due to wear

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
- Range distance measurement: Up to over 500 m (depending on device and 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 (no longitudinal offset must be taken into account)
- The theoretical reversal point of the measuring beam (K = 0 mm), which is realized as a steel pin, is only 11.3 mm behind the visible prism centre (centrally symmetrical point)

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.

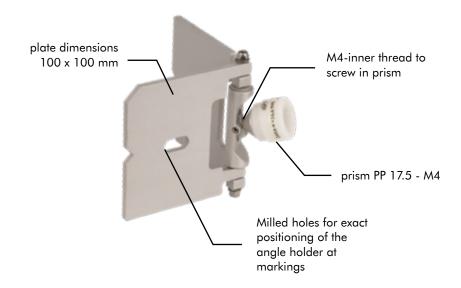
For these cases we developed the special **holder for concrete components with cham- fers SBF.** It can be used for all components with a chamfer width of 20 mm or more and is ideally suited for the positioning of precast concrete elements as well as for the inspection of elements concreted on site.

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 $\stackrel{\square}{-}$ 54

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
Mini Prism MP24 (🗋 16)	1400	92,-



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



INFO Special equipment: Mandrel extensions 20.



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 (38).

Monitoring / Tunneling

1/2

B.1. General information about our Monitoring Systems





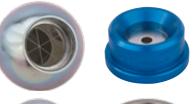




B.2. **Ball Prism - Monitoring System**











B.3. Rugged MoniPro System









B.4. L-Bar Prisms











Monitoring / Tunneling

2/2

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











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















B.7. M8 wall bolts as surveying points















Monitoring Systems in comparison



Monitoring with ball prisms

Advantages

- 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 with bases with integrated magnet, but using only one ball prism
- System can be put together project-based and then extended with time



Monitoring with L-Bar Prisms

Advantages

- · 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



Monitoring with MoniPro System

Advantages

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



Monitoring with prisms perpendicular above wall bolt

Advantages

- 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



Monitoring with Twin-Systems

Advantages

- · 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



Monitoring with Stacking

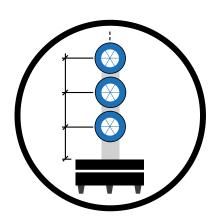
Advantages

- · 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 🗋 21
- 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



I - Carrier with Ball Prisms

- Use of thread bases with ball prisms with constants -11.3 mm or -16,9 mm 1 72
- 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



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) 10
- Connecting elements between the prisms allow individual 360° rotation 243
- 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 15
- Maximum coverage: All directions except steep down
- 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

1/1

B.2.1. Information / Ball Prism













B.2.2. Magnet base / nest / thread base















Centering plate B.2.3.









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





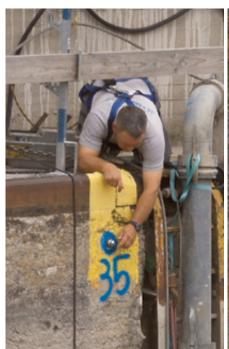








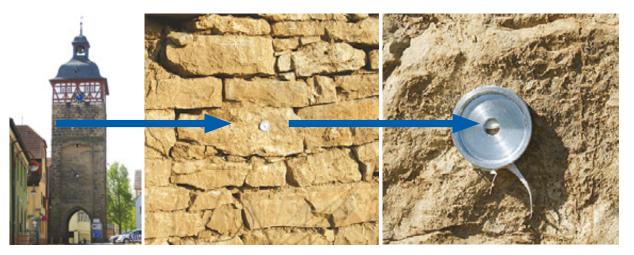
APPLICATION EXAMPLE FLOODGATE RENOVATION







APPLICATION EXAMPLE MONUMENT MONITORING



APPLICATION EXAMPLE TRACK/RAIL MONITORING

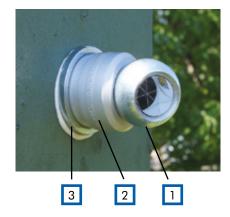










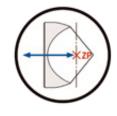


Monitoring: Ball Prism System

Precise - universal - inexpensive

Tachymetric monitoring of buildings, structures, bridges, tunnels, railway tracks etc. with the Bohnenstingl 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, \emptyset 1.5" 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.



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.



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.







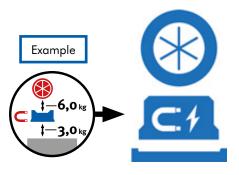
The choice is yours

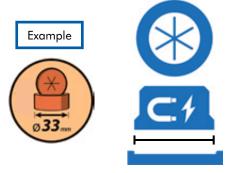
Base / nest: strength of magnetic holding force

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

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.

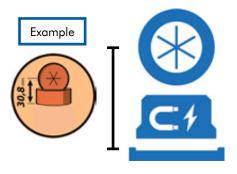




Base / nest: Base diameter

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).



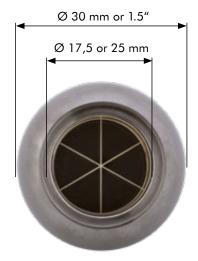
Centering plates: Mounting options

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 \varnothing it also only offers space for the small glass prism. Here you are bound to one prism constant.



Ball prism: Galvanized steel or stainless steel

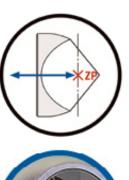
As our ball monitoring system finds more and more applications, the demands change as well. For this reason, in addition to the classic galvanized steel version, we also offer ball prism casings in stainless steel design. These have increased weather resistance and are also magnetic.

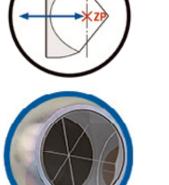
General: Accuracies

The diameters of the balls are manufactured with an accuracy of \pm 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 \pm 0.1 to \pm 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



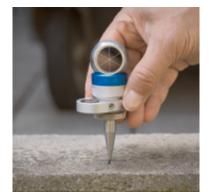








Although our ball prism was developed for the monitoring market, its accuracy and compact size mean that it can also be used in numerous other applications. Here are just a few



With stake-out tip and level

Our thread bases with 5/8" internal thread (\bigcirc 72) can easily be supplemented with any positioning tip/spike (40). Use 1466.B as circular bubble. If you want to use the pendulum head as a stake-out point, choose 0140 (154).



With ground tripod "Triangel"

117



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 1445 (68). 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, 🗋 126).



Two ball prisms in Twin-System

More possibilities

94





D|JUMP



₽RINT

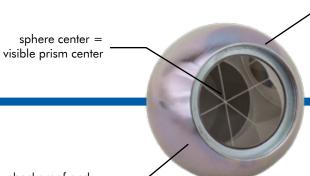


Ball Prism Ø 30 mm

• Sphere: Ø 30 mm ± 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: ± 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

Socket made of galvanized steel or magnetic stainless steel



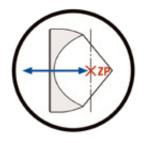
shockproof and waterproof



Description	Backside	Material	Order-No.	Euro
Ball prism Ø 30 mm, K = -11,3 (Leica = +23,1) mm	M6 thread	galvanized steel	1450	129,-
	M6 thread	stainless steel	1450.S	145,-
	-	polished stainless steel	1451.SP	155,-

INFO

On request, the 1450 ball prism is also available without the M6 thread. Using bases the M6 thread has no affect on measurements at all though.



Protective cap

A protective cap can be clipped onto the ball prisms. Info: 🗋 81.



Ball target Ø 30 mm with reflective foil



- 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



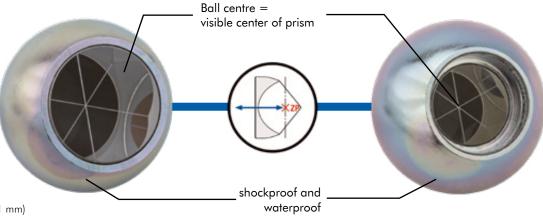
Description	Material	Order-No.	Euro
Ball target Ø 30 mm, reflective foil, K = 0 (Leica = +34,4) mm	galvanized steel	1455	82,-
	stainless steel	1455.SP	108,-





Ball prism Ø 1.5" (38,1 mm)

- Material of the ball: Galvanized steel or magnetic stainless steel
- Steel sphere- \emptyset 1.5": \pm 0,05 mm
- Grinding accuracy of triple prism: 2"
- Reflective surfaces: Silver mirrored on the rear side
- Mounting of the prism in sphere: ± 0,1 mm
- On request also available with test certificate









Prism constant: K = -16.9 (Leica = +17.5) mm

- With triple prism made of glass \varnothing 25 mm
- Range: 500 up to over 1000 m (device and weather dependent)
- Weight: 160 g

Description	Material	Order-No.	Euro
Ball prism Ø 1.5", K = -16,9 (Leica = +17,5) mm	galvanized steel	1445	152,-
	stainless steel	1445.S	168,-



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

- With triple prism made of glass Ø 17,5 mm
- Range: 300 up to over 500 m (device and weather dependent)
- Weight: 180 g

Description	Material	Order-No.	Euro
Ball prism Ø 1.5″,	galvanized steel	1453	152,-
K = -11,3 (Leica = +23,1) mm	stainless steel	1453.S	168,-

Protective cap

A protective cap can be clipped onto the 1453 and 1453.S ball prisms. Info: 🗋 **81**.





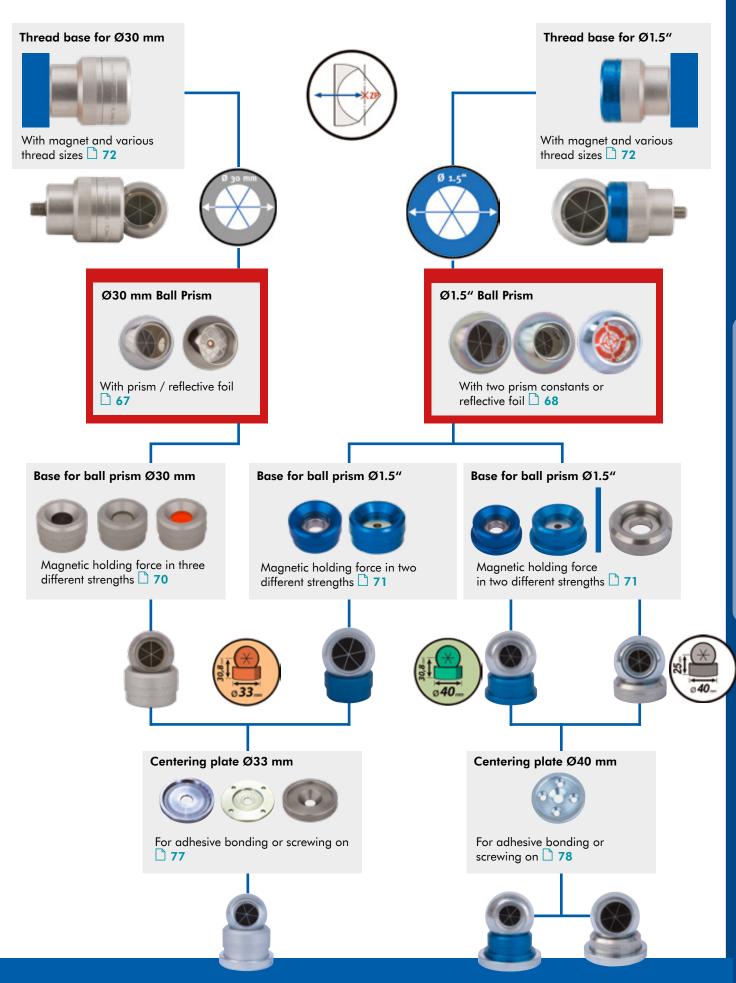
- For measurements at shorter distances and without automatic target acquisition
- Reflective foil applied in the axis / level of the ball center
- Prism constant of K = 0 (Leica = +34.4) mm
- Stainless steel casing





JUMP 1

Magnetic Ball Prism Monitoring System















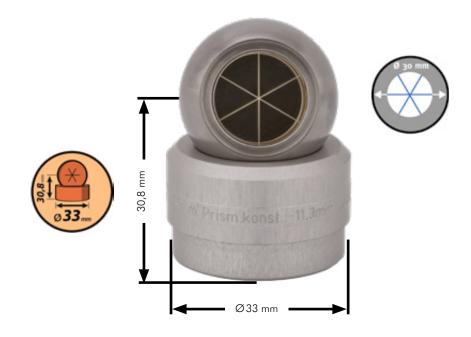


Base with integrated magnet for ball-Ø 30 mm

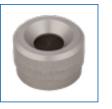
- Turned part made of hard anodised aluminium with integrated permanent magnet
- For mounting on magnetic surfaces, e.g. railway rails, machines, vehicles and centring
- Each base is supplied with a protective cover plate

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



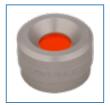












Description	magnetic holding force	Order-No.	Euro
Base Ø 33 mm for ball prism Ø 30 mm, with integrated magnet and protective cover plate	approx. 1,0/1,5 kg	1460	29,-
	approx. 6,0/3,0 kg	1460.5	34,-
	approx. 12,0/20,0 kg	1460.52	38,-



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 1 73.









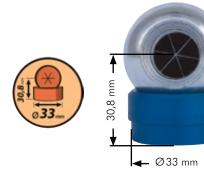


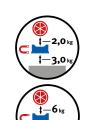
Base with magnet for ball-Ø 1.5" (38,1 mm)

- 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 base is supplied with a protective cover plate

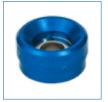
Protective cover plate

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.



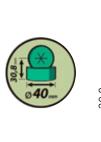




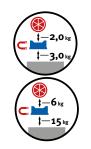




Description	magnet. force	Order-No.	Euro
Base Ø 33 mm for ball prism Ø 1.5", with integrated magnet and protective plate	approx. 2,0/3,0 kg	1457.S	34,-
	approx. 6,0/15,0 kg	1457.\$2	37,-









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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.\$2	37,-



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 1 73.



JUMP 14

Base without permanent magnet

Can be used only in horizontally mounted centering plates Ø40 mm.

Description	Order-No.	Euro
Base Ø 40 mm for ball prism Ø 1.5", without magnet	1459	22,-







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 ± 0.1 mm (without thread)
- All bases are shipped including cover plate for protection against dirt (70)
- On request many of the bases are also available with weaker or stronger magnets















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

With outer thread

Description	thread connection	magn. holding force	Order-No.	Euro
D f	1/4" x 8 mm	approx. 3 kg	1466.14a	52,-
1.5", outer thread	M8 x 8 mm	approx. 1 kg	1466.08aL	46,-
	Moxomm	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	1/4"	approx. 4,5 kg	1465.214	49,-	
prism Ø 30 mm, oinner thread	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
5 () !!	1/4" x 8 mm	approx. 4,5 kg	1465.214a	52,-
Base for ball prism Ø 30	MAQ Q	approx. 0,5 kg	1465.08a	46,-
mm, outer thread	M8 x 8 mm	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 (72) 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, Alumi-	M8 inner thread	M8 inner thread	0372.050	24,-
nium, Ø 25 x 50 mm	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 797), 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,-





219 for information on combining the adapter withsystem 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



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











Centering Base ,Compact'

Possibility of staking out and measuring object points

Additional features extend the application possibilities of the classic magnet base 1458.S (1 71) 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)	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.

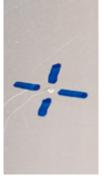
- Stakeout of points. After correct positioning, the ball is removed. Use the pin to mark the point to be staked out with a light hammer blow, if necessary.
- Measuring of points. Using the centering pin, the base can be placed at a point that is already marked on the object (e.g. cross, grain).

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











Nutshell Adapter: Ø30 mm to Ø1.5"

Ball prisms are available with outer \emptyset 30 mm and \emptyset 1.5". 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 71
 - Bases / nests with various bases with threads 172
- Magnetic quick change system for force-centered switching between ball prisms and laser scanning/lasertracker targets, e.g. for registration and georeferencing

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 \emptyset 1.5" 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,-



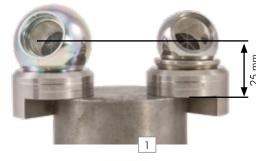
Properties of the nut shell adapter:

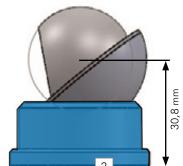
• Made of non-magnetic stainless steel

Klimax-Bases 128 Bases with threads 72

- 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 (
- 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





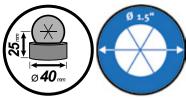














Design and function of the stainless steel ball base corresponds to that of the aluminium ball bases.

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. 178.

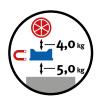
Special features:

- 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: \emptyset 40 \pm 0,01 mm
- Fits to centering plate No. 6009 🗋 78
- 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		61,-
Stainless steel base Ø 40 mm for ball prism Ø 1.5" (38,1 mm), without magnet	1431	49,-





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 1 130.

Description	Order-No.	Euro
Centering pin with hardend tip [1]		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 120



Centering plate for Ø 33 mm

To use with adhesive











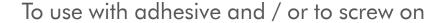




- Galvanized steel plate Ø 40 x 4 mm, magnetic
- To use with **assembly adhesive** (79)
- Accuracy of centering fit \varnothing 33 mm: \pm 0,1 mm
- Bore hole Ø 8 mm in center for exact fixation of the plate during gluing

Description	Order-No.	Euro
Centering plate (use with adhesive), centering Ø 33 mm, galvanized	1461	8,-
Centering plate (use with adhesive), centering Ø 33 mm, stainless steel	1461.VA	8,50





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

Mounting options:

- To use with **assembly adhesive** (**79**)
- Center bore hole Ø 8 mm for countersunk screws



Galvanized steel (magnetic) or stainless steel (magnetic)

Description	Order-No.	Euro
Centering plate ∅ 33 mm, ountersunk bore 8 mm, stain. steel	1464.VA	12,-





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: $\emptyset 33 \pm 0.1$ mm
- Center bore hole Ø 8 mm for exact positioning of the plate when screwing on

Description	Order-No.	Euro
Centering plate \varnothing 33 mm to screw on object, center bore hole \varnothing 8 mm + 4 x \varnothing 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: \emptyset 40 \pm 0,1 mm
- Effective height to centering level: 5,5 mm

Mounting options

- To use with assemly adhesive 🗋 79
- 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		12,-

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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



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 = $\emptyset/2$ = 19.05 mm



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









INFO

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

HOME









For ball prisms Ø30 mm and 1.5" with glass-Ø17,5 mm

To use with ball prisms with glassbody- Ø17,5 mm (1450, 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 ∅ 25 mm, white plastic, to clip on	1469	9,-





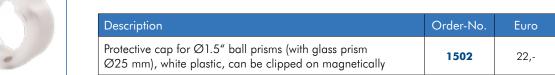




For ball prisms 1.5" with glass-Ø25 mm

To use with ball prisms 1.5" with glassbody- Ø25 mm (1445, 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









D|JUMP



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 vertically mounted bases

- 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,-







- 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,-







JUMP |





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 $\frac{1}{4}$ " 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 ($\frac{1}{27}$), the two 5/8'' threads increase the application possibilities

- 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: \pm 1.5 mm with 360° prism, \pm 0.2 mm with ball prism
- Comes with 1/4" screw, to connect 360° prism
- Weight: 200 g

П				
Married		Description	Order-No.	Euro
ı	E .	CAGE prism carrier for 360° prism Bo medium format and ball prism	5668	154,-
	Mary J.			





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,-





D|JUMP











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



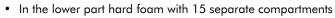
For base with standard magents

- 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



• For bases with holding force 15 kg to 20 kg









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 \varnothing 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



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Monitoring Prism Series MoniPro

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



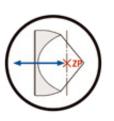


Prism in U-Frame

Ideal for monitoring from one or more tachymeter positions

- Prism \emptyset 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





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







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







Fastening platform for prism in U-Frame

The perforated plate platform is mounted on the object without a prism. The U-Frame is then stuck onto the M8 stainless steel thread of the cylindrical support and, after aligning the prism, screwed onto the total station using a hexagon nut. The centering accuracy is \pm 0.2 mm.

- 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):











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: \pm 0.2 mm
- Holding force of the magnet: approx. 5 kg
- Weight: 50 g





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



Our centering plates are particularly suitable for monitoring tasks with precise repeat measurements (🗀 77)





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 Ø 35 x 50 mm
- Optimized light exposure due to bright silver anodizing
- Very good water drainage in case of rain
- Weight: 20 g





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







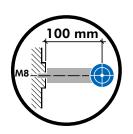




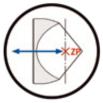
L-Bar-Prism with Leica socket

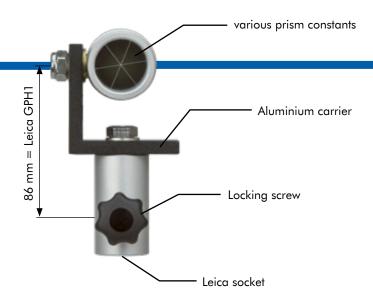
To mount Leica spigots Ø12 mm

- 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)



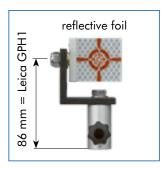






With Prism

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,-
		-16,9 (Leica = +17,5) mm	1002.17	118,-
	Ø 05	-30 (Leica = +4,4) mm	1002.30	170,-
	Ø 25 mm	-34,40 (Leica = 0) mm	1002.34	170,-
		-35 (Leica = 0,6) mm	1002.35	170,-



With reflective foil

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

INFO

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





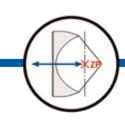


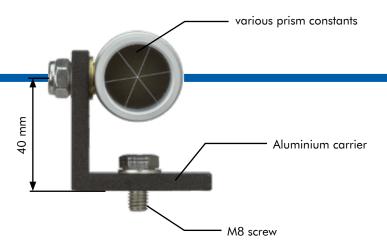


L-Bar-Prism with M8 screw

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 restistance
- 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





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,-
	Ø 25 mm	-34,4 (Leica = 0) mm	1005.34	166,-
		-35,0 (Leica = -0,6) mm	1005.35	166,-



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,-

INFO

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





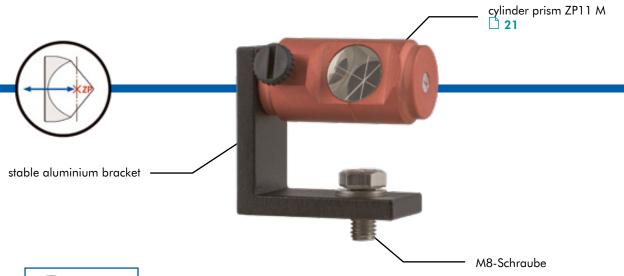




L-Carrier for Cylinder Prism ZP11

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 1 79
 - 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.









JUMP 14

















L-Bar-Prism with cylindrical magnetic base

Extends the ball prism system by additional common prism constants

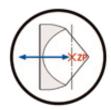
- · Sturdy, CNC-milled bracket made of anodised aluminium
- 6,0 kg magnetic holding in force in base guarantees secure hold
- Distance from center of prism to the underside of the base = 30.8 mm + -0.1 mm. Thus identical with the offset distance of the ball prism system
- Ball prisms (with base) and prisms on L-Carriers can be exchanged as desired on centering plates (Ø33/40 mm). The prism center stays the same.
- Adjustable tilting resistance (wrench size 10); can also be fixed in a certain position

Description	foil / prism	prism constant K	Order-No.	Euro
	reflective foil target (26x40 mm)	0 (Leica = +34,4) mm	1060.0	63,-
Reflector on L-Carrier	glass prism Ø 17,5 mm	-11,3 (Leica = +23,1) mm	1060.11	147,-
with cylindri-		-16,9 (Leica = +17,5) mm	1060.17	137,-
cal base with	-l	-30 (Leica = +4,4) mm	1060.30	189,-
Ø 33 mm	glass prism Ø 25 mm	-34,40 (Leica = 0) mm	1060.34	189,-
		-35 (Leica = -0,6) mm	1060.35	189,-

Centering plates 77

Description	foil / prism	prism constant K	Order-No.	Euro
	reflective foil target (26x40 mm)	0 (Leica = $+34,4$) mm	1070.0	63,-
Reflector on L-Carrier	glass prism Ø 17,5 mm	-11,3 (Leica = +23,1) mm	1070.11	147,-
with cylindri-		-16,9 (Leica = +17,5) mm	1070.17	137,-
cal base with	-l	-30 (Leica = +4,4) mm	1070.30	189,-
Ø 40 mm	glass prism Ø 25 mm	-34,40 (Leica = 0) mm	1070.34	189,-
		-35 (Leica = -0,6) mm	1070.35	189,-

Centering plates 78





For all constants the tilting and standing axis runs exactly through the target center: At K = 0 it runs through the center of the printed target sign, with all other constants through the visible prism center (central symmetric point). This minimizes errors if the prism is inaccurately aligned with the total station.



Centering plates

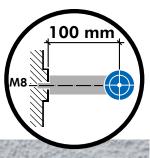
77















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 PO.

By averaging the X-, Y- and Z-coordinates of the measurements to the two prisms, the coordinates of point PO 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 PO had been measured with one triple prism; once aligned with the first tachymeter and once aligned with the second tachymeter.

The coordinates of PO 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 (68) and on the other on our cylinder prism ZP11 (21).

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 (94)

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,-

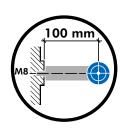






Holder with Leica socket

- 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

|--|



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.

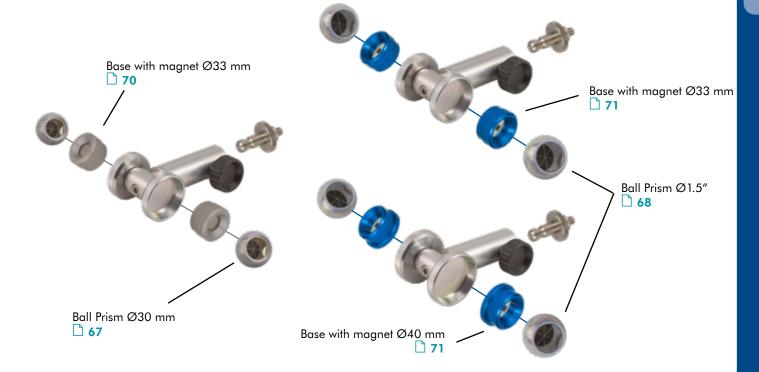


Leica Wall Adapter WA **39**









JUMP 14

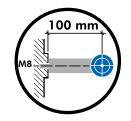








The individual cylinder prisms can be rotated about their axis. For optimum alignment of the prisms towards the total stations, the prism traverse can also be rotated 360° and locked. For a monitoring task with tachymeter placement over the horizon, the traverse can be placed vertically, for vertical 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, 2 93)

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 39



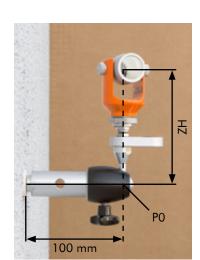
Cylinder Prism ZP11 s. page 21

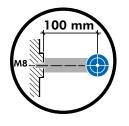














Use of any prisms perpendicular to the nominal point PO, according to AdV version (German norm) 100 mm in front of the front face of the wall bolt

We offer prisms and reflectors which are force-centered at the set point after screwing them into the wall bolt 251.

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 above 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 PO
- 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

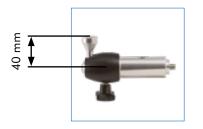
Ball Head

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

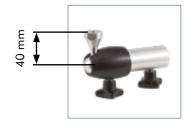
Description	Order-No.	Euro
Ball head for M8 wall bolt, M8 outer thread	6676.M	84,-



For mounting on a Leica spigot with $\varnothing 12~\text{mm}$ 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

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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 72 can be screwed in directly
- Distance from the base underside to the ball center is 50 mm
- Target height ZH between point PO 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, accuracy 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, accuracy 30'	1466.B	38,-

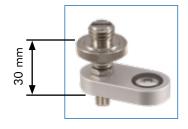


Prism adapter M8

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, accuracy 30'. Also visible from below
- Effective length = 30 mm. The height offset between nominal point PO 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,-







50 mm

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 PO 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, seethrough 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 PO 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,-



> JUMP

JUMP 14





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 (1 79). 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







wall tripod 🗋 221



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 $\emptyset \ge 14 \text{ mm}$
- 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 Ø12 x 50 , M8 inner thread, hexagon head, stain. steel	0892.50	5,50
Wall bolt Ø12 x 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 Ø14 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 Ø12x70, 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 Ø14x75, for screw-Ø 10-12 mm	0898.D	0,84
Allen key SW 5, straight, with plastic handle	0899.5	5,-
Masonry drill SDS-Plus Ø14 x 160/100 mm	0898.B	11,-

Precision Measurements

1/2

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









C.2. **Accessories for Mini-Vektor**



Ground Tripod "Triangle" for precise point measurements **C.3.**











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











Precision Measurements

2/2

C.5. Triangle frame "Klimax" for ground and wall points





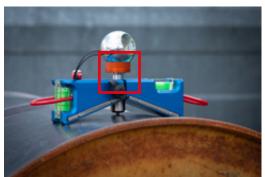




C.6. Revolver Base M8 for Ø1.5" and Ø30 mm ball prisms

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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 105

Modular

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

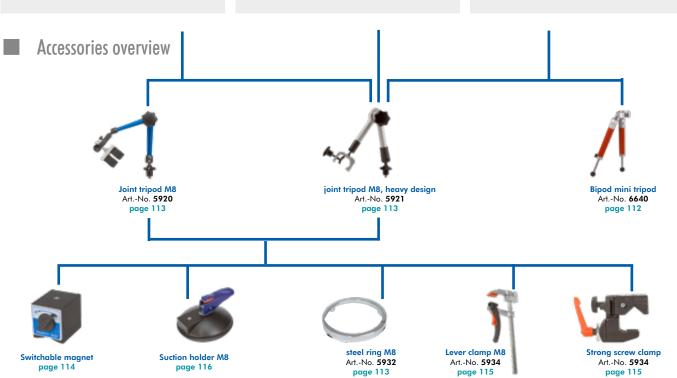


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Telescopic

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

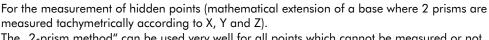








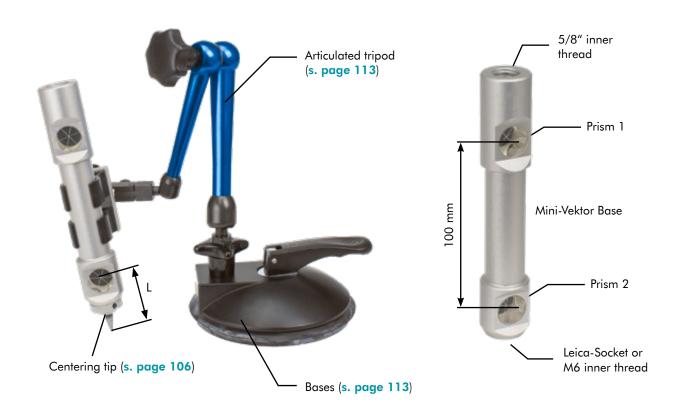
Mini-Vektor as a "rigid" unit

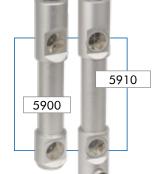


The "2-prism method" can be used very well for all points which cannot be measured or not measured exactly in the classical way, i.e. neither electrooptically with one prism or reflector, nor directly with a laser distance meter.

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 256).





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,-







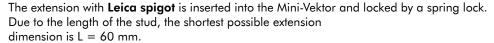


Extensions with hardend centering tip

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,-



Longer extensions: s. page 42

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

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, accuracy 30'	1585.30	36,-

Includes 2.5 mm Allen key.

Description	Order-No.	Euro
Adjustbale circular level "central", glass bubble, accuracy 30'	1587.30	51,-

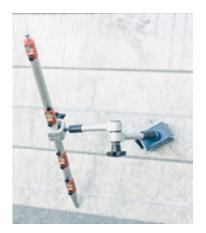
s. page 37



s. page 113

JUMP 14





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.





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

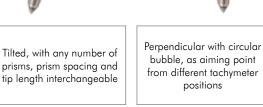


Angled, as "classic minivector" with prism spacing 100 mm



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





Examples of use

















Elements for modular mini vector

Cylinder prism ZP11 s. page 21

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 ± 0.1 mm:

Description	prism distance	Order-No.	Euro
Extension 50 mm with bolt + socket	100 mm	6650	39,-
Extension 100 mm with bolt + socket	150 mm	6651	43,-
Extension 150 mm with bolt + socket	200 mm	6653	47,-



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

Available in 2 lengths with accuracy ± 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:

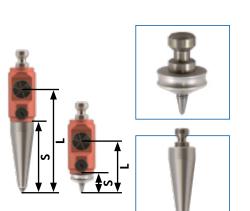
Description	Order-No.	Euro
Centering tip, length s = 70 mm, hardened mandrel, B1216 bolt	6665	43,-



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,-





JUMP 14

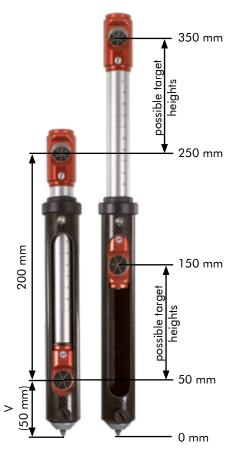








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Mini Vector Telescope MVT

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 256). Compared to the "Mini-Vector" (see page 105) and the "Modular Mini-Vector" (see page 107), 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







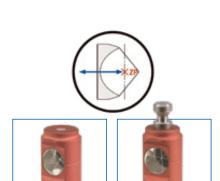












Complementary items & accessories

Cylinder prism ZP11 s. page 21

• 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 ± 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,-





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

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







Target height:

$$H_{B} = V + T$$

 $H_{A} = V + T + 200$

Telescope fully retracted

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

$$H_B$$
: 50 + 0 = 50 mm
 H_A : 50 + 0 + 200 = 250 mm

Telescope fully extended

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

$$H_B$$
: 50 + 100 = 150 mm
 H_A : 50 + 100 + 200 = 350 mm

L = V + T

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
- 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

You can find other transport cases on page 215.

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















Accessories for Mini-Vektor

Articulated Tripod

The Mini-Vektors 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.





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.

Magnetic Base

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

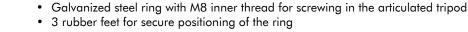
The ring is placed on the ground near the object and the centring tip of the Mini-Vektor is placed on the point to be measured with the help of the central clamp on the articulated arm. The object point can be anywhere within the radius of action of the articulated tripod (see picture examples).











D JUMP

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

1	

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







JUMP 14

Stable universal screw clamp

For fastening to tubes and surfaces, such as scaffolding struts, table tops, steel beams, floorboards, etc.

- Very stable quality clamp made of full metal
- Rubberized clamping surfaces to protect the material

Uni. screw clamp M8, incl. screws and flat-insert-piece

- Clamping range on cylinders Ø and surfaces thickness: 13 55 mm
- Two M8 inner threads

Description

- Clamping lever with latching function, i.e. lever direction can still be aligned after tightening
- Insert-piece for flat surfaces (plates, table edges, boards etc.)



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Order-No.

6884

Euro

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,-



JUMP 14















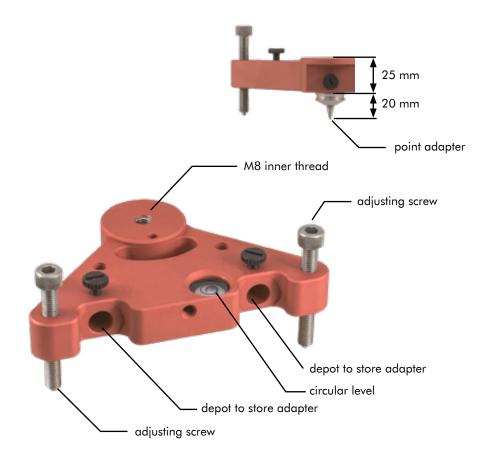




Ground tripod "triangle" for ground level point measurements

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, accuracy 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,-



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For exact positioning of the triangle on different ground points

Centering tip

For line crosses or measuring points with centering etc.

- Slender tip with hardened mandrel
- B1216 bolt for quick exchange
- Effective length: 20 mm
- 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
- B1216 bolt for quick exchange
- 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

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X	TIP	6	

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





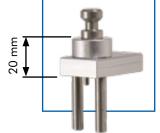
Angular stop

For wall edges, also chamfered concrete parts

- Angle length 30 mm for chamfers up to 25 mm width
- B1216 bolt for quick exchange
- Effective length: 20 mm
- Results in total height of bearing surface angle stop up to screw-in surface M8 thread: 45 mm

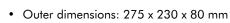


Description	Order-No.	Euro
Angular stop for ground tripod triangle, B1216 bolt	6808	44,-



Transport case

For storage and transport of 1x ground stand and prism or 2x ground stands

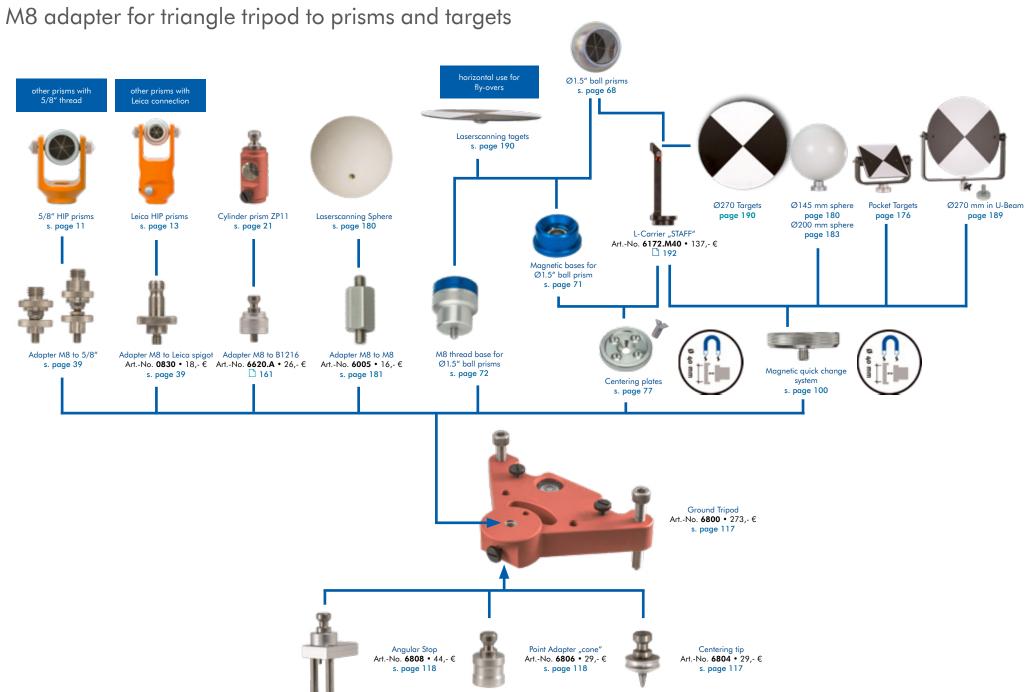


- Made of red plastic with 2 click fasteners
- Upper and lower part with foam inlays and studs
- Weight: approx. 420 g

Description	Order-No.	Euro
Transport case for ground tripod "triangle"	1468.1	34,-







D|JUMP











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 68.

System Information

Features

- Base made of stainless steel (V2A)
- Integrated permanent magnet (often available with two holding forces)
- Usable ball prisms: ø 1.5" (38,1 mm) s. page 68
- Positional accuracy of the ball in the base: \pm 0,02 mm
- Height-Offset HO of prism center: 25 ± 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



D|JUMP



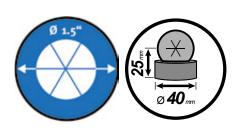




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Base for measurement of corners & edges

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°

	Lower part 270			
	Description	magnet. holding force	Order-No.	Euro
Ball prism base for outer corners	around 1,2/0,4 kg	1434.A	132,-	
	for ball with Ø 1.5", stainless steel	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,-



JUMP |

Kanten [3]

• Lower part exactly semi-circular

Description	magnet. holding force	Order-No.	Euro
Ball prism base for edges for balls	around 1,2/0,4 kg	1432	132,-
with Ø 1.5", stainless steel	around 4,0/2,6 kg	1432.5	138,-



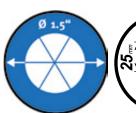






















Base to measure bore holes

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.

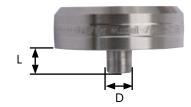
The bolt diameters are manufactured with "h6 accuracy".

The ball centre is located exactly in the stud axis (=bore axis).

Features

- General information: s. page 120
- · 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
C	Ø 6 x 8 mm		1433.06	132,-
Stainless steel base for ball-Ø 1.5",	Ø 8 x 10 mm		1433.08	132,-
to measure bore holes	Ø 10 x 12 mm	around 2 kg	1433.10	132,-
noies	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 99. Due to the small distance of only 25 mm, very accurate measurements are possible.

Features

- General information: s. page 120
- 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,-







JUMP 14

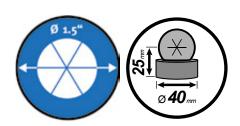
TIP

Outside of industrial 3D measurements, the inexpensive, universally applicable M8 revolver base can be used alternativley s. page 132













Basis for measuring contours

The base is placed onto the object and held with the tip (= base center) against the contour edge. After aligning the ball prism with the tachymeter, the measurement can take place. Due to the permanent magnet built into the base, the ball prism sticks reliably to the base. With the "Contour" base, both straight and curved edges can be measured.

Since the tip of the quadrant lies exactly in the center of the base, it can be held at any angle to the edge. Apart from the height offset HO of 25 mm, no further parallel dimension must be taken into account.





- General information: s. page 120
- 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).



Ø 1.5" (38,1 mm)



ball prisms ø 1.5" s. page 68



bases from s. page 128



triangle frame from s. page 125

Triangle-Frame "Klimax" for high precision point measurement on floors and walls

- 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 / floors
- Solid, compact design

Setup

With the Klimax, our ball prism Ø1.5" can be, regarding the application, equipped with various stainless steel bases. These are movably mounted in the triangular frame.

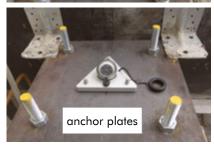
The centre of the base is exactly below the centre of the ball and directly above the measuring point to stake out or measure.

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









APPLICATION EXAMPLE

Examples in practice





D|JUMP





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 fixing the base in the triangle frame at a certain posi-

Storage option 1 Prism on rubber ring



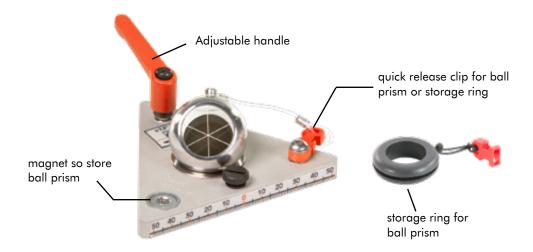
Storage option 2 Prism on magnet



Klimax

For horizontal floors such as screeds, industrial floors, etc. and on the wall

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. It is attached to the frame with a quick release clip
- On the wall it is recommended to use a ball prism with fall protection (s. page 126). This can be clipped on the frame instead of the storage ring via the quick release











Measurements with the Klimax on the wall

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

For the measurement on the wall we recommend the Klimax standard frame no. 1492. The used base should be fixed 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.



On the ground, 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.

TIP

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

For wall measurements, the ball prism must always be removed from the base and then 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. 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 \emptyset 1.5" (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 \emptyset 1.5" (38,1 mm), galvanized steel, K = -11,3 (Leica = +23,1) mm, string with quick connector for fall protection	1454	179,-



JUMP 14

INFO Safety string for ball prisms Ø1.5" made of other materials on request!



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 one of our neck straps.

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

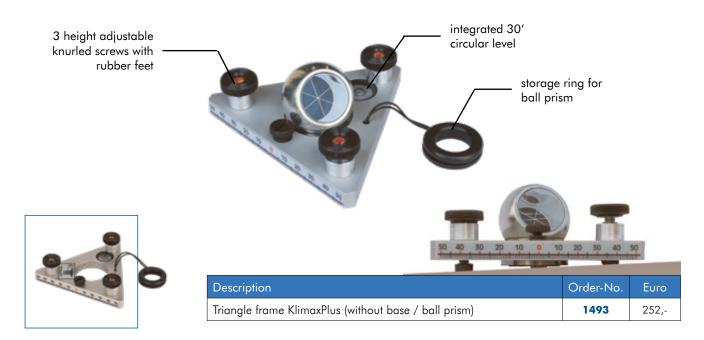




KlimaxPlus

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.





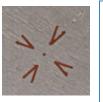




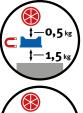
















Choice of bases according to application

The replaceable 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

- 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 and wall points

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

- Move the sphere prism with the triangle frame until no more differences to the target coordinates are displayed
- Remove ball from base and "store" on tray ring
- 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	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 on 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	around 4,5/3,0 kg	1495.M	104,-
points, with magnet	around 0,5 / 1,5 kg	1495.M2	100,-

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













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,-



The bore hole has a \varnothing 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. 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	on	Order-No.	Euro
Base P fo	r 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.







JUMP 4

Measurement / control of ground 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 or the wall can thus be found and measured very precisely. Weight: 50 g.

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



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







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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 bearing-insert and centering pin, an already marked ground point can also be centred to the base centre.

- 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 ± 0.1 mm
- Center-punch/centering pin Ø 6 x 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 C 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.

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 ma-	around 4,5/3,0 kg	1499.M	72,-	
	around 0,5 / 1,5 kg	1499.M2	68,-	













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

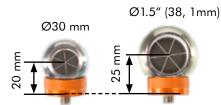
Description	Order-No.	Euro
Transport case, 7 recesses	1468.7	46,-
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"Revolver base"



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 \pm 0.1 mm
- Use in a centering plate is not possible
- Magnetic holding force (ball direction): \emptyset 1.5" (38.1 mm) = approx. 0.3 kg, \emptyset 30 mm = 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.









CONE Adapter



Accessories

If vertical adjustment is necessary, the see-through circular bubble can be attached to the revolver base 2 97



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**





BOAXE: Measurement of bolt axis Ø16 - 56 mm D.2.





HEMI: Measurement of bore axis up to Ø95 mm D.3.









CONE: Cone adapter for measuring bolts and boreholes D.4.















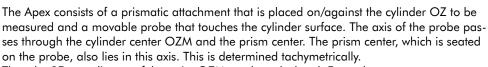




APEX

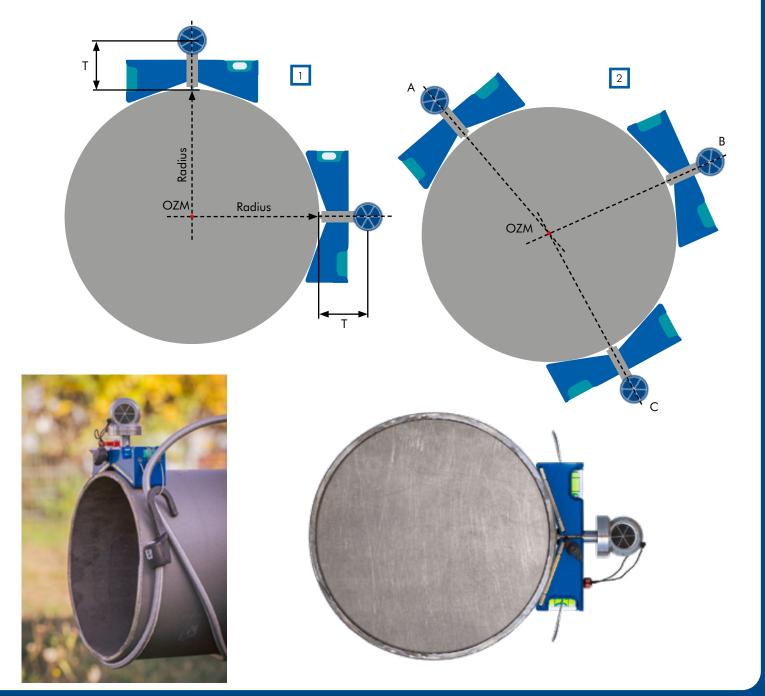
Tool for tachymetric measurement of the axis of all types of cylinders, such as shafts, rollers, tubes, rolls, etc.

Measurement methods



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, 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.



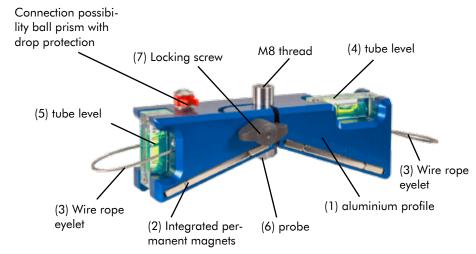
Features

- Anodized aluminum profile for cylinders \varnothing 60 to 2000 mm (1)
- Integrated permanent magnets to hold on cylinders made of magnetic steel (2)
- 2 eyelets for fixing rubber bands (see next page) for cylinders made of non-magnetic material (3)
- 2 tubular levelsfor defined placement of the Apex: 1. plumb above the cylinder axis (4) or 2. horizontal to the cylinder axis (5)
- Movable probe rests reliably on the cylinder surface by spring pressure (6). The probe can be fixed at a certain position by a wing screw (7)
- Dimensions of prismatic attachment: 140 x 45 x 38 mm
- Effective height of the probe: 45 mm
- Total weight (without prism): 178 g



Description	Order-No.	Euro
Apex for cylinders with Ø 60 - 2000 mm	1420	445,-







Elastic band

• For fixing the apex to cylinders made of non-magnetic material

Description	Order-No.	Euro
Adjustable elastic band for cylinders Ø60 - 300 mm	1421	12,-



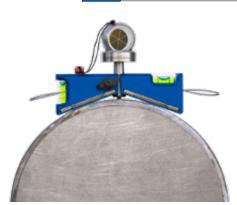
Description	Order-No.	Euro
Adjustable elastic band for cylinders Ø300 - 700 mm	1422	16,-



For cylinders with a diameter of more than 0.7 m, the rubber band must be extended.



JUMP 14

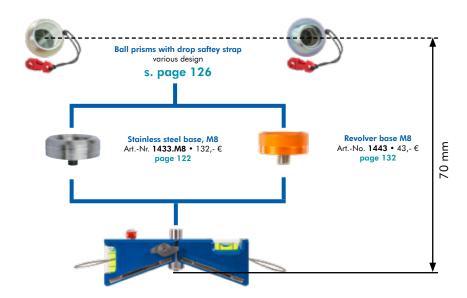




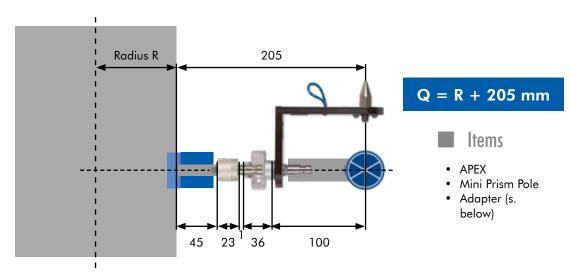
Accessories for APEX tool



Transport case for APEX tool Art.-No. **1468.09** • 54 Euro s. page **216**



Measurement of vertical cylinders (columns, beams, etc.) with a measurement with lateral eccentric Q







M8 outer <-> Leica 27 mm bolt Art 0404.050 • 36,-€

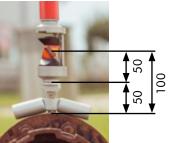








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JUMP 14





BOAXE

Tool for determining the axis of vertical or inclined bolts with \emptyset 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





Lid (Cover)









Ø16 - 36 mm



90° attachment prism BOAXE S

Description	Order-No.	Euro
90° attachment prism BOAXE S	1721	175,-

The BOAXE S attachment prism cannot be used with \varnothing 42 to \varnothing 56 mm lids/bolts.

Lid: BOAXE S16 to BOAXE S36



Туре	Description	For Ø	Thread bolt	Order-No.	Euro
BOAXE lid Type "S"	BOAXE \$16	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 \$36	36 mm	M36	1720.36	31,-













90° attachment prism BOAXE B

Description	Order-No.	Euro
90° attachment prism BOAXE B	1731	195,-

The BOAXE S attachment prism cannot be used with \varnothing 16 to \varnothing 36 mm lids/bolts.

Deckel BOAXE B42 bis BOAXE B56



Туре	Description	For Ø	Thread bolt	Order-No.	Euro
	BOAXE B42	42 mm	M42	1730.42	34,-
BOAXE lid Type "B"	BOAXE B48	48 mm	M48	1730.48	36,-
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	BOAXE B56	56 mm	M56	1730.56	38,-











JUMP 14



Transport case for BOAXE accessories

Description	Order-No.	Euro
Transport case for BOAXE accessories	1468.11	54,-

s. page 216











Vertical bolts

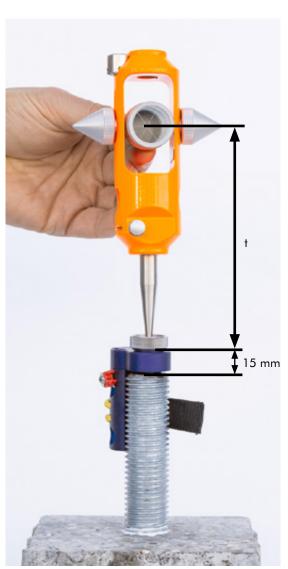
To determine the axis position, all you need is a prism and suitable adapter, which is screwed into the M8 inner thread of the BOAXE lid (s. page 141).

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).

Descrip	tion	Order-No.	Euro
Centeri	ng adapter M8	1723	14,-





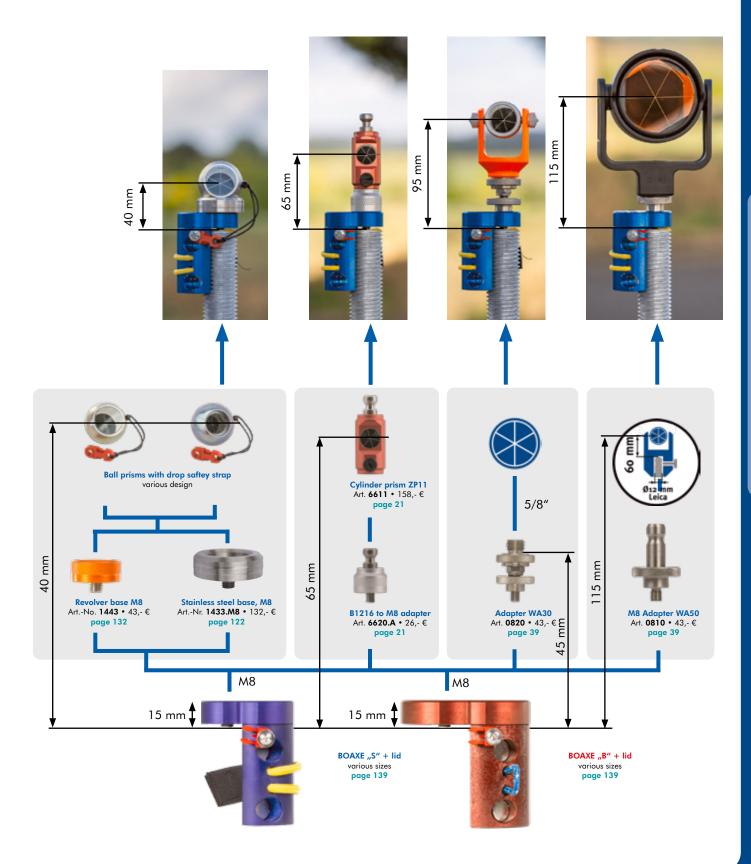
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Adapter for axis extension M8

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).

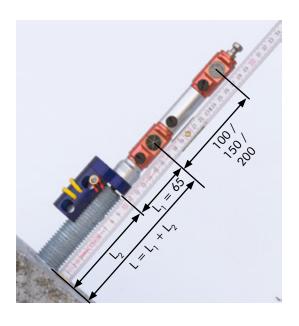


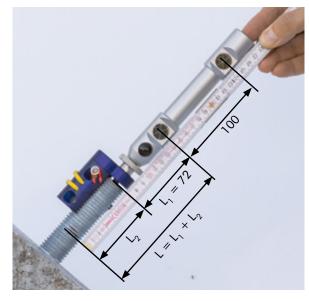


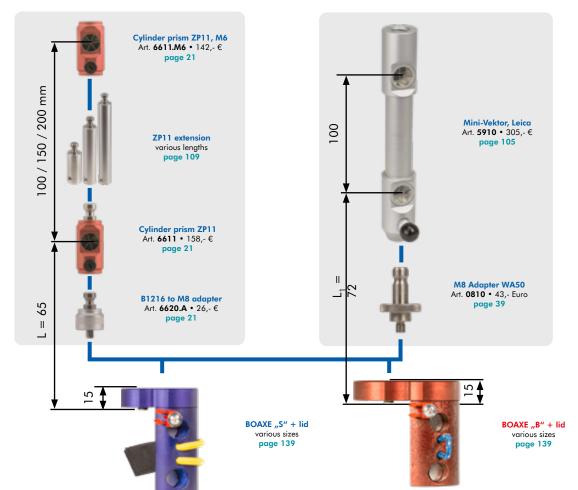
Inclined Bolts

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.).















To determine the axes of circular openings / holes

The hemisphere adapter can be placed on all boreholes and circular openings with Ø35to 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)

ball prisms with Ø30 mm.



On request, the hemisphere adapter is also available for the small



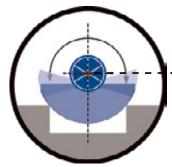


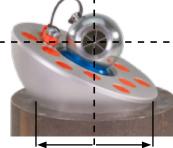
Due to 20 integrated magnets, the adapter also holds in vertical holes in magnetic material.

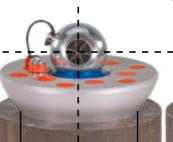
INFO

A ball head with handle can be screwed into the M8 thread.

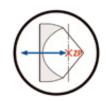
This makes handling, especially when measuring round openings made of non-magnetic material easier.











No matter how the hemisphere adapter is placed, the center of the spherical prism always remains at the same height in the borehole axis.



The sphere prism can be inserted directly (without hemisphere adapter) into holes smaller than Ø35 mm.











We recommend to use a ball prism with drop protection (article no. 1444 / 1454 page 126). By means of a plug-in connector, the ball prism can be connected to the Hemishere adapter and thus cannot fall down.





JUMP |









Cone Adapter B60

Measuring of bore holes, as well as bolts, bolt heads, nuts, etc.

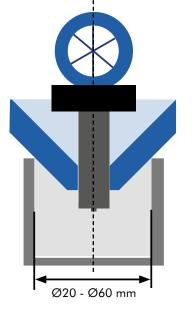
The exact tachymetric measuring of the axis position of circular objects is only possible with auxiliary means.

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.











Ø20 - Ø60 mm





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 🗋 147



















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		



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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 \varnothing 6 mm as tightening aid when screwing on

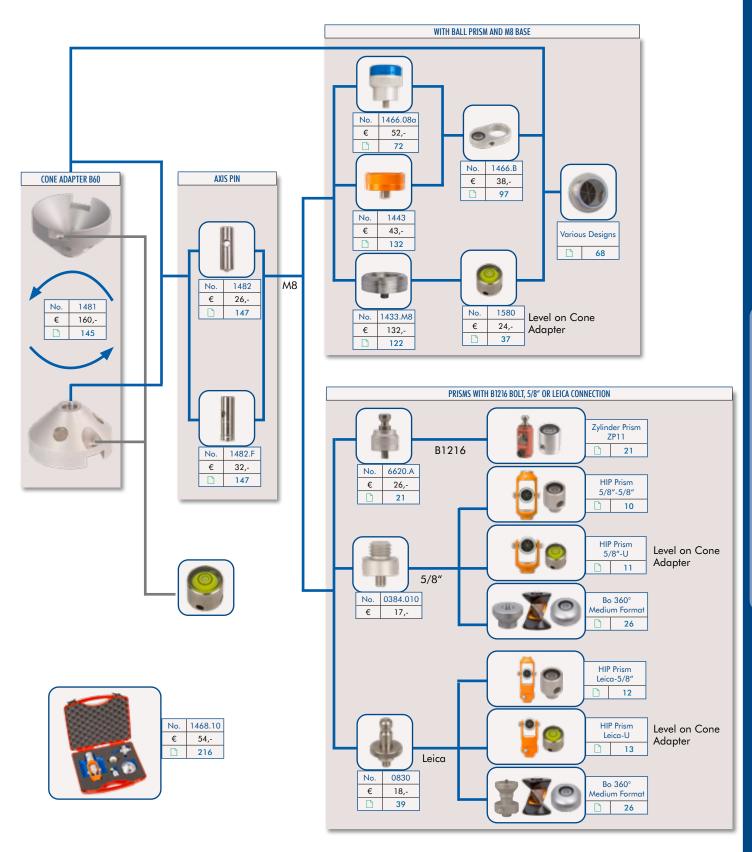
Description	No.	Euro
Axis pin Ø12x40 mm, M8, with flange, L = 40 mm	1482.5	32,-
Weight: 42 g		











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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 151
- 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 $\emptyset 40$ mm instead of $\emptyset 60$ 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"

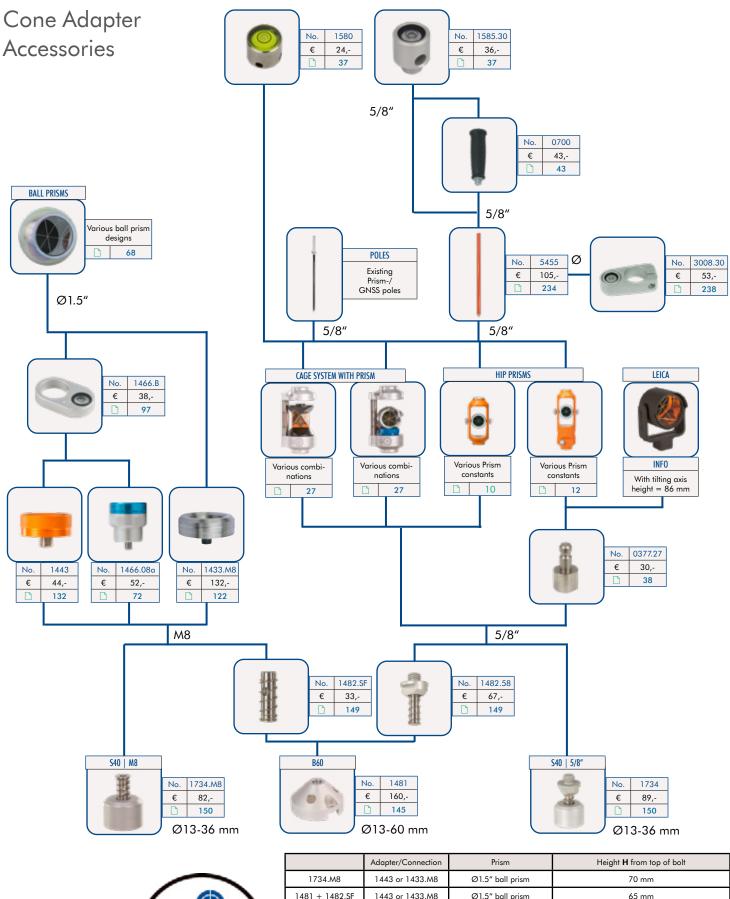
- Aluminum cylinder Ø40 mm with conical bottom part
- Captive axis pin Ø12 mm with collar and compression spring
- Ball segment at the bottom of the axis pin to be placed on the top of the bolt
- 5/8"-outer thread to screw on prisms with 5/8" inner thread
- Tightening aid on 5/8" thread: SW17
- Effective length axis pin + 5/8" threaded connection: 50 mm
- Usage with prism pole 🗋 151

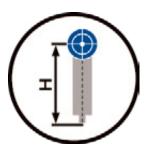
Description	No.	Euro
Cone Adapter S40, 5/8"	1734	89,-
Weight: 132 g		
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	Adapter/Connection	Prism	Height H from top of bolt
1734.M8	1443 or 1433.M8	Ø1.5" ball prism	70 mm
1481 + 1482.SF	1443 or 1433.M8	Ø1.5" ball prism	65 mm
1734.M8	1466.08a	Ø1.5" ball 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

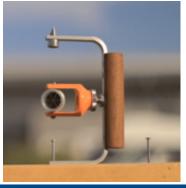


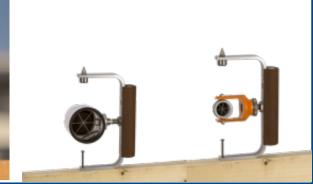
Batter Boards

1/1

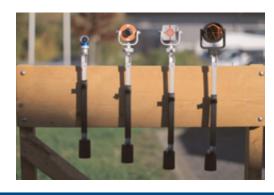
E.1. Manual Reflector Holder







Pendulum holder for prisms / reflectors E.2.





E.3. Nail Prism Holder HIT





E.4. Instrument Holder 5/8"





D|JUMP





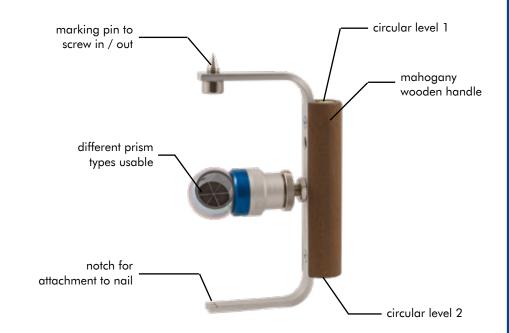
Manual Prism Holder

- One holder to stakeout (Fig. 1 and 2) and control (Fig. 3) the batter board nails
- Interchangable marking pin
- Compact and lightweight design
- You are able to use prism constants of your choice
- Cardan suspension of prism: After putting the reflector holder onto the batter board, the prism can be aligned to any instrument standpoint without having to also rotate the support shaft











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 11)
- ONRT 50 with mini prism MP24 or reflective foil (s. page 18)
- Ball prism base 5/8" (s. page 72) + ball prism (s. page 68)

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,-



2

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



pendulum head: reflector mount+ marking pin and standing point + integrated nail-bit-shell

- - nail-bit-shell is connected to the marking pin and adjustable to hang pendulum holder also safley 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)



(sold separately)

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,-



















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



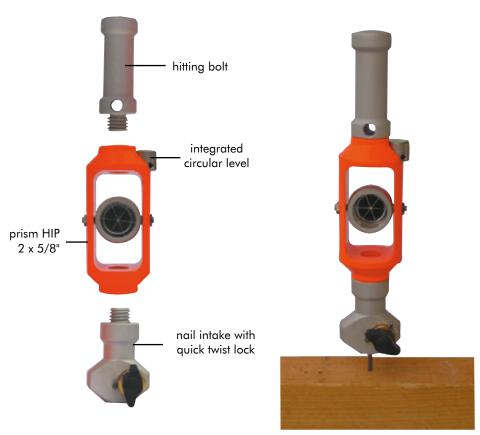




Nail Holder Prism HIT

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 \varnothing of 3,0 mm
- Modular design: nail holder, prism and hitting bolt can be easily separated. So theprism is also available for other applications by itself
- Available with all prism constants of common surveying systems

JUMP 1









With 2 x 5/8" internal thread

Description	Prism	sm Prism Constant		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,-

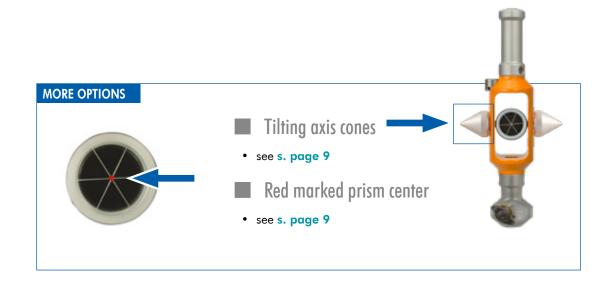
INFO

The tilting and standing axes run exactly through the center of the printed target mark or the visible prism center (center-symmetrical point).

With Leica spigot

INFO

For the discontinued series of HIT systems with Leica connection, we continue to offer spare parts on request.





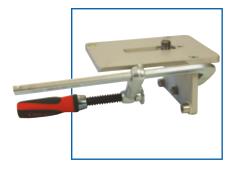












Instrument Holder

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.





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 longhole, 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,-

Gleis und- Schienenvermessung

1/1

E.1. Aufmessung der Gleislage (Schienenachse und Außenkanten)







F.2. Aufmessung der Gleislage (Außenkanten)









F.3. Bolzenvermarkung









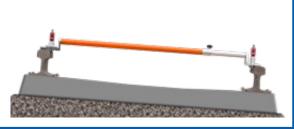


Gleismessstab F.4.

JUMP 1























Tachymetrische Bestimmung der Lage und Höhe von Eisen- und Kranbahn-Schienen

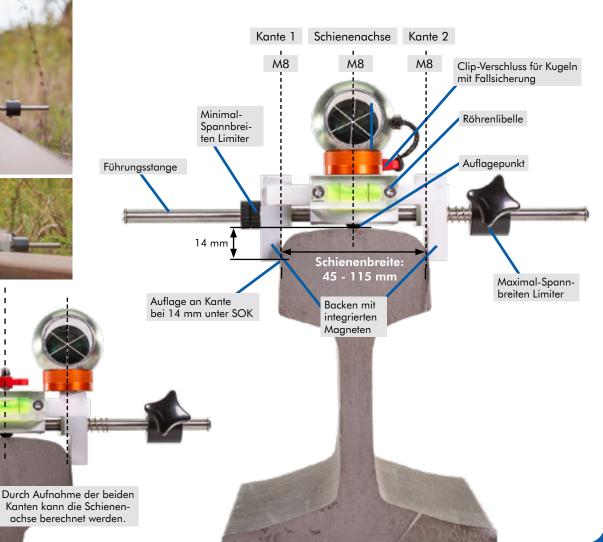
Mit dem HUG steht ein Werkzeug zur Verfügung, mit dem Schienen universell aufgemessen werden können. So lässt sich nach Aufsetzen des HUG nicht nur die Fahrkante bestimmen, wie z.B. mit unserem Schienenwinkel SW PRO, sondern auch die gegenüberliegende Außenkante, sowie die **Schienenachse**.

Aufbau und Funktion des HUG

- Abstand der Backen einstellbar auf Schienenbreiten 45 115 mm
- Beide Backen haben immer den gleichen Abstand zur HUG-Mitte
- Aufnahme der beiden Kanten 14 mm unter der Schienenoberkante [SOK] bzw. Fahrfläche
- Drei M8-Innengewinde zum Einschrauben von Adaptern/Prismenträgern oberhalb von beiden Kanten und Schienenachse
- Einstellbare Anschläge zum schnellen Aufmessen eines Schienentyps
- Magnete in Backen sorgen für ein zuverlässiges Anliegen an der Schiene
- Röhrenlibelle zur horizontalen Ausrichtung des HUG quer zu Längsachse
- Schnalle zum Einclipsen bei Verwendung der Fallsicherung am Kugelprisma
- Abstand von Fahrfläche bis zur Oberseite des M8-Gewindes: 25 mm
- 2 Möglichkeiten den HUG auszurichten (1 160)

Beschreibung	Nr.	Euro
Schienen-Tool HUG für beide Kanten und Schienenachse	0807	475,-
Gowicht: 285 a		











HUG mit Prismenstab

Komfortables Aufnehmen vieler Punkte ohne Bücken.

Mit einmaligem Aufsetzen können mit dem HUG die wesentlichen Punkte an einer Schiene tachymetrisch bestimmt werden: Kante 1, Kante 2 und Schienenachse. Durch Verwendung eines Prismas HIP oder Cage im mittleren M8-Gewinde kann das HUG im Stehen bedient werden. Dabei wird mit Hilfe des Prismenstabs das HUG aufgesetzt, lotrecht gestellt und das Prisma auf das Tachymeter ausgerichtet.

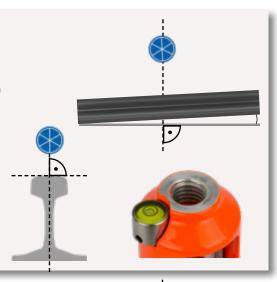


Zwei Ausrichtvarianten



Lotrecht in Längsachse / Lotrecht in Querrichtung der Schiene

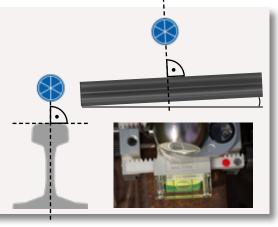
- · Das HUG liegt nur mit einem zentrischen Punkt auf der Schiene auf
- Das Lotrechtstellen erfolgt mit einer am Prismenträger angebrachten Dosenlibelle oder mit der Dosenlibelle am Prismenstab, falls ein solcher verwendet wird. Das Lotrechtstellen in Querrichtung kann zusätzlich durch Beobachtung der Röhrenlibelle am HUG unterstützt werden
- Unterseite des HUG: Eine Linsenkopfschraube wird zentrisch eingeschraubt, die 2. Schraube wird vertieft "geparkt" (jeweils mit "A" gekennzeichnet)





Senkrecht zur Längsachse / lotrecht in Querrichtung der Schiene

- Das HUG liegt mit 2 Punkten auf der Schiene auf. Damit steht die Prismenachse senkrecht zur Schienenlängs-
- Das Lotrechtstellen in Querrichtung erfolgt mit der Röhrenlibelle am HUG.
- Unterseite des HUG: Die beiden Linsensenkschrauben werden in die Gewinde mit der Kennzeichnung "B" eingeschraubt



INFO

Zur Verwendung mit dem Prismenstab empfehlen wir die erste Variante.



Transportkoffer für HUG

Kunststoffkoffer zur Aufbewahrung und Transport des HUG, sowie Zubehör. Diverse Aussparungen im Schaumstoff.

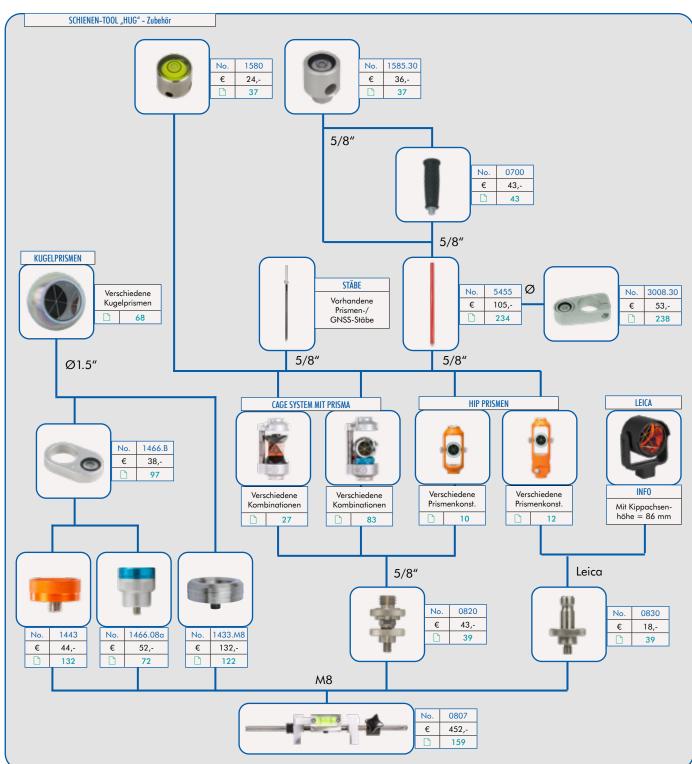
Beschreibung	Nr.	Euro
Transportkoffer für Schienentool HUG	1468.12	54,-
Gewicht: 420 g, Außenmaße: 275 x 230 x 80 mm		

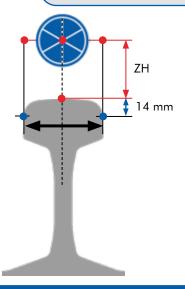










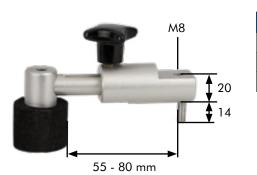


	Adapter	Prisma	Zielhöhe ZH	Arbeiten mit Prismenstab möglich
	, laapioi	11101110	Ziomono Ziri	, abonon min i nomensida megnen
	1433.M8	Kugel Ø1.5"	50 mm	-
	1466.08a	Kugel Ø1.5"	75 mm	-
	1433.M8	Kugel Ø1.5"	50 mm	-
HUG	0820	Cage + Bo 360°	105 mm	✓
	0820	Cage + Ø1.5"	105 mm	✓
	0820	HIP 2 x 5/8"	105 mm	✓
	0830	HIP 5/8"-Leica	125 mm	✓
	0830	Andere Leica	125 mm	-
INFO	360° Prism	en haben eine Anz	ielgenauigkeit	von maximal 1,5 - 2 mm.

D|JUMP







Schienenwinkel SW PRO

Schienenwinkel zur exakten Aufmessung der Gleislage. Der aufzumessende Bezugspunkt P (Fahrkante) liegt an der Innenseite der Schiene, 14 mm unter der Schienenoberkante SOK (Fahrfläche).

Genau dieser Punkt wird durch Aufsetzen des Schienenwinkels SW PRO realisiert.

Aufbau und Vorteile

- Metallkonstruktion mit gehärtetem, 14 mm langem Zylinderstift zur punktgenauen Anlage am Bezugspunkt P
- Zylindrische Auflage des SW PRO auf der Schiene. So ist auch bei Gleisen mit Steigung eine lotrechte Verwendung bei gleichbleibendem Abstand zur SOK gewährleistet
- Einschraubachse der Prismenaufnahme (M8-Gewinde) liegt exakt über Bezugspunkt P
- Prisma kann bei feststehendem Schienenwinkel beliebig um die Prismenachse gedreht und auf das Tachymeter ausgerichtet werden
- Verstellbarer Moosgummi-Anschlag. Nach Aufsetzen des Gleiswinkels sorgt dieser dafür, dass der Zylinderstift immer mit leichtem Druck an den Bezugspunkt P gedrückt wird. Einstellung Schienenbreite ist dabei nur einmal vorzunehmen. Wird ein Prisma mit Verlängerung nach oben (z.B. Prismenstab) verwendet, sorgt der Moosgummi-Anschlag für eine sichere und zuverlässige Anlage des Gleiswinkels am Bezugspunkt
- Das Aufsetzen kann stehend ausgeführt werden, was vor allem bei einer großen Zahl von aufzumessenden Punkten eine große Erleichterung darstellt.
- Mit dem schlanken Zylinderstift kann eine evtl. seitlich an der Schiene angebrachte Markierung gut fixiert werden
- Das Lotrechtstellen des Schienenwinkels samt Prisma erfolgt mit Hilfe einer Dosenlibelle, die entweder am Prismenträger oder am Prismenstab angebracht sein kann

Beschreibung	Nr.	Euro	
Schienenwinkel SW PRO	0800	123,-	
Gewicht: 190 g			
Info: Einsetzbar für Schienenbreiten von 55 - 80 mm			

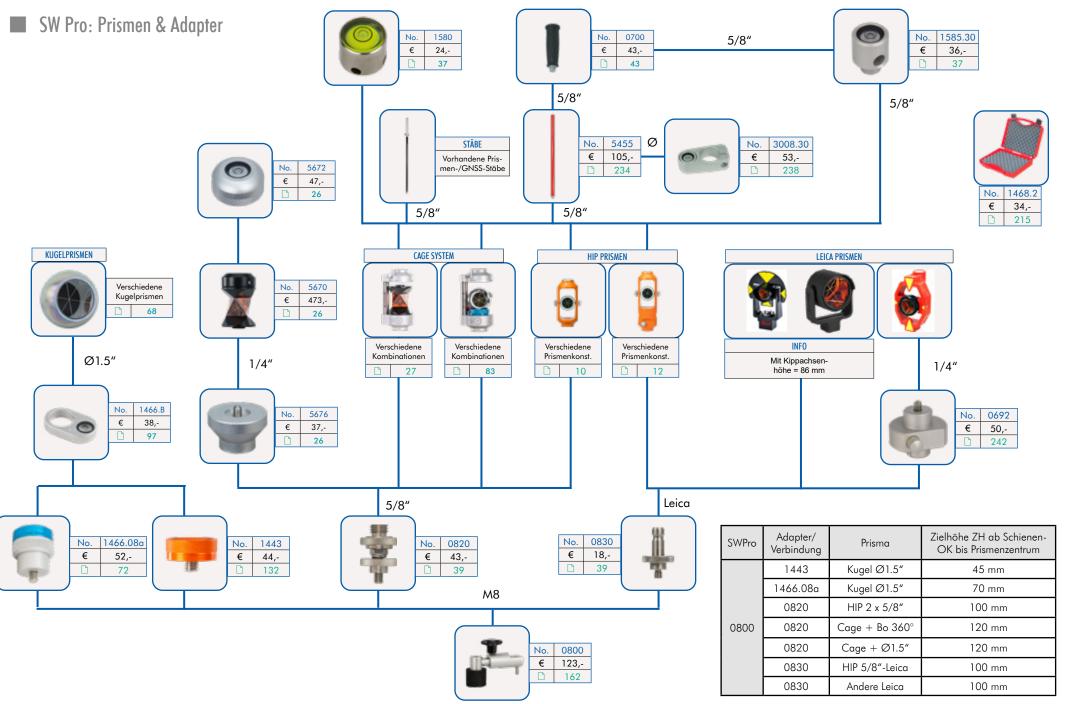


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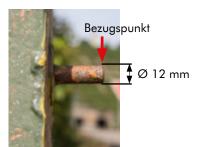






>|JUMP



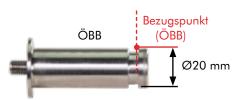












Prismenhalter für Bolzenvermarkung

Der Halter kann auf allen Horizontalbolzen Ø12 mm (bzw. ÖBB: Ø20 mm) eingesetzt werden, die man an Oberleitungsmasten aus Stahl oder Schleuderbeton vorfindet. Über Adapter können Prismen und Scan-Kugel-Segmente verwendet werden (s. Übersicht nächste Seite). Das Prismenzentrum liegt in einem exakt bestimmten Abstand über dem Bezugspunkt (siehe Bilder). Besitzt das Prisma keine Dosenlibelle kann der Halter mit integrierter Dosenlibelle genutzt werden.

Nach Aufstecken des Halters auf den Bolzen wird das Prisma auf den Tachymeter ausgerichtet und lotrecht gestellt. Mit den beiden Rändelschrauben wird diese Lage fixiert und die Messung vorgenommen.

- Exakt gearbeitete Metallkonstruktion aus eloxiertem Aluminium
- Ergonomische Rändelschrauben
- Einschraubachse der Prismenaufnahme (M8-Gewinde) liegt exakt über dem Bezugspunkt (= Mitte Bolzenvorderkante)
- Bei ÖBB Bolzen liegt die Einschraubachse 5 mm hinter der Bolzenvorderkante
- Die in den Haltern 0852 und 0854 integrierte Dosenlibelle kann von oben oder unten eingesehen werden. Vor allem bei hoch angebrachten Bolzen ist das eine wesentliche Arbeitserleichterung, da keine aufwendigen und gefährlichen Klettereien notwendig sind.

Beschreibung	Nr.	Euro
Prismenhalter für Horizontalbolzen (Ø12 mm), ohne Dosenlibelle	0850	146,-
Prismenhalter für Horizontalbolzen (Ø12 mm), mit Durchsichtlibelle	0852	163,-
Prismenhalter für ÖBB -Horizontalbolzen (Ø20 mm), mit Durchsichtlibelle	0854	163,-



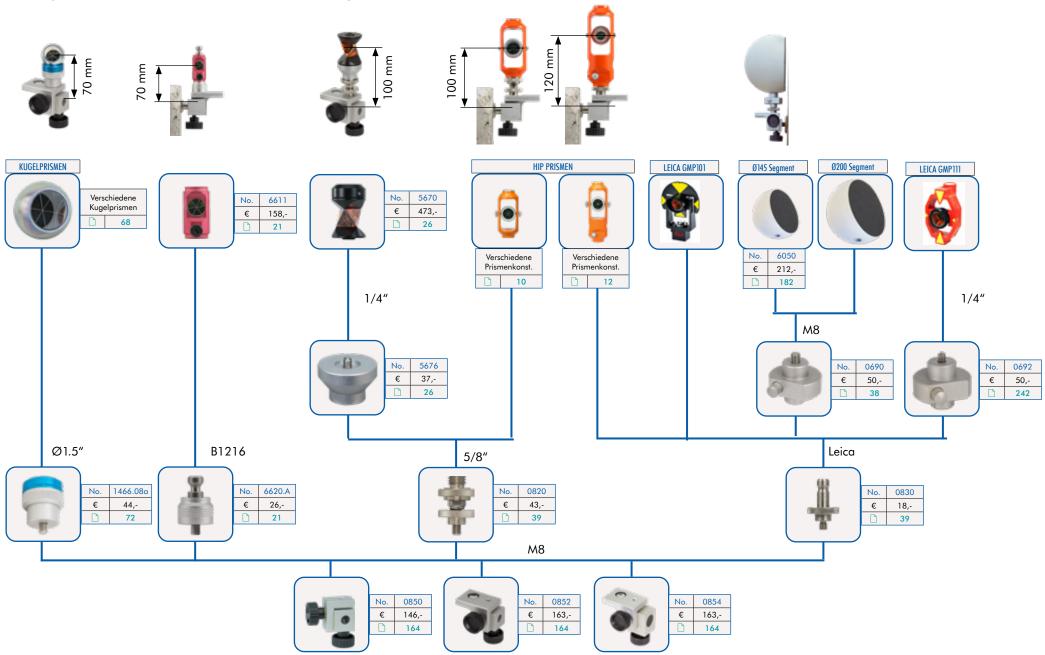
Info: Auf Anfrage ist auch 0854 ohne integrierte Dosenlibelle erhältlich.



D|JUMP



Adapter für Prismenhalter zur Bolzenvermarkung



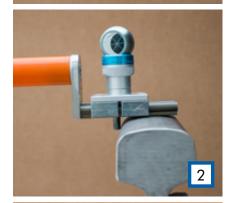














Gleismessstab TGS

Tachymetrische Bestimmung der Spurweite (950 bis 1500 mm), Überhöhung und Gleisachse.

Mit dem Gleismessstab TGS werden 2 Prismen exakt über den Fahrkanten der beiden Schienen positioniert. Nach tachymetrischer Bestimmung dreidimensionalen Koordinaten der Prismenzentren lassen sich folgende Informationen programmgesteuert berechnen:

- Spurweite
- Querneigung (Überhöhung)
- Gleismitte

Bei entsprechender Stationierung des Tachymeters erhält man die Koordinaten der Gleisachse im gewünschten Landes- oder Projektsystem. Näheres hierzu 🗋 167

Eigenschaften

- Teleskopstab aus GFK und Aluminium
- Schnelles Einstellen des Stabes auf die gewünschte Spurweite (950 mm bis 1500 mm)
- Hohe Stabilität bei geringem Gewicht
- Zylindrisches Außenrohr aus 100% GFK:
 - Einfaches Handling
 - Elektrisch nicht leitend
 - Angenehmes Tragen auch bei niedrigen Temperaturen
- Messung der Spurweite 14 mm unterhalb der Schienenoberkante
- 1. Prisma auf der 1. Schiene: Fester Anschlag mit Doppelbolzen [1]
 - Der große Abstand von 180 mm der beiden Anschlagbolzen stellt die sichere rechtwinkligen Ausrichtung zum variablen Anschlag auf der gegenüberliegenden
 - 2. Schiene sicher
 - Abstand der Bolzen auf 90 mm verkürzbar,
 - z.B. für enge Kurvenradien bei Straßenbahnen
- 2. Prisma auf der 2. Schiene: Flexibler Schlitten [2]
 - Eine Feder mit 20 mm Federweg drückt den Schlitten mit dem Anschlagbolzen zuverlässig gegen den Bezugspunkt an der Schieneninnenseite
 - Spielfreies Gleitlager
- M8-Gewinde zum Aufschrauben der beiden Prismen/Adapter
- Abstand von SO bis Einschraubfläche des M8-Gewindes: 30 \pm 0,1 mm
- Ca. 35 mm lichte Höhe von SO bis Unterseite Teleskopstab. Verlängerbar auf lichte Höhe von 85 mm (☐ 169)

Beschreibung	Nr.	Euro	
Tachymetrischer Gleismessstab TGS, für Spurweiten von 950 bis 1500 mm	0802	1.260,-	~
Gewicht: ca. 2 kg (ohne Prismen)			





Der Gleismessstab ist umrüstbar zur Aufmessung auch von Fahrkanten 10 mm unter der Schienenoberkante. Bitte anfragen.



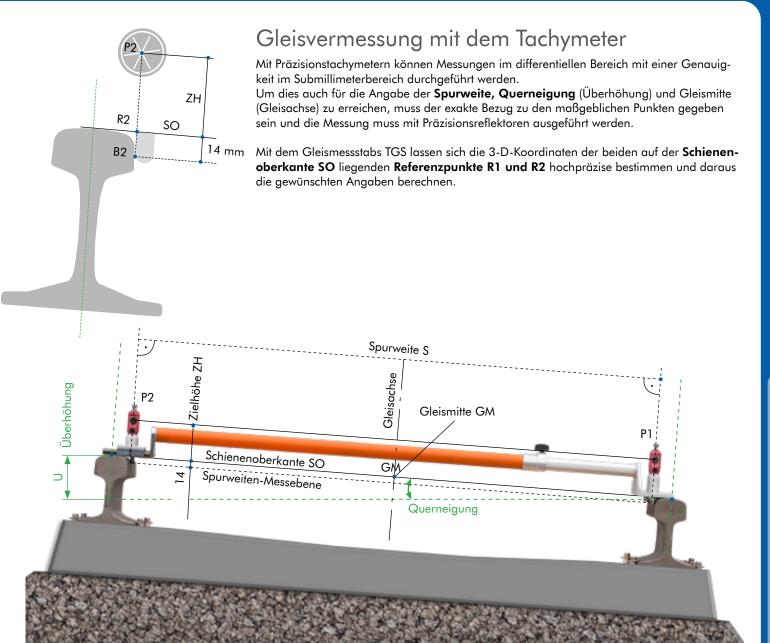












Grundlage der Gleisvermessung ist die Definition der Spurweite in den maßgeblichen Vorschriften.

INFO

Die Spurweite des Gleises ist der Abstand zwischen den Fahrkanten der Schienen und wird 14 mm unter der Verbindungslinie der höchsten Punkte der beiden Schienen gemessen (Schienenoberkante = SO).

Die Spurweite S ist somit der Abstand zwischen den beiden Bezugspunkten B1 und B2, die sich auf den Innenseiten der beiden Schienen gegenüberliegen.

Der Gleismessstab ist so konstruiert, dass die Prismenzentren P1 und P2 auf einer Parallelen mit definiertem Abstand zur Verbindungsgeraden der Punkte B1 und B2 liegen, jeweils im exakten rechten Winkel zu diesen.

Nach Auflegen des Stabes mit Anschlag an den Schieneninnenkanten werden die beiden Prismenzentren P1 und P2 tachymetrisch aufgemessen. Aus deren 3D-Koordinaten lassen sich unter Berücksichtigung der Zielhöhe ZH die Referenzpunkte R1 und R2 berechnen und hieraus, unabhängig vom Koordinatensystem, die tatsächliche Spurweite und die Überhöhung U. Bei entsprechender Stationierung des Tachymeters erhält man durch Mittelbildung der Punkte R1 und R2 zusätzlich die Koordinaten der Gleismitte GM im gewünschten System. Voraussetzung ist eine Software, die die relativ einfachen geometrischen Zusammenhänge berechnen kann.





JUMP 14

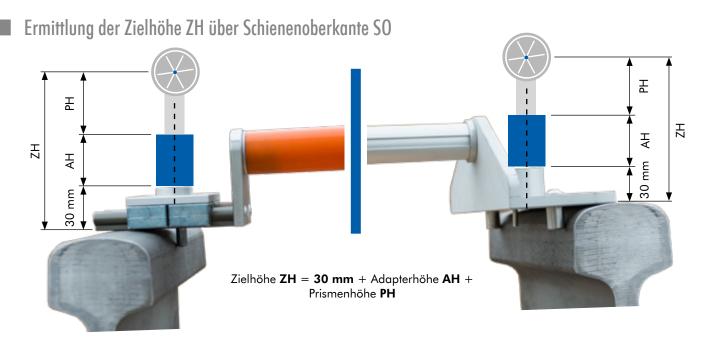


M8-Adapter zum Gleismessstab für Prismen und Zielzeichen

Die Genauigkeit der Gleisvermessung hängt zum einen vom verwendeten Tachymeter und der Stationierung ab, und zum anderen von der exakten Abbildung der Gleisgeometrie durch den Gleismessstab. Dritter wesentlicher Faktor sind die verwendeten Reflektoren.

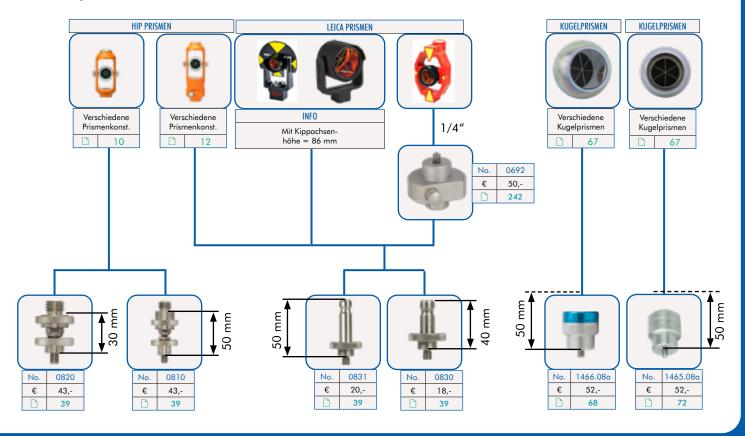
Der Gleismessstab TGS besitzt auf beiden Seiten ein M8-Innengewinde. Über entsprechende Adapter können beinahe alle handelsüblichen Prismen verwendet werden. Allerdings sollten für Präzisionsmessungen entsprechend hochwertige Prismen bzw. Prismenträger verwendet werden. Ganz wichtig ist, dass das sichtbare Prismenzentrum (zentralsymmetrischer Punkt) durch die Stehachse des Trägers verläuft. Außerdem ist auf die notwendige Stabilität zu achten, die besten Ergebnisse liefern aus Metall gefertigte Fassungen und Träger. Eine eindeutige und stimmende Angabe der Prismenkonstanten ist selbstverständlich. Es wird empfohlen auf beiden Seiten der TGS den gleichen Prismentyp zu verwenden, mit identischer und durch Vergleichsmessungen geprüfter Konstante.

Unsere Kugelprismen-Serie und das Zylinderprisma ZP11 erfüllen alle diese Bedingungen. Zudem haben sie eine sehr niedrige Bauhöhe, was ebenfalls die Genauigkeit erhöht.



Hinweis für Leicaprismen: Kippachsenhöhe 86 mm = Abstand ab Bolzenoberseite (PH) = 60 mm

M8 Adapter Höhen









Gleise mit Erhöhungen zwischen den Schienen

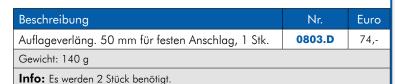
Gleisanlagen haben vor allem im innerstädtischen Bereich zwischen den Schienen oftmals Einbauten, die über die Schienenoberkante (SO) ragen. Der Gleismessstab TGS kann in seiner Standardausführung für Hindernisse bis zu einer Höhe von 40 mm über SO verwendet werden. Für höhere Aufbauten lassen sich die Sockel der Schienenauflagen erhöhen, so dass einen lichte Höhe von 85 mm über SO zur Verfügung steht.

Ein notwendiger Satz zum Aufrüsten des TGS besteht aus drei Auflagenverlängerungen: zwei für die Seite mit dem festen Anschlag, und eine für die Seite mit dem flexiblen Schlitten.

Auflageverlängerung für festen Anschlag

- Zum Einsetzen in Bohrungen am Doppelanschlag
- Sicherung mit M6-Inbusschraube (SW 4)
- Exakte axiale Verlängerung des Standardbolzens Ø12 mm
- Bolzenlänge 14 mm für Anschlag am Bezugspunkt
- Abstand von SO bis Einschraubfläche M8-Gewinde für Prismen/Adapter: 80 ± 0.1 mm
- Lichte Höhe von SO bis Unterseite Teleskopstab: ca. 85 mm











Auflageverlängerung für festen Anschlag

- Zum Aufstecken auf Anschlagbolzen des Schlittens
- Sicherung mit M6-Inbusschraube (SW 4). Schlüssel wird mitgeliefert
- Exakte axiale Verlängerung des Bolzens Ø8 mm
- Bolzenlänge 14 mm für Anschlag am Bezugspunkt
- Abstand von SO bis Einschraubfläche des M8-Gewindes für Prismen/Adapter: 80 ±0,1 mm
- Abstand von SO bis Unterseite Teleskopstab: ca. 85 mm

Beschreibung	Nr.	Euro	
Auflageverlängerung 50 mm für flexiblen Anschlag	0803.E	74,-	4
Gewicht: 140 g			
Info: Es wird 1 Stück benötigt.			
			100



Die Auflageverlängerungen sind auch mit Bolzen zur Aufmessung von Fahrkanten 10 **INFO** mm unter Schienenoberkante erhältlich. Bitte Anfragen.













Transportkoffer für TGS

Sicherer Schutz des Gleismessstabs beim Transport.

Adapter, Prismen und evtl. Auflageverlängerungen finden ebenfalls Platz, müssen aber vor dem Verschließen des Koffers vom TGS abgenommen werden.

- Robuster Hartschalenkoffer mit Noppenschaum in Boden und Deckel
- Außenmaße LxBxH: ca. 118 x 29 x 12 cm
- 4 Schnappverschlüsse

Beschreibung	Nr.	Euro
Transportkoffer for TGS	0802.K	74,-
Gewicht: 4,7 kg		









Laser Scanning

1/3

G.1. Systems in overview

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

Laserscanning Sphere

- Scan sphere Ø145 mm
- Scan sphere "segment" Ø145 mm
- Scan sphere Ø200





G.3. Targets (target size: 110 x 110 mm)

184

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

189

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

190

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



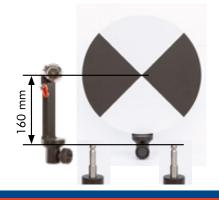




G.6. L-Carrier "STAFF"

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



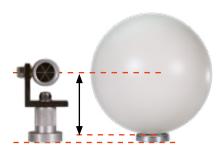


G.7. Prism for georeferencing

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

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

Targetfs for scanning with drones









G.10. Tripods / adapter for laser scanners

- Tripod options for laser scanner
- Adapter plate 5/8" 3/8
- Instrument tripod mini













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).

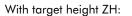
Within a target height, the 3D coordinates of the target centers are identical when targets and prisms are exchanged.

A condition for the exchange possibility is a forced centering of the target and prism holders. Here you can choose between:

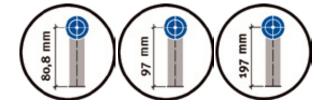
- Quick-change system with magnetic base for centering plate Ø40 mm
- Quick-change system with adapter for stud bolt Ø12 mm (Leica)
- Adapter for screwing into a bolt with M8 female thread on the specimen.

The following logos are used for quick orientation

Quick change with magnetic base for centering plate Ø40 mm



- 80,8 mm s. page 176
- 97 (100) mm s. page 177
- 197 (200) mm s. page 178





Quick change with

identical target centers

Quick change with mount for spigot Ø12 mm (Leica)

From top edge of bolt target height ZH = 60 mm s. page 187, With additional distance piece ZH = 160 mm s. page 178



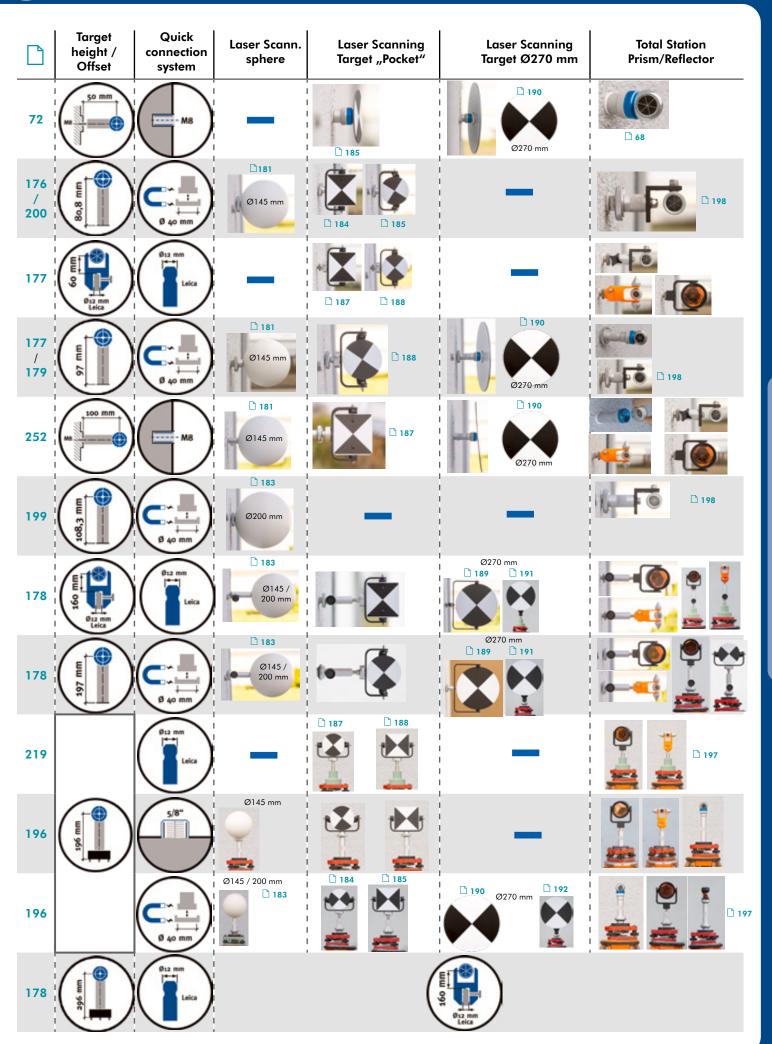
Adapter for screwing into a bolt with M8 female thread on the object

With magnetic base Ø40 mm or Leica bolt



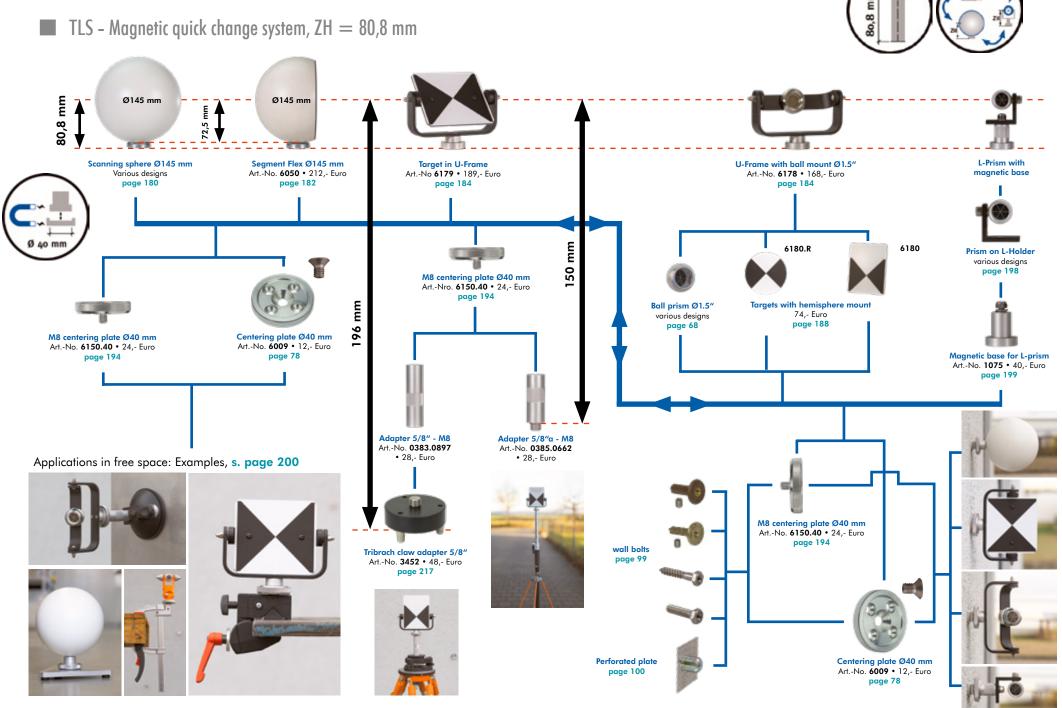


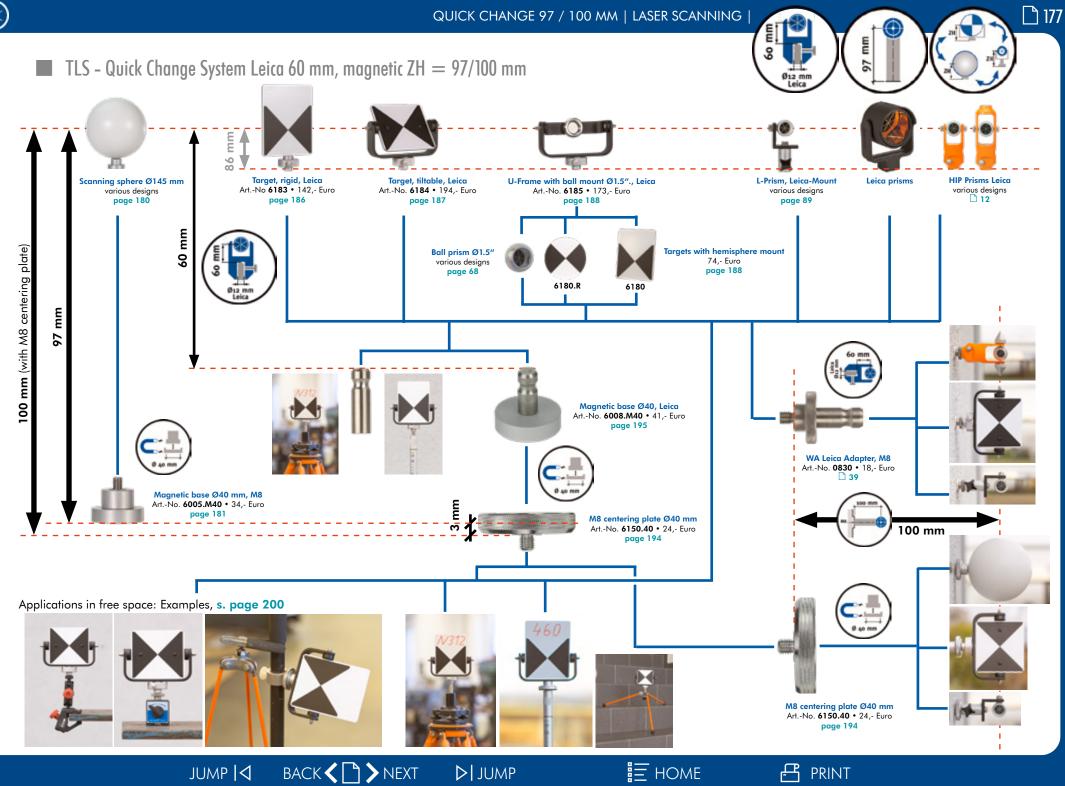




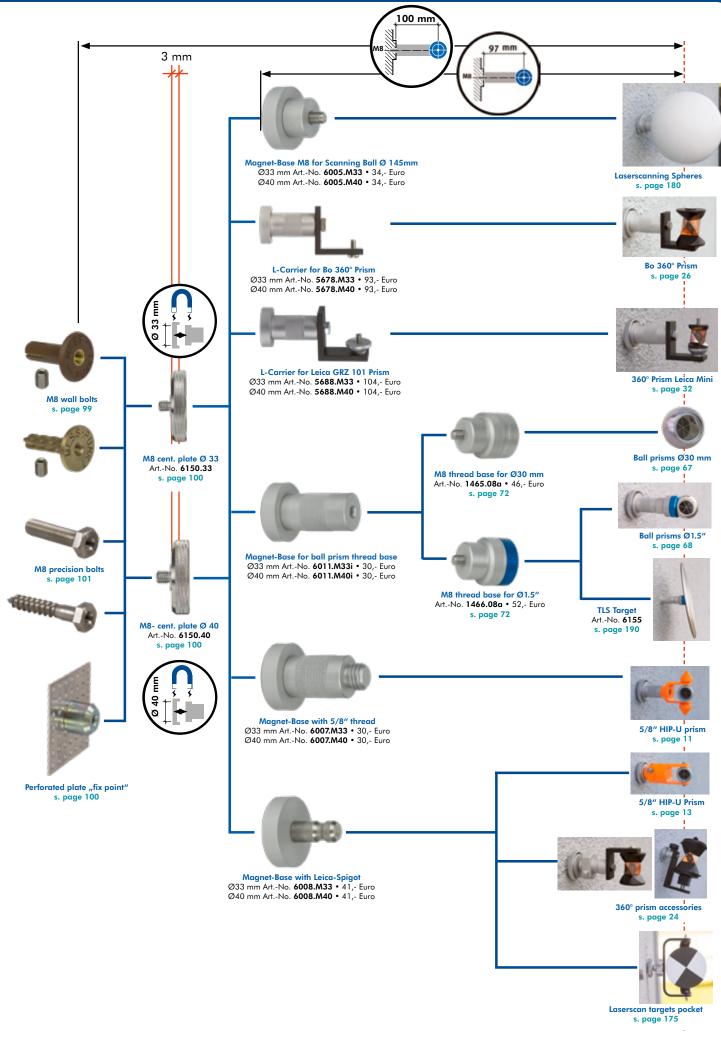
D|JUMP















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 198

Model 1: Standard

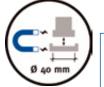
- Operation: 0° bis +50° C
- Plastic, coated matt white

Model 2: Flex

- Operation: -20° bis +50° C
- Plastic with shock-absorbing surface coating

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,-



with M8 magnet

Ø40 x 8,3 mm



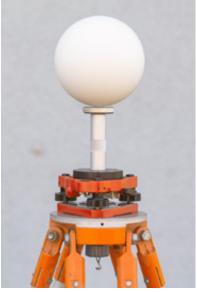
Set of 6 in transport case

with standard magnet(s) Ø40 mm/M8

Sturdy plastic case (575 x 470 x 250 mm)

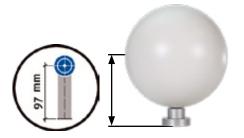
Description	Order-No.	Euro
Set of 6 spheres Standard , Ø 145 mm, with 6 magnets	6053	620,-
Set of 6 spheres Flex , Ø 145 mm, with 6 magnets	6054	875,-













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)

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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 194) results in the target height of 100 mm according to AdV version (German standard) (s. page 251)







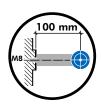


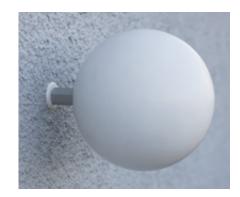


M8-Adapter: Offset 100 mm

- Aluminium hexagon with 2 x M8 outher 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).

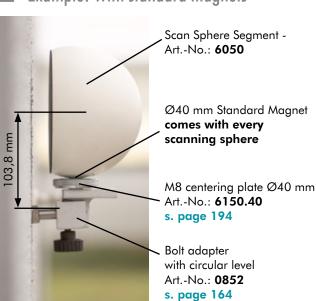
Description	Order-No.	Euro
Scanning Sphere Segment , Ø 145 mm, with Ø40, M8 magnet	6050	205,-

Description	Order-No.	Euro
6 pc. set flex sphere segments, Ø 145 mm, with M8 magnets	6051	1.205,-

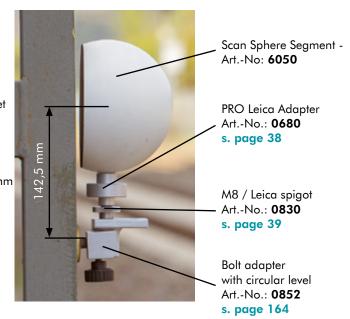
For perfect results, the complete circular TIP shape of the sphere should be visible in the scan.



Example: With standard magnets



Example: With Leica-Adapter



incl. M8 magnet Ø40 x 8,3 mm



Scanning Sphere Ø200 mm

Standard magnet M8 (ZH = 108,3 mm)

For registration and georeferencing with laser scanner at long distances

- 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 198



Single scanning sphere

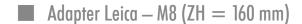








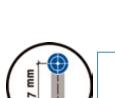
The Ø200 mm scanning spheres are not stock items. Delivery times may be longer than usual.

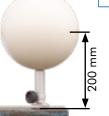


Screws into the M8 thread of the ball instead of the standard magnet

- 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,-







For use with magnetic quick-change system Ø40 mm

D|JUMP

- Description s. page 195
- 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,-



When using a Ø200 mm scanning sphere (Nr. 6056.1) with adapter Leica-M8 (No. 0302.060), magetic base Ø40 mm (No. 6008.M40) and M8 centering plate (No. 6150.40) -s. page 194- a target height ZH of 200 mm results overview page 178





Target for laser scanners & total stations, ZH = 80.8 mm

Tiltable target plate, magetic 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.



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, magetic 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





- 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 176
- Target height ZH = 97 / 100 mm

D|JUMP

- s. page 177
- Application in "open space"
- s. page 200
- Transport case
- s. page 215



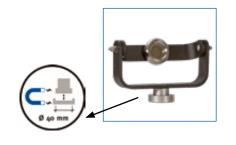














With magnetic base for changing between target and ball prism, magnet Ø40 mm

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

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,-



- 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 mms. page 68















BOHNENSTINGL 2024



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 177
- Application in "open space"
- s. page 200



s. page 215











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

- 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	Order-No.	Euro
Target Pocket, ZH= 60 mm, with Leica bolt connection, target with checkerboard design and reflective target, tiltable	6184	194,-





- With target height ZH = 97 / 100 mm
- s. page 177
- Application in "open space"
- s. page 200
- Transport case
- s. page 215















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 $\varnothing 1.5$ " (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,-

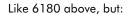
^{*)} without ball prism and scanning target

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 ∅1.5" connection	6180	74,-



- 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 mms. page 68





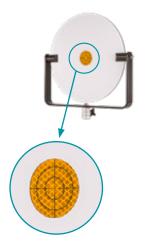












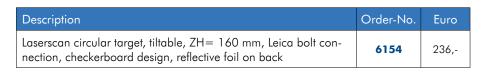


Titltable scanning target, ZH = 160 mm

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







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 190)
 - 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

D|JUMP

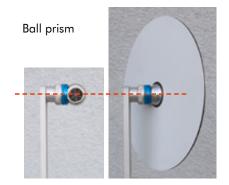
Description	Order-No.	Euro
SLAM-Target Ø270 mm, tiltable, reflective foil, ZH= 160 mm, Leia connection Ø12 mm, hemisphere Ø1.5" on backside	6154.RB	236,-







Scanning target



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.



- 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: ± 35°

Description	Order-No.	Euro
magnet. base, M8 outer thread, holding force 6 kg (s. page 72)	1466.08a	52,-

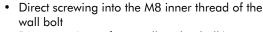




Also available with Ø30 mm ball connection: Scanning taget Ø270 mm Order-No. 6150, Base Order-No. 1465.208a

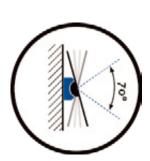


To use with M8 wall bolts



- Distance 50 mm from wall stud to ball/target center [Fig. 1].
- With adapter (see page 73) Distance 100 mm from wall bolt to ball/target center [Fig. 2].
- Overview s. page 251

Wall bolts see page 99

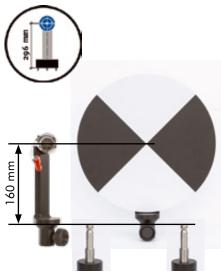














L-Carrier "STAFF"

For all ball prism with Ø1.5" and scanning taget 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. 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,-

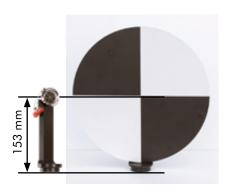


















With magnetic base Ø40 mm

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. 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 $-\emptyset$ 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 ± 0,1 mm
- Galvanized steel, magentic
- Effective length: 20,5 mm

• s. overview 🗋 193	0			
Bezeichnung	Bestell-Nr.	Euro		
Centering adapter 5/8" - Ø40 mm	6162.40	27,-		







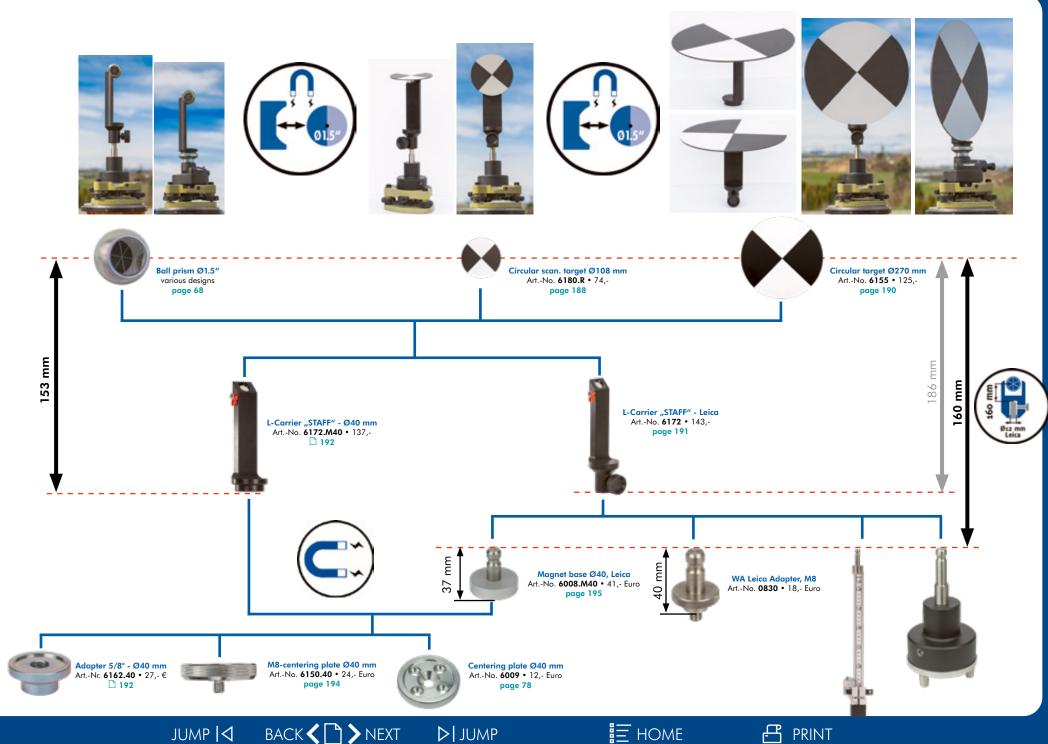


















3 mm



- 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.

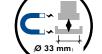
The targets (reflectors, prisms, scan balls, target plates, etc.) are equipped with a cylindrical base with integrated permanent magnet, the length of which is adapted to the distance of 100 mm from the wall bolt to the center of the target.

The targets stick securely and force-centered in the centering plate with an repeat accuracy of \pm 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





BOHNENSTINGL 2024

- 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,-





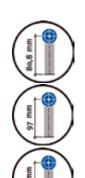
Outer-Ø 50 mm



Description	Order-No.	Euro
M8 centering plate ∅ 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

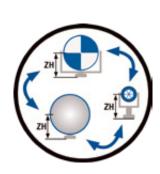
s. page 176

Target height ZH 97 / 100 mm

s. page 177

Target height ZH 197 / 200 mm

s. page 178









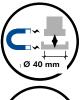


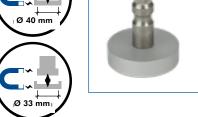


Magnetic base - Leica Ø12 mm

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





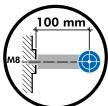
Description	Order-No.	Euro
Magnetic base Ø40 mm with Leica bolt Ø12 x 27 mm	6008.M40	41,-
Magnetic base Ø33 mm with Leica bolt Ø12 x 27 mm	6008.M33	41,-



INFO

For laser scanning applications the Ø40 mm is well established. Centeirng plates Ø40 mm s. page 194 (also: Plates with Ø33 mm).









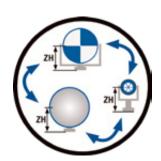






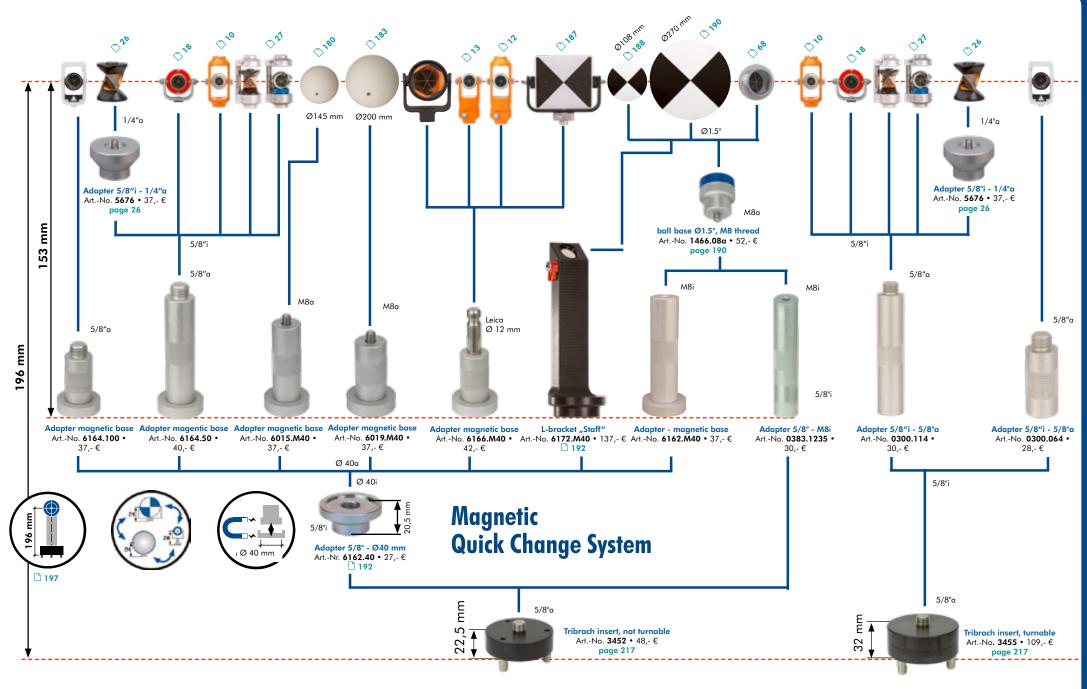




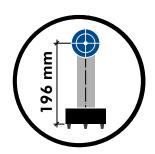


JUMP 14

TLS quick change system s. page 174



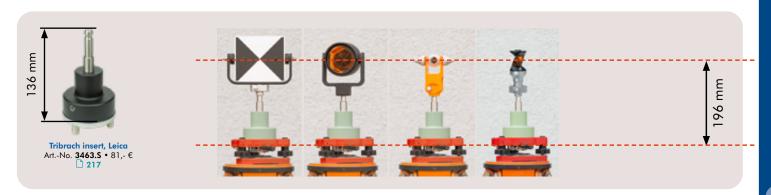


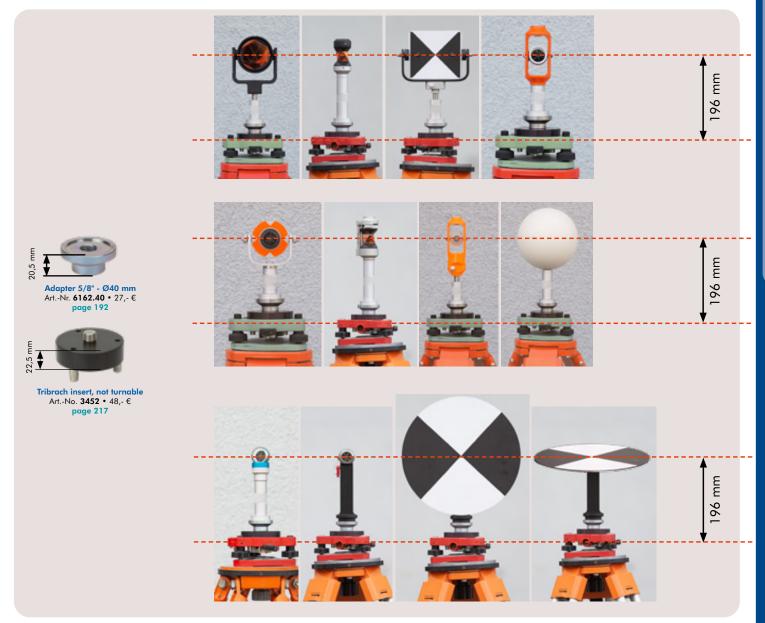


Tilting Axis Height 196 mm

Various adapters in use

We are happy to help you in choosing the right adapter. An overview of all available adapters can be found on page 196.





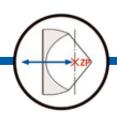


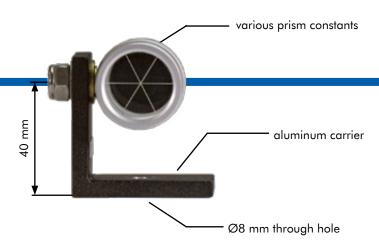


L-Prism

To screw on magnetic base (s. page 199)

- 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 99







Description	glass prism	prism constant K	Order-No.	Euro
Tiltable 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 05	-30,0 (Leica = +4,4) mm	1005.30	166,-
	Ø 25 mm	-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 199

INFO

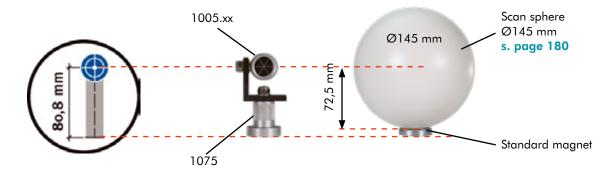
When ordering an L-prism and a magnetic base, both are delivered as an assembled unit.

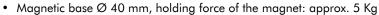


Magnetic base Ø40 mm for L-Prism, ZH = 80.8 mm

For use with prism on L-beam 1005.XX

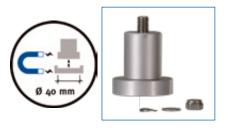
The combination results in the system height 80.8 mm.





- 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

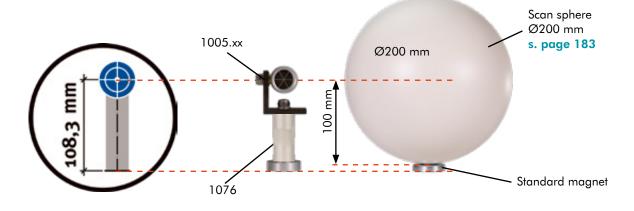
Description	Order-No.	Euro
Magnetic base Ø 40 x 40,8 mm for L-prism	1075	40,-



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.





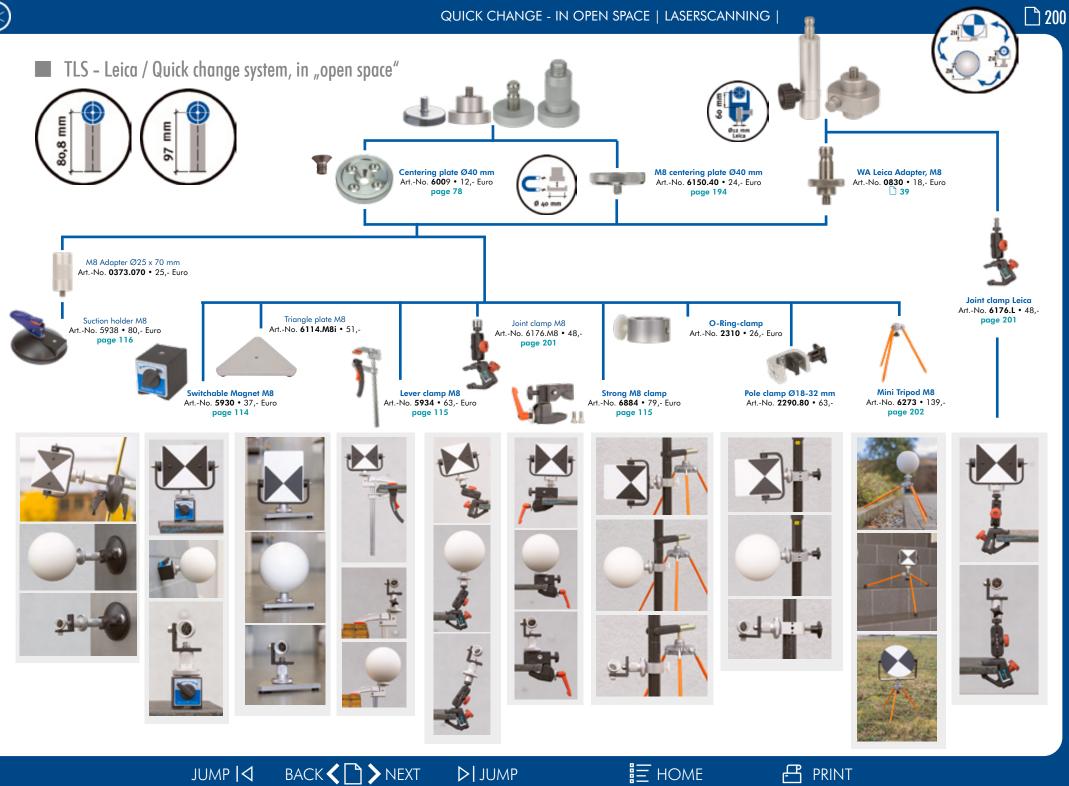


- Magnetic base Ø 40 mm, holding force of the magnet: approx. 5 Kg
- Effective height: 68.3 mm
- Target height ZH: 108.3 mm (from the bottom of base to the tilt axis of the prism)
- Cardanic suspension of the prism: The L-beam can be rotated axially on the magnetic base, the prism can be tilted (360° 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,-















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.

- 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 ∅12 x 27 mm	6176.L	48,-







Sturdy M8 screw clamp

Very robust metal alternative to this screw clamp you can find on page 115



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 46.





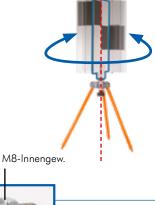














Universal tripod for laser scanning targets

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: 40 cm, weight: 1.000 g

Description	Order-No.	Euro
Universal Tripod TALASCA PRO, M8 inner thread	6273	139,-

Solid ground







Smooth and sensitive surfaces









INFO

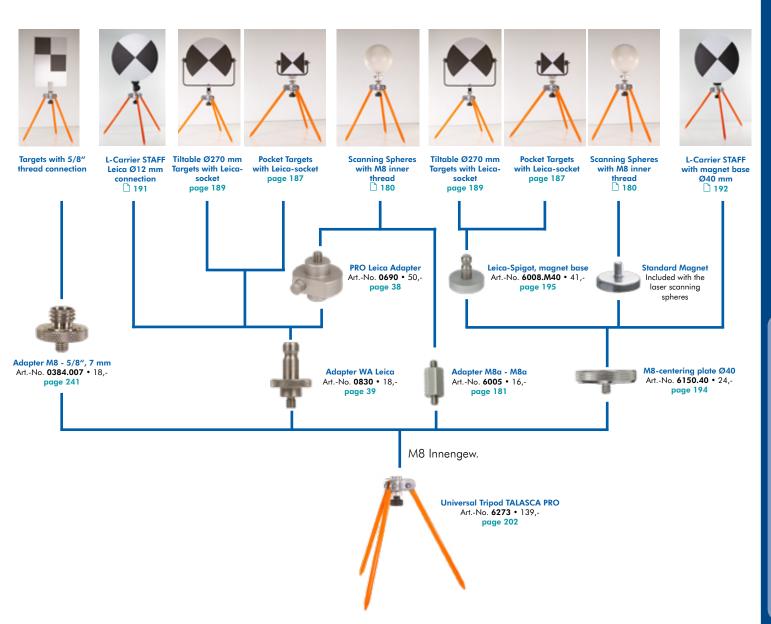
Our Pocket Targets (page 175) and Ø270 mm Tagets in U-beam have aiming marks for both laser scanners and total stations. They can be aimed from all directions by rotating them around the standing axis.

Accessories and adapters on the next page

D|JUMP



Accessories & Adapters for Mini Tripod





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 194	6150.40	24,-



M8 stainless steel spikes

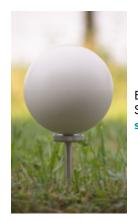
- Material: Ø12 mm stainless steel
- M8 inner thread

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,-



JUMP |

Example with Pocket Target s. page 184



Example with Scan-Sphere: s. page 180



Example: Target Ø270 mm page 190 & Thread base M8 page 72

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 coordiantes) 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 206





Square target plate with pole centering

For re-coordinating the center of the target or for positioning on known points.

page 207





Swap between scanning taget 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. 🖺 191

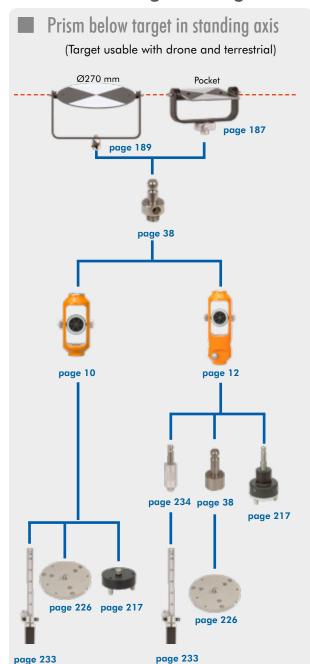


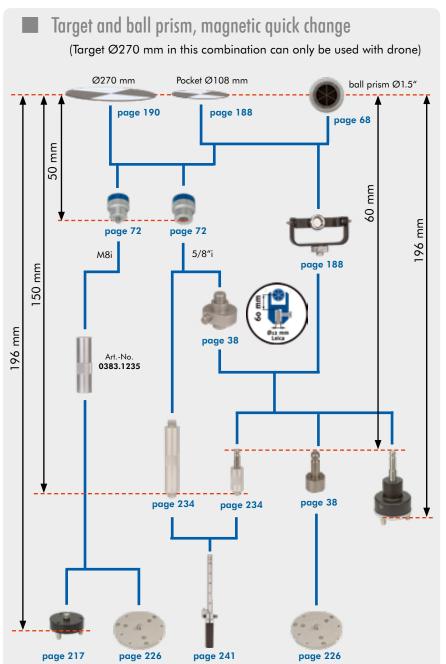


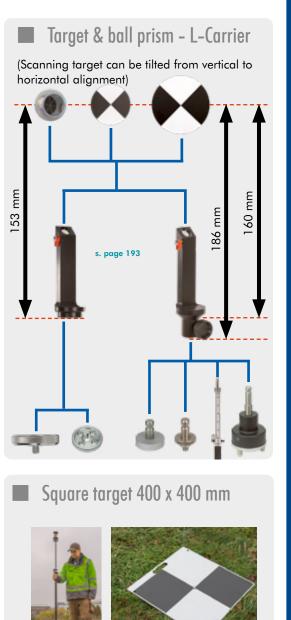




Laser Scanning: Linking drone scans and terrestrial measurements











page 207









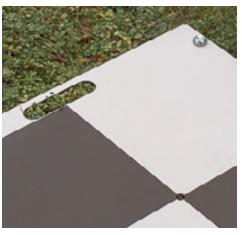
Checkerboard target plates/targets are suitable for photogrammetric surveys with drones. Depending on the application, they can be used for georeferencing and as a control or pass point.

- 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 holesØ10 mm: 1x centrically, 4 x in the corners
- Weight: 875 g
- Comes with two nails Ø 9 x 90 mm with centering

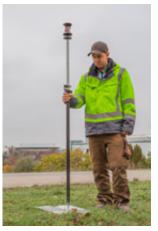
Description	Order-No.	Euro
Target for drone recordings, checkerboard pattern, 450 x 420 mm	6076	48,-



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,-













JUMP |

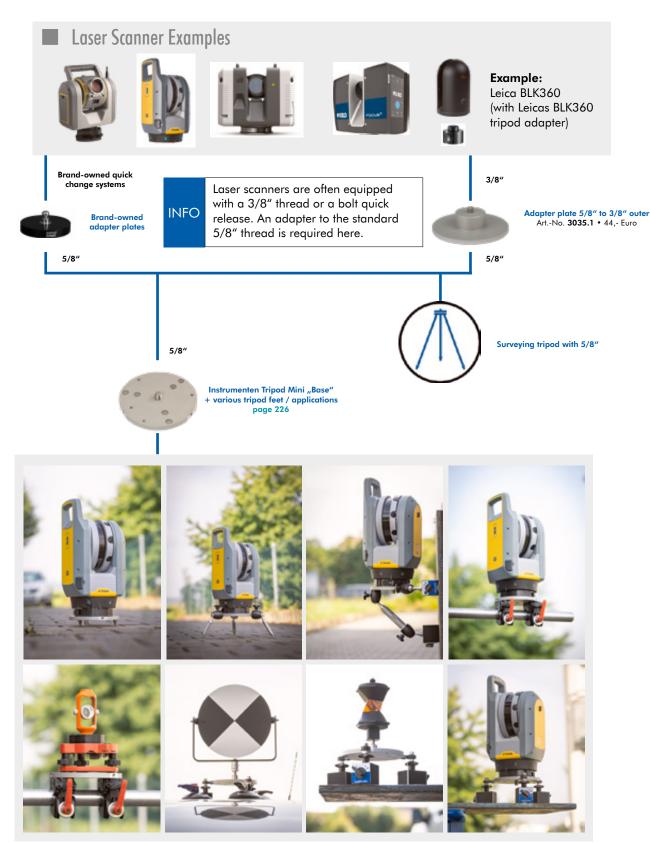




Tripod for Laser Scanners

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.



Surveying Accessories

1/2

H.1. Instrument Tripod, Tribrachs, Transport Case





H.2. **Wall Tripod**







H.3. Mini Instrument Tripod











H.4. Prism/GNSS pole, strud tripod & accessories









Surveying Accessories

2/2

Holder for distance laser meter H.5.













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

















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
- 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,-

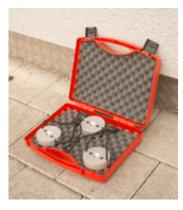
INFO

Despite the 9 rubber buffers, the tripod should not be set up too wide on very smooth floors.









Universal Transport Case s. page 215











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:



For extremely smooth floors such as waxed or polished industrial floors, glass, stone or plastic surfaces page 116



In magnet holder

For magnetic surfaces such as ships, rail vehicles, industrial plants, tanks etc.

D|JUMP

page 114





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	thin (25 mm)	1468.1	34,-
	medium (30 mm)	1468.2	34,-
	thick (40 mm)	1468.3	34,-

INFO

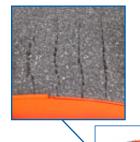
Available with three different bubble foam thicknesses. The choice of foam thickness depends on the contents to be transported.













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.



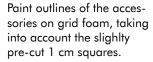


• Bottom: grid foam (to be cut out by yourself as required)



Description	Order-No.	Euro
Transport case Universal with 1 x 1 cm grid foam	1468.R	48,-







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
- 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,-





2x HIP-Prism Cone adapter Ball prism More 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



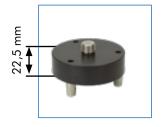


Tribrach with Claw System

Tribrach

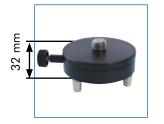


Description	Order-No.	Euro
Tribrach, claw system, black, without optical plummet	3366.S	147,-

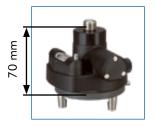


Tribrach-Insers

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,-



JUMP 14

INFO

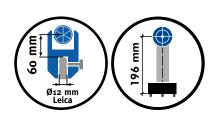
Adapter to reach the target / tilting axis height of 196 mm s. next page 218













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,-

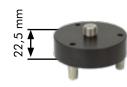






Plate holder to mount tribrachs on desks

For safe mounting of measuring instruments on tables, workbenches etc.

- Cylindrical plate made of anodized Aluminium
- Ø 160 mm, height: 12 mm
- 5/8" outer stainless steel thread for screwing on the tripod
- Brand screw clamp for plates up to 100 mm thickness
- Thigh length of the screw clamp: 50 mm
- Weight: 850 g

Description	Order-No.	Euro
Cylindrical plate with 5/8" outer thread and scew clamp	3350	79,-

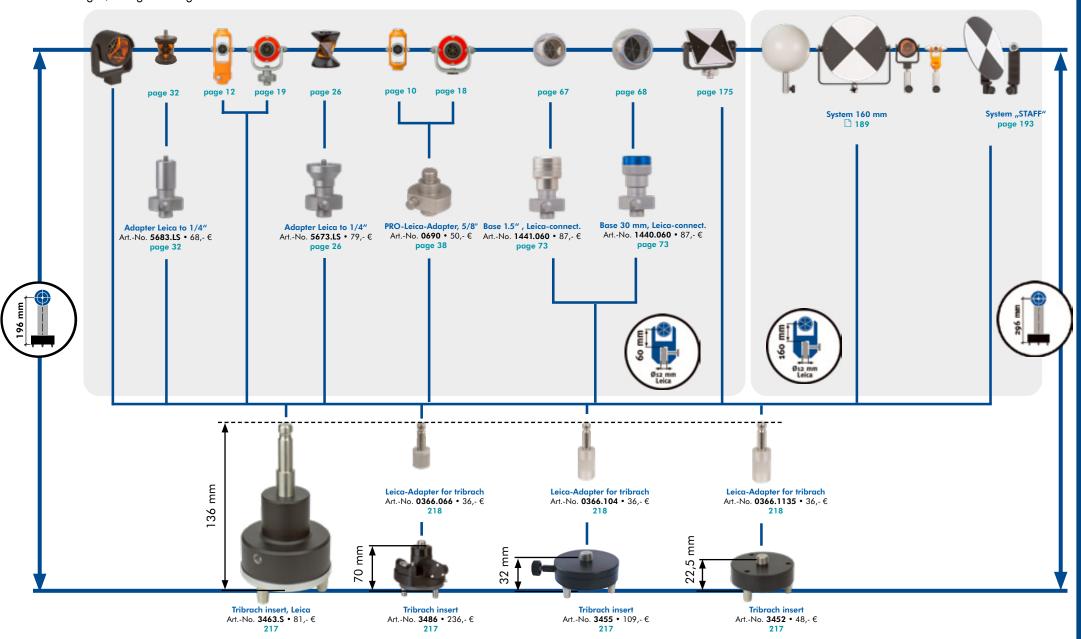




JUMP 14

Tribrach Claw Insert with Leica spigot Ø12 mm (Leica)

To reach a target / tilting axis height of 196 mm or 296 mm











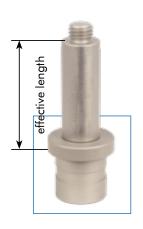
DIN spigots with 10 mm flange

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		M8 outer thread	10 mm	0360	30,-
	5/8" inner thread	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

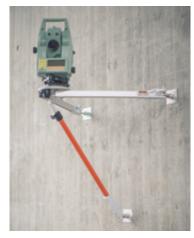
Other lengths are available on request.





JUMP |





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 ist 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 heightstable instrument tripod is used.

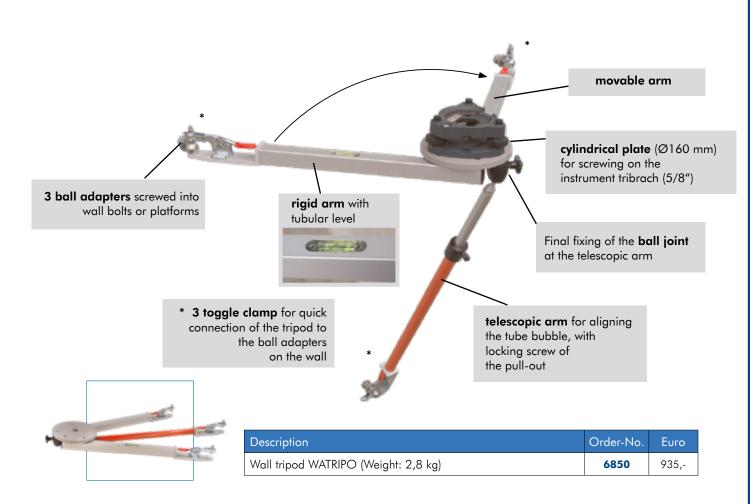


Setup

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 pullout, 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-destructive-

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.





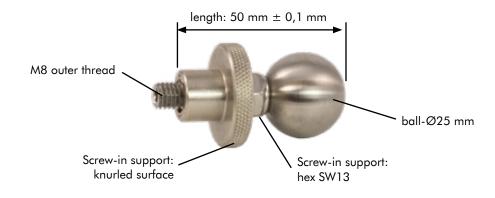




Wall tripod: Accessories

M8 ball adapter

- · for connecting the tripod to the object
- uniform length for accurate repeat measurements
- stainless steel
- Weight: 120 g





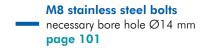
Description	Order-No.	Euro
M8 ball adapter	6860	33,-

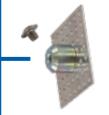














Perforated plate "Fix point" M8 non-desctructive adhesive page 100





Suction holder for smooth, gas-tight surfaces page 116





Switchable magnet for magnetic surfaces (iron) page 114

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









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.

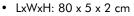
- Robust hard shell case with nap foam in base and lid
- External dimensions L x W x H: approx. 81 x 23 x 10 cm
- 4 sliding closures
- Weight: 1.8 kg

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



- 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

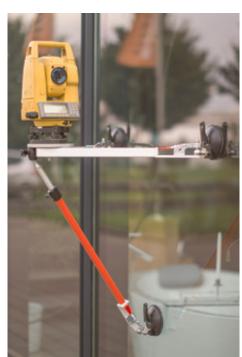
For attaching the perforated plate "fix point". More information: 79

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



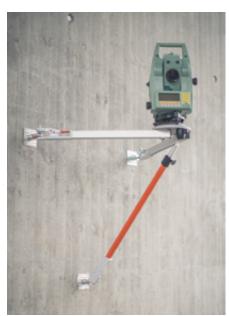
Application examples











JUMP 14







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,-

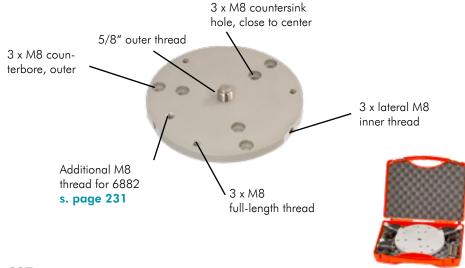
Scope of delivery and equipment



3 x cylinder head screw for mounting the cap nuts and other accessories (s. page 228)



3 x stainless steel cap nuts, can be used as contact tips or to secure the cylinder head screws during transport (s. page 229)



- Carrying case (not suitable for magnets and suction holders)
 - s. page 215



Overview of complete accessories s. page 228













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 231) 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,-







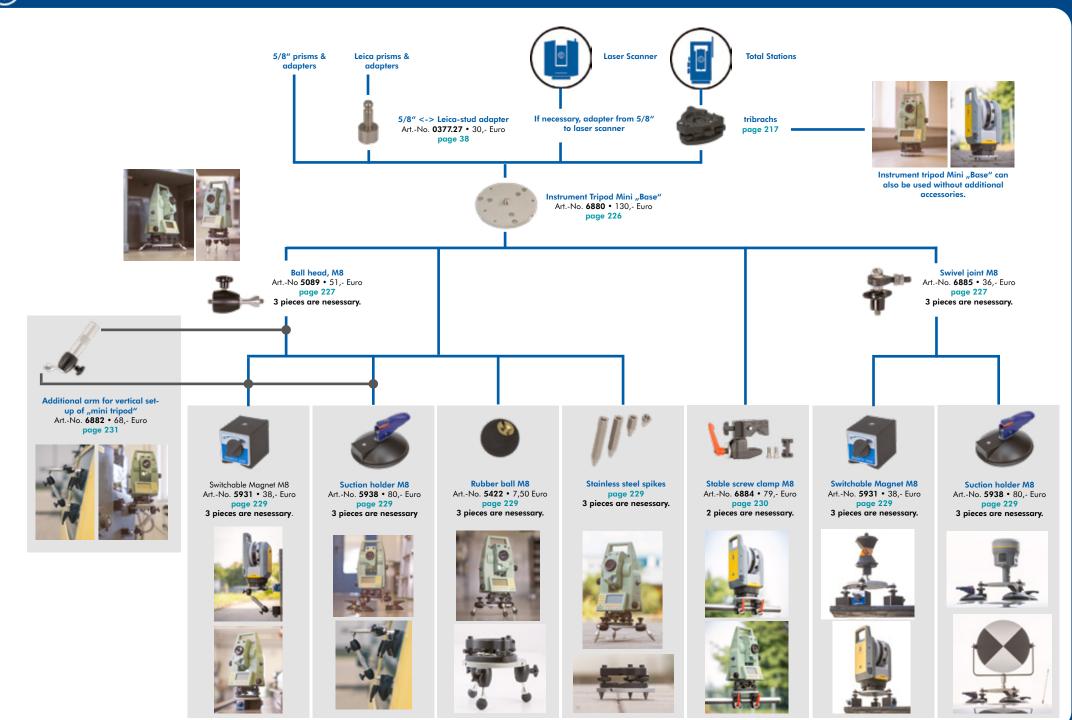












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Further setup options

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
	20 mm	2059.20	14,-
Spike, stainless steel, M8 internal thread	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 114)	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 116	5938	80,-



JUMP 14



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 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,-



8M

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 226):





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 104



With scanning targets s. page 175









Extension: Support arm

For using the mini tripod on vertical walls and surfaces

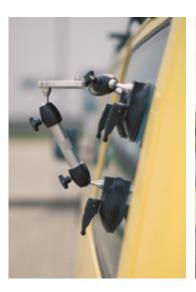
The support arm consists of a additional ball head with attached extension. It is particularly suitable for using the mini tripod vertically, with switchable magnets on steel constructions, or with suction holders on gas-tight surfaces.

- 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 232).





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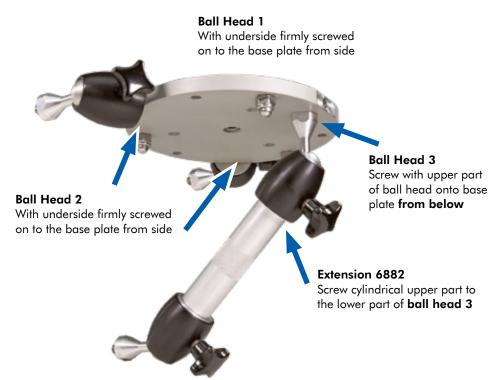






Manual: Instrument Tripod Mini - Vertical

- 6880 is delivered with three ball heads. For vertical installation, two ball heads must be screwed in at the sides. The third one from below.
- All connections should be screwed firmly and tight.
- We recommend to test the mini tripod after vertical assembly on its load capacity first without instrument



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.



JUMP 14





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

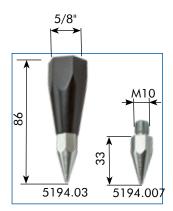
The inner rod is not clamped with a screw clamp (as with other prism rods), but with an eccentric lever (Figs. 1 and 2).

- · 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

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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



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.

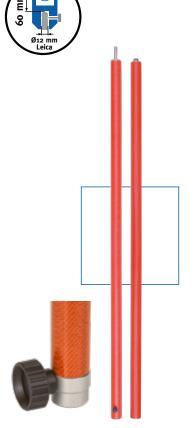
Description	Order-No.	Euro
Extension with Leica spigot Ø 12 x 40 mm, stainless steel	0378.90	30,-

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.



Leica Extensions						
Ø	bottom	top	length	weight	Order-No.	Euro
20	1 -:	Laian animat 40 mana	0,5 m	400 g	5455.2L	110,-
32 mm	Leica socket	Leica spigot, 40 mm	1,0 m		5455.L	131,-





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- 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.



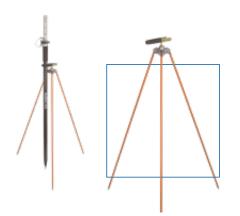
Bipod (Seco)

- Top pushbutton clamp
- Adjustable range of legs: 1,05 1,80 m
- Open clamp for lateral insertion of the poles
- Suitable for poles with $\emptyset: 25-38 \text{ mm}$

Description	Order-No.	Euro
Strut bipods, 2 legs, Alu, red, 1,8 kg	2091.R	208,-



Other bipods and tripods available on request.



Ranging Pole Tripod

Standard design, 3 legs, with holding clamp on ball joint, height approx. 95 cm, PVCcoated legs. Fluorescent paint, weight approx. 1.5 kg.

Description	Order-No.	Euro
Ranging Pole Tripod FS 45	2090	24,-









Protective sleeve for poles with Ø32 mm

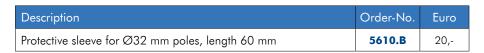
Modern materials, such as GRP and CFRP, allow the production of light yet stiff prism and GNSS rods. The disadvantage of the often thin wall of the pole is its high sensitivity to punctiform pressure.

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.

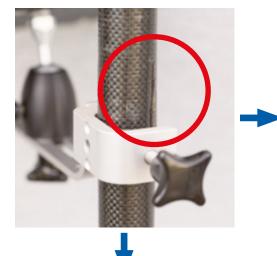
Alternatively, a sleeve can be pushed onto the pole for the use of clamps that generate punctiform pressure. This protects the pole surface and allows the use of accessories that either have a high weight (e.g. large field computers) or develop high lever forces (e.g. 2-leg

We offer sleeves for the common pole standard \emptyset 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



















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 ∅ 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 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.



Simple circular level with Velcro fastener

- For attachment to all poles up to Ø 35 mm with Velcro fastener
- Plastic level with accuracy 50'
- Delivered adjusted (not adjustable)

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Weight: 25 g

Description	Order-No.	Euro
Circular level with Velcro fastener	5425	21,-





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- 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 accuracy: 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.

Ø32 mm



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					
Pole-∅ reduction sleeve (∅32 mm): For poles with ∅25 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.



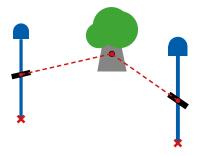
Second Level

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 controll 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 240
- 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,-

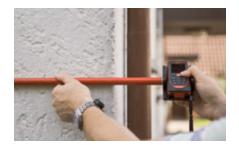
Laser odometer without inclination sensor

- · Offsets of -65 mm with measuring plane adjustment from trailing edge
- Horizontal distances: Set the tube level horizontally and secure the tilting device

Description		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,-



For distance measurement, the target plate is placed vertically on the ground point.



- 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,-



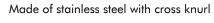








Thread connection Adapters





Description	1. side	2. side	Effective length	Order-No.	Euro
Adapter M8 -	E/0//t	M8 inner	7 mm	0385	18,-
5/8"	5/8" outer	M8 outer	7 mm	0384.007	18,-



Made of aluminium with stainless steel external thread

Description	bottom	top	Effective length	Order-No.	Euro
A -l t	M8 inner	M8 inner	50 mm	0372.050	24,-
Adapter M8 - M8		M8 outer	50 mm	0373.050	25,-



Made of aluminium with stainless steel external thread

Description	bottom	top	Effective length	Order-No.	Euro
Extensions		M8 outer	40 mm	0381.040	26,-
Ø 25 mm, 5/8" thread	5/8" inner	1/4" outer	30 mm	0390	23,-
		3/8" outer	30 mm	0382	26,-



Made of aluminium



Description	bottom	top	Effective length	Order-No.	Euro
			30 mm	0300.030	28,-
			40 mm	0300.040	28,-
			50 mm	0300.050	28,-
			64 mm	0300.064	28,-
	5/8" inner		65 mm	0300.065	28,-
			75 mm	0300.075	28,-
Extension			86 mm	0300.086	30,-
Ø 25 mm,		5/8" outer	86,5 mm	0300.0865	30,-
5/8" thread			100 mm	0300.100	30,-
			114 mm	0300.114	30,-
			115 mm	0300.115	30,-
			136 mm	0300.136	30,-
			150 mm	0300.150	30,-
			175 mm	0300.175	30,-
			200 mm	0300.200	30,-

Other lengths are available as special designs under the number 0300.L (s. page 244).

rder-No.

0680

0692

0693

0690

Euro

50,-

50,-

50,-

50,-









Adapter: Thread connection to Leica spigot

• Stainless steel design

Description	bottom	top	Effective length	Order-No.	Euro
Adapter	A40 :	Leica spigot Ø 12 x 27 mm	27 mm	0180.25	13,-
M8 - Leica	M8 inner	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	Oı
Adapter, Leica - Threads		M8 outer	10 mm	
	Leica socket Ø 12 x 26 mm	1/4" outer	10 mm	
		3/8" outer	10 mm	
		5/8" outer	10 mm	



- 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	5/8" outer	10 mm	0291.10	29,-
	Leica socket Ø 12 x 40 mm		10 mm	0306.10	30,-







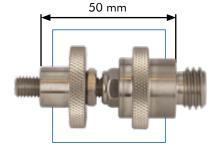
JUMP 14







- 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

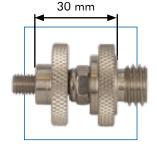


Length 50 mm

Screwing-in can be supported with a fork wrench (SW 13)

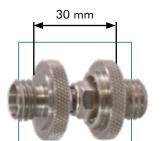
Description	Order-No.	Euro
Adapter WA 50, M8 - 5/8", L = 50 mm	0810	43,-

Example: Wall offset system 100 mm with HIP prisms see page 39



Length 30 mm

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

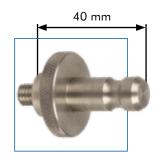


Adapter: 5/8" - 5/8" - rotateable

- 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 60

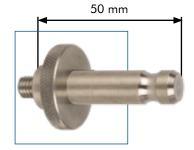


Adapter: M8 – Leica Ø 12 mm

- 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 39



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,-



Customs extensions 5/8" and Leica

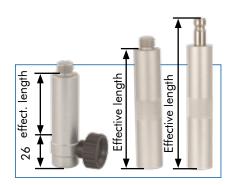
up to 200 mm length

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

Description	bottom	top	Order-No.	Euro
Extension Ø 25 mm		5/8" inner thread	0295.L	30,-
	5/8" inner- thread	5/8" outer thread	0300.L	34,-
		Leica spigot Ø 12 x 27 mm	0377.L	39,-
	5/8" outer- thread	5/8" outer thread	0297.L	36,-
		Leica spigot Ø 12 x 27 mm	0376.L	41,-
	Leica socket Ø 12 x 26 mm	5/8" inner thread	0290.L	36,-
		5/8" outer thread	0291.L	42,-
		Leica spigot Ø 12 x 27 mm	0304.L	43,-



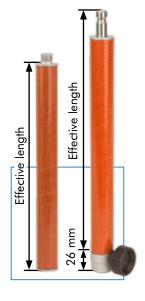
from 200 mm up to 500 mm length

NOTE

When ordering please state Order-No. + effective length in mm

- Made of red GFK/CFK Ø 26 mm
- Leica spigot made of stainless steel
- Leica socket with horizontal locking screw

Description	bottom	top	Order-No.	Euro	
Extension Ø 26 mm		5/8" inner thread	5630.L	86,-	
	5/8" inner- thread	5/8" outer thread	5631.L	89,-	
		Leica spigot Ø 12 x 27 mm	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,-	



INFO

Fixed lengths 0.5 m and 1.0 m with Ø32 mm 234

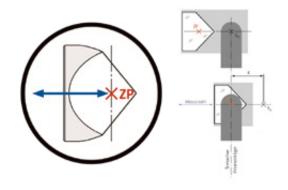




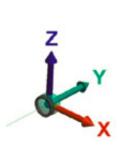
1/2

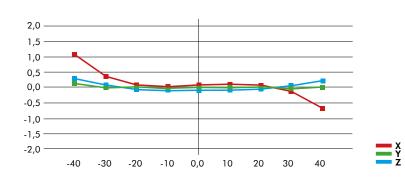
Info: Prism contents 1.1.





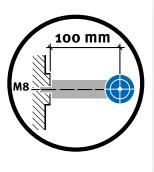
1.2. Info: Alignment of prism towards total station



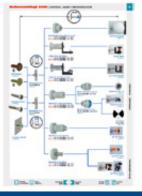


Info: System 100 mm Wall Offset 1.3.



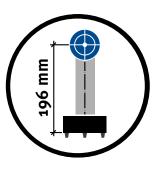






I.4. Info: Leica Tiltring axis height and stud connection









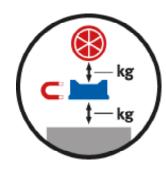




2/2

1.5. Info: Magnetic holding force







I.6. Info: Two prism / Vector method









1.7. **Order Form**

Terms of sale, delivery and payment 1.8.







D|JUMP



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 "improvment", 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:

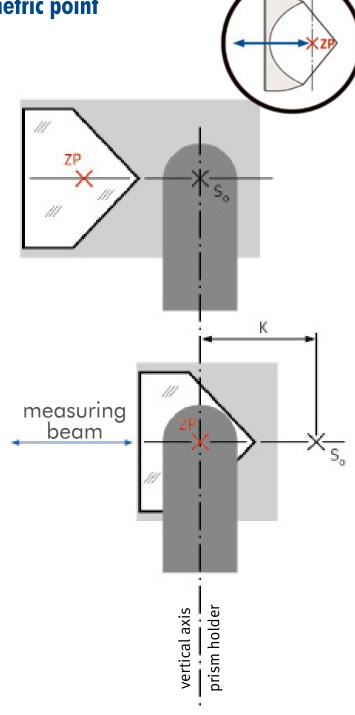
-30.0 mm + 34.4 mm = +4.4 mm. This must be set on the Leica total station.

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 mm - 34.4 mm = -11.3 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.

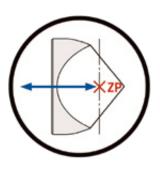
If it is to be avoided that the setting of the constants on the total station must be changed during a prism change, standard prisms or prisms from other manufacturers with identical constants must be used.







Standard prisms and small prisms with adapted prism constant

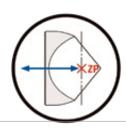


The purchase of a tachymeter usually involves the purchase of a standard prism. Small prisms or 360° prisms from the same manufacturer have constants that differ from this standard prism and therefore it is necessary to change the set prism constants on the total station. If you forget to change the 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.

ism-/Reflector Type Standard	prism constant K in mm		● ○ available by Bohnensting! 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-Measurments	Ball prism, Ground points	Monitoring Prism Series MoniPro	Cylindrical prism ZP11
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	•	•	0			0	0						
Topcon 360°-Prism A7	-2	+32,4													
Trimble 360°-Prism for Zeiss \$10	-3	+31,4													
Leica 360° Mini GRZ101	-4,4	+30													
360°-Prism Medium Format	-6	+28,4					0								
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	•	•	0	•				•	•	•	•		•
Leica Mini GMP101, GMP 111	-16,9	+17,5	•	•	•					•	•	•	•	•	
Prisms by Nikon, Sokkia, Topcon etc.	-30	+4,4	•	•	0						•				
Leica Standard prism GPH1P, GPR121, GPR1, GPH1	-34,4	0	•	•	0						•				
Trimble (Zeiss ETR, KTR, KTO, KTM)	-35	-0,6	•	•	0						•				



• = 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.

0 = No mounting of the prism/reflector in the centrally symmetrical point (visible center)





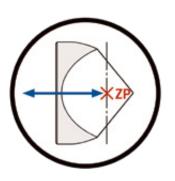




Leica GRZ4 Leica GRZ122



Leica GRZ122



The prism constant K = -11.3 (Leica = +23.1) mm for all surveying tasks

Modern tachymeters with automatic target setting or target tracking require an all-round or 360° prism as reflector. It represents a continuous reflection even with a moving target. The 3 large 360° reflectors of Leica, GRZ4, GRZ121 and GRZ122, have a true prism constant of K = -11.3 (according to Leica definition = +23.1) mm. They are for Terrain surveys and profile measurements in one-man measuring mode very suitable and therefore often present in the measuring equipment. Disadvantages of these prisms are size, high weight and price, the limited accuracy of the automatic Target acquisition. Due to the design of the individual prisms of all 360° prisms on the market the visible center "wanders out of the standing axis" depending on the rotation of the prism pole.

That is why we have developed a series of small prisms that are matched uniformly to the large 360° prisms from Leica mentioned above. Since the central symmetrical point of these prisms lies exactly in the vertical axis of the holder, they are also suitable for precision measurements.

Thus, the requirement to perform all surveying tasks with one prism constant can be met with the constant K = -11.3 (Leica definition = +23.1) mm with the following prism family:

- 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

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.





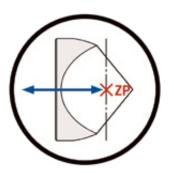




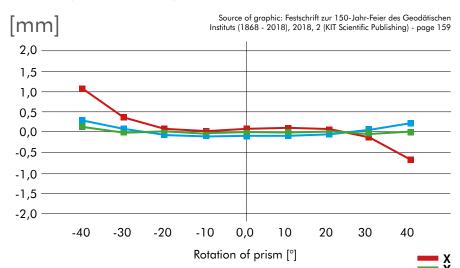
If the prism is not exactly aligned to the tachymeter, errors occur in the angle and distance measurement. These errors are lowest if the vertical axis of a prism carrier runs through the central symmetrical point of the prism, or if the centre of the sphere and the central symmetrical point of the prism are identical in the case of a prism built into a sphere.

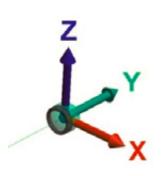
This is the case with all our ball prisms. The Institute of Technology Karlsruhe has used a laser tracker to analyze the effects of a ball prism that is not exactly aligned with the instrument (ball Ø 38.1 mm, triple prism Ø 25 mm). It was placed in a base (nest) and precisely aligned with the laser 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



Prism "zero-point" when rotating the prism around Z-axis (horizontal) [mm]



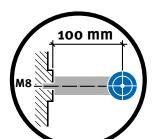


Reference system

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

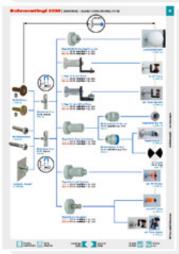
AdV Version (Germany)

- 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 PO 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

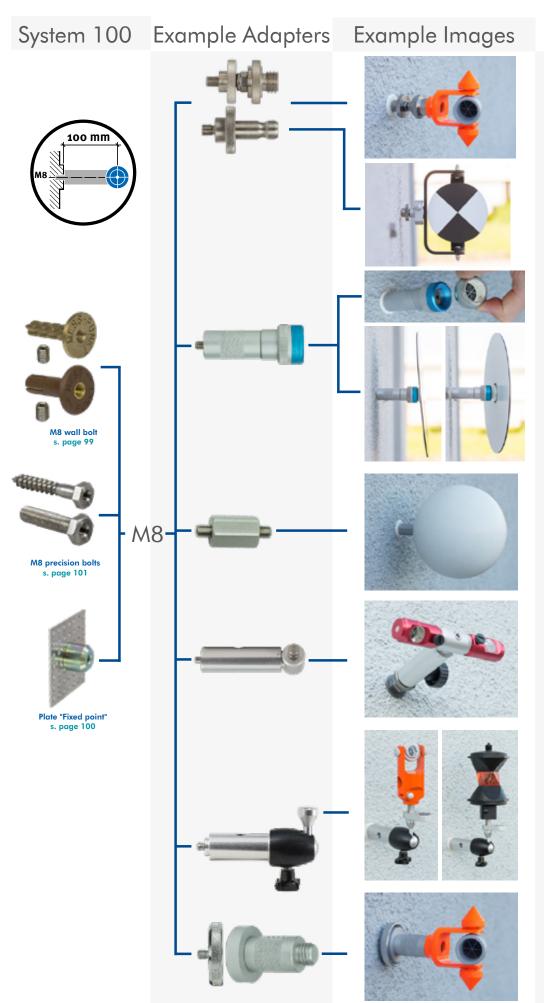


Adapters in M8 thread 252



Quick change system with M8-centering-plates, s. page 179





100 mm Systems

Wall adapter Leica & 5/8"

- For 5/8" prisms with tilting axis height 50 mm
- For Leica prisms with standard tilting axis height s. page 39

Laserscan. Target Pocket

- with standard tilting axis height of Leica prisms
 - s. Seite 187

Ball prism System 100

- For ball prisms Ø1.5" and Ø30 mm
- Various magnetic forces
 - s. page 73
- For circular laser scanning targetswith ball connection
 - s. page 190

Laserscanning Sphere Target

- For standard laser scanning spheres 145 mm with M8 internal thread
 - s. page 180

Twin-Prism-Systems

- To monitor a point from two tachymeter positions
 - s. page 93

Prism vetically above a point

- Adapter for all commercial prisms available
 - s. page 96

Magnet. quick change system

- For fast switching between prisms and laser scanning equipment
 - s. page 179

JUMP 14



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 fulfils several functions:

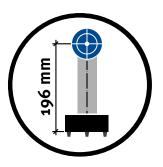
- Secure hold: After insertion of the instrument/target sign into the tripod, securing is achieved by means of a clamping screw or locking lever. This ensures that the instrument/target sign is held reliably in the tribrach so that it can also be transported overhead if necessary
- one tripod type Levelling: The upper part of the tribrach and thus the instrument or the target holder

Compatibility: Possibility to use instruments and targets of different manufacturers in

• 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

can be leveled with 3 adjusting screws.

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)

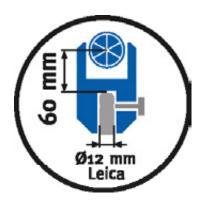
There are also quasi standards for the assembly of surveying accessories. The 5/8" thread has become established for threaded connections. While it was initially mainly known for screwing tribrachs onto the instrument stand, it can now be found in all types of screw connections. The main advantage of 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".

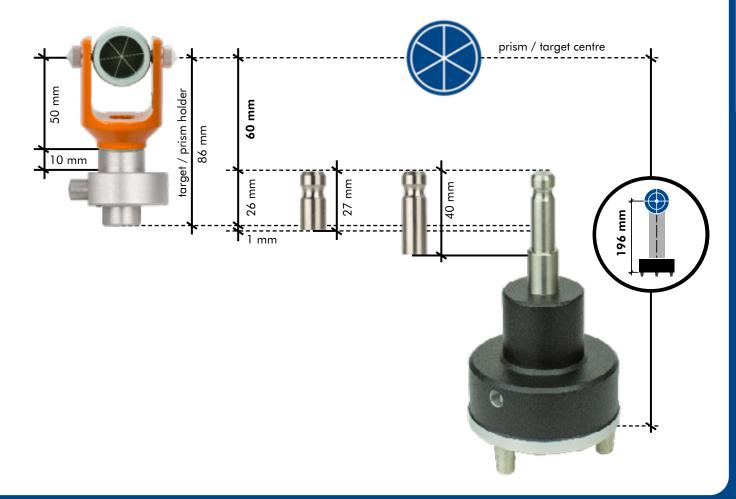
The Leica quick-release fastener has established itself as a screwless connection. On a Ø12 mm stud bolt (spigot) with a conical notch, a bolt receptacle is inserted, the stop surface of which rests on the top of the stud bolt. The sleeve and accessories are secured against falling out by means of a 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.

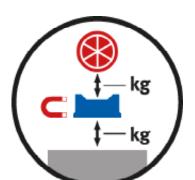












Ball bases with magnet - Two holding forces

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.

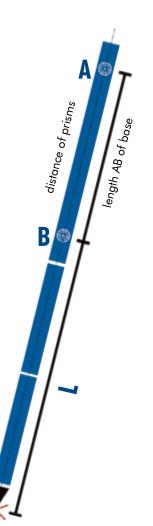


JUMP 14









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



Mini-Vectors

- · Accurate determination of not directly visible object points
- Industrial surveying
- Precision surveying
- One-unit-Vector s. page 104







- Modular Mini-Vector s. page 104
- Mini-Vector Telescope s. page 104

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 wheather 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)

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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".



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Signature



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Date



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.

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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.

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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. Custommade 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.

Updated last: 01.11.2023





